

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

Anadarko Petroleum Corporation  
**Dry Willow Phase I**

ENVIRONMENTAL ASSESSMENT –WY-070-07-048

DECISION: Is to approve Alternative C as described in the attached Environmental Assessment (EA) and authorize Anadarko Petroleum Corporation’s Dry Willow Coal Bed Natural Gas (CBNG) POD comprised of the following 32 Applications for Permit to Drill (APDs), as follows:

	<b>Well Name</b>	<b>Well Number</b>	<b>Qtr/Qtr</b>	<b>Section</b>	<b>TWP</b>	<b>RNG</b>	<b>Lease Number</b>
1	DRY WILLOW 1	2-21*	NENW	2	43N	76W	WYW153076
2	DRY WILLOW 1	2-32	SWNE	2	43N	76W	WYW153076
3	DRY WILLOW 1	2-41	NENE	2	43N	76W	WYW153076
4	DRY WILLOW 1	19-12	SWNW	19	44N	75W	WYW147293
5	DRY WILLOW 1	20-21	NENW	20	44N	75W	WYW161649
6	DRY WILLOW 1	20-32	SWNE	20	44N	75W	WYW161649
7	DRY WILLOW 1	20-41	NENE	20	44N	75W	WYW145169
8	DRY WILLOW 1	20-43	NESE	20	44N	75W	WYW145169
9	DRY WILLOW 1	29-23	NESW	29	44N	75W	WYW145175
10	DRY WILLOW 1	29-32	SWNE	29	44N	75W	WYW145174
11	DRY WILLOW 1	29-34	SWSE	29	44N	75W	WYW138611
12	DRY WILLOW 1	29-43	NESE	29	44N	75W	WYW138611
13	DRY WILLOW 1	31-21	NENW	31	44N	75W	WYW145176
14	DRY WILLOW 1	31-23	NESW	31	44N	75W	WYW145176
15	DRY WILLOW 1	31-32	SWNE	31	44N	75W	WYW145176
16	DRY WILLOW 1	31-43	NESE	31	44N	75W	WYW145176
17	DRY WILLOW 1	24-12	SWNW	24	44N	76W	WYW140723
18	DRY WILLOW 1	24-21	NENW	24	44N	76W	WYW140723
19	DRY WILLOW 1	24-14	SWSW	24	44N	76W	WYW144535
20	DRY WILLOW 1	24-23	NESW	24	44N	76W	WYW144535
21	DRY WILLOW 1	24-32	SWNE	24	44N	76W	WYW153063
22	DRY WILLOW 1	24-41	NENE	24	44N	76W	WYW153063
23	DRY WILLOW 1	25-12	SWNW	25	44N	76W	WYW153070
24	DRY WILLOW 1	25-21	NENW	25	44N	76W	WYW150206
25	DRY WILLOW 1	26-14	SWSW	26	44N	76W	WYW45731
26	DRY WILLOW 1	26-41	NENE	26	44N	76W	WYW150206
27	DRY WILLOW 1	35-21	NENW	35	44N	76W	WYW45731
28	DRY WILLOW 1	35-23	NESW	35	44N	76W	WYW153064
29	DRY WILLOW 1	35-32	SWNE	35	44N	76W	WYW45731
30	DRY WILLOW 1	35-34	SWSE	35	44N	76W	WYW153064
31	DRY WILLOW 1	35-41	NENE	35	44N	76W	WYW45731
32	DRY WILLOW 1	35-43	NESE	35	44N	76W	WYW45731

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

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

1. The Operator, in their POD, has committed to:
  - Comply with all applicable Federal, State and Local laws and regulations.
  - Obtain the necessary permits from other agencies for the drilling, completion and production of these wells including water rights appropriations, the installation of water management facilities, water discharge permits, and relevant air quality permits.
  - Provide water well agreements to the owners of record for permitted water wells within the area of influence of the action.
  - Provide water analysis from a designated reference well in each coal zone.
2. The Operator has certified that a Surface Use Agreement has been reached with the Landowner(s).
3. Alternative C will not result in any undue or unnecessary environmental degradation.
4. It is in the public interest to approve these wells, as the leases are being drained of federal gas, resulting in a loss of revenue for the government.
5. Mitigation measures applied by the BLM will alleviate or minimize environmental impacts.
6. Alternative C is the environmentally-preferred Alternative.
7. The proposed action is in conformance with the PRB FEIS and the Approved Resource Management Plan for the Public Lands Administered by the Bureau of Land Management (BLM), Buffalo Field Office, April 2001.
8. Based on current information, we determined that no significant impacts in the spread of WNV would occur from the implementation of this project.

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

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

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

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

**BUREAU OF LAND MANAGEMENT  
BUFFALO FIELD OFFICE  
ENVIRONMENTAL ASSESSMENT (EA)  
FOR  
Anadarko Petroleum Corporation  
Dry Willow Phase I  
PLAN OF DEVELOPMENT  
WY-070-07-048**

## **INTRODUCTION**

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

### **1. PURPOSE AND NEED**

The purpose for the proposal is to define and produce coal bed natural gas (CBNG) on one or more 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.

The purpose for the proposal is to quantify reserves and produce coal bed natural gas (CBNG) on one or more valid federal oil and gas mineral leases issued to the applicant by the BLM.

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

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

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

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

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

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

Description of the Proposed Action

Proposed Action Title/Type: Anadarko Petroleum Corporation’s Dry Willow Plan of Development (POD) for 33 coal bed natural gas well APD’s and associated infrastructure.

Proposed Well Information: There are 33 wells proposed within this POD, as follows:

	<b>Well Name</b>	<b>Well Number</b>	<b>Qtr/Qtr</b>	<b>Section</b>	<b>TWP</b>	<b>RNG</b>	<b>Lease Number</b>
1	DRY WILLOW 1	2-21*	NENW	2	43N	76W	WYW153076
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4	DRY WILLOW 1	19-12	SWNW	19	44N	75W	WYW147293
5	DRY WILLOW 1	20-21	NENW	20	44N	75W	WYW161649
6	DRY WILLOW 1	20-32	SWNE	20	44N	75W	WYW161649
7	DRY WILLOW 1	20-41	NENE	20	44N	75W	WYW145169
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11	DRY WILLOW 1	29-34	SWSE	29	44N	75W	WYW138611
12	DRY WILLOW 1	29-43	NESE	29	44N	75W	WYW138611
13	DRY WILLOW 1	31-21	NENW	31	44N	75W	WYW145176
14	DRY WILLOW 1	31-23	NESW	31	44N	75W	WYW145176
15	DRY WILLOW 1	31-32	SWNE	31	44N	75W	WYW145176
16	DRY WILLOW 1	31-24	SESW	31	44N	75W	WYW145176
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18	DRY WILLOW 1	24-12	SWNW	24	44N	76W	WYW140723
19	DRY WILLOW 1	24-21	NENW	24	44N	76W	WYW140723
20	DRY WILLOW 1	24-14	SWSW	24	44N	76W	WYW144535
21	DRY WILLOW 1	24-23	NESW	24	44N	76W	WYW144535
22	DRY WILLOW 1	24-32	SWNE	24	44N	76W	WYW153063
23	DRY WILLOW 1	24-41	NENE	24	44N	76W	WYW153063
24	DRY WILLOW 1	25-12	SWNW	25	44N	76W	WYW153070
25	DRY WILLOW 1	25-21	NENW	25	44N	76W	WYW150206
26	DRY WILLOW 1	26-14	SWSW	26	44N	76W	WYW45731
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31	DRY WILLOW 1	35-34	SWSE	35	44N	76W	WYW153064
32	DRY WILLOW 1	35-41	NENE	35	44N	76W	WYW45731
33	DRY WILLOW 1	35-43	NESE	35	44N	76W	WYW45731

County: Campbell

Applicant: Anadarko Petroleum Corporation

Surface Owners:

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

- Drilling of 33 total federal CBM wells in the Big George coal zone to depths of approximately 1325 – 1844 feet.
- An unimproved and improved road network.
- A Water Management Plan (WMP) that involves pumping water to the water transfer station, which will pump the water to an existing high pressure line. The water will be injected into 5

injections wells in Midwest from the high pressure line. The water will be injected into the Madison and Tensleep formations.

- A buried gas, water and power line network, 1 electrical substation , and 1 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(WMP) in the POD and individual APDs. Also see the subject POD and/or APDs for maps showing the proposed well locations and associated facilities described above. More information on CBNG well drilling, production and standard practices is also available in the PRB FEIS, Volume 1, pages 2-9 through 2-40 (January 2003).

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

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

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

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

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

Modifications, or alternatives, to the original proposal received from the operator, were identified as the result of the pre-approval onsite inspection(s). The following changes and mitigation measures to the proposed action resulting from the on-site will be analyzed in Alternative C.

Implementation of committed mitigation measures contained in the Master Surface Use Plan, Drilling Program and Water Management Plan, in addition to the Standard COA contained in the PRB FEIS Record of Decision Appendix A, are incorporated and analyzed in this alternative.

At the on-sites, all areas of proposed surface disturbance were inspected to ensure that potential impacts to natural resources would be minimized. In some cases, access roads were re-routed, and well locations, pipelines, discharge points and other water management control structures were moved, modified, mitigated or dropped from further consideration to alleviate or minimize environmental impacts. Alternatives to the different aspects of the proposed action are always considered and applied as pre-approval changes, site specific mitigation and/or Conditions of Approval (COAs), if they will alleviate or minimize environmental effects of the operator’s proposal. The specific changes identified for the Dry Willow POD are listed below under 2.3.1:

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

1. Moved pipeline corridor from Fed 2-41, to avoid disturbance to existing phone line. Need updated project maps and SUDS form.
2. Access to the Fed 20-41 changed to follow the pipeline corridor. Need updated project maps and SUDS form.
3. Moved access pipeline corridor for the Fed 29-34 to avoid disturbance to water tank and reservoir.

- Need updated project maps and SUDS form. The drainage crossing will need an engineer design.
4. Moved Fed 29-43 well .15 miles east to provide a raptor nest buffer. Infrastructure will be moved from well to east. Need new survey, APD, updated project maps and SUDS form.
  5. Moved pipeline/access corridor to the north for the Fed 31-23 well. Need updated project maps and SUDS form.
  6. The drainage crossing with headcut will need an engineer design to the Fed 24-32 well.
  7. The Fed 24-41 well was moved to existing 2-track access road. Will need new survey, APD, updated project maps, and SUDS form.
  8. Access to the Fed 25-12 was changed to come from the north. Need updated project maps and SUDS form.
  9. Need to engineer steep drainage crossing for the access road to the Fed 26-32.
  10. Moved the Fed 35-34 well 30' north away from drainage. Need new survey plat and APD.
  11. Looked at alternate route for access to Fed 35-32 well. If changed (access off State 36-5 well), will need updated project maps and SUDS form.
  12. The Fed 31-24 was dropped due to its close proximity to cultural sites. No alternative location was found within the 80 acre spacing window.

