

**FINDING OF NO SIGNIFICANT IMPACT & DECISION RECORD  
FOR**

Merit Energy

**North Buck Draw**

ENVIRONMENTAL ASSESSMENT –WY-070-EA07-028

DECISION: Is to approve Alternative C as described in the attached Environmental Assessment (EA) and authorize Merit Energy’s North Buck Draw Coal Bed Natural Gas (CBNG) POD comprised of the following 1 Applications for Permit to Drill (APDs), as follows:

	<b>Well Name</b>	<b>Well #</b>	<b>Qtr/Qtr</b>	<b>Section</b>	<b>TWP</b>	<b>RNG</b>	<b>Lease #</b>
1	NORTH BUCK DRAW	32-25	SWNE	25	42N	74W	WYW111603

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

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

1. The Operator, in their POD, has committed to:
  - Comply with all applicable Federal, State and Local laws and regulations.
  - Obtain the necessary permits from other agencies for the drilling, completion and production of these wells including water rights appropriations, the installation of water management facilities, water discharge permits, and relevant air quality permits.
  - Provide water well agreements to the owners of record for permitted water wells within the area of influence of the action.
  - 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.
8. Based on current information, we determined that no significant impacts in the spread of WNV would occur from the implementation of this project.

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

**ADMINISTRATIVE REVIEW AND APPEAL:** Under BLM regulations, this decision is subject to administrative review in accordance with 43 CFR 3165. Any request for administrative review of this decision must include information required under 43 CFR 3165.3(b) (State Director Review), including

all supporting documentation. Such a request must be filed in writing with the State Director, Bureau of Land Management, P.O. Box 1828, Cheyenne, Wyoming 82003, no later than 20 business days after this Decision Record is received or considered to have been received.

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

Field Manager: \_\_\_\_\_ Date: \_\_\_\_\_

**BUREAU OF LAND MANAGEMENT  
 BUFFALO FIELD OFFICE  
 ENVIRONMENTAL ASSESSMENT (EA)  
 FOR  
 Merit Energy  
 North Buck Draw  
 PLAN OF DEVELOPMENT  
 WY-070-EA07-028**

**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 one valid federal oil and gas mineral lease WYW111603, 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: Merit Energy’s North Buck Draw Plan of Development (POD) for 1 coal bed natural gas well APD and associated infrastructure.

Proposed Well Information: There is 1 well proposed within this POD, as follows:

	<b>Well Name</b>	<b>Well #</b>	<b>Qtr/Qtr</b>	<b>Section</b>	<b>TWP</b>	<b>RNG</b>	<b>Lease #</b>
1	NORTH BUCK DRAW	32-25	SWNE	25	42N	74W	WYW111603

County: Campbell

Applicant: Merit Energy

Surface Owners: L.J. Turner

Project Description

The proposed action involves the following:

- Drilling of 1 federal CBM well in the Big George Coal, to a depth of approximately 692 - 760 feet.
- An unimproved primitive access road with a utility corridor in the roadbed for the installation of pipelines and power lines.
- A Water Management Plan (WMP) that involves the following strategy: the use of one existing discharge point, which includes a tire stock tank, to a Bates Creek tributary within the Antelope Creek watershed. Because the water quality in this area is acceptable for direct discharge, the operator has proposed to directly discharge the water from this well to a tributary to Bates Creek, as approved in the modification of the Wyoming Pollutant Discharge Elimination System (WYPDES) Permit #WY0054496 issued by the Wyoming Department of Environmental Quality (WDEQ).

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

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

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

1. Comply with all applicable Federal, State and Local laws and regulations.
2. Obtain the necessary permits for the drilling, completion and production of these wells including water rights appropriations, the installation of water management facilities, water discharge permits, and relevant air quality permits.
3. 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. 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 or minimize 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 N Buck Draw POD are listed below under 2.3.1:

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

Well ID	Aliquot	Section	T/R	Notes
32-25	SWNE	25	42/74	The well location did not correlate with the POD project maps. Maps depict a well location north of the existing primitive road. On location, the well was located south of both the existing route and the utility corridor. New maps were provided correcting the well location.

Subsequent to the onsite, the operator modified the water management plan. The impoundment will not be improved and the water discharge point will be relocated to discharge to the channel below the dam structure.

**2.3.2. Programmatic mitigation measures identified in the PRB FEIS ROD**

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

The above changes and mitigation measures to the proposed action resulting from the on-site will be analyzed in Alternative C.

**2.3.2.1. Wildlife**

1. 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.

**2.3.2.2. Visual Resources**

1. The Companies will mount lights at compressor stations 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.

**2.3.2.3. Noise**

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

#### **2.3.2.4. Air Quality**

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

#### **2.3.3. Site specific mitigation measures**

##### **General**

1. All changes made at the onsite will be followed. They have all been incorporated into the operator's POD.
2. Please contact Julian Serafin – Natural Resource Specialist, @ (307) 684-1043, Bureau of Land Management, Buffalo, if there are any questions concerning these surface use COAs.

##### **Surface Use**

1. All topsoil removed for the construction activity will be re-spread for interim reclamation success.
2. 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.
3. 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 Stoddard POD is Carlsbad Canyon, (Munsell standard color No. 2.5Y 6/2).
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. In lieu of a different specific mix desired by the surface owner, use the following:

<b>Loamy Ecological Site Seed Mix</b>		
<b>Species</b>	<b>% in Mix</b>	<b>Lbs PLS*</b>
<b>Western Wheatgrass</b> (Pascopyrum smithii)	40	4.8
<b>Bluebunch Wheatgrass</b> (Pseudoroegneria spicata ssp. Spicata)	10	1.2
<b>Green needlegrass</b> (Nassella viridula)	25	3.0
<b>Thickspike Wheatgrass</b> (Elymus lanceolatus ssp. lanceolatus)	10	1.2
<b>Prairie coneflower</b> (Ratibida columnifera)	5	0.6
<b>White or purple prairie clover</b> (Dalea candidum, purpureum)	5	0.6
<b>Rocky Mountain beeplant</b> (Cleome serrulata) /or <b>American vetch</b> (Vicia americana)	5	0.6
<b>Totals</b>	<b>100%</b>	<b>12 lbs/acre</b>

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

### **Water Management**

1. The operator will be required to monitor the condition of the drainage below the discharge point for accelerated erosion or other potential problems monthly for the first year of production. Reports of monitoring will be provided to the BLM upon request.
2. The water management plan proposes 100% channel discharge. The operator must do one of the following:
  - a. Breach the impoundment located at the discharge point so that there is no discharge water impounded,
  - b. Install the water discharge point downstream of the impoundment (Sundry required) or
  - c. Bring the impoundment up to WSEO and BLM standards, permit the impoundment through the WSEO and bond the structure through the WDEQ (Sundry required).
3. Water will not be allowed to overflow the edges of the tire tank in order to prevent additional surface damage.

