

Fortification Creek Planning Area Final Resource Management Plan Amendment/Decision Record



Wyoming High Plains District Office – Buffalo Field Office

BLM

August 2011



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WY-070-EA08-135

**Fortification Creek Planning Area Resource Management Plan
Amendment**

**Buffalo Field Office, Wyoming
Bureau of Land Management
U.S. Department of the Interior**

WY-070-EA08-135

August 2011

Fortification Creek Planning Area Resource Management Plan Amendment

Action Location:

Fortification Creek Planning Area
U.S. Department of the Interior
Bureau of Land Management
Campbell, Johnson, and Sheridan Counties, Wyoming

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Acronyms

ACEC	Area of Critical Environmental Concern
AEM	adaptive environmental management
APD	Application for Permit to Drill
BFO	Buffalo Field Office
BLM	Bureau of Land Management
BMP	Best Management Practice
BRA	Buffalo Resource Area
CBNG	coal bed natural gas
CFR	Code of Federal Regulations
dBA	decibel
EIS	Environmental Impact Statement
FLPMA	Federal Land Policy and Management Act
FCPA	Fortification Creek Planning Area
FEIS	Final Environmental Impact Statement
LWC	Lands with Wilderness Characteristics
NEPA	National Environmental Policy Act
NPDES	National Pollutant Discharge Elimination System
O&G	Oil and Gas
PRB	Powder River Basin
POD	Plan of Development
PRB O&G FEIS	Powder River Basin Oil and Gas Final Environmental Impact Statement
RMP	Resource Management Plan
RMPA	Resource Management Plan Amendment
ROD	Record of Decision
ROW	right-of-way
SRP	Special Recreation Permit
TL	timing limitation
USFWS	U.S. Fish and Wildlife Service
UWYO	University of Wyoming
VRM	Visual Resource Management
WDEQ	Wyoming Department of Environmental Quality
WGFD	Wyoming Game and Fish Department
WHMA	Wildlife Habitat Management Area
WSA	Wilderness Study Area
WSEO	Wyoming State Engineer's Office

1.0 Introduction

This Resource Management Plan Amendment (RMPA) presents management actions that the Bureau of Land Management (BLM) has approved for managing minerals within the Fortification Creek Planning Area (FCPA).

The FCPA is located within the Powder River Basin (PRB) in Northeastern Wyoming. The location of the FCPA is shown on Figure 1-1. As shown on Figure 1-2, the FCPA is generally bounded on the northeast by Wild Horse Creek, on the west by the Powder River, and on the south by Fortification and Montgomery roads.

Total acreage within the boundaries of the FCPA is 100,655 acres. The plan addresses the management of 79,362 acres of Federal mineral estate managed by the BLM within Sheridan, Johnson, and Campbell counties. Total Federal mineral estate in the FCPA is 93,159 acres; however, because the Wilderness Study Area (WSA) will not be developed, Federal mineral estate in the WSA was not included. Federal coal mineral estate was not included in the analysis. There are approximately 42,755 acres of BLM surface land, 52,576 acres of private surface land, and 5,324 acres of State of Wyoming surface and subsurface land in the area.

A wilderness inventory was completed in 1979 and those Lands with Wilderness Characteristics (LWCs) became a WSA. A coalition of conservation groups proposed to expand the boundaries of the Fortification Creek WSA in 1994 and 2004. These proposed lands have been inventoried for LWCs as part of the Fortification Creek Resource Management Plan (RMP) amendment process. The inventory is available at http://www.blm.gov/wy/st/en/info/NEPA/documents/bfo/fortification_creek.html. The inventory determined that the FCPA outside of the WSA does not contain LWCs.

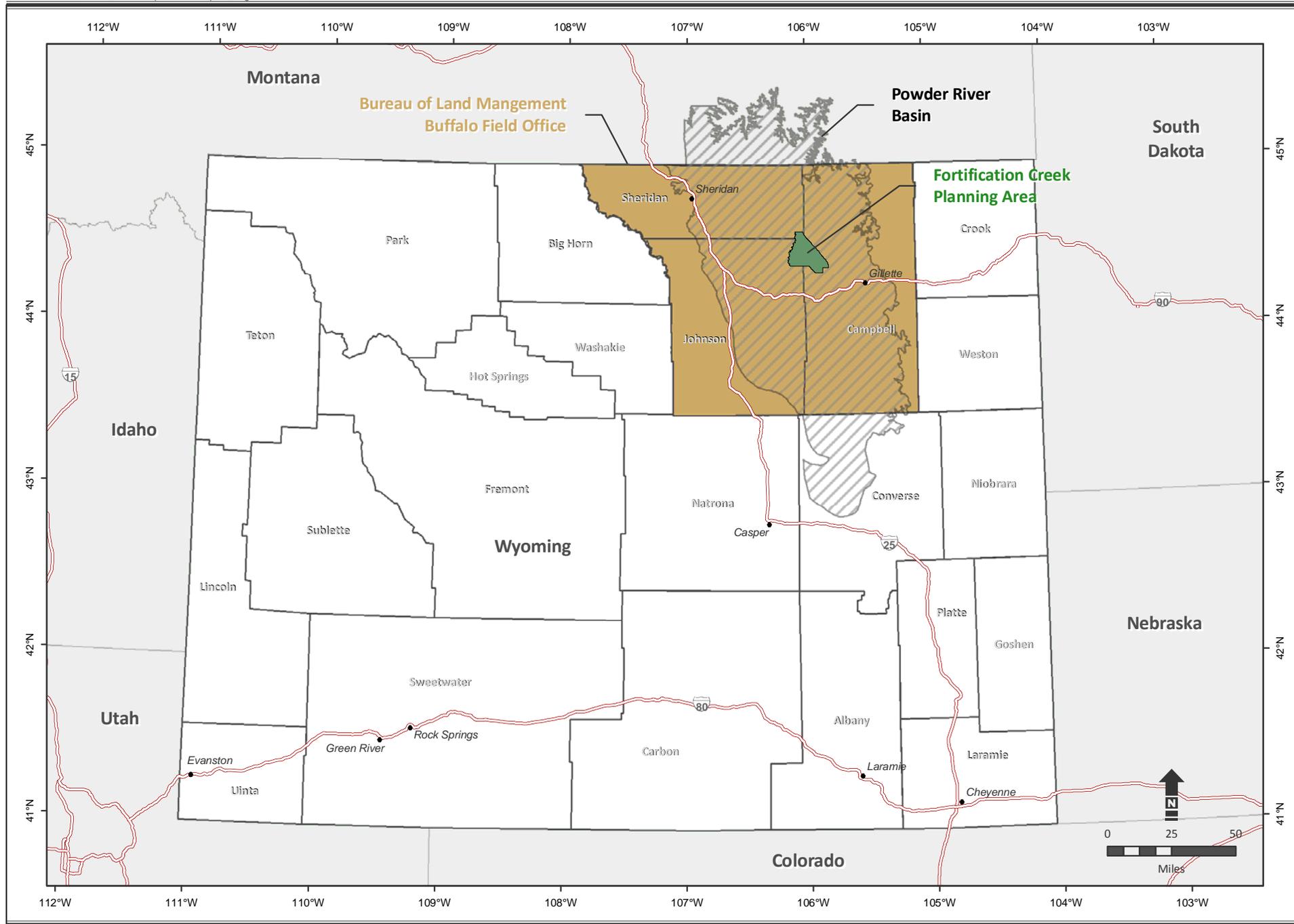
Oil and gas leasing in the PRB has been ongoing since before the Buffalo RMP was revised in 1985; currently the FCPA is nearly completely leased. The BLM has received several plans of development for existing oil and gas leases; therefore, development of these leases is anticipated.

With generally rugged topography, elevations in the FCPA range from approximately 3,700 feet along the Powder River on the western boundary to approximately 4,800 feet on ridges. The area is covered by shrublands, with ridges supporting juniper woodlands. This diverse landscape is home to an isolated elk herd as well as a variety of other wildlife.

The FCPA is used as a hunting area for resident and non-resident hunters. Effects of human activity are visible throughout the landscape with gas field developments on the south and east, and private ranches surrounding the FCPA.

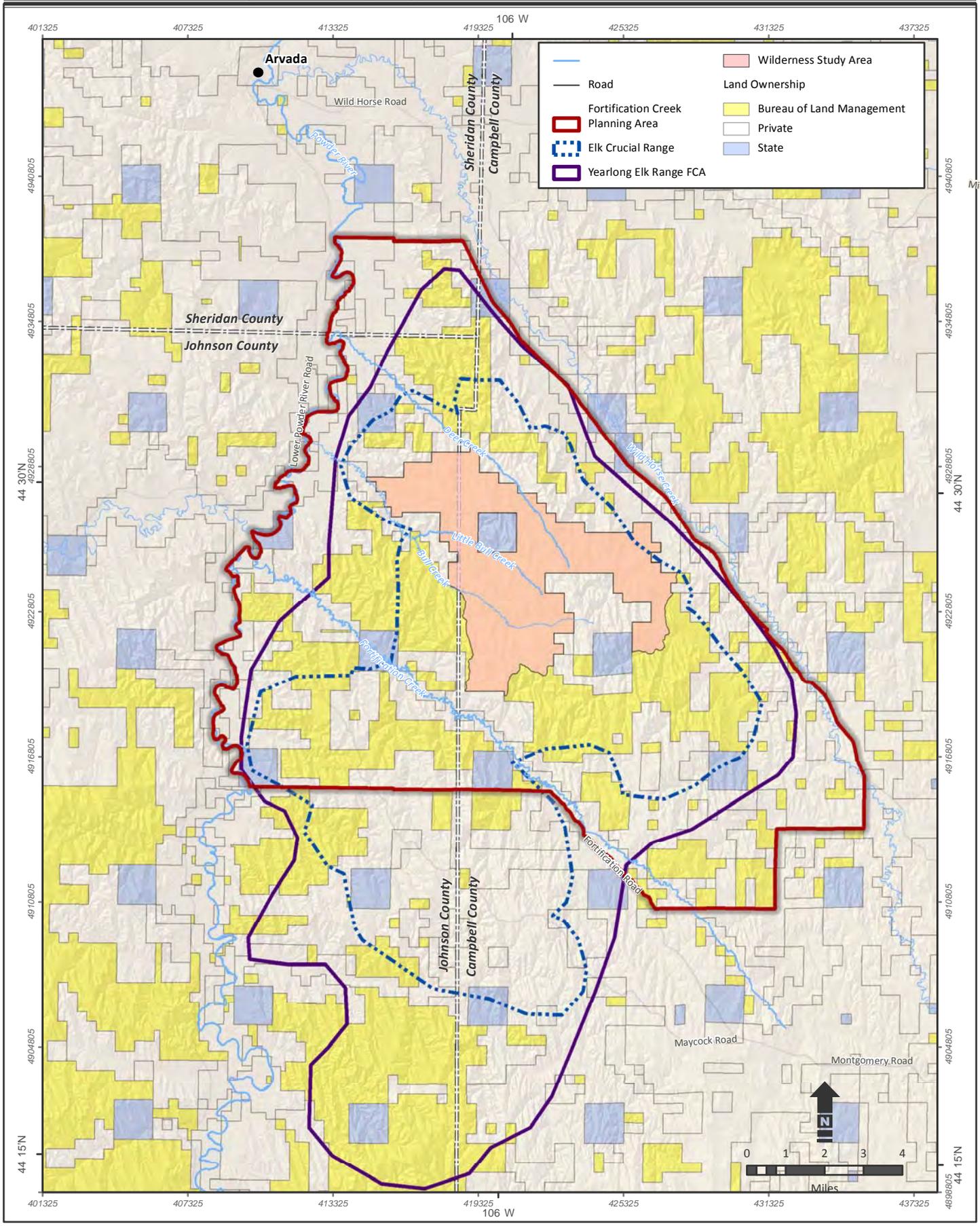
The RMPA was developed with the cooperation and input of several State agencies, the three affected counties, and other interested parties. BLM also coordinated with the U.S. Fish and Wildlife Service (USFWS) and Native American tribes.

The purpose of this RMPA is to consider the management of coal bed natural gas (CBNG) development within the FCPA. While virtually all of the Federal CBNG reserves have been leased, new information regarding wildlife, notably elk, led BLM to consider modifying certain operational standards for CBNG development. The current land use plan was prepared in 1985 and amended in 2001. In 2003, BLM prepared another RMPA/Environmental Impact Statement (EIS) for the entire PRB, which includes the FCPA (BLM 2003a).



Source:
Wilderness Boundaries - Bureau of Land Management 2009
Basemap - ESRI 2009

Figure 1-1
General Location Map
Fortification Creek Planning Area



Source:
 Mineral Estate/Boundaries - Bureau of Land Management 2009
 Topography - United States Geological Survey 2005
 Hydrography - National Hydrography Dataset 2003

Figure 1-2

Fortification Creek Planning Area
 Campbell, Johnson, and Sheridan Counties, Wyoming

This RMPA/EIS did not specifically address the following issues:

- Protection of the isolated elk herd found in the FCPA;
- Continuation of the prohibition against overhead power lines within the FCPA;
- Designation of portions of the FCPA as an Area of Critical Environmental Concern (ACEC); and
- Lands with Wilderness Characteristics and Wild Lands (Secretarial Order 3310).

In cooperation with the Wyoming Game and Fish Department (WGFD) and the University of Wyoming (UWYO), BLM has been monitoring elk populations and movement within the FCPA. This ongoing study and analysis has confirmed that the elk are particularly susceptible to mineral development. Because BLM has leased fluid minerals in the FCPA, but has not generally allowed development, the agency decided to reevaluate its management controls to balance additional impacts to the elk and other resources.

1.1 Planning Criteria

Planning criteria are the constraints or ground rules that were developed to guide and direct the planning revision of the FCPA RMPA. Planning criteria are based on laws and regulations; guidance provided by the BLM Wyoming State Director; results of consultation and coordination with the public, other agencies, and governmental entities, and Native American tribes; analysis of information pertinent to the FCPA; public input; and professional judgment. Planning criteria for the RMPA included the following:

- The RMPA will comply with the Federal Land Policy and Management Act (FLPMA) and all other applicable laws, regulations, and policies. The land use plan amendment process will be governed by the planning regulations in 43 Code of Federal Regulations (CFR) 1610 and the BLM Land Use Planning Handbook H-1601-1.
- The proposed action and alternatives will be analyzed in accordance with the National Environmental Policy Act (NEPA).
- Lands affected by the RMPA will be public lands and mineral estate managed by BLM. No decisions will be made relative to non-BLM administered lands or non-Federal minerals.
- Broad-based public participation will be an integral part of the planning process.
- The RMPA will recognize all valid existing rights.
- The planning team will work cooperatively and collaboratively with cooperating agencies and all other interested groups, agencies, and individuals. The RMPA will be consistent with existing non-Federal plans and policies, provided the decisions in the existing plans are consistent with the purposes, policies, and programs of Federal law, and regulations applicable to public lands.
- The WSA will continue to be managed under the Interim Management Policy for Lands under Wilderness Review until Congress either designates all or portions of the WSA as wilderness or releases the lands from further wilderness consideration.
- The wilderness inventory was updated and no LWCs outside the WSA are present.
- The planning process involved American Indian tribal governments.

- The RMPA shall include adaptive environmental management (AEM) principles and protocols to deal with unknown future issues and outcomes.

1.2 Monitoring

Consistent with BLM Land Use Planning Handbook H-1601-1, BLM will monitor plan implementation and effectiveness, and will report annually, or as BLM determines is appropriate, on:

- The management actions undertaken;
- The management actions remaining to be undertaken; and
- The effectiveness of those actions toward meeting goals and objectives.

Monitoring strategies have been developed that identify indicators of change, acceptable thresholds, methodologies, protocols, and timeframes that will be used to evaluate and determine whether desired outcomes are being achieved. The BLM, with assistance from the State of Wyoming, will review and evaluate all monitoring data. The public will be invited to observe at least one monitoring team meeting annually. The reclamation monitoring plans has been included as Appendix A. The elk protection and reclamation performance standards (acceptable thresholds) are identified in Appendix B.

The RMPA will be evaluated at least every five years as documented in an evaluation schedule. Special or unscheduled evaluations may also be required to review unexpected management actions or significant changes that have the potential to trigger an amendment or revision.

1.3 Relationship to BLM Policies, Plans, and Programs

BLM has three principal levels of land use planning decisions: (1) the RMP or RMPA level; (2) the activity level; and (3) the site-specific level. This RMPA focused on establishing resource objectives and direction while providing some activity-level guidance and site-specific decisions. It builds on the history of natural resource management planning in the vicinity of the FCPA.

1.3.1. Related Plans

The 1985 Buffalo Resource Area (BRA) RMP (BLM 1985) was amended in 2001 with the BFO RMP (BLM 2001). Management direction for land and mineral resources administered by the BFO are described in these two documents. Along with the two RMPs for the BFO, there are additional oil and gas and wildlife plans including the 2003 PRB Oil and Gas (O&G) Final Environmental Impact Statement (FEIS) (PRB O&G FEIS; BLM 2003a). The BRA Resource Area Oil and Gas Surface Protection Plan for the Fortification Creek Area (BLM 1982) provides guidance for oil and gas exploration and development within the FCPA.

2.0 Performance Based Management

The RMPA incorporates a performance-based approach containing standards for reclamation and the protection of elk (Appendix B) for industry to achieve with their development plans. Operators will supply comprehensive annual development plans detailing which areas are to be developed each year and explaining how the performance standards will be achieved. Operator performance will be closely monitored by the BLM. BLM may authorize additional drilling if BLM determines that the performance standards have been met or less drilling if performance standards are not met. The citizen proposed ACEC and a Wildlife Habitat Management Area (WHMA) will not be established as the performance standards will ensure the important and relevant resource values are conserved.

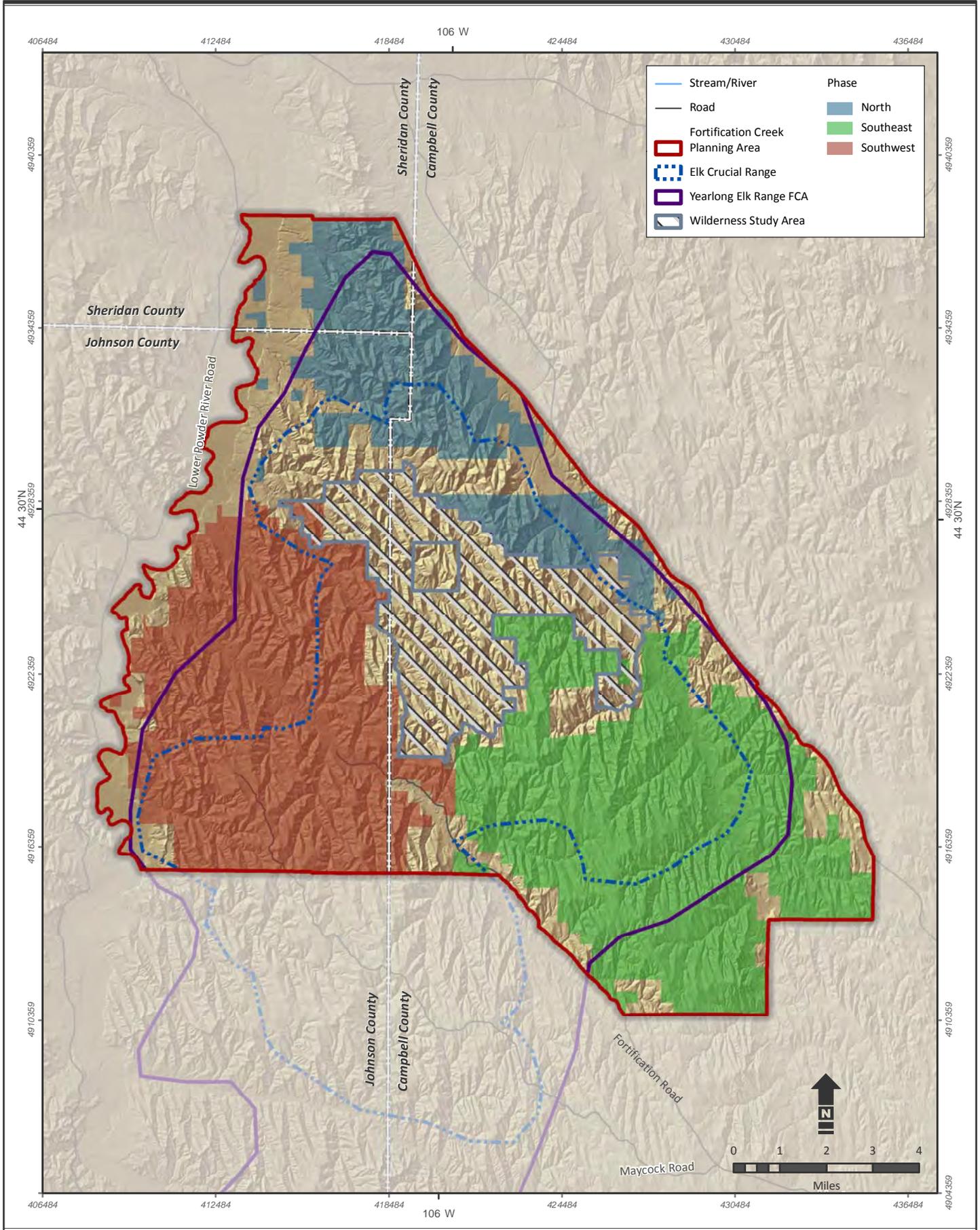
The pace of CBNG development will be based on the performance standards and the geographic phases, following an orderly “bolt-on” approach. Operators will confine their development operations to a small geographic area annually, approximately one-third of a phase area. This approach provides the opportunity to concurrently allow a small development area within another geographic phase while still providing the elk with sufficient area free of construction and drilling disturbance. All development is dependent upon meeting the performance standards. With the “bolt-on” approach, new infrastructure will expand from, and tie into existing infrastructure. CBNG development will be expected to generally follow the three geographic phases as shown in Figure 2-1. Development will start in the eastern third of the Southeast phase and annually progress clockwise.

Existing stipulations for steep slopes, fragile watersheds, and elk crucial habitat will remain (Appendix C). Exceptions could be granted if the operator proposed an acceptable plan explaining how the performance standards will be achieved. Eighty percent of the elk security habitat will be retained within each geographic phase. Overhead power lines will be allowed on BLM surface land within road corridors.