### **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. Surface Water**

1. 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.
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.

#### **2.3.2.2. Wildlife**

1. For any surface-disturbing activities proposed in sagebrush shrublands, the Companies will conduct clearance surveys for sage-grouse breeding activity during the sage-grouse's breeding season before initiating the activities. The surveys must encompass all sagebrush shrublands within 0.5 mile of the proposed activities.

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

##### **2.3.2.3.1. Bald Eagle**

1. Special habitats for raptors, including wintering bald eagles, will be identified and considered during the review of Sundry Notices.
2. Additional mitigation measures may be necessary if the site-specific project is determined by a BLM biologist to have adverse effects to bald eagles or their habitat.

##### **2.3.2.3.2. Black-footed Ferret**

1. Prairie dog colonies will be avoided wherever possible.

**2.3.2.3.3. Mountain Plover**

1. Work schedules and shift changes will be set to avoid the periods from 30 minutes before to 30 minutes after sunrise and sunset during June and July, when mountain plovers and other wildlife are most active.

**2.3.2.4. Visual Resources**

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

**2.3.2.5. 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.

**2.3.2.6. 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. 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 Dry Willow Phase I POD is Covert Green (18-0617 TPX).
3. To minimize disturbance in sagebrush habitat, digging in wheel wells for the rig, constructing drilling pits, and trenching pipelines is the only surface disturbance authorized for the following wells and infrastructure; Feds 2-32, 31-23, (26-32 past engineered crossing), 26-34, & 26-41. No other blading is authorized.
4. The Fed 2-41 location will need a lined pit.
5. Due to fragile soils and or steep topography, the following wells will need additional soil amendments Feds 29-34, 24-14, & 2-41.
6. An auto gate will be constructed in the fence for access to the Fed 24-41 location.

7. A constructed pad is authorized for the Fed 24-2 location. No other pad construction or rig slotting is authorized for this POD.
8. All construction activities that pass through the boundary of site 48CA383, an existing improved road located in NWN Sec. 25 T. 44 N., R. 76 W., will be restricted to the existing disturbed corridor. A construction monitor by a qualified cultural resource use permittee will be required to identify any potentially buried cultural materials and assure construction activities do not impact any portions of the site that contribute to its significance.
9. A construction monitor to identify potential buried cultural resources will be required along Dry Willow Creek. Prior to the start of construction within T. 44 N., R. 76 W., Sections 35 & 36 and T. 43 N., R. 76 W., Sections 1 & 2, the project proponent's cultural resource use permittee will meet with the BLM Authorized Officer (Clint Crago @ (307)-684-1118 or Buck Damone @ (307) 684-1042 to coordinate final report requirements, methodology and locations to be monitored.
10. The operator must adhere to all mitigation measures outlined in the Memorandum of Agreement for the Resolution of Adverse Affects to the Pumpkin Buttes (48CA268).
11. 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:

<b>Species</b>		<b>% in Mix</b>	<b>Lbs PLS*</b>
<b><i>Thickspike Wheatgrass</i></b> ( <i>Elymus lanceolatus</i> ssp. <i>lanceolatus</i> )		20	2.4
<b><i>Prairie sandreed</i></b> ( <i>Calamovilfa longifolia</i> )		15	1.8
<b><i>Indian ricegrass</i></b> ( <i>Achnatherum hymenoides</i> )		20	2.4
<b><i>Bluebunch Wheatgrass</i></b> ( <i>Pseudoroegneria spicata</i> ssp. <i>Spicata</i> )		30	3.6
<b><i>Prairie coneflower</i></b> ( <i>Ratibida columnifera</i> )		5	0.6
<b><i>White or purple prairie clover</i></b> ( <i>Dalea candidum</i> , <i>purpureum</i> )		5	0.6
<b><i>Scarlet Globemallow</i></b> ( <i>Sphaeralcea coccinea</i> ) / or <b><i>Blue flax</i></b> ( <i>Linum lewisii</i> )		5	0.6
<b>Totals</b>		<b>100%</b>	<b>12 lbs/acre</b>

12. The operator will follow the guidance provided in the Wyoming Policy on Reclamation (IM WY-90-231) specifically the following:  
Reclamation Standards:  
C. 3 The reclaimed area shall be stable and exhibit none of the following characteristics:

- a. Large rills or gullies.
  - b. Perceptible soil movement or head cutting in drainages.
  - c. Slope instability on, or adjacent to, the reclaimed area in question.
- C. 4 The soil surface must be stable and have adequate surface roughness to reduce runoff and capture rainfall and snow melt. Additional short-term measures, such as the application of mulch, shall be used to reduce surface soil movement.
- C. 5 Vegetation canopy cover (on un-forested sites), production and species diversity (including shrubs) shall approximate the surrounding undisturbed area. The vegetation shall stabilize the site and support the planned post disturbance land use, provide for natural plant community succession and development, and be capable of renewing itself. This shall be demonstrated by:
- a. Successful onsite establishment of species included in the planting mixture or other desirable species.
  - b. Evidence of vegetation reproduction, either spreading by rhizomatous species or seed production.
- C. 6 The reclaimed landscape shall have characteristics that approximate the visual quality of the adjacent area with regard to location, scale, shape, color and orientation of major landscape features and meet the needs of the planned post disturbance land use.

13. Please contact Casey Freise, Natural Resource Specialist, @ (307) 684-1189, Bureau of Land Management, Buffalo, if there are any questions concerning these surface use COAs.

**Wildlife**

1. All conservation measures and terms and conditions identified in the Powder River Basin Oil and Gas Project Biological Opinion (WY6633) shall be complied with.
2. 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” (M32). 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, Anadarko will coordinate with the BLM to determine if additional resurvey will be required.
3. The contract biologist shall contact the BLM prior to initiating any wildlife surveys.
4. No surface disturbing activity shall occur within one mile of bald eagle habitat (The Pumpkin Buttes) annually from November 1 through April 1 (CM9), prior to a winter roost survey or from February 1 through August 15 (CM8) prior to a nesting survey. This affects the following wells and infrastructure:

<b><i>Township/Range</i></b>	<b><i>Section</i></b>	<b><i>Affected Wells and Infrastructure</i></b>
44/76	24	<b>Wells: 24-12, 24-14, 24-21, 24-23, 24-32, 24-41, and 24-43</b> <b>ALL</b> project related activities within this <b>ENTIRE</b> section.
44/76	25	<b>Wells: 25-12, and 25-21</b> <b>ALL</b> project related activities within the <b>northern</b> ½ of this section.
44/76	26	<b>Wells: 26-32 and 26-41</b> <b>ALL</b> project related activities within the <b>northern</b> ½ of this section.

<b>Township/Range</b>	<b>Section</b>	<b>Affected Wells and Infrastructure</b>
44/75	19	<b>Wells: 19-12 and 19-21</b> ALL project related activities within the NW ¼ of this section.
44/75	29	<b>Wells: 29-23, 29-32, 29-34, and 29-43</b> ALL project related activities within the southern ¾ of this section.
44/75	31	<b>Wells: 31-23, 31-32, and 31-43</b> ALL project related activities within this ENTIRE section.

- a. If a roost is identified and construction has not been completed, a year round disturbance-free buffer zone of 0.5 mile and a seasonal (November 1 - April 1) disturbance-free buffer zone of 1 mile will be established for all bald eagle winter roost sites. Additional measures such as remote monitoring and restricting maintenance visitation to between 9:00 AM and 3:00 PM will be necessary to prevent disturbance.
- b. If a nest is identified and construction has not been completed, a minimum disturbance-free buffer zone of 0.5 mile (i.e., no surface occupancy) would be established year round for all bald eagle nests. A seasonal minimum disturbance-free buffer zone of 1-mile will be established for all bald eagle nest sites (February 1 - August 15).

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

<b>Township/Range</b>	<b>Sec.</b>	<b>Affected Wells and Infrastructure</b>
44/75	19	<b>Wells: 19-12 and 19-21</b> ALL project related activities within the northern ½ of this section.
44/75	29	<b>Wells: 29-23, 29-34, and 29-43</b> ALL project related activities within the southern ½ of this section.
44/75	31	<b>Well: 31-43</b>
44/76	24	<b>Wells: 24-12, 24-21, and 24-23</b> ALL project related activities north of the 24-23 well in the northwestern ¼ of this section
44/76	25	<b>Wells: 25-12, 25-14, and 25-21</b> ALL project related activities within this ENTIRE section.
44/76	26	<b>Wells: 26-14, 26-32, 26-34 and 26-41</b> ALL project related activities within this ENTIRE section.

- 1) Surveys to document nest occupancy shall be conducted by a biologist following BLM protocol, between April 15 and June 30. All survey results shall be submitted in writing to a Buffalo BLM biologist and approved prior to surface disturbing activities. Surveys outside this window may not depict nesting activity. If a survey identifies active raptor nests, a ½ mile timing buffer will be implemented. The timing buffer restricts surface disturbing activities within ½ mile of occupied raptor nests from February 1 to July 31.
- b. Nest productivity checks shall be completed for the first five years following project completion. The productivity checks shall be conducted no earlier than June 1 or later than June 30 and any evidence of nesting success or production shall be recorded. Survey results will be submitted to a Buffalo BLM biologist in writing no later than July 31 of each survey year. This applies to the following nest(s):

<b>BLM ID#</b>	<b>SPECIES</b>	<b>UTM</b>	<b>LEGAL LOCATION</b>	<b>SUBSTRATE</b>	<b>STATUS (2006)</b>
4096	Long-eared	428135E	SESE Sec. 29	Juniper, live	Active