### **Wildlife**

1. Merit Energy will contract a qualified biologist to survey for Ute Ladies'-tresses orchid from the outfall to the confluence with Bates Creek in the flowering seasons of 2007, 2008 and 2009 (FEIS Table A-2 # 66).
2. The following conditions will minimize the impacts to raptors:

- a. No surface disturbing activity shall occur within ½ mile of all identified raptor nests from February 1 through July 31, annually, prior to a raptor nest occupancy survey for the current breeding season. This timing limitation will affect the following

<i>Township/Range</i>	<i>Sec.</i>	<i>Affected Wells and Infrastructure</i>
42N 74W	25	32-25 and infrastructure to discharge point.

- 1) Surveys to document nest occupancy shall be conducted by a biologist following BLM protocol, between April 15 and June 30. All survey results shall be submitted in writing to a Buffalo BLM biologist and approved prior to surface disturbing activities. Surveys outside this window may not depict nesting activity. If a survey identifies active raptor nests, a 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.
- b. Nest productivity checks shall be completed for the first five years following project completion. The productivity checks shall be conducted no earlier than June 1 or later than June 30 and any evidence of nesting success or production shall be recorded. Survey results will be submitted to a Buffalo BLM biologist in writing no later than July 31 of each survey year. This applies to the following nest(s):

<b>BLM ID#</b>	<b>SPECIES</b>	<b>UTM</b>	<b>LEGAL LOCATION</b>	<b>SUBSTRATE</b>	<b>STATUS (2006)</b>
1926	FEHA	4825825N 443612E	SESW Sec 25 TR4274	Creek Bank	Inactive
1623	FEHA	4825610N 443732E	NESE Sec 25 TR 4274	Creek Bank	3 Young

- c. 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.
- d. Well metering, maintenance and other site visits within 0.5 miles of raptor nests shall be minimized as much as possible during the breeding season (February 1 – July 31), and restricted to between 0900 and 1500 hours.

**2.4. Alternatives considered but not analyzed in detail**

“Merit has conducted pre-planning for project water management in conjunction with the landowner to arrive at the strategy for water management proposed in this plan of development. A variety of water management alternatives were considered for the project including the following:

Land Application:

1. Land application is not a year-round strategy, and as such storage would be required for the non-irrigation season.
2. There was not a need expressed by the landowner.

Re-injection into disposal wells and/or Aquifer Storage and Retrieval:

1. Re-injection reduces the beneficial use of water for stock which was desired results for the project.
2. Costs were prohibitive for this project.” North Buck Draw POD WMP pg. 5.

### 3. DESCRIPTION OF AFFECTED ENVIRONMENT

Applications to drill were received on July 6, 2006. Field inspections of the proposed N Buck Draw CBM project were conducted on 10/5/2006 by Kathy Brus, Natural Resource Specialist – BLM; Leigh Grench, Archeologist – BLM; Steve Kalberer, Production Foreman – Merit Energy; Clay Munger, Operations Manager – Merit Energy; and, Julian Serafin, Natural Resource Specialist – BLM. Wildlife issues were reviewed at the BLM Buffalo Field Office by Guymen Easdale and Bill Ostheimer.

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			Bill Ostheimer
Floodplains			X	Kathy Brus
Wilderness Values			X	Julian Serafin
ACECs			X	Julian Serafin
Water Resources	X			Kathy Brus
Air Quality		X		Julian Serafin
Cultural or Historical Values			X	Leigh Grench
Prime or Unique Farmlands			X	Julian Serafin
Wild & Scenic Rivers			X	Julian Serafin
Wetland/Riparian		X		Kathy Brus
Native American Religious Concerns			X	Leigh Grench
Hazardous Wastes or Solids		X		Julian Serafin
Invasive, Nonnative Species	X			Julian Serafin
Environmental Justice		X		Julian Serafin

#### 3.1. Topographic Characteristics of Project Area

The North Buck Draw POD is located approximately 15 miles southwest of Wright, Campbell County, Wyoming, within Section 25, T42N R74W. Elevations within the project area range from 5,099 to 5,276 feet above sea level. 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. The project area is within the North Bates Creek drainage which is tributary to the Antelope Creek primary watershed. The topography throughout the general area consists of ephemeral stream bottomlands rising to rolling hills with a few moderately steep ridges and draws. CBNG development exists around and within the proposed North Buck Draw project. This, in conjunction with conventional oil production and livestock grazing, are the major land uses within the project area. In contrast with the surrounding Fee development, however, the proposed well location is situated on private land overlaying federal minerals.

#### 3.2. Vegetation & Soils

Ecological Site Descriptions are used to provide soils and vegetation information needed for resource identification and management recommendations. To determine the appropriate Ecological Sites for this proposed action, BLM specialists analyzed data from onsite field reconnaissance and Natural Resource Conservation Service (NRCS, USDA) soil survey information.

Using the NRCS Technical Guides for the Major Land Resource Area 58B Northern Rolling High Plains, in the 10-14" Northern Plains precipitation zone, the soils and plant communities identified in this POD are predominantly loamy-mixed sagebrush/grass. The soils of this site are deep to moderately deep (greater than 20" to bedrock), well drained and moderately permeable. Layers of the soil most influential to the plant community vary from 3 to 6 inches thick. These layers consist of the A horizon with very fine sandy loam, loam, or silt loam texture and may also include the upper few inches of the B horizon with sandy clay loam, silty clay loam or clay loam texture. The main soil limitations include a low organic matter content and soil droughtiness. The low annual precipitation must be considered when planning a seeding.

