

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

**XTO Energy Inc  
HD Federal CBM POD #3**

**ENVIRONMENTAL ASSESSMENT –WY-070-07-174**

DECISION: Is to approve Alternative C as described in the attached Environmental Assessment (EA) and authorize XTO Energy Inc’s HD Federal CBM POD #3 Coal Bed Natural Gas (CBNG) POD comprised of the following 44 Applications for Permit to Drill (APDs):

	<b>Well Name</b>	<b>Well #</b>	<b>Qtr/Qtr</b>	<b>Sec</b>	<b>TWP</b>	<b>RNG</b>	<b>Lease #</b>
1	HD CBM 3 HARTZOG	12-4BG	SWNW	4	44N	75W	WYW48001
2	HD CBM 3 HARTZOG	14-4BG	SWSW	4	44N	75W	WYW48001
3	HD CBM 3 HARTZOG	21-4BG	NENW	4	44N	75W	WYW48001
4	HD CBM 3 HARTZOG	23-4BG	NESW	4	44N	75W	WYW48001
5	HD CBM 3 HARTZOG	32-13BG	SWNE	13	44N	75W	WYW44628
6	HD CBM 3 HARTZOG	34-7BG	SWSE	7	45N	75W	WYW40400
7	HD CBM 3 HARTZOG	43-18BG	NESE	18	45N	75W	WYW42610
8	HD CBM 3 HARTZOG	23-18BG	NESW	18	45N	75W	WYW36691
9	HD CBM 3 HARTZOG	12-19BG	SWNW	19	45N	75W	WYW36691
10	HD CBM 3 HARTZOG	21-19BG	NENW	19	45N	75W	WYW36691
11	HD CBM 3 HARTZOG	21-34BG	NENW	34	45N	75W	WYW50395
12	HD CBM 3 HARTZOG	12-2BG	SWNW	2	45N	76W	WYW48009
13	HD CBM 3 HARTZOG	14-2BG	SWSW	2	45N	76W	WYW48009
14	HD CBM 3 HARTZOG	21-2BG	NENW	2	45N	76W	WYW48009
15	HD CBM 3 HARTZOG	23-2BG	NESW	2	45N	76W	WYW48009
16	HD CBM 3 HARTZOG	32-2BG	SWNE	2	45N	76W	WYW48009
17	HD CBM 3 HARTZOG	34-2BG	SWSE	2	45N	76W	WYW48009
18	HD CBM 3 HARTZOG	41-2BG	NENE	2	45N	76W	WYW48009
19	HD CBM 3 HARTZOG	43-2BG	NESE	2	45N	76W	WYW48009
20	HD CBM 3 HARTZOG	23-3BG	NESW	3	45N	76W	WYW51704
21	HD CBM 3 HARTZOG	21-11BG	NENW	11	45N	76W	WYW51704
22	HD CBM 3 HARTZOG	32-11BG	SWNE	11	45N	76W	WYW51704
23	HD CBM 3 HARTZOG	41-11BG	NENE	11	45N	76W	WYW51704
24	HD CBM 3 HARTZOG	43-11BG	NESE	11	45N	76W	WYW47318
25	HD CBM 3 HARTZOG	21-12BG	NENW	12	45N	76W	WYW51704
26	HD CBM 3 HARTZOG	23-12BG	NESW	12	45N	76W	WYW51704
27	HD CBM 3 HARTZOG	32-12BG	SWNE	12	45N	76W	WYW51704
28	HD CBM 3 HARTZOG	43-12BG	NESE	12	45N	76W	WYW51704
29	HD CBM 3 HARTZOG	12-13BG	SWNW	13	45N	76W	WYW47318
30	HD CBM 3 HARTZOG	14-13BG	SWSW	13	45N	76W	WYW47318
31	HD CBM 3 HARTZOG	21-13BG	NENW	13	45N	76W	WYW47318
32	HD CBM 3 HARTZOG	23-13BG	NESW	13	45N	76W	WYW47318
33	HD CBM 3 HARTZOG	32-13BG	SWNE	13	45N	76W	WYW47318
34	HD CBM 3 HARTZOG	34-13BG	SWSE	13	45N	76W	WYW47318
35	HD CBM 3 HARTZOG	41-14BG	NENE	14	45N	76W	WYW47318
36	HD CBM 3 HARTZOG	43-14BG	NESE	14	45N	76W	WYW42622
37	HD CBM 3 HARTZOG	41-23BG	NENE	23	45N	76W	WYW42622

	Well Name	Well #	Qtr/Qtr	Sec	TWP	RNG	Lease #
38	HD CBM 3 HARTZOG	43-23BG	NESE	23	45N	76W	WYW42622
39	HD CBM 3 HARTZOG	12-24BG	SWNW	24	45N	76W	WYW42622
40	HD CBM 3 HARTZOG	21-24BG	NENW	24	45N	76W	WYW42622
41	HD CBM 3 HARTZOG	23-24BG	NESW	24	45N	76W	WYW42622
42	HD CBM 3 HARTZOG	41-24BG	NENE	24	45N	76W	WYW46867
43	HD CBM 3 HARTZOG	14-24BG	SWSW	24	45N	76W	WYW42622
44	HD CBM 3 HARTZOG	23-7BG*	NESW	7	45N	75W	WYW0314786

The following APD's and associated infrastructure lie within an area identified as containing high quality greater sage-grouse habitat. These wells are not analyzed in this EA and therefore are not approved at this time. See section 4.2.4.2.3.

	Well Name	Well #	Qtr/Qtr	Sec	TWP	RNG	Lease #
1	HD CBM 3 HARTZOG	41-18BG	NENE	18	45N	75W	WYW42610
2	HD CBM 3 HARTZOG	21-1BG	NENW	1	45N	76W	WYW51704
3	HD CBM 3 HARTZOG	23-1BG	NESW	1	45N	76W	WYW51704
4	HD CBM 3 HARTZOG	34-1BG	SWSE	1	45N	76W	WYW51704
5	HD CBM 3 HARTZOG	43-1BG	NESE	1	45N	76W	WYW72485
6	HD CBM 3 HARTZOG	41-12BG	NENE	12	45N	76W	WYW51704

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

	IMPOUNDMENT Name / Number	Qtr/Qtr	Sec	TWP	RNG	Capacity (Acre Feet)	Surface Disturbance (Acres)	Lease Number
1	Shorty's Enlargement	NESW	11	45	76	10.89	3.5	NA

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

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

1. The Operator, in their POD, has committed to:
  - Comply with all applicable Federal, State and Local laws and regulations.
  - Obtain the necessary permits from other agencies for the drilling, completion and production of these wells including water rights appropriations, the installation of water management facilities, water discharge permits, and relevant air quality permits.
  - Offer water well agreements to the owners of record for permitted water wells within ½ mile of a federal CBNG producing well in the POD.
  - Provide water analysis from a designated reference well in each coal zone.
2. The Operator has certified that a Surface Use Agreement has been reached with the Landowner(s).
3. Alternative C will not result in any undue or unnecessary environmental degradation.

4. It is in the public interest to approve these wells, as the leases are being drained of federal gas, resulting in a loss of revenue for the government.
5. Mitigation measures applied by the BLM will alleviate or minimize environmental impacts.
6. Alternative C is the environmentally-preferred Alternative.
7. The proposed action is in conformance with the PRB FEIS and the Approved Resource Management Plan for the Public Lands Administered by the Bureau of Land Management (BLM), Buffalo Field Office, April 2001.

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

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

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

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

**BUREAU OF LAND MANAGEMENT  
BUFFALO FIELD OFFICE  
ENVIRONMENTAL ASSESSMENT (EA)  
FOR  
XTO Energy Inc  
HD Federal CBM POD #3  
PLAN OF DEVELOPMENT  
WY-070-07-174**

## **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 13 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: XTO Energy Inc’s HD Federal CBM POD #3 (HD3) Plan of Development (POD) for 51 coal bed natural gas well APD’s and associated infrastructure.

Proposed Well Information: There are 51 wells proposed within this POD, the wells are vertical bores proposed on an 80 acre spacing pattern with one well per location. Each well will produce from one coal seam. Proposed well house dimensions are 6 ft wide x 6 ft length x 8 ft height. Wells are located as follows:

	<b>Well Name</b>	<b>Well #</b>	<b>Qtr/Qtr</b>	<b>Sec</b>	<b>TWP</b>	<b>RNG</b>	<b>Lease #</b>
1	HD CBM 3 HARTZOG	12-4BG	SWNW	4	44N	75W	WYW48001
2	HD CBM 3 HARTZOG	14-4BG	SWSW	4	44N	75W	WYW48001
3	HD CBM 3 HARTZOG	21-4BG	NENW	4	44N	75W	WYW48001
4	HD CBM 3 HARTZOG	23-4BG	NESW	4	44N	75W	WYW48001
5	HD CBM 3 HARTZOG	32-13BG	SWNE	13	44N	75W	WYW44628
6	HD CBM 3 HARTZOG	34-7BG	SWSE	7	45N	75W	WYW40400
7	HD CBM 3 HARTZOG	43-18BG	NESE	18	45N	75W	WYW42610
8	HD CBM 3 HARTZOG	23-18BG	NESW	18	45N	75W	WYW36691
9	HD CBM 3 HARTZOG	12-19BG	SWNW	19	45N	75W	WYW36691
10	HD CBM 3 HARTZOG	21-19BG	NENW	19	45N	75W	WYW36691
11	HD CBM 3 HARTZOG	21-34BG	NENW	34	45N	75W	WYW50395
12	HD CBM 3 HARTZOG	12-2BG	SWNW	2	45N	76W	WYW48009
13	HD CBM 3 HARTZOG	14-2BG	SWSW	2	45N	76W	WYW48009
14	HD CBM 3 HARTZOG	21-2BG	NENW	2	45N	76W	WYW48009
15	HD CBM 3 HARTZOG	23-2BG	NESW	2	45N	76W	WYW48009
16	HD CBM 3 HARTZOG	32-2BG	SWNE	2	45N	76W	WYW48009
17	HD CBM 3 HARTZOG	34-2BG	SWSE	2	45N	76W	WYW48009
18	HD CBM 3 HARTZOG	41-2BG	NENE	2	45N	76W	WYW48009
19	HD CBM 3 HARTZOG	43-2BG	NESE	2	45N	76W	WYW48009
20	HD CBM 3 HARTZOG	23-3BG	NESW	3	45N	76W	WYW51704
21	HD CBM 3 HARTZOG	21-11BG	NENW	11	45N	76W	WYW51704
22	HD CBM 3 HARTZOG	32-11BG	SWNE	11	45N	76W	WYW51704
23	HD CBM 3 HARTZOG	41-11BG	NENE	11	45N	76W	WYW51704
24	HD CBM 3 HARTZOG	43-11BG	NESE	11	45N	76W	WYW47318
25	HD CBM 3 HARTZOG	21-12BG	NENW	12	45N	76W	WYW51704
26	HD CBM 3 HARTZOG	23-12BG	NESW	12	45N	76W	WYW51704
27	HD CBM 3 HARTZOG	32-12BG	SWNE	12	45N	76W	WYW51704
28	HD CBM 3 HARTZOG	43-12BG	NESE	12	45N	76W	WYW51704
29	HD CBM 3 HARTZOG	12-13BG	SWNW	13	45N	76W	WYW47318
30	HD CBM 3 HARTZOG	14-13BG	SWSW	13	45N	76W	WYW47318
31	HD CBM 3 HARTZOG	21-13BG	NENW	13	45N	76W	WYW47318
32	HD CBM 3 HARTZOG	23-13BG	NESW	13	45N	76W	WYW47318
33	HD CBM 3 HARTZOG	32-13BG	SWNE	13	45N	76W	WYW47318
34	HD CBM 3 HARTZOG	34-13BG	SWSE	13	45N	76W	WYW47318
35	HD CBM 3 HARTZOG	41-14BG	NENE	14	45N	76W	WYW47318
36	HD CBM 3 HARTZOG	43-14BG	NESE	14	45N	76W	WYW42622
37	HD CBM 3 HARTZOG	41-23BG	NENE	23	45N	76W	WYW42622
38	HD CBM 3 HARTZOG	43-23BG	NESE	23	45N	76W	WYW42622
39	HD CBM 3 HARTZOG	12-24BG	SWNW	24	45N	76W	WYW42622
40	HD CBM 3 HARTZOG	21-24BG	NENW	24	45N	76W	WYW42622
41	HD CBM 3 HARTZOG	23-24BG	NESW	24	45N	76W	WYW42622
42	HD CBM 3 HARTZOG	41-24BG	NENE	24	45N	76W	WYW46867
43	HD CBM 3 HARTZOG	14-24BG	SWSW	24	45N	76W	WYW42622
44	HD CBM 3 HARTZOG	23-7BG	NESW	7	45N	75W	WYW0314786
45	HD CBM 3 HARTZOG	41-18BG	NENE	18	45N	75W	WYW42610
46	HD CBM 3 HARTZOG	21-1BG	NENW	1	45N	76W	WYW51704
47	HD CBM 3 HARTZOG	23-1BG	NESW	1	45N	76W	WYW51704
48	HD CBM 3 HARTZOG	34-1BG	SWSE	1	45N	76W	WYW51704

	<b>Well Name</b>	<b>Well #</b>	<b>Qtr/Qtr</b>	<b>Sec</b>	<b>TWP</b>	<b>RNG</b>	<b>Lease #</b>
49	HD CBM 3 HARTZOG	43-1BG	NESE	1	45N	76W	WYW72485
50	HD CBM 3 HARTZOG	41-12BG	NENE	12	45N	76W	WYW51704
51	HD CBM 3 HARTZOG	34-3BG	SWSE	3	45N	76W	WYW51704

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

	<b>IMPOUNDMENT Name / Number</b>	<b>Qtr/Qtr</b>	<b>Sec</b>	<b>TWP</b>	<b>RNG</b>	<b>Capacity (Acre Feet)</b>	<b>Surface Disturbance (Acres)</b>	<b>Lease Number</b>
1	Shorty's Enlargement	NESW	11	45	76	10.89	3.5	NA

County: Campbell

Applicant: XTO Energy Inc

Surface Owners: Robert F. Christensen  
John Christensen  
Albert Schlautmann  
Gilbertz Enterprises, Inc.

