DECISION RECORD
For
Yates Petroleum Corporation
Queen B POD
WY-070-EA11-226
Bureau of Land Management, Buffalo Field Office

DECISION: The BLM approves 15 coalbed natural gas (CBNG) well applications for permit to drill (APD) and resurfacing of the bridge accessing Queenb CS Federal 13 in Yates Petroleum Corporation 's (Yates) Queen B Plan of Development (POD). This approval includes the well's support facilities. The environmental effects of the Queen B POD are analyzed in environmental assessment (EA) WY-070-EA12-226.

COMPLIANCE; this decision complies with:

- Federal Land Policy and Management Act of 1976 (FLPMA) (43 USC 1701); DOI Order 3310.
- Mineral Leasing Act of 1920 (30 U.S.C. 181) and as prescribed in 43 CFR Part 3160 to include On Shore Order No. 1.
- National Environmental Policy Act of 1969 (NEPA) (42 USC 4321).
- Migratory Bird Treaty Act (16 USC 703).
- 1985 Buffalo Resource Management Plan (RMP) (updated 2001).
- Powder River Basin Final Environmental Impact Statement (FEIS) and RMP Amendment (2003).
- National Historic Preservation Act of 1966 (NHPA) (16 USC 470).
- Fortification Creek Environmental Assessment and RMP Amendment (2011).

SELECTED FEATURES

This Decision Record approves 15 APDs, through the analysis yielded from Environmental Assessment WY-070-11-226, the 1985 Buffalo RMP and its amendments. These 15 APDs, the two (2) rights of way (ROWs), water management plan (WMP), and associated infrastructure were evaluated in WY-070-EA11-226.

The BFO approves these 15 APDs:

Table 2.1 Proposed Wells – Alternative B (Well Names are consistent with Yates Submission)

	Well Name	Well #	Qtr/Qtr	Sec.	Township	Range	Lease #
1	Queenb CS Federal	#1	NENE	15	51	76	WYW40814
2	Queenb CS Federal	#3	SWNE	15	51	76	WYW40814
3	Queenb CS Federal	#4	SWSW	15	51	76	WYW40814
4	QueenB CS Federal Com.	#5	SWSE	15	51	76	WYW40814
5	QueenB CS Federal	#6	NENW	22	51	76	WYW40814
6	QueenB CS Federal	#7	SWNW	22	51	76	WYW40814
7	Queenb CS Federal	#8	SWNE	22	51	76	WYW40814
8	QueenB CS Federal	#9	NESW	22	51	76	WYW40814
9	Queenb CS Federal Com.	#10	NENE	28	51	76	WYW40814
10	Queenb CS Federal	#11	SWNE	28	51	76	WYW40814
11	Queenb Injector Federal	#12	NWNE	22	51	76	WYW40814
12	Queenb CS Federal	#13	NENE	14	51	76	WYW40814
13	Queenb CS Federal	#14	SWNE	14	51	76	WYW40814
14	Queenb CS Federal	#15	NESE	14	51	76	WYW40814

	Well Name	Well #	Qtr/Qtr	Sec.	Township	Range	Lease #
15	Queenb CSFederal	#16	SWSE	14	51	76	WYW40814

The BFO approves the following right-of-ways:

ROW Grant	*ROW Action*	*SEC.*	*T.*	*R.*	*Lengths*	*Width*
Yates WYW-170253	Road, Water, Power	21	51N	76W	5,340'	NTE 50'
Rowdy Pipeline WYW-170254	Gas Pipeline	14,15,21,22	51N	76W	10,941'	NTE 50'

Water Management:
The water treatment facilities and associated existing infrastructure in the table below were inspected and approved for use in association with the water management strategy for the POD.

	Facility Name / Number	Qtr/Qtr	Sec	TWP	RNG	Capacity (acre feet)	Surface Disturbance (acres)	Lease #
1	Honeycomb	NESE	15	51	76	13.6	1.9	Fee
2	Stinger	SWSE	15	51	76	12.1	1.7	Fee & FED WYW40814
3	Swarm	NESE	15	51	76	10.2	2.1	Fee

Transportation:

Soft Water Draw Crossing-

BLM approves use of the existing bridge with resurfacing and erosion control measures.

Limitations:

- **Reclamation Timing (**WYW40814)
  Reclamation of areas disturbed as a result of lessee's operations will be done, insofar as possible, concurrently with operations.

- **Watershed Timing Limitation Stipulation (TLS) (**WYW40814)
  In order to minimize watershed damage, during wet or heavy snow periods the Casper District Manager, Bureau of Land Management, may prohibit exploration, drilling or other development. This limitation does not apply to maintenance and operation of producing wells.

- **Controlled Surface Use (CSU) (WYW40814)**
  (1) Surface occupancy or use within the Fortification Creek Special Management Area (FCSMA) will be restricted or prohibited unless the operator and the surface managing agency arrive at an acceptable plan for mitigation of anticipated impacts. This may include development and operations and maintenance of facilities; (2) entire lease; (3) protecting elk crucial winter range.
  This stipulation would only be applied if information shows such is needed and is agreed upon by the Field Manager and the RMP is amended (PRB FEIS pg P-5).

The BFO released the Decision Record (DR) and Approved Resource Management Plan Amendment (RMPA) for the Fortification Creek Planning Area (FCPA) on August 5, 2011. CBNG development would be phased based on performance standards established to protect elk and their habitat and to protect highly erodible soils. Overhead power could extend across BLM surface along road corridors. Operators

would be responsible for achieving elk and reclamation performance standards in order for BLM to process applications for permit to drill (APDs).

The Master Surface Use Plan and Site Specific Reclamation Plans provide a range of mitigation measures and best management practices but do not specifically identify which will be employed in each situation encountered; Therefore, BLM may prescribe specific mitigation measures based on monitoring results to achieve the performance standards set forth in the RMPA.

The following one APDs, well location, access road, and associated infrastructure are denied:

Well Name	Well #	Environmental Issues
QueenB CS Federal Com	#2	The QueenB CS Federal Com #2 access road is proposed over steep slopes exceeding 35% exceeding the limitations set forth in the FCPA RMPA. (page 4-23). Established mitigation measures are unlikely to successfully stabilize and control erosion.

THE FINDING OF NO SIGNIFICANT IMPACT

Analysis of EA, WY-070-11-226, found approval of the Queen B POD will have no significant impacts on the human environment, beyond those described in the PRB FEIS, thus an EIS is not required.

DECISION RATIONALE:
The decision to authorize 15 APDs and associated infrastructure as summarized above, is based on the following:

1. The denial of QueenB CS Federal Com #2. The QueenB CS Federal Com #2 APD and its infrastructure are outside the parameters found in the FCPA RMPA (page 4-23);
   - Surface disturbance will not be authorized on slopes greater than 35 percent.
   - On slopes from 30 to 35 percent, a maximum of 0.25 acres (10,890 sq. feet) total disturbance would be allowed per feature. Here the operator exceeded these parameters (see EA, pages 50-52).
   - Established mitigation measures are unlikely to successfully stabilize and control erosion.
2. The additional wells, right-of-ways, WMP, and infrastructure will not result in significant environmental degradation, and any minor environmental degradation that will result is revealed in the PRB FEIS.
3. The project area was inventoried and determined to lack wilderness characteristics.
4. The approved wells will help meet the nation's energy needs, and may stimulate local economies by maintaining workforce stability.
5. The Operator, in their POD, 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 0.5 miles of a federal CBNG producing well in the POD.
   - Has a surface use agreement with affected landowners.
6. The selected project features are based on the operator and BLM working together to reduce environmental impacts. The BFO applied further mitigation measures as Conditions of Approval where appropriate.

7. The selected project features will not result in any undue or unnecessary environmental degradation. The PRB FEIS analyzed and predicted that the PRB oil and gas development would have significant impacts to the region's sage-grouse population. The impact of the development cumulatively contributes to the potential for local extirpation yet its effect is acceptable because it is outside priority habitats and is within the parameters of the PRB FEIS/ROD and current BLM and Wyoming sage-grouse conservation strategies.

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.

for Field Manager: _____ Date: 5/31/12

FINDING OF NO SIGNIFICANT IMPACT
For
Yates Petroleum Corporation
Queen B POD
WY-070-EA11-226
Bureau of Land Management, Buffalo Field Office

FINDING OF NO SIGNIFICANT IMPACT:
On the basis of the information contained in the environmental assessment (EA), and all other information available to me, it is my determination that:

(1) the decision to approve 15 and deny 1 applications to drill (APDs), approve 2 rights of way, a water management plan (WMP), and associated plan of development (POD) infrastructure previously onsited in the **Yates Petroleum Corporation** (Yates) Queen B coalbed natural gas (CBNG) POD will not have significant environmental impacts beyond those already addressed in the Powder River Basin (PRB) Final Environmental Impact Statement (FEIS) (2003), to which the EA is tiered; and

(2) the decision to approve the 15 and deny 1 APD is within the parameters of the Fortification Creek RMPA (2011) performance standards. The decision will have minor adverse impacts to the Fortification Creek elk and their habitat. The adverse impacts will contribute to the cumulative impacts from this development and other developments within the elk range; and

(3) the decision to authorize the 15 and deny 1 APD is in conformance with the Buffalo Field Office (BFO) Resource Management Plan (RMP) (1985, 2001) and amendments (2003, 2011), and other legislative or regulatory processes; and

(4) the decision to authorize the 15APDs and deny 1 APD does not constitute a major federal action having a significant effect on the human environment. Therefore, an environmental impact statement is not necessary and will not be prepared.

This finding is based on my consideration of the Council on Environmental Quality's (CEQ) criteria for significance (40 CFR 1508.27), both with regard to the context and to the intensity of the impacts described in the EA, WY-070-EA11-226, which is incorporated here by reference.

CONTEXT:
The Fortification elk are a small isolated herd living in a prairie environment. Such prairie herds were common prior to European expansion on the western plains. Today, elk herds occupying prairie habitats are unusual though not unique and are therefore of local interest and importance. The public, conservation groups, and the State of Wyoming have all expressed their interest in maintaining a viable elk herd within the Fortification Creek Planning Area (FCPA). The Fortification Creek RMPA included elements such as phasing development and performance standards such as maintaining the elk herd above 80 percent of the Wyoming Game and Fish Department (WGFD) population objective. The impacts described by the EA comply with the performance standards as there is no loss of elk security habitat anticipated from this project.

Performance Standard Compliance
Herd Unit population – 228 (POP-II estimate, WGFD 2010 Job Completion Report (JCR)).

Calf production – 45.5 (POP-II estimate, WGFD 2010 JCR).

Winter calf survival – 30.9 (POP-II estimate, WGFD 2010 JCR)

Next-summer calf survival (calf to yearling) – 32.4 (POP-II estimate, WGFD 2010 JCR).

Range Fidelity (yearlong, calving, crucial winter) – 78.7% of the collared elk locations within the herd unit from March 26, 2008 through June 15, 2011 were within the FCPA (103,838 of 131,846). 88.0% of the collared elk locations within the designated calving range from May 15 through June 15 (2008-2011) were within the FCPA designated calving range (10,035 of 11,409). 86.9% of the collared elk locations within the designated crucial winter range from December 1 through April 30 (2008-2011) were within the FCPA designated crucial winter range (23,765 of 27,356).

Security habitat – 32,406 acres in crucial ranges and 40,781 acres in yearlong range; FCPA-RMPA baseline (pages 4-55-4-57). The Queen B project falls within the Southeast (SE) Development Phase of the FCPA which is described in the FCPA-RMPA. Approximately 5,593 acres of elk security habitat was modeled within the SE Phase for the FCPA-RMPA. A total of 742 acres (13.3 percent) of the elk security habitat in the SE Phase is currently considered affected by CBNG development.

Habitat effectiveness –Sixteen of the GPS collars adult female elk recorded 105 locations from March 2008 through July 2011 within the Queen B project boundary. None of the collared elk have used the project area consistently. The greatest number of relocations recorded of any of the collared elk was 28 relocations (elk 335328) over the 40 month period with most collared individuals having less than 10 relocations recorded from within the project area. Of these sixteen collared elk recorded within the Queen B project area, 11 were collared in 2008 and five in 2011.

Oil and gas development is a long-standing and common land use within the Powder River Basin including the FCPA. The Fortification Creek RMP amendment (USDI BLM 2011a) reported 480 wells present within the FCPA (397 CBNG wells, 239 conventional gas wells, and five oil wells). The PRB FEIS reasonably foreseeable development predicted and analyzed the development of 51,000 CBNG wells and 3,200 oil wells (PRB FEIS ROD pg. 2). The additional CBNG development described in Alternative B and C is insignificant within the national, regional, and local context.

INTENSITY:
The implementation of the selected alternative will result in beneficial effects in the forms of energy and revenue production however; there will also be adverse effects to the environment. Lease stipulations, design features, and mitigation measures were included within the proposal to prevent significant adverse environmental effects. The BLM also added site specific and programmatic mitigation measures to reduce adverse environmental effects of this development.

The preferred alternative does not pose a significant risk to public health and safety. The geographic area of the POD does not contain unique characteristics identified within the 1985 RMP, 2003 PRB FEIS, or other legislative or regulatory processes, including DIO Order 3310 and supporting manuals. Large tracts of BLM lands within the FCPA were identified and inventoried. The BFO did not find any lands with wilderness characteristics outside the WSA.

Relevant scientific literature and professional expertise were used in preparing the EA. The scientific community is reasonably consistent with their conclusions on environmental effects relative to oil and gas development. Research findings on the nature of the environmental effects are not highly controversial, highly uncertain, or involve unique or unknown risks.

CBNG development of the nature proposed with this POD and similar PODs was predicted and analyzed

in the PRB FEIS and the FCPA RMPA; the selected alternative does not establish a precedent for future actions with significant effects.

There are no cultural or historical resources present that will be adversely affected by the selected alternative (EA sec 4.2.6). This federal action is clearly lacking wilderness characteristics; see the EA's Appendix B, Resource and Species Worksheets. No species listed under the Endangered Species Act or their designated critical habitat will be adversely affected (EA, sec. 4). The selected alternative will not have any anticipated effects that would threaten a violation of Federal, State, or local law or requirements imposed for the protection of the environment.

For Field Manager: _____ Date: 5/31/12

ENVIRONMENTAL ASSESSMENT (EA), WY-070-EA11-226
Yates Petroleum Corporation, Queen B Plan of Development (POD)
Bureau of Land Management, Buffalo Field Office

1. INTRODUCTION

This environmental assessment (EA) analyzes the environmental impacts of Yates Petroleum Corporation's (Yates) 15 applications for permit to drill (APDs) in the Queen B coalbed natural gas (CBNG) POD and 1 water injection well (nine (9) of the Queen B's sixteen (16) well locations are located within the FCPA) The proposed project is about 33 miles west northwest of Gillette, WY in Campbell County, in and around the Fortification Creek Planning Area (FCPA). See Table 2.1 for legal descriptions. This site-specific analysis tiers to and incorporates by reference the information and analysis in the Powder River Basin Oil and Gas Project Final Environmental Impact Statement and Resource Management Plan Amendment (PRB FEIS), WY-070-02-065 (2003) and the FCPA Resource Management Plan Amendment/Environmental Assessment (FCPA RMPA), WY-070-08-135 (2011), pursuant to 40 Code of Federal Regulations (CFR) 1508.28 and 1502.21 (U.S. Department of the Interior, Bureau of Land Management [BLM] 2003a, 2003b). One may review these documents at the BLM Buffalo Field Office (BFO) or on our website (http://www.blm.gov/wy/st/en/field_offices/Buffalo.html). This project EA addresses site-specific resources and impacts unaddressed in the PRB FEIS or FCPA RMPA.
Note: BLM used the well names and document names as submitted by Yates in order to maintain clarity through the APDs, administrative record (AR), and this EA document.

1.1. Background

The current BLM land use plan was prepared in 1985 and updated in 2001. In 2003, BLM prepared a RMPA/Environmental Impact Statement (EIS) for the Powder River Basin (PRB), which includes the FCPA (BLM 2003a). The PRB RMPA/EIS did not specifically address protection of the isolated elk herd found in the FCPA. New information was being collected regarding the Fortification elk herd. Past management decisions specific to the FCPA, such as the overhead power prohibition on BLM surface, did not consider CBNG development. Therefore, BLM determined that in order to address these issues an RMPA specific to the FCPA was necessary.

The formal scoping period began on August 20, 2007; with the publication of the Notice of Intent (NOI) in the Federal Register to prepare the RMPA/EA. Critical issues that the RMPA addressed are wildlife, cultural, paleontological, and visual resources and how to best manage fluid mineral development in a region with erosive soils and steep slopes. The FCPA RMPA EA provides the analysis upon which to base project-specific CBNG development decisions within the FCPA. Nine (9) of the Queen B's sixteen (16) well locations are located within the FCPA.

- Yates submitted the Queen B POD on October 31, 2008 with 11 federal APDs and 1 injection well.
- Yates submitted the Queen B Addition POD on May 5, 2010 with 4 federal APDs.
- BLM conducted onsite visits on November 4, 5, and December 16, 2010. Yates received BLM's post-onsite deficiency letters for the Queen B and Queen B Addition PODs on January 20, 2011.
- Yates combined the Queen B and the Queen B Addition PODs into one POD with 15 APDs and 1 injection well on March 11, 2011. BLM includes a summary of APDs submitted in Yates's filings in Appendix A. Yates submitted a revised well list, drilling prognosis, well plats, well pad designs, and project maps with each revision.
- BLM sent a post-onsite deficiency letter on August 29, 2011 after approval of the FCPA RMPA Decision Record (DR). BLM received Yates's response to the deficiencies on October 12, 2011.
- BLM asked for corrected operator certifications on November 3, 2011, receiving those 5 days later.
- The BLM asked for a structural engineer to review of Yates's bridge designs. BLM, National Operation

Center Structural and Professional Engineer , completed the review on January 20, 2012.

- Information in Yates's response (received by the BLN on October 12, 2011) to the post-onsite deficiency letter sent on August 29, 2011 was either absent or lacking detail. The BLM sent Yates a letter on January 17, 2012 to obtain the remaining deficiency information that was either absent or lacked sufficient detail for analysis.
- BLM and Yates conducted a phone conference on January 23, 2012 at Yates' request.
- BLM received Yates's written response to BLM's January 23 letter on February 24, 2012.
- BLM conducted an onsite review on March 20, 2012 to review staking and discuss bridge designs.
- BLM sent a follow up fax to Yates on March 20, 2012.
- BLM considered the proposed project and APDs complete on March 20, 2012 –
- An additional onsite visit occurred on March 22, 2012.
- Yates further addressed the bridge design on April 1 and 2, 2012.
- BLM shared proposed conditions of approval (COAs) with Yates on May 7, 2012.

1.2. Purpose and Need for the Proposed Action

BLM's purpose is to determine whether to, and if so, how and under what conditions to allow the operator to exercise their conditional lease rights to develop fluid minerals on a valid federal leasehold. Information in the APD is an integral part of this EA and BLM incorporates all QueenB APDs by reference (CFR 1502.21).

1.3. Decision to be Made

The BLM will decide whether or not to approve the proposed developments, and if so, under what terms and conditions supporting the Bureau's multiple use mandate, environmental sustainability, and the RMP.

1.4. Scoping and Issues

BFO conducted extensive external scoping for the PRB FEIS - discussed on p. 2-1 of the PRB FEIS and on p. 15 of the PRB ROD. In addition, BLM performed external scoping for the FCPA RMPA EA (BLM 2011a), p. 1-6. This project is similar in scope to other fluid mineral development analyzed in the FCPA. External scoping would be unlikely to identify new issues, as verified by the fluid mineral EAs that BLM has externally scoped. External scoping of Samson Resources EA, WY-060-EA11-181 received 2 comments, revealing no new issues.

The BFO interdisciplinary team (ID team) conducted internal scoping by reviewing the proposal and its location to identify potentially affected resources and land uses. Appendix B identifies those resources and land uses present and affected by the proposed action. BLM will not discuss or analyze in this EA those resources and land uses that are not present, unaffected, or received adequate analysis by the PRB FEIS or FCPA EA. The ID team identified major issues for the affected resources to further focus the analysis. This EA addresses those site-specific impacts that would help in making a reasoned decision or may relate to a potentially significant effect. Issues for this project include:

- **Soils and Vegetation**: site stability, reclamation potential, invasive species, riparian and wetland areas;
- **Wildlife**: raptor productivity, greater sage-grouse lek occupancy and persistency, and the Fortification elk herd;
- **Cultural**: National Register eligible sites;
- **Water**: ground water depletion, quality, and quantity of produced water.

2. ALTERNATIVES INCLUDING THE PROPOSED ACTION

2.1. Alternative A - No Action

The PRB FEIS considered a No Action Alternative, pp. 2-54 to 2-62 which is incorporated here by reference. The no action alternative would deny these APDs. The no action alternative provides a useful baseline for comparison of environmental effects and demonstrates the consequences of not meeting the purpose of the action (BLM Handbook H-1790-1 pg.51)

2.2. Alternative B – Operator Proposed Action with Lease Stipulations

Alternative B contains complete APDs and is based on Yates' project proposal. This alternative summarizes the POD submitted by Yates on October 31, 2010, and subsequently revised following the onsite visits by Yates and BLM on November 4, 5, December 16, 2010, and March 20, 2012. A summary table of project changes since the initial POD submittal is in Appendix A.

Proposed Action Title/Type: Yates Petroleum Corporation's Queen B CBNG POD.

Proposed Well Information: There are 15 wells proposed in this POD and 1 injection well; the 15 wells are vertical bores proposed on an 80-acre spacing pattern with 1 well per location. Each well will produce from Fort Union coal seams: The Smith, Upper and Lower Canyon, Cook, and Wall. Well house color is Covert Green, selected to blend with the surrounding vegetation. A list of proposed wells is in Table 2.1.

Note: well names are as Yates submitted them throughout the administrative record (AR) and this EA.

Table 2.1. Proposed Wells – Alternative B

	Well Name	Well #	Qtr/Qtr	Sec.	Township	Range	Lease #
1	Queenb CS Federal	#1	NENE	15	51	76	WYW40814
2	QueenB CS Federal Com.	#2	NENW	15	51	76	WYW40814
3	Queenb CS Federal	#3	SWNE	15	51	76	WYW40814
4	Queenb CS Federal	#4	SWSW	15	51	76	WYW40814
5	QueenB CS Federal Com.	#5	SWSE	15	51	76	WYW40814
6	QueenB CS Federal	#6	NENW	22	51	76	WYW40814
7	QueenB CS Federal	#7	SWNW	22	51	76	WYW40814
8	Queenb CS Federal	#8	SWNE	22	51	76	WYW40814
9	QueenB CS Federal	#9	NESW	22	51	76	WYW40814
10	Queenb CS Federal Com.	#10	NENE	28	51	76	WYW40814
11	Queenb CS Federal	#11	SWNE	28	51	76	WYW40814
12	Queenb Injector Federal	#12	NWNE	22	51	76	WYW40814
13	Queenb CS Federal	#13	NENE	14	51	76	WYW40814
14	Queenb CS Federal	#14	SWNE	14	51	76	WYW40814
15	Queenb CS Federal	#15	NESE	14	51	76	WYW40814
16	Queenb CSFederal	#16	SWSE	14	51	76	WYW40814

Table 2.2. Lease Stipulations for Well Leases in the Queen B POD

Lease	Stipulations	Well Locations & Associated Roads & Infrastructure Affected	
WYW40814	Reclamation Timing and Watershed Timing Limit Stipulation (TLS)2	Queenb CS Federal # 1, QueenB CS Federal Com. #2 Queenb CS Federal #3 Queenb CS Federal #4 QueenB CS Federal Com. #5 QueenB CS Federal #6 QueenB CS Federal #7 Queenb CS Federal #8	QueenB CS Federal #9 Queenb CS Federal Com #10 Queenb CS Federal #11 Queenb Injector Federal #12 Queenb CS Federal #13 Queenb CS Federal #14 Queenb CS Federal #15 Queenb CS Federal #16

Lease Stipulation Definitions (as issued by the WY BLM State Office):

- **Reclamation Timing** – Reclamation of areas disturbed as a result of lessee's operations will be done, insofar as possible, concurrently with operations.
- **Watershed TLS 2** – In order to minimize watershed damage, during wet or heavy snow periods the Casper District Manager, Bureau of Land Management, may prohibit exploration, drilling or other development. This limitation does not apply to maintenance and operation of producing wells.

Drilling and Construction:

- Wells would be drilled to the Smith, Upper and Lower Canyons, the Cook, and the Wall coal zones to depths of approximately 2,290 feet. Multiple seams would be produced by co-mingling production (a single well per location capable 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 impose longer temporal restrictions on portions of this POD, but rarely do these restrictions affect an entire POD.
- Well metering would be accomplished by individual well telemetry. No central metering facility is proposed. In addition to telemetry Yates will need to visit each location an undisclosed number of times each week to ensure the wells are operating correctly and there are no leaks undetected by telemetry.
- A Water Management Plan (WMP) that involves the following infrastructure and strategy: A combination of delivery of CBNG produced water to 3 on-channel reservoirs on ephemeral draws that are tributary to Fortification Creek and/or deep injection of treated water to the Lower Fort Union sands (estimated depth of 2700 feet to 4200 feet).
- An existing and proposed road network consisting of the following:
  - 2.3 miles of proposed improved roads
  - 6.2 miles of existing improved roads
  - 0.2 miles of proposed 2-track roads
  - 0.7 mile existing 2-track road to be improved
- Three temporary generators are anticipated for this project located where proposed power drop locations are (see Queen B POD map D for specific locations).
- Utility corridors include buried gas, water, and power line networks; 2.79 miles are adjacent to proposed or existing roads and 6.0 miles run cross country and are not associated with well access roads.
- Use of an existing rail car bridge to be re-decked and refurbished of replacement of the existing rail car bridge with a precast, reinforced concrete box culvert crossing.

Right-of-Ways

Rowdy Pipeline, LLC requested one right-of-way (ROW) grant. Grant number WYW-170254, the authority from the Minerals Leasing Act (MLA) right-of-way is for the gas pipeline. Yates requested one right-of-way (ROW) grant. Grant number WYW-170253, the authority from the Federal Land and Policy Management Act (FLPMA) right-of-way is for the road, water pipeline, and buried power. This ROW is being analyzed under this environmental analysis. A ROW grant will be executed (approved) in a separate document.

ROW Grant Yates	**ROW Project**	**Section**	**Twp**	**Rng**	**Lengths**	**Width**
WYW-170253	Road, Water, Power	21	51N	76W	5,340’	NTE 50’
ROW-Grant Rowdy Pipeline LLC	**ROW Project**	**Section**	**Twp**	**Rng**	**Lengths**	**Width**
WYW-170254	Gas Pipeline	14,15,21,22	51N	76W	10,941’	NTE 50’

Water Management: Table 2.3 includes the water management infrastructures proposed for use in association with this POD.

Table 2.3. Proposed Water Management Capacity, Surface Disturbance – Alternative B

	Facility Name	Qtr/Qtr	Sec	Twp	Rng	Capacity	Disturbance	Lease #
1	Honeycomb	NESE	15	51	76	13.6 acre feet	1.9 acres	Fee
2	Stinger	SWSE	15	51	76	12.1 acre feet	1.7 acres	Fee & FED WYW40814
3	Swarm	NESE	15	51	76	10.2 acre feet	2.1 acres	Fee
4	Injector Well	NESE	15	51	76	282 acre feet	1.0 acres	Fee

For a detailed description of design features, construction practices, and water management strategies associated with the proposed action, refer to the Multi-Point Surface Use and Operations Plan (MSUP), Drilling Plan, and WMP in the POD. POD maps show the proposed well locations and associated facilities described above. More information on CBNG well drilling, production and standard practices is available in the PRB FEIS, pp. 2-9 to 2-40 (BLM 2003a).

BLM incorporated and analyzed the implementation of lease stipulations, committed mitigation measures in the MSUP, Drilling Program, WMP, and the Standard COAs from the PRB FEIS ROD Appendix A.

County: Campbell, Wyoming, see, Table 2.1 for legal descriptions.

Surface Owners: The BLM manages 417 acres in the project area (28%) in T51N, R76W, Sections 14, 15, 22, and 28. The balance is private land. Doyle G (Bud) and Hayden Trust and Kerry and Stephanie Hayden own land in the project area in T51N, R76W Sections 14, 15, 22, and 28. Doyle G (Bud) and Hayden Trust own all of T51N, R76W section 21. The land ownership is displayed on the APD maps.

2.3. Alternative C- Modified Action

Alternative C is similar to Alternative B with additional design features to further reduce environmental effects. A full description of Alternative C is included in Section 5 of this document (Modified Action), and a summary table of wells considered since initial POD submittal is in Appendix A of this document.

Alternative C includes a precast, reinforced concrete box culvert to access Queenb CS Federal #13 (instead of the existing bridge) and removes the following 2 well locations:

QueenB CS Federal Com. #2 – To avoid slopes greater than 35% in conformance with the FCPA-RMPA.

Queenb CS Federal Com. #10 – To avoid raptor nest abandonment due to lack of an adequate biological buffer from the proposed well location.

2.4. Alternatives Considered but Not Analyzed in Detail

BLM did not consider additional alternatives beyond those described in Alternatives B and C. Alternatives considered but not analyzed in detail in the FCPA-RMPA are disclosed on pages 2.6–2-10.

Summary of Alternatives

BLM summarized the existing and proposed development in Table 2.4.

Table 2.4. Proposed Surface Disturbances by Alternative – Queen B POD

Facility	Alternative A[1] (No Action) Existing # or Miles/Acres	Alternative B[1] (Proposed Action) Proposed # or Miles/Acres	Alternative C[1] (Proposed Action) Proposed # or Miles/Acres
Total CBNG Wells			
Well Locations [2]		7 pads (4.2 acres)	5 pads/ 2.8 acres
Constructed Pads	5 locations (8 wells)	6 slots (0.5 acres)	6 slots (0.5 acres)
Slotted Pads	2.5 acres	3 locations (1.5 acres)	3 locations (1.5 acres)
Nonconstructed Pads			
Conventional Wells [2]	2 locations 1 acre	2 locations (1 acre)	2 locations 1 acre
Compressor Stations	0	0	0
Ancillary Facilities (Staging and Water Loadout Areas) [3]	0	3 locations (2.75 acres)	3 locations (2.75 acres)
Water Impoundments	3/1.8 acres	2 / 5.5 acres	2 / 5.5 acres
Roads-Engineered [4]			
Without Utility Corridor	0	1.1 acres	1.1 acres
With Utility Corridor	0	3.5 acres	1.3 acres
Roads-Template/Spot Upgrade			
Without Utility Corridor	22355'x45' 4.23miles (23.10 acres)	1392'x 45' 0.3miles (1.4 acres)	1392'x 45' 0.3miles (1.4 acres)
With Utility Corridor	10175' x 50' 1.927 miles (11.68 acres)	6171'x 45' 1.2 miles (6.4 acres)	6171'x 45' 1.2 miles (6.4 acres)
Existing Primitive (2-track) Road, Proposed Roads-Template			
With Utility Corridor	2340' x 30' 0.4 miles (1.6 acres)	2340'x45' 0.44miles (2.42 acres)	2340'x45' 0.44miles (2.42 acres)

Facility	Alternative A[1] (No Action) Existing # or Miles/Acres	Alternative B[1] (Proposed Action) Proposed # or Miles/Acres	Alternative C[1] (Proposed Action) Proposed # or Miles/Acres
Proposed Primitive (2-track) Road *With Utility Corridor*	0	1265'x 45' 0.2 miles (1.3 acres)	1265'x 45' 0.2 miles (1.3 acres)
Roads-Existing with Proposed Utility Corridor (water, gas, and buried power) *Improved Road* *Primitive (2-track) Road*	1550' x 45' 0.294 miles (1.6 acres)	10175'x 45' 1.9 miles (10.5 acres) 1550'x 45' 0.3 miles (1.6 acres)	10175'x 45' 1.9 miles (10.5 acres) 1550'x 45' 0.3 miles (1.6 acres)
Utility Corridors (water, gas, and buried power) [4]		11453' x 45' 6.0 miles (11.83 acres)	11453' x 45' 6.0 miles (11.83 acres)
Power lines-Overhead [5]	13855'x 30 2.62 miles (9.54 acres)	0	0
Water Pump/Treatment Facilities [6]	1 (3.5 acres)	0	0
Injection Well	0	1 (1.0 acre)	1 (1.0 acre)
Water Discharge Points	0	3 (0.30 acres)	3 (0.30 acres)
TOTAL ACRES DISTURBANCE	**56.3 acres**	**56.8 acres**	**53.2 acres**

[1] Figures in the action alternatives represent additional facilities, do not include existing facilities, and are subject to rounding.
[2] Data not available for well site type for existing wells; assume 0.5 acre of disturbance per CBNG well. The proposed 16 wells would be built at 16 distinct locations.
[3] Data limited to Yates's proposal only, which includes use of 3 staging areas to be constructed.
[4] Includes utility corridors that are independent of roads. Corridor widths vary see engineered diagrams for site-specific detail.
[5] Acreage is estimated based on an assumed 30-foot right-of-way.
[6] The treatment facility size estimate for the facilities was interpreted from aerial photography.

2.5. Conformance with Land Use Plan and Other Applicable Laws, Regulations, and Policies

The proposed development conforms to the terms and the conditions of the 1985 Buffalo RMP, the PRB ROD), and the FCPA RMPA DR (BLM 1985, 2003a, 2003b, and 2011). The proposed action complies with federal laws, regulations, and policies. This includes, but is not limited to, the Federal Land Policy and Management Act (FLPMA) (1976), the Mineral Leasing Act of (1920), the National Historic Preservation Act (1966), the Endangered Species Act (ESA) (1973), the Migratory Bird Treaty Act (MBTA) (1918), and the National Environmental Policy Act (1969).

3. AFFECTED ENVIRONMENT

This section briefly describes the physical and regulatory environment affected by implementation of the alternatives in Section 2. The BFO interdisciplinary team (ID team) conducted internal scoping by reviewing the proposal and its location to identify potentially affected resources and land uses. Appendix B identifies those resources and land uses present and affected by the proposed action. BLM will not discuss or analyze in this EA those resources and land uses that are not present, unaffected, or received adequate analysis by the PRB FEIS or FCPA EA. The ID team identified major issues for the affected resources to further focus the analysis. This EA addresses those site-specific impacts that would help in making a reasoned decision or may relate to a potentially significant effect.

3.1. Project Area Description

The proposed POD area is about 1,508 acres and elevations are from 4,300 to 4,718 feet above sea level. BLM incorporates by reference the project area descriptions from overlapping, contiguous projects' Sections 3.1 listed in Table 3.1, below. These 4 approved PODs include 95 wells that have 1 well per location and 134 wells with 2 wells per location, there are 329 producing oil and gas wells within a 4-mile radius of this proposal (WOGCC 2012), 8 producing gas wells are within the project area.

Table 3.1 Some Adjacent/Overlapping Development within 1 mile of the Queen B POD.

	Development Name	Operator	Approval Date	Well Type/#	BLM NEPA #
1	Augusta Unit Zeta (134 wells)	Lance	7/22/2009 2/10/2010	CBNG/134	WY-070-08-154
2	Camp John Unit Epsilon (21 wells)	Lance	3/30/2011	CBNG/21	WY-070-10-239
3	Camp John SMA Phase 1 (57 wells)	Lance	11/4/2011	CBNG/56	WY-070-11-214
4	Camp John & Augusta (18 wells)	Lance	8/25/2005	CBNG/18	WY-070-05-373

3.2. Transportation

Fortification Road is the main access road to, and bisects, the Queen B POD area. Two existing roads access the POD off of Fortification Road (Roads are named Road B and Road C and can be located on POD maps); these roads travel south through Sections 16, 21, and 22 of T51N, R76W. Another existing road (named Road A) travels north then west through Sections 15 and 14 of T51N, R76W; this road was analyzed under The Camp John & Augusta POD and BLM incorporates that by reference. There are about 6.9 miles of existing roads in the POD boundary used for ranching, recreation, and oil and gas development. These are primitive and crown and ditch roads. Direct vehicle use created the primitive roads; their average travel width is less than 10 feet without surfacing, and without drainage control. The crown and ditch roads were mechanically constructed but their general condition is poor due to a insufficient maintenance. The crown and ditch roads have a 12-14 feet travel width with a sub-grade of 14-16 feet; some with and some without surfacing material. The surfacing material is clinker rock. The maximum grade on both road types is 16%. Where slope and grade are minimal (less than 15% slope and 7% grade), the ditches are well vegetated they are approximately 6-8 inches deep with some visible scouring. Ditches on steep slopes and grade (16% slope and 8% grade or greater) are typically not well vegetated, erosion is occurring and scouring is 6 to 24 inches deep. There are several spots where rutting greater than 4 inches has occurred on the running surface due to minimal compaction and minimal drainage control. A majority of the existing culverts are 18 inches diameter, corrugated metal, and are generally in poor condition. Several require maintenance to clean them out.

Queenb CS Federal #13Bridge: A bridge crossing Soft Water Draw is constructed from an old railroad car. The source of the railcar and its integrity are unknown. Yates proposes using the bridge for accessing the Queenb CS Federal 13 in the NENE, Section 14 T51N R76W. The bridge's wooden decking has

rotted completely through the structure. The concrete abutments on both banks are undercut by scouring from past storm events to the extent that they have developed several severe cracks. There are two pylons visible, although it is unclear as to how deep the cracks go. There are steel plates laid down on the rotten wood to fabricate a drivable surface.

The bridge structure is a single span steel box car with steel plates across the rooted, wooden decking. There is also excessive erosion around the abutments (foundation) of the bridge. Per Keith Christensen's review, Structural Engineer from the National Operations Center, the BLM 9112 requirements do not allow new bridges to be constructed out of railroad cars because there are too many unknowns when dealing with used railroad cars. Some cars have been in wrecks and are damaged, properties of the steel can be unknown, normal design load distribution factors are not reliable, and the fatigue life of a particular railroad car may have been surpassed. This particular boxcar was installed approximately 26 years ago as a bridge; with its previous history before then unknown. Therefore, the longevity of the steel structure is unknown. The Wyoming State Engineer agreed with the BLM National Operations Center's (NOC) structural engineer's assessment and confirmed that the BLM has been in the process of removing all boxcar bridges from Federal surface because of the liability associated with them.

Pictures below are provided to show the wooden decking rotting and undercutting of the foundation that is being described above.

Undercutting of the cement support

Undercutting of the cement support

Rotted wooden decking (view from underneath the bridge)

3.3. Soils, Ecological Sites and Vegetation

3.3.1. Ecological Sites

Ecological site descriptions are soil and vegetation community descriptions compiled by the USDA Natural Resources Conservation Service (NRCS) for the purpose of resource identification providing management and reclamation recommendations. See this EA's Section 3.3.3 for Ecological sites in the Queen B project area.

3.3.2. Soils

BLM identified soils in the project area from the North Campbell County Survey Area, Wyoming

(WY705). The project area contains 8 dominant soil map units, each representing 2 percent of the project area or greater (Table 3.2. and Figure 3.1).

3.3.3. Soils

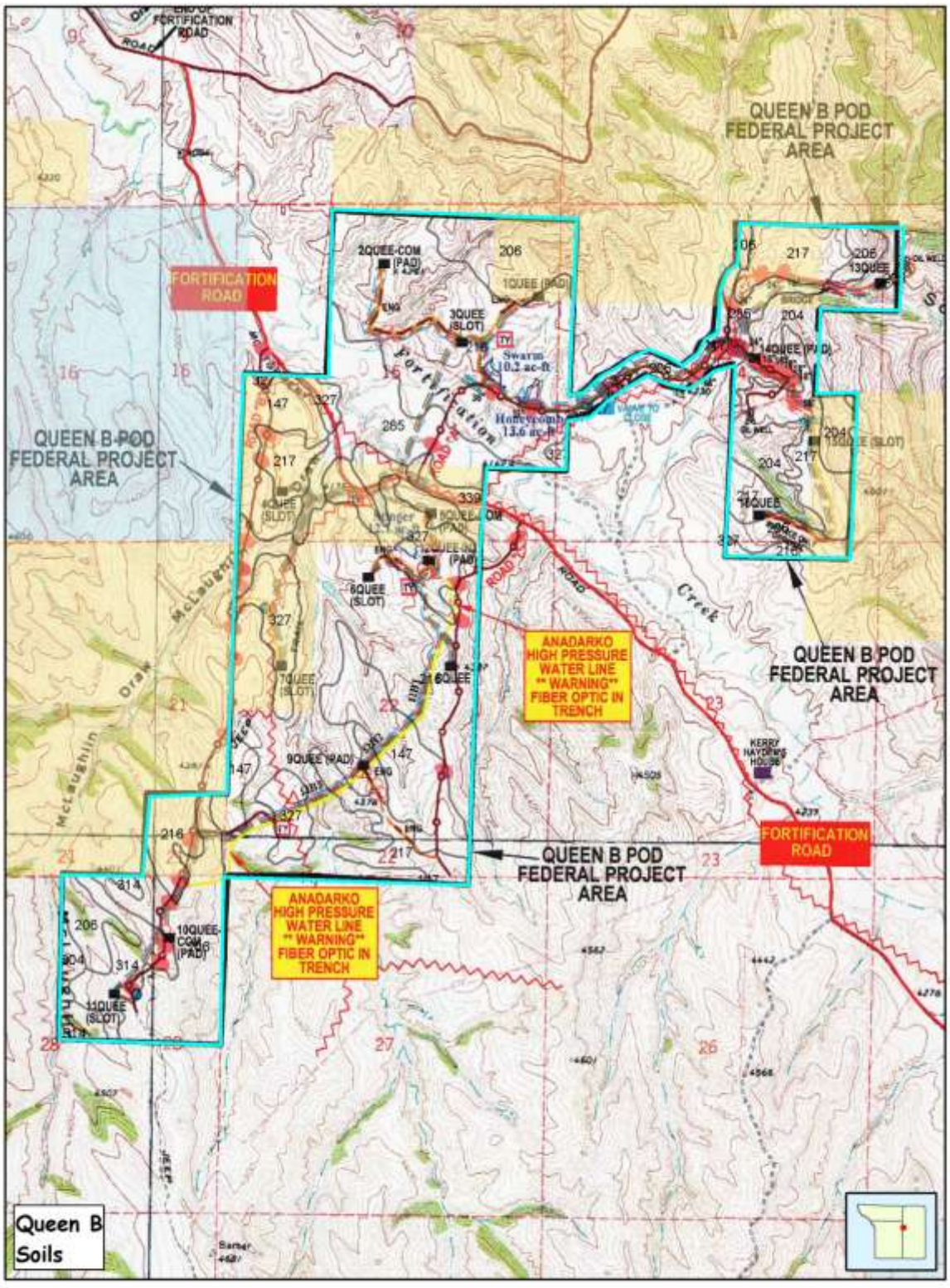
BLM identified soils in the project area from the North Campbell County Survey Area, Wyoming (WY705). The project area contains 8 dominant soil map units, each representing 2 percent of the project area or greater (Table 3.2. and Figure 3.1).

Table 3.2 Dominant or Important Soils Affected by the Proposed Queen B POD

Map Unit	Map Unit Name	Approximate Acres[1]	Project Area (%)
216	Theedle-Kishona-Shingle loams, 3 to 30 percent slopes	609	40%
206	Samday-Shingle-Badland complex, 10 to 45 percent slopes	216	14%
217	Theedle-Shingle loams, 3 to 30 percent slopes	165	11%
147	Forkwood-Cushman loams, 6 to 15 percent slopes	133	9%
327	Ulm-Bidman complex, 0 to 6 percent slopes	117	8%
204	Samday-Samday, very shallow-Shingle clay loams, 6 to 40 percent slopes	108	7%
285	Haverdad-Boruff complex, 0 to 3 percent slopes, occasionally flooded	104	7%
314	Savageton-Silhouette clay loams, 6 to 15 percent slopes	45	3%

[1] The dominant soils are soil types that cover at least 2 percent or more of the project area.
Discrepancies in totals are due to rounding.
Source: USDA 2010a.

