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ENVIRONMENTAL ASSESSMENT of the Red Point 3D Seismic Survey Project Proposed by Bill Barrett Corporation in Park County, Wyoming



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**ENVIRONMENTAL ASSESSMENT FOR THE
RED POINT 3D SEISMIC SURVEY PROJECT
PROPOSED BY BILL BARRETT CORPORATION
IN PARK COUNTY, WYOMING**

Prepared for:

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This Environmental Assessment was prepared by Anderson Environmental Consulting, an independent environmental consulting firm, with the guidance, participation, and independent evaluation of the Bureau of Land Management (BLM). The BLM, in accordance with Federal Regulation 40 CFR 1506.5 (a) and (b), is in agreement with the findings of the analysis and approves and takes responsibility for the scope and content of this document.

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1.0 PURPOSE OF AND NEED FOR ACTION

1.1 INTRODUCTION

This environmental assessment (EA) has been prepared to analyze the Red Point 3D Seismic Survey Project as proposed by Bill Barrett Corporation and is a site specific analysis of the potential impacts that could result from implementation of the Proposed Action or alternatives to the Proposed Action. The EA assists the Bureau of Land Management in project planning, ensuring compliance with the *National Environmental Policy Act* of 1969 (NEPA), and in making a determination as to whether any “significant” impacts could result from the analyzed actions. “Significance” is defined by NEPA and is found in 40 CFR 1508.27. This EA will assist the Authorized Officer (AO) in making a determination as to whether to issue a Finding of No Significant Impact (FONSI) or begin the preparation of an environmental impact statement (EIS). A FONSI is a document that briefly presents the reasons why implementation of the Proposed Action would not result in significant environmental impacts (effects) beyond those already addressed in the Cody Field Office Resource Management Plan and Record of Decision (BLM 1990). If the Authorized Officer determines that this project has significant impacts following the analysis in this EA, then an EIS would be prepared for the project. Otherwise, a Decision Record (DR) may be signed for the EA approving the selected alternative.

1.2 BACKGROUND

On February 12, 2007, Bill Barrett Corporation (BBC) filed a Notice of Intent (NOI) with the Cody Field Office (CYFO), Bureau of Land Management (BLM) to conduct geophysical (seismic) operations in a project area identified as the Red Point 3D Seismic Survey Project Area (see Map 1, Appendix A). At the time that the NOI was filed, BBC had not selected a geophysical contractor to conduct the referenced seismic survey; however, in the interim period of time, CGGVeritas (Veritas) has been selected as the geophysical contractor and would conduct the seismic survey on behalf of BBC.

The proposed seismic survey would utilize both “Vibroseis” and “Shot Hole” techniques as energy sources, and would encompass approximately 44.0 square miles (28,160 acres) in eastern Park County, Wyoming. Of the total surface acreage included within the proposed seismic survey project area boundary, approximately 26,040 acres (92.5% of the project area) are owned by the United States of America (administered by the BLM), 1,920 acres (6.8% of the project area) are owned by the State of Wyoming (administered by the Office of State Lands and Investments), with the remaining 200 acres (0.70% of the project area) in private ownership. No surface disturbance is proposed on those private lands included within the overall project area boundary. All BLM-administered lands included within the proposed seismic survey project area boundary fall under the jurisdiction of the CYFO. Those sections (all or portions thereof) potentially affected by the proposed seismic survey project (regardless of surface ownership) are included in Table 1.1. It should be noted that geophysical activities proposed on private and state lands in conjunction with this seismic survey project are not subject to BLM authorization.

Table 1.1

**Lands Potentially Affected by the Proposed
Red Point 3D Seismic Survey Project**

Township	Range	Sections
52 North	98 West	1-24, 26 and 27
52 North	99 West	1, 2, 3, 11, 12 and 13
53 North	98 West	19, 20 and 26-36
53 North	99 West	23, 24, 25, 26, 35 and 36

The Red Point 3D Seismic Survey project area is approximately 9 miles wide by 7 miles long and covers approximately 28,160 acres. Approximately 105 miles of source lines are planned in conjunction with the proposed seismic operation, with data acquisition on/along these source lines obtained through a combination of energy sources including “vibroseis” on the “flatter” portions of the project area and explosives contained in drilled “shot-holes” on the steeper areas within the project area that are not reasonably accessible to the vibroseis buggies. Equipment to be used on the receiver lines would be delivered to selected staging areas within the overall seismic survey project area via truck, with a helicopter used to distribute the equipment to the field from the staging areas. Actual placement of the geophones, stringing of the cables, etc. on each individual receiver line would be accomplished by the survey crews on foot.