Project Description:

The proposed action involves the following:

- Drilling of 51 total federal CBM wells in the Big George coal zones to a depth of approximately 1400 feet.
- Drilling and construction activities are anticipated to be completed within two years, the term of an APD. Drilling and construction occurs year-round in the PRB. Weather may cause delays lasting several days but rarely do delays last multiple weeks. Timing limitations in the form of COAs and/or agreements with surface owners may impose longer temporal restrictions on portions of this POD, but rarely do these restrictions affect an entire POD.
- Well metering shall be accomplished by telemetry. Metering would entail four visits per month to each well.
- A Water Management Plan (WMP) that involves the following infrastructure and strategy: 1 emergency discharge point and 1 emergency stock water reservoir within the Upper Powder River watershed and 1 existing discharge point to the Upper Belle Fourche River. Produced water will be transferred from the project area to the water discharge point on the Belle Fourche River. The emergency facilities would only be used temporarily when problems with the water transfer system are experienced.

The operator has obtained a permit under the Wyoming Pollutant Discharge Elimination System (WYPDES) from the Wyoming Department of Environmental Quality (WDEQ) which has primacy over water quality as delegated by the Environmental Protection Agency (EPA). The WYPDES permit (#WY0052370) authorizes discharge from all the XTO production in the Hartzog Draw area directly to the Upper Belle Fourche River.

- An unimproved and improved road network.

- An above ground power line network to be constructed by the operator and a contractor. The proposed route has been reviewed by the contractor. If the proposed route is altered, then the new route will be proposed via sundry application and analyzed in a separate NEPA action. Power line construction has not been scheduled and will not be completed before the CBNG wells are producing. Since the power line network is not completed before the wells are in production, temporary diesel generators will be placed at the 20 power drops, as needed.
- A storage tank of 500 gallon capacity shall be located with each diesel generator. Generators are projected to be in operation for a maximum of 6 months. Fuel deliveries are anticipated to be once per week. Generator noise level is expected to be 92.5 decibels at 3.28 feet distance.
- A buried gas, water and power line network, and one compression facility.

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

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

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

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

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

### **2.3. Alternative C – Environmentally Preferred**

Alternative C represents a modification of Alternative B based on the operator and BLM working cooperatively to reduce environmental impacts. The description of Alternative C is the same as Alternative B with the addition of the project modifications identified by BLM and the operator following the initial project proposal (Alternative B). At the on-sites, all areas of proposed surface disturbance were inspected to insure that the project would meet BLM multiple use objectives to conserve natural resources while allowing for the extraction of Federal minerals. In some cases, access roads were re-routed, and well locations, pipelines, discharge points and other water management control structures were moved, modified, mitigated or dropped from further consideration to alleviate environmental impacts. Alternatives to the different aspects of the proposed action are always considered and applied as pre-approval changes, site specific mitigation and/or Conditions of Approval (COAs), if they will alleviate environmental effects of the operator's proposal. The specific changes identified for the HD3 POD are listed below under 2.3.1:

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

Well	Changes Made
41-18	Changed Access to a more direct route from the existing Injection Well location. Re-routed pipeline to corridor with access road, location is being deferred until Sage Grouse Polygon issue is resolved
23-18	moved well ~60' SW to be adjacent to pipeline disturbance, pit needs to be lined, Avoid disturbance within 25' of headcut that is NE of location
32-13	moved well ~80' E
23-13	Pipeline moved to corridor along access from VS 115, stake says 34-13
21-13	moved ~80' closer to road, changed power to come to VS 116 from 32-13 well and have power drop there at VS 116 and buried power from there to 21-13, OHP will not come across drainage, pipeline was moved to corridor with access
34-13	moved well ~90' N to be inside the disturbance of existing oil well location
12-19	Biologist Checking on mitigation to be required, RTHA nest in Pre-Corp OHP power drop pole adjacent to location
43-23	moved pipeline to corridor with access and link to VS 105 instead of VS 104, limit disturbance width to 30' through the sagebrush
14-24	moved well ~105' SW toward stock tank to be out of line-of-sight of raptor nest, access will now go along existing 2-track after consulting with landowner, and pipeline will corridor with access and T into or follow alongside existing pipeline next to C&D road to VS 105
41-23	moved access and pipeline to avoid sagebrush, old stake at location
12-13	moved well ~150' WSW towards the road
34-2	Well will be moved to a new location due to being in line-of-sight and within the 1/4 mile of raptor nest. Need to consult landowner for proper placement
23-3	moved road and pipeline to come from existing well location (well 5034). After the onsites the road to the 23-3 location, which was moved with the 34-3 well at the onsites, will remain as proposed. Since the operator has withdrawn the 34-3 well, the amount of disturbance to put the changed road in would be greater than to use the originally proposed road.
34-3	moved well to injection well 5034 because of a great horned owl nest, will have to be an exception location and well name will probably be changed 32-3, access route changed to come from the east, utilizing an existing 2-track. Later XTO withdrew the 34-3 well due to proximity to a great horned owl nest and the lack of an alternative location.
21-2	Changed Access to be along existing pipeline corridor from the west
32-11	Moved well up to oil well location ~200' SE out of drainage
43-2	moved well ~100' N to get out of Line-of-sight of raptor nest
41-11	OHP removed, MD 57 now at pump jack and buried power from there
21-1	moved well ~150' NW to more open and flatter location, location being deferred until Sage Grouse Polygon issue is resolved
34-1	moved well ~160' ENE to get out of line-of-sight of Ferruginous Hawk nest and rerouted power to the south away from the nest (MD 60 moved to new location of VS 127), location being deferred until Sage Grouse Polygon issue is resolved
41-12	moved pipeline and VS 127 to access road and will follow 2-track up to 34-01 and 43-01 well locations, location being deferred until Sage Grouse Polygon issue is resolved
12-4	Keep disturbance to 25' or less through Sagebrush

Well	Changes Made
23-4	Moved well ~60' SSE to be adjacent to existing pipeline corridor, to avoid excessive disturbance of sagebrush; access and pipeline will follow existing pipeline disturbance
21-4	alternative pipeline route to VS 57 by following existing pipeline corridor, instead of going to 12-4 location
21-34	moved pipeline to corridor with existing pipeline next to road
32-13	Well moved to opposite side of drainage. Pipeline also changed to follow alongside existing pipeline scar to VS 1; access from east, existing C&D road

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

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

#### 2.3.2.1. Groundwater

1. In order to address the potential impacts from infiltration on shallow ground water, the Wyoming DEQ has developed a guidance document, "Compliance Monitoring 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. For WYPDES permits received by DEQ after the August 1<sup>st</sup> effective date, the BLM will require that operators comply with the latest DEQ standards and monitoring guidance.

#### 2.3.2.2. Surface Water

1. Channel Crossings:
  - a) Channel crossings by road and pipelines will be constructed perpendicular to flow. Culverts will be installed at appropriate locations for streams and channels crossed by roads as specified in the BLM Manual 9112-Bridges and Major Culverts and Manual 9113-Roads. Streams will be crossed perpendicular to flow, where possible, and all stream crossing structures will be designed to carry the 25-year discharge event or other capacities as directed by the BLM.
  - b) Channel crossings by pipelines will be constructed so that the pipe is buried at least four feet below the channel bottom.
2. Low water crossings will be constructed at original streambed elevation in a manner that will prevent any blockage or restriction of the existing channel. Material removed will be stockpiled for use in reclamation of the crossings.
3. The operator will supply a copy of the complete approved SW-4 permit to BLM as it is issued by WSEO for the impoundment.

#### 2.3.2.3. Soils

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

#### 2.3.2.4. Vegetation

1. Temporarily fence reseeded areas, if not already fenced, for at least two complete growing seasons to

insure reclamation success on problematic sites (e.g. close to livestock watering source, erosive soils etc.).

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

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

#### **2.3.2.6. Wildlife**

1. The Companies will locate facilities so that noise from the facilities at any nearby sage grouse or sharp-tailed grouse display grounds does not exceed 49 decibels (10 dBA above background noise) at the display ground.
2. All stock tanks shall include a ramp to enable trapped small birds and mammals to escape. See Idaho BLM Technical Bulletin 89-4 entitled Wildlife Watering and Escape Ramps on Livestock Water Developments: Suggestions and Recommendations.

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

##### **2.3.2.7.1. Black-footed Ferret**

1. If any black-footed ferrets are located, the USFWS will be consulted. Absolutely no disturbance will be allowed within prairie dog colonies inhabited by black-footed ferrets.
2. Additional mitigation measure may be necessary if the site-specific project is determined by a BLM biologist to have adverse effects to black-footed ferrets or their habitat. In the event that a mountain plover is located during construction or operation, the USFWS' Wyoming Field Office (307-772-2374) and the USFWS' Law Enforcement Office (307-261-6365) will be notified within 24 hours.

##### **2.3.2.7.2. Mountain Plover**

1. Project-related features that encourage or enhance the hunting efficiency of predators of mountain plover will not be constructed within ½ mile of occupied mountain plover nesting habitat.
2. Construction of ancillary facilities (for example, compressor stations, processing plants) will not be located within ½ mile of known nesting areas. The threats of vehicle collision to adult plovers and their broods will be minimized, especially within breeding aggregation areas.
3. Work schedules and shift changes will be set to avoid the periods from 30 minutes before to 30 minutes after sunrise and sunset during June and July, when mountain plovers and other wildlife are most active.

4. Creation of hunting perches or nest sites for avian predators within 0.5 mile of identified nesting areas will be avoided by burying power lines, using the lowest possible structures for fences and other structures and by incorporating perch-inhibiting devices into their design.
5. When above ground markers are used on capped and abandoned wells they will be identified with markers no taller than four feet with perch inhibiting devices on the top to avoid creation of raptor hunting perches within 0.5 mile of nesting areas.
6. Reclamation of areas of previously suitable mountain plover habitat will include the seeding of vegetation to produce suitable habitat for mountain plover.

#### **2.3.2.7.3. Ute Ladies'-tresses Orchid**

1. Suitable habitat will be avoided wherever possible.

#### **2.3.2.8. 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.

#### **2.3.2.9. 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.

#### **2.3.2.10. 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**

1. All changes made at the onsite will be followed. They have all been incorporated into the operator's plan of development.
2. Onshore Order #1, as revised effective 05-07-07, requires that all operators certify to the Field Office in writing that they have supplied a copy of the Surface Use Plan to each of the private surface owners affected by the project. This self-certification must be received by this office before construction on the project begins. Please note, effective 05-07-07, operators must supply a copy of the Surface Use Plan to each of the private surface owners prior to approval of the APD.
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 HD3 POD is Covert Green, 18-0617 TPX.

4. Line the pit and maintain a 25 foot undisturbed vegetated buffer from headcut that is NE of the 23-18 well location to avoid possible siltation down ephemeral drainage.
5. Pipeline and Access corridor to the 43-23 location is limited to a maximum of 30 feet of disturbance through the sagebrush to minimize disturbance of sagebrush habitat.
6. Limit pipeline disturbance between 12-4 and 21-4 locations to a maximum of 25 feet through the sagebrush to minimize disturbance of sagebrush habitat.
7. 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:

**Loamy Ecological Site Seed Mix**

<b>Species</b>	<b>% in Mix</b>	<b>Lbs PLS*</b>
<i>Western Wheatgrass</i> (Pascopyrum smithii)/or <i>Thickspike Wheatgrass</i> (Elymus lanceolatus ssp. lanceolatus)	30	3.6
<i>Bluebunch Wheatgrass</i> (Pseudoroegneria spicata ssp. Spicata)	10	1.2
<i>Green needlegrass</i> (Nassella viridula)	25	3.0
<i>Slender Wheatgrass</i> (Elymus trachycaulus ssp. trachycaulus)	20	2.4
<i>Prairie coneflower</i> (Ratibida columnifera)	5	0.6
<i>White or purple prairie clover</i> (Dalea candidum, purpureum)	5	0.6
<i>Rocky Mountain beeplant</i> (Cleome serrulata) /or <i>American vetch</i> (Vicia americana)	5	0.6
<b>Totals</b>	<b>100%</b>	<b>12 lbs/acre</b>

- \*PLS = pure live seed
- \*Northern Plains adapted species
- \*Double this rate if broadcast seeding

At the following locations use the Sandy Seed Mix (below) instead of the Loamy Mix (above):

14-4-4475BG	14-2-44576BG	23-13-4576BG
43-14-4576BG	41-23-4576BG	12-24-4576BG

## Sandy Ecological Site Seed Mix

Species	% in Mix	Lbs PLS*
<i>Thickspike Wheatgrass</i> ( <i>Elymus lanceolatus</i> ssp. <i>lanceolatus</i> )	25	3.0
<i>Prairie sandreed</i> ( <i>Calamovilfa longifolia</i> )	35	4.2
<i>Indian ricegrass</i> ( <i>Achnatherum hymenoides</i> )	25	3.0
<i>Prairie coneflower</i> ( <i>Ratibida columnifera</i> )	5	0.6
<i>White or purple prairie clover</i> ( <i>Dalea candidum</i> , <i>purpureum</i> )	5	0.6
<i>Scarlet Globemallow</i> ( <i>Sphaeralcea coccinea</i> ) / or <i>Blue flax</i> ( <i>Linum lewisii</i> )	5	0.6
<b>Totals</b>	<b>100%</b>	<b>12 lbs/acre</b>

\*PLS = pure live seed

\*Northern Plains adapted species

\*Double this rate if broadcast seeding

These are recommended seed mixes based on the native plant species listed in the NRCS Ecological Site descriptions, U.W. College of Ag. and seed market availability.

8. Slopes too steep for machinery may be hand broadcast and raked with twice the specified amount of seed.
9. 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.
10. Please contact Ben Kniola Natural Resource Specialist, @ (307) 684-1127, Bureau of Land Management, Buffalo, if there are any questions concerning these surface use COAs.