Figure 3.1 Soil Map Units Affected by the Queen B POD



Yates proposes approximately 3 miles of utility corridors with 45 to 75 foot width disturbance along existing roads. Yates proposes approximately 3 miles of utility corridors with a 100 foot disturbance width along other existing infrastructure. Plan and profiles as well as site specific reclamation plans were submitted by Yates for utility corridors not proposed along existing infrastructure disturbances.

3.3.3.1. Soils Susceptible to Erosion

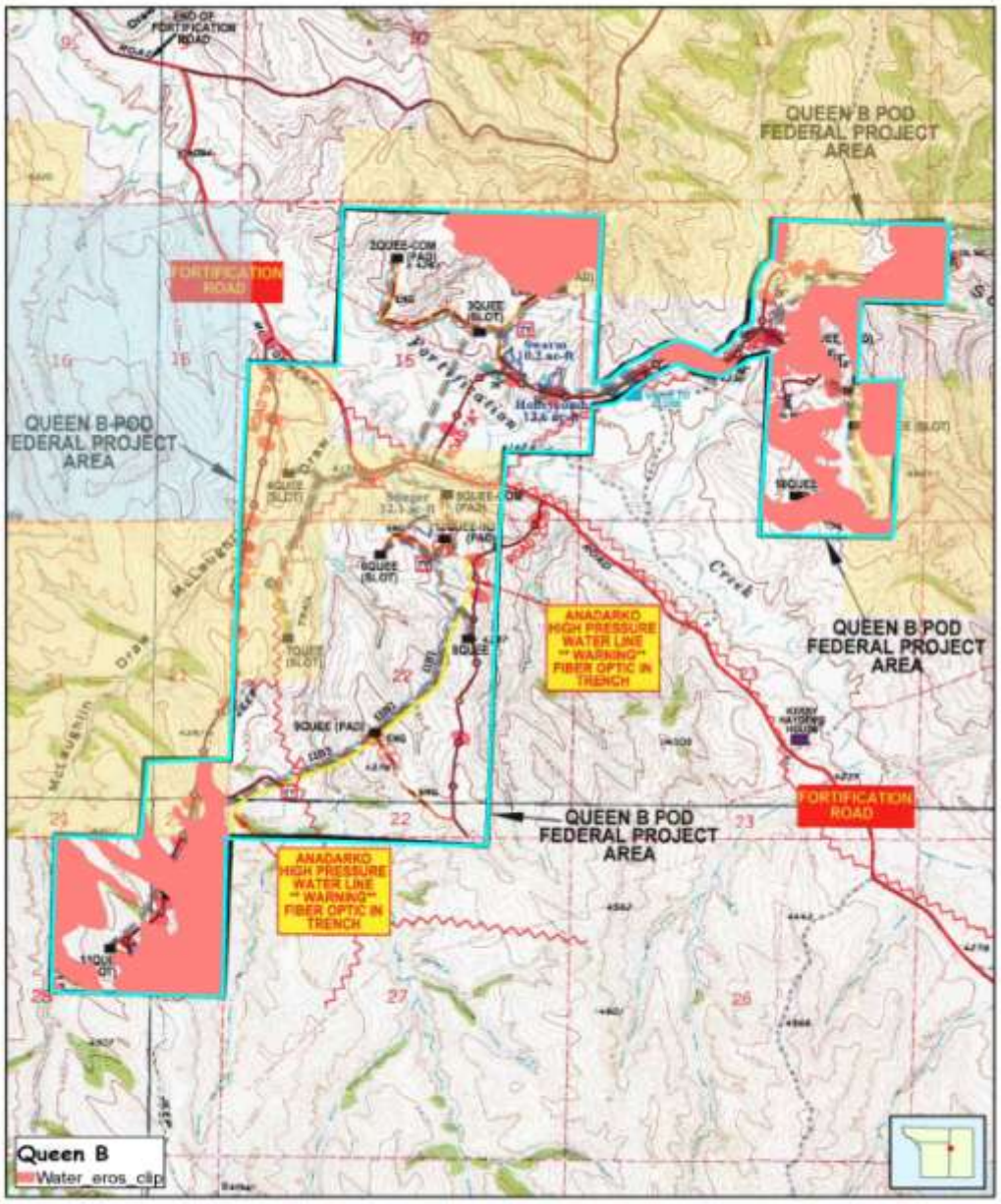
BLM, through USDA NRCS, identified specific soil complexes in the Queen B area designated as Soils Susceptible to Erosion. The USDA NRCS defines these characteristics as soils with: 1) relative erosion potential; 2) limited reclamation potential (LRP); and 3) slopes in excess of 25%. Table 3.3 and Figure 3.2 show the relative erosion potential, based on the site-specific information.

Table 3.3 Relative Erosion Potential in the Queen B POD Project Area

Erosion Potential	Acres	% of Project Area
Slight/Moderate	1,185	79
Severe	323	21

Source: USDA NRCS 2010

Figure 3.2 Areas of severe erosion potential in the Queen B POD



3.3.3.2. Limited Reclamation Potential (LRP)

Scientists identify LRP soils using USDS NRCS SSURGO data and onsite investigation. For preliminary analysis BLM filters the SSURGO data soil mapping units by the "most limiting" aggregation method. Thus BLM initially labels any soil mapping unit containing a named component described as a miscellaneous area as an LRP area. BLM used the Soil Survey Geographic Database (SSURGO) data to determine that 21% of the Queen B soils contain LRP areas (see Figure 3.3). The area having the miscellaneous component (LRP area) would typically be substantially less; which BLM identifies during the onsite investigation.

Limited Reclamation Potential (LRP) - Areas possessing unique landscape characteristics (e.g., sensitive geologic formations, extremely limiting soil conditions, biological soil crusts, badlands, rock-outcrops, etc.) often make reclamation success impractical and/or unrealistic due to physical, biological, and/or

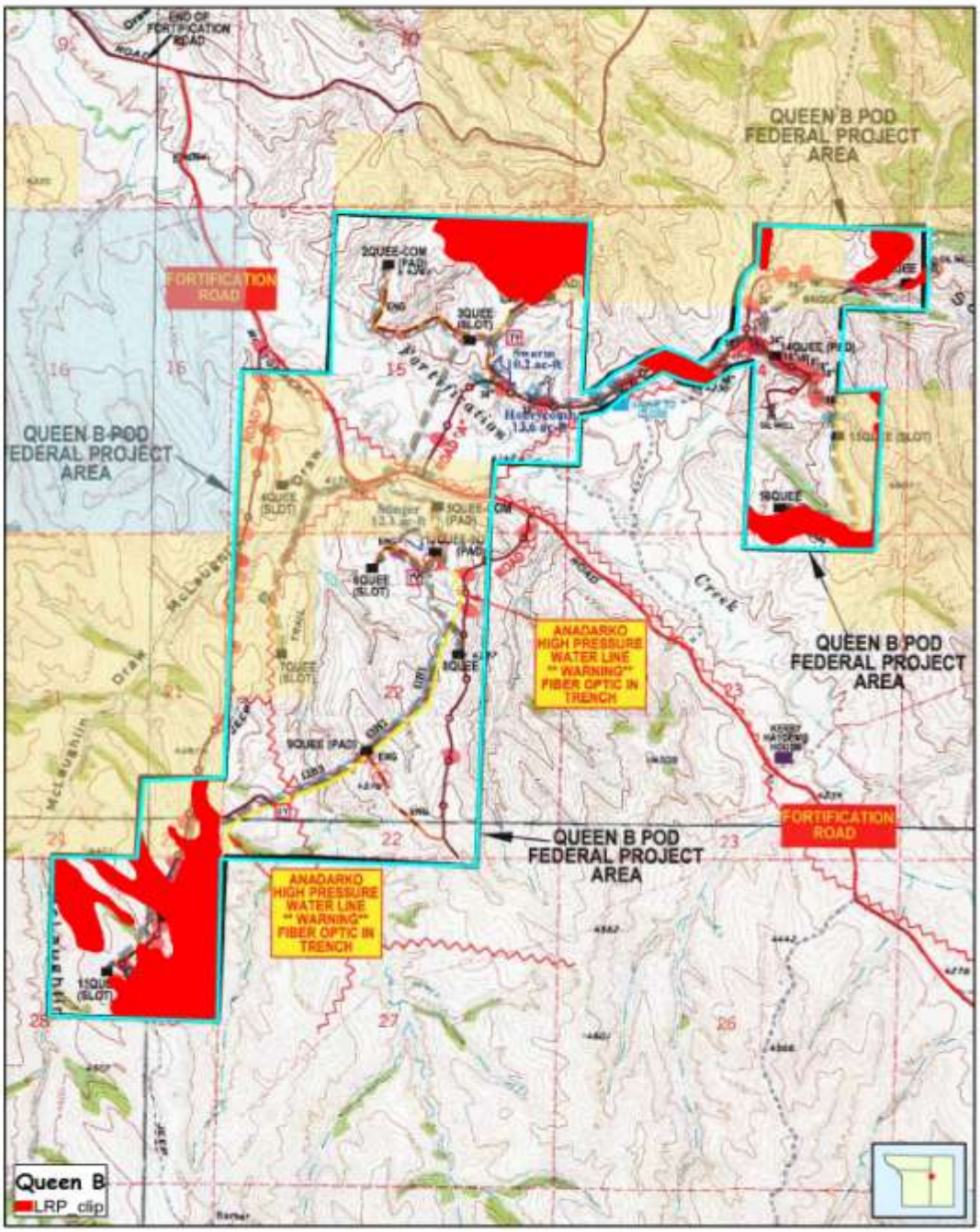
chemical challenges. When disturbed, these areas may require unconventional reclamation strategies to address the ten requirements established by this Policy.

Badlands: A landscape which is intricately dissected and characterized by a very fine drainage network with high drainage densities and short, steep slopes with narrow interfluves. Badlands develop on surfaces with little or no vegetative cover, overlying unconsolidated or poorly cemented materials (clays, silts, or in some cases sandstones) sometimes with soluble minerals such gypsum or halite. (430-VI-NSSH, 1996)

Rock outcrop: Consists of exposures of bare bedrock. Most rock outcrops are hard rock, but some are soft. (430-VI-NSSH, 1996)

Biological crusts: A living community of bacteria, microfungi, cyanobacteria, green algae, mosses, liverworts, and lichens that grow on or just below the soil surface. Biological crusts can heavily influence the morphology of the soil surface, stabilize soil, fix carbon and nitrogen, and can either increase or decrease infiltration. The percent cover and the components of the crust can vary across short distances. (USDA Natural Resources Conservation Service)

Figure 3.3 LRP Areas in the Queen B POD.



3.3.3.3. Slopes in Excess of 25%

Onshore Oil and Gas Order Number 1, PRB FEIS, FCPA RMPA, and the Federal Lease Notice Number 1 recommends avoiding development on slopes 25% or greater due to their limited reclamation potential, increased risk of slumping or mass failure, and high probability of irrecoverable soil losses, (SDRs WY-2006-011, p. 17, WY-2010-026, pp. 6-17, 23-24). Approximately 394 acres (26%) of the project area has slopes of 25% or more. Slopes 25% or greater, as defined by the USDA NRCS (USDA 2010a), are displayed in Table 3.4 and Figure 3.4.

Figure 3.4. Areas of Slopes Exceeding 25% in the Project Area

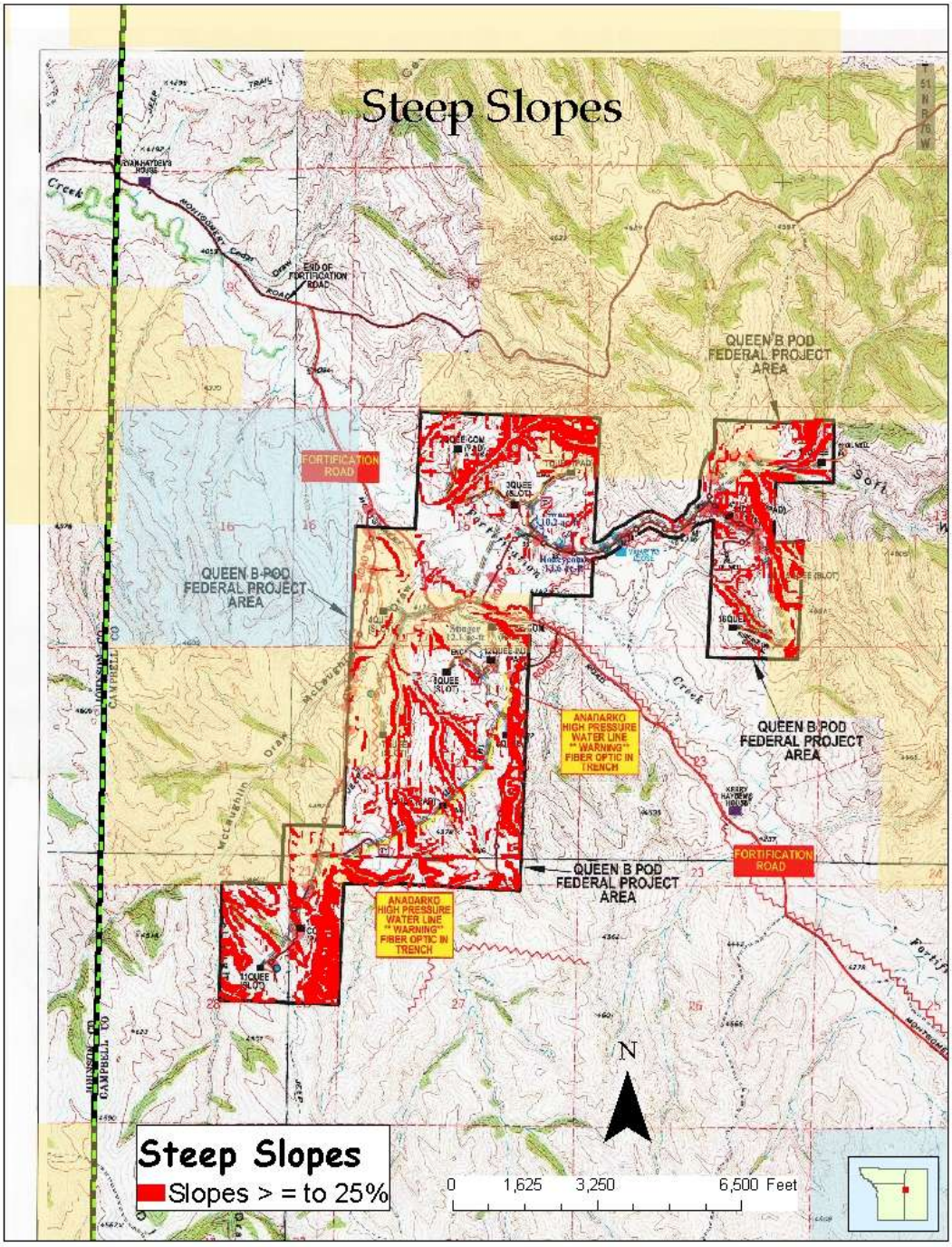


Table 3.4 Percent Slope in the Queen B POD

Percent Slope	Approximate Acres	Percent of Project Area
0-24%	1114	74%
Greater than or Equal to 25%	394	26%

Source: BLM 2010

3.3.3.4. Reclamation

3.3.3.4.1. Suitability (Source Material)

Shallow soil types, droughty conditions, limiting chemical and physical properties (pH, EC, SAR, texture, etc.) are identified as areas of poor reclamation suitability. Approximately 32% of the proposed project area contains soil mapping units having poor reclamation suitability (See Figure 3.5 and Table 3.5 below). The remaining soils have slight or moderate reclamation suitability. Stabilization of disturbance and reclamation will be challenging and possibly unachievable in these areas if disturbed by the proposed activities.

Figure 3.5. Reclamation Suitability in the Queen B POD

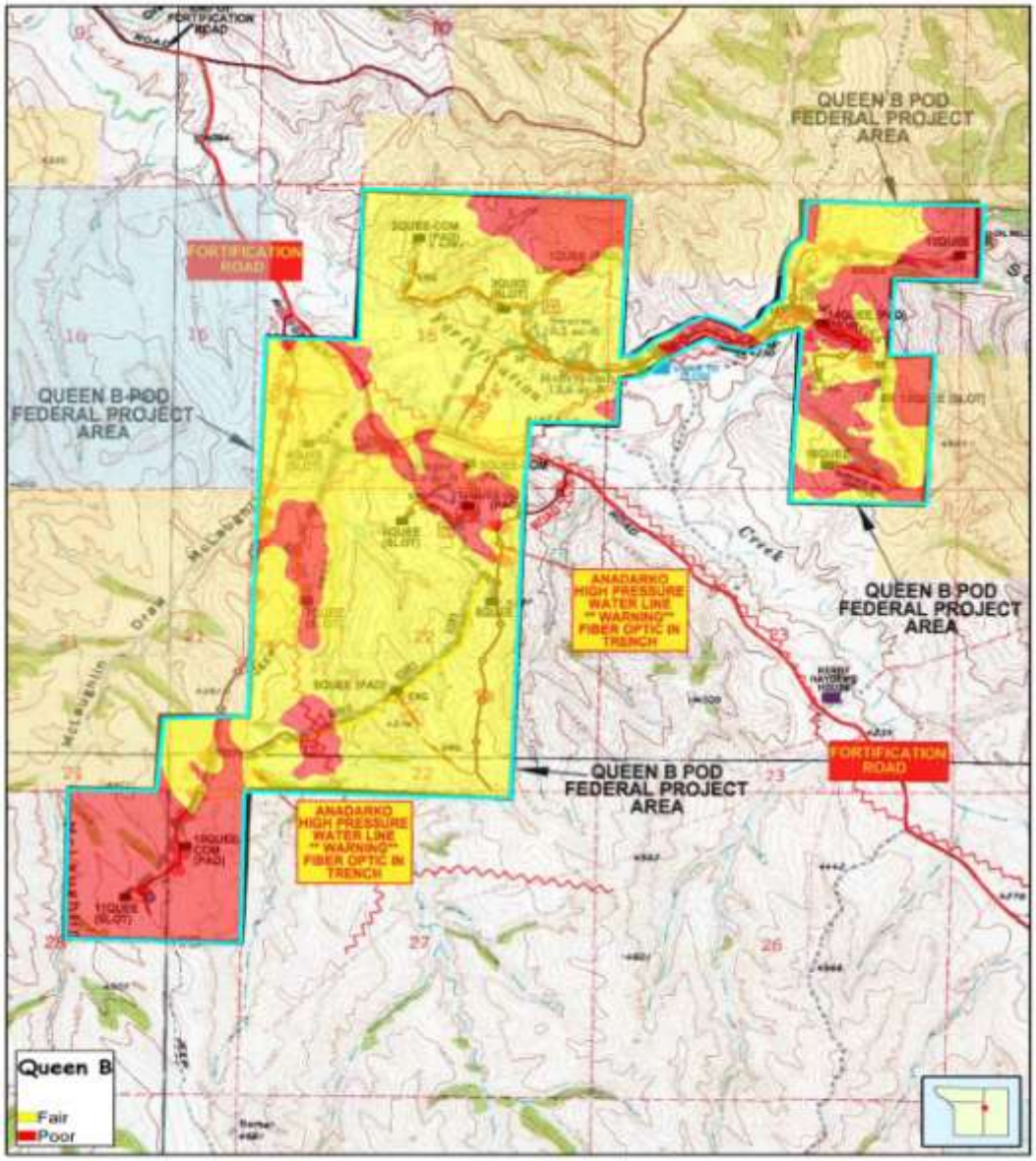


Table 3.5 Reclamation Suitability in the Queen B POD

Reclamation Potential	Approximate Acres	Percent of Project Area
Fair	1,024	68%
Poor	484	32%

Source: USDA 2010a

3.3.4. Ecological Sites and Vegetation

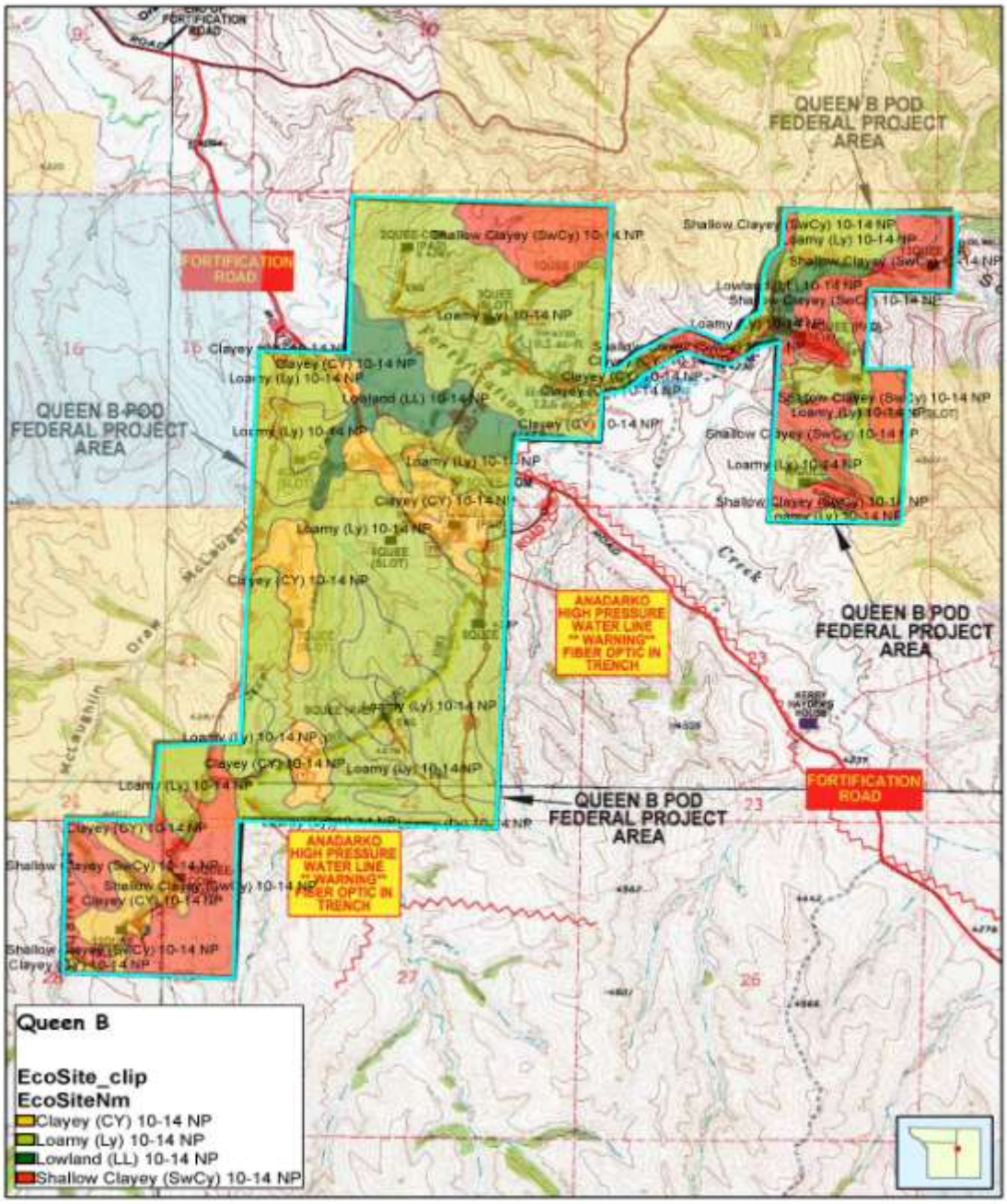
Ecological site descriptions provide soil and vegetation information needed for resource identification, management, and reclamation recommendations. To determine the appropriate Ecological sites, BLM specialists analyzed data from on-site field reconnaissance and from NRCS published soil survey information. A summary of the Ecological sites within the project area and their corresponding map units, approximate acreage, and percentage of the total area identified within the POD boundary are listed in Table 3.6 and displayed in Figure 3.6.

Table 3.6 Ecological Sites and Soils Map Units in the Queen B POD

Map Unit	Ecological Site	Approximate Acreage[1]	% of Project Area
147	Loamy (Ly) 10-14 NP	919	61%
216			
217			
339			
206	Shallow Clayey (SwCy) 10-14 NP	324	21%
204			
314	Clayey (CY) 10-14 NP	161	11%
327			
285	Lowland (LL) 10-14 NP	104	7%

[1] Ecological site information is available for 98% of the project area; 2% (approximately 131 acres) is unassigned.
Source: USDA 2010a.

Figure 3.6. Ecological Sites and Soils Map Units in the Queen B POD



Dominant ecological sites and plant communities identified in this POD include loamy (10-14NP), clayey (10-14NP), and shallow clayey (10-14NP) sites. Refer to the vegetation discussion, below for a description of vegetation observed during on-site field visits. Minor ecological sites and plant communities identified as areas that are difficult to reclaim include sands and sandy sites. In addition, in the project area are small inclusion areas of very shallow parent material (10 inches or less deep). Typically, vegetation indicators of shallow soils are found in these locations such as little bluestem and juniper. Table 3.6 demonstrates the diversity of soil types and structure found in the 1,508 acre project area.

The loamy (10-14NP) ecological site (covering approximately 61% of the POD) is a rangeland site type, found in the Northern rolling high plains. Composed of gently undulating rolling lands, this ecological site receives approximately 10 to 14 inches of annual precipitation and consists of well-drained, moderately permeable, and deep to moderately deep soils. The dominant species found within this ecological site include western wheatgrass, needle-and-thread, green needlegrass, Cusick's bluegrass, Sandberg bluegrass, bluebunch wheatgrass, and blue grama. Wyoming big sagebrush typically comprises 15% of the vegetation community. Disturbances such as overgrazing and changes in the fire regime lead to changes in the vegetation community. Overgrazing increases the Wyoming big sagebrush and blue grama and decreases cool season grasses. The absence of fire can increase the cover and percentage of Wyoming big sagebrush on the site, until it becomes the dominant species. Disturbances also can lead to an increase in cheatgrass, western wheatgrass, and plains pricklypear (USDA 2010a).

The shallow clayey (10-14NP) ecological site (covering approximately 21 percent of the POD) is a rangeland site type, found in the Northern Rolling High Plains. Found on slopes, ridge tops, and escarpments, this ecological site receives approximately 10 to 14 inches of annual precipitation and consists of shallow, well-drained soils. The bedrock is characterized as clay shale bedrock, which is virtually impenetrable to plant roots. Textures range from clay to silty clay loam. The dominant species found within this ecological site include cool-season midgrasses, such as wheatgrass, Cusick's bluegrass, Sandberg bluegrass, needleleaf sedge, blue grama and plains reedgrass. Dominant shrub species include Wyoming big sagebrush and winterfat. Disturbances can lead to increases in blue grama and Wyoming big sagebrush; and decreases in green needlegrass, bluebunch wheatgrass, and rhizomatous wheatgrasses (USDA 2010a).

The clayey (10-14NP) ecological site (covering approximately 11 percent of the POD) is a rangeland site type, found in the Northern rolling high plains. Found on hill sides, alluvial fans, and stream terraces on nearly level to slopes of 30 percent, this ecological site receives approximately 10 to 14 inches of annual precipitation and consists of well-drained, slightly permeable, and moderate to deep soils formed in alluvium or alluvium over residuum. The dominant species found within this ecological site include western wheatgrass, green needlegrass, Cusick's bluegrass, Sandberg bluegrass, needleleaf sedge (*Carex duriuscula*), blue grama, and plains reedgrass. Wyoming big sagebrush is a conspicuous element of this community (5 to 10 percent), occurring in a mosaic pattern; however, big sagebrush may become a dominant species with the absence of fire. As a result of frequent and severe grazing, species such as blue grama, plains pricklypear, cheatgrass, and big sagebrush may increase in dominance (USDA 2010a).

The lowland (10-14NP), sandy (10-14NP), sandy (15-17NP), and loamy (15-17NP) Ecological sites (covering approximately 7 percent of the POD, collectively) are rangeland site types, found in the Northern rolling high plains. Found on alluvial fans, hillsides, plateaus, ridges, and stream terraces ranging from nearly level to 50 percent slopes, these ecological sites receive approximately 10 to 17 inches of annual precipitation and consist of shallow, well-drained soils. Soils are moderately deep to very deep, well-drained, and have moderate to rapid permeability. These ecological site types are dominated by warm and cool season midgrasses. Typical species include needle-and-thread, prairie sandreed, sand bluestem, little bluestem, Sandberg bluegrass, and Indian ricegrass. Dominant shrub species include silver sagebrush and green rabbitbrush. Cottonwoods of various age classes may be a conspicuous part of the overstory community within the lowland ecological site. Disturbances such as overgrazing can lead to the conversion of sandy and loamy sites to a blowout community dominated by yucca, plains pricklypear, fringed sagewort, sandbur and western ragweed (USDA 2010a).

The predominant vegetation community types in the project area are mixed-grass prairie and sagebrush shrubland. Species typical of the mixed-grass prairie community type consist of western wheatgrass, blue grama, needle-and-thread, prickly pear cactus, scarlet globemallow, and Wyoming big sagebrush. Species typical of the sagebrush shrubland community type include silver sagebrush, western wheatgrass, prairie junegrass, Sandberg bluegrass, prickly pear cactus, and rabbitbrush (USDI BLM 2003a, USDA 2010a,). Inclusions within the dominant ecological sites are very shallow sites dominated by little bluestem and

juniper trees. Species nomenclature is consistent with the USDA NRCS Plants Database (USDA 2010a). A description of the wetland/riparian habitats within the project area is presented in Section 3.2.3.2 of this document, Wetlands/Riparian.

During the winter/spring of 2010/2011, wildlife and special status species habitat surveys were conducted by ICF International (ICF 2011). The site visits confirmed the dominant vegetation communities and the presence of the typical species listed above. In addition, other native species observed include Sandberg bluegrass, threadleaf sedge, spiny phlox, common yarrow, and greasewood. In some locations, cheatgrass is the dominant species present. Some portions of the project area are managed by prescribed burns to establish and maintain grasslands (ICF 2011).

The site visits also confirmed the presence of tree species in draws, along the creeks, and at higher elevations in the project area. In many of the draws, juniper is extensive, while cottonwoods are scattered along Fortification Creek within the riparian corridor. At higher elevations, ponderosa pine also occurs.

3.4. Wetlands/Riparian

The project area includes Fortification Creek, approximately 8 miles above the confluence with the Upper Powder River. The Fortification Creek floodplain within the POD boundary varies in width from approximately 400 feet to 1,000 feet. The valley floor is well vegetated with grass, shrubs, and cottonwood trees. A CBNG discharge point to Fortification Creek located in the SWSE Section 15, T51N, R76W, was removed within the past year and therefore the volume of perennial water flowing at this location has been significantly reduced. Tall, mature cottonwood trees are found throughout the Fortification Creek flood plain. The National Wetland Inventory (NWI) map shows the entire reach of Fortification Creek within the POD boundary and adjacent land area to be comprised of wetlands. The proposed location of the Swarm Reservoir also contains wetland vegetation, as this location is currently being used as a stock water pond that captures runoff from the small watershed upstream. Three more freshwater ponds with associated wetlands are mapped by the NWI within the POD boundary with none being over 1.2 acre in size. The operator has stated in their WMP (page 7) that there are no natural wetlands identified within the project boundary. The wetlands that we observed within the POD boundary appear to have been established through altered conditions such as the addition of CBNG water to the drainages or by the construction of stock impoundments and therefore could be considered not "natural" wetlands. The total and type of wetland vegetation as mapped by the NWI is shown in Table 3.7 below.

Table 3.7 Wetland Vegetation

NWI ATTRIBUTE	WETLAND TYPE	ACREAGE OF EACH
PEMCh	Freshwater Emergent Wetland	6.2
PABFh	Freshwater Pond	1.8
PSSB	Freshwater Forested/Shrub Wetland	0.1
	TOTAL ACREAGE OF WETLANDS	**8.1**

3.5. Noxious Weeds and Invasive Species

The project proponent discovered the following state-listed noxious weeds and invasive/exotic plant infestations to be common to the area by a search of inventory maps and/or databases:

leafy spurge (*Euphorbia esula*),
saltcedar (*Tamarix ramosissima*),
Canada thistle (*Cirsium arvense*),
common cocklebur (*Xanthium strumarium*),
buffalo bur (*Solanum rostratum*),
spotted knapweed *(Centaurea stoebe*), and
diffuse knapweed *(Centaurea diffusa*)
burdock,
licorice,
Canada thistle, and
whitetop

Cheatgrass or downy brome (*Bromus tectorum*) and to a lesser extent, Japanese brome (*B. japonicus*) are known to exist in the affected environment. These 2 species are found in high densities and numerous locations throughout NE Wyoming and is a species of concern even though it is not a designated state or county noxious weed species.

3.6. Wildlife

Several resources were consulted to identify wildlife species that may occur in the project area. Resources that were consulted include the wildlife database compiled and managed by the BFO wildlife biologists, the PRB FEIS, the Wyoming Game and Fish Department (WGFD) big game and sage-grouse maps, the Fortification Creek Planning Area RMPA/EA, and the Wyoming Natural Diversity Database (WYNDD). A habitat assessment and wildlife inventory surveys were performed by ICF from 2008 to 2011 (ICF 2011). Species surveyed for include bald eagle (nests and winter roosts), mountain plover, sharp-tailed grouse, greater sage-grouse, raptor nests, black-tailed prairie dog colonies, and mountain plover according to PRB Interagency Working Group accepted protocol during winter 2010 and spring 2011. Surveys were also conducted for Ute ladies'-tresses orchid following US Fish and Wildlife Service protocol.

WGFD has developed several guidance documents that the BFO wildlife staff relies upon in evaluating impacts to wildlife and wildlife habitats. In its *Recommendations for Development of Oil and Gas Resources within Important Wildlife Habitats* (WGFD 2009b), WGFD developed impact thresholds to evaluate impacts to wildlife from oil and gas development. For species or habitats discussed in this EA where impact thresholds have been developed, those thresholds will be disclosed and discussed both in relation to the current conditions (Affected Environment) and in relation to reasonable foreseeable development, including development associated with the proposed project (Environmental Effects). Moderate impacts occur when impairment of habitat function becomes discernible. High impacts occur when impairment of habitat function increases. Extreme impacts occur where habitat function is substantially impaired. Mitigation for each level of impact is discussed in the guidelines. Thresholds for impacts generally are determined by well density.

3.6.1. Habitat Types

The dominant vegetation types that make up the available habitat within and surrounding the project area are described above in the Ecological Sites and Vegetation section. To summarize, the project area is a rolling hill, grassland with a dominant Wyoming sage-brush shrub component. Tree species found within the project area include juniper scattered in the uplands with dense stands in the draws and cottonwoods scattered along Fortification Creek's banks.

The type of available wildlife habitat found within the project area is defined by the roughness of the topography. Topography ranges from moderately to extremely rugged with steep ridgelines and deeply incised draws. Much of the project area consists of dissected uplands with steep down-cut channels, created predominately by summer thunderstorms and spring runoff in ephemeral drainages with steep gradients and fine sediment substrate, which lead to Powder River.

3.6.2. Federally Threatened, Endangered, and Candidate Species

Threatened, Endangered, and Candidate species that could be affected beyond the level analyzed within the PRB FEIS are described below. At this time, there are no proposed species known to be present within the BFO resource area.

3.6.2.1. Threatened and Endangered Species (Ute Ladies'-tresses Orchid)

Proposed disturbance locations along Fortification Creek were surveyed from 2006 through 2010 for Ute ladies'-tresses orchid; no suitable habitat or individuals were present (ICF 2011). The ephemeral drainages have heavy clay soils and immediately rise to upland vegetation, precluding potential for this species.

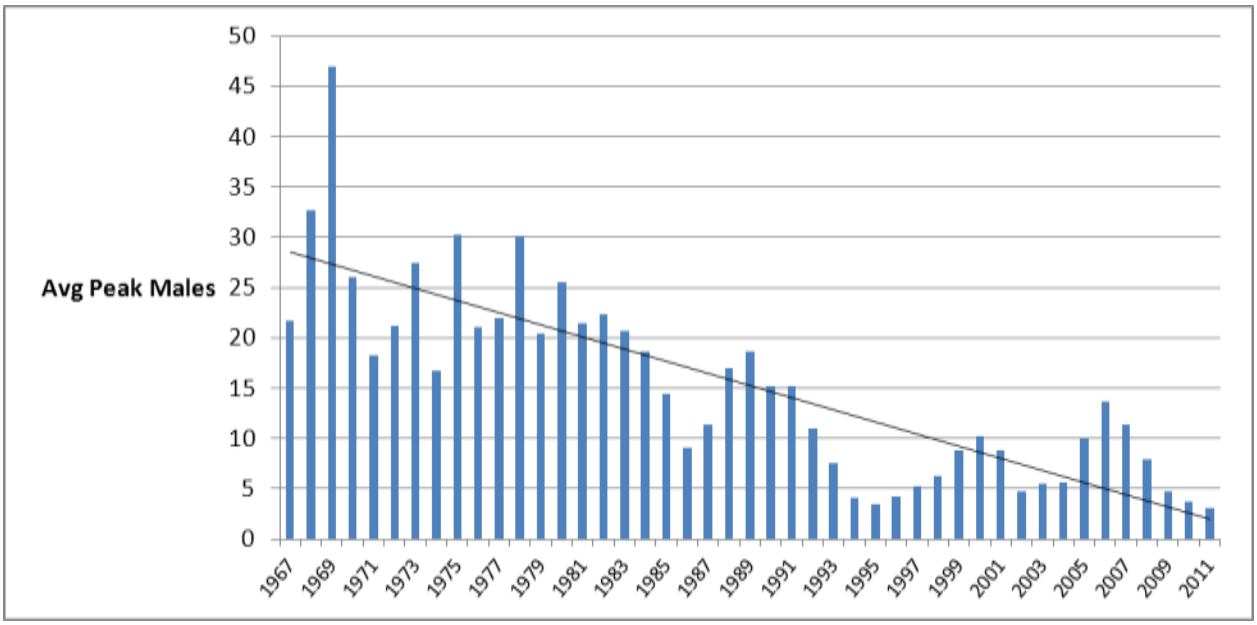
3.6.2.2. Candidate Species (Greater Sage-Grouse)

The PRB FEIS addressed the affected environment for sage-grouse, pp. 3-194 to 3-199. Since issuance of the FEIS the regulatory and biologic status of sage-grouse has changed:

1. 2005-2007: The PRB FEIS (2003) predicted that a ¼ mile year-round controlled surface use lek buffer, and timing limitations restricting surface disturbance within 2 miles of leks, would be sufficient for protection of sage-grouse populations. Several recent studies and literature reviews indicate that the PRB FEIS's restrictions, spatial scale, and timing limitations, may not be sufficient to alleviate impacts to sage-grouse (Holleran 2005, Walker et al 2007, Taylor et al 2012).
2. January, 2005: U.S. Fish and Wildlife Service (FWS) warranted that the sage-grouse was inappropriate for listing under the Endangered Species Act.
3. December, 2007: The U.S. District Court remanded the "not warranted" decision, finding a flawed decision-making process and ordered the FWS to conduct a new Status Review; Western Watersheds Project v. FWS, 535 F. Supp. 2d 1173 (D. Idaho 2007).
4. January 2008: The State Wildlife Agencies' Ad Hoc Committee for Consideration of Oil and Gas Development Effects to Nesting Habitat recommended land managers consider impacts on leks within 4 miles of oil and gas developments.
5. August, 2008: The WY BLM implemented management of identified core habitats in support of the population management objectives set by the State of Wyoming (Wyoming Governor's Executive Order (EO) 2011-5), in accordance with the BLM Wyoming Instruction Memorandums (IM), most recently, IM- WY-2012-019.
6. September, 2009: In its Recommendations for Development of Oil and Gas Resources within Important Wildlife Habitats, WGFD categorized impacts to sage-grouse by number of well pad locations per square mile within 2 miles of a lek.
7. 2010: Connectivity habitat designated by the State of Wyoming within North East Wyoming.
8. November, 2010: FWS warranted that the sage-grouse justified listing across its range, but precluded listing due to higher priorities (FWS 2010). The sage-grouse is a listing candidate.
9. March, 2012: WY BLM released the report, "Viability analyses for conservation of sage-grouse populations: Buffalo Field Office, Wyoming," indicating that a viable population of sage-grouse remains in the PRB, but the combined impacts of multiple stressors, including West Nile virus (WNv) and energy development, threaten that viability (Taylor et al 20012).

The sage-grouse population in northeast Wyoming is exhibiting a steady long term downward trend, as measured by lek attendance (WGFD 2011b). Figure 3.8 illustrates a 10-year cycle of periodic highs and lows. Each subsequent population peak is lower than the previous peak. Research suggests that the declines since 2001 are a result, in part, of energy development (FWS 2010, Taylor et. al. 2012).

Figure 3.8. Average Peak Number of Sage-grouse Males at WGFD Count Leks by Year in the PRB



Greater sage-grouse habitat is present within the project area, and portions of the POD provide valuable habitat for sage-grouse. However, the POD is not within designated core or connectivity habitat and the area supports extensive existing development (Tables 2.2 and 3.1). Mapped and modeled high quality sage-grouse nesting habitat is found throughout the project area (Figure 3.9). Although no sage-grouse were observed in the field by the BLM biologist, sage-grouse droppings were located within the mapped/modeled habitat that included the exoskeletons of insects confirming use of the habitat by sage-grouse during the brood rearing season. The size of the droppings was consistent with that from sage-grouse broods.

WGFD records indicate that 2 occupied sage-grouse leks occur within 4 miles of the project area. These leks are listed in Table 3.8. Currently there are 483 existing (producing or approved) wells within a 4 mile radius of these 2 leks, (Automated Fluid Minerals Support System [AFMSS] and Wyoming Oil and Gas Commission [WOGCC], April 24, 2012).