2.1 RMPA Management Actions

Air Quality and Climate

1. Any BLM-initiated actions or authorizations that result in air quality or visibility deterioration will be conditioned to avoid violating Wyoming and national air quality standards.
2. Dust control measures will be required to increase visibility and reduce particulate impacts for all construction and other surface-disturbing activities.
3. During construction, emissions of particulate matter from well pad and resource road construction will be minimized by application of water, or other dust suppressants, with at least 50 percent control efficiency. Roads and well locations constructed on soils susceptible to wind erosion could be appropriately surfaced or otherwise stabilized to reduce the amount of fugitive dust generated by traffic or other activities, and dust inhibitors (surfacing materials, non-saline dust suppressants, and water) could be used as necessary on unpaved collector, local and resource roads that present a fugitive dust problem. The use of chemical dust suppressants on BLM surface will require prior approval from the BLM-authorized officer (PRB O&G Record of Decision [ROD], p. A-39; BLM 2003b).



Source:
 Topography - United States Geological Survey 2005
 Hydrography - National Hydrography Dataset 2003

Figure 2-1
Phased Development
 Campbell, Johnson, and Sheridan Counties, Wyoming

Soil Resources

1. Management actions on BLM lands will be consistent with achieving or maintaining the Standards for Healthy Rangelands and Guidelines for Livestock Grazing Management for Public Lands Administered by the Bureau of Land Management in the State of Wyoming (BLM 1997).
2. BLM will use soil survey interpretations to predict soil behavior, limitation, or suitability for a given activity or action.
3. Prior to authorizing any surface-disturbing activity, BLM will evaluate the activity and, if necessary, apply mitigation measures, relocate the activity to a more suitable soil type, or deny the authorization.
4. Authorized surface-disturbing activities will be subject to an onsite evaluation to develop mitigation (if necessary), apply best management practices (BMPs) (Appendix D), and plan for reclamation. Site-specific measures will be developed for soils susceptible to erosion (water and wind), soils with high sodium and salt content, soils with sparse vegetation, areas with low effective precipitation, droughty soils, and/or shallow soils.
5. Areas where the erosion potential cannot be effectively controlled or mitigated for, and reclamation treatments to BLM standards likely to be unsuccessful will be avoided.
6. Operators will submit a disturbance and reclamation plan with their APDs when specified by BLM. With an acceptable disturbance and reclamation plan, surface disturbing activities may be authorized on slopes greater than 25 percent and on soils with a severe erosion hazard where reclamation goals are achievable. The operator will propose an acceptable disturbance and reclamation plan, which will take into account the performance-based standards for soil reclamation (Appendix B). The operator will be required to meet these performance-based standards for soil reclamation.

Water Resources

1. The rights to water-related projects on public lands will be filed with the Wyoming State Engineer's Office (WSEO) in order to obtain valid water rights.
2. A Wyoming Department of Environmental Quality (WDEQ) permit is necessary for water discharge.
3. Locate discharge points in areas that will minimize erosion and impacts to the receiving channel, existing improvements, and downstream users (PRB O&G ROD, p. A-30; BLM 2003b).
4. Locate discharge points in stable, low gradient drainage systems and below active headcuts, when possible. If discharge is located above a headcut, mitigation measures will be required by the BLM Authorized Officer on a site-specific basis. Some mitigation measures will require engineering design (PRB O&G ROD, p. A-30; BLM 2003b).
5. All discharge points will require energy dissipation measures (PRB O&G ROD, p. A-30; BLM 2003b).
6. Discharge points, regardless of National Pollutant Discharge Elimination System (NPDES) status or previous use, may not be authorized by BLM. Sites may be moved or otherwise mitigated by the BLM Authorized Officer during onsite inspections where environmental issues exist (PRB O&G ROD, p. A-30; BLM 2003b).

7. Cumulative produced water discharge must not exceed the naturally occurring 2-year peak flow of the receiving channel (PRB O&G ROD, p. A-30; BLM 2003b).
8. Discharge points will not be located in playas or enclosed basins unless it can be demonstrated that they will not result in adverse impacts. Discharges into valley bottoms with no defined low-flow channel will generally not be allowed, but will be reviewed on a site-specific basis (PRB O&G ROD, p. A-30; BLM 2003b).
9. Channel crossings (PRB O&G ROD, p. A-30; BLM 2003b):
 - Minimize channel disturbance as much as possible by limiting pipeline and road crossings.
 - Avoid running pipelines and access roads within floodplains or parallel to a stream channel.
 - Channel crossings by roads 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. All stream crossing structures will be designed to carry a 25-year discharge event or other capacities as directed by BLM.
 - Channel crossings by pipelines will be constructed so that the pipe is buried at least 4 feet below the channel bottom.
10. Low-water crossings will be constructed at original streambed elevation in a manner that will prevent any blockage or restriction of the existing channel. Material removed will be stockpiled for use in reclamation of the crossings (PRB O&G ROD, p. A-30; BLM 2003b).
11. Concerns regarding the quality of discharged CBNG water on downstream irrigation use may require operators to increase the amount of storage of CBNG water during the irrigation months and allow more surface discharge during the non-irrigation months (PRB O&G ROD, p. A-30; BLM 2003b).
12. The operator will be required to provide a reclamation bond for impoundments over Federal minerals in the amount specified by a qualified Professional Engineer for the impoundments to be used for the management of CBNG water. The bond amount will be submitted within 90 days after Plan of Development (POD) approval and will be approved by BLM prior to commencing construction (PRB O&G ROD, p. A-30; BLM 2003b).
13. The operator will supply a copy of the complete approved SW-4, SW-3, or SW-CBNG permits to BLM as they are issued by WSEO for impoundments (PRB O&G ROD, p. A-30; BLM 2003b).
14. The operator will supply a copy of the complete approved Chapter 3 permit to construct associated with treatment facilities to BLM as they are issued by WDEQ (PRB O&G ROD, p. A-30; BLM 2003b).
15. When water discharge is authorized by the State of Wyoming, location of water management facilities shall meet performance-based objectives (See: Elk and Reclamation Standards, Appendix B).
16. Authorize activities associated with the surface discharge of produced water when permitted by the State of Wyoming.

17. Operators will provide summer water sources for livestock and wildlife if current sources (permitted through the WSEO) become unavailable and that loss is directly attributable to development of CBNG. Water will be provided until those lost sources are again available and/or other permanent sources are developed.

Vegetation Resources

1. Management actions affecting vegetation will be designed to meet overall resource management objectives and will be consistent with the policy to protect or improve biodiversity and water quality.
2. Livestock stocking rates will not be increased.

Noxious Weeds

1. In cooperation with county weed and pest districts, cooperative integrated weed control programs are being implemented on public land in conjunction with control work on adjoining deeded and State lands.
2. Weed educational material will be reviewed during pre-construction onsite meetings with operators, subcontractors, and landowners and will be attached to approved Applications for Permit to Drill (APDs) and PODs (PRB O&G ROD, p. A-32; BLM 2003b).
3. Moist soils near wetlands, streams, lakes, or springs in the project area will be promptly revegetated if construction activities impact the vegetation in these areas. Revegetation will be designed to avoid the establishment of noxious weeds.
4. Operators in areas with identified weed infestations or suitable Ute ladies'-tresses orchid habitat will be required to submit an integrated pest management plan prior to APD approval. Mitigation will be determined on a site-specific basis and may include measures such as spraying herbicides prior to entering areas and washing vehicles before leaving infested areas. Infestation areas of noxious weeds have been identified through the county weed and pest districts and are available at the Buffalo BLM office.
5. The operator will be responsible for prevention and control of noxious weeds and weeds of concern on all areas of surface disturbance associated with the project (well locations, roads, water management facilities, etc.). Use of pesticides will comply with applicable Federal and State laws. Pesticides will be used only in accordance with their registered uses and within limitations imposed by the Secretary of the Interior. Prior to the use of pesticides on public land, the holder will 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 container storage and disposal, and any other information deemed necessary by the BLM Authorized Officer to such use.

Fish and Wildlife Resources

1. Surface disturbance and disruptive activities will be restricted within elk crucial winter habitat from November 15 through April 30.
2. Surface disturbance and disruptive activities will be restricted within elk parturition habitat from May 1 through June 30.
3. Preclude new surface-disturbing activities within 0.5 mile of raptor nest sites to prevent increased stress to and/or displacement of animals during the critical period from February 1 through July 31.

4. Stock tanks will be required to be wildlife friendly with ramps to allow escape by small mammals and birds.

Elk

1. Performance-based phased (Elk and Reclamation Standards, Appendix B) development will be implemented geographically with a “bolt on” approach. Grazing management should be a component of the operator submitted disturbance and reclamation plan.
2. Metering and visitation will meet performance-based objectives. (Elk and Reclamation Standards, Appendix B).
3. When water discharge is authorized by the State of Wyoming, location of water management facilities shall meet performance-based objectives (See: Elk and Reclamation Standards, Appendix B).
4. Operators will provide summer water sources for livestock and wildlife if current sources (permitted through the WSEO) become unavailable and that loss is directly attributable to development of CBNG. Water will be provided until those lost sources are again available and/or other permanent sources are developed.
5. Compression facilities will meet performance-based objectives (Elk and Reclamation Standards, Appendix B).
6. Retain 80 percent of elk security habitat as measured from roads within all seasonal ranges and within each geographic phase.

Special Status Species

1. Known populations of threatened and endangered species (plants and animals) will be protected as mandated by law.
2. The operator will locate impoundments to avoid sagebrush shrublands, where practical.
3. Containment impoundments will be fenced to exclude wildlife and livestock. If they are not fenced, they will be designed and constructed to prevent entrapment and drowning.
4. All stock tanks will include a ramp to enable trapped small birds and mammals to escape. See Idaho BLM Technical Bulletin 89-4 entitled Wildlife Watering and Escape Ramps on Livestock Water Developments: Suggestions and Recommendations.
5. Noise mufflers will be installed on the exhaust of compressor engines to reduce the exhaust noise.
6. Where noise impacts to existing sensitive receptors are an issue, noise levels will be required to be no greater than 55 decibels (dBA) measured at a distance of 0.25 mile from the appropriate booster (field) compressor. When background noise exceeds 55 dBA, noise levels will be no greater than 5 dBA above background. This may require the installation of electrical compressor motors at these locations.
7. Overhead power lines on BLM surface limited to within road corridors to manage within the existing visual class.
8. The operator will limit the construction of aboveground power lines near streams, water bodies, and wetlands to minimize the potential for waterfowl colliding with power lines.

Bald Eagle

1. Site-specific project areas will be evaluated for suitable bald eagle nesting and roosting habitat prior to permit approval. Suitable nesting habitat (USFWS 2007) is any mature stand

of trees or individual tree capable of supporting a bald eagle nest in association with an adequate food supply. Suitable roosting habitat is defined as any mature stand of conifer or deciduous trees where eagles consistently perch during winter.

2. Special habitats for raptors, including wintering bald eagles, will be identified and considered during the review of Sundry Notices.
3. Surveys for active bald eagle nests and winter roost sites will be conducted within suitable habitat by a BLM-approved biologist. Surface-disturbing activities will not be permitted within 1 mile of suitable habitat prior to survey completion.
4. A disturbance-free buffer zone of 0.5 mile will be established year-round for all bald eagle nest sites. A timing limitation (TL) buffer zone of 1 mile will be established for all bald eagle nest sites from February 15 through August 15.
5. A disturbance-free buffer zone of 0.5 mile will be established year-round for all bald eagle roost sites. A TL buffer zone of 1 mile will be established for all bald eagle roost sites from November 1 through April 1.
6. Within 1 mile of bald eagle winter roost sites additional measures such as remote monitoring and restricting maintenance visitation to between 9:00 a.m. and 3:00 p.m. may be necessary to prevent disturbance from November 1 through April 1.
7. Additional mitigation measures may be necessary if the site-specific project is determined by a BLM biologist to have adverse effects on bald eagles or their habitat.

Black-footed Ferret

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

Blowout Penstemon

1. Site-specific project areas will be evaluated for suitable habitat prior to permit approval.
2. Suitable habitat will be avoided wherever possible.
3. If suitable habitat cannot be avoided, surveys will be conducted in compliance with USFWS standards by a BLM-approved biologist or botanist.

Mountain Plover

1. Site-specific project areas will be evaluated for suitable mountain plover nesting habitat prior to permit approval. Flat areas of shortgrass prairie or low shrubs with a prevalence of bare ground characterize suitable mountain plover nesting habitat. Typically the vegetation height is less than 4 inches, and bare ground is greater than 30 percent. In the event that a mountain plover is located during construction or operation, the USFWS's Wyoming Field Office (307-772-2374) and the USFWS' Law Enforcement Office (307-261-6365) will be notified within 24 hours.

2. A mountain plover nesting survey following USFWS protocol will be conducted prior to permit authorization. Additional measures such as monitoring and activity restrictions may be applied if mountain plovers are documented.
3. A disturbance-free buffer zone of 0.25 mile will be established around all occupied mountain plover nesting habitat between March 15 and July 31.
4. Construction of ancillary facilities (for example, compressor stations and processing plants) will not be located within 0.5 mile of known nesting areas. The threat of vehicle collision to adult plovers and their broods will be minimized, especially within breeding aggregation areas.
5. Where possible, roads will be located outside of plover nesting areas.
6. Work schedules and shift changes will be set to avoid the periods from 30 minutes before to 30 minutes after sunrise and sunset during June and July, when mountain plovers and other wildlife are most active.
7. BLM will monitor all road-associated carcasses, jackrabbit-sized and larger, along project (operator-maintained) roads. The presence of carrion could attract mountain plover predators.
8. Project-related features that encourage or enhance the hunting efficiency of predators of mountain plover will not be constructed within 0.25 mile of known mountain plover nest sites.
9. Creation of hunting perches or nest sites for avian predators within 0.5 mile of identified nesting areas will be avoided by burying power lines, by using the lowest possible structures for fences and other structures, and by incorporating perch-inhibiting devices into their design.
10. When aboveground markers are used on capped and abandoned wells, they will be no taller than 4 feet with perch-inhibiting devices on the top to avoid creation of raptor hunting perches within 0.5 mile of nesting areas.
11. Reclamation of areas of previously suitable mountain plover habitat will include the seeding of vegetation to produce suitable habitat for mountain plover.

Greater Sage-Grouse

1. Surface disturbing activities or surface occupancy is prohibited or restricted on or within one quarter (0.25) mile radius of the perimeter of occupied or undetermined greater sage-grouse leks (WY-IM-2010-12; BLM 2009).
2. Disruptive activity is restricted on or within one quarter (0.25) mile radius of the perimeter of occupied or undetermined greater sage-grouse leks from 6 pm to 8 am from March 15 – May 15 (WY-IM-2010-12; BLM 2009).
3. Surface disturbing and/or disruptive activities are prohibited or restricted from March 15 – June 30 within suitable greater sage-grouse nesting and early brood-rearing habitat and within habitat important for connectivity (WY-IM-2010-12; BLM 2009).
4. Surface disturbing and/or disruptive activities in mapped or modeled greater sage-grouse winter habitats/concentration areas that support Core Area populations, are prohibited or restricted from November 15 – March 14.
5. For any surface-disturbing activities proposed in sagebrush shrublands, the operator will conduct clearance surveys for sage-grouse breeding activity during the greater sage-grouse's

breeding season before initiating the activities. The surveys must encompass all sagebrush shrublands within 0.5 mile of the proposed activities.

6. The operator will locate facilities so that noise from the facilities at any nearby greater sage-grouse or sharp-tailed grouse display grounds does not exceed 49 dBA (10 dBA above background noise) at the display ground.
7. The operator will locate aboveground power lines, where practical, at least 0.5 mile from any greater sage-grouse breeding or nesting grounds to prevent raptor predation and greater sage-grouse collision with the conductors. Power poles within 0.5 mile of any greater sage-grouse breeding ground will be raptor-proofed to prevent raptors from perching on the poles.
8. POD-level site specific NEPA analyses will evaluate greater sage-grouse management actions consistent with Wyoming BLM Policy IM-WY-2010-012 (BLM 2009).

Sharp-tailed Grouse

1. Surface-disturbing activities within 250 yards of a sharp-tailed grouse strutting/dancing ground will be restricted or prohibited.
2. Prohibit surface-disturbing activities within sharp-tailed grouse nesting habitats. An additional 0.5 mile radius will be established beyond the 250-yard lek radius, to prevent increased stress to and/or displacement of animals during the critical time period from April 1 through May 31.

Note: The WGFD recommends a 0.25 mile surface use buffer and two mile TL buffer for sharp-tailed grouse leks which will be evaluated during POD level site specific NEPA analyses.

Raptors

1. Preclude new surface-disturbing activities within 0.5 mile of raptor nest sites to prevent increased stress to and/or displacement of animals during the critical period from February 1 through July 31.
2. The operator will construct power lines to minimize the potential for raptor collisions with the lines. Potential modifications include burying the lines, avoiding areas of high avian use (for example, wetlands, prairie dog towns, and grouse leks), and increasing the visibility of the individual conductors.

Ute Ladies'-tresses Orchid

1. Site-specific project areas will be evaluated for suitable Ute ladies'-tresses orchid habitat prior to permit approval. Suitable habitat is characterized by moist soils near springs, lakes, or perennial streams; most occurrences are in alluvial substrates along riparian edges, gravel bars, old oxbows, and moist to wet meadows in the floodplains of perennial streams (USFWS 1995).
2. Suitable habitat will be avoided wherever possible.
3. If suitable habitat for Ute ladies'-tresses cannot be avoided, surveys will be conducted in compliance with USFWS standards (USFWS 1995) by a BLM-approved biologist or botanist. Surveys can only be conducted between July 20 and August 31.

Cultural Resources

1. Require archaeological inventory for all Federal undertakings, regardless of surface ownership.
2. Identify historic properties.

3. Design projects to avoid or mitigate impacts to historic properties prior to approval.
4. Mitigate impacts to historic properties inadvertently discovered during or after construction.

Geologic Resources

1. BLM will provide for the efficient use of the mineral resources.
2. The mineral owners are entitled to access their minerals to explore for and develop them and to prudently use an area of the land surface and surface resources that are directly necessary to those exploration and development activities.

Paleontological Resources

1. Paleontological inventories will be targeted to specific areas or will be issue-driven, as needed.
2. Large, conspicuous, and/or scientifically significant fossils or localities found during development will be reported to BLM.
3. Evaluation of discoveries during construction will be conducted by a BLM-approved professional paleontologist within five working days.
4. Adverse impacts to paleontological resources will be mitigated as necessary.

Visual Resources

1. No activity or occupancy is allowed within 200 feet of the edge of State and Federal highways.
2. Facilities or structures such as power lines, oil wells, and storage tanks are required to be screened, painted, and designed to blend with the surrounding landscape except where safety indicates otherwise.
3. Any facilities or structures proposed in or near WSAs will be designed so as not to impair wilderness suitability.
4. The FCPA is designated and managed as Visual Resource Management (VRM) Class III.
5. The WSA is managed under interim guidance for non-impairment, (i.e., VRM Class I)
6. The operator will complete the following measures where practical: use existing well pads where feasible, use vegetative and topographic screening when siting well locations, and avoid highwall cuts.
7. The operator will mount lights at compressor stations and other facilities on a pole or building and direct them downward to illuminate key areas within the facility while minimizing the amount of light projected outside the facility (PRB O&G ROD, p. A-38; BLM 2003b).
8. The operator will use buried power lines to each well, where feasible, to reduce the linear element in the landscape.
9. Overhead power lines on BLM surface limited to within road corridors to manage within the existing visual class.

Fuels and Fire

1. Unwanted wildland fires will be suppressed. The use of some types of suppression equipment will be restricted in some areas, and fire and suppression damage will be rehabilitated.

2. Wildfires will be managed in all areas of the resource area. Priority will be given to suppressing fires in or threatening higher-value resources (the WSA) and keeping fires from spreading onto private, State, or other Federal lands. Protecting human life will be the highest priority.
3. Heavy equipment (dozers) will be restricted from being used for wildfire suppression in the WSA and areas of known cultural values.
4. Aerial retardant use will be restricted to keep retardant out of water sources. Specific restrictions on retardant use apply to the WSA.
5. Helispot construction is prohibited in the WSA.
6. Firelines that are constructed by heavy equipment or on steep slopes will be rehabilitated to prevent or control erosion. Rehabilitation includes, but is not limited to, water barring and reseeded.
7. Prescribed burns will be used as a tool to reach management objectives planned for areas in conjunction with items such as range and wildlife habitat management projects.

Rangeland

1. Livestock grazing is allowed on all public lands in the FCPA.
2. Any permanent increases in the amount of forage produced are considered for wildlife and watershed protection before additional livestock use is authorized.
3. Fences will be constructed to maintain wildlife mobility in important habitat areas. Fences on public land that are hindering natural movement of wildlife will be modified to conform to BLM standards. See BLM Handbook H-1741-1 for fence specifications.
4. Reservoirs, wells, troughs, and pipelines will be constructed to provide water in dry areas and to disperse grazing use. The grazing lessee or other cooperator will be required to maintain water in all troughs located on public land during the frost-free period (April through October) for wildlife.
5. All stock tanks will include a ramp to enable trapped small birds and mammals to escape. See Idaho BLM Technical Bulletin 89-4 entitled Wildlife Watering and Escape Ramps on Livestock Water Developments: Suggestions and Recommendations.
6. Performance-based phased (Elk and Reclamation Standards – Appendix B) development will be implemented geographically with a “bolt on” approach. Grazing management should be a component of interim reclamation.
7. Operators will provide summer water sources for livestock and wildlife if current sources (permitted through the WSEO) become unavailable and that loss is directly attributable to development of CBNG. Water will be provided until those lost sources are again available and/or other permanent sources are developed.

Recreation

1. Special recreation permits (SRPs) are issued for commercial competitive and large-scale nonprofit organized recreational events on a case-by-case basis.

Transportation

1. Long-term occupancy of the public lands for roads, power lines, pipelines, communication sites, and irrigation ditches is authorized by granting a right-of-way (ROW). ROWs are to be removed and reclaimed upon termination of the grant.
2. Transmission lines and transportation facilities will be located within identified corridor areas to the extent feasible.

