

**FINDING OF NO SIGNIFICANT IMPACT & DECISION RECORD
FOR
Williams Production RMT Company
Ridgeline/Bullwhacker II Adds 1
ENVIRONMENTAL ASSESSMENT –WY-070-EA09-150**

DECISION: BLM’s decision is to approve alternative C, as summarized below and described in the attached EA, and authorize Williams Production RMT Company’s Ridgeline and Bullwhacker II Adds 1 Coal Bed Natural Gas (CBNG) PODs, comprised of the following 8 Applications for Permit to Drill (APDs):

	Well Name	Well #	Qtr/Qtr	Section	TWP	RNG	Lease #
1	RIDGELINE FEDERAL	34-23	SWSE	23	44N	77W	WYW144543
2	RIDGELINE MEHL	12-25	SWNW	25	44N	77W	WYW140148
3	RIDGELINE MEHL	14-25	SWSW	25	44N	77W	WYW144543
4	RIDGELINE MEHL	21-25	NENW	25	44N	77W	WYW140148
5	RIDGELINE MEHL	23-25	NESW	25	44N	77W	WYW144543
6	BULLWHACKER II ADD I DRY FORK	12-26	SWNW	26	43N	77W	WYW50143
7	BULLWHACKER II ADD I DRY FORK	32-26	SWNE	26	43N	77W	WYW50143
8	BULLWHACKER II ADD I DRY FORK	12-27	SWNW	27	43N	77W	WYW50143

The following 11 APDs are included in this environmental analysis, but have been deferred at this time due to lack of a signed Surface Use Agreement (SUA) with the Surface Owner. The Ridgeline Federal 14-14-4477 and 12-23-4477 wells, though not on Mr. Christensen’s property, cannot be accessed without an SUA. Approval is pending upon submittal of a signed SUA. The operator has two years from the approval date of this project to submit the signed SUA.

	Well Name	Well #	Qtr/Qtr	Section	TWP	RNG	Lease#
1	RIDGELINE FEDERAL	14-14	SWSW	14	44N	77W	WYW140148
2	RIDGELINE FEDERAL	12-23	SWNW	23	44N	77W	WYW139690
3	RIDGELINE J CHRISTENSEN	23-14	NESW	14	44N	77W	WYW140148
4	RIDGELINE J CHRISTENSEN	21-23	NENW	23	44N	77W	WYW139690
5	RIDGELINE J CHRISTENSEN	32-23	SWNE	23	44N	77W	WYW140148
6	RIDGELINE J CHRISTENSEN	43-23	NESE	23	44N	77W	WYW144543
7	RIDGELINE J CHRISTENSEN	41-23	NENE	23	44N	77W	WYW140148
8	RIDGELINE J CHRISTENSEN	43-24	NESE	24	44N	77W	WYW144543
9	RIDGELINE J CHRISTENSEN	31-24	NWNE	24	44N	77W	WYW140148
10	RIDGELINE J CHRISTENSEN	32-24	SWNE	24	44N	77W	WYW140148
11	RIDGELINE J CHRISTENSEN	34-24	SWSE	24	44N	77W	WYW144543

The following impoundments were inspected and approved for use in association with the water management strategy for the POD. The Johnson 43-26-4477 reservoir has a Secondary designation due to lack of a bond.

	IMPOUNDMENT Name / Number	Qtr/Qtr	Sec	TWP	RNG	Capacity (Acre Feet)	Surface Disturbance (Acres)	Lease #
1	Johnson 43-26-4477	NESE	26	44	77	18.63	5	WYW139692

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

SUMMARY OF SELECTED ALTERNATIVE

In response to the BLM's recent incorporation of enhanced sage-grouse protection measures into its approval process, Williams Production Company voluntarily modified this project to bury all proposed power. Due to this modification, no additional project components from Alternative D were incorporated into this project. Therefore, the selected alternative for this project is Alternative C, which will minimize surface impacts to the extent practicable, alleviate site specific impacts to sage-grouse and habitat, and provide for expedient reclamation success.

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

1. The Operator, in their POD, has committed to:
 - Comply with all applicable Federal, State and Local laws and regulations.
 - Obtain the necessary permits from other agencies for the drilling, completion and production of these wells including water rights appropriations, the installation of water management facilities, water discharge permits, and relevant air quality permits.
 - Offer water well agreements to the owners of record for permitted water wells within ½ mile of a federal CBNG producing well in the POD.
 - Provide water analysis from a designated reference well in each coal zone.
2. The Operator has certified that a Surface Use Agreement has been reached with the Landowners.
3. The selected alternative will not result in any undue or unnecessary environmental degradation.
 - 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.
4. 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.
5. 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.
 - The modified proposed action includes *only* buried power. The operator proposed this

mitigation measure in recognition of recommendations by the Wyoming Game and Fish Department, (Recommendations for Development of Oil and Gas Resources within Important Wildlife Habitats, 2009) and other collected sage grouse research (refer to bibliography for further information).

6. 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.
7. 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 Ridgeline/Bullwhacker II Adds 1 Project.

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

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

1. Early initiation of a Resource Management Plan (RMP) revision, based on the evaluation of monitoring data generated under the mitigation monitoring and reporting plan (MMRP) in the PRB FEIS Record of Decision
2. 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 1).
3. Initiation of a population viability analysis in the Powder River Basin. This is a 24-month project involving the U.S. Geological Survey (USGS), BLM Miles City Field Office, BLM BFO, and the University of Montana.
4. Development of alternatives that modify the proposed action to reflect the findings of the best available science regarding sage-grouse management.
5. Development of conditions of approval, specific to sage-grouse management, that incorporate some recommendations from recent research, the Northeast Local Sage-grouse Working Group, the Wyoming Game and Fish Department (WGFD), BLM, and the Petroleum Association of Wyoming.

The implementation of the selected alternative best meets the stated purpose and need for the proposed action. With the application of mitigating measures from alternative C, sage-grouse population viability in the Powder River Basin will not be compromised due to the larger scope of planning actions and research initiated by the BLM, BFO.

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

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

Field Manager: *Sharon M. Dy...* Date: 9/22/09

**BUREAU OF LAND MANAGEMENT
BUFFALO FIELD OFFICE
ENVIRONMENTAL ASSESSMENT (EA)
FOR
Williams Production RMT Company
Ridgeline/Bullwhacker II Adds 1
PLAN OF DEVELOPMENT
WY-070-EA09-150**

INTRODUCTION

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

1. PURPOSE AND NEED

The purpose and need of this EA is to determine how and under what conditions to allow Williams Production RMT Company 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 Ridgeline and Bullwhacker II Adds 1 wells would return royalties to the federal Treasury as well as stimulate local economies.

Agency Responsibilities

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

This action responds to the goals and objectives outlined in the 1985 Buffalo RMP 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 PRB EIS, PRB EIS ROD, and the RMP for the Public Lands Administered by the Bureau of Land Management, Buffalo Field Office (BFO), April 2001.

The BFO RMP is currently under revision.

For the RMP revision, BFO established Focus Areas with rigorous interim protections in order to preserve "decision space" during the revision process. Outside the Focus Areas, BFO continues to apply appropriate, but far less rigorous, site-specific mitigating measures for high-quality sage-grouse habitat

with well densities up to 80-acre spacing and may include site-specific mitigating measures suggested by the best available science. Actions within BFO Focus Areas will be limited to impacts consistent with 640 acre spacing, and must have a plan of development that demonstrates that the proposal can be managed in a manner that effectively conserves sage-grouse habitats (in Focus Areas) affected by the proposal.

The Ridgeline/Bullwhacker II Adds 1 projects do not occur within a core or focus area. However, high quality sage-grouse habitat, as indicated by the University of Montana model, occurs 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 Ridgeline/Bullwhacker II Adds 1 Project as originally submitted to the BLM by Williams Production RMT Company, prior to any BLM review or modifications.

The specific changes identified for the Ridgeline/Bullwhacker II Adds 1 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 the project modifications of the initial project proposal (Alternative B) identified by BLM and the operator. At the on-sites, all areas of proposed surface disturbance were inspected to insure that the project would meet BLM multiple use objectives to conserve natural resources while allowing for the extraction of Federal minerals. In some cases, access roads were re-routed, and well locations, pipelines, discharge points and other water management control structures were moved, modified, mitigated or dropped from further consideration to alleviate environmental impacts. Alternatives to the different aspects of the proposed action are always considered and applied as pre-approval changes, site specific mitigation and/or Conditions of Approval (COAs), if they will alleviate environmental effects of the operator’s proposal.

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 Ridgeline/Bullwhacker II Adds 1 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 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 the project-level 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 sage-grouse habitat.

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 Ridgeline/Bullwhacker II Adds 1 are described in detail in Appendix A.

2.5. Alternatives considered but not analyzed in detail

Alternatives considered but not analyzed in detail, if applicable, are described in detail for the Ridgeline/Bullwhacker II Adds 1 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 Date Received 4/11/2008. Field inspections of the proposed Ridgeline/Bullwhacker II Adds 1 CBNG project were conducted on 5/7/2009 by:

NAME	TITLE	AGENCY
Randee Jespersen	Landman	Williams
Ron Gossard	Facilities	Williams
Justine Clyde	Construction	Williams
Nathan Lopez	Drilling	Williams
Jim Adams	Planning	
Will Myers	Hydrologist/CE	WWC
David Platt	Planning	Windmill Energy
Dee Johnson	Landowner	
John Christensen	Landowner	
Don Brewer	Wildlife Biologist	BLM
Ray Stott	NRS/Hydrologist	BLM
Ardeth Hahn	Archaeologist	BLM
Clint Crago	Archaeologist	BLM
Melanie Hunter	NRS	BLM

3.1. Topographic Characteristics of Project Area

The Ridgeline and Bullwhacker II Adds 1 PODs are located in Johnson County, approximately 11 miles northeast of Sussex, Wyoming. Elevations within the project area range from approximately 4600 to 5000 feet above sea level. The topography consists of gentle rolling prairie dissected by ephemeral swales and deeper rugged draws. Rocky outcrops and exposed soils exist in most of the deeper drainages.

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 main soil limitations include: depth to bedrock, low organic matter content, droughtiness, and high erosion potential especially in areas of steep slopes. Most of the area within the boundary of the proposed action contains soil mapping units comprised of soils having slight or moderate water erosion hazard. Even with loamy soils and good reclamation potential, proper planning and minimizing soil disturbance will help ensure disturbance will be short term and help set the course for final reclamation objectives with the development of this project.

3.2.2. Vegetation

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

Table 3.1 Map Units and Ecological Sites:

Map Unit Symbol	Ecological Sites
709	Loamy (10-14" ppt. zone) Northern Plains
708	Loamy (10-14" ppt. zone) Northern Plains
623	Loamy (10-14" ppt. zone) Northern Plains
687	Clayey (10-14" ppt. zone) Northern Plains
715	Clayey (10-14" ppt. zone) Northern Plains
667	Clayey (10-14" ppt. zone) Northern Plains

Dominant Ecological Sites and Plant Communities identified in this POD and its infrastructure are Loamy and Clayey, Northern Plains 10-14" precipitation zone:

Loamy Sites occur on gently undulating to rolling land on landforms which include hill sides, alluvial fans, ridges and stream terraces, in the 10-14 inch precipitation zone. 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 Western Wheatgrass/Cheatgrass. Rhizomatous wheatgrasses and annuals dominate the site. Cool-season mid-grasses are decreasing and being replaced by cheatgrass. Dominant vegetation includes Blue grama, Plains Pricklypear, cheatgrass and Bare Ground.

Clayey Sites occur on nearly level to steep slopes on landforms which include hill sides, alluvial fans and stream terraces in the 10-14" precipitation zone. The soils of this site are moderately deep to very deep

(greater than 20" to bedrock), well-drained soils that formed in alluvium or alluvium over residuum derived calcareous shale. These soils have slow permeability. The bedrock is clay shale which is virtually impenetrable to plant roots. The present plant community is a Mixed Sagebrush/Grass. Wyoming big sagebrush is a significant component of this Mixed Sagebrush/Grass plant community. Big sagebrush is a significant component of this plant community. Cool-season grasses make up the majority of the understory with the balance made up of short warm-season grasses, annual cool-season grass, and miscellaneous forbs. Dominant grasses include rhizomatous wheatgrasses, green needlegrass, blue grama, and prairie junegrass. Forbs include Louisiana sagewort (cudweed), plains wallflower, hairy goldaster, and scarlet globemallow. Fringed sagewort and plains pricklypear and also occur. Cheatgrass has invaded the state.

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 3.2 Summary of Ecological Sites

Ecological site	Acres	Percent
Loamy (Ly) 10-14 inch Northern Plains	5153.8	72%
Clayey (Cy) 10-14 inch Northern Plains	1727.1	24%
Shallow Clayey (SwCy) 10-14inch Northern Plains	169.6	2%
Shallow Loamy (SwLy) 10-14inch Northern Plains	92.3	1%

3.2.3. Wetlands/Riparian

There are no wetland/riparian areas present in the Ridgeline and Bullwhacker II Adds I project area.