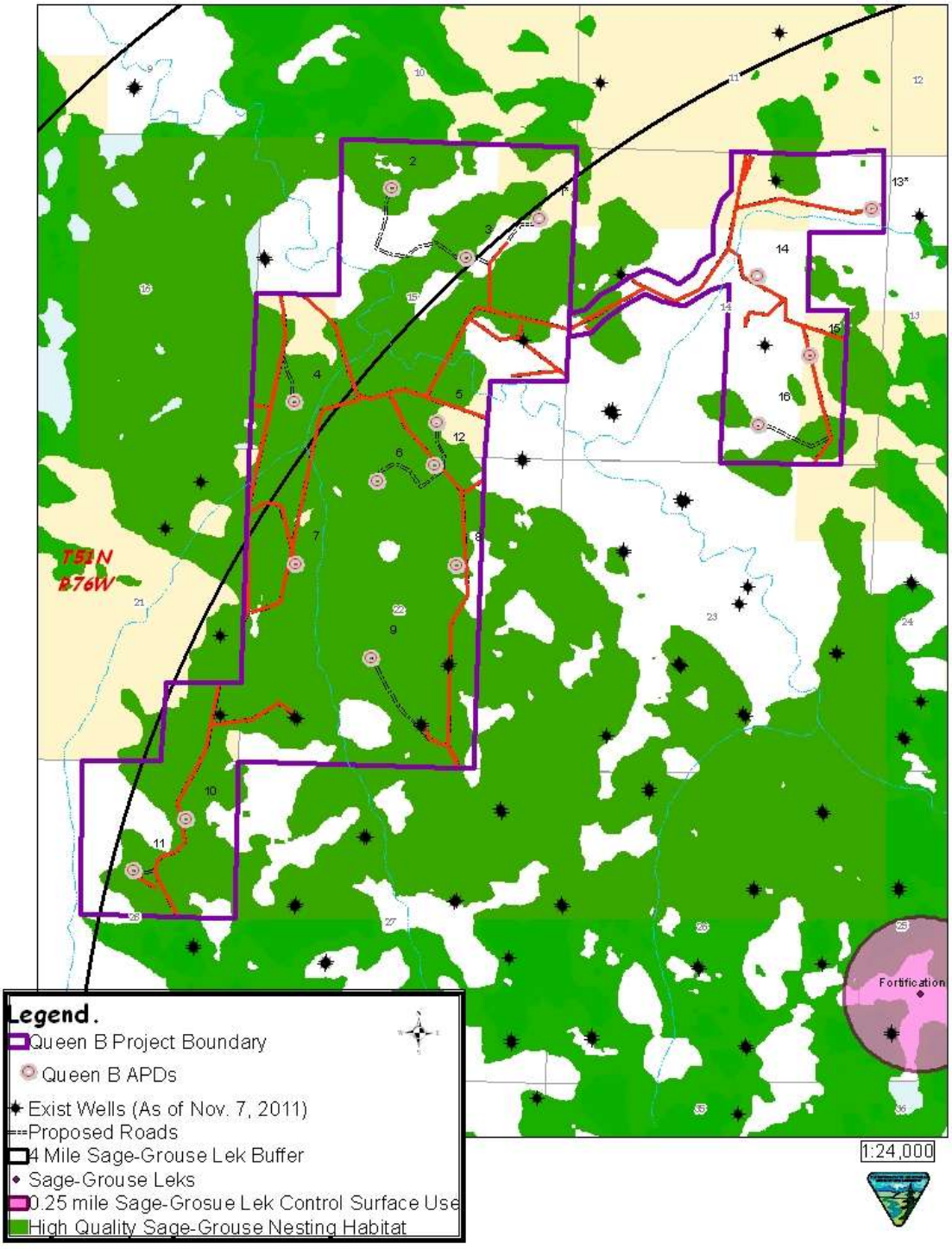
Table 3.8 Sage-grouse leks within 4 miles of the Queen B Project Area

Lek Name	Legal Location	Approximate Distance from Project Area	2011Activity Status
Fortification	Section 25, T51N R76W	1.6 mile	Inactive
Hayden II	Section 31, T51N R75W	2.8 miles	Inactive

Impacts from oil and gas development are most discernible at the spatial scale of 20 km (12.4 mi) (Taylor et al. 2012). These findings echo results from previous studies conducted in the Powder River Basin, wherein biologists observed basin-wide population declines (Walker et al. 2007).

There are 25 occupied sage-grouse leks within 12.4 miles of the Queen B project area.

Figure 3.9 Mapped and Modeled Sage-Grouse Habitat within the Queen B POD



3.6.3. BLM-Sensitive Species

Sensitive species are discussed in the PRB FEIS page 3-189 to 3-201. Wyoming BLM manages habitats for Sensitive Species and Species of Concern to preclude listings as threatened or endangered species. The authority for the sensitive species policy and guidance comes from the Endangered Species Act (ESA) of 1973, as amended; the FLPMA of 1976; the U.S. Department of the Interior (USDI) Manual

235.1.1A, and BLM Manual 6840. The policy goals are:

- 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

Wyoming BLM-Sensitive Species evaluations are found in Appendix B of this document, Table B.3. For those species listed below, where habitat is present but there were no recorded observations, surveys specifically targeting these species were not conducted unless otherwise stated. Some may be present, but haven't been recorded, and others likely are not present.

3.6.3.1. Northern Leopard Frog

The affected environment for northern leopard frog is discussed in the PRB FEIS on p. 3-181. Suitable habitat is present along Fortification Creek, its associated tributaries, and within the wetland and riparian areas of the project area. There are no recorded observations of northern leopard frogs within the project area, but it is suspected to be present.

3.6.3.2. Bald Eagle

The affected environment for bald eagles is described in the PRB FEIS on p. 3-175. At the time the PRB FEIS was written, the bald eagle was listed as a threatened species under the ESA. It was removed from the ESA on August 8, 2007, but remains a BLM Sensitive species. The bald eagle is protected from take by the Bald and Golden Eagle Protection Act and the MBTA.

In the PRB Oil & Gas Project Biological Opinion (BO) (USFWS 2002b), USFWS defined bald eagle winter roosting habitat as any mature conifer or deciduous tree where bald eagles consistently perch. A consistent use roost was defined as a location where bald eagles are observed on more than one occasion (at least one week apart) within a single winter or over multiple winters.

Suitable nesting and winter roosting habitat in the vicinity of the proposed project is limited to mature cottonwood trees along Fortification Creek and Wild Horse Creek, and scattered mature ponderosa pines in upland areas. Aerial and ground surveys were conducted within 1 mile of the project area for bald eagle nest and winter roost sites. Nest surveys were conducted in spring 2011, and winter roost surveys were conducted during winter 2010/2011 (ICF 2011). The Queen B POD was included in aerial surveys for wintering bald eagles on December 8, 2010; January 14 and February 15, 2011. No bald eagles were observed perched within 1 mile of the POD and no bald eagle nests were identified (ICF 2011).

3.6.3.3. Baird's Sparrow

The affected environment for Baird's sparrow is discussed in the PRB FEIS on p. 3-188. This species is found within, shortgrass prairie and basin-prairie shrubland habitats, plowed and stubble fields, grazed pastures, dry lakebeds, and other sparse, bare, dry ground. On May 24, a Baird's sparrow was observed within in SWSW Section 28, T51N/R76W (ICF 2011).

3.6.3.4. Brewer's Sparrow

The affected environment for Brewer's sparrow is discussed in the PRB FEIS on p. 3-200. This species is considered a sagebrush obligate species and is closely associated with sagebrush shrublands that have abundant, scattered shrubs and short grass (WGFD 2005). Suitable habitat for the Brewer's sparrow is present throughout the POD. There have not been any recorded observations within the project area.

3.6.3.5. Ferruginous Hawk

The affected environment for ferruginous hawk is discussed in the PRB FEIS on p. 3-183. This species is found within grasslands, agricultural lands, sagebrush/saltbrush/greasewood, shrublands, and the periphery of juniper woodlands. Suitable foraging habitat for the ferruginous hawk is present throughout

the POD. However, no active ferruginous hawk nests were identified during past raptor nest surveys (see Table 3.13).

3.6.3.6. Loggerhead Shrike

The affected environment for Loggerhead shrike is discussed in the PRB FEIS on p. 3-187. The species is found within grasslands, which are interspersed with spiny shrubs and low trees. Pastures and hay meadows with hedges or shrubs are preferred. Suitable habitat for the Loggerhead shrike is present throughout the POD. There have not been any recorded observations within the project area.

3.6.3.7. Long-billed Curlew

The affected environment for long-billed curlew is discussed in the PRB FEIS on p. 3-184. The species is found in grasslands, prairies, pastures, mud flats, sandy islands, and shorelines. Suitable habitat for the long-billed curlew is present within the POD, in areas associated with the wetland and riparian areas. Because the habitat is limited, the species is not suspected to nest within the project area but may utilize it during seasonal migrations.

3.6.3.8. Northern Goshawk

The affected environment for northern goshawk is discussed in the PRB FEIS on pp. 3-193 to 3-194. This species is found in coniferous and deciduous forest habitats. Suitable habitat for the northern goshawk is present. There have not been any recorded observations or nests (see Table 3.15) within the project area.

3.6.3.9. Peregrine Falcon

The affected environment for peregrine falcon is discussed in the PRB FEIS on p. 3-194. The peregrine falcon preys on smaller birds and forages in a variety of open habitats from open woodlands and forests to shrub-steppe, grasslands, marshes, and riparian habitats (WGFD 2005). It nests on cliffs which are usually proximate to habitats with abundant prey (WGFD 2005). Suitable foraging habitat for the peregrine falcon is present throughout the entire POD. However, no nesting habitat is present in the project area or vicinity and would likely only to be used during the species migration. (see Table B.3).

3.6.3.10. Sage Sparrow

The affected environment for sage sparrow is discussed in the PRB FEIS on pp. 3-200 to 3-201. The sage sparrow is found in open shrub lands and grasslands, in areas with mature big sagebrush stands. These sparrows prefer sites with sparse shrub cover arranged in patches, interspersed with bare ground. Suitable habitat for the sage sparrow is present throughout the POD. There have not been any recorded observations within the project area.

3.6.3.11. Sage Thrasher

The affected environment for sage thrasher is discussed in the PRB FEIS on pp. 3-199 to 3-200. The sage thrasher is a sagebrush obligate species and inhabits prairie and foothills shrublands where sagebrush is present. The species prefers habitat with tall shrubs and low grass cover, where sagebrush is clumped in a patchy landscape. Suitable habitat for the sage thrasher is present throughout the POD. There have not been any recorded observations within the project area.

3.6.3.12. Western Burrowing Owl

The affected environment for the Western burrowing owl (burrowing owl) is discussed in the PRB FEIS on p. 3-186. Current population estimates for the U.S. 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).

Historic survey information at the BFO indicates there are no burrowing owl nests within 0.25 mile of the Queen B project area. The prairie dog colonies listed in Table 3.9 of this document provide suitable

western burrowing owl habitat within the Queen B project area. However, presence of the species within the project area has not been documented.

3.6.3.13. Black-tailed Prairie Dog

The affected environment for black-tailed prairie dogs is discussed in the PRB FEIS, p. 3-179. 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. 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 percent of the prairie dog acreage was impacted by Sylvatic plague and/or control efforts (Grenier et al. 2004). Due to human-caused factors, black-tailed prairie dog populations are now highly fragmented and isolated (Miller et al. 1994). Most colonies are small and subject to potential extirpation due to inbreeding, population fluctuations, and other problems that affect long term population viability, such as landowner poisoning and disease (Primack 1993, Meffe and Carroll 1994, Noss and Cooperrider 1994).

A total of six black-tailed prairie dog colonies, totaling 22.1 acres exist within or adjacent to the Queen B project boundary. Two of the colonies were active in the spring of 2011. Only two of the colonies are located within the Queen B POD (ICF 2011). Table 3.9 summarizes these colonies.

Table 3.9 Prairie Dog Colonies within the Queen B Project Area

Qtr/Qtr	Section(s)	Township (N)	Range (W)	Size (acres)
SWNW	15	T51N	R76W	0.9
SENE	16	T51N	R76W	1.8
SESW, NENW	23	T51N	R76W	14.3
NWNW	22	T51N	R76W	1.2
NENE	27	T51N	R76W	2.3
SWSE	14	T51N	R76W	1.6

3.6.3.14. Mountain Plover

The PRB FEIS discussed the affected environment for mountain plover on pp. 3-177 to 3-178. USFWS proposed the mountain plover as a threatened species under the ESA when the PRB EIS was written. In 2003, USFWS withdrew the proposal, finding that the population was larger than previously thought and was no longer declining. On May 12, 2011, after a review of the current scientific and commercial information, the USFWS, found mountain plover not warranted for listing, citing threats to its habitat as less significant than previously thought.

Suitable habitat for mountain plover within the POD is limited to prairie dog colonies (Table 3.9 of this document). Surveys for nesting mountain plovers were conducted on May 9, 14, 15, 16, 29, June 3, and 20, 2010 following the USFWS guidelines for mountain plover surveys (USFWS 2002a). Surveys were conducted within the entire POD and extended buffer of 0.25 mile from proposed construction areas, paying particular attention to black-tailed prairie dog colonies and other suitable terrain including access roads to the project (ICF 2011).

The identified black-tailed prairie dog colonies are generally in close proximity to the Fortification Creek county road. These colonies occur in relatively flat terrain, but vegetation height in excess of 6 inches is common. This reduces the habitat suitability for breeding plovers. Additionally, the colonies are small and do not provide optimal habitat for mountain plover (see Table 3.8 of this document). Mountain plover were not observed during the 2010 surveys (ICF 2011).

3.6.3.15. Fringed Myotis

The affected environment for fringed myotis is discussed in the PRB FEIS on pp. 3-188 to 3-189.

The fringed myotis is most commonly found in xeric woodlands, such as juniper, ponderosa pine, and Douglas fir. It typically forages over water, along forest edges, or within forests and woodlands. Roost sites and hibernacula include rock crevices, tree cavities, caves, abandoned mines, and buildings (WGFD 2005). Suitable habitat for the fringed myotis is present throughout the POD. There have not been any bat surveys within the project area.

3.6.3.16. Long-eared Myotis

The affected environment for long-eared myotis is discussed in the PRB FEIS on pp. 3-201. In addition to being listed as a Wyoming BLM-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 substantial loss of habitat, and they are sensitive to human disturbance.

The long-eared myotis primarily inhabits coniferous forest and woodland, including juniper, ponderosa pine, and spruce-fir. It typically forages over rivers, streams, and ponds within the forest-woodland environment (WGFD 2005). Roost sites include a wide variety of structures, including cavities in snags, under loose bark, stumps, buildings, rock crevices, caves, and abandoned mines (WGFD 2005). During winter, it probably hibernates primarily in caves and abandoned mines (WGFD 2005). Suitable habitat for the fringed myotis is present. There have not been any bat surveys within the project area.

3.6.4. Big Game

3.6.4.1. General

Big game species expected to occur within the Queen B POD include pronghorn antelope, mule deer, white-tailed deer, and elk. The affected environment for pronghorn is discussed in the PRB FEIS, pp. 3-117 to 3-122, while-tailed deer on pp. 3-122 to 3-127, and for mule deer, pp. 3-127 to 3-132. Big game range maps are available in the PRB FEIS, pp. 3-119 to 3-143. The project area supports crucial winter, and parturition range for Fortification elk.

The affected environment for the Fortification elk herd is discussed in the PRB FEIS, pp. 3-132 to 3-140 and in the FCPA RMPA, pp. 3-27 to 3-32. The PRB FEIS considered cumulative impacts to elk throughout the Basin; however, it did not specifically address the isolated Fortification elk herd. The FCPA RMPA addressed cumulative impacts to the Fortification elk herd resulting from CBNG development within the herd's yearlong range. CBNG development is probable throughout the elk herd's seasonal ranges.

3.6.4.2. Elk

In 1992, a 2.5 year study of the Fortification Creek elk herd was initiated by the WGFD, in cooperation with the BLM and area landowners, with the collaring of 17 cows. Data from this study allowed the WGFD to delineate crucial elk winter range, elk summer/yearlong range, and elk parturition range (USDI BLM 2006).

The WGFD defined 2 types of important seasonal elk habitats within the elk yearlong range; crucial winter range and parturition (calving) range (Figure 3.8). Both provide important seasonal habitat functions during sensitive periods for elk. These crucial ranges overlap on the landscape; the overlapping area is referred to as "dual crucial" range. In March 2011, the BLM released a comprehensive Fortification Creek Area RMPA/EA. Habitat for the Fortification Creek elk herd is described in detail in this document. Table 3.10 summarizes elk habitat by category for the Fortification Creek Study Area available within the Queen B project area.

Table 3.10 Acres of Elk Ranges/Habitats within the Queen B POD

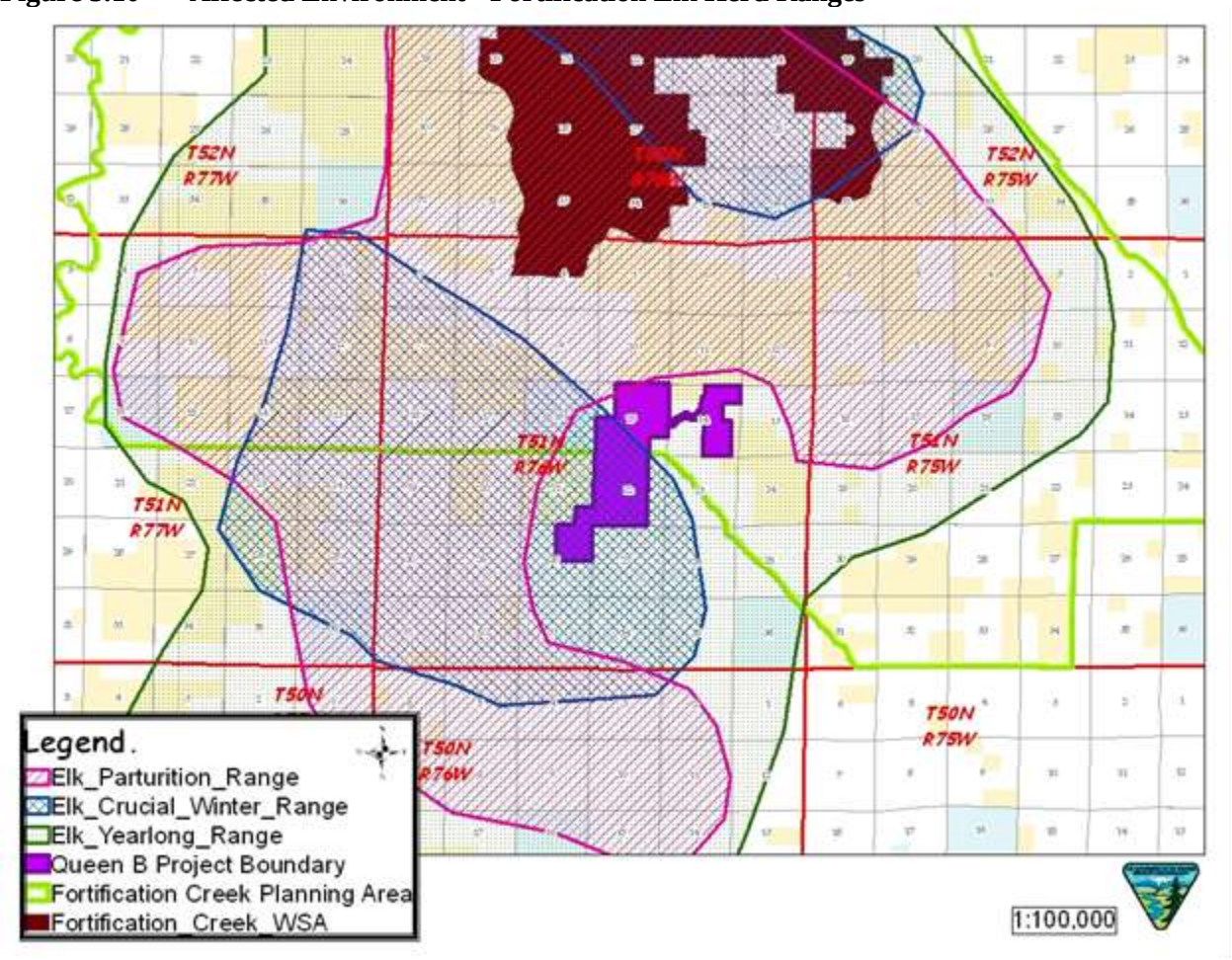
Range/Habitat	Size (Acres)	Percent Area of the Queen B Project Area [1]
Yearlong	1,509	100

Table 3.10 Acres of Elk Ranges/Habitats within the Queen B POD

Range/Habitat	Size (Acres)	Percent Area of the Queen B Project Area [1]
Crucial Winter	860	57
Parturition	19	1.3
Effective Habitat	139	9.2
Security Habitat	0	0

Figure 3.10 displays the position of the Queen B project area within Fortification Creek Planning Area and the elk seasonal ranges.

Figure 3.10 Affected Environment - Fortification Elk Herd Ranges



The FCPA RMPA established performance standards for CBNG development. The performance standards are used to achieve BLM's goal and objectives for the FCPA. The goal is to maintain a viable elk herd across the FCPA utilizing their seasonal ranges during the appropriate seasons. The elk performance standards (USDI BLM 2011a) and current status are as follows:

1. The population is maintained at 80% (120) or greater as measured from the Wyoming Game and Fish Department (WGFD) population objective (currently 150). Coal Bed Natural Gas (CBNG) will not be the causative factor to a population below this level. The WGFD 2010 Job Completion Report provides a 2009 post-season population estimate for the Fortification Creek elk herd of 232.
2. Calf production is maintained at least 80% (100:37) of current cow:calf ratio (100:45.5). The initial ratio is based on a 9 year average (2003-2011 WGFD 2010 JCR Table 7).

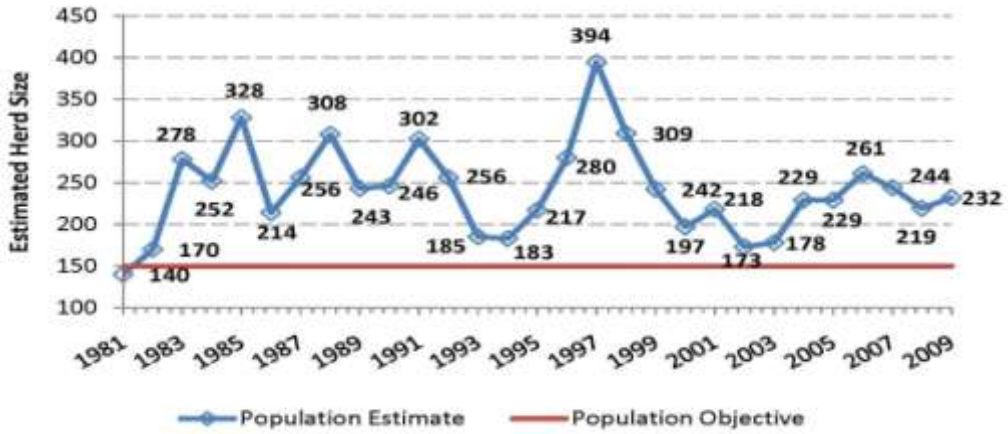
3. Winter calf survival is at least 80% (100:25) of current cow:calf ratio (100:30.9). The initial ratio is based on a 9 year average (2003-2011 WGFD 2010 JCR Table 8).
4. Next-summer calf survival (calf to yearling) is at least 80% (100:26) of current cow:Yrlng ratio (100:32.4). The initial ratio is based on a 9 year average (2003-2011 WGFD 2010 JCR Table 7).
5. Fidelity to the seasonal ranges (yearlong, calving, and crucial winter) remains greater than 80% of current levels. This means that if currently 80% of the collared elk locations (pre-CBNG) are within the yearlong range for the entire year, then following drilling 64% of the collared elk locations should remain within the yearlong range for the entire year (64% is 80% of 80). The seasonal crucial range fidelity will evaluate the collared elk use within the seasonal ranges (calving and crucial winter) during the crucial seasons. Calving range fidelity will be evaluated for the period from May 15 through June 15. Crucial winter range fidelity will be evaluated for the period from December 1 through April 30.
6. Security habitat is maintained at 80% or greater than baseline levels within the crucial ranges and the yearlong range for each geographic phase.
7. Habitat effectiveness (local – plan of Development [POD]) is maintained at 80% or greater of current levels within the crucial ranges and the yearlong range.

3.6.4.3. Population Demographics

The productivity of a big-game herd is often used as an indicator of the overall health and welfare of a population. Relatively high herd productivity is closely associated with good nutritional resources resulting from a desirable forage/range condition, as well as variables such as slope, aspect, elevation, distance to road, distance to shrub cover, and habitat diversity (Sawyer et al. 2007). Pre-hunt productivity estimates indicate the Fortification Creek herd health is good to excellent (BLM 2007a). Blood samples taken from 36 adult cow elk in late March 2008 showed a greater than 90 percent pregnancy rate (USDI BLM 2011a). The 2010 post hunt cow calf ratio is 100:45.5.

The WGFD 2010 Job Completion Report (JCR) provides a 2011 post-season population estimate for the Fortification Creek elk herd of 210, down from a 2010 post-season population estimate of 238 and the 9-year average (2000-2009) of 241. The population has increased in 2009 and 2010 as shown in Figure 3.11 below.

Figure 3.11 Fortification Elk Herd Population Trends 1981 to 2009



3.6.4.4. Range Fidelity

Fidelity to seasonal ranges (yearlong, calving, and crucial winter) remains greater than 80% of current level within the FCPA. This means that currently 80% of collared elk locations pre-CBNG is within the yearlong range for the entire year. Seasonal crucial range fidelity remains greater than 80% of current

levels, meaning that collared elk use the appropriate seasonal ranges during the crucial seasons within 80% of the current use level and use pattern. See the figures included in Appendix D of the Kernel Density Models.

3.6.4.5. Habitat Effectiveness

Habitat effectiveness is the degree to which habitat features fulfill specific functions; (i.e., the degree to which a species or population is able use their habitat).

Security habitat is a subset of effective habitat. A security area is defined as "any area that will hold elk during periods of stress because of geography, topography, vegetation, or a combination of those features" (Lyon and Christensen 1992). Hillis et al. (1991) quantified security areas as nonlinear blocks of hiding cover ≥250 acres in size and ≥0.5 mile from any open road (Lyon and Canfield 1991, Hillis et al. 1991). WGFD also uses this definition (WGFD 2004). Descriptions of effective and security habitat and the methods used to identify them are included in the FCPA RMPA, pp. 3-30 to 3-32, 4-39 to 4-77, and Appendix B.

The Queen B POD includes parturition, effective, and security habitats. Table 3.10 provides the areas and percent of these range types within the project area. Figure 3.12 displays elk security habitat and effective elk habitat in relation to the Queen B project area.

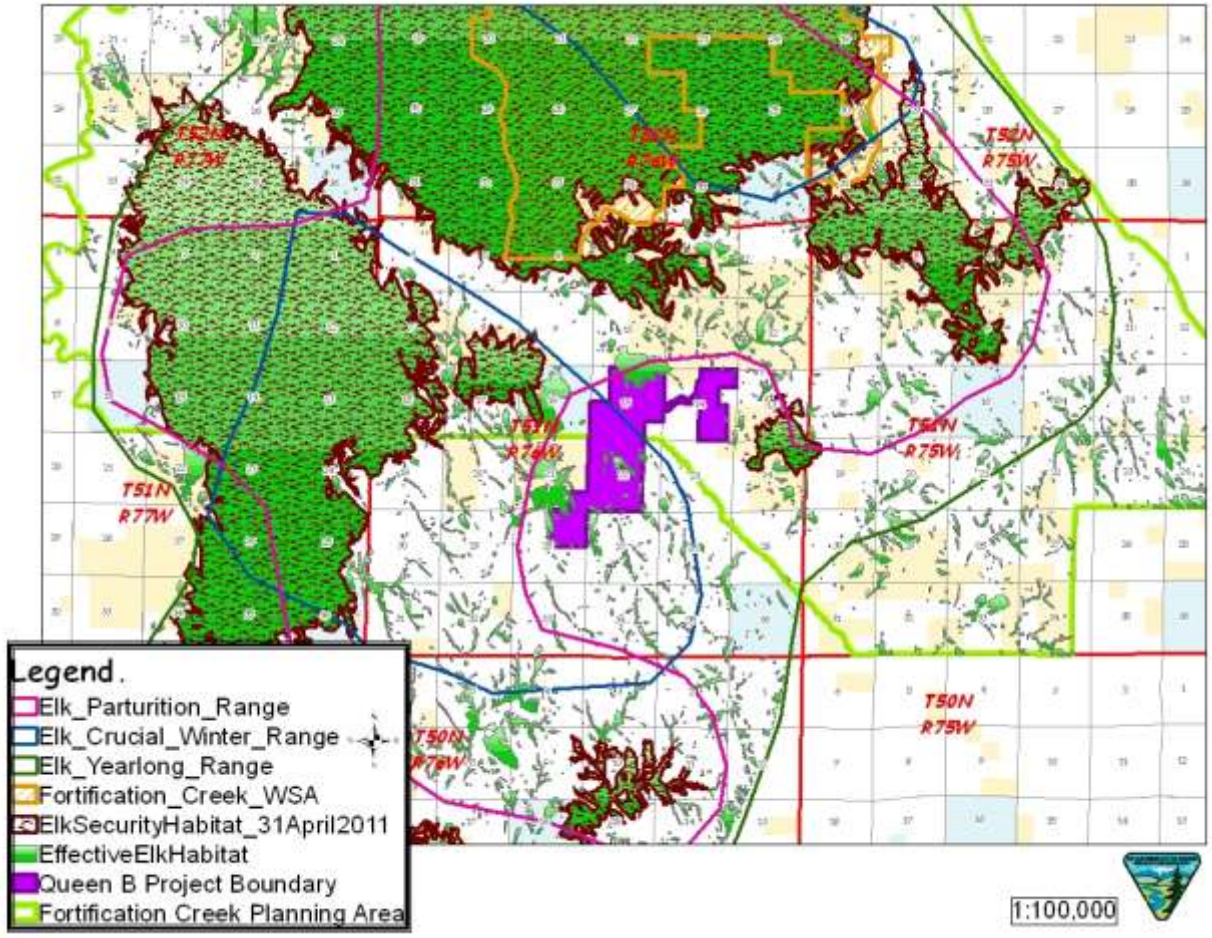
The Queen B project falls within the Southeast (SE) Development Phase of the FCPA which is described in the FCPA-RMPA. Approximately 5,593 acres of elk security habitat was modeled within the SE Phase for the FCPA-RMPA. Since the August 5, 2011 decision record on the FCPA-RMPA, one CBNG project has been approved with 56 wells that will result in a loss of 443 acres or 7.9% of the elk security habitat within the SE Phase. Between July 2011 and January 2012, WOGCC changed the status of 70 nonfederal permits from expired (EP) to approved (AP) making those wells reasonably foreseeable for future development. Development of these wells would impact another 622 acres of elk security habitat; 299 acres within the SE Development Phase. A total of 742 acres (13.3 percent) of the elk security habitat in the SE Phase is currently considered affected.

The herd is subjected to the increased impacts (wells, roads, weeds, and human presence) associated with the energy development that has occurred in the FCPA in the recent past. Road density has been positively correlated with reduced habitat effectiveness (Lyon 1983). The habitat effectiveness within and adjacent to the southern and western portions of the project area has been compromised due to prior oil and gas development.

Based on analyses of road density, topography, and vegetation in combination with radio monitoring, it appears that the FCPA elk are choosing to occupy the WSA and other remote areas to avoid mineral development. CBNG development in the southern yearlong range is likely to concentrate the elk herd within the WSA and undeveloped portions of the FCPA (USDI BLM 2011a).

There are 6 registered stock and domestic water wells within a 1 mile radius of the POD as well as 5 existing stock reservoirs and several stock tanks scattered throughout the project area. Availability of water from existing free-flowing water wells could decrease because of CBNG drawdown. Because access to water is an important component of elk habitat, this decrease in well availability could lead to a downward trend in the elk population; however, additional water sources associated with CBNG water could increase water supply (USDI BLM 2011a).

Figure 3.12 Elk Security Habitat and Effective Elk Habitat



3.6.4.6. Habitat Use

Studies of elk radio telemetry from the Fortification Creek herd in the early 1990s showed elk ranging out of the Fortification Creek area as far north as Montana. Recent radio telemetry data from the Fortification Creek herd have shown that between 15 and 20 percent of the collared animals were observed, at least seasonally, in other locations including; east of Wild Horse Creek and the Fortification Creek area, on the west side of the Powder River, south along the Kinney Divide, and occasionally as far north as Sonnette, Montana. Despite these movements, the yearlong range in the Fortification Creek Area remains the core use area for the vast majority of this herd (Laird 2005). Appendix D includes images of Kernel Density models using the 2008-2011elk relocation data to identify the density of use within the Yearlong, Parturition, and Crucial Winter ranges. Figure D1 shows the Queen B area to fall within the 75-95% level of yearlong and parturition collared elk use and the 90-95% level of crucial winter collared elk use. Elk observations by the BLM biologist have also been more common during late fall, winter and early spring respectively.

In April 2005, 26 elk (5 yearling bulls and 21 adult cows) from the Fortification Creek elk herd were fitted with VHF radio collars. One cow was fitted with a GPS collar in February 2005. Radio-telemetry (VHF) and GPS collaring data collected by BLM and WGFD since 2005 have shown that the Fortification elk tend to avoid oil and gas development by moving to less developed areas. Disruptive activity is usually temporary in nature. Studies have shown that elk returned to the area of disturbance once the source of disturbance and human presence was gone (Gussey 1986, WGFD 2000), albeit at 50 percent or less of the previous levels in forested environments (Hayden-Wing Associates 1990). Sawyer et al. (2005) observed a similar response of elk within the more open terrain of the Jack Morrow Hills of

Wyoming. The literature consistently shows a correlation between elk avoidance response and the level of human activity associated with roads, including those servicing oil and gas development. Radio-collared elk avoided available habitat that was within 1.7 miles of well sites and within 0.5 mile of roads (USDI BLM 2011a).

Monitoring the movement patterns of the Fortification Creek elk continued with deployment of 38 additional VHF/GPS collars in March 2008 and 17 additional collars in December 2008. This effort was repeated in March 2011 when 35 new VHF/GPS collars were deployed. Data collected in 2008-2011 have shown similar trends as previously discussed with a few collared individuals from the Fortification Creek elk herd relocated outside of the herd unit for periods exceeding 6 months.

As of August 1, 2011, 150,000 relocation data have been recorded over the 40 months (March 2008 through July 2011) of monitoring with the GPS collars. Sixteen of the GPS collars deployed have recorded 105 observations (0.07 percent) within the Queen B project boundary. None of the collared elk have used the project area consistently. The greatest number of relocations recorded of any of the collared elk was 28 relocations (elk 335328) over the 40 month period with most collared individuals having less than 10 relocations recorded from within the project area. Of these sixteen collared elk recorded within the Queen B project area, 11 were collared in 2008 and five in 2011.

Two collared elk (335328 & 356905) have used the project area during the 2008 through 2011 calving seasons (May 15 through June 15). They were recorded within the project area 9 times during the 2008 through 2010 calving seasons; during this same time period there was a total of 13,720 data points recorded from all the collared elk. Less than one percent (9/13,720=0.0007) of the elk locations during the 2008 through 2010 calving seasons were within the project area. Elk 335328 spent 5 days within the project area; 4 in 2009 calving season (June 9-12) and one day during the 2010 calving season (May 18). Elk 356905 was relocated only once within the project area during this time period (May 9). None of the elk collared in 2011 were located within the project area during the 2011 calving season.

Five collared elk, all collared in 2008, (335328, 356905, 332416, 330469, & 330465) used the project area during the 2008 through 2010 crucial winter season (November 15 through April 30). These five elk were relocated within the project are a total of 22 times during this period; during this same time period there was a total of 56,110 data points recorded from all the collared elk. Less than one percent (22/56,110=0.0004) of the elk locations during the 2008 through 2010 crucial winter seasons were within the project area.

During field visits, elk sign is observed throughout the project area with the highest use observed late fall to early spring. Individuals are observed on rare occasion as they flee into thick juniper cover or over ridge tops.

3.7. Upland Game Birds (Plains Sharp-tailed Grouse)

The affected environment for plains sharp-tailed grouse is discussed in the PRB FEIS, pp. 3-148 to 3-150. Surveys for grouse species were conducted using WGFD and BLM protocols that required surveys extend 0.64 mile beyond the proposed project boundary. Ground surveys were conducted for grouse species on April 4, 13 and 21, 2010 (ICF 2011). One historic sharp-tailed grouse lek, the Fortification I lek (located NWNW Section 31, T51N/R75W), was determined inactive in 2010 (Table 3.10) (ICF 2011).

3.8. Aquatic Species

The PRB ecosystem and fishery is discussed in the PRB FEIS (pp. 3-153 to 3-166). The Queen B POD lies within the Fortification Creek watershed, a tributary to the Powder River. Fortification Creek is considered ephemeral (ICF 2011). The channel of the creek is deep and varies from narrow to wide with soils along the creek composed of heavy clay with intermittent sand. Seasonally, the creek receives high runoff, with pools along the channel maintaining standing water between storm events.

Perennial streams within northeastern Wyoming were sampled by U.S. Geological Survey (USGS) between 1980 and 1981, and generally supported invertebrate communities that included taxa adapted to flowing water. Ephemeral stream communities generally were composed of taxa adapted to standing water (Peterson 1990).

3.9. 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 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. *Culex tarsalis* appears to be the most common mosquito vector. Mosquitoes can hatch from standing water in as few as four days.

Data collected by the CDC and published by the USGS at www.westnilemaps.usgs.gov are summarized in Table 3.11. Reported data from the Powder River Basin (PRB) includes Campbell, Sheridan and Johnson counties.

Table 3.11. Historical West Nile Virus Information

Year	Total WY Human Cases	Human Cases PRB	Equine 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
2009	10	1	1	No record
2010	6	0	0	0
2011	3	0	Unk	No record

Source: Wyoming Department of Health, http://diseasemaps.usgs.gov/wnv_wy_human.html

Human cases of WNv in Wyoming occur primarily in the late summer or early fall. WNv has 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 corvids (crows, jays). 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).

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). Current science suggests a synergy between west nile virus and energy development that amplifies the negative impact sage-grouse (USFWS 2010 p. 13947).

In the PRB, there may be increased surface water associated with CBNG development. This increase in potential mosquito breeding habitat provides opportunities for mosquito populations to increase. Preliminary research conducted in the PRB indicates WNv mosquito vectors were notably more abundant on a developed CBNG site than 2 similar undeveloped sites (Walker et al. 2003).

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.

3.10. Migratory Birds

The PRB FEIS discussed the affected environment for migratory birds, pp. 3-150 to 3-153. Migratory birds migrate for breeding and foraging at some point in the year. The BLM-FWS MOU (2010) promotes the conservation of migratory birds, as directed through Executive Order 13186 (Federal Register V. 66, No. 11). BLM must include migratory birds in every NEPA analysis of actions having potential to affect migratory bird species of concern to fulfill obligations under the Migratory Bird Treaty Act (MBTA). BLM encourages voluntary design features and conservation measures agreeing with those in the programmatic mitigation in Appendix A of the PRB ROD.

Habitats occurring near the proposed well location include sagebrush steppe grasslands and mixed grass prairie. 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 than any other ecological association of birds over the last 30 years (WGFD 2009). The FWS's Birds of Conservation Concern (BCC 2008) report identifies species of all migratory nongame birds that, without additional conservation actions, are likely to become candidates for listing under the Endangered Species Act. Species in this list that have the potential to occur in the project area include: Brewer's sparrow, sage thrasher, loggerhead shrike, short-eared owl, and grasshopper sparrow. Of these, 3 species are identified on the BLM Wyoming Sensitive Species list. More information about the BCC is on the Wyoming Ecological Services website.

The WGFD Wyoming Bird Conservation Plan (Nicholoff 2003) identified 3 groups of Wyoming's high-priority bird species: 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 of high priority but are of local interest. Species likely occurring in the project area are in Table 3.12.

Table 3.12 Migratory bird species occurring in shrub-steppe habitat, NE Wyoming (Nicholoff 2003)

Level	Species	Wyoming BLM Sensitive
Level I	Brewer's sparrow	Yes
	Ferruginous hawk	Yes
	Greater sage-grouse	Yes
	McCown's longspur	No
	Sage sparrow	Yes
Level II	Lark bunting	No
	Lark sparrow	No
	Loggerhead shrike	Yes
	Sage thrasher	Yes
	Vesper sparrow	No
Level III	Common poorwill	No
	Say's phoebe	No

3.11. Raptors

The affected environment for raptors is discussed in the PRB FEIS on pp. 3-141 to 3-148. Ground surveys were conducted for raptors in spring 2008, 2009 & 2010 (ICF 2011). Surveys were conducted within 1 mile of the project area for bald eagle nests and within 0.5 mile of the project area for all other raptor species. According to the ICF 2010 wildlife surveys and the BLM database, 24 raptor nests are found within 0.5 mile of the project area (Table 3.13). Two nests were active in 2010, nest ID's 2659 & 2658.

Table 3.13 Documented Raptor Nests within 0.5 mile of the Queen B POD

	Nest ID	UTME	UTMN	Legal	Substrate[1]
1	2653	422861	4915080	Section 23 T51N 76W	CTD
2	2657	422233	4915609	Section 15 T51N R76W	CTL
3	2658	421346	4916175	Section 15 T51N R76W	CTL
4	2659	420893	4916504	Section 15 T51N R76W	CLF
5	3350	421385	4916067	Section 15 T51N R76W	CTD
6	5098	422205	4915689	Section 15 T51N R76W	CTL
7	5099	422299	4915655	Section 15 T51N R76W	CTL
8	5101	421234	4916124	Section 15 T51N R76W	CTL
9	5123	419434	4912492	Section 28 T51N R76W	JUN
10	5124	422752	4916441	Section 14 T51N R76W	JUN
11	5125	421390	4914965	Section 22 T51N R76W	JUN
12	5126	420154	4913542	Section 28 T51N R76W	JUN
13	5127	422968	4917120	Section 11 T51N R76W	JUN
14	5128	420774	4917190	Section 9 T51N R76W	CTL
15	5849	420619	4917275	Section 9 T51N R76W	CTL
16	6260	422921	4917465	Section 11 T51N R76W	JUN
17	6628	420719	4914169	Section 22 T51N R76W	JUN
18	10216	422206	4915687	Section 15 T51N R76W	CTL
19	10217	422772	4915571	Section 14 T51N R76W	CTL
20	10218	421409	4914954	Section 22 T51N R76W	JUN
21	10219	423741	4914941	Section 23 T51N R76W	JUN
22	12269	420743	4914169	Section 22 T51N R76W	JUN
23	12310	429831	4917022	Section 16 T51N R75W	POL
24	12378	420890	4916475	Section 15 T51N R76W	CLF
25	12498	422691	4915435	Section 14 T51N R76W	CTL
26	12690	422034	4916777	Section 15 T51N R76W	JUN

1 JUN – Juniper; CTL – Cottonwood Live; CLF – Cliff; POL – Ponderosa Pine (Live).

3.12. Water Resources

The project area is within the Upper Powder River drainage system. The Queen B POD is located on the north and south drainage slopes of Fortification Creek, a tributary to the Powder River. Fortification Creek is a low gradient, moderately sinuous, well vegetated stream with a well-defined, low flow channel. The flood plain is well developed creating a wide valley bottom. The tributaries to Fortification Creek are typically dendritic, deeply incised, ephemeral draws with sparse vegetation on the creek slopes. Once the ephemeral draws reach the valley floor of the Fortification Creek watershed, their channels become well vegetated and their stream gradient considerably decreases.

The Wyoming Department of Environmental Quality (WDEQ) has assumed primacy from United States Environmental Protection Agency for maintaining the water quality in the waters of the state. The Wyoming State Engineer's Office (WSEO) has authority for regulating water rights issues and permitting impoundments for the containment of surface waters of the state. The Wyoming Oil and Gas

Conservation Commission (WYOGCC) have the authority for permitting and bonding off channel pits that are located over State and fee mineral leases.

3.12.1. Groundwater

The groundwater in this project area has historically been used for stock water or domestic purposes. A search of the Wyoming State Engineer Office (WSEO) Ground Water Rights Database for this area showed six registered stock water wells within one mile of a federal CBNG producing well in the POD with drilled depths ranging from 40 to 1,376 feet. Static water levels recorded for these six wells ranged from 20 to 220 feet below ground surface (bgs). For additional information on water, please refer to the PRB FEIS (January 2003), Chapter 3, Affected Environment pages 3-1 through 3-36 (groundwater).

WDEQ water quality parameters for groundwater classifications (Chapter 8 – Quality Standards for Wyoming Groundwater) define the following general limits for Total Dissolved Solids (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). For additional water quality limits for groundwater, please refer to the WDEQ web site.

The production of CBNG necessitates the removal of some degree of the water saturation in the coal zones to temporarily reduce the hydraulic head in the coal. The Buffalo Field Office has been monitoring coal zone pressures as expressed in depth to water from surface since the early 1990s in the PRB (Figure 3.13).

There are several CBNG wells in the surrounding area already permitted and approved for production. Using the WOGCC website, a search was conducted of a nine section area around the POD for oil and gas wells. The search showed 7 wells within Section 9, 10, 11, 14, 15, 16, 21, 22, and 23 of T51N, R76W. As a result of CBNG production, the target coal zone pressure may have been reduced through off set water production. BLM has been monitoring the ground water levels and gas pressures in the deep coal zones and overlying sandstone formations for several years. As part of the Cooperative Agreement between the BLM and the CBNG operators, a series of 144 monitoring wells have been installed at 61 different locations by the operators in the Powder River Basin to assist in this monitoring effort (PRB FIES). The Cedar Draw groundwater monitoring well is located in the NESW Sec.02, T51N, R75W and is approximately 5.6 miles to the northeast of the closest, proposed natural gas well in the Queen B POD. The Cedar Draw groundwater monitoring well was installed by the Prima Company as a part of the BLM deep groundwater monitoring program. The initial water level in the Wall Coal, which is indicative of the pressure in the coal zone, was recorded at 230.8 feet below ground level on February 20, 2004. The most recent measurement, dated February 16, 2012 recorded the water level at 858.2 feet below ground level, for a decline of 627.4 feet since the well was completed. The Wasatch Sand well at the Cedar Draw monitoring well location has also shown a decrease in groundwater elevations. The initial sand well reading on January 29, 2004 showed the groundwater level in the sand well to be at 229.5 feet BGS and the most current reading of September 7, 2011 shows the groundwater level to be at 765.4 feet BGS. This is a drop in groundwater levels within the Wasatch Sands of 535.9 feet.

