FINDING OF NO SIGNIFICANT IMPACT & DECISION RECORD
FOR
Citation Oil & Gas Corporation
Triangle CBM Unit Addition 1
ENVIRONMENTAL ASSESSMENT –WY-070-09-064

DECISION: BLM's decision is to approve alternative D, as summarized below and described in the attached EA, and authorize Citation Oil & Gas Corporation's Triangle CBM Unit Addition 1 Coal Bed Natural Gas (CBNG) POD comprised of the following 4 Applications for Permit to Drill (APDs):

	Well Name	Well #	Qtr/Qtr	Section	TWP	RNG	Lease #
1	Triangle (CBM) Unit	21-1	NENW	1	46N	76W	WYW0311402
2	Triangle (CBM) Unit	41-1	NENE	1	46N	76W	WYW0311402
3	Triangle (CBM) Unit	14-17	SWSW	17	47N	75W	WYW145191
4	Triangle (CBM) Unit	23-17	NESW	17	47N	75W	WYW145191

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

	IMPOUNDMENT Name / Number	Qtr/Qtr	Section	TWP	RNG	Capacity (Acre Feet)	Surface Disturbance (Acres)	Lease #
1	Sandman (existing)	NENE	1	46N	76W	13.50	3	WYW0311402

The following wells have been deferred due to resource conflicts.

	Well Name	Well #	Qtr/Qtr	Section	TWP	RNG	Lease #
1	Triangle (CBM) Unit	32-1	SWNE	1	46N	76W	WYW0311402
2	Triangle (CBM) Unit	43-1	NESE	1	46N	76W	WYW0311402

The following access road, infrastructure and associated facilities are not being approved as proposed.

	Infrastructure/facility	Qtr/Qtr	Section	TWP	RNG
1	Pipeline from the 41-1 to the 32-1 well location	NE1/4	1	46N	76W
2	Header building proposed at the 32-1 well location	SWNE	1	46N	76W
3	Access road from the 21-1 to the 32-1 well location	NW1/4 and NE1/4	1	46N	76W
4	Access road from the 32-1 to the 43-1 well location	NE1/4	1	46N	76W
5	Pipeline from the 21-1 to the 32-1 well location	NW1/4 and NE1/4	1	46N	76W
6	Pipeline from the 32-1 to the 43-1 well location	NE1/4	1	46N	76W
7	Overhead Power line from the 41-1 to the 32-1 well location	NE1/4	1	46N	76W

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 Final Environmental Impact Statement and Resource Management Plan Amendment (PRB FEIS) approved April 30, 2003.

SUMMARY OF ALTERNATIVE D

Alternative D includes appropriate components of Alternatives C and additional project modifications as described in the EA that will alleviate site specific impacts to sage-grouse and habitat.

The following items summarize the components of Alternative C included in Alternative D:

1. The pipeline in section 17 of T47N R75W was moved to be a corridor with the access road from the 14-17 location to the existing 43-18 location, where it will tie into existing infrastructure.

RATIONALE: The decision to authorize the selected alternative, as summarized above, is based on the following:

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

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

3. The selected alternative will not result in any undue or unnecessary environmental degradation.

4. It is in the public interest to approve these wells as this development will help meet the nation's future needs for energy reserves, and will help to stimulate local economies by maintaining stability for the workforce.

5. The selected alternative incorporates the best available science in development of the attached conditions of approval regarding wildlife.

6. Mitigation measures from the range of alternatives were selected to best meet the purpose and need, and will be applied by the BLM to alleviate environmental impacts.

7. Approval of this alternative is in conformance with the Final Powder River Basin Oil and Gas Project Environmental Impact Statement and Proposed Plan Amendment (PRB FEIS), Record of Decision and Resource Management Plan Amendments for the Powder River Basin Oil and Gas Project (PRB FEIS ROD), (refer to Appendix E of PRB FEIS ROD page E-1), and the Approved Resource Management Plan (RMP) for the Public Lands Administered by the Bureau of Land Management (BLM), Buffalo Field Office (BFO), April 2001.

8. The selected alternative incorporates components of the Wyoming Governor's Sage Grouse Implementation Team's core population area strategy and executive order and local research to provide appropriate protections for sage-grouse, while meeting the purpose and need for the Triangle CBM Unit Addition 1 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 the selected alternative, and, therefore, an environmental impact statement is not required.

In conformance with Appendix E of the PRB FEIS ROD, the BLM BFO has initiated actions within the PRB FEIS analysis area in response to additional information regarding impacts to sage-grouse. These measures include:

1. Early initiation of a Resource Management Plan (RMP) revision, based on the evaluation of monitoring data generated under the mitigation monitoring and reporting plan (MMRP) in the PRB FEIS ROD.
2. Establishment of sage-grouse Focus Areas encompass approximately 1 million acres managed under strict guidelines designed to preserve decision-space for managing sage-grouse populations for development of alternatives during the RMP process (Appendix B).
3. Initiation of a population viability analysis in the Powder River Basin. This is a 24-month project involving the University of Montana, U.S. Geological Survey (USGS), BLM Miles City Field Office, and BLM BFO.
4. Development of alternatives that modify the proposed action to reflect the findings of the best available science regarding sage-grouse management.
5. Development of conditions of approval, specific to sage-grouse management, that incorporate recommendations from recent research, the Northeast Local Sage-grouse Working Group, the Wyoming Game and Fish Department (WGFD), BLM, and the Petroleum Association of Wyoming.

The implementation of the selected alternative best meets the stated purpose and need for the proposed action. With the application of mitigating measures associated with Alternative D, there's an increased probability that sage-grouse population viability in the Powder River Basin will not be compromised, due to the larger scope of planning actions and research initiated by the BLM BFO.

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: 9/2/09

BUREAU OF LAND MANAGEMENT
BUFFALO FIELD OFFICE
ENVIRONMENTAL ASSESSMENT (EA)
FOR
Citation Oil & Gas Corporation
Triangle CBM Unit Addition 1
PLAN OF DEVELOPMENT
WY-070-09-064

INTRODUCTION

This site-specific analysis tiers into and incorporates by reference the information and analysis contained in the *Final Environmental Impact Statement and Proposed Plan Amendment for the Powder River Basin Oil and Gas Project* (PRB FEIS), #WY-070-02-065 (approved April 30, 2003), and the PRB FEIS Record of Decision (ROD) pursuant to 40 CFR 1508.28 and 1502.21. This document is available for review at the BLM Buffalo Field Office (BFO). This project environmental assessment (EA) addresses site-specific resources and impacts that were not covered within the PRB FEIS.

1. PURPOSE AND NEED

The purpose and need of this EA is to determine how and under what conditions to allow Citation Oil & Gas Corporation to exercise lease rights granted by the United States to develop the oil and gas resources on federal leaseholds as described in their proposed action.

Development of the Triangle CBM Unit Addition 1 wells would return royalties to the federal Treasury as well as stimulate local economies.

Agency Responsibilities

The BLM recognizes the extraction of natural gas is essential to meeting the nation's future needs for energy. As a result, private exploration and development of federal gas reserves are integral to the agencies' oil and gas leasing programs under the authority of the Mineral Leasing Act of 1920, as amended, and the Federal Land Policy Management Act (FLPMA) of 1976. The oil and gas leasing program managed by BLM encourages the development of domestic oil and gas reserves and reduction of the U.S. dependence on foreign sources of energy.

This action responds to the goals and objectives outlined in the 1985 Buffalo RMP, the 2001 Approved RMP for Public Lands Administered by the BLM BFO and the 2003 PRB FEIS. This action helps move the project area toward desired conditions for mineral development with appropriate mitigation consistent with the goals, objectives and decisions outlined in these two documents.

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

The proposed action conforms to the terms and the conditions of the 1985 Buffalo RMP, the 2001 Approved RMP, the 2003 PRB FEIS, and the PRB FEIS ROD as required by 43 CFR 1610.5. The BFO RMP is currently under revision.

For the RMP revision, BFO established Focus Areas with rigorous interim protections in order to preserve decision space during the revision process. Outside the Focus Areas, BFO continues to apply appropriate, but far less rigorous, site-specific mitigating measures for high-quality sage-grouse habitat with well densities up to 80-acre spacing and may include site-specific mitigating measures suggested by the best available science. Actions within BFO Focus Areas will be limited to impacts consistent with

640 acre spacing, and must have a plan of development that demonstrates that the proposal can be managed in a manner that effectively conserves sage-grouse habitats (in Focus Areas) affected by the proposal.

The Triangle CBM Unit Addition 1 does not occur within a core or focus area. However, high quality sage-grouse habitat, as indicated by sage-grouse habitat models (Doherty 2008, Doherty et al. 2008), occurs throughout the project area.

2. ALTERNATIVES INCLUDING THE PROPOSED ACTION

Four alternatives were evaluated in determining how to best meet the stated purpose and need of the proposed action. A brief description of each alternative follows. For the complete detailed description of each alternative, including the alternatives considered but not analyzed in detail, see Appendix A.

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

Alternative B, the "proposed action" alternative, summarizes the Triangle CBM Unit Addition 1 Project as originally submitted to the BLM by Citation Oil & Gas Corporation, prior to any BLM review or modifications.

2.3. Alternative C - Modified Proposed Action

Alternative C represents a modification of Alternative B based on the operator and BLM working cooperatively to reduce environmental impacts. The description of Alternative C is the same as Alternative B with the addition of modifications to the proposed action identified by BLM and the operator at the onsite visits and modifications proposed by the operator following the onsite visits. At the onsite, all areas of proposed surface disturbance were inspected to insure that the project would meet BLM multiple use objectives to conserve natural resources while allowing for the extraction of Federal minerals. Project specific changes made at the onsite are described in Appendix A. Alternatives to the different aspects of the proposed action are always considered and applied as pre-approval changes, site specific mitigation and/or Conditions of Approval (COAs), if they will alleviate environmental effects of the operator's proposal.

Alternative C also incorporates the results of sage-grouse habitat mapping efforts in the project area and on-site verification of habitat suitability. This alternative represents BFO efforts to reduce project-specific impacts to sage-grouse habitat, while maintaining proposed spacing and infrastructure requirements consistent with the purpose and need of the proposed action.

The specific changes identified for the Triangle CBM Unit Addition 1 are described in detail in Appendix A.

2.4. Alternative D

Alternative D represents additional project modifications that will reduce the environmental impacts across multiple resources including sage-grouse and sage-grouse habitat. Alternative D is the same as Alternative C in terms of the modifications made to the proposed action during the onsite visits. Additional project-level modifications were identified by BLM after review of the modified proposed

action, guided by seven years of sage-grouse research in the project area and additional studies from across the species' range. Alternative D encompasses mitigation that would reduce habitat fragmentation, reduce surface disturbance, and enhance the reclamation potential of the project area. Alternative D represents the Buffalo Field Office's efforts to reduce project-specific impacts across multiple resources, while maintaining spacing and infrastructure requirements consistent with the purpose and need of the proposed action.

Implementation of Alternative D would provide contiguous habitat by reducing disturbance to and fragmentation of nesting and brood-rearing habitat within 0.8 miles of an active sage-grouse lek. This alternative also incorporates mitigation designed around site-specific habitat characteristics to accelerate return to habitat effectiveness at reclamation.

The specific changes identified for the Triangle CBM Unit Addition 1 are described in detail in Appendix A.

2.5. Alternatives considered but not analyzed in detail

Alternatives considered but not analyzed in detail for the Triangle CBM Unit Addition 1 are described in detail, if applicable, in Appendix A.

3. DESCRIPTION OF AFFECTED ENVIRONMENT

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.

Applications to drill were received on 12/07/2007. Field inspections of the proposed Triangle CBM Unit Addition 1 CBNG project were conducted on 1/14/2009 by:

NAME	TITLE	AGENCY
Dorvan Poulson	Production Engineer	Citation O&G Corporation
Bob Holum	Operations Foreman	Citation O&G Corporation
Dave Huber	Permitting Agent	Arcadis USA, Inc.
Courtney Frost	Wildlife Biologist	BLM-Buffalo Field Office
Mary Maddux	Natural Resource Specialist/Team Lead	BLM-Buffalo Field Office

Certain critical environmental components require analysis under BLM policy. These items are presented below in Table 3.1.

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

Mandatory Item	Potentially Impacted	No Impact	Not Present On Site	BLM Evaluator
Threatened and Endangered Species			X	Courtney Frost
Floodplains		X		Mary Maddux, Chris Williams
Wilderness Values			X	Mary Maddux
ACECs			X	Mary Maddux
Water Resources		X		Mary Maddux, Chris Williams
Air Quality		X		Mary Maddux
Cultural or Historical Values				BJ Earle

Mandatory Item	Potentially Impacted	No Impact	Not Present On Site	BLM Evaluator
Prime or Unique Farmlands				Mary Maddux
Wild & Scenic Rivers			X	Mary Maddux
Wetland/Riparian		X		Mary Maddux, Chris Williams
Native American Religious Concerns				BJ Earle
Hazardous Wastes or Solids		X		Mary Maddux
Invasive, Nonnative Species	X			Mary Maddux
Environmental Justice		X		Mary Maddux

3.1. Topographic Characteristics of Project Area

The Triangle Unit Addition 1 project area is located roughly 28 miles SW of Gillette Wyoming.
The topography of the project area consists of gently rolling mixed grass prairie that is divided by ephemeral swales and the intermittent broad ephemeral drainages. The area elevation ranges from 4,500 to 5,000 feet above sea level. Beaver Creek located north of the project area is the major drainage for this area.

The southern portion of the project area is located within the Triangle Unit Central POD and the northern portion of the project area is located within the Triangle Unit North POD. CBNG and Conventional oil development exists throughout the project area.

3.2. Vegetation & Soils

Species typical of short grass prairie comprise the project area flora. Specific species observed throughout the project area include Western wheatgrass, Prairie junegrass, Bluebunch wheatgrass, Downy brome and Wyoming big sagebrush. Differences in dominant species within the project area vary with soil type, aspect and topography.

3.2.1. Soils

The soils are primarily loamy throughout the project area. Soils differ with topographic location, slope and elevation. Topsoil depths to be salvaged for reclamation range from 4 to 6 inches on ridges to 6 to 8 inches in bottomland. Erosion potential varies from to depending on the soil type, vegetative cover and slope. Reclamation potential of soils also varies throughout the project area.

Soils within the project area were identified from the *South Campbell County Survey Area, Wyoming (WY605).* The soil survey was performed by the Natural Resource Conservation Service according to National Cooperative Soil Survey standards. The BLM uses the soil survey information to predict soil behavior, limitations, or suitability for a given action or activity. Reclamation potential of soils varied throughout the project area. The main soil limitations for the loamy ecological sites include low organic matter content and soil droughtiness. The main soil limitations for the sandy ecological sites include depth to bedrock, low organic matter content, soil droughtiness, low water holding capacity, and high wind erosion potential. Approximately 74% of the project area has a moderate rating of reclamation potential compared to only 5% of the project area having a poor rating for reclamation potential. The wells and infrastructure proposed occurs in the moderate to well rating for reclamation potential.

Dominant soil map units are listed in the table below with their individual acreage and percentage of the area within the POD boundary.

Table 3.2 Dominant soils affected by the proposed action include:

Map Unit	Map Unit Name	Acres	Percent
124	CUSHMAN-SHINGLE LOAMS, 6 TO 15 PERCENT SLOPES	33	8
145	FORKWOOD-CAMBRIA LOAMS, 0 TO 6 PERCENT SLOPES	7	2
146	FORKWOOD-CUSHMAN LOAMS, O TO 6 PERCENT SLOPES	52	12
147	FORKWOOD-CUSHMAN LOAMS, 6 TO 15 PERCENT SLOPES	68	16
148	FORKWOOD-ULM LOAMS, 0 TO 6 PERCENT SLOPES	5	1
190	PARMLEED-RENOHILL COMPLEX, 3 TO 15 PERCENT SLOPES	23	6
215	THEEDLE-KISHONA LOAMS, 6 TO 20 PERCENT SLOPES	119	29
216	THEEDLE-KISHONA-SHINGLE LOAMS, 3 TO 30 PERCENT SLOPES	81	19
217	THEEDLE-SHINGLE LOAMS, 3 TO 30 PERCENT SLOPES	12	3
221	TURNERCREST-KEELINE-TALUCE FINE SANDY LOAMS, 6 TO 30 PERCENT SLOPES	10	2
236	VONALEE-TERRO FINE SANDY LOAMS, 2 TO 10 PERCENT SLOPES	9	2

For more detailed soil information, see the NRCS Soil Survey WY605—South Campbell County. Additional site specific soil information is included in the ecological site interpretations.

3.2.2. Vegetation

The map unit symbols for the soils identified above and the associated ecological sites for the identified soil map unit symbols found within the POD boundary are listed in the table below.

Table 3.3 Map Units and Ecological Sites:

Map Unit	Ecological Site
124	Loamy 10-14” Northern Plains
145	Loamy 10-14” Northern Plains
146	Loamy 10-14” Northern Plains
147	Loamy 10-14” Northern Plains
148	Loamy 10-14” Northern Plains
190	Loamy 10-14” Northern Plains
215	Loamy 10-14” Northern Plains
216	Loamy 10-14” Northern Plains
217	Loamy 10-14” Northern Plains
221	Sandy 10-14” Northern Plains
236	Sandy 10-14” Northern Plains

The dominant Ecological Sites and Plant Communities using the Natural Resource Conservation Service, (NRCS, USDA), Technical Guides for the Major Land Resource Area 58B Northern Rolling High Plains, in the 10-14” Northern Plains precipitation zone are Loamy and Sandy.

Loamy Sites occur on gently undulating rolling land on landforms which consists of hill sides, alluvial fans, ridges & stream terraces. The soils are deep to moderately deep (greater than 20” to bedrock), well drained & moderately permeable that were formed in alluvium and residuum derived from sandstone and shale. Layers of the soil most influential to the plant community varies from 3 to 6 inches thick.

The present dominant plant community within the loamy sites is a mixed sagebrush/grass. Currently, it is found under moderate, season-long grazing by livestock in the absence of fire or brush management.

Wyoming big sagebrush is a significant component of this 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 grasses, and miscellaneous forbs.

Dominant grasses include needleandthread, western wheatgrass, and green needlegrass. Grasses of secondary importance include blue grama, prairie junegrass, and Sandberg bluegrass. Forbs commonly found in this plant community include plains wallflower, hairy goldaster, slimflower scurfpea, and scarlet globemallow. Sagebrush canopy ranges from 20% to 30%. Fringed sagewort is commonly found. Plains pricklypear can also occur.

The sagebrush canopy protects the cool-season mid-grasses, but this protection makes them unavailable for grazing. Cheatgrass (downy brome) has invaded the site. The overstory of sagebrush and understory of grass and forbs provide a diverse plant community that will support domestic livestock and wildlife such as mule deer and antelope.

This plant community is resistant to change. The herbaceous species present are well adapted to grazing; however, species composition can be altered through long-term overgrazing. If the herbaceous component is intact, it tends to be resilient if the disturbance is not long-term.

Sandy Sites occur on nearly level to 50% slopes on landforms consisting of alluvial fans, hillsides, plateaus, ridges & stream terraces. These soils are moderately deep (greater than 20" to bedrock) to very deep, well-drained soils that formed in alluvium or alluvium over residuum. These soils have moderate, moderately rapid, or rapid permeability. The surface soil will vary from 3 to 6 inches deep and have one of the following textures: fine sandy loam, sandy loam, or loamy very fine sand. Coarser topsoils may be included if underlain by finer textured subsoil. Layers of the soil most influential to the plant community vary from 3 to 6 inches thick.

The present dominate plant community within the sandy sites is needleandthread/threadleaf sedge/fringed sage. This plant community is the result of moderate season long grazing. The understory of grass includes needleandthread, threadleaf sedge, and prairie junegrass. Fringed sagewort has increased. This community is well suited to grazing by both domestic livestock and wildlife, during the spring, summer and fall. A summary of the ecological sites within the project area are listed in the table below along with the individual acreage and the percentage of the total area identified within the POD boundary.

Table 3.4 Summary of Ecological Sites

Ecological Site	Acres	Percent
Loamy 10-14" Northern Plains	398	96
Sandy 10-14" Northern Plains	18	4

3.2.3. Wetlands/Riparian

Small areas of existing enhanced riparian vegetation is present below the existing Sandman reservoir and no wetlands or riparian vegetation is present in the northern portion of the project area.

3.2.4. Invasive Species

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

Black Henbane
Buffalo Bur

The onsites were conducted in late winter, and the operator and BLM did not confirm the presence of Black Henbane or Buffalo Bur within the project area.

The operator and BLM confirmed the following infestations and/or documented additional weed species during onsite field investigations:

Cocklebur
Canada Thistle

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

3.3. Wildlife

Wildlife species that occur in the Powder River Basin were identified in the PRB FEIS (pp. 3-113 to 3-206). A habitat assessment and wildlife inventory surveys of the Triangle CBM Unit Addition 1 project area were performed by ARCADIS in 2007, 2008, and 2009 (ARCADIS 2007, 2008, 2009). ARCADIS performed surveys for bald eagle nesting and roosting habitat, raptor nest occupancy and productivity, greater sage-grouse and sharp-tailed grouse lek and nesting habitat, black-tailed prairie dog colony delineation, mountain plover breeding and nesting habitat and activity, and Ute ladies'-tresses orchid habitat. All surveys were conducted according to the Powder River Basin Interagency Working Group's protocols (available on the BFO internet website at http://www.blm.gov/wy/st/en/field_offices/Buffalo/wildlife.html).