### Wildlife

1. If any dead or injured threatened, endangered, proposed, or candidate species is located during construction or operation, the U.S. Fish and Wildlife Service's Wyoming Field Office (307-772-2374) and law enforcement office (307-261-6365) and BLM Buffalo Field Office (307-684-1100) shall be notified within 24 hours.
2. Observations of any threatened, endangered, proposed, or candidate species within the project area shall be reported to the BLM Buffalo Field Office (307-684-1100).
3. The Record of Decision for the Powder River Basin EIS includes a programmatic mitigation measure that states, "The companies will conduct clearance surveys for threatened and endangered or other special-concern species at the optimum time". The measure requires companies to coordinate with the BLM before November 1 annually to review the potential for disturbance and to agree on inventory parameters. Should this project not be completed by November 1, XTO Energy will coordinate with the BLM to determine if additional resurvey will be required.

4. No surface disturbing activities 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 stipulation will affect the following:

Township/Range	Section	Affected Wells and Infrastructure
T45N, R76W	1	Wells 21-01, 43-01, 34-01, 23-01 and their associated infrastructure; proposed pipeline from the 21-01 well to the state well 14-36; proposed overhead power and pipeline going to VS27.
T45N, R76W	2	Wells 41-02, 21-02, 32-02, 43-02, 23-02, 34-02, 14-02 and their associated infrastructure.
T45N, R76W	3	23-03 and associated infrastructure; pipeline to VS 133.
T45N, R76W	11	Wells 41-11, 21-11, 32-11, 43-11 and their associated infrastructure; pump station 3, proposed overhead power from the SE Sec 11 to pump station 3.
T45N, R76W	12	Wells 41-12, 21-12, 23-12 and their associated infrastructure; pipeline from the SW Sec 1 to MD 59.
T45N, R76W	13	Wells 21-13 and 14-13 and their associated infrastructure.
T45N, R76W	14	Wells 41-14 and 43-14 and their associated infrastructure.
T45N, R76W	23	Well 41-23 and associated infrastructure.
T45N, R76W	24	Wells 21-24, 41-24, 32-24, 12-24, 43-24, 23-24, 14-24 and their associated infrastructure.
T45N, R75W	7	Wells 23-07 and 34-07 and their associated infrastructure; all pipelines leading into VS 130.
T45N, R75W	18	Well 41-18 and associated infrastructure; pipeline from the 41-18 well to the VS111; access road/pipeline from the MD 49 to the 21-19 well.
T45N, R75W	19	Wells 21-19 and 12-19 and their associated infrastructure.
T44N, R75W	4	Wells 21-04, 12-04 and 14-04 and their associated infrastructure; pipelines leading into VS 101.

- a. 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):

BLM ID#	UTM N	UTM E	Legal (Quarter, Section, Township, Range)
644	4862925	423273	Sec 35, T46N, R76W
4381	4862642	423391	SE Sec 35, T46N, R76R
New	4862159	424884	NWNE Sec 1, T45N, R76W
New	4861923	425020	NE Sec 1, T45N, R76W
4384	4862011	425496	NWNW Sec 6, T45N, R75W
4383	4861004	424614	SWSE Sec 1, T45N, R76W
3368	4861159	423168	Central portion of Sec 2, T45N, R76W
643	4861079	423150	Central portion of Sec 2, T45N, R76W
3837	4860040	423410	SWSE Sec 11, T45N, R76W
New	4859582	422270	SW Sec. 11, T45N, R76W
New	4859544	422262	SW Sec. 11, T45N, R75W
3367	4859359	423822	SW Sec. 12, T45N, R76W
3371	4859415	426578	SE Sec. 7, T45N, R75W
New	4857426	423825	NWNW Sec. 24/13, T45N, R76W
New	4856813	425373	NW Sec.19, T45N, R75W
3137	4855790	424056	Sec24/25, T45N, R76W
647	4855569	424118	NW Sec25, T45N, R76W
3369	4853031	428930	SW Sec. 33, T45N, R75W
666	4851713	428236	SE Sec. 5 T44N, R75W
New	4860542	421055	NW Sec. 10, T45N, R76W
New	4860973	421547	SE Sec. 3, T45N, R76W

5. 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.
6. The following conditions will reduce impacts to sage grouse: No surface disturbing activities are permitted within 2 miles of a sage grouse lek between March 1 and June 15, prior to completion of a greater sage grouse lek survey. **This condition will be implemented on an annual basis for the duration of surface disturbing activities.** This timing stipulation will affect the following:

Township/Range	Section	Affected Wells and Infrastructure
T45N, R76W	1	Well 21-01 and associated infrastructure.
T45N, R76W	13	Wells 21-13, 12-13, 32-13, 23-13, 34-13, 14-13 and all associated infrastructure.
T45N, R76W	14	Wells 41-14 and 43-14 and their associated infrastructure.
T45N, R76W	23	Wells 41-23 and 43-23 and their associated infrastructure.
T45N, R76W	24	Wells 41-24, 21-24, 12-24, 32-24, 23-24, 14-24, 43-24 and all associated infrastructure.
T45N, R75W	19	Wells 21-19 and 12-19 and all associated infrastructure.
T44N, R75W	13	Well 32-13 and associated infrastructure.

- a. If an active lek is identified during the survey, the 2 mile timing restriction (March 1-June 15) will be applied and surface disturbing activities will not be permitted until after the nesting season. If surveys indicate that the identified lek is inactive during the current breeding season, surface disturbing activities may be permitted within the 2 mile buffer until the following breeding season (March 1). The required sage grouse survey will be conducted by a biologist following the most current WGFD protocol. All survey results

shall be submitted in writing to a Buffalo BLM biologist and approved prior to surface disturbing activities.

- b. Access road/pipeline to well 43-23 will **not exceed 30 feet** maximum disturbance width.
  - c. Pipeline corridor from well 12-04 to 21-04 will **not exceed 25 feet** maximum disturbance width.
  - d. Access road/pipeline will **not exceed 25 feet** maximum disturbance width. These widths were agreed to by Al Erwin of XTO and XTO's road/pipeline contractor during the onsite.
7. No surface disturbing activity shall occur within 1 mile of bald eagle roosting habitat from November 1 through April 1, annually, prior to a bald eagle roost survey. No surface disturbing activity shall occur within 1 mile of bald eagle nesting habitat from February 1 through August 15 prior to a bald eagle nest survey. Bald eagle nesting and roosting habitat is located within the project area: the central portion of Section 2 along South Prong; northeast quarter of Section 11 along South Prong; Township 45 North, Range 76 West. This condition will be implemented on annual basis for the duration of the surface disturbing activities. This timing limitation will affect the following wells and infrastructure:

Township/Range	Section	Affected Wells and Infrastructure
T45N, R76W	2	41-02, 21-02, 12-02, 32-02, 43-02, 23-02, 14-02, 34-02 and all associated infrastructure (all of Section 2)
T45N, R76W	11	41-11, 21-11, 32-11, pump station 4, 43-11 and associated infrastructure (all of Section 11)

8. Power lines will be buried whenever possible in the project area to protect bald eagles and other important wildlife. When it is not possible to bury them, overhead power lines will be constructed to standards identified by the Avian Power Line Interaction Committee (2006) and the additional measures outlined in the PRBEIS to minimize raptor electrocution potential.
9. No surface disturbing activities are permitted in suitable mountain plover habitat i.e. prairie dog colonies, bare ground and short grass prairie from March 15-July 31 annually, unless a mountain plover survey has been conducted during the current breeding season. This condition will be implemented on an annual basis for the duration of surface disturbing activities. This timing limitation will affect the Entire project area.
- a. Mountain plover nesting surveys shall be conducted by a biologist following the most current U.S. Fish and Wildlife Service Mountain Plover Survey Guidelines (the survey period is May 1-June 15). All survey results must be submitted in writing to the BFO and approved prior to initiation of surface disturbing activities.
  - b. If a mountain plover is identified, then a seasonal disturbance-free buffer of ¼ mile shall be maintained between March 15 and July 31. If no mountain plovers are identified, then surface disturbing activities may be permitted within suitable habitat until the following breeding season (March 15).
10. The BLM, after consultation with USFWS has decided to have the nest, in the power pole adjacent to the 12-19 well location, removed before February 1, 2008 and have XTO bring that

portion of the power line up to Avian Power Line Interaction Committee's (2006) suggested practices and with the Service's standards (USFWS 2002).

**Water Management**

1. The operator will sample the spring as listed below twice each year (spring and fall) for the duration of production to determine any changes in water quality or quantity. Analysis will follow the WYPDES Permit quality criteria suite. Copies of water quality and quantity data will be reported to the BLM BFO. If it is determined that either are changing as a result of CBNG production in the area, additional mitigation may be required.

<b>Name</b>	<b>Qtr/Qtr</b>	<b>Sec</b>	<b>T(N)</b>	<b>Range</b>
Spring 10	SWSW	18	45	75

2. The operator will provide an updated water management map (Map C) which includes the spring location identification.
3. To control erosion, no water will be allowed to overflow the tire stock water tanks.
4. The operator shall submit to the BLM a copy of the WYPDES Permit for discharge into the Shorty's impoundment as it become available from the WDEQ. The operator has committed to comply with all the regulations and reporting requirements of the WYPDES permits as issued by the WDEQ for this action.

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

Most of the alternatives discussed for this project concerned water management. The operator and contractors considered the following alternatives in the water management plan (WMP), but did not include them in the water management strategy.

- Land application disposal – not cost effective, landowner concerns.
- Total containment – excessive surface disturbance, not cost effective.
- Treatment – not currently necessary based on water analysis and WYPDES permit requirements.
- Re-injection – not cost effective.

For more information regarding these alternatives, please see the HD3 WMP page 3.

**3. DESCRIPTION OF AFFECTED ENVIRONMENT**

Applications to drill were received on September 26, 2006. Field inspections of the proposed HD3 CBNG project were conducted on April 23, 2007 through April 25, 2007, by Al Erwin (XTO), Christi Hazwell (Pearl), John Kluz (XTO), Joey Shelley (Pearl), Bill Kovar (Pearl), Dave Baker (XTO), Ben Kniola (BLM), Kathy Brus (BLM), and Guymen Easdale (BLM).

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

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

<b>Mandatory Item</b>	<b>Potentially Impacted</b>	<b>No Impact</b>	<b>Not Present On Site</b>	<b>BLM Evaluator</b>
Threatened and Endangered Species		X		Guymen Easdale

<b>Mandatory Item</b>	<b>Potentially Impacted</b>	<b>No Impact</b>	<b>Not Present On Site</b>	<b>BLM Evaluator</b>
Floodplains		X		Kathy Brus
Wilderness Values			X	Ben Kniola
ACECs			X	Ben Kniola
Water Resources	X			Kathy Brus
Air Quality		X		Ben Kniola
Cultural or Historical Values		X		G.L. "Buck" Damone III
Prime or Unique Farmlands			X	Ben Kniola
Wild & Scenic Rivers			X	Ben Kniola
Wetland/Riparian		X		Kathy Brus
Native American Religious Concerns			X	G.L. "Buck" Damone III
Hazardous Wastes or Solids		X		Ben Kniola
Invasive, Nonnative Species	X			Ben Kniola
Environmental Justice		X		Ben Kniola

### **3.1. Topographic Characteristics of Project Area**

The HD3 Federal POD area lies south of Gillette in an area comprised of primarily gently rolling hills typical of the short grass prairie located in the southeastern portion of the Powder River Basin. The landscape is shaped by the generally low gradient intermediate to primarily ephemeral drainages. This project falls within Major Land Resource Area 58B in the 10 to 14 inch precipitation zone as defined by the Natural Resource Conservation Service.

To the south and west of the project area lie the Pumpkin Buttes. These major features are flat mesas formed by the weathering of resistant cap rock (White River formation). Pumpkin Buttes are visible from all locations in the proposed project and from most areas within the Powder River Basin. The Buttes rise over 700 feet above the surrounding prairie and dominate the landscape. Generations of travelers and settlers have used the Buttes as a focal point for navigation.

The highest point in the area is south and west of the HD3 POD boundary at 6052 feet above sea level at the top of the North Butte. The lowest point in the area is located to the north of the POD along a Hartzog Draw at 4600 feet above sea level. The topography is rolling to relatively flat (3-10% slope) with numerous draws (rather wide with gently rising slopes) throughout the project area.

Recent historical uses of the lands in this area are ranching, stock grazing, dry land farming, conventional oil and gas production, uranium mining, and most recently CBNG development. Conventional oil field development and the origination of the Hartzog Draw unit were commenced in 1980 by Exxon. There is existing road and pipeline infrastructure which was developed by the mineral companies as well as ranch operations. The entire POD area (6448 acres) is privately held surface which overlays an intermingled patchwork of mineral ownership in the following percentages: 77% federal, and 23% private.

The project area is primarily grass land consisting mostly of native grasses. Sagebrush cover is primarily sparse (0-5 %) with small pockets (0.5 to 20 acres) of moderate to dense (10-20 %) growth occurring throughout the project area.

### **3.2. Vegetation & Soils**

#### **3.2.1. Soils**

Soils within the project area were identified from the *South Campbell County Survey Area, Wyoming (WY605)*. The soil survey was performed by the Natural Resource Conservation Service according to National Cooperative Soil Survey standards. Pertinent information for analysis was obtained from the

published soil survey and the National Soils Information System (NASIS) database for the area.

Soils differ with topographic location, slope and elevation. Topsoil depths to be salvaged for reclamation range from 0 to 4 inches on ridges to 8+ inches in bottomland. Erosion potential varies from moderate to severe depending on the soil type, vegetative cover and slope. Reclamation potential of soils also varies throughout the project area.

The map units identified for the soils within this project area are listed in the table below along with the individual acreage and the percentage of the total area identified within the POD boundary.