There are 2 existing groundwater monitoring wells drilled to the Big George and Wall coal zones located in proximity to the Queen B POD, as listed in the table 3.14 below.

Table 3.14 BLM Monitoring Wells

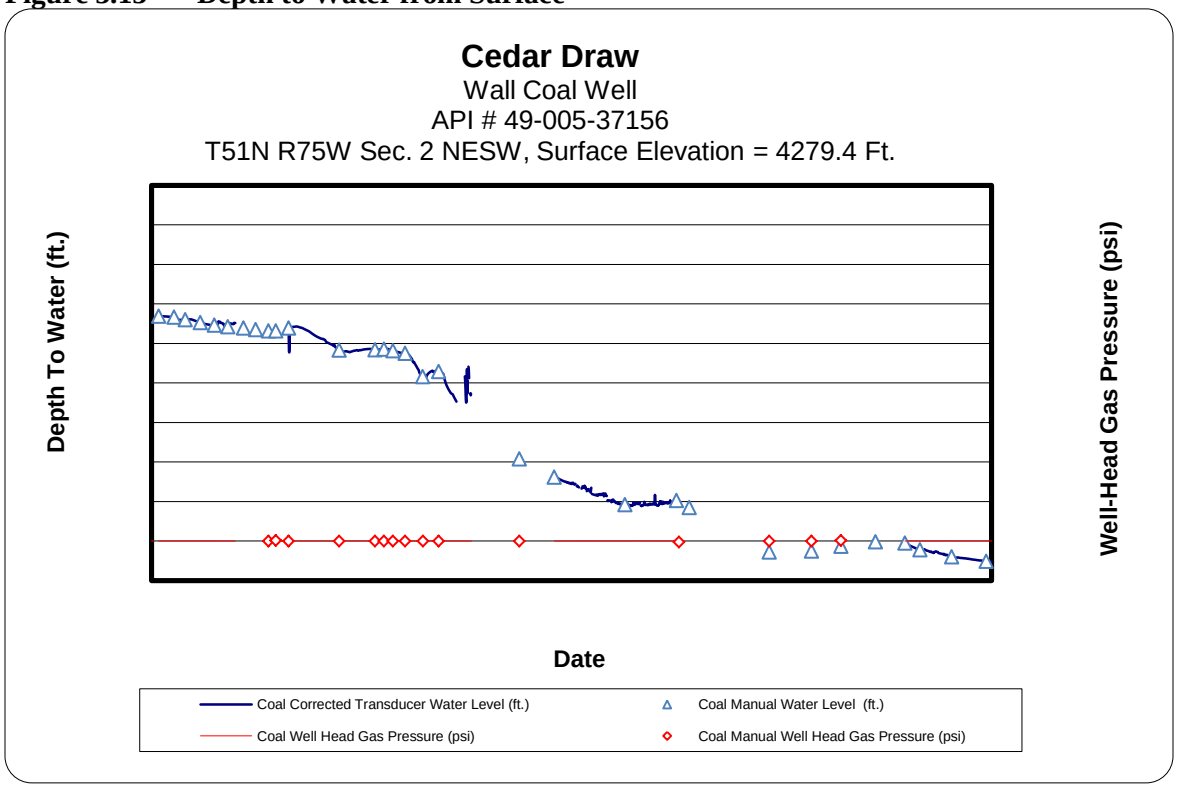
Monitor Well Name	QtrQtr	Sec	T N	R W	Distance from Queen B POD, mi	Total Depth, ft	Initial WL, ft depth from surface	Most Recent WL, ft depth from surface	Drilled by	Date Installed
Cedar Draw	NESW	02	51	75	5.6	1679	230.8	858.2	Prima	1-29-2004

Monitor Well Name	QtrQtr	Sec	T N	R W	Distance from Queen B POD, mi	Total Depth, ft	Initial WL, ft depth from surface	Most Recent WL, ft depth from surface	Drilled by	Date Installed
Echeta Coal	NESE	30	52	75	4.8	880	245.9	408.5	USGS	8-22-1983

The initial water level in these monitoring wells was recorded between 231 and 246 feet below ground level prior to the majority of drilling and production in the area. In the most recent measurements, dated February 2012, the water level ranged between 408 and 858 feet below ground level.

The drawdown in groundwater level for the Cedar Draw monitoring well (coals) is beyond the potential predicted in the PRB FEIS which was determined through the Regional Groundwater Model for that document (PRB FEIS Page 4-16 & Figure 4-12). For additional information, please refer to the PRB FEIS Chapter 4 Groundwater and the Wyoming State Geological Survey's Open File Report 2009-10 titled "1993-2006 Coalbed Natural Gas (CBNG) Regional Groundwater Monitoring Report: Powder River Basin, Wyoming" which is available on their website at http://www.wsgs.uwyo.edu.

Figure 3.13 Depth to Water from Surface



3.12.2. Surface Water

The project area is within the Fortification Creek watershed which is tributary to the Upper Powder River watershed. Most of the drainages in the area are ephemeral (flowing only in response to a precipitation event or snow melt) to intermittent (flowing only at certain times of the year when it receives water from alluvial groundwater, springs, or other surface source – PRB FEIS Chapter 9 Glossary). The channels are primarily well vegetated grassy swales, without defined bed and bank.

The PRB FEIS presents the historic mean Electrical Conductivity (EC, in µmhos/cm) and Sodium Adsorption Ratio (SAR) by watershed at selected United States Geological Survey (USGS) Gauging

Stations in Table 3-11 (PRB FEIS page 3-49). These water quality parameters "illustrate the variability in ambient EC and SAR in streams within the Project Area. The representative stream water quality is used in the impact analysis presented in Chapter 4 as the baseline for evaluating potential impacts to water quality and existing uses from future discharges of CBM produced water of varying chemical composition to surface drainages within the Project Area" (PRB FEIS page 3-48). For the Upper Powder River watershed, 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).

There are no existing, on-channel impoundments being used for disposal of produced water within the POD boundary. There are three impoundments being used for livestock watering for the Hayden Ranch. These impoundments capture natural runoff to utilize the water for stock watering.

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

3.13. Economics and Recovery of CBNG Resources

Queen B POD proposes a maximum of 15 CBNG wells and 1 injection well, Table 2.1. BLM petroleum engineers reviewed well logs from within or near the project area to determine what Queen B CBNG wells potentially could produce. It is worth noting that many of the CBNG wells in the project vicinity were not producing gas long enough to determine peak values for gas production and therefore no production curves were analyzed. Since all wells do not produce the same amount of gas due to the thickness or quality of coal formation which lie below each well, BLM grouped the wells in the POD boundary into areas where data was obtainable and created a weighted average for predicting CBNG production resulting from Queen B wells. The BLM findings are in Table 3.15 and Table 3.16.

The project would potentially produce (in the course of project life span approximately 10-15 years) 19,478,000 million cubic feet (MCF) of CBNG and would generate about $43.7 million measured in the present value (PV) of the revenue stream. Payments in the form of the PV of the royalty stream would amount to nearly $5.5 million paid to the US Government general treasury. Of those federal royalties, the State of Wyoming would receive a little over $2.6 million.

Table 3.15 Prediction of Total Produced CBNG by Section

Section #	Number of Wells in Section	Average MCF Per Well	Total Gas (MCF)
14, 15	9	1,120,000	10,080,000
22	4	1,759,000	7,036,000
28	2	1,181,000	2,362,000

Table 3.16 Prediction of Total Revenue

Number of Wells	Total Gas (MCF)	Total Revenue @ $3.5/MCF	PV of Total Revenue Stream Discounted @ 3.00%	Federal Royalties @ 12.5%	PV of Federal Royalties Discounted @ 3.00%	State of Wyoming - (49% of PV of Federal Royalty)
15	19,478,000	$68,173,000	$43,757,655	$8,521,625	$5,469,707	$2,680,156

3.14. Cultural Resources

Class III cultural resource inventory was performed for the Queen B POD prior to on-the-ground project work (BFO project no. 70090017). A 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 was provided to BFO by Yates. Seth Lambert, 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
48CA1923	Historic	NE
48CA6261	Prehistoric	NE
48CA6930	Historic	NE
48CA6931	Historic	NE
48CA6932	Prehistoric	NE

3.15. Visual Resources Management

The project area is located within a portion of the Powder River Breaks that has experienced moderate oil and gas development. The human influence is apparent on the landscape, ranch homes as well as several wells and compressor stations are visible from public access roads (county roads). Existing roads, pipeline scars, overhead power lines, and fence lines are present within the viewshed. The north half of the project area is classified as VRM Class III. The south half of the project area is classified as VRM Class IV. The Class III Objective is to provide for management activities which partially retain the existing character of the landscape. The level of change to the characteristic landscape could be moderate. Contrasts would be seen but remain subordinate to the existing landscape character. The Class IV Objective is to provide for management activities which require major modification of the existing character of the landscape. The level of change to the characteristic landscape can be high.

4. ENVIRONMENTAL EFFECTS

This section describes the environmental effects of the No Action Alternative (Alternative A), the Proposed Action (Alternative B), and Modified Action (Alternative C). Alternative C includes design changes to the proposal described in Alternative B. Alternative C analyzes the environmental effects with the exclusion of the QueenB CS Federal Com. 2 and Queenb CS Federal Com. 10 wells and the Queenb CS Federal 13 bridge crossing. The effects analysis addresses direct, indirect, and cumulative effects; identifies and analyzes mitigation measures; and discloses any residual effects remaining following mitigation.

4.1. Alternative A

The No Action Alternative was analyzed as Alternative 3 in the PRB FEIS, and is incorporated by reference into this EA. Information specific to resources for this alternative is included within the PRB FEIS on pages listed in Table 4.1.

Table 4.1 Location of Discussion of the No Action Alternative in the PRB FEIS

Resource		Type of Effect	Page(s) of PRB FEIS
Project Area Description	Geologic Features and Mineral Resources	Direct and Indirect Effects	4-164 and 4-134
		Cumulative Effects	4-164 and 4-134
Soils, Vegetation, and Ecological Sites	Soils	Direct and Indirect Effects	4-150
		Cumulative Effects	4-152
	Vegetation	Direct and Indirect Effects	4-163
		Cumulative Effects	4-164
	Wetlands/Riparian	Direct and Indirect Effects	4-178

Table 4.1 Location of Discussion of the No Action Alternative in the PRB FEIS

Resource		Type of Effect	Page(s) of PRB FEIS
		Cumulative Effects	4-178
Wildlife	Sensitive Species - Greater Sage-Grouse	Direct and Indirect Effects	4-271
		Cumulative Effects	4-271
	Aquatic Species	Direct and Indirect Effects	4-246
		Cumulative Effects	4-249
	Migratory Birds	Direct and Indirect Effects	4-234
		Cumulative Effects	4-235
	Big Game	Direct and Indirect Effects	4-186
		Cumulative Effects	4-211
	Raptors	Direct and Indirect Effects	4-224
		Cumulative Effects	4-225
Water	Groundwater	Direct and Indirect Effects	4-63
		Cumulative Effects	4-69
	Surface Water	Direct and Indirect Effects	4-77
		Cumulative Effects	4-69
Cultural Resources		Direct and Indirect Effects	4-273
		Cumulative Effects	4-287
Transportation, Visual Resources and Recreation	Transportation	Direct and Indirect Effects	4-298
		Cumulative Effects	4-302
	Visual Resources	Direct and Indirect Effects	4-302
		Cumulative Effects	4-314
	Recreation	Direct and Indirect Effects	4-319
		Cumulative Effects	4-328

4.2. Alternative B

4.2.1. Land Use

4.2.1.1. Direct and Indirect Effects

Short-term effects will exist for land uses within or adjacent to the project area due to construction activities, including surface disturbance, dust generation, and noise associated with heavy equipment operation. Construction, initial operation, and well servicing and maintenance would likely displace wildlife. Consequently, this would reduce the success of big game hunting in the area. Likewise, livestock grazing potential would be reduced. These effects would continue until drilling and construction activities are complete, interim reclamation and stabilization measures achieve a steady state, and well visitation declines. Although reduced, some of these impacts will continue during production i.e. noise, dust, ect.

Interim reclamation is proposed to revegetate portions of the well pads, and access roads no longer needed after construction. Project impacts that will be long term (greater than 2 years) result from the use of pads and roads needed for operations and maintenance for the life of the project (approximately 10-20 years). It is anticipated that these lands would not be available for wildlife or livestock grazing or other land uses during that time frame.

4.2.1.2. Cumulative Effects

Cumulative effects to land uses from oil and gas development are discussed in the PRB FEIS in page 4-298 and in the RMP Amendment on pages 4-107 to 4-129.

4.2.1.3. Mitigation Measures

No additional mitigation is proposed for the effects to land use. However, in conformance with the FCPA RMPA, the proposed project design utilizes many existing oil and gas roads thereby reducing adverse effects to current land use.

4.2.1.4. Residual Effects

Land use at well locations and along the access roads would be converted to a mineral development use for the duration of the well operation (and until final reclamation is achieved). During this timeframe, the proposed lands would offer marginal if any grazing potential.

4.2.2. Transportation

4.2.2.1. Direct and Indirect Effects

The Queen B plan of development proposes an additional 2.52 miles of proposed in sloped, out sloped, and crown and ditch roads. The main access to the POD is off of Campbell County Fortification Creek Road with development to the north-east and south-west. There are 5 engineered sections with an average travel surface of 14 feet. The lowest design speed for the POD is 10 mph with an average daily traffic (ADT) ranging from 1 to 20 trips per day. The in-sloped and out-sloped roads have road grades less than 8%, and the crown and ditch roads have grades less than 16%. The maximum road grade proposed is 16%. The additional culverts will have a minimum diameter of 18 inches and additional cross drain culverts will be added as needed during construction. Culvert installation will follow the typical installation details provided in the engineered diagrams. Additional culverts and wing ditches may be needed through the life of the project.

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Transportation within the project area would be affected on a long-term basis. The proposed development will increase the average daily traffic on all of the roads within the POD boundary for the duration of well production. Well lifespan is anticipated to extend up to 10 years and possibly beyond the period of the management action or development activity. Examples include impacts associated with the continued presence of elevated levels of human activity throughout the life of CBNG development (20 years or longer) and the period needed for final reclamation of disturbed areas. Some impacts with duration of more than 50 years may occur. During this period both the proposed and existing roads will have additional traffic, additional dust, accelerated erosion and sedimentation, and increased potential for accidents from the proposed project. The roads will mostly be used by the local ranchers, oil and gas personnel, federal government personnel, and to a lesser extent, the general public for recreational purposes.

There has been new development within and around Queen B POD although most is outside the FCPA. Therefore, it is assumed that these vehicle trips will continue at least 10 years into the future. Daily vehicle trips associated with new CBNG development in the FCPA will be in addition to the existing 80 vehicle trips per day. Current CBNG development in the FCPA is concentrated in the southeast. Traffic patterns are likely to change as CBNG development occurs in other parts of the FCPA (BLM 2011a, pg. 4-127).

The two main surfacing materials used in the PRB are gravel and clinker (sometimes referenced as scoria). Gravel is a hard durable material and by definition it is loose rock that has a particle distribution from 0.8 to 2.5 inches in diameter. One cubic yard of gravel typically weighs around 3,000 pounds. Clinker rock is a red-brown shale that has been baked and fused by in situ burning of underlying coal. Clinker rock found in the PRB (called porcelanite) has similar properties to ceramic; it readily breaks down into smaller fragments and has sharp edges when broken (Coates, D.A. and Heffern E.L., 1999, Origin and Geomorphology of Clinker in the Powder River Basin, Wyoming and Montana: Coalbed Methane and Tertiary Geology of the Powder River Basin; 50th Annual Field Conference Guidebook, p. 211-229). Its weight varies depending upon the parent material but it usually is fairly light and has a specific gravity greater than one.

Vehicles have better traction with a road when the surfacing material is compacted, creating a safer driving surface. Because clinker rock is a soft, non-durable, material, during compaction it breaks down into dust rather than being compacted. It typically lacks a distribution of particle sizes. Regular gravel without gradation parameters is a hard durable material but lacks the distribution of particle sizes required for compaction. Whereas gravel that meets Gradation W parameters, is a hard durable material that has a distribution of particle sizes that are designed to interlock when compacted - creating a solid driving surface. A solid driving surface also promotes sheet flow of surface run-off directing water away from the road. Clinker rock tends to promote infiltration into the road bed due to the porosity of burnt shale resulting in rutting and excessive erosion. The benefits of keeping water off or away from the road are maintaining a safe driving surface, reducing erosion, and decreasing maintenance costs.

The benefit of clinker rock is that it is readily available and more economical. The adverse consequence of gravel is that there are fewer gravel sources and gravel is more costly.

Queenb CS Federal #13Bridge: A full description of this structure can be found in Chapter 3. Yates provided a bridge design by a licensed professional engineer yet the design does not address the substantial undercutting of the foundation. The bridge's capability to handle traffic loads associated with well drilling operations remains a concern to the BLM because of the bridge's foundation. Structural failure can occur if the erosion at the structures' foundation is not addressed. Failure of the structure would leave multiple federal wells stranded, both existing conventional oil wells as well as proposed CBNG wells by multiple operators. Chapter 3 also identifies that the integrity of the bridge itself is unknown as it is an old railroad car of unknown origin.

4.2.3.2. Cumulative Effects

Overall road conditions in the Queen B project area are highly variable. Roads are unpaved, constructed of native soils rated as marginal construction material. Mobilization of drilling and construction equipment relies on semi-trucks with trailers typically designed for use on paved roads and highways. The gross vehicle weight of these combination vehicles often exceeds 80,000 pounds with drilling rigs exceeding 100,000 pounds. There is concern that the use of these vehicles, especially when loaded, on roads not completely constructed leads to a higher potential for motor-vehicle accidents. CBNG development not only creates a high ADT with commercial vehicles during drilling and construction activities but the ADT during production operations exceeds those of conventional oil well production operations due to the higher maintenance needs of CBNG wells.

4.2.3.3. Mitigation Measures

All constructed road segments and the proposed bridge construction will be completed, including any culverts, low water crossings and required surfacing, before the drilling rig or other drilling equipment move onto the pad.

The typical engineering notes require that an average of 4 inches of surfacing material be used when specified. It is important to use a surfacing material that is hard and durable so that it can be compacted, minimizes dust, and minimizes maintenance. The BLM requires the following roads on federal surface to

be surfaced with an average of 4 inches of Gradation W gravel due to the higher anticipated ADT and steep slopes/grades per the WY Supplement to the BLM Manual 9113:

- All roads with grades steeper than 8% grade
- All roads with an anticipated ADT of 10 or greater (Specifically Road B as listed on map D provided by Yates Petroleum)
- All engineered road segments

If a road currently has surfacing material applied, gravel will be applied as necessary to upgrade the road or as maintenance.

Per the BLM Manual 9113 turnouts will be provided every 1,000 feet or intervisible whichever is less for single lane roads. Single-lane roads are considered to be any constructed road with a travel way width less than 24 feet.

The operator is responsible for having the licensed professional engineer(s) certify that the actual construction of the road meets the design criteria and is constructed to BLM standards.

The operator is responsible for having the licensed professional structural engineer(s) certify that the actual construction of the boxcar bridge meets the design criteria and is constructed to Bureau standards.

For newly constructed roads, a minimum of the top 12 inches of road grade will be thoroughly compacted to 90 percent standard maximum dry density.

To the extent that is beneficial and feasible, lead-out ditches (these are wing ditches) shall be placed between relief culverts-in order to reduce flow in the road ditch especially on steeper slopes.

Where relief culverts are not needed, the road shall be constructed to ensure that flow does not concentrate and water does not pond next to the road. As is necessary, lead-out ditches shall be constructed to ensure that water is dispersed away from the road according to the minimum spacing given for relief culverts.

Road runoff shall not be directed into pre-existing eroded features (including small steep hillside channels with no discernible floodplain or riparian vegetation), but instead will be put to beneficial use by routing lead-out ditches away from eroded features and onto stable soils. Lead-out ditches and relief culverts shall be constructed as close as practicable to crossings (e.g. on the crossing approaches or just before the approach) in order to reduce the amount of ditch water and sediment directly entering drainages.

4.2.3.4. Residual Effects

Transportation along the roads would be converted either permanently or for the duration of the well operation to a mineral development use. During this timeframe, the road network would experience all weather use with an Average Daily Traffic (ADT) of 2-20. This is far in excess of seasonal fair-weather use of primitive roads used for livestock operations and recreational use. Even if the roads are constructed as proposed, the residual effects associated with CBNG traffic combined with existing oil and gas traffic, livestock operations and recreational use will result in rutting and erosion.

4.2.4. Soils, Ecological Sites and Vegetation

4.2.4.1. Soils

4.2.4.1.1. Direct and Indirect Effects

Impacts anticipated to occur include soil rutting and mixing, compaction, increased erosion potential, and loss of soil productivity. Most impacts would occur with the construction of well pads, staging areas, and

roads. Grading and leveling would be required to construct these facilities with the greatest effort required on steeply sloping areas. During construction, the soil profile would be mixed with a corresponding loss of soil structure. Mixing may result in removal, dilution, or relocation of organic matter and nutrients to depths where it would be unavailable for vegetative use. Less desirable inorganic compounds such as carbonates, salts, or weathered materials could be relocated and have a negative impact on revegetation. The effects of surface disturbance range from chronic and long-term contributions of sediment into surface waters to catastrophic effects associated with mass failures of road fill material during large storms. Roads can affect geomorphic processes primarily by: accelerating erosion from the road surface and prism through mass failures and surface erosion processes; directly affecting stream channel structure and geometry; altering surface flow paths, leading to diversion or extension of channels onto previously channelized portions of the landscape; and causing interactions among water, sediment, and debris at road-stream crossings.

Construction of 3 (of 16) wells with no pad and no slot would result in less soil disturbance to the soil resource. These locations have less than 4% side slope requiring no soil to be removed or graded to level the work space. Surface disturbance at these locations would be limited to the excavation of the 3 reserve pits (60 ft long by 15ft wide by 16 ft deep each) and installation of buried gas and water pipelines and electrical power line. Where reserve pits are excavated for these wells, soil productivity and soil quality would be negatively altered if subsoil is spread on the surface of the soil.

Soils would be compacted as a result of the construction of wells and associated facilities, with compaction continuing from operational activities such as vehicle and foot traffic. Factors affecting compaction include soil texture, moisture, organic matter, clay content, pressure exerted, and the number of passes by vehicle traffic or machinery. Compaction leads to a loss of soil structure; decreased infiltration, permeability, and soil aeration; as well as increased runoff and erosion. Increased erosion can lead to a decrease in soil fertility and an increase in sedimentation. The duration and intensity of these impacts would vary according to the type of construction activity to be completed and the inherent characteristics of the soils to be impacted. During interim and final reclamation, cat walking steep slopes would further compact soils and increase runoff and erosion.

The potential for erosion would increase through the loss of vegetation cover and soil. A Storm Water Pollution Prevention permit (SWPPP) is required for activities and would address runoff and erosion. Under the terms and conditions of the permit visible or measurable erosion is defined as:

- " Deposits of mud, dirt, sediment, or similar material exceeding one cubic foot volume in any area of 100 square feet or less on public or private roads, adjacent property, or into waters of the state by deliberate actions as a result of water or wind erosion; bare soils, turbid or sediment-laden flows, or evidence of on-site erosion on bare slopes, where runoff of water is not filtered, treated, or captured on the site using BMPs specified in the SWPP; or
- Earth slides, mud flows, earth sloughing, or other earth movement which leaves the construction site."

Compliance with the term and conditions of the SWPPPs does not assure meeting the objectives of stabilization and interim reclamation of the FCPA-RMPA because the SWPP allows for erosion.. The BLM performance standards not only meet the SWPPP terms and conditions but the land use plan objectives for the FCPA-RMPA

Soil productivity would decrease, primarily as a result of profile mixing and compaction along with the loss in vegetative cover. A decrease in soil productivity also would occur in association with soil salvage and stockpiling activities as microbial action is reduced in long-term stockpiles. These impacts would begin immediately as the soils are subjected to grading and construction activities and impacts would continue for the term of operations. The disturbed soils would be stabilized as construction activities are completed and well production/maintenance operations begin.

Rutting affects the surface hydrology as well as the rooting environment. The process of rutting physically severs roots and reduces the aeration and infiltration of the soil, thereby degrading the rooting environment. Rutting may result in mixing of topsoil and subsoil, thereby reducing soil productivity. Rutting also disrupts natural surface water hydrology by diverting and concentrating water flows creating accelerated erosion. Soil mixing typically results in a decrease in soil fertility and a disruption of soil structure.

Additional effects to soils resulting from well pad, access roads, and utility corridor construction include:

- Loss of biologic crusts, organic matter, and productivity; and
- Increased soil erosion and reduced soil health and productivity. Erosion rates are site-specific and are dependent on soil, climate, topography, and cover.

Biological soil crusts are adapted to growing in severe climates; however, they take many years to develop (20 to 100 years) and can be easily damaged or destroyed by surface disturbances associated with construction activities. They are present throughout the project area, particularly in areas with shallow soils. The prevalence of biologic crust increases proportionately to the amount of bare ground in the absence of vascular plants. These crusts have not been well studied in the area, so their current extent or survival trend is unknown.

Multiple resources are affected by the amount of disturbance introduced into the area. Keeping disturbance to a minimum is important for successful reclamation and to reduce negative impacts to these resources. The BLM identified the disturbance widths for roads and utility corridors proposed by Yates are in excess to other CBNG roads and utility corridors located within the same foot print (see Tables 3.3 through 3.6). These disturbances will increase disturbance acreage, loss of biologic crusts, organic matter, and soil productivity. Additionally, this will increase soil erosion and decrease soil health and productivity. The negative impacts to the multiple resources affected will be increased.

Table 3.3

POD Name	Environmental Assessment #
Camp John & Augusta	WY-070-05-373
Augusta Unit Zeta	WY-070-08-154
Camp John Unit Epsilon	WY-070-EA10-239
Camp John SMA Phase 1 Year 1	WY-070-EA11-214

Table 3.4

Camp John & Augusta, EA#: WY-070-05-373	
Facility	**Factor**
Improved Roads No Corridor With Corridor	30’ Width
2-Track Roads No Corridor With Corridor	 12’ Width
Pipelines No Corridor With Corridor	 20’ Width 30’ Width
Proposed Overhead Power lines	15’ Width

Table 3.5

Augusta Unit Zeta, EA#: WY-070-08-154	
Facility	**Factor**
Improved Roads	50’ Width
No Corridor	
With Corridor	
2-Track Roads	35’ Width
No Corridor	35’ Width
With Corridor	
Pipelines	35’ Width
No Corridor	
With Corridor	

Table 3.6

Camp John Unit Epsilon, EA#: WY-070-EA10-239	
Facility	**Factor**
Improved Roads	
No Corridor	45’ Width
With Corridor	50’ Width
2-Track Roads	
No Corridor	35’ Width
With Corridor	35’ Width
Pipelines	
No Corridor	
With Corridor	35’ Width

In the *Reclamation Plan Appendix B Soils Report* (Appendix B soils report) submitted by Yates, erosion control practices are identified. These practices prevent runoff and encourage successful reclamation. However, the mitigation measures identified in the report fail to address the very shallow soils and local areas of coal and shale outcrops identified in the report. Disturbance to these areas without proper erosion control practices will lead to increased soil erosion and decreased soil health and productivity.

The *Queen Bee P.O.D. Reclamation Plan* provides diagrams showing pads and roads and where and what reclamation practices will be applied. The pad designs show cut and fill slopes proposed to be 1.5:1. The plans show erosion control mats on the cut and fill slopes. The plans do not include slope breakers to be placed on cut and fill slopes. Slope breakers are needed to reduce slope length to minimize erosion on steep slopes created by construction. BLM will apply COAs to require this mitigation.

During the field visits, BLM identified that the staking was either not present or incorrect for the engineered road segments. Staking, where present, was consistently off an average of three quarters of a foot. The engineered road designs were generated to create a balanced cut and fill. The staking did not match the cut and fill values of the engineered designs. When the actual staking in the field does not match the engineered design plan, the result is an unbalanced design. There will either be a deficit of construction material or an excess of spoil. To ensure the engineered sections of the Queen B POD are constructed as designed, adequate construction oversight is necessary. This will prevent excessive disturbance and irrecoverable soil loss.

QueenB CS Federal #9
Adequate work space for the QueenB CS 9 is questionable due to combination of rough unstable ground, side slopes, and safety requirements. Yates feels this design will provide enough space for operations to be conducted safely because there is a turn out on the road just before the pad location. The BLM reviewed the location and designs and determined that the excess spoil (approximately 200 cy) could be used to extend the turn out to the pad. This would allow for more space for vehicle movement. As discussed at the onsite, plans will be finalized during the preconstruction onsite. BLM may require the alignment be modified during the pre-construction to allow for adequate work space.

Queenb Injector Federal #12
During the field visit the Queenb Injector Federal 12 well and road were found to be located below the Camp John Augusta Water Pump Station. Run off and water spills can occur in this area. The proposed Queenb Injector Federal 12 well and road are not designed to adequately drain water in the case of an overflow event potentially damaging the access road and/or site location. Road and pad failure may occur in such an event.

4.2.4.2. Soils Susceptible to Erosion

The following 4 wells (2 acres of disturbance) were located on soils susceptible to erosion:

1. Queenb CS Federal #1
2. Queenb CS Federal Com. #10
3. Queenb CS Federal #13
4. Queenb CS Federal #14

New disturbance of approximately 4,348 feet (0.82 miles) of road and utility corridor are located on soils susceptible to erosion. Typically, the proposed disturbance is associated with developing improved roads where lesser (pioneered) roads exist and are failing to accommodate runoff and control erosion.

Onsite investigations confirmed soils susceptible to erosion identified from NRCS SSURGO data. Onsite investigation identified additional areas of soils susceptible to erosion throughout the project area. All wells and/or associated infrastructures were identified during the onsite to have areas of soils susceptible to erosion.

4.2.4.3. Limited Reclamation Potential (LRP)

Evaluation of the NRCS SSURGO data and subsequent onsite field inspections identified, BLM staff observed site conditions for well pads and access roads within areas of limited reclamation potential.
Nine of the proposed well locations (4.5 acres) are sited on soils with limited reclamation potential. Approximately 4,170 feet (0.79 miles) of new disturbance associated with road and utility corridor are proposed on soils with limited reclamation potential. BLM identifies these as avoidance areas. Disturbance in these areas are difficult if not impossible to meet the goals of the WY-BLM reclamation policy, control erosion, and the suitability of the material for construction (roads, pad, etc.) is in question. Disturbance in these areas is likely to compromise the health and productivity of the surrounding lands through sediment transport and contamination.

The following wells and/or associated infrastructures were identified to have areas of LRP:

1. Queenb CS Federal #1
2. QueenB CS Federal Com. #2
3. Queenb CS Federal #3
4. QueenB CS Federal ##6
5. QueenB CS Federal 9
6. Queenb CS Federal Com. #10
7. Queenb CS Federal #11
8. Queenb CS Federal #14
9. Queenb CSFederal #16

Queenb CS Federal Com. #1
The Queenb CS Federal Com. #1 well location and access road/pipeline corridor was moved to reduce impacts to steep slopes, very shallow soils, areas of severe soil erosion, and soils with LRP. The proposed access road and utility corridor traverse gently sloping (<15%) grass range before ascending and descending a small, moderately steep sloped saddle (15-25%). The engineered section of the road is where the road ascends and descends the saddle. This section of the road impacts shallow soils, soils with LRP, and areas of severe soil erosion. These disturbances will increase disturbance acreage, loss of biologic crusts, organic matter, and soil productivity. Additionally, this will increase soil erosion and decrease soil health and productivity. Impacts to LRP areas have been reduced by moving the well and road alignment and maintaining a vegetative buffer.

Although the engineered diagrams calculations show the road impacting slopes greater than 25%, onsite visits found that the new road alignment will not affect slopes greater than 25% as long as a vegetative buffer is kept at the break point. Additionally, the pipeline corridor with the road should be kept off slopes greater than 25% as well as a vegetative buffer maintained at the break point.

QueenB CS Federal Com. #2
Onsite evaluation of the QueenB CS Federal Com. #2 access road showed the road siting on steep slopes with severe soil erosion, and soils with low reclamation potential. Active erosion was observed during onsite visits. The BLM requested a site specific reclamation plan for the engineered section of the access road. During the onsite Yates had a reservoir, culvert crossing, and/or low water crossing proposed for the location. On February 24, 2012 Yates submitted a preliminary Geotechnical Analysis Investigation conducted by Strata as asked for by the BLM. The analysis determined that there are 3 locations along the QueenB CS 2 access road that are rated at a level 4. Level 4 areas contain higher potential for slope instability. Strata recommend investigating the Level 4 sites with a field and laboratory investigation to determine what construction techniques or additional remedial efforts need to occur to stabilize the slopes. Yates did not further evaluate these locations.

The QueenB CS #2 access road crosses a tributary of Fortification Creek. Fortification Creek is within approximately 330 feet of the drainage crossing. A deeply incised channel is approximately within 90 feet of the proposed engineered road. The channel would be a direct conduit for transported sediment to reach Fortification Creek. Sedimentation into Fortification creek was not addressed. Pictures below show areas of bare ground and low reclamation potential, steep slopes, areas of severe soil erosion, and areas of low reclamation potential. (See photos below)

Most landscapes can be reclaimed using established conventional reclamation methods. However, some areas have unique characteristics that make achieving all the reclamation requirements unrealistic. Areas posing the most extreme reclamation challenges include steep slopes. Such is the case with access road to and well location QueenB CS Federal Com. #2; this location has highly sensitive and erosive soils, extremely sensitive vegetation types, soils with severe physical or chemical limitations. Steep slopes ranging from 25% to 45% created these conditions.

Yates' documents (Appendix B soils report, the *Queen Bee P.O.D. Reclamation Plan,* and the preliminary Geotechnical Investigation report) do not adequately address the location because the suitability of the material to be used for the road construction as well as the construction practices to be implemented are not described. (See the preliminary Geotechnical Investigation report). Surface occupancy or use within slopes in excess of 25% is restricted or prohibited unless the operator and BLM arrive at an acceptable plan for mitigation of anticipated impacts. BLM will strongly consider avoidance in order to retain the project within the parameters of the PRB ROD and the Wyoming Reclamation Policy. This is in line with BFOs current policy to avoid impacts to slopes in excess of 25%.

The FCPA RMPA page 4-23 Alternative III Soil Resource Management states the following:

"Alternative III would restrict surface disturbance on slopes greater than 25 percent, badlands, rock outcrop, slopes susceptible to mass failure, and soils with severe erosion hazard. There could be exceptions to this restriction if the operator proposed an acceptable disturbance and reclamation plan with their POD when required by the BLM. The operator would be required to meet performance-based standards for soil reclamation for three years as described in Appendix B. Analysis assumptions for possible components of an acceptable disturbance and reclamation plan include:

- Surface disturbance will not be authorized on slopes greater that 35 percent.
- Only linear features (roads, pipelines, electric lines, etc.) will be considered.
- An engineered reclamation plan acceptable to the authorized officer must be submitted with the project proposal.
- On slopes from 25 to 30 percent, a maximum of 0.5 acre (21,780 sq. feet) total disturbance would be allowed per feature.
- On slopes from 30 to 35 percent, a maximum of 0.25 acre (10,890 sq. feet) total disturbance would be allowed per feature."

As mentioned above the QueenB CS Federal #2 access road and pipeline are located on slopes ranging greater than 35%. In particular the access road has two sections exceeding 35%. One section of the road has approximately 52% slopes and a total disturbance of approximately 0.11 acres. Another section of the same road has approximately 36% slopes and a total disturbance of approximately 0.43 acres. The two sections together disturb 0.54 acres. This exceeds what is set forth in the FCPA RMPA. (See photos below).

The impacts listed above would increase soil loss due to increased water and wind erosion and increased sedimentation and salt loads to the watershed.

Drainage crossing

Drainage crossing: Steep slopes, sever soil erosion, low reclamation potential

Soils above and east the drainage: Bare ground and low reclamation potential

4.2.4.4. Slopes In Excess of 25 Percent

The following wells and their associated infrastructure will have impacts to topography in excess of 25% slope:

1. Queenb CS Federal Com. #1
2. QueenB CS Federal Com. #2

These impacts are described above.

4.2.4.4.1. Cumulative Effects

Designations for disturbance duration are defined in the PRB FEIS (pp. 4-1 and 4-151). Most soil disturbances would be short term due to expedient interim reclamation and site stabilization, as described

by the operator in their MSUP, Appendix B soils report, the *Queen Bee P.O.D. Reclamation Plan,* and the preliminary Geotechnical Investigation report and as required by the BLM in COAs. The proposed project is planned in an area already impacted by mineral development and other associated infrastructure, which currently represents approximately 3.5 percent of the land surface within the POD boundary. By comparison, the proposed project represents an additional 3.3 percent of land surface disturbance within the POD boundary, for a total of 6.8 percent surface-disturbance within the project boundary. Without mitigation measures to reduce surface disturbance Yates' proposed disturbance would be 103.13 acres, this is an additional 6.8 percent of surface disturbance within the POD boundary.

4.2.4.4.2. Mitigation Measures and Monitoring

Impacts to soils and vegetation from surface-disturbance will be reduced by following the BLM applied mitigation. The mitigation described below, if successfully implemented, would reduce impacts to soils below the thresholds described in the Fortification Creek RMP Amendment. Monitoring the implementation of mitigation measures will ensure compliance with the performance based reclamation standards.

Yates submitted several documents (as asked for by the BLM) in addition to Yates master surface use plan (MSUP), outlining ways to achieve reclamation success. These documents include *Queen Bee Plan Development (POD) Reclamation Plan Appendix B Soils Report* by KC Harvey (Appendix B soils report), and the *Queen Bee P.O.D. Engineered Diagrams.*

The Appendix B soils report breaks the soils into distinct divisions. Certain soils are identified to be shallower then the rest of the area, with rocky coal and shale outcrops. The soils in these shallow areas should be salvaged to a depth no greater than 6 inches whereas the rest of the soils can be salvaged up to 12 inches.

The BMPs identified within Yates' plan (listed above) conform to the performance standards identified in the FCPA-RMPA, yet Yates has not committed to these measures in the plan. BLM utilized these plans to analyze the potential impacts of this project; therefore BLM must require that Yates follow the recommendation identified in their plans in order for this analysis to be valid.

The performance standards as outlined in the FCPA RMPA Appendix B.

Interim reclamation shall be initiated within 30 days of initiating surface disturbing activities. The objective of interim reclamation is to restore desirable vegetative cover sufficient to maintain healthy, biologically active topsoil; control erosion; and minimize habitat, visual, and forage loss during the life of the project in those areas that will not receive continual use or disturbance during the project life. Interim Reclamation includes disturbed areas that may be disturbed during operations and will be disturbed at final reclamation to achieve restoration of the original landform and a natural vegetative community.
The operator will submit a subsequent report by Sundry Notice to BLM once stabilization measures have been implemented.

The following lease stipulations apply to the Queen B POD:

Reclamation TLS: Reclamation of areas disturbed as a result of lessee's operations will be done, insofar as possible, concurrently with operations. This stipulation applies to all areas disturbed within federal leases WYW40814 including the well locations and associated access roads and infrastructure listed below.

- Queenb CS Federal #1,
- QueenB CS Federal Com. #2,
- Queenb CS Federal #3,
- Queenb CS Federal #4,

- QueenB CS Federal Com. #5,
- QueenB CS Federal #6,
- QueenB CS Federal #7,
- Queenb CS Federal #8,
- QueenB CS Federal #9,
- Queenb CS Federal #10,
- Queenb CS Federal #11,
- Queenb Injector Federal #12,
- Queenb CS Federal #13,
- Queenb CS Federal #14,
- Queenb CS Federal #15, and
- Queenb CS Federal #16

Watershed TLS2: In order to minimize watershed damage, during wet or heavy snow periods the Casper District Manager, Bureau of Land Management, may prohibit exploration, drilling or other development. This limitation does not apply to maintenance and operation of producing wells. This stipulation applies to all surface disturbing activities within federal leases WYW40814.

- Queenb CS Federal #1,
- QueenB CS Federal Com. #2,
- Queenb CS Federal #3,
- Queenb CS Federal #4,
- QueenB CS Federal Com. #5,
- QueenB CS Federal #6,
- QueenB CS Federal #7,
- Queenb CS Federal #8,
- QueenB CS Federal #9,
- Queenb CS Federal #10,
- Queenb CS Federal #11,
- Queenb Injector Federal #12,
- Queenb CS Federal #13,
- Queenb CS Federal #14,
- Queenb CS Federal #15, and
- Queenb CS Federal #16

To ensure soil and vegetation resources are adequately mitigated and that the reclamation goals are met, the following Conditions of Approval (COAs) shall apply to the Queen B POD:

1. The operator will follow the guidance provided in the Wyoming Policy on Reclamation (IM WY-2009-022); see http://www.blm.gov/wy/st/en/programs/reclamation.html for details.

2. Yates will provide for construction oversight of all engineered roads and well pads.

3. The operator shall contact the BLM NRS Meleah Corey at (307)684-1070 at least 4-days prior to construction of engineered sections of the Queen B POD.

4. A 20 foot vegetative buffer from the slopes greater than 25% will be maintained along the Queenb CS Federal Com. #1 access road.

5. Construction plans will be finalized during the preconstruction onsite. BLM may require road alignments be modified during the pre-construction for the following wells:
    - QueenB CS Federal #6

- QueenB CS Federal #9
- Queenb Injector Federal #12

6. In the absence of manufacturer specifications included in the operator's MSUP, erosion control fabric will be installed as follows:
   a. The fabric will be 'keyed' into the slope by digging a small trench at the top of the slope;
   b. Lay the top end of the material into the trench to line it;
   c. To line it the edge is folded underneath itself and then it is secured using staples;
   d. The trench is then filled in to the previous soil level; and
   e. Fabric should be overlapped no less than 0.3 meter on edges and stapled on 1 meter spacing and at every seam.

7. Stabilization of steep slopes greater than 4H:1V (natural or constructed) will include all but is not limited to the following components to minimize soil erosion and loss of seed:
   a. Surface roughening/pocking or scarification perpendicular to the slope;
   b. Install slope breakers such as wattles and water bars at the appropriate spacing;
   c. Seed with appropriate seed mix; and
   d. Apply straw mulch or bio/photodegradable erosion control fabric on highly erodible soils.

8. Straw/Excelsior wattles are most effective as erosion control if applied on slopes less than 3H:1V. The table below is an example of appropriate spacing of straw or excelsior wattles commonly applied as slope breakers recommended by American Excelsior Company. Tighter spacing may be required based on soil type and seasonal precipitation. If waddles are used the following spacing will be required in the absence of manufacture's specifications included in the operator's MSUP, the minimum spacing requirements will be as follows:

Slope	6-inch waddle	9-inch waddle	12-inch waddle
≤4H:1V	20 feet	40 feet	60 feet
3H:1V	15 feet	30 feet	45 feet
2H:1V	10 feet	20 feet	30 feet
1H:1V	5 feet	10 feet	15 feet

9. Soil compaction will be remediated on all compacted surfaces and prior to the redistribution of topsoil on disturbed surfaces to the depth of compaction by methods that prevent mixing of the soil horizons. BLM's recommended methods are subsoiling, paraplowing, or ripping with a winged shank (as shown in the figure in Appendix C of this document). Scarification is acceptable on areas identified as very shallow or shallow soils in the MSUP.