A BLM biologist conducted field visits on 14 January 2009 and 14 August 2009. During that time, the biologist verified the wildlife survey information, evaluated impacts to wildlife resources, and recommended project modifications where wildlife issues arose.

In addition to the surveys submitted by ARCADIS and the onsite evaluation, the wildlife biologist also consulted databases compiled and managed by BLM BFO wildlife staff, the PRB FEIS, Wyoming Game and Fish Department datasets, and the Wyoming Natural Diversity Database (WYNDD) to evaluate the affected environment for wildlife species that may occur in the project area.

3.3.1. Big Game

Big game species expected to occur within the Triangle CBM Unit Addition 1 project area include pronghorn and mule deer. The affected environment for pronghorn is discussed in the PRB FEIS on pp. 3-117 to 3-122 and for mule deer on pp. 3-127 to 3-132.

WGFD data indicate that the project area contains winter yearlong range for pronghorn and yearlong and winter-yearlong range for mule deer. 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. 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, but during the winter months there is a significant influx of additional animals into the area from other seasonal ranges.

Populations of pronghorn and mule deer within their respective hunt areas are above WGFD objectives. The most current big game range maps are available from WGFD.

3.3.2. Aquatics

Ephemeral tributaries of Beaver Creek and Pumpkin Creek drain the project area. Both creeks are tributaries of the Upper Powder River subbasin, one of eight subbasins that make up the Powder River Basin.

Aquatic invertebrate communities can be indicators of the quality of aquatic environments (Peterson 1990). Perennial streams within northeastern Wyoming were sampled by USGS between 1980 and 1981, and generally supported invertebrate communities that included taxa adapted to flowing water. Ephemeral stream communities generally were composed of taxa adapted to standing water (Peterson 1990). These communities are discussed in the PRB FEIS (pp. 3-153 to 3-154).

Table 3.5 lists the fish that occur in the Upper Powder River subbasin and their WGFD Native Species Status (NSS) designation, if applicable. WGFD has identified Species of Greatest Conservation Need (SGCN) within the state (WGFD 2005), all of which are given NSS designations. Seven of the species that may occur in the Upper Powder River subbasin are designated as either NSS 1, 2, or 3 species.

Species in these designations are considered to be species of concern, in need of more immediate management attention, and more likely to be petitioned for listing under the Endangered Species Act (ESA). For these species, WGFD recommends that no loss of habitat function occur. WGFD allows for some modification of the habitat, provided that habitat function is maintained (i.e., the location, essential features, and species supported are unchanged). NSS 4-7 refers to populations that are widely distributed throughout their native range and are stable or expanding. Habitats are also stable. There is no special concern for these species.

The Powder River Basin ecosystem and fishery is discussed in further detail in the PRB FEIS (pp. 3-155 to 3-166). The sturgeon chub is considered a Wyoming BLM sensitive species, according to Wyoming BLM Sensitive Species Policy, and will be discussed in more detail later in this document.

Table 3.5 Fish that occur in the Upper Powder River Subbasin

Wyoming Native Species Status	Species	Wyoming BLM Sensitive
NSS1	Sturgeon chub	Yes
NSS2	Goldeye	
	Sauger	
NSS3	Black bullhead	
	Flathead chub	
	Mountain sucker	
	Plains minnow	
NSS4	Channel catfish	
	Northern redhorse	
	Quillback	
	River carpsucker	
	Stonecat	
NSS6	Fathead minnow	
	Plains killifish	
NSS7	Longnose dace	
	Sand shiner	
	White sucker	
None	Common carp	
	Rock bass	
	Shovelnose sturgeon	

Amphibian and reptile species (herpetiles) occur throughout the Basin. WGFD conducted a baseline inventory of herpetiles along the Powder River and its major tributaries from 2004-2006 (Turner 2007).

WYNDD has completed the first year of a three-year herpetile study in the Power River Basin in order to detect impacts from CBNG development (Griscom et al. 2009). Herpetiles expected to occur in the Powder River Basin, according to these studies, are listed in Table 3.6 (Turner 2007, Griscom et al. 2009). Eight of the species listed are classified by WGFD as SGCNs, all with a rating of NSS4, indicating that they are widely distributed throughout their native ranges, and populations are stable. Of the species listed in Table 3.6, WYNDD reported that, for 2008 surveys, boreal chorus frogs were the most abundant amphibian in the PRB and were located in a variety of habitats. The second most abundant amphibian was Woodhouse's toad, which occurred along rivers, temporary ponds, and in CBNG reservoirs. Plains spadefoot and Great Basin toads were the least common species, occurring primarily in temporary ponds fed by rainstorms. Relatively few observations were made for reptile species. Bullsnakes and sagebrush lizards were most commonly seen. Turtles were rarely observed, due to their almost exclusive occurrence in deep backwaters. Two of the herpetiles listed in Table 3.6 (northern leopard frog and Columbia spotted frog) are Wyoming BLM sensitive species and will be discussed in detail later in this document.

Table 3.6 Herpetile species expected to occur in the Powder River Basin (Turner 2007 ,Griscom et al. 2009)

Species	Verified by Survey*	WGFD Status	Wyoming BLM Sensitive
Tiger salamander	Yes	NSS4	
Northern leopard frog	Yes	NSS4	Yes
Milk Snake	No		
Columbia spotted frog	Yes	NSS4	Yes
Bullfrog	Maybe	NSS4	
Spiny softshell	Yes		
Northern prairie lizard	No		
Boreal chorus frog	Yes	NSS4	
Great plains toad	Yes	NSS4	
Woodhouse's toad	Yes	NSS4	
Plains spadefoot toad	Yes	NSS4	
Short-horned lizard	Yes		
Sagebrush lizard	Yes		
Eastern yellowbelly racer	Yes		
Prairie rattlesnake	Yes		
Western hog-nosed snake	Yes		
Bullsnake	Yes		
Terrestrial garter snake	Yes		
Plains garter snake	Yes		
Common garter snake	Yes		
Snapping turtle	Yes		
Painted turtle	Yes		
Notes * As reported in Turner (2007) and Griscom et al. (2009).			

3.3.3. Migratory Birds

Migratory birds are those that migrate for the purpose of breeding and foraging at some point in the year. According to WO Instruction Memorandum No. 2008-050, BLM must include migratory birds in every NEPA analysis of actions that have the potential to affect migratory bird species of concern in order to fulfill its obligations under the Migratory Bird Treaty Act.

The WGFD Wyoming Bird Conservation Plan (Nicholoff 2003) identified three groups of high-priority bird species in Wyoming: Level I – those that clearly need conservation action, Level II – species where the focus should be on monitoring, rather than active conservation, and Level III – species that are not otherwise of high priority but are of local interest. Vegetation types that occur in the project area include shortgrass prairie (15%)and shrub-steppe (85%) (ARCADIS 2007). Many species that are of high management concern use these areas for their primary breeding habitats (Saab and Rich 1997). Nationally, grassland and shrubland birds have declined more consistently in the last 30 years than any other ecological association of birds (WGFD 2009). Species that may occur in these vegetation types in northeast Wyoming, according to the Wyoming Bird Conservation Plan, are listed in Table 3.7 and are grouped by Level as identified in the Plan.

Table 3.7 Migratory bird species that occur in shortgrass prairie and shrub-steppe habitats in northeast Wyoming (Nicholoff 2003)

Level	Species	Wyoming BLM Sensitive
Level I	Brewer's sparrow	Yes
	Ferruginous hawk	Yes
	Greater sage-grouse	Yes
	Long-billed curlew	Yes
	McCown's longspur	
	Mountain plover	Yes
	Sage sparrow	Yes
	Short-eared owl	
	Upland sandpiper	
	Western burrowing owl	Yes
Level II	Black-chinned hummingbird	
	Bobolink	
	Chestnut-collared longspur	
	Dickcissel	
	Grasshopper sparrow	
	Lark bunting	
	Lark sparrow	
	Loggerhead shrike	Yes
	Sage thrasher	Yes
	Vesper sparrow	
Level III	Common poorwill	
	Say's phoebe	

The affected environment for migratory birds is discussed in the PRB FEIS (pp. 3-150 to 3-153). The discussion includes a list of habitat requirements and foraging patterns for the species listed above, with the exception of upland sandpipers, common poorwills, and Say's phoebes, which are discussed here.

Upland sandpipers prefer Great Plains grasslands, dryland grass pastures, hayfields, and alfalfa fields. They nest in grass-lined depressions in the ground and feed on insects and seeds on the ground where grasses are low and open. Common poorwills inhabit sparse, rocky sagebrush; open prairies; mountain-foothills shrublands; juniper woodlands; brushy, rocky canyons; and ponderosa pine woodlands. They prefer clearings, such as grassy meadows, riparian zones, and forest edges for foraging. They lay eggs directly on gravelly ground, flat rock, or litter of woodland floor. Nests are often placed near logs, rocks, shrubs, or grass for some shade. They feed exclusively on insects, catching them by leaping from the ground or a perch, or picking them up from the ground. Say's phoebes inhabit arid, open country with sparse vegetation, including shrub-steppe, grasslands, shrublands, and juniper woodlands. They nest on a

variety of substrates such as cliff ledges, banks, bridges, eaves, and road culverts and often reuse nests in successive years. They eat mostly insects and berries.

3.3.4. Raptors

The affected environment for raptors is discussed in the PRB FEIS on pp. 3-141 to 3-148.
Four raptor species are known to have used nests within 0.5 miles of the project area: golden eagles, short-eared owls, great-horned owls, and ferruginous hawks. Ferruginous hawks are Wyoming BLM sensitive species and will be discussed in more detail later in this document.

The affected environment for golden eagles is discussed in the PRB FEIS on pp. 3-145 to 3-146. Golden eagles are listed as a Bird of Conservation Concern (BCC) by USFWS for Region 17, which encompasses the project area. BCCs are those species that represent USFWS's highest conservation priorities, outside of those that are already listed under ESA. The goal of identifying BCCs is to prevent or remove the need for additional ESA bird listings by implementing proactive management and conservation actions. Golden eagles were also identified as a Level III species in the Wyoming Bird Conservation Plan. Golden eagles are sensitive to extensive human activity around nest sites and are threatened by loss of nesting habitat to industrial development, powerline executions, and other factors (Nicholoff 2003). The WGFD Wyoming Bird Conservation Plan habitat objectives for golden eagles include maintaining open country to provide habitat for small mammals as a food source. Recommendations for management include restricting human activities near nests during peak breeding season; protecting, enhancing, and restoring prey populations; and protecting known nesting territories.

The affected environment for short-eared owls is discussed in the PRB FEIS on pp. 3-147. Short-eared owls are also listed by USFWS as a BCC for Region 17. Short-eared owls were identified as a Level I species in the Wyoming Bird Conservation Plan. Short-eared owl populations are threatened by rapid urbanization, industrialization, and intensive agriculture in both breeding and wintering habitats. Human disturbance of nesting and wintering areas, intensive grazing around wetlands, and habitat fragmentation have also been identified as impacting populations (Nicholoff 2003). The WGFD Wyoming Bird Conservation Plan habitat objective for short-eared owls is to minimize the amount of loss of shortgrass prairie habitat and reduce urban sprawl and habitat fragmentation. Recommendations for management include avoiding fragmentation of existing tracts of shortgrass prairie habitat, managing for areas where large acreages of grasslands are allowed to go to a climax stage, and protecting existing shortgrass prairie habitat through legal agreements.

The affected environment for great-horned owls is discussed in the PRB FEIS (pp. 3-147 to 3-148).
Five raptor nest sites have been identified to occur within 0.5 mile of the project boundary. These are listed in the Table 3.8. Nests in the project area were located in cottonwood trees, on the ground, and in creekbanks. No raptors were known to use any of the nests in 2009. In 2008, one nest was active with great-horned owls. Ferruginous hawks were last known to use a nest in 2007. Short-eared owls were last known to breed in the area in 2006. Golden eagles were last known to use a nest in 2004. BLM has no documented use of two of the nests (2523 and 5869).

Table 3.8 Documented raptor nests within the Triangle CBM Unit Addition 1 project area[1].

BLM ID	UTMs	Legal	Substrate[2]	Year	Condition	Status[3]	Species[4]
2523	426852E 4878147N	S18 T47N R75W	CTL	2009	Gone	INAC	n/a
				2008	Gone	INAC	n/a
				2007	Gone	INAC	n/a
				2006	Gone	INAC	n/a

BLM ID	UTMs	Legal	Substrate[2]	Year	Condition	Status[3]	Species[4]
2523	426852E 4878147N	S18 T47N R75W	CTL	2005	Gone	INAC	n/a
				2004	Fair	INAC	n/a
2528	427568E 4878109N	S17 T47N R75W	CTL	2009	Gone	INAC	n/a
				2009	Poor	INAC	n/a
				2008	Gone	INAC	n/a
				2008	Remnants	ACTI	GRHO
				2007	Gone	INAC	n/a
				2006	Gone	INAC	n/a
				2005	Gone	INAC	n/a
				2004	Good	ACTI	GOEA
3735	428030E 4876639N	S20 T47N R75W	GHS	2009	Poor	INAC	n/a
				2008	Poor	INAC	n/a
				2008	Fair	INAC	n/a
				2007	Remnants	INAC	n/a
				2007	Fair	INAC	n/a
				2006	Poor	INAC	n/a
				2005	Fair	INAC	n/a
				2004	Gone	INAC	n/a
3879	427984E 4876869N	S17 T47N R75W	CKB	2009	Poor	INAC	n/a
				2008	Poor	INAC	n/a
				2007	Good	ACTI	FEHA
				2007	Poor	INAC	n/a
				2006	Fair	INAC	n/a
				2005	Gone	INAC	n/a
				2004	Gone	INAC	n/a
				2003	Gone	INAC	n/a
3880	426195E 4877312N	S18 T47N R75W	GHS	2009	Gone	INAC	n/a
				2008	Gone	INAC	n/a
				2007	Gone	INAC	n/a
				2007	Fair	INAC	n/a
				2006	Fair	ACTI	SEOW
				2005	Gone	INAC	n/a
				2004	Gone	INAC	n/a
				2003	Gone	INAC	n/a
3881	426933E 4876376N	S19 T47N R75W	CKB	2009	Poor	INAC	n/a
				2008	Fair	INAC	n/a
				2007	Good	ACTI	FEHA
				2007	Fair	INAC	n/a
				2006	Good	INAC	n/a
				2005	Gone	INAC	n/a

BLM ID	UTMs	Legal	Substrate[2]	Year	Condition	Status[3]	Species[4]
3881	426933E 4876376N	S19 T47N R75W	CKB	2004	Gone	INAC	n/a
				2003	Gone	INAC	n/a
5869	426861E 4876716N	S19 T47N R75W	GHS	2009	Poor	INAC	n/a
				2008	Fair	INAC	n/a

Notes

1. Where nests were surveyed by more than one consultant, results may have varied. All results are reported here.
2. CTL = Cottonwood (live); CKB = Creekbank; GHS = Ground/Hillside
3. ACTI = Active; DNLO = Did not locate; INAC = Inactive; OCCU = Occupied; UNK = Unknown;
4. FEHA = Ferruginous hawk; GOEA = Golden eagle; GRHO = Great-horned owl; SEOW = Short-eared owl

3.3.5. Plains Sharp-tailed Grouse

Plains sharp-tailed grouse are discussed in this document because specific concerns for this species were identified during the scoping process for the PRB FEIS. The affected environment for plains sharp-tailed grouse is discussed in the PRB FEIS on pp. 3-148 to 3-150.

Habitats within the Triangle CBM Unit Addition 1 project area have limited potential to support sharp-tailed grouse. The mosaic of grasslands and sagebrush-grasslands that occurs along the grassy ridges and knolls present throughout the project area may provide marginal nesting habitat, but the lack of wooded draws, shrubby riparian areas, and wet meadows limit the likelihood of plains sharp-tailed grouse occurrence. The nearest known plains sharp-tailed grouse lek is approximately 10 miles to the northwest of the project area. No plains sharp-tailed grouse were noted in the project area by ARCADIS or by the BLM biologist.

3.3.6. Sagebrush Obligates

Sagebrush communities are the most common habitat type in the project area (ARCADIS 2007). Large-scale development of energy reserves underlying sagebrush ecosystems is placing sagebrush communities and wildlife increasingly at risk (WGFD 2009). Sagebrush ecosystems support a variety of species, including migratory birds, raptors, big game, reptiles, and small mammals. Several Wyoming BLM sensitive species are associated with sagebrush ecosystems. These include ferruginous hawk, loggerhead shrike, Townsend's big-eared bat, and western burrowing owl.

Sagebrush obligates are species that require sagebrush for some part of their life cycle and cannot survive without it. Sagebrush obligate species within the Powder River Basin that are listed as sensitive species by Wyoming BLM include Brewer's sparrow, sage thrasher, sage sparrow, and greater sage-grouse. All of these bird species require sagebrush for nesting, with nests typically located within or under the sagebrush canopy.

3.3.7. Threatened and Endangered Species and Sensitive Species

3.3.7.1. Threatened and Endangered Species

Within the BLM Buffalo Field Office there are three species that are Threatened or Endangered under the Endangered Species Act: black-footed ferret, blowout penstemon, and Ute ladies'-tresses.

3.3.7.1.1. Black-footed ferret

The black-footed ferret is listed as Endangered under the ESA. The affected environment for black-footed ferrets is discussed in the PRB FEIS on pg. 3-175.

WGFD has identified seven prairie dog complexes, located partially or wholly within the BFO administrative area, as potential black-footed ferret reintroduction sites (Grenier et al. 2004). The Triangle CBM Unit Addition 1 project area is located approximately six miles south of the Pleasantdale complex, the nearest potential reintroduction area.

A black-footed ferret population requires at least 1,000 acres of prairie dog colonies, separated by no more than 1.5 km, for survival (USFWS 1989). No black-tailed prairie dog colonies were identified within 0.75 miles of the project boundary, the minimum distance required to affect habitat, according to the above criterion. Black-footed ferret habitat is not present within the project area.

3.3.7.1.2. Blowout Penstemon

Blowout penstemon is a regional endemic species of the Sand Hills of west-central Nebraska and the northeastern Great Divide Basin in Carbon County, Wyoming. Suitable blowout penstemon habitat consists of sparsely vegetated, early successional, shifting sand dunes and blowout depressions created by wind (BLM 2005). In Wyoming, the habitat is typically found on sandy aprons or the lower half of steep sandy slopes deposited at the base of granitic or sedimentary mountains or ridges. The Triangle CBM Unit Addition 1 project area does not contain areas with these characteristics, and blowout penstemon is not expected to occur.

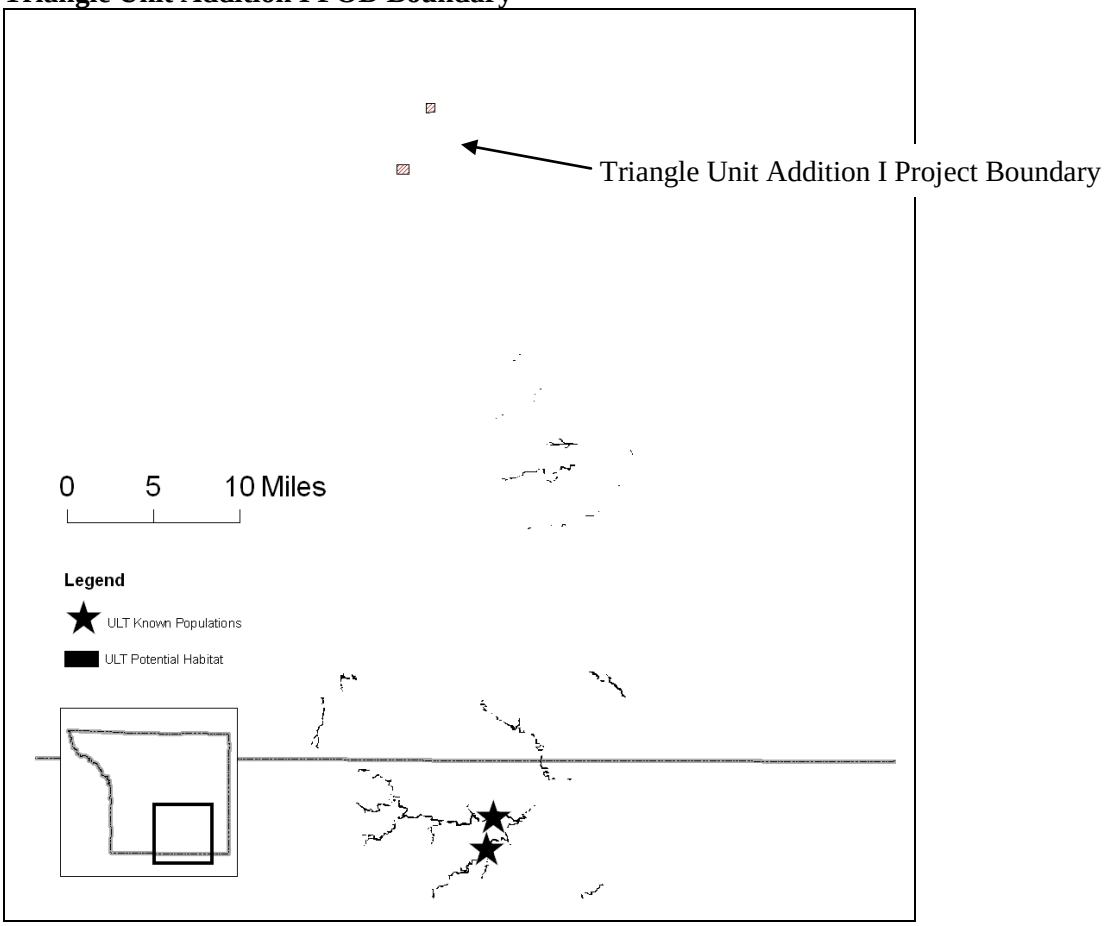
3.3.7.1.3. Ute Ladies'-Tresses Orchid

The Ute ladies'-tresses orchid (ULT) is listed as Threatened under the ESA. The affected environment for ULT is discussed in the PRB FEIS on pg. 3-175.