This Environmental Assessment addresses potential effects to the project area, regardless of surface ownership or federal administrative unit; however, it should be noted that seismic survey activities on state and private lands, while similar in nature to those described here for BLM lands, require a separate approval from the Wyoming Oil and Gas Conservation Commission (WOGCC).

1.3 PURPOSE AND NEED FOR THE PROPOSED ACTION

1.3.1 Need for the Proposed Action

The Proposed Action would provide high definition imaging of the sub-surface geology in the proposed Red Point 3D Seismic Survey (RP3DSS) project area, which would aid in the identification of potential sub-surface geologic targets that may contain commercial quantities of oil and/or natural gas. The sub-surface geologic information generated from the RP3DSS project may ultimately reduce the number of exploratory wells required to evaluate the subject acreage thereby resulting in less overall surface disturbance associated with any future exploratory drilling operations.

Section 1.2.2 of the EA for the Clark 3D Geophysical Exploration Project (BLM 2005) and Section 1.1 of the EA for the Sellers Draw 3-D Geophysical Exploration Project (BLM 2006a) contain fairly comprehensive explanations of general seismic exploration methodology and describes the benefits of 3D seismic technology over the older 2D technology.

1.3.2 Purpose of the Proposed Action

The exploration and development of federal oil and gas leases is an integral part of the BLM's oil and gas leasing program under the authority of the *Mineral Leasing Act* (MLA) of 1920 as amended (30 USC 181 et seq.), the *Federal Land Policy and Management Act* (FLPMA) of 1976 (43 USC 1701 et seq.), the *Federal Onshore Oil and Gas Royalty Management Act* (FOOGRMA) of 1982 (30 USC 1701 et seq.), and the *Federal Onshore Oil and Gas Leasing Reform Act* (FOOGLRA) of 1987 (30 USC 226 et seq.). The BLM's oil and gas leasing program is intended to encourage the development of domestic oil and gas reserves, thereby reducing national dependence upon foreign energy supplies. Furthermore, exploration and production of both oil and natural gas is in accordance with the President's National Energy Policy, 2005, as outlined in Executive Order (EO) 13212.

1.4 CONFORMANCE WITH EXISTING LAND USE PLANS

The RP3DSS project, as proposed by BBC, would be consistent with management direction contained in the Record of Decision (ROD) for BLM's Cody Resource Area Resource Management Plan dated November 8, 1990 (BLM 1990).

The project design features referenced in Appendix B are subsequently incorporated into the Conditions of Approval for the NOI and are in compliance with all relevant resource management plan decisions contained in the ROD for the Cody Resource Area RMP.

1.5 RELATIONSHIP TO STATUTES, REGULATIONS, AND OTHER PLANS

This EA was prepared in accordance with NEPA and in compliance with all applicable regulations and laws passed subsequently, including Council on Environmental Quality (CEQ) regulations (40 CFR, Parts 1500-1508), U.S. Department of the Interior (USDI) requirements (Department Manual 516, Environmental Quality), and guidelines listed in BLM's NEPA Handbook, H-1790-1 (BLM 1988). The proposed project would be consistent with other federal, state and local laws, rules and regulations and BBC would procure any required permits or easements prior to the commencement of geophysical operations as identified in Table 1.2.

1.6 LAND AND RESOURCE MANAGEMENT ISSUES AND CONCERNS

In accordance with NEPA and the CEQ regulations contained in 40 CFR 1501.7, an open process has been employed for the determination and scope of issues to be addressed in this environmental document. In compliance with this procedural requirement, the CYFO released a scoping notice on February 28, 2007 in order to identify the significant issues related to the RP3DSS project proposal.