General vegetation communities within the project area consist of short-grass prairie grassland, fragmented sagebrush steppe, and ephemeral stream bottomlands. Wyoming Big Sagebrush (*Artemisia tridentata*) intermixed with various native bunch grasses dominates the vegetative composition of the POD. Cool-season grasses make up the majority of the understory with the balance made up of short warm-season grasses, annual cool-season grass, and miscellaneous forbs. Ephemeral stream bottoms are vegetated with a diverse mix of annual forbs and perennial grasses. An abundance of field pennycress (*Thlaspi arvense*) and flixweed tansymustard (*Descurainia sophia*) were identified by the operator along ephemeral stream bottoms in concentrated areas. Common plants identified during the onsite inspection included needleandthread (*Stipa comata*), green needlegrass (*Nassella viridula*), western wheatgrass (*Agropyron smithii*), prairie junegrass (*Koeleria macrantha*), prickly pear cactus (*Opuntia*), and threadleaf sedge (*Carex filifolia*).

An increase in bare ground reduces water infiltration and increases soil erosion, therefore rutting potential for this site is generally moderate to severe. However, reclamation potential is generally fair due to the location's high T-factor score and topsoil thickness. T-factor is the maximum rate of annual soil erosion that will permit crop productivity to be sustained economically and indefinitely.

Soil Units affected by the proposed action include:  
111 – Bidman-Parmlaad loams, 0 – 6 percent slopes.

For more detailed soil information, see the NRCS Soil Survey WY605, Campbell County, WY.

### **3.2.1. Wetlands/Riparian**

While there may be wetland areas downstream of this project in the Upper Bates Creek Watershed, the unnamed tributary in the project area did not exhibit riparian or wetland characteristics. There were sporadic existing potholes in the stream channel, where the channel flattens out and water ponds periodically. Livestock use, as well as soil saturation changes produced these pothole areas. There was no riparian vegetation noted.

### **3.2.2. Invasive Species**

The Wyoming Coal Bed Methane Clearinghouse Interactive Map (Wyoming CBM Clearinghouse Interactive Map Viewer, 2003) identifies skeletonleaf bursage (*Ambrosia tonentosa* Nutt.) as a known weed population in T42N R74W. However, observations made during the onsite inspection did not identify the existence of this invasive species in the project area. Conversely, the presence of cheatgrass was noted during the onsite.

### **3.3. Wildlife**

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

A habitat assessment and wildlife inventory surveys were performed by Arcadis G &M Inc (Arcadis 2006). Arcadis surveyed the POD and appropriate buffers for bald eagle (*Haliaeetus leucocephalus*) roost and nest habitat, greater sage-grouse (*Centrocercus urophasianus*) and sharp-tailed grouse (*Tympanuchus phasianellus*) leks and nesting habitat, raptor nests, black tailed prairie dog (*Cynomys ludovicianus*) colonies, mountain plover (*Charadrius montanus*) breeding and nesting habitat. Surveys were performed between December 2005 and June 2006 (Arcadis 2006). North Bates Creek was not surveyed for Ute ladies'-tresses orchid (*Spiranthes dilucialis*). Ute ladies'-tresses orchid are documented in Antelope Creek, approximately 18 miles upstream from the confluence of North Bates and Antelope Creeks.

A BLM biologist reviewed the wildlife survey information for accuracy, evaluated impacts to wildlife resources, and determined effects to listed species. Wildlife species common to the habitat types present are identified in the Final Environmental Impact Statement and Proposed Plan Amendment for the Powder River Basin Oil and Gas Project (PRB FEIS 3-114). Species that have been identified in the project area or that have been noted as being of special importance are described below.

### 3.3.1. Big Game

Big game species expected to be within the project area include pronghorn antelope and mule deer. The area is yearlong habitat for both antelope and mule deer. The antelope population within Hunt Area 26 (North Converse Herd) is below the Wyoming Game and Fish Department objective of 28,000 animals, the estimated population for the herd is 22,572 animals (WGFD 2003). The mule deer population within Hunt Area 22 (North Converse Herd) is slightly above WGFD objective of 9,100 animals, the estimated population for the herd is 9,361 animals.

### 3.3.2. Aquatics

The project area is drained by ephemeral tributaries of North Bates Creek, within the Upper Bates Creek watershed which feed the Cheyenne River. No springs were identified in project area. Produced water will be discharged into an ephemeral drainage. Fish that have been identified in the Antelope Creek watershed are listed in the PRB FEIS (3-156).

### 3.3.3. Migratory Birds

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

### 3.3.4. Raptors

Two raptor nest sites were identified by Arcadis within 0.5 mile of the project area. One was active in 2006 (Table 3.2).

**Table 3.2.** Documented raptor nests within the 0.5 mile of the project areas in 2006.

BLM ID#	SPECIES	UTM	LEGAL LOCATION	SUBSTRATE	CONDITION	STATUS IN 2006
1623	FEHA	4825610N 443732E	NESW Sec 25 TR4274	Creek Bank	Good	Active, Three young in June
1926	FEHA	4825825N 443612E	SENW Sec 25 TR4274	Creek Bank	Poor	Inactive

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

#### **3.3.5.1. Threatened and Endangered Species**

Within the BLM Buffalo Field Office there are three species that are Threatened or Endangered under the Endangered Species Act; black-footed ferret (*Mustela nigripes*), bald eagle, and Ute Ladies'-tresses orchid. Listed species that may occur in the project area are Bald eagle (*Haliaeetus leucocephalus*), Ute ladies'-tresses orchid (*Spiranthes diluvialis*).

##### **3.3.5.1.1. Bald eagle**

On February 14, 1978, the bald eagle was federally listed as Endangered in all the continental United States except for Minnesota, Wisconsin, Michigan, Oregon, and Washington. In these states the bald eagle was listed as Threatened. On July 12, 1995 the eagle's status was changed to Threatened throughout the United States. Species wide populations are recovering from earlier declines and the bald eagle was proposed for de-listing in 2000, but as yet no final decision has been made.