The PRB FEIS reported that only four orchid populations had been documented within Wyoming, but since the writing of that document, five additional sites were located in 2005 and one in 2006 (Heidel pers. comm.). The new locations were in the same drainages as the original populations, with two on the same tributary and within a few miles of an original location. Drainages with documented orchid populations include Wind Creek and 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. A WYNDD model predicts undocumented populations may be present particularly within southern Campbell and northern Converse Counties. Figure 1 shows the Triangle CBM Unit Addition 1 POD Boundary in relation to the known and predicted populations of ULT.

ARCADIS surveyed for potential Ute ladies'-tresses habitat in the project area and concluded that the area has limited potential to support the species. No perennial streams were located and the ephemeral drainages did not possess the hydrology necessary to propagate the orchid. This was confirmed by USFWS upon inspection of photographs taken at the onsite inspection of the locations that would be impacted by proposed infrastructure (Rogers, pers. comm.).

Figure 1. Ute Ladies'-tresses orchid known populations and potential habitat in relation to the Triangle Unit Addition I POD Boundary



3.3.7.2. Sensitive Species

Wyoming BLM has prepared a list of sensitive species on which management efforts should be focused towards maintaining habitats under a multiple use mandate. The goals of the policy are to:

- Maintain vulnerable species and habitat components in functional BLM ecosystems
- Ensure sensitive species are considered in land management decisions
- Prevent a need for species listing under the ESA
- Prioritize needed conservation work with an emphasis on habitat

This section lists those species on the Wyoming BLM sensitive species list that, according to the PRB FEIS, may occur in the Powder River Basin Oil and Gas Project Area, which includes the Triangle CBM Unit Addition 1 project area. The following discussion for each of those sensitive species includes an analysis of whether the species is likely to occur in or be affected by the proposed project. According to the PRB FEIS, spotted bats were not likely to be affected by the Powder River Basin Oil and Gas Project, and are therefore not discussed in this section. The authority for the sensitive species 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.

3.3.7.2.1. Northern Leopard Frog

The affected environment for northern leopard frog is discussed in the PRB FEIS on pg. 3-181. This is a WGFD Species of Greatest Conservation Need (SGCN), with a rating of NSS4, indicating that the species is common (widely distributed throughout its native range and populations are stable) and habitat is stable.

Northern leopard frog habitat is present at the existing Sandman reservoir in NE S01 T46N R76W.

3.3.7.2.2. Columbia Spotted Frog

The affected environment for the Columbia spotted frog is discussed in the PRB FEIS on pg. 3-193. This is a WGFD SGCN, with a rating of NSS4, indicating that the species is common (widely distributed throughout its native range and populations are stable) and habitat is stable.

Within the BFO administrative area, the Columbia spotted frog is confined to the headwaters of the South Tongue River drainage. The project area is not located within this drainage and is thus outside the species' range. Columbia spotted frogs are not expected to occur in the project area.

3.3.7.2.3. Sturgeon Chub

The sturgeon chub was petitioned for listing under the ESA in 2000, but, in 2001, it was determined that the listing was not warranted due to the population being more abundant and better distributed throughout its range than previously believed. According to Wyoming BLM Sensitive Species policy, because this species has been petitioned for listing, it remains on the sensitive species list. The affected environment for this species is discussed in the PRB FEIS on pg. 3-165. Sturgeon chub is listed by WGFD as a SGCN with a rating of NSS1, indicating that the species is rare (populations are physically isolated and/or it occurs in extremely low densities throughout its historic range and that extirpation appears possible), and habitat is declining or vulnerable.

Discharge from the proposed project will not flow into the Powder River, where this species is known to occur.

3.3.7.2.4. Yellowstone Cutthroat Trout

The affected environment for Yellowstone cutthroat trout is discussed in the PRB FEIS on pg. 3-192. Within the BFO administrative area, this species may occur in the Upper Tongue sub-watershed.
The project area is located outside of this watershed and is thus outside the species' range. Yellowstone cutthroat trout is not expected to occur in the project area.

3.3.7.2.5. Baird's Sparrow

The affected environment for Baird's sparrow is discussed in the PRB FEIS on pg. 3-188. In addition to being listed as a Wyoming BLM sensitive species, Baird's sparrows are listed by USFWS as a BCC for Region 17.

Marginal habitat is present in the project area in S17, S18 T47N R75W, and this species may occur.

3.3.7.2.6. Bald Eagle

The affected environment for bald eagles is described in the PRB FEIS on pg. 3-175. At the time the PRB FEIS was written, the bald eagle was listed as a threatened species under the ESA. Due to successful recovery efforts, it was removed from the ESA on 8 August 2007. The bald eagle remains under the protection of the Bald and Golden Eagle Protection Act and the Migratory Bird Treaty Act. In order to avoid violation of these laws and uphold the BLM's commitment to avoid any future listing of this

species, the BLM shall continue to comply with all conservation measures and terms and conditions identified in the Powder River Basin Oil and Gas Project Biological Opinion (PRB Oil & Gas Project BO), #WY07F0075) (USFWS 2007).

In addition to being listed as a Wyoming BLM sensitive species, bald eagles are a WGFD SGCN with a NSS2 rating, due to populations being restricted in numbers and distribution, ongoing significant loss of habitat, and sensitivity to human disturbance. The Wyoming Bird Conservation Plan rates them as a Level I species, indicating they are clearly in need of conservation action. They are also listed by USFWS as a BCC for Region17.

Bald eagle nesting and roosting habitat is present within one mile of the project area. Scattered mature cottonwood tree stands along Beaver Creek in S08, S16, S17 T47N R75W provide potential winter roost structures for bald eagles. Prairie dog colonies within the area and nearby sheep operations provide reliable prey sources.

3.3.7.2.7. Brewer's Sparrow

The affected environment for Brewer's sparrow is discussed in the PRB FEIS on pg. 3-200. In addition to being listed as a BLM Wyoming sensitive species, Brewer's sparrows are a WGFD SGCN, with a rating of NSS4 because populations are declining, habitat is vulnerable with no ongoing loss, and the species is not sensitive to human disturbance. The Wyoming Bird Conservation Plan rates them as a Level I species, indicating they are clearly in need of conservation action. They are also listed by USFWS as a BCC for Region 17.

Brewer's sparrow habitat is present throughout the project area, and this species is suspected to occur.

3.3.7.2.8. Ferruginous Hawk

The affected environment for ferruginous hawk is discussed in the PRB FEIS on pg. 3-183. In addition to being listed as a Wyoming BLM sensitive species, ferruginous hawks are a WGFD SGCN, with a rating of NSS3 because the species is widely distributed, population status and trends are unknown but are suspected to be stable, they are experiencing ongoing loss of habitat, and they are sensitive to human disturbance. The Wyoming Bird Conservation Plan rates them as a Level I species, indicating they are clearly in need of conservation action. They are also listed by USFWS as a BCC for Region 17.

Territory and nest site reoccupancy is common for ferruginous hawks, and one of several nests within a territory may be used in alternate years (Dechant et al. 2003). In Utah, as many as 15 nests have been found in a territory (an area defended by a mated pair during a breeding season (Hawkwatch 2009). The clustered pattern of ferruginous hawk nests that includes nests 3879, 3735, 3881, and 654 suggest that this may be a breeding territory (a group of nests that is defended by a single breeding pair).

At least five ferruginous hawk nests are present within 0.5 miles of the project area, one of which was used most recently in 2007. Foraging habitat and prey is available throughout the project area.

3.3.7.2.9. Greater Sage-Grouse

The affected environment for greater sage-grouse (herein referred to as sage-grouse) is discussed in the PRB FEIS (pg. 3-194 to 3-199). In addition to being listed as a Wyoming BLM sensitive species, sage-grouse are listed as a WGFD SGCN, with a rating of NSS2, because populations are declining, and they are experiencing ongoing significant loss of habitat. The Wyoming Bird Conservation Plan rates them as a Level I species, indicating they are clearly in need of conservation action. They are also listed by USFWS as a BCC for Region 17.

In recent years, several petitions have been submitted to USFWS to list sage-grouse as threatened or endangered under the ESA. On 12 January 2005, USFWS issued a decision that the listing of the greater sage-grouse was not warranted following a Status Review. The decision document supporting this outcome noted the need to continue or expand all conservation efforts to conserve sage-grouse. In 2007, the U.S. District Court remanded that decision, stating that USFWS's decision-making process was flawed and ordered USFWS to conduct a new Status Review (Winmill Decision Case No. CV-06-277-E-BLW, December 2007).

The BFO has taken several steps to consider the evolving information on impacts to sage-grouse which could result from development activities on federal lands. These steps include:

- February 2008: BFO consolidated research and data to identify high-quality sage-grouse habitat in the Powder River Basin. University of Montana developed models indicating quality of habitat using topographic and vegetative criteria and habitat selection by radio-collared birds to identify areas with high potential for use by nesting/wintering birds. The models are divided into habitat categories of 1 through 5. Categories 1 & 2 are not considered suitable habitat. Category 3 may have the vegetative components necessary for suitable habitat. Categories 4 & 5 have the vegetative components for suitable habitat, and meet criteria for topography, slope and other landscape level characteristics that were indicated through analysis of radio-collared sage-grouse. The 4 and 5 categories of habitats are considered "high-quality".
- March 2008: BFO, Wyoming State Office (WYSO) and Washington Office (WO) established the need for a Resource Management Plan (RMP) approach to evaluate impacts to sage-grouse and habitat. A RMP amendment or revision was discussed. The decision to begin a RMP revision was approved two years ahead of the originally scheduled date.
- May 28, 2008: BFO conducted a public meeting to present habitat information developed through research in the Powder River Basin. BFO solicited additional information from the public and energy development companies to refine sage-grouse habitat maps. The objective was to establish areas of interim management for sage-grouse to preserve decision space during the RMP process.
- August 13, 2008: BFO released its *Guidance for general management actions during BFO Resource Management Plan Revision* and a map identifying the Focus Areas. The guidance contained criteria for any proposed development in Focus Areas (Appendix B). For fluid mineral development inside Focus Areas, this guidance includes the following requirement; "The proponent will be asked to demonstrate that the proposal can be managed in a manner that effectively conserves sage-grouse habitats affected by the proposal." The guidance also states that "Efforts will be made to assure that the impacts of surface disturbing projects will be consistent with a well pad density of 640 acres."

Efforts to minimize impacts to high-quality sage-grouse habitats outside the Focus Areas will be far less restrictive, with well densities up to 80-acre spacing, but may include site-specific mitigating measures suggested by the best available science.

- August 1, 2008: Concurrent with BFO efforts, the Governor of the State of Wyoming issued an Executive Order (EO 2008-2) mandating special management for all lands within sage-grouse Core Population Areas. Lands for special management were identified by the Wyoming Governor's Sage-Grouse Implementation Team, and generally followed the boundaries of the majority of the Focus Areas identified by the BFO. This team also recommended stipulations to be placed on development activities on state lands to ensure existing habitat function is maintained within those areas. EO 2008-2 also identifies objectives outside of Core Areas, including that "…development scenarios should be designed and managed to maintain populations, habitats and essential migration routes outside core population areas."

- August 13, 2008 to the Present: BFO crafted an updated impacts assessment to be included in all project analyses affecting sage-grouse habitat. This analysis included research conducted in the Powder River Basin and other sage-grouse research published since the 2003 PRB FEIS and ROD. The analysis explicitly tied impacts to the impacts accepted under the 2003 ROD.
- October 1, 2008: BFO officially began the RMP revision. This process was accelerated by two years to more rapidly assess impacts to sage-grouse.
- April 14, 2009: BFO/WYSO entered into an agreement with the University of Montana and the Miles City Field Office to conduct a population viability analysis in the Powder River Basin. The
- emphasis will be on the adequacy of BFO Focus Areas for maintenance of a persistent sage-grouse population. Information gathered will be used in developing alternatives for the RMP revision.
- May, 2009: The WGFD released an updated version of its *Recommendations for Development of Oil and Gas Resources within Important Wildlife Habitats*, which further described management objectives for sage-grouse outside Core Areas: "Non-core areas should not be construed as "sacrifice areas" since this conservation strategy requires habitat connectivity and movement between populations in core areas. The goal in non-core areas is to maintain habitat conditions that will sustain at least a 50% probability of lek persistence over the long term."

In conformance with Appendix E of the PRB FEIS ROD, BLM BFO has initiated actions within the PRB FEIS analysis area in response to additional information regarding impacts to sage-grouse. These measures include:

- Early initiation of a RMP revision, based on the evaluation of monitoring data generated under the mitigation monitoring and reporting plan (MMRP) in Appendix E of the PRB FEIS ROD.
- Establishment of sage-grouse Focus Areas, encompassing approximately 1 million acres of sage-grouse habitat. These areas are managed under strict guidelines designed to preserve sage-grouse habitat for development of alternatives during the RMP process (Appendix B).
  Initiation of a population viability analysis in the Powder River Basin. This is a 24-month project involving the USGS, BLM Miles City Field Office, BLM BFO, and the University of Montana.
- Development of alternatives that modify the proposed action to reflect the best available science in sage-grouse management.
- Development of conditions of approval, specific to sage-grouse management, that incorporate some recommendations from recent research, the NE Local Sage-grouse Working Group, and the Petroleum Association of Wyoming.

Suitable (as defined in Soehn et al. 2001) sage-grouse habitat is present in the Triangle CBM Unit Addition 1 project area. Continuous stands of sparsely to moderately dense sagebrush are present in patches throughout. Section 01 T46N R76W contains large, contiguous stands of sagebrush with 20-25% canopy cover (based on ocular estimates) on moderate topography that provide suitable nesting habitat. A drainage travels North-South through S01 that contains perennially moist vegetation that provides brood-rearing and late summer habitat. These areas are locate approximately 0.5 miles from an active sage-grouse lek and approximately 1 mile from a satellite lek. A hen and brood were noted by the BLM biologist in NE S01 T46N R76W during the August onsite visit. An unnamed draw in S17 T47N R75W also provides brood-rearing and late summer habitat. The sagebrush stands in S17 provide marginal (as defined in Soehn et al. 2001) nesting habitat, based on sparse canopy cover and smaller sagebrush plants.
Sage-grouse habitat models indicate that virtually all of the proposed infrastructure is located within high quality sage-grouse nesting and winter habitat (Doherty 2008, Doherty et al. 2007). According to a statewide population density model that was developed based on lek attendance (Doherty 2008), the entire project is contained in an area, that when combined with other similar areas, is predicted to contain 65% of the state's sage-grouse population, the highest density category modeled.

Figure 2 Project boundary in relation to modeled sage-grouse population density in the Buffalo Field Office Administrative Area

The State Wildlife Agencies' Ad Hoc Committee for Consideration of Oil and Gas Development Effects to Nesting Habitat (2008) recommends that impacts be considered for leks within four miles of oil and gas developments. WGFD records indicate that seven sage-grouse leks occur within four miles of the project area. These seven lek sites are identified in Table 3.9.

Table 3.9 Sage-grouse leks within 4 miles of the Triangle CBM Unit Addition 1 project area

Lek Name	Legal Location	Distance from Project Area (mi)	Occupied?
Gilkie Ranch	SESW S01 T46N R76W	< 1	yes
Kauffman Draw	NWNW S18 T47N R75W	< 1	yes
Upper Kauffman Draw	SESE S24 T47N R76W	< 2	yes
Cottonwood	SWNE S16 T47N R75W	< 2	yes
County Line	NWSE S16 T46N R76W	< 4	yes
County Line N	SENE S05 T46N R76W	< 4	yes
Innes	NWNE S30 T46N R75W	< 4	yes

3.3.7.2.10. Loggerhead Shrike

The affected environment for loggerhead shrike is discussed in the PRB FEIS on pg. 3-187. In addition to being listed as a Wyoming BLM sensitive species, loggerhead shrikes are listed by USFWS as a BCC for Region 17. The Wyoming Bird Conservation Plan rates them as a Level II species, indicating they are in need of monitoring.

Loggerhead shrike habitat is present throughout the project area, and the species is suspected to occur.

3.3.7.2.11. Long-billed Curlew

The affected environment for long-billed curlew is discussed in the PRB FEIS on pg. 3-184. In addition to being listed as a Wyoming BLM sensitive species, long-billed curlews are a WGFD SGCN, with a rating of NSS3, because populations are restricted in distribution, and habitat is vulnerable but not undergoing significant loss. The Wyoming Bird Conservation Plan rates them as a Level I species, indicating they are clearly in need of conservation action. They are also listed by USFWS as a BCC for Region 17.

Long-billed curlew habitat is not present in the project area, due to the lack of wet meadows, and the species is not expected to occur.

3.3.7.2.12. Mountain Plover

The affected environment for mountain plover is discussed in the PRB FEIS on pg. 3-177 to 3-178. At the time the PRB FEIS was written, the mountain plover was proposed for listing as a threatened species under the ESA. In 2003, USFWS withdrew the proposal, finding that the population was larger than had been thought and was no longer declining. In addition to being listed as a Wyoming BLM sensitive species, mountain plovers are a WGFD SGCN, with a rating of NSS4, because population status and trends are unknown but are suspected to be stable, habitat is vulnerable without ongoing significant loss, and the species is sensitive to human disturbance. The Wyoming Bird Conservation Plan rates them as a Level I species, indicating they are clearly in need of conservation action. They are also listed by USFWS as a BCC for Region 17.

Small, isolated patches of suitable mountain plover habitat are present within 0.25 miles of the project area. The rolling terrain of the project area limits the suitability of the area for mountain plover. Heavily grazed areas, pipeline scars, and large wellpads on flat terrain were surveyed in 2007, 2008, and 2009. No plover were observed. The project area has limited potential to support mountain plover.

3.3.7.2.13. Northern Goshawk

The affected environment for northern goshawk is discussed in the PRB FEIS on pg. 3-193 to 3-194. In addition to being listed as a Wyoming BLM sensitive species, northern goshawks are a WGFD SGCN, with a rating of NSS4, because the species is widely distributed, population status and trends are unknown but are suspected to be stable, habitat is vulnerable but not undergoing any significant loss, and the species is sensitive to human disturbance. The Wyoming Bird Conservation Plan rates them as a Level I species, indicating they are clearly in need of conservation action.

No forest habitat is located within or adjacent to the project area. Suitable northern goshawk habitat is not present in the project area, and this species is not likely to occur.

3.3.7.2.14. Peregrine Falcon

The affected environment for peregrine falcon is discussed in the PRB FEIS on pg. 3-194. In addition to being listed as a Wyoming BLM sensitive species, peregrine falcons are a WGFD SGCN, with a rating of NSS3, because populations are restricted in distribution, habitat is restricted but not undergoing

significant loss, and they are sensitive to human disturbance. The Wyoming Bird Conservation Plan rates them as a Level I species, indicating they are clearly in need of conservation action. They are also listed by USFWS as a BCC for Region 17.

The project area does not contain cliffs, and peregrine falcons are not suspected to breed in the project area.

3.3.7.2.15. Sage Sparrow

The affected environment for sage sparrow is discussed in the PRB FEIS on pg. 3-200 to 3-201. Sage sparrows are a WGFD SGCN, with a rating of NSS3, because populations are restricted in distribution, habitat is restricted but not undergoing significant loss, and they are sensitive to human disturbance. The Wyoming Bird Conservation Plan rates them as a Level I species, indicating they are clearly in need of conservation action. They are also listed by USFWS as a BCC for Region 17.

Sage sparrow habitat is present throughout the project area, and the species may occur.

3.3.7.2.16. Sage Thrasher

The affected environment for sage thrasher is discussed in the PRB FEIS on pg. 3-199 to 3-200. In addition to being listed as a Wyoming BLM sensitive species, sage thrashers are a WGFD SGCN, with a rating of NSS4, because populations are declining, habitat is vulnerable but not undergoing loss, and the species is not sensitive to human disturbance. The Wyoming Bird Conservation Plan rates them as a Level II species, indicating the action and focus should be on monitoring and because Wyoming has a high percentage of and responsibility for the breeding population. They are also listed by USFWS as a BCC for Region 17.

Suitable sage thrasher habitat occurs throughout the project area, and the species may occur.

3.3.7.2.17. Trumpeter Swan

The affected environment for trumpeter swan is discussed in the PRB FEIS on pg. 3-193. In addition to being listed as a Wyoming BLM sensitive species, trumpeter swans are a WGFD SGCN, with a rating of NSS2, because populations are restricted in numbers and distribution, they are experiencing ongoing and significant loss of habitat, and they are sensitive to human disturbance. The Wyoming Bird Conservation Plan rates them as a Level I species, indicating they are clearly in need of conservation action. Issues, management strategies, and population goals are addressed in the Trumpeter Swan Recovery Plans (Pacific Flyway Study Committee 2002, Patla 2001, Subcommittee on Rocky Mountain Trumpeter Swans 1998).