3.2.4. Invasive Species

Windmill Energy coordinated with Johnson County Weed and Pest and conducted field visits to determine the specific areas of concern to address in the Integrated Pest Management Plan for this project. The following state-listed noxious weeds and/or weed species of concern infestations were discovered through these onsites:

- Scotch Thistle
- Canada Thistle
- Russian Knapweed
- Buffalobur,
- Cocklebur
- Salt Cedar

The following weeds are considered a potential threat in the general area, and should be checked for in subsequent field visits:

- Bull Thistle
- Diffuse Knapweed
- Field Bindweed

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

3.3. Wildlife

Several resources were consulted to identify wildlife species that may occur in the proposed project area. These included wildlife databases compiled and managed by BFO wildlife biologists, the PRB FEIS,

Wyoming Game and Fish Department (WGFD) datasets, and the Wyoming Natural Diversity Database (WYNDD).

Habitat assessment and wildlife inventory surveys were performed in 2009 for the Ridgeline POD by ICF Jones & Stokes (ICF Jones & Stokes 2008 2009) and for the Bullwhacker II Addition 1(BULLWHACKER II ADDS 1)POD by Wildlife Resources LLC (Wildlife Resources LLC 2009). ICF Jones & Stokes performed surveys for bald eagle roosts and nests, other raptor nests, greater sage-grouse, sharp-tailed grouse, black-tailed prairie dog colonies, Ute lady tresses orchid, and breeding mountain plovers. All surveys were conducted according to the Powder River Basin Interagency Working Group's protocols (available on the Buffalo Field Office internet website at http://www.blm.gov/wy/st/en/field_offices/Buffalo/wildlife.html).

A BLM biologist conducted a field visit on May 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 Ridgeline/Bullwhacker II Adds 1 project area include pronghorn and mule deer. WGFD data indicates that the project area contains yearlong range and winter-yearlong 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 pp. 3-117 to 3-122 in the PRB FEIS and for mule deer in pp. 3-127 to 3-132.

3.3.2. Aquatics

The project area is drained to the southwest by Beecher Draw and unnamed drainages to the Dry Fork Powder River; and to the north by drainage to Willow Creek. These 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 U.S. Geological Survey 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 lists the fish that occur in the Upper Powder River subbasin and their WGFD Native Species Status (NSS) designation, if applicable. Seven of the species listed in the PRB FEIS 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 BLM Wyoming sensitive species, according to BLM Wyoming Sensitive Species Policy, and will be discussed in more detail later in this document.

Table 3.3 Fish that occur in the Upper Powder River Subbasin

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

Amphibian and reptile species (herpetiles) occur throughout the Basin. WGFD conducted a baseline inventory of herpetiles along the Powder River and its major tributaries from 2004-2006 (Turner 2007). WYNDD has completed the first year of a three-year herpetile study in the Power River Basin in order to detect impacts from CBNG development (Griscom et al. 2009). Herpetiles expected to occur in the Powder River Basin, according to these studies, are listed in Table 3.4 (Turner 2007, Parker and Anderson 2001). Eight of the species listed are classified by WGFD as Species of Greatest Conservation Need (SGCN), 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 3.4, 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 3.4 northern leopard frog and Columbia spotted frog, are BLM Wyoming sensitive species.

Table 3.4 Herpetile species expected to occur in the Powder River Basin (Turner 2007, Parker and Anderson 2001)

Species	Verified by Survey*	WGFD Status	BLM Sensitive
Tiger salamander	Yes	NSS4	
Northern leopard frog	Yes	NSS4	Yes
Milk Snake	No		

Species	Verified by Survey*	WGFD Status	BLM Sensitive
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 calendar 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 include the following.

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	Species	Wyoming BLM Sensitive?
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 was discussed in the PRB FEIS (pp. 3-150 to 3-153). This discussion included 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 ferruginous hawks. The ferruginous hawk, which is a BLM Wyoming 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 WGFD Wyoming Bird Conservation Plan habitat objectives 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).

Sixteen raptor nest sites were identified by BLM and ICF JONES & STOKES (ICF JONES & STOKES 2007 2008 2009) within 0.5 mile of the Ridgeline POD and six nests were identified within 0.5 mile of the Bullwhacker II Add 1 project area (Wildlife Resources LLC 2008 2009). These are listed in the table below. None of the nests were reported as active in 2009. One nest was reported as occupied by red-tail hawks. Occupied means that either there was fresh nest lining material present, adults were present, or there was a recent and well used perch site near the nest.

Table 3.5 Documented Raptor Nests within the Ridgeline/ BULLWHACKER II ADDS 1 Project Area

BLM ID	UTMs	Legal	Substrate	Year	Condition	Status	Species
3712	412648E 4847492N	S23 T44N R77W	CTL	2009	Poor	INAC	n/a
				2008	Poor	INAC	n/a
				2007	Poor	INAC	n/a
				2006	Unknown	INAC	n/a
				2005	Fair	INAC	n/a
				2004	Gone	INAC	n/a
3714	413031E 4845624N	S26 T44N R77W	CTL	2009	Gone	INAC	n/a
				2008	Gone	INAC	n/a
				2007	Good	ACTI	RETA
				2007	Poor	INAC	n/a
				2006		ACTI	RETA
				2005	Good	ACTI	RETA
5025	412097E 4846187N	S27 T44N R77W	CTD	2008	Poor	INAC	n/a
				2007	Poor	INAC	n/a
				2006	Poor	INAC	n/a
				2005	Good	ACTI	RETA
5026	414410E 4844570N	S36 T44N R77W	CTL	2009	Gone	INAC	n/a
				2008	Gone	INAC	n/a
				2007	Good	ACTI	RETA
5027	414216E 4844517N	S36 T44N R77W	CTD	2009	Gone	INAC	n/a
				2008	Poor	INAC	n/a
				2007	Poor	INAC	n/a
5411	415430E 4845068N	S25 T44N R77W	CTL	2009	Poor	INAC	n/a
				2008	Poor	INAC	n/a
				2007	Fair	INAC	n/a
				2006	Unknown	ACTI	GRHO
5412	415017E 4845453N	S25 T44N R77W	CTL	2009	Good	INAC	n/a
				2008	Good	INAC	n/a
				2007	Good	ACTI	RETA
6385	415747E 4847911N	S19 T44N R76W	CTL	2009	Poor	INAC	n/a
				2008	Excellent	ACTF	RETA

BLM ID	UTMs	Legal	Substrate	Year	Condition	Status	Species
				2008	Poor	INAC	n/a
				2007	Good	ACTI	GRHO
6386	416118E 4847961N	S19 T44N R76W	CTL	2009	Poor	INAC	n/a
				2008	Fair	INAC	n/a
				2007	Good	ACTI	RETA
				2007	Unknown	ACTI	RETA
6492	414629E 4848292N	S13 T44N R77W	CTL	2009	Poor	INAC	n/a
				2008	Poor	INAC	n/a
				2007	Poor	ACTI	GRHO
6493	414670E 4848211N	S13 T44N R77W	CTL	2009	Gone	INAC	n/a
				2008	Gone	INAC	n/a
				2007	Remnants	INAC	n/a
				2006		ACTI	GRHO
6494	412841E 4845457N	S26 T44N R77W	CTL	2009	Good	INAC	n/a
				2008	Good	ACTI	RETA
				2007	Good	ACTI	RETA
6495	414926E 4845527N	S25 T44N R77W	CTL	2009	Good	INAC	n/a
				2008	Good	INAC	n/a
				2007	Fair	ACTI	GRHO
				2006		ACTI	RETA
6496	412869E 4845515N	S26 T44N R77W	CTL	2009	Good	INAC	n/a
				2008	Good	ACTI	RETA
8373	413676E 4848502N	S14 T44N R77W	CKB	2009	Good	INAC	n/a
				2008	Good	INAC	n/a
10665	413673E 4849309N	S TN RW	CKB	2009	Poor	INAC	n/a
Notes: 1 CRK=Creek bank; CTD = Cottonwood - dead; CTL = Cottonwood – live 2 ACTF = Active failed; ACTI = Active; INAC = Inactive; OCC=Occupied 3 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 Ridgeline/Bullwhacker II Adds 1 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 twenty-two miles to the north of the project area. No plains sharp-tailed grouse were noted in the project area by ICF Jones & Stokes, Wildlife Resources LLC or by the BLM biologist.

3.3.6. Sagebrush Obligates

Sagebrush communities are the most common habitat type in the project area. These ecosystems support a variety of species, including migratory birds, raptors, big game, reptiles, and small mammals. Sagebrush obligates are those which require sagebrush for some part of their life cycle and cannot survive without it. Several sensitive species are associated with sagebrush ecosystems. These include Townsend's big-eared bat, ferruginous hawk, burrowing owl, and loggerhead shrike. Sagebrush obligate birds within the Powder River Basin that are listed as sensitive species by BLM Wyoming include Brewer's sparrow, sage thrasher, sage sparrow, and greater sage-grouse. All require sagebrush for nesting, with nests typically located within or under the sagebrush canopy. Large-scale development of energy reserves underlying sagebrush ecosystems is placing sagebrush communities and wildlife increasingly at risk (WY 2009).

3.3.7. Threatened and Endangered and Sensitive Species

3.3.7.1. Threatened and Endangered Species

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

3.3.7.1.1. Black-footed ferret

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

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). 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).

One black-tailed prairie dog colony of approximately 105 acres exists within the Bullwhacker II Adds 1 project area. This colony is connected to other colonies in the complex in a chain of colonies within 1.5 km of each other. 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 Ridgeline/ 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 nearest potential reintroduction area, the Linch complex, is approximately 2.5 miles south of the Ridgeline project area and encompasses the Bullwhacker II Adds 1 project Area.

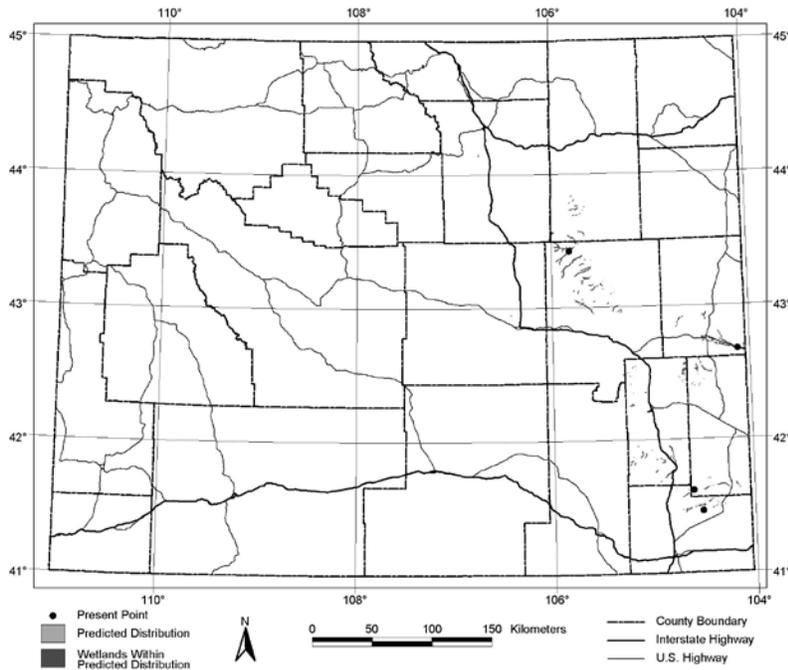
3.3.7.1.2. Ute Ladies'-Tresses Orchid

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.

The only potential habitat for Ute ladies'-tresses orchid in the Ridgeline/Bullwhacker II Adds 1 project area is in the Little Bullwhacker Creek drainage (NWSE section 23, T43N, R77W). A survey conducted by Wildlife Resources LLC found no orchids. Intermittent flows occur through the drainage, creating pockets of standing water and moist soil conditions. Negative indicators present included intermittent flows, steep banks between riparian and upland terraces, xeric vegetation present to water's edge, and alkali deposits (Wildlife Resources LLC 2008).

Figure 2. Predicted Distribution of Ute ladies'-tresses in Wyoming



3.3.7.1.3. Blowout Penstemon

Blowout penstemon was recently identified by the U.S. Fish & Wildlife Service as potentially occurring in the BFO area. The plant is regionally endemic of the Nebraska Sandhills, and the northeastern end of the Great Divide Basin in Carbon County, Wyoming. Blowout penstemon is restricted to sparsely vegetated, early successional, shifting sand with crater-like blowout depressions created by wind erosion. In Wyoming, blowout penstemon is found primarily on the rim and lee slopes of blowouts, and associated steep slopes deposited at the base of foothills, at elevations of 5860-7440 feet Fertig (2001). None of the habitat described above was observed during field surveys and onsite visits.

3.3.7.2. Sensitive Species

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

- Maintain vulnerable species and habitat components in functional BLM ecosystems
- Ensure sensitive species are considered in land management decisions
- Prevent a need for species listing under the ESA

- Prioritize needed conservation work with an emphasis on habitat

This section lists those species on the Wyoming BLM sensitive species list that, according to the PRB FEIS, may occur in the Powder River Basin Oil and Gas Project Area, which includes the Ridgeline/Bullwhacker II Adds 1 project area. The following discussion for each of those sensitive species includes an analysis of whether the species is likely to occur in or be affected by the proposed Ridgeline/Bullwhacker II Adds 1. According to the PRB FEIS, spotted bats were not likely to be affected by the Powder River Basin Oil and Gas Project, and are therefore not discussed in this section. The authority for the sensitive species policy and guidance comes from the Endangered Species Act of 1973, as amended; Title II of the Sikes Act, as amended; the Federal Land Policy and Management Act (FLPMA) of 1976; and the Department Manual 235.1.1A.