Bald eagle nesting habitat is generally found in areas that support large mature trees. Eagles typically will build their nests in the crown of mature trees that are close to a reliable prey source. Wintering bald eagles may congregate in roosting areas generally made up of several large trees clumped together in stands of large ponderosa pine, along wooded riparian corridors, or in isolated groups. Bald eagles often share these roost sites with golden eagles.

This species feeds primarily on fish, waterfowl, and carrion. In more arid environments, such as the Powder River Basin, prairie dogs, ground squirrels, and lagomorphs (hares and rabbits) can make up the primary prey base. The diets of wintering bald eagles can be more varied. In addition to prairie dogs and lagomorphs, domestic sheep and big game carcasses may provide a significant food source in some areas. Historically, sheep carcasses from large domestic sheep ranches provided a reliable winter food source within the Powder River Basin (Patterson and Anderson 1985). Today, few large sheep operations remain in the Powder River Basin.

#### **Site Specific Habitat Conditions**

The North Buck Draw project has few mature trees associated with it and no water. Arcadis, and a search of the BLM database, identified no potential nests, suitable nesting habitat, or roosting habitat within one mile from proposed activities.

##### **3.3.5.1.2. Ute Ladies'-tresses' orchid**

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

#### **Site Specific Habitat Conditions**

North Bates Creek was not surveyed for Ute ladies'-tresses orchid. Ute ladies'-tresses orchid are documented in Antelope Creek, approximately 18 miles upstream from the confluence of North Bates and Antelope Creeks.

#### **3.3.5.1.3. Black-footed ferret**

The USFWS listed the black-footed ferret as Endangered on March 11, 1967. Active reintroduction efforts have reestablished populations in Mexico, Arizona, Colorado, Montana, South Dakota, Utah, and Wyoming. In 1988, the WGFD identified four prairie dog complexes (Arvada, Recluse, Thunder Basin National Grasslands, and Midwest) partially or wholly within the BLM Buffalo Field Office administrative area as potential black-footed ferret reintroduction sites (Oakleaf 1988).

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

The WGFD believes the combined effects of poisoning and Sylvatic plague on black-tailed prairie dogs have greatly reduced the likelihood of a black-footed ferret population persisting east of the Big Horn Mountains (Grenier 2003). Extensive surveys on the Thunder Basin National Grassland from 1981-1991 revealed no ferrets within that complex. The U.S. Fish and Wildlife Service has also concluded that black-tailed prairie dog colonies within Wyoming are unlikely to be inhabited by black-footed ferrets (Kelly 2004).

#### **Site Specific Habitat Conditions**

No suitable ferret habitat exists in the project area.

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

The USDI Bureau of Land Management (BLM) Wyoming has prepared a list of sensitive species to focus species management efforts towards maintaining habitats under a multiple use mandate. 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. Sensitive species of management concern that may occur in the project area are listed in the PRB FEIS (3-189).

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

On August 12, 2004, the U.S. Fish and Wildlife Service removed the black-tailed prairie dog's Candidate status. The Buffalo Field Office however will consider prairie dogs as a sensitive species and continue to afford this species the protections described in the FEIS. The black-tailed prairie dog is a diurnal rodent inhabiting prairie and desert grasslands of the Great Plains. Their decline is related to multiple factors including, habitat destruction, poisoning, and Sylvatic plague. No prairie dog colonies are present in the area.

##### **3.3.5.2.2. Greater sage grouse**

Greater sage grouse are found in prairie, sagebrush shrublands, other shrublands, wet meadows, and agricultural areas; they depend upon substantial sagebrush stands for nesting and winter survival (BLM 2003). Marginal sage-grouse nesting, brood rearing and winter habitat is present throughout the project area. The closest lek to the project (lek 59) is approximately eight miles east of the POD.

##### **3.3.5.2.3. Mountain plover**

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

Suitable mountain plover habitat is not present within the project area.

### 3.4. West Nile Virus

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

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

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

**Table 3.4 Historical West Nile Virus Information**

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

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 Antelope Creek drainage system.

#### **3.5.1. Groundwater**

A search of the Wyoming State Engineer Office (WSEO) Ground Water Rights Database for this area showed 3 registered stock and domestic water wells within the area of influence of this POD with depths ranging from 336 to 930 feet. For additional information on water, please refer to the PRB FEIS (January 2003), Chapter 3, Affected Environment pages 3-1 through 3-36 (groundwater).

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).

#### **3.5.2. Surface Water**

The project area is within the North Bates Creek drainage which is tributary to the Antelope Creek watershed. Most of the drainages in the area are ephemeral (flowing only in response to a precipitation event or snow melt) to intermittent (flowing only at certain times of the year when it receives water from alluvial groundwater, springs, or other surface source – PRB FEIS Chapter 9 Glossary). The channels are primarily well vegetated grassy swales, without defined bed and bank.

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

the EC ranges from 1,800 at Maximum monthly flow to 2,354 at Low monthly flow and the SAR ranges from 2.82 at Maximum monthly flow to 2.6 at Low monthly flow. These values were determined at the USGS station 06364700 located near Teckla, WY (PRB FEIS page 3-49).

The operator has not identified any natural springs within this POD boundary.

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

### **3.6. Cultural Resources**

Class III cultural resource inventories were conducted for the North Buck Draw project prior to on-the-ground project work (BFO project no. 70060242). Greystone conducted a Class III cultural resource inventory following the Archeology and Historic Preservation: Secretary of the Interior's Standards and Guidelines (48FR190) for the project.

Leigh Grench, BLM Archaeologist, reviewed the report for technical adequacy and compliance with Bureau of Land Management (BLM) standards, and determined it to be adequate. No cultural resources were located in the area of potential effect.

## **4. ENVIRONMENTAL CONSEQUENCES**

The changes to the proposed action POD, 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**

Overall impacts to vegetation and soils from surface disturbance should be reduced by following the operator's plans and BLM applied mitigation. The proposed well location can be drilled without a well pad being constructed. As such, surface disturbance would occur with the drilling of the well. This disturbance 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 x 8 feet), and compaction (from vehicles driving/parking at the drill site). The total estimated disturbance associated with this well would involve approximately 0.23 acre/well. This would be a short-term impact with expedient, successful reclamation and site-stabilization, as committed to by the operator in their POD MSUP and as required by BLM in COAs.