10. The Queen B Project area is dominated by steep slopes and/or fragile soils. Improved roads used in conjunction with accessing federal wells must be fully built (including all water control structures such as wingditches, culverts, relief ditches, low water crossings, surfacing, et. cetera) and functional to BLM standards as outlined in the BLM Manual 9113 prior to drilling of the well. This applies to the entire Queen B project area. This measure will help to improve the overall safety (as discussed in Appendix G of this document) and reduce erosion and sedimentation relative to the use of incomplete roads at insufficient stages of completion. Refer to Appendix G of this document for a discussion on oil and gas motor vehicle fatalities related to travel on native surface roads.

11. On cut-slope sections of road and other sections of road where topography on one side of the road does not allow the use of lead-out (wing) ditches to relieve road ditch flow, laterals in the form of culverts, water bars, or drainage dips shall be placed according to the following minimum spacing:

Lateral Spacing Feet				
Soil Type	**Road Grade 2-4%**	**Road Grade 5-8%**	**Road Grade 9-12%**	**Road Grade 13-16%**
Highly erosive granitic or sandy	240	180	140	100
Intermediate erosive clay or clay/silt/sand	310	260	200	150
Low erosive shale or gravel	400	325	250	200

NOTE: Sometimes laterals and lead-out ditches are constructed following spacing guidelines without regard to best placement of these structures. For this reason, experienced personnel who see how the road operates for years after construction or, preferably, road design engineers, should direct the placement of these structures to ensure that a sufficient number are constructed and that they are placed in locations that do not worsen hillside erosion below the discharge point. Over about the last 5-7 years, laterals and lead-out ditches have often been inadequately utilized, with contractors instead relying on coir wattles s to slow down ditch flow to non-erosive velocities. Coir wattles should only be used in addition to properly placed laterals and lead-out ditches to help vegetation to get established.

12. The outer limits of disturbance will be staked at 100-foot intervals for all pipeline and utility corridor disturbances prior to the pre-construction field meeting.
    a. All areas requiring bench cutting will be clearly identified.
    b. During the pre-construction, the BLM Authorized Officer may require the alignment be modified to minimize impacts to the natural resources.
        i. Modifications will be considered the approved plan.

13. Cross country pipeline routes will not become roads after construction is complete. All sections of pipeline will be fully reclaimed to blend with the surrounding topography. Routine pipeline inspections should be conducted by other means of transportation other than automobile.

14. Phased reclamation plans will be submitted to BLM for approval prior to individual POD facility abandonment via a Notice of Intent (NOI) Sundry Notice. Individual facilities, such as well locations, pipelines, discharge points, impoundments, etc. need to be addressed in these plans as they are no longer needed. Individual items that will need to be addressed in reclamation plans include:
    - Pit closure (Close ASAP after suitably dry, but no later than 90 days from time of drilling unless an extension is given by BLM Authorized Officer.) BLM may require closure prior to 90 days in some cases due to land use or environmental concerns.
    - Configuration of reshaped topography, drainage systems, and other surface manipulations
    - Waste disposal
    - Revegetation methods, including specific seed mix (pounds pure live seed/acre) and soil treatments (seedbed preparation, fertilization, mulching, etc.). On private surface, the landowner should be consulted for the specific seed mix.
    - Other practices that will be used to reclaim and stabilize all disturbed areas, such as water bars, erosion fabric, hydro-mulching, etc.
    - An estimate of the timetables for beginning and completing various reclamation operations relative to weather and local land uses.
    - Methods and measures that will be used to control noxious weeds, addressing both ingress and egress to the individual well or POD.
    - Decommissioning/removal of all surface facilities
    - Closure and reclamation of areas utilized or impacted by produced CBM water, including

discharge points, reservoirs, off-channel pits, land application areas, livestock/wildlife watering facilities, surface discharge stream channels, etc.

Monitoring
For wells in the FCPA reclamation monitoring will be completed in accordance with Appendix A of the FCPA RMPA. Industry is to monitor individual APDs and ROWs including; well pads, portions of roads, power lines, pipelines, and other disturbances. Monitoring should begin with pre-disturbance surveys before disturbance takes place. Monitoring and reporting will take place annually. BLM will perform follow-up monitoring to insure quality control and quality assurance to maintain the integrity of the data.
Wells in the FCPA include:

- Queenb CS Federal #1,
- Queenb CS Federal #2,
- Queenb CS Federal #3,
- Queenb CS Federal #4,
- Queenb CS Federal #5,
- Queenb CS Federal #13,
- Queenb CS Federal #14,
- Queenb CS Federal #15, and
- Queenb CS Federal #16

4.2.4.4.3. Residual Effects

Residual effects were identified in the PRB FEIS at p. 4-408, such as the loss of vegetative cover and erosion by wind and water, despite expedient reclamation, for several years until reclamation is successfully established.

Yates must implement a number of actions to lessen the impacts to soils and maintain soil productivity. The reclamation plans developed by Yates and BLM's COAs will mitigate or reduce the impacts associated with construction and operation. In addition, Yates has provided site-specific reclamation plans for areas of concern.

Well pads and associated facility disturbances would be regraded to match existing topography and revegetated following project termination. The project wide and site-specific reclamation plans and the COA document include measures for both interim and final reclamation. Interim reclamation consists of reducing the footprint of disturbance by reclaiming all portions of construction disturbance not needed during production operations. For wells located in the FCPA, final reclamation would meet the FCPA RMPA reclamation performance standards and guidelines outlined in the statewide reclamation policy. These actions would notably reduce intensity of the impacts to soils as well as the estimated time it would take to return the disturbed soils to a stable and productive state. Commitment to implementing the mitigation measures identified in the *Queen Bee Plan Development (POD) Reclamation Plan Appendix B Soils Report* by KC Harvey (Appendix B soils report), and the *Queen Bee P.O.D. Engineered Diagrams* and BLM's COAs are imperative to accomplishing this.

The access road to CS Federal Com 2 exceeds 35% in two sections. Soil stabilization and erosion control measures are unlikely to fully stabilize and control erosion.

4.2.4.5. Ecological Sites and Vegetation

4.2.4.5.1. Ecological Sites and Vegetation

4.2.4.5.1.1. Direct and Indirect Effects

Direct and indirect effects to ecological sites are discussed in the PRB FEIS, pp. 4-153 to 4-164. As proposed, the project could potentially alter the disturbance regimes in the project area, especially the frequency of fire due to increased activity in the project area. Additional effects include the increase in noxious weeds and alterations in vegetation community diversity and cover.

Direct and indirect effects to vegetation are discussed in the PRB FEIS (pp. 4-153 to 4-164). Direct effects to vegetation would occur from ground disturbance caused by construction of well pads, ancillary facilities, associated pipelines, and roads. Short-term effects would occur where vegetated areas are disturbed and reclaimed to the performance goal standards within 1 to 3 years of the initial disturbance. Long-term effects would occur where well pads, compressor stations, roads, water-handling facilities, or other semi-permanent facilities would result in loss of vegetation for the life of the project. Indirect effects, as described in the PRB FEIS, would include the spread and/or establishment of noxious weeds, the alteration in surface water flows affecting vegetation communities, alteration in ecosystem biodiversity, and changes in wildlife habitat. These impacts would be mitigated by expediently stabilizing the disturbance through interim reclamation, and the implementation of erosion control measures.

Areas that are difficult to reclaim include sandy sites and areas where the parent material is very shallow (typically less than 10 inches deep). These areas were identified during initial site visits to the well sites. Well sites were adjusted or moved to avoid most of these areas as described in Section 2.3 of this document. In addition, portions of the road and utility corridors are located on poor reclamation potential soils as on-the-ground alternatives were limited. The plant communities on these areas can be difficult to re-establish, especially in areas of shallow parent material.

Long-term impacts to sagebrush are anticipated due to slow recovery rates and the duration between construction and final reclamation. Complete restoration of sagebrush shrubland after disturbance can often take decades. Studies of Wyoming big sagebrush post fire recovery intervals indicated that natural post-fire regeneration of this species can take 50 to 120 years (Cooper et al. 2007, Baker 2006). Wyoming big sagebrush took approximately 17 years to re-establish after chemical removal in Wyoming (Johnson 1969) and sagebrush species can take 3 to 7 years to begin to spread in locations where seed drilling or transplant of seedlings occurred (Tirmenstein 1999).

4.2.4.5.1.2. Cumulative Effects

Cumulative effects to Ecological sites are discussed in the PRB FEIS, pp. 4-153 to 4-172. Cumulative effects to Ecological sites include the further alteration of disturbance regimes from the increased activity, increase in noxious weeds, and alterations in vegetation community's diversity and cover.

Cumulative effects to vegetation from oil and gas development are discussed in the PRB FEIS, pp. 4-164 and 4-172. Most surface disturbances would result in short-term impacts to herbaceous plant communities related to construction activities that would be reclaimed through interim reclamation and site stabilization, as committed to by the operator and as required by the BLM in COAs. The proposed project is planned in an area already impacted by mineral development and other associated infrastructure, which currently represents approximately 4 percent of the land surface within the POD boundary. By comparison, the proposed project represents an additional 4 percent of land surface disturbance within the POD boundary, for a total of 8 percent of surface-disturbance within the project boundary.

4.2.4.5.1.3. Mitigation Measures

Impacts to vegetation from surface disturbance will be mitigated through the implementation of the COAs as presented in the COA document; and the Queen B POD, and its associated plans including the IPMP, Site-Specific Reclamation Plans, the WMP, and the MSUP (specifically Section 10, Plans for Reclamation of the Surface). These documents are included in the Administrative Record for the Queen B POD at the BFO.

If applied correctly, BLM selected seed mixes containing native grasses and forbs should be progressing towards restoring disturbed areas to properly functioning vegetation communities within 3 years of surface disturbance.

Based on the implementation of the COAs; and the measures outlined within the Queen B POD, and its associated plans including the IPMP, Site-Specific Reclamation Plans, the WMP, and the MSUP, additional mitigation measures are recommended.

To ensure site stabilization and promote successful revegetation, interim reclamation (associated with temporary/construction activities) and final reclamation (associated with permanent/operation activities after production ceases) would be completed pursuant to methods and timing listing in the POD and COA document. In addition, the operator will follow the guidance provided in the Wyoming Policy on Reclamation (Instruction Memorandum 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 through the implementation of final reclamation measures. 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 will be used to achieve this short-term goal.

Successful interim and final reclamation are described in the FCPA RMPA Appendix B.

Ecological site and vegetation monitoring will be completed in accordance with Appendix A of the FCPA RMPA.

4.2.4.5.1.4. Residual Effects

The alteration of biodiversity of Ecological sites could result from changes in disturbance regimes, alterations in vegetation in reclaimed areas, and the spread and establishment of weed species.

Residual effects also were identified in the PRB FEIS, p. 4-408, such as the loss of vegetative cover for several years until reclamation is successfully established. In the event the operator fails on their obligation to successfully reclaim the area as defined by the Wyoming Policy on Reclamation (Instruction Memorandum WY-90-231), the bond will not be released for the site and the BLM will be responsible for site reclamation.

Reclamation and vegetation monitoring will measure success by criteria identified in FCPA RMPA Appendix A. Private surface owner rights will be respected when considering revegetation methods, including specific seed mix(s) and soil treatments (seedbed preparation, fertilization, mulching, etc.). On private surface, the landowner should be consulted for the specific seed mix. However, the standards for successful reclamation set forth in this document for soil stability and ground cover must be meet the reclamation performance standards set forth in FCPA RMPA. Yates's commitment to achieve the reclamation performance standards are outlined in "Addendum X, BMP's and Mitigation Measures for the Fortification Creek SMA" of the Queen B Master Surface Use Plan included in Appendix E of this document. The commitments listed by Yates' Addendum X do not demonstrate how the reclamation performance standards of the FCPA-RMPA will be achieved. The site specific reclamation plans developed for the Queen B POD do not meet the reclamation performance standards of the FCPA-RMPA for the following reasons:

- Soil samples did not appear to be taken along the final road alignment nor did they take in account the entire disturbance area for the roads or pads. Aerial imagery provided by Yates did not identify sample sites. Soil divisions identified did not clearly represent areas of minor components and areas of steep slopes. The engineered diagrams did not complement the site specific reclamation plans and did not identify by station the BMPs to be implemented.
- Soil tests were limited to 12 inches; soils below 12 inches prone to mixing with salvaged soil tend to dilute the integrity of surface soil. This is not addressed in the reclamation plans. The reclamation plans repeatedly recommend resampling but lack the locations, frequency, and constituents to test for,

4.2.5. Wetlands/Riparian

4.2.5.1. Direct and Indirect Effects

Re-surfacing water from the impoundments will potentially allow for wetland-riparian species establishment. Continuous flows into on-channel reservoirs would produce wetlands and riparian areas. This would change the composition of species and dynamics of the food web now established in ephemeral drainages. The shallow groundwater table would rise closer to the surface with increased and continuous flows of produced water discharges. Vegetation in the newly developed riparian areas, such as cottonwood trees, that cannot tolerate year-round inundated root zones would die and would not be replaced. Other plant species in riparian areas and wetland edges that favor inundated root zones would flourish, thus changing the plant community composition and the associated animal species. A rise in the shallow groundwater table would also influence the hydrology of wetlands by reducing or eliminating the seasonal drying periods that affect recruitment of plant species and species composition of benthic and water column invertebrates. These changes to the aquatic food web base would affect species richness for wetlands and riparian areas. (PRB FEIS Page 4-175).

If the reservoirs are removed and as water production decreases toward the end of the project, wetland/riparian areas would contract, returning to the pre-project sizes. Areas of excessive erosion or sediment deposition may cease to function as wetland/riparian areas. All of these changes in the extent of wetland/riparian areas would provide opportunities for aggressive species, including noxious weeds, to invade disturbed areas. (PRB FEIS Page 4-406)

In the PRB FEIS ROD is programmatic mitigation "which may be appropriate to apply at the time of APD approval if site specific conditions warrant."(ROD page A-30). One of the conditions included in that section addresses the impact to trees in A.5.8-2: "To reduce adverse effects on existing wetlands and riparian areas, water discharge should not be allowed if increased discharge volumes or subsequent recharge of shallow aquifers will inundate and kill woody species, such as willows or cottonwoods."(ROD Page A-32).

4.2.5.2. Cumulative Effects

Potential cumulative effects to the wetland and riparian areas are adequately covered in Chapter 4, pages 4-178 to 179 of the PRB FEIS.

4.2.5.3. Mitigation Measures

Mitigation measures that will help to protect the riparian and wetland habitat potentially affected by the activities described in this EA include, but are not limited to, the control of noxious weeds, adherence to the WYPDES permit requirements for the water quality and quantity monitoring of the discharges tied to this POD development, road crossing maintenance, and enforcement of the COA's and BMP's associated with this CBNG development.

4.2.5.4. Residual Effects

There will be changes to wetland and riparian areas through alterations in volume, velocity, timing and quality of the produced water discharge into the reservoir locations. Turbidity and solids loading in the streams would probably increase due to erosion of project disturbed areas and sediment transport to the associated drainages. These impacts would be mitigated by expediently stabilizing the disturbance and reducing the amount of sediment reaching the streams.

4.2.6. Noxious Weeds and Invasive Species

4.2.6.1. Direct and Indirect Effects

Direct and indirect effects resulting from invasive and/or noxious weed species are discussed in the PRB FEIS, pp. 4-158 to 4-162. The use of existing facilities along with the surface disturbance associated with construction of proposed wells, access roads, pipelines, and related facilities would present opportunities for the introduction and spread of noxious weeds and invasive species. Following surface disturbance

activities, noxious weeds and invasive species may readily colonize areas that typically lack or have minimal vegetation cover.

As stated in the PRB FEIS, noxious weeds and invasive species have the ability to displace native vegetation, reduce the carrying capacity for livestock, reduce available forage and habitat for wildlife, and hinder reclamation efforts.

4.2.6.2. Cumulative Effects

Cumulative effects resulting from noxious and invasive weed species are discussed in the PRB FEIS, p. 4-171. Species of concern identified in the Queen B POD IPMP, include the following: leafy spurge, saltcedar, Canada thistle, common cocklebur, buffalo bur, spotted knapweed, and diffuse knapweed.

4.2.6.3. Mitigation Measures

The operator has committed to the control of noxious weeds and weed species of concern using measures identified in their Integrated Pest Management Plan (IPMP). Successful reclamation through application of the operator's reclamation plans will discourage establishment of invasive species during operations. In addition, measures incorporated into the programmatic COAs listed in the COA document will further mitigate the potential spread and establishment of weed species.

The operator has committed to the control of noxious weeds and species of concern using the following measures identified in their IPMP:

1. The operator will be responsible for prevention and control of noxious weeds and weeds of concern on all areas of surface disturbance associated with this project (well locations, roads, water management facilities, etc.) Use of pesticides shall comply with the applicable Federal and State laws. Pesticides shall be used only in accordance with their registered uses and within limitations imposed by the Secretary of Interior. Prior to the use of pesticides on public land, the holder shall obtain from the BLM authorized officer written approval of a plan showing the type and quantity of material to be used, pest(s) to be controlled, method of application, location of storage and disposal of containers, and any other information deemed necessary by the authorized officer to such use.

2. Any mulch utilized for reclamation needs to be certified weed free.

Additionally, pursuant to the Queen B POD Integrated Weed and Pest Management Plan (IPMP), the following fourteen noxious weeds and invasive plant species have been targeted for management within the project area through a Pesticide Use Permit (PUP) submitted by Yates as part of their Integrated Pest Management Plan:

- leafy spurge (*Euphorbia esula*),
- Canada thistle (*Cirsium arvense*),
- field bindweed (*Convolvulus arvensis)*
- hoary cress i.e. whitetop (*Lepidium draba* L.)
- common burdock (*Arctium minus)*
- musk thistle (*Carduus nutans* L.)
- Scotch thistle (*Onopordum acanthium* L.)
- black henbane (*Hyoscyamus niger*),
- common cocklebur (*Xanthium strumarium*),
- buffalo bur (*Solanum rostratum*),
- wild licorice (*Glycyrrhiza lepidota),*
- spotted knapweed *(Centaurea stoebe*),
- common mullein (*Verbascum Thapsus),* and
- skelton bursage (*Ambrosia tomentosa)*

Based on the implementation of the COAs, and the measures outlined within the Queen B POD and its associated plans including the IPMP, Site-Specific Reclamation Plans, the WMP, and the MSUP, no additional mitigation measures are recommended.

Monitoring of noxious weeds will be completed in conjunction with the reclamation monitoring in accordance with Appendix A of the FCPA RMPA.

4.2.6.4. Residual Effects

Control efforts by the operator would be limited to the surface disturbance associated the construction and operation of the project. Cheatgrass and other weed species that are present within non-physically disturbed areas of the project area are anticipated to continue to spread unless control efforts are expanded. Cheatgrass and to a lesser extent, Japanese brome (*Bromus japonicus*) are found in such high densities and numerous locations throughout northeast Wyoming that a control program is not considered feasible at this time; these annual bromes will continue to be found within the project area.

4.3. Wildlife

4.3.1. Habitat Types

In its Recommendations for Development of Oil and Gas Resources within Important Wildlife Habitats (WGFD 2009b), WGFD developed impact thresholds to evaluate impacts to wildlife from oil and gas development. For species or habitats discussed in this EA where impact thresholds were developed, those thresholds are disclosed and discussed both in relation to the current conditions (Section 3 of this document, Affected Environment) and in relation to reasonable foreseeable development, including development associated with the proposed project (Environmental Effects). Moderate impacts occur when impairment of habitat function becomes discernible. High impacts occur when impairment of habitat function increases. Extreme impacts occur where habitat function is substantially impaired. Mitigation for each level of impact is discussed in the guidelines. Thresholds for impacts generally are determined by well densities.

4.3.1.1. Direct and Indirect Effects

Direct effects to wildlife habitats due to surface disturbances proposed by the operator would cause loss of approximately 74 acres of habitat. These impacts would result from construction and operation of the proposed project. Habitat loss or alteration would result in direct losses of smaller, less mobile species of wildlife, such as small mammals and reptiles, and the displacement of more mobile species into adjacent habitats. Displacement could result in some local reductions in wildlife populations, especially if adjacent habitats are at carrying capacity.

Project-related surface disturbance would also result in an increase in habitat fragmentation, until reclamation is completed and vegetation is re-established. The goal as established by the FCPA RMPA performance standards is to have vegetation re-established across disturbed surfaces within 3 years. Causes of habitat fragmentation in the project area include, but are not limited to, increased noise levels, elevated human presence, dispersal of noxious weeds and invasive species, and dust deposition from project construction and unpaved road traffic, which would extend beyond the boundaries of the proposed project facilities. These activities would directly and indirectly result in changes in habitat quality, habitat loss, increased animal displacement, reductions in local population and breeding success, and species composition. However, the severity of these activities on terrestrial wildlife would depend on factors such as sensitivity of the species, seasonal use, type and timing of project activities, and physical parameters (e.g., topography, cover, forage, and climate).

4.3.1.2. Cumulative Effects

The Queen B POD area has been exposed to historic oil and gas development and is considered previously disturbed (Table 2.2 and Section 3.3.4). The WOGCC data base shows 10 existing wells (2 oil wells and 8 CBNG wells) within the Queen B project area as of November 7, 2011. These wells are supported by approximately 15 miles of existing oil and gas roads and one central tank battery also within

the POD boundary. The existing surface disturbance within the project area boundary is approximately 96 acres. Impacts to wildlife habitats are similar to those discussed in the Vegetation section above and in the PRB FEIS, pp. 4-151 and 4-181. Additional discussions on species-specific impacts such as fragmentation of wildlife habitats and displacement are discussed in the following sections.

4.3.1.3. Mitigation Measures

Impacts to wildlife habitats from surface disturbance would be reduced through the implementation of the mitigation measures discussed in the Vegetation; the Queen B POD IPMP and reclamation plans. The greatest benefit to wildlife would be through implementation of the elk and sage-grouse Best Management Practices (BMPs).

4.3.1.4. Residual Effects

Residual effects identified in the PRB FEIS on p. 4-408 include the loss of vegetative cover (i.e., wildlife habitats), despite expedient reclamation, for several years until reclamation is successfully established and plant communities are fully recovered. Not only is shrub establishment important but so is age class and functionality. The FCPA RMPA outlines success criteria in Appendix B of that document.

4.3.2. Federally Threatened and Endangered Species (Ute Ladies'-Tresses Orchid)

4.3.2.1. Direct and Indirect Effects

There are no known populations of Ute ladies'-tresses orchid within the project area and suitable habitat is not present. Implementation of the proposed project would not affect the Ute ladies'-tresses orchid.

4.3.3. Candidate Species, Greater Sage-grouse

4.3.3.1. Direct and Indirect Effects

Biologists expect the direct and indirect impacts to sage-grouse to be similar to those described in the respective environmental assessments listed in Table 3.1 on page 9 and incorporated here by reference. The 2010 FWS listing decision discussed impacts to sage-grouse associated with energy development in detail. Impacts to sage-grouse are generally a result of loss and fragmentation of sagebrush habitats associated with roads and infrastructure. Research indicates that yearling sage-grouse hens also avoid nesting in developed areas, while older hens will continue nesting attempts in impacted habitats (Lyon and Anderson 2003, Holloran 2005, Holloran et al. 2010, FWS 2010).

Within the project area, approximately 968 acres of high quality nesting habitat for greater sage-grouse have been mapped (64% of the project area). The onsite field visits verified the habitat quality recognizing that existing oil and gas development has compromised portions of the mapped habitat. Direct loss of approximately 34 acres of high-quality habitat from the facilities and roads is anticipated within the POD from full development of the 16 well locations, access roads, and associated infrastructure. For a specific breakdown of proposed disturbance see Table 2.2. Implementation of the project will adversely impact nesting habitat, both through direct loss and avoidance of the area by sage-grouse.

4.3.3.2. Cumulative Effects

Biologists expect the cumulative effects to sage-grouse to be similar to those described in the respective environmental assessments listed in Table 3.1 on page 9 and incorporated here by reference.

There are currently 483 existing wells (http://wogcc.state.wy.us/2011) in the 4-mile cumulative impact assessment area, an area of 61 square miles, which amounts to a density of approximately 7.9 wells per square mile, already an extreme impact on sage-grouse. With approval of Alternative B (16 wells at 16 proposed well locations), well density would increase to 8.2 wells per square mile. With the addition of the proposed wells, the well density within 4 miles of the leks increases to 8 times the 1 well per square mile recommendation made by the State Wildlife Agencies' Ad Hoc Committee for Sage-Grouse and Oil and Gas Development. There are 3,412 existing wells within an analysis area of approximately 520 square miles or 6.6 well per square mile.

The 2012 population viability analysis for the Northeast Wyoming sage-grouse found there remains a viable population of sage-grouse in the PRB (Taylor et al. 2012). Threats from energy development and West Nile Virus (WNv) are impacting future viability (Taylor et al. 2012). The study indicated that effects from energy development, as measured by male lek attendance, are discernible out to a distance of 12.4 miles.

Studies document the additive impacts of energy development and WNv as a threat to sage-grouse persistence in the PRB (Taylor et al. 2012, Garton et al. 2011). The cumulative and synergistic effects of CBNG development and WNv in the PRB area will continue to impact the local sage-grouse population, causing further declines in lek attendance, and could result in local extirpation: "[f]indings reflect the status of a small remaining sage-grouse population that has already experienced an 82% decline within the expansive energy fields (Walker et al. 2007a), a level of impact that has severely reduced options for delineating core areas that are large enough and in high enough quality habitats to sustain populations." (Taylor et al. 2012).

Current well densities reduce the effectiveness of PRB core areas (Taylor et al. 2012). Continued energy development around the core areas will continue to impact their remaining value. Declines in active leks and male attendance indicate that the WNv outbreaks and energy development reduce sage-grouse populations and that they interact to exacerbate population declines. The effects of one WNv outbreak year could cut a population in half. Absent a WNV outbreak, or another stochastic event of similar magnitude, immediate extirpation is unlikely. Results suggest that if current oil and gas development rates continue, they may compromise future viability of NE Wyoming sage-grouse, additional WNv outbreaks increase the potential for extirpation (Taylor et al. 2012).

Figure 4.3 below shows the sage-grouse habitat that has been modeled and mapped to be the highest quality nesting and brood rearing habitat with in the project area. The model's accuracy was field verified during the onsite inspections November 5 and 11, 2010. The model did not identify high quality nesting and brood rearing habitat between the Queen B Federal 2 and Queen B Federal 3 wells but high quality habitat was confirmed on the ground. The BLM Biologist confirmed the model's findings and observed sign of sage-grouse use during the 2010 and 2011 field seasons.

4.3.3.3. Mitigation Measures

In order to reduce the impacts to sage-grouse associated with noise, construction, and human disturbance resulting from implementation of the proposed project, BLM will include a timing limitation (March 15-June 30) on surface-disturbing activities in and adjacent to identified nesting habitat across the project area. Because nesting grouse are 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 nesting season.

The BLM policy is to implement the State of Wyoming's Sage-grouse Core Area Strategy (IM 2012-019); which protects approximately 80% of sage-grouse leks in the State. However in the PRB only 20% of leks are in designated core habitats, and the shape and size of the Buffalo core habitat limits the protections afforded these leks. Additional mitigation may be necessary to maintain populations in the PRB. Such mitigation could include; increasing WNv control efforts, avoiding/minimizing surface water discharges, enhancing core area habitat quality, accelerating the pace of development by modifying or eliminating timing restrictions in some areas, efficiently suspending leases in (or habitats supporting) core, identifying areas in core, or undeveloped areas adjacent to core, that are appropriate for off-site mitigation, reducing supplemental predator habitat, and increased reclamation.

Aggressive reclamation of plugged and abandoned well fields, combined with habitat enhancements in functional core and supporting areas, may provide a population of birds to re-populate areas that can be successfully reclaimed.

Sage-grouse habitat restoration efforts in the PRB are ongoing. The BLM identified historical sage-grouse population centers that are ready for oil and gas reclamation where stakeholders will apply enhanced reclamation techniques. The intent is maintaining and enhancing those areas with remaining sage-grouse and increase suitability of currently uninhabited areas that are important for connectivity. The WY BLM initiated the PRB Restoration Program to implement strategies for accelerated reclamation and sage-grouse habitat restoration in areas affected by federal oil and gas developments.

Measures intended to avoid, minimize, or mitigate impacts to greater sage-grouse include:

- Surface disturbing activities are prohibited from March 15 to June 30 in suitable sage-grouse nesting and early brood-rearing habitat within mapped habitat. This condition will be implemented on an annual basis for the life of the project. This condition affects the following locations:

Township/Range	Section	Wells and Infrastructure
T51N R76W	14	Well locations: Queen B Federal 16 All access roads and associated utility corridors within the SESE, SWSE, NWSW and SWNW of this section.
	15	Well locations: Queen B CS Federal Com 2, Queen b CS Federal 3, Queen b CS Federal 4, Queen B CS Federal Com 5 All access roads and associated utility corridors, 1 power drop and 2 staging areas within the, SESW, SWSW, SWSE, NENW, NWSE, SENE and SWNE of this section. Impoundments: Swarm, Stinger and Honeycomb
	22	Well locations: Queen B CS Federal 7, Queen b CS Federal 8, Queen B CS Federal 9, and Queen b Injector Federal 12. All access roads and associated utility corridors, 1 power drop and 2 staging areas within this ENTIRE section.
	21	All access roads within the SESE of this section.
	28	Well locations: Queen b CS Federal Com 10 and Queen b CS Federal 11 All access roads and associated utility corridors within the NE of this section.

- A greater sage-grouse survey will be conducted by a biologist following the most current WGFD protocol. All survey results shall be submitted in writing to a BFO biologist and approved prior to surface-disturbing activities.

4.3.3.4. Residual Effects

A timing limitation does not mitigate habitat loss and fragmentation or affect disease mechanisms. Suitability of the project area for sage-grouse will be negatively affected due to habitat loss and fragmentation from the proximity of human activities associated with oil and gas development.

The PRB EIS based its analysis and decision, in part, on the removal of all CBNG wells and most infrastructure at final well abandonment after the CBNG plays out (10-15 years after drilling). In areas that are important to sage-grouse, leaving infrastructure on the landscape may hamper restoration efforts (Taylor et al. 2012). The PRB FEIS predicted that the PRB oil and gas development would have significant impacts to the sage-grouse population. The impact of the Queen B development cumulatively contributes to the potential for local extirpation and is within the parameters of the PRB FEIS/ROD and

current BLM Wyoming (WY IM 2012-019) and State of Wyoming (Executive Order 2011-5) sage-grouse conservation strategies.

Management of energy development based on current core area configurations and associated lease stipulations, conditions of approval, and best management practices (BMPs), may not provide enough contiguous habitats sufficient to protect the remaining population viability of PRB sage-grouse without a substantial investment in restoration.

4.3.4. BLM-Sensitive Species

The PRB FEIS discusses impacts to sensitive species on pp. 4-257 to 4-265. Additional direct and indirect impacts, cumulative effects, and residual effects are not anticipated for the BLM-Sensitive Species from this project with the exception of those indicated below and are not discussed in this EA.

4.3.4.1. Northern Leopard Frog

4.3.4.1.1. Direct and Indirect Effects

Direct injury or mortality of adults is possible where construction occurs within the stream channels such as Fortification Creek. Injury or mortality may occur to eggs or young as a result of construction. Foraging individuals may be harassed or displaced by the project. Disturbance, destruction, or fragmentation of nesting and foraging habitats would occur as a result of construction. Constructed impoundments will provide suitable habitat once hydrophilic vegetation is established.

4.3.4.1.2. Cumulative Effects

The PRB FEIS discusses impacts, including cumulative effects, to sensitive species on pp. 4-257 to 4-273.

4.3.4.1.3. Mitigation Measures

No timing limitations on surface disturbing activities are proposed specifically for northern leopard frog.

However, sage-grouse and raptor nesting timing limitations on surface disturbing activities will in part mitigate impacts to northern leopard frog.

4.3.4.1.4. Residual Effects

No long-term residual effects are anticipated.

4.3.4.2. Bald Eagle

4.3.4.2.1. Direct and Indirect Effects

Impacts to bald eagles are discussed in the PRB FEIS, pp. 4-251 to 4-253. A study completed in 2004 suggests that two-tracks and improved project roads pose minimal collision risk to bald eagles (Bills 2004). No road-killed eagles were reported; bald and golden eagles were observed feeding on 16 of the reported road-side carcasses (less than 4 percent). The risk of big-game vehicle-related mortality along CBNG project roads is insignificant or discountable, 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.

No bald eagle nests or winter roosts were identified within 1 mile of the project area. However, suitable roosting and nesting habitat exists within the project area. Implementation of the proposed project is not anticipated to impact bald eagles.

4.3.4.2.2. Cumulative Effects

Refer to the PRB FEIS, pp. 4-251 to 2-253, for the cumulative effects of Alternative B on bald eagles.

4.3.4.2.3. Mitigation Measures

Measures intended to avoid, minimize, or mitigate impacts, including COAs, to bald eagles include:

1. In the event that a bald eagle (dead or injured) is located during construction or operation, the USFWS' Wyoming Field Office (307-772-2374) and the USFWS' Law Enforcement Office (307-261-6365) will be notified within 24 hours.
2. Special habitats for raptors, including wintering bald eagles, will be identified and considered during the review of Sundry Notices.
3. Additional mitigation measures may be necessary if the site-specific project is determined by a BLM biologist to have adverse effects to bald eagles or their habitat.

Additionally, application of the BLM's 2010 MBTA MOU with the USFWS will serve to further mitigate potential effects to this migratory bird.

4.3.4.2.4. Residual Effects

No long-term residual effects are anticipated.

4.3.4.3. Baird's Sparrow

4.3.4.3.1. Direct and Indirect Effects

No direct injury or mortality of adults is expected. Injury or mortality may occur to eggs or young as a result of construction. Nesting and foraging individuals may be harassed or displaced by the project. Disturbance, destruction, or fragmentation of nesting and foraging habitats would occur as a result of construction.

4.3.4.3.2. Cumulative Effects

The PRB FEIS discusses impacts, including cumulative effects, to sensitive species on pp. 4-257 to 4-273.

4.3.4.3.3. Mitigation Measures

No timing limitations on surface disturbing activities are proposed specifically for Baird's sparrow.

However, sage-grouse and raptor nesting timing limitations on surface disturbing activities will also serve to mitigate impacts to nesting Baird's sparrow.

4.3.4.3.4. Residual Effects

No long-term residual effects are anticipated.

4.3.4.4. Brewer's Sparrow

4.3.4.4.1. Direct and Indirect Effects

Injury or mortality may occur to eggs or young as a result of construction. Nesting and foraging individuals may be harassed or displaced by the project. Disturbance, destruction, or fragmentation of nesting and foraging habitats would occur as a result of construction.

4.3.4.4.2. Cumulative Effects

The PRB FEIS discusses impacts, including cumulative effects, to sensitive species on pp. 4-257 to 4-273.

4.3.4.4.3. Mitigation Measures

No timing limitations on surface disturbing activities are proposed specifically for Brewer's sparrow.

However, sage-grouse and raptor nesting timing limitations on surface disturbing activities will also serve to mitigate impacts to nesting Brewer's sparrow.

4.3.4.4.4. Residual Effects

No long-term residual effects are anticipated.

4.3.4.5. Loggerhead Shrike

4.3.4.5.1. Direct and Indirect Effects

No direct injury or mortality of adults is expected. Injury or mortality may occur to eggs or young as a result of construction. Nesting and foraging individuals may be harassed or displaced by the project. Disturbance, destruction, or fragmentation of nesting and foraging habitats would occur as a result of construction.

4.3.4.5.2. Cumulative Effects

The PRB FEIS discusses impacts, including cumulative effects, to sensitive species on pp. 4-257 to 4-273.

4.3.4.5.3. Mitigation Measures

No timing limitations on surface disturbing activities are proposed specifically for loggerhead shrike.

However, sage-grouse and raptor nesting timing limitations on surface disturbing activities will also serve to mitigate impacts to nesting loggerhead shrike.

4.3.4.5.4. Residual Effects

No long-term residual effects are anticipated.

4.3.4.6. Long-billed Curlew

4.3.4.6.1. Direct and Indirect Effects

No direct injury or mortality of adults is expected. Injury or mortality may occur to eggs or young as a result of construction. Nesting and foraging individuals may be harassed or displaced by the project. Disturbance, destruction, or fragmentation of nesting and foraging habitats would occur as a result of construction.

4.3.4.6.2. Cumulative Effects

The PRB FEIS discusses impacts, including cumulative effects, to sensitive species on pp. 4-257 to 4-273.

4.3.4.6.3. Mitigation Measures

No timing limitations on surface disturbing activities are proposed specifically for long-billed curlew.

However, sage-grouse and raptor nesting timing limitations on surface disturbing activities will also serve to mitigate impacts to nesting long-billed curlew.

4.3.4.6.4. Residual Effects

No long-term residual effects are anticipated.

4.3.4.7. Sage Sparrow

4.3.4.7.1. Direct and Indirect Effects

No direct injury or mortality of adults is expected. Injury or mortality may occur to eggs or young as a result of construction. Nesting and foraging individuals may be harassed or displaced by the project. Disturbance, destruction, or fragmentation of nesting and foraging habitats would occur as a result of construction.

4.3.4.7.2. Cumulative Effects

The PRB FEIS discusses impacts, including cumulative effects, to sensitive species on pp. 4-257 to 4-273.

4.3.4.7.3. Mitigation Measures

No timing limitations on surface disturbing activities are proposed specifically for sage sparrow.

However, sage-grouse and raptor nesting timing limitations on surface disturbing activities will also serve to mitigate impacts to nesting sage sparrow.

4.3.4.7.4. Residual Effects

No long-term residual effects are anticipated.

4.3.4.8. Sage Thrasher

4.3.4.8.1. Direct and Indirect Effects

No direct injury or mortality of adults is expected. Injury or mortality may occur to eggs or young as a result of construction. Nesting and foraging individuals may be harassed or displaced by the project. Disturbance, destruction, or fragmentation of nesting and foraging habitats would occur as a result of construction.

4.3.4.8.2. Cumulative Effects

The PRB FEIS discusses impacts, including cumulative effects, to sensitive species on pp. 4-257 to 4-273.

4.3.4.8.3. Mitigation Measures

No timing limitations on surface disturbing activities are proposed specifically for sage thrasher.

However, sage-grouse and raptor nesting timing limitations on surface disturbing activities will also serve to mitigate impacts to nesting sage thrasher.

4.3.4.8.4. Residual Effects

No long-term residual effects are anticipated.

4.3.4.9. Western Burrowing Owl

4.3.4.9.1. Direct and Indirect Effects

There are no known burrowing owl nests within the Queen B POD project area, however, suitable habitat is found within the identified prairie dog colonies listed in Table 3.8. Direct impacts to prairie dog colonies are discussed in Section 4.2.3.5.5. Impacts expected from project actions are the same as those described on p. 4-263 of the PRB FEIS and in Section 4.2.3.5. In addition to the impacts listed in these sections, burrowing owls are vulnerable to vehicle collision.

4.3.4.9.2. Cumulative Effects

The cumulative impacts to burrowing owls are similar to those discussed for all raptor and migratory bird species and are discussed in the PRB FEIS, pp. 4-221 and 4-235.

4.3.4.9.3. Mitigation Measures

The Thunder Basin National Grasslands in Campbell County, Wyoming, who cooperated with the BLM in the creation of the 2003 PRB FEIS, recommends a 0.25-mile timing restriction buffer zone for burrowing nest locations during their nesting season (April 15 to August 31). Alteration of the general raptor nest timing limitation (February 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 4.5 months from 6.5 months and to 0.25 mile from 0.5 mile. The COAs address measures to minimize and mitigate impacts to burrowing owls.

Measures intended to avoid, minimize, or mitigate impacts to the western burrowing owl include:

- No surface-disturbing activity shall occur within 0.25 mile of all identified prairie dog colonies from April 15 to August 31, annually, prior to a burrowing owl nest occupancy survey for the current breeding season. A 0.25 mile buffer will be applied if a burrowing owl nest is identified. This condition will be implemented on an annual basis for the duration of surface-disturbing activities

within the prairie dog town(s). This timing limitation will be in effect unless surveys determine the nest(s) to be inactive. This timing limitation will affect the following:

Township/Range	Section	Wells and Infrastructure
T51N R76W	14	Well location: Queen b CS Federal 16 All access roads and associated utility corridors within the SWSE of this section or within 0.25 mile of the mapped prairie dog colony.
	22	Well location: Queen B CS Federal 6 and Queen B CS Federal 7 All access roads and associated utility corridors within 0.25 mile of the mapped prairie dog colony within the NW of this section or within 0.25 mile of the mapped prairie dog colony.

4.3.4.9.4. Residual Effects

There would be an increase in traffic, construction activity, and human presence in the area throughout the life of the project that would affect the quality of the area for nesting burrowing owls. Timing limitations during the construction phase of the project would protect nests from disturbance, but production activities such as work over operations and routine well monitoring may discourage burrowing owls from using the nest locations.

4.3.4.10. Mountain Plover

4.3.4.10.1. Direct and Indirect Effects

Direct and indirect effects to mountain plover are discussed in the PRB FEIS, pp. 4-254 to 4-255. Suitable mountain plover habitat is limited to the identified prairie dog colonies within the project area. Impacts to prairie dog colonies are discussed in Section 4.2.4.5.5, black-tailed prairie dog effects. No mountain plovers were observed in the area from surveys conducted from 2004 to 2010 (ICF 2011); nesting plovers are not suspected to be present.

Mountain plovers seek habitat that may be of poor quality, such as heavily grazed land, burned fields, fallow agriculture lands, roads, oil and gas well pads, and pipelines, when loss or alteration of more suitable breeding habitat (predominantly prairie dog colonies) occurs. These areas could become reproductive sinks. Although adult mountain plovers may breed in areas with poor quality habitat, lay eggs and hatch chicks; the young may not reach fledging age due to the poor quality of the habitat.

Recent analysis of the USWFS Breeding Bird Survey data suggests that mountain plover populations have declined at an annual rate of 3.7 percent a year over the last 30 years, which represents a cumulative decline of 63 percent during the last 25 years (Knopf and Rupert 1995).

Use of roads and disturbed construction areas by mountain plovers may increase their vulnerability to vehicle collision. Designing roads for a maximum travel speed of 25 miles per hour provides drivers an opportunity to notice and avoid mountain plovers and allow mountain plovers sufficient time to escape from approaching vehicles.

4.3.4.10.2. Cumulative Effects

The cumulative impacts to mountain plovers are discussed in the PRB FEIS; cumulative impacts to special status species are discussed in the RMP Amendment, p 4-91.

4.3.4.10.3. Mitigation Measures

Measures intended to avoid, minimize, or mitigate impacts to mountain plover include:

- A mountain plover nesting survey is required in suitable habitat prior to commencement of surface-disturbing activities in the following areas:

Qtr/Qtr	Section(s)	Township (N)	Range (W)	Size (acres)
SESW, NENW	23	T51N	R76W	14.3
NW	22	51	76	1.2
SWSE	14	51	76	1.6

- If a mountain plover nest is identified, a seasonal disturbance-free buffer of 0.25 mile shall be maintained between March 15 and July 31. If no mountain plover nests are identified, surface disturbing activities may be permitted within suitable habitat until the following breeding season (March 15).
- If occupied mountain plover nesting habitat is located, the amount and nature of ground-disturbing activities will be limited within identified nesting areas in a manner to avoid the abandonment of these areas. All survey results must be submitted in writing to the BFO and approved prior to initiation of surface-disturbing activities.
- No surface-disturbing activities are permitted in the suitable habitat area listed above, from March 15 - July 31. This timing limitation will be in effect unless surveys determine no plovers are present. This timing limitation will affect the following project components:

Township/Range	Section	Wells and Infrastructure
T51N R76W	14	Well location: Queen b CS Federal 16 All access roads and associated utility corridors within the SWSE of this section or within 0.25 mile of the mapped prairie dog colony.
	22	Well location: Queen B CS Federal 6 and Queen B CS Federal 7 All access roads and associated utility corridors within 0.25 mile of the mapped prairie dog colony within the NW of this section or within 0.25 mile of the mapped prairie dog colony.