3.3.7.2.1. Northern Leopard Frog

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

3.3.7.2.2. Columbia Spotted Frog

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

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

3.3.7.2.3. Sturgeon Chub

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

Discharge from the proposed project into the Powder River will be insignificant. Suitable habitat for the sturgeon chub will be not be impacted by the Ridgeline/Bullwhacker II Adds 1.

3.3.7.2.4. Yellowstone Cutthroat Trout

The affected environment for Yellowstone cutthroat trout is discussed in the PRB FEIS on pg. 3-192. Within the BFO administrative area, this species may occur in the Upper Tongue sub-watershed.

The project area is located outside of this watershed and is thus outside the species' range. Yellowstone cutthroat trout is not expected to occur in the project area.

3.3.7.2.5. Baird's Sparrow

The affected environment for Baird's sparrow is discussed in the PRB FEIS on pg. 3-188. In addition to being listed as a BLM Wyoming 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 is scattered throughout the project area, and this species may occur.

3.3.7.2.6. Bald Eagle

The affected environment for bald eagles is described in the PRB FEIS on pg. 3-175. At the time the PRB FEIS was written, the bald eagle was listed as a threatened species under the ESA. Due to successful recovery efforts, it was removed from the ESA on 8 August 2007. The bald eagle remains under the protection of the Bald and Golden Eagle Protection Act and the Migratory Bird Treaty Act. In order to avoid violation of these laws and uphold the BLM's commitment to avoid any future listing of this species, all conservation measures and terms and conditions identified in the Powder River Basin Oil and Gas Project Biological Opinion (PRB Oil & Gas Project BO - WY07F0075) (USFWS 2007) shall continue to be complied with.

In addition to being listed as a BLM Wyoming 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 Region 17.

No bald eagle nest or communal winter roost sites have been documented within one mile of the Ridgeline/Bullwhacker II Adds 1 project area. Only a few scattered cottonwoods are present in drainages in the project area. One historic winter roost is near Willow Creek approximately 1.4 miles north of the Ridgeline POD. Bald eagles are present in the area as numerous prairie dog colonies (described in Section 3.3.7.1.1) and nearby sheep operations provide reliable prey sources.

3.3.7.2.7. Brewer's Sparrow

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

Brewer's sparrow habitat is present throughout the project area. Brewer's sparrows were observed multiple times throughout the project area during field surveys.

3.3.7.2.8. Ferruginous Hawk

The affected environment for ferruginous hawk is discussed in the PRB FEIS on pg. 3-183. In addition to being listed as a BLM Wyoming 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 BLM database lists two ferruginous hawk nests in the project area. Both are in creek banks in the SE Section 14 T44N, R77W. BLM has two years of survey results for nest #8373 and one year for Nest # 10665 (Table 2). Neither nest was active in 2009. Ferruginous hawk nests are located throughout the Powder River Basin. Foraging habitat and prey is available throughout the project area, and ferruginous hawks likely occur.

3.3.7.2.9. Greater Sage-Grouse

The affected environment for sage-grouse is discussed in the PRB FEIS (pg. 3-194 to 3-199). In addition to being listed as a BLM Wyoming sensitive species, greater sage-grouse (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 the USFWS to list greater sage-grouse as threatened or endangered under the ESA. On January 12th, 2005, the USFWS issued a decision that the listing of the greater sage-grouse was not warranted following a Status Review. The decision document supporting this outcome noted the need to continue or expand all conservation efforts to conserve sage-grouse. In 2007, the U.S. District Court remanded that decision, stating that the USFWS's decision-making process was flawed and ordered the 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 consolidates research and data to identify high-quality sage-grouse habitat in the basin. BFO, in conjunction with the University of Montana, developed models indicating "high-quality" 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, with 5 being "excellent" habitat. 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 WO establish the need for a Resource Management Plan (RMP) approach to evaluate impacts to sage-grouse and habitat; RMP amendment or revision discussed. Decision to begin a RMP revision is approved two years ahead of original schedule.
- May 28, 2008: BFO conducts public meeting to present habitat information developed through research in the Powder River Basin. BFO solicits additional information from the public and interested energy development companies to refine sage-grouse habitat maps. Objective is to establish areas of interim management for sage-grouse to preserve "decision space" during the RMP process.
- August 13, 2008: BFO releases "Guidance for general management actions during BFO Resource Management Plan Revision" and a map identifying the "focus areas". The guidance contains criteria for any proposed development in focus areas (Appendix 1). For fluid minerals, 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 (in focus areas) 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.

- Concurrent with BFO efforts, on August 1, 2008, 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 follow 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, “...development scenarios should be designed and managed to maintain populations, habitats and essential migration routes outside core population areas.”
- August 13, 2008 – Present: BFO crafts updated impacts assessment to be included in all project analysis affecting sage-grouse habitat. This analysis includes research conducted in the Powder River Basin and other sage-grouse research published since the 2003 PRB EIS ROD. Analysis explicitly tied impacts to the impacts accepted under the 2003 ROD.
- October 1, 2008: BFO officially begins the RMP revision. This process was accelerated by two years to more rapidly assess impacts to sage-grouse.
- April 14, 2009: BFO/WYSO enters into agreement with University of Montana and the Miles City FO to conduct a population viability analysis in the PRB. 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 Wyoming Game and Fish Department releases, “ Recommendations for Development of Oil and Gas Resources within Important Wildlife Habitats”, which further describes 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, *Record of Decision, Powder River Oil and Gas Project Environmental Impact Statement and Resource Management Plan Amendment* BLM Buffalo Field Office 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 Resource Management Plan (RMP) revision, based on the evaluation of monitoring data generated under the mitigation monitoring and reporting plan (MMRP) in the PRB FEIS 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 1).
- 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 Buffalo Field Office, 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 implementation of the selected alternative best meets the stated purpose and need for the proposed action. With the application of mitigating measures in alternative C, sage-grouse population viability in the Powder River Basin will not be compromised due to the larger scope of planning actions and research initiated by the BLM, Buffalo Field Office.

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 good quality 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.

These basic concepts for management are based on the assumptions that sufficient “islands” of undisturbed (by human infrastructure) sage-grouse habitat would remain to sustain a large enough sage-grouse population for the long-term, and be surrounded by the planned major management activities (MMAs) in the PRB (for sage-grouse in the PRB, the MMA are livestock grazing and energy development)¹. Research on sage-grouse in the PRB was initiated to determine what direct, indirect and cumulative impacts energy development would have on both sage-grouse habitat and its constituent resident population.

Suitable sage-grouse habitat is present in the Ridgeline/Bullwhacker II Adds 1 project area. Continuous stands of sparsely to moderately dense sagebrush are present in patches throughout. Sections 24, W 25, and E 26 T44N R77W contain the largest and most contiguous stands of sagebrush on moderate topography. Stands of sagebrush located near moist draws throughout the project area could provide adequate brood rearing and late summer habitat. Sage-grouse habitat models indicate that approximately 97% of the project area contains high quality sage-grouse nesting habitat and approximately 99% of the project area contains high quality sage-grouse wintering habitat (Walker et al. 2007). According to a statewide population density model that was developed based on lek attendance (Doherty 2008), the entire Ridgeline POD and the portion of the Bullwhacker II Adds 1 project area in the NE Section 26 are in a high sage-grouse population area.

The State Wildlife Agencies' Ad Hoc Committee for Consideration of Oil and Gas Development Effects to Nesting Habitat (WGFD 2008) recommends that impacts be considered for leks within four miles of oil and gas developments. WGFD records indicate that fifteen sage-grouse leks occur within four miles of the project area. These fifteen lek sites are identified in Table 3.6.

Table 3.6 Sage-grouse leks within 4 miles of the Ridgeline/Bullwhacker II Adds 1 project area

LekName	Legal Location	Distance from Project Area (mi)	Occupied?
Beecher Draw	T43N R77W NE SW S2	1.8	Yes
Beecher Draw N	T44N R77W NE NW S34	1.0	Yes
Bushwhacker Creek I	T43N R77W SE NE S22	0.5	Yes
Bushwhacker Creek II	T43N R77W SW NE S32	0.9	Yes
Bushwhacker Creek IV	T43N R77W NW SW S34	1.0	Yes
Bushwhacker Creek V	T42N R77W SE NE S4	2.0	Yes

LekName	Legal Location	Distance from Project Area (mi)	Occupied?
Christensen Ranch 1	T44N R76W SW SW S19	0.6	Yes
Christensen Ranch 2	T44N R77W NE NE S24	In POD	Yes
Christensen Ranch 3	T44N R77W NE NE S12	1.4	Yes
Christensen Ranch 5	T45N R76W NW NE S32	3.6	Yes
Christensen Ranch 7	T44N R77W SW NW S11	1.1	Yes
Cottonwood Creek 1	T43N R76W NW SE S33	3.8	Yes
Dry Willow	T44N R76W NE NW S34	3.9	Yes
Irigaray II	T45N R77W SE SW S28	3.6	Yes
Mengel	T44N R77W NE SW S19	3.4	Yes

3.3.7.2.10. Loggerhead Shrike

The affected environment for loggerhead shrike is discussed in the PRB FEIS on pg. 3-187. In addition to being listed as a BLM Wyoming sensitive species, they 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. Several shrikes were observed in the project area during field surveys.

3.3.7.2.11. Long-billed Curlew

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

Long-billed curlew habitat is present throughout the project area, and the species may occur.

3.3.7.2.12. Mountain Plover

The affected environment for mountain plover is discussed in the PRB FEIS on pg. 3-177 to 3-178. At the time the PRB FEIS was written, the mountain plover was proposed for listing as a threatened species under the ESA. In 2003, USFWS withdrew the proposal, finding that the population was larger than had been thought and was no longer declining. In addition to being listed as a BLM Wyoming 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.

The lack of prairie dog towns, roughness of topography, and vegetation height determine nesting habitat as unsuitable. No mountain plovers were observed during field surveys in 2006 and 2007. Suitable mountain plover habitat is present throughout the Bullwhacker II Adds 1 project area. The majority of landscape is sparse to moderate sagebrush/short grassland habitat with generally flat rolling terrain (Wildlife Resources LLC 2009). Prairie dog colonies are present. No mountain plovers were observed during field surveys.

3.3.7.2.1. Northern Goshawk

The affected environment for northern goshawk is discussed in the PRB FEIS on pg. 3-193 to 3-194. In addition to being listed as a Wyoming BLM sensitive species, northern goshawks are a WGFD SGCN, with a rating of NSS4, because the species is widely distributed, population status and trends are

unknown but are suspected to be stable, habitat is vulnerable but not undergoing any significant loss, and the species is sensitive to human disturbance. The Wyoming Bird Conservation Plan rates them as a Level I species, indicating they are clearly in need of conservation action.

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

3.3.7.2.2. Peregrine Falcon

The affected environment for peregrine falcon is discussed in the PRB FEIS on pg. 3-194. In addition to being listed as a Wyoming BLM sensitive species, peregrine falcons are a WGFD SGCN, with a rating of NSS3, because populations are restricted in distribution, habitat is restricted but not undergoing significant loss, and they are sensitive to human disturbance. The Wyoming Bird Conservation Plan rates them as a Level I species, indicating they are clearly in need of conservation action. They are also listed by USFWS as a BCC for Region 17.

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

3.3.7.2.3. 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.

3.3.7.2.4. 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 BLM Wyoming 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. Sage thrashers prefer dense stands of shrubs for nesting. ICF Jones & Stokes did report a singing sage thrasher perched in sagebrush habitat in SE SW Section 25 in May 2007.

3.3.7.2.5. 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.

3.3.7.2.6. 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 BLM Wyoming 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).

No burrowing owls are known to nest in the project area. Habitat is present in the Bullwhacker II Adds 1 prairie dog colony.

3.3.7.2.7. White-faced Ibis

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

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

3.3.7.2.8. 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. Yellow-billed cuckoo are not likely to occur.

3.3.7.2.9. 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).

One prairie dog colony of approximately 105 acres exists in the Bullwhacker II Adds 1 project area, in T43N R77W W Section 26.

3.3.7.2.10. 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.

There is very little habitat for fringed myotis in the project area.

3.3.7.2.11. 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. There is very little habitat for long-eared myotis in the project area.

3.3.7.2.12. 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 contain suitable swift fox habitat. Patches of grassland with gentle terrain are available. No occurrences of swift fox have been reported in the vicinity of the project area. Swift fox may occur in the project area.

3.3.7.2.13. 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.

3.3.7.2.14. Porter’s Sagebrush

The affected environment for Porter’s Sagebrush is discussed in the PRB FEIS on pg. 3-190. The Ridgeline/Bullwhacker II Adds 1 project area does not contain suitable habitat for this species, and it is not expected to occur.

3.3.7.2.15. 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 Ridgeline/Bullwhacker II Adds 1 project area is outside of this species’ range, and it is not expected to occur.

3.4. West Nile Virus

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

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

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

Table 3.7 Historical West Nile Virus Information

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

*Wyoming Department of Health Records.