BLM ID#	SPECIES	UTM	LEGAL LOCATION	SUBSTRATE	STATUS (2006)
	owl	4845016N	T44N, R75W		
3659	Great-horned owl	423380E 4845725N	SENE Sec. 26 T44N, R76W	Cottonwood, live	Active
3559	Red-tailed hawk	426300E 4847650N	NWNE Sec. 19 T44N, R75W	Cottonwood, live	Active
3683	Golden eagle	421600E 4845422N	NWSE Sec. 27 T44N, R76W	Cottonwood, dead	Active
3661	Great-horned owl	422830E 4845650N	NESW Sec. 26 T44N, R76W	Cottonwood, live	Active
4097	Long-eared owl	423960E 4847925N	NWNW Sec. 24 T44N, R76W	Juniper, live	Active
4098	Red-tailed hawk	425170E 4844450N	NENE Sec. 36 T44N, R75W	Cottonwood, live	Active
4101	Long-eared owl	425028E 4842796N	NENE Sec. 1 T43N, R76W	Juniper, live	Active
4102	Prairie falcon	427040E 4843215N	SWSW Sec. 32 T44N, R75W	Rock outcrop	Active
4103	Prairie falcon	427130E 4843380N	SWSW Sec. 32 T44N, R75W	Rock outcrop	Active
4105	Red-tailed hawk	422960E 4841850N	SWSE Sec. 2 T43N, R76W	Cottonwood, dead	Active
4106	Long-eared owl	425968E 4845500N	NESW Sec. 30 T44N, R75W	Juniper, live	Active
3662	Unknown	424011E 4845643N	NESW Sec. 25 T44N, R76W	Cottonwood, live	Inactive
3664	Unknown	424000E 4845612N	NESW Sec. 25 T44N, R76W	Cottonwood, live	Inactive
4107	Unknown	423480E 4847990N	NENE Sec. 23 T44N, R76W	Limber pine, live	Inactive
4109	Unknown	422560E 4845550N	NESW Sec. 26 T44N, R76W	Cottonwood, live	Inactive
4110	Unknown	423602E 4848388N	SESE Sec. 14 T44N, R76W	Juniper, live	Inactive
4111	Unknown	424000E 4847495N	SWNE Sec. 24 T44N, R76W	Juniper, live	Inactive
4112	Long-eared owl	423490E 4847540N	SENE Sec. 23 T44N, R76W	Juniper, live	Inactive
4113	Unknown	422040E 4845300N	SESE Sec. 27 T44N, R77W	Cottonwood, live	Inactive
3647	Golden eagle	421500E 4845470N	NWSE Sec. 27 T44N, R76W	Cottonwood, live	Inactive
3681	Red-tailed hawk	421500E 4845332N	SWSE Sec. 27 T44N, R76W	Cottonwood, live	Inactive
3648	Golden eagle	421638E 4845144N	SWSE Sec. 27 T44N, R76W	Cottonwood, live	Inactive
3695	Unknown	422969E 4845425N	NWSE Sec. 26 T44N, R76W	Cottonwood, live	Inactive

BLM ID#	SPECIES	UTM	LEGAL LOCATION	SUBSTRATE	STATUS (2006)
3660	Unknown	423055E 4845420N	NWSE Sec. 26 T44N, R76W	Cottonwood, live	Inactive
645	Red-tailed hawk	423308E 4845730N	SENE Sec. 26 T44N, R76W	Cottonwood, live	Inactive
3693	Great-horned owl	423434E 4845520N	NESE Sec. 26 T44N, R76W	Cottonwood, live	Inactive
3646	Red-tailed hawk	423688E 4845326N	NESE Sec. 26 T44N, R76W	Cottonwood, live	Inactive
3698	Unknown	424065E 4845443N	NWSW Sec. 25 T44N, R76W	Cottonwood, live	Inactive
3663	Unknown	424048E 4845391N	NWSW Sec. 25 T44N, R76W	Cottonwood, live	Inactive
3696	Unknown	424052E 4845385N	NWSW Sec. 25 T44N, R76W	Cottonwood, live	Inactive

- c. If an undocumented raptor nest is located during project construction or operation, the Buffalo Field Office (307-684-1100) shall be notified within 24 hours.
  - d. Well metering, maintenance and other site visits within 0.5 miles of raptor nests shall be minimized as much as possible during the breeding season (February 1 – July 31), and restricted to between 0900 and 1500 hours.
6. The following conditions will minimize the impacts to sage-grouse:
- a. 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 limitation will affect the following: **ALL project related activities within the ENTIRE project area.**
    - 1) 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. Creation of raptor hunting perches will be avoided within 0.5-mile of documented sage grouse lek sites.
  - c. Well metering, maintenance and other site visits within 0.5 miles of documented sage grouse lek sites shall be minimized as much as possible during the breeding season (March 1– June 15), and restricted to between 0900 and 1500 hours.
  - d. The Companies will locate facilities so that noise from the facilities at any nearby sage grouse or sharp-tailed grouse display grounds does not exceed 49 decibels (10 dBA above background noise) at the display ground.

### 3. DESCRIPTION OF AFFECTED ENVIRONMENT

Applications to drill were received on 2/17/06. Field inspections of the proposed Dry Willow CBM project were conducted on 5/19/06 & 6/1/06 by Jeff Ramsey, Darrell Hebert – Anadarko Petroleum Corp., Chuck Williams – Rocky Mountain Permitting, Gene Mankin, Patricia Clark – T-Chair Land Company.

Elizabeth Burghard, Ben Kniola, Jenny Morton, Clint Crago, Casey Freise – 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			Jennifer Morton
Floodplains		X		Casey Freise,
Wilderness Values			X	Casey Freise
ACECs			X	Casey Freise
Water Resources		X		Casey Freise,
Air Quality		X		Casey Freise
Cultural or Historical Values	X			Robert C. Wilson
Prime or Unique Farmlands			X	Casey Freise
Wild & Scenic Rivers			X	Casey Freise
Wetland/Riparian		X		Casey Freise,
Native American Religious Concerns	X			Robert C. Wilson
Hazardous Wastes or Solids		X		Casey Freise
Invasive, Nonnative Species	X			Casey Freise
Environmental Justice		X		Casey Freise

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

The Dry Willow Phase 1 project area is located 50 miles south of Gillette, WY in the Pumpkin Buttes area. The project is between North and North Middle Buttes. No wells or infrastructure are located on the sides or top of the Buttes. The topography consists of gentle rolling prairie dissected by gentle ephemeral swales and occasional steep erosive ephemeral drainages. Some existing fee and state CBNG development and conventional oil and gas exist in the area.

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

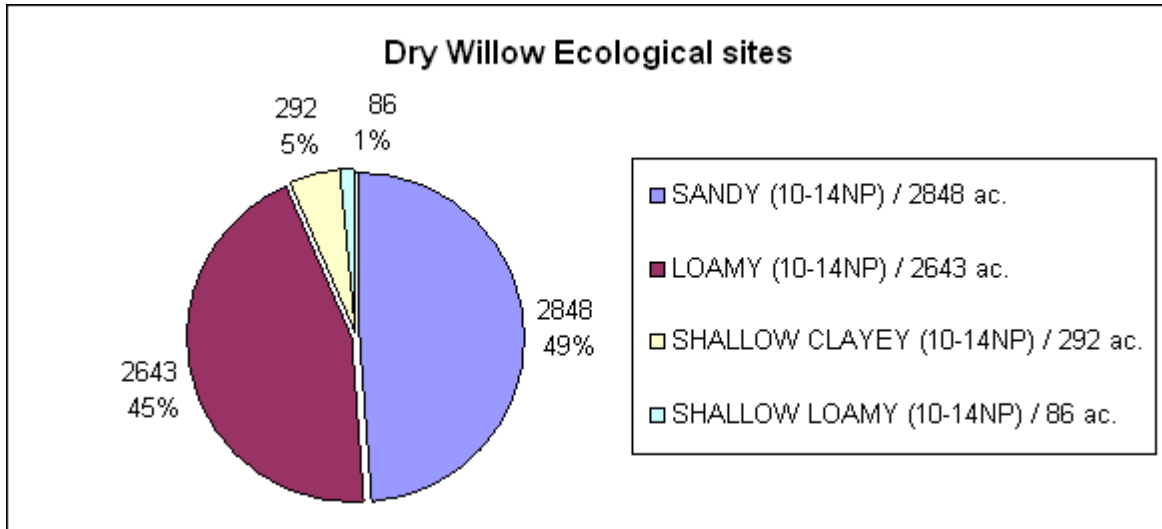
Ecological Site Descriptions are used to provide soils and vegetation information needed for resource identification and management recommendations. To determine the appropriate Ecological Sites for this proposed action, BLM specialists analyzed data from onsite field reconnaissance and soil survey soils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

Soils within the project area were identified from the *South Campbell County survey Area, Wyoming*. 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.

**Dominate Ecological Sites and Plant Communities identified in this POD and its infrastructure are:**

**Dry Willow Ecological Sites**

Ecological Site	Acres
SANDY (10-14NP) / 2848 ac.	2848
LOAMY (10-14NP) / 2643 ac.	2643
SHALLOW CLAYEY (10-14NP) / 292 ac.	292
SHALLOW LOAMY (10-14NP) / 86 ac.	86



- I. *Sandy-needleandthread/threadleaf sedge/fringed sage, plant community (49%)*
- II. *Loamy-mixed sagebrush/grass, plant community (45%)*

**I. 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 (greater than 20”to bedrock) to very deep, well drained soils that formed in alluvium, eolian deposits over residuum. These soils have moderate, moderately rapid, or rapid permeability. The main soil limitations include low available water holding capacity, low organic matter content, and high wind erosion potential.

The present plant community is Needleandthread/ Threadleaf sedge/ Fringed sage plant community. Dominant grasses identified include: Needleandthread, Bluebunch wheat, and Downy brome. Forbs identified include: Threadleaf sedge. Other vegetative species identified at onsite: Wyoming big sagebrush and Prickly pear cactus.

**II. Loamy Sites:**

This site occurs on gently undulating to rolling land which includes landforms which include hill sides, alluvial fans, ridges and stream terraces, in the 10-14”precipitation zone. The soils of this site are moderately deep to deep (greater than 20" to bedrock), well drained and moderately permeable. The main soil limitations include low organic matter content and soil droughtiness.

The present plant community is a Mixed Sagebrush/Grass.

Dominant grasses identified include: Prairie junegrass, Western wheatgrass, and Downy brome. Graminoids identified include: Threadleaf sedge. Other vegetative species identified at onsite: Wyoming big sagebrush.

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.

For more detailed soil information, see the NRCS Soil Survey 705 – Southern Campbell County. Species typical of short grass prairie comprise the project area flora. Differences in dominant species within the project area vary with soil type, aspect and topography.

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

Willow Creek and Dry Willow Creek are two major ephemeral drainages located within the POD boundary. Both creek bottoms are relatively flat and lack continuous well-defined channels. No standing water, running water, or wetlands were observed in any of the inspected channel sections. A few decadent isolated and clustered cottonwood trees are located in the drainage bottoms.

### **3.2.2. Invasive Species**

Below are the state-listed noxious weeds and invasive/exotic plant infestations discovered by a search of inventory maps and/or databases or during subsequent field investigation by the operator and the Campbell County Weed and Pest District. The plants include; Russian knapweed, Canada thistle, Common burdock, Common cocklebur, and Wild licorice.

### **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 Wildlife Resources, LLC and Hayden-Wing Associates (HWA). HWA performed surveys for bald eagles. Wildlife Resources, LLC performed surveys for mountain plover, sharp-tailed grouse, greater sage-grouse, raptor nests and prairie dog colonies according to protocol in 2006. No formal surveys were conducted for Ute ladies'-tresses orchid.

A BLM Biologist conducted field visits on June 2 and 3, 2006. 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. A Biological Assessment was prepared by a BLM biologist. The Biological Assessment was submitted to the U.S. Fish and Wildlife Service (USFWS) for consultation.