Table 1.2

**Major Federal, State and Local Permits and Approvals Required
for the Red Point 3D Seismic Survey Project**

Agency	Permit, Approval or Action
Bureau of Land Management	Compliance with BLM Handbook H-3150-1, <i>Onshore Oil and Gas Geophysical Exploration</i>
Bureau of Alcohol, Tobacco and Firearms	Permit handling, storage and use of explosives
U.S. Department of Transportation	Permit for transport of explosives
U.S. Fish and Wildlife Service	Conformance with the Endangered Species Act
Wyoming Game and Fish Department	Coordination on impacts to wildlife and state-sensitive species
Wyoming Department of Transportation	Conformance with applicable size and weight limits for trucks and permit to transport explosives
Wyoming State Historic Preservation Office	Consultation for cultural resource inventory, evaluation and mitigation
Wyoming Office of State Lands and Investments	Temporary use permits on state surface
Wyoming Oil and Gas Conservation Commission	Permits for seismic exploration on private and state surface estate
Affected Private Surface Owners	Easements for Operations on Private Surface Estate

Approximately 118 comments were received from the public in response to project scoping which led to the identification of the following land and resource management issues and concerns potentially associated with the Proposed Action:

- 1) Contamination resulting from project activities
- 2) Cumulative impacts
- 3) Habitat fragmentation
- 4) Impacts to cultural resources
- 5) Impacts to livestock grazing operations
- 6) Impacts to recreational users
- 7) Impacts to social/economic values
- 8) Impacts to soils
- 9) Impacts to the viewshed (aesthetics of open spaces)
- 10) Impacts to wetlands and riparian areas
- 11) Impacts to wild horses
- 12) Impacts to wildlife
- 13) Reclamation of disturbed areas

A synopsis of the comments received during the public scoping process (scoping matrix) has been compiled and is contained in Appendix C. Certain issues identified in conjunction with project scoping were determined not to be “significant issues related to the Proposed Action” (40 CFR 1501.7) because they are not potentially affected or impacted by the proposal. Those issues brought

forth during public scoping that are not considered in depth in this document and the reasons for eliminating that particular issue from consideration in this analysis are enumerated in Appendix C.

2.0 PROPOSED ACTION AND ALTERNATIVES

2.1 INTRODUCTION

Bill Barrett Corporation (BBC) has filed a Notice of Intent and Authorization to Conduct Oil and Gas Geophysical Exploration Operations (NOI) on lands administered by the Cody Field Office (CYFO), Bureau of Land Management (BLM). The proposed Red Point 3D Seismic Survey Project would encompass approximately 44.0 square miles (28,160 acres) in Townships 52 and 53 North, Ranges 98 and 99 West in eastern Park County, Wyoming. The proposed seismic survey would facilitate the development of a three dimensional image of the sub-surface geology and stratigraphy underlying the project area that would then be used to predict the presence (or absence) of geologic formations potentially containing commercial quantities of hydrocarbons. The proposed seismic survey project would involve the generation of ground vibrations utilizing both shot hole and vibroseis techniques with the reflected sound waves recorded for future processing and evaluation.

As indicated in Section 1.2, approximately 26,040 acres (92.5% of the project area) are owned by the United States of America (administered by the BLM), 1,920 acres (6.8% of the project area) are owned by the State of Wyoming (administered by the Office of State Lands and Investments), with the remaining 200 acres (0.70% of the project area) in private ownership.

2.2 THE PROPOSED ACTION

Bill Barrett Corporation (BBC), through Veritas, proposes to conduct an exploratory, three-dimensional (3D), geophysical seismic survey of the Red Point 3D Seismic Survey (RP3DSS) project area in eastern Park County, Wyoming. The proposed RP3DSS project would facilitate development of a 3D image of the geologic structures and stratigraphy underlying the project area and would involve:

- a) the generation of ground vibrations utilizing both “vibroseis” and “shot hole” techniques to create seismic (sound) waves that would be reflected from various sub-surface features back to the surface; and
- b) the recording of these reflected seismic (sound) waves and patterns arising from the different underground geologic strata for subsequent processing and evaluation.

As stated above, the raw data generated from the 3D seismic survey would be post-processed and then may be used to facilitate actual exploration and development (drilling) activities within the project area as deemed appropriate, based upon the interpretation of the data gathered from the proposed seismic survey.