The project area does not contain lakes and ponds with developed aquatic vegetation preferred by trumpeter swans. This species is not suspected to occur in the project area.

3.3.7.2.18. Western Burrowing Owl

The affected environment for western burrowing owl (herein after referred to as burrowing owl) is discussed in the PRB FEIS on pg. 3-186. In addition to being listed as a Wyoming BLM sensitive species, burrowing owls are a WGFD SGCN, with a rating of NSS4 because the species is widely distributed, population status and trends are unknown but are suspected to be stable, habitat is restricted or vulnerable without recent or on-going significant loss, and it may be sensitive to human disturbance. The Wyoming Bird Conservation Plan rates them as a Level I species, indicating they are clearly in need of conservation action, and they are also a USFWS BCC in Region 17.

Current population estimates for the United States are not well known but trend data suggest declines throughout the burrowing owl's North American range (McDonald et al. 2004). Primary threats are

habitat loss and fragmentation, mostly due to intensive agricultural and urban development, and habitat degradation, due to declines in populations of colonial burrowing mammals (Klute et al. 2003).

The BFO database indicates that no burrowing owl nests have been reported within 0.5 mile of the Triangle CBM Unit Addition 1 project area. No prairie dog colonies are present within 0.25 miles of the project area. This species is not expected to occur.

3.3.7.2.19. White-faced Ibis

The affected environment for white-faced ibis is discussed in the PRB FEIS on pg. 3-182. In addition to being listed as a Wyoming BLM sensitive species, the white-faced ibis is a WGFD SGCN, with a rating of NSS3, because populations are restricted in numbers and distribution, habitat is restricted and vulnerable but not undergoing significant loss, and they are sensitive to human disturbance.

The project area does not contain any water bodies with islands of tall emergent vegetation, nor does it include wet hay meadows, flooded agricultural croplands, or marshes. Suitable white-faced ibis nesting habitat is not present in the project area, and the species is not expected to occur.

3.3.7.2.20. Yellow-billed Cuckoo

The affected environment for yellow-billed cuckoo is discussed in the PRB FEIS on pg. 3-185. In addition to being listed as a Wyoming BLM sensitive species, the yellow-billed cuckoo is a WGFD SGCN, with a rating of NSS2, because populations are restricted in numbers and distribution and they are experiencing ongoing significant loss of habitat.

The project area does not contain mature cottonwood riparian habitats, and the species is not expected to occur.

3.3.7.2.21. Black-tailed Prairie Dog

The affected environment for black-tailed prairie dogs is discussed in the PRB FEIS (pg 3-179). At the time the PRB FEIS was written, the black-tailed prairie dog was added to the list of candidate species for federal listing in 2000 (USFWS 2000). It was removed from the list in 2004. Wyoming BLM considers black-tailed prairie dogs a sensitive species and continues to afford this species the protections described in the PRB FEIS. The black-tailed prairie dog is a WGFD SGCN, with a rating of NSS3, because populations are declining, and habitat is vulnerable but not undergoing significant loss.

The black-tailed prairie dog is considered common in Wyoming, although its abundance fluctuates with activity levels of Sylvatic plague and the extent of control efforts by landowners. Comparisons with 1994 aerial imagery indicated that black-tailed prairie dog acreage remained stable from 1994 through 2001, but aerial surveys conducted in 2003 indicated that approximately 47% of the prairie dog acreage was impacted by Sylvatic plague and/or control efforts (Grenier et al. 2004). Due to human-caused factors, black-tailed prairie dog populations are now highly fragmented and isolated (Miller et al. 1994). Most colonies are small and subject to potential extirpation due to inbreeding, population fluctuations, and other problems that affect long term population viability, such as landowner poisoning and disease (Primack 1993, Meffe and Carroll 1994, Noss and Cooperrider 1994).

No prairie dog colonies will be directly impacted by the Triangle CBM Unit Addition 1 project, and no colonies are located within 0.25 miles of any proposed infrastructure.

3.3.7.2.22. Fringed Myotis

The affected environment for fringed myotis is discussed in the PRB FEIS on pg. 3-188 to 3-189. In addition to being listed as a BLM WY sensitive species, the fringed myotis is a WGFD SGCN, with a rating of NSS2, because populations are restricted in distribution, they are experiencing ongoing

significant loss of habitat, and they are sensitive to human disturbance. The fringed myotis occupies a variety of habitats, including grasslands and basin-prairie shrublands, usually in proximity of drinking water (Hester and Grenier 2005). After feeding, it uses night roosts, which may include buildings, rock crevices, and bridges (Hester and Grenier 2005), all of which occur in the vicinity of the project area.
Although the project area contains grassland and shrublands in proximity of drinking water, suitable roost habitat is limited. Fringed myotis may occur in the project area, but they are likely to roost outside of areas impacted by proposed infrastructure.

3.3.7.2.23. Long-eared Myotis

The affected environment for long-eared myotis is discussed in the PRB FEIS on pg. 3-201. In addition to being listed as a BLM WY sensitive species, the long-eared myotis is a WGFD SGCN, with a rating of NSS2, because populations are restricted in distribution, they are experiencing ongoing significant loss of habitat, and they are sensitive to human disturbance. Although long-eared myotis primarily inhabit coniferous forest and woodland, they are occasionally found in cottonwood riparian areas and sagebrush grasslands where roost sites are available (Hester and Grenier 2005). Roosts include cavities in snags, under loose bark, stumps, buildings, and rock crevices (Hester and Grenier 2005), all of which may occur in the vicinity of the project area.

Because long-eared myotis may occur in sagebrush grasslands, their occurrence in the project area is most likely limited by availability of roost sites. Long-eared myotis may occur in the Triangle CBM Unit Addition 1 project area, but they are not likely to roost in areas impacted by proposed infrastructure.

3.3.7.2.24. Swift Fox

The affected environment for swift fox is discussed in the PRB FEIS on pg. 3-189. In addition to being listed as a BLM WY sensitive species, swift fox is also listed as a WGFD SGCN, with a rating of NSS4, because population status and trends are unknown but are suspected to be stable, and habitat is vulnerable but is not undergoing significant loss.

The project area does not contain suitable swift fox habitat. Patches of grassland are available, but they are smaller in size and do not dominate the landscape. The overall rolling terrain precludes the availability of den sites that would provide good views of the surrounding area. No occurrences of swift fox have been reported in the vicinity of the project area. Swift fox are not expected to occur in the project area.

3.3.7.2.25. Townsend's Big-eared Bat

The affected environment for Townsend's big-eared bat is discussed in the PRB FEIS on pg. 3-189. In addition to being listed as a BLM WY sensitive species, Townsend's big-eared bat is listed as a WGFD SGCN, with a rating of NSS2, because populations are restricted in distribution, they are experiencing ongoing significant loss of habitat, and they are sensitive to human disturbance. Townsend's big-eared bats occur in sagebrush and other shrublands, and roosts include rock outcrops and buildings, which occur in the vicinity of the project area. It may be limited to areas with reliable, accessible sources of drinking water (Hester and Grenier 2005), such as the Powder River. Foraging areas include riparian corridors (Hester and Grenier 2005).

Townsend's big-eared bat may occur in the project area at times of the year when drinking water is available. Their occurrence is likely limited by availability of roost sites.

3.3.7.2.26. Porter's Sagebrush

The affected environment for Porter's Sagebrush is discussed in the PRB FEIS on pg. 3-190. The Triangle CBM Unit Addition 1 project area does not contain suitable habitat for this species, and it is not expected to occur.

3.3.7.2.27. Williams' Wafer-Parsnip

The affected environment for William's wafer-parsnip is discussed in the PRB FEIS on pg. 3-191 to 3-192. The Triangle CBM Unit Addition 1 project area is outside of this species' range, and it is not expected to occur.

3.4. West Nile Virus

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

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

The human health issues related to WNv are well documented and continue to escalate. Historic data collected by the CDC and published by the USGS at www.westnilemaps.usgs.gov are summarized below in Table 3.10. Reported data from the Powder River Basin (PRB) includes Campbell, Sheridan and Johnson counties.

Table 3.10 Historical West Nile Virus Information

Year	Total WY Human Cases	Human Cases PRB	Veterinary Cases PRB	Bird Cases PRB
2001	0	0	0	0
2002	2	0	15	3
2003	392	85	46	25
2004	10	3	3	5
2005	12	4	6	3
2006	65	0	2	2
2007*	155	22	Unk	1
2008*	10	0	0	0

***Wyoming Department of Health Records.**

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

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

While birds infected with WNv have many of the same symptoms as infected humans, they appear to be more sensitive to the virus (Rinkes 2003).

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

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

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

3.5. Water Resources

The project area is within the Upper Powder River drainage system. The southern portion of the project area lies within the North Prong Pumpkin Creek watershed and the northern portion of the project area lies within the Upper Beaver Creek watershed. Both Beaver Creek and North Prong of Pumpkin Creek are tributaries to Upper Powder River.

3.5.1. Groundwater

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

A search of the Wyoming State Engineer Office (WSEO) Ground Water Rights Database for this area showed 14 registered stock and domestic water wells within ½ mile of a federal CBNG producing well in the POD with depths ranging from 120 to 650 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).

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.

3.5.2. Surface Water

The project area is within the Upper Beaver Creek and the North Prong of Pumpkin Creek drainage, both of which are 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 μmhos/cm) and Sodium Adsorption Ratio (SAR) by watershed at selected United States Geological Survey (USGS) Gauging Stations in Table 3-11 (PRB FEIS page 3-49). These water quality parameters "illustrate the variability in ambient EC and SAR in streams within the Project Area. The representative stream water quality is used in the impact analysis presented in Chapter 4 as the baseline for evaluating potential impacts to water quality and existing uses from future discharges of CBM produced water of varying chemical composition to surface drainages within the Project Area" (PRB FEIS page 3-48). For the Upper 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 Powder River at Arvada, WY (PRB FEIS page 3-49).
The operator has identified no natural springs within this POD boundary.

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

3.6. Economics and Recovery of CBNG Resources

Development of this project would have effects on the local, state, and national economies. Based on the estimates in the PRBEIS, the drilling of the 6 proposed wells in the Triangle CBM Unit Addition 1 will generate approximately 0.35 billion cubic feet of gas (BCFG) per well, over the life of the well. Actual revenue from this amount of gas is difficult to calculate, as there are several variables contributing to the price of gas at any given time. Regardless of the actual dollar amount, the royalties from the gas produced in the Triangle CBM Unit Addition 1 would have wide-ranging benefit. The federal government collects 12.5% of the royalties from all federal wells, which helps offset the costs of maintaining the federal agencies that oversee permitting. In addition to generating federal income, approximately 49% of the royalties from the Triangle CBM Unit Addition 1 wells would return to the State of Wyoming. This revenue from mineral development has contributed to Wyoming's strong economy for the past several years, allowing for improvements in state funded programs such as infrastructure and education. The development of the Triangle CBM Unit Addition 1 project would also provide revenue locally by employing an array of workers, both directly and indirectly. People would be

employed to build the roads and project infrastructure, drill the wells, and maintain and monitor the project area. The large pool of individuals employed to work on the Triangle CBM Unit Addition 1 project would also have the secondary effect of increased demand for goods and services from nearby communities, primarily those of Gillette and Wright.

3.7. Cultural Resources

Class III cultural resource inventory was conducted for the project prior to on-the-ground work (BFO # 70080045, Arcadis for Citation: Triangle Unit POD Addition 1) following the Secretary of the Interior's Standards and Guidelines (48CFR190) for the project. No cultural resources were located in or near the area of potential effect. Additional inventory partially covering this project area was conducted as BFO #70070065, SWCA for Bill Barrett Pumpkin Creek POD II; no sites were located in 46-76: Sec. 1 which will be affected by the present project. Wendy Sutton and BJ Earle, BLM Archaeologists, reviewed the reports for technical adequacy and compliance with Bureau of Land Management (BLM) standards, and determined them to be adequate. Field inspection was made by BJ Earle in February and April of 2009.
On 4/30/2009, BJ Earle, BLM Archaeologist, notified the Wyoming State Historic Preservation Office (SHPO) following section VI(A)(1) of the Wyoming State Protocol, that no historic properties will be affected by the undertaking.

The project area is mapped as the Tertiary Wasatch undifferentiated, with a PFY Classification of 3, low to moderate. If significant vertebrate remains or other objects of scientific interest are encountered during construction, the operator should consult the attached stipulations. No resources of interest to Native American cultural groups or Traditional Cultural Properties are known to occur in the project area.

3.8. Air Quality

Existing air quality throughout most of the Powder River Basin is in attainment with all ambient air quality standards. Although specific air quality monitoring is not conducted throughout most of the Powder River Basin, air quality conditions in rural areas are likely to be very good, as characterized by limited air pollution emission sources (few industrial facilities and residential emissions in the relatively small communities and isolated ranches) and good atmospheric dispersion conditions, resulting in relatively low air pollutant concentrations.

Existing air pollutant emission sources within the region include following:

- Exhaust emissions (primarily CO and nitrogen oxides [NOx]) from existing natural gas fired compressor engines used in production of natural gas and CBNG; and, gasoline and diesel vehicle tailpipe emissions of combustion pollutants;
- Dust (particulate matter) generated by vehicle travel on unpaved roads, windblown dust from neighboring areas and road sanding during the winter months;
- Transport of air pollutants from emission sources located outside the region;
- Dust (particulate matter) from coal mines;
- NOx, particulate matter, and other emissions from diesel trains and,
- SO2 and NOx from power plants.

For a complete description of the existing air quality conditions in the Powder River Basin, please refer to the PRB Final EIS Volume 1, Chapter 3, pages 3-291 through 3-299.

4. ENVIRONMENTAL CONSEQUENCES

The changes to the proposed action (Alternative B) resulted in development of Alternative C. Alternative D incorporates additional recommendations. Only the environmental consequences of Alternative C and Alternative D are described below.

4.1. Alternative C

4.1.1. Vegetation & Soils Direct and Indirect Effects

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

- Mixing of horizons – occurs where construction on roads, pipelines or other activities take place. Mixing may result in removal or relocation of organic matter and nutrients to depths where it would be unavailable for vegetative use. Soils which are more susceptible to wind and water erosion may be moved to the surface. Soil structure may be destroyed, which may impact infiltration rates. Less desirable inorganic compounds such as carbonates, salts or weathered materials may be relocated and have a negative impact on revegetation. This drastically disturbed site may change the ecological integrity of the site and the recommended seed mix.
- Loss of soil vegetation cover, biologic crusts, organic matter and productivity. With expedient reclamation, productivity and stability should be regained in the shortest time frame.
- Soil erosion would also affect soil health and productivity. Erosion rates are site specific and are dependent on soil, climate, topography and cover.
- Soil compaction – the collapse of soil pores results in decreased infiltration and increased erosion potential. Factors affecting compaction include soil texture, moisture, organic matter, clay content and type, pressure exerted, and the number of passes by vehicle traffic or machinery. Compaction may be remediated by plowing or ripping.
- Modification of hill slope hydrology.
- An important component of soils in Wyoming's semiarid rangelands, especially in the Wyoming big sagebrush cover type, are biological soil crusts, or cryptogamic soils that occupy ground area not covered with vascular plants. Biological soil crusts are important in maintaining soil stability, controlling erosion, fixing nitrogen, providing nutrients to vascular plants, increasing precipitation infiltration rates, and providing suitable seed beds (BLM 2003). They are adapted to growing in severe climates; however, they take many years to develop (20 to 100) and can be easily disturbed or destroyed by surface disturbances associated with construction activities.

These impacts, singly or in combination, would increase the potential for valuable soil loss due to increased water and wind erosion, invasive/noxious/poisonous plant spread, invasion and establishment, and increased sedimentation and salt loads to the watershed system.

Impacts to vegetation and soils from surface disturbance will be reduced, by following the operator's plans and BLM applied mitigation. Of the 6 proposed well locations, 6 can be drilled without a well pad being constructed. Surface disturbance associated with the drilling of the (6) wells without constructed pads would involve digging-out of rig wheel wells (for leveling drill rig on minor slopes), reserve pit construction (estimated approximate size of 25 x 40 feet), and compaction (from vehicles driving/parking at the drill site). Estimated disturbance associated with these xx wells would involve approximately 0.2 acre/well for 1.2 total acres. The total estimated disturbance for all 6 wells would be 1.2 acres.

Approximately 1.4 miles of new and existing two-track trails would be utilized to access well sites. The majority of proposed pipelines (gas and water) have been located in "disturbance corridors." Disturbance corridors involve the combining of 2 or more utility lines (water, gas, power) in a common trench, usually along access routes. This practice results in less surface disturbance and overall environmental impacts. Approximately 0.6 miles of pipeline would be constructed outside of corridors. Expedient reclamation of disturbed land with stockpiled topsoil, proper seedbed preparation techniques, and appropriate seed mixes, along with utilization of erosion control measures (e.g., waterbars, water wings, etc.) would ensure land productivity/stability is regained and maximized.

The operator will follow the guidance provided in the Wyoming Policy on Reclamation (IM WY-2009-022). The Wyoming Reclamation Policy applies to all surface disturbing activities. Authorizations for

surface disturbing actions are based upon the assumptions that an area can and ultimately will be successfully reclaimed. BLM reclamation goals emphasize eventual ecosystem reconstruction, which means returning the land to a condition approximate to an approved "Reference Site" or NRCS Ecological Site Transition State. Final reclamation measures are used to achieve this goal. BLM reclamation goals also include the short-term goal of quickly stabilizing disturbed areas to protect both disturbed and adjacent undisturbed areas from unnecessary degradation. Interim reclamation measures are used to achieve this short-term goal.

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

Impacts to vegetation and soils from surface disturbance will be reduced by following the operator's plans and BLM applied mitigation.

Proposed (low water crossings) are shown on the MSUP and the WMP maps (see the POD). These structures would be constructed in accordance with sound, engineering practices and BLM standards.
The PRB FEIS made predictions regarding the potential impact of produced water to the various soil types found throughout the Basin, in addition to physical disturbance effects. "Government soil experts state that SAR values of 13 or more cause potentially irreversible changes to soil structure, especially in clayey soil types, that reduce permeability for infiltration of rainfall and surface water flows, restrict root growth, limit permeability of gases and moisture, and make tillage difficult." (PRB FEIS page 4-144).

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".

4.1.2. Wetland/Riparian

No effect is anticipated with the project.

4.1.3. Invasive Species

The operator has committed to the control of noxious weeds and species of concern using the following measures identified in their Integrated Pest Management Plan (IPMP):

1. Control Methods include physical, biological, and chemical methods:
   Physical methods include mowing during the first season of establishment, prior to seed formation, and hand pulling of weeds (for small or new infestations). Biological methods include the use of domestic animals, or approved biological agents. Chemical methods include the use of herbicides, done in accordance with the existing Surface Use Agreement with the private surface owner.

2. Preventive practices:
   Use of sanitary procedures for equipment, including cleaning equipment between sites or infestations.
   Recognition and elimination of new weed populations as they are identified.
   Identification and delineation of new weed infestations.
   Maintenance of detailed records of size and extent of infestations.
   Exclusive use of certified weed-free seed for revegetation projects.
   Exclusive use of weed-free mulch during revegetation and soil stabilization projects.

3. Education:
   The company will provide periodic weed education and awareness programs for its employees and contractors through the county weed districts and federal agencies. Field employees and contractors will be notified of known noxious weeds or weeds of concern in the project area.

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

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

4.1.4. 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. The cumulative effects on vegetation and soils are within the analysis parameters and impacts described in the PRB FEIS for the following reasons:

- They are proportional to the actual amount of cumulatively produced water in the Upper Powder River drainage, which is approximately 20.3% of the total predicted in the PRB FEIS.
- The WDEQ enforcement of the terms and conditions of the WYPDES permit that are designed to protect irrigation downstream.
- The WMP for the Triangle CBM Unit Addition 1 proposes that produced water will not contribute significantly to flows downstream.
- The commitment by the operator to monitor the volume of water flowing into Upper Powder River and prevent significant volumes of water from flowing into the Upper Powder River Watershed.

No additional mitigation measures are required.

4.1.5. Wildlife

4.1.5.1. Big Game Direct and Indirect Effects

Impacts to big game are discussed in the PRB FEIS on pp. 4-181 to 4-215. As discussed in that document, impacts to mule deer and pronghorn would occur through alterations in hunting and/or poaching, increased vehicle collisions, harassment and displacement, increased noise, increased dust, alterations in nutritional status and reproductive success, increased fragmentation, loss or degradation of habitats, reduction in habitat effectiveness, and declines in populations. Impacts to pronghorn would also occur through addition of barbed wire fences.

Additional studies support the impacts discussed in the PRB FEIS. A study in central Wyoming reported that mineral drilling activities displaced mule deer by more than 0.5 miles (Hiatt and Baker 1981). WGFD has determined thresholds for high and extreme impacts that range from greater than two wells per square mile in crucial winter ranges for mule deer and greater than five wells per square mile for pronghorn crucial winter ranges and that avoidance zones around mineral facilities overlap, creating contiguous avoidance areas (WGFD 2009). 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 do not become accustomed to the disturbance (Sawyer et al. 2001).

Big game animals are expected to return to the project area following construction; however, populations will likely be lower than prior to project implementation, because human activities associated with operation and maintenance will 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. Survival 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.

Reclamation and other activities that occur within big game habitats during the spring will likely displace does and fawns due to the human presence in the area. This may cause reduced survival rate of does and fawns that must expend increased energies to avoid such activities.