Lands and Realty

1. Long-term occupancy of the public lands for roads, power lines, pipelines, communication sites, and irrigation ditches is authorized by granting a ROW. ROWs are to be removed and reclaimed upon termination of the grant.
2. Transmission lines and transportation facilities will be located within identified corridor areas to the extent feasible.
3. Withdrawals for surface and/or minerals will be considered on a case-by-case basis.
4. Priority is given to acquiring public land in areas adjacent to major blocks of public land, especially in areas of high recreational potential.
5. Easements that will provide access to contiguous blocks of public lands for recreation and administrative purposes will be pursued.

Fluid Minerals – CBNG

1. Authorization for activities on existing mineral leases will be governed by valid existing rights.
2. Implement standard lease terms (individual leases).
3. No CBNG or conventional oil and gas development will occur within the WSA.
4. All pipelines will be located in corridors.
5. The operator will locate impoundments to avoid sagebrush shrublands where practical.
6. Containment impoundments will be fenced to exclude wildlife and livestock. If they are not fenced, they will be designed and constructed to prevent entrapment and drowning.
7. Noise mufflers will be installed on the exhaust of compressor engines to reduce the exhaust noise.
8. Where noise impacts to existing sensitive receptors are an issue, noise levels will be required to be no greater than 55 dBA measured at a distance of 0.25 mile from the appropriate booster (field) compressor. When background noise exceeds 55 dBA, noise levels will be no greater than 5 dBA above background. This may require the installation of electrical compressor motors at these locations.
9. All stock tanks will include a ramp to enable trapped small birds and mammals to escape. See Idaho BLM Technical Bulletin 89-4 entitled Wildlife Watering and Escape Ramps on Livestock Water Developments: Suggestions and Recommendations.

Elk

1. Surface disturbance and disruptive activities will be restricted within elk crucial winter habitat from November 15 through April 30.
2. Surface disturbance and disruptive activities will be restricted within elk parturition habitat from May 1 through June 30.

3. Performance-based phased (Elk and Reclamation Standards, Appendix B) development will be implemented geographically with a “bolt on” approach. Grazing management should be a component of the operator submitted disturbance and reclamation plan.
4. Metering and visitation will meet performance-based objectives (Elk and Reclamation Standards, Appendix B).
5. When water discharge is authorized by the State of Wyoming, location of water management facilities shall meet performance-based objectives (See: Elk and Reclamation Standards, Appendix B).
6. Operators will provide summer water sources for livestock and wildlife if current sources (permitted through the WSEO) become unavailable and that loss is directly attributable to development of CBNG. Water will be provided until those lost sources are again available and/or other permanent sources are developed.
7. Compression facilities will meet performance-based objectives (Elk and Reclamation Standards, Appendix B).
8. Retain 80 percent of elk security habitat as measured from roads within all seasonal ranges and within each geographic phase.

Visual Resources

1. Overhead power lines on BLM surface limited to within road corridors to manage within the existing visual class.
2. The operator will locate aboveground power lines, where practical, at least 0.5 mile from any greater sage-grouse breeding or nesting grounds to prevent raptor predation and sage-grouse collision with the conductors. Power poles within 0.5 mile of any sage-grouse breeding ground will be raptor-proofed to prevent raptors from perching on the poles.
3. The operator will construct power lines to minimize the potential for raptor collisions with the lines. Potential modifications include burying the lines, avoiding areas of high avian use (for example, wetlands, prairie dog towns, and grouse leks), and increasing the visibility of the individual conductors.
4. The operator will limit the construction of aboveground power lines near streams, water bodies, and wetlands to minimize the potential for waterfowl colliding with power lines.

Special Status Species

1. Special Status Species management actions applicable to Fluid Minerals are listed under Special Status Species alternatives.

Special Designations

1. The WSA will be managed, according to the Interim Management Plan (BLM 1995), to maintain wilderness characteristics.
2. Vehicle travel is limited to designated roads and vehicle routes.
3. The citizen-proposed ACEC (33,757 acres) was not designated. Performance standards (elk and reclamation) have been determined sufficient to protect resource values.
4. No WHMA was designated.

3.0 REFERENCES

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- U.S. Fish and Wildlife Service. 1995. Draft Ute ladies' tresses (*Spiranthes diluvialis*) Recovery Plan. Denver, Colorado.
- U.S. Fish and Wildlife Service. 2007. Reinitiation of Formal Consultation for the Powder River Basin Oil and Gas Project, Campbell, Converse, Johnson, and Sheridan Counties, Wyoming. (Formal Consultation No. ES-6-WY-07-F012).

APPENDIX A

**BUREAU OF LAND MANAGEMENT
BUFFALO FIELD OFFICE**

**FORTIFICATION CREEK PLANNING AREA RECLAMATION
MONITORING AND REPORTING GUIDE**

August 2011

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ATTACHMENTS

- Attachment 1 – Tech Note #346 U.S. Department of the Interior- Bureau of Land Management Erosion Condition Classification System by Ronnie Clark
- Attachment 2 – Form 7310-12 Determination of Erosion Condition Class
- Attachment 3 – Example Monitoring Summary Report
- Attachment 4 – Cover By Lifeform Transect
- Attachment 5 – BLM Recommended Seed Mixes Based on Ecological Sites
- Attachment 6 – Fortification Creek Planning Area Plant Species List
- Attachment 7 – Fortification Creek Planning Area – Ecological Sites

**BUREAU OF LAND MANAGEMENT
BUFFALO FIELD OFFICE
FORTIFICATION CREEK PLANNING AREA RECLAMATION
MONITORING AND REPORTING GUIDE**

It is the mission of the Bureau of Land Management (BLM) to sustain the health, diversity, and productivity of the public lands for the use and enjoyment of present and future generations.

This reclamation guide is designed to be used as direction for reclamation implementation, monitoring, and reporting within the Fortification Creek Planning Area (FCPA) of the Buffalo Field Office (BFO). It applies to all federally authorized actions which disturb vegetation and/or mineral/soil resources. This policy is intended to be compatible with all BLM program objectives and tiers to and is an extension of the Wyoming Reclamation Policy.

This monitoring plan is designed to answer specific questions pertaining to reclamation of surface disturbances, including well pads, roads, rights-of-way (ROW's), pipelines, power lines and other disturbances. The analysis of collected data should determine if reclamation success has been achieved, as well as providing information on the success of various reclamation techniques and timeframes.

I. Required Documentation

A Reclamation Plan

A reclamation plan shall be developed for all surface disturbing activities and will become part of the proposed action in the NEPA document used to analyze each specific project. The level of detail for the reclamation plan shall reflect: the complexity of the project (i.e., topography, soil limitations, unusual plant composition, etc.), the environmental concerns, and the reclamation potential for the site. These plans shall also incorporate any program or regulatory-specific requirements for reclamation. The reclamation plan shall address short-term stabilization to facilitate long term reclamation. Reclamation plans will need to include an initial soil analysis (i.e., topsoil depth, texture, pH, etc.) that adequately represents the various soil types that are found within a project area's disturbance.

If necessary to ensure timely re-vegetation at surface disturbances, livestock will be excluded for the first two growing seasons or until seeded species become firmly established, whichever comes later. Fencing or resting grazing allotments for two or more seasons is acceptable. If fencing is used, it will meet the standards found on page 18 of the Gold Book, 4th Edition, or will be operational electric fencing.

The reclamation plan is considered complete when all the reclamation requirements described in the Wyoming Reclamation Policy have been addressed, the techniques to meet the reclamation requirements are described in detail, and the BLM concurs with the reclamation plan. The Wyoming Reclamation Policy can be found on the web at <http://www.blm.gov/style/medialib/blm/wy/resources/efoia/IMs/2009.Par.54664.File.dat/wy2009-022.pdf>.

B Monitoring Report

The project proponent will be responsible for monitoring each individual Application for Permits to Drill (APD) and ROW including; well pads, associated access roads, power lines, pipelines, and other disturbances. Monitoring and reporting will take place annually, with reports due to the BLM by December 31 of each year. It is assumed that the proponent will complete reclamation monitoring during the same field season as the operators for comparison.

C Integrated Pest Management Plan

An Integrated Pest Management Plan (IPMP) will be developed and submitted by each project proponent to the BLM BFO. Weed surveys will be conducted annually after disturbance takes place. Monitoring will include identifying noxious and invasive weeds by species and the extent of surface disturbance.

An initial weed survey before disturbance occurs is beneficial to weed management practices. Pre-treatment of weeds may be necessary to minimize the potential for spread and to minimize post-construction treatment costs. Surveys may need to be conducted more than once per year to allow for variation of each species' growing periods (e.g., cool-season vs. warm-season species).

II. Monitoring Guidelines

A Monitoring intensity

Monitoring and reporting will take place annually, with reports due to the BLM by December 31 of each year. BLM projects are required to make annual monitoring reports on all surface disturbances as defined in the Wyoming Reclamation Policy.

This schedule will allow everyone to track their own success and provide a concerted effort and involvement in timely and efficient restoration. It would also provide a verifiable means to track and review reclamation methods and results, as well as the amount of disturbance taking place within the FCPA by various entities.

BLM will perform follow-up monitoring on a minimum of 10% of the sites annually to ensure compliance, as well as to ensure quality control to maintain the integrity of the data.

B Monitoring methods

When ascertaining if reclamation success criteria have been met, the BFO BLM will evaluate basal cover, canopy cover, species diversity, and soil stability to make their determination. The operator may use any BLM approved monitoring method to examine reclamation success. These methods are described in BLM Technical Reference 4400-4, 1996 and can be located on the web at <http://www.blm.gov/nstc/library/pdf/samplveg.pdf>. However, BFO BLM will utilize image-based monitoring with SamplePoint software for vegetation (see Section V—*BLM Monitoring Methodology*), line intercept and soil surface factor (SSF) methods for site stability as the primary monitoring methods to determine when reclamation standards have been met. BFO BLM strongly encourages the use of this protocol. Qualitative ocular estimates are not an approved BLM methodology.

See Attachment 3 as a monitoring report example.

C Site selection

Site selection must include representative sections of all areas of the disturbed environment. Monitoring points need to be located in every ecological site identified in the Natural Resource Conservation Service (NRCS) Class 3 Soil Survey that is present within the disturbance.

D Well pads and similar shaped disturbances

If employing a monitoring method that requires transects, those transects should be configured to include edge effects, pits, and general resource conditions, as much as practicable. If employing image-based monitoring, plots should be located on a grid across the disturbed site. A minimum of one monitoring location will be identified on each well pad or similarly shaped disturbance that is representative of the Ecological Site Description (ESD). Monitoring sites will be located in each ecological site present within the disturbance. The onsite investigation will confirm or identify the correct ESD. Standardization will assure repeatability and allow comparison of data.

E Linear features

Linear features include roads, power lines, pipelines, and fiber optic lines, etc. associated with APD's or ROW's. Monitoring sites will be established in each ecological site present along the disturbance at regular intervals. A minimum of one monitoring location will be required every 0.25 mile or change of soil site as defined by NRCS ESD, whichever comes first.

F Timing and duration

Monitoring should be conducted at the same time every year, within two weeks of the date of the first measurement for a given site, and between the dates of May 15 to August 15. When sampling vegetation in the latter half of the growing season, care should be taken when evaluating senescent (i.e., dead) plant matter. If the plant matter is recently senesced, implying that it grew in the current growing season, it should be recorded as live, and the species or functional group should be identified. If the plant matter is older than one year (i.e., the current growing season), it should be recorded as litter. This will aid in producing comparable information for sites evaluated at different times during the growing season. Monitoring and reporting of reclamation will be required from the time reclamation is initiated until success is achieved and agreed to by BLM.

G Photographs

Digital photographs provide a visual record of conditions over time. Digital photographs will be used to document conditions of vegetation, site stability, erosion, and other features or conditions subject to change over time. Photographs should be taken as near the same time each year as possible, within two weeks is the preference. All photographs must be taken between May 15 and August 15. Photographs require minimal time and costs while supplying a permanent and objective record. Photographs compliment, and can be used later to verify, the other data collected (basal cover, canopy cover, etc.). .

Photograph locations should be geo-referenced for repeatability and mapping purposes. Digital photos must be taken from each corner of a well pad facing the well head or facility. Photos must have sufficient clarity and focus to determine general conditions on the pad. More than four photographs can be taken to capture important features. In addition, a ground cover photograph should be taken from a height of approximately 1.5 meters. Identify photo location on a field monitoring form to record photos, include direction of photo (compass) and where photo was taken from. Also record what the photo is capturing i.e., noxious weeds (or lack thereof), a fence, grass stand, certain forbs or shrubs, etc. Be sure the field of view and focus are similar in subsequent photos. The operators will submit subsequent reports to BLM with photo copies of seed tags georeferenced to the treatment site(s). Photos should be part of the annual reporting for that year's planting. If no seed planting takes place, there is no need to include a copy of the seed tags.

III. Interim Reclamation, Year 1-3

Interim reclamation is to be initiated within 30 days of initiating surface disturbing activities, and includes disturbed areas that may be re-disturbed during operations and will be re-disturbed at final reclamation to achieve restoration of the original landform and a natural vegetative community.

A Goals

Immediately stabilize disturbed areas and provide conditions necessary to achieve the long-term reclamation goals.

B Objectives

The objective of interim reclamation is to restore desirable vegetative cover and a portion of the landform sufficient to maintain biologically active topsoil, control erosion, and minimize habitat and forage loss as well as visual impacts during the life of the well or facilities.

- The operator will submit a subsequent report by Sundry Notice to BLM once stabilization measures have been implemented. This initiates the reclamation timeline. The sundry notice should include the well pads and all associated infrastructure on a lease.

C Indicators

- Erosion control methods shall be in place to mitigate any erosive features, including rills and sheet erosion.
- Disturbed areas not needed for active, long-term production operations or vehicle travel have been re-contoured, protected from erosion, and re-vegetated with a self-sustaining, vigorous, diverse, native (or as otherwise approved by the BLM) plant community sufficient to provide forage, stabilize soils, impede the invasion of noxious, invasive, and non-native weeds as well as minimize visual impacts.
- During initial well pad, production facility, road, pipeline, and utility corridor construction, pre-interim reclamation stormwater management actions will be taken to ensure disturbed areas are quickly stabilized to control surface water flow and to protect both the disturbed and adjacent areas from erosion and siltation.

D Success Criteria

Private surface owner rights will be respected when considering revegetation methods, including specific seed mix(s) (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. However, the standards for successful reclamation set forth in this document for soil stability and ground cover must be met.

- i. Year 1 (first growing season): The site must be in stable condition as indicated by the Erosion Control Classification System (BLM Tech Note 346).
 - a. The operator has ensured that 100% of the disturbance site is in a stable condition as indicated by the Erosion Control Classification System (BLM Tech Note 346). The site is stable as defined with a SSF factor range 1-20.
 - b. The disturbance area has been seeded with the approved seed mix. See Attachment 5.
- ii. Year 2 (second growing season): 100% of the disturbance area is stable (as defined above) and native, perennial vegetation is becoming established with desirable species and trending towards long-term goal(s).
- iii. Year 3 (third growing season): 100% of the disturbance area is stable (as defined above) and re-vegetated to within 80% of the ESD reference sheet for bare ground, as outline in the table below.

	ESD BARE GROUND (reference sheet)	Year 3 allowable BARE GROUND (65% of ESD)	Year 3+ allowable BARE GROUND (80% of ESD)
Very Shallow ≥ 10” Precipitation Zone, Northern Plains	40-50%	54-67.5%	48-60%
Shallow Loamy ≥ 10” Precipitation Zone, Northern Plains	20-25%	27-33.75%	24-30%
Shallow Sandy ≥ 10” Precipitation Zone, Northern Plains	30-50%	40.5-67.5%	36-60%
Shallow Clayey ≥ 10” Precipitation Zone, Northern Plains	25-40%	33.75-54%	30-48%
Loamy ≥ 10” Precipitation Zone, Northern Plains	15-20%	20.25-27%	18-24%
Sandy ≥ 10” Precipitation Zone, Northern Plains	20-25%	27-33.75%	24-30%
Clayey ≥ 10” Precipitation Zone, Northern Plains	5-15%	6.75-20.25%	6-18%
Lowland ≥ 10” Precipitation Zone, Northern Plains	0-1%	0-1.35%	0-1.2%

- iv. Each plan of development must meet the performance standards prior to proceeding with additional development. The Fortification Creek Monitoring Team (BLM and State of Wyoming) will meet at least once per year to review the reclamation reports and determine if the performance standards are being met.

- a. Native Grasses: Reclaimed sites must have a minimum of 3 native perennial grass species within the overall data summary established in the disturbance area, 1 of which must be a bunchgrass species.
- b. Native Forbs: Reclaimed sites must have a minimum of 2 native forbs within the overall data summary.
- c. Native Shrubs: Reclaimed sites must have a minimum of 1 native shrub within the overall data summary.
- d. Weeds: Sites must be free of all listed species on the County, Wyoming, or Federal noxious weed list. All state and federal laws regarding noxious weeds must be followed. Other highly competitive invasive, non-native species such as cheatgrass and halogeton will not exceed 5% of the basal cover.
 - The Wyoming Noxious Weed List is available at:
<http://plants.usda.gov/java/noxious?rptType=State&statefips=56> or
<http://www.wyoweed.org/>.
 - The Federal Noxious Weed List is available at:
<http://plants.usda.gov/java/noxious?rptType=Federal>.
 - County weed and pest district information is available at:
<http://www.wyoweed.org/>.
- e. Plant Vigor: Plants must be resilient as evidenced by well-developed root systems, flowers, and seed heads. All sites must exhibit the sustainability of the above desired attributes after the removal of external influences (i.e., irrigation, fencing, matting, etc.).

IV. Reclamation, Year 3+

A Goals

- The FCPA Monitoring Team will evaluate the annual monitoring reports and determine whether successful reclamation criteria have been met to allow phase development to progress.
- Facilitate eventual ecosystem reconstruction to maintain a safe and stable landscape and meet the desired outcomes of the land use plan.
- Vegetative communities within CBNG development mirror those of healthy communities as described by the ESD.

B Objectives

The objectives of reclamation are to:

- Restore a disturbed area to a state containing sufficient biotic and abiotic resources to continue its development and interactions without further assistance or subsidy.
- Demonstrate resilience to normal ranges of environmental stress and disturbance. Achieving this level of ecosystem function requires the establishment of self-sustaining, desirable vegetative cover over the reconstructed landform. Reclamation is complete once the disturbance area is considered stable and functioning to allow optimum production of vegetation, control of undesirable species, conservation of water and control of erosion.

Further disturbance of an area for maintenance, spills, infill, etc. will be measured against reclamation success criteria of the associated plan of development. Minimizing the re-disturbance within a project area promotes the progression of phased development.

C Indicators

Refer to the Wyoming Reclamation Policy – Instruction Memorandum No. WY-2009-022 available at:

<http://www.blm.gov/style/medialib/blm/wy/resources/efoia/IMs/2009.Par.54664.File.dat/wy2009-022.pdf>

D Success Criteria

i. General guidelines

- a. Native Grasses: Reclaimed sites must have a minimum of 3 native perennial grass species within the overall data summary established in the distance area, 1 of which must be a bunchgrass species.
- b. Native Forbs: The average density or frequency of forbs must be a minimum of 3 native forb species within the overall data summary.
- c. Native Shrubs: The average density or frequency of forbs must be a minimum of 2 native shrub species within the overall data summary.
- d. Weeds: Sites must be free from all species listed on the Wyoming or Federal noxious weed list. All state and federal laws regarding noxious weeds must be followed. Other highly competitive invasive species such as cheatgrass will not exceed 5%.
- e. Plant Vigor: Plants must be resilient as evidenced by well-developed root systems, flowers, and seed heads. All sites must exhibit the sustainability of the above desired attributes after the removal of external influences (i.e., irrigation, fencing, matting, etc.).

ii. Specific Guidelines

Reclamation success criteria are based on the ESDs for the Northern Great Plains as defined by the Natural Resources Conservation Service (NRCS) (Attachment 7). A separate standard applies to each ESD. The data contained within the NRCS's ESDs pertain to historical climax systems. The success criteria for reclamation were derived by taking 65% of the numbers listed in the ESDs. This would be equivalent to a rangeland in a mid-seral stage, or within the "good" condition class.

The BLM will monitor and document basal cover and/or canopy cover to determine reclamation success in addition to species diversity, and soil stability. The success criteria are defined as follows:

Ground cover can be measured by either basal cover, or by canopy cover. Both are listed below by soil type. These numbers are accurate estimates for the Powder River Basin from Wyoming into Montana. They are from the NRCS Ecological Sites MLRA 58A.

<http://esis.sc.egov.usda.gov/Welcome/pgReportLocation.aspx?type=Reference%20Sheet>

Note: Success criteria are calculated by multiplying values listed in the EDS by the by the offset: (100%-65%).

Example:

To calculate the minimum percentage of bare ground allowed to meet the success criteria for within a loamy site multiply the offset for 65% allowable bare ground by the upper range allowed and then add the value for the range:

$$[20\%(100\%-65\%)/100]+20\% \text{ or } [0.2(1-0.65)100]+20\% = 27\%$$

27% is the upper threshold of bare ground allowed to meet success criteria for bare ground at a loamy site.