Approximately 0.03 miles of new and existing two-track trails would be utilized to access the well location. 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. 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, rip-rap, mulching, geotextiles, silt fences, etc.) would ensure land productivity/stability is regained and maximized.

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**

<b>Facility</b>	<b>Number or Miles</b>	<b>Factor</b>	<b>Acreage of Disturbance</b>	<b>Duration of Disturbance</b>
Well	1	0.1/acre	0.23	Long Term
Gather/Metering Facilities	0	Site Specific	0.0	Long Term
Screw Compressors	0	Site Specific	0.0	Long Term
Monitor Wells	0	0.1/acre	0.0	Long Term
Impoundments	0		0.0	Long Term
On-channel	0	Site Specific	0.0	
Off-channel	0	Site Specific	0.0	
Water Discharge Points	1	Site Specific or 0.01 ac/WDP	0.12	
Channel Disturbance				
Headcut Mitigation*		Site Specific	0.0	
Channel Modification		Site Specific	0.0	
Improved Roads	0.0	40' Width or Site Specific	0.0	Long Term
2-Track Roads With Corridor	0.03	30' Width or Site Specific	0.11	Long Term
Pipelines	0.0	20' Width or Site Specific	0.0	Short Term
No Corridor				
With Corridor				
Buried Power Cable	0.0	12' Width or Site Specific	0.0	Short Term
No Corridor				
Overhead Powerlines	0.0	15' Width	0.0	Long Term
Additional Disturbance	0.0	Site Specific	0.0	
Totals				
Short Term			0.0	
Long Term			0.46	

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. Invasive Species**

As stated in the Integrated Weed Management Plan submitted with the POD, Merit Energy will provide information regarding noxious weed identification, prevention measures, management techniques, and the impacts of weeds on agriculture, livestock, and wildlife to appropriate employees. Prevention programs will be implemented to deter the introduction of weed species that are not yet present within the project boundary. Suggested weed prevention methods include:

- Use of sanitary procedures for equipment, including cleaning equipment between sites or infestations
- Recognition and elimination of new weed populations as they are identified
- Identification and delineation of new weed infestations
- Exclusive use of certified weed-free seed for revegetation projects
- Exclusive use of weed-free mulch during revegetation and soil stabilization projects

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

#### **4.1.2. Cumulative Effects**

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

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

- They are proportional to the actual amount of cumulatively produced water in the Antelope Creek drainage, which is approximately 25.2 % of the total predicted in the PRB FEIS.
- The WDEQ enforcement of the terms and conditions of the WYPDES permit that are designed to protect irrigation downstream.
- The commitment by the operator to monitor the volume of water flowing into North Bates Creek to prevent significant volumes of water from flowing into the Antelope Creek Watershed.
- The WMP for the N Buck Draw proposes that produced water will not contribute significantly to flows downstream.

No additional mitigation measures are required.

## **4.2. Wildlife**

### **4.2.1. Big Game Direct and Indirect Effects**

Under the environmentally preferred alternative, approximately one acre of yearlong range for antelope and mule deer would be directly disturbed with the construction of wells, 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).

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

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

#### **4.2.2. Migratory Birds Direct and Indirect Effects**

Disturbance of the habitat types within the project area is likely to impact migratory birds. Native habitats are being lost directly with the construction of wells, roads, and pipelines. Prompt re-vegetation of short-term disturbance areas should reduce habitat loss impacts. Human activities likely displace migratory birds farther than simply the physical habitat disturbance. Drilling and construction noise can be troublesome for songbirds by interfering with the males’ ability to attract mates and defend territory, and the ability to recognize calls from conspecifics (BLM 2003). Additional direct and indirect effects to migratory birds are discussed in the PRB FEIS (4-231-235).

#### **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 4-235.

#### **4.2.3. Raptors Direct and Indirect Effects**

Human activities in close proximity to active raptor nests may interfere with nest productivity. Romin and Muck (1999) indicate that activities within 0.5 miles of a nest are prone to cause adverse impacts to nesting raptors. If mineral activities occur during nesting, they could be sufficient to cause adult birds to remain away from the nest and their chicks for the duration of the activities. This absence can lead to over heating or chilling of eggs or chicks. The prolonged disturbance can also lead to the abandonment of the nest by the adults. Both actions can result in egg or chick mortality. In addition, routine human activities near these nests can draw increased predator activity to the area and increase nest predation. Additional direct and indirect impacts to raptors, from oil and gas development, are analyzed in the PRB FEIS (4-216-221).

To reduce the risk of decreased productivity or nest failure, the BLM BFO requires a one-half mile radius timing limitation during the breeding season around active raptor nests and recommends all infrastructure requiring human visitation to be located greater than one-quarter mile from occupied raptor nests. No raptor nests were located within 0.5 miles of the proposed well location. The proposed action should not affect raptors. Human activities in close proximity to active raptor nests may interfere with nest productivity. Romin and Muck (1999) indicate that activities within 0.5 mile of a nest are prone to cause adverse impacts to nesting raptors. If mineral activities occur during nesting, they could be sufficient to

cause adult birds to remain away from the nest and their chicks for the duration of the activities. This absence can lead to over heating or chilling of eggs or chicks. The prolonged disturbance can also lead to the abandonment of the nest by the adults. Both actions can result in egg or chick mortality. In addition, routine human activities near these nests can draw increased predator activity to the area and increase nest predation. Additional direct and indirect impacts to raptors, from oil and gas development, are analyzed in the PRB FEIS (4-216-221).