4.1.5.1.1. 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, refer to the PRB FEIS, pg. 4-181 to 4-215.

4.1.5.2. Aquatics Direct and Indirect Effects

Impacts to aquatics are discussed in the PRB FEIS on pp. 4-235 to 4-247.

4.1.5.2.1. 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, refer to the PRB FEIS, (pp. 4-247 to 4-249). No additional mitigation measures are required.

4.1.5.3. Migratory Birds Direct and Indirect Effects

Direct and indirect effects to migratory birds are discussed in the PRB FEIS (pp. 4-231 to 4-235).
More recent research suggests that impacts will occur. Ingelfinger (2004) identified that the density of some breeding bird species declined within 100 m of dirt roads within a natural gas field. In the study, the density of Brewer's sparrows declined by 36%, and the density of breeding sage sparrows declined by 57%. Effects occurred along roads with light traffic volume (<12 vehicles per day). The increasing density of roads constructed in developing natural gas fields exacerbated the problem creating substantial areas of impact where indirect habitat losses through displacement were much greater than the direct physical habitat losses.

Migratory bird species within the Powder River Basin nest in the spring and early summer and are vulnerable to the same effects as sage-grouse and raptor species. Though no timing restrictions are typically applied specifically to protect migratory bird breeding or nesting, where sage-grouse or raptor nesting timing limitations are applied, nesting migratory birds are also protected. Where these timing limitations are not applied and migratory bird species are nesting, migratory birds remain vulnerable.

4.1.5.3.1. 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, refer to the PRB FEIS, pg. 4-235. No additional mitigation measures are required.

4.1.5.4. Raptors Direct and Indirect Effects

Direct and indirect effects to raptors are discussed in the PRB FEIS (pp. 4-216 to 4-221).
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 overheating or chilling of eggs or chicks and can result in egg or chick mortality. Prolonged disturbance can also lead to the abandonment of the nest by the adults. Routine human activities near these nests can also draw increased predator activity to the area and resulting in increased nest predation.

To reduce the risk of decreased productivity or nest failure, the BLM BFO requires a 0.5 mile radius timing limitation during the breeding season around active raptor nests and recommends all infrastructure requiring human visitation be located in such a way as to provide an adequate biologic buffer for nesting raptors. A biologic buffer is a combination of distance and visual screening that provides nesting raptors with security such that they will not be flushed by routine activities.

All five of the raptor nest locations within 0.5 miles of the proposed infrastructure are within 0.5 miles of the two wells and associated infrastructure proposed in S17 T47N R75W. Both wells are out of line-of-sight of any of the raptor nests.

Nest 2528 is approximately 0.5 miles and out of line-of-sight of well 23-17. The impacts from this well are mitigated by its distance from the nest location and the visual barrier provided by the terrain.

Nest location 3880 is located across a main traffic route and approximately 0.5 miles from the access and corridor to well 14-17. Two existing wells separate the nest location from the proposed well. Impacts to this nest location have probably already occurred due to the existing development, and additional impacts from the proposed action are likely to be marginal.

Nest location 2523 is approximately 0.5 miles from the proposed corridor and access to well 14-17. This nest is located directly adjacent to an existing well and main traffic route. Impacts to this nest location have probably already occurred due to the existing development, and additional impacts from the proposed action are likely to be marginal.

The existing access road to well 23-17 travels within 0.25 miles of two of the nests that may make up a ferruginous hawk breeding territory. To minimize new disturbance and fragmentation, infrastructure was proposed to corridor with the existing route. The traffic associated with visitation to this well may preclude ferruginous hawks from selecting these nests in the future. Nests 5869 and 3881 are located within 0.5 miles but out of line-of-sight of well 14-17. They are directly adjacent to an existing well. It is likely that these nests have already been impacted by the existing well, and the effects of well 14-17 would be marginal.

Table 4.1 Proposed and existing infrastructure within 0.5 mile of documented raptor nests within the Triangle CBM Unit Addition 1 project area

BLM ID	Infrastructure
2523	Corridor and access route to 14-17
2528	Well 23-17
3735	Access route and corridor to well 23-17.
3879	Well 23-17. Access route and corridor to well 23-17.
3880	Corridor and access route to 14-17
3881	Access route and corridor to well 23-17.
5869	Well 14-17. Access route and corridor to well 14-17.

4.1.5.4.1. 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, refer to the PRB FEIS, pg. 4-221. No additional mitigation measures are required.

4.1.5.5. Plains Sharp-tailed Grouse Effects

Sharp-tailed grouse are not expected to be impacted by the proposed project.

4.1.5.6. Sagebrush Obligates Direct and Indirect Effects

Construction and maintenance activities associated with development of the Triangle CBM Unit Addition 1 project are likely to cause a decline in sagebrush obligate species. In Wyoming, existing oil and gas wells are located primarily in landscapes dominated by sagebrush, causing direct loss of this habitat. Associated road networks, pipelines, and powerline transmission corridors also influence vegetation dynamics by fragmenting habitats or by creating soil conditions facilitating the spread of invasive species (Braun 1998, Gelbard and Belnap 2003). Density of sagebrush-obligate birds within 100m of roads constructed for natural gas development in Wyoming was 50% lower than at greater distances (Ingelfinger 2001).

4.1.5.6.1. Sagebrush Obligates Cumulative Effects

Fragmentation of shrubsteppe habitat is a major disruption that has consequences for sagebrush-obligate species (Braun et al. 1976; Rotenberry & Wiens 1980). In fragmented habitats, suitable habitat area remains only as remnants surrounded by unusable environments (Urban and Shugart 1984; Fahrig and Paloheimo 1988). Sagebrush-obligate species decline because areas of suitable habitat decrease (Temple & Cary 1988), because of lower reproduction, and/or because of higher mortality in remaining habitats (Robinson 1992; Porneluzi et al. 1993). Fragmentation of shrubsteppe has the further potential to affect the conservation of sagebrush-obligate species because of the permanence of disturbance (Knick and Rotenberry 1995). Several decades are required to reestablish ecologically functioning mature sagebrush communities. Due to this, sagebrush obligate species may not return for many years after reclamation activities are completed.

4.1.5.7. Threatened and Endangered Species

Potential project effects on Threatened and Endangered Species were analyzed and a summary is provided in Table 4.2.

Table 4.2 Summary of Threatened and Endangered Species Habitat and Project Effects.

Common Name (scientific name)	Habitat	Presence	Project Effects	Rationale
Endangered				
Black-footed ferret (*Mustela nigripes*)	Black-tailed prairie dog colonies or complexes > 1,000 acres.	NS	NE	Suitable habitat will not be directly impacted.
Blowout penstemon (*Penstemon haydenii*)	Sparsely vegetated, shifting sand dunes	NS	NE	No suitable habitat present.
Threatened				
Ute ladies'-tresses orchid (*Spiranthes diluvialis*)	Riparian areas with permanent water	NP	NE	No suitable habitat present.

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

Project Effects
LAA - Likely to adversely affect
NE - No Effect
NLAA - May Affect, not likely to adversely affect individuals or habitat.

4.1.5.7.1. Black-Footed Ferret Direct and Indirect Effects

Direct and indirect effects to black-footed ferret are discussed in the PRB FEIS (pg. 4-251).
Implementation of the proposed development will have no effect on the black-footed ferret because habitat is not present in the project area, and the species is not likely to occur.

4.1.5.7.2. Ute Ladies'-Tresses Orchid Direct and Indirect Effects

Suitable habitat is not present within the proposed Triangle CBM Unit Addition 1 project area. Implementation of the proposed coal bed natural gas project will have no effect on the Ute ladies'- tresses orchid.

4.1.5.7.3. Blowout Penstemon Direct and Indirect Effects

Suitable habitat is not present within the proposed Triangle CBM Unit Addition 1 project area. Implementation of the proposed coal bed natural gas project will have no effect on the blowout penstemon.

4.1.5.7.4. 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, refer to the PRB FEIS, pp. 4-250 to 4-257. No additional mitigation measures are required.

4.1.5.8. Sensitive Species

BLM will take necessary actions to meet the policies set forth in sensitive species policy (BLM Manual 6840). BLM Manual 6840.22A states that "The BLM should obtain and use the best available information deemed necessary to evaluate the status of special status species in areas affected by land use plans or other proposed actions and to develop sound conservation practices. Implementation-level planning should consider all site-specific methods and procedures which are needed to bring the species and their habitats to the condition under which the provisions of the ESA are not necessary, current listings under

special status species categories are no longer necessary, and future listings under special status species categories would not be necessary."

The PRB FEIS discusses impacts to sensitive species on pp. 4-257 to 4-273. Table 4.3 summarizes the habitat requirements and potential impacts of the Triangle CBM Unit Addition 1 project on all Wyoming BLM sensitive species that occur in the BFO administrative area. Some sensitive species are of particular concern in the project area, due to their demonstrated or suspected sensitivity to CBNG development or because they were recently considered for listing under the ESA. These species include bald eagle, black-tailed prairie dog, greater sage-grouse, mountain plover, and western burrowing owl. Bald eagle habitat and greater sage-grouse habitat are present in the project area, and those species are discussed in further detail in this section.

Table 4.3 Summary of Sensitive Species Habitat and Project Effects.

Common Name (scientific name)	Habitat	Presence	Project Effects	Rationale
Amphibians				
Northern leopard frog (*Rana pipiens*)	Beaver ponds and cattail marshes from plains to montane zones.	S	MIIH	Construction will affect existing waterway and alter habitat conditions.
Columbia spotted frog (*R*anus pretiosa)	Ponds, sloughs, small streams, and cattails in foothills and montane zones. Confined to headwaters of the S Tongue R drainage and tributaries.	NP	NI	The project area is outside the species' range, and the species is not expected to occur .
Fish				
Sturgeon chub (*Macrhybopsis gelida)*	Swift, rocky riffles throughout the Powder River.	S	NI	Amount of water discharged to the Powder River not of sufficient magnitude to have impacts to this species. Changes in water quality not expected to have an impact.
Yellowstone cutthroat trout (*Oncoryhynchus clarki bouvieri*)	Cold-water rivers, creeks, beaver ponds, and large lakes in the Upper Tongue sub-watershed	NP	NI	The project area is outside the species' range, and the species is not expected to occur .
Birds				
Baird's sparrow (*Ammodramus bairdii*)	Shortgrass prairie and basin-prairie shrubland habitats; plowed and stubble fields; grazed pastures; dry lakebeds; and other sparse, bare, dry ground.	S	MIIH	Shortgrass prairie and sagebrush cover will be affected.
Bald eagle (*Haliaeetus leucocephalus*)	Mature forest cover often within one mile of large water body with reliable prey source nearby.	K	MIIH	Infrastructure within one mile of mature cottonwood galleries.
Brewer's sparrow (*Spizella breweri*)	Sagebrush shrubland	S	MIIH	Sagebrush cover will be affected.
Ferruginous hawk (*Buteo regalis*)	Basin-prairie shrub, grasslands, rock outcrops	K	MIIH	Nesting habitat will be impacted and human activities will increase
Greater sage-grouse (*Centrocercus urophasianus*)	Basin-prairie shrub, mountain-foothill shrub	K	WIPV	Sagebrush cover will be affected.
Loggerhead shrike (*Lanius ludovicianus*)	Basin-prairie shrub, mountain-foothill shrub	S	MIIH	Sagebrush cover will be affected.

Common Name (scientific name)	Habitat	Presence	Project Effects	Rationale
Long-billed curlew (*Numenius americanus*)	Grasslands, plains, foothills, wet meadows	NP	NI	Suitable habitat not present.
Mountain plover (*Charadrius montanus*)	Short-grass prairie with slopes < 5%	S	MIIH	Small patches of habitat are present and habitat conditions may be altered.
Northern goshawk (*Accipiter gentilis*)	Conifer and deciduous forests	NP	NI	No forest habitat present.
Peregrine falcon (*Falco peregrinus*)	Cliffs	NP	NI	No nesting habitat present.
Sage sparrow (*Amphispiza billneata*)	Basin-prairie shrub, mountain-foothill shrub	S	MIIH	Sagebrush cover will be affected.
Sage thrasher (*Oreoscoptes montanus*)	Basin-prairie shrub, mountain-foothill shrub	S	MIIH	Sagebrush cover will be affected.
Trumpeter swan (*Cygnus buccinator*)	Lakes, ponds, rivers	NP	NI	Habitat not present.
Western Burrowing owl (*Athene cunicularia*)	Grasslands, basin-prairie shrub	NP	NI	Habitat not present.
White-faced ibis (*Plegadis chihi*)	Marshes, wet meadows	NP	NI	Permanently wet meadows not present.
Yellow-billed cuckoo (*Coccyzus americanus*)	Open woodlands, streamside willow and alder groves	NP	NI	Streamside habitats not present.
Mammals				
Black-tailed prairie dog (*Cynomys ludovicianus*)	Prairie habitats with deep, firm soils and slopes less than 10 degrees.	NP	NI	No known colonies present.
Fringed myotis (*Myotis thysanodes*)	Conifer forests, woodland chaparral, caves and mines	S	MIIH	Construction may impact foraging areas and alter habitat conditions.
Long-eared myotis (*Myotis evotis*)	Conifer and deciduous forest, caves and mines	S	MIIH	Construction may impact foraging areas and alter habitat conditions.
Swift fox (*Vulpes velox*)	Grasslands	NP	NI	Habitat not present.
Townsend's big-eared bat (*Corynorhinus townsendii*)	Caves and mines.	S	MIIH	Construction may impact foraging areas and alter habitat conditions.
Plants				

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

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.
MIIH - 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

4.1.5.8.1. Bald Eagle Direct and Indirect Effects

Infrastructure proposed in S17 T47N R75W are within one mile of Beaver Creek, which provides bald eagle roosting and nesting habitat. To reduce the risk of disruption to the winter roosting activities of bald eagles, the BLM BFO requires a 0.5 mile disturbance-free buffer and a 1.0 mile radius timing limitation of all winter roost habitat (both communal and consistent use).

Impacts to bald eagles are discussed in the PRB FEIS on pg. 4-251 to 4-253. A more recent study completed in 2004 suggests that two-tracks and improved project roads pose minimal collision risk to bald eagles. In one year of monitoring road-side carcasses the BLM BFO 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; bald and golden eagles were observed feeding on 16 of the reported road-side carcasses (<4%). The risk of big-game vehicle-related mortality along CBNG project roads is so insignificant or discountable that when combined with the lack of bald eagle mortalities associated with highway foraging leads to the conclusion that CBNG project roads do not affect bald eagles.

4.1.5.8.1.1. Cumulative Effects

The cumulative effects for bald eagles associated with Alternative C are within the analysis parameters and impacts described in the PRB FEIS (pp. 4-251 to 4-253).

4.1.5.8.2. Greater Sage-grouse Direct and Indirect Effects

Implementation of Alternative C will adversely impact nesting, brood rearing, late summer, and winter habitat, both through loss of habitat and avoidance of habitat in proximity to the development. Proposed project elements that are anticipated to negatively impact grouse include 6 CBNG wells on 6 locations, 2.3 miles of new linear disturbance, and increased vehicle traffic on established roads.

All of the infrastructure proposed within S01 is within high quality nesting habitat less than one mile from an active sage-grouse lek. Wells 21-1, 32-1, and 43-1 are proposed in high quality nesting habitat adjacent to brood-rearing habitat. The road and corridor that connects these three wells from 21-1 to 43-1 would create new disturbance and fragment high quality nesting habitat. The cross-country pipeline corridor that connects wells 41-1 and 32-1 would create new disturbance and fragment high quality nesting habitat. It would also cross a drainage that provides late summer brood-rearing habitat. The header building located at the 32-1 location would require increased visitation in high quality nesting habitat, as compared to the other well locations. At the onsite in January, 2009, an overhead powerline was staked between wells 41-1 and 32-1. This overhead powerline would have added another corridor of disturbance in this section. Sage-grouse were documented to be using the area between wells 21-1, 41-1, and 32-1 in August, 2009.

At the operator informational meeting, BLM identified that the infrastructure in S01 introduced new disturbance, including cross-country routes, in high quality habitat, close to a lek. At this meeting, BLM requested both verbally and in writing that the operator provide mitigation for the impacts to sage-grouse in this section. At the onsite, the operator provided no additional mitigation and did not agree to moving or relocating any of the proposed infrastructure. BLM noted at the onsite that there is existing infrastructure in this section that could be used to corridor some of the proposed infrastructure. Following the onsite, BLM again requested mitigation for impacts to sage-grouse in this section and made recommendations for relocating infrastructure along existing disturbance and minimizing the proposed disturbance. These recommendations included:

- Move the 32-1 well location 260 m north along an existing primitive road to reduce new disturbance and fragmentation.

- Relocate the header building from the 32-1 location to the 21-1 location to increase the distance between the lek and human activity, eliminate the need for upgrading the road to the 32-1, and keep the header building closer to a main road to concentrate activity.
- Move the pipeline corridor between the 41-1 and 32-1 to the existing primitive road between the 21-1 location and the Sandman reservoir to eliminate new disturbance and reduce fragmentation
- Bury the proposed power from the 41-1 location to the new header location and corridor with the existing primitive road to eliminate new overhead power close to a lek and in nesting and brood-rearing habitat.
- Drop the 43-1 well location from the project to maintain a contiguous patch of sagebrush and brood-rearing habitat adjacent to a lek.

In response, the operator indicated that the placement of the header building was based on future development plans in the section and was optimally located. The 43-1 location had already been relocated to minimize engineering requirements for access and infrastructure. The cross-country pipeline was considered to be the most direct route with the least amount of disturbance. Placement of overhead power was said to be determined by PreCorp and not by Citation. Several considerations had to be made for burying the 3-phase powerline, including additional disturbance, operational/maintenance problems, and delays in timing of development. The operator instead proposed to forego the crown and ditch segment of road proposed between wells 21-1 and 32-1 and keep it a 2-track road with spot upgrades on the steeper portions. The operator also agreed to minimize the mowing width for access roads and corridors to 20 feet. The 43-1 well location would be restricted to a mowed area of 100 x 100 feet.

In S17, the access road that connects the existing 43-18 well and the proposed 14-17 well would create new disturbance in marginally suitable nesting habitat and would cross a drainage in brood-rearing habitat. To mitigate impacts associated with this disturbance, the well and road were placed in areas that introduced the least amount of disturbance, and the cross-country pipeline route proposed in S18 was relocated to corridor with existing road disturbance.

BLM will also implement a timing limitation on all activities within identified nesting habitat across the project area. Because nesting grouse have been shown to avoid infrastructure by up to 0.6 miles, the intent of this timing restriction is to decrease the likelihood that grouse will avoid these areas and increase habitat quality by reducing noise and human activities during the breeding season.

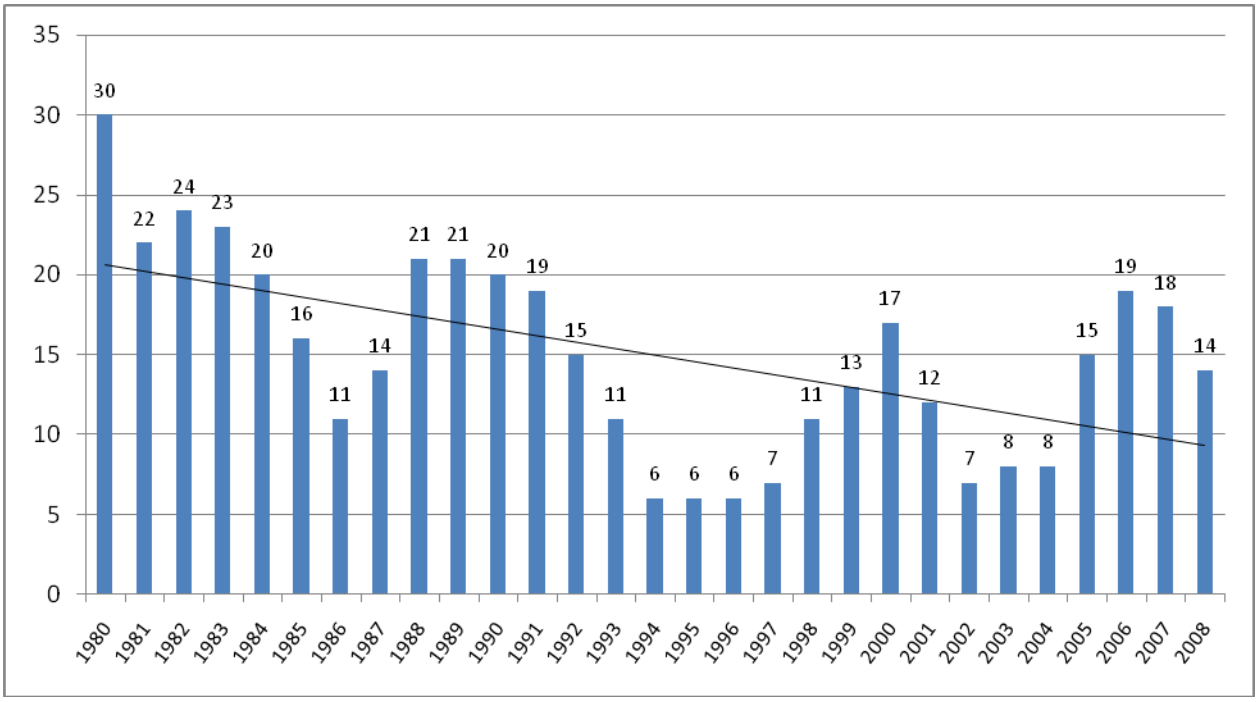
Direct and indirect impacts to sage-grouse are discussed in more detail in the PRB FEIS on pg. 4-257 to 4-273.

