

**FINDING OF NO SIGNIFICANT IMPACT & DECISION RECORD  
FOR  
Lance Oil & Gas Company, Inc.  
Whiskey Drawn POD  
ENVIRONMENTAL ASSESSMENT –WY-070-09-048**

DECISION: BLM’s decision is to approve a combination of alternatives C and D as summarized below and described in the attached EA and authorize Lance Oil & Gas Company, Inc.’s Whiskey Drawn POD Coal Bed Natural Gas (CBNG) POD comprised of the following 8 Applications for Permit to Drill (APDs):

	Well Name	Well #	Qtr/Qtr	Section	TWP	RNG	Lease #
1	Whiskey Drawn WDU	11-12	NWNW	12	47N	78W	WYW150386
2	Whiskey Drawn WDU	14-12	SWSW	12	47N	78W	WYW135630
3	Whiskey Drawn WDU	11-21	NWNW	21	47N	78W	WYW146890
4	Whiskey Drawn WDU	33-21	NWSE	21	47N	78W	WYW146890
5	Whiskey Drawn WDU	43-21	NESE	21	47N	78W	WYW146890
6	Whiskey Drawn WDU	24-33	SESW	33	48N	78W	WYW161144
7	Whiskey Drawn WDU	23-33	NESW	33	48N	78W	WYW161144
8	Whiskey Drawn WDU	34-33	SWSE	33	48N	78W	WYW161144

The following impoundment locations were inspected and approved for use in association with the water management strategy for the Whiskey Drawn POD. All locations are a Primary designation.

	IMPOUNDMENT Name / Number	Qtr/Qtr	Section	TWP	RNG	Capacity (Acre Feet)	Lease #
1	14-5	NWSW	5	47N	78W	0.5	WYW1468
2	Simon	NWNW	16	47N	78W	3.3	State
3	33-1	SENW	33	48N	78W	80	WYW0853
4	Iberlin	NENW	23	47N	79W	91.7	WYW1456
5	6-1	SESW	6	47N	78W	3	WYW1468
6	Fourmile Creek Facility	NENW	5	47N	78W	treatment	WYW0853
7	Fourmile Creek East Facility	SWNW	1	47N	78W	treatment	Fee

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

**SUMMARY OF SELECTED ALTERNATIVE**

The selected alternative includes appropriate components of alternatives C and D as described in the EA that will alleviate site specific impacts to sage-grouse and habitat. Timing restrictions on surface-disturbing activities are incorporated from Alternative C.

The following items summarize actions in the selected alternative:

1. Implement reclamation activities, including seeding, in the fall for section 21.
2. The installation of all wells and infrastructure in section 21, must be expediently stabilized in order to reduce the wind and water erosion and promote reclamation success. The operator will be required to stabilize any disturbed area within 30 days of the disturbance.
3. The following wells are removed from consideration under the proposed action:

Whiskey Drawn WDU	32-21	SWNE	21	47N	78W	WYW146890
Whiskey Drawn WDU	41-21	NENE	21	47N	78W	WYW146890
Whiskey Drawn WDU	21-21	NENW	21	47N	78W	WYW146890

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

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

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

It is in the public interest to approve these wells, as the leases are being drained of federal gas, resulting in a loss of revenue for the government. Furthermore, approval of 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.

The selected alternative incorporates appropriate local sage-grouse research and the best available science from across the species’ range in development of the attached conditions of approval.

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.

Approval of this alternative is in conformance with the *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 that document relative to adaptive management), and the Approved Resource Management Plan (RMP) for the Public Lands Administered by the Bureau of Land Management, Buffalo Field Office (BFO), April 2001

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 Whiskey Drawn Project.



**BUREAU OF LAND MANAGEMENT  
BUFFALO FIELD OFFICE  
ENVIRONMENTAL ASSESSMENT (EA)  
FOR  
Lance Oil & Gas Company, Inc.  
Whiskey Drawn POD  
PLAN OF DEVELOPMENT  
WY-070-EA09-039**

## **INTRODUCTION**

This site-specific analysis tiers into and incorporates by reference the information and analysis contained in the *Powder River Basin Oil and Gas Project Environmental Impact Statement and Proposed Resource Management Plan Amendment* (PRB FEIS), #WY-070-02-065 (approved April 30, 2003), pursuant to 40 CFR 1508.28 and 1502.21. This document is available for review at the BLM Buffalo Field Office. 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 Lance Oil and Gas 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 Whiskey Drawn POD wells would return royalties to the federal Treasury as well as stimulate local economies.

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 agency's 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 Resource Management Plan (RMP) and the 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 and the PRB FEIS, 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 for greater sage-grouse (sage-grouse) habitat 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 Whiskey Drawn POD does not occur within a Focus Area, but a portion of the project directly borders one. High quality sage-grouse nesting and winter habitat, as indicated by University of Montana sage-grouse habitat models and on-site verification, occur throughout the project area.

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

Four alternatives, A, B, C and D, 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 Whiskey Drawn Project as originally submitted to the BLM by Lance Oil & Gas Company, Inc., prior to any BLM review or modifications. The specific changes identified for the Whiskey Drawn POD are described in detail in Appendix A.

### **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 project modifications of the initial project proposal identified by BLM and the operator. At the onsites, all areas of proposed surface disturbance were inspected to insure that the project would meet BLM multiple use objectives to conserve natural resources while allowing for the extraction of Federal minerals. In some cases, access roads were re-routed, and well locations and pipelines were moved, modified, mitigated or dropped from further consideration to alleviate environmental impacts. Alternatives to the different aspects of the proposed action are always considered and applied as pre-approval changes, site specific mitigation, and/or conditions of approval (COAs), if they will alleviate environmental effects of the operator’s proposal.

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 Whiskey Drawn POD are described in detail in Appendix A.

**2.4. Alternative D – Sage-Grouse Emphasis**

Alternative D represents a modification of Alternative C based on the application of additional mitigating measures designed to reduce impacts to sage-grouse and sage-grouse habitat. Alternative D is the same as Alternative C with the addition of project modifications identified by BLM, guided by seven years of sage-grouse research in the project area and additional studies from across the species’ range. Alternative D 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.

In conjunction with project-level modifications, site-specific measures applied for specific wells and infrastructure would maintain open corridors for sage-grouse, provide contiguous habitat patches, and reduce disturbance in and adjacent to an active sage-grouse lek. This alternative incorporates mitigation designed around site-specific habitat characteristics to minimize habitat fragmentation and accelerate return to habitat effectiveness at reclamation.

The specific changes identified for the Whiskey Drawn POD are described in detail 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 December 20, 2007. Field inspections of the proposed Whiskey Drawn POD CBNG project were conducted on January 7, 2009, by:

<b>Name</b>	<b>Title</b>	<b>Agency</b>
Meleah Corey	NRS	BLM
Casey Friese	Hydrologist/Supervisory NRS	BLM
Courtney Frost	Wildlife Biologist	BLM
BJ Earle	Archeologist	BLM
Ted Hamersma	Civil Engineering Tech.	BLM
Ethan Janke	Permitting Agent	LOG (Anadarko)
Colt Rodeman	Layout/Permitting	LOG (Anadarko)
Joy Kennedy	Permitting Specialist	LOG (Anadarko)
Liz Hunter	Civil Engineer	LOG (Anadarko)
Tom Lohse	Land Representative	Land Representative

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

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

<b>Mandatory Item</b>	<b>Potentially Impacted</b>	<b>No Impact</b>	<b>Not Present On Site</b>	<b>BLM Evaluator</b>
Threatened and Endangered Species			X	Courtney Frost
Floodplains		X		Meleah Corey
Wilderness Values			X	Meleah Corey
ACECs			X	Meleah Corey
Water Resources		X		Casey Freise

<b>Mandatory Item</b>	<b>Potentially Impacted</b>	<b>No Impact</b>	<b>Not Present On Site</b>	<b>BLM Evaluator</b>
Air Quality	X			Meleah Corey
Cultural or Historical Values			X	BJ Earle
Prime or Unique Farmlands			X	Meleah Corey
Wild & Scenic Rivers			X	Meleah Corey
Wetland/Riparian		X		Meleah Corey
Native American Religious Concerns			X	BJ Earle
Hazardous Wastes or Solids		X		Meleah Corey
Invasive, Nonnative Species	X			Meleah Corey
Environmental Justice		X		Meleah Corey

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

The Whiskey Drawn project is located in Johnson County approximately 20 miles southeast of Buffalo WY. The project is located in typical northeast Wyoming river breaks country, adjacent to the Powder River. Both uplands and intermittent drainages are included in the area. Elevations range from 4100 feet to 4600 feet. The area is dissected with numerous draws and narrow ridges. Flat areas exist at the mouths of drainages where they run into Fourmile Creek and the Powder River.

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

#### **3.2.1. Soils**

Soils have developed in alluvium and residuum derived from the Wasatch Formation. Lithology consists of light to dark yellow and tan siltstone and sandstones with minor coal seams. Soils have surface and subsurface textures of silt loam and fine sandy loam. Soil depths vary from deep on lesser slopes to shallow and very shallow on steeper slopes. Soils are generally productive, though varies with texture, slope and other characteristics. Soils differ with topographic location, slope and elevation. Topsoil depths to be salvaged for reclamation range from 0 to 4 inches on ridges to 8+ inches in bottomland. Erosion potential varies from moderate to severe depending on the soil type, vegetative cover and slope.

Soils within the project area were identified from the *North Johnson County Survey Area, Wyoming (WY719)*. The soil survey was performed by the Natural Resource Conservation Service according to National Cooperative Soil Survey standards. The BLM used county soil survey information to predict soil behavior, limitations, or suitability for a given activity or action. The agency's long term goal for soil resource management is to maintain, improve, or restore soil health and productivity, and to prevent or minimize soil erosion and compaction. Soil management objectives are to ensure that adequate soil protection is consistent with the resource capabilities. The soil erosion hazard is predominately moderate with a severe hazard in areas of steep slopes. Many of the soils and landforms of this area present distinct challenges for development, and eventual site reclamation. The proponent planned their project and the BLM made further recommendations on the onsite to avoid those areas where possible, but remaining disturbances within these areas require the programmatic/standard COA's be complimented with a site specific performance based stabilization/reclamation COA. Overcoming the unfavorable soil/site properties or limitations requires special design, extra maintenance, and costly alteration.

The map unit symbols within this project area were filtered and map units representing 3.0% or greater in extent within the pod boundary are displayed. 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 Symbol	Map Unit Name	Acres	Percent
708	Theedle-Kishona loams, 6 to 20 percent slopes	1305.9	51%
684	Hiland-Bowbac fine sandy loams, 6 to 15 percent slopes	642.7	25%
640	Cushman-Shingle loams, 6 to 15 percent slopes	328.2	13%
632	Cambria-Kishona loams, 6 to 15 percent slopes	76.9	3%
707	Samday-Shingle-Badland complex, 10 to 45 percent slopes	69.7	3%

For more detailed soil information, see the NRCS Soil Survey 719 – North Johnson County. Additional site specific soil information is included in the Ecological Site interpretations.