ESD: Loamy >10" Northern Plains Precipitation Zone								
% Basal Cover			% Ground Cover			% Canopy Cover		
Grasses	Forbs	Shrubs	Litter	Rock	Bare Ground	Grasses	Forbs	Shrubs
10 to 15	1 to 3	0 to 1	50 to 60	0 to 1	15 to 20	60 to 85	1 to 5	0 to 1

ESD: Sandy >10" Northern Plains Precipitation Zone								
% Basal Cover			% Ground Cover			% Canopy Cover		
Grasses	Forbs	Shrubs	Litter	Rock	Bare Ground	Grasses	Forbs	Shrubs
10 to 15	1 to 4	1 to 2	40 to 50	0 to 4	20 to 25	70 to 85	5 to 10	1 to 5

ESD: Clayey >10" Northern Plains Precipitation Zone								
% Basal Cover			% Ground Cover			% Canopy Cover		
Grasses	Forbs	Shrubs	Litter	Rock	Bare Ground	Grasses	Forbs	Shrubs
5 to 15	1 to 4	1 to 2	35 to 60	0 to 4	5 to 15	55 to 85	5 to 10	1 to 5

ESD: Shallow Loamy >10" Northern Precipitation Zone								
% Basal Cover			% Ground Cover			% Canopy Cover		
Grasses	Forbs	Shrubs	Litter	Rock	Bare Ground	Grasses	Forbs	Shrubs
5 to 15	1 to 4	1 to 3	40 to 48	0 to 4	20 to 25	60 to 70	1 to 5	5 to 10

ESD: Shallow Sandy >10" Northern Plains Precipitation Zone								
% Basal Cover			% Ground Cover			% Canopy Cover		
Grasses	Forbs	Shrubs	Litter	Rock	Bare Ground	Grasses	Forbs	Shrubs
5 to 10	1 to 4	1 to 5	15 to 25	0 to 5	30 to 50	20 to 30	1 to 5	10 to 15

ESD: Shallow Clayey >10" Northern Precipitation Zone								
% Basal Cover			% Ground Cover			% Canopy Cover		
Grasses	Forbs	Shrubs	Litter	Rock	Bare Ground	Grasses	Forbs	Shrubs
5 to 15	1 to 4	1 to 5	20 to 30	0 to 4	25 to 40	20 to 40	1 to 5	10 to 15

ESD: Very Shallow >10" Northern Precipitation Zone								
% Basal Cover			% Ground Cover			% Canopy Cover		
Grasses	Forbs	Shrubs	Litter	Rock	Bare Ground	Grasses	Forbs	Shrubs
5 to 10	1 to 4	1 to 5	10 to 15	10 to 15	40 to 50	15 to 20	1 to 5	15 to 25

ESD: Lowland >10" Northern Precipitation Zone								
% Basal Cover			% Ground Cover			% Canopy Cover		
Grasses	Forbs	Shrubs	Litter	Rock	Bare Ground	Grasses	Forbs	Shrubs
30 to 40	1 to 3	1 to 5	>50	0 to 1	0 to 1	55 to 70	1 to 5	5 to 10

V. Final Reclamation

Reclamation Year 3+ success criteria pertains to all final reclamation. Final reclamation includes disturbed areas where the original landform and the native vegetative community have been restored.

VI. BLM Monitoring Protocol & Methodologies

Monitoring for interim or final reclamation will follow the same monitoring protocols; when basal vegetation is observed along the transects the species will be recorded. This will allow for a determination of species diversity and abundance. This standard applies to all disturbance features well locations, pad associated with facilities, roads, corridors, staging areas, etc.

A SamplePoint

BLM will employ image-based photo monitoring, utilizing the SamplePoint software developed by the USDA Agricultural Research Service (ARS) to monitor basal cover on reclaimed sites. SamplePoint is a manual image-analysis program designed to facilitate vegetation cover measurements from nadir digital images of any scale. Operating essentially as a digital point frame, the software loads images, places classification points on the image, and stores classification data to a database as the user classes each point. Functional use is not limited to vegetation classification. Although developed to measure canopy cover of vegetation, a reasonable estimate of basal cover can also be determined using this method.

This method was chosen because it is time effective, cost effective, and utilizes the best available science. Data analysis can be conducted in the office, at any time of the year. This monitoring method also provides a visual confirmation of the quantitative data gathered. The results gained from this type of sampling are comparable to those gained from more traditional monitoring sources such as the line-intercept methods.

SamplePoint software can be downloaded at no cost at:

<http://www.ars.usda.gov/services/software/download.htm?softwareid=246>

- i. Sampling design
 - a. Aerial sampling

Capture color (red, green, blue [RGB]) 1-mm ground sample distance (GSD; a measure of digital image resolution defined as the linear dimension of a pixel on the ground) digital images using at least a 10 megapixel camera with 840-mm (equivalent) lens mounted in a sport aircraft (225-kg empty weight). The aircraft should be equipped with a navigation and camera-triggering system and a laser range-finder for measuring altitude above ground level (AGL; Booth and Cox 2006a). The navigation system should be powered by a laptop computer interfaced with (1) a central navigation box, (2) a WAAS-enabled GPS (the Wide Area Augmentation System improves the accuracy of Global Positioning Systems for aircraft en route), and (3) a 15-cm in-cockpit LCD display. Raw images with a 3 x 4-meter field of view to be systematically captured from 100 meter AGL at 80-meter intervals, via automatic triggering using planned GPS coordinates in a sampling grid that covered the study area. Images should be stored on an onboard laptop.

b. Ground sampling

Capture color (RGB) 1-mm-GSD digital images using at least a 5 megapixel camera mounted on a camera base that positioned the camera for nadir images at 2 meters (AGL; Booth *et al.* 2004). Images are acquired with GPS coordinates and aspect recorded for each station. Images are cropped to 1 square meter prior to their analysis.

ii. Line-intercept

a. Well locations

Each well location will be sampled using 4 transects 100 feet long, with a reading every foot. Transect lines should be oriented North, South, East, and West of the well bore or, in the case of constructed pads, the transect lines may radiate from the well bore to the pad corners. Using a straight, fine wire, such as a pin flag, carefully lower the wire so that it is perpendicular with the ground surface or straight up and down and at each 1 foot interval along one side of the tape; record hits on the field form. Optical sighting devices such as a laser pointer may also work well. Only basal vegetation will be recorded. If foliage is encountered, insert wire through foliage and record hit at ground surface (bare ground, litter, grass, etc.). The process of a randomized start with a systematic process should, over time, record representative samples from the entire area.

b. Linear disturbance

Linear features will be similarly monitored by selecting representative portions consisting of a minimum of one monitoring location every ¼ mile or change of ecological site (as defined by NRCS soil survey), whichever comes first. Specific monitoring locations may be modified as approved by the BLM Authorized Officer. Additionally, multiple pipeline rights-of-way will be monitored by each “linear layer” based on date of disturbance/reclamation. Pipeline operators will provide a reclamation monitoring plan detailing how each pipeline company will comply with reclamation monitoring criteria.

Monitoring will consist of a minimum of four 100’ transects run from disturbed edge to disturbed edge, with a reading every two feet.

Definitions:

Bare ground – Areas of mineral soil with no vegetation or litter.

Basal Area (plants) – The cross-sectional area of the stem or the stems of all plants in a stand.

Herbaceous and small woody plants are measured at the near ground level; larger woody plants are measured at breast or other designate height. *Interpreting Indicators of Rangeland Health – Technical Reference 1734-6*

Bunchgrass – A grass having the characteristic growth habit of forming a bunch; lacking stolons or rhizomes (SRM 1999).

Contamination – The presence of man-made chemicals or other alterations in the natural soil or water environment (pesticides, hazardous substances, petroleum, salts). *Adapted from various sources.*

Erosion Control – To protect soil surface and prevent soil particles from being detached by rainfall, snowmelt or wind. Erosion control works to keep the soil in place.

Dominant species – No single species will account for more than 30% total vegetative composition unless it is evident at higher levels in the adjacent landscape. Vegetation canopy cover and species diversity and type shall approximate the surrounding undisturbed area. Exception may be granted where this standard conflicts with the desires of a private landowner.

Ecosystem – Includes all the organisms of an area, their environment, and the linkages or interactions among all of them; all parts of an ecosystem are interrelated. The fundamental unit in ecology, containing both organisms and abiotic environments, each influencing the properties of the other and both necessary for the maintenance of life. *Vegetation Treatments Using Herbicides in 17 Western States, Programmatic Environmental Impact Statement (BLM 2007)*

Edge Effect – The influence of one adjoining plant community upon the margin of another affecting the composition and density of the populations.

Feature – Proposed linear disturbance.

Federal Action – Approval of specific projects, such as construction or management activities located in a defined geographic area. Projects include actions approved by permit or other regulatory decision as well as federal and federally assisted activities. *National Environmental Policy Act (NEPA) [42 U.S.C. 4321 et seq.]*

Forb – Non-grassy herbaceous (non-woody) plant.

Grass – Any of a large family gramineae of monocotyledonous, mostly herbaceous plants, with a jointed stem, slender sheathing leaves and flowers borne on spikelet's or bracts.

Gravel – less than 2" at the intermediate axis.

Invasive Species – A species that is not native to the ecosystem under consideration and whose introduction causes or is likely to cause economic or environmental harm or harm to human health. See BLM Invasive Species List, *Executive Order 13112*.

Litter – Litter provides a source of organic matter for incorporation into the underlying mineral soil, acts as a source of carbon for organisms carrying out decomposing functions, and insulates the soil from extreme air temperatures. Litter also plays a critical role in watershed protection by promoting water infiltration and protecting the soil from the erosive energy of raindrops and surface runoff. Ground cover has typically been defined as the area of ground covered by vegetation and litter. Plant litter such as hay, straw, wood chips, or matting that is mechanically fixed to the soil surface.

Limited Reclamation Potential Areas (LRP) – There are areas (e.g., alkali flats, badlands, dunes, rocky outcrops) where reclamation may be more difficult than in traditional landscapes. LRP areas are characterized by highly erodible soils; steep slopes; sites having physical, biological, and/or chemical limitations, low precipitation rates; or areas which have characteristics that make traditional reclamation practices impractical or unfeasible. Because reclamation in LRP areas is more difficult, LRP areas should be avoided. However, if LRP areas have been previously leased or permitted, additional bonding may be required. Alternatives to development in LRPs should be carefully analyzed using information from the reclamation plan and documented in the NEPA process.

Persistent Litter – Litter has been defined by some authorities as dead organic matter lying on the mineral soil; others have included standing dead material and dead fallen organic material. On the basis of these definitions, litter in sagebrush steppe ecosystems includes fallen dead leaves; stems; bark; flowers; and seeds of shrubs, forbs, and grasses; dead cushion plants and moss; detached lichen; animal feces and dead insects; and unidentifiable amorphous woody organic matter (humic litter) lying on the mineral soil surface. Litter seems to be the most prevalent ground cover component in sagebrush steppe ecosystems.

Reclamation Plan – A written document that addresses the reconstruction of disturbed ecosystems by returning the land to a stable and productive condition compatible with the land use plan. This Plan shall address the Goals and Objectives described in the Wyoming Reclamation Policy.

Rills – A small, intermittent water course with steep sides, usually only several centimeters deep. Rills generally are linear erosion features.

Scenic Quality – The overall impression of a landscape retained after driving or walking through, or flying over an area. The Scenic Quality of an area is rated as Class A (outstanding visual characteristics), Class B (combination of outstanding and common visual characteristics), and Class C (common visual characteristics). See *BLM Handbook H-8410 Visual Resource Inventory and BLM Handbook H-8431 Visual Resource Contrast Rating*.

Sediment Control – To trap soil particles after they have been dislodged and moved by wind or water. Sediment controls generally rely on filtering or settling soil particles out of water or wind that is transporting them.

Shrub – A woody plant which branches below or near ground level into several main stems, so has no clear trunk. It may be deciduous or evergreen. At the end of the growing season there is no die-back of the axis.

Soil Surface Factor (SSF) – Numerical expression of surface erosion activity caused by wind and water as reflected by soil movement, surface litter, erosion pavement, pedestalling, rills, flow patterns, and gullies. Values vary from 0 for stable erosion condition to 100 for a severe condition. *Technical Note #346, Erosion Condition Classification System*

Surface Disturbing Activities – An action that alters the vegetation, surface/near surface soil resources, and/or surface geologic features, beyond natural site conditions and on a scale that affects other Public Land values. Examples of surface disturbing activities may include: operation of heavy equipment to construct well pads, roads, pits and reservoirs; installation of pipelines and power lines; and the conduct of several types of vegetation treatments (e.g., prescribed fire, etc.). Surface disturbing activities may be either authorized or prohibited. *Wyoming Information Bulletin 2007-029, Guidance for Use of Standardized Surface Use Definitions*

Topsoil – The biologically active, upper part of the soil profile, being the most favorable material for plant growth. *Adapted from U.S.D.A., NRCS*

Tree – Perennial, woody plant with a single stem (trunk), normally greater than 4 to 5 meters (13 to 16 feet) in height; under certain environmental conditions, some tree species may develop a multi-stemmed or short growth form (less than 4 meters or 13 feet in height).

Weed – A plant considered undesirable, unattractive, or troublesome, especially one growing where it is not wanted. We are generally interested in noxious and non-native invasive species.

Waste materials – Any discarded or abandoned material that can interfere with successful reclamation, safety, and long term stability of a site (contaminated soil or water, drilling mud, solid waste). *Adapted from various sources*

ATTACHMENT 1

Tech Note #346 U.S. Department of the Interior- Bureau of Land Management Erosion Condition Classification System by Ronnie Clark

Operator: _____ Collector: _____

Well name/number AND Legal description: _____

Coordinates(UTMs): _____ Date: _____

Erosional Feature	Potentially Present Yes/No	Identified Factors (Form 7310-12)	Possible Factor
Soil Movement			
Surface Litter			
Surface Rock Fragments			
Pedestalling			
Flow Patterns			
Rills			
Gullies			
Column Totals			
Soil Surface Factor Totals			
Class			

Erosion Control Classification System Values	
SSF	Class
1-20%	Stable
21-40%	Slight
41-60%	Moderate
61-80%	Critical
81-100%	Severe

ATTACHMENT 2

FORM 7310-12 DETERMINATION OF EROSION CONDITION CLASS

Erosion Control Classification System Determinations					
Soil Surface Factor (SSF)					
Soil Movement	Depth of recent deposits around obstacles, or in microterraces; and/or depth of truncated areas, is 0 – 0.1 in (0 – 2.5 mm). 0 or 3	Depth of recent deposits around obstacles, or in microterraces; and/or depth of truncated areas, is 0.1 – 0.2 in (2 – 5 mm). 5	Depth of recent deposits around obstacles, or in microterraces; and/or depth of truncated areas, is 0.2 – 0.4 in. (5 – 10 mm) 8	Depth of recent deposits around obstacles, or in microterraces; and/or depth of truncated areas, is 0.4 – 0.8 in. (10 – 20 mm) 11	Depth of recent deposits around obstacles, or in microterraces; and/or depth of truncated areas, is > 0.8 in. (20 mm) 14
Surface Litter	No movement, or if present, < 2% of the litter has been translocated and redeposited against obstacles. 0 or 3	2 – 10% of the litter has been translocated and redeposited against obstacles. 6	10 – 25% of the litter has been translocated and redeposited against obstacles. 8	25 – 50% of the litter has been translocated and redeposited against obstacles. 11	> 50% of the litter has been translocated and redeposited against obstacles. 14
Surface Rock Fragments	Depth of soil removal around the fragments, and/or depth of recent deposits around the fragments is < 0.1 in (2.5 mm). 0 or 2	Depth of soil removal around the fragments, and/or depth of recent deposits around the fragments is 0.1 – 0.2 in. (2.5 – 5 mm). 5	Depth of soil removal around the fragments, and/or depth of recent deposits around the fragments is 0.2 – 0.4 in. (5 – 10 mm). 8	Depth of soil removal around the fragments, and/or depth of recent deposits around the fragments is 0.4 – 0.8 in. (10 – 20 mm). 11	Depth of soil removal around the fragments, and/or depth of recent deposits around the fragments is > 0.8 in. (20 mm). 14
Pedestals	Pedestals are mostly < 0.1 in (2.5 mm) high and/or have a frequency < 2 pedestals/100 ft. 0 or 3	Pedestals are mostly 0.1 – 0.3 in. (2.5 – 8 mm) high and/or have a frequency of < 2 – 5 pedestals/100 ft. 6	Pedestals are mostly 0.3 – 0.6 in. (8 – 15 mm) high and/or have a frequency of < 5 – 7 pedestals/100 ft. 9	Pedestals are mostly 0.6 – 1 in. (15 – 25 mm) high and/or have a frequency of < 7 – 10 pedestals/100 ft. 11	Pedestals are mostly > 1 in. (25 mm) high and/or have a frequency of > 10 pedestals/100 ft. 14
Flow Patterns	If present, < 2% surface area shows evidence of recent translocation and deposition of soil & litter.	2 – 10% surface area shows evidence of recent translocation and deposition of soil & litter. 6	10 – 25% surface area shows evidence of recent translocation and deposition of soil & litter.	25 – 50% surface area shows evidence of recent translocation and deposition of soil & litter.	> 50% surface area shows evidence of recent translocation and deposition of soil & litter.

Erosion Control Classification System Determinations					
	0 or 3		9	12	15
Rills	If present, are < 0.5 in (13 mm) deep and at intervals > 10 ft. 0 or 3	Rills are mostly 0.5 – 1 in. (13 – 25 mm) deep, and at intervals >10 ft. 6	Rills are mostly 1 – 1.5 in. (25 – 38 mm) deep, and at intervals > 10 ft. 9	Rills are mostly 1.5 – 3 in. (38 – 76 mm) deep, and at intervals >10 ft. 12	Rills are mostly 3 – 6 in. (76 – 152 mm) deep, and at intervals > 5 ft. 14
Gullies	If present, < 2% of the channel bed and walls show active erosion (no vegetation), gullies make up <2% total area. 0 or 3	2 – 5% of the channel bed and walls show active erosion (no vegetation), gullies make up 2 – 5% total area. 6	5 – 10% of the channel bed and walls show active erosion (no vegetation), gullies make up 5 – 10% total area. 9	10 – 50% of the channel bed and walls show active erosion (no vegetation), gullies make up 10 – 50% total area. 12	Over 50% of the channel bed and walls show active erosion (no vegetation), gullies make up >50% total area.

ATTACHMENT 3 EXAMPLE MONITORING SUMMARY REPORT

Once 100 points of data at a transect are collected, the sum of the forb, shrub, grass component is entered by species and life form. Then calculate the percentages of desirable species by life form, add the percentages of all desirable vegetation species of grass, forb, and shrub from your raw monitoring data.

Operator: _____ Collector: _____

Well name/number AND Legal description: _____

Coordinates (UTMs): _____ Date: _____

Species	Life form	Raw data from monitoring field sheet (# of hits)	% by life form			% of total desirable vegetation by species
			Forb	Shrub	Grass	
Green rabbit brush	Shrub	1				4.5%
Scarlet globemallow	Forb	1				4.5%
Western wheatgrass	Grass	3				13.6%
Indian ricegrass	Grass	1				4.5%
Bluebunch wheatgrass	Grass	2				9%
Fourwing saltbush	Shrub	1				4.5%
Big sagebrush	Shrub	2				9%
Thickspike wheatgrass	Grass	1				4.5%
Totals		22	4.5%	18%	31%	

Calculations for percent of desirable vegetation by life form and species

**ATTACHMENT 4
COVER BY LIFEFORM TRANSECT**

Operator: _____ Collector: _____

Well name/number AND Legal description: _____

Coordinates (UTMs): _____ Date: _____

	Grasses	Forbs	Shrubs	Litter	Rock	Bare Ground	Other (i.e. cactus)
Perennial							
Annual							
Noxious							
Other							
Total (=100)							

**Litter includes standing dead matter, moss, lichen, biological crust, and scat.*

ATTACHMENT 5
BLM RECOMMENDED SEED MIXES BASED ON ECOLOGICAL SITES

Shallow Loamy Ecological Site Seed Mix	
Species	Lbs PLS*
<i>Thickspike wheatgrass (Elymus lanceolatus ssp. lanceolatus)</i>	7
<i>Bluebunch wheatgrass (Pseudoroegneria spicata ssp. spicata)</i>	4.6
<i>Blue grama (Bouteloua gracilis)</i> Or <i>Needleandthread (Hesperostipa comata)</i>	1.0
<i>Prairie coneflower (Ratibida columnifera)</i>	0.8
<i>White or purple prairie clover (Dalea candidum, purpurea)</i>	0.8
<i>Rocky Mountain beeplant (Cleome serrulata)</i>	0.8
<i>Fourwing saltbush (Atriplex canescens)</i> Or <i>Wyoming big sagebrush (Artemisia tridentata)</i> Or <i>Winterfat (Krascheninnikovia lanata)</i>	0.5
<i>Rubber rabbitbrush (Ericameria nauseosa)</i> Or <i>Green rabbitbrush (Chrysothamnus viscidiflorous)</i>	0.5
Totals	16 lbs/acre

Shallow Sandy Ecological Site Seed Mix	
Species	Lbs PLS*
<i>Thickspike wheatgrass</i> (<i>Elymus lanceolatus</i> ssp. <i>lanceolatus</i>)	3.5
<i>Bluebunch wheatgrass</i> (<i>Pseudoroegneria spicata</i> ssp. <i>spicata</i>)	3.5
<i>Blue grama</i> (<i>Bouteloua gracilis</i>) Or <i>Needleandthread</i> (<i>Hesperostipa comata</i>)	1.0
<i>Prairie sandreed</i> (<i>Calamovilfa longifolia</i>)	4.6
<i>Prairie coneflower</i> (<i>Ratibida columnifera</i>)	0.8
<i>White or purple prairie clover</i> (<i>Dalea candidum, purpurea</i>)	0.8
<i>Blue flax</i> (<i>Linum lewisii</i>)	0.8
<i>Fourwing saltbush</i> (<i>Atriplex canescens</i>) Or <i>Wyoming big sagebrush</i> (<i>Artemisia tridentata</i>) Or <i>Winterfat</i> (<i>Krascheninnikovia lanata</i>)	0.5
<i>Rubber rabbitbrush</i> (<i>Ericameria nauseosa</i>) Or <i>Green rabbitbrush</i> (<i>Chrysothamnus viscidiflorous</i>)	0.5
Totals	16 lbs/acre

Clayey Ecological Site Seed Mix	
Species	Lbs PLS*
<i>Western wheatgrass (Pascopyrum smithii)</i>	4.6
<i>Green needlegrass (Nassella viridula)</i>	5.2
<i>Slender wheatgrass (Elymus trachycaulus ssp. trachycaulus)</i>	1.8
<i>Blue grama (Bouteloua gracilis)</i> Or <i>Needleandthread (Hesperostipa comata)</i>	1.0
<i>Prairie coneflower (Ratibida columnifera)</i>	0.8
<i>White or purple prairie clover (Dalea candidum, purpurea)</i>	0.8
<i>Rocky Mountain beeplant (Cleome serrulata)</i>	0.8
<i>Fourwing saltbush (Atriplex canescens)</i> Or <i>Wyoming big sagebrush (Artemisia tridentata)</i> Or <i>Winterfat (Krascheninnikovia lanata)</i>	0.5
<i>Rubber rabbitbrush (Ericameria nauseosa)</i> Or <i>Green rabbitbrush (Chrysothamnus viscidiflorous)</i>	0.5
Totals	16 lbs/acre