4.1.5.8.2.1. Greater Sage-grouse Cumulative Effects

Recent research suggests that the cumulative and synergistic effects of current and foreseeable CBNG development within the vicinity of the project area are likely to impact the local sage-grouse population, cause declines in lek attendance, and may result in local extirpation. The cumulative impact assessment area for this project encompasses a four mile radius from the seven sage-grouse leks that occur within four miles of the project boundary. Analysis of impacts up to four miles was recommended by the State Wildlife Agencies' Ad Hoc Committee for Consideration of Oil and Gas Development Effects to Nesting Habitat (2008).

The sage-grouse population within northeast Wyoming has been exhibiting a steady long term downward trend, as measured by lek attendance (WGFD 2008b). Figure 3 illustrates a ten-year cycle of periodic highs and lows. Each subsequent population peak is lower than the previous peak. The research described below suggests that these declines may be a result, in part, of CBNG development in this region of Wyoming and that the leks within the cumulative impact assessment area are experiencing similar declines.

Figure 1 Average number of male sage-grouse per active lek within the WGFD Sheridan region, 1980-2007



Research has shown that declines in lek attendance are correlated with oil and gas development. In a typical landscape in the Powder River Basin, energy development within two miles of leks is projected to reduce the average probability of lek persistence from 87% to 5% percent (Walker et al. 2007). Several studies have shown that well density can be used as a metric for evaluating impacts to sage-grouse, as measured by declines in lek attendance (Braun et al. 2002, Holloran et al. 2005, and Walker et al. 2007). These studies indicated that oil or gas development exceeding approximately one well pad per square mile, resulted in calculable impacts on breeding populations, as measured by the number of male sage-grouse attending leks (State Wildlife Agencies' Ad Hoc Committee for Sage-Grouse and Oil and Gas Development 2008).

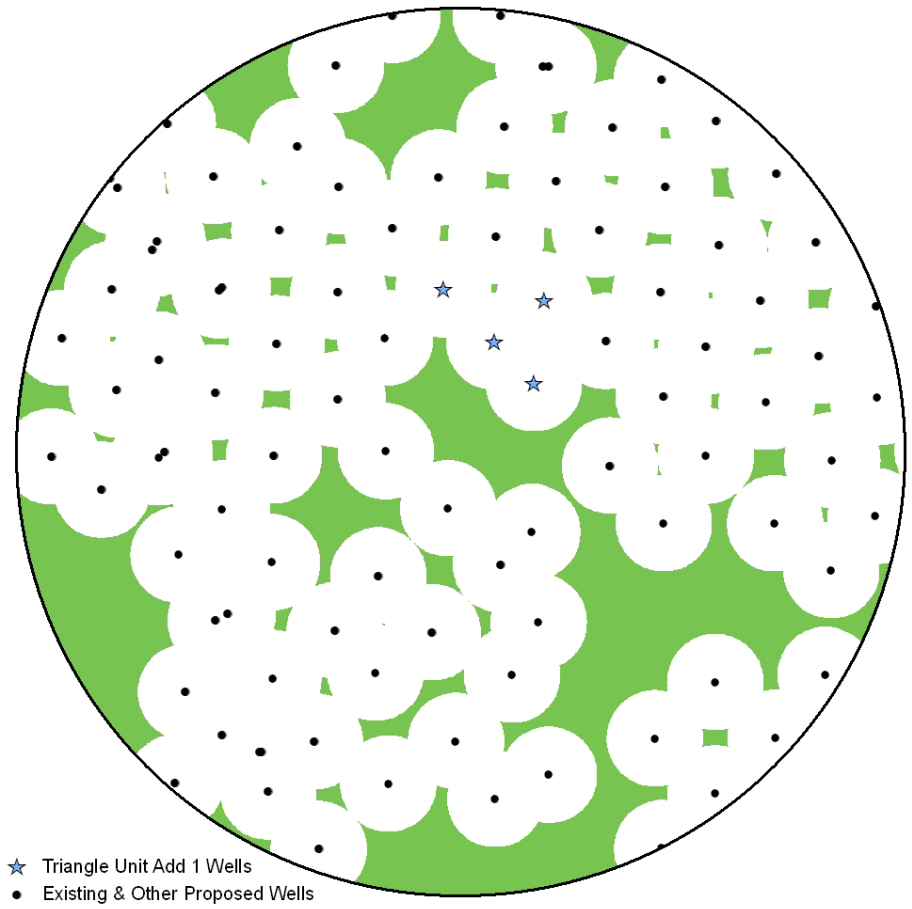
There are currently 1,034 wells (Wyoming Oil and Gas Conservation Commission [WOGCC] 08/2009) within the cumulative impact assessment area, an area of 166 square miles, which amounts to a density of approximately 6.2 wells per square mile. Currently, there are approximately 281 proposed wells (Automated Fluid Minerals Support System [AFMSS] 08/2009) (including the 6 from this project) within four miles of the seven leks. With the addition of the 275 proposed wells that are not associated with this proposed action, the well density within four miles of the leks increases to 7.9 wells per square mile. With approval of alternative C (6 proposed well locations) the well density remains the same at 7.9 wells per square mile, well above the one well per square mile recommendation by the State Wildlife Agencies' Ad Hoc Committee for Sage-Grouse and Oil and Gas Development.

In its *Recommendations for Development of Oil and Gas Resources within Important Wildlife Habitats* (2009), WGFD categorized levels of oil and gas development into thresholds that correspond to moderate, high, and extreme impacts to habitat effectiveness for various species of wildlife, based on well pad densities and acreages of disturbance. All three levels of impact result in a loss of habitat function by directly eliminating habitat; disrupting wildlife access to, or use of habitat; or causing avoidance and stress to wildlife. Impacts to sage-grouse are categorized by number of well pad locations per square mile within two miles of a lek and within identified nesting/brood-rearing habitats greater than two miles from

a lek. Moderate impacts occur when well density is between one and two well pad locations per square mile or where there is less than 20 acres of disturbance per square mile. High impacts occur when well density is between two and three well pad locations per square mile or when there are between 20 and 60 acres of disturbance per square mile. Extreme impacts occur when well density exceeds three well pad locations per square mile or when there are greater than 60 acres of disturbance per square mile. Extreme impacts mean those where the function of an important wildlife habitat is substantially impaired or lost
The wells in S01 T46N R76W are located less than one mile from the Gilkie Ranch lek. There are currently 62 wells within two miles of this lek, an area of 12.6 square miles, for a total well density of 4.9 wells per square mile, indicating that impacts to this lek as a result of existing oil and gas development are considered by WGFD to be extreme. Thirty-three additional wells are proposed within two miles of the Gilkie Ranch lek. Four are from this project. If only the four Triangle CBM Unit Addition 1 wells were to be drilled, well density would increase to 5.2 wells per square mile within two miles of the Gilkie Ranch lek. With the addition of the 29 wells not associated with the Triangle CBM Unit Addition 1 project, well density within two miles of this lek would increase to 7.5 wells per square mile, well above the threshold of 3 wells per square mile for extreme impacts.

Walker et al. (2007) estimated the extent of CBNG development around leks by buffering wells by 350 m. At well densities of 1 well per 80-160 acres, a 350 m buffer around wells estimated the extent of CBNG development more accurately than larger or smaller buffer sizes. This metric was less sensitive to variation in spacing of wells such as well density and therefore more accurately estimated the total area affected by CBNG development. Figure 2 depicts the extent of CBNG development within two miles of the Gilkie Ranch lek by creating a 350 m buffer around existing wells, approved APDs, and the Triangle Unit Additions 1 wells.

Figure 2 Alternative C - Impacted area within 2 miles of the Gilkie Ranch Lek based on a 350 m buffer around wells



Declines in lek attendance associated with oil and gas development may be a result of a suite of factors including avoidance (Holloran et al. 2005, Holloran et al. 2007, Aldridge and Boyce 2007, Walker et al. 2007, Doherty et al. 2008, WGFD 2009), loss and fragmentation of habitat (Connelly et al. 2000, Braun et al. 2002, Connelly et al. 2004, WGFD 2004a, Rowland et al. 2005, WGFD 2005, Naugle et al. in press), reductions in habitat quality (Braun et al. 2002, WGFD 2003, Connelly et al. 2004, Holloran et al. 2005) and changes in disease mechanisms (Naugle et al. 2004, WGFD 2004b, Walker et al. 2007, Cornish pers. comm.).

The leks within the cumulative impact assessment area have experienced an overall downward trend since 2003, with the exception of the Kaufman Draw lek, which increased from 20 males in 2004 to 76 males in 2007 and then decreased. The lek counts from 2009 were submitted by consultants to BLM and have not been reviewed by WGFD at the time this EA was written. WOGCC data shows that the number of wells drilled within two miles of the Kaufman Draw lek increased each year between 2006 and 2008. The peak number of males observed at the lek increased from 2004 to 2007 but then declined from 2007 to 2009. This is consistent with patterns described in Walker et al. (2007) where lek attendance initially increased as development encroached, to account for displaced birds, but then declined rapidly as development continued to move through an area.

Figure 3 Peak male attendance at leks within the cumulative impact assessment area between 2003 and 2009

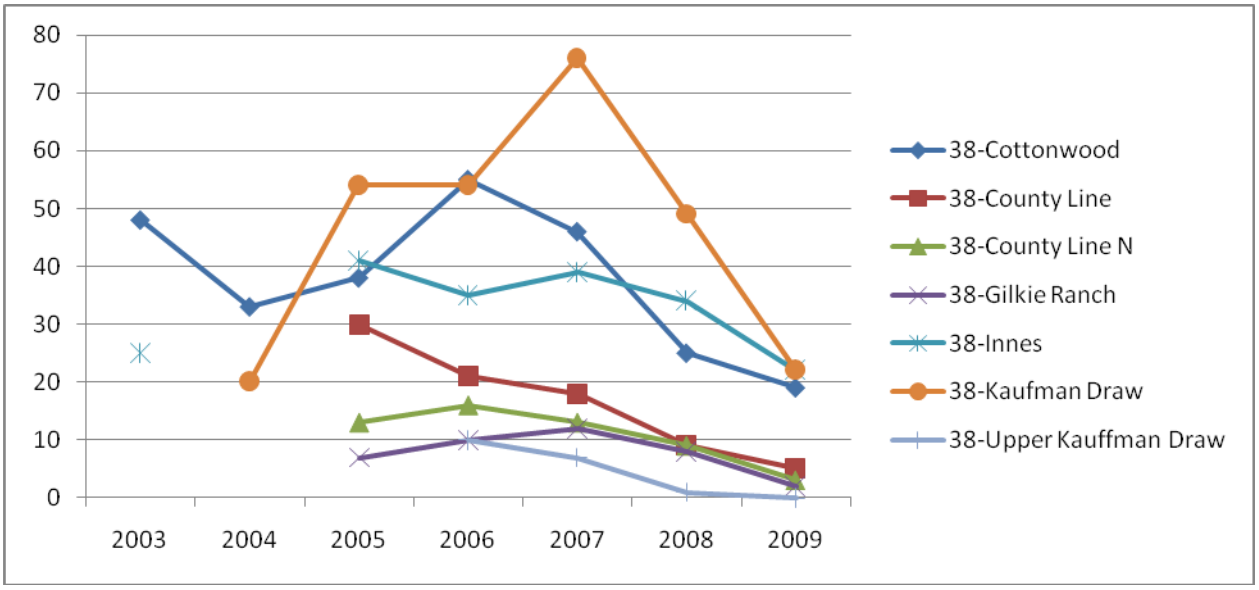


Table 4.4 shows the leks within the cumulative impact assessment area, the counts at the earliest year between 2003 and the present, the latest count, and the percent change.

Table 4.4 Earliest and latest counts at leks within the cumulative impact assessment area between 2003 and 2009 and the percent change

Lek	Earliest Year	Count	Latest Year	Count	Change
Cottonwood	2003	48	2009	19	-60%
County Line	2005	30	2009	5	-83%
County Line N	2005	13	2009	3	-77%
Gilkie Ranch	2005	7	2009	2	-71%
Innes	2003	25	2009	22	-12%
Kauffman Draw	2004	20	2009	22	10%
Upper Kauffman Draw	2006	10	2009	0	-100%

The BFO Resource Management Plan (BLM 2001) and the PRB FEIS Record of Decision (BLM 2003) included a two-mile timing limitation on surface-disturbing activities around sage-grouse leks. The two-mile measure originated with the Western Association of Fish and Wildlife Agencies (WAFWA) (BLM 2004). Wyoming BLM adopted the two-mile recommendation in 1990 (BLM 1990).

The two-mile recommendation was based on early research which indicated between 59% and 87% of sage-grouse nests were located within two miles of a lek (BLM 2004). These studies were conducted within vast contiguous stands of sagebrush, such as those that occur in Idaho's Snake River plain.

Additional research across more of the sage-grouse's range have since indicated that nesting may occur much farther than two miles from the breeding lek (BLM 2004). Holloran and Anderson (2005), in their Upper Green River Basin study area, reported that only 45% of their sage-grouse hens nested within 1.9 miles of the capture lek. Moynahan and Lindberg (2004) found that only 36% of their sage-grouse hens nested within 1.9 miles of the capture lek. Habitat conditions, and, thus, sage-grouse biology, within the BFO are more similar to Moynahan's north-central Montana study area than the Upper Green River area.

Moynahan's study area occurred in mixed-grass prairie and sagebrush steppe, dominated by Wyoming big sagebrush (Moynahan et al. 2007). Recent research in the Powder River Basin suggests that impacts to leks from energy development are discernable out to a minimum of four miles, and that some leks within this radius have been extirpated as a direct result of energy development (Walker et al. 2007, Walker 2008, Naugle et al. *In press*). Based on these studies, the BLM has determined that a two-mile timing limitation is insufficient to reverse the population decline.

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. A timing limitation does nothing to mitigate loss and fragmentation of habitat and changes in disease mechanisms. Rather than limiting mitigation to only timing restrictions, more effective mitigation strategies may include, at a minimum, burying power lines (Connelly et al. 2000b); minimizing road and well pad construction, vehicle traffic, and industrial noise (Lyon and Anderson 2003, Holloran 2005); and managing produced water to prevent the spread of mosquitoes with the potential to vector West Nile Virus in sage grouse habitat (Walker et al 2007). Walker et al. (2007) recommend maintaining extensive stands of sagebrush habitat over large areas (at least one mile in size) around leks to ensure sage-grouse persistence. The size of such a no-development buffer would depend on the amount of suitable habitat around the lek and the population impact deemed acceptable. Connelly et al. (2000) recommended locating all energy-related facilities at least two miles from active leks. Other researchers have recommended avoiding areas within four miles of a lek and within areas of mapped nesting and brood-rearing habitat outside the four-mile perimeter (Walker et al. 2007, Walker 2008, Naugle et al. *In press*).

Several guidance documents are available that recommend practices that would reduce impacts of development on greater sage-grouse. These include *Northeast Wyoming Sage-Grouse Conservation Plan* (Northeast Wyoming Sage-grouse Working Group 2006), *Sage-Grouse Habitat Management Guidelines for Wyoming* (Bohne et al. 2007), *Recommendations for Development of Oil and Gas Resources within Important Wildlife Habitats* (WGFD 2009), *Bureau of Land Management National Sage-Grouse Habitat Conservation Strategy* (USDI 2004), and *Greater Sage-Grouse Comprehensive Conservation Strategy* (Stiver et al. 2006).

The PRB FEIS (BLM 2003) states that "the synergistic effect of several impacts would likely result in a downward trend for the sage-grouse population, and may contribute to the array of cumulative effects that may lead to its federal listing. Local populations may be extirpated in areas of concentrated development, but viability across the Project Area (Powder River Basin) or the entire range of the species is not likely to be compromised (pg. 4-270)." Based on the impacts described in the Powder River Basin Oil and Gas Project FEIS and the findings of more recent research, the proposed action may contribute to a decline in male attendance at the five leks that occur within four miles of the project area, and, potentially, extirpation of the local grouse population.

4.2. West Nile Virus Direct and Indirect Effects

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

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

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

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

4.3. Water Resources

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

The operator has planned on using existing infrastructure and water impoundments of the existing Triangle (CBM) Unit Central and Triangle (CBM) Unit North PODs as part of their water management strategy.

The WDEQ has assumed primacy from United States Environmental Protection Agency for maintaining the water quality in the waters of the state. The WSEO has authority for regulating water rights issues and permitting impoundments for the containment of surface waters of the state.

The maximum water production is predicted to be 35.0 gpm per well or 210.0 gpm (0.47cfs or 338.7 acre-feet per year) for this POD. The PRB FEIS projected the total amount of water that was anticipated to be produced from CBNG development per year (Table 2-8 Projected Amount of Water Produced from CBM Wells Under Alternatives 1, 2A and 2B pg 2-26). For the Upper Powder River drainage, the projected volume produced within the watershed area was 147,481acre-feet in 2008 (maximum production is estimated in 2006 at 171,423 acre-feet). As such, the volume of water resulting from the production of these wells is 0.23% of the total volume projected for 2008. This volume of produced water is also within the predicted parameters of the PRB FEIS.

4.3.1. Groundwater

The PRB FEIS predicts an infiltration rate of 40% to groundwater aquifers and coal zones in the Upper Powder River drainage area (PRB FEIS pg 4-5). For this action, it may be assumed that a maximum of 84gpm will infiltrate at or near the discharge points and impoundments (135.5 acre feet per year). This water will saturate the near surface alluvium and deeper formations prior to mixing with the groundwater used for stock and domestic purposes. According to the PRB FEIS, “the increased volume of water recharging the underlying aquifers of the Wasatch and Fort Union Formations would be chemically similar to alluvial groundwater.” (PRB FEIS pg 4-54). Therefore, the chemical nature and the volume of the discharged water may not degrade the groundwater quality.

The PRB FEIS predicts that one of the environmental consequences of coal bed natural gas production is possible impacts to the groundwater. “The effects of development of CBM on groundwater resources would be seen as a drop in the water level (drawdown) in nearby wells completed in the developed coal aquifers and underlying or overlying sand aquifers.” (PRB FEIS page 4-1). In the process of dewatering the coal zone to increase natural gas recovery rates, this project may have some effect on the static water level of wells in the area. The permitted water wells produce from depths which range from 120 to 650 feet compared to 1200 feet to the Big George. As mitigation, the operator has committed to offer water

well agreements to holders of properly permitted domestic and stock wells within the circle of influence (½ mile of a federal CBNG producing well) of the proposed wells.

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

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

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

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

In order to address the potential impacts from infiltration on shallow ground water, the WDEQ has developed a guidance document, "Compliance Monitoring for Ground Water Protection Beneath Unlined Coalbed Methane Produce Water Impoundments" (June 14, 2004) which can be accessed on their web site. For all new WYPDES permits, the WDEQ requires that the proponent investigate the shallow groundwater at the proposed impoundment locations. As of April of 2009, approximately 1,999 impoundment sites had been investigated through over 2,272 borings. Of these impoundments, 277 met the criteria to require "compliance monitoring" if constructed and used for CBNG water containment. Only 155 impoundments requiring monitoring are presently being used. As of the first quarter of 2009, only 18 of those monitored impoundments caused a change in the "Class of Use" of the underlying aquifer water.

4.3.1.1. Groundwater Cumulative Effects:

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

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

4.3.1.2. Surface Water

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

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

Predicted Values	TDS, mg/l	SAR	EC, µmhos/cm
Most Restrictive Proposed Limit –		2	1000
Least Restrictive Proposed Limit		10	3200
Primary Watershed at Arvada, WY Gauging station Historic Data Average at Maximum Flow Historic Data Average at Minimum Flow		 4.76 7.83	 1797 3400
WDEQ Quality Standards for Wyoming Groundwater (Chapter 8) Drinking Water (Class I) Agricultural Use (Class II) Livestock Use (Class III)	 500 2,000 5,000	 8	
WDEQ Water Quality Requirement for WYPDES Permit # WY0049204 At discharge point	5,000	N/A	7,500
Predicted Produced Water Quality Coal Zone 1: Big George	1490	17.5	2,450

Based on the analysis performed in the PRB FEIS, the primary beneficial use of the surface water in the Powder River Basin is the irrigation of crops (PRB FEIS pg 4-69). The water quality projected for this POD is 1490.0 mg/l TDS which is within the WDEQ criteria for agricultural use (2000 mg/l TDS).

However direct land application is not included in this proposal. If at any future time the operator entertains the possibility of irrigation or land application with the water produced from these wells, the proposal must be submitted as a sundry notice for separate environmental analysis and approval by the BLM.

The quality for the water produced from the Big George target coal zone from these wells is predicted to be similar to the sample water quality collected from a location near the POD. A maximum of 35.0 gallons per minute (gpm) is projected is to be produced from these 6 wells, for a total of 210.0 gpm for the POD. See Table 4.5.

For more information, please refer to the WMP included in this POD and the WMP included in the Triangle (CBM.) Unit Central Area POD.

There is 1 discharge points proposed for this project. They have been appropriately sited and utilize appropriate water erosion dissipation designs. Existing and proposed water management facilities were evaluated for compliance with best management practices during the onsite.

To manage the produced water, existing impoundments will be utilized. All water management facilities were evaluated for compliance with best management practices during the onsite.