### 3.2.2. Vegetation

Ecological Site Descriptions are used to provide site and vegetation information needed for resource identification, management and reclamation recommendations. To determine the appropriate Ecological Sites for the area contained within this proposed action, BLM specialists analyzed data from onsite field reconnaissance and Natural Resources Conservation Service published soil survey soils information. The 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 Symbol	Ecological Site
708	Loamy 10-14" Northern Plains
684	Shallow Clayey 10-14" Northern Plains
640	Loamy 10-14" Northern Plains
632	Loamy 10-14" Northern Plains
707	Loamy 10-14" Northern Plains

Dominant Ecological Sites and Plant Communities identified in this POD and its infrastructure are Loamy and Shallow Clayey within the 10-14" Northern Plains precipitation zone.

*Loamy Sites* occur on gently undulating to rolling landforms which include hill sides, alluvial fans, ridges and stream terraces. These soils are moderately deep to very deep (greater than 20" to bedrock), well drained soils that formed in alluvium and residuum derived from sandstone and shale. These soils have moderate permeability. The present plant community is Mixed Sagebrush/Grass. Wyoming big sagebrush is a significant component of this Mixed Sagebrush/Grass plant community. Cool-season mid-grasses make up the majority of the understory with the balance made up of short warm-season grasses, annual cool-season grass, and miscellaneous forbs. Dominant vegetation includes needleandthread, western wheatgrass, green needlegrass, blue grama, prairie junegrass and Sandberg bluegrass. Other grasses occurring on the state include Cusick's and Sandberg bluegrass, and prairie junegrass. Cheatgrass has invaded the site. Other vegetative species identified at onsite include: pricklypear and fringed sagewort.

*Shallow Clayey Sites* occur on nearly level to steep slopes on landforms which include hill sides, ridges and escarpments. The soils of this site are shallow (less than 20" to bedrock), well-drained soils that formed in alluvium or alluvium over residuum derived from unspecified shale. These soils have moderate to slow permeability. The bedrock is clay shale which is virtually impenetrable to plant roots. The present plant community is a Mixed Sagebrush/Grass.

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 Ecological Site Summary**

<b>Ecological Site</b>	<b>Acres</b>	<b>Percent</b>
Loamy 10-14" Northern Plains	1882.5	74%
Shallow Clayey 10-14" Northern Plains	642.7	25%
Lowland 10-14" Northern Plains	16.7	1%
Sandy 10-14" Northern Plains	13.0	1%

**3.2.3. Wetlands/Riparian**

There are existing wetland/riparian areas along Fourmile Creek, Red Draw, and the Powder River. These areas consist of cottonwood trees with limited riparian vegetation adjacent the stream channels. Fourmile Creek has had produced water discharged down the channel. This previous discharge has enhanced the riparian vegetation and scoured out the channel in certain areas. The Powder River floodplain has well established wetland/riparian species.

**3.2.4. Invasive Species**

State-listed noxious weeds and invasive/exotic plant infestations were discovered by a search of inventory maps and/or databases or during subsequent field investigation by the proposed project proponent and the BLM. Specific species of concern include Saltcedar, Russian knapweed, Scotch thistle, cocklebur, buffalo bur, whitetop, and Canada thistle.

Scotch thistle and salt cedar below the discharge of the Fourmile Creek East treatment facility were found during the onsite. The operator has developed an Integrated Weed and Pest Management Plan for education and control of noxious weeds in this project.

**3.3. Wildlife**

A habitat assessment and wildlife inventory surveys were performed by Big Horn Environmental Consultants (BHEC) in 2007 and 2008 (BHEC 2007, 2008). BHEC performed surveys for bald eagle roosts and nests, other raptor nests, greater sage-grouse, sharp-tailed grouse, black-tailed prairie dog colonies, and breeding mountain plovers. 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](http://www.blm.gov/wy/st/en/field_offices/Buffalo/wildlife.html)).

A BLM biologist conducted field visits on December 12, 2008, and January 7, 2009. During that time, the biologist verified the wildlife survey information, evaluated impacts to wildlife resources, and provided project modification recommendations where wildlife issues arose.

**3.3.1. Big Game**

Big game species expected to occur within the Whiskey Drawn project area include pronghorn and mule deer. WGFD data indicate that the project area contains yearlong range for pronghorn 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. 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.

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.

### 3.3.2. Aquatics

The project area is drained by Fourmile Creek and Red Draw, which are tributaries of the Upper Powder River subbasin, one of eight subbasins that make up the Powder River Basin.

Aquatic invertebrate communities, which can be indicators of the quality of aquatic environments (Peterson 1990), are discussed in the PRB FEIS (pp. 3-153 to 3-154). 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).

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, 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	

Wyoming Native Species Status	Species	Wyoming BLM Sensitive
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. Bullsnares 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 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 and shrub-steppe. 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 (WY 2009). Species that may occur in these vegetation types, 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 Wyoming Bird Conservation Plan Species within Project Area**

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). This 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, red-tailed hawks, great-horned owls, and western burrowing owls. Western burrowing owl, which is a Wyoming BLM sensitive species, 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 WGFYD 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 red-tailed hawks and great-horned owls are discussed in the PRB FEIS (pp. 3-146 to 3-148).

Nineteen raptor nest sites were identified by BHEC (BHEC 2007, 2008) and BLM within 0.5 mile of the project boundary. These are listed in the table below. With the exception of the western burrowing owl nest, all raptor nests are located in live or dead cottonwood trees. Of the nests listed, six were active in 2008. One was active with golden eagles, three were active with red-tailed hawks, and one was active with great-horned owls. Two of the red-tailed hawk nests failed in 2008. Nest 2340 was active with golden eagles between 2003 and 2006 but was not active in 2007 or 2008. Nest 2331 has been active with red-tailed hawks since 2004.

**Table 3.8 Documented Raptor Nests within the Whiskey Drawn POD Project Area**

BLM ID	UTMs	Legal	Substrate <sup>1</sup>	Year	Condition	Status <sup>2</sup>	Species <sup>3</sup>
10	404992E 4880339N	S01 T47N R78W	CTL	2008	Excellent	ACTI	GOEA
				2007	Fair	INAC	n/a
2331	401766E 4880149N	S03 T47N R78W	CTL	2008	Excellent	ACTI	RETA
				2007	Good	ACTI	RETA
				2006	Good	ACTI	RETA
				2005	Good	ACTI	RETA
				2004	Good	ACTI	RETA
				2003	Unknown	INAC	n/a

BLM ID	UTMs	Legal	Substrate <sup>1</sup>	Year	Condition	Status <sup>2</sup>	Species <sup>3</sup>
				2000	Unknown	ACTI	RETA
2332	401766E 4880149N	S03 T47N R78W	CTL	2007	Fair	INAC	n/a
2340	405304E 4879839N	S12 T47N R78W	CTL	2008	Fair	INAC	n/a
				2007	Fair	INAC	n/a
				2006	Good	ACTI	GOEA
				2005	Good	ACTI	GOEA
				2004	Good	ACTI	GOEA
				2003	Good	ACTI	GOEA
2341	405402E 4880240N	S01 T47N R78W	CTD	2008	Good	INAC	n/a
				2007	Good	ACTI	GOEA
				2006	Good	INAC	n/a
				2004	Unknown	INAC	n/a
				2003	Unknown	INAC	n/a
3260	401299E 4883025N	S33 T48N R78W	CTL	2008	Good	INAC	n/a
				2007	Good	INAC	n/a
				2006	Good	INAC	n/a
				2005	Excellent	INAC	n/a
				2004	Fair	INAC	n/a
3264	399016E 4881922N	S32 T48N R78W	CTL	2008	Poor	INAC	n/a
				2007	Poor	INAC	n/a
				2006	Poor	INAC	n/a
				2005	Unknown	INAC	n/a
				2004	Poor	INAC	n/a
3561	401299E 4883025N	S33 T48N R78W	CTL	2008	Good	INAC	n/a
				2007	Good	INAC	n/a
4614	405783E 4879095N	S12 T47N R78W	CTL	2008	Excellent	INAC	n/a
				2007	Excellent	INAC	n/a
				2006	Good	INAC	n/a
5162	398280E 4874892N	S29 T47N R78W	CTL	2008	Poor	INAC	n/a
				2007	Poor	INAC	n/a
5205	401262E 4882407N	S33 T48N R78W	CTL	2008	Good	ACTF	RETA
				2007	Good	ACTF	RETA
5208	405515E 4878109N	S13 T47N R78W	CTL	2008	Good	ACTI	GRHO
				2007	Good	ACTI	RETA
				2006	Good	ACTI	RETA
5597	405283E 4880073N	S12 T47N R78W	CTD	2006	Gone	INAC	n/a
5601	405209E 4880009N	S12 T47N R78W	CTL	2006	Good	ACTF	GOEA
5802	399977E 4881869N	S33 T48N R78W	CTL	2008	Good	ACTF	RETA

BLM ID	UTMs	Legal	Substrate <sup>1</sup>	Year	Condition	Status <sup>2</sup>	Species <sup>3</sup>
5803	401199E 4882477N	S33 T48N R78W	CTD	2008	Fair	INAC	n/a
5804	401905E 4882801N	S34 T48N R78W	CTL	2008	Good	INAC	n/a
6041	400311E 4875200N	S28 T47N R78W	ABB	2008	Unknown	INAC	n/a
				2006	Unknown	ACTI	BUOW
6160	401381E 4880470N	S04 T47N R78W	CTD	2005	Remnants	INAC	n/a
Notes:							
1 ABB = Abandoned burrow; CTD = Cottonwood - dead; CTL = Cottonwood - live							
2 ACTF = Active failed; ACTI = Active; INAC = Inactive							
3 BUOW = Burrowing Owl; GOEA = Golden Eagle; GRHO = Great-horned Owl; RETA = Red-tailed Hawk							

### 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 Whiskey Drawn project area have limited potential to support sharp-tailed grouse. The mosaic of grasslands and sagebrush-grasslands that occurs in the area may provide nesting and brood-rearing 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 six miles to the northeast of the project area. No plains sharp-tailed grouse were noted in the project area by BHEC or by the BLM biologist.

### 3.3.6. Sagebrush Obligates

Sagebrush communities are the most common habitat type in the project area. Large-scale development of energy reserves underlying sagebrush ecosystems is placing sagebrush communities and wildlife increasingly at risk (WY 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

Within the BLM BFO there are two species listed as Threatened or Endangered under the Endangered Species Act: the black-footed ferret and the Ute ladies'-tresses orchid.