- Creation of hunting perches or nest sites for avian predators within 0.25 mile of identified nesting areas will be avoided by burying power lines, using the lowest possible structures for fences and other structures and by incorporating perch-inhibiting devices into their design.
- In addition, any mountain plovers, undetected by surveys, that may use the area, would receive some protection from raptor and sage-grouse timing limitations.

4.3.4.10.4. Residual Effects

There is potential for plovers to be impacted by project-related traffic outside the project boundary and a potential for impacts if individuals were undetected at the time of survey.

4.3.4.11. Black-tailed Prairie Dog

4.3.4.11.1. Direct and Indirect Effects

Wells within 0.25 mile of prairie dog towns include:

- Queen b CS Federal #16
- Queen B CS Federal #6
- Queen B CS Federal #7

Direct loss to habitat will occur within the prairie dog colony located in NW Section 22 as a result of the proposed access road and utility corridor for the Queen B CS Federal 7 well. Vehicle traffic could increase mortality along roads. Additional impacts to the black-tailed prairie dog are discussed in the PRB FEIS on pp. 4-255 to 4-256.

4.3.4.11.2. Cumulative Effects

The PRB FEIS discusses cumulative effects to sensitive species on pp. 4-257 to 4-273.

4.3.4.11.3. Mitigation Measures

No additional mitigation measures are required.

4.3.4.11.4. Residual Effects

The PRB FEIS discusses residual effects to sensitive species on pp. 4-257 to 4-273.

4.3.4.12. Big Game

4.3.4.12.1. Direct and Indirect Effects

The PRB FEIS discusses impacts, including direct and indirect effects, cumulative effects, and residual effects to big game on pp. 4-181 to 4-215. The FCPA RMPA discusses impacts, including cumulative effects, to elk, pp. 4-49 to 4-53, 4-67 to 4-73, and 4-74 to 4-78.

Big game in the area including elk, mule deer, white-tailed deer, and pronghorn antelope are expected to respond in similar fashion. However, deer and pronghorn do not move as easily as elk through deep snow, so winter disturbance could impact these shorter legged species more severely. The most important difference between the elk herd and the deer and antelope herds is that the Fortification elk herd resides primarily within a 173,000 acre yearlong range isolated from other elk herds where the deer and antelope herds range throughout the Powder River Basin and can intermix with neighboring herds.

Yearlong and crucial winter range for elk, winter range for pronghorn antelope, and winter yearlong range for mule deer would be directly disturbed by the construction of wells, pipelines, and roads resulting in habitat loss. Table 2.2 of this document summarizes the proposed activities associated with the development of the Queen B POD; items identified as long term disturbance would result in direct habitat loss. Short-term disturbances also would result in direct habitat loss as vegetative cover is removed. Short term disturbances may provide some habitat value as these areas are reclaimed and native vegetation becomes established.

In addition to the direct habitat loss, big game would likely be displaced from the project area during drilling, construction and reclamation activities. A study in central Wyoming reported that mineral drilling activities displaced mule deer by more than 0.5 mile (Hiatt and Baker 1981). The WGFD indicates a well density of 8 wells per section creates a high level of impact for big game and that avoidance zones around mineral facilities overlap creating contiguous avoidance areas (WGFD 2004). The foreseeable development within the Queen B POD includes an additional 16 wells at 16 locations to an existing 10 wells at 7 locations within 2.4 square miles, resulting in a well density of approximately 11.4 well locations per section.

Big game animals may return to the project area following drilling, construction and reclamation activities if Yates practices a very low number of well and facility visits; however, populations would likely be lower than prior to project implementation as the human activities associated with operation and maintenance continue to displace big game. Elk and mule deer are more sensitive to operation and maintenance activities than pronghorn.

The Pinedale Anticline study (Sawyer et. al. 2005) suggests mule deer do not readily habituate. A study in North Dakota concluded, "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 are 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 winter progresses. Survival below the maintenance level requires behavior emphasizing energy conservation. Canfield et al. (1999) wrote that forced activity caused by human disturbance exacts an energetic

disadvantage, while inactivity provides an energetic advantage for animals. Drilling, construction and reclamation activities including the closure of reserve pits are examples of such activities. Geist (1978) further defined effects of human disturbance in terms of increased metabolism, which could result in illness, decreased reproduction, and death.

Reclamation activities that occur within big game habitats during the spring would 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.

Appendix B of FCPA RMPA identifies seven performance goals and objectives (listed in Chapter 3 of this document), designed to be used in conjunction with the FCPA RMPA. These will be used to achieve the BLM goal and objectives for the FCPA. The goal is that a viable elk herd utilizing their seasonal ranges during the appropriate seasons is maintained across the FCPA.

4.3.4.13. Elk

The Queen B POD is expected to affect the Fortification elk herd and their habitat. Habitat effectiveness will be reduced due to avoidance and displacement of animals and altered behavior from reactions to CBNG activities. Within the Queen B project boundary, less than 0.1 acre direct disturbance would occur within elk effective habitat; which is approximately 0.01 percent of the effective habitat within the project boundary. (See Figure 4.2 Elk Security Habitat and Proposed Project Components.)

Within the Queen B project boundary, there is no surface disturbance proposed within elk security habitat. No elk crucial winter range or dual crucial range would be lost due to project construction or operation however elk utilization of these crucial ranges is likely to be affected. It is likely that elk displacement in the Queen B project area would be similar to displacement seen in other area developments.

Movement patterns of elk captured north of Fortification Creek versus elk captured south of Fortification Creek were compared through December 2010. Typically, elk captured in the northern portion of the elk yearlong range stay north of Fortification Creek, but elk captured in the southern portion of the yearlong range tend to roam throughout the north and south halves of the yearlong range. Nine (50 percent) of the 18 elk collared south of Fortification Creek spent considerable time north of Fortification Creek (April 1, 2008 - July 17, 2009); 37 percent of the locations from 'southern' elk were north of Fortification Creek. While of 37 elk collared north of Fortification Creek only 3 (8 percent) spent much time south of Fortification Creek; only 4 percent of the locations from the 'northern elk were south of Fortification Creek. Effective elk habitat along the southern boundary of the Fortification Creek Planning Area (FCPA) provides connectivity for elk moving between the north and south halves of the elk yearlong range. The project area is split by the FCPA boundary with 9 of the 16 wells falling within the FCPA and the remaining 7 wells located south of the FCPA boundary. The north half (815 acres or 54%) of the Queen B POD is located in the southeastern corner of the FCPA, north east of Fortification Creek.

Following non-federal CBNG development initiated in May of 2008 within the Augusta Unit, more than half the collared elk that were within the Augusta Unit Zeta (AUZ) POD area left. Consistent with the literature (studies conducted in forested as well as desert habitats), less than 50 percent of the collared elk returned to the POD area to date. Only 6 of the original (March 2008) 25 GPS collared elk that used the AUZ area pre-development continued using the remaining effective habitat within the AUZ's western boundary in 2009. That use declined further with three collared elk using the effective habitat remaining within AUZ in 2010. The highest numbers of elk relocations were observed in February 2010; 79 of the total 695 data points (11 percent). It is likely that connectivity of the effective habitat within the AUZ POD has been compromised perhaps until that POD is reclaimed. Likewise, fewer elk relocations were recorded in the Carr Draw III West (CD3W) and Carr Draw IV (CDIV) project areas even though 720 acres of security habitat was maintained (over 9,000 acres lost from 2005-2009) within those PODs. Only a few elk relocations have been recorded in AUZ in 2011 where no elk security habitat remains. There

are slightly increasing numbers of relocations observed in the Carr Draw PODs where a small patch of elk security habitat remains.

Security habitat provides refuge for elk when stressed by human disturbance. Human disruption (i.e. work over operations, routine well visits, etc.) can cause displacement for prolonged periods of time; such areas could be avoided by elk altogether resulting in the loss of security habitat.

The figures included in Appendix D depict the concentration of elk relocation data collected since March 2008. Figures D-1, D-2, and D-3 show that the collared elk have been prone to use the effective habitat within the project area outside of the crucial winter or calving periods. When comparing Figures D-2 and D-3 it appears that the collared elk select the Queen B POD more frequently during the crucial winter period versus the calving period. This is to be expected since the majority of the POD, 861 acres, falls within the crucial winter range while very little (less than 20 acres) lies within the elk calving range. The trend observed is that the elk relocation data density is greatest where the greatest area of un-impacted elk security habitat exists. BLM's field observations of the elk herd's habitat use is consistent with the GPS relocation data noting that number of elk utilizing the habitat is greater than the number animals fitted with GPS collars.

4.3.4.13.1. Population Demographics

The goal of the FCPA-RMPA is to maintain a viable elk population while allowing for reasonable CBNG development. An objective to that end is to see the Fortification herd maintained at 80% or greater as measured from the WGFD population objective of 150 elk. Coal Bed Natural Gas (CBNG) will not be the causative factor to a population below this level. Although a decline in the population is anticipated due to animals displaced by the human disruption associated with oil and gas development, it is not the only factor affecting the Fortification elk herd numbers.

The WGFD JCR reports the 2011 post season population at 210, down from the 2010 estimate of 238. The Wyoming Game Fish Department issued a total of 80 elk hunting permits for the Fortification herd in 2011, an increase from 70 permits issued in 2010. Harvest success also increased with 69% successful in 2011 versus 60% report for the 2010 hunting season. A recent increase in hunting opportunity and success is at least partially responsible for the population decline (by management design).

Reclamation activities that occur within big game habitats during the spring would likely displace cows and calves due to the human presence in the area. This may cause reduced survival rate of cows and calves that must expend increased energies to avoid such activities.
Because of the affinity of elk for the Fortification Creek Area, and their wary nature, the most probable scenario for elk response to the proposed CBNG development is for the herd to seek out security patches within the Fortification herd unit and attempt to avoid the CBNG activities during project construction and other disruptive activities. During the peak of proposed development, with road and facility construction, and human activity on most ridges and some drainages in the Queen B project area, the elk population is expected to be stressed and impacted almost continuously.

While some habituation may occur over time, a reduction in local elk use through displacement should be expected. This displacement is usually temporary in nature, and some studies have shown that elk returned to the area of disturbance once the source of disturbance and human presence was gone (Gussey 1986, WGFD 2000). In forested environments, elk have returned at 50 percent or less of the previous levels (Hayden-Wing Associates 1990). Elk may also shift their centers of distribution to the least impacted sites, such as the WSA. This trend is supported by data collected on collared elk within the Fortification herd unit and the response to ongoing non-federal CBNG development. When monitoring the impacts of development on the elk population, it would be a concern if:

- The current population trend, about 3 percent population decrease per year, were to precipitously decline (i.e., rapid rate increase);

- The overall total herd population were to drop below an estimated 120 animals (about 52 percent of the current population);
- The rate of elk ventures outside the Fortification Creek area were to drastically increase above 15 percent of the herd;
- The nature (i.e., longevity) of elk ventures outside the Fortification Creek area were to shift from mostly seasonal to mostly permanent; or
- Degradation of security/effective habitat occurs due to elk concentrating within the remaining available habitat.

4.3.4.13.2. Range Fidelity

Following drilling within the FCPA, calf production, winter and summer survival, and fidelity to yearlong range are to be maintained at 80 percent or greater of the current level. The seasonal crucial range fidelity will be evaluated by monitoring the collared elk use within the seasonal ranges (calving and crucial winter) during the crucial seasons. Calving range fidelity will be evaluated for the period May 15 through June 15. Crucial range fidelity will be evaluated for the period from December 1 through April 30. 78.7 percent of the collared elk locations within the herd unit from March 26, 2008 through June 15, 2011 were within the FCPA (103,838 of 131,846). 88.0 percent of the collared elk locations within the designated calving range from May 15 through June 15 (2008-2011) were within the FCPA designated calving range (10,035 of 11,409). 86.9 percent of the collared elk locations within the designated crucial winter range from December 1 through April 30 (2008-2011) were within the FCPA designated crucial winter range (23,765 of 27,356).

Yates outlines in "Addendum X, BMP's and Mitigation Measures for the Fortification Creek SMA" (See Appendix E) measures that may achieve elk and reclamation performance standards. These measures include the following

- Minimizing surface disturbance where possible
- Using existing roads where available.
- Locating water production facilities near existing facilities and/or roads.
- Use of telemetry to limit well visitation to once weekly.
- Limit well visits and schedule work over operations outside the crucial winter time period as much as practicable.
- Reclamation planning.
- Strive for expedient soil stabilization and interim reclamation.
- Visually monitoring reclamation success.

4.3.4.13.3. Habitat Effectiveness

The entire 1,509 acre project area falls within the elk yearlong range (Figure 4.1). In addition, the project area includes approximately 861 acres of elk crucial winter habitat with 9 proposed federal wells, 1.1 miles of new access road, and nearly 32 acres of surface disturbance. Activities within elk ranges are likely to increase impacts to elk habitat beyond the impacts already associated with the existing oil and gas activities. The current monitoring data indicates that elk within the Fortification herd typically avoid oil and gas roads out to 0.5 miles or greater.

No loss of elk security habitat is anticipated from the development of the Queen B project. Approximately 290 acres of effective elk habitat will be compromised, elk displaced (less than 0.1 acres of direct habitat removal), by the drilling, construction and production of the project (Figure 4.2).

Figure 4.1 Elk Ranges and Project Components

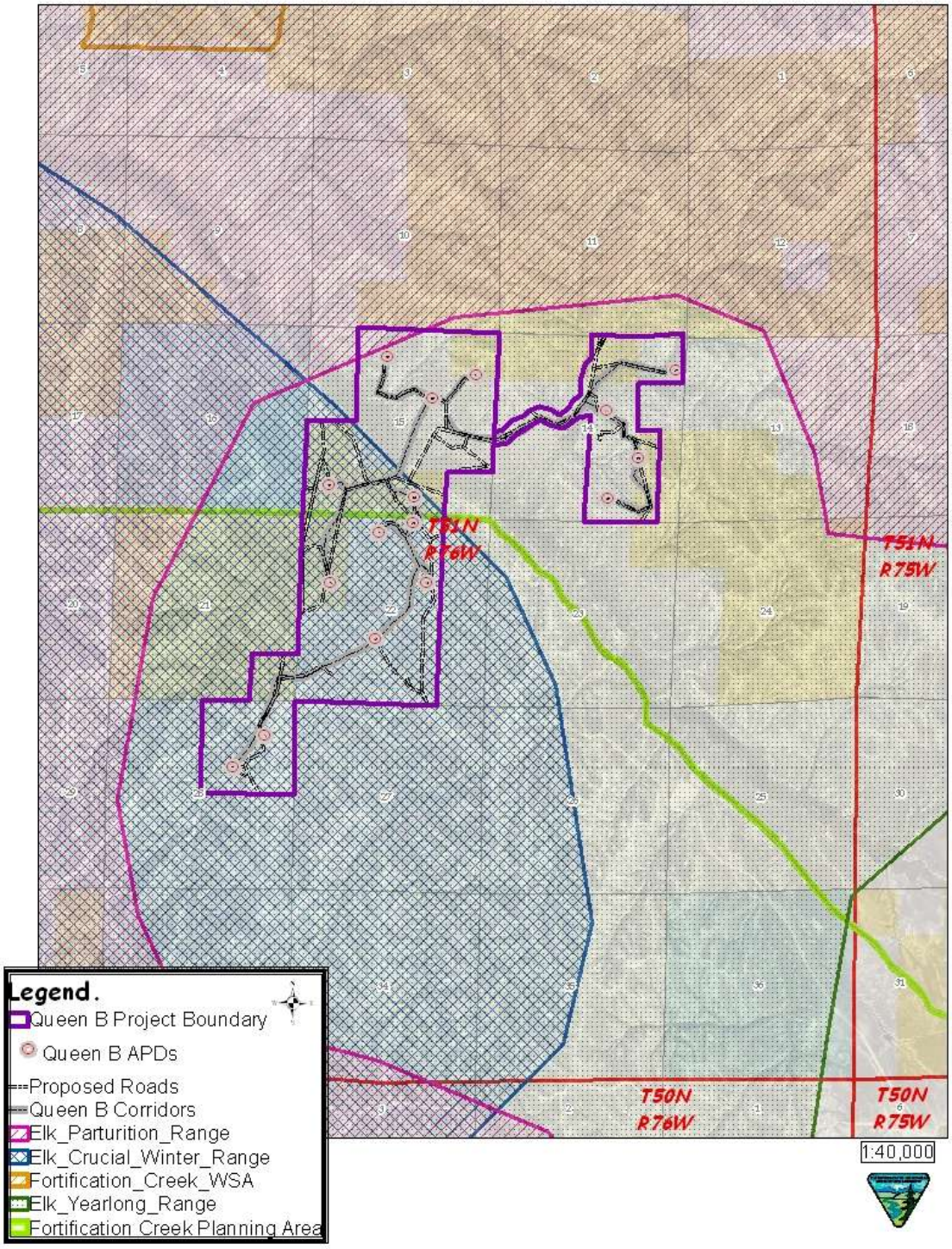
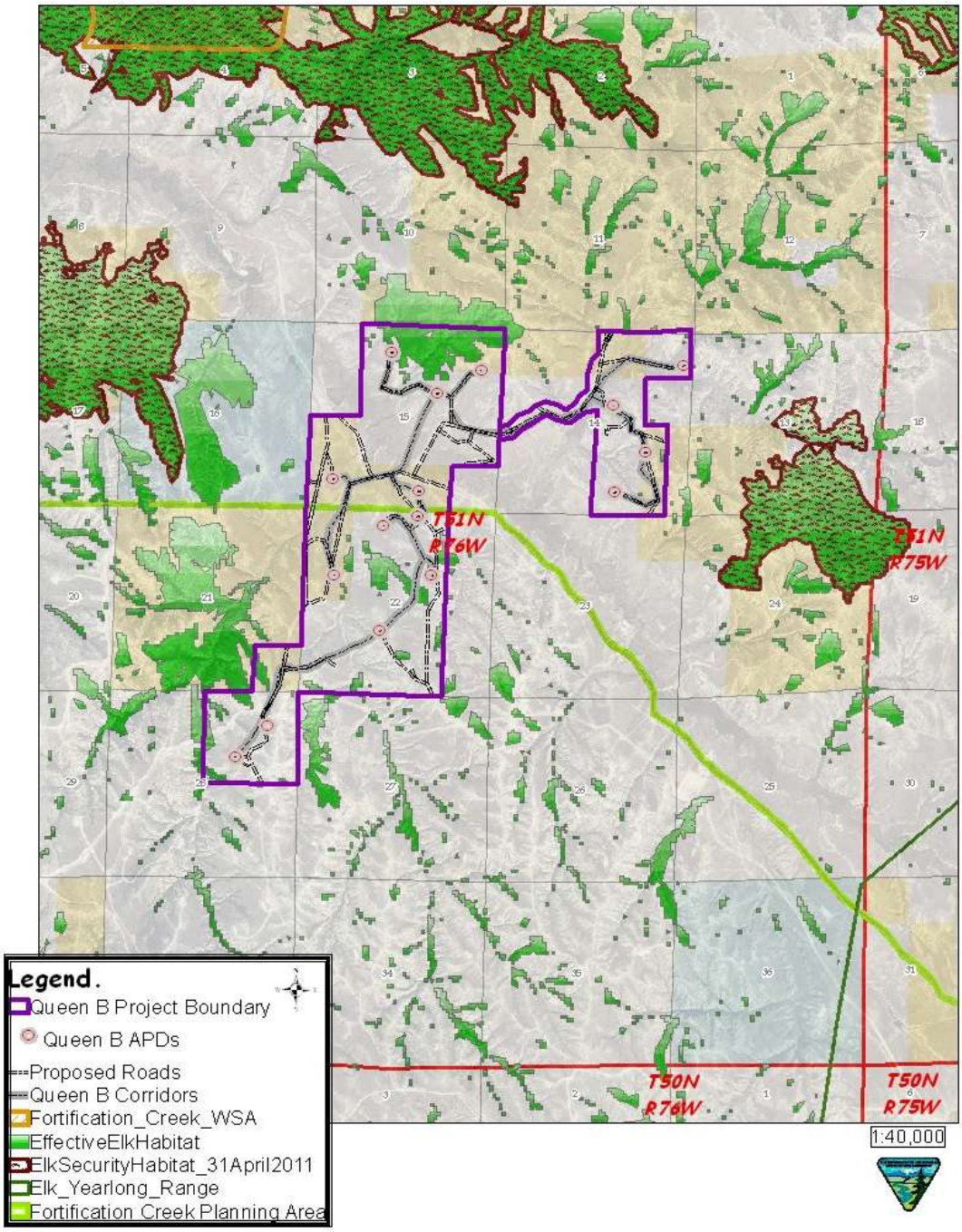


Figure 4.2 Elk Security Habitat and Proposed Project Components



4.3.4.13.4. Habitat Use

It is likely that elk will be displaced from the Queen B project area by human disturbance for prolonged periods of time as occurred in the AUZ and Carr Draw project areas.

Sawyer (2005) observed similar response of elk within the open terrain of the Jack Morrow Hills of southern Wyoming. The literature consistently shows a correlation between elk avoidance response and the level of human activity associated with oil and gas development. In the absence of forest cover, elk seem to rely on a combination of shrubs, topography, and low human disturbance to meet their thermal and hiding cover requirements (Sawyer et al. 2007).

Since March 2008 when the first GPS collars were deployed on elk within the Fortification Creek herd, 668 observations from 7 individual elk have been recorded within the project area. The data do not show a strong trend for elk to select habitat within the project area for a particular season (i.e. calving or winter). The elk appear to utilize the available habitat within the POD year-round**.**

Elk may return to the project area after drilling, construction, and reclamation activities have subsided if Yates practices a low number of well visits; however, use would likely remain lower than prior to project implementation while human activities associated with operation and maintenance continue. The goal is to complete the developments of the Southeast Phase of the FCPA within 3 years then restore the habitat function through expedient reclamation and minimizing human disruption to encourage the elk to utilize the effective habitat once the PODs, including Queen B, are in production status.

4.3.4.13.4.1. Cumulative Effects

Impacts to elk and their habitat in the Fortification Creek area have occurred during prior construction and drilling activities. In addition to the direct habitat loss, big game would likely be further displaced from the project area during drilling and construction. Current well density is approximately 4.4 wells per square mile (Figure 4.3). The foreseeable development within the Queen B POD (APDs received by WOGCC as of April 24, 2012) includes an additional 18 wells at 18 locations to an existing 10 wells within 2.4 square miles, resulting in a well density of approximately 12 wells per square mile (Figure 4.5). The WGFD indicates a well density of 4 wells or more per section within elk crucial winter and/or parturition ranges creates an extreme level of impact for big game and that avoidance zones around mineral facilities overlap creating contiguous avoidance areas (WGFD 2010d). The result is that extensive areas will be avoided especially when avoidance zones don't provide connectivity between areas of effective habitat.

Between July 2011 and January 2012, the Wyoming Oil and Gas Conservation Commission (WOGCC) changed the status of 170 CBNG well permits from expired (EP) to approved (AP). These include 110 Federal and 60 non-federal well locations. There are 106 of these wells within the Southeast, 55 in the Southwest and 9 within the North development phases of the FCPA. The BLM approved 56 of the Federal well locations included in the Camp John Unit SMA Phase 1 Year 1 POD on November 4, 2011. The remaining 34 Federal well locations have not been processed by BLM. 15 of the 60 non-federal well locations lie on Wyoming Land Trust Board surface and the other 45 are on privately owned surface. These 60 well locations are not drilled at this time but they may be drilled at any time without elk related mitigation.

Of the 60 non-federal locations, 3 lie within mapped and modeled elk security habitat and 31 lie within 0.5 miles of elk security habitat. BLM has estimated an additional 8 miles of new oil gas roads will be needed to access these wells locations. A viewshed analysis was conducted using the likely routes to access these locations. The results show a loss of 622 acres of elk security habitat and 846 acres of effective habitat within the FCPA. Approximately 269 acres of this elk security habitat loss will occur within the Southeast, 154 acres in the Southwest, and 199 acres in the North development phases respectfully. With a baseline of 5,593 acres of elk security habitat, 4.8% is compromised by these new wells and associated access roads. Cumulative impacts of the WOGCC approved permits and the 56 approved BLM permits results in a total loss of 712 acres or 12.7 % of the elk security habitat available in the FCPA's Southeast Development Phase. BLM anticipates no loss of elk security habitat from the development of the Queen B project.

In a non-precedent setting manner for any other project(s) located outside the FCSMA, Yates will strive to utilize the following Best Management Practices (BMPs) and mitigation measures when performing SMA work for construction and production of the Queen B POD" (Yates 2011).

The BLM ID team found project plans and mitigation measures proposed by Yates provide inadequate detail to achieve the specific performance standards of the FCPA RMPA.

Cumulative impacts to the Fortification Creek elk herd will be managed by mitigation and monitoring discussed in Appendix B of the RMP Amendment. The FCPA-RMPA's performance-based management provides for mitigation flexibility dependent upon monitoring results. BLM will review performance standards prior to issuing further drilling permits. Collectively, operators must achieve the performance standards to BLM's satisfaction in order to remain in compliance. If a performance standard is not met and BLM determines it is necessary, then BLM may defer or deny additional permitting until the standard is met (BLM 2011).

Figure 4.3 Elk Ranges, Project Components and Existing Disturbance

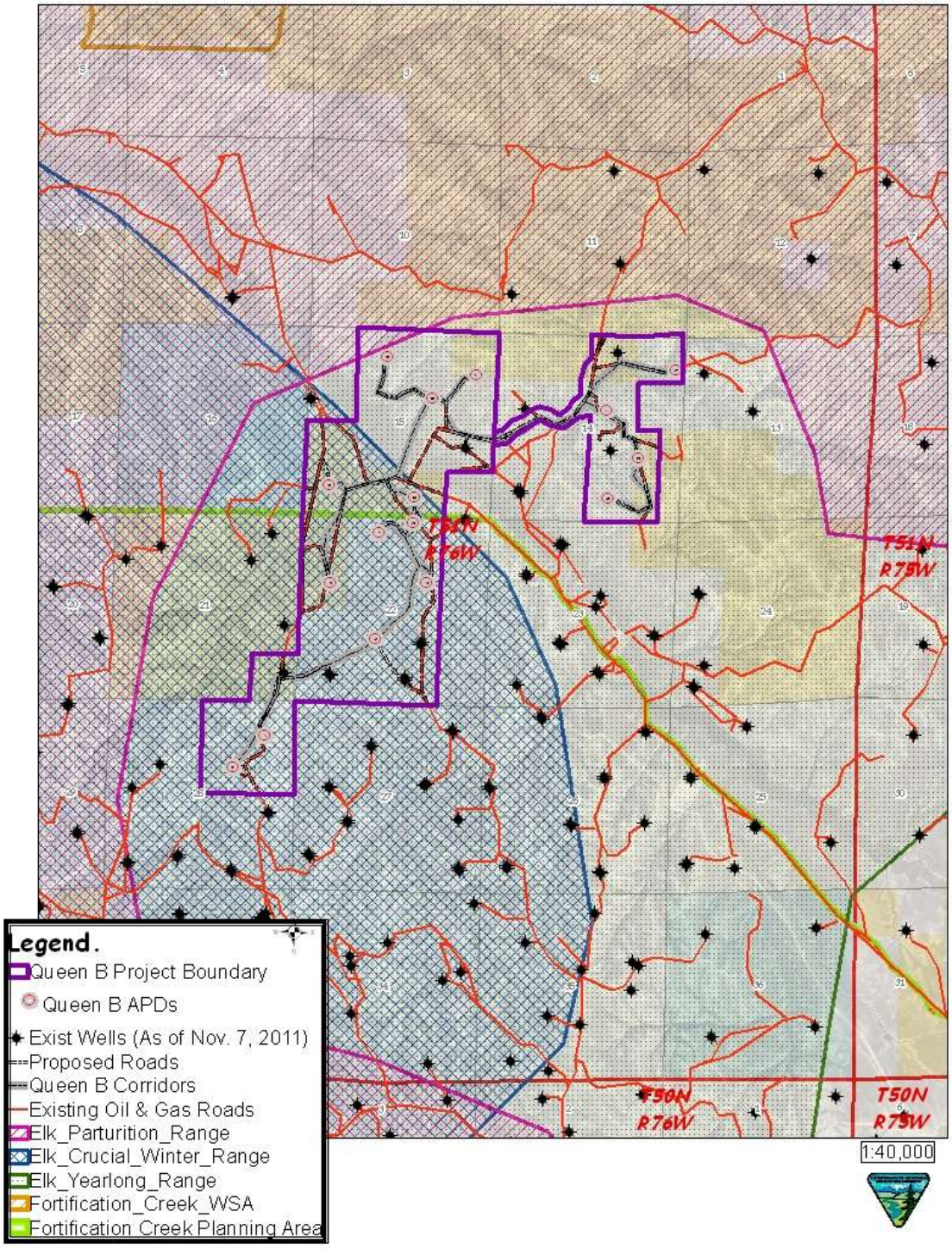
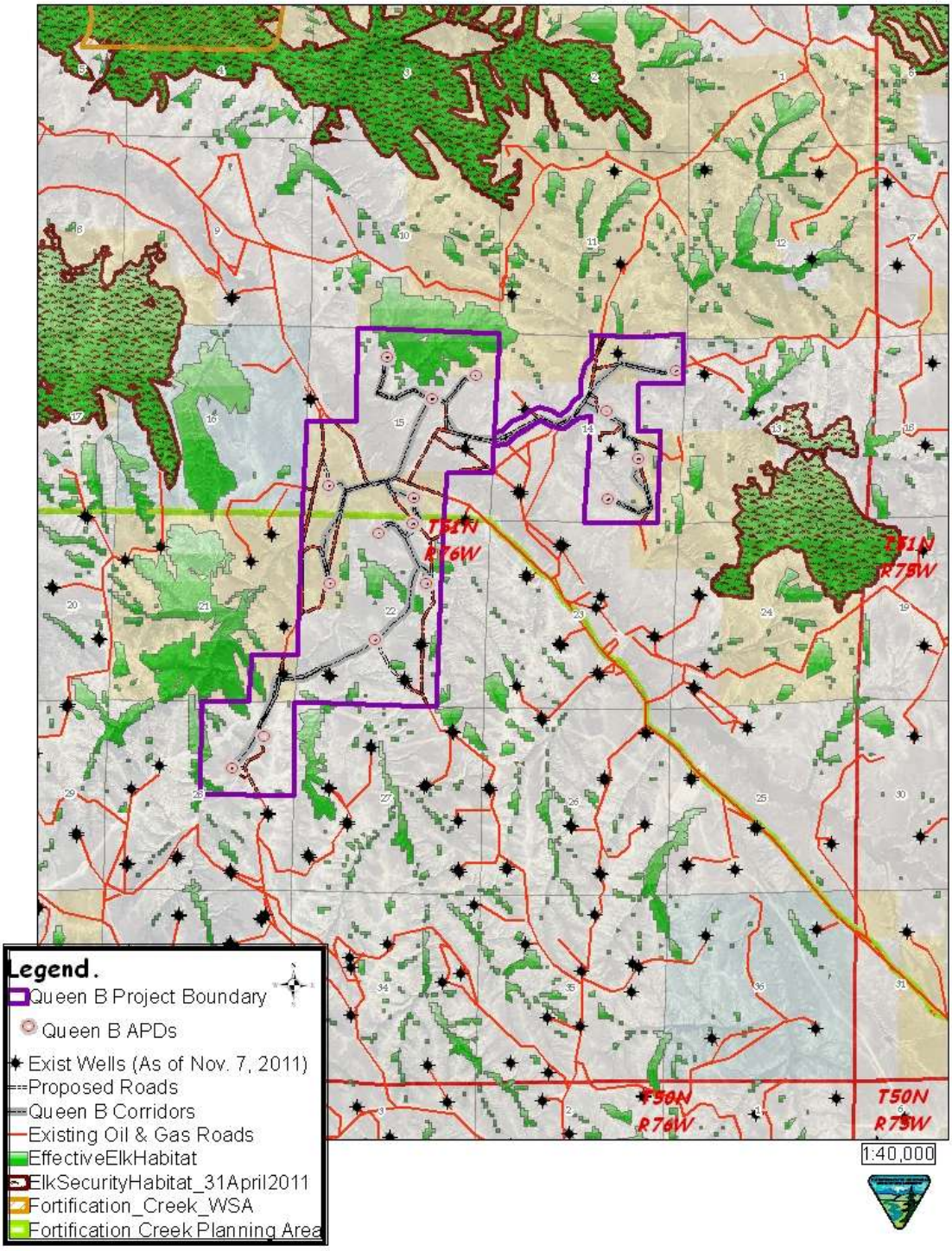


Figure 4.4 Elk Security Habitat, Project Components and Existing Disturbance



4.3.4.13.4.2. Mitigation

Timing limitations restricting surface disturbing activities during the crucial winter season as well as implementation of mitigation measures identified in the operators MSUP, Addendum X will be key to achieving the performance based elk and reclamation standards of the FCPA-RMPA.
Site-specific mitigation measures to be required by BLM include:

- No surface disturbing activity shall occur within identified elk crucial winter range from November

15 to April 30. This timing stipulation will affect the following:

Township/Range	Section	Wells and Infrastructure
T51N R76W	15	Well locations: Queen b CS Federal 4 and Queen B CS Federal Com 5 All access roads and associated utility corridors, 1 power drop and 2 staging areas within the, SW and SWSE of this section. Impoundment: Stinger
	22	Well locations: Queen B CS Federal 6, Queen B CS Federal 7, Queen b CS Federal 8, Queen B CS Federal 9, and Queen b Injector Federal 12. All access roads and associated utility corridors, 1 power drop and 2 staging areas within this ENTIRE section.
	21	All access roads within this ENTIRE section.
	28	Well locations: Queen b CS Federal Com 10 and Queen b CS Federal 11 All access roads and associated utility corridors, within this ENTIRE section.

- Elk crucial winter timing limitation stipulations (TLS) are November 15-April 30. Wells spudded after November 1 will be prone to have reserve pit fluids freeze and therefore the reserve pit(s) cannot be closed within the 90 day timeframe required by BLM. Removing the reserve pit fluids immediately after well completion and before they freeze will allow for expedient reserve pit closure and avoid infringing on the elk crucial winter TLS.

- For the wells listed below if spudded after November 1, the reserve pit fluids must be removed immediately following completion activities to avoid potential conflicts with wildlife timing limitations and the standard COA that reserve pits be closed within 90 days, unless an exception is granted by the BLM AO.
  Wells:
  - Queenb CS Federal #3
  - Queenb CS Federal #4
  - QueenB CS Federal Com. #5
  - QueenB CS Federal #6
  - QueenB CS Federal #7
  - QueenB CS Federal #9
  - Queenb CS Federal #10
  - Queenb CS Federal #11
  - Queenb Injector Federal #12

- As per the August 5, 2011Decision Record for the FCPA-RMPA, Yates will supply a comprehensive annual development plan detailing which areas are to be developed each year and explain how the performance standards will be achieved prior to any surface disturbing activities.

- Monitoring of the elk population will be completed in accordance with Appendix B of the RMP Amendment.

4.3.4.13.4.3. Residual Effects

The incorporated design features and mitigation will not eliminate all project effects. Habitat effectiveness and habitat use will likely be affected and possibly the population itself. However, monitoring in accordance with the RMPA shall maintain compliance with the performance standards thereby avoiding any significant impacts.

4.3.4.14. Upland Game Birds (Plains Sharp-tailed Grouse)

4.3.4.14.1. Direct and Indirect Effects

The PRB FEIS discusses impacts, including direct and indirect effects, and cumulative effects, to plains sharp-tailed grouse, pp. 4-221 to 4-226.

Sharp-tailed grouse would be impacted by the proposed project because suitable habitat exists throughout the project area. Construction and maintenance activities associated with development of the Queen B POD would cause direct habitat loss. Associated road networks, pipelines, and powerline transmission corridors would influence vegetation dynamics by fragmenting habitats and creating soil conditions that facilitate the spread of invasive species (Braun 1998, Gelbard and Belnap 2003).

Impacts to Fortification/Hayden sharp-tailed grouse lek will result from increased average daily traffic during the drilling and construction activities. The lek lies only 365 feet from the County (Fortification) Road and has been highly impacted from the present level of energy development in the area. No sharp-tailed grouse, leks or sign were observed in the project area in 2011 (ICF 2011).

4.3.4.14.2. Cumulative Effects

The cumulative effects associated with Alternative B are within the analysis parameters and impacts described in the PRB FEIS. Fragmentation of shrub steppe habitat is a major disruption that has consequences for sagebrush-obligate species (Braun et al. 1976, Rotenberry and Wiens 1980a). In fragmented habitats, suitable habitat area remains only as remnants surrounded by unusable environments (Urban and Shugart 1984, Fahrig and Paloheimo 1988). Sagebrush-obligate species decline when areas of suitable habitat decrease (Temple and Cary 1988), due to lower reproduction, and/or due to of higher mortality in remaining habitats (Robinson 1992, Porneluzi et al. 1993). Fragmentation of shrub steppe has 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 re-establish ecologically functioning mature sagebrush communities. Therefore, sagebrush obligate species may not return to the project area for many years after reclamation activities are completed.

4.3.4.14.3. Mitigation Measures

Timing limitations for sage-grouse will also benefit sharp-tailed grouse.

4.3.4.14.4. Residual Effects

The effectiveness of the mitigation measures are limited because the timing limitation does not apply to well monitoring and maintenance. Impacts would span the life of the wells which is anticipated to be 10 years or more.

4.3.4.15. Aquatic Species

4.3.4.15.1. Direct and Indirect Effects

The PRB FEIS discusses impacts, including direct and indirect effects, to aquatic species on pp. 4-235 to 4-247. Direct discharge of CBNG produced water to Fortification Creek is not proposed for the Queen B POD. Water that may reach Fortification Creek from seeping reservoirs is not likely to reach the Powder River.

4.3.4.15.2. Cumulative Effects

The PRB FEIS discusses impacts, including cumulative effects, to aquatic species on pp. 4-235 to 4-247. The cumulative effects associated with Alternative B are within the analysis parameters and impacts described in the PRB FEIS.

4.3.4.15.3. Mitigation Measures

No additional mitigation measures are required.

4.3.4.15.4. Residual Effects

No residual effects are anticipated.

4.3.4.16. West Nile Virus

4.3.4.16.1. Direct and Indirect Effects

This project is likely to result in standing surface water which may increase mosquito breeding habitat.

4.3.4.16.2. Cumulative Effects

There are many sources of native standing water throughout the PRB that add mosquito habitat. Summer thunderstorms, that pool water for more than four days in hot weather, can result in large Culex mosquito hatches. Other sources of water include; natural flows, livestock watering facilities, coal mining operations, and human outdoor water use and features in and around communities.

4.3.4.16.3. Mitigation Measures

No additional mitigation measures are required.

4.3.4.16.4. Residual Effects

No residual effects are anticipated.

4.3.4.17. Migratory Birds

4.3.4.17.1. Direct and Indirect Effects

The PRB FEIS discussed direct and indirect effects to migratory birds, pp. 4-231 to 4-235. The PRB FEIS states on page 4-231, "Surface disturbance associated with construction, operation, and abandonment of facilities, including roads, have the potential to result in direct mortality of migratory birds. Most birds would be able to avoid construction equipment; however, nests in locations subject to disturbance would be lost, as would any eggs or nestlings." Direct mortality of a bird or destruction of an active nest due to construction activities would result in a "take" as defined (and prohibited) by the MBTA, a non-discretionary statute, and in turn a violation of the law.

Disturbance of habitat within the project area is likely to impact migratory birds. Nesting habitat would be lost directly with the construction of wells, roads, buried utilities, and pipelines. Construction in the spring may kill migratory birds. Drilling and construction noise can interfere with the males' ability to attract mates and defend territory, and the ability to recognize calls from conspecifics (USDI BLM 2003a). Prompt revegetation of short-term disturbance areas should reduce habitat loss.

Habitat fragmentation results in more than just a loss in the total habitat area; the quality of the remaining habitat is also altered (Temple and Wilcox 1986). The increasing density of roads constructed in developing natural gas fields creates substantial areas of impact where indirect habitat losses through displacement are much greater than the direct physical habitat losses. Ingelfinger (2001) identified that the density of breeding Brewer's sparrows declined by 36 percent and breeding sage sparrows declined by 57 percent within 100 meters of natural gas field roads. Effects occurred along roads with light traffic volume (less than 12 vehicles per day).

Those species that are edge-sensitive would be displaced furthest from vegetative edges, causing otherwise suitable habitat to be abandoned. If the interior habitat is at carrying capacity, then birds displaced from the edges would 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.

4.3.4.17.2. Cumulative Effects

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

4.3.4.17.3. Mitigation Measures

Migratory bird species within the project area nest in the spring and early summer and are vulnerable to the same effects as sage-grouse, sharp-tailed grouse, and raptors. Though no timing restrictions typically are applied specifically to protect migratory bird breeding or nesting, where other spring timing limitations are applied, nesting migratory birds also will receive protection. These mitigation measures are addressed in the COAs for the other wildlife species.

4.3.4.17.4. Residual Effects

Those species and individuals that are still nesting when the greater sage-grouse timing limitations are over (June 30) may have nests destroyed or disturbed by construction activities. Greater sage-grouse timing limitations would apply (March 15-June 30) within the sage-grouse breeding, nesting and brood-rearing habitat identified in section 4.3.3. Protections around active raptor nests (February 1 to July 31) extend past most migratory bird nesting seasons. Only a percentage of known nests are active any given year, so the protections for migratory birds from June 30 to July 31 will depend on how many raptor nests are active.

4.3.4.18. Raptors

4.3.4.18.1. Direct and Indirect Effects

Direct and indirect impacts to raptors, from oil and gas development, are analyzed in the PRB FEIS, pp. 4-216 to 4-221. No direct impacts to raptor nests, physical destruction of nests, are anticipated from the project. However, indirect impacts will likely occur as a result of project activities. Human activities in close proximity to active raptor nests may interfere with nest productivity. Romin and Muck (1999) indicate that activities within 0.5 mile 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 also can lead to the abandonment of the nest by the adults. Routine human activities near these nests also can 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 2003 ROD requires a 0.5-mile radius timing limitation during the breeding season around active raptor nests. However, routine and emergency work over operations in addition to regular well visits during the raptor breeding and nesting period are not restricted offering nesting raptors no protection from human disruption. The 2003 ROD recommends all infrastructures 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.

A list of documented raptor nests within 0.5 mile of project components is shown in Table 4.2.