**Table 3.2 – Soil Map Unit Types**

<b>MUSYM</b>	<b>Map Unit Name</b>	<b>Acres</b>	<b>%</b>
102	ARVADA, THICK SURFACE-ARVADA-SLICKSPOTS COMPLEX, 0 TO 6 PERCENT SLOPES	0.49	0.01%
112	BIDMAN-PARMLEED LOAMS, 6 TO 15 PERCENT SLOPES	21.09	0.33%
116	CAMBRIA-KISHONA-ZIGWEID LOAMS, 0 TO 6 PERCENT SLOPES	539.55	8.37%
117	CAMBRIA-KISHONA-ZIGWEID LOAMS, 6 TO 15 PERCENT SLOPES	2.63	0.04%
121	CUSHMAN-CAMBRIA LOAMS, 0 TO 6 PERCENT SLOPES	0.07	0.00%
122	CUSHMAN-CAMBRIA LOAMS, 6 TO 15 PERCENT SLOPES	238.27	3.70%
126	CUSHMAN-THEEDLE LOAMS, 0 TO 6 PERCENT SLOPES	20.30	0.32%
145	FORKWOOD-CAMBRIA LOAMS, 0 TO 6 PERCENT SLOPES	571.74	8.87%
146	FORKWOOD-CUSHMAN LOAMS, 0 TO 6 PERCENT SLOPES	829.91	12.88%
147	FORKWOOD-CUSHMAN LOAMS, 6 TO 15 PERCENT SLOPES	298.56	4.63%
148	FORKWOOD-ULM LOAMS, 0 TO 6 PERCENT SLOPES	247.00	3.83%
153	HAVERDAD-KISHONA ASSOCIATION, 0 TO 6 PERCENT SLOPES	409.50	6.36%
157	HILAND-BOWBAC FINE SANDY LOAMS, 0 TO 6 PERCENT SLOPES	59.76	0.93%
158	HILAND-BOWBAC FINE SANDY LOAMS, 6 TO 15 PERCENT SLOPES	76.31	1.18%
160	HILAND-VONALEE FINE SANDY LOAMS, 6 TO 15 PERCENT SLOPES	45.66	0.71%
171	KEELINE-TULLOCK-NIOBRARA, DRY COMPLEX, 3 TO 30 PERCENT SLOPES	68.04	1.06%
172	KEYNER FINE SANDY LOAM, 0 TO 6 PERCENT SLOPES	75.62	1.17%
214	THEEDLE-KISHONA LOAMS, 0 TO 6 PERCENT SLOPES	232.91	3.61%
215	THEEDLE-KISHONA LOAMS, 6 TO 20 PERCENT SLOPES	1086.64	16.86%
216	THEEDLE-KISHONA-SHINGLE LOAMS, 3 TO 30 PERCENT SLOPES	123.85	1.92%
217	THEEDLE-SHINGLE LOAMS, 3 TO 30 PERCENT SLOPES	36.48	0.57%
218	THEEDLE-TURNERCREST-KISHONA COMPLEX, 3 TO 15 PERCENT SLOPES	389.51	6.05%
221	TURNERCREST-KEELINE-TALUCE FINE SANDY LOAMS, 6 TO 30 PERCENT SLOPES	335.49	5.21%
226	ULM LOAM, 0 TO 6 PERCENT SLOPES	59.60	0.92%
228	ULM-RENOHILL CLAY LOAMS, 0 TO 6 PERCENT SLOPES	0.63	0.01%
233	USTIC TORRIORTHENTS, GULLIED	530.90	8.24%

<b>MUSYM</b>	<b>Map Unit Name</b>	<b>Acres</b>	<b>%</b>
236	VONALEE-TERRO FINE SANDY LOAMS, 2 TO 10 PERCENT SLOPES	142.92	2.22%
247	WYOTITE-ULM LOAMS, 0 TO 6 PERCENT SLOPES	0.04	0.00%
		6443.4	100%

Additional site specific soil information is included in the Ecological Site interpretations which follow in Section 3.2.2.

### **3.2.2. Vegetation**

Ecological Site Descriptions are used to provide soils and vegetation information needed for resource identification, management and reclamation recommendations. To determine the appropriate Ecological Sites for the area contained within this proposed action, BLM specialists analyzed data from onsite field reconnaissance and Natural Resources Conservation Service published soil survey soils information. The soils and the associated ecological sites found within the POD boundary are Loamy 10-14" Northern Plains, SANDY (10-14 NP), LOWLAND (10-14 NP), and Clayey 10-14" Northern Plains.

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

#### ***Loamy Sites:***

This site occurs on gently undulating to rolling land on landforms which include hill sides, alluvial fans, ridges and stream terraces, in the 10-14 inch precipitation zone.

The soils of this site are moderately deep to deep (greater than 20" to bedrock), well drained soils that formed in alluvium and residuum derived from sandstone and shale. These soils have moderate permeability.

The Historic Climax Plant Community (HCPC - defined as the plant community that was best adapted to the unique combination of factors associated with this ecological site) for this site would be a Rhizomatous Wheatgrasses, Needleandthread, Blue Grama Plant Community. The potential vegetation is about 75% grasses or grass-like plants, 15% forbs, and 10% woody plants.

The present plant community is a *Mixed Sagebrush/Grass*. Compared to the HCPC, cheatgrass has invaded with western wheatgrass and thickspike wheatgrass maintains at a similar or slightly higher level. Virtually all other cool-season mid-grasses are severely decreased. Blue grama is the same or slightly less than found in the HCPC. Plant diversity is low.

Dominant grasses identified include: mixed wheatgrasses, cheatgrass and crested wheatgrass. Forbs identified include: phlox and wild parsley. Other vegetative species identified at onsite: Sagebrush, lichens and prickly pear.

Wyoming big sagebrush is a significant component of this Mixed Sagebrush/Grass plant community. 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.

#### ***Sandy Sites:***

This site occurs on nearly level to 50 percent slopes on landforms which include alluvial fans, hillsides, plateaus, ridges and stream terraces in the 10-14" precipitation zone.

The soils of this site are moderately deep to very deep (greater than 20" to bedrock), well drained soils that

formed in eolian deposits or residuum derived from unspecified sandstone. These soils have moderate, moderately rapid or rapid permeability. The main soil limitations include low available water holding capacity, and high wind erosion potential.

The Historic Climax Plant Community (HCPC - defined as the plant community that was best adapted to the unique combination of factors associated with this ecological site) for this site would be a Needleandthread/Prairie sandreed Plant Community. Potential vegetation is about 75% grasses or grass-like plants, 15% forbs, and 10% woody plants. The state is a mix of warm and cool season midgrasses.

The present plant community is a *Needleandthread/threadleaf sedge/Fringed sagewort* plant community. Compared to the HCPC, prairie sandreed and Indian ricegrass have decreased. Threadleaf sedge, needleandthread and fringed sagewort have increased.

Dominant grasses identified include: prairie junegrass and prairie sandreed. Forbs identified include: sand lilly. Other vegetative species identified at onsite: yucca and threadleaf sedge.

A summary of the ecological sites within the project area are listed in the table below along with the individual acreage and the percentage of the total area identified within the POD boundary.

**Table 3.4 – Summary of Ecological Sites**

<b>Ecological Site</b>	<b>Acres</b>	<b>Percent</b>
Loamy 10-14" Northern Plains	4774.2	74.09%
SANDY (10-14 NP)	728.2	11.30%
Badlands	530.9	8.24%
LOWLAND (10-14 NP)	409.5	6.36%
Clayey 10-14" Northern Plains	0.6	0.01%
	6443.4	100%

### **3.2.3. Wetlands/Riparian**

The project area lies along the South Prong Pumpkin Creek. The drainages are all ephemeral within the POD boundary. However, there were several locations along the mainstem which exhibited riparian and wetland characteristics due to decreased channel slope, resulting in periodic water detention. There are areas of isolated cottonwood growth along the stream course. As is common in northeastern Wyoming, many of the cottonwoods are decadent, with limited recruitment of new growth noted.

### **3.2.4. 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/>):

- Black Henbane

The CBM Clearinghouse database was created cooperatively by the University of Wyoming, BLM and county Weed and Pest offices.

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

### **3.3. Wildlife**

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

A habitat assessment and wildlife inventory surveys were performed by Western Ecosystem Technology Consultants (WEST). WEST performed aerial surveys for bald eagles on December 19, 2005, January 5, and February 20, 2006, December 16, 2006, January 19 and February 20, 2007. Ground surveys for raptors were conducted on June 1, 2, 7 and 12, 2006 and on May 2, 3 and 4, 2007. Mountain plover surveys were conducted on May 12, 25, June 8, 2006 and May 2, 3, 4, 22, 23, 24, and June 8 and 9, 2007. Aerial surveys for sage grouse were conducted on April 17, 25, May 1, 2006 and April 1, 15, 29 and May 2, 2007. Ground surveys for sage grouse were conducted on April 16, 18, 26, 28 and May 3, 2007.

A BLM Biologist conducted a field visit to the proposed HD3 project area on April 23, 24, and 25, 2007. During this time, the biologist reviewed the wildlife survey information for accuracy, evaluated impacts to wildlife resources, and provided project adjustment recommendations where wildlife issues arose.

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

### **3.3.1. Big Game**

Big game species expected to be within the HD3 project area include mule deer and pronghorn antelope. The project area is part of the Pumpkin Buttes mule deer herd unit. The 2004 estimated herd population was 14,800 with a population objective of 11,000 (Wyoming Game and Fish Department (WGFD) 2004).

Pronghorn antelope belong to the Pumpkin Butte herd unit. Pronghorn antelope populations have been increasing since 1998 with a 2004 population estimate of 27,109 animals, and a herd objective of 18,000 (WGFD 2004).

The WGFD has designated the entire project area as winter-yearlong range for pronghorn antelope. The central portion of the project area has been designated as winter-yearlong range and the eastern and western portions as yearlong range for mule deer.

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

### **3.3.2. Aquatics**

The project area is drained by ephemeral tributaries of Pumpkin Creek which is an ephemeral tributary to the Upper Powder River and the Belle Fourche River. There is one known spring located in SWSW Sec 18 T45N R75W.

### **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). Species observed by WEST include Brewer's sparrow, McCown's longspur, and sage thrasher (2005). During the onsite (April 24-25,2007) BLM biologist, Guyman Easdale, observed Brewer's sparrows and sage thrashers within the project area.

### **3.3.4. Raptors**

Raptor species expected to occur in suitable habitats within the project area include northern harrier,

golden eagle, red-tailed hawk, Swainson's hawk, ferruginous hawk, American kestrel, prairie falcon, short-eared owl, great horned owl, bald eagle, rough-legged hawk, Merlin and burrowing owls. Most raptor species nest in a variety of habitats including but not limited to; native and non-native grasslands, agricultural lands, live and dead trees, cliff faces, rock outcrops, and tree cavities (PRB FEIS 3-145-148). According to the BLM Buffalo Field Office data base and Western EcoSystems wildlife reports, 21 raptor nests occur within or near the project boundaries. Eleven were active in 2007.

**Table 3.5 Summary of Raptor Nests: Location, Activity and Nest Condition (The nests are numbered as per BLM Buffalo Field Office). Information in the table is based on the 2007 raptor survey.**

BLM ID#	Species	Substrate	Activity	Nest condition	UTM N	UTM E	Legal Quarter, Section, Township, Range,
644	RTHA	CTL	Active	Good	4862925	423273	Sec 35, T46N, R76W
4381	UNRA	CTL	Gone	Gone	4862642	423391	SE Sec 35, T46N, R76R
New	FEHA	GHS	Active	Fair	4862159	424884	NWNE Sec 1, T45N, R76W
New	FEHA	GHS	Active	Fair	4861923	425020	NE Sec 1, T45N, R76W
4384	RTHA	CTL	Active	Good	4862011	425496	NWNW Sec 6, T45N, R75W
4383	FEHA	GHS	Inactive	Fair/Good	4861004	424614	SWSE Sec 1, T45N, R76W
3368	RTHA	CTL	Active	Good	4861159	423168	Central portion of Sec 2, T45N, R76W
643	RTHA	CTL	No data 2007	No Data	4861079	423150	Central portion of Sec 2, T45N, R76W
3837	GHOW	CTL	No Data 2007	No Data 2007	4860040	423410	SWSE Sec 11, T45N, R76W
New	FEHA	GHS	Inactive	Fair	4859582	422270	SW Sec. 11, T45N, R76W
New	GHOW	CTL	Active	Good	4859544	422262	SW Sec. 11, T45N, R75W
3367	RTHA	CTL	Active	Good	4859359	423822	SW Sec. 12, T45N, R76W
3371	FEHA	GHS	Gone	Gone	4859415	426578	SE Sec. 7, T45N, R75W
New	FEHA	GHS	Active	Good	4857426	423825	NWNW Sec. 24/13, T45N, R76W
New	RTHA	Power Pole	Active	Good	4856813	425373	NW Sec.19, T45N, R75W
3137	RTHA	CTL	Active	Good	4855790	424056	Sec24/25, T45N, R76W
647	RTHA	CTL	Gone	Gone	4855569	424118	NW Sec25, T45N, R76W
3369	FEHA	Roc	Not	Not	4853031	428930	SW Sec. 33, T45N,

BLM ID#	Species	Substrate	Activity	Nest condition	UTM N	UTM E	Legal Quarter, Section, Township, Range,
			checked in 2007	checked in 2007.			R75W
666	FEHA	GHS	Not checked in 2007	Not checked in 2007	4851713	428236	SE Sec. 5 T44N, R75W
New	RTHA	Power pole	Active	Good	4860542	421055	NW Sec. 10, T45N, R76W
New	GHOW	CTL	Active	Good	4860973	421547	SE Sec. 3, T45N, R76W

RTHA= red-tailed hawk      FEHA = ferruginous hawk      GOEA = golden eagle  
 UNKN= unknown              AMKE = American kestrel      GRHO = great-horned owl  
 BUOW = burrowing owl      CLFF = cliff                      CTL = cotton wood tree live  
 JUNP = juniper                GHS = ground/hillside          PD = prairie dog colony  
 PPD = ponderosa pine dead      CTD = cottonwood tree dead

### 3.3.5. Threatened and Endangered and Sensitive Species

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

#### 3.3.5.1. Black-footed ferret

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

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

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

According to the wildlife report submitted by Western Ecosystems Technology (2006 and 2007) no prairie dog colonies were observed within the project area. However, during the onsite held on April 23, 24, and 25, 2007, BLM biologist, Guymen Easdale, observed prairie dogs beginning to colonize the area near well 41-18 within the project area. They are occupying an area approximately 0.2 to 0.5 acres, burrows are sparse. At this time there is insufficient habitat to support a black-footed ferret population.