Loamy Ecological Site Seed Mix	
Species	Lbs PLS*
<i>Western wheatgrass (Pascopyrum smithii)</i> Or <i>Thickspike wheatgrass (Elymus lanceolatus ssp. lanceolatus)</i> <i>Bluebunch wheatgrass (Pseudoroegneria spicata ssp. spicata)</i>	3.9
<i>Green needlegrass (Nassella viridula)</i>	3.4
<i>Slender wheatgrass (Elymus trachycaulus ssp. trachycaulus)</i>	2.8
<i>Blue grama (Bouteloua gracilis)</i> Or <i>Needleandthread (Hesperostipa comata)</i>	1.0
<i>Prairie coneflower (Ratibida columnifera)</i>	0.8
<i>White or purple prairie clover (Dalea candidum, purpurea)</i>	0.8
<i>Rocky Mountain beeplant (Cleome serrulata)</i>	0.8
<i>Fourwing saltbush (Atriplex canescens)</i> Or <i>Wyoming big sagebrush (Artemisia tridentata)</i> Or <i>Winterfat (Krascheninnikovia lanata)</i>	0.5
<i>Rubber rabbitbrush (Ericameria nauseosa)</i> Or <i>Green rabbitbrush (Chrysothamnus viscidiflorous)</i>	0.5
Totals	16 lbs/acre

Sandy Ecological Site Seed Mix	
Species	Lbs PLS*
<i>Thickspike wheatgrass</i> (<i>Elymus lanceolatus</i> ssp. <i>lanceolatus</i>)	3.5
<i>Prairie sandreed</i> (<i>Calamovilfa longifolia</i>)	4.6
<i>Indian ricegrass</i> (<i>Achnatherum hymenoides</i>)	3.5
<i>Blue grama</i> (<i>Bouteloua gracilis</i>) Or <i>Needleandthread</i> (<i>Hesperostipa comata</i>)	1.0
<i>Prairie coneflower</i> (<i>Ratibida columnifera</i>)	0.8
<i>White or purple prairie clover</i> (<i>Dalea candidum, purpurea</i>)	0.8
<i>Blue flax</i> (<i>Linum lewisii</i>)	0.8
<i>Fourwing saltbush</i> (<i>Atriplex canescens</i>) Or <i>Wyoming big sagebrush</i> (<i>Artemisia tridentata</i>) Or <i>Winterfat</i> (<i>Krascheninnikovia lanata</i>)	0.5
<i>Rubber rabbitbrush</i> (<i>Ericameria nauseosa</i>) Or <i>Green rabbitbrush</i> (<i>Chrysothamnus viscidiflorous</i>)	0.5
Totals	16 lbs/acre

Shallow Clayey Ecological Site Seed Mix	
Species	Lbs PLS*
<i>Western wheatgrass (Pascopyrum smithii)</i>	2.4
<i>Green needlegrass (Nassella viridula)</i>	2.4
<i>Blue grama (Bouteloua gracilis)</i> Or <i>Needleandthread (Hesperostipa comata)</i>	1.0
<i>American vetch (Vicia Americana)</i>	1.0
<i>Blue flax (Linum lewisii)</i>	0.2
<i>Fourwing saltbush (Atriplex canescens)</i> Or <i>Wyoming big sagebrush (Artemisia tridentata)</i> Or <i>Winterfat (Krascheninnikovia lanata)</i>	0.5
<i>Rubber rabbitbrush (Ericameria nauseosa)</i> Or <i>Green rabbitbrush (Chrysothamnus viscidiflorous)</i>	0.5
Totals	8.0 lbs/acre

Very Shallow Ecological Site Seed Mix	
Species - Cultivar	Lbs PLS*
<i>Thickspike wheatgrass</i> (<i>Elymus lanceolatus</i> ssp. <i>lanceolatus</i>) Or <i>Western wheatgrass</i> (<i>Pascopyrum smithii</i>)	1.2
<i>Bluebunch wheatgrass</i> (<i>Pseudoroegneria spicata</i> ssp. <i>spicata</i>)	3.5
<i>Needleandthread</i> (<i>Hesperostipa comata</i>)	0.9
<i>Blue grama</i> (<i>Bouteloua gracilis</i>) Or <i>Buffalo grass</i> (<i>Buchloe dactyloides</i>)	1.0
<i>American vetch</i> (<i>Vicia Americana</i>) OR <i>Milkvetches</i> (<i>Astragalus</i>)	0.7
<i>Blue flax</i> (<i>Linum lewisii</i>)	0.2
<i>Fourwing saltbush</i> (<i>Atriplex canescens</i>) Or <i>Wyoming big sagebrush</i> (<i>Artemisia tridentata</i>) Or <i>Winterfat</i> (<i>Krascheninnikovia lanata</i>)	0.5
<i>Rubber rabbitbrush</i> (<i>Ericameria nauseosa</i>) Or <i>Green rabbitbrush</i> (<i>Chrysothamnus viscidiflorous</i>)	0.5
Totals	8.5 lbs/acre

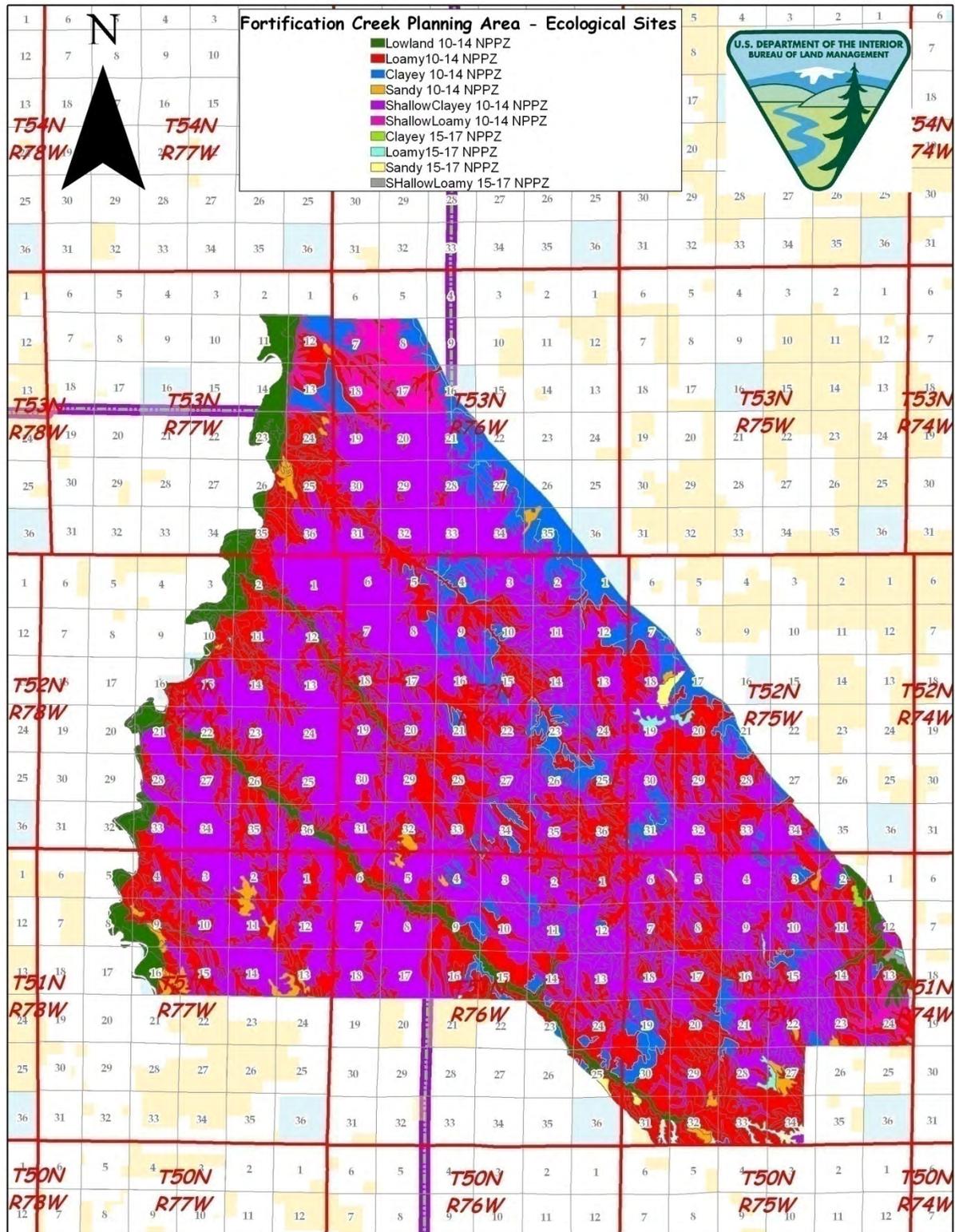
Lowland Ecological Site Seed Mix	
Species	Lbs PLS*
<i>Thickspike wheatgrass</i> (<i>Elymus lanceolatus</i> ssp. <i>lanceolatus</i>) Or <i>Western wheatgrass</i> (<i>Pascopyrum smithii</i>)	4.8
<i>Green needlegrass</i> (<i>Nassella viridula</i>)	4.1
<i>Basin wildrye</i> (<i>Leymus cinereus</i>)	3.5
<i>Blue grama</i> (<i>Bouteloua gracilis</i>) Or <i>Needleandthread</i> (<i>Hesperostipa comata</i>)	1.0
<i>Prairie coneflower</i> (<i>Ratibida columnifera</i>)	0.8
<i>White or purple prairie clover</i> (<i>Dalea candidum, purpurea</i>)	0.8
<i>Fourwing saltbush</i> (<i>Atriplex canescens</i>) Or <i>Wyoming big sagebrush</i> (<i>Artemisia tridentata</i>) Or <i>Winterfat</i> (<i>Krascheninnikovia lanata</i>)	0.5
<i>Rubber rabbitbrush</i> (<i>Ericameria nauseosa</i>) Or <i>Green rabbitbrush</i> (<i>Chrysothamnus viscidiflorous</i>)	0.5
Totals	16 lbs/acre

ATTACHMENT 6

FORTIFICATION CREEK PLANNING AREA PLANT SPECIES LIST

COMMON NAME/ GROUP NAME	SCIENTIFIC NAME
GRASSES/GRASSLIKES	
<i>RHIZOMATOUS WHEATGRASSES:</i>	
thickspike wheatgrass	<i>Elymus lanceolatus</i>
western wheatgrass	<i>Pascopyrum smithii</i>
<i>OTHER GRASSES</i>	
green needlegrass	<i>Nassella viridula</i>
bluebunch wheatgrass	<i>Pseudoroegneria spicata</i>
Cusick's bluegrass	<i>Poa cusickii</i>
needleandthread	<i>Hesperostipa comata</i>
little bluestem	<i>Schizachyrium scoparium</i>
threadleaf sedge	<i>Carex filifolia</i>
<i>MISCELLANEOUS GRASSES/GRASSLIKES*</i>	
blue grama	<i>Bouteloua gracilis</i>
hairy grama	<i>Bouteloua hirsuta</i>
Canby bluegrass	<i>Poa canbyi</i> (syn. to <i>Poa secunda</i>)
plains reedgrass	<i>Calamagrostis montanensis</i>
needleleaf sedge	<i>Carex duriuscula</i>
buffalo grass	<i>Buchloe dactyloides</i>
prairie junegrass	<i>Koeleria macrantha</i>
Sandberg bluegrass	<i>Poa secunda</i>
plains muhly	<i>Muhlenbergia cuspidata</i>
threadleaf sedge	<i>Carex filifolia</i>
bottlebrush squirreltail	<i>Elymus elymoides</i>
sideoats grama	<i>Bouteloua curtipendula</i>
Fendler threeawn	<i>Aristida purpurea</i>
Indian ricegrass	<i>Achnatherum hymenoides</i>
sand dropseed	<i>Sporobolus cryptandrus</i>
FORBS	
<i>MISCELLANEOUS FORBS*</i>	
American vetch	<i>Vicia americana</i>
prairie coneflower	<i>Ratibida columnifera</i>
asters	<i>Asters</i>
biscuitroots	<i>Lomatium spp.</i>
breadroot scurfpea	<i>Pediomelum esculentum</i>
western yarrow	<i>Achillea lanulosa</i>
rosy pussytoes	<i>Antennaria rosea</i>
milkvetches	<i>Astragalus</i>
scarlet gaura	<i>Gaura coccinea</i>
purple prairie clover	<i>Dalea purpurea</i>
white prairie clover	<i>Dalea candida</i>
bluebells	<i>Mertensia</i>
wild onion	<i>Allium textile</i>
prairie thermopsis	<i>Thermopsis rhombifolia</i>

COMMON NAME/ GROUP NAME	SCIENTIFIC NAME
stemless goldenweed	<i>Haplopappus acaulis</i>
twogrooved milkvetch	<i>Astragalus bisulcatus</i>
hawksbeard	<i>Crepis acuminata</i>
sulphur flower buckwheat	<i>Eriogonum umbellatum</i>
TREES, SHRUBS & HALF-SHRUBS	
Wyoming big sagebrush	<i>Artemisia tridentata</i>
birdfoot sagebrush	<i>Artemisia pedatifida</i>
winterfat	<i>Krascheninnikovia lanata</i>
rubber rabbit brush	<i>Ericameria nauseosa</i>
silver sagebrush	<i>Artemisia cana</i>
skunkbush sumac	<i>Rhus trilobata</i>
green rabbit brush	<i>Chrysothamnus viscidiflorous</i>
yucca	<i>Yucca glauca</i>
ponderosa pine	<i>Pinus ponderosa</i>
junipers	<i>Juniperus scopulorum</i>
western snowberry	<i>Symphoricarpos occidentalis</i>



APPENDIX B

**BUREAU OF LAND MANAGEMENT
BUFFALO FIELD OFFICE**

**FORTIFICATION CREEK RESOURCE MANAGEMENT PLAN
AMENDMENT**

**PERFORMANCE-BASED STANDARDS:
GOALS, OBJECTIVES, INDICATORS, AND
RECOMMENDATIONS**

August 2011

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1 INTRODUCTION

These performance goals, objectives, indicators, and recommendations were designed to be used in conjunction with the Fortification Creek Resource Management Plan Amendment (FCRMPA). These will be used instead of prescriptive requirements to achieve Bureau of Land Management (BLM) goals and objectives for the Fortification Creek Planning Area (FCPA).

1.1 Elk

Goal:

A viable elk herd utilizing their seasonal ranges during the appropriate seasons is maintained across the FCPA.

Objectives:

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.
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:YrIng 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.

Initial cow:calf ratios are based on minimum of 9 year average, subsequent (monitoring ratios) will be based on a rolling 5 year average. Initial fidelity thresholds will be based on a three year average for crucial winter range fidelity (winters 2008-2009, 2009-2010, and 2010-2011) and yearlong fidelity (spring 2008-spring 2011), and a four year average for parturition range fidelity (2008-2011). Initial local habitat effectiveness will be based on elk use from April 2008 until project authorization.

Monitoring data will be reviewed during site-specific POD analyses to determine compliance with the performance standards. The Monitoring Team (BLM and State of Wyoming) will meet at minimum of once per year to assess trends and determine if any thresholds have been crossed. The thresholds are guides for adaptive management they are not hard thresholds. If a threshold

is crossed it will not be automatic that management actions will change. The monitoring team will review all the data, and determine whether a management change is warranted. For example if the winter calf survival ratio falls below the threshold and the monitoring team after reviewing the data believes the decreased calf survival is related to winter weather and not CBNG development then a management change would likely not be proposed.

Indicators:

- a. Population – WGFD post hunt estimate from fall (Nov. – Dec.) helicopter survey and POP II (VI.2.5) simulation modeling. (Initial estimate from WGFD 2010 JCR Table 1)
- b. Calf production – WGFD post hunt estimate from fall (Nov. – Dec.) helicopter survey and POP II (VI.2.5) simulation modeling. (Initial estimate from WGFD 2010 JCR Table 7, 2003-2011)
- c. Winter calf survival – WGFD spring estimate from late winter (late Feb. – early April) helicopter survey. (Initial estimate from WGFD 2010 JCR Table 8, 2003-2011)
- d. Next-summer calf survival (yearling) – WGFD post hunt estimate from fall (Nov. – Dec.) helicopter survey and POP II (VI.2.5) simulation modeling. (Initial estimate from WGFD 2010 JCR Table 7, 2003-2011)
- e. Range fidelity – GPS data analyzed quarterly for yearlong range.
- f. Seasonal fidelity – GPS data analyzed following seasonal periods. Calving: May 15 – June 15. Winter: December 1 – April 30. Fidelity includes not only the amount of use, but the pattern of use. For example crucial winter range use is anticipated to show elk movement in and out of the CWR based on storm events.
- g. Security habitat – Viewshed modeling from available roads prior to APD approval.
- h. Effective habitat – During the operational phase of CBNG wells elk use returns to 80% of current (pre-APD) levels. GPS data analyzed quarterly.

Recommendations:

Consolidate and minimize infrastructure – range fidelity, security habitat, and habitat effectiveness. Example: Operators are encouraged to work together in designing a primary road and infrastructure corridor network.

1. Locate ancillary facilities (water management, compressors, metering stations, etc.) outside crucial ranges – seasonal fidelity.
2. Reduce metering and other production related visitation – security habitat, habitat effectiveness, seasonal fidelity, range fidelity.
3. Close and reclaim redundant or otherwise unnecessary roads – security habitat, habitat effectiveness, seasonal fidelity, range fidelity.
4. Limit operations within crucial seasonal ranges where not stipulated – security habitat, habitat effectiveness, seasonal fidelity. Honor timing limitations not only with construction activities but to the greatest extent practical during production as well.
5. Work with BLM and WGFD to incorporate forage and habitat enhancements into plans of development (PODs) – habitat effectiveness, range fidelity, calf production, and calf survival.
6. Limit security habitat loss – security habitat, effective habitat, seasonal fidelity, range fidelity.

1.2 Reclamation (Soil & Vegetation)

Sources: Wyoming BLM Reclamation Policy, BLM Tech Note 346, Jonah and Atlantic Rim reclamation standards, BLM Washington Office lead Natural Resource Specialist.

Goals:

1. Short term goal: immediately stabilize disturbed areas and provide conditions necessary to achieve the long term goal.
2. Long term goal: facilitate eventual ecosystem reconstruction to maintain a safe and stable landscape and meet the desired outcomes of the land use plan.
3. Vegetative communities within CBNG development mirror those of healthy communities as described in the Ecological Site Description (ESD).

Objectives:

1. Interim reclamation (initiated within 30 days of completing surface disturbing activities):
The objective of interim reclamation is to restore desirable vegetative cover and a portion of the landform sufficient to maintain healthy, biologically active topsoil; control erosion; and minimize habitat, visual, and forage loss during the life of the well or facilities. Interim Reclamation – Includes disturbed areas that may be redisturbed during operations and will be redisturbed at final reclamation to achieve restoration of the original landform and a natural vegetative community.
 - i. The operator will submit a subsequent report by Sundry Notice to BLM once stabilization measures have been implemented.

Indicators:

- a. Erosion control methods shall be in place to mitigate any erosive features, such as rills, gullies, or sheet erosion.
 - b. Disturbed areas not needed for active, long-term production operations or vehicle travel have been recontoured; protected from erosion; and revegetated with a self-sustaining, vigorous, diverse, native (or as otherwise approved) plant community sufficient to minimize visual impacts, provide forage, stabilize soils, and impede the invasion of noxious, invasive, and non-native weeds.
 - c. During initial well pad, production facility, road, pipeline, and utility corridor construction, pre-interim reclamation stormwater management actions will be taken to ensure disturbed areas are quickly stabilized to control surface water flow and to protect both the disturbed and adjacent areas from erosion and siltation.
2. Successful interim reclamation:
 - a. Year 1: The site must be in stable condition as indicated by the Erosion Control Classification System (BLM Tech Note 346).
 - i. The operator has ensured that 100% of the disturbance site is in a stable condition as indicated by the Erosion Control Classification System (BLM Tech Note 346). The site is stable as determined by the soil surface factor (SSF) factor range 1-20. The disturbance area has been seeded with the approved seed mix.
 - b. Year 2: 100% of the disturbance area is stable and vegetation is becoming established with desirable species and trending towards long-term goal(s).

- c. Year 3: 100% of the disturbance area is stable and re-vegetated to within 80% of the ESD reference site for bare ground.
 - i. Native Grasses: Reclaimed sites must have a minimum of 2 native perennial grass species established in the disturbance area, 1 of which must be a bunch grass species.
 - ii. Native Forbs: The average density or frequency of forbs must be a minimum of 80% of the reference site. Diversity of forbs on a reclaimed site must be equal to or greater than the reference site.
 - iii. Non-Native Weeds: Sites must be free from all species listed on the Wyoming or Federal noxious weed list. All state and federal laws regarding noxious weeds must be followed. Other highly competitive invasive species such as cheatgrass must be controlled.
 - iv. Plant Vigor: Plants must be resilient as evidenced by well-developed root systems, flowers, and seed heads. All sites must exhibit the sustainability of the above desired attributes after the removal of external influences. A minimum of 1 growing season without external influences (irrigation, mat pads, fences, etc.) may satisfy this requirement.
- Successful reclamation criteria must be met prior to the operator proceeding with additional development within the FCPA. For example if development in Phase 1 begins in 2011 and runs through 2013, prior to moving into Phase II the 2011 development areas must meet the Year 3 reclamation requirements, the 2012 development areas must meet the Year 2 reclamation requirements, and the 2013 development areas must meet the Year 1 reclamation requirements.

1. Final reclamation:

- d. Final Reclamation – Includes disturbed areas where the original landform and a natural vegetative community have been restored.

Indicators:

Refer to the Wyoming Reclamation Policy – Instruction Memorandum No. WY-2009-022 located on the web at:

<http://www.blm.gov/style/medialib/blm/wy/resources/efoia/IMs/2009.Par.54664.File.dat/wy2009-022.pdf>.

1. Reclamation plan:

A reclamation plan shall be developed for all surface disturbing activities and will become part of the proposed action in the NEPA document. The level of detail for the reclamation plan shall reflect: the complexity of the project, the environmental concerns, and the reclamation potential for the site. These plans shall also incorporate any program or regulatory specific requirements for reclamation. The reclamation plan shall address short-term stabilization to facilitate long-term reclamation. The reclamation plan is considered complete when all the reclamation requirements described in the WY Reclamation Policy have been addressed, the techniques to meet the reclamation requirements are described in detail, and the BLM concurs with the reclamation plan.