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

**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 4-221. No additional mitigation measures are required.

**4.2.4. Threatened and Endangered and Sensitive Species**

While preparing this document, local and regional information on the occurrence and abundance of species of concern that could be present in the project area, current scientific literature, and other available reports pertaining to the biology and presence of those species were reviewed. A summary of effects determinations for Threatened and Endangered species was provided in Table 4.2

**Table 4.2 Effects determinations for Threatened and Endangered species**

Common Name (scientific name)	Habitat	Presence	Project Effects	Rationale
Endangered Black-footed ferret ( <i>Mustela nigripes</i> )	At least 1000 acres of black-tailed prairie dog colony, separated by no more than 1.5 km.	NP	NE	Habitat not present.
Threatened Bald eagle ( <i>Haliaeetus leucocephalus</i> )	Mature forest cover often within one mile of large water body.	S	NE	Eagles may use project area while foraging. No new overhead power. No new improved roads present.
Ute ladies'-tresses orchid ( <i>Spiranthes diluvialis</i> )	Riparian areas with permanent water	S	LAA	Historically perennial water not present. Discharge may reach suitable habitat.

**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.

#### **4.2.4.1. Black Footed Ferret**

The project area does not support suitable habitat for black-footed ferrets. The project will have no effect on black-footed ferrets.

#### **4.2.4.2. Bald Eagle**

Power to the federal well will be buried and connected to an existing buried line. No new overhead electric lines are proposed. No new CBNG constructed road will be used to access the federal well. The project area does not support nesting or roosting habitat and the proposed action does not include overhead power or improved roads. Therefore the proposed action will have **no effect** on bald eagle.

#### **4.2.4.3. Ute Ladies'-tresses orchid**

Produced water will be discharged into North Bates Creek, a tributary of Antelope Creek. Produced water from the proposed action may travel up to 0.75 miles downstream from the discharge. The confluence of North Bates and Bates Creeks is 0.5 miles from the discharge point. North Bates Creek has not been surveyed for the orchid. Bates Creek was surveyed during the 2005 flowering season. Based on produced water reaching potentially occupied habitat, implementation of the proposed coal bed natural gas project is **likely to adversely affect** Ute ladies'- tresses orchid. Produced water may change the hydrology of a portion of Antelope Creek. The effect on the orchid from this changed hydrology is unknown. Additional water may create habitat where none existed in the past, thereby increasing the distribution of this plant. Conversely the produced water may armor portions of the stream channel and reduce the amount of suitable alluvial habitat.

Merit Energy will contract a qualified biologist to survey North Bates Creek from the outfall to the confluence with Bates Creek in the flowering seasons of 2007, 2008 and 2009.

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

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

No prairie dog colonies are present in the area. The proposed project is not expected to impact black-tailed prairie dogs.

##### **4.2.4.4.2. Greater sage grouse**

Marginal sage-grouse nesting, brood rearing and winter habitat is present throughout the project area. The closest lek to the project (lek 59) is approximately eight miles east of the POD. The proposed project is not expected to impact greater sage-grouse.

##### **4.2.4.4.3. Mountain plover**

Suitable mountain plover habitat is not present within the project area. The proposed project is not expected to impact mountain plover.

Table 4.2 lists the potential impacts to other sensitive species from the proposed project.

**Table 4.2 Summary of Sensitive Species Habitat and Project Effects.**

Common Name (scientific name)	Habitat	Presence	Project Effects	Rationale
<b>Amphibians</b>				
Northern leopard frog ( <i>Rana pipiens</i> )	Beaver ponds, permanent water in plains and foothills	S	MIIH	Additional water will affect existing waterways. Prairie not mountain habitat.
Spotted frog ( <i>Rana pretiosa</i> )	Ponds, sloughs, small streams	NP	NI	
<b>Birds</b>				
Baird's sparrow ( <i>Ammodramus bairdii</i> )	Grasslands, weedy fields	S	MIIH	Grassland cover will be affected. Stock-tank escape ramp will minimize drowning.
Brewer's sparrow ( <i>Spizella breweri</i> )	Basin-prairie shrub	S	MIIH	Grassland cover will be affected. Stock-tank escape ramp will minimize drowning.
Burrowing owl ( <i>Athene cunicularia</i> )	Grasslands, basin-prairie shrub	S	MIIH	Grassland cover will be affected. Stock-tank escape ramp will minimize drowning.
Ferruginous hawk ( <i>Buteo regalis</i> )	Basin-prairie shrub, grasslands, rock outcrops	K	NI	Identified nest is not in proximity to proposed action.
Greater sage-grouse ( <i>Centrocercus urophasianus</i> )	Basin-prairie shrub, mountain-foothill shrub	NP	NI	Habitat not present
Loggerhead shrike ( <i>Lanius ludovicianus</i> )	Basin-prairie shrub, mountain-foothill shrub	S	MIIH	Grassland cover will be affected. Stock-tank escape ramp will minimize drowning.
Long-billed curlew ( <i>Numenius americanus</i> )	Grasslands, plains, foothills, wet meadows	S	MIIH	Grassland cover will be affected. Stock-tank escape ramp will minimize drowning.
Mountain plover ( <i>Charadrius montanus</i> )	Short-grass prairie with slopes < 5%	NP	NI	Grassland cover will be affected.
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 billineata</i> )	Basin-prairie shrub, mountain-foothill shrub	S	MIIH	Shrub cover will be affected. Stock-tank escape ramp will minimize drowning.
Sage thrasher ( <i>Oreoscoptes montanus</i> )	Basin-prairie shrub, mountain-foothill shrub	S	MIIH	Shrub cover will be affected. Stock-tank escape ramp will minimize drowning.
Trumpeter swan ( <i>Cygnus buccinator</i> )	Lakes, ponds, rivers	S	NI	Reservoirs may provide migratory habitat. Stock-tank escape ramp will minimize drowning.
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
<b>Fish</b>				
Yellowstone cutthroat trout ( <i>Oncorhynchus clarki bouvieri</i> )	Mountain streams and rivers in Tongue River drainage	NP	NI	Outside species range.
<b>Mammals</b>				
Black-tailed prairie dog ( <i>Cynomys ludovicianus</i> )	Prairie habitats with deep, firm soils and slopes less than 10 degrees.	NP	NI	Habitat not present.
Fringed myotis ( <i>Myotis thysanodes</i> )	Conifer forests, woodland chaparral, caves and mines	NP	NI	Habitat not present.
Long-eared myotis ( <i>Myotis evotis</i> )	Conifer and deciduous forest, caves and mines	NP	NI	Habitat not present.
Spotted bat ( <i>Euderma maculatum</i> )	Cliffs over perennial water.	NP	NI	Habitat not present.
Swift fox ( <i>Vulpes velox</i> )	Grasslands	S	MIIH	Grassland cover will be affected. Stock-tank escape ramp will minimize drowning.
Townsend's big-eared bat ( <i>Corynorhinus townsendii</i> )	Caves and mines.	NP	NI	Habitat not present.