#### 3.3.5.2. Ute's 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 (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.

The project area is drained by numerous ephemeral drainages that drain north to the Powder River or east to the Belle Fourche River. Dry upland vegetation (Wyoming big sagebrush and bunch grasses) exist throughout all of the drainages. One spring was identified within the HD3 project area in Section 18, Township 45 North, Range 75 West (Pearl 2006). The area around the spring is heavily grazed and the vegetation is dry upland vegetation. Suitable orchid habitat is not present within the HD3 project area.

### **3.3.6. 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.

#### **3.3.6.1. Bald eagle**

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

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

Groups of mature cottonwood trees capable of supporting nesting and roosting bald eagles occur along Hartzog Draw and South Prong of Pumpkin Creek. Between 20 and 30 trees are grouped together in the central portion of Section 2; approximately 20 trees are grouped together in northeast quarter of Section 11 along South Prong; four trees occur in the drainage in the southwest quarter Section 11; between 10 and 20 trees are grouped together in SWSW of Section 12 along South Prong; approximately 20 trees are grouped together around the ranch house in the northeast quarter of Section 13 along South Prong, Township 45 North, Range 76 West. Lone cottonwood trees are found throughout the project area in the drainages.

On January 24, 2006, Arcadis observed 3 bald eagles (2 adult and 1 juvenile) perched in a cottonwood tree located in the southwest quarter of Section 2, Township 45 North, Range 75 West (UTM 4861096N, 422709E) within the HD3 project area. According to the BLM Buffalo Field Office data base, 6 adult bald eagles were observed on December 20, 2006 and on 1 on December 27, 2006. These sighting occurred in the NWNW Section 35, Township 45 North, Range 76 West (UTM 4853953N, 422136E). This location is 1.2 miles south of the project area. A bald eagle winter roost site is located on the boundary of Section 10/15 Township 44 North, Range 76 West (UTM 421619E, 4849643N) near North Butte of Pumpkin Buttes. Observations were made on January 16, 2006, January 19, 2007 and February 28, 2007. Seven bald eagles were observed on January 19, 2007; four bald eagles were observed on February 28, 2007 and two bald eagles were observed on January 16, 2006. The roost site is approximately four miles from the project area.

A reliable prey base exists within the project area in the lagomorphs (hares and rabbits) sheep and big game carcasses. The project area is a large active sheep and cattle ranch. During the onsite (April 23-25, 2007), sheep and cattle were found grazing throughout the project area. According to the land owner, he runs between 700 and 1500 head of sheep throughout the project area. During the onsite, 96 sheep and 18 pronghorn antelope carcasses were observed throughout the project area. The dead sheep were found at four locations: 20 in the SWNW quarter of Section 19; 20 in the SE quarter of Section 12; 38 in the SWNE quarter of Section 13; and 18 in the NENW Section 19, Township 45 North, Range 76 West. Single antelope carcasses were found scattered throughout the project area were usually within 50 to 150 feet from an improved road. It is likely that bald eagles forage through the project area on a regular basis.

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

On August 12, 2004, the U.S. Fish and Wildlife Service removed the black-tailed prairie dog's Candidate status. The Buffalo Field Office however will consider prairie dogs as a sensitive species and continue to afford this species the protections described in the FEIS.

According to the wildlife report submitted by Western Ecosystems Technology (2006 and 2007) no black-tailed prairie dog colonies were observed within the project area. However, during the onsite held on April 23, 2007, BLM biologist, Guymen Easdale, observed prairie dogs beginning to colonize the area near well 41-18. They are occupying an area approximately 0.2 to 0.5 acres, burrows are sparse.

#### **3.3.6.3. Greater sage-grouse**

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

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

The project area is primarily grassland consisting mostly of native grasses. Pockets (0.5 to 20 acres) of Wyoming big sagebrush occurs throughout the project area in a patchy mosaic of sparse (0-5% cover), low (5-10% cover), moderate (10-15% cover) and dense (15-25% cover) stands. During the onsite, April 23-25, 2007, the grasses ranged in height from 0 to 4 inches.

There are numerous draws located throughout the project area that serve as catch basins for moisture creating areas that are rich in forb density and diversity during the early summer months. These forb-rich areas provide a nutrient rich food source for young, developing, sage grouse.

According to the Wyoming Game and Fish Department database (2006) and surveys conducted by Western EcoSystems Technology (2007), 2 sage grouse leks occur on the southwest boundary, and 2 are within 3 miles of the project area. Numerous piles of sage grouse scat were found at three well sites (12-4, 43-23 and 23-13).

**Table 3.6 Sage Grouse Leks Within and Surrounding the Project Area**

<b>Lek Name</b>	<b>Activity</b>	<b>UTM N</b>	<b>UTM E</b>	<b>Legal Quarter, Section, Township, Range</b>	<b>Comments</b>
New (near Willow)	Active	4856935	423046	SWNE Sec 23, T45N, R76W	2007 active 1-male observed strutting on 2 different surveys.
Willow	Active	4856661	422653	NESW Sec 23, T45N, R76W	2007 active-7 males (WGFD 2007); 2006 active-12 males
Innes	Active	4864814	426004	Center Sec. 30, T46N, R75W	2007 active-39 males; 2006 active-35 males; 2005 active-41 males.
Christensen Ranch 6	Inactive	4853900	424800	NWNE Sec.36 T45 R76W	2002-2007 inactive.

**Sharp-tailed grouse**

The Plains sharp-tailed grouse habitat is typically considered native grasslands composed of wheatgrasses, needle grasses, grama grasses and blue steam with some shrubby areas to serve as roosting cover and winter habitat. Plains sharp-tailed grouse are expected to occur throughout northeastern Wyoming. Suitable habitat for the Plains sharp-tailed grouse exists throughout the project area. During the surveys for sage and sharp-tailed grouse no sharp-tailed grouse were observed within the project area.

**3.3.6.4. Mountain plover**

In September 2003, the U.S. Fish and Wildlife Service withdrew their proposal to list the mountain plover. However, the mountain plover remains an agency-designated Sensitive Species within both the Bureau of Land Management and the Forest Service.

The mountain plover originated on the plains, nesting solely on arid, level terrain (0-5% slope) with short vegetation (less than 6 inches tall). According to the U.S. Geological Survey, prairie dogs currently exist on less than one percent of their former range, and their numbers have declined by 98 percent (Turbak 2004). Mountain plover numbers have declined-possibly from millions-to only about 10,000 birds today (Turbak 2004).

The project area is primarily flat to rolling, with a slope ranging from 0 to 8%. The project area is primarily grassland with pockets of sagebrush, percent cover of sagebrush ranges from sparse (0-5%), low (5-10%), moderate (10-15%) and dense (15-25%). Due to heavy grazing pressure from cows and sheep the grass is kept short. During the onsite (April 23-25, 2007), BLM biologist observed that the grass height throughout the project area ranged from 0-4 inches (Easdale 2007).

Suitable mountain plover habitat is found throughout the project area according to the 2006 and 2007 habitat survey, and the BLM (Buffalo Field Office) habitat suitability model and observations made by a BLM biologist.

### 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 3.7 Historical West Nile Virus Information**

Year	Total WY Human Cases	Human Cases PRB	Veterinary Cases PRB	Bird Cases PRB
2001	0	0	0	0
2002	2	0	15	3
2003	392	85	46	25
2004	10	3	3	5
2005	12	4	6	3
2006	65	0	2	2
2007	119	20	Unk	Unk

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 watershed but the water will be discharged to the Upper Belle Fourche River drainage system.

#### **3.5.1. Groundwater**

A search of the Wyoming State Engineer Office (WSEO) Ground Water Rights Database for this area showed 18 registered stock and domestic water wells within ½ mile of a federal CBNG producing well in the POD with depths ranging from 10 to 885 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 Pumpkin Creek drainage which is tributary to the Upper Powder River. However, the water associated with this project will be discharged to the Upper Belle Fourche River. 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.

There are several existing impoundments located with the project area. Most are located at or near the Pumpkin Creek channel. These impoundments are not proposed for use for the water management strategy for this project, nor will they be impacted by any construction for this project.

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

composition to surface drainages within the Project Area” (PRB FEIS page 3-48). For the Upper Belle Fourche River, the EC ranges from 1,532 at Maximum monthly flow to 2,755 at Low monthly flow and the SAR ranges from 3.81 at Maximum monthly flow to 6.77 at Low monthly flow. These values were determined at the USGS station (#06426500) located below Moorcroft, WY (PRB FEIS page 3-49).

The operator has identified a natural spring within this POD boundary at T45N, R75W, Sec 18. The estimated flow of the spring has been determined to be <1 gpm with a water quality of 4590 µmhos/ cm conductivity, 4290 mg/l TDS and 7 SAR.

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 River Unit Gamma POD project prior to on-the-ground project work (BFO project no. 070070018). SWCA Environmental Consultants conducted a Class III cultural resource inventory following the Archeology and Historic Preservation, Secretary of the Interior's Standards and Guidelines (48CFR190) for the project. G.L. “Buck” Damone III, BLM Archaeologist, reviewed the report for technical adequacy and compliance with Bureau of Land Management (BLM) standards, and determined it to be adequate. The following cultural resources are located in or near the area of potential effect.

**Table 3.8 Cultural Resources Inventory Results**

Site Number	Site Type	National Register Eligibility
48CA836	Prehistoric Site	Not Eligible
48CA837	Prehistoric Site	Not Eligible
48CA928	Historic Site	Not Eligible
48CA930	Prehistoric Site	Not Eligible
48CA937	Prehistoric Site	Unevaluated
48CA941	Historic Site	Not Eligible
48CA2013	Historic Site	Not Eligible
48CA2148	Prehistoric Site/Historic Site	Not Eligible
48CA2150	Historic Site	Not Eligible
48CA2151	Prehistoric Site	Not Eligible
48CA2153	Historic Site	Not Eligible
48CA2154	Prehistoric Site	Not Eligible
48CA2172	Prehistoric Site	Not Eligible
48CA2194	Historic Site	Not Eligible
48CA2210	Prehistoric Site	Not Eligible
48CA2274	Historic Site	Not Eligible

<b>Site Number</b>	<b>Site Type</b>	<b>National Register Eligibility</b>
48CA2278	Prehistoric Site/Historic Site	Not Eligible
48CA2280	Prehistoric Site/Historic Site	Not Eligible
48CA2283	Prehistoric Site	Not Eligible
48CA2284	Prehistoric Site	Not Eligible
48CA2285	Prehistoric Site/Historic Site	Not Eligible
48CA2286	Prehistoric Site/Historic Site	Not Eligible
48CA5541	Historic Site	Not Eligible
48CA5542	Historic Site	Not Eligible
48CA5543	Prehistoric Site/Historic Site	Not Eligible
48CA5546	Prehistoric Site/Historic Site	Not Eligible
48CA5547	Prehistoric Site	Not Eligible
48CA5548	Prehistoric Site	Not Eligible
48CA5549	Prehistoric Site	Not Eligible
48CA5550	Prehistoric Site	Not Eligible
48CA5551	Prehistoric Site	Not Eligible
48CA5552	Historic Site	Not Eligible
48CA5553	Prehistoric Site	Not Eligible
48CA5554	Prehistoric Site	Not Eligible
48CA5555	Prehistoric Site/Historic Site	Not Eligible
48CA5556	Prehistoric Site	Not Eligible
48CA5557	Prehistoric Site/Historic Site	Not Eligible
48CA5561	Prehistoric Site	Not Eligible
48CA5600	Prehistoric Site/Historic Site	Not Eligible

#### **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 would be reduced, based on the operator's plans and BLM applied mitigation. Of the 50 proposed well locations, all can be drilled

without a well pad being constructed. Surface disturbance will occur with the drilling of the wells. This disturbance would involve digging-out of rig wheel wells (for leveling drill rig on minor slopes), reserve pit construction (estimated approximate size of 25 X 40 feet), and compaction (from vehicles driving/parking at the drill site). Estimated disturbance associated with all wells would involve approximately 0.32 acre/well for 14.08 total acres. This could 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.

There will be no new construction of improved roads to provide access to various well locations. Approximately 10.72 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 1.21 miles of pipeline would be constructed outside of corridors. Expedient reclamation of disturbed land with stockpiled topsoil, proper seedbed preparation techniques, and appropriate seed mixes, along with utilization of erosion control measures (e.g., waterbars, water wings, culverts, rip-rap, etc.) would ensure land productivity/stability is regained and maximized.

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

- Mixing of horizons – occurs where construction on roads, pipelines or other activities take place. Mixing may result in removal or relocation of organic matter and nutrients to depths where it would be unavailable for vegetative use. Soils which are more susceptible to wind and water erosion may be moved to the surface. Soil structure may be destroyed, which may impact infiltration rates. Less desirable inorganic compounds such as carbonates, salts or weathered materials may be relocated and have a negative impact on revegetation. This drastically disturbed site may change the ecological integrity of the site and the recommended seed mix.
- Loss of soil vegetation cover, biologic crusts, organic matter and productivity. With expedient reclamation, productivity and stability should be regained in the shortest time frame.
- Soil Erosion would also affect soil health and productivity. Erosion rates are site specific and are dependant on soil, climate, topography and cover.
- Soil Compaction – the collapse of soil pores results in decreased infiltration and increased erosion potential. Factors affecting compaction include soil texture, moisture, organic matter, clay content and type, pressure exerted, and the number of passes by vehicle traffic or machinery. Compaction may be remediated by plowing or ripping.
- Modification of hill slope hydrology.

Soil disturbances other than permanent facilities would be short term with expedient, successful interim reclamation and site stabilization. Construction activities would be designed following Best Management Practices (BMPs) Seed mixes were determined based on soil map unit types, the dominant ecological sites found within the project area, and the mixing of soil horizons in disturbed areas.

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

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

Table 4.1 summarizes the proposed surface disturbance.