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 Dry Willow Phase 1 project area include pronghorn antelope and mule deer. The project area is part of the Pumpkin Buttes antelope herd unit. The 2004 estimated

herd population was 27,109 with a population objective of 18,000 (WGFD 2004). Mule deer belong to the Pumpkin Buttes herd unit. Mule deer populations have been increasing since 1998 with a 2004 population estimate of 14,800 animals, and a herd objective of 11,000 (WGFD 2004). Populations of pronghorn antelope and mule deer within their respective hunt areas are above WGFD objectives.

The WGFD has designated nearly the entire project area as winter-yearlong range for pronghorn antelope. The northeastern quarter of the project area is designated as yearlong range for mule deer, while the remainder of the project area is designated as winter-yearlong range.

**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 Willow Creek, an ephemeral tributary to the Powder River. No springs were identified within the project area. Fish that have been identified in the Powder River watershed are listed in the PRB FEIS (3-156-159).

### 3.3.3. Migratory Birds

A wide variety of migratory birds may be found in the proposed project area at some point throughout the year. Migratory birds are those that migrate for the purpose of breeding and foraging at some point in the calendar year. Migratory bird species of management concern that may occur in the project area are listed in the PRB FEIS (3-151). Species observed by Wildlife Resources, LLC include northern harrier, American kestrel, loggerhead shrike, and spotted towhee (2006).

### 3.3.4. Raptors

Twenty-one raptor nest sites were identified by Wildlife Resources, LLC (2006) and BLM within 0.5 mile of the project area, of these twelve nests were active in 2006.

**Table 4.** Documented raptor nests within the Dry Willow project area in 2006.

BLM ID#	SPECIES	UTM	LEGAL LOCATION	SUBSTRATE	CONDITION	STATUS
4096	Long-eared owl	428135E 4845016N	SESE Sec. 29 T44N, R75W	Juniper, live	Fair	Active
3659	Great-horned owl	423380E 4845725N	SENE Sec. 26 T44N, R76W	Cottonwood, live	Good	Active
3559	Red-tailed hawk	426300E 4847650N	NWNE Sec. 19 T44N, R75W	Cottonwood, live	Good	Active
3683	Golden eagle	421600E 4845422N	NWSE Sec. 27 T44N, R76W	Cottonwood, dead	Good	Active
3661	Great-horned owl	422830E 4845650N	NESW Sec. 26 T44N, R76W	Cottonwood, live	Good	Active
4097	Long-eared owl	423960E 4847925N	NWNW Sec. 24 T44N, R76W	Juniper, live	Good	Active
4098	Red-tailed hawk	425170E 4844450N	NENE Sec. 36 T44N, R75W	Cottonwood, live	Good	Active
4101	Long-eared	425028E	NENE Sec. 1	Juniper, live	Fair	Active

BLM ID#	SPECIES	UTM	LEGAL LOCATION	SUBSTRATE	CONDITION	STATUS
	owl	4842796N	T43N, R76W			
4102	Prairie falcon	427040E 4843215N	SWSW Sec. 32 T44N, R75W	Rock outcrop	Good	Active
4103	Prairie falcon	427130E 4843380N	SWSW Sec. 32 T44N, R75W	Rock outcrop	Good	Active
4105	Red-tailed hawk	422960E 4841850N	SWSE Sec. 2 T43N, R76W	Cottonwood, dead	Good	Active
4106	Long-eared owl	425968E 4845500N	NESW Sec. 30 T44N, R75W	Juniper, live	Good	Active
3662	Unknown	424011E 4845643N	NESW Sec. 25 T44N, R76W	Cottonwood, live	Fair	Inactive
3664	Unknown	424000E 4845612N	NESW Sec. 25 T44N, R76W	Cottonwood, live	Fair	Inactive
4107	Unknown	423480E 4847990N	NENE Sec. 23 T44N, R76W	Limber pine, live	Good	Inactive
4109	Unknown	422560E 4845550N	NESW Sec. 26 T44N, R76W	Cottonwood, live	Fair	Inactive
4110	Unknown	423602E 4848388N	SESE Sec. 14 T44N, R76W	Juniper, live	Fair	Inactive
4111	Unknown	424000E 4847495N	SWNE Sec. 24 T44N, R76W	Juniper, live	Fair	Inactive
4112	Long-eared owl	423490E 4847540N	SENE Sec. 23 T44N, R76W	Juniper, live	Fair	Inactive
4113	Unknown	422040E 4845300N	SESE Sec. 27 T44N, R77W	Cottonwood, live	Fair	Inactive
3647	Golden eagle	421500E 4845470N	NWSE Sec. 27 T44N, R76W	Cottonwood, live	Good	Inactive
3681	Red-tailed hawk	421500E 4845332N	SWSE Sec. 27 T44N, R76W	Cottonwood, live	Unknown	Inactive
3648	Golden eagle	421638E 4845144N	SWSE Sec. 27 T44N, R76W	Cottonwood, live	Unknown	Inactive
3695	Unknown	422969E 4845425N	NWSE Sec. 26 T44N, R76W	Cottonwood, live	Unknown	Inactive
3660	Unknown	423055E 4845420N	NWSE Sec. 26 T44N, R76W	Cottonwood, live	Unknown	Inactive
645	Red-tailed hawk	423308E 4845730N	SENE Sec. 26 T44N, R76W	Cottonwood, live	Unknown	Inactive
3693	Great-horned owl	423434E 4845520N	NESE Sec. 26 T44N, R76W	Cottonwood, live	Unknown	Inactive
3646	Red-tailed hawk	423688E 4845326N	NESE Sec. 26 T44N, R76W	Cottonwood, live	Unknown	Inactive
3698	Unknown	424065E 4845443N	NWSW Sec. 25 T44N, R76W	Cottonwood, live	Unknown	Inactive
3663	Unknown	424048E 4845391N	NWSW Sec. 25 T44N, R76W	Cottonwood, live	Unknown	Inactive
3696	Unknown	424052E 4845385N	NWSW Sec. 25 T44N, R76W	Cottonwood, live	Unknown	Inactive

### 3.3.5. Threatened and Endangered and Sensitive Species

#### 3.3.5.1. Threatened and Endangered Species

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

##### 3.3.5.1.1. Black-footed ferret

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

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

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

Three black-tailed prairie dog colonies were identified during site visits by Wildlife Resources, LLC within and surrounding the project area.

**Table 3. Black-tailed prairie dog colonies identified during site visits by Wildlife Resources, LLC within the project area or within 1.5km, totaling 332.9 acres.**

Location	Size in acres	Status
NWSE Sec. 36, T44N, R76W	5.7	Active
SENE Sec. 1, T43N, R76W	51.7	Active
NENE Sec. 2 and SE Sec. 3, T43N, R76W and SESE Sec. 34 and SWSW Sec. 35, T44N, R76W	275.5	Active

The project area is located approximately ten miles east of the Midwest potential reintroduction area. Black-footed ferret habitat is present but of insufficient size to support a ferret population within the Dry Willow project area at this time.

##### 3.3.5.1.2. Bald eagle

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

Bald eagle nesting habitat is generally found in areas that support large mature trees. Eagles typically will build their nests in the crown of mature trees that are close to a reliable prey source. 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.

Bald eagle nesting and roosting habitat exists within one mile of the project area in the form of large stands of mature ponderosa pine on the side-slopes of Pumpkin Buttes and scattered mature cottonwood trees along drainages. Due to the high concentration of potential prey (domestic sheep ranch and high populations of lagomorphs), bald eagles are likely to forage throughout the project area. One historic roost site (seven individuals documented on February 5, 1985) was documented approximately 1.6 miles northwest of the project area. Hayden-Wing and Associates performed aerial winter roost surveys during the winter of 2005/2006. No eagles were observed.

#### **3.3.5.1.3. 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.

No springs or other potential habitat are present. Suitable orchid habitat is not present within the Dry Willow project area.

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

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

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

On August 12, 2004, the U.S. Fish and Wildlife Service removed the black-tailed prairie dog's Candidate status. The Buffalo Field Office however will consider prairie dogs as a sensitive species and continue to afford this species the protections described in the FEIS. The black-tailed prairie dog is a diurnal rodent inhabiting prairie and desert grasslands of the Great Plains. Their decline is related to multiple factors including, habitat destruction, poisoning, and Sylvatic plague.

Two black-tailed prairie dog colonies are located within the project area. One is located in NWSE Section 36, T44N, R76W and one is located in NENE Sec. 2 and SE Sec. 3, T43N, R76W and SESE Sec. 34 and SWSW Sec. 35, T44N, R76W.

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

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

Suitable sage-grouse habitat is present through out the project area. Ten documented sage-grouse leks are present within two miles of the project area (Table 7). Sage-grouse were observed by Wildlife Resources, LLC on all ten leks in 2006.

**Table 7. Documented sage-grouse leks within two miles of the Dry Willow project in 2006.**

Lek ID	UTM NAD83	Legal Location	Status (Peak Males in 2006)	Distance From Project Area (Miles)
Windmill	423350E 4841900N	SESE Sec. 2 T43N, R76W	3	0.0 (within project area)
Windmill NW	422593E 4842050N	NESW Sec. 2 T43N, R76W	1	0.0 (within project area)
Windmill North	423500E 4843360N	SESE Sec. 35 T44N, R76W	25	0.0 (within project area)
Cottonwood	421621E 4838450N	SESE Sec. 15 T43N, R76W	25	1.9
North Butte	436000E 4848800N	NESW Sec. 18 T44N, R75W	60+	0.5
Mud Spring	430150E 4844590N	NENE Sec. 33 T44N, R75W	16	1.3
Gilbertz III	428960E 4846700N	SWSW Sec. 21 T44N, R75W	10	0.4
North Butte Sat.	427450E 4846946N	NESW Sec. 20 T44N, R75W	7	0.0 (within project area)
Dry Willow	421500E 4844450N	NWNE Sec. 34 T44N, R76W	70+	0.3
Dry Willow Sat.	423500E 4843360N	SESE Sec. 35 T44N, R76W	25+	0.0 (within project area)

#### 3.3.5.2.3. Mountain plover

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

Mountain plover breeding and nesting habitat exists throughout the project area. Surveys for mountain plover occupancy according to Service protocol were conducted during the 2006 (Brown 2006) nesting season. No mountain plovers were observed. No nests were documented.

#### 3.4. West Nile Virus

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

Since its discovery in 1999 in New York, WNV has become firmly established and spread across the

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

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

**Table 3.4 Historical West Nile Virus Information**

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

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

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

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

The most common pesticide treatment is to place larvicidal briquettes in small standing water pools along drainages or every 100 feet along the shoreline of reservoirs and ponds. It is generally accepted that it is

not necessary to place the briquettes in the main water body because wave action prevents this environment from being optimum mosquito breeding habitat. Follow-up treatment of adult mosquitoes with malathion may be needed every 3 to 4 days to control adults following application of larvicide (Mooney, personal conversation). These treatment methods seem to be effective when focused on specific target areas, especially near communities, however they have not been applied over large areas nor have they been used to treat a wide range of potential mosquito breeding habitat such as that associated with CBNG development.