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

**Presence**

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

**Project Effects**

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

#### **4.2.4.5. Cumulative effects**

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

#### **4.3. West Nile Virus**

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 COA 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 North Bates Creek and Antelope Creek watersheds and commitment to comply with Wyoming State water laws/regulations. It also addresses potential impacts to the environment and landowner concerns. Qualified hydrologists, in consultation with the BLM, developed the water management plan. Adherence with the plan, in addition to BLM applied mitigation (in the form of COAs), will reduce 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 10.0 gpm (0.023 cfs or 16.1 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 Antelope Creek drainage, the projected volume produced within the watershed area was 17,503 acre-feet in 2006 (maximum production is estimated in 2005 at 17,685 acre-feet). As such, the volume of water resulting from the production of these wells is 0.09 % of the total volume projected for 2006, which is within the predicted parameters of the PRB FEIS.

The water management strategy for the North Buck Draw well (POD) is to include the water produced in association with Federal minerals with water produced from fee wells and directly discharge the water to the channel of an unnamed tributary to Upper Bates Creek. Water will not be impounded.

#### **4.4.1. Groundwater**

The PRB FEIS predicts an infiltration rate of 28% to groundwater aquifers and coal zones in the Antelope Creek drainage area (PRB FEIS pg 4-5). For this action, it may be assumed that a maximum of 2.8 gpm will infiltrate at or near the discharge point (4.5 acre feet per year). This water will saturate the near surface alluvium and deeper formations prior to mixing with the groundwater used for stock and domestic purposes. According to the PRB FEIS, “the increased volume of water recharging the underlying aquifers of the Wasatch and Fort Union Formations would be chemically similar to alluvial groundwater.” (PRB FEIS pg 4-54). Therefore, the chemical nature and the volume of the discharged water may not degrade the groundwater quality.

The PRB FEIS predicts that one of the environmental consequences of coal bed natural gas production is possible impacts to the groundwater. “The effects of development of CBM on groundwater resources would be seen as a drop in the water level (drawdown) in nearby wells completed in the developed coal aquifers and underlying or overlying sand aquifers.” (PRB FEIS page 4-1). In the process of dewatering the coal zone to increase natural gas recovery rates, this project may have some effect on the static water level of wells in the area. The permitted water wells produce from depths which range from 336 to 930 feet compared to 742 feet to the Big George. As mitigation, the operator has committed to offer water well agreements to holders of properly permitted domestic and stock wells within the circle of influence 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 will 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.

##### **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 CBM through 2018 (and coal mining through 2033) would remove 4 million acre-feet of groundwater from the coal zone aquifer (PRB FEIS page 4-65). This volume of water “...cumulatively represents 0.5 percent of the recoverable groundwater stored in the Wasatch – Tongue river sands and coals (nearly 750 million acre-feet, from Table 3-5). All of the groundwater projected to be removed

during reasonably foreseeable CBM 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 effluent 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
Primary Watershed at Teckla, WY Gauging station			
Historic Data Average at Maximum Flow		2.6	1,800
Historic Data Average at Minimum Flow		2.8	2,354
WDEQ Quality Standards for Wyoming Groundwater (Chapter 8)			
Drinking Water (Class I)	500		
Agricultural Use (Class II)	2,000	8	
Livestock Use (Class III)	5,000		
WDEQ Water Quality Requirement for WYPDES Permit # WY0054496			
At discharge point	5,000	10	2,000
At Irrigation Compliance point			
Predicted Produced Water Quality			
Big George Coal Zone	810	8	1,330

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

There is 1 discharge point which will be utilized for this project. It has been appropriately sited and utilizes appropriate water erosion dissipation design. Water management facilities were evaluated for compliance with best management practices during the onsite.

Alternative (2A), the approved alternative in the Record of Decision for the PRB FEIS, states that the peak production of water discharged to the surface will occur in 2005 at a total contribution to the mainstem of the Antelope Creek of 13 cfs (PRB FEIS pg 4-82). The predicted maximum discharge rate from this well is anticipated to be a total of 10.0 gpm or 0.02 cfs to channels. Using an assumed conveyance loss of 20% (PRB FEIS pg 4-74) the water from this action may add a maximum 0.017 cfs to the Antelope Creek flows, or 0.13% of the predicted total CBNG produced water contribution. The discharge point is located over 15 stream miles above the confluence of Bates and Antelope Creeks. The WDEQ assumes an evapotranspiration rate of 0.1 cfs per stream mile, which means that the water produced from this Federal action would be “consumed” within two miles of the outfall. The addition of

the water produced from these wells will not impact the water quantity in the mainstem of the Antelope Creek. For more information regarding the maximum predicted water impacts resulting from the discharge of produced water, see Table 4-6 (PRB-FEIS pg 4-85).

In the WMP portion of the POD, the operator provided an analysis of the potential development in the watershed of the project area (WMP page 4). Based on the area of the Upper Bates Creek watershed area (2.02 sq mi) and an assumed density of 1 well per location every 80 acres, the potential exists for the development of 16 wells which could produce a maximum flow rate of 160 gpm (0.35 cfs) of water. The BLM agrees with the operator that this is not expected to occur because:

1. Some of these wells have already been drilled and are producing.
2. New wells will be phased in over several years, and
3. A decline in well discharge generally occurs after several months of operation.

The potential maximum flow rate of produced water within the watershed upstream of the project area, 0.35 cfs, is much less than the volume of runoff estimated from the 2-year storm event for 74.48 cfs in the drainage. Therefore, the estimated flow rate of water produced from the full development in the watershed above the project area is significantly less than the natural runoff from the area.

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 (WY0054496).