Reclamation Monitoring and Final Abandonment Approval

Monitoring Intensity

The vision is for industry to monitor each individual Application for Permit to Drill (APD) and right-of-way (ROW) 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. Point line transects will be the base monitoring methodology with a minimum of 200 points for each location.

a. Monitoring methods

Methods for monitoring vegetation and ground cover are recognized as standard monitoring and surveying methodologies. The point line or line intercept method is used to measure the amount of ground cover after disturbance. Ground cover is important in controlling surface erosion after a disturbance. Most ground cover on a reclaimed well pad is in the form of mulch or reestablished vegetation. Monitoring and reporting of surface disturbances will occur annually.

The operator may use any BLM approved monitoring method, however, BLM will utilize the point line transect method for vegetation and soil surface factor (SSF) method for site stability to determine when reclamation standards have been met.

b. Site selection

Site selection must include representative sections (transects) of all areas of the disturbed environment. Transects are configured to include edge effect, pits, and general resource conditions, as much as practicable. Standardization will assure repeatability and allow comparison of data as well as reduce confusion.

c. Linear features

Include roads, power lines, pipe lines, etc. associated with applications for permit to drill (APDs) or rights of way (ROW). Sites selection should be made after speaking with individuals who are familiar with the characteristics of the different land forms, soil types, precipitation zones, and vegetation communities within the length of the linear feature. 0.25 mile monitoring sections must be selected that best represent all of the disturbed areas. For example; variation in slope, aspect, plant communities, soil types, view sheds, and other features.

d. Size and frequency

Monitoring sites will be in standardized segments, measured by tape. Monitoring segments should also be selected for reference conditions as well as for ROW or APD representation. Success and degree of success will be determined by how closely each site matches the defined Ecological Site description (ESD), in the success criteria for each described soil type and precipitation zone.

e. Timing and duration

Monitoring should be conducted during the effective growing season generally from April 1st to July 15th but may go into October with sufficient moisture. Monitoring should occur at approximately the same time each year. Monitoring and reporting of interim reclamation will be required from the time restoration is initiated until success is achieved and agreed to

by BLM, then every third year thereafter until signed off as successfully reclaimed at project completion.

f. Field methods

Field methods include both qualitative assessments and quantitative measurements.

Revegetation is an important component of site stabilization and accelerates a return to landscape productivity. Vegetation reduces erosion by roughening the ground surface, slowing drainage, and increasing infiltration and deposition. Plant roots promote slope stability by breaking up soil, increasing shear strength, increase porosity, and encourage infiltration. Vegetation can reduce soil moisture loss, increasing the available storage for the next precipitation event. Revegetation goals are twofold: Short-term erosion prevention and long-term conversion to native plant communities. We have five questions we would like to answer through vegetative monitoring:

- Is there sufficient ground cover to control surface erosion?
- Is there sufficient establishment of desired plant species?
- Are erosion features within standards?
- Has the site been properly re-contoured?
- Are weeds controlled?

g. Well pads and similar shaped disturbances

To monitor well pads run a tape to measure the length and width of a pad or other feature, divide into transects across the shortest width 20 feet apart. Only basal vegetation will be recorded. If foliage is encountered record hit at ground surface (bare ground, litter, grass etc). Pad transects will include 200 points. The basic rule is transects should be no more than two times the distance between points. For example, if you reduce the distance between points on a small pad to a reading every five feet, then transects should be spaced at no more than 10 foot intervals.

Monitoring for successful interim reclamation or final reclamation and abandonment will follow the same monitoring protocols.

h. Linear features

Linear features will be similarly monitored by selecting representative portions consisting of a minimum of one 0.25 mile (1,320') monitoring section for each 5 miles or less of each feature. For sites less than 0.25 mile in length, the entire length will be monitored.

Monitoring will consist of a minimum of four 100 foot transects run from disturbed edge to disturbed edge, with a reading every two feet. Monitoring will continue annually after reclamation is initiated until bond release or commensurate with the life of the project.

Problem areas, for example, weed infestations or bare spots, may require remedial work to bring them into standards.

Pre-disturbance and Annual (post-disturbance) Surveys

a. Noxious and invasive weeds

An Integrated Pest Management Plan (IPMP) will be developed and submitted by each project proponent to the BLM Buffalo Field Office. Weed surveys will be conducted before surface disturbance takes place and annually afterwards. Monitoring will include, identifying noxious and invasive weeds by species and extent.

Pre-treatment of weeds may be necessary to minimize the potential for spread and to minimize treatment costs post-construction. Annual surveys may need to be conducted more than once per year to allow for variation of each species' growing periods (i.e., cool season vs. warm season species).

b. Photographs

Digital photographs give a visual record of conditions over time. Digital photographs will be used to document conditions of vegetation, site stability, erosion, and other features or conditions subject to change over time. Digital photos must be taken from each corner of a well pad with sufficient clarity and focus to monitor general conditions on the pad. More than four photos' can be taken to capture important features. Identify photo location on a field monitoring form to record photos, include direction of photo (compass) and where photo was taken from. Also record what the photo is capturing (i.e., noxious weeds [or lack of], a fence, a good stand of grass, certain forbs or shrubs, etc.) Also be sure the field of view and focus are similar in subsequent photos. BLM will also need photo copies of seed tags. Photos should be part of the annual reporting for that years planting, if no seed planting takes place then there is no need to include a new copy of the seed tags.

c. Reclamation Success Criteria

The following list contains seed mixes recommended by resource specialists with years of local knowledge. Care and planning must be taken to choose mixes and amounts that are appropriate for the site specific conditions. All sites must be planted with a diverse mix of grasses and forbs and possibly shrubs to be considered successful. The final goal is to restore disturbed sites so that they closely resemble pre-disturbance native plant communities. No single species will account for more than 30% total vegetative composition unless it is evident at higher levels in the adjacent landscape. Vegetation canopy cover and species diversity and type shall approximate the pre-selected reference site. Erosion features shall be equal to or less than the reference site and include restoration of the original land form.

d. Reclamation re-vegetation standards

The following are example Ecological Site Descriptions (ESDs). Wyoming site descriptions currently do not contain percentages. The Buffalo Field Office (BFO) intends to initiate a rigorous, statistically sound, ecological site description sampling program to develop appropriate percentages for Fortification Creek and the Powder River Basin.

Shallow Loamy/Clay Sites – *characterized as a sagebrush/wheatgrass community with 10-14 inches precipitation.* Includes: Dense clay, Impervious clay, Shale, Shallow loam and Loamy ESD's.

Reclamation revegetation standards for this ecological site include the following:

- Grasses 50-70%;
- Forbs 10%;
- Bare ground < 25%;
- No noxious weeds; and
- Less than 5% non-native invasives.
- Shallow soils will tend to be composed of 10-20% woody species, and deeper soils will tend to be composed of 20-30% woody species.
- All vegetation measurements are of basal vegetation on point line transects.

Shallow Sandy Sites – characterized as a sagebrush/bunchgrass community with 10-14 inches precipitation. Includes Sandy ESD.

Reclamation revegetation standards for this ecological site include the following:

- Grasses 45-55%;
- Forbs 10-20% %;
- Bare ground < 20%;
- No noxious weeds; and
- Less than 5% non-native invasives.
- Shallow soils will tend to be composed of 10-20% woody species, and deeper soils will tend to be composed of 20-30% woody species.
- All vegetation measurements are of basal vegetation on point line transects.

Loamy/Clay Sites – characterized as a sagebrush/wheatgrass community with 10-14 inches of precipitation. Includes: Dense clay, Impervious clay, Shale, Shallow loam and Loamy ESD's.

Reclamation revegetation standards for this ecological site include the following:

- Grasses 60-70%;
- Forbs 10-15%;
- Bare ground < 30%;
- No noxious weeds and
- Less than 5% non-native invasives.
- Shallow soils will tend to be composed of 10-20% woody species, and deeper soils will tend to be composed of 20-30% woody species.
- All vegetation measurements are of basal vegetation on point line transects.

Sandy Sites – characterized as a sagebrush/bunchgrass community with 10-14 inches of precipitation. Includes Sandy ESD

Reclamation revegetation standards for this ecological site include the following:

- Grasses 70%;
- Forbs 10%;
- Woody 20%;
- Bare ground < 40%;
- No noxious weeds; and
- Less than 5% non-native invasives.
- All vegetation measurements are of basal vegetation on point line transects. Sand dunes will tend to have a higher woody component.

Recommendations:

To be pulled from BFO standard and programmatic COAs, BLM BMPs, etc.

1.3 Definitions

Bare ground – Areas of mineral soil with no vegetation or litter.

Basal Area (plants) – The cross-sectional area of the stem or the stems of all plants in a stand. Herbaceous and small woody plants are measured at the near ground level; larger woody plants are measured at breast or other designate height. *Interpreting Indicators of Rangeland Health – Technical Reference 1734-6*

Contamination – The presence of man-made chemicals or other alterations in the natural soil or water environment (pesticides, hazardous substances, petroleum, salts). *Adapted from various sources.*

Erosion Control – To protect soil surface and prevent soil particles from being detached by rainfall, snowmelt, or wind. Erosion control works to keep the soil in place.

Dominant species – No single species will account for more than 30% total vegetative composition unless it is evident at higher levels in the adjacent landscape. Vegetation canopy cover and species diversity and type shall approximate the surrounding undisturbed area.

Ecosystem – Includes all the organisms of an area, their environment, and the linkages or interactions among all of them; all parts of an ecosystem are interrelated. The fundamental unit in ecology, containing both organisms and abiotic environments, each influencing the properties of the other and both necessary for the maintenance of life. *Vegetation Treatments Using Herbicides in 17 Western States, Programmatic Environmental Impact Statement (BLM 2007)*

Federal Action – Approval of specific projects, such as construction or management activities located in a defined geographic area. Projects include actions approved by permit or other regulatory decision as well as federal and federally assisted activities. *National Environmental Policy Act (NEPA) [42 U.S.C. 4321 et seq.]*

Forb – non-grassy herbaceous (non-woody) plant.

Grass – Any of a large family gramineae of monocotyledonous, mostly herbaceous plants, with a jointed stem, slender sheathing leaves and flowers borne on spikelet's or bracts.

Gravel – less than 2" at the intermediate axis.

Invasive Species – A species that is not native (or is alien) to the ecosystem under consideration and whose introduction causes or is likely to cause economic or environmental harm or harm to human health. See BLM Invasive species list. *Executive Order 13112*

Litter – Litter provides a source of organic matter for incorporation into the underlying mineral soil, acts as a source of carbon for organisms carrying out decomposing functions, and insulates the soil from extreme air temperatures. Litter also plays a critical role in watershed protection by promoting water infiltration and protecting the soil from the erosive energy of raindrops and surface runoff. Ground cover has typically been defined as the area of ground covered by vegetation and litter. Litter has been defined by some authorities as dead organic matter lying on the mineral soil; others have included standing dead material and dead fallen organic material. On the basis of these definitions, litter in sagebrush steppe ecosystems includes fallen dead leaves, stems, bark, flowers, and seeds of shrubs, forbs, and grasses; dead cushion plants and moss; detached lichen; animal feces and dead insects; and unidentifiable amorphous woody organic matter (humic litter) lying on the mineral soil surface. Litter seems to be the most prevalent ground cover component in sagebrush steppe ecosystems. Researchers have collected long-term data on vegetation and ground cover characteristics in high-elevation sagebrush steppe in south-central Wyoming. According to these data, litter was consistently the largest ground cover component, averaging 46% over a 14 year measurement period. Data from sagebrush steppe plant communities in North Park, Colorado, also showed litter to be the largest component (>30% of ground cover).

Limited Reclamation Potential Areas (LRP) – There are areas (e.g., alkali flats, badlands, dunes, rocky outcrops) where reclamation may be more difficult than in traditional landscapes. LRP areas are characterized by highly erodible soils, steep slopes, Sites having physical, biological, and/or chemical limitations, low precipitation rates, or areas which have characteristics that make traditional reclamation practices impractical or unfeasible. Because reclamation in LRP areas is more difficult, LRP areas should be avoided. However, if areas of LRP have been previously leased or permitted, additional bonding may be required. Alternatives to development in LRPs should be carefully analyzed using information from the reclamation plan and documented in the NEPA process.

Reclamation Plan – A written document that addresses the reconstruction of disturbed ecosystems by returning the land to a stable and productive condition compatible with the land use plan. This Plan shall address the Goals and Objectives described in the Wyoming Reclamation Policy.

Scenic Quality – The overall impression of a landscape retained after driving or walking through, or flying over an area. The Scenic Quality of an area is rated as Class A (outstanding visual characteristics), Class B (combination of outstanding and common visual characteristics), and Class C (common visual characteristics). See BLM Handbook H-8410 Visual Resource Inventory and BLM Handbook H-8431 Visual Resource Contrast Rating

Sediment Control – To trap soil particles after they have been dislodged and moved by wind or water. Sediment controls generally rely on filtering or settling soil particles out of water or wind that is transporting them.

Shrub – A woody plant which branches below or near ground level into several main stems, so has no clear trunk. It may be deciduous or evergreen. At the end of the growing season there is no die-back of the axis.

Soil Surface Factor (SSF) – Numerical expression of surface erosion activity caused by wind and water as reflected by soil movement, surface litter, erosion pavement, pedestalling, rills, flows patterns, and gullies. Values vary from 0 for stable erosion condition to 100 for a severe condition. *Technical Note #346, Erosion Condition Classification System*

Surface Disturbing Activities – An action that alters the vegetation, surface/near surface soil resources, and/or surface geologic features, beyond natural site conditions and on a scale that affects other Public Land values. Examples of surface disturbing activities may include: operation of heavy equipment to construct well pads, roads, pits and reservoirs; installation of pipelines and power lines; and the conduct of several types of vegetation treatments (e.g., prescribed fire, etc.). Surface disturbing activities may be either authorized or prohibited. *Wyoming Information Bulletin 2007-029, Guidance for Use of Standardized Surface Use Definitions*

Topsoil – The biologically active, upper part of the soil profile, being the most favorable material for plant growth. *Adapted from U.S.D.A., Natural Resources Conservation Service*

Tree – Perennial, woody plant with a single stem (trunk), normally greater than 4 to 5 meters (13 to 16 feet) in height; under certain environmental conditions, some tree species may develop a multi-stemmed or short growth form (less than 4 meters or 13 feet in height).

Weed – A plant considered undesirable, unattractive, or troublesome, especially one growing where it is not wanted. We are generally interested in noxious and non-native invasive species.

Waste materials – Any discarded or abandoned material that can interfere with successful reclamation, safety, and long term stability of a site (contaminated soil or water, drilling mud, solid waste). Adapted from various sources.

APPENDIX C

**BUREAU OF LAND MANAGEMENT
BUFFALO FIELD OFFICE**

**FORTIFICATION CREEK RESOURCE MANAGEMENT PLAN
AMENDMENT**

LEASE STIPULATIONS

August 2011

Resource Protection Stipulations Applied to Leases within the Fortification Creek Planning Area.

The following table identifies the stipulations applied to each lease within the FCPA, lease notices and guidance statements are not included. The full stipulation text follows the table. There may be minor variations in the text between leases. Locational descriptions on stipulations that may apply to only a portion of the lease are not identified.

Lease	Effective Date	Stipulations
WYW-030762	10/01/1971	None
WYW-031336	11/01/1971	None
WYW-031786	12/01/1971	None
WYW-032847	04/01/1972	None
WYW-083558	05/01/1983	Blend with Surroundings Surface Disturbance 1 Cultural Resources Non-conventional Oil Recovery Slope NSO Surface Disturbance 2 Surface Disturbance 3 Watershed TLS 1
WYW-084915	08/15/1983	Blend with Surroundings Cultural Resources Elk Calving NSO 1 Elk Critical Winter Range Production Non-conventional Oil Recovery Slope NSO Surface Disturbance 1 Surface Disturbance 2 Surface Disturbance 3 Wildlife Seasonal Habitat TLS
WYW-036706	10/03/1972	Notification
WYW-040809	09/01/1973	Reclamation Timing Surface Disturbance 1 Surface Disturbance 2 Surface Disturbance 3 Watershed TLS 2
WYW-040814	09/01/1973	Reclamation Timing Surface Disturbance 1 Surface Disturbance 2 Surface Disturbance 3 Watershed TLS 2
WYW-042101	12/01/1973	Reclamation Timing Surface Disturbance 1 Surface Disturbance 2 Surface Disturbance 3 Watershed TLS 2
WYW-082738	09/01/1973	Reclamation Timing Watershed TLS 2

Lease	Effective Date	Stipulations
WYW-084917	08/01/1983	Blend with Surroundings Cultural Resources Elk Calving NSO 1 Elk Critical Winter Range Production Non-conventional Oil Recovery Reservoir Buffer Slope NSO Surface Disturbance 1 Surface Disturbance 2 Surface Disturbance 3 Wildlife Seasonal Habitat TLS
WYW-084920	08/01/1983	Blend with Surroundings Cultural Resources Non-conventional Oil Recovery Sage-Grouse NSO/TLS Slope NSO Surface Disturbance 1 Surface Disturbance 2 Surface Disturbance 3 Watershed TLS 1
WYW-084921	08/01/1983	Blend with Surroundings Cultural Resources Non-conventional Oil Recovery Sage-Grouse NSO/TLS Slope NSO Surface Disturbance 1 Surface Disturbance 2 Surface Disturbance 3 Watershed TLS 1
WYW-084936	09/01/1983	Blend with Surroundings Cultural Resources Non-conventional Oil Recovery NSO (resource not defined) Slope NSO Surface Disturbance 1 Surface Disturbance 2 Surface Disturbance 3 Watershed TLS 1
WYW-084939	06/01/1983	Blend with Surroundings Cultural Resources Non-conventional Oil Recovery Slope NSO Stream Buffer Surface Disturbance 1 Surface Disturbance 2 Surface Disturbance 3 Watershed TLS 1

Lease	Effective Date	Stipulations
WYW-087599	03/01/1984	Blend with Surroundings Cultural Resources Non-conventional Oil Recovery Sage-Grouse NSO/TLS Slope NSO Watershed TLS 1
WYW-090969	05/01/1985	Elk Calving NSO 2
WYW-092023	12/01/1971	None
WYW-108592	01/01/1990	Surface Disturbance 4
WYW-114691	02/01/1989	Surface Disturbance 4 Watershed NSO 1
WYW-125401	11/01/1991	Elk Winter/Calving TLS Surface Disturbance 4
WYW-125982	01/01/1992	Surface Disturbance 4 Watershed NSO
WYW-127413	09/01/1992	Soil NSO Surface Disturbance 4
WYW-127422	09/01/1992	Soil NSO Surface Disturbance 4
WYW-130291	09/01/1993	Multiple Mineral Development
WYW-130292	09/01/1993	Multiple Mineral Development
WYW-131736	03/01/1994	Multiple Mineral Development Sage-Grouse Nesting TLS
WYW-131742	03/01/1994	Big Game Crucial Winter Range TLS Multiple Mineral Development Watershed NSO 2
WYW-132253	06/01/1994	Big Game Crucial Winter Range TLS Multiple Mineral Development Watershed NSO 2
WYW-132254	06/01/1994	Multiple Mineral Development
WYW-132255	06/01/1994	Multiple Mineral Development
WYW-132259	06/01/1994	Big Game Crucial Winter Range TLS Multiple Mineral Development Watershed NSO 2
WYW-132924	08/01/1994	Big Game Crucial Winter Range TLS Elk Calving NSO 3 Multiple Mineral Development
WYW-132925	08/01/1994	Multiple Mineral Development
WYW-133615	10/01/1994	Elk Calving NSO 3 Multiple Mineral Development
WYW-133616	10/01/1994	Multiple Mineral Development
WYW-133617	10/01/1994	Elk Calving NSO 3 Multiple Mineral Development
WYW-133622	10/01/1994	Big Game Crucial Winter Range TLS Multiple Mineral Development
WYW-133623	10/01/1994	Multiple Mineral Development
WYW-134916	02/01/1995	Multiple Mineral Development

Lease	Effective Date	Stipulations
WYW-135618	04/01/1995	Multiple Mineral Development Raptor Nesting TLS
WYW-135625	04/01/1995	Elk Crucial Winter Range CSU Multiple Mineral Development
WYW-137639	11/01/1995	Big Game Crucial Winter Range TLS Multiple Mineral Development
WYW-137646	11/01/1995	Multiple Mineral Development
WYW-138136	02/01/1996	Multiple Mineral Development Sage-Grouse Nesting TLS
WYW-138448	03/01/1996	Multiple Mineral Development
WYW-139092	07/01/1996	Multiple Mineral Development
WYW-139093	07/01/1996	Elk Calving/Winter NSO Multiple Mineral Development
WYW-139094	07/01/1996	Elk Calving/Winter NSO Multiple Mineral Development
WYW-139095	07/01/1996	Big Game Crucial Winter Range TLS Multiple Mineral Development Wilderness and Wildlife CSU
WYW-139107	07/01/1996	Big Game Crucial Winter Range TLS Multiple Mineral Development Wilderness and Wildlife CSU
WYW-139680	09/01/1996	Multiple Mineral Development
WYW-139810	09/01/1996	Elk Crucial Winter Range/Calving CSU Multiple Mineral Development
WYW-141579	06/01/1997	Elk Crucial Winter Range CSU Multiple Mineral Development WSA CSU
WYW-141581	06/01/1997	Bald Eagle Winter CSU Big Game Crucial Winter Range TLS Elk Crucial Winter Range CSU Multiple Mineral Development Raptor Nesting TLS
WYW-141582	06/01/1997	Elk Crucial Winter Range/Calving CSU Multiple Mineral Development
WYW-141585	07/01/1997	Bald Eagle Winter CSU Elk Crucial Winter Range CSU Multiple Mineral Development Raptor Nesting TLS
WYW-142832	10/01/1997	Multiple Mineral Development
WYW-143158	02/01/1998	Elk Crucial Winter Range CSU Multiple Mineral Development WSA CSU
WYW-143159	02/01/1998	Elk Crucial Winter Range/Calving CSU Multiple Mineral Development
WYW-143161	02/01/1998	Elk Crucial Winter Range CSU Multiple Mineral Development
WYW-143980	02/01/1998	Elk Calving/Winter NSO Multiple Mineral Development