2.2.1 Planning Surveys and Pre-Approval Actions

Planning surveys for the proposed seismic exploration project have commenced and are expected to be completed by mid-May, 2007. Due to the time lag between surveying and actual initiation of source generation activities, it may become necessary to re-flag some of the receiver and source lines prior to the start of the actual geophysical survey. To accurately define the extent and location of project activities, a survey crew would locate and place temporary markers (including lathe, pin flags, flagging and/or spray paint as appropriate) at receiver and source points using a high-accuracy global positioning system (GPS). The survey crew would establish and flag the receiver and source point locations and travel routes between them. This work would be completed both on foot, in trucks, and/or using ATVs from existing roads and trails including off-road travel as necessary or required. These surveys are considered “Casual Use” under BLM regulations governing onshore oil and gas geophysical exploration activities [43 CFR 3150.0-5(b)]. Vehicles bringing surveyors to and from the project area would remain on existing roads and trails. The survey crew would be responsible for positioning source point stations such that they avoid all known and apparent cultural, natural, and existing land use features of importance.

Archaeologists would follow the land surveyors to identify potential sites or areas of concern for cultural resources that could potentially be affected by surface disturbing activities associated with the seismic survey project (source points and overland access routes for vehicles). Identified sites/areas of potential concern for cultural resources would be flagged for avoidance according to BLM-approved criteria. This work would be conducted on foot and would extend into early June of 2007. The results of these cultural inventories would be provided to the land surveyors, means of avoidance for any identified cultural resources would be determined as necessary, and the survey location markers and designated access routes would be relocated accordingly.

Those locales within the overall RP3DSS project area where the Willwood Formation crops out at the surface and that could potentially be affected by disturbance from seismic survey activities (overland access routes for vehicles) would be inventoried for the presence of fossilized vertebrate remains by a qualified paleontologist. The results of the paleontological inventory would be provided to the CYFO, means of avoidance for any scientifically important paleontological resources identified in conjunction with the inventory would be determined as necessary, and the survey location markers and designated access routes would be relocated accordingly.

Following the pre-planning survey of the receiver and source lines, but prior to the commencement of intensive geophysical activities (e.g., project mobilization including the drilling of shot holes, placement of receiver cables and geophones, source acquisition, etc.), BBC has agreed to install a watering trough for use by wild horses inhabiting the southern portion of the project area. The water trough would consist of a thirty foot tank (trough) holding approximately 8,000 to 10,000 gallons of water and would be installed at a previously disturbed location to be mutually agreed upon by both BBC and the CYFO. The trough would be strategically located not only to provide vehicular access for installation and maintenance purposes but also to best suit the needs of wild horses in the area during seismic survey operations. Fresh water for use in the watering trough would be obtained from an approved source in the general area with possible sources including the municipal water supply for the city of Cody, Wyoming and/or irrigation water obtained from the Cody canal. The

trough would be filled prior to the commencement of intensive geophysical activities, and water levels therein would be maintained until such time as the project has been completed.

2.2.2. Proposed Source Generation

The proposed source lines are situated in a north-south array oriented perpendicular to the receiver lines within the project area (see Map 2, Appendix A). Approximately twenty-one (21) source lines would ideally be placed in a parallel pattern, 2200 feet apart, with source points (either shot holes or vibroseis locations) spaced approximately 220 feet apart along the source line. This ideal configuration is anticipated to be modified due to topographic constraints on access in some areas and to avoid other surface resource concerns including cultural sites, important wildlife features, and scientifically important paleontological features. There would be a total of approximately 2,521 source points (or approximately 24 source points per linear mile). The recording of seismic information would involve a total of approximately twenty-six (26) parallel lines of receiver (geophone) stations laid out in an east-west orientation. The parallel lines would ideally be spaced approximately 1540 feet apart with a total of approximately 3614 receiver points within the RP3DSS project area. Ideal receiver locations may also be modified due to topographic constraints on access.

Methods of generating ground vibration would differ across the project area based on terrain, accessibility and other obstacles. Vibroseis buggies are the preferred method of source generation and would be utilized to the greatest extent possible in accessible areas (see photo 1, Appendix D). In those areas where vibroseis buggies are unable to operate, source generation would be achieved through the sub-surface detonation of a small explosive charge in a “shot hole”. The drilling of holes (shot holes) would be performed by either off-road buggy-mounted drills (equipped with flotation tires much the same as the vibroseis buggies) or by helicopter moveable (heli-portable) drill rigs. Buggy-mounted drill rigs would be utilized to drill shot holes in any areas accessible to wheeled vehicles with slopes up to 30 percent but not accessible to the vibrators (see photo’