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

Total Petroleum Hydrocarbons	10 mg/l
pH	6.5 to 9.0
TDS	5000 mg/l
Specific Conductance	2000 $\mu$ mhos/cm
Dissolved iron	1000 $\mu$ g/l
Total Barium	1800 $\mu$ g/l
Total Arsenic	2.4 $\mu$ g/l
Chlorides	46 mg/l
Sodium Adsorption Ratio	10

The WYPDES permit also addresses existing downstream concerns, such as irrigation use, in the COA for the permit. The designated point of compliance identified for this permit is at the end of pipe at the discharge point. There were no irrigation compliance points identified.

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 will designate a reference well to each coal zone within the POD boundary. The reference well will be sampled at the wellhead for analysis within sixty days of initial production. A copy of the water analysis will be submitted to the BLM Authorized Officer.

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

In-channel downstream impacts are addressed in the WMP for the North Buck Draw POD prepared by ARCADIS for Merit Energy Company. The contractor identified several unadjudicated irrigation permits,

but no permitted water rights in the Bates Creek drainage. The water discharge point and channel will be inspected regularly for erosion. If additional problems are identified in the channel, the operator will provide a mitigation plan for approval to the BLM, affected landowners and any other Federal State or local agencies involved. See WMP page 5.

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

**4.4.2.1. Surface Water Cumulative Effects**

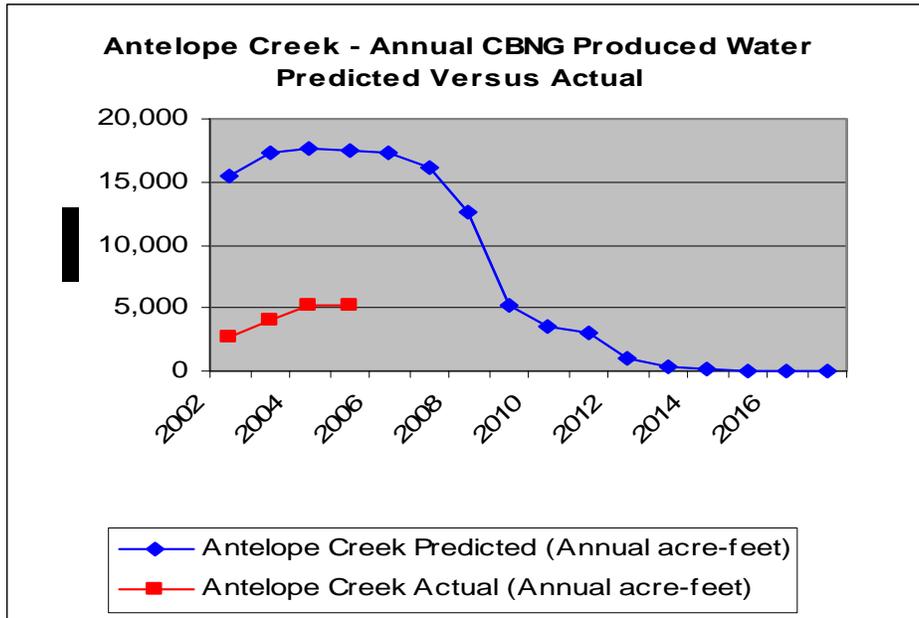
The analysis in this section includes cumulative data from Fee, State and Federal CBNG development in the Antelope Creek watershed. These data were obtained from the Wyoming Oil and Gas Conservation Commission (WOGCC).

As of December 2005, all producing CBNG wells in the Antelope Creek watershed have discharged a cumulative volume of 17,125 acre-ft of water compared to the predicted 67,919 acre-ft disclosed in the PRB FEIS (Table 2-8 page 2-26). These figures are presented graphically in Figure 4.1 and Table 4.6 following. This volume is 74.8% of the total predicted produced water analyzed in the PRB FEIS for the Antelope Creek watershed.

**Table 4.6 Actual vs. predicted water production in the Antelope Creek watershed 2005 Data Updated 4-5-06**

Year	Antelope Creek Predicted (Annual acre-feet)	Antelope Creek Predicted (Cumulative acre-feet from 2002)	Antelope Creek Actual (Annual acre-feet)		Antelope Creek Actual (Cumulative acre-feet from 2002)	
			Actual Ac-ft	% of Predicted	Cum Ac-ft	% of Predicted
2002	15,460	15,460	2,668	17.3	2,668	17.3
2003	17,271	32,731	4,042	23.4	6,710	20.5
2004	17,685	50,416	5,181	29.3	11,891	23.6
2005	17,503	67,919	5,234	29.9	17,125	25.2
2006	17,385	85,304				
2007	16,180	101,484				
2008	12,613	114,097				
2009	5,226	119,323				
2010	3,574	122,897				
2011	2,956	125,853				
2012	1,041	126,894				
2013	363	127,257				
2014	124	127,381				
2015	40	127,421				
2016	13	127,434				
2017	3	127,437				
<b>Total</b>	<b>127,437</b>		<b>11,891</b>			

**Figure 4.1 Actual vs predicted water production in the Antelope Creek watershed**



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

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

1. They are proportional to the actual amount of cumulatively produced water in the Antelope Creek drainage, which is approximately 25.2% 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 Antelope Creek watershed and page 4-117 for cumulative effects common to all sub-watersheds.

**4.5. Cultural Resources**

The environmentally preferred alternative would affect no known cultural resources. According the Wyoming State Protocol Section VII (B)(5) the Bureau of Land Management notified the Wyoming State Historic Preservation Office (SHPO) that it had determined no historic properties exist within the area potential of effect for this project.

If any cultural values [sites, artifacts, human remains (Appendix L.PRB FEIS)] are observed during operation of this lease/permit/right-of-way, they will be left intact and the Buffalo Field Manager notified.

Further discovery procedures are explained in the *Standard Conditions of Approval* (General) (A) (1).

## 5. CONSULTATION/COORDINATION

Contact	Title	Organization	Present at Onsite
L.J. Turner	Surface Owner	Karen Turner et al.	No
Steve Kalberer	Production Foreman	Merit Energy	Yes
Clay Munger	Operations Manager	Merit Energy	Yes
Sara Needles	Acting State Historic Preservation Officer	Wyoming SHPO	No

## 6. OTHER PERMITS REQUIRED

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

## 7. REFERENCES AND AUTHORITIES

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