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

### **3.5. Water Resources**

The project area is within the Willow Creek drainage system. Willow Creek, including its tributary Dry Willow Creek, is an ephemeral stream located in a portion of the Powder River Breaks comprised of rolling hills trending to steep hills and deep draws feeding towards the Powder River. The total drainage area of the Willow Creek watershed is approximately 110 sq mi. Willow Creek has a slope ranging from .17 to 1.08 percent. It possesses a channel with low sinuosity, ranging from 1.0 to 1.7.

#### **3.5.1. Groundwater**

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

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

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

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

A search of the Wyoming State Engineer Office (WSEO) Ground Water Rights Database for this area showed 19 registered stock and domestic water wells within the POD boundary with depths ranging from 275 to 1132 feet. For additional information on water, please refer to the PRB FEIS (January 2003), Chapter 3, Affected Environment pages 3-1 through 3-36 (groundwater).

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

The project area is within the Willow Creek drainage which is tributary to the Upper Powder River primary watershed. Most of the drainages in the area are ephemeral (flowing only in response to a

precipitation event or snow melt) to intermittent (flowing only at certain times of the year when it receives water from alluvial groundwater, springs, or other surface source – PRB FEIS Chapter 9 Glossary). The channels are primarily well vegetated grassy swales, without defined bed and bank.

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

No natural springs were identified within  $\frac{1}{2}$  mile of the Dry Willow POD boundary. For more information regarding surface water, please refer to the PRB FEIS Chapter 3 Affected Environment pages 3-36 through 3-56.

### **3.6. Cultural Resources**

Class III cultural resource inventories were conducted for the proposed project’s area of potential effect (APE) following the Secretary of the Interior’s Guidelines and Standards.

#### **Class III Cultural Resource Inventory of the Dry Willow POD I Coal Bed Methane Plan of Development, Campbell County, Wyoming SWCA Cultural Resource Report Number 2006-59**

T. 44 N., R. 76 W., Sec. 24, 25, 26 & 36

T. 44 N., R. 75 W., Sec. 19, 20, 29, 30 & 31

T. 43 N., R. 76 W., Sec. 2

Supplemental Report for the Class III Cultural Resource Inventory of the Dry Willow POD 1 Coal Bed Methane Plan of Development Campbell County, Wyoming

T. 44 N., R. 75 W., Sec. 31

Cultural Resources Testing and Data Recovery at Site 48CA383 Associated with the Proposed Dry Willow POD 1 Coal Bed Methane Plan of Development, Campbell County, Wyoming

T. 44 N., R. 76 W., Sec. 25

Pumpkin Buttes Cultural resources: Ethnohistory, Ethnographic, and traditional Cultural Properties Investigation in Campbell and Johnson Counties, Wyoming (48CA268)

Prepared by SWCA Environmental Consultants

Previously Submitted to SHPO

Memorandum of Agreement for the Resolution of Adverse Affects to the Pumpkin Buttes (48CA268).

### **IDENTIFICATION, ELIGIBILITY, AND EFFECT:**

Because of federal leasing around the Pumpkin Buttes, the BFO deemed it necessary to evaluate the Pumpkin Buttes for the National Register of Historic Places (NRHP) in order to analyze potential effects brought on by oil and gas development within the general area. It was determined by the agency that the Pumpkin Buttes (48CA268) are eligible for the NRHP under criteria A (are associated with events that have made a significant contribution to our history), B (are associated with the lives of significant persons), & D (have yielded information important in history) and qualifies as a traditional cultural

property (TCP).

Ethnohistoric research along with interviews and fieldtrips to the Buttes by several Native American Tribes provided the supporting evidence that 48CA268 is eligible for the NRHP because of its association with important people and events in Plains Indian history. Interviews and ethnohistoric data also indicate the Buttes are still important to maintaining the spiritual, cultural and historic identity of several Native American Tribes.

Although the ethnohistory also includes discussion that the Buttes may qualify as a rural historic landscape because of the association to historic period exploration, settlement and mineral extraction, it is beyond the scope of the ethnohistory. In order for the area to be classified as a rural historic landscape or district, the historic integrity and landscape characteristics of the area would need to be defined (National Register Bulletin #30). The BFO does not feel at this time that formally classifying the area around the Buttes as a historic district or rural historic landscape will provide for a better management strategy than the current strategy provided in the section 106 process.

The class III cultural resource inventory for the remainder of the POD identified 67 cultural properties. Of the 67 properties identified within the APE, five are eligible under criterion D for the NRHP

**Table 3.5 Cultural Resources Inventory Results**

Site Number	Site Type	Eligibility	Criteria	Impacted	Concurrence
<b>48CA268</b>	<b>Traditional Cultural Property</b>	<b>Yes</b>	<b>A, B, D</b>	<b>Adverse Effect Setting</b>	<b>No</b>
48CA281	Prehistoric Open Camp	Not Eligible	N/A	No	No
48CA378	Prehistoric Open Camp	Not Eligible	N/A	Yes	No
48CA379	Prehistoric Open Camp	Not Eligible	N/A	No	No
48CA381	Lithic Scatter	Not Eligible	N/A	No	No
<b>48CA382</b>	<b>Prehistoric Open Camp</b>	<b>Eligible</b>	<b>D</b>	<b>No</b>	<b>No</b>
<b>48CA383</b>	<b>Prehistoric Open Camp</b>	<b>Eligible</b>	<b>D</b>	<b>No Adverse</b>	<b>No</b>
48CA384	Prehistoric Open Camp	Not Eligible	N/A	No	No
48CA385	Lithic Scatter	Not Eligible	N/A	No	No
48CA386	Prehistoric Open Camp	<b>Unevaluated</b>	N/A	<b>No</b>	No
48CA387	Lithic Scatter	Not Eligible	N/A	No	No
<b>48CA409</b>	<b>Prehistoric Open Camp</b>	<b>Eligible</b>	<b>D</b>	<b>No</b>	<b>No</b>
48CA410	Lithic Scatter	Not Eligible	N/A	Yes	No
48CA411	Lithic Scatter	Not Eligible	N/A	Yes	No

48CA412	Lithic Scatter	Not Eligible	N/A	No	No
48CA416	Lithic Scatter	Not Eligible	N/A	No	No
48CA417	Lithic Scatter	Not Eligible	N/A	No	No
48CA418	Lithic Scatter	Not Eligible	N/A	No	No
48CA419	Lithic Scatter	Not Eligible	N/A	No	No
48CA420	Lithic Scatter	Not Eligible	N/A	No	No
48CA421	Lithic Scatter	Not Eligible	N/A	Yes	No
48CA423	Lithic Scatter	Not Eligible	N/A	No	No
48CA424	Lithic Scatter	Not Eligible	N/A	No	No
48CA426	Lithic Scatter	Not Eligible	N/A	No	No
<b>48CA427</b>	<b>Prehistoric Open Camp</b>	<b>Eligible</b>	<b>N/A</b>	<b>No</b>	<b>No</b>
48CA430	Lithic Scatter	Not Eligible	N/A	Yes	No
48CA432	Lithic Scatter	Not Eligible	N/A	No	No
48CA662	Lithic Scatter	Not Eligible	N/A	Yes	No
48CA663	Lithic Scatter	Not Eligible	N/A	No	No
48CA742	Lithic Scatter	Not Eligible	N/A	Yes	No
48CA743	Lithic Scatter	Not Eligible	N/A	No	No
48CA744	Lithic Scatter	Not Eligible	N/A	No	No
48CA6131	Lithic Scatter	Not Eligible	N/A	Yes	No
48CA6132	Lithic Scatter	Not Eligible	N/A	No	No
48CA6133	Lithic Scatter	Not Eligible	N/A	No	No
48CA6134	Lithic Scatter	Not Eligible	N/A	No	No
48CA6135	Lithic Scatter	Not Eligible	N/A	No	No
48CA6136	Lithic Scatter	Not Eligible	N/A	No	No
48CA6137	Lithic Scatter	Not Eligible	N/A	No	No
48CA6138	Lithic Scatter	Not Eligible	N/A	No	No
48CA6139	Lithic Scatter	Not Eligible	N/A	No	No
48CA6140	Lithic Scatter	Not Eligible	N/A	No	No
48CA6141	Lithic Scatter	Not Eligible	N/A	No	No
48CA6142	Lithic Scatter	Not Eligible	N/A	No	No

48CA6143	Lithic Scatter	Not Eligible	N/A	Yes	No
48CA6144	Lithic Scatter	Not Eligible	N/A	No	No
48CA6145	Lithic Scatter	Not Eligible	N/A	Yes	No
48CA6146	Lithic Scatter	Not Eligible	N/A	No	No
48CA6147	Lithic Scatter	Not Eligible	N/A	Yes	No
48CA6148	Lithic Scatter	Not Eligible	N/A	No	No
48CA6149	Lithic Scatter	Not Eligible	N/A	No	No
48CA6150	Lithic Scatter	Not Eligible	N/A	No	No
48CA6151	Lithic Scatter	Not Eligible	N/A	No	No
48CA6152	Lithic Scatter	Not Eligible	N/A	Yes	No
<b>48CA6153</b>	<b>Prehistoric Open Camp</b>	<b>Unevaluated</b>	<b>N/A</b>	<b>No</b>	<b>No</b>
48CA6154	Lithic Scatter	Not Eligible	N/A	No	No
48CA6155	Lithic Scatter	Not Eligible	N/A	No	No
48CA6156	Lithic Scatter	Not Eligible	N/A	No	No
48CA6157	Lithic Scatter	Not Eligible	N/A	No	No
48CA6158	Lithic Scatter	Not Eligible	N/A	Yes	No
48CA6159	Lithic Scatter	Not Eligible	N/A	Yes	No
48CA6160	Lithic Scatter	Not Eligible	N/A	No	No
48CA6161	Lithic Scatter	Not Eligible	N/A	No	No
48CA6162	Lithic Scatter	Not Eligible	N/A	No	No
48CA6163	Lithic Scatter	Not Eligible	N/A	No	No
48CA6164	Lithic Scatter	Not Eligible	N/A	No	No
<b>48CA6165</b>	<b>Lithic Scatter</b>	<b>Eligible</b>	<b>D</b>	<b>No</b>	<b>No</b>
48CA6172	Lithic Scatter	Not Eligible	N/A	No	No

#### 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

Surface disturbance will occur with well drilling and construction. Compliance with operator plans and

BLM applied mitigation will reduce surface disturbance impacts on vegetation and soils. Of the 32 proposed well locations, 1 is on an existing or reclaimed conventional well pad, 30 can be drilled without a well pad being constructed, and 1 will require a constructed (cut & fill) well pad. As such, minor Surface disturbance will occur with the drilling of the wells. Disturbance, for wells without constructed pads, would involve digging-out of rig wheel wells (for leveling drill rig on minor slopes), reserve pit construction (estimated approximate size of 20 x 30 feet), and compaction (from vehicles driving/parking at the drill site). Estimated disturbance associated with these 30 wells would involve approximately 0.1 acre/well for 3.0 total acres. The well requiring cut & fill pad construction would disturb approximately .3 acres/well pad. The total estimated disturbance for all 32 wells would be 3.3 acres. This would be a short-term, impact with expedient, successful reclamation and site-stabilization, as committed to by the operator in their POD MSUP and as required by BLM in COAs.