#### 3.3.7.1. Black-footed Ferret

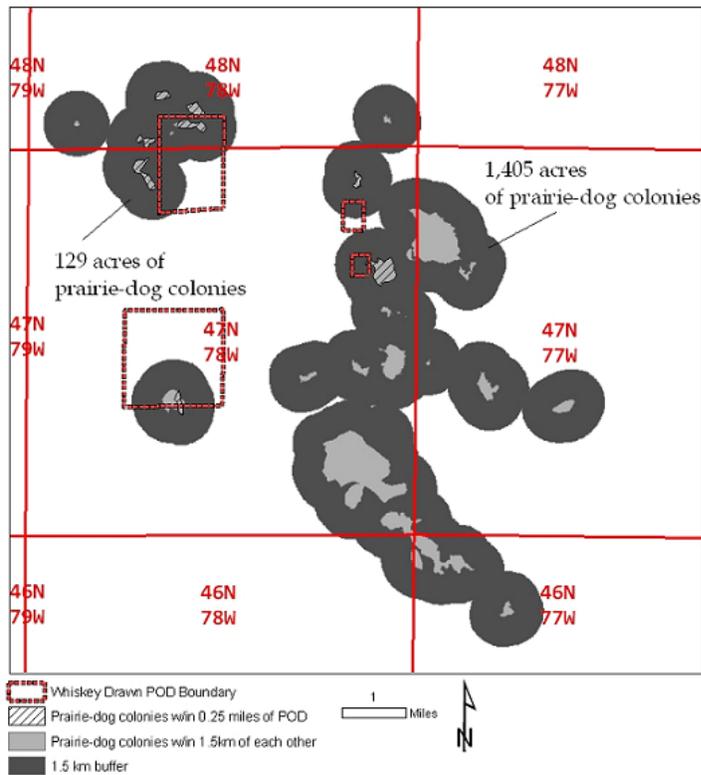
The black-footed ferret is listed as Endangered under the ESA. The affected environment for black-footed ferrets is discussed in the PRB FEIS on pg. 3-175.

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). Black-tailed prairie dog colonies exist within 0.25 miles of the project boundary in S32, S33 T48N R78W and S01, S05, S12, S21, S28 T47N R78W. These colonies have been mapped by several different consultants and WGFD over a range of years. Most recently, BHEC reported eight active colonies in 2008 within 0.25 miles of the project boundary. The individual mapped colonies range in size from 1.6 acres to 76.8 acres. Where overlap occurs and colonies are combined, they range in size from 1.6 to 77.0 acres and cover a total area of approximately 270 acres. Two distinct groups of mapped prairie dog colonies occur within 1.5 km of each other, beginning with colonies in the project area. These groups of colonies cover areas approximately 1,405 acres and 129 acres in size, respectively. Because there is a group of black-tailed prairie dog colonies separated by less than 1.5 km and totaling greater than 1,000 acres that intersects the project area, black-footed ferret habitat is present within the Whiskey Drawn project area.

In 2004, WGFD 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 Whiskey Drawn project area is located approximately 13 miles from the Pleasantdale complex, the nearest potential reintroduction area.

**Figure 1. Prairie-dog colonies within 1.5 km of each other that intersect the Whiskey Drawn POD project area**



### 3.3.7.2. 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.

There are no proposed actions associated with the Whiskey Drawn POD that have not been analyzed under NEPA that will impact perennial systems. Water discharge will occur at outfalls already analyzed and approved for the Whiskey Draw POD, Whiskey Draw Additions I POD, and Second Addendum to the Whiskey Draw POD.

### **3.3.8. 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 Whiskey Drawn POD 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 Whiskey Drawn POD. 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.

#### **3.3.8.1. 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 five existing on-channel impoundments that were approved with the Whiskey Draw POD, Whiskey Draw Additions I POD, and Second Addendum to the Whiskey Draw POD.

#### **3.3.8.2. 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.

#### **3.3.8.3. 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 flow into the Powder River, where this species is known to occur. Suitable habitat for the sturgeon chub will be impacted by the Whiskey Drawn POD.

#### **3.3.8.4. 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.

#### **3.3.8.5. 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. Suitable habitat is present in the project area in the shortgrass prairie that occurs in S33 T48N R78W and S04 T47N R78W, and this species may occur.

#### **3.3.8.6. 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, BLM shall continue to comply with 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 Whiskey Drawn POD. Large galleries of mature cottonwoods are common along the Powder River and Fourmile Creek. Numerous prairie dog colonies (described in Section 3.3.7.1) and nearby sheep operations provide reliable prey sources. Bald eagles were observed at three locations along Fourmile Creek within one mile of the project area in 2007. Another observation occurred in the same area in 2003. Thirty observations of bald eagles were reported along the eastern half of S12 T47N R78W during the winters of 2006-2007 and 2007-2008. In the PRB Oil & Gas Project BO, USFWS defined bald eagle winter roosting habitat as any mature

conifer or deciduous trees where bald eagles consistently perch. A consistent use roost was defined as a location where bald eagles are observed on more than one occasion (at least one week apart) within a single winter or over multiple winters. Based on this definition, BLM has designated the location in S12 a consistent use bald eagle winter roost.

#### **3.3.8.7. 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.

#### **3.3.8.8. 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. The nearest known ferruginous hawk nest is approximately four miles to the west of the project area. BLM has two years of survey results for this nest. It was active in 2006 and inactive in 2007. Ferruginous hawk nests are located throughout the Powder River Basin. Foraging habitat and prey is available throughout the project area, and ferruginous hawks may occur.

#### **3.3.8.9. 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 January 12<sup>th</sup>, 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 A). 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 WGF 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 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 the PRB FEIS Record of Decision.
- 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 A).
- 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.

The 2003 PRB EIS significance threshold and population viability assumptions are based on the analysis that sufficient functioning habitat for sage grouse will remain to support population viability within the project area. The six areas identified as BFO sage-grouse Focus Areas assume that sufficient amounts of sage-grouse habitat remains unfragmented by energy or other man-made infrastructure. It is also assumed that the fragmented portions in the energy areas of sage-grouse habitat provide for the necessary breeding, feeding, and sheltering components to sustain sage-grouse habitat connectivity between the six Focus Areas.

Suitable sage-grouse habitat is present in the Whiskey Drawn project area. Continuous stands of sparsely to moderately dense sagebrush are present in patches throughout. Sections 04 and 21 T47N R78W contain the largest and most contiguous stands of sagebrush on moderate topography. Stands of sagebrush located near moist draws throughout the project area provide brood rearing and late summer habitat. Sage-grouse habitat models indicate that approximately 84% of the project area contains high quality sage-grouse nesting habitat (Doherty 2008) and approximately 95% of the project area contains high quality sage-grouse wintering habitat (Doherty et al. 2007). According to a statewide population density model that was developed based on lek attendance (Doherty 2008), the portions of the project area in S16, S17, S20, and S21 are entirely contained in an area, that when combined with other similar areas, is predicted to contain 80% of the state's sage-grouse population. The portions of the project in SW S04 and SWNW S04 T47N R78W, when combined with other similar areas, are predicted to contain 85% of the state's sage-grouse population. Telemetry data show that sage-grouse have been located within the project area in S S33 T48N R78W; N S04 T47N R78W; and S16, S20, and S21 T47N R78W.

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 five sage-grouse leks occur within four miles of the project area. These five lek sites are identified in 3.9.

**Table 3.9 Sage-grouse leks within 4 miles of the Whiskey Drawn project area**

Lek Name	Legal Location	Distance from Project Area (mi)	Occupied?
Red Draw	S21 T47N R78W	0	Yes
Fourmile Rd	S25 T47N R79W	2.2	Yes
Curtis Draw	S04 T47N R78W	2.3	Yes
Indian Creek III	S07 T48N R78W	3.7	Yes
Indian Creek I	S10 T48N R78W	3.9	Yes

**3.3.8.10. 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.

**3.3.8.11. 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 present throughout the project area, and the species may occur.

**3.3.8.12. 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.

Suitable mountain plover habitat is present within 0.25 miles of the project area. The prairie dog colonies in S S33 T48N R78W are located on flat terrain with no surrounding trees. Vegetation was less than four inches in height on the date of the onsite inspection. Mountain plover individuals and nests have been observed on the prairie dog colonies located in S S12 T47N R48W.

#### **3.3.8.13. 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.

#### **3.3.8.14. 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.

#### **3.3.8.15. 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.

Although sage sparrows prefer to nest in areas characterized by dense, tall shrub cover, the areas of moderately dense shrub cover and smaller stature shrubs that occur throughout the project area may be selected for nesting habitat.

#### **3.3.8.16. 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.

The project area contains marginal habitat for sage thrashers, due to the presence of only moderately dense sagebrush stands. Although they prefer dense stands of shrubs for nesting, sage thrashers may occur throughout the project area.

#### **3.3.8.17. 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 that trumpeter swans prefer. This species is not suspected to occur in the project area.

#### **3.3.8.18. Western Burrowing Owl**

The affected environment for western burrowing owl (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 one burrowing owl nest has been reported within 0.25 mile of the Whiskey Drawn project area. This nest was located in NENE S28 T47N R78W by Greystone Environmental Consultants during surveys for the Falxa Red Draw POD (Greystone 2006) and was active in 2006. BHEC also surveyed for burrowing owls but did not find any additional nest locations (BHEC 2007, BHEC 2008). Prairie dog colonies are present within 0.25 miles of the project area in S33 T48N R78W, S12 T47N R78W, and this species may occur in those areas.

#### **3.3.8.19. 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.

#### **3.3.8.20. 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, although the proposed activities in S12 T47N R78W are located less than a mile from the Powder River riparian corridor, which may support yellow-billed cuckoos.

#### **3.3.8.21. 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 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 Whiskey Drawn project, but there are several colonies located within 0.25 miles of the project area, as discussed in Section 3.3.7.1.

#### **3.3.8.22. 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. Fringed myotis may occur in the project area, due to availability of roost sites and its proximity to the Powder River and Fourmile Creek.

#### **3.3.8.23. 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 of its proximity to the Powder River and the potential for available roost sites, long-eared myotis may occur in the Whiskey Drawn project area.

#### **3.3.8.24. 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.

#### **3.3.8.25. 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 because of its proximity to potential roost sites and a foraging area along the Powder River.

#### **3.3.8.26. Porter's Sagebrush**

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

#### **3.3.8.27. 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 Whiskey Drawn 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](http://www.westnilemaps.usgs.gov) are summarized below. 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	Veterinary Cases	Bird Cases
	Human Cases	PRB	PRB	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 and its tributaries. The tributaries include, Fourmile Creek, Red Draw, and Hupp Draw. The entire lengths of these watersheds consist of moderately steep terrain with slopes at times exceeding 20%, while the majority of the drainages have slopes between 8 and 12%. The main stems and most tributaries possess sinuous, well-vegetated channel bottoms that exhibit a continuous pool and riffle sequence in various stages of development. The tributaries receiving produced water have well-defined channels which avoid sheet flow in broad bottomed drainages.