Lease	Effective Date	Stipulations
WYW-143981	02/01/1998	Multiple Mineral Development Raptor Nesting TLS
WYW-145193	06/01/1998	Elk and Visual CSU Multiple Mineral Development
WYW-145194	06/01/1998	Elk and Visual CSU Multiple Mineral Development
WYW-146292	10/01/1998	Big Game Crucial Winter Range TLS Elk and Visual CSU Multiple Mineral Development
WYW-146294	10/01/1998	Multiple Mineral Development
WYW-146295	10/01/1998	Multiple Mineral Development
WYW-146296	10/01/1998	Big Game Crucial Winter Range TLS Elk and Visual CSU Multiple Mineral Development
WYW-146308	10/01/1998	Multiple Mineral Development
WYW-146309	10/01/1998	Multiple Mineral Development
WYW-146311	10/01/1998	Multiple Mineral Development
WYW-146312	10/01/1998	Multiple Mineral Development
WYW-146313	10/01/1998	Multiple Mineral Development
WYW-146317	10/01/1998	Multiple Mineral Development
WYW-146319	10/01/1998	Big Game Crucial Winter Range TLS Elk and Visual CSU Multiple Mineral Development
WYW-146320	10/01/1998	Big Game Crucial Winter Range TLS Elk and Visual CSU Multiple Mineral Development
WYW-146321	10/01/1998	Multiple Mineral Development
WYW-146322	10/01/1998	Multiple Mineral Development
WYW-146323	10/01/1998	Multiple Mineral Development
WYW-146810	12/01/1998	Multiple Mineral Development
WYW-146813	12/01/1998	Elk Crucial Winter Range/Calving CSU Multiple Mineral Development
WYW-147337	02/01/1999	Big Game Crucial Winter Range TLS Multiple Mineral Development Sage-Grouse/Sharp-Tailed Grouse Nesting TLS
WYW-147349	02/01/1999	Multiple Mineral Development
WYW-149357	10/01/1994	Big Game Crucial Winter Range TLS Multiple Mineral Development
WYW-149358	10/01/1994	Multiple Mineral Development
WYW-149361	07/01/1996	Big Game Crucial Winter Range TLS Multiple Mineral Development Wilderness and Wildlife CSU
WYW-151170	10/01/2000	Multiple Mineral Development
WYW-151177	10/01/2000	Multiple Mineral Development
WYW-151680	10/01/1998	Big Game Crucial Winter Range TLS Elk and Visual CSU Multiple Mineral Development

Lease	Effective Date	Stipulations
WYW-151709	12/01/2000	Big Game Crucial Winter Range TLS Elk Calving NSO 3 Multiple Mineral Development Wilderness and Wildlife CSU
WYW-153356	10/01/1998	Multiple Mineral Development
WYW-153359	10/01/2000	Multiple Mineral Development
WYW-155328	10/01/1998	Multiple Mineral Development
WYW-159005	02/01/1998	Elk Crucial Winter Range CSU Multiple Mineral Development
WYW-159006	02/01/1998	Elk Crucial Winter Range CSU Multiple Mineral Development WSA CSU
WYW-159007	10/01/2000	Multiple Mineral Development
WYW-160053	02/01//1998	Elk Crucial Winter Range CSU Multiple Mineral Development WSA CSU
WYW-160381	10/01/2000	Multiple Mineral Development
WYW-162028	02/01/1998	Elk Calving/Winter NSO Multiple Mineral Development
WYW-162029	02/01/1999	Big Game Crucial Winter Range TLS Multiple Mineral Development Sage-Grouse/Sharp-Tailed Grouse Nesting TLS
WYW-162030	12/01/2000	Elk Calving NSO 3 Multiple Mineral Development
WYW-163521	02/01/1998	Elk Crucial Winter Range CSU Multiple Mineral Development WSA CSU
WYW-172690	10/01/2000	Multiple Mineral Development

Stipulations:

Bald Eagle Winter CSU – Surface occupancy or use is subject to the following special operating constraints. (1) Surface occupancy or use within the Powder River Eagle Habitat will be restricted or prohibited unless the operator and surface managing agency arrive at an acceptable plan for mitigation of the anticipated impacts; On the lands described below: (2) as mapped on the Buffalo RMP map; For the purpose of: (3) protecting winter Bald Eagle Habitat.

Big Game Crucial Winter Range TLS – No surface use is allowed during the following time period(s). This stipulation does not apply to operation and maintenance of production facilities. (1) Nov 15 to Apr 3-; On the lands described below: (2) (location); For the purpose of (reasons): (3) protecting big game crucial winter range.

Blend with Surroundings – to maintain esthetic values, all semi-permanent and permanent facilities may require painting or camouflage to blend with the natural surroundings. The paint selection or method of camouflage will be subject to approval by the District Manager, Bureau of Land Management.

Cultural Resources – The Federal surface management agency is responsible for assuring the leased lands are examined to determine if cultural resources are present and to specify mitigation measures. Prior to undertaking any surface-disturbing activities on the lands covered by this lease, the lessee or

operator, unless notified to the contrary by the authorized officer of the surface management agency or BLM as appropriate, shall:

1. Contact the appropriate BLM office on lands managed by BLM or the appropriate surface managing agency on lands where the surface is administered by such agency to determine if a site specific cultural resource inventory is required. If a survey is required, then;
2. Engage the services of a qualified cultural resource specialist acceptable to the Federal surface management agency to conduct an intensive inventory for evidence of cultural resource values;
3. Submit a report acceptable to the authorized officer of the surface management agency; and
4. Implement mitigation measures required by the surface management agency to preserve or avoid destruction of cultural resource values. Mitigation may include relocation of proposed facilities, testing and salvage or other protective measures. Where impacts cannot be mitigated to the satisfaction of the surface managing agency, surface occupancy on that area must be prohibited.

The lessee or operator shall immediately bring to the attention of the Bureau of Land Management or the authorized officer of the Federal surface management agency any cultural resources or any other object of scientific interest discovered as a result of surface operations under this lease, and not disturb such discoveries until directed to proceed by the Bureau of Land Management.

Elk Calving NSO 1 – All of the land in (...) is included in Elk Calving Area. Therefore, no occupancy or disturbance of the surface of the land described in this lease is authorized. The lessee, however, may exploit the oil and gas resources in this lease by directional drilling from sites outside the lease. If a proposed drilling site lies on lands administered by the Bureau of Land Management, a permit for use of the site must be obtained from the BLM District Manager before drilling or other development begins.

Elk Calving NSO 2 – No occupancy or other activity on the surface of (location) is allowed under this lease (elk calving area).

Elk Calving NSO 3 – No surface occupancy or use is allowed on the lands described below (legal subdivision or other description). (1) (location); For the purpose of: (2) protecting elk parturition area in Fortification Creek.

Elk Calving/Winter NSO – No surface occupancy or use is allowed on the lands described below (legal subdivision or other description). (1) location; For the purpose of: (2) Fortification Creek Plan; (3) protecting crucial elk parturition calving and wintering habitat.

Elk Critical Winter Range Production – Concerning elk winter range in the Fortification Creek Area where production is established, the oil or gas will be piped to tank batteries outside the critical elk winter range.

Elk Crucial Winter Range CSU – Surface occupancy or use is subject to the following special operating constraints. (1) Surface occupancy or use within the Fortification Oil and Gas Plan area will be restricted or prohibited unless the operator and surface managing agency arrive at an acceptable plan for mitigation of anticipated impacts; On the lands described below: (2) (location); For the purpose of: (3) protecting elk crucial winter range.

Elk Crucial Winter Range/Calving CSU – Surface occupancy or use is subject to the following special operating constraints. (1) Surface occupancy or use within the Fortification Creek Area will be restricted or prohibited unless the operator and surface managing agency arrive at an acceptable plan for mitigation of anticipated impacts. This may include development, operations and maintenance of facilities; On the lands described below: (2) (location); For the purpose of: (3) protecting elk crucial winter and parturition range.

Elk Winter/Calving TLS – To protect important big game ungulate winter habitat, drilling and other surface disturbing activity will not be allowed during the period from November 15 to April 30 within certain areas encompassed by this lease. The same criterion applies to elk calving areas from the period of May 1 to June 30. This limitation does not apply to maintenance and operation of producing wells. Modifications to this limitation in any year may be approved in writing by the Authorized Officer.

Elk and Visual CSU – Surface occupancy or use is subject to the following special operating constraints. (1) Surface occupancy or use within the Fortification Creek Management Area will be restricted or prohibited unless the operator and surface managing agency arrive at an acceptable plan for mitigation of anticipated impacts. This may include development, operations and maintenance of facilities; On the lands described below: (2) as mapped on the Buffalo RMP map; For the purpose of: (3) protecting elk and visual resources.

Multiple Mineral Development – Operations will not be approved which, in the opinion of the authorized officer, would unreasonably interfere with the orderly development and/or production from a valid existing mineral lease issued prior to this one for the same lands.

Non-conventional Oil Recovery – Under the provisions of Public Law 97-78, this lease includes all deposits of non-gaseous hydrocarbon substances other than coal, oil shale, or gilsonite (including all vein-type solid hydrocarbons). Development by methods not conveniently used for oil and gas extraction such as fire flooding and including surface mining will require the lessee to submit a plan of operations and will be subject to regulations governing development by such methods when those rules are issued by the Bureau of Land Management, and the rules or procedures of the surface managing agency, if other than BLM. Development may proceed only if the plan of operations is approved.

Notification – The lessee or his designated operators shall notify the Casper District Manager, Bureau of Land Management, at least ten days in advance of initiation of any activities on the public land surface included in this lease. The District Manager may determine where necessary the location of all exploratory and development facilities, including but not limited to, such items as roads, well sites, pipelines, etc. The District Manager may also prescribe construction, restoration and other surface protection measures to protect the land surface and prevent erosion.

NSO (resource not defined) – No occupation or other activity on the surface of (location) is allowed under this lease.

Raptor Nesting TLS – No surface use is allowed during the following time period(s). This stipulation does not apply to operation and maintenance of production facilities. (1) Feb 1 to Jul 31; On the lands described below: (2) (location): For the purpose of (reasons): (3) protecting raptor nesting habitat.

Reclamation Timing – Reclamation of areas disturbed as a result of lessee's operations will be done, insofar as possible, concurrently with operations.

Reservoir Buffer – No drilling or storage facilities will be allowed within 500 feet of the reservoir located in (location). This distance may be modified when specifically approved in writing by the District Manager, Bureau of Land Management.

Sage-Grouse Nesting TLS – No surface use is allowed during the following time period(s). This stipulation does not apply to operation and maintenance of production facilities. (1) Feb 1 to Jul 31; On

the lands described below (2) (location); For the purpose of (reasons): (3) protecting sage grouse nesting habitat.

Sage-Grouse/Sharp-Tailed Grouse Nesting TLS - No surface use is allowed during the following time period(s). This stipulation does not apply to operation and maintenance of production facilities. (1) Feb 1 to Jul 31; On the lands described below (2) as mapped on the Buffalo RMP map; For the purpose of (reasons): (3) protecting sage/sharp-tailed grouse nesting habitat.

Sage-Grouse NSO/TLS – No occupancy or other surface disturbance will be allowed within a 1,320-foot radius of the center of a sage grouse strutting ground (lek). No exceptions will be granted. In order to protect the nesting area around the strutting ground, exploration, drilling, and other development activity will be allowed within a 1 3/4 –mile distance from the ¼-mile lek protection zone only during the period June 15 to March 1. Exceptions to the monthly limitations in any year may be specifically authorized in writing by the District Manager, Bureau of Land Management.

Slope NSO – No occupancy or other surface disturbance will be allowed on slopes in excess of 25 percent, without written permission from the District Manager, Bureau of Land Management.

Soil NSO – No surface occupancy will be allowed on the following described lands: (location) because of steep and fragile soils.

Stream Buffer – No occupancy or other surface disturbance will be allowed within 500 feet of the (name) creek. This distance may be modified when specifically approved in writing by the District Manager/Bureau of Land Management.

Surface Disturbance 1- Notwithstanding any provision of this lease to the contrary, any drilling, construction, or other operation on the leased lands that will disturb the surface thereof or otherwise affect the environment, hereinafter called “surface disturbing operation,” conducted by lessee shall be subject, as set forth in this stipulation, to prior approval of such operation by the District Manager in consultation with appropriate surface management agency and to such reasonable conditions, not inconsistent with the purposes for which the lease is issued, as the District Manager may require to protect the surface of the eased lands and the environment.

Surface Disturbance 2 – Prior to entry upon the land or the disturbance of the surface thereof for drilling or other purposes, lessee shall submit for approval two (2) copies of a map and explanation of the nature of the anticipated activity and surface disturbance to the District Manager, as appropriate, and will also furnish the appropriate surface management agency named above, with a copy of such map and explanation.

An environmental analysis will be made by the Bureau of Land Management in consultation with the appropriate surface management agency for the purpose of assuring proper protection of the surface, the natural resources, the environment, existing improvements, and for assuring timely reclamation of disturbed lands.

Surface Disturbance 3 – Upon completion of said environmental analysis, the District Manager as appropriate, shall notify lessee of the conditions, if any, to which the proposed surface disturbing operations will be subject.

Said conditions may relate to any of the following:

- a. location of drilling or other exploratory or developmental operations or the manner in which they are to be conducted;
- b. types of vehicles that may be used and areas in which they may be used; and
- c. manner or location in which improvements such as roads, buildings, pipelines, or other improvements are to be constructed.

Surface Disturbance 4

Surface disturbance will be prohibited in any of the following areas or conditions. Modifications to this limitation may be approved in writing by the Authorized Officer.

- a. slopes in excess of 25%
- b. within important scenic areas (Class I and II Visual Resource Management areas).
- c. within 500 feet of surface water and/or riparian areas.
- d. within a quarter mile or visual horizon (whichever is closer) of significant sites along historic trails.
- e. construction with frozen material or during periods when the soil material is saturated, frozen, or when watershed damage is likely to occur.

Watershed NSO 1 – No surface occupancy will be allowed on the following described lands (location); Fortification Creek Management Plan, because of extremely steep and fragile watershed.

Watershed NSO 2 – No surface occupancy or use is allowed on the lands described below (legal subdivision or other description). (1) (location); For the purpose of: (2) protecting the steep topography and fragile watershed.

Watershed TLS 1 – In order to minimize watershed damage, exploration, drilling, and other development activities will be allowed only during the period from June 15 to February 28. This limitation does not apply to maintenance and operation of producing wells. Exceptions to this limitation in any year may be specifically authorized in writing by the District Manager, Bureau of Land Management.

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.

Wilderness and Wildlife CSU – Surface occupancy or use is subject to the following special operating constraints. (1) Surface occupancy or use within the Fortification Creek Plan area will be restricted or prohibited unless the operator and surface managing agency arrive at an acceptable plan for mitigation of anticipated impacts. This may include development, operations and maintenance of facilities; On the lands described below: (2) as mapped on the Fortification Creek Plan; For the purpose of: (3) protecting wilderness values and wildlife habitat.

WSA CSU – Surface occupancy or use is subject to the following special operating constraints. (1) Surface occupancy or use within the Fortification Creek Area will be restricted or prohibited unless the operator and surface managing agency arrive at an acceptable plan for mitigation of anticipated impacts; On the lands described below: (2) as mapped on the Buffalo RMP map; For the purpose of: (3) protecting Fortification Creek Wilderness Study Area.

Wildlife Seasonal Habitat TLS – In order to protect important seasonal wildlife habitat, exploration, drilling, and other development activity will be allowed only during the period from May 1 to November 30. This limitation does not apply to maintenance and operation of producing wells. Exceptions to this

limitation in any year may be specifically authorized in writing by the District Manager, Bureau of Land Management.

**APPENDIX D
BUREAU OF LAND MANAGEMENT
BUFFALO FIELD OFFICE**

**FORTIFICATION CREEK RESOURCE MANAGEMENT PLAN
AMENDMENT**

**BEST MANAGEMENT PRACTICES FOR FLUID MINERAL
DEVELOPMENT IN THE FORTIFICATION CREEK
PLANNING AREA**

August 2011

**U.S. DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT**

**BEST MANAGEMENT PRACTICES FOR FLUID MINERAL
DEVELOPMENT IN THE FORTIFICATION CREEK PLANNING AREA**

A. Visual Resource Management (VRM) Best Management Practices (BMP) Principles

1) Minimize Contrast

a. To reduce contrast, we repeat elements of:

i. Form, Line, Color, and Texture

Examples:

A winding road that follows the lay of the land may appear more natural than a straight road cutting through hills and across valleys.

An irregularly shaped well pad may better blend with existing openings in the landscape vegetation than a rectangular well pad.

2) Key observation points

a. Consider how and where the development will be seen from:

i. Key Observation Points could be:

a) linear features: byways, trails, rivers (a continual moving view)

b) points: scenic overlooks, residential areas. (stationary long duration views)

3) Reduce surface disturbance

a. The more long-term surface disturbance you have, the more visual contrast you will have.

b. The larger the scale of the disturbance, the more contrast as well.

c. It's not just the pad; consider roads, pipelines and ancillary facilities too.

4) Other resource benefits

a. Visual Resources are not the sole resources we are managing. We also manage the larger landscape for minerals, wildlife, recreation, water, etc.

B. The VRM system provides us with many basic principles and techniques to help reduce contrast. As they relate to Fluid Minerals and similar development, the four most critical are:

1) Proper Site Selection - Location! Location! Location!

a. Proper site selection can be the most important tool for reducing visual contrast.

i. Avoid placing facilities on ridgetops

- ii. Move facilities further from key observation points to reduce their apparent size.
 - iii. Avoid locating facilities near “prominent” features.
 - iv. Screening & Hiding - Use natural or artificial features such as topography, vegetation, or an artificial berm to help screen facilities.
- 2) Reduce Unnecessary Disturbance
- a. Avoid locating roads and pipelines on steep slopes
 - b. Avoid Locating Well Pads on or Adjacent to Steep Slopes
 - c. Construct the Minimum Road Necessary
 - d. Interim Reclamation
 - i. Initiate “interim reclamation” of roads immediately after construction by returning topsoil to cuts, fills, and borrow ditches and reseeding. This includes partially reshaping and revegetating roads, and well pads to reduce the amount of bare ground created during construction and drilling activity.
 - e. Share Rights-of-Way
 - i. Minimize surface disturbance, by corridoring roads and utilities in common rights-of-ways.
 - a) Burying utilities including power lines in areas that are visually sensitive.
 - 1. Plowing and pulling pipes and lines into the ground in certain soil types will disturb much less ground and vegetation than excavating and trenching.
 - f. Minimize Topsoil Removal
 - i. In flat areas, consider brush-beating, mowing the well location, and/or parking on the grass for drilling and production operations.
 - g. Reduce the Pad Size to the minimum that is needed
 - h. Emerging Practices Under Study
 - i. Use of Oak or Plastic Mats for Pads and Roads
 - i. Centralize Facilities Out of Sight
 - i. Low Structures
 - ii. Ultra-Low Structures
 - iii. Co-locate Wells
 - iv. Plan for Interim Reclamation - Place production facilities on the well location correctly so that you allow the maximum room for recontouring.
- 3) Choice of Color
- a. COLOR is generally the least expensive and most common design (or mitigation) measure used to reduce visual contrast.

- i. Match Colors in the Landscape
 - a) Consider the overall dominant color in the landscape
 - ii. Standard BLM Colors
 - a) The “Standard and Supplemental Environmental Color Charts
- 4) Final Reclamation - Oil and Gas development is a temporary use of the land and its impacts should be temporary as well.
- a. Goal: Seamless Natural Landscape
 - i. Steps to achieving successful Final Reclamation
 - a) Restore the landform:
 - 1. Restrip topsoil and vegetation from all areas to be recontoured. Do not hesitate to restrip healthy vegetation and topsoil if the landform is not correct. You can always regrow vegetation, but a damaged landform is noticeable forever.
 - 2. Recontour the well location back to the original contour or a natural looking contour that blends with the surrounding topography.
 - b) Site Preparation:
 - 1. Respread topsoil that had been salvaged.
 - 2. Roughen the surface to trap moisture and seed.
 - 3. Utilize stabilization devices in addition to mulch for those sites subject to wind or water erosion.
 - c) Revegetate with native species:
 - 1. Revegetation may result in a color contrast over the short-term, but if you used native seed, the local native plants can be expected to recolonize over time.
 - 2. A good job of recontouring, site preparation, and seeding, will greatly reduce the visibility of the well site 20 years from abandonment.
 - d) Reclaiming Roads
 - 1. Nearly all oil and gas roads should be reclaimed following abandonment of the producing wells.
 - 2. Ripping and seeding roads is usually not sufficient. Most roads need be recontoured back to the original contour so that they absorb back into the seamless landscape.
 - e) Site Preparation: Leaving a Rough Texture
 - 1. Recontouring to a rough texture helps trap broadcast seed and moisture, deters off-road travel, and helps to match the “texture” of the surrounding landscape.

C. Production Operations

- 1) Housekeeping

- a. Maintain a clean project area; remove trash, junk, and other materials not in current use.
- 2) Maintain Roads and Erosion Control Devices.
 - a. Typically “maintenance” is not restricted by wildlife timing limitation stipulations.
- 3) Noxious and Invasive Weed Prevention
 - a. The Number 1 tool in the fight against noxious and invasive weeds is the prompt reapplication of topsoil and reseeding and revegetation of all disturbed soils with weed-free seed.
 - b. Control noxious and invasive weeds during construction, production, and reclamation using an integrated approach: Cultural; Chemical; Biological; Physical means.