All of the 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. No improved or unimproved roads will be constructed outside of corridors to provide access to various well locations. Expedient reclamation of disturbed land with stockpiled topsoil, proper seedbed preparation techniques, and appropriate seed mixes, along with utilization of erosion control measures (e.g., waterbars, water wings, culverts, rip-rap, gabions etc.) would ensure land productivity/stability is regained and maximized.

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

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

Table 4.1 summarizes the proposed surface disturbance.

**Table 4.1 - SUMMARY OF DISTURBANCE**

<b>Facility</b>	<b>Number or Miles</b>	<b>Factor</b>	<b>Acreage of Disturbance</b>	<b>Duration of Disturbance</b>
Nonconstructed Pad	31	0.1/acre or Site Specific	2.9	Long Term
Constructed Pad	1		.3	
Temporary Storage Yard	1	Site Specific	6	Short Term
Screw Compressors	1	Site Specific	2.8	Long Term
Channel Disturbance				Long Term
Headcut Mitigation*	1	Site Specific	.5	
Road/Utility Crossings	8	Site Specific	.49	
Improved Roads				Long Term
No Corridor				
With Corridor	2.5	50' Width	15.1	

Facility	Number or Miles	Factor	Acreage of Disturbance	Duration of Disturbance
2-Track Roads With Corridor	26.4	40' Width	128.1	Long Term
Pipelines With Corridor	3.4	40' Width	16.5	Short Term
Overhead Powerlines	0.0	15' Width	0	Long Term
Additional Disturbance		Site Specific	0	

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

#### 4.1.1. Soils

Under this alternative 32 federal wells would be drilled (see description of alternatives). The topography and soils in this area are diverse. There are many areas which will be reclaimed by traditional methods, minimizing the overall impact of the project. However, some areas will be challenging for reclamation due to soil properties and/or site characteristics. The operator planned their project to avoid those areas where possible, however the proposed action will affect some areas of soils with a limited potential for successful reclamation.

**Direct and Indirect Effects:** Direct and indirect effects resulting from well pad, access roads, pipelines, powerlines and other activities may include: soil compaction, mixing of horizons, loss of soil vegetative cover, organic matter and productivity, modification of hillslope hydrology and increased susceptibility of the soil to erosion. Soil productivity would be eliminated along improved roads and severely restricted along two track trails until successful final reclamation is achieved. The majority of proposed pipelines (gas and water) would be located in “disturbance corridors”, which involve placing two 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. Estimated disturbance associated with this Pod is summarized in Table 4.1.

Soil compaction by vehicle traffic results in the collapse of soil pores reducing the transmissivity of water and air. Compaction decreases infiltration thus increasing runoff and hazard of water erosion. The potential for compaction is greatest when soils are wet. 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 in these areas may be reduced by remedial action such as plowing or ripping. In addition, operators and contractors should not be working in the field when soils are wet to prevent these effects.

Soil horizon mixing may result where construction of roads, pipelines or other activities occur. Mixing of horizons may result in moving organic matter and nutrients at depths out of reach of surface plants or destroyed. Horizon mixing may bring soil texture and structure to the surface that are more susceptible to wind and water erosion. If soil structure is destroyed, surface infiltration by water and air may be affected. Inorganic compounds, such as carbonates and other salts, or unweathered material may be brought to the surface which effect seed germination, plant health and viability.

Soil erosion would affect soil health and productivity. Erosion rates are site specific and are dependent on soil, climate, topography, and cover. Expedient reclamation of disturbed land with salvaged topsoil, proper seedbed preparation techniques, and appropriate seed mixes, along with use of erosion control measures (e.g., waterbars, water wings, silt fences, culverts, rip-rap, gabions etc.) would ensure soil

productivity and stability will be regained in the shortest time frame.

Soil disturbances other than permeate facilities would be short term, and have minor impacts with expedient, successful interim reclamation and site stabilization. Construction activities would be designed following Best Management Practices (BMPs) to control erosion and sedimentation; erosion control measures would be maintained and continued until adequate vegetation cover is re-established; vegetation would be removed only when necessary and reseeded following the BLM seeding policy.

The proposed action will effect areas of soils with a limited potential for successful reclamation. These areas are identified as having slope >15%, limiting the use of conventional farm machinery and farming practices or ecological sites susceptible to site degradation and increased soil erosion. Disturbances within these areas require the programmatic/standard COA's be complimented with a site specific performance based reclamation related COA.

The following roads and well locations are identified as areas requiring additional reclamation efforts beyond traditional methods.

- The access road and location in SE Sec.29 T.44N R.75W to the 29-34 well site.
- The access road and location in SWSW Sec. 24 T.44N R.76W to the 24-14 well site.
- The access road and location in NENE Sec. 2 T.43N R.75W to the 2-41 well site

**Cumulative Effects:** Most soil disturbances would be short term, and would be reduced with expedient, successful interim reclamation and site stabilization, as committed to by the operator in their POD Surface Use Plan and as required by BLM in COAs. Construction activities associated with the Proposed Action would impact approximately 22.6 acres during the short term (<5 yrs) and approximately 150 acres in the long term (>5 yrs).

#### **4.1.2. Wetland/Riparian**

No effects to wetland/riparian habitat are expected due to all water being transferred off site via water pipeline to injection wells. No wells or other infrastructure are located within wetlands or riparian areas.

#### **4.1.3. Invasive Species**

Utilization of existing facilities and surface disturbance associated with construction of proposed access roads, pipelines, water management infrastructure, produced water discharge points and related facilities would present opportunities for weed invasion and spread. 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 ensure that potential impacts from noxious weeds and invasive plants will be reduced.

#### **4.1.4. Cumulative Effects**

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

As referenced above, the PRB FEIS did disclose that cumulative impacts may occur to soils and vegetation as a result of discharged produced CBNG water. Impacts are within the parameters identified

in the PRB FEIS.

No additional mitigation measures are required.

## **4.2. Wildlife**

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

Under the environmentally preferred alternative, winter-yearlong range for pronghorn antelope and yearlong and winter-yearlong range for mule deer would be directly disturbed with the construction of wells, reservoirs, pipelines and roads. Table 4.1 summarized the proposed activities; items identified as long term disturbance would be direct habitat loss. Short-term disturbances also result in direct habitat loss; however, they should provide some habitat value as these areas are reclaimed and native vegetation becomes established. In addition to the direct habitat loss, big game would likely be displaced from the project area during drilling and construction. A study in central Wyoming reported that mineral drilling activities displaced mule deer by more than 0.5 miles (Hiatt and Baker 1981). The WGFD feels a well density of eight wells per section creates a high level of impact for big game and that avoidance zones around mineral facilities overlap creating contiguous avoidance areas (WGFD 2004). A multi-year study on the Pinedale Anticline suggests not only do mule deer avoid mineral activities, but after three years of drilling activity the deer have not accepted the disturbance (Madson 2005).

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

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

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

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

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

All streams within the project area are ephemeral. Produced water is being piped off site and reinjected into the Madison aquifer. No produced water is being surface discharged, there will be no effects to aquatic species from the Dry Willow I POD.

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

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

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

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

**4.2.3.1. Cumulative effects**

The cumulative effects associated with Alternative C are within the analysis parameters and impacts described in the PRB FEIS. For details on expected cumulative impacts, please refer to the referenced PRB FEIS, Volume 2, Chapter 4, Page 4-235.

**4.2.4. Raptors Direct and Indirect Effects**

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

**Table 4.2. Wells within close proximity to documented raptor nests within the Dry Willow project area (Timing restrictions will apply to these wells).**

<b>BLM ID#</b>	<b>UTM (NAD 83)</b>	<b>SPECIES</b>	<b>STATUS (2006)</b>	<b>WELL / PIT NUMBER</b>	<b>DISTANCE (MILES)</b>
4097	423960E 4847925N	Long-eared owl	Active	24-21	0.27
4097	423960E 4847925N	Long-eared owl	Active	24-12	0.31
4107	423480E 4847990N	Unknown	Inactive	24-12	0.43
4112	423490E 4847540N	Long-eared owl	Inactive	24-12	0.26
4111	424000E 4847495N	Unknown	Inactive	24-12	0.10 (out of line-of-sight)
4111	424000E 4847495N	Unknown	Inactive	24-21	0.34
4111	424000E 4847495N	Unknown	Inactive	24-23	0.38
3559	426300E 4847650N	Red-tailed hawk	Active	19-21	0.20
3559	426300E 4847650N	Red-tailed hawk	Active	19-12	0.46
4096	428135E 4845016N	Long-eared owl	Active	29-24	0.10 (out of line-of-sight)
4096	428135E 4845016N	Long-eared owl	Active	29-23	0.48

<b>BLM ID#</b>	<b>UTM (NAD 83)</b>	<b>SPECIES</b>	<b>STATUS (2006)</b>	<b>WELL / PIT NUMBER</b>	<b>DISTANCE (MILES)</b>
4096	428135E 4845016N	Long-eared owl	Active	29-43	0.40
4103	427130E 4843380N	Prairie falcon	Active	31-43	0.45
3648	421638E 4845144N	Golden eagle	Inactive	26-14	0.44
4113	422040E 4845300N	Unknown	Inactive	26-14	0.24
4109	422560E 4845550N	Unknown	Inactive	26-14	0.35
3661	422830E 4845650N	Great-horned owl	Active	26-14	0.48
3695	422969E 4845425N	Unknown	Inactive	26-14	0.47
645	423308E 4845730N	Red-tailed hawk	Inactive	26-41	0.30
645	423308E 4845730N	Red-tailed hawk	Inactive	25-12	0.40
3659	423380E 4845725N	Great-horned owl	Active	26-41	0.29
3659	423380E 4845725N	Great-horned owl	Active	25-12	0.35
3693	423434E 4845520N	Great-horned owl	Inactive	26-41	0.42
3693	423434E 4845520N	Great-horned owl	Inactive	25-12	0.37
3646	423688E 4845326N	Red-tailed hawk	Inactive	25-12	0.34
3646	423688E 4845326N	Red-tailed hawk	Inactive	35-41	0.47
3662	424011E 4845643N	Unknown	Inactive	26-41	0.48
3662	424011E 4845643N	Unknown	Inactive	25-12	0.12 (out of line-of-sight)
3662	424011E 4845643N	Unknown	Inactive	25-21	0.39
3664	424000E 4845612N	Unknown	Inactive	26-41	0.49
3664	424000E 4845612N	Unknown	Inactive	25-12	0.14 (out of line-of-sight)
3664	424000E 4845612N	Unknown	Inactive	25-21	0.41
3698	424065E 4845443N	Unknown	Inactive	25-12	0.25
3698	424065E 4845443N	Unknown	Inactive	25-21	0.49
3663	424048E	Unknown	Inactive	25-12	0.28

<b>BLM ID#</b>	<b>UTM (NAD 83)</b>	<b>SPECIES</b>	<b>STATUS (2006)</b>	<b>WELL / PIT NUMBER</b>	<b>DISTANCE (MILES)</b>
	4845391N				

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. In some cases, the BLM was unable to move infrastructure greater than one-quarter mile from raptor nests. This infrastructure was moved to locations out of line-of-sight of these nests.