**Table 4.1 - SUMMARY OF DISTURBANCE**

<b>Facility</b>	<b>Number or Miles</b>	<b>Factor</b>	<b>Acreage of Disturbance</b>	<b>Duration of Disturbance</b>
Nonconstructed Pad	50	0.32/acre	16.0	Long Term
Constructed Pad				
Gather/Metering Facilities	0	Site Specific	0.0	Long Term
Compressors	1	Site Specific	2.06	Long Term
Monitor Wells	0	0.1/acre	0	Long Term
Impoundments	1		3.5	Long Term
On-channel	1	Site Specific	3.5	
Off-channel	0	Site Specific	0.0	
Water Discharge Points	1	Site Specific	0.1	
Improved Roads	0.0	40' Width or Site Specific	0.0	Long Term
No Corridor				
With Corridor				
2-Track Roads	5.27		24.92	Long Term
No Corridor	0.52	30' Width	1.89	
With Corridor	4.75	40' Width	23.03	
Pipelines	18.73		90.35	Short Term
No Corridor	11.35	40' Width	55.03	
With Corridor	7.19	40' Width	34.86	
Buried Power Cable				
No Corridor	0.19	20' Width	0.46	Short Term
Overhead Powerlines	2.8	30' Width	10.18	Long Term
		<b>TOTALS</b>	<b>147.47</b>	<b>Short Term</b>
			<b>56.66</b>	<b>Long Term</b>

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**

The water management strategy for the HD3 POD does not include direct discharge to Pumpkin Creek. The water produced from the wells in this project area will be transported to the approved water discharge point at the Upper Belle Fourche River. An on-channel impoundment will be constructed within the project area to contain produced water in the event of a problem with the transfer pumps, but it is not anticipated that the impoundment will continuously contain water. There will be no additional impacts to wetland or riparian areas due to the development of this project.

Most of the road crossings are already in place. Any new disturbance in Pumpkin Creek or any other ephemeral drainage will be expediently reclaimed to minimize erosion potential.

The PRB FEIS assumes that 15% of the impounded water will re-surface as channel flow (PRB FEIS pg 4-74). Re-surfacing water from the impoundments will potentially allow for wetland-riparian species establishment. The impoundment permitted with this project will only be used for temporary discharge in

the event of a problem with the water transfer system. The volume of water which could resurface would be much less than 0.5 cfs (15% of the total volume of water produced from this project).

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

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

1. A weed-spraying program designed by the landowner and XTO Energy will be administered on all of the disturbed areas. The program involves watching for spring and fall growth of noxious weeds along the road ways, dam sites, well locations, all Right-of Ways, and any other disturbed areas due to operations of XTO Energy. Upon noxious weed growth, the current Campbell County Weed and Pest Control's mixture and rates will be applied. Once the area is deemed clear of noxious weeds, the designed seed mixture will be applied to the disturbed area. The weed control shall be done in a timely manner in cooperation with all agencies, operators and landowners. For specific rates of application refer to the Integrated Pest Management Plan in the POD book.
2. Precautionary measures, such as washing vehicles, may also be implemented to minimize seed transportation and dispersal. Noxious weed control will be incorporated into the construction of all facilities within the exterior limits of the permit to prevent the introduction or spread of any noxious weeds, taking into consideration where noxious weeds are most likely to invade and flourish. Much of the area around the HD3 is currently heavily developed and weed control is taking place in those project areas.
3. XTO Energy will educate field personnel and other contractors in identification and awareness of noxious weeds.

Cheatgrass or downy brome (*Bromus tectorum*) and to a lesser extent, Japanese brome (*B. japonicus*) are known to exist in the affected environment. These two species are found in such high densities and numerous locations throughout NE Wyoming that a control program is not considered feasible at this time. Pricklypear cactus (*Opuntia polyacantha*), is a native species found throughout native rangelands. A control program for this species is not recommended.

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

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

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

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

- They are proportional to the actual amount of cumulatively produced water in the Upper Belle

Fourche River drainage, which is approximately 26.0% of the total predicted in the PRB FEIS.

- The WDEQ enforcement of the terms and conditions of the WYPDES permit that are designed to protect irrigation downstream.
- The WMP for the HD3 proposes that produced water will not contribute significantly to flows downstream.

## **4.2. Wildlife**

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

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

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

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

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

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

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

### **4.2.2. 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, pipelines and reservoirs. Prompt re-vegetation of short-term disturbance areas should reduce habitat loss impacts. Human activities likely displace migratory birds farther than simply the physical habitat disturbance. Drilling and construction noise can be troublesome for songbirds by interfering with the males’ ability to attract mates and defend territory, and the ability to recognize calls from conspecifics (BLM 2003).

Density of breeding Brewer’s sparrows declined by 36% within 100 m of dirt roads within a natural gas field. Effects occurred along roads with light traffic volume (<12 vehicles per day). Findings suggest that indirect habitat losses from energy development may be substantially larger than direct habitat losses (Ingelfinger 2004).

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

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

Existing and newly constructed reservoirs may have either a positive or negative affect on waterfowl. The reservoirs may provide winter forage and nesting habitat for migrating waterfowl and shore birds. Concentrations of salts and metals, particularly barium and selenium, may increase in the containment reservoirs receiving coalbed natural gas produced water discharges, as water evaporates overtime. Direct effects (toxicity) to waterfowl could occur, depending on the quality of the produced water.

With numerous existing reservoirs surrounding the project area and 2 (1 existing and 1 proposed) reservoirs within the project area, the potential for mosquito breeding areas will increase. With the creation of more reservoirs within the sage brush community more species are being exposed to the West Nile virus. Mortality rates are likely to increase and reproductive success is likely to decrease in most bird species using the region. 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).

**Table 4.2.** Infrastructure within close proximity to documented raptor nests within the HD3 project area (Timing limitations will apply to this infrastructure).

<b>BLM ID#</b>	<b>SPECIES</b>	<b>UTM (NAD 83)</b>	<b>STATUS</b>	<b>WELL / PIT NUMBER</b>	<b>DISTANCE</b>
644	RTHA	4862925N 423273E	Active	proposed access road leading to well 41-02.	0.46 miles

<b>BLM ID#</b>	<b>SPECIES</b>	<b>UTM (NAD 83)</b>	<b>STATUS</b>	<b>WELL / PIT NUMBER</b>	<b>DISTANCE</b>
4381	UNRA	4862642N 423391E	Gone	Gone	Gone
New	FEHA	4862159N 424884E	Active	well 21-01 existing 2 track.	0.31 miles 0.18 miles
New	FEHA	4861923N 425020E	Active	well 43-01 well 21-01 existing 2-track road	0.34 miles 0.39 miles 0.17 miles
4384	RTHA	4862011N 425496E	Active	well 43-01	0.49 miles
4383	FEHA	4861004N 424614E	Inactive	well 34-01 well 43-01 well 23-01 well 21-12 well 41-21	0.125 miles 0.33 miles 0.22 miles 0.36 miles 0.4 miles
3368	RTHA	4861159N 423168E	Active	well 43-02 well 32-02 well 23-02 well 42-11 well 21-11	0.23 miles 0.36 miles 0.33 miles 0.4 miles 0.45 miles
643	RTHA	4861079N 423150E	No data 2007	well 43-02 well 32-02 well 23-02 well 42-11 well 21-11	0.23 miles 0.36 miles 0.33 miles 0.4 miles 0.45 miles
3837	GHOW	4860040N 423410E	No Data 2007	well 32-11 well 43-11 well 43-11 well 21-11 well 34-02	0.16 miles 0.2 miles 0.32 miles 0.42 miles 0.45 miles
New	FEHA	4859582N 422270E	Inactive	from proposed reservoir (Shortys)	0.26 miles
New	GHOW	4859544N 422262E	Active	from proposed reservoir (Shortys)	0.27 miles
3367	RTHA	4859359N 423822E	Active	well 23-12 well 43-11 well 41-14 well 31-13	0.33 miles 0.28 miles 0.32 miles 0.38 miles
3371	FEHA	4859415N 426578E	Gone	well 34-07 well 41-18 well 23-07	0.19 miles 0.21 miles 0.46 miles

<b>BLM ID#</b>	<b>SPECIES</b>	<b>UTM (NAD 83)</b>	<b>STATUS</b>	<b>WELL / PIT NUMBER</b>	<b>DISTANCE</b>
New	FEHA	4857426N 423825E	Active	well 41-23 well 43-14 well 23-13 pump station 3 well 23-24 access road to 43-23 well 14-13 well 21-24 well 12-24	0.22 miles 0.45 miles 0.49 miles 0.48 miles 0.32 miles 0.48 miles 0.17 miles 0.27 miles 0.32 miles
New	RTHA	4856813N 425373E	Active	well 12-19 well 43-24 well 14-19 well 32-24 well 41-24 well 21-19 well 23-19	0.081 miles 0.26 miles 0.5 miles 0.4 miles 0.29 miles 0.43 miles 0.35 miles
3137	RTHA	4855790N 424056E	Active	well 14-24 well 23-24 well 34-24 access road to well 34-24 well 12-25	0.14 miles 0.41 miles 0.49 miles 0.37 miles 0.44 miles
647	RTHA	4855569N 424118E	Gone	well 14-24 well 34-24 access road to 34-24 well 32-25 well 23-25 well 12-25 access road connecting wells 14- 24 to 14-25	0.25 miles 0.45 miles 0.32 miles 0.38 miles 0.46 miles 0.34 miles 0.20 miles
3369	FEHA	4853031N 428930E	Not checked in 2007	well 21-04	0.44 miles
666	FEHA	4851713N 428236E	Not checked in 2007	well 14-04 well 12-04	0.45 miles 0.44 miles
New	RTHA	4860542N 421055E	Active	well 23-03	0.47 miles
New	GHOW	4860973N 421547E	Active	well 23-03	0.3 miles

Well 34-03 was dropped from the project. During the onsite, the BLM biologist found a new active great-horned owl nest located approximately 0.05 miles from well 34-03, BLM and XTO moved the well.

After the onsite XTO discovered that they do not own the lease for that location so XTO chose to drop the well.

During the onsite, BLM biologist found a new red-tailed hawk nest on top of a power pole within approximately 300 feet of well 12-19. During the onsite, no changes were made. On April 30 and August 20, 2007, BLM biologist, Guymen Easdale consulted with Brad Rogers of the US Fish and Wildlife Service (USFWS) about the raptor nest located on the power pole. The BLM, after consultation with USFWS, has decided to have the nest removed from the power pole before February 1, 2008 and to have XTO bring that portion of the powerline up to Avian Power Line Interaction Committee's (2006) suggested practices and with the Service's standards (USFWS 2002). This will help to reduce the possibility of raptor electrocutions within the general area of the well.

The 14-24 well was originally 0.15 miles from an active red-tailed hawk nest. The well was moved approximately 105 feet to the west. The new well location puts the well approximately 0.19 miles from the nest and out of sight. The new location is on the edge of an existing 2-track road in a flat grassy area, thus eliminating an access road. Moving the well in any other direction would cause considerable more surface disturbance.

Originally well 34-02 was 0.21 miles from a raptor nest. The well was moved approximately 350 feet east, the new location puts the well more than a quarter mile from the nest and out sight. Well 43-02 was moved 100 feet to the north, the new location puts the well more than a quarter mile away from the raptor nest and is out of sight. Originally well 34-01 was 0.14 miles from an inactive ferruginous hawk nest (nest is in poor condition), well was moved approximately 160 feet northeast. The new location puts the well 0.19 miles from nest and out of sight.

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.

#### **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**

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

#### 4.2.4.1. Threatened and Endangered and Sensitive Species

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

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

#### Presence

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

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

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

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

#### Effect Determinations

**LAA** Likely to adversely affect

**NE** No Effect.

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

**4.2.4.1.1. Black-footed ferret**

Because there is only one very small (0.2 to 0.5 acres) black-tailed prairie dog colony within the HD3 project area and it is isolated from any prairie dog complexes, implementation of the proposed development should have “no effect” on the black-footed ferret.

**4.2.4.1.2. Ute’s Ladies Tresses Orchid**

Produced water will primarily be piped to the Belle Fourche River in the NENW Sec 5 T44N R73W, produced water may also be stored temporarily stored in 1 proposed reservoir. The reservoir is on-channel and is located within a dry upland drainage. The spring in Section 18, Township 45 North, Range 75 West will not be affected by surface activities. With extensive natural gas development in the area and with the removal of water from underground sources, it is likely that the spring will go dry.

Reservoir seepage may create suitable habitat if historically ephemeral drainages become perennial, however no historic seed source is present within or upstream of the project area. Implementation of the proposed coal bed natural gas project should have “no effect” on the Ute ladies’- tresses orchid as neither suitable habitat nor a seed source are present.

#### 4.2.4.2. Sensitive Species Direct and Indirect Effects

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

Common Name (scientific name)	Habitat	Presence	Project Effects	Rationale
<b>Amphibians</b>				
Northern leopard frog ( <i>Rana pipiens</i> )	Beaver ponds, permanent water in plains and foothills	S	MIIH	Additional water will effect existing waterways.
Spotted frog ( <i>Ranus pretiosa</i> )	Ponds, sloughs, small streams	NP	NI	Prairie not mountain habitat.
<b>Birds</b>				
Bald eagle ( <i>Haliaeetus leucocephalus</i> )	Mature forest cover often within one mile of large water body.	K	MIIH	Project includes overhead power and roads.
Baird's sparrow ( <i>Ammodramus bairdii</i> )	Grasslands, weedy fields	S	MIIH	Sagebrush cover will be affected.
Brewer's sparrow ( <i>Spizella breweri</i> )	Basin-prairie shrub	K	MIIH	Sagebrush cover will be affected.
Burrowing owl ( <i>Athene cucularia</i> )	Grasslands, basin-prairie shrub	S	MIIH	Prairie dog colony present, burrows will be lost.
Ferruginous hawk ( <i>Buteo regalis</i> )	Basin-prairie shrub, grasslands, rock outcrops	K	MIIH	Grassland and shrubland habitat 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	S	MIIH	Grassland habitat will be affected.
Mountain plover ( <i>Charadrius montanus</i> )	Short-grass prairie with slopes < 5%	S	MIIH	Grassland habitat 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 billneata</i> )	Basin-prairie shrub, mountain-foothill shrub	K	MIIH	Sagebrush cover will be affected.
Sage thrasher ( <i>Oreoscoptes montanus</i> )	Basin-prairie shrub, mountain-foothill shrub	K	MIIH	Sagebrush cover will be affected.
Trumpeter swan ( <i>Cygnus buccinator</i> )	Lakes, ponds, rivers	S	MIIH	Reservoirs may provide migratory habitat.
White-faced ibis ( <i>Plegadis chihi</i> )	Marshes, wet meadows	NP	NI	Permanently wet meadows not present.
Yellow-billed cuckoo ( <i>Coccyzus americanus</i> )	Open woodlands, streamside willow and alder groves	NP	NI	Streamside habitats not present
<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.	K	MIIH	Prairie dog towns will be affected.
Fringed myotis ( <i>Myotis thysanodes</i> )	Conifer forests, woodland chaparral, caves and mines	NP	NI	Habitat not present.
Long-eared myotis ( <i>Myotis evotis</i> )	Conifer and deciduous forest, caves and mines	NP	NI	Habitat not present.
Spotted bat ( <i>Euderma maculatum</i> )	Cliffs over perennial water.	NP	NI	Cliffs & perennial water not present.
Swift fox ( <i>Vulpes velox</i> )	Grasslands	S	MIIH	Sagebrush and grassland habitat will be lost.
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 tufaceous mudstone and clay slopes 5300-6500 ft.	NP	NI	Habitat not present.
William's wafer parsnip ( <i>Cymopterus williamsii</i> )	Open ridgetops and upper slopes with exposed limestone outcrops or rockslides, 6000-8300 ft.	NP	NI	Habitat not present.