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

Although most of the attention has been focused on human health issues, WNV has had an impact on vertebrate wildlife populations. At a recent conference at the Smithsonian Environmental Research Center, scientists disclosed WNV had been detected in 157 bird species, horses, 16 other mammals, and

alligators (Marra et al 2003). In the eastern US, avian populations have incurred very high mortality, particularly crows, jays and related species. Raptor species also appear to be highly susceptible to WNV. During 2003, 36 raptors were documented to have died from WNV in Wyoming including golden eagle, red-tailed hawk, ferruginous hawk, American kestrel, Cooper's hawk, northern goshawk, great-horned owl, prairie falcon, and Swainson's hawk (Cornish et al. 2003). Actual mortality is likely to be greater. Population impacts of WNV on raptors are unknown at present. The Wyoming State Vet Lab determined 22 sage-grouse in one study project (90% of the study birds), succumbed to WNV in the PRB in 2003. While birds infected with WNV have many of the same symptoms as infected humans, they appear to be more sensitive to the virus (Rinkes 2003).

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

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

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

3.5. Water Resources

The project area is within the Upper Powder River drainage system. The upper most affected drainage is Beecher Draw which consists of steep, dissected terrain with slopes exceeding 15% in the upper reaches, while the lower portion is less steep as a result of the subdued topography as the drainage converges on the main channel of the Dry Fork Powder River. The watershed has slope gradients ranging from 4% to 8% throughout most of the catchment area. The main portion of the drainage consists of relatively undisturbed rangeland composed of a mixture of sagebrush and native grassland. The main stem and larger tributaries possess a sinuous, well-vegetated channel bottom with moderately defined low-flow channel that occasionally disappears due to headcutting. The Beecher Draw drainage is represented by a dendritic tributary system.

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 17 permitted stock and domestic water wells within 1 mile of a federal CBNG producing well in the POD with depths ranging from 24 to 1650 feet. For additional information on water, please refer to the PRB FEIS (January 2003), Chapter 3, Affected Environment pages 3-1 through 3-36 (groundwater).

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

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

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

3.5.2. Surface Water

The project area is within Beecher Draw and converges on the Dry Fork Powder River drainage which is tributary to the Upper Powder River watershed. The affected watershed and drainages in the Ridgeline POD are ephemeral (flowing only in response to a precipitation event or snow melt) to intermittent (flowing only at certain times of the year when it receives water from alluvial groundwater, springs, or other surface source – PRB FEIS Chapter 9 Glossary). The channels are primarily undisturbed rangeland composed of a mixture of sagebrush and native grassland.

Williams has no existing federal production wells within the Ridgeline POD. Newly developed wells within the Ridgeline POD will have an estimated life expectancy of approximately seven years. Williams expects that the initial discharge from the Big George coal seam will be approximately 20 gpm per well, with only the first year experiencing discharge rates near the maximum.

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

ranges from 4.76 at Maximum monthly flow to 7.83 at Low monthly flow. These values were determined at the USGS station located at Arvada, WY (PRB FEIS page 3-49).

The operator found no natural springs within this POD boundary.

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

3.6. Economics and Recovery of CBNG Resources

Development of this project would have effects on the local, state, and national economies. Based on the estimates in the PRBEIS, the drilling of the 19 proposed wells in the Ridgeline/Bullwhacker II Adds 1 will generate approximately 0.35 billion cubic feet of gas (BCFG) per well, over the life of the well. Actual revenue from this amount of gas is difficult to calculate, as there are several variables contributing to the price of gas at any given time. Regardless of the actual dollar amount, the royalties from the gas produced in the Ridgeline/Bullwhacker II Adds 1 would have wide-ranging benefit. The federal government collects 12.5% of the royalties from all federal wells, which helps offset the costs of maintaining the federal agencies that oversee permitting. In addition to generating federal income, approximately 49% of the royalties from the Ridgeline/Bullwhacker II Adds 1 wells would return to the State of Wyoming. This revenue from mineral development has contributed to Wyoming's strong economy for the past several years, allowing for improvements in state funded programs such as infrastructure and education. The development of the Ridgeline/Bullwhacker II Adds 1 project would also provide revenue locally by employing an array of workers, both directly and indirectly. People would be employed to build the roads and project infrastructure, drill the wells, and maintain and monitor the project area. The large pool of individuals employed to work on the Ridgeline/Bullwhacker II Adds 1 project would also have the secondary effect of increased demand for goods and services from nearby communities, primarily those of Wright, Gillette, Kaycee, and Buffalo.

3.7. Cultural Resources

Two previously reviewed and accepted Class III cultural resource inventories (BFO # 70040114, 70050050) adequately covered the proposed Bullwhacker II Add I project area. The following resources are located in or near the project area.

Site Number	Site Type	Eligibility
48JO5336	Historic Site	NE
48JO5338	Prehistoric Site	U

There are no eligible sites within the APE of the proposed project. Following the Wyoming State Protocol Section VI(A)(1) the Bureau of Land Management electronically notified the Wyoming State Historic Preservation Officer (SHPO) on 9/11/2009 that no historic properties exist within the APE.

Class III cultural resource inventory was performed for the Ridgeline POD prior to on-the-ground project work (BFO project no. 70080129). SWCA Environmental Consultants conducted a combination block and linear class III cultural resource inventory following 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*. Ardet Hahn, BLM Archaeologist, reviewed the report for technical adequacy and compliance with Bureau of Land Management (BLM) standards, and determined it to be adequate. The following resources are located in or near the project area.

Site Number	Site Type	Eligibility
48JO1648	Multi-component site	NE
48JO1649	Prehistoric site	NE
48JO3665	Historic Black & Yellow Trail—Sussex Variant	NE
IR-1	Historic isolated resource	NE
IR-2	Prehistoric isolated resource	NE
IR-3	Prehistoric isolated resource	NE
IR-4	Prehistoric isolated resource	NE

3.8. Air Quality

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

Existing air pollutant emission sources within the region include following:

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

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

4. ENVIRONMENTAL CONSEQUENCES

The changes to the proposed action (Alternative B) resulted in development of Alternatives C and D. These 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.

Impacts to vegetation and soils from surface disturbance will be reduced by following the operator's plans and BLM applied mitigation. Impacts to vegetation and soils from surface disturbance will be reduced, by following the operator's plans and BLM applied mitigation. Of the 19 proposed well locations, 1 is on a reclaimed conventional well pad, 17 can be drilled without a well pad being constructed and 1 will require a constructed (cut & fill) well pad. Surface disturbance associated with the drilling of the 18 wells without constructed pads (including the well on the reclaimed conventional location) would involve digging-out of rig wheel wells (for leveling drill rig on minor slopes), reserve pit construction (estimated approximate size of 25 x 40 feet), and compaction (from vehicles driving/parking at the drill site).

Estimated disturbance associated with these 18 wells would involve approximately 0.25 acre/well for 4.5 total acres. The other well requiring cut & fill pad construction would disturb approximately 0.5 acre. The total estimated disturbance for all 19 well locations would be 5 acres.

For further mitigation measures employed by Williams for this project, refer to the MSUP for the Ridgeline POD, Attachment 1.

For a detailed record of surface disturbance associated with the Ridgeline and Bullwhacker II Adds I PODs, see Appendix A.

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

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

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

4.1.2. Invasive Species

Windmill Energy, on behalf of Williams Production RMT Company, consulted with Johnson County Weed and Pest to develop an Integrated Pest Management Plan (IPMP) specific to the project area. In addition to periodic field visits to determine which noxious weeds are present, Williams has committed to the control of noxious weeds and species of concern using the following measures, identified in their IPMP:

1. Control Methods include physical, biological, and chemical methods:
Physical methods include mowing during the first season of establishment, prior to seed formation, and hand pulling of weeds (for small or new infestations). Biological methods include the use of domestic animals, or approved biological agents. Chemical methods include the use of herbicides, done in accordance with the existing Surface Use Agreement with the private surface owner.
2. Preventive practices:
Certified weed-free seed mixtures will be used for re-seeding, and vehicles and equipment will be washed before leaving areas of known noxious weed infestations.

3. Education:

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

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

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

4.1.3. Cumulative Effects

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

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

- They are proportional to the actual amount of cumulatively produced water in the Upper Powder River drainage, which is approximately 20.3% of the total predicted in the PRB FEIS.
- The WDEQ enforcement of the terms and conditions of the WYPDES permit that are designed to protect irrigation downstream.
- The WMP for the Ridgeline/Bullwhacker II Adds 1 proposes that produced water will not contribute significantly to flows downstream. The maximum discharge from the proposed federal wells within the Ridgeline/Bullwhacker II Adds 1 POD would be 19 wells at 20 gpm per well or 380 gpm (0.85 cfs). The discharge will be distributed through the Ridgeline POD infrastructure to a proposed reservoir, as well as piped to existing reservoirs and infrastructure associated with Bullwhacker development, which has been permitted under separate federal actions. See Bullwhacker Area Master POD WY-070-EA08-56 for more information on approved water management infrastructure. Beecher Draw and its tributaries lack fluvial components and are generally dominated by gully erosion and downstream deposition of sediments during precipitation events. Analysis of the hydraulic capacity of the main channel sections and tributaries indicate that the maximum potential discharges from CBNG development are much less than typical peak annual flows and if necessary could be transported in a stable, non-erosive manner. The channels could support continuous flow of CBNG water throughout the duration of development due to the low channel velocities (less than 2 ft/sec in any reach), small flow areas, low Froude numbers (indicating flow within the subcritical range), distribution of flow throughout the watershed, and the observation that most of the flow is consumed by seepage and evapotranspiration. Remaining water production not consumed within the Ridgeline POD will be

piped to nearby previously permitted Bullwhacker development to existing reservoirs and infrastructure.

No additional mitigation measures are required.

4.1.4. Wildlife

4.1.4.1. 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.

4.1.4.1.1. 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.

4.1.4.2. 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 in one new reservoir, or in existing reservoirs in adjacent PODs. No additional impacts to aquatic communities are expected to occur.

4.1.4.2.1. Aquatics Cumulative Effects

The cumulative effects associated with Alternative C are within the analysis parameters and impacts described in the PRB FEIS. For details on expected cumulative impacts, refer to the PRB FEIS, (pp. 4-247 to 4-249). No additional mitigation measures are required.

4.1.4.3. Migratory Birds Direct and Indirect Effects

Direct and indirect effects to migratory birds are discussed in the PRB FEIS (pp. 4-231 to 4-235).

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.

4.1.4.3.1. Migratory Birds Cumulative Effects

The cumulative effects associated with Alternative C are within the analysis parameters and impacts described in the PRB FEIS. For details on expected cumulative impacts, refer to the PRB FEIS, pg. 4-235. No additional mitigation measures are required.

4.1.4.4. Raptors Direct and Indirect Effects

Human activities in close proximity to active raptor nests may interfere with nest productivity. Romin and Muck (1999) indicate that activities within 0.5 miles of a nest are prone to cause adverse impacts to nesting raptors. If mineral activities occur during nesting, they could be sufficient to cause adult birds to remain away from the nest and their chicks for the duration of the activities. This absence can lead to 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 Ridgeline Federal 12-23 is proposed 0.15 miles from nest 3712. The well and proposed access corridors are located on the other side of a ridge out of line of sight. The topography is fairly rugged, limiting the options for moving the access route. The likelihood that raptors will use the nest site in the future may be reduced because of the disturbance brought in by the project but the natural buffer and application of timing restrictions during nesting season will reduce the disturbance from this project.

Well Mehl Federal 23-35 is 0.23 miles of nest 6495. The well and access to the north are out of line of sight of the nest which is in a ravine with a ridge forming a visual screen. The nest has been used by red-tailed hawks and great-horned owls in the past. As red-tailed hawks and great-horned owls are more tolerant of disturbance and because of the natural screening it is likely that the nest site will be used in the future in spite of the CBM activity associated with this project.

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

BLM ID	Infrastructure
1967	<ul style="list-style-type: none"> • Intersects POD boundary, but no infrastructure is proposed within 0.5 mile
3712	<ul style="list-style-type: none"> • Well Ridgeline Federal 12-23 • Well Ridgeline J Christensen Federal 21-23 • Well Ridgeline Federal 14-14 • Access/utility corridors • Main travel road
3714	<ul style="list-style-type: none"> • Main travel road • Utility corridor • Overhead power
5025	<ul style="list-style-type: none"> • Intersects POD boundary, but no infrastructure is proposed within 0.5 mile
5026	<ul style="list-style-type: none"> • Well Mehl Federal 14-25 • Access/utilities
5027	<ul style="list-style-type: none"> • Well Mehl Federal 14-25 • Access/utilities
5411	<ul style="list-style-type: none"> • Intersects POD boundary, but no infrastructure is proposed within 0.5 mile
5412	<ul style="list-style-type: none"> • Well Mehl Federal 23-25 • Access/utilities
5642	<ul style="list-style-type: none"> • Well Dry Fork Federal 12-26 • Access road
5646	<ul style="list-style-type: none"> • Access/utility corridor
5657	<ul style="list-style-type: none"> • Intersects POD boundary, but no infrastructure is proposed within 0.5 mile
6385	<ul style="list-style-type: none"> • Well Ridgeline J Christensen 31-24 • Access/utility corridor

BLM ID	Infrastructure
6386	<ul style="list-style-type: none"> • Intersects POD boundary, but no infrastructure is proposed within 0.5 mile
6492	<ul style="list-style-type: none"> • Well Ridgeline J Christensen 31-24 • Access/utility corridor
6493	<ul style="list-style-type: none"> • Well 31-24 • Access/utility corridor
6494	<ul style="list-style-type: none"> • Main travel road • Utility corridor • Overhead power
6495	<ul style="list-style-type: none"> • Well Mehl Federal 21-25 • Well Mehl Federal 23-25 • Well Mehl Federal 12-25 • Access/utilities
6496	<ul style="list-style-type: none"> • Main travel road • Utility corridor • Overhead power
8373	<ul style="list-style-type: none"> • Well J Christensen Federal 23-14 • Well J Christensen Federal 41-23 • Access/utilities
10665	<ul style="list-style-type: none"> • Intersects POD boundary, but no infrastructure is proposed within 0.5 mile
10666	<ul style="list-style-type: none"> • Intersects POD boundary, but no infrastructure is proposed within 0.5 mile
10667	<ul style="list-style-type: none"> • Well Dry Fork Federal 12-26 • Access road
Notes:	
1	Rows shown in gray indicate nests that fall within 0.5 miles of the POD boundary but that do not have infrastructure proposed within 0.5 miles.