**4.2.4.1. Cumulative effects**

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

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

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

**4.2.5.1. Threatened and Endangered 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 of insufficient size.
<b>Threatened</b> Bald eagle ( <i>Haliaeetus leucocephalus</i> )	Mature forest cover often within one mile of large water body.	S	LAA	Overhead power lines present and increased human activity within potential habitat.
Ute ladies'-tresses orchid ( <i>Spiranthes diluvialis</i> )	Riparian areas with permanent water	NP	NE	Historically perennial water not present.

**Presence**

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

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

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

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

Effect Determinations

**Listed Species**

**LAA** Likely to adversely affect

**NE** No Effect.

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

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

Because the black-tailed prairie dog colonies within the Dry Willow project area are of insufficient size for supporting ferrets, are isolated from any prairie dog complexes, and will not be impacted by project infrastructure, implementation of the proposed development should have no effect on the black-footed ferret.

#### **4.2.5.1.2. Bald eagle**

The proposed project is likely to adversely affect bald eagles due to the presence of existing roads and overhead electric lines, some of which are not in compliance with APLIC suggestions and Service standards. The project will also increase noise and human activity within potential nesting and roosting habitat.

Bald eagle nesting and roosting habitat exist within one mile of the project area in the form of large stands of mature ponderosa pine on the side-slopes of Pumpkin Buttes and scattered mature cottonwood trees along drainages. Due to the high concentration of potential prey (domestic sheep ranch and high populations of lagomorphs), bald eagles are likely to forage throughout the project area.

There are 7.1 miles of existing overhead three-phase distribution lines within the project area. The wire spacing is not in compliance with the Avian Power Line Interaction Committee's (1996) suggested practices and with the Service's standards (USFWS 2002). Anadarko is proposing no additional overhead three-phase distribution lines. There are currently 3.8 miles of two-track roads and 7.5 miles of improved roads within the project area, with 10.7 miles and 2.5 miles proposed respectively.

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 Dry Willow project area. Twenty-two raptors including 16 golden eagles were electrocuted within Wyoming's Powder River Basin in 2003; 12 electrocutions were on recently constructed lines which did not fully meet APLIC standards (Rogers pers. Comm.). Power lines not constructed to APLIC suggestions pose an electrocution hazard for eagles and other raptors perching on them; the Service has developed additional specifications improving upon the APLIC suggestions. Constructing power lines to the APLIC suggestions and Service standards minimizes but does not eliminate electrocution risk.

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

#### **4.2.5.1.3. Ute's Ladies Tresses Orchid**

No reservoirs will be utilized in this project. No spring has been identified. Suitable habitat is not present within the Dry Willow project area. Implementation of the proposed coal bed natural gas project should not affect the Ute ladies'-tresses orchid as suitable habitat is not present.

#### **4.2.5.2. 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	NP	NI	Habitat will not be affected.
Spotted frog ( <i>Rana pretiosa</i> )	Ponds, sloughs, small streams	NP	NI	Prairie not mountain habitat.
<b>Birds</b>				
Baird's sparrow ( <i>Ammodramus bairdii</i> )	Grasslands, weedy fields	S	MIH	Sagebrush cover will be affected.
Brewer's sparrow ( <i>Spizella breweri</i> )	Basin-prairie shrub	S	MIH	Sagebrush cover will be affected.
Burrowing owl ( <i>Athene cunicularia</i> )	Grasslands, basin-prairie shrub	S	MIH	Prairie dog colonies present.
Ferruginous hawk ( <i>Buteo regalis</i> )	Basin-prairie shrub, grasslands, rock outcrops	K	MIH	Grassland and shrubland habitats will be affected.
Greater sage-grouse ( <i>Centrocercus urophasianus</i> )	Basin-prairie shrub, mountain-foothill shrub	K	WIPV	Sagebrush cover will be affected.
Loggerhead shrike ( <i>Lanius ludovicianus</i> )	Basin-prairie shrub, mountain-foothill shrub	K	MIH	Sagebrush cover will be affected.
Long-billed curlew ( <i>Numenius americanus</i> )	Grasslands, plains, foothills, wet meadows	S	MIH	Grasslands will be affected.
Mountain plover ( <i>Charadrius montanus</i> )	Short-grass prairie with slopes < 5%	S	MIH	Prairie 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	S	MIIH	Sagebrush cover will be affected.
Sage thrasher ( <i>Oreoscoptes montanus</i> )	Basin-prairie shrub, mountain-foothill shrub	S	MIIH	Sagebrush cover will be affected.
Trumpeter swan ( <i>Cygnus buccinator</i> )	Lakes, ponds, rivers	S	NI	No new reservoirs within the project area.
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	No facilities proposed within prairie dog towns.
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	Grassland habitat will be affected.
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

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

No project related activities are proposed within any prairie dog colonies. There should be no effects to prairie dogs.

#### **4.2.5.2.2. Greater sage-grouse**

Suitable sage-grouse habitat is present throughout the project area. Nine documented sage-grouse leks are present within two miles of the project area.

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).

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).

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

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

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

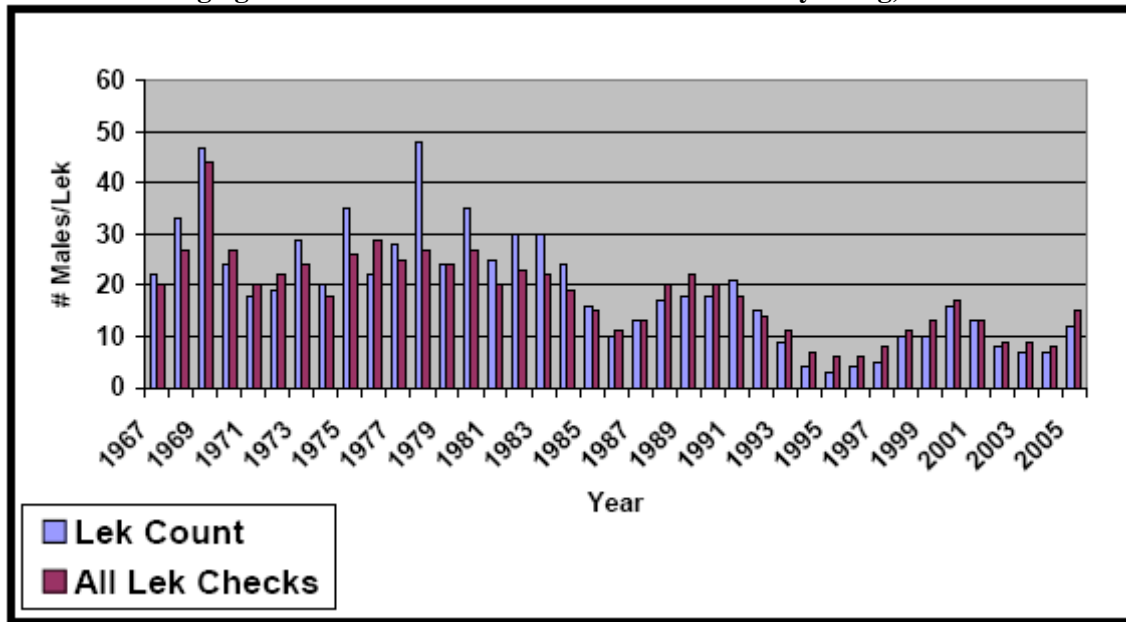
Percentage of sage-grouse nesting within a certain distance from their breeding lek is unavailable for the Powder River Basin. The Buffalo and Miles City field offices through the University of Montana with assistance from other partners including the U.S. Department of Energy and industry are currently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

Vegetation communities within the Powder River Basin are naturally fragmented as they represent a transition between the intermountain basin sagebrush communities to the west and the prairie communities to the east. The Powder River Basin is also near the eastern edge of greater sage-grouse range. Without contiguous habitat available to nesting grouse it is likely a smaller percentage of grouse nest within two-miles of a lek within the PRB than grouse within those areas studied in the development

of the 1977 WAFWA recommendations and even the Holloran and Moynahan study areas. Holloran and Moynahan both studied grouse in areas of contiguous sagebrush habitats without large scale fragmentation and habitat conversion (Moynahan et al In press, Holloran and Anderson 2005). A recent sagebrush cover assessment within Wyoming basins estimated sagebrush coverage within Holloran and Anderson’s Upper Green River Basin study area to be 58% with an average patch size greater than 1200 acres; meanwhile Powder River Basin sagebrush coverage was estimated to be 35% with an average patch size less than 300 acres (Rowland et al. 2005). The Powder River Basin patch size decreased by more than 63% in forty years, from 820 acre patches and an overall coverage of 41% in 1964 (Rowland et al. 2005). Recognizing that many populations live within fragmented habitats and nest much farther than two miles from the lek of breeding WAFWA revised their sage grouse management guidelines (Connelly et. al. 2000) and now recommends the protection of suitable habitats within 5 km (3.1 mi) of leks where habitats are not distributed uniformly such as the Powder River Basin.

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

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



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

A two-mile timing limitation given the long-term population decline and that less than 50% of grouse are expected to nest within the limitation area is likely insufficient to reverse the population decline.

Moynahan and Lindberg (2004) like WAFWA (Connely et al. 2000) recommend increasing the protective distance around sage grouse leks. Even with a timing limitation on construction activities, sage-grouse may avoid nesting within CBNG fields because of the activities associated with operation and production. As stated earlier, a well density of eight wells per section creates sage-grouse avoidance zones which overlap creating contiguous avoidance areas (WGFD 2004).