**Presence**

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

**Project Effects**

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

#### **4.2.4.2.1. Bald eagle**

According to the BLM Buffalo Field Office database bald eagles have been observed within the project area and at two locations within 1.3 miles of the project area. Bald eagles were observed near the project area during the 2005 and 2006 winters. Cottonwood trees capable of supporting roosting and nesting bald eagles exist at four locations within the HD3 project area. Single cottonwood trees are found scattered throughout the project area in deep narrow draws.

The HD3 project area is surrounded by extensive natural gas development. There are 166.7 miles of existing overhead electrical power lines within and around the Hartzog Draw Oil Field/HD CBM #1, HD CBM#2 and HD3 project areas. XTO is proposing to construct an additional 2.8 miles of 3-phase overhead power lines. The existing overhead lines are a combination of single and three phase lines. Observations made by the BLM biologist during the onsite visit indicate that many of these lines are not in compliance with the Avian Power Line Interaction Committee's (APLIC 2006) suggested practices and with the Service's standards (USFWS 2002). XTO Energy is working with Powder River Energy Corporation to bring XTO's existing powerlines up to the APLIC (2006) standards.

The presence of overhead power lines and roads 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, such as the HD3 project area. From May 2003, through August 14, 2007, Service Law Enforcement salvage records for northeast Wyoming identified that 180 raptors, including 1 bald eagle, 106 golden eagles, 1 unidentified eagle, 28 hawks, 44 owls and 8 unidentified raptors and 1 great-blue heron were electrocuted on power poles within the Powder River Basin Oil and Gas Project area (USFWS 2007). Of the 180 raptors electrocuted 58 were at power poles that are considered new construction (post 1996 construction standards). Additionally, two golden eagles and a Cooper's hawk were killed in apparent mid span collisions with powerlines (USFWS 2006a). Power lines not constructed to APLIC suggestions pose an electrocution hazard for eagles and other raptors perching on them; the Service has developed additional specifications improving upon the APLIC suggestions. Constructing power lines to the APLIC suggestions and Service standards minimizes but does not eliminate electrocution risk.

Outlined in the biological assessment, the biological opinion, the environmental assessment and the conditions of approval for the Hartzog Draw Oil Field/HD CBM #1 and HD CBM#2 projects, XTO was required to modify the existing overhead powerlines to 3-phase and bring them up to the standards outlined by Avian Power Line Interaction Committee's (2006) suggested practices and with the Service's standards (USFWS 2002).

Currently, there are 162 miles of engineered crown and ditch roads within and around the HD3 project area. Roads present a collision hazard, primarily from bald eagles scavenging on carcasses resulting from other road related wildlife mortalities. Collision risk increases with vehicle size and travel speed. Typically two-tracks and improved project roads pose minimal collision risk. In one year of monitoring road-side carcasses the BLM Buffalo Field Office reported 439 carcasses, 226 along Interstates (51%), 193 along paved highways (44%), 19 along gravel county roads (4%), and 1 along an improved CBNG road (<1%) (Bills 2004). No road-killed eagles were reported; eagles (bald and golden) were observed feeding on 16 of the reported road-side carcasses (<4%).

With the increase in gas development in the area, vehicle size and traffic volume will also increase. Over 90% of the vehicle traffic using the road system within the project area will be semi trucks and large pick-up trucks. Based on personal observations and conversations with landowners, operators and other BLM employees, vehicles using improved crown and ditch roads associated with natural gas development are traveling at speeds well over 25 miles per hour. During the onsite, the BLM biologist observed three

4000 gallon water trucks traveling on an improved crown and ditch road within the project area at speeds well over 25 miles per hour, probably in the range of 40 to 50 miles per hour. During the onsite a total of 18 pronghorn antelope carcasses were observed within 50 to 150 feet of improved crown and ditch roads.

Produced water will be primarily discharged into the Belle Fourche River (NENW Sec 5 T44N R73W), and will also be stored temporally in 1 proposed reservoir, which may attract eagles if reliable prey is present, most likely in the form of waterfowl. The effect of reservoirs on eagles is unknown. 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 the reservoir should be reported to determine the need for any future management.

**4.2.4.2.2. Black-tailed prairie dog**

As of April 23, 2007, there is a very small prairie dog colony (0.2-0.5acres) just getting started and burrows are sparse. At present the proposed development will not affect the prairie dogs. However, as the colony expands and becomes denser there is the potential for development to impact the prairie dogs in the future. With the construction of well pads, pipelines and roads prairie dog burrows might be lost as well as direct mortalities. With increased traffic in the area there is the potential for more road related mortalities.

**4.2.4.2.3. Greater sage-grouse**

Peer-reviewed, published research indicates that Coalbed Natural Gas (CBNG) development is having negative impacts to long-term Sage grouse population levels. The Bureau of Land Management (BLM) has been participating in discussions with the Petroleum Association of Wyoming (PAW), the Governor of Wyoming, and the academic community to develop an approach to continue coalbed natural gas development, while not compromising the overall population of Sage grouse in Wyoming.

The BLM, Wyoming Game and Fish Department and researchers have identified high quality sage grouse habitat areas. These areas have been referred to as “sage grouse planning polygons” and have become the subject of considerable discussion and concern. The BLM is hopeful that the efforts of PAW can provide practices that can be implemented that allow continued CBNG development in these areas. The BLM will need to prepare additional National Environmental Protection Act (NEPA) and/or planning documents to integrate this information into our future decisions.

The following APD’s and associated infrastructure lie within a greater sage-grouse planning polygon.

	<b>Well Name</b>	<b>Well #</b>	<b>Qtr/Qtr</b>	<b>Section</b>	<b>TWP</b>	<b>RNG</b>	<b>Lease #</b>
1	HD CBM 3 HARTZOG	41-18BG	NENE	18	45N	75W	WYW42610
2	HD CBM 3 HARTZOG	21-1BG	NENW	1	45N	76W	WYW51704
3	HD CBM 3 HARTZOG	23-1BG	NESW	1	45N	76W	WYW51704
4	HD CBM 3 HARTZOG	34-1BG	SWSE	1	45N	76W	WYW51704
5	HD CBM 3 HARTZOG	43-1BG	NESE	1	45N	76W	WYW72485
6	HD CBM 3 HARTZOG	41-12BG	NENE	12	45N	76W	WYW51704

The BLM Wyoming is currently developing interim guidance for processing energy actions in Sage grouse habitats and more specifically for the Powder River Basin. In light of the above, the following actions will be taken in the Powder River Basin:

1. Decisions on APD/POD/ROW applications that lie within identified high quality sage grouse habitat will be processed by completing NEPA analysis that incorporates the findings of the recent peer reviewed research. Operators may amend their current applications in the Buffalo Field Office to exclude actions in the high quality sage grouse habitat areas if they wish to continue the processing of their applications in

the short-term.

2. The Buffalo Field Office will give a priority to processing APD/POD/ROW applications that are outside of these identified high quality sage grouse habitats and submitted in lieu of previously submitted applications that would be processed in number 1, above.
3. Operators with innovative ideas for CBNG development in the high quality sage grouse habitat areas should initiate discussions with the Buffalo Field Office and share those ideas with the industry representatives on the Governor's task force that was formed in follow-up to the recent sage grouse summit. The Buffalo Field Office will consider applications with innovative ideas on a case-by-case basis and in consultation with this office, may proceed to process applications incorporating approaches which appear to have a high likelihood of success.
4. Operators/lessees whose leases would be adversely affected by this action may request a suspension of operations and/or production through the Buffalo Field Office.

Due to the ongoing efforts described above, the above six wells are not analyzed in this EA.

According to the Wyoming Game and Fish Department database (2006) and surveys conducted by Western EcoSystems Technology (2007), 2 sage grouse leks occur on the southwest boundary, and 2 are within 3 miles of the project area. Numerous piles of sage grouse scat were found at three well sites (12-4, 43-23 and 23-13).

Small pockets (0.5 -10 acres) of suitable sage-grouse nesting and brood rearing habitat (10-25% cover) is present throughout the project area.

Approximately 3 acres of good sage grouse nesting habitat (10-25% cover) will be lost during project development. The access road/pipeline corridor to well 43-23 will not exceed 30 feet maximum disturbance width. The pipeline corridor from well 12-4-4475 to well 21-04-4475 will not exceed 25 feet maximum disturbance width. Access road/pipeline to the 23-4 well was rerouted from areas of suitable sage grouse nesting habitat (10-25%) to areas of poor sage grouse nesting habitat (0-8% cover) and will not exceed 25 feet maximum disturbance width. Originally, these access roads/pipelines were to be 40 feet wide. The access road/pipeline corridor to well 41-23 was rerouted out of suitable sage grouse nesting habitat (10-25% cover) to an area of poor sage grouse nesting habitat (0-5% cover). These changes will help to reduce the amount of suitable sage grouse nesting and brood rearing habitat (10-25% cover) lost.

With extensive natural gas development occurring throughout the Powder River Basin, sage grouse are being forced out of areas of good quality nesting habitat into areas that are poor to marginal quality nesting habitat.

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

The presence of overhead power lines and roads within the project area may adversely affect sage grouse. Overhead power lines create hunting perches for raptors, thus increasing the potential for predation on sage grouse. Increased predation from overhead power near leks may cause a decrease in lek attendance

and possibly lek abandonment. Overhead power lines are also a collision hazard for sage grouse flying through the area. Increased roads and mineral related traffic can affect grouse activity and reduce survival (Braun et al. 2002). Activity along roads may cause nearby leks to become inactive over time (WGFD 2003).

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

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

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

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

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

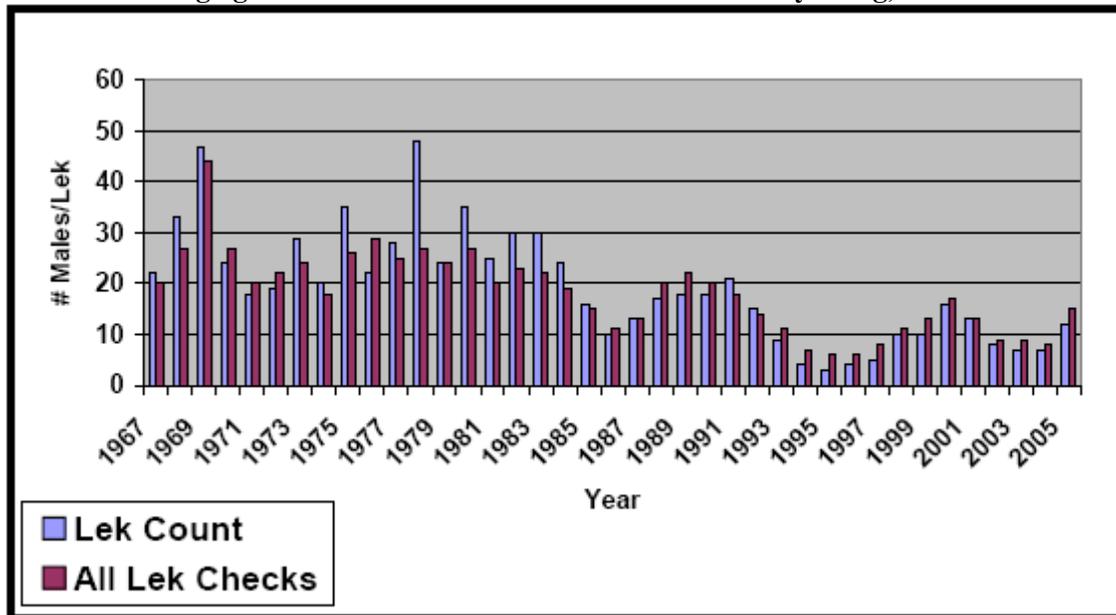
Percentage of sage-grouse nesting within a certain distance from their breeding lek is unavailable for the Powder River Basin. The Buffalo and Miles City field offices through the University of Montana with assistance from other partners including the U.S. Department of Energy and industry are currently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

Vegetation communities within the Powder River Basin are naturally fragmented as they represent a transition between the intermountain basin sagebrush communities to the west and the prairie communities to the east. The Powder River Basin is also near the eastern edge of greater sage-grouse range. Without contiguous habitat available to nesting grouse it is likely a smaller percentage of grouse nest within two-miles of a lek within the PRB than grouse within those areas studied in the development of the 1977 WAFWA recommendations and even the Holloran and Moynahan study areas. Holloran and Moynahan both studied grouse in areas of contiguous sagebrush habitats without large scale fragmentation and habitat conversion (Moynahan et al In press, Holloran and Anderson 2005). A recent

sagebrush cover assessment within Wyoming basins estimated sagebrush coverage within Hollaran and Anderson's Upper Green River Basin study area to be 58% with an average patch size greater than 1200 acres; meanwhile Powder River Basin sagebrush coverage was estimated to be 35% with an average patch size less than 300 acres (Rowland et al. 2005). The Powder River Basin patch size decreased by more than 63% in forty years, from 820 acre patches and an overall coverage of 41% in 1964 (Rowland et al. 2005). Recognizing that many populations live within fragmented habitats and nest much farther than two miles from the lek of breeding WAFWA revised their sage grouse management guidelines (Connelly et. al. 2000) and now recommends the protection of suitable habitats within 5 km (3.1 mi) of leks where habitats are not distributed uniformly such as the Powder River Basin.