Nests 3714, 6494 and 6496 are within 0.5 miles of a main travel, a proposed utility corridor and a proposed overhead powerline. The nests were not active in 2009 but 6494 and 6496 were used by red-tailed hawks in 2008. Nest 3714 was reported as gone (nest destroyed by weather over winter) but was active in 2007. All of the nests were used by red-tailed hawks. The development of the Ridgeline project will increase the amount of disturbance in the area. The proposed powerline will introduce new perch sites and a slight increase in the chance of electrocution (APLIC standards will be followed). It is likely that future use of the nest sites will not be altered by the project actions.

Nests 5025, 5411 and 6386 are far enough away from proposed Ridgeline project action that they will not be affected by the project. Nests 5026, 5027, 5412, 6385, 6492, and 6493 are within 0.5 miles of wells and infrastructure but will be protected during the construction phase by timing limitations. The nest sites have all been used by either red-tailed hawks or great-horned owls, which will likely adapt to the ongoing activity in the CBM field once construction has been completed.

Nest 8373 and 10665 are located in creek banks in close proximity to each other and were reported as ferruginous hawk nests. It is likely that they were alternate nests for a territorial pair. Neither nest was active in 2009. It is not likely that the disturbance from the 31-24 and 41-23 wells from the Ridgeline project will be significant enough to affect future use of these nest sites, but along with activity from other projects, disturbance may reach a level where ferruginous hawks may avoid the area.

Nest 1967 of the Bullwhacker II Addition 1 project was occupied by red-tailed hawks (a species more tolerant of disturbance) in 2009. The nest has been inactive the past five years but was tended and improved this past nesting season. The project should have no impact on the nest. The rest of the nests in the Bullwhacker II Adds 1 project area, Nests: 5642, 5646, 5657, 10666, and 10667 were all inactive in 2009 with no other recent information available. The construction of the wells and infrastructure under timing restrictions will not likely affect the future use of these nests by raptors.

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

4.1.4.4.1. Raptors Cumulative Effects

The cumulative effects associated with Alternatives C are within the analysis parameters and impacts described in the PRB FEIS. For details on expected cumulative impacts, refer to the PRB FEIS, pg. 4-221. No additional mitigation measures are required.

4.1.4.5. 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.

4.1.4.6. Sagebrush Obligates Direct and Indirect Effects

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

4.1.4.6.1. Sagebrush Obligates Cumulative Effects

Fragmentation of shrubsteppe habitat is a major disruption that has consequences for sagebrush-obligate species (Braun et al. 1976; Rotenberry & Wiens 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.

4.1.4.7. 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 (<i>Mustela nigripes</i>)	Black-tailed prairie dog colonies or complexes > 1,000 acres.	NS	NE	Suitable habitat will not be directly impacted.
Blowout penstemon (<i>Penstemon haydenii</i>)	Sparsely vegetated, shifting sand dunes	NP	NE	No suitable habitat present.
<i>Threatened</i>				
Ute ladies'-tresses orchid (<i>Spiranthes diluvialis</i>)	Riparian areas with permanent water	NP	NE	No suitable habitat present.
<p>Presence K - Known, documented observation within project area. S - Habitat suitable and species suspected, to occur within the project area. NS - Habitat suitable but species is not suspected to occur within the project area. NP - Habitat not present and species unlikely to occur within the project area.</p> <p>Project Effects LAA - Likely to adversely affect NE - No Effect NLAA - May Affect, not likely to adversely affect individuals or habitat.</p>				

4.1.4.7.1. 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 within the Linch 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. Implementation of the proposed development will have no effect on the black-footed ferret because the species is not likely to occur.

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

Suitable habitat is not present within the proposed Ridgeline/Bullwhacker II Adds 1 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.

4.1.4.7.3. Blowout Penstemon Direct and Indirect Effects

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

4.1.4.7.4. Threatened and Endangered Species Cumulative Effects

The cumulative effects associated with Alternative C are within the analysis parameters and impacts described in the PRB FEIS. For details on expected cumulative impacts, refer to the PRB FEIS, pp. 4-250 to 4-257. No additional mitigation measures are required.

4.1.4.1. 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

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 Ridgeline/Bullwhacker II Adds 1 project on all Wyoming BLM sensitive species that occur in the BFO administrative area. Some sensitive species are of particular concern in the project area, due to their demonstrated or suspected sensitivity to CBNG development or because they were recently considered for listing under the ESA. These species include bald eagle, black-tailed prairie dog, greater sage-grouse, mountain plover, and western burrowing owl 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
Amphibians				
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>Rana 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	Species is not expected to occur within the project area.
Fish				
Sturgeon chub	Swift, rocky riffles throughout the Powder River.	NP	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>Oncorhynchus clarki bouvieri</i>)	Cold-water rivers, creeks, beaver ponds, and large lakes in the Upper Tongue sub-basin	NP	NI	Suitable habitat is not present, and the project area is outside species' range.
Birds				
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	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.
Burrowing owl (<i>Athene cunicularia</i>)	Grasslands, basin-prairie shrub	S	MIIH	Prairie dog towns will be affected, thus may impact nesting individuals or selection of nest sites.
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	K	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%	S	MIIH	Prairie dog towns will be affected.
Northern goshawk (<i>Accipiter gentilis</i>)	Conifer and deciduous forests	NP	NI	No forest habitat present.
Peregrine falcon (<i>Falco peregrinus</i>)	Cliffs	NP	NI	No nesting habitat present.
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	K	MIIH	Sagebrush cover will be affected.
Trumpeter swan (<i>Cygnus buccinator</i>)	Lakes, ponds, rivers	S	MIIH	Reservoirs may provide migratory habitat.
White-faced ibis (<i>Plegadis chihi</i>)	Marshes, wet meadows	NP	NI	Permanently wet meadows not present.
Yellow-billed cuckoo (<i>Coccyzus americanus</i>)	Open woodlands, streamside willow and alder groves	NP	NI	Streamside habitats not present.
Mammals				
Black-tailed prairie dog (<i>Cynomys ludovicianus</i>)	Prairie habitats with deep, firm soils and slopes less than 10 degrees.	K	MIIH	Prairie dog towns will be affected.
Fringed myotis (<i>Myotis thysanodes</i>)	Conifer forests, woodland chaparral, caves and mines	NP	NI	Habitat not present.
Long-eared myotis (<i>Myotis evotis</i>)	Conifer and deciduous forest, caves and mines	NP	NI	Habitat not present.
Spotted bat (<i>Euderma maculatum</i>)	Cliffs over perennial water.	NP	NI	Cliffs & perennial water not present.
Swift fox (<i>Vulpes velox</i>)	Grasslands	S	MIIH	Habitat is present.
Townsend's big-eared bat (<i>Corynorhinus townsendii</i>)	Caves and mines.	NP	NI	Habitat not present.
Plants				

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

Presence

K - Known, documented observation within project area.

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

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

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

Project Effects

NI - No Impact.

MIH - May Impact Individuals or Habitat, but will not likely contribute to a trend towards Federal listing or a loss of viability to the population or species.

WIPV - Will Impact Individuals or Habitat with a consequence that the action may contribute to a trend towards Federal listing or cause a loss of viability to the population or species.

BI - Beneficial Impact

4.1.4.1.1. Bald Eagle Direct and Indirect Effects

Bald eagle nesting or winter roost does not exist in the Ridgeline/Bullwhacker II Adds 1 project area.

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.

4.1.4.1.2. Black-tailed Prairie Dog Direct and Indirect Effects

One well, The Dry fork Federal 12- 26 will directly affect a prairie dog colony. The well is proposed just off of the existing road into the prairie dog colony and should cause minimal impact to the colony. 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.

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

4.1.4.1.3. 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 19 CBNG wells on 19 locations, 2.7 miles of new roads, 1.8 miles of new pipelines outside of roads, one 5 acre reservoir, and increased vehicle traffic on established roads. In particular, the access corridors to wells; Mehl Federal 12-25, 14-25, 21-25, 23-25 and J Christensen Federal 41-23 will fragment high quality sage-grouse habitat in Sections 24, W 25, E 26. The Johnson 43-26-4477 reservoir will inundate approximately five acres of brood-rearing habitat.

Originally, the Williams' proposed action (Alternative B) had 0.9 miles of proposed overhead power. After the onsite, the operator submitted a new proposal, in which power will be buried in high quality sage-grouse habitat to reduce the potential for predation. The proposed 41-24 location is 0.12 miles from the Christensen Ranch 2 lek, and was dropped in favor of the alternative 31-34 well, which is 0.30 from the lek. One reservoir, the Mehl 22-25, which would have inundated brood-rearing cover was dropped by Williams. Williams designed the project so that access roads, power, gas and water are within the same corridors, using existing roads where possible. One exception is the proposal to bury power between Mehl 32-26 and Mehl Fed 12-25. This would be through rough terrain that has less value to sage grouse. It will decrease the amount of disturbance through high quality sage-grouse habitat, and reduces the need for overhead power.

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

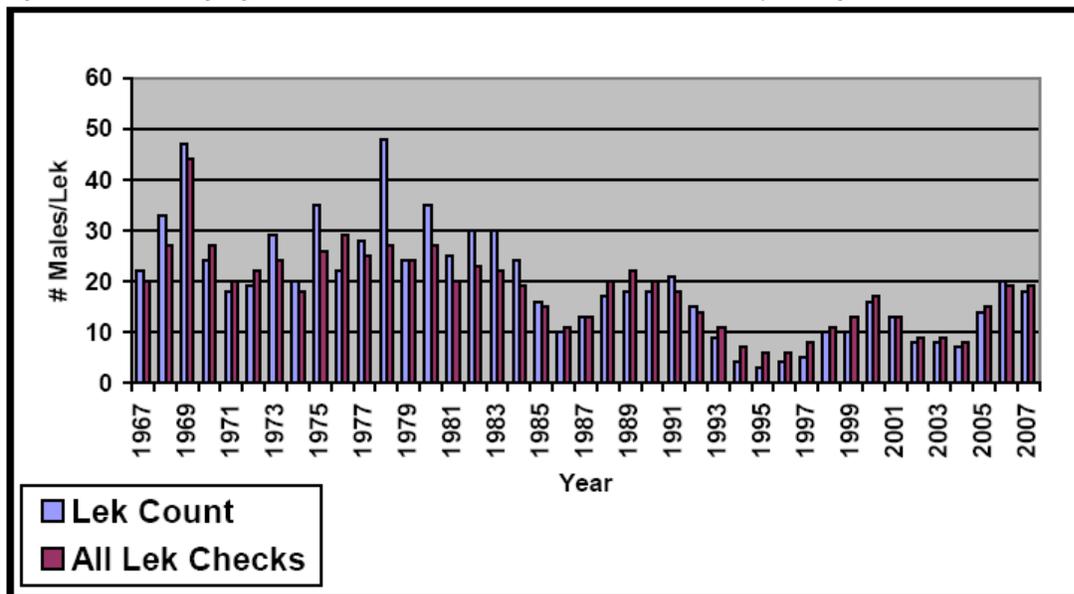
4.1.4.1.3.1. Greater Sage-grouse Cumulative Effects

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 sage-grouse leks that occur within four miles of the project boundary. Analysis of impacts up to four miles was recommended by the State Wildlife Agencies' Ad Hoc Committee for Consideration of Oil and Gas Development Effects to Nesting Habitat (2008). Impacts will occur as development continues to fragment an already disturbed landscape within the cumulative impact assessment area. Ongoing development will further isolate existing areas of high quality habitat by adding infrastructure between those areas and therefore reduce connectivity between suitable seasonal habitats around leks.

The sage-grouse population within northeast Wyoming has been exhibiting a steady long term downward trend, as measured by lek attendance (Figure 1) (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 1 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 1,313 wells (Wyoming Oil and Gas Conservation Commission [WOGCC] 08/2009) within the cumulative impact assessment area, an area of 277 square miles, which amounts to a density of approximately 4.7 wells per square mile. Currently, there are approximately 692 proposed wells (including the 19 from this project) within four miles of the leks (Automated Fluid Minerals Support System [AFMSS] 09/2009). With the addition of the 673 proposed wells that are not associated with this proposed action, the well density within four miles of the leks increases to 7.2 wells/section. With approval of alternative C (19 proposed well locations, including the 11 deferred due to lack of a signed Surface Use Agreement) the well density remains the same at 7.2 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

To mitigate impacts on nesting sage-grouse associated with surface-disturbing activities, BLM will implement a timing limitation on all activities within 0.6 miles of suitable nesting habitat. 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.