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

#### **4.2.5.2.3. Mountain plover**

Mineral development may have mixed effects on mountain plovers. Disturbed ground such as buried pipe line corridors and roads may be attractive to plovers while human activities within one-quarter mile may be disruptive. Use of roads and pipe line corridors by mountain plovers may increase their vulnerability to vehicle collision. CBNG infrastructure such as the well houses, roads, pipe line corridors, and nearby metering facilities may provide shelter and den sites for ground predators such as skunks and foxes. An analysis of direct and indirect impacts to mountain plover due to oil and gas development is included in the PRB FEIS (4-254-255).

Mountain plover breeding and nesting habitat exists throughout the project area.

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

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

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

Produced water is being piped offsite and reinjected into the Madison formation. No produced water is being surface discharged; therefore no mosquito breeding habitat will be created as a result of the Dry Willow POD. Without mosquitoes, there will be no increased risk of WNV spread resulting from the Dry Willow POD.

### **4.4. Water Resources**

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

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 Water Management Plan (WMP) proposes the transportation and injection of a maximum of 40,000 barrels per day (BPD) from the Dry Willow POD. The wells will inject into the Madison and Tensleep

formations near the Anadarko's Salt Creek field. Underground Injection Permit (UIC) 05-231, Class V, is permitted for a maximum of 80,000 BPD per well (potentially 5 wells) for a total of 400,000 BPD. This reinjection contribution from this POD would account for 10% of the total reinjection capacity if all wells were online at maximum water production. ReInjection is discussed in the PRB FEIS in the CBM Produced Water Use and Treatment section on page 3-54.

#### **4.4.1. Groundwater**

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 in the water wells in the area. The permitted water wells in the area produce from alluvial or bedrock zones above the targeted coal bed natural gas producing zones (275- 1132 feet depth for the stock and domestic wells compared to 1,325-1,844 feet to the Big George ). As mitigation, the operator has committed to offer water well agreements to holders of properly permitted domestic and stock wells within the circle of influence of the proposed wells.

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

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

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

##### **4.4.1.1. Groundwater Cumulative Effects:**

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

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

#### **4.4.2. Surface Water**

The operator has obtained a Wyoming Class V Underground Injection permit (Permit UIC 05-231) for the

injection of water produced from this project from the WDEQ, which is permitted for a maximum of 80,000 BPD per well for a total of 400,000 BPD. The proposed action involves the transportation and injection of a maximum of 40,000 barrels per day (BPD) into potentially 5 injection wells into the Madison and Tensleep formations near the Anadarko's Salt Creek field. The injected water cannot exceed 5,000 mg/L total dissolved solids.

The quality for the water produced from the Big George target coal zone is predicted to be similar to, or better than, the ground water within the Madison and Tensleep formations. The TDS in the Madison Well 10 MAD SW13 is 4,090 mg/L while the Big George TDS of the representative water quality sample is 2,140 mg/L.

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 WDEQ analytical parameters 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.

#### **4.5. Cultural Resources Direct and Indirect Effects**

Only one of the eligible properties will be affected by the proposed undertaking. A pipeline corridor will be constructed through 48CA383 within an existing crown and ditched road. The existing disturbed portion of the site does not contribute to the sites integrity and will result in **no adverse effect**.

Visual Resource Management contrast ratings determined that the entire Dry Willow POD will have a moderate to strong contrast to the setting of the Pumpkin Buttes. Setting is a contributing aspect of integrity for the Pumpkin Buttes. In accordance with the Wyoming State BLM/SHPO protocol, this will result in an **adverse effect** to 48CA268.

The BFO, Anadarko and the State Historic Preservation Officer have developed a memorandum of agreement (MOA) for the resolution of adverse effects for the Dry Willow POD. Mitigation measures within the MOA will reduce visual impacts by proposing to follow an extensive reclamation plan, bury electric power lines, corridor gas, water, and electric lines, maintain all utilized roads to their present condition, and paint structures and facilities to blend into the environment as much as possible. Although the project will have an adverse effect to the setting in the short-term, these mitigation measures will reduce visual impacts over the long-term life of the project, thus meeting the intent of the MOA to minimize adverse effects.

The project as proposed will have an adverse effect to historic property (48CA268). A memorandum of agreement for the resolution of adverse effects to 48CA268 was signed by the Buffalo BLM, The State Historic Preservation Office, tribal names, and Anadarko. If any cultural values [sites, artifacts, human remains (Appendix L PRB FEIS)] are observed during operation of this lease/permit/right-of-way, they will be left intact and the Buffalo Field Manager notified. Further discovery procedures are explained in the *Standard COA* (General)(A)(1).

##### **4.5.1. Native American Consultation**

On May 01, 2006, The BFO sent letters to multiple Native American Tribes regarding consultation for the proposed Dry Willow Phase 1 POD. The purpose of the letter was to invite the tribes to participate in the development of a memorandum of agreement for the resolution of adverse effects to the Pumpkin Buttes (48CA268). Letters were sent to all tribal chairpersons and known official representatives. Follow up

calls were made for each letter. If contact was not made, attempts were made to leave voice mails or messages with person who answered explaining purpose of call and contact information. Only one tribe provided a written response. Fort Berthold expressed a desire to consult on reclamation to avoid, minimize or mitigate impacts to sacred and cultural resources. No other tribes contacted requested to be consulting parties. Because of the lack of response by the tribes, the agency, the Wyoming SHPO, and Anadarko proceeded to draft a MOA for the resolution of adverse effects to 48CA268. In August of 2007, the Blackfeet contacted the agency and expressed an interest in the project. The BFO stated that they would submit a draft of the MOA for their review.

Tribes contacted for the May 01 letter:

**Apache Tribe of Oklahoma:** Nathan Tselee  
**Blackfeet:** William Talks About, John Murray  
**Arapaho:** Richard Brannan, Alonzo Moss  
**Cheyenne River Sioux:** Harold Frazier, Albert Labeau  
**Crow:** Carl Venne, George Reed  
**Kiowa:** Billy Evens Horse  
**Lower Brule:** Michael Jandreau  
**Northern Cheyenne:** Eugene Little Coyote, Conrad Fisher  
**Oglala:** Cecilia Little Thunder, Edger Bear Runner  
**Rosebud:** Rodney Bordeaux  
**Shoshone:** Ivan poesy, Arlen Shoyo  
**Standing Rock:** Ron His Horses Thu, Tim Mentz  
**Fort Peck:** John Morales Jr., Darrel "Curly" Youpee  
**Ft. Berthold:** Russell Mason,

On October 12, 2006, information packages including a draft MOA, a Plan of Development and project specific cultural resource information were sent to the tribes with a request for their comment on the draft MOA. Letters were sent to the tribes identified in the Ethnohisotry that requested to be contacted for proposed federal actions in close proximity to the buttes. The Crow and Northern Cheyenne were also contacted because of their close proximity to the buttes. Letters were also sent to the Blackfeet and Fort Bethold because of their desire to comment. The BFO invited the tribes and the SHPO to meet face-to-face to discuss the draft MOA and listen to their concerns. Letters were sent to all tribal chairpersons and known official representatives. Follow up calls were made for each letter. If contact was not made, attempts were made to leave voice mails or messages with person who answered explaining purpose of call and contact information.

The Northern Arapaho and reparative from the Fort Peck Reservation attended meetings with the agency. The agency toured the project area with the two tribes and held formal meetings with each tribe to discuss the MOA. Neither tribe expressed concerns related to visual impacts to the Pumpkin Buttes. The Northern Arapaho were concerned that no disturbance takes place on the slopes or top of Pumpkin Buttes. Stipulations in the MOA do not allow physical impacts to the slopes or the tops of the Buttes. The agency invited the Northern Arapaho and Fort Peck to be Concurring Signatories to the agreement, which provides for future participation with the Dry Willow Phase I POD and the agreement. The BFO conducted a follow up conference call with The Northern Arapaho to discuss a letter submitted by their attorney. The letter requested clarification of the tribe's role in the process and NAGPRA concerns. The agency amended the document to address their concerns. Both the Northern Arapaho and Fort Peck committed to submit written comments to the agency related to the agreement, but those documents were never received by the agency. The comments by the Northern Arapaho were in addition to the letter submitted by their attorney. The agency has taken the two tribes verbal comments into consideration as it relates to the MOA.

On January 02, 2007, the agency submitted a final MOA to the Northern Arapaho and the Fort Peck with an invitation to sign the agreement as Concurring Signatories.

Tribes contacted for the October 12, 2007 letter:

**Arapaho:** Richard Brannan, Alonzo Moss

**Blackfeet:** William Talks About, John Murray

**Cheyenne River Sioux:** Harold Frazier, Albert Labeau

**Crow:** Carl Venne, George Reed

**Northern Cheyenne:** Eugene Little Coyote, Conrad Fisher

**Oglala:** Cecilia Little Thunder, Edger Bear Runner

**Shoshone:** Ivan poesy, Arlen Shoyo

**Fort Peck:** John Morales Jr., Darrel “Curly” Youpee

**Ft. Berthhold:** Tex G. Hall, Pemina Yellow Bird

## 5. CONSULTATION/COORDINATION

Contact	Title	Organization	Present at Onsite
Nathan Tselee	Chairman	Apache Tribe of Oklahoma	No
William Talks About,	Chairman	Blackfeet	No
John Murray	Cultural Resource Lead (THPO)	Blackfeet	No
Richard Brannan	Chairman	Northern Arapaho	No
Jo Ann White	Cultural Lead	Northern Arapaho	Field Visits
Alonzo Moss	Elder	Northern Arapaho	Field Visit
Harold Frazier,	Chairman	Cheyenne River Sioux	No
Albert Labeau	Cultural Resource Reparative	Cheyenne River Sioux	No
Carl Venne,	Chairman	Crow	No
George Reed	Cultural Resource	Crow	No
Billy Evens Horse	Chairman	Kiowa:	No
Michael Jandreau	Chairman	Lower Brule	No
Eugene Little Coyote	Chairman	Northern Cheyenne:	No
Conrad Fisher	Cultural Reprehensive	Northern Cheyenne:	No
Cecilia Little Thunder	Chairman	Oglala	No
Edger Bear Runner	Cultural Reprehensive	Oglala	No
Rodney Bordeaux	Chairman	Rosebud	No
Ivan poesy	Chairman	Shoshone	No
Arlen Shoyo	Cultural Reprehensive	Shoshone	No
John Morales Jr.	Chairman	Fort Peck	
Darrel “Curly” Youpee	Cultural Reprehensive	Fort Peck	Field Visit
Ron His Horses Thu,	Chairman	Standing Rock	No

Contact	Title	Organization	Present at Onsite
Tim Mentz	Cultural Representative	Standing Rock	No
Russell Mason	Past Chairman	Ft. Berthhold	No
Tex G. Hall,	Current Chairman	Ft. Berthhold	No
Pemina Yellow Bird	Cultural Repreentive	Ft. Berthhold	No
Brian Kelly	Field Supervisor	U.S. Fish and Wildlife Service	No

## 6. OTHER PERMITS REQUIRED

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

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