#### **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 28 registered stock and domestic water wells within ½ mile of a federal CBNG producing well in the POD with depths ranging from 85 to 500 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 CBNG impoundments, and;
- Shallow groundwater wells would be installed and monitored where necessary.

### **3.6. Surface Water**

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

The operator did not find any springs in the POD area and there were none identified from a map search or at the onsite.

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

### **3.7. 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 12 proposed wells in the Whiskey Drawn POD 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 Whiskey Drawn POD 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 Whiskey Drawn 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 Whiskey Drawn 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 Whiskey Drawn project would also have the secondary effect of increased demand for goods and services from nearby communities, primarily those of Gillette and Wright.

### **3.8. Cultural**

Class III cultural resource inventories were performed for the Whiskey Drawn POD prior to on-the-ground project work (BFO project no. 70050179, 70040057, 70050093, and 0080073A). The class III cultural resource inventories followed the Archeology and Historic Preservation, Secretary of the Interior's Standards and Guidelines (48CFR190) and the *Wyoming State Historic Preservation Office Format, Guidelines, and Standards for Class II and III Reports*. BJ Earle, BLM Archaeologist, reviewed the reports for technical adequacy and compliance with Bureau of Land Management (BLM) standards, and determined them to be adequate. The following resources are located in or near the project area.

**Table 3.11 Cultural Resources Inventory Results**

Site Number	Site Type	National Register Eligibility
48 JO 2161	Prehistoric Site	Not eligible
48 CA 2162	Historic site	Not eligible
48 CA 2963	Historic trail	Not eligible

**3.9. 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 Alternatives C and D as preferred alternatives. The changes have reduced impacts to the environment which will result from this action. 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.

The operator will follow the guidance provided in the Wyoming Policy on Reclamation (IM WY-90-231). 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.

For a detailed record of surface disturbance associated with the Whiskey Drawn POD, see table 2.5. Impacts to vegetation and soils from surface disturbance will be reduced by following the operator’s plans and BLM applied mitigation. Of the 11 proposed well locations, 4 can be drilled without a well pad being constructed (1 of these is on a reclaimed staging area), and 4 will require a constructed slot. Surface disturbance associated with the drilling of the 4 wells without constructed pads would involve digging-out of rig wheel wells (for leveling drill rig on minor slopes), reserve pit construction, and compaction from vehicles driving/parking at the drill site.

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

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

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**

The water management facilities have already been analyzed and approved. For impacts discussed refer to the Whiskey Draw Environmental Assessment #WY-070-04-201 and the Whiskey Draw Unit 1 Additions Environmental Assessment WY-070-05-261. No additional impacts are anticipated.

#### **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):

- Cultural  
Methods of control and prevention are outlined in the IPMP such as re-seeding, mulching, vehicle and equipment maintenance, and surface disturbance.
- Physical  
Methods of control and prevention are outlined in the IPMP such as mowing and hand pulling weeds.
- Biological  
Methods of control and prevention are outlined in the IPMP such as domestic animal use and biological control agents.
- Chemical  
Methods of control and prevention are outlined in the IPMP such as use of herbicides.
- Education  
Methods of control and prevention are outlined in the IPMP such as weed education awareness programs, identifying weeds found, and reporting weed infestation.

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 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.

No additional mitigation measures are required.

#### **4.1.5. Wildlife**

##### **4.1.5.1. Big Game**

##### **4.1.5.1.1. 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 for mule deer and greater than five wells per square mile for pronghorn and that avoidance zones around mineral facilities overlap, creating contiguous avoidance areas (WGFD 2004). A multi-year study on the Pinedale Anticline suggests not only do mule deer avoid mineral activities, but after three years of drilling activity, the deer do not become accustomed to the disturbance (Madson 2005).

Big game animals are expected to return to the project area following construction; however, populations will likely be lower than prior to project implementation, 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.

#### **4.1.5.1.2. Big Game 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**

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

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

Produced water will be stored, reinjected, and/or treated and piped to the Powder River and/or Fourmile Creek at outfalls previously approved in the Whiskey Draw POD, Whiskey Draw Additions 1 POD, and Second Addendum to the Whiskey Draw POD.

Because the Whiskey Drawn POD does not include any changes to existing or approved water management, no additional impacts to aquatic communities are expected to occur as a result of implementation of the Whiskey Drawn POD.

##### **4.1.5.2.2. Aquatics Cumulative Effects**

The cumulative effects associated with Alternative C and D 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**

##### **4.1.5.3.1. 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).

Disturbance of habitat within the project area is likely to impact migratory birds. Native habitats will be lost directly with the construction of wells, roads, and pipelines. Reclamation and other activities that occur in the spring may be detrimental to migratory bird survival. Prompt re-vegetation of short-term disturbance areas should reduce habitat loss impacts. Activities will likely displace migratory birds farther than the immediate area of physical disturbance. Drilling and construction noise can be troublesome for songbirds by interfering with the males' ability to attract mates and defend territory, and the ability to recognize calls from conspecifics (BLM 2003).

Habitat fragmentation will result in more than just a quantitative loss in the total area of habitat available; the remaining habitat area will also be qualitatively altered (Temple and Wilcox 1986). Ingelfinger (2004) identified that the density of breeding Brewer's sparrows declined by 36% and breeding sage sparrows declined by 57% within 100 m of dirt roads within a natural gas field. 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.

Those species that are edge-sensitive will be displaced further away from vegetative edges due to increased human activity, causing otherwise suitable habitat to be abandoned. If the interior habitat is at carrying capacity, then birds displaced from the edges will have no place to relocate. One consequence of habitat fragmentation is a geometric increase in the proportion of the remaining habitat that is near edges (Temple 1986). In severely fragmented habitats, all of the remaining habitat may be so close to edges that no interior habitat remains (Temple and Cary 1988). Over time, this leads to a loss of interior habitat species in favor of edge habitat species. Other migratory bird species that utilize the disturbed areas for nesting may be disrupted by the human activity, and nests may be destroyed by equipment.

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.

#### **4.1.5.3.2. Migratory Birds Cumulative Effects**

The cumulative effects associated with Alternative C and D 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**

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

Human activities in close proximity to active raptor nests may interfere with nest productivity. Romin and Muck (1999) indicate that activities within 0.5 miles of a nest are prone to cause adverse impacts to nesting raptors. If mineral activities occur during nesting, they could be sufficient to cause adult birds to remain away from the nest and their chicks for the duration of the activities. This absence can lead to 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 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. Well 24-33 was originally proposed 0.1 miles to the east of nest 5802 and directly within line-of-sight, overlooking the nest. To reduce visual impacts to this nest, the well was moved to the other side of an adjacent ridgeline, thereby placing it out of line-of-sight of the nest but still within 0.25 miles. This move will also minimize noise disturbance associated with construction and maintenance, as the topography will create a natural sound barrier between the well and the nest. The access road was also moved, which placed traffic out of line-of-sight of the nest from the well location all the way to well 23-33. The access road to well 23-33 was originally in line-of-sight of nest 5802, but by moving well 24-33, the access road to well 23-33 was also moved on the other side of a ridgeline and out of line-of-sight of the nest. Placement of these wells at the new locations will reduce impacts associated with both visual disturbance and noise disturbance.

**Table 4.1 Proposed and existing infrastructure within 0.5 mile of documented raptor nests within the Whiskey Drawn POD project area**

BLM ID	Infrastructure
10	<ul style="list-style-type: none"> <li>• Main travel road</li> <li>• Well 11-12</li> <li>• 1 proposed template road and utility corridor</li> </ul>
2331	<ul style="list-style-type: none"> <li>• 1 proposed template road and utility corridor</li> <li>• Main travel road</li> </ul>
2332	<ul style="list-style-type: none"> <li>• 1 proposed template road and utility corridor</li> <li>• Main travel road</li> </ul>
2340	<ul style="list-style-type: none"> <li>• Well 11-12</li> <li>• 1 proposed template road and utility corridor</li> <li>• Main travel road</li> </ul>
2341	<ul style="list-style-type: none"> <li>• 1 proposed template road and utility corridor</li> <li>• Main travel road</li> </ul>
3260 <sup>1</sup>	<ul style="list-style-type: none"> <li>• Intersects POD boundary, but no infrastructure is proposed within 0.5 mile</li> </ul>
3264	<ul style="list-style-type: none"> <li>• Intersects POD boundary, but no infrastructure is proposed within 0.5 mile</li> </ul>
3561	<ul style="list-style-type: none"> <li>• Intersects POD boundary, but no infrastructure is proposed within 0.5 mile</li> </ul>
4614	<ul style="list-style-type: none"> <li>• Intersects POD boundary, but no infrastructure is proposed within 0.5 mile</li> </ul>
5162	<ul style="list-style-type: none"> <li>• Intersects POD boundary, but no infrastructure is proposed within 0.5 mile</li> </ul>
5205	<ul style="list-style-type: none"> <li>• Intersects POD boundary, but no infrastructure is proposed within 0.5 mile</li> </ul>
5208	<ul style="list-style-type: none"> <li>• Main travel road</li> </ul>
5597	<ul style="list-style-type: none"> <li>• Well 11-12</li> <li>• 1 proposed template road and utility corridor</li> <li>• Main travel road</li> </ul>
5601	<ul style="list-style-type: none"> <li>• Well 11-12</li> <li>• 1 proposed template road and utility corridor</li> <li>• Main travel road</li> </ul>
5802	<ul style="list-style-type: none"> <li>• Three wells (23-33, 24-33, 34-33)</li> <li>• 3 segments of proposed template roads and utility corridors</li> </ul>
5803	<ul style="list-style-type: none"> <li>• Intersects POD boundary, but no infrastructure is proposed within 0.5 mile</li> </ul>
5804	<ul style="list-style-type: none"> <li>• Intersects POD boundary, but no infrastructure is proposed within 0.5 mile</li> </ul>
6041	<ul style="list-style-type: none"> <li>• No infrastructure proposed within 0.25 miles</li> </ul>
6160	<ul style="list-style-type: none"> <li>• 1 proposed template road and utility corridor</li> <li>• Main travel road</li> </ul>

Use of nest 10 will likely continue to occur, because traffic associated with the Whiskey Drawn project will not increase to levels greater than existing levels on the main access road to the oil and gas development already in the area. The golden eagles that occupied this nest in 2008 are likely accustomed to the disturbance associated with this main travel road.

Nest 6160 was discovered in 2008, in remnant condition, and was inactive that year. This nest may already have been abandoned as a result of increased activities associated with existing development in the area. The Whiskey Drawn project will likely reinforce the negative selection of this nest.

Nests 2331 and 2332 may continue to be used by raptors. Nest 2331 is in close proximity (<0.25 mi) to an existing well, and has been active since 2004. The additional disturbance associated with traffic on the main travel road and the proposed template road and utility corridor between 0.24 and 0.5 miles away is not likely to impact these nests because the additional traffic volume will be marginal. The pair that uses nest 2331 has demonstrated a high fidelity to this nest site and is likely to continue to select this nest.