D. Minimize Wildlife Habitat Fragmentation and Loss

- 1) Reducing the Initial and Interim Size of Roads, Utilities, & Well Pads
 - a. Interim Reclamation
 - i. To minimize habitat loss and fragmentation, re-establish as much habitat as possible by maximizing the area reclaimed during well production operations. In many cases, this “interim” reclamation can cover nearly the entire site, including the road and right up to the facilities.
 - a) Fully recontour unneeded areas to the original contour or a contour that blends with the surrounding topography;
 - b) Respread topsoil over entire pad; and
 - c) Revegetate to reestablish vegetative production.
- 2) Emerging Practices Under Study
 - a. To Reduce Reclamation Costs & Speed Recovery
 - b. Use of Oak Mats for Pads and Roads
 - c. Centralized Metering Facilities
 - d. Directional Drilling Multiple Wells On An Individual Well Pad
- 3) Corridor buried pipelines and powerlines with access roads.
- 4) Eliminating Hazards to Wildlife
 - a. Reduce Vehicle Traffic
 - i. In important wildlife areas
 - ii. During critical wildlife use periods
 - b. Wildlife Enclosures
 - i. Fence reserve pits and off-channel pits to exclude wildlife
 - ii. Install escape ramps or cover tanks
- 5) Reducing Noise

- a. Noise can deter wildlife from using an area.
 - i. Use noise reduction mufflers to comply with noise standards.
 - ii. Also, consider using earthen berms, walls, sheds, and/or distance to reduce sound levels in important habitats.
- 6) Centralizing Production Facilities
- 7) Remote Production Monitoring
- 8) Wildlife Monitoring
 - a. Work Activity Reporting
 - i. In order to better understand the avoidance and displacement of wildlife species, it is important to record when and where disruptive activities are occurring within the development. The response of the wildlife species of concern can then be correlated to particular human activities.
- 9) Habitat Restoration
 - a. The long-term goal is to restore ecological function

E. Reference Sources for BMP's

BLM - **BMP Technical Information**

Western Governors' Association Coal Bed Methane BMPs Handbook
<http://www.westgov.org/wga/initiatives/coalbed/>

Recommendations for Development of Oil and Gas Resources Within Important Wildlife Habitats; <http://gf.state.wy.us/downloads/pdf/OGRecommendationsNovember09.pdf>

NRCS Wyoming State Web Site <http://www.wy.nrcs.usda.gov/>

F. BMP's by Application

Some of these measures, if not incorporated into planning for plans of development, may be applied as Conditions of Approval at the time of permit approval.

These measures are from various sources including the Fortification Creek Management Plan, the Powder River Basin Oil and Gas EIS/ROD and "Recommendations for Development of Oil and Gas Resources within Crucial and Important Wildlife Habitats", Wyoming Game and Fish Department (WGFD), 2009.

Pre-planning

1. Recommended well spacing will be 160 acres unless there is satisfactory justification for alternate spacing.
2. Consult the appropriate state and federal wildlife agencies early in the process, during pre-planning exercises if possible
3. Design configurations of oil and gas development to avoid or reduce unnecessary disturbances, wildlife conflicts, and habitat impacts. Where possible, coordinate planning among companies operating in the area.

4. Identify important, sensitive, or unique habitats and wildlife in the area. To the extent feasible, incorporate mitigation practices that minimize impacts to these habitats and resources.
5. If geologically and technically feasible, plan the pattern and rate of development to avoid the most important habitats and generally reduce the extent and severity of impacts.
6. Cluster drill pads, roads and facilities in specific, “low-impact” areas.
7. The Fortification Creek SMA is classified as a Class III visual resource management area. The objective of Class III is to provide for management activities that may contrast with the basic landscape elements, but remain subordinate to the existing landscape character. Activities may be visually evident, but should not be dominant.
8. Surface use or occupancy will be strictly controlled or if absolutely necessary prohibited on slopes exceeding 25%.
9. Companies will coordinate their projects in order to utilize common corridors for roads, pipelines, power, and facilities.
10. Develop a travel plan that minimizes the amount of vehicular traffic needed to monitor and service wells and other facilities.

Surface water

1. Operators will be required to develop water handling infrastructure as a joint effort. Multiple facilities, similar in nature, will not be considered in any part of the watershed. This will require operators to share pipelines, treatment facilities, discharge points, etc.
2. Operators will consider water handling methods other than direct discharge or storage. Some options will include:
 - a. Treatment of produced water with subsequent direct discharge to the Powder River.
 - b. Treating the water and beneficially using it for irrigation.
 - c. Piping the produced water out of the (SMA).
3. Locate discharge points in areas that will minimize erosion and impacts to the receiving channel, existing improvements, and downstream users. Locate discharge points in stable, low gradient drainage systems and below active head cuts, when possible. If discharge is located above a head cut, mitigation measures will be required by the BLM Authorized Officer on a site specific basis. Some mitigation measures will require engineering design.
4. All discharge points will require energy dissipation measures.
5. Discharge points may not be authorized by BLM regardless of National Pollutant Discharge Elimination System (NPDES) status or previous use. Sites may be moved or otherwise mitigated by the BLM Authorized Officer during onsite inspections where environmental issues exist.
6. Cumulative produced water discharge must not exceed the naturally occurring 2 year peak flow of the receiving channel.
7. Discharge points will not be located in playas or enclosed basins unless it can be demonstrated that it can be done without resulting in adverse impacts. Discharges into valley bottoms with no defined low-flow channel will generally not be allowed, but will be reviewed on a site-specific basis.

8. Direct discharge to drainages high in basins will not be allowed. Proposed direct discharge sites will be downstream of areas with severe erosion potential and near the confluence of major drainages.

Channel Crossings

1. Minimize channel disturbance as much as possible by limiting pipeline and road crossings.
2. Avoid running pipelines and access roads within floodplains or parallel to a stream channel.
3. 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.
4. Channel crossings by pipelines will be constructed so that the pipe is buried at least four feet below the channel bottom.
5. Low water crossings will be constructed at original streambed elevation in a manner that will prevent any blockage or restriction of the existing channel. Material removed will be stockpiled for use in reclamation of the crossings.

Impoundments

1. Concerns regarding the quality of the discharged CBM water on downstream irrigation use may require operators to increase the amount of storage of CBM water during the irrigation months and allow more surface discharge during the non-irrigation months.
2. Operators will design produced water handling systems that minimize the need for containment structures (reservoirs or pits). Containment structures in excess of what can be beneficially used by landowners or wildlife will not be considered.
3. The operator will be required to provide reclamation bonds in the amount specified by a qualified Professional Engineer for the impoundments to be used for the management of CBNG water.
4. The operator will supply a copy of the complete approved SW-4, SW-3, or SW-CBNG permits to BLM as they are issued by WSEO for these impoundments.
5. Any stream crossing of a pipeline should be protected by installation of automatic shutoff valves.
6. Pipeline crossings can be installed through ephemeral streams by trenching. Use appropriate size riprap to stabilize stream banks. Place riprap from the channel bottom to the top of the normal high water line on the bank at all stream crossings. We recommend double-ditching techniques to separate the top one foot of stream bottom substrate from deeper soil layers. Reconstruct the original layers by replacing deeper substrate first.
7. Locate and construct all structures crossing intermittent and perennial streams such that they do not decrease channel stability or increase water velocity.

Stream Habitats and Riparian Corridors

1. Surface use or occupancy will be strictly controlled or if absolutely necessary prohibited within 500 feet of surface water, riparian areas, or wetlands.

2. Should the need for disturbance in these areas be necessary the following should be considered and may be applied:
 - a. Avoid stripping riparian canopy or stream bank vegetation if possible. It is preferable to crush or shear streamside woody vegetation rather than completely remove it. Any locations from which vegetation is stripped during installation of stream crossings, should be revegetated immediately after the crossing is completed.
 - b. Hydrostatic test waters released during pipeline construction could cause alterations of stream channels, increased sediment loads, and introduction of potentially toxic chemicals or invasive species into drainages. Avoid discharging hydrostatic test waters directly to streams. Release these waters first into a temporary, sediment retention basin if the concentration of total suspended solids is significantly higher than in the receiving water. Dewater temporary sedimentation basins in a manner that prevents erosion.
 - c. Locate pipelines that parallel drainages, outside the 100-year floodplain. Construct pipeline crossings at right angles to all riparian corridors and streams to minimize the area of disturbance.
 - d. Use the minimum practical width for rights-of-way where pipelines cross riparian areas and streams.
 - e. Measures will be taken to ensure that cottonwood trees are not impacted by CBNG production. Options to accomplish this may include:
 - i. Locating discharge points below susceptible trees.
 - ii. Routing flow paths away from susceptible trees.
 - h. For any jurisdictional wetlands identified that may be impacted, a detailed mitigation plan will be developed during the APD/POD or sundry notice approval process. Federal requirements to replace all impacted wetlands will mitigate this loss, so environmental impacts will occur only during the life of the project (including reclamation).
 - i. Any fences used in wetland areas should be placed well back from the wetlands to prevent waterfowl mortalities and should be constructed to standards that allow big game movement.
 - j. Power line corridors will avoid wetlands, to the extent possible, in order to reduce the chance of waterfowl hitting the lines. Where avoidance can't occur, the minimum number of poles necessary to cross the area will be used.
 - k. Wetland areas will be disturbed only during dry conditions (that is, during late summer or fall), or when the ground is frozen during the winter.
 - l. No waste material will be deposited below high water lines in riparian areas, flood plains, or in natural drainage ways.
 - m. The lower edge of soil or other material stockpiles will be located outside the active floodplain.

- n. Drilling mud pits will be located outside of riparian areas, wetlands, and floodplains, where practical.
- o. Disturbed channels will be re-shaped to their approximate original configuration or stable geomorphological configuration and properly stabilized.
- p. Reclamation of disturbed wetland/riparian areas will begin immediately after project activities are complete.

Roads and Travel

1. Use existing roads and two-tracks if they are sufficient and not within environmentally sensitive areas. Use corridors to the maximum extent possible; roads, power, gas, and water lines should utilize the same corridor wherever possible.
2. Utilize the guidance document that was presented at the February 8th CBNG Open House in Gillette. (Road Design and Transportation Planning In the Powder River Breaks for Applications for Permit to Drill/Plans of Development.
3. Construct the minimum number and length of roads necessary.
4. Use common roads to the extent reasonable. The main road corridor for access and compression facilities will be the Montgomery, Hayden, and Echeta county roads.
5. Coordinate road construction and use among companies operating in the same oil and gas field.
6. Design roads to an appropriate standard no higher than necessary to accommodate their intended purpose. Rights-of-way clearing for access roads, prior to construction, shall be limited to 20 feet on each side of the centerline.
7. Design roads with adequate structures or features to prohibit or discourage vehicles from leaving the roads.
8. Salvage topsoil from all road construction and re-apply during interim and final reclamation.
9. Where feasible, locate all roads below ridgelines or behind topographic features (knolls, rises) to minimize the zone of visual and auditory effect.
10. Locate roads away from bottoms of drainages, which often provide the most important sources of cover and forage for wildlife.
11. Construct road crossings at right angles to all riparian corridors and streams to minimize the area of disturbance. In situations where this is not possible, never straighten or otherwise channelize a stream in order to create a right-angle crossing.
12. Design road crossings of streams to allow fish passage at all flows. Types of crossing structures that minimize aquatic impacts, in descending order of effectiveness, are: a) bridge spans with abutments on banks; b) bridge spans with center support; c) open bottomed box culverts; and d) round culverts with the bottom placed no less than one foot below the existing stream grade. Perched culverts block fish passage and are unacceptable in any stream that supports a fishery.
13. Locate and construct all structures crossing intermittent and perennial streams such that they do not decrease channel stability or increase water velocity.
14. Use a variety of native grasses and forbs to establish effective, interim reclamation on road shoulders and borrow areas.
15. OHV use is limited to designated or seasonal roads only and restricted to a seasonal limitation in elk crucial winter and calving range. From December 1st to April 1st and calving May 1st to June 15th.

16. OHV travel will be prohibited on wet soils and on slopes greater than 25% if damage to vegetation, soils, or water quality would result.
17. The operator shall restrict travel on two-track roads (casual use) during periods of inclement weather or spring thaw when the possibility exists for surface damage from excessive rutting.
18. The operator will sign any newly constructed roads to BLM standard. The signs will read "Authorized Vehicles Only".
19. After the completion of any new well access roads, the road will be reclaimed to a two-track if appropriate.
20. The operator will sign any new corridors and/or pipelines as "No Motor Vehicles Allowed, Reclamation in Progress."
21. Prohibit or substantially limit traffic during high wildlife use hours (within 3 hours of sunrise and sunset) to the extent possible.
22. Use pipelines to transport condensates off site, or install larger capacity storage tanks when frequent truck trips would impact habitat effectiveness.
23. Transmit instrumentation readings from remote monitoring stations to reduce maintenance traffic.
24. Post speed limits on all access and maintenance roads to reduce wildlife collisions and limit dust: 20-30 mph is adequate in most cases.
25. Provide adequate inspection to ensure that the project is constructed as approved. Submit to the BLM a contact who will be responsible for construction oversight.
26. Remove debris/sediment from the entrance of culverts to prevent plugging and overtopping.
27. Clean ditches and reshape when necessary to maintain adequate flow capacity. Do not grade ditches that do not need it.
28. Avoid disturbing soil vegetation if not necessary. Leave as much vegetation in ditches, on road shoulder areas, and on cut or fill slopes as possible without creating safety concerns.
29. Stake culvert locations prior to construction. The culvert invert grade and finished road grade will be clearly indicated on the stakes. Culverts will be installed on natural ground, or on a designed flow line of a ditch.
30. The minimum cover over culverts will be 12" or one-half the diameter whichever is greater. Drainage laterals in the form of culverts or water bars shall be placed according to the following spacing:

Grade	Drainage Spacing
2-4%	310 ft
5-8%	260 ft
9-12%	200 ft

Well Locations

1. If geologically and technically feasible, drill multiple wells from the same pad using directional (horizontal) drilling technologies.
2. Disturb the minimum area (footprint) necessary to efficiently drill and operate a well.
3. Salvage topsoil from all well pad construction and re-apply during interim and final reclamation.

4. If geologically and technically feasible, locate well pads in the least environmentally sensitive areas, at least 500 feet away from riparian habitats, streams or drainages, below ridge lines, away from important sources of forage, cover, reproductive habitats, winter habitats, parturition areas, brood-rearing habitats, etc.
5. Use a variety of native grasses and forbs to establish effective, interim reclamation on all well pads and associated disturbances.
6. Line reserve pits with a suitable, impermeable barrier to eliminate possible contamination of soil and groundwater.
7. Design drill pad sites to drain excess storm water and other fluids into a properly sized reserve pit. The pit should have adequate capacity to intercept and hold excess precipitation. Discharges from the pit should meet NPDES standards or otherwise assure the discharged water is of suitable quality.

Ancillary Facilities

1. Locate facilities including tanks, transfer stations, shops, equipment shelters, utility towers, etc. in the least environmentally sensitive areas, well away from riparian habitats, streams or drainages; below ridge lines; away from important sources of forage, cover, reproductive habitats, winter habitats, parturition areas, brood-rearing habitats, etc.
2. Salvage topsoil from all facilities construction and re-apply during interim and final reclamation.
3. Design all facilities such that they will not be used as perching or nesting substrates by raptors, crows, and ravens in open prairie or shrub-steppe environments.
4. Use existing utility, road, and pipeline corridors to the extent feasible.
5. All gas and water pipelines and electrical cables will be installed in disturbance corridors, a common trench, placed within the access roadways.
6. To maintain aesthetic values, all semi-permanent facilities will require painting or camouflage to blend the natural surroundings. The paint selection or method of camouflage will be subject to approval by the Bureau of Land Management.
7. Establish effective, interim reclamation on all surface disturbances associated with ancillary facilities, including equipment staging areas. Interim reclamation should be achieved using a variety of native grasses and forbs.

Noise

1. Minimize noise generally. All compressors, vehicles, and other sources of noise should be equipped with effective mufflers or noise suppression systems (e.g., “hospital mufflers”).
2. To minimize the effects of continuous noise on bird populations, reduce noise levels to 86 dBA or less at 50 feet, particularly during the bird nesting season (April 1st through June 30th). Constant noise generators should be located far enough away from sensitive habitats or muffled such that noise reaching those habitats is less than 49 dBA.

Human Activity & Secondary Effects

1. All employees should be aware of BMPs, and conditions of approval (COAs) for the project and receive environmental awareness training.
2. Employees should be instructed to avoid walking away from vehicles or facilities into view of wildlife, especially during winter months and reproductive (courtship, nesting) seasons.

3. Employees should not be allowed to carry firearms while on the job or riding in company vehicles.

Pollutants, Toxic Substances, Fugitive Dust, Erosion and Sedimentation

1. Avoid exposing or spilling hydrocarbon products on the surface. Oil pits will not be used, but if absolutely necessary, they should be enclosed in small-mesh netting and fence to prevent entrapment of birds and mammals. All netting and fence should be maintained and kept in serviceable condition.
2. Limit the permitted discharge of produced water to those areas where it can be beneficially used by wildlife, provided water quality standards for wildlife and livestock are met. Produced water will not be discharged on the surface within big game crucial winter ranges or near complexes of sage-grouse leks. New water sources within crucial winter ranges encourage yearlong use by livestock and wildlife, and may result in reduced or depleted forage during winter. Additional water sources near lek complexes could increase vulnerability of sage-grouse to mosquito-borne, West Nile virus. However, produced water of suitable quality may be used for supplemental irrigation to improve reclamation success.
3. Employ erosion control practices and sediment retention structures to prevent sediment transport off site during precipitation events and runoff.
4. Use dust abatement procedures including reduced speed limits and application of (environmentally compatible) chemical suppressants or suitable quality water.

Monitoring and Environmental Response

1. Monitor conditions or events that may indicate environmental problems. Such conditions or events can include any significant chemical spill or leak, detection of multiple wildlife mortalities, sections of roads with frequent and recurrent wildlife collisions (especially big game or sage-grouse), poaching and harassment incidents, severe erosion into tributary drainages, raptor electrocutions, structures associated with frequent bird or bat collisions, migration impediments (e.g., pronghorn concentrating along a fence), wildlife entrapment, sick or injured wildlife, or other unusual observations.
2. Promptly report observations of potential wildlife problems to the regional office of the WGFD and, as applicable, the U.S. Fish and Wildlife Service.

Research and Special Studies

1. Where questions or uncertainties exist about the degree of impact to specific resources, or the effectiveness of mitigation, companies should consider funding or cost-sharing special studies to collect data for evaluation and documentation.

Noxious Weeds

1. Control noxious and invasive plants that become established along roads, on well pads, or adjacent to other facilities.
2. Clean and sanitize all equipment brought in from other regions. Seeds and propagules of noxious plants are commonly imported by equipment and mud clinging to equipment.
3. Request employees to clean mud from boots/work shoes before traveling to the work site, to prevent importation of noxious weeds.

Interim Reclamation

1. Establish effective, interim reclamation on all surfaces disturbed throughout the operational phase of the well field. A variety of native grasses and forbs will be used. Non-native vegetation is unacceptable for any purpose, including surface stabilization. Continue to monitor and treat reclaimed surfaces until satisfactory plant cover is established.
2. Where pipeline and power line trenching is on ridges, topsoil with vegetation shall be stripped and stockpiled temporarily until lines are laid in ditch and the ditch is backfilled. Then the topsoil shall be respread over the backfill and the topsoil shall be reseeded. The areas identified as highly erosive and or fragile soils shall after seeding have a protective cover applied to prevent soil erosion and to prevent the seed from blowing or washing away.
3. Complete reclamation on all disturbed areas within one growing season, or implement temporary measures until the next growing season.
4. Limit livestock grazing on reclaimed areas for two growing seasons after final reclamation is complete. Grazing controls will vary by site but might include herding, fencing, deferred use, or supplemental feeding.
5. Require a protective surface treatment on Sandy, Sands, and Shallow Ecological Sites. Require a protective surface treatment on side slopes too steep for tractor seeding horizontal to disturbance. Require a protective surface treatment on sites with side slopes greater than 25 feet of horizontal distance on each side regardless of soil type or Ecological Site.
6. Re-treat all reclaimed areas of unsuccessful reclamation. Re-treating will vary by site and initial reclamation success but may include invasive species control, re-seeding the site with other native species, or the same native species under more favorable environmental conditions. Re-treatment may also involve additions of fertilizers or soil amendments and protective cover such as mulch, matting or netting.
7. Cool season species can be planted from November 1st to March 15th as a dormant planting. If planting in the spring, plant in late March or early April.
8. All erosive and or fragile soils shall be kept stabilized to prevent erosion until revegetation has stabilized the soils.

Final Reclamation

1. Salvage topsoil during decommissioning operations and reapply to reclaimed surfaces.
2. Replant a mixture of forbs, grasses, and shrubs that are native to the area and suitable for the specific ecological site.
3. Restore vegetation to achieve numeric standards of cover, composition, and diversity that are commensurate with the ecological site.
4. Continue to monitor and treat reclaimed areas until plant cover, composition, and diversity standards have been met.
5. Reclaimed sites depending on their size and magnitude may be fenced to ensure the objectives of the reclamation projects are achieved, however as sites increase in number and size, the management of the livestock will need to be addressed to ensure the objectives of the reclamation projects as well as the objectives of the livestock manager are also met.

Table 1 Wildlife Lease Stipulations and Survey Criteria for Surface Disturbing Activities in the Buffalo Field Office

SPECIES	ACTIVITY	TIMING/ SURFACE USE STIPULATION	SURVEY DISTANCE FROM ACTIVITY	SURVEY DATES
Raptors	Nesting	TLs – February 1 st to July 31 st	0.5 Mile	May 1 st – June 15 th (Occupancy) May 1 st – January 31 st (Nest Sites)
Sage-grouse	Breeding Ground	CSU	0.5 Mile	April 7 th – May 7 th
Sage-grouse	Nesting	TLs – March 1 st – June 15 th	2 Miles	
Sharptailed Grouse	Breeding Ground	CSU	250 Yards	April 1 st – May 15 th
Sharptailed Grouse	Nesting	TLs – March 1 st – June 15 th	0.5 Mile	
Bald eagle	Nesting	NSO – 0.5 Mile TLs – February 1 st – August 15 th (1 Mile)	1Mile.	Same as Raptor
Bald eagle	Winter Roost	TLs – November 1 st – April 1 st (1 Mile)	1 Mile.	December 1 st – February 28 th
Black-footed ferret	Occurrence	NSO	Prairie Dog Colonies	July 1 st – October 31 st (Nocturnal) December 1 st – March 31 st (Diurnal)
Ute Ladies’ Tresses	Occurrence	Avoidance	Perennial Wetlands	July 15 th – September 15 th
Mountain plover	Breeding/Nesting	NSO – 0.25 Mile	Preferred Habitat	May 1 st – June 15 th
Elk	Crucial Winter Range	TLs – November 30 th – April 30 th	Established. Habitat	
Elk	Parturition Areas	TLs – May 1 st – June 30 th	Established. Habitat	

CSU : Controlled Surface Use – Surface occupancy and use are permitted, but are restricted to mitigate effects to particular resources.

NSO: No Surface Occupancy – Neither exploration nor production facilities would be allowed to be constructed.

TLs: Timing Limitation Stipulation – Construction activities would be restricted or prohibited during certain periods to protect resources.