Table 4.2 Proposed Project Infrastructure within 0.5 mile of Documented Raptor Nests

Nest ID	Infrastructure
2653	Nest is gone
2657, 5098, 5099 and 10216	2 wells and associated facilities, 8,875 feet of utility corridors, 3,546 feet of new access roads, 3 CBNG produced water storage impoundments, 2 water discharge outfalls and 1 staging area.
2658 and 5101	4 wells and associated facilities, 11,540 feet of utility corridors, 6,990 feet of new access roads, 3 culverts, 1 CBNG produced water storage impoundments 2 water discharge outfalls, 1 power drop and 2 staging areas.
2659, 12310 and 12378	1 well and associated facilities, 2,283 feet of utility corridors and new access roads and 2 culverts.
3350	6 wells and associated facilities, 11,540 feet of utility corridors, 6,990 feet of new access roads, 3 culverts, 2 CBNG produced water storage impoundments 3 water discharge outfalls, 1 power drop and 2 staging areas.
5123, 5849, 6260	No infrastructure proposed within 0.5 miles of the nest.
5124	2 wells and associated facilities, 7,787 feet of utility corridors, 1,196 feet of new access roads, 2 culverts, 2 CBNG produced water storage impoundments, 2 water discharge outfalls, 1 power drop and 1 staging area.
5125 and 10218	5 wells and associated facilities, 12,378 feet of utility corridors, 5,230 feet of new access roads, 3 culverts, 1 power drop and 2 staging areas
5126	2 wells and associated facilities, 3,672 feet of utility corridors, and 340 feet of new access roads
5127	2,696 feet of utility corridor
5128	1 well and associated facilities, 350 feet of utility corridor and new access road
6628 and 12269	3 wells and associated facilities, 5,365 feet of utility corridors, 1,542 feet of new access roads, 2 culverts, 1 power drop and 1 staging areas

Nest ID	Infrastructure
10217	1 well and associated facilities, 3,506 feet of utility corridors, 672 feet of new access roads, and 1 CBNG produced water storage impoundment.
10219	1 well and associated facilities, 2,175 feet of utility corridor and new access road
12498	1 well and associated facilities, 2,193 feet of utility corridors and 456 feet of new access roads.
12690	3 wells and associated facilities, 7,913 feet of utility corridors, 7,382 feet of new access roads, 2 culverts, 2 CBNG produced water storage impoundments, 2 water discharge outfalls and 1 staging area.

Source: USDI BLM 2010b.

BLM identified proposed well locations and associated infrastructure in proximity to raptor nests within the project area where an adequate biological buffer is not maintained and may cause nest abandonment. BLM coordinated with Fish & Wildlife Service (FWS) on the Queen B POD due to these concerns. Specific concerns were identified with the Queen B CS Federal 2 well location, Queen B CS Federal 3 pipeline, Queen B CS Federal 6 well location, Queen B CS Federal 8 access road, Queen B CS Federal Com 10 well location and Queen B CS Federal 11 well location. Appendix F includes the FWS recommendations BLM received on March 16, 2011 which states:

In an effort to help ensure activities do not take nesting birds, their eggs, or immature birds, for raptor species protected by MBTA, we [FWS] recommend implementing voluntary spatial and seasonal buffer zones to protect individual nest sites/territories. These include: (1) keeping a distance between the activity and around nest trees (disturbance buffers), (2) maintaining natural areas between the activity and around the nest trees (landscape buffers), and (3) avoiding certain activities during the breeding season."

With the exception of the Queen B CS Federal Com 10 well location, the FWS concerns are partially addressed as indirect project modifications placed other wells and associated roads infrastructure out of line-of-sight of the raptor nests. A timing limitation will be imposed on surface disturbing activities (not including maintenance operations) within 0.5 miles of active raptor nests February 1 through July 31, annually. This is consistent with the BLM-BFO's land use planning documents affording the nests the only protection included in the 2003 ROD. If Yates would voluntarily restrict well site visits and work-over operations at the Queen B CS Federal Com 10 well location during the raptor breeding season, it is likely that raptor breeding and nesting activities would be minimally affected. The operator did not volunteer any such mitigation and such a measure is more restrictive than BLM-BFO land use plans provide for. A timing restriction for surface disturbance is insufficient to adequately protect this nest.

The Queen B CS Federal Com 10 well location is approximately 700 feet from and within clear line-of site of raptor nest BLM ID #5126. The viewshed between the Queen B CS Federal Com 10 and nest 5126 is an area roughly 20 acres in size. The topography is steep with the nest tree setting approximately 100 vertical feet below the proposed well (Figure 4.6). Any human activities at the well site are likely to flush nesting raptors eventually leading to nest failure and abandonment.

The Queen B CS Federal 11 well location is also within 0.25 mile of nest 5126 however the Queen B CS Federal 11 well location is not within line-of-sight of the nest and is further from the nest (~1,000 feet).

There is an existing oil and gas road that supports a number of existing oil and gas wells (more than 5) located 0.11 miles east of the nest and between the nest and the two proposed well locations. Current traffic has not caused nest abandonment however the installation of CBNG wells, routine work over operations, and more frequent well visits (3-4 visits per week are anticipated) during the raptor breeding and nesting period will likely cause nest abandonment. Prior to nest initiation, activities at the Queen B CS Federal Com 10 location such as worker movements while performing maintenance and/or monitoring operations and noise and movement of equipment used to complete operations, will be threaten raptors attempting to nest at the 5126 location and dissuade them from selecting it as a nest site.

Survey data indicates that nest 5126 has been active and productive 2007-2010 with red-tailed hawk and inactive in 2011. On March 2, 2012, the BLM biologist visited the nest location. The structure, located in a live juniper tree, was found to be in excellent condition (See Figure 4.5) with an adult red-tailed hawk hovering above in a defensive display. The defensive display is sufficient to conclude that 5126 is an active nest for the 2012 nesting season.

Yates was made aware of the BLM's concerns (that operations and maintenance could cause abandonment) and FWS's recommendations during the onsites visit. Yates did not present an alternative well location nor was an alternative site obvious to the BLM ID team. Yates did relocate the well from its original location to avoid steep, erosive slopes. The well moved 24 feet toward nest 5126 and Yates' representative clearly stated during the onsites that the move was not intended to minimize impacts to nesting raptors, nor would any such mitigation be implemented.

A list of project components that are within line of sight and approximately 700 feet or less of the raptor nest BLM ID#5126 is shown in Table 4.3.

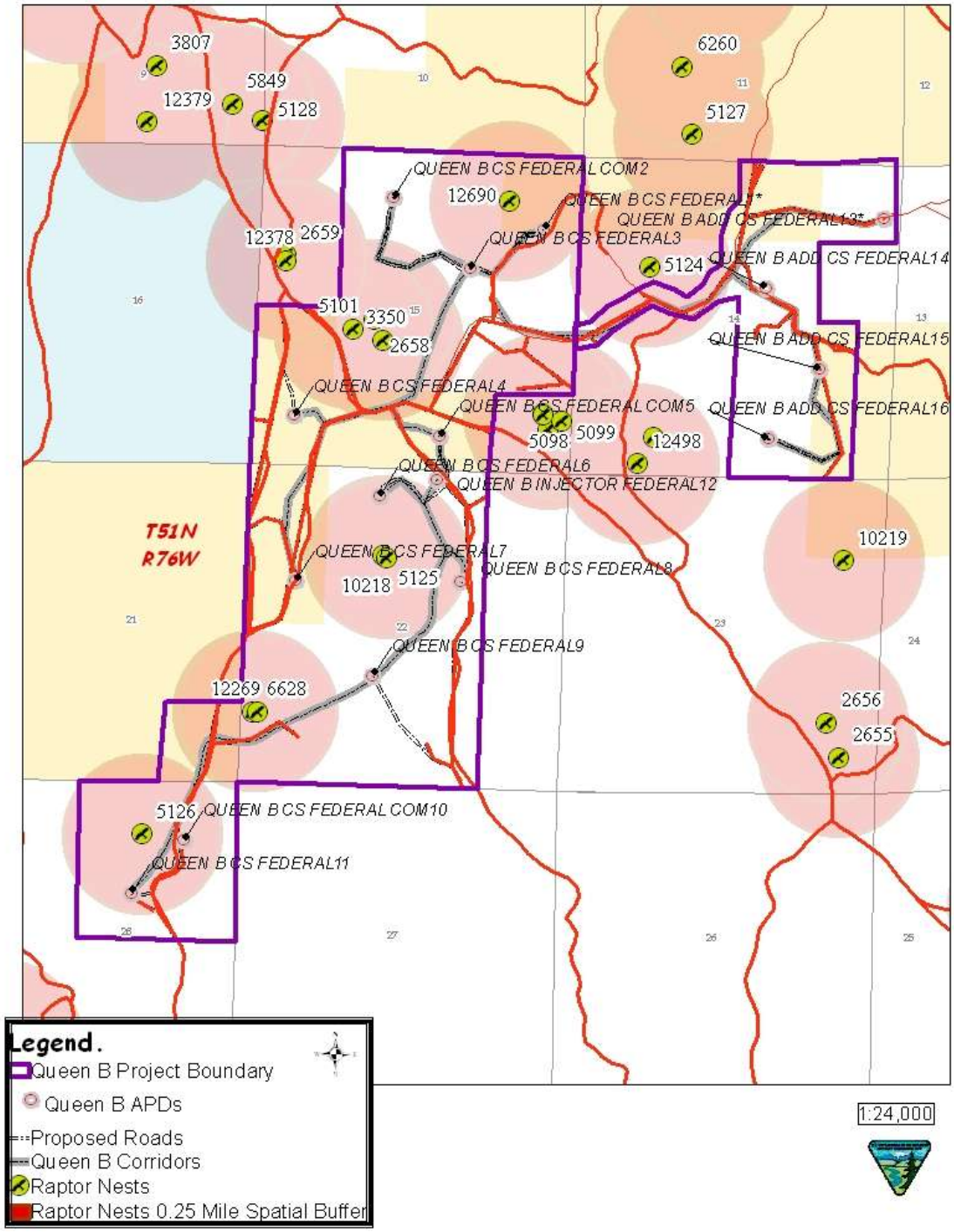
Table 4.3 Proposed Project Infrastructure within line of sight of Raptor Nests 5126

Nest ID	Infrastructure
5126	1CBNG well (CS Federal Com 10) at approximately 700 feet 1 well pad at approximately 670 feet 910 feet of utility corridor at approximately 445 feet

Source: USDI BLM 2010b.

Figure 4.5 Raptor Nest BLM ID #5126

Figure 4.6 Raptor Nest within proximity to the Queen B Project Area.



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

4.3.4.18.2. Cumulative Effects

The cumulative effects associated with Alternatives B are within the analysis parameters and impacts described in the PRB FEIS, p. 4-221.

4.3.4.18.3. Mitigation Measures

Measures intended to avoid, minimize, and mitigate impacts to raptors are outlined in the COA document, including operator committed measures and site-specific COAs. For example, to reduce the risk of adverse impacts to nesting raptors, no surface-disturbing activity will occur within 0.5 mile of all identified raptor nests from February 1 through July 31, annually, prior to a raptor nest occupancy survey. Surveys shall be conducted by a biologist following the most current BLM protocol. All survey results must be submitted in writing to the BFO and approved prior to initiation of surface-disturbing activities. A 0.5-mile timing restriction will be applied if a nest is identified as active. Additionally, the following resource and site-specific BLM COAs will be implemented:

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
T51N R76W	14	Well locations: Queen b CS Federal #14 and Queen B Federal #16 All access roads and associated utility corridors within this ENTIRE section *except* NENE and NESE.
	15	Well locations: Queen B CS Federal Com #2, Queen b CS Federal #3, Queen b CS Federal #4, Queen B CS Federal Com #5 All access roads and associated utility corridors, 1 power drop and 2 staging areas this ENTIRE section. Impoundments: Swarm, Stinger and Honeycomb
	22	Well locations: Queen B CS Federal #7, Queen b CS Federal #8, Queen B CS Federal #9, and Queen b Injector Federal #12. All access roads and associated utility corridors, 1 power drop and 2 staging areas within this ENTIRE section.
	21	All access roads within this ENTIRE section.
	28	Well locations: Queen B CS Federal Com #10 and Queen b CS Federal #11 All access roads and associated utility corridors within this ENTIRE section.

- 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.

- 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.

4.3.4.18.4. Residual Impacts

There would be an increase in traffic, construction activity, and human presence in the area throughout the life of the project that would affect the quality of the area for nesting raptors. Timing limitations during the construction phase of the project would protect nests from disturbance, but during well operations activities such as well monitoring and maintenance activities would discourage raptors from using nest locations unless an adequate biological buffer (both visual and special) is maintained. Nest 5126 will likely fail due to production activities associated with well CS Federal Com 10 occurring during the nesting season.

4.4. Water Resources

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

The maximum water production is predicted to be 50 gpm per well or 750 gpm (1.67 cubic feet per second (cfs) or 1,209 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 23,697acre-feet in 2012 (maximum production is estimated in 2006 at 171,423 acre-feet). As such, the volume of water resulting from the production of these wells is 5% of the total volume projected for 2012. This volume of produced water is within the predicted parameters of the PRB FEIS.

4.4.1. Groundwater

4.4.1.1. Direct and Indirect Effects

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 20 gpm will infiltrate at or near the discharge points and impoundments (484 acre feet per year). The PRB FEIS also predicted that only 5% of the CBNG produced water would be injected into disposal wells in the Upper Powder River watershed (PRB FEIS pg 2-46). The operator has received on January 28, 2009, a conditional approval from the WDEQ for a Class 5 Underground Injection Control Permit for the Queen B Injector Federal #12 injection well. For this action, it may be assumed that a maximum of 175 gpm (282 acre feet per year) will be injected into the lower Fort Union sandstones at depths of 2,700 to 4,200 feet BGS, per the operator's Class 5 Injection well permit application Summary. The water from the impoundments will saturate the near surface alluvium 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 and is regulated by the WDEQ.

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 at the time they were drilled from depths which range from 20 to 220 feet compared to depths of 335 to 1,986 feet to the coal seams targeted for production in this POD. 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 (MSUP Tab 4, pg 15, Sec. 12-B).

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 stored within the Wasatch - Tongue River sand and coals, and sands units above and below the coals is almost 750 million acre-feet of recoverable groundwater are (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).

4.4.1.2. 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).

4.4.1.3. Mitigation Measures

Adherence to the drilling COAs, the setting of casing at appropriate depths, following safe remedial procedures in the event of casing failure, and utilizing proper cementing procedures should protect any fresh water aquifers above the target coal zone. The same drilling safeguards and procedures for the installation and operation of the injection well and the regulatory oversight of the WDEQ of the quality of the water disposed of through the injection well, will ensure that ground water will not be adversely impacted by well drilling, completion, and injection operations.

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 Impoundments Receiving Coalbed Methane Produced Water" (November, 2008). For all new WYPDES permits, the WDEQ requires that the proponent investigate the shallow groundwater at the proposed impoundment locations. Drilling at proposed impoundments began in the spring of 2004. Based on information received from the WDEQ, as of July, 2011, over 2016 impoundment sites have been investigated with more than 2305 borings. Of these impoundments, 257 met the criteria to require "compliance monitoring" if constructed and used for CBNG water containment. Only 125 impoundments requiring monitoring are presently being used. As of the second quarter of 2011, only 24 of those monitored impoundments (19.2%) caused a change in the "Class of Use" of any parameter in the underlying aquifer water.

4.4.1.4. Residual Effects

As described in Chapter 3.4.1, the production of CBNG in this project area has already removed some of the water saturation in the coal zones for the production of gas. There are 87 wells within Section 9, 10, 11, 14, 15, 16, 21, 22, and 23 of T51N, R76W which contains and surrounds the central area of the Queen B POD. The addition of 15 more wells should impact the groundwater by a smaller percentage than the amount of wells that are already permitted and operating. There is a potential that the wells will not produce the volume of CBNG water estimated due to the dewatering history in the area.

4.4.2. Surface Water

4.4.2.1. Direct and Indirect Effects

Produced Water Quality

Table 4.4 shows the average values of EC and SAR as measured at selected USGS gauging stations at high and low monthly flows as well as the Wyoming groundwater quality standards for TDS and SAR for Class I to Class III water (there is no current standard for EC). It also shows constituent limits for TDS, SAR and EC detailed in the project area WYPDES permit, and the concentrations found in the POD's representative water sample.

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

Sample location or Standard	TDS mg/l	SAR	EC µmhos/cm
Primary Watershed at 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		
Predicted Produced Water Quality			
Felix, Stray, Anderson, Upper Canyon, Lower Canyon, Wall	726	15.6	1180
Wall	529	17.7	864
Smith	608	16.8	1030
Cook, Upper Canyon, Lower Canyon, Wall	894	10.9	1390

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 ranges from 529 to 894 mg/l TDS but is over 8 SAR which limits the water for only stock water use according to the WDEQ Standards.

The quality for the water produced from the target coal zones from the Queen B POD wells is predicted to be similar to the sample water quality collected from a location near the POD. A maximum of 50 gallons per minute (gpm) is projected is to be produced from each of the 15 wells, for a total of 750 gpm for the POD.

The discharge 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 will apply for a Wyoming Pollutant Discharge Elimination System permit from the WDEQ for the discharge of water produced from this POD into the proposed reservoirs. Yates does have a General Permit 5C5-1 for the injection well discharge at the Queen Bee Federal Injector #12 well, facility number WYS 005-00548. Water quality parameters for the discharge of the produced water will be regulated and enforced by the WDEQ.

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.

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

Produced Water Control
There are three discharge points and one injection well proposed for this project. The three on-channel impoundments and the injector well proposed for the discharge of the produced water have been appropriately sited and utilize appropriate water energy dissipation designs. The three on-channel impoundments have a holding capacity of 10.2, 12.1 and 13.6 acre feet and will disturb approximately 5.7 acres. The Swarm impoundment is an existing stock impoundment that will be improved to meet WSEO standards for the retention of 10.2 acre-feet of produced water. The other two impoundments, Honeycomb and Stinger are to be constructed with the project development. The Stinger impoundment is also to be used as the upset pond for the Injector #12 well. The injector well facility will disturb approximately 1.0 acres in the construction of this facility. The on-channel impoundments would result in evaporation and infiltration of CBNG water. The impoundments are to be filled with produced water to assist in providing water for the Hayden Ranch livestock. All water management facilities were evaluated for compliance with best management practices during the onsite.

Produced Water Quantity
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 0.25 cfs below the lowest reservoir (after infiltration and evapotranspiration losses). 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 15 wells is anticipated to be a total of 750 gpm or 1.67 cfs to impoundments, if the maximum discharge is utilized to the impoundments and no produced water is discharged using the injector well. Using an assumed conveyance loss of 20% (PRB FEIS pg 4-74) and full containment, the produced water re-surfacing in Fortification Creek from this action (0.25 cfs) may add a maximum 0.20 cfs to the Upper Powder River flows, or less than 0.3% 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. Based on the area of the 48.1 square miles of watershed above the POD, and an assumed density of 1 well per location for every 80 acres, the potential exists for the development of a total of 385 CBNG wells. Assuming a similar flow rate for these wells as predicted for the Queen B project wells, the 385 wells upgradient could produce a maximum flow rate of 19,250 gpm (42.9 cfs) of water. The BLM agrees with the operator that this is not expected to occur because:

1. Production has been active in the area for several years.
2. New wells will be phased in over several years.
3. 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, 42.9 cfs, is less than 10 percent of the volume of runoff estimated from the 2-year storm event of the drainage at 448 cfs (WMP pg. 4).

In-channel downstream impacts were not are addressed in the WMP for the QUEEN B POD prepared by InterTech Environmental and Engineering, LLC of Laramie, Wyoming for Yates Petroleum Corporation. Yates states that as the impoundments are permitted to be full containment, no significant downstream impacts are expected. No monitoring or mitigation of downstream impacts was offered in the WMP by Yates.

Springs
There were no natural springs identified by the operator for the Queen B POD or within ½ mile radius of the POD boundary.

4.4.2.1.1. 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 2011, all producing CBNG wells in the Upper Powder River watershed have discharged a cumulative volume of 342,027 acre-ft of water compared to the predicted 1,240,055 acre-ft disclosed in the PRB FEIS (Table 2-8 page 2-26). These figures are presented in Table 4.5 following. This volume is 27.6 % 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 *2011 Data Updated 03-2012*

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	43,009	48.8	255,531	22.5
2010	60,319	1,195,886	43,263	71.7	298,864	25.0
2011	44,169	1,240,055	**43,163**	**97.7**	**342,027**	**27.6**
2012	23,697	1,263,752				
2013	12,169	1,275,921				
2014	5,672	1,281,593				
2015	2,242	1,283,835				
2016	1,032	1,284,867				
2017	366	1,285,233				
Total	**1,285,233**		**342,027**			

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 27.6% of the total predicted in the PRB FEIS.
2. The operator has committed to fully containing the water produced from this POD in impoundments which should eliminate downstream impacts.
3. The WDEQ enforcement of the terms and conditions of the WYPDES permit that are designed to protect irrigation downstream.

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

4.4.2.2. Mitigation Measures

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. Channel crossings by pipelines will be constructed so that the pipe is buried at least four feet below the channel bottom.

4.4.2.3. Residual Effects

The lifespan of a CBNG POD project is estimated to last ten years if the wells are in producing mode during the whole ten year span. The reservoirs are to be full containment with no discharge to the channels downstream. Once the wells have been plugged and abandoned, there should not be any noticeable residual effects to the environment if reclamation of the soil at the three reservoirs and the disturbed soil at the injection well site, is done properly.

4.5. Cultural Resources

4.5.1. Direct and Indirect Effects

Non eligible site(s) 48CA1923 will be impacted by the proposed project. 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 08/11/11 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).

4.5.2. Cumulative Effects

Construction and development of oil and gas resources impacts cultural resources through ground disturbance, unauthorized collection, and visual intrusion of the setting of historic properties. This results in fewer archaeological resources available for study of past human life-ways, changes in human behavior through time, and interpreting the past to the public. Additionally, these impacts may compromise the

aspects of integrity that make a historic property eligible for the National Register of Historic Places. Recording and archiving basic information about archaeological sites and the potential for subsurface cultural materials in the proposed project area serve to partially mitigate potential cumulative effects to cultural resources.

Fee actions constructed in support of federal actions can result in impacts to historic properties. Construction of large plans of coalbed natural gas development on split estate often include associated infrastructure that is not permitted through BLM. Project applicants may connect wells draining fee minerals, or previously constructed pipelines on fee surface with a federal plan of development. BLM has no authority over such development which can impact historic properties. BLM has the authority to modify or deny approval of federal undertakings on private surface, but that authority is limited to the extent of the federal approval. Historic properties on private surface belong to the surface owner and they are not obligated to preserve or protect them. The BLM may go to great lengths to protect a site on private surface from a federal undertaking, but the same site can be legally impacted by the landowner at any time. The cumulative effect of numerous federal approvals can result in impacts to historic properties. Archeological inventories reveal the location of sites and although the BLM goes to great lengths to protect site location data, information can potentially get into the wrong hands. BLM authorizations that result in new access can inadvertently lead to impacts to sites from increased visitation by the public.

4.5.3. Mitigation Measures

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

4.5.4. Residual Effects

During the construction phase, there will be numerous crews working across the project area using heavy construction equipment without the presence of archaeological monitors. Due to the extent of work and the surface disturbance caused by large vehicles, it is possible that unidentified cultural resources can be damaged by construction activities. The increased human presence associated with the construction phase can also lead to unauthorized collection of artifacts or vandalism of historic properties.

4.6. Visual Resources Management

4.6.1. Direct and Indirect Effects

The visual resources will be impacted by construction of new access roads, pipelines, and the introduction of new wells to the area. Disturbance associated with access roads, pipelines, and power lines will create linear contrasts with the natural lines and the constructed well pads will contrast with the natural forms. However, considering the presence of other modifications (fences, existing wells, etc.), the impact is expected to be minor. Adherence with BLM applied mitigation (in the form of COAs) addressing these visual contrasts should reduce visual resource impacts to the Queen B project area and keep the plan of development within the visual resource management Class III and Class IV requirements.

4.6.2. Cumulative Effects

The cumulative effects associated with Alternative B are within the analysis parameters and impacts described in the PRB FEIS and FCPA RMPA. For details on expected cumulative impacts, refer to the PRB FEIS, p. 4-314 and FCPA RMPA, p. 4-103.

4.6.3. Mitigation Measures

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

Access roads must follow natural contours as closely as possible and will avoid approaching public roads at a perpendicular angle to prevent direction of the attention of a casual observer. Powerlines will be buried to prevent additional visual disturbance.

To maintain esthetic values, all semi-permanent and permanent facilities may require painting or camouflage to blend with the natural surroundings. 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." Temporary structures (i.e. generators, etc.) present for more than 90 days will be required to comply with visual resource mitigation. The color selected for the Queen B project area is Covert Green, 18-0617 TPX.

4.6.4. Residual Effects

Roads, wells and other project infrastructure will remain visible until final reclamation activities are completed and the vegetation blends with the surrounding undisturbed communities.

5. Alternative C- Modified Action

Alternative C is a modification of Alternative B based on BLM removing 2 APDs and their infrastructure from the project proposal; as the implementation of the APDs would impact the following resources:

- local raptors population through a high likelihood of nest abandonment (CS Federal Com 10).
- soils highly susceptible to erosion, LRP, and slope greater than 25% (CS Federal Com 2).

Additionally, Alternative C includes a precast reinforced (RC) concrete box culvert crossing, as a component of the Queenb CS Federal 13 access road, instead of the existing railroad car bridge.

This analysis of Alternative C only addresses resources affected differently by Alternative C than from Alternative B. Alternative C incorporates by reference all other mitigation measures and analysis from Alternative B.

5.1. Transportation

5.1.1. Direct & Indirect

Queenb CS Federal #13 access road/drainage crossing:

Anadarko Petroleum has proposed replacing the existing railroad car bridge with a pre-casted, RC box culvert in their Camp John SMA Year 2 POD. Anadarko Petroleum Corporation has submitted an engineered design. The culvert is Anadarko's preferred alternative..

The box culvert was designed to have the same opening span as the existing bridge so as to ensure there would be no obstructions during high flow events. The RC box culvert is designed to pass 25 year storm events; with larger storm events designed to overtop the culvert. The box culvert was designed to be able to withstand the loadings caused by the maximum vehicle weights anticipated to use the crossing. It also addresses the existing erosion through the channel and has a design to stabilize the soils and slopes to reduce or impede any further erosion. The design meets or exceeds the specifications as listed in the BLM Manual 9112.

5.1.2. Cumulative Effects

Cumulative effects to transportation for Alternative C are the same as those in Alternative B.

5.1.3. Mitigation Measures

Mitigation Measures to transportation for Alternative C are the same as those in Alternative B.

5.1.4. Residual Effects

Residual effects to transportation for Alternative C are the benefits of a safe and dependable drainage crossing that meets or exceeds the BLM Manual 9112 specifications.

5.2. Soils & Vegetation

The soil and vegetation impacts and effects would be the same as those addressed in Alternative B. By denying the QueenB CS Federal Com. #2 the access road will not be built thus not disturbing the steep slopes with severe soil erosion, and soils with low reclamation potential described in sections 3 and 4 in this document. Erosion will be prevented. There would be 3.6 acres less disturbance due to the removal of 2 CBNG wells and their associated infrastructure from the POD.

5.3. Wetland/Riparian

Impacts to wetland/riparian areas are the same as those in Alternative B.

5.4. Wildlife

5.4.1. Raptors

5.4.1.1. Direct and Indirect Effects

Direct and indirect impacts to raptors, from oil and gas development, are analyzed in the PRB FEIS, pp. 4-216 to 4-221. Alternative B (section 4.3.4.17) further described oil and gas development effects on raptor nesting, and is hereby incorporated by reference.

The FWS letter for Queen B recommended: (1) keeping a distance between activity and around nest trees (disturbance buffers), (2) maintaining natural areas between the activity and around the nest trees (landscape buffers), and (3) avoiding certain activities during the breeding season." A suitable alternative location for well CS Federal Com #10, likely to mitigate impacts to nest 5126, was not proposed by Yates or identified by the BLM biologist. Therefore CS Federal Com 10 was excluded from this alternative.

Without CS Federal Com #10, there will be no direct effects associated with the CS 10 well site. Nesting season traffic on the existing road will increase once CS Federal Com 11 is in production. Raptors would likely continue to occupy nest 5126 in future years without a well at the CS Federal Com 10 location, as evident by the fact that the nest is active in 2012 with current traffic levels.

5.4.1.2. Cumulative Effects

The cumulative effects associated with Alternatives C are within the analysis parameters and impacts described in the PRB FEIS, p. 4-221.

5.4.1.3. Mitigation Measures

Oil and gas wells and facilities should be located a minimum of 0.25 miles from and out of line-of-sight of raptor nests. This recommendation protects the wildlife resource and complies with the Migratory Bird Treaty Act as well as guidance issued by the BLM Wyoming State Office March 7, 2011. A suitable location meeting these recommendations was not located for CS Federal Com #10, therefore the well was removed from Alternative C.

Additional measures intended to avoid, minimize, and mitigate impacts to raptors are described in Alternative B and outlined in the COA document.

5.4.1.4. Residual Impacts

There would be an increase in traffic, construction activity, and human presence in the area throughout the life of the project that would affect the quality of the area for nesting raptors. Timing limitations during the construction phase of the project would protect nests from disturbance, but during well operation, well monitoring and maintenance activities within the biological buffers of nests could displace

raptors from nest locations. Where the disturbance level is tolerable, nests should continue to be successful, including nest 5126.

5.5. Water Resources

There would be a reduction in water volume of approximately 20 percent, from Alternative B; 600 gpm in Alternative C versus the 750 gpm proposed in Alternative B.

5.6. Economics of CBNG Resource Extraction

5.6.1. Direct and Indirect Effects

Direct and indirect effects for Alternative C are similar to those identified in Alternative B, but it is important to acknowledge there would be a reduction in revenue associated with not approving the two wells, which translates into about a 14% reduction in the present value (PV) of the total revenue stream associated with these wells.

5.6.2. Cumulative Effects

The impact from the removal of two wells would be a loss of about $488 thousand dollars in the PV of federal and state royalties, which translates into a loss of about 8.7 percent compared to Alternative B. Property taxes and severance taxes would also go down as a result of not approving these wells. The reduction in drilling and subsequent production would also produce a minor impact on the local economy measured in terms of the loss in personal income and employment. But without running a regional economic model, those impacts cannot be quantified. However, the loss in economic activity would be, to some unknown extent, offset by the benefits to other resources and activities. For example, there are both market and non-market benefits associated with the preservation of wildlife habitat, maintenance of open space, maintaining buffer zones around nesting areas for ferruginous hawks and creating and maintaining wildlife viewing areas for nonconsumptive recreation use. But in the absence of quantifying these values, the benefits and costs associated with the reduction in oil wells compared to enhancing the area for wildlife and wildlife viewing cannot be made. Nonetheless, these tradeoffs need to be considered, at least qualitatively, when making these decisions. And while the Queen B POD project is primarily on private surface and/or landlocked federal surface, the benefit of a reduction in the number of wells approved is not just limited to private ranchers and those individuals that have access to the area, but there is also a non-use value component that would also add to the overall benefits of protecting this area.

5.6.3. Mitigation Measures

Mitigation measures for Alternative C are the same as those identified in Alternative B.

5.6.4. Cultural Resources

The effects will be the same as Alternative B.

6. Summary of Effects

Table 6.1 provides a comparison of the cumulative effects associated with the alternatives.

Table 6.1 Environmental Effects for Queen B POD by Alternative

Resource/Species	Alternative A	Alternative B	Alternative C
Soils and Vegetation			
Soils	No locations with low reclamation potential affected.	9 locations on soils with limited reclamation potential. 16 wells on soils susceptible to erosion. 1 wells on slopes in excess of 25%.	7 locations on soils with limited reclamation potential. 14 wells on soils susceptible to erosion.
Vegetation	No additional loss of vegetation communities.	9 locations and 1 road on soils with limited reclamation potential.	7 locations on soils with limited reclamation potential.
Wetlands/Riparian Areas	No additional existing wetlands/riparian areas will be disturbed.	1 wetland will be disturbed by a pipeline.	1 wetland will be disturbed by a pipeline.
Wild Lands/Wilderness	Lands with wilderness characteristics not present	Lands with wilderness characteristics not present.	Lands with wilderness characteristics not present.
Wildlife			
Big Game	No additional habitat loss or fragmentation. Would likely see increased traffic passing through due to surrounding mineral development.	Greater habitat loss. Greater habitat fragmentation.	Greater habitat loss. Greater habitat fragmentation.
Raptors	No additional habitat loss. No additional wells authorized near nests.	Greater fragmentation of foraging habitat. 6 additional wells authorized near nests; 1 well in line-of-sight.	Greater fragmentation of foraging habitat. 5 additional wells authorized near nests; 0 in line-of-sight.
Migratory Birds	No additional habitat loss. No additional habitat fragmentation.	Greater habitat loss. Greater habitat fragmentation.	Greater habitat loss. Greater habitat fragmentation.
Threatened and Endangered Species			
Bald eagle	No additional habitat loss.	No further habitat loss.	No further habitat loss.

Table 6.1 Environmental Effects for Queen B POD by Alternative

Resource/Species	Alternative A	Alternative B	Alternative C
Sensitive Species			
Greater Sage Grouse	No additional habitat loss.	Greater habitat loss.	Greater habitat loss.
	No decision on existing 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.	No additional predation and collision risk associated with overhead power lines, as any additional power lines associated with the project would be buried.	No additional predation and collision risk associated with overhead power lines, as any additional power lines associated with the project would be buried.
	No additional habitat fragmentation. Would likely see increased traffic passing through due to surrounding mineral development.	Greater habitat fragmentation.	Greater habitat fragmentation.
Water			
Surface Water	Permitted surface disposal of produced water.	No impacts beyond those permitted.	No impacts beyond those permitted.
Groundwater	Groundwater drawdown from existing developments.	Additional drawdown not quantified.	Additional drawdown not quantified.
Economic Conditions	No increased revenue.	Generate $43.7 million in the present value (PV) of the revenue stream	Generate $37.6 million in the present value (PV) of the revenue stream

7. CONSULTATION & COORDINATION

Agencies and other parties summarized in Table 5.1 were consulted on the proposed project to confirm compliance with applicable laws and regulations.

Table 7.1 Consultations

Contact	Title	Organization	Present at Field Reviews
Jim Verplancke	Natural Resource Specialist/Wildlife Biologist	BLM	Yes
Meleah Corey	Natural Resource Specialist	BLM	Yes
Keith Anderson	Hydrologist	BLM	Yes
Seth Lambert	Archeologist	BLM	Yes

Stacy Gunderson	Civil Engineer	BLM	Yes
J Bunderson	Civil Engineer	BLM	Yes
Keith Christiansen	Structural Engineer and Professional Engineer	BLM	No
Arnie Irwin	Soils Specialist	BLM	Yes
Gordon Williams	Petroleum Engineer Technician	BLM	Yes
Jeff Jette	Petroleum Engineer Technician	BLM	Yes
Pauline Schuette	Wildlife Biologist	Fish and Wildlife Service	No
Bud Stewart	Energy Development Biologist	WGFD	No
Jeb Techick	Federal Regulatory Agent	Yates Petroleum	Yes
Bob Irwin	Federal Regulatory Agent	Yates Petroleum	Yes
Trent Knez	Drilling Foreman	Yates Petroleum	Yes
Buster Ivory	Regulatory Agent	Yates Petroleum	Yes
Tim Barber	Environmental/Federal Regulatory Supervisor	Yates Petroleum	Yes
Brad MacKearney	Pipeline Construction Foreman	Yates Petroleum/ Rowdy	Yes
Kerry Hayden	Land Owner	Hayden Ranch	Yes

On-site reviews were conducted on November 4 & 5, 2010; December 16; and March 20 & 22, 2012. Individuals listed as present attended at least one of the on-site reviews, as well as office reviews. Individuals listed as not present provided consultation or office review.

8. 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 ROD. Additionally, Yates currently is in possession of one WYPDES permit (WY0056081) for discharge of water produced from the proposed project.

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APPENDIX A: ALL WELLS CONSIDERED DURING DEVELOPMENT OF THE QUEEN B CBNG POD

Proposed Well	Location (QtrQtr Section Township Range)	On-site Evaluation	Changes due to on-sites relative to initial location	Issues addressed by changes at on-sites (relative to initial location)	Part of Alt B?
Queenb CS Federal #1	NENE 15 T51N R76W	Access road and pipeline on slopes > 25% with poor reclamation potential, with bare ground outcroppings and carbonaceous shale blowouts.	Well moved south east off ridge to an exception location to avoid 25% slopes. Site specific reclamation plans submitted for the engineered section of the road.	Soil erosion, Site stability, Reclamation	Yes
QueenB CS Federal Com. #2	NENW 15 T51N R76W	Well site located on slopes >10% and not adequate for a slot location and does not allow for adequate room for safe operations. Poor reclamation potential, with bare ground outcroppings and carbonaceous shale blowouts. Access road and pipeline on slopes >25%.	Changed well location from a slot to a pad. Site specific reclamation plans submitted for the engineered section of the road. Preliminary geo-technical analysis done on access road.	Soil erosion, Site stability, Reclamation	Yes
Queenb CS Federal #3	SWNE 15 T51N R76W	There is a small section of road in very shallow soil. Well location is in close proximity to a swale.	Road was moved approximately 30 feet out of the shallow soils. Well moved 30 feet north away from the swale.	Soil erosion, Reclamation	Yes

Proposed Well	Location (QtrQtr Section Township Range)	On-site Evaluation	Changes due to on-sites relative to initial location	Issues addressed by changes at on-sites (relative to initial location)	Part of Alt B?
Queenb CS Federal #4	SWSW 15 T51N R76W	The pipeline in the base of the draw causing erosion concerns. Well site located on slopes >4% and not adequate for a no slot no pad location and does not allow for adequate room for safe operations. Raptor timing stipulations apply.	The pipeline moved 20 to 30 feet south out of base of the draw. Well moved 30 feet east to allow for adequate room and safe operations. No pad no slot changed to a slot location.	Soil erosion, Site safety, Reclamation	Yes
QueenB CS Federal Com. #5	SWNE 15 T51N R76W	Well site located on slopes 10% and not adequate for a slot design. Raptor and sage grouse timing stipulation will apply. Mapped and modeled this is high sage grouse habitat.	Changed well location from a slot to a pad.	Soil erosion, Site stability, Reclamation, Site safety	Yes
QueenB CS Federal #6	NENW 22 T51N R76W	Well site located on slopes 7% and not adequate for a slot no pad location. Road side slopes are 12% to 20% and have a 12% grade. This section of road has poor reclamation potential. Well location within quarter mile biological buffer of a Red Tailed Hawk nest.	No pad no slot changed to slot location. An engineered road design submitted. A site specific reclamation plan submitted for the engineered section of the road.	Soil erosion, Site stability, Reclamation, Site safety	Yes
QueenB CS Federal #7	SWNW 22 T51N R76W	Well site located on slopes 6% and not adequate for a slot no pad location.	No pad no slot changed to slot location.	Site safety	Yes

Proposed Well	Location (QtrQtr Section Township Range)	On-site Evaluation	Changes due to on-sites relative to initial location	Issues addressed by changes at on-sites (relative to initial location)	Part of Alt B?
Queenb CS Federal #8	SWNE 22 T51N R76W	Well location has 22% slopes, highly erosive soils, and LRP. Raptor and grouse timing stipulation will apply.	Well moved north-east to a flat area off Road C. Access has also changed due to well move.	Soil erosion, Site stability, Reclamation,	Yes
QueenB CS Federal #9	NESW 22 T51N R76W	Well site located on slopes 20% and not adequate a slot design. Well site and access road has highly erosive soils, and LRP. Access road in greater than 8% grade and 10-20% side slopes.	Slot changed to PAD. Road engineered and site specific reclamation plans submitted.	Soil erosion, Site stability, Reclamation, Site safety	Yes
Queenb CS Federal Com. #10	NENE 28 T51N R76W	Well site located on slopes 20% and has highly erosive soils, and LRP. In line of site of raptor nest and within ¼ mile.	Well moved to eyebrow PAD with Crown and ditch access road. Site specific reclamation plans submitted.	Soil erosion, Site stability, Reclamation	Yes
Queenb CS Federal #11	SWNE 28 T51N R76W	Well site located on slopes 15% and has highly erosive soils, and LRP.	Well moved north approximately 70 feet and will be a slot location.	Soil erosion, Site stability, Reclamation	Yes
Queenb Injector Federal #12	NWNE 22 T51N R76W	Adjacent to the existing Camp John Augusta Water Pump Station. Access road and well site has marginal reclamation potential.	NA	NA	Yes
Queenb CS Federal #13	NENE 14 T51N R76W	Access road has a bridge that the wooden decking has rotted completely through the structure. There is substantial undercutting of the cement support.	NA	NA	Yes

Proposed Well	Location (QtrQtr Section Township Range)	On-site Evaluation	Changes due to on-sites relative to initial location	Issues addressed by changes at on-sites (relative to initial location)	Part of Alt B?
Queenb CS Federal #14	SWNE 14 T51N R76W	Area is erosive with uneven topography.	NA	NA	NA
Queenb CS Federal #15	NESE 14 T51N R76W	Area is erosive with uneven topography.	NA	NA	NA
Queenb CSFederal #16	SWSE 14 T51N R76W	Area is erosive with uneven topography.	NA	NA	NA

APPENDIX B: RESOURCE AND SPECIES WORKSHEETS

Table B.1 Affected Resources Worksheet

Resource	Resource Present	Resource Affected	PRB FEIS Sufficient	Notes
Air quality	Yes	Yes	Yes	See PRB EIS 3-291, 3-298, 4-404-4-406, 4-377, 4-386
Transportation	Yes	Yes	No	
Cultural	Yes	Yes	Yes	See PRB EIS 3-206, 3-228, 4-273, 4-287, 4-394; waiting for final cultural report to confirm
Native American religious concerns	No	No	No	PBTCP & PRB EIS 3-228, 4-227
Traditional Cultural Properties	No	No	No	PBTCP
Mineral Potential				See PRB EIS 3-66, 3-70, 3-230, 4-127 through 4-129
Coal	Yes	No	Yes	3-66,
Fluid Minerals	Yes	Yes	Yes	3-68, 3-69
Locatable Minerals	Yes	No	Yes	Address in EA
Other leasables	Yes	No	Yes	
Salable minerals	Yes	Yes	Yes	
Paleontology				See PRB EIS 3-65-66, 4-125-127
PFYC 3	No	No	No	
PFYC 5	No	No	No	
Rangeland management				
Existing range improvements	Yes	Yes	Yes	Boundary Fences between the Fortification Cr.(Hayden) ,Upper Fortification Cr. (Belus Brothers) and Scotty Draw (Eaton Brothers, Inc.) allotments
Proposed range improvements	NA	NA	NA	
Realty	Yes	Yes	Yes	ROW Grants WYW-168303 and WYW-168304
Recreation	Yes	Yes	Yes	See PRB EIS 3-263, 3-273, 4-319 -4-328
Developed site	No	No	No	3-266, 4-326
Walk-in-Area	No	No	No	
Social & Economic	Yes	Yes	Yes	Analyze in EA. See PRB EIS 3-275-3-289, 4-336-4-370
Soils & Vegetation	Yes	Yes	Yes	Analyze in EA. See PRB EIS 3-80-3-107, 4-134-4-152, 4-153-4-164, 4-343-4-391, 4-406
Erosion Hazard	Yes	Yes	Yes	Analyze in EA. See PRB EIS 3-82, 4-35
Poor Reclamation Potential	Yes	Yes	Yes	Analyze in EA.