Nest 2340 was active between 2003 and 2006. In 2007 two wells were drilled to the south of and within 0.5 miles of this nest. In 2007, nest 2341 was active with golden eagles. This may have been the same pair that had occupied nest 2340 in previous years, but the pair may have moved to the north to nest 2341 in 2007 because of the disturbance associated with plans to drill the two new wells to the south. In 2008, another well was drilled to the north of both nests, within 0.5 miles of nest 2340 and within 0.25 miles of nest 2341. Drilling of well 11-12 to the west and within 0.5 miles of nest 2340 may contribute to abandonment of these nests and the other golden eagles nests that fall within 0.5 miles of this disturbance (5597, 5601).

Nest 5208 will likely continue to be used by red-tailed hawks and great-horned owls, as the main access road crosses just within 0.5 miles of this nest, and both these species tend to be more tolerant of disturbance.

Additional direct and indirect impacts to raptors, from oil and gas development, are analyzed in the PRB FEIS (pp. 4-216 to 4-221).

#### **4.1.5.4.2. Raptors Cumulative Effects**

The cumulative effects associated with Alternatives C and D 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 because the project area has limited potential to support them.

#### **4.1.5.6. Sagebrush Obligates**

##### **4.1.5.6.1. Sagebrush Obligates Direct and Indirect Effects**

Construction and maintenance activities associated with development of the Whiskey Drawn 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).

##### **4.1.5.6.2. 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 1980a). In fragmented habitats, suitable habitat area remains only as remnants surrounded by unusable environments (Urban and Shugart 1984; Fahrig & 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
<i>Endangered</i>				
Black-footed ferret (Mustela nigripes)	Black-tailed prairie dog colonies or complexes > 1,000 acres.	NS	NE	Suitable habitat will not be directly impacted.
<i>Threatened</i>				
Ute ladies'-tresses orchid (Spiranthes diluvialis)	Riparian areas with permanent water	NP	NE	No suitable habitat present.
<p><b>Presence</b>  <b>K</b> - Known, documented observation within project area.  <b>S</b> - Habitat suitable and species suspected, to occur within the project area.  <b>NS</b> - Habitat suitable but species is not suspected to occur within the project area.  <b>NP</b> - Habitat not present and species unlikely to occur within the project area.</p> <p><b>Project Effects</b>  <b>LAA</b> - Likely to adversely affect  <b>NE</b> - No Effect  <b>NLAA</b> - May Affect, not likely to adversely affect individuals or habitat.</p>				

**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).

Suitable habitat is of sufficient size to support a black-footed ferret population. The project area is 13 miles from the Pleasantdale reintroduction area. No surveys for ferrets were required or conducted. It is extremely unlikely that any black-footed ferret is present in the project area. However, if any black-footed ferret became present, the proposed action would likely make portions of the project area unsuitable for ferret inhabitation because it would further fragment existing colonies and impose permanent barriers between prairie dog towns. Implementation of the proposed development will have no effect on the black-footed ferret because 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 Whiskey Drawn project area. Reservoir seepage may create suitable habitat if historically ephemeral drainages become perennial; however, no historic seed source is present within the 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. Threatened and Endangered Species Cumulative Effects**

The cumulative effects associated with Alternative C and D 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 Whiskey Drawn 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 and 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
<b>Amphibians</b>				
Northern leopard frog ( <i>Rana pipiens</i> )	Beaver ponds and cattail marshes from plains to montane zones.	S	MIIH	Additional water will affect existing waterways and alter habitat conditions.
Columbia spotted frog ( <i>Ranus pretiosa</i> )	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 pecies is not expected to occur .
<b>Fish</b>				
Sturgeon chub ( <i>Macrhybopsis gelida</i> )	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 ( <i>Oncoryhynchus clarki bouvieri</i> )	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 pecies is not expected to occur .
<b>Birds</b>				
Baird's sparrow ( <i>Ammodramus bairdii</i> )	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 ( <i>Haliaeetus leucocephalus</i> )	Mature forest cover often within one mile of large water body with reliable prey source nearby.	S	MIIH	Infrastructure within one mile of mature cottonwood galleries.
Brewer's sparrow ( <i>Spizella breweri</i> )	Sagebrush shrubland	S	MIIH	Sagebrush cover will be affected.
Ferruginous hawk ( <i>Buteo regalis</i> )	Basin-prairie shrub, grasslands, rock outcrops	S	MIIH	Nesting habitat will be impacted and human activities will increase
Greater sage-grouse ( <i>Centrocercus urophasianus</i> )	Basin-prairie shrub, mountain-foothill shrub	K	WIPV	Sagebrush cover will be affected.

Common Name (scientific name)	Habitat	Presence	Project Effects	Rationale
Loggerhead shrike ( <i>Lanius ludovicianus</i> )	Basin-prairie shrub, mountain-foothill shrub	S	MIIH	Sagebrush cover will be affected.
Long-billed curlew ( <i>Numenius americanus</i> )	Grasslands, plains, foothills, wet meadows	S	MIIH	Grasslands, meadows will be impacted
Mountain plover ( <i>Charadrius montanus</i> )	Short-grass prairie with slopes < 5%	K	MIIH	Infrastructure within 0.25 miles of prairie dog colonies and suitable habitat will be impacted.
Northern goshawk ( <i>Accipiter gentilis</i> )	Conifer and deciduous forests	NP	NI	No forest habitat present.
Peregrine falcon ( <i>Falco peregrinus</i> )	Cliffs	NP	NI	No nesting habitat present.
Sage sparrow ( <i>Amphispiza billneata</i> )	Basin-prairie shrub, mountain-foothill shrub	S	MIIH	Sagebrush cover will be affected.
Sage thrasher ( <i>Oreoscoptes montanus</i> )	Basin-prairie shrub, mountain-foothill shrub	S	MIIH	Sagebrush cover will be affected.
Trumpeter swan ( <i>Cygnus buccinator</i> )	Lakes, ponds, rivers	NP	NI	Habitat not present.
Western Burrowing owl ( <i>Athene cunicularia</i> )	Grasslands, basin-prairie shrub	S	MIIH	Infrastructure within 0.25 miles of prairie dog colonies, thus may impact nesting individuals or selection of nest sites.
White-faced ibis ( <i>Plegadis chihi</i> )	Marshes, wet meadows	NP	NI	Permanently wet meadows not present.
Yellow-billed cuckoo ( <i>Coccyzus americanus</i> )	Open woodlands, streamside willow and alder groves	NP	NI	Streamside habitats not present.
<b>Mammals</b>				
Black-tailed prairie dog ( <i>Cynomys ludovicianus</i> )	Prairie habitats with deep, firm soils and slopes less than 10 degrees.	K	MIIH	Infrastructure within 0.25 miles of prairie dog towns will be affected.
Fringed myotis ( <i>Myotis thysanodes</i> )	Conifer forests, woodland chaparral, caves and mines	S	MIIH	Habitat not present.
Long-eared myotis ( <i>Myotis evotis</i> )	Conifer and deciduous forest, caves and mines	S	MIIH	Habitat not present.
Spotted bat ( <i>Euderma maculatum</i> )	Cliffs over perennial water.	NP	NI	Cliffs & perennial water not present.

Common Name (scientific name)	Habitat	Presence	Project Effects	Rationale
Swift fox ( <i>Vulpes velox</i> )	Grasslands	NP	NI	Habitat not present.
Townsend's big-eared bat ( <i>Corynorhinus townsendii</i> )	Caves and mines.	S	MIIH	Habitat not present.
Plants				
Porter's sagebrush ( <i>Artemisia porteri</i> )	Sparsely vegetated badlands of ashy or tufaceous mudstone and clay slopes 5300-6500 ft.	NP	NI	Habitat not present.
William's wafer parsnip ( <i>Cymopterus williamsii</i> )	Open ridgetops and upper slopes with exposed limestone outcrops or rockslides, 6000-8300 ft.	NP	NI	Project area outside of species' range.
<p><b>Presence</b>  <b>K</b> - Known, documented observation within project area.  <b>S</b> - Habitat suitable and species suspected, to occur within the project area.  <b>NS</b> - Habitat suitable but species is not suspected to occur within the project area.  <b>NP</b> - Habitat not present and species unlikely to occur within the project area.</p> <p>Project Effects  <b>NI</b> - No Impact.  <b>MIIH</b> - 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.  <b>WIPV</b> - 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.  <b>BI</b> - Beneficial Impact</p>				

#### **4.1.5.8.1. Bald Eagle Direct and Indirect Effects**

Wells 23-33, 24-33, and 34-33 and a portion of the template road and utility corridor to access these wells are proposed within one mile of Fourmile Creek, which provides bald eagle roosting and nesting habitat. Well 11-12, the template road and utility corridor to access the well, and well 14-12 are all proposed within one mile of the Powder River, which also 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 no surface occupancy radius and a 1.0 mile radius timing limitation of all winter roosts (both communal and consistent use). None of the proposed activities associated with the project are within the no surface occupancy radius of the consistent-use bald eagle winter roost identified in S12 T47N R77W.

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.

#### **4.1.5.8.2. Black-tailed Prairie Dog Direct and Indirect Effects**

None of the proposed infrastructure will directly affect prairie dog colonies. Well 23-33 is proposed in close proximity to a prairie dog colony to the north (approximately 370 feet) and one to the west (approximately 180 feet). During construction of the wells, dispersal of prairie dogs may be affected. As prairie dog colonies grow in size, prairie dogs may disperse to new colonies, preferring to move into an existing colony or one that has been abandoned, rather than start a completely new colony (Hoogland 1995). Construction may cause increased stress on prairie dogs as they attempt to disperse and may result in avoidance of colonies in close proximity to such activities.

Additional impacts to black-tailed prairie dogs are discussed in the PRB FEIS on pg. 4-255 to 4-256.

#### **4.1.5.8.3. Greater Sage-grouse**

##### **4.1.5.8.3.1. Greater Sage-grouse Direct and Indirect Effects**

The proposed action 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 11 CBNG wells on 11 locations, 3.6 miles of new roads, 0.3 miles of new pipelines outside of roads, and increased vehicle traffic on established roads.

Well 34-21 was originally proposed approximately 0.3 miles from the Red Draw lek, but because of its proximity to the lek and its location in high quality sage-grouse nesting habitat, the well was removed from the project plan. The project plan also originally included a proposed pipeline that connected wells 43-21, 32-21, 41-21, and 21-22-4778 (Falxa POD). This proposed pipeline crossed and traveled along a drainage less than one mile from the Red Draw lek that provides late summer brood-rearing habitat. The wildlife biologist recommended that this pipeline be removed from the project plan to provide an unbroken corridor of late summer brood-rearing habitat approximately 1.8 miles long along the drainage within close proximity of the lek. The operator agreed to implement this measure, but a segment of pipeline connecting wells 32-21 and 41-21 remained in the project plan.