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

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



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

A two-mile timing limitation given the long-term population decline and that less than 50% of grouse are expected to nest within the limitation area is likely insufficient to reverse the population decline. Moynahan and Lindberg (2004) like WAFWA (Connelly et al. 2000) recommend increasing the protective distance around sage grouse leks. Even with a timing limitation on construction activities, sage-grouse may avoid nesting within CBNG fields because of the activities associated with operation and production.

As stated earlier, a well density of eight wells per section creates sage-grouse avoidance zones which overlap creating contiguous avoidance areas (WGFD 2004).

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

#### **4.2.4.2.4. Mountain plover**

The majority of the HD3 project area is suitable mountain plover habitat. The project area is primarily grassland on flat to gently rolling terrain with a slope ranging from 0 to 8%.

Mineral development may have mixed effects on mountain plovers. Disturbed ground such as buried pipeline corridors and roads may be attractive to plovers, while human activities within one-quarter mile may be disruptive. Use of roads and pipe line corridors by mountain plovers may increase their vulnerability to vehicle collision. Overhead power lines provide perch sites for raptors that could potentially result in increased mountain plover predation. Well pump houses that are over four feet tall create additional hunting perches for raptors within the project area. XTO plans on constructing well pump houses that are eight feet tall. With the addition of structures over 4 feet tall, mountain plovers are likely to avoid the area although there is suitable habitat. CBNG infrastructure such as well houses, roads, pipe line corridors, and nearby metering facilities may provide shelter and den sites for ground predators such as skunks and foxes.

With the loss or alteration of their natural breeding habitat (predominately prairie dog colonies), mountain plovers have been forced to seek habitat with similar qualities that may be poor quality habitat. Such as heavily grazed land, burned fields, fallow agriculture lands, roads, oil and gas well pads and pipelines. These areas could become reproductive sinks. In these areas food quality may be greatly reduced, human activity in the area may lead to displacement of the adults during nesting causing chilling or overheating of the eggs and young. Adults may abandon the nest altogether causing nest failure. Vehicles and construction equipment operating in the area are more than likely to cause direct mortalities as they hit eggs and/or the young.

Recent analysis of the US Fish and Wildlife Service (USFWS) Breeding Bird Survey (BBS) data suggests that mountain plover populations have declined at an annual rate of 3.7 % over the last 30 years which represents a cumulative decline of 63% during the last 25 years (Knopf 1995).

An analysis of direct and indirect impacts to mountain plover due to oil and gas development is included in the PRB FEIS (4-254-255).

#### **4.2.4.2.4.1. 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 4-271.

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

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

effects in Wyoming.

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

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

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

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

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

The water management strategy proposed by XTO Energy Inc. consists of the transport of the total volume of water produced in association with CBNG from these Federal mineral wells to an existing water discharge point located on the Belle Fourche River in the NENW Sec 5 T44N R73W. Currently, all the water produced from CBNG wells operated by XTO is being discharged at this location. There are additional, previously evaluated water discharge points to impoundments located along the course of the water transfer line that could be used in emergency situations. One new emergency impoundment will be constructed within the project area. Water would only be discharged to these locations if there were problems with transfer pumps, water line or the final discharge point.

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 30.0 gpm per well or 1500 gpm (3.34 cfs or 2419.1 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 Upper Belle Fourche River drainage, the projected volume produced within the watershed area was 84,507 acre-feet in 2007 (maximum production was estimated in 2006 at 85,761 acre-feet). As such, the volume of water resulting from the production of these wells is 2.9% of the total volume projected for 2007. This volume of produced water is within the predicted parameters of the PRB FEIS.

##### **4.4.1. Groundwater**

The PRB FEIS predicts an infiltration rate of 28% to groundwater aquifers and coal zones in the Upper Belle Fourche River drainage area (PRB FEIS pg 4-5). For this action, it may be assumed that a maximum of 420 gpm will infiltrate at or near the discharge points and impoundments (677.4 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 10 to 885 feet (average 340 ft) compared to 1400 feet to the Big George coal zone. As mitigation, the operator has committed to offer water well agreements to holders of properly permitted domestic and stock wells within the circle of influence (½ mile of a federal CBNG producing well) of the proposed wells.

Recovery of the coal bed aquifer was predicted in the PRB FEIS to “...resaturate and repressurize the areas that were partially depressurized during operations. The amount of groundwater storage within the coals and sands units above and below the coals is enormous. Almost 750 million acre-feet of recoverable groundwater are stored within the Wasatch - 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.

Water will be discharged to the Shorty’s Impoundment only in emergencies when the water transfer line to the Belle Fourche River water discharge point is not functional.

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

**4.4.1.1. Groundwater Cumulative Effects:**

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

Development of CBNG through 2018 (and coal mining through 2033) would remove 4 million acre-feet of groundwater from the coal zone aquifer (PRB FEIS page 4-65). This volume of water “...cumulatively represents 0.5 percent of the recoverable groundwater stored in the Wasatch – Tongue River sands and coals (nearly 750 million acre-feet, from Table 3-5). All of the groundwater projected to be removed during reasonably foreseeable 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 SAR and EC average values 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 parameter 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**

<b>Predicted Values</b>	<b>TDS, mg/l</b>	<b>SAR</b>	<b>EC, µmhos/cm</b>
Belle Fourche River Watershed at the Gauging station below Moorcroft, WY			
Historic Data Average at Maximum Flow		3.81	1,532
Historic Data Average at Minimum Flow		6.77	2,755
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 # WY0052370			
At discharge point	5,000	10	2,000
Predicted Produced Water Quality			
Big George Coal Zone	1,440	10.5	2,310
Existing Shallow Groundwater Quality			
Spring 10 SWSW Sec 18 T45N R75W	4,290	6.7	4,590

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 1440 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 emergency discharge point proposed for this project. It has been appropriately sited and will utilize appropriate water erosion dissipation design. Existing and proposed water management facilities were evaluated for compliance with best management practices during the onsite. This on-channel

impoundment (10.89 acre-feet) will be used to manage the produced water on an emergency basis. It will disturb approximately 3.5 acres including the dam structures. Water will be discharged into this impoundment only if there are problems with the water transfer system to the Belle Fourche River. Monitoring may be required based upon WYDEQ findings relative to “Compliance Monitoring for Ground Water Protection Beneath Unlined Coalbed Methane Produced Water Impoundments” (June 14, 2004). The impoundment will be constructed to meet the requirements of the WSEO, WDEQ and the needs of the operator and the landowner.

The PRB FEIS assumes that 15% of the impounded water will re-surface as channel flow (PRB FEIS pg 4-74). Consequently, if all the water were impounded, the volume of water produced from these wells may result in the addition of 0.5 cfs below the reservoir (after infiltration and evapotranspiration losses). The operator has committed to monitor the condition of channels and address any problems resulting from discharge. The impoundments will not be allowed to discharge except in response to a storm event. Sedimentation could occur in the impoundment, 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 Belle Fourche River of 61 cfs (PRB FEIS pg 4-80). The predicted maximum discharge rate from these 50 wells is anticipated to be a total of 1500 gpm or 3.34 cfs or 5.5% of the predicted total CBNG produced water contribution. For more information regarding the maximum predicted water impacts resulting from the discharge of produced water, see Table 4-6 (PRB-FEIS pg 4-85).

The operator has stated and the BLM agrees, that the maximum projected water production rate of 1,500 gpm 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 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 WYPDES permit (#WY0052370) for the discharge of water produced from this project from the WDEQ.

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

pH	6.5 to 9.0
Sodium Adsorption Ratio	10
TDS	5000 mg/l max
Specific Conductance	2000 mg/l max
Sulfates	3000 mg/l max
Radium 226	5 pCi/l max*
Dissolved iron	280 µg/l max**
Dissolved Manganese	820 µg/l max
Total Barium	1800 µg/l max
Total Arsenic	3.1 µg/l max
Chlorides	46 mg/l
Total Flow, MGD (All outfalls)	4.01

\* Total Radium concentrations set for specific emergency discharge points, not the primary discharge at the Belle Fourche River.

\*\*Dissolved iron concentration limit at emergency discharge points is 1,000 µg/l maximum.

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

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

The development of coal bed natural gas and the production and discharge of water in the area surrounding the existing natural spring may affect the flow rate or water quality of the spring. The operator will be required to monitor the water quality and flowrate of the spring located in Section 18 twice per year and submit copies of the analysis to the BLM BFO. Through routine monitoring of the flowrate and water quality, it may be determined if the application of additional mitigation may be required.

In-channel downstream impacts are addressed in the WMP for the HD3 POD prepared by Pearl Field Services for XTO Energy Inc. The water management strategy includes the transport of the water produced from this project through an existing pipeline to discharge to the Belle Fourche River. The surface use agreement with one of the landowners down stream of this project area states that no CBNG produced water will allowed to flow to or across his surface. There should be no additional downstream concerns related to the completion of this project.

#### **4.4.2.1. Surface Water Cumulative Effects**

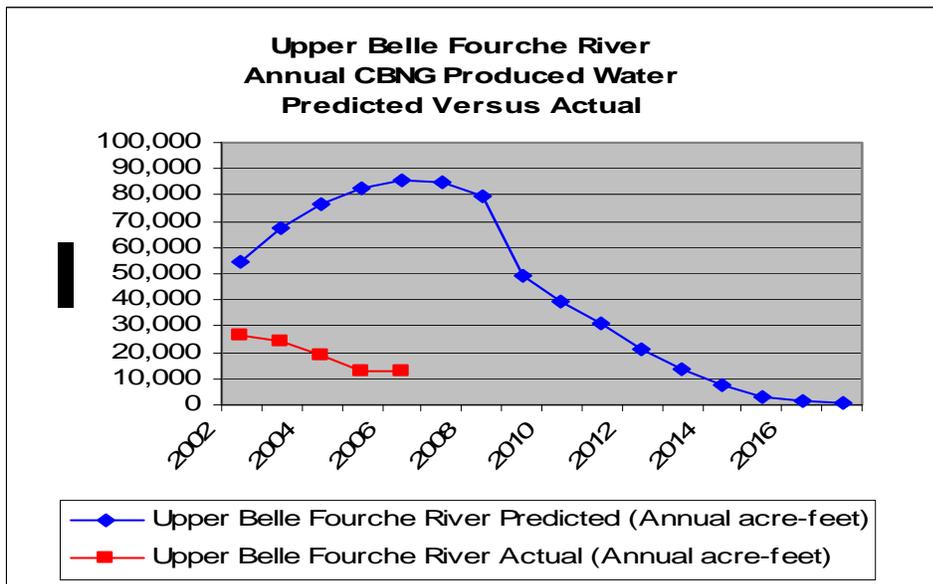
The analysis in this section includes cumulative data from Fee, State and Federal CBNG development in the Upper Belle Fourche River watershed. These data were obtained from the Wyoming Oil and Gas Conservation Commission (WOGCC).

As of December 2006 all producing CBNG wells in the Upper Belle Fourche River watershed have discharged a cumulative volume of 95,294 acre-ft of water compared to the predicted 366,949 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 26.0% of the total predicted produced water analyzed in the PRB FEIS for the Upper Belle Fourche River watershed.

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

Year	Upper Belle Fourche Predicted (Annual acre-feet)	Upper Belle Fourche Predicted (Cumulative acre-feet from 2002)	Upper Belle Fourche Actual (Annual acre-feet)		Upper Belle Fourche Actual (Cumulative acre-feet from 2002)	
			Actual Ac-ft	% of Predicted	Cum Ac-ft	% of Predicted
2002	54,735	54,735	26,761	48.9	26,761	48.9
2003	67,481	122,216	24,309	36.0	51,070	41.8
2004	76,259	198,475	18,906	24.8	69,975	35.3
2005	82,713	281,188	12,817	15.5	82,792	29.4
2006	85,761	366,949	12,502	14.6	95,294	26.0
2007	84,507	451,456				
2008	79,493	530,949				
2009	49,435	580,384				
2010	39,170	619,554				
2011	31,277	650,831				
2012	21,215	672,046				
2013	13,495	685,541				
2014	7,630	693,171				
2015	3,347	696,518				
2016	1,849	698,367				
2017	790	699,157				
<b>Total</b>	<b>699,157</b>		<b>95,294</b>			

**Figure 4.2 Actual vs predicted water production in the Upper Belle Fourche River watershed**



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

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

1. They are proportional to the actual amount of cumulatively produced water in the Upper Belle Fourche River drainage, which is approximately 26.0 % 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 Belle Fourche River watershed and page 117 for cumulative effects common to all sub-watersheds.

#### 4.5. Cultural Resources

Non-eligible sites 48CA836, 48CA2013, 48CA2280, 48CA2286, 48CA5553 and 48CA5554 will be impacted by proposed infrastructure. There are no eligible sites within the APE of the proposed project. Following the Wyoming State Protocol Section VI (A)(1) the Bureau of Land Management electronically notified the Wyoming State Historic Preservation Officer (SHPO) on 8/8/07 that no historic properties exist within the APE.

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

#### 5. CONSULTATION/COORDINATION

Contact	Title	Organization	Present at Onsite
Robert Christensen	Landowner		No
Al Erwin	Senior Operations Engineer	XTO Energy	Yes
Christi Haswell	Regulatory Project Manager	Pearl Field Services	Yes
John Kluz	Construction Foreman	XTO Energy	Yes
Brad Rogers	Fish and Wildlife Biologist	USFWS	No
Mary Hopkins	Interim SHPO	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.

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