4.1.4.1.4. 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.

4.1.4.1.5. 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.

4.1.4.1.6. Sensitive Species Cumulative Effects

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

4.2. West Nile Virus Direct and Indirect Effects

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

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

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

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

4.3. Water Resources

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

Williams Production RMT Company (Williams) proposes to pipe the produced water from this project to

its nearby Bullwhacker development, which has been permitted under separate federal actions. See Bullwhacker Area Master POD WY-070-EA08-56 for more information on approved water management infrastructure. Water received by Bullwhacker development will be discharged to and consumed by existing reservoirs and infrastructure.

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 380 gpm (0.85 cfs or 612 acre-feet per year) for this POD. The PRB FEIS projected the total amount of water that was anticipated to be produced from CBNG development per year (Table 2-8 Projected Amount of Water Produced from CBM Wells Under Alternatives 1, 2A and 2B pg 2-26). For the Upper Powder River drainage, the projected volume produced within the watershed area was 147,481 acre-feet in 2008 (maximum production is estimated in 2007 at 171,423 acre-feet). As such, the volume of water resulting from the production of these wells is 0.41% of the total volume projected for 2008. This volume of produced water is also within the predicted parameters of the PRB FEIS.

4.3.1. Groundwater

The PRB FEIS predicts an infiltration rate of 40% to groundwater aquifers and coal zones in the Upper Powder River drainage area (PRB FEIS pg 4-5). For this action, it may be assumed that a maximum of 152 gpm will infiltrate at or near the discharge points and impoundments (245 acre feet per year). This water will saturate the near surface alluvium and deeper formations prior to mixing with the groundwater used for stock and domestic purposes. According to the PRB FEIS, “the increased volume of water recharging the underlying aquifers of the Wasatch and Fort Union Formations would be chemically similar to alluvial groundwater.” (PRB FEIS pg 4-54). Therefore, the chemical nature and the volume of the discharged water may not degrade the groundwater quality.

The PRB FEIS predicts that one of the environmental consequences of coal bed natural gas production is possible impacts to the groundwater. “The effects of development of CBM on groundwater resources would be seen as a drop in the water level (drawdown) in nearby wells completed in the developed coal aquifers and underlying or overlying sand aquifers.” (PRB FEIS page 4-1). In the process of dewatering the coal zone to increase natural gas recovery rates, this project may have some effect on the static water level of wells in the area. The permitted water wells produce from depths which range from 24 to 1650 feet compared to 1,135 feet to the Big George. As mitigation, the operator has committed to offer water well agreements to holders of properly permitted domestic and stock wells within the circle of influence (½ mile of a federal CBNG producing well) of the proposed wells.

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

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

Shallow ground water monitoring is ongoing at impoundment sites across the basin. Due to the limited

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

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

4.3.1.1. Groundwater Cumulative Effects:

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

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

4.3.2. 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 that covers the Bullwhacker area, and the levels found in the POD’s representative water sample.

Table 4.4 Comparison of Regulated Water Quality Parameters to Predicted Water Quality

Predicted Values	TDS, mg/l	SAR	EC, µmhos/cm
Most Restrictive Proposed Limit –		2	1,000
Least Restrictive Proposed Limit		10	3,200
Primary Watershed, Arvada, WY 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		
WDEQ Water Quality Requirement for WYPDES			

Predicted Values	TDS, mg/l	SAR	EC, µmhos/cm
Permit # WY0054411 At discharge point At Irrigation Compliance point	5,000 NA	NA NA	7,500 NA
Predicted Produced Water Quality Big George Coal Zone	1,360	16.1	2130

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 1360.0 mg/l TDS which is within the WDEQ criteria for agricultural use (2000 mg/l TDS). However direct land application is not included in this proposal. The planned method of disposal is storage in the proposed reservoir within the Ridgeline POD as well as transfer via pipeline into existing development of the nearby Bullwhacker POD. See Bullwhacker Area Master POD WY-070-EA08-56 for more information on approved water management infrastructure. If at any future time the operator entertains the possibility of irrigation or land application with the water produced from these wells, the proposal must be submitted as a sundry notice for separate environmental analysis and approval by the BLM.

The quality for the water produced from the Big George target coal zone from these wells is predicted to be similar to the sample water quality collected from a location near the POD. A maximum of 20 gallons per minute (gpm) is projected is to be produced from these 19 wells, for a total of 380 gpm for the POD. See Table 4.5 .

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

There are 2 discharge points proposed for this project. They have been appropriately sited and utilize appropriate water erosion dissipation designs. Existing and proposed water management facilities were evaluated for compliance with best management practices during the onsite.

Williams will pipe the produced water to nearby existing reservoirs, channels and infrastructure in the previously permitted Bullwhacker development, through the transfer station in the SWNE section 26. All water management facilities were evaluated for compliance with best management practices during previous onsites for the Bullwhacker development.

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 0.13 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 19 wells is anticipated to be a total of 380 gpm or 0.85 cfs to impoundments. Using an assumed conveyance loss of 20% (PRB FEIS pg 4-74) and full containment the produced water re-

surfacing in Beecher Draw, its tributaries and other drainages within the Bullwhacker Development, from this action (0.13 cfs) may add a maximum 0.1 cfs to the Upper Powder River flows, or 0.15% of the predicted total CBNG produced water contribution. For more information regarding the maximum predicted water impacts resulting from the discharge of produced water, see Table 4-6 (PRB-FEIS pg 4-85).

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 3). Based on the area of the Beecher Draw watershed above the POD (5.0 sq mi) and an assumed density of 8 wells per location every 640 acres, the potential exists for the development of 40 wells which could produce a maximum flow rate of 800 gpm (1.8 cfs) of water. The BLM agrees with the operator that this is not expected to occur because:

1. New wells will be phased in over several years, and
2. A decline in well discharge generally occurs after several months of operation.

The potential maximum flow rate of produced water within the watershed upstream of the project area, 1.8 cfs, is much less than the volume of runoff estimated from the 2-year storm event for Beecher Draw of the drainage. (See WMP pp. 8-10).

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 committed to obtaining a Wyoming Pollutant Discharge Elimination System (WYPDES) permit for the discharge of water produced from this project from the WDEQ and will submit the appropriate copies when available. Permit limits shown below are derived from WYPDES permit WY0054411, which is representative of the Bullwhacker area. See Bullwhacker Area Master POD WY-070-EA08-56 for more information.

Permit effluent limits were set at (WYPDES WY0054411 page 2):

pH	6.5 to 9.0
TDS	5000 mg/l max
Specific Conductance	7500 mg/l max
Dissolved iron	1000 µg/l max
Dissolved Fluoride	629 µg/l max
Total Barium	1800 µg/l max
Total Arsenic	7 µg/l max
Chlorides	46 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 Pending. When available, Williams will submit the WYPDES permit associated with the Ridgeline POD. See WMP, p.9.

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 Ridgeline/Bullwhacker II Adds 1 POD prepared by WWC Engineering for Williams Production RMT Company. There is one headcut feature downstream of the proposed Ridgeline POD outfalls which could potentially be affected by Ridgeline POD discharges. The headcut is located in the SESE section 26, T44N R 77W and depicted on the map as HC 26-1. According to Landowner wishes, the headcut will be monitored, but not mitigated. It is the viewpoint of the landowner that the disturbance necessary to mitigate the headcut will outweigh the benefit of addressing the headcut. If however, the landowner requests that the headcut be mitigated, Williams will do so. Williams will pipe the produced water to nearby existing reservoirs, channels and infrastructure in the previously permitted Bullwhacker development. Therefore, no impacts resulting from continuous discharges will occur in the downstream channel section.

4.3.2.1. 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).

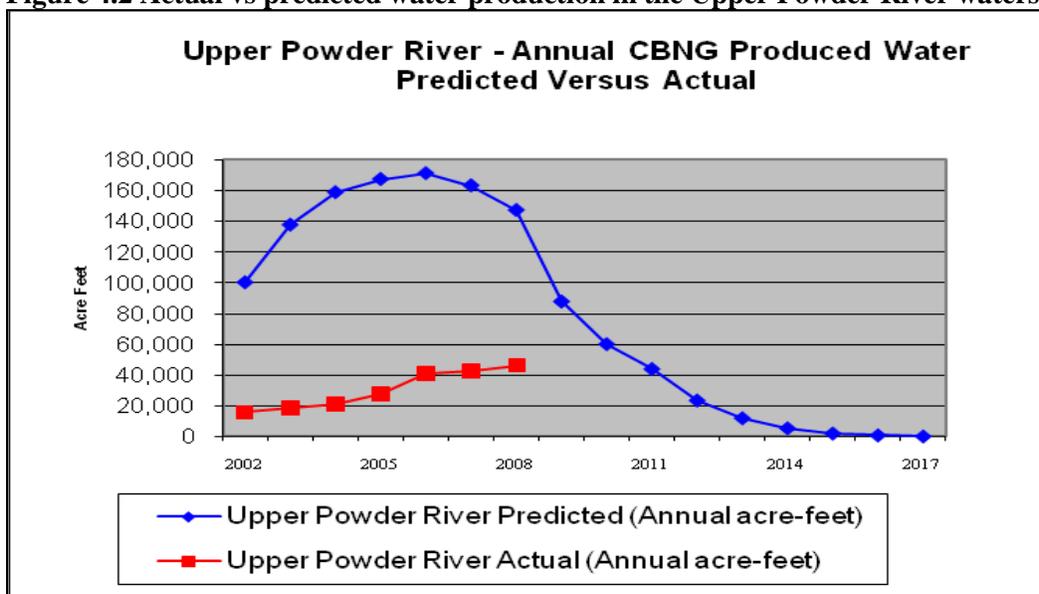
As of December 2008, all producing CBNG wells in the Upper Powder River watershed have discharged a cumulative volume of 212,522 acre-ft of water compared to the predicted 1,047,521 acre-ft disclosed in the PRB FEIS (Table 2-8 page 2-26). These figures are presented graphically in Figure 4.2 and Table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

Table 4.5 Actual vs predicted water production in the Upper Powder River watershed 2008 Data Update 06-08-09

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

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
2017	366	1,285,233				
Total	1,285,233		212,522			

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.

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 122 for cumulative effects common to all sub-watersheds.

4.4. Economics and Recovery of CBNG Resources

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

4.5. Fluid Minerals

The cumulative effects associated with Alternative C are within the analysis parameters and impacts described in the PRB FEIS. For information regarding potential losses from the wells deferred in Alternative D, see section 5.1 on p. 58-59 of this document. For details on expected cumulative impacts, please refer to the referenced PRB FEIS, Volume 2, Chapter 4.

4.6. Cultural Resources

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 9/11/2009 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).

4.7. Air Quality

In the project area, air quality impacts would occur during construction (due to surface disturbance by earth-moving equipment, vehicle traffic fugitive dust, well testing, as well as drilling rig and vehicle engine exhaust) and production (including non-CBM well production equipment, booster and pipeline compression engine exhaust). The amount of air pollutant emissions during construction would be controlled by watering disturbed soils, and by air pollutant emission limitations imposed by applicable air quality regulatory agencies. Air quality impacts modeled in the PRB FEIS concluded that projected oil & gas development would not violate any local, state, tribal or federal air quality standards.

5. ALTERNATIVE D

Only specific differences from alternative C will be discussed. Alternatives D was not explored during the onsite, however following the onsite inspection, the BLM Interdisciplinary Team (IDT) reviewed the surface use and wildlife data with the changes agreed to in the field. The BLM-IDT identified that further mitigation to reduce the loss of sage-grouse habitat within the project area was warranted. BLM determined that the greatest impact to the habitat from the proposed action is the fragmentation of sage-grouse habitat on a landscape scale, specifically the proposed road segments to various well locations, vertical intrusion from over head power, an increase risk of West Nile virus, and an increase of predators due to travel corridors, increase in habitat edge, and introduction of new nesting substrate proposed in Alternative C. The following proposal will be recommended to the operator as mitigation to reduce the impacts of habitat loss, habitat fragmentation, and West Nile virus within the Ridgeline/Bullwhacker II Adds 1.

5.1. 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). Removal of all 11 impoundments will retain native soil and vegetation. (see table 4.9.1 for quantification) The following table summarizes the proposed surface disturbance associated with Alternative D.

Table 5.1 Surface Disturbance Associated with Impoundments

Impoundment Name / Number	Qtr/Qtr	Sec	TWP	RNG	Capacity (Acre Feet)	Surface Disturbance (Acres)	Surface disturbance of pipeline and access road (Acres)
Johnson 43-26-4477	NESE	26	44	77	18.63	5.0	43.9

5.1.1. Cumulative effects for Vegetation and Soils

No additional mitigation measures are required.

5.2. Wildlife

5.2.1. Big Game Direct and Indirect Effects

Short-term disturbances associated with burying proposed overhead power will result in direct habitat loss until reclamation accelerates return to habitat effectiveness. This alternative will reduce habitat disturbance and eliminate habitat fragmentation by relocation/removal of five wells.