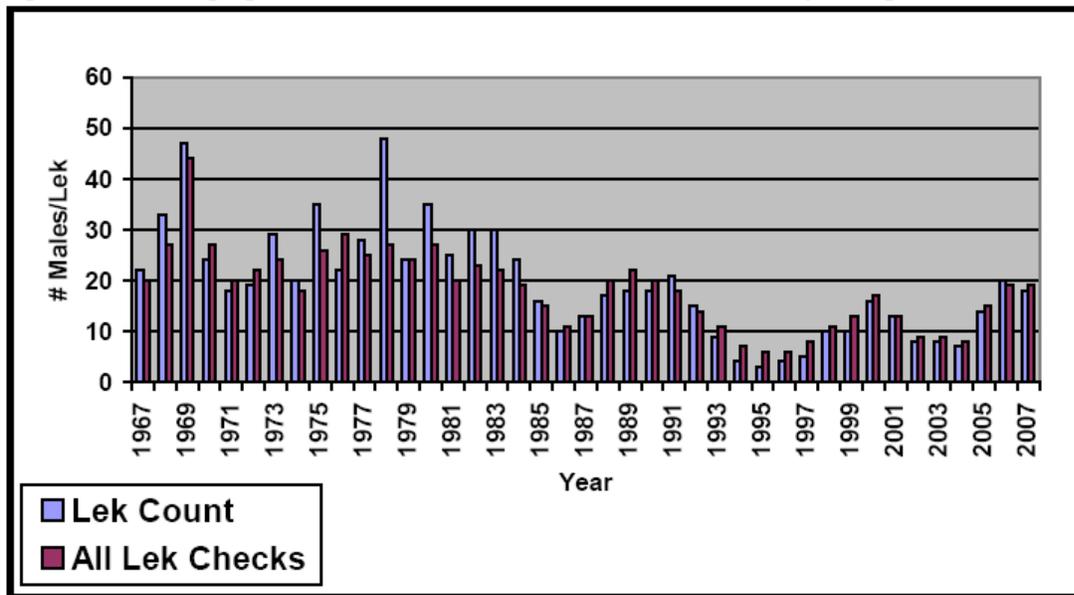
Direct and indirect impacts to sage-grouse are discussed in more detail in the PRB FEIS on pg. 4-257 to 4-273.

**4.1.5.8.3.1.1. 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 four sage-grouse leks that occur within four miles of the project boundary (listed in Table 3.9). 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 (Figure 2) (WGFD 2005). The figure illustrates a ten-year cycle of periodic highs and lows. Each subsequent population peak is lower than the previous peak. Long-term harvest trends are similar to that of lek attendance (WGFD 2005). 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 may experience similar declines.

**Figure 2 Male sage-grouse lek attendance within northeastern Wyoming, 1967-2007.**



Research has shown that declines in lek attendance are correlated with oil and gas development. 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).

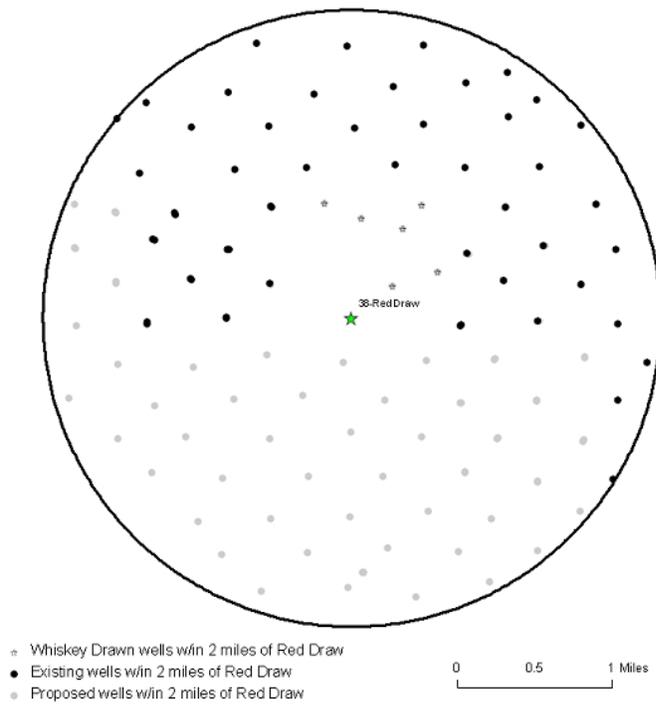
There are currently 801 wells (Wyoming Oil and Gas Conservation Commission [WOGCC] 07/2009) within the cumulative impact assessment area, an area of 160 square miles, which amounts to a density of

approximately 5.0 wells per square mile. Currently, there are approximately 290 proposed wells (Automated Fluid Minerals Support System [AFMSS] 07/2009) (including the 11 from this project) within four miles of the five leks. With the addition of the 279 proposed wells that are not associated with this proposed action, the well density within four miles of the leks increases to 6.8 wells/section. With approval of alternative C (11 proposed well locations) the well density remains the same at 6.8 wells/section, 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

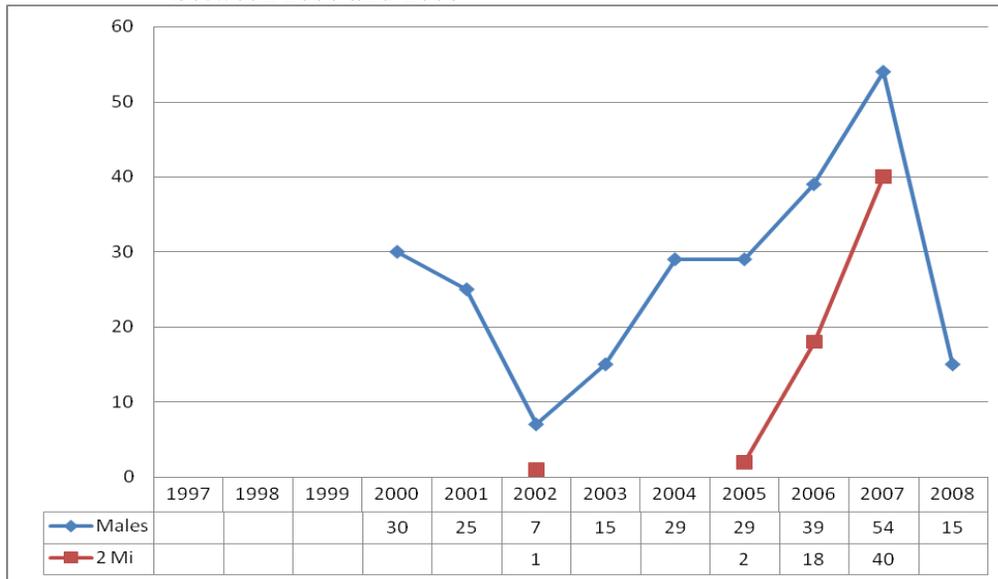
The Red Draw lek is the only sage-grouse lek within two miles of the project boundary. There are currently 53 wells within two miles of this lek, an area of 12.6 square miles, for a total well density of 4.2 wells per square mile, indicating that impacts to this lek as a result of existing oil and gas development are considered by WGFD to be extreme. Eighty-two additional wells are proposed within two miles of the Red Draw lek. Six are from this project. If only the six Whiskey Drawn wells were to be drilled, well density would increase by 12% to 4.7 wells per square mile within two miles of the Red Draw lek. With the addition of the 76 wells not associated with the Whiskey Drawn project, well density within two miles of this lek would increase to 10.7 wells per square mile, well above the threshold of 3 wells per square mile for extreme impacts.

**Figure 3 Existing and proposed wells within 2 miles of the Red Draw lek**



According to lek counts maintained by WGF, the number of males attending the Red Draw lek increased between 2002 and 2007 (see Figure 4). The WOGCC data shows that the number of wells drilled within two miles of the lek increased each year between 2005 and 2007. The peak number of males observed at the lek declined from 54 in 2007 to 15 in 2008. 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 4.4 Peak male attendance at the Red Draw lek and number of wells drilled each year between 2000 and 2008**



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 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). 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). 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).

To mitigate impacts of the proposed project, well 34-21 was removed from the project plan. This well was located in high-quality nesting habitat approximately 0.3 miles from the Red Draw lek. No overhead power will be installed for the project, which will limit additional vertical intrusion on the landscape. Approximately 0.9 miles of utility corridor were removed from the project plan to avoid brood-rearing habitat less than one mile from the Red Draw lek. Approximately 0.2 miles of template road and utility were relocated in S33 T48N R78W away from brood-rearing habitat and into less suitable nesting habitat. BLM will also implement a timing limitation on all activities within 0.6 miles of mapped 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.

The Powder River Basin Oil and Gas Project 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.

#### **4.1.5.8.4. Mountain Plover Direct and Indirect Effects**

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

Occupied mountain plover habitat is present within 0.25 miles of the project area. The project may impact mountain plovers.

Mountain plovers have been forced to seek habitat with similar qualities that may be poor quality habitat when loss or alteration of their natural breeding habitat (predominantly prairie dog colonies) occurs, such as heavily grazed land, burned fields, fallow agriculture lands, roads, oil and gas well pads and pipelines. These areas could become reproductive sinks. Adult mountain plovers may breed there, lay eggs and hatch chicks; however, the young may not reach fledging age due to the poor quality of the habitat. Recent analysis of the USWFS Breeding Bird Survey (BBS) data suggests that mountain plover populations have declined at an annual rate of 3.7 % over the last 30 years which represents a cumulative decline of 63% during the last 25 years (Knopf and Rupert 1995).

Use of roads and pipeline corridors by mountain plovers may increase their vulnerability to vehicle collision. Limiting travel speed to 25mph provides drivers an opportunity to notice and avoid mountain plovers and allows mountain plovers sufficient time to escape from approaching vehicles. Even if a nesting plover flushes in time, the nest likely would still be destroyed. To reduce impacts to nesting mountain plovers, the BLM BFO requires a 0.25 mile timing limitation for potential nesting habitat prior to nest survey completion and a 0.25 mile timing limitation for all occupied nesting habitat for the entire nesting season.

#### **4.1.5.8.5. Western Burrowing Owl Direct and Indirect Effects**

Use of roads and pipeline corridors may increase owl vulnerability to vehicle collision. CBNG infrastructure such as well houses, compressors, and nearby metering facilities may provide shelter and den sites for ground predators such as skunks and foxes.

The USFS Thunder Basin National Grasslands in Campbell County, WY, (who cooperated with the BLM in the creation of the PRB FEIS), recommends a 0.25 mile timing restriction buffer zone for burrowing owl nest locations during their nesting season (April 15 to August 31). Instruction Memorandum No. 2006-197, directs the field offices to “use the least restrictive stipulations that effectively accomplish the resource objectives or uses.” Alteration of the general raptor nest timing limitation (Feb 1 to July 31) to a more specific burrowing owl nesting season timing limitation will effectively reduce the vulnerability of owls to collision while shortening the timing restriction period to four and one half months from six and one half months and from 0.5 mile to 0.25 mile.