The PRB FEIS assumes that 15% of the impounded water will re-surface as channel flow (PRB FEIS pg 4-74). Consequently, the volume of water produced from these wells may result in the addition of 0.07 cfs below the lowest reservoir (after infiltration and evapotranspiration losses). The operator has committed to monitor the condition of channels and address any problems resulting from discharge. Discharge from the impoundments will potentially allow for streambed enhancement through wetland-riparian species establishment. Sedimentation will occur in the impoundments, but would be controlled through a concerted monitoring and maintenance program. Phased reclamation plans for the impoundments will be submitted and approved on a site-specific, case-by-case basis as they are no longer needed for disposal of CBNG water, as required by BLM applied COAs.

Alternative (2A), the approved alternative in the Record of Decision for the PRB FEIS, states that the peak production of water discharged to the surface will occur in 2006 at a total contribution to the mainstem of the Upper Powder River of 68 cfs (PRB FEIS pg 4-86). The predicted maximum discharge rate from these 6 wells is anticipated to be a total of 210.0 gpm or 0.47 cfs to impoundments. Using an assumed conveyance loss of 20% (PRB FEIS pg 4-74), the produced water re-surfacing from this action (0.07 cfs) may add a maximum 0.06 cfs to the Upper Powder River flows, or 0.09% of the predicted total CBNG produced water contribution. This incremental volume is statistically below the measurement capabilities for the volume of flow of the Upper Powder River (refer to Statistical Methods in Water Resources U.S. Geological Survey, Techniques of Water-Resources Investigations Book 4, Chapter A3 2002, D.R. Helsel and R.M. Hirsch authors). For more information regarding the maximum predicted water impacts resulting from the discharge of produced water, see Table 4-6 (PRB-FEIS pg 4-85).

In the WMP portion of the POD, the operator provided an analysis of the potential development in the Beaver Creek and North Prong Pumpkin Creek watersheds above the project area (Triangle Unit Central WMP page 5). Based on the area of the Beaver Creek watershed above the POD (49.55 sq mi) and an assumed density of one well per location every 80 acres, the potential exists for the development of 896 wells which could produce a maximum flow rate of 26,880 gpm (59.9 cfs) of water. Based on the area of the North Prong Pumpkin Creek watershed above the POD (23.46 sq mi) and an assumed density of one well per location every 80 acres, the potential exists for the development of 187 wells which could produce a maximum flow rate of 7,480 gpm (16.7 cfs) of water. The BLM agrees with the operator that this is not expected to occur because:

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

The potential maximum flow rate of produced water within the watersheds upstream of the project area is much less than the volume of runoff estimated from the 2-year storm event for these drainages. Therefore, the estimated volume of water produced from the full development in the watersheds above the project area is significantly less than the natural run off from the area.

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

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

Permit effluent limits were set at (WYPDES WY0049204 page 2):

Total Petroleum Hydrocarbons	10 mg/l max
pH	6.5 to 8.5
TDS	5000 mg/l max
Specific Conductance	7500 mg/l max
Sulfates	3000 mg/l max
Radium 226	1 pCi/l max
Dissolved iron	1000 µg/l max
Dissolved manganese	650 µg/l max
Total Barium	1800 µg/l max
Total Arsenic	7 µg/l max
Chlorides	46 mg/l
Total Flow	1.76 MGD (1222 gpm)

The WYPDES permit (WY0049204) also addresses existing downstream concerns, such as irrigation use, in the COA for the permit. The designated point of compliance identified for this permit is on the tributary (Pumpkin Creek), in the NWNE Sec 30 T47N R77W and on the mainstem in the SENE Sec 25, and the SWNW Sec 13 of T47N R78W, upstream and downstream (respectively) of the confluence of Pumpkin Creek and the Powder River, in the main channel of the Powder River.

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

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

In-channel downstream impacts are addressed in the WMP for the Triangle (CBM) Unit Central POD prepared by Greystone for the North Prong of Pumpkin Creek and Beaver Creek on page 9 of the WMP. The operator has committed to monitor the condition of downstream channels and mitigate any adverse impacts. The water system is manifolded which allows the water discharged to be directed to any discharge point and this allows the operator to more easily manage the discharge of the water to protect downstream concerns.

4.3.1.3. Surface Water Cumulative Effects

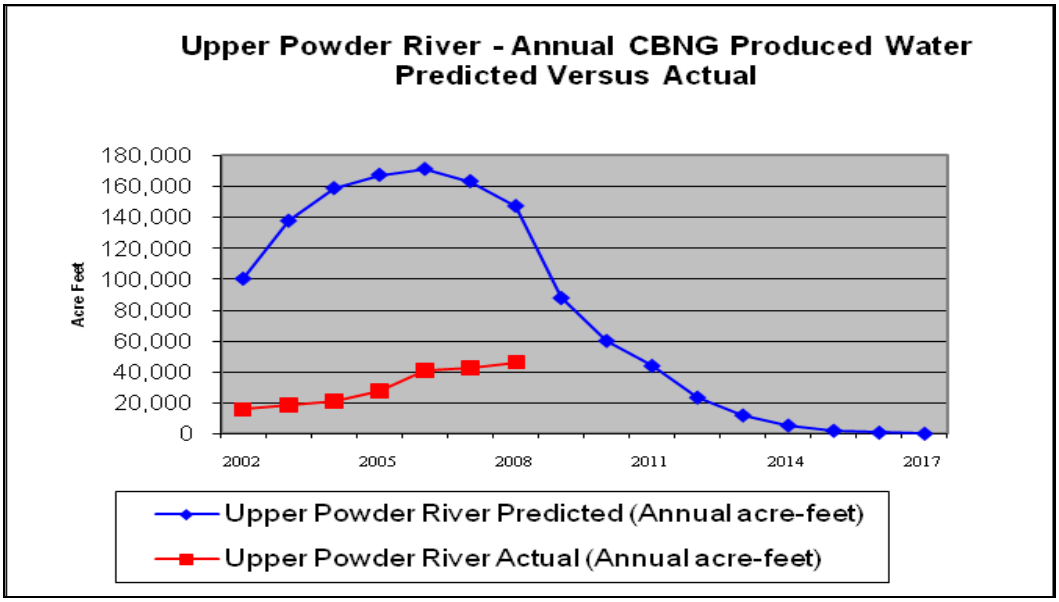
The analysis in this section includes cumulative data from Fee, State and Federal CBNG development in the Upper Powder River watershed. These data were obtained from the Wyoming Oil and Gas Conservation Commission (WOGCC).

As of December 2008, all producing CBNG wells in the Upper Powder River watershed have discharged a cumulative volume of 212,522 acre-ft of water compared to the predicted 1,047,521 acre-ft disclosed in the PRB FEIS (Table 2-8 page 2-26). These figures are presented graphically in Figure 4 and Table 4.6 following. This volume is 20.3 % of the total predicted produced water analyzed in the PRB FEIS for the Upper Powder River watershed.

Table 4.6 Actual vs predicted water production in the Upper Powder River watershed ***2008 Data Update 06-08-09***

Year	Upper Powder River Predicted (Annual acre-feet)	Upper Powder River Predicted (Cumulative acre-feet from 2002)	Upper Powder River Actual (Annual acre-feet)		Upper Powder River Actual (Cumulative acre-feet from 2002)	
			A-ft	% of Predicted	A-Ft	% of Predicted
2002	100,512	100,512	15,846	15.8	15,846	15.8
2003	137,942	238,454	18,578	13.5	34,424	14.4
2004	159,034	397,488	20,991	13.2	55,414	13.9
2005	167,608	565,096	27,640	16.5	83,054	14.7
2006	171,423	736,519	40,930	23.9	123,984	16.8
2007	163,521	900,040	42,112	25.8	166,096	18.5
2008	147,481	1,047,521	45,936	31.1	212,522	20.3
2009	88,046	1,135,567				
2010	60,319	1,195,886				
2011	44,169	1,240,055				
2012	23,697	1,263,752				
2013	12,169	1,275,921				
2014	5,672	1,281,593				
2015	2,242	1,283,835				
2016	1,032	1,284,867				
2017	366	1,285,233				
Total	**1,285,233**		**212,522**			

Figure 4 Actual vs predicted water production in the Upper Powder River watershed



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

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

1. They are proportional to the actual amount of cumulatively produced water in the Upper Powder River drainage, which is approximately 20.3% of the total predicted in the PRB FEIS.
2. The WDEQ enforcement of the terms and conditions of the WYPDES permit that are designed to protect irrigation downstream.
3. The commitment by the operator to monitor the volume of water discharged.

No additional mitigation measures are required.

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

4.4. Economics and Recovery of CBNG Resources

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.

4.5. Fluid Minerals

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. In addition, the table below indicates potential for lost resources and revenue under Alternative D.

Estimated Lost Gas from Two Undrilled Federal Locations

	<-Unrecovered		**<-Value of CBNG->**		**<-Lost Royalty->**	
	High	**Low**	**High**	**Low**	**High**	**Low**
Triangle CBM Unit 43-1	467	195	3,160,000	1,323,000		
Triangle CBM Unit 32-1	467	195	3,160,000	1,323,000		
Totals	**934**	**390**	**6,320,000**	**2,646,000**		

Note: All figures are in thousands of MCFG or thousands of dollars.
CBMG value is based on 2010-2105 NYMEX Henry Hub gas price.

4.6. Cultural Resources

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).

4.7. Air Quality

In the project area, air quality impacts would occur during construction (due to surface disturbance by earth-moving equipment, vehicle traffic fugitive dust, well testing, as well as drilling rig and vehicle engine exhaust) and production (including non-CBM well production equipment, booster and pipeline

compression engine exhaust). The amount of air pollutant emissions during construction would be controlled by watering disturbed soils, and by air pollutant emission limitations imposed by applicable air quality regulatory agencies. Air quality impacts modeled in the PRB FEIS concluded that projected oil & gas development would not violate any local, state, tribal or federal air quality standards.

5. ALTERNATIVE D

Only specific differences from alternative C will be discussed. Alternative D was not explored during the onsite; however, following the onsite inspection, the BLM Interdisciplinary Team (IDT) reviewed the surface use and wildlife data with the changes agreed to in the field. The BLM-IDT identified that further mitigation to reduce the loss of sage-grouse habitat within the project area was warranted. BLM determined that impacts to sage-grouse habitat from Alternative C were not adequately mitigated. The following proposal will be recommended to the operator as mitigation to reduce the impacts from implementation of Triangle CBM Unit Addition 1.

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5.1. Vegetation & Soils Direct and Indirect Effects

This alternative will reduce surface disturbance through the use of corridors which will maintain native soil and vegetation.

5.1.1. Cumulative effects for Vegetation and Soils

No additional mitigation measures are required.

5.2. Wildlife

5.2.1. Big Game Direct and Indirect Effects

This alternative will reduce habitat disturbance and eliminate habitat fragmentation by the deferral of wells and associated infrastructure.

5.2.1.1. Cumulative effects for Big Game

The cumulative effects associated with Alternative D are within the analysis parameters and impacts described in the PRB FEIS. For details on expected cumulative impacts, please refer to the referenced PRB FEIS, Volume 2, Chapter 4, page 4-211. No additional mitigation measures are required.

5.2.2. Migratory Birds Direct and Indirect Effects

Alternative D contains the least habitat impact to migratory birds.

5.2.2.1. Cumulative Effects for Migratory Birds

The cumulative effects associated with Alternative D are within the analysis parameters and impacts described in the PRB FEIS. For details on expected cumulative impacts, please refer to the referenced PRB FEIS, Volume 2, Chapter 4, Page 4-235. No additional mitigation measures are required.

5.2.3. Raptors Direct and Indirect Effects

Alternative D contains the least habitat impact to raptors.

5.2.3.1. Cumulative effects for Raptors

The cumulative effects associated with Alternative D 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.

5.2.4. Threatened and Endangered and Sensitive Species

5.2.4.1. Sensitive Species Direct and Indirect Effects

5.2.4.1.1. Greater Sage-grouse

Alternative D would create the least amount of disturbance to and fragmentation of sage-grouse habitat while meeting the purpose and need of the proposed action.

Alternative D incorporates site-specific mitigation measures recommended by BLM to decrease the impacts associated with development as proposed by the operator in S01 T46N R76W. These mitigation measures were recommended in a letter to the operator following the January, 2009, onsite visit but were not agreed to for reasons stated in the Greater Sage-grouse Cumulative Effects section (section 4.1.5.8.2.2) in Alternative C. As a result of implementation of Alternative D, all new disturbance would corridor with existing disturbance, and no new overhead power would be installed in S01. Table A-1 in Appendix A provides a summary of the amount of surface disturbance associated with each alternative.
Declines in sage-grouse populations are attributed, in part, to habitat fragmentation (Braun et al. 2002,

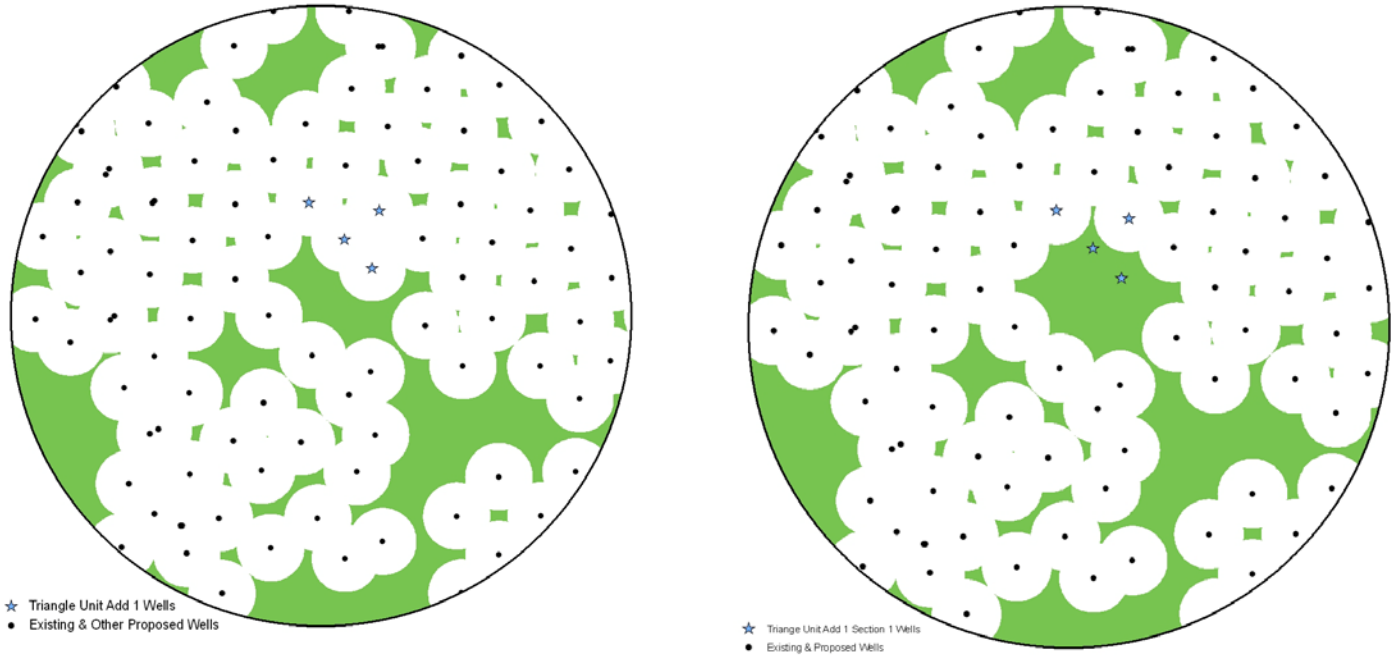
Connelly et al. 2004, Walker et al. 2007). Implementation of Alternative D would result in a less fragmented landscape than Alternative C. Fragmentation can be measured by a number of landscape characteristics, including total number of patches, average patch size, and total perimeter of all patches. Fragmentation increases when number of patches increases, average patch size decreases, and total perimeter increases (Bogaert et al. 2000). The differences between the alternatives focus on infrastructure proposed in S01 T46N R76W, less than one mile from the Gilkie Ranch lek. Using a 350 m buffer around existing wells, approved APDs, and wells proposed for each alternative, Alternative D would result in a less fragmented landscape than Alternative C, as shown by the difference in these measures of fragmentation within two miles of the Gilkie Ranch lek (summarized in Table 5.1). Alternative D would also amount to approximately half the amount of linear disturbance within one mile of the Gilkie Ranch lek as compared to Alternative C.

Table 5.1 Comparison of Measures of Fragmentation between Alternative C and Alternative D

Measure of Fragmentation	Alternative C	Alternative D
# Patches	54	53
Average patch size (acres)	30	33
Total Perimeter (feet)	98,330	97,619
Total Linear Disturbance (miles)	2.3	1.2

Figure 1 shows the difference in impacts between Alternative C and Alternative D when assuming a 350 m buffer around wells for impacts.

Figure 1 Comparison of Alternatives C and D assuming a 350 m buffer around wells



In its *Recommendations for Development of Oil and Gas Resources within Important Wildlife Habitats*, WGFD recommended no surface occupancy within 0.6 miles of occupied sage-grouse leks within core areas. Alternative D achieves the least amount of new disturbance and fragmentation within a 0.6 mile radius around the Gilkie Ranch lek.

5.3. Economics and Recovery of CBNG Resource (Fluid minerals, socio-economics)

The cumulative effects associated with Alternative D 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.

5.4. Comparison Summary of Effects By Cumulative effects

The cumulative effects associated with Alternative D are within the analysis parameters and impacts described I the PRB FEIS. For details on expected cumulative impacts, please refer to the referenced PRB FEIS, Volume 2, Chapter 4, page4-271. No additional mitigation measures are required.

Table 5.2 Cumulative Effects

Resource/Species	Alternative A	Alternative C	Alternative D Sage Grouse emphasis
Wetlands/Riparian Areas	No existing wetlands/riparian areas would be disturbed.		
Wildlife			
Big Game	No habitat loss or fragmentation. Would likely see increased traffic passing through due to surrounding mineral development	Greatest habitat loss.	Least habitat loss.
		Greatest habitat fragmentation.	Least habitat fragmentation.

Resource/Species	Alternative A	Alternative C	Alternative D Sage Grouse emphasis
Raptors	No habitat loss.	Greatest foraging habitat fragmentation	Least foraging habitat fragmentation.
Migratory Birds	No habitat loss.	Greatest habitat loss.	Least habitat loss.
	No habitat fragmentation.	Greatest habitat fragmentation.	Least habitat fragmentation.
	No decision on overhead electricity. Overhead power could be routed through project area on private surface without BLM discretion increasing predation and collision risk.	Overhead electric poses predation & collision risk.	Overhead electric poses predation & collision risk.
Threatened and Endangered Species			
Bald eagle	No habitat loss	Overhead electricity increasing mortality risk from electrocution.	Removal of overhead electricity will eliminate risk from electrocution.
Sensitive Species			
Greater Sage Grouse	No habitat loss.	Greatest habitat loss.	Least habitat loss.
	No habitat fragmentation.	Greatest habitat fragmentation.	Least habitat fragmentation.
	No decision on overhead electricity. Overhead power could be routed through project area on private surface without BLM discretion increasing predation and collision risk. Grouse may avoid overhead power lines.	Greatest predation and collision risk associated with overhead power lines.	Least habitat fragmentation. Increase habitat connectivity. Eliminate collision and vertical intrusion from overhead power.

Resource/Species	Alternative A	Alternative C	Alternative D Sage Grouse emphasis
West Nile Virus	No Impact	likely to have effect on the overall spread of WNV.	Unlikely to have any effect on the overall spread of WNV.
Water Resources			
CBNG Produced Water	0 gpm water produced		
Groundwater	No Impact		
Surface Water	No Impact		
Long Term Disturbance	No Impact		

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.

6. CONSULTATION/COORDINATION

Contact	Title	Organization	Present at Onsite
Dorvan Poulson	Production Engineer	Citation O&G Corporation	Yes
Bob Holum	Operations Foreman	Citation O&G Corporation	Yes
Dave Huber	Permitting Agent	Arcadis USA, Inc.	Yes

7. 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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Appendix A
Detailed Description of Alternatives B, C, D, and
Alternatives Considered but not Analyzed in Detail
Citation Oil & Gas Corporation
Triangle CBM Unit Addition 1
ENVIRONMENTAL ASSESSMENT –WY-070-09-064

1. Alternative B - Proposed Action

Proposed Action Title/Type: Citation Oil & Gas Corporation‘s Triangle CBM Unit Addition 1 Plan of Development (POD) for 6 coal bed natural gas well APD‘s and associated infrastructure.

Proposed Well Information: There were 6 wells proposed within this POD; the wells are vertical bores proposed on an 80 acre spacing pattern with 1 well per location. Each well will produce from one coal seams. Proposed well house dimensions are 4 ft wide x 4 ft length x 4 ft height. Well house color is Covert Green, selected to blend with the surrounding vegetation. Proposed wells are located as follows:

	Well Name	Well #	Qtr/Qtr	Section	TWP	RNG	Lease #
1	Triangle (CBM) Unit	21-1	NENW	1	46N	76W	WYW0311402
2	Triangle (CBM) Unit	32-1	SWNE	1	46N	76W	WYW0311402
3	Triangle (CBM) Unit	41-1	NENE	1	46N	76W	WYW0311402
4	Triangle (CBM) Unit	43-1	NESE	1	46N	76W	WYW0311402
5	Triangle (CBM) Unit	14-17	SWSW	17	47N	75W	WYW145191
6	Triangle (CBM) Unit	23-17	NESW	17	47N	75W	WYW145191

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

	IMPOUNDMENT Name / Number	Qtr/Qtr	Sec	TWP	RNG	Capacity (Acre Feet)	Surface Disturbance (Acres)	Lease #
1	Sandman (existing)	NENE	1	46N	76W	13.50		

County: Campbell

Applicant: Citation Oil & Gas Corporation

Surface Owners: Iberlin Ranch Partnership, Flying T Land Co LP, Etc.