5.2.1.1. Cumulative effects for Big Game

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

5.2.2. Migratory Birds Direct and Indirect Effects

Alternative D contains the least habitat impact to migratory birds.

5.2.2.1. Cumulative effects for Migratory Birds

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

5.2.3. Raptors Direct and Indirect Effects

Alternative D contains the least habitat impact to raptors.

5.2.3.1. Cumulative effects for Raptors

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

5.2.4. Threatened and Endangered and Sensitive Species

5.2.4.1. Threatened and Endangered Species Direct and Indirect Effects

5.2.4.1.1. Bald eagle

The overall vertical intrusion within the project would be reduced with implementation of Alternative D. With a decreased amount of overhead power there would be a decreased likelihood of power line mortalities.

5.2.4.2. Sensitive Species Direct and Indirect Effects

5.2.4.2.1. Greater sage-grouse

Alternative D would reduce the negative impact to sage-grouse and habitat fragmentation of habitat as well as accelerate return to habitat effectiveness at reclamation.

Trenching construction would temporarily remove habitat while burying proposed overhead power outside of existing corridors. This will cause a short-term disturbance and direct habitat loss; however, effective reclamation should provide some habitat value as these areas are reclaimed and native vegetation becomes established. This alternative would improve sage grouse habitat by removing vertical intrusions and consolidating most linear infrastructure with access roads.

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.

According to the Wyoming Game and Fish Department’s “*Recommendations for Development of Oil and Gas Resources Within Important Wildlife Habitats*”, “in CBM fields, treat, remove, or re-inject produced water to reduce habitat for mosquitoes that vector West Nile virus (Walker et al. 2007b).”

The Wyoming Game & Fish Department Recommendations cite a study indicating that coal-bed natural gas (CBNG) ponds significantly increased the overall population of West Nile virus (WNV) vector mosquitoes in the Powder River Basin, and added to the duration of larval habitats that would normally be ephemeral. The author concluded CBNG ponds and associated habitats may serve to increase pathogen transmission in an otherwise arid ecosystem. (Doherty, M. K. 2007. Mosquito populations in the Powder River Basin, Wyoming: a comparison of natural, agricultural and effluent coal-bed natural gas aquatic habitats. M. S. Thesis. Montana State University, Bozeman, MT, USA.) Larval habitats of the West Nile virus vector mosquito *Culex tarsalis* were identified via remote sensing and GIS analyses. Result showed a 75% increase in potential larval habitats from 1999 to 2004 primarily because of the large increase in coalbed methane discharge ponds. (Zou, L.S.N Miller and E.T. Schmidtman. 2006 . Mosquito larval habitat mapping using remote sensing and GIS: implications of coalbedmethane development and West Nile Virus. Journal of Medical Entomology 43:1034-1041.)

5.2.4.2.2. Sharp-tailed grouse

Impacts to sharp-tailed grouse are similar to that of sage-grouse.

5.2.4.3. Cumulative effects for Sharp-tailed grouse

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

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

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

5.4. Fluid Minerals

The tables below indicates potential for lost resources and revenue under Alternative D.

Assuming these wells are not drilled but all surrounding 80s are							
Twp	Rng	Sec	Qtr/Qtr	Lease	Well Name	Unrecovered CBM	
						High	Low
44N	77W	23	NENE	WYW140148	J Christensen Federal 41-23-4477	98	13
44N	77W	25	SWNW	WYW140148	Mehl Federal 12-25-4477	76	13
44N	77W	25	SWSW	WYW144543	Mehl Federal 14-24-4477	76	13
44N	77W	25	NENW	WYW140148	Mehl Federal 21-25-4477	76	13
44N	77W	25	NESW	WYW144543	Mehl Federal 23-25-4477	76	13
All numbers are in thousands of MCF.							

Assuming these wells are not drilled and there are no offsetting wells							
Twp	Rng	Sec	Qtr/Qtr	Lease	Well Name	Unrecovered CBM	
						High	Low
44N	77W	23	NENE	WYW140148	J Christensen Federal 41-23-4477	889	118
44N	77W	25	SWNW	WYW140148	Mehl Federal 12-25-4477	695	118
44N	77W	25	SWSW	WYW144543	Mehl Federal 14-24-4477	695	118
44N	77W	25	NENW	WYW140148	Mehl Federal 21-25-4477	695	118
44N	77W	25	NESW	WYW144543	Mehl Federal 23-25-4477	695	118
All numbers are in thousands of MCF.							

5.5. Comparison Summary of Effects By Cumulative effects

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

Table 5.2 Cumulative Effects

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

Resource/Species	Alternative A	Alternative C	Alternative D Sage Grouse emphasis
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.
Threatened and Endangered Species			
Bald eagle	No habitat loss	Overhead electricity increasing mortality risk from electrocution.	Removal of overhead electricity will eliminate risk from electrocution. Removal of proposed impoundments will reduce West Nile virus impacts to eagles and retain foraging in areas where impoundments will impact prairie dogs.
Sensitive Species			
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. Reduce predators in nesting habitat with eliminating water impoundments. 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.

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

6. CONSULTATION/COORDINATION

Contact	Title	Organization	Present at Onsite
David Platt	Environmental Planner	Windmill Energy	yes
Will Myers	Hydrologist/CE	WWC	yes
Randee Jespersen	Landman	Williams	yes

7. OTHER PERMITS REQUIRED

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

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Appendix A
Detailed Description of Alternatives B, C, D, and
Alternatives Considered but not Analyzed in Detail
Williams Production RMT Company
Ridgeline/Bullwhacker II Adds 1
ENVIRONMENTAL ASSESSMENT –WY-070-EA09-150

1. Alternative B - Proposed Action

Proposed Action Title/Type: Williams Production RMT Company’s Ridgeline/Bullwhacker II Adds 1 Plan of Development (POD) for 19 coal bed natural gas well APD’s and associated infrastructure.

Proposed Well Information: There were 19 wells proposed within this POD; the wells are vertical bores proposed on an 80 acre spacing pattern with 1 well per location. Each well will produce from one coal seam. Proposed well house dimensions are 4 ft wide x 4 ft length x 4 ft height. Well house color is Covert Green, selected to blend with the surrounding vegetation. Proposed wells are located as follows:

	Well Name	Well #	Qtr/Qtr	Section	TWP	RNG	Lease #
1	RIDGELINE FEDERAL	14-14	SWSW	14	44N	77W	WYW140148
2	RIDGELINE FEDERAL	12-23*	SWNW	23	44N	77W	WYW139690
3	RIDGELINE FEDERAL	34-23	SWSE	23	44N	77W	WYW144543
4	RIDGELINE J CHRISTENSEN	23-14	NESW	14	44N	77W	WYW140148
5	RIDGELINE J CHRISTENSEN	21-23	NENW	23	44N	77W	WYW139690
6	RIDGELINE J CHRISTENSEN	32-23	SWNE	23	44N	77W	WYW140148
7	RIDGELINE J CHRISTENSEN	43-23	NESE	23	44N	77W	WYW144543
8	RIDGELINE J CHRISTENSEN	41-23	NENE	23	44N	77W	WYW140148
9	RIDGELINE J CHRISTENSEN	43-24	NESE	24	44N	77W	WYW144543
10	RIDGELINE J CHRISTENSEN	31-24	NWNE	24	44N	77W	WYW140148
11	RIDGELINE J CHRISTENSEN	32-24	SWNE	24	44N	77W	WYW140148
12	RIDGELINE J CHRISTENSEN	34-24	SWSE	24	44N	77W	WYW144543
13	RIDGELINE MEHL	12-25	SWNW	25	44N	77W	WYW140148
14	RIDGELINE MEHL	14-25	SWSW	25	44N	77W	WYW144543
15	RIDGELINE MEHL	21-25	NENW	25	44N	77W	WYW140148
16	RIDGELINE MEHL	23-25	NESW	25	44N	77W	WYW144543
17	BULLWHACKER II ADD I DRY FORK	12-26*	SWNW	26	43N	77W	WYW50143
18	BULLWHACKER II ADD I DRY FORK	32-26	SWNE	26	43N	77W	WYW50143
19	BULLWHACKER II ADD I DRY FORK	12-27	SWNW	27	43N	77W	WYW50143

Water Management Proposal: The following impoundments were proposed for use in association with the water management strategy for the POD. The Johnson 43-26-4477 reservoir has a Secondary designation due to lack of a bond.

	IMPOUNDMENT Name / Number	Qtr/Qtr	Sec	TWP	RNG	Capacity (Acre Feet)	Surface Disturbance (Acres)	Lease #
1	Johnson 43-26-4477	NESE	26	44	77	18.63	5.0	WYW139692

County: Johnson

Applicant: Williams Production RMT Company

Surface Owners: Dee Johnson, Wayne and Helen Mehl, John Christiansen

Project Description:

The proposed action involves the following:

- Drilling of 19 total federal CBM wells in Big George and Lower Big George coal zones to depths of approximately 1500 feet for the Bullwhacker II Adds wells, 1700 feet for the Ridgeline wells. Multiple seams will be produced by co-mingling production (a single well per location cable of producing from multiple coal seams).
- Drilling and construction activities are anticipated to be completed within two years, the term of an APD. Drilling and construction occurs year-round in the PRB. Weather may cause delays lasting several days but rarely do delays last multiple weeks. Timing limitations in the form of COAs and/or agreements with surface owners may impose longer temporal restrictions on portions of this POD, but rarely do these restrictions affect an entire POD.
- Williams intends to use conventional meter runs and/or electric measurement located at central metering buildings.
- A Water Management Plan (WMP) that involves the following infrastructure and strategy: 2 discharge points and 1 stock water reservoirs within the Upper Powder River primary watershed that would provide full containment of discharge water from this POD. Additional flows will be piped to existing reservoirs and infrastructure associated with Bullwhacker development, which has been permitted under separate federal actions. See Bullwhacker Area Master POD WY-070-EA08-56 for more information on approved water management infrastructure.
- An unimproved and improved road network.
- An above ground power line network to be constructed by a contractor. The proposed route has been reviewed by the contractor. If the proposed route is altered, then the new route will be proposed via sundry application and analyzed in a separate NEPA action. Power line construction has not been scheduled and will not be completed before the CBNG wells are producing. If the power line network is not completed before the wells are in production, then temporary diesel generators shall be placed at the 3 power drops.
- A storage tank of 1000 gallon capacity shall be located with each diesel generator. Generators are projected to be in operation for 6-12 months. Fuel deliveries are anticipated to be 2 times per week. Noise level is expected to be 75 decibels at 50 feet distance. Use of the topography,

generator housing, and mufflers will be used to further mitigate any noise issues that may occur from the generators. It is William's intention to have a power supply other than the use of generators, such as overhead or buried power, as soon as possible to reduce the use of the fuel run generators.

- A buried gas, water and power line network.
- There are no proposed central gathering/metering facilities or compression facilities.

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

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

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

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

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

2. Alternative C – Environmentally Preferred

2.1. Changes as a result of the on-sites

Williams has removed all overhead power from their proposal. Alternative C now contains only buried power.

Ridgeline:

1. 23-14 well: Change access to use existing 2-track to the north. Use of this existing road will reduce the amount of new disturbance in sage-grouse habitat.
2. 12-23 well: At the landowner's request, there will be no cattle guard in the gate to this well.
3. 34-23 well: Moved the well stake 115' NW to avoid building a pad.
4. 41-23 well: Well moved approximately 75' E to get it away from the edge of the drainage.
5. 12-25 well: Access across the bottom of the drainage was re-routed a little further N. This new access route goes straight across the drainage, eliminating a couple hundred feet of road in the drainage bottom.
6. 32-26 well: Well was originally staked right next to the pipeline, so it was moved approximately 100' N off of the pipeline.

7. 31-24 well (this is the alternate location for the 41-24 well, which was originally staked next to a lek. Moved alt location approximately 50' away from main access road. Williams doesn't like to drill right next to roads or pipelines since this doesn't give them enough room to tie in from the new well.
8. 14-41 well: Access was moved approximately 50' downhill along the main road to a more level access point.

Bullwhacker II Adds 1:

1. 32-26-4377 well: Moved well approx 132' west to move away from existing pipeline. Access: Same alignment but changed from improved template to existing primitive with two gravel spot upgrades.

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

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

3. Programmatic and Site specific mitigation measures, Alternative C

3.1. Programmatic mitigation measures identified in the PRB FEIS ROD

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

3.1.1. Wildlife

1. For any surface-disturbing activities proposed in sagebrush shrublands, the Companies will conduct clearance surveys for sage grouse breeding activity during the sage grouse's breeding season before initiating the activities. The surveys must encompass all sagebrush shrublands within 0.5 mile of the proposed activities.
2. The Companies will locate facilities so that noise from the facilities at any nearby sage grouse or sharp-tailed grouse display grounds does not exceed 49 decibels (10 dBA above background noise) at the display ground.
3. The Companies will construct power lines to minimize the potential for raptor collisions with the lines. Potential modifications include burying the lines, avoiding areas of high avian use (for example, wetlands, prairie dog towns, and grouse leks), and increasing the visibility of the individual conductors.
4. Containment impoundments will be fenced to exclude wildlife and livestock. If they are not fenced, they will be designed and constructed to prevent entrapment and drowning.
5. All stock tanks shall include a ramp to enable trapped small birds and mammals to escape. See Idaho BLM Technical Bulletin 89-4 entitled Wildlife Watering and Escape Ramps on Livestock Water Developments: Suggestions and Recommendations.