#### **4.1.5.8.6. Sensitive Species Cumulative Effects**

The cumulative effects associated with Alternative C are described in the PRB FEIS (pp. 4-257 to 4-273).

#### **4.1.6. 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.

#### **4.1.7. 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 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 20 gpm per well or 220 gpm (0.5 cfs or 355 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 is 88,046 acre-feet in 2009 (maximum production was estimated in 2007 at 163,521 acre-feet). As such, the volume of water resulting from the production of these wells is 0.4% of the total volume projected for 2009. This volume of produced water is also within the predicted parameters of the PRB FEIS.

##### **4.1.7.1. 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 88 gpm will infiltrate at or near the discharge points and impoundments (141 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. These numbers hold true if 100% of the water is discharged to the 5 existing and/or approved on-channel impoundments. The water management plan also proposes utilizing existing treatment facilities and an injection site located in Midwest, WY. If these other options are used, the above figures would be considerably less.

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 85 to 500 feet compared to 1,790 to 2,085 feet in the Big George Coal Zone. As mitigation, the operator has committed to offer water well agreements to holders of properly permitted domestic and stock wells within the circle of influence (½ mile of a federal CBNG producing well) of the proposed wells.”

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

The BLM has installed shallow groundwater monitoring wells at five impoundment locations in the PRB to assess ground-water quality changes due to infiltration of CBNG produced water. Water quality data has been sampled from these wells on a regular basis. Preliminary data from three sites show increasing TDS level as water infiltrates while two sites are not. On-going shallow groundwater monitoring at four other impoundment locations are less intensive and consist of batteries of between 4 and 6 wells. Preliminary data from two of these other sites are showing increasing TDS levels as water infiltrates, while two other sites are not.

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 Produced Water Impoundments” (June 14, 2004) which can be accessed on their website. This guidance document became effective August 1, 2004, and has been revised as the “Compliance Monitoring and Siting Requirements for Unlined Coalbed Methane Produced Water Impoundments” issued September, 2006. Almost 2000 impoundment sites have been investigated with over 2250 borings as of December, 2008, and of these, 286 impoundments met the criteria to provide compliance monitoring data if constructed and used for CBNG water containment. As of the 4th quarter 2008, 159 monitored impoundments are currently in submitting monitoring data, and 10 impoundments are exceeding groundwater class of use limits (Fischer, 2009). The BLM requires that operators comply with the DEQ compliance monitoring guidance document prior to discharge of federally-produced water into newly constructed or upgraded impoundments.

**4.1.7.1.1. 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 Member sands and coals (nearly 750 million acre-feet, from Table 3-5). All of the groundwater projected to be removed during reasonably foreseeable CBNG development and coal mining would represent less than 0.3 percent of the total recoverable groundwater in the Wasatch and Fort Union Formations within the PRB (nearly 1.4 billion acre-feet, from Table 3-5).” (PRB FEIS page 4-65). No additional mitigation is necessary.

**4.1.7.2. 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 4.4 Comparison of Regulated Water Quality Parameters to Predicted Water**

Predicted Values	TDS, mg/l	SAR	EC, µmhos/cm
Most Restrictive Proposed Limit –		2.0	1,000
Least Restrictive Proposed Limit		10.0	3,200
Primary Watershed at Arvada Gauging station			
Historic Data Average at Maximum Flow		4.76	1,797
Historic Data Average at Minimum Flow		7.83	3,400
WDEQ Quality Standards for Wyoming Groundwater (Chapter 8)			
Drinking Water (Class I)	500		
Agricultural Use (Class II)	2,000	8	
Livestock Use (Class III)	5,000		
Predicted Produced Water Quality			
Coal Zone – Big George	2,070	33.3	3,240

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 not 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 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 20 gpm is projected is to be produced from these 11 wells, for a total of 220 and gpm for the POD. See Table 4.5.

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

There are 7 existing discharge points for this project. Two of the 7 discharge points are associated with treatment facilities, while the remaining 5 are to the impoundments. 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, 5 existing impoundments would be utilized within the project area. These impoundments have all been approved in prior projects. Therefore, no new disturbance will be associated with this WMP. Existing impoundments will be upgraded and proposed impoundments will be constructed to meet the requirements of the WSEO, WDEQ and the needs of the operator and the landowner. All water management facilities were evaluated for compliance with best management practices during the onsite.

The PRB FEIS assumes that 15% of the impounded water will re-surface as channel flow (PRB FEIS pg 4-74). Consequently, the volume of water produced from these wells may result in the addition of 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 11 wells is anticipated to be a total of 220 gpm or 0.5 cfs to impoundments. Using an assumed conveyance loss of 20% (PRB FEIS pg 4-74) and full containment the produced water re-surfacing in the Upper Powder River 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. The operator may choose to treat and discharge 100% of the water directly to the Powder River. This would add 0.5 cfs to the Upper Powder River flows, or 0.07% of the predicted total CBNG produced water contribution. These incremental volumes are 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). If theFor more information regarding the maximum predicted water impacts resulting from the discharge of produced water, see Table 4-6 (PRB-FEIS pg 4-85).

In the WMP portion of the POD, the operator provided an analysis of the potential development in the watershed above the project area (WMP page 4). Based on the area of the Fourmile Creek watershed above the POD (117.9 sq mi) and an assumed density of one well per location every 80 acres, the potential exists for the development of 943 wells which could produce a maximum produced water volume of 37,728 gpm or 84.1 cfs. 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 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 #s WY0048313 and WY0051934) for the discharge of water produced from this project from the WDEQ.

Permit effluent limits were set at (WYPDES page 2 & 3):

pH	6.5 to 9
TDS	5000 mg/l max
Specific Conductance	7500 mg/l max
Sulfates	3000 mg/l max
Radium 226	3 pCi/l max
Dissolved iron	1000 µg/l max
Total Barium	1800 µg/l max
Total Arsenic	8.4 µg/l max
Chlorides	230 mg/l

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

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 Whiskey Drawn POD prepared by WWC Engineering for Lance Oil & Gas Company.

#### **4.1.7.2.1. Surface Water Cumulative Effects**

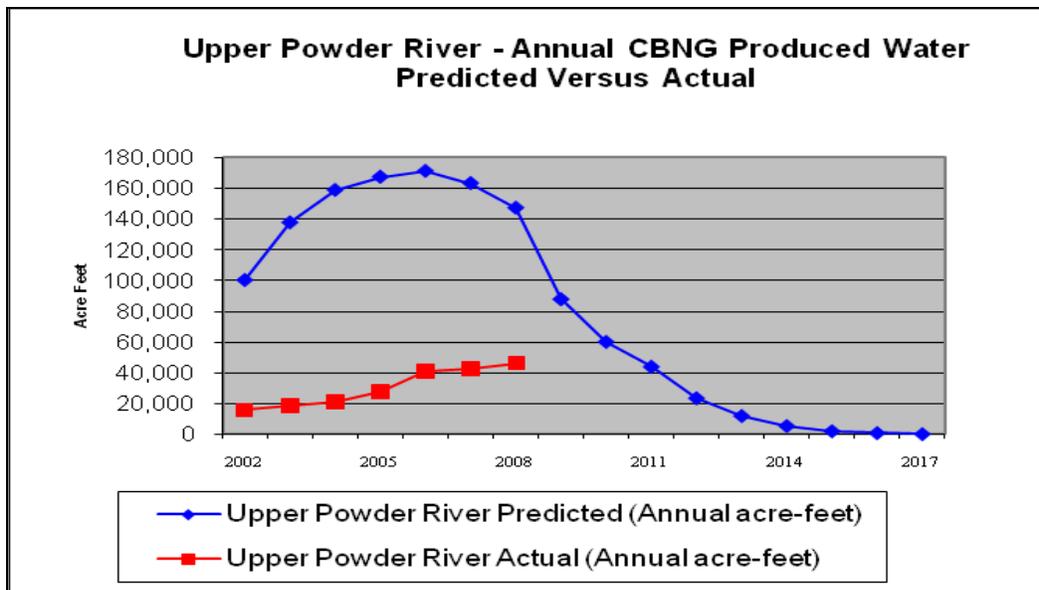
The analysis in this section includes cumulative data from Fee, State and Federal CBNG development in the Upper Powder River watershed. These data were obtained from the Wyoming Oil and Gas Conservation Commission (WOGCC).

As of December 2008 all producing CBNG wells in the Upper Powder River watershed have discharged a cumulative volume of 212,522 acre-feet of water compared to the predicted 1,047,521 acre-feet disclosed in the PRB FEIS (Table 2-8 page 2-26). These figures are presented graphically in Table 4.5 and Figure 4.2 below. This volume is 20.3% of the total predicted produced water analyzed in the PRB FEIS for the Upper Powder River watershed.

**Table 4.5 Actual vs predicted water production in the Upper Powder River watershed 2008**  
***DataUpdate 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				
<b>Total</b>	<b>1,285,233</b>		<b>212,522</b>			

Figure 4.2 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.

The PRB FEIS states, “Cumulative effects to the suitability for irrigation of the Powder River would be minimized through the interim Memorandum of Cooperation (MOC) that the Montana and Wyoming DEQ’s (Departments of Environmental Quality) have signed. This MOC was developed to ensure that designated uses downstream in Montana would be protected while CBM development in both states continued. However, this MOC has expired and has not been renewed. The EPA has approved the Montana Surface Water Standards for EC and SAR and as such the WDEQ is responsible for ensuring that the Montana standards are met at the state line under the Clean Water Act (CWA). Thus, through the implementation of in-stream monitoring and adaptive management, water quality standards and interstate agreements can be met.” (PRB FEIS page 4-117)

As referenced above, the PRB FEIS did disclose that cumulative impacts may occur 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. .

**4.1.8. 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.

**4.1.9. 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 information below indicates potential for lost resources and revenue under Alternative D.

Estimates of potentially lost gas for the four wells in the Whiskey Draw POD, located in Section 21, T. 47 N., R. 78 W have been calculated. Calculations include high and low estimates of unrecoverable gas, total value of the gas, and potentially lost royalty for two situations:

- (1) The locations are not drilled and the locations around them are not drilled so that there is no drainage of the undrilled locations, and
- (2) The locations are not drilled but all the locations around them have Federal wells drilled on an 80-acre drilling pattern.

Volumetrics was used for the high estimate and decline curve analysis for the low estimate. There are numerous wells in the vicinity of the evaluated locations. Because there is very little well history however, decline curve EURs were calculated for only seven of forty-two producing wells. None were in close proximity to the evaluated locations and none had enough well history for a real definitive EUR calculation. Because of this we simply compared decline curve and volumetric EURs and calculated a ratio to get the low estimate. The high and low estimates are uncomfortably close together. Additional time may have resolved this situation. Volumetric calculations were based on calculated mid coal depths and coal thicknesses from well log data. An average isotherm for the PRB was provided by the US Geological Survey (USGS Open-File Report 2006-1174, p. 18). The average Langmuir volume and pressure values were acquired from Gary Stricker of the USGS. Gary was the chief author of the open file report. Estimated coal undersaturation was based on data from two BLM water monitor wells. Dollar values are based on adjusted average NYMEX natural gas futures for 2010-2014 as recorded in July 2009. Estimated lost gas volumes, plus dollar and royalty values are listed below.

<b>Estimated lost gas caused by four undrilled Federal locations in Whiskey Draw POD</b>								
Locations are not drilled and there are no offset wells.								
Well No.	Location	Unrecovered CBNG		Value of CBNG		Royalty Value		Remarks
		High	Low	High	Low	High	Low	
11-21	NWNW	482	419	\$1,842	\$1,604	\$230	\$200	
21-21	NENW	518	451	\$1,980	\$1,724	\$248	\$215	
32-21	SWNE	555	483	\$2,124	\$1,849	\$265	\$231	

<b>Estimated lost gas caused by four undrilled Federal locations in Whiskey Draw POD</b>								
41-21	NENE	347	302	\$1,325	\$1,154	\$166	\$144	
<u>Locations are not drilled but all surrounding 80s contain Federal wells.</u>								
Well No.	Location	Unrecovered CBNG		Value of CBNG		Royalty Value		Remarks
		High	Low	High	Low	High	Low	
11-21	NWNW	54	47	\$207	\$180	\$26	\$23	
21-21	NENW	58	51	\$223	\$194	\$28	\$24	
32-21	SWNE	62	54	\$239	\$208	\$30	\$26	
41-21	NENE	39	34	\$149	\$130	\$19	\$16	
Notes:								
1. All figures are in thousands of MCF and thousands of dollars.								
2. Estimates are based on calculated values for two or three wells in close proximity to the locations requested for evaluation.								

The wells located in Sec 21, T47N R78W are located within the Whiskey Draw Unit (WYW148368X). Whiskey Draw is 13,233.36 acres. Of that 85.94% is federal, 8.91% is patent, and 5.75% is state. The Whiskey Draw Unit is 100% Lance and was effective 2/8/2000. As the wells are drilled, the Whiskey Draw PA (WYW148368A) is expanded. Currently the PA is 12,589.2 acres. With the two wells that will be drilled in Sec 21 then 320 acre radius around the wells will then be included into the PA. All revenue are shared based in percent acres within the PA currently 85.86% is Federal.

The north half of section 21 will be adequately drained with the approval of 3 wells in section 21, in addition to existing nearby wells in section 15, 16, and 22.

#### **4.1.10. 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.

#### **4.2. Alternative D**

Only specific differences from Alternative C will be discussed in this section. Alternative D was not considered 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 the greatest impact to sage-grouse habitat from Alternative C is fragmentation of sage-grouse habitat within close proximity of an occupied lek caused by well locations and associated infrastructure. Alternative D will be recommended to the operator as mitigation to reduce the impacts of loss and fragmentation of sage-grouse habitat within the Whiskey Drawn POD.

**4.2.1. Vegetation & Soils Direct and Indirect Effects**

Trenching construction will remove vegetation while burying proposed and existing overhead power until reclamation restores native habitat. Consolidated linear infrastructure will maintain native soil and vegetation ( see below). Table 4.6 summarizes the proposed surface disturbance associated with Alternative D.

**Table 4.6 Direct surface disturbance reduction from removal of wells and associated infrastructure (pipeline, utility, and access route)**

<b>Well</b>	<b>Well Location</b>	<b>Linear Disturbance</b>
41-21	Constructed Pad (156' x 175')/43560 = 0.6 acres	2,070 feet template road (1.7 acres) 1,680 feet utility corridor (1.3 acres)
32-21	Slot (150' x 170')/43560 = 0.6 acres	1,606 feet template road/utility (1.8 acres)
21-21	Location (150' x 170')/43560 = 0.6 acres	1,258 feet template road/utility (1.4 acres) 460 feet engineered road (0.5 acres)
11-21	Slot (150' x 170')/43560 = 0.6 acres	4,275 feet template road/utility (4.9 acres)

**4.2.2. Wildlife**

**4.2.2.1. Big Game**

**4.2.2.1.1. Big Game Direct and Indirect Effects**

Short-term disturbances associated with burying existing and proposed overhead power will result in direct habitat loss until reclamation accelerates return to habitat effectiveness. Overall habitat disturbance and fragmentation will be reduced by removing infrastructure in S21 T47N R78W. Impacts associated with human presence and traffic will also be minimized with fewer production visits.

**4.2.2.1.2. Big Game Cumulative Effects**

The cumulative effects associated with Alternative D are within the analysis parameters and impacts described in the PRB FEIS.

**4.2.2.2. Migratory Birds**

**4.2.2.2.1. Migratory Birds Direct and Indirect Effects**

Alternative D contains the least overall habitat disturbance and fragmentation, traffic, and visitation.

**4.2.2.2.1.1. Migratory Birds Cumulative Effects**

The cumulative effects associated with Alternative D are within the analysis parameters and impacts described in the PRB FEIS.

**4.2.2.3. Raptors**

**4.2.2.3.1. Raptors Direct and Indirect Effects**

Alternative D provides the least habitat impact. Less overhead power may reduce perching opportunities, but will also reduce electrocution hazards.

**4.2.2.3.2. Raptors Cumulative Effects**

The cumulative effects associated with Alternative D are within the analysis parameters and impacts described in the PRB FEIS.

**4.2.2.4. Sagebrush Obligates**

**4.2.2.4.1. Sagebrush Obligates Direct and Indirect Effects**

Alternative D provides the least disturbance to and fragmentation of sagebrush habitats.

**4.2.2.4.2. Sagebrush Obligates Cumulative Effects**

Cumulative effects associated with Alternative D are the same for those as Alternative C

**4.2.2.5. Sensitive Species**

**4.2.2.5.1. Bald Eagle**

**4.2.2.5.1.1. Bald Eagle Direct and Indirect Effects**

A reduction in overhead power would decrease the likelihood of power line mortalities. Fewer production visits would also reduce the disturbance to bald eagles associated with human presence and traffic.

**4.2.2.5.1.2. Bald Eagle Cumulative Effects**

The cumulative effects associated with Alternative D are the same as those described for Alternative C.

**4.2.2.5.2. Greater Sage-grouse**

**4.2.2.5.2.1. Greater Sage-grouse Direct and Indirect Effects**

Alternative D would minimize disturbance to and fragmentation of sage-grouse habitat as well as accelerate the return to habitat effectiveness of those areas that are disturbed as a result of implementation of the Whiskey Drawn POD.

Declines in sage-grouse populations are attributed, in part, to habitat fragmentation (Braun 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). For the Whiskey Drawn project, Alternative C would result in a more fragmented landscape than Alternative D, as shown by the difference in these measures of fragmentation summarized in Table 4.7.

**Table 4.7 Comparison of Measures of Fragmentation between Alternative C and Alternative D**

Measure of Fragmentation	Alternative C	Alternative D
# Patches	20	19
Average patch size	392 acres	414 acres
Total Perimeter	65.9 miles	48.8 miles

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. The Red Draw sage-grouse lek is located 0.1 miles to the north of a core area boundary. The area that encompasses a 0.6 mile radius around the lek intersects the core area. Alternative D achieves the least amount of new disturbance and fragmentation within a 0.6 mile radius around the Red Draw lek.

While overhead power outside of corridors gets buried, trenching construction would result in direct loss of habitat . This will cause short-term disturbance ; however, effective reclamation would ensure that these areas continue to provide some habitat value as native vegetation becomes re-established. Alternative D would minimize disturbance to sage-grouse habitat by removing vertical intrusions on the landscape.

Limiting production visits to once a month as well as eliminating surface disturbing or disruptive activities (to include disruptive maintenance activities such as a “work over rig”) from March 1 to July 15 would reduce adverse impacts to nesting success.

**4.2.2.5.2.2. Greater Sage-grouse Cumulative Effects**

The cumulative effects to sage-grouse for Alternative D are similar to Alternative C but are anticipated to reduce habitat fragmentation and other landscape-scale impacts.

**4.2.3. 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.

**4.2.4. 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 4.8 Cumulative Effects**

<b>Resource/Species</b>	<b>Alternative A</b>	<b>Alternative C</b>	<b>Alternative D Sage Grouse emphasis</b>
Wetlands/Riparian Areas	No existing wetlands/riparian areas would be disturbed.		
<b>Wildlife</b>			
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.
Raptors	No habitat loss.	Greatest foraging habitat fragmentation.	Least foraging habitat fragmentation.

<b>Resource/Species</b>	<b>Alternative A</b>	<b>Alternative C</b>	<b>Alternative D Sage Grouse emphasis</b>
Migratory Birds	No habitat loss.	Greatest habitat loss.	Least habitat loss.
		Greatest habitat fragmentation.	Least habitat fragmentation.
	No habitat fragmentation.	Overhead electric poses predation & collision risk.	Overhead electric poses predation & collision risk.
<i>Threatened and Endangered Species</i>			
Bald eagle	No habitat loss	Overhead electricity increasing mortality risk from electrocution.	Removal of overhead electricity will eliminate risk from electrocution. Removal of proposed impoundments will reduce West Nile virus impacts to eagles and retain foraging in areas where impoundments will impact prairie dogs.

Resource/Species	Alternative A	Alternative C	Alternative D Sage Grouse emphasis
<i>Sensitive Species</i>			
Greater Sage Grouse	No habitat loss.	Greatest habitat loss.	Least habitat loss.
	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 burying overhead power.
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		

### 4.3. Cultural

No historic properties will be impacted by the proposed project. Following the Wyoming State Protocol Section VI(A)(1) the Bureau of Land Management electronically notified the Wyoming State Historic Preservation Officer (SHPO) on 3/26/2009 that no historic properties exist within the APE. If any cultural values [sites, artifacts, human remains (Appendix L PRB FEIS)] are observed during operation of this lease/permit/right-of-way, they will be left intact and the Buffalo Field Manager notified. Further discovery procedures are explained in the Standard COA (General)(A)(1).

## 5. CONSULTATION/COORDINATION

Contact	Title	Organization	Present at Onsite
Ethan Janke	Permitting Agent	LOG (Anadarko)	Yes
Joy Kennedy	Permitting Specialist	LOG (Anadarko)	Yes
Liz Hunter	Civil Engineer	LOG (Anadarko)	Yes
Tom Lohse	Land Representative	Falxa land Company	Yes
Dewitt G Hupp, Victor W. Hupp and Don L. Hupp	Land Owner	Dean L. & Dewitt G Hupp	No
Simon J Iberlin & Betty L Iberlin	Land Owner	Simon J Iberlin & Betty L Iberlin Trust	No

## 6. OTHER PERMITS REQUIRED

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

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