Resource	Resource Present	Resource Affected	PRB FEIS Sufficient	Notes
Slope hazard	Yes	Yes	Yes	Analyze in EA. See PRB EIS 3-81, 4-135
Forest products	Yes	Yes	Yes	
Invasive Species	Yes	Yes	Yes	Analyze in EA. See PRB EIS 3-103-3-108, 4-153
Wetlands/Riparian	yes	Yes	Yes	Analyze in EA. See PRB EIS 3-108-3-111, 4-172-4-178, 4-406, 4-395-4-396
Special Designations				
Proposed ACEC	No	No	No	
Wild & Scenic River	No	No	No	
Wilderness Characteristics/Citizen Proposed	No	No	No	
WSA	No	No	No	
Visual Resources				See PRB EIS 3-252-3-263, 4-302-4-314, 4-403
Class II	No	No	No	
Class III	Yes	Yes	Yes	Class IV bordered by Class III
Water	X			
Floodplains	Yes	Yes	Yes	See PRB EIS 3-1-3-56, 4-1-4-122, 4-135, 4-393, 4-405; ROD (A32), Vol. 1 (3-108 to 113)
Ground water	Yes	Yes	No	Analyze in EA. See PRB EIS 3-1-3-30, 4-1-4-69, 4-392, 4-405; ROD pg 7&8 (App. D), Vol.1 (3-1 to 36)
Surface water	Yes	Yes	No	Analyze in EA. See PRB EIS 3-36-3-56, 4-69-4-122, 4-393, 4-405; ROD pg 7&8 (App. D) (App. A pg 30 to 310, Vol.1 (3-36 to 56)
Drinking water	Yes	Yes	Yes	ROD pg 7&8 (App. D), Vol. 1 (3-1 to 56)
Wildland Urban Interface	No			
Wildlife	Yes	Yes	Yes	
ESA listed, proposed, or candidate species	Yes	Yes	Yes	Sage-grouse will be affected by this proposal and will require thorough analysis of effects including cumulative effects
BLM sensitive species	Yes	Yes	Yes	See attached sensitive species wildlife checklist
General wildlife	Yes	Yes	Yes	Nesting raptor site-specific effects; Fortification Creek Elk herd habitat and population effects will be analyzed including cumulative effects.
West Nile virus potential	Yes	Yes	Yes	

Table B.2 Threatened, Endangered, Proposed, and Candidate Species Worksheet

Common Name	Habitat	Habitat Present?	Individuals Present?	Direct Impacts Anticipated?	Impacts anticipated beyond the level analyzed within the PRB FEIS?
Endangered					
Black-footed ferret	Black-tailed prairie dog colonies or complexes > 1,000 acres.	No	NP	NE	4-251 & BA
Blowout penstemon	Sparsely vegetated, shifting sand dunes	No	NP	NE	
Threatened					
Ute ladies'-tresses orchid	Riparian areas with permanent water	Yes	NP	NE	4-253 & BA; brief EA treatment required
Proposed					
Candidate					
Greater sage-grouse	Basin-prairie shrub, mountain-foothill shrub	Yes	K	NJ	4-257 to 4-273; required treatment in EA relative to 12-month finding (USFWS) and recent PRB research

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

Effect Determinations

Listed Species
LAA Likely to adversely affect
NE No Effect.
NLAA May Affect, not likely to adversely affect individuals or habitat.

Candidate Species
J Is likely to jeopardize candidate.
NJ Is not likely to jeopardize candidate species.

Table B.3 Sensitive Species worksheet

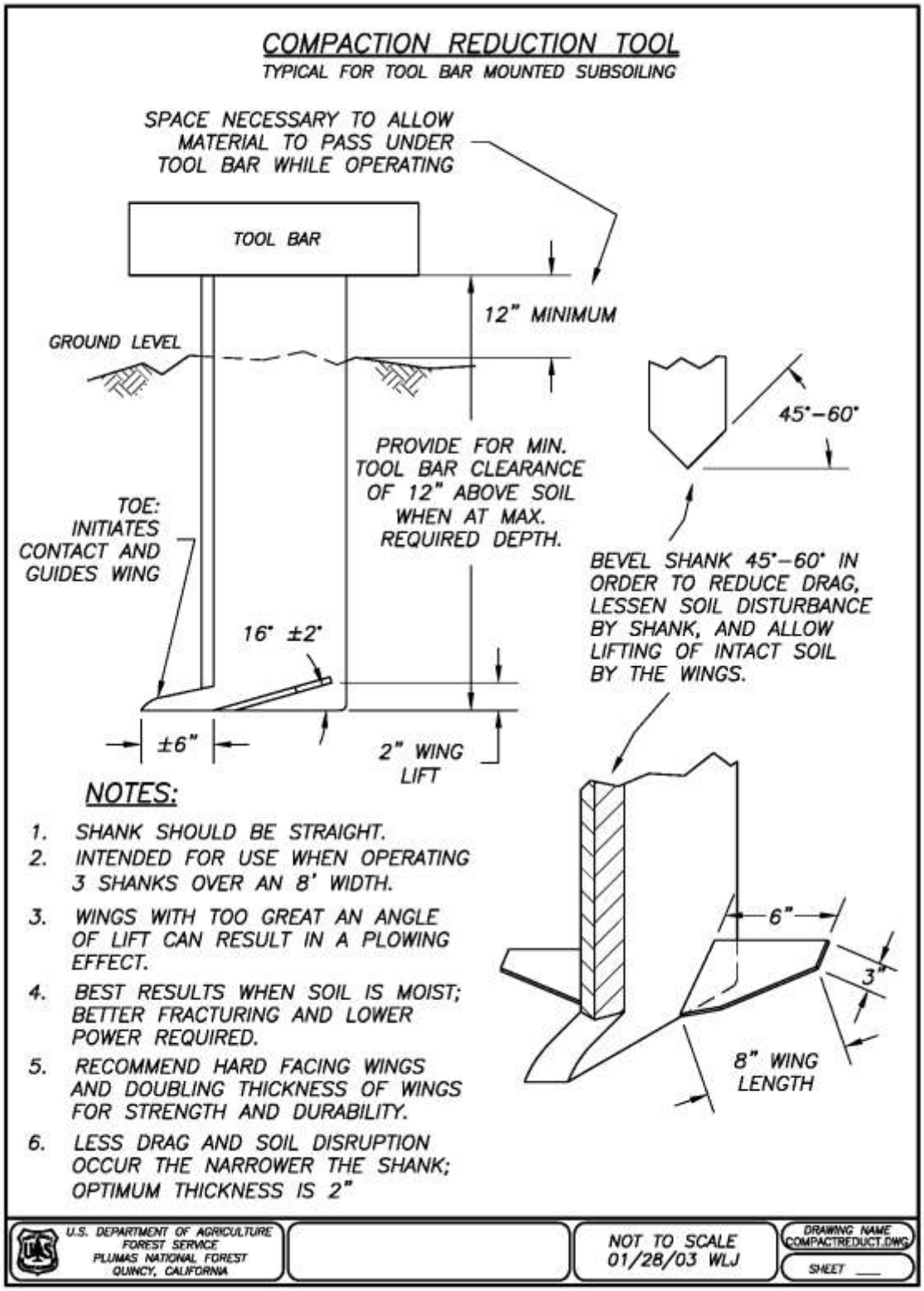
Common Name	Habitat	Habitat Present?	Individuals Present?	Direct Impacts Anticipated?	Impacts anticipated beyond the level analyzed within the PRB FEIS?
Amphibians					**PRB FEIS 4-258**
Northern leopard frog	Beaver ponds and cattail marshes from plains to montane zones.	Yes	S	NLAA	No
Columbia spotted frog	Ponds, sloughs, small streams, and cattails in foothills and montane zones. Confined to headwaters of the S Tongue R drainage and tributaries.	No	NP	NE	No
Fish					**PRB FEIS 4-259 to 4-260**
Yellowstone cutthroat trout	Cold-water rivers, creeks, beaver ponds, and large lakes in the Upper Tongue sub-watershed	No	NP	NE	
Birds					**PRB FEIS 4-260 to 4-264**
Baird's sparrow	Shortgrass prairie and basin-prairie shrubland habitats; plowed and stubble fields; grazed pastures; dry lakebeds; and other sparse, bare, dry ground.	Yes	K	NLAA	PRB FEIS 4-257 and 4-273; EA treatment required
Bald eagle	Mature forest cover often within one mile of large water body with reliable prey source nearby.	Yes	NS	NLAA	No; PRB FEIS 4-251 to 4-253 & BA
Brewer's sparrow	Sagebrush shrubland	Yes	S	NLAA	PRB FEIS 4-257 and 4-273; EA treatment required
Ferruginous hawk	Basin-prairie shrub, grasslands, rock outcrops	Yes	S	NLAA	PRB FEIS 4-257 and 4-273; EA treatment required

Common Name	Habitat	Habitat Present?	Individuals Present?	Direct Impacts Anticipated?	Impacts anticipated beyond the level analyzed within the PRB FEIS?
Loggerhead shrike	Basin-prairie shrub, mountain-foothill shrub	Yes	S	NLAA	PRB FEIS 4-257 and 4-273; EA treatment required
Long-billed curlew	Grasslands, plains, foothills, wet meadows	Yes	NS	NLAA	PRB FEIS 4-257 and 4-273; EA treatment required
Mountain plover	Short-grass prairie with slopes < 5%	Yes	S	NLAA	4-254, 4-255 & BA; EA treatment required
Northern goshawk	Conifer and deciduous forests	Yes	S	NLAA	PRB FEIS 4-221 and 4-235; EA treatment required
Peregrine falcon	Cliffs	No	NP	NE	No
Sage sparrow	Basin-prairie shrub, mountain-foothill shrub	Yes	S	NLAA	PRB FEIS 4-257 and 4-273; EA treatment required
Sage thrasher	Basin-prairie shrub, mountain-foothill shrub	Yes	S	NLAA	PRB FEIS 4-257 and 4-273; EA treatment required
Trumpeter swan	Lakes, ponds, rivers	No	NP	NE	No
Western Burrowing owl	Grasslands, basin-prairie shrub	Yes	S	NLAA	PRB FEIS 4-221 and 4-235; EA treatment required
White-faced ibis	Marshes, wet meadows	No	NP	NE	No

Common Name	Habitat	Habitat Present?	Individuals Present?	Direct Impacts Anticipated?	Impacts anticipated beyond the level analyzed within the PRB FEIS?
Yellow-billed cuckoo	Open woodlands, streamside willow and alder groves	No	NP	NE	No
Mammals					**PRG FEIS 4-264 &4-265**
Black-tailed prairie dog	Prairie habitats with deep, firm soils and slopes less than 10 degrees.	Yes	K	NLAA	PRG FEIS 4-255, 4-256; EA treatment required
Fringed myotis	Conifer forests, woodland chaparral, caves and mines	Yes	S	NLAA	No
Long-eared myotis	Conifer and deciduous forest, caves and mines	Yes	S	NLAA	No
Spotted bat	Cliffs over perennial water.	No	NP	NE	No
Swift fox	Grasslands	No	NP	NE	No
Townsend's big-eared bat	Caves and mines.	No	NP	NE	No
Plants					**PRB FEIS 4-258**
Limber pine	Mountains, associated with high elevation conifer species	No	NP	NE	No
Porter's sagebrush	Sparsely vegetated badlands of ashy or tufaceous mudstone and clay slopes 5300-6500 ft.	No	NP	NE	No
William's wafer parsnip	Open ridgetops and upper slopes with exposed limestone outcrops or rockslides, 6000-8300 ft.	No	NP	NE	No

Presence
K Known, documented observation within project area.
S Habitat suitable and species suspected, to occur within the project area.
NS Habitat suitable but species is not suspected to occur within the project area.
NP Habitat not present and species unlikely to occur within the project area.
Effect Determinations
Listed Species
LAA Likely to adversely affect
NE No Effect.
NLAA May Affect, not likely to adversely affect individuals or habitat.
Candidate Species
J Is likely to jeopardize candidate.
NJ Is not likely to jeopardize candidate species.

APPENDIX C: DIAGRAM OF COMPACTION REDUCTION TOOL



APPENDIX D: KERNEL DENSITY MODELS OF SEASONAL RANGE USE BY COLLARED FORTIFICATION ELK

Figure D-1 Kernel Density Models of Yearlong Range Use By Collared Fortification Elk

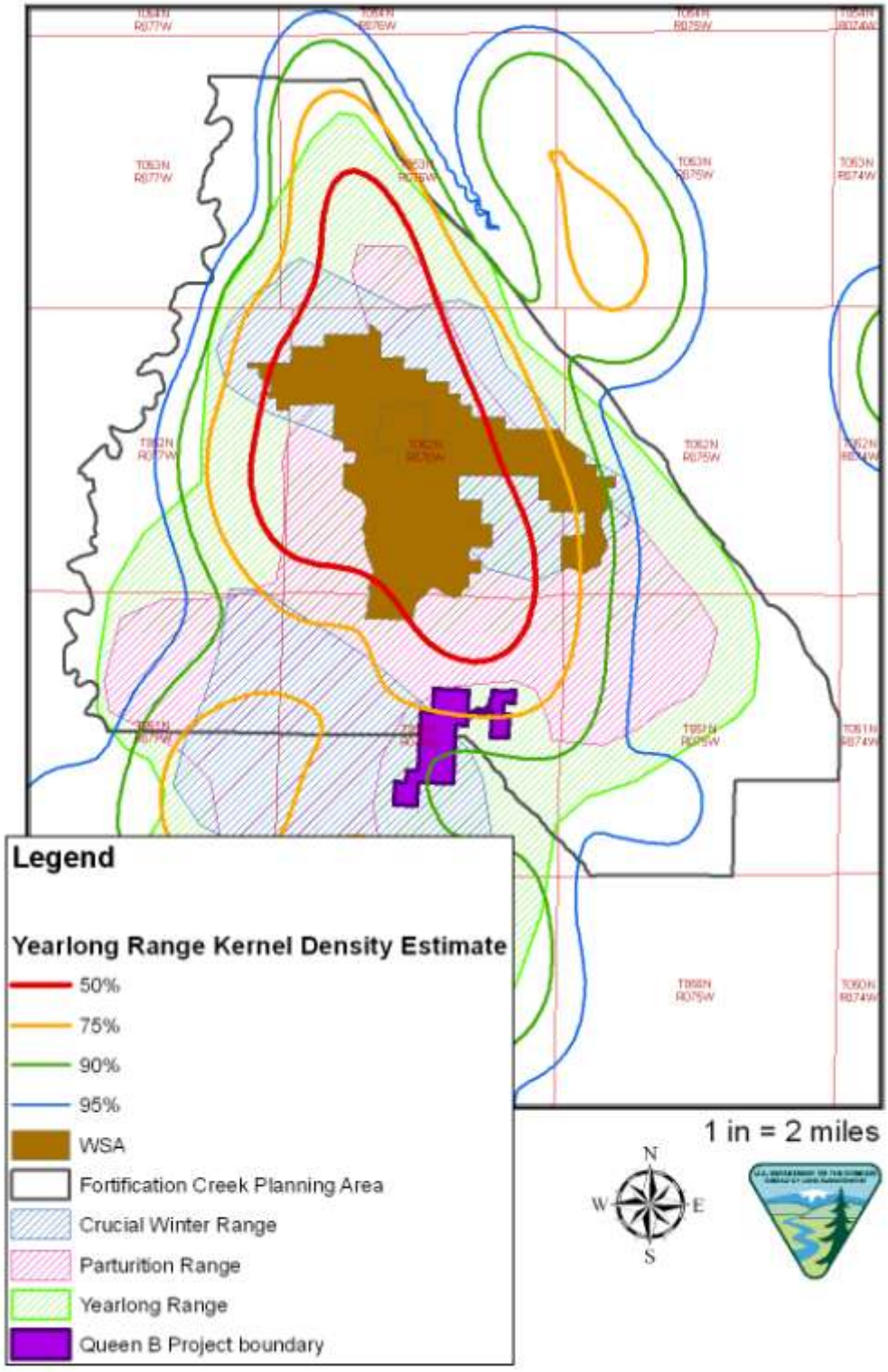


Figure D-2 Kernel Density Models of Parturition Range Use By Collared Fortification Elk

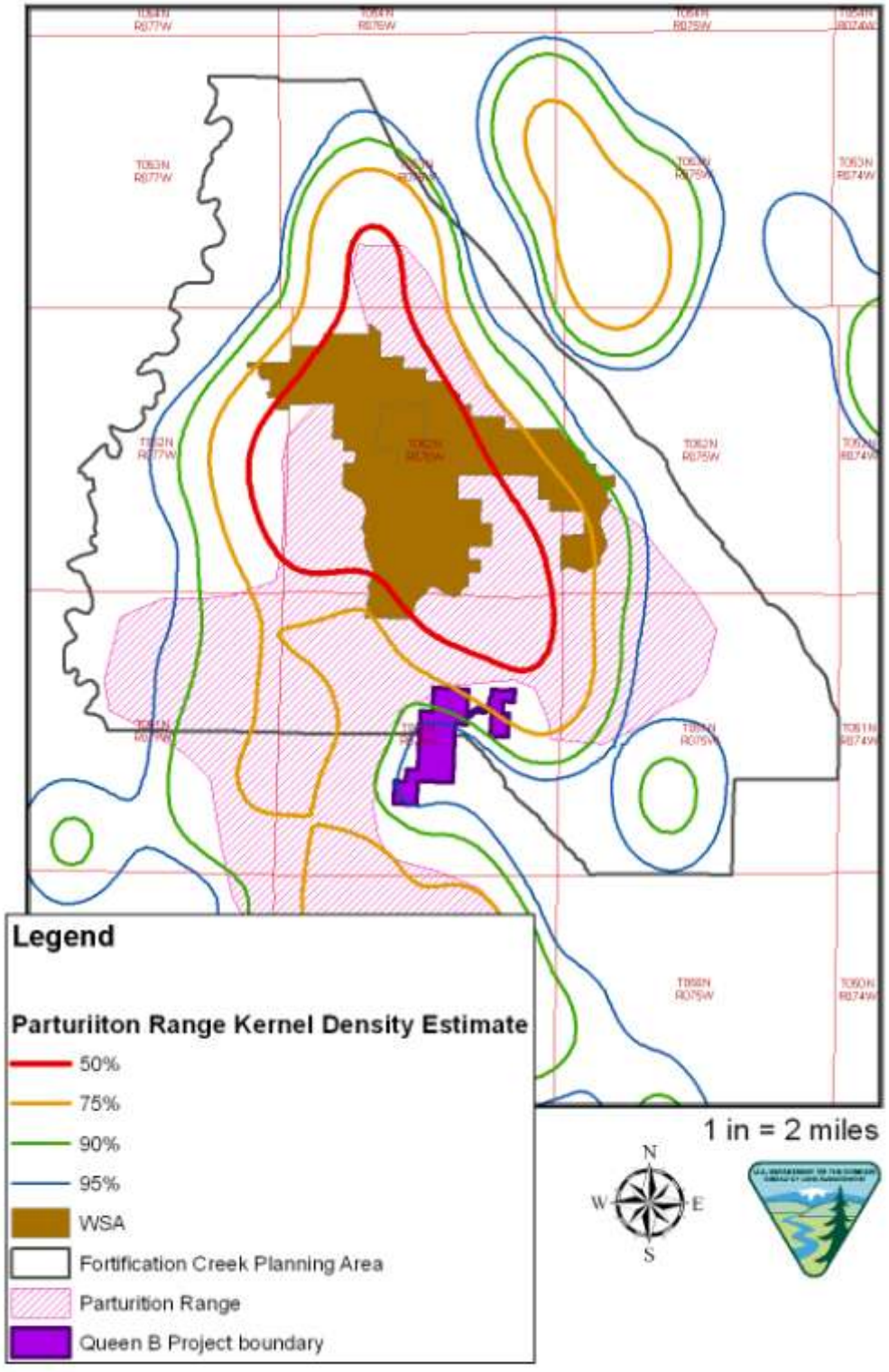
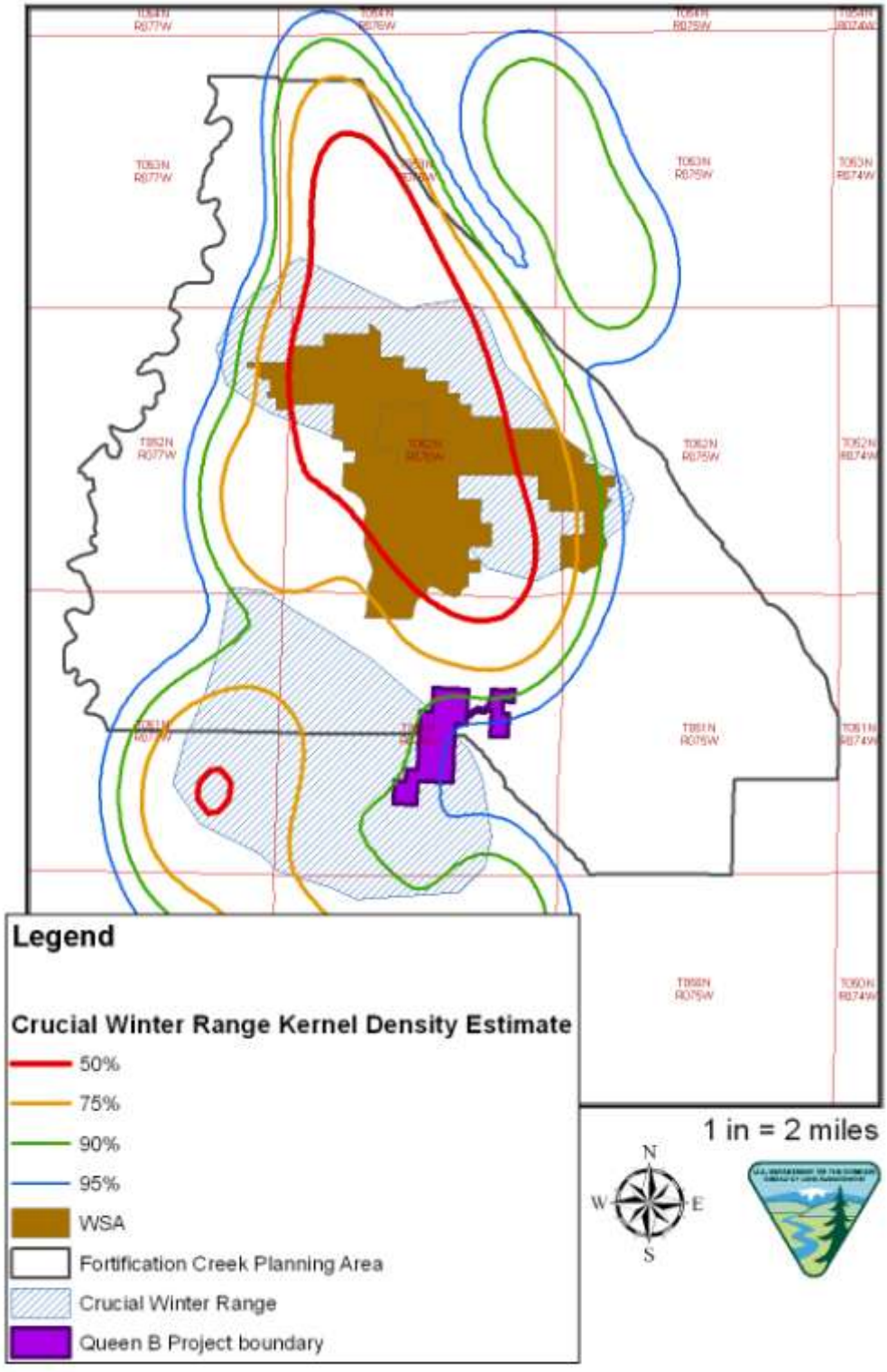


Figure D-3 Kernel Density Models of Crucial Winter Range Use By Collared Fortification Elk



APPENDIX E: YATES COMMITMENT TO PERFORMANCE RECOMMENDATIONS FROM FORTIFICATION CREEK PLANNING AREA RMPA

02/24/2012 BLM BFO

Yates Petroleum **Queen B POD** **Feb. 2012** (revised)

Addendum X

BMP's and Mitigation Measures for the Fortification Creek Planning Area (FCPA) [formerly referenced pre-RMPA Decision, as SMA, *Special Management Area*]

The following *BMP's and Mitigation Measures* are proposed to be utilized inside Fortification Creek PA/SMA, to reduce impacts to the Elk herd & Soil resources.

Seven (7) of sixteen (16) proposed Queen B POD wells were known to be located in the FCPA/SMA, using north of Fortification CR (County Road) as a *topographic discerned divide*, which BFO concurred per 8/26/2011 deficiency letter defining these 7 wells for *Controlled Surface Use* (CSU: 1, 2 Com., 3, 13, 14, 15, & 16QUEE). Now finalized, of the *Resource Management Plan Amendment* (RMPA) *Decision*, the FCPA captures All of Section 15, using the southern section line as a *regional default*, geo-political mapping *divide*. The RMPA's amended listing adds two (2) wells, both south of Fortification CR (4, 5 Com. QUEE), and expands the *CSU* of the FCPA. Yates disappointed with RMPA Decision's expanded Queen B POD impact, requests BLM consideration to waiver area's FCPA boarder utilizing site-specific conditions, adjusting application to Fortification CR. Nevertheless, revised **Addendum X** now applies to the RMPA's **FCPA *total* = 9 wells**.

Queen B POD is located *outside* all of the *areas* known to see *heavy use* from the resident Elk herd that are inside the FCPA/SMA. Queen B POD area maps indicate that all 16 wells & associated infrastructure proposed are within portions of the *Elk Crucial Range*, the *Elk Crucial Winter Range*, and perhaps of *Effective Elk Habitat*. However, the Queen B POD area is outside the *Elk Caving Range* and the *Elk Security Habitat*.

In a non-precedent setting manner for any 'other project(s)' located outside the FCPA, Yates will strive to utilize and follow the guidance *Best Management Practices (BMPs) & Mitigation Measures* presented below when performing FCPA works for construction & production of Queen B POD. These BMP concepts, conserving both elk & soil resource, are reinforced and augment actions prescribed throughout MSUP's Section 10 *PLANS for SURFACE RECLAMATION* and supported by the *site-specific details* identified & presented in *Attachments*, of Tab 5: *Transportation Plan/Road Guide/Upgrades Summary Table*, all *Engineered designs*, *Appendix A* (Utility, Focus Zones), and *Appendix B* (Soils Report).

The site-specific plans are tiered to the reclamation plan (section item #10) contained within the MSUP for the Queen B POD. Addressed there is the process in which Yates intends to proceed from interim reclamation to final reclamation. The site-specific plans and interim reclamation plans will set the stage for final reclamation success, which intern protects both elk & soil resources, present and future.

Timely, final abandonment notice (FAN) sundry will be submitted, to outline the final reclamation(s) planned for specific disturbances associated with the Queen B POD. Chadwick EN-designed facilities (most roads, exception - being the landowner desired, road with 60" culvert to the 2QUEE-COM location, and all pads) have a *final reclamation plan* (basically, return to natural topography) presented in Queen B POD Application's binder, for pre-approval, upon POD's approval.

16a

Addendum X – continued

Elk

1. Yates has utilized existing infrastructure wherever possible.

   Road A (north of Fortification CR) and all points accessed (7 wells) from it and proposed for the Queen B POD are in the FCPA/SMA. It leads to and utilizes two other existing oil and gas lease roads of *E ½ of Sec 14*, shared with adjacent operators, which Yates pledges to maintain or improve.
   Where no existing lease roads are available Yates has proposed new template improved or EN roads, with the landowner approved exception of a short single well ridgeline lateral to the 16QUEE location.

   South of Fortification CR, *Road B* accesses 4 wells – 4QUEE is in the FCPA/SMA. 7QUEE uses an existing two track (Template improve) and utilities corridor an old jeep trail and road used to service PreCorp overhead electric that runs through the base of Mclaughlin Draw, which ties to 4QUEE and is of Reclamation Focus Zone (per Appendix A). 10QUEE-COM is an eyebrow pad to *Road B*.
   11QUEE is a slot on a hunting jeep trail near a ranch stock tire tank, feeding area.
   Utilities from both essentially corridor Road B to join an operator's two track and from there parallel the west flank of a steel high pressure water line with fiberoptic, that ties to the EMIT water facility beside the 12QUEE-INJ .

   Road C accesses 5 wells – 5QUEE-COM is in the FCPA/SMA, well's pad & utilities are hidden from view from Fortification CR. Utility corridor parallels existing utilities near Fortification CR, upon turning north.
   12QUEE-INJ pad is in shadow of existing EMIT Plant & pit, access flanks fence.
   6QUEE route was landowner selected, provides least length and disturbance (climb over hill, EN) and avoids dense sage.
   8QUEE is (onsite adjusted, exception location) near eyebrow to *Road C*.
   9QUEE pad is adjacent the steel high pressure water line with fiberoptic, accessed from adjacent operators pad with two segments of EN road.
   Utilities receive south from 10QUEE-COM from 9QUEE north parallel the west flank of the steel high pressure water line with fiberoptic, that picks up the 8QUEE and ties to the 12QUEE-INJ beside the EMIT water facility. Three draw crossings are Reclamation Focus Zones (per Appendix A).

   Yates shares with the current operator(s) these existing roads & utility segments and will share in maintenance & reclamation activities. Reducing additional roads and overall traffic in the FCPA will aid meeting objectives 1-5, 7 of the FCPA RMPA.

2. Yates has not proposed any 'loop' or redundant roads in Queen B POD, having only proposed 'single access' into each set of wells. Limits disturbance, and habitat loss.

3. Yates has limited surface disturbance and footprint wherever possible in the planning of the Queen B POD. Yates has always strived to construct the minimal footprint necessary to drill and produce their wells (demonstrated in many past PODs: Lela & Lottery PODs are proximal comparisons in similar geomorphologic terrain, near adjacent to the FCPA/SMA). By limiting surface disturbance, Yates also limits the amount of open soil, and reflectively limits the amount of reclamation needed. Intern, this limits the amount of elk habitat (and sage grouse habitat) disruption and will aid in meeting objectives 1, 2, 3, 4, 5, and 7 of the FCPA RMPA.

16b

4. In the case of the Queen B POD, the BLM I.D. team has requested an increase in disturbance and footprint over what Yates had originally proposed. Such examples include the requesting of many fully constructed pads instead of slot pads or just utilizing the native surface for 2-trk/primitive access for drilling activities; rather instead, fully Template or Engineered roads are now required, with access graveled. The landowner agreed with the request to gravel all roads and improve as necessary for traffic needs and to alleviate mud-tracked two tracks. Limiting the amount of open soil, were possible, reduces the reclamation needs. Gravel will armor the roadways and reduce open soil. Intern, these safe trafficking factors limit habitat disruption, preserve soil resource and aid meeting FCPA RMPA objectives 1-5.

5. Yates has located their water management facilities near existing infrastructure whenever possible. The water management for the Queen B POD consists of a single injector located at the base of a EMIT treatment plant facility. The injector (12QUEE-INJ) has a proposed adjacent, a small lined impoundment, needed for emergency overflow and for back flushing the injection filters. The two other impoundments are existing, adjacent to Road A, incorporated to the dam(s), and both proposed rebuilt to meet current standards. By locating the water management facilities adjacent existing disturbances and travel ways, Yates has reduced increase of traffic and activity in areas that have seen only limited activity. These efforts reduce impacts to habitat and aid in meeting objectives 1-5, 7 of the FCPA RMPA.

6. Yates has provided site-specific reclamation plans for all locations listed as having low reclamation potential (Appendix B) and has also committed to prompt interim stabilization / reclamation efforts to ensure loss of forage and habitat is minimized.

   Yates will also strive to limit well visitations as much as practicable during the Elk timing stipulations (November 15th – June 30th, in most areas). As standard practice, Yates utilizes telemetry for daily production numbers from each individual well. This reduces the need to visit each well on a daily basis; however, it does not eliminate the need to visit each well. The facilities need to be inspected regularly to ensure that Yates is operating the wells in a prudent manner. The telemetry equipment will not alert Yates to situations (such as, pipeline breaks) that could cause potentially dangerous or environmentally hazardous situations. During timing stipulations, Yates will strive to limit the inspections of the facilities to an average of once a week under normal operating conditions; as problems arise they will be remedied as soon as possible. Yates will inspect the facilities before the beginning of the timing stipulations to detect and remedy any foreseeable, potential problems. Problems noted will be corrected before the start of the stipulations in order to reduce activity during those timeframes. Yates will also strive to schedule routine maintenance (cleanouts, workovers, etc.) outside of the timing limitations. Emergency action needs will be completed as soon as possible. Quick reclamation promotes habitat regeneration. By using of telemetry on the wells, traffic is limited to approx. weekly visitations, per well. Telemetry reduces visitation. Intern, these factors limit habitat disruption and aid meeting FCPA RMPA objectives 1-5, 7.

16c

Yates Petroleum **Queen B POD** **Feb. 2012**
(revised)

Soil Resources

1. Yates will initiate interim reclamation within 30 days of the completion of construction activities and will stabilize disturbances before the beginning of timing stipulations on November 15th each year. All EN road segments and Chadwick EN pad designs illustrate appropriate interim reclamations that may be augmented further by BMP tools listed in the *MSUP*, per site-specific recommendations of the *Appendix B*: Soils Report. Applicable EN segments, those not desired for future ranch use are presented with full EN final reclamations, for pre-approval with POD.

   Focus areas (*Appendix A*) have been BMP identified for utility line segments of difficult terrain ($\Omega\beta$: 1 - 3) and/or fragile soils (McLaughlin Draw), most of which is south and out of the FCPA; these utility placements corridor existing disturbances, respectively – a steel, high pressure water line w/ fiber optic line; and old jeep trail.

   Yates will provide notification to the BLM upon the completion of stabilization activities each fall. This will reduce the amount of soil loss from water and wind erosion; promoting regrowth will result in better and faster reclamation of the disturbed areas. Overall, this soil stabilization effort action will not only reduce the impacts to the current habitat; but thus, also reduce any potential elk herd impacts.

2. Areas not needed for vehicle travel will be seeded and stabilized with necessary measures to provide the best probability for interim reclamation success. Appendix B (Soils Report) presents by well, site-specific reclamation plans that specify seed mixes suitable for the areas listed of low reclamation potential (LRP). All other areas will be seeded with the prescribed mix in Yates Petroleum's surface use plan (MSUP), a standard PRB mix identified suitable by the private surface owner, or a mix of Appendix B, or a mix prescribed by the BLM authorized officer. Most disturbances have site-specific reclamation plans with BMP recommendations of seed mixes selected to be compatible with the respective soil conditions. This will result in reduced time that disturbances are bare, prior to re-vegetation. Expediting re-vegetation will reduce impacts to the habitat and elk herd.

3. After seeding and stabilization measures have been completed, the disturbances will be visually monitored routinely to identify any areas where the stabilization efforts were not satisfactory and could be augmented, further. Specifically, they will be monitored for potential rills, gullies, or areas of sheet erosion that may be stripping topsoil and reducing the probability of reclamation success. Areas identified will be corrected ASAP using available BMP technology (mat/erosion blanket, straw logs, etc.) to re-stabilize the site and further alleviate degradation. Monitoring disturbed areas will ensure any noted problems are addressed quickly, to aid reclamation success.

4. The goal for the first year of reclamation is that all disturbances are stabilized and not exhibiting any major erosional features. The goal for the second year is the disturbances remain stabile and re-vegetation is beginning. The goal for the third year is disturbances are still stabile and trending to successful interim reclamations. The success strived for and to be exhibited in year three will be dependent upon weather conditions. Yates desires for favorable reclamation conditions to meet the interim reclamation goals outlined in the FC-RMPA; however, without timely rain, Yates is unable to commit to a specific standard of re-vegetation.

16d

APPENDIX F: Fish & Wildlife Service Comments on the Queen B Plan of Development

United States Department of the Interior

FISH AND WILDLIFE SERVICE

Ecological Services
5353 Yellowstone Road, Suite 308A
Cheyenne, Wyoming 82009

MASTER

BLM

MAR 16 2011

BUFFALO FO

MAR 14 2011

In Reply Refer To
ES-61411/WY11CPA0025
ES-61411/WY11CPA0027

Memorandum

To: Field Supervisor, Bureau of Land Management, Buffalo Field Office, Buffalo, Wyoming

From: Field Supervisor, U.S. Fish and Wildlife Service, Wyoming Field Office, Cheyenne, Wyoming

Subject: Comments on Queen B and Queen B Additions Plans of Development

We received your letter on November 22, 2010, regarding the Yates Queen B and Queen B Additions Plans of Development (POD) to drill 12 and 4 coal bed methane (CBM) wells, respectively. These PODs are located in T51N, R76W in Campbell County, Wyoming, along Fortification Road, west of Gillette, in the Fortification Creek Planning Area. The Bureau of Land Management (Bureau) has requested technical assistance from the U.S. Fish and Wildlife Service (Service) for this POD.

General Comments

We are providing you with recommendations concerning migratory birds in accordance with the Migratory Bird Treaty Act (MBTA), 16 U.S.C. 703.

The MBTA, enacted in 1918, prohibits the taking of any migratory birds, their parts, nests, or eggs except as permitted by regulations, and does not require intent to be proven. Section 703 of the MBTA states, "Unless and except as permitted by regulations ... it shall be unlawful at any time, by any means or in any manner, to ... take, capture, kill, attempt to take, capture, or kill, or possess ... any migratory bird, any part, nest, or eggs of any such bird...".

Removal or destruction of such nests, or causing abandonment of a nest could constitute violation of the MBTA. Removal of any active migratory bird nest or nest tree is prohibited. Mitigation, as determined by the local Service field office, may be required for loss of these nests. No permits will be issued for an active nest of any migratory bird species, unless removal of an active nest is necessary for reasons of human health and safety. Therefore, if nesting

migratory birds are present on, or near the project area, timing is a significant consideration and needs to be addressed in project planning.

In an effort to help ensure activities do not take nesting birds, their eggs, or immature birds, for many raptor species protected by the MBTA, we recommend implementing voluntary spatial and seasonal buffer zones to protect individual nest sites/territories. These include: (1) keeping a distance between the activity and the nest (distance buffers), (2) maintaining natural areas between the activity and around nest trees (landscape buffers), and (3) avoiding certain activities during the breeding season. The buffer areas serve to minimize visual and auditory impacts associated with human activities near nest sites. The size and shape of effective buffers vary depending on the topography and other ecological characteristics surrounding the nest site. In open areas where there are little or no forested or topographical buffers, distance alone must serve as the buffer.

Specific Recommendations

On November 3, 2010, the Service provided the Bureau with general comments for this POD. During onsites on November 4 and 5, 2010, no wells were moved to minimize concerns for raptor nests in the area, and no mitigation was offered by Yates.

Queen B CS Federal 2 Well
The Service does not have a concern with the CS Federal 2 well location, but the access road to this well is approximately 0.18 mile from red-tailed hawk nest #2658. This nest was active in 2004 through 2009 but was not active in 2010. The road is also within the Service's recommended 0.25-mile disturbance free spatial buffer for red-tailed hawk nest #3350 (0.23 miles), which was active in 2006. If the road cannot be moved outside of a 0.25-mile spatial buffer, the Service recommends that construction and maintenance of the road does not occur from February 1 through August 15, seasonally. Additionally, while the nest is active, traffic should not stop along this road unless there is an emergency situation.

Queen B CS Federal 3 Pipeline
The lines (gas/water/electric) proposed south of the CS Federal 3 well are located within 0.25 mile of two red-tailed hawk nests (#2658 and #3350). The Service recommends that the construction of these lines not occur from February 1 through August 15 to protect active nests.

Queen B CS Federal 6 Well
The CS Federal 6 well is proposed 0.19 mile from red-tailed hawk nest #5125. This nest was surveyed 2008 to 2010, and it was active in 2008. The Service recommends a 0.25-mile disturbance free spatial buffer to protect active red-tailed hawk nests. If the well cannot be moved outside of the 0.25-mile spatial buffer, we recommend that the well be moved out of line of sight of the nest and that well construction, drilling and completion activities, and work over operations not occur from February 1 through August 15 seasonally.

Access to the Queen B CS Federal 8 Well
The road and pipelines between the Injector Federal 12 well and the CS Federal 8 well are located within 0.25 mile of red-tailed hawk nest #5125. The Service recommends that existing

road "C" be used to access the CS Federal 8 well rather than upgrade the two-track that is near the red-tailed hawk nest. If the road cannot be moved outside of a 0.25-mile disturbance free spatial buffer, the Service would recommend that construction and maintenance of the road not occur from February 1 through August 15, seasonally. Also, construction of the pipelines should not occur from February 1 through August 15 to protect active nests.

Queen B CS Federal Com 10 Well

The CS Federal Com 10 well is 0.14-mile from red-tailed hawk nest #5126. This nest was surveyed 2007 through 2010, and was active every year. The Service recommends a 0.25-mile disturbance free spatial buffer to protect active red-tailed hawk nests. If the well cannot be moved outside of the 0.25-mile spatial buffer, we recommend that the well be moved out of line of sight of the nest and that well construction, drilling and completion activities, and work over operations not occur from February 1 through August 15 seasonally.

Queen B CS Federal 11 Well

The CS Federal 11 well is 0.19-mile from red-tailed hawk nest #5126. This nest was surveyed 2007 through 2010, and was active every year. The Service recommends a 0.25-mile disturbance free spatial buffer to protect active red-tailed hawk nests. If the well cannot be moved outside of the 0.25-mile spatial buffer, we recommend that the well be moved out of line of sight of the nest and that well construction, drilling and completion activities, and work over operations not occur from February 1 through August 15 seasonally.

Queen B Additions POD

The Service does not have any concerns with the Queen B Additions POD.

Thank you for your efforts to ensure the conservation of migratory birds in Wyoming. If you have any questions regarding this letter or your responsibilities under the MBTA, please contact Pauline Schuette at (307) 684-1069.

cc: WGFD, Statewide Habitat Protection Coordinator, Cheyenne, WY (M. Flanderka)
WGFD, Non-Game Coordinator, Lander, WY (B. Oakleaf)
BLM, T&E Species Coordinator, Cheyenne, WY (T. Abbott)
BLM, Acting Supervisory Natural Resource Specialist, Buffalo, WY (J. Morton)

APPENDIX G: SUMMARY OF OIL AND GAS RELATED MOTOR-VEHICLE FATALITIES

Overall road conditions in the Camp John Unit Epsilon POD project area are highly variable. Roads generally are unpaved, and are constructed of native soils rated as marginal construction material. Travel on these roads frequently relies on light trucks and cars designed for use on paved roads and highways. There is concern that the use of these vehicles on unsurfaced roads, especially when loaded, leads to a higher than average potential for fatal motor-vehicle accidents. To evaluate this potential, multiple sources from the past decade were evaluated in order to determine whether any relationship exists between road condition and oil and gas related fatalities. While statistical information is not available specific to northern Wyoming, extrapolations can be drawn from state and national oil and gas fatality statistics and can be applied to the Camp John Unit Epsilon POD project area.

Based on available nationwide data summarized in Table 1, approximately 30 percent of fatal incidents specific to oil and gas activities are associated with motor-vehicle accidents. Of those deaths, approximately 40 percent were attributed to non-collision events. While causes of these non-collision events are not included in the available data, it is conceivable that road condition, among other factors, could contribute to the incidents.

Table 1: Nationwide Oil and Gas Related Fatalities Due to Motor-Vehicle Accidents

Source	Period	Percent of all Fatalities for Oil and Gas Related Activities Due to Motor-Vehicle Accidents	
Morbidity and Mortality Weekly Report, Centers for Disease Control and Prevention (CDC 2008)	2003 - 2006	27% (total)	Non-collision Events (e.g. rollovers) – 38%
			Striking a Stationary Object – 21%
			Collisions with Other Vehicles – 36%
			Other Causes – 5%
Preventing Fatalities Through Partnerships, Centers for Disease Control, National Institute for Occupational Safety and Health (NIOSH, CDC 2010)	2003 - 2008	34%	
Census of Fatal Occupational Injuries, Bureau of Labor Statistics (BLS 2008)	2008	32%	
Census of Fatal Occupational Injuries, Bureau of Labor Statistics (BLS 2009a)	2009	28%	

Travel for oil and gas related activities often occurs on either a rural road network or on unpaved roads within oil and gas developments. Specific data about the types of roads where incidents occurred is not available; however, based on where oil and gas activities generally occur it can be reasoned that there is a high likelihood that oil and gas related motor-vehicle incidents happened on unpaved rural roads or unpaved roads within oil and gas developments.

In Wyoming, oil and gas related motor-vehicle fatalities occur at higher rates than national levels. From 2003-2009, 262 oil and gas related deaths occurred in the state. Of these deaths, 63% were transportation related, compared to the nationwide rate of approximately 30%. Non-collision accidents made up 51% of the transportation related fatalities, compared to the national average of 38% (BLS 2009b).

While information on whether these non-collision incidents are directly related to road condition is not available, in the absence of other direct causes (e.g. impact with another vehicle), there is a possibility

that poor road condition may have contributed to these fatal accidents. A well maintained road network would only add to the safety of oil and gas employees traveling on these roads.

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