Project Description:
The proposed action involves the following:

- Drilling of 6 total federal CBM wells in the Big George coal zone to depths of approximately 1200 feet.
- Drilling and construction activities are anticipated to be completed within two years, the term of an APD. Drilling and construction occurs year-round in the PRB. Weather may cause delays lasting several days but rarely do delays last multiple weeks. Timing limitations in the form of COAs and/or agreements with surface owners may impose longer temporal restrictions on portions of this POD, but rarely do these restrictions affect an entire POD.

- A Water Management Plan (WMP) that involves the following infrastructure and strategy: 1 discharge points and use of existing stock water reservoirs within the Upper Powder River primary watershed.
- An unimproved and improved road network.
- An above ground power line network to be constructed by the contractor. The proposed route has been reviewed by the contractor. If the proposed route is altered, then the new route will be proposed via sundry application and analyzed in a separate NEPA action. Power line construction has not been scheduled and will be completed before the CBNG wells are producing.
- A buried gas, water and power line network, and 1 existing central gathering/metering facilities.

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

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

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

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

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

2. Alternative C – Modified Proposed Action

2.1. Changes as a result of the on-sites

1. The pipeline in section 17 of T47N R75W was moved to be a corridor with the access road from the 14-17 location to the existing 43-18 location, where it will tie into existing infrastructure.

2. The following is an alternative proposed by the operator in response to concerns BLM raised in the Post-onsite deficiency letter, in an effort to reduce the impacts to wildlife, specifically sage grouse in Section 1 of T46N R76W.

    - Forego the proposed crown and ditch road to the proposed header location, keeping it a primitive road with spot upgrades on the steeper portions.
    - Minimize the mowing width for the access roads and corridors to 20 feet.
    - Restrict the mowed area of the 43-1 location to 100 x 100 feet.

2.2. Description of Mitigation Measures (applied as Conditions of Approval):

The operator is responsible for the COAs attached to this EA and will be issued an Incident of Non-Compliance if found to be in violation of any COA.

3. Programmatic and Site specific mitigation measures, Alternative C

3.1. 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.

3.1.1. Wildlife

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

2. The Companies will construct power lines to minimize the potential for raptor collisions with the lines. Potential modifications include burying the lines, avoiding areas of high avian use (for example, wetlands, prairie dog towns, and grouse leks), and increasing the visibility of the individual conductors.

3. All stock tanks shall include a ramp to enable trapped small birds and mammals to escape. See Idaho BLM Technical Bulletin 89-4 entitled Wildlife Watering and Escape Ramps on Livestock Water Developments: Suggestions and Recommendations.

3.1.1.1. Threatened, Endangered, or Sensitive Species

3.1.1.1.1. Bald Eagle

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

3.1.1.1.2. Mountain Plover

1. A disturbance-free buffer zone of 0.25 mile will be established around all occupied mountain plover nesting habitat between March 15 and July 31.

2. 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.

3.1.2. 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.

3.1.3. Water Management

3.1.3.1. Groundwater

1. In order to address the potential impacts from infiltration on shallow ground water, the Wyoming DEQ has developed a guidance document, "Compliance Monitoring and Siting Requirements for Unlined Coalbed Methane Produced Water Impoundments" which was approved September, 2006.

For WYPDES permits received by DEQ after the August 1st effective date, the BLM requires that operators comply with the current approved DEQ compliance monitoring guidance document prior to discharge of federally-produced water into newly constructed or upgraded impoundments.

3.1.3.2. Surface Water

1. Channel Crossings:
   a) Channel crossings by road and pipelines will be constructed perpendicular to flow. Culverts will be installed at appropriate locations for streams and channels crossed by roads as specified in the BLM Manual 9112-Bridges and Major Culverts and Manual 9113-Roads. Streams will be crossed perpendicular to flow, where possible, and all stream crossing structures will be designed to carry the 25-year discharge event or other capacities as directed by the BLM.
   b) Channel crossings by pipelines will be constructed so that the pipe is buried at least four feet below the channel bottom.

2. Low water crossings will be constructed at original streambed elevation in a manner that will prevent any blockage or restriction of the existing channel. Material removed will be stockpiled for use in reclamation of the crossings.

3. Concerns regarding the quality of the discharged CBNG water on downstream irrigation use may require operators to increase the amount of storage of CBNG water during the irrigation months and allow more surface discharge during the non-irrigation months.

3.1.4. Soils

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

3.2. Site Specific Conditions of Approval, Alternative C

3.2.1. General

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

2. Please contact Mary Maddux, Natural Resource Specialist, (307) 684-1164, Bureau of Land Management, Buffalo, if there are any questions concerning these COAs.

3.2.2. Surface Use

1. The approval of the 21-1 location is only for the well. The infrastructure (gas pipeline, water pipeline, powerline) associated with the 21-1 well is not approved as proposed. The operator will be required to submit a sundry notice for infrastructure associated with the 21-1 well.

2. The approval of the 41-1 location is only for the well. The infrastructure (gas pipeline, power line) associated with the 41-1 well is not approved as proposed. The operator will be required to submit a sundry notice for the infrastructure associated with the 41-1 well.

3. All permanent above-ground structures (e.g., production equipment, tanks, etc) not subject to safety requirements will be painted to blend with the natural color of the landscape. The paint used will be a color which simulates "Standard Environmental Colors". The color selected for the Triangle CBM Unit Addition 1 POD is Covert Green.

4. The operator will drill seed on the contour to a depth of 0.5 inch, followed by cultipaction to compact the seedbed, preventing soil and seed losses. To maintain quality and purity, the current years tested, certified seed with a minimum germination rate of 80% and a minimum purity of 90% will be used. On BLM surface or in lieu of a different specific mix desired by the surface owner, use the following:

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

***PLS = pure live seed (this seeding rate has not been doubled).**

This is a recommended seed mix based on the native plant species listed in the NRCS Ecological Site descriptions, U.W. College of Ag, and seed market availability.

- Slopes too steep for machinery may be hand broadcast and raked with twice the specified amount of seed.

3.2.3. Wildlife

3.2.3.1. Bald Eagles

No project related actions shall occur within one mile of Beaver Creek from November 1 through April 1, annually, prior to a winter roost survey, or from February 1 through August 15, annually, prior to a nesting survey. All survey results must be submitted in writing to the BFO and approved prior to initiation of surface disturbing activities. This timing limitation will be in effect unless surveys determine the nest/roost to be inactive. This affects the following wells and infrastructure:

Township/Range	Section	Wells and Infrastructure
T47N R75W	S17	Two wells (14-17, 23-17) and associated infrastructure.

If a roost is identified and construction has not been completed, a year-round disturbance-free buffer zone of 0.5 mile will be established for all bald eagle winter roost sites. A seasonal minimum disturbance buffer zone of 1 mile will be established for all bald eagle roost sites (November 1 - April 1). Additional measures such as remote monitoring and restricting maintenance visitation to between 9:00 AM and 3:00 PM may be necessary to prevent disturbance.

If a nest is identified and construction has not been completed, a disturbance-free buffer zone of 0.5 mile will be established for all bald eagle nests. A seasonal minimum disturbance buffer zone of 1 mile will be established for all bald eagle nest sites (February 1 - August 15).

Additional mitigation measures may be necessary if the site-specific project is determined by a BLM biologist to have an adverse affect to bald eagles or their habitat.

3.2.3.2. Greater Sage-Grouse

All wells and access roads within 0.6 miles of sage-grouse nesting habitat will have timing limitation stipulations of no surface disturbing activities (to include maintenance, unless in an emergency) from 1 March to 15 June for the life of the project. Because all infrastructure associated with the Triangle Unit Addition I POD is within 0.6 miles of sage-grouse nesting habitat, this condition applies to the entire project.

A sage-grouse lek survey will be conducted for all known leks within 2 miles of the POD by a biologist following the most current WGFD protocol. All survey results shall be submitted annually, in writing, to a Buffalo BLM biologist by 31 July. Currently, this includes the Gilkie Ranch, Kauffman Draw, Upper Kauffman Draw, and Cottonwood leks but will also include any new leks discovered over the life of the project.

If an active lek is identified within 0.25 miles of any project-related activities, no surface disturbing activities will be allowed within 0.25 miles of the lek between 1 March and 15 June.

Maximum design speed on all operator-constructed and maintained roads (except county roads) will not exceed 25 miles per hour except travel along roads within 0.5 miles of any known leks. Currently, this applies to the Red Draw lek but will include any new leks discovered over the life of the project.

3.2.3.3. Raptors

No surface disturbing activity shall occur within 0.5 mile of all identified raptor nests from 1 February through 31 July, annually, prior to a raptor nest occupancy survey. Surveys shall be conducted by a biologist following the most current BLM protocol. All survey results must be submitted in writing to the BFO and approved prior to initiation of surface disturbing activities. A 0.5 mile timing restriction will be applied if a nest is identified as active. This timing limitation will affect the following:

Township/Range	Section	Wells and Infrastructure
T47N R75W	S17	Two wells (14-17, 23-17) and associated infrastructure.

Surveys for new raptor nests shall be conducted, annually, within 0.5 miles of the POD boundary on or after 15 April, and prior to or during the first nest occupancy check.

Nest occupancy and productivity checks shall be completed for all raptor nests identified within a 0.5 mile of any infrastructure associated with the POD for as long as the POD is under construction. Once construction of the POD has ceased, nest occupancy and productivity checks shall continue for the first five years on all identified nests within a 0.5 mile of the POD boundary. Productivity checks shall be completed only on those nests that were verified to be occupied during the initial occupancy check of that year. The productivity checks shall be conducted no earlier than 1 June or later than 30 June, 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 31 July of each survey year.

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.

Well metering, maintenance and other site visits within 0.5 miles of raptor nests should be minimized as much as possible during the breeding season (February 1 – July 31).

3.2.4. Cultural

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. Alternative D

4.1. Description of the Alternative

Alternative D incorporates further refinements of Alternative C. These refinements are described in the post-onsite deficiency letter sent from BLM to the operator. The site-specific level modifications are all associated with infrastructure proposed in S01 T46N R76W. These modifications are listed below:

- Defer the 43-1 and 32-1 well locations.
- Deny overhead power as proposed from 41-1 to 32-1 well locations.
- Deny cross-country pipeline proposed from 41-1 to 32-1 well locations.
- Deny locating header building at the proposed 32-1 well location.
- Deny upgrading of the existing primitive road from the 21-1 well location to the 32-1 well location.

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.

4.2. Description of Mitigation Measures (applied as Conditions of Approval):

All programmatic and site specific measures from Alternative C apply.

4.3. Alternatives considered but not analyzed in detail

BLM considered the alternative proposed by the operator as described in section 2.1 Changes as a result of the on-sites, however the changes proposed would not have mitigated the impacts to wildlife and therefore will not be analyzed further.

A-1 Summary of Alternatives

A summary of the infrastructure currently existing within the POD area (Alternative A), the infrastructure originally proposed by the operator (Alternative B), and the infrastructure within the BLM/operator modified proposal (Alternative C) and Alternative D are presented below.

Table A-1 Summary of the Alternatives

Facility	**Alternative A (No Action) Existing Number/ Acres/Miles**	**Alternative B (Original Proposal) Proposed Number/ Acres/Miles**	**Alternative C (Modified Proposal) Revised Number/ Acres/Miles**	**Alternative D Revised Number/ Acres/Miles**
Total CBNG Wells	0	6	6	4
Well Locations Nonconstructed Constructed Slotted	 0 0 0	 1.3 (0.2 acre ea.) 0 0	 1.3 (0.2 acre ea.) 0 0	 0.8 (0.2 acre ea.) 0 0
Conventional Wells	0	0	0	0
Gather/Metering Facilities Number of Facilities Acreage of Facilities	 0	 1 0.46	 1 0.46	 0 0
Compressors Number of Compressors	 0	 0	 0	 0
Ancillary (Staging/Storage Areas)	3 (0.9 acre ea)	3 (existing) for 2.7 acres	3 (existing) for 2.7 acres	3 (existing) for 2.7 acres
Template/Spot Upgrade Roads No Corridor With Corridor	 0 0	 0 0	 0 0	 0 0
Engineered Roads No Corridor With Corridor	 470 ft 0	 0 0.4 miles for 1.79 acres	 0 0	 0 0
Primitive Roads No Corridor With Corridor	 0.6 0	 0.3 miles for 0.7 acres 0.7 miles for 1.7 acres	 0.4 miles for 0.9 acres 1.4 miles for 3.4 acres	 0.4 miles for 0.9 acres 0.8 miles for 1.9 acres

Facility	Alternative A (No Action) Existing Number/ Acres/Miles	Alternative B (Original Proposal) Proposed Number/ Acres/Miles	Alternative C (Modified Proposal) Revised Number/ Acres/Miles	Alternative D Revised Number/ Acres/Miles
Buried Utilities No Corridor With Corridor	 0 0	 0 0.6 miles for 1.4 acres	 0 0	 0 0
Buried Pipeline No Corridor With Corridor	 245ft 0	 35 ft for 0.01 acres 0	 35 ft for 0.01 acres 0	 35 ft for 0.01 acres 0
Overhead Powerlines	690 ft	0.3 miles for 1.1 acres	0.3 miles for 1.1 acres	0.0
Communication Sites	0	0	0	0
Monitor Wells	0	0	0	0
Land Application Disposal	0	0	0	0
Subsurface Drip Irrigation	0	0	0	0
Treatment Facilities	0	0	0	0
Impoundments On-channel Off-channel Lined Unlined	 1 0 0 1	 0 0 0 0	 0 0 0 0	 0 0 0 0
Water Discharge Points	1	1 at 0.005 acres	1 at 0.005 acres	1 at 0.0005 acres
Channel Disturbance Headcut Mitigation Channel Modification	 0 0	 0.0 0.0	 0.0 0.0	 0.0 0.0
TOTAL ACRES DISTURBANCE	8.2	11.1	9.9	6.3

APPENDIX B
Bureau of Land Management Wyoming Buffalo Field Office
Guidance for general management actions during BFO
Resource Management Plan Revision
as of August 13, 2008

Lands shown on the attached map in white will be subject to the existing decisions from the 1985 RMP (as amended) and the 2003 Environmental Impact Statement/Plan Amendment Record of Decision for the Powder River Basin. Areas that are shown in blue will be managed according to these same planning documents as well as the management actions listed below.

The additional management actions were designed in accordance with the 2003 Record of Decision which states, in part, "Land use plan monitoring will be conducted by BLM…Information gathered from this monitoring will guide mid-course corrections in adapting to the inevitable changes that will occur because of new information."

Fluid Minerals

- Processing of new proposals will be considered on a case-by-case basis.
- Efforts will be made to assure that the impacts of surface disturbing projects will be consistent with a well pad density of 640 acres.
- Lease suspension requests will be processed in accordance with current regulations and policy.

Solid Minerals

- Processing of new proposals will be considered on a case-by-case basis.

Vegetation Management

- Current and proposed pesticide use proposals for weed control will be reviewed on a case-by-case basis.
- Consideration of new proposals for vegetation treatments other than weed control may be considered on a case-by-case basis.

Fire Suppression

- The national strategy for fire suppression in sage-grouse habitat will be applied.
- Renewed emphasis on integration of resource advisors in fire suppression efforts.

Recreation

- Renewals for existing permitted actions will be allowed.
- New proposals for permitted activities will be considered on a case-by-case basis.
- New proposals for recreational facilities will be considered on a case-by-case basis.

Wildlife

- Approved habitat improvements and maintenance of existing improvements will be allowed.
- New proposals for habitat improvement projects will be considered on a case by case basis.

Rangeland Management

- Grazing use will continue in accordance with the grazing regulations.
- New proposals for range improvements or treatments will be considered on a case-by-case basis.

Realty

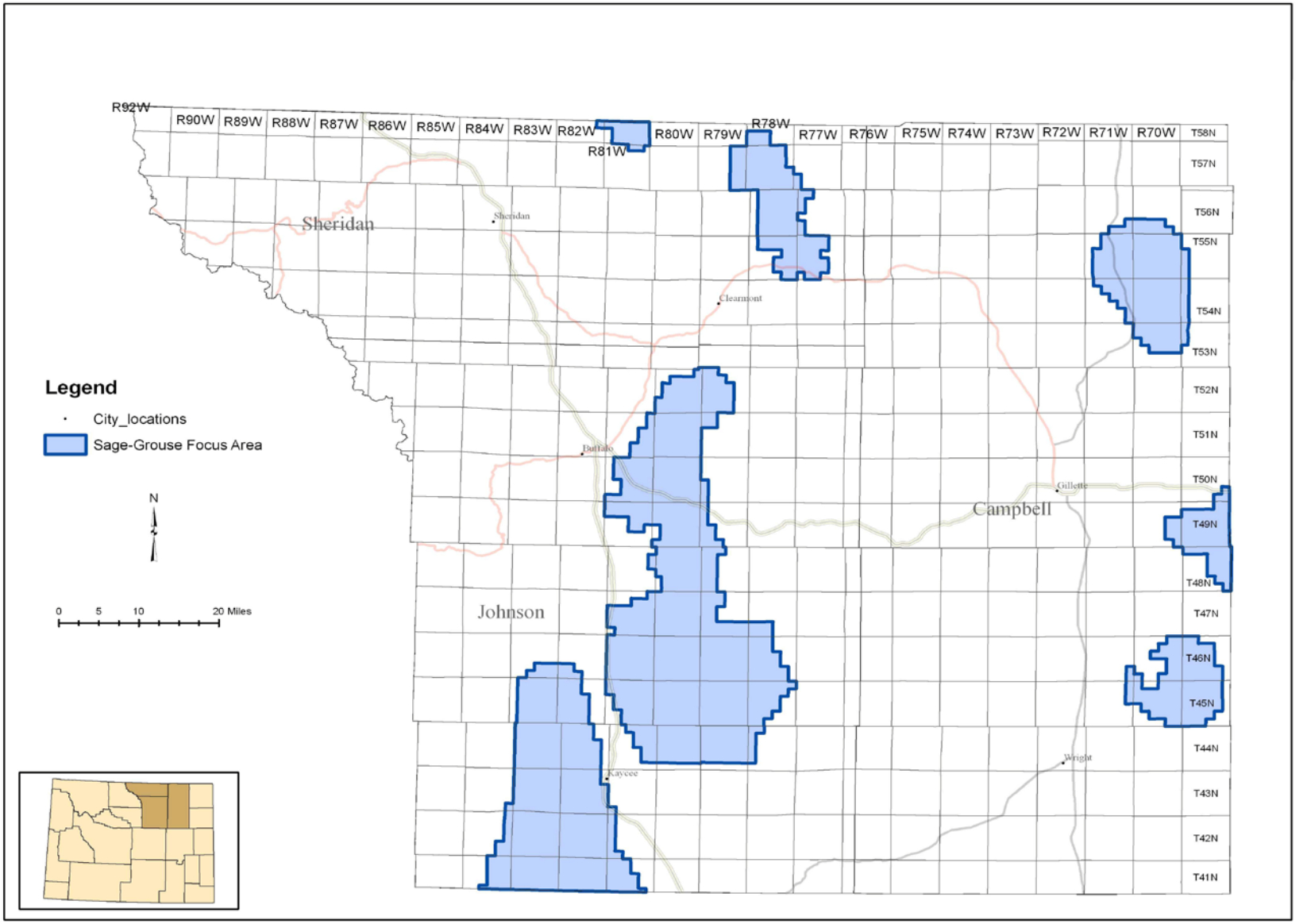
- Processing of new applications will be considered on a case-by-case basis. Changes to existing Terms & Conditions will be considered on a case-by-case basis.

When considering these general management actions on a case-by-case basis consideration will be given to maintaining a viable population of sage-grouse and associated habitat needs. The proponent will be asked to demonstrate that the proposal can be managed in a manner that effectively conserves sage-grouse habitats affected by the proposal.

BLM will work with industry to include measurable conservation objectives for use in project planning. Resources such as, but not limited to, the Local Sage-Grouse Working Group Plan may be used to develop these objectives. Each proposal will be evaluated by BLM in coordination with the Wyoming Game & Fish Department to ensure that BLM maintains habitat connectivity by addressing habitat loss, degradation and fragmentation.

Criteria that will be used when reviewing proposed activities include, but are not limited to the following:

- Consolidation of infrastructure to lessen habitat fragmentation, degradation and loss.
- Effective conservation of sage-grouse seasonal habitats and habitat connectivity.
- Measurable conservation objectives.
- Consideration of measures contained in the Local Working Group Conservation Plan.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R86W
R85W
R84W
R83W
R82W
R81W
R80W
R79W
R78W
R77W
R76W
R75W
R74W
R73W
R72W
R71W
R70W
T58N
T57N
T56N
T55N
T54N
T53N
T52N
T51N
T50N
T49N
T48N
T47N
T46N
T45N
T44N
T43N
T42N
T41N
Sheridan
Sheridan
Clearmont
Buffalo
Gillette
Campbell
Johnson
Kaycee
Wright
Legend
City_locations
Sage-Grouse Focus Area
N
0
5
10
20 Miles