3.1.1.1. Threatened, Endangered, or Sensitive Species

3.1.1.1.1. Bald Eagle

1. Site-specific project areas will be evaluated for suitable bald eagle nesting and roosting habitat prior to permit approval. Suitable nesting habitat is any mature stand of conifer or cottonwood trees in

association with rivers, streams, reservoirs, lakes or any significant body of water. Suitable roosting habitat is defined as any mature stands of conifer or cottonwood trees.

3.1.1.1.2. Black-footed Ferret

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

3.1.1.1.3. Mountain Plover

1. A mountain plover nesting survey shall be conducted following U.S. Fish and Wildlife Service protocol within occupied black-tailed prairie dog colonies prior to permit authorization.

Outside of occupied black-tailed prairie dog colonies, a mountain plover nesting survey following U.S. Fish and Wildlife Service protocol is encouraged prior to construction initiation, as project modifications can be made if necessary to protect nesting plovers and natural gas production. If requested in writing, then authorization may be granted for construction activities to occur between August 1 and March 15, outside the mountain plover breeding season. A mountain plover nesting survey following U.S. Fish and Wildlife Service protocol shall be conducted during the first available survey period (May 1 – June 15). Additional measures such as monitoring and activity restrictions may be applied if mountain plovers are documented.

2. A disturbance-free buffer zone of 0.25 mile will be established around all occupied mountain plover nesting habitat between March 15 and July 31.
3. Project-related features that encourage or enhance the hunting efficiency of predators of mountain plover will not be constructed within ½ mile of occupied mountain plover nesting habitat.
4. Construction of ancillary facilities (for example, compressor stations, processing plants) will not be located within ½ mile of known nesting areas. The threats of vehicle collision to adult plovers and their broods will be minimized, especially within breeding aggregation areas.
5. Work schedules and shift changes will be set to avoid the periods from 30 minutes before to 30 minutes after sunrise and sunset during June and July, when mountain plovers and other wildlife are most active.
6. Reclamation of areas of previously suitable mountain plover habitat will include the seeding of vegetation to produce suitable habitat for mountain plover.

3.1.1.1.4. Ute Ladies'-tresses Orchid

1. Site-specific project areas will be evaluated for suitable Ute ladies'-tresses orchid habitat prior to permit approval. Suitable habitat is characterized by moist soils near springs, lakes, or perennial streams; most occurrences are in alluvial substrates along riparian edges, gravel bars, old oxbows, and moist to wet meadows in the floodplains of perennial streams (USFWS 1995).

3.1.2. Air Quality

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

3.1.3. Water Management

3.1.3.1. Groundwater

1. In order to address the potential impacts from infiltration on shallow ground water, the Wyoming DEQ has developed a guidance document, "Compliance Monitoring and Siting Requirements for Unlined Coalbed Methane Produced Water Impoundments" which was approved September, 2006. For WYPDES permits received by DEQ after the August 1st effective date, the BLM requires that operators comply with the current approved DEQ compliance monitoring guidance document prior to discharge of federally-produced water into newly constructed or upgraded impoundments.

3.1.3.2. Surface Water

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

3.1.4. Soils

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

3.2. Site Specific Conditions of Approval, Alternative C

3.2.1. General/ Surface Use

1. All permanent above-ground structures (e.g., production equipment, tanks, etc.) not subject to safety requirements will be painted to blend with the natural color of the landscape. The paint used will be a color which simulates "Standard Environmental Colors." The color selected for the Ridgeline/Bullwhacker II Adds I PODs is Covert Green, 18-0617 TPX.

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

Loamy Ecological Site Seed Mix		
Species	% in Mix	Lbs PLS*
Western Wheatgrass (Pascopyrum smithii)/or Thickspike Wheatgrass (Elymus lanceolatus ssp. lanceolatus)	30	3.6
Bluebunch Wheatgrass (Pseudoroegneria spicata ssp. Spicata)	10	1.2
Green needlegrass (Nassella viridula)	25	3.0
Slender Wheatgrass (Elymus trachycaulus ssp. trachycaulus)	20	2.4
Prairie coneflower (Ratibida columnifera)	5	0.6
White or purple prairie clover (Dalea candidum, purpureum)	5	0.6
Rocky Mountain beeplant (Cleome serrulata)	5	0.6
Chapter 2 Totals	100%	12 lbs/acre

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

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

- Slopes too steep for machinery may be hand broadcast and raked with twice the specified amount of seed. Complete fall seeding after September 15 and prior to prolonged ground frost. To be effective, complete spring seeding after the frost has left the ground and prior to May 15.
- Please contact Melanie Hunter, Natural Resource Specialist, at (307) 684-1138, Bureau of Land Management, Buffalo, if there are any questions concerning these surface use COAs.

3.2.2. Wildlife

Raptors

The following conditions will alleviate impacts to raptors:

- No surface disturbing activity shall occur within 0.5 mile of all identified raptor nests from February 1 through July 31, annually, prior to a raptor nest occupancy survey for the current breeding season. This timing limitation will affect the following:

Township/Range	Section	Wells and Infrastructure
44N/77W	14	J Christensen Federal 23-14-4477 Federal 14-14-4477
44N/77W	23	Federal 12-23-4477 and access corridor J Christensen Federal 21-23-4477 J Christensen Federal 32-23-4477 J Christensen Federal 41-23-4477
44N/77W	24	31-24-4477 ALT

Township/Range	Section	Wells and Infrastructure
		Access corridor to J Christensen Federal 41-23-4477
44N/77W	25	Mehl Federal 12-25-4477 Mehl Federal 14-25-4477 Mehl Federal 21-25-4477 Mehl Federal 23-25-4477 All infrastructure
44N/77W	26	Power corridor
43N/77W	26	Dry Fork Federal 12-26

- a. Surveys to document nest occupancy shall be conducted by a biologist following BLM protocol, between April 15 and June 30. All survey results shall be submitted in writing to a Buffalo BLM biologist and approved prior to surface disturbing activities. Surveys outside this window may not depict nesting activity. If a survey identifies active raptor nests, a 0.5 mile timing buffer will be implemented. The timing buffer restricts surface disturbing activities within 0.5 mile of occupied raptor nests from February 1 to July 31.
- b. Nest occupancy and productivity checks shall be completed for nests within a 0.5 mile of any surface disturbing activities across the entire POD for as long as the POD is under construction. Once construction of the POD has ceased, nest occupancy and productivity checks shall continue for the first five years on all nests that are within 0.5 mile of locations where any surface-disturbing activities took place. Productivity checks shall be completed only on those nests that were verified to be occupied during the initial occupancy check of that year. The productivity checks shall be conducted no earlier than June 1 or later than June 30, and any evidence of nesting success or production shall be recorded. Survey results will be submitted to a Buffalo BLM biologist in writing no later than July 31 of each survey year. The nests that are checked each year is subject to change, pending surveys.
2. If an undocumented raptor nest is located during project construction or operation, the Buffalo Field Office (307-684-1100) shall be notified within 24 hours.
3. Well metering, maintenance and other site visits within 0.5 miles of raptor nests should be minimized as much as possible during the breeding season (February 1 – July 31).

Sage Grouse

The following conditions will alleviate impacts to sage-grouse:

1. No surface disturbing activities are permitted in high quality sage grouse habitat between March 1 and June 15. This condition will be implemented on an annual basis for the life of the project. This timing limitation will affect the following entire project area.

3.2.3. Water Management

1. The operator will supply two copies of the complete approved WYPDES permits to BLM as they are issued by WDEQ.

4. Programmatic and Site Specific Mitigation Measures Alternative D-Sage-Grouse Emphasis

The project-level modifications identified for the Ridgeline/Bullwhacker II Adds 1, Alternative D, are listed below:

- The BLM National Sage-grouse Habitat Conservation Strategy's Guidance for the Management of Sagebrush Plant Communities for Sage-Grouse Conservation contains a Habitat Fragmentation Suggested Management Practice to manage existing road use to decrease the level of disturbance during critical periods such as breeding (lek use) by implementing seasonal or daily use

schedules, by limiting traffic volume, and/or by posting speed limits. Limit well visitation to three times a week.

To avoid disturbance during breeding season, implement reclamation activities, including seeding, between August 1 and January 31.

The site-specific level modifications identified for the Ridgeline/Bullwhacker II Adds 1 Alternative D, are listed below:

Defer the following wells:

Name/Number	Township/Range	Qtr Qtr	Section
Federal 41- 23-4477	T44N,R77W	NENE	23
Mehl Fed 12-25-4477	T44N,R77W	SWNW	25
Mehl Fed 14-24-4477	T44N,R77W	SWSW	25
Mehl Fed 21-25-4477	T44N,R77W	NENW	25
Mehl Fed 23-25-4477	T44N,R77W	NESW	25

Alternatives to the different aspects of the proposed action are always considered and applied as pre-approval changes, site specific mitigation and/or Conditions of Approval (COAs), if they will alleviate or minimize environmental effects of the operator’s proposal.

4.1. Programmatic and Site specific mitigation measures

All programmatic and site specific measures from Alternative C apply, with the exception of the following:

4.1.1. Water Management

In Alternative D, no impoundments would be approved and no water could be discharged to the surface. This leaves the operator without a mechanism for the management of the water produced in association with the natural gas. In order to produce the approved wells, the operator would be required to submit a viable alternative water management plan for approval. That plan would need to be developed to conform with all the sage grouse management criteria, i.e. no new surface water impoundment structures and no surface discharge of the CBNG produced water.

4.2. Alternatives considered but not in detail

4.2.1. Land Application

Land application would involve applying the water to cropland at agronomic rates through an irrigation system. Land application is at best a seasonal approach and would require the construction of several reservoirs to store produced water during the non-irrigation season. Land application of water produced from the Ridgeline/Bullwhacker II Adds 1 was considered, but due to the high construction and operating costs, land application was ruled out. However, CBNG water may be piped and used at approved existing Bullwhacker development land application facilities. See Bullwhacker Area Master POD WY-070-EA08-56 for more information on approved water management infrastructure.

4.2.1.1. Treatment of Produced Water

Treatment of produced water from the Ridgeline/Bullwhacker II Adds 1 was extensively researched to examine the full range of possibilities. Ion exchange was the principle technology considered, but costs were considered to be cost prohibitive for this project. In particular, the waste stream produced would

require disposal through commercial injection or evaporation on site, thus adding substantial costs and detracted from the viability of this project. As well, the discharge of treated water into stream channels was not desirable.

4.2.1.2. Artificial Wetlands

Artificial wetlands do not effectively reduce the level of dissolved solids in the discharge water or meet the volume requirements of this project, and the landowners and lessees did not desire the creation of large wetland areas.

5. Summary of Alternatives

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

Table 5.1 Summary of the Alternatives

Facility	Alternative A (No Action) Existing Number/ Acres/Miles	Alternative B (Original Proposal) Proposed Number/ Acres/Miles	Alternative C (Environmental Alt.) Revised Number/ Acres/Miles	Alternative D (Environmental Alt.2) Revised Number/ Acres/Miles
Total CBNG Wells		19	19	14
Well Locations				
Nonconstructed		18	18	13
Constructed		1	1	1
Slotted		0	0	0
Conventional Wells		0	0	0
Gather/Metering Facilities				
Number of Facilities		0	0	0
Acreage of Facilities				
Compressors				
Number of Compressors		0	0	0
Ancillary (Staging/Storage Areas)		0	0	0
Template/ Spot Upgrade Roads				
No Corridor		5.3 acres	5.6 acres	4.1 acres
With Corridor		2.8 acres	2.7 acres	2.7 acres
Engineered Roads				
No Corridor		1.9 acres	2.5 acres	0.5 acres
With Corridor		4.5 acres	3.9 acres	2.9 acres

Facility	Alternative A (No Action) Existing Number/ Acres/Miles	Alternative B (Original Proposal) Proposed Number/ Acres/Miles	Alternative C (Environmental Alt.) Revised Number/ Acres/Miles	Alternative D (Environmental Alt.2) Revised Number/ Acres/Miles
Primitive Roads No Corridor With Corridor		0.5 acres 7.7 acres	0.5 acres 6.0 acres	0.5 acres 2.7 acres
Buried Utilities (power) No Corridor With Corridor		0.3 acres Included in buried pipeline	0.3 acres Included in buried pipeline	0.3 acres Included in buried pipeline
Buried Pipeline No Corridor With Corridor		4.7 acres 19.7 acres	4.7 acres 19.7 acres	2.0 acres 19.7 acres
Overhead Powerlines		1.7 acres Total dist. to this point = 54.1 acres	OHP removed from project at operator request Total dist = 50.9	0.0
Land Application Disposal		0	0	0
Subsurface Drip Irrigation		0	0	0
Treatment Facilities		0	0	0
Impoundments On-channel Off-channel Lined Unlined		1 (5 acres) 0	1 (5 acres) 0	1(5 acres) 0
Water Discharge Points		2	2	2
Channel Disturbance Headcut Mitigation Channel Modification		0.31 0.0	0.31 0.0	0.31 0.0
TOTAL ACRES DISTURBANCE		60.6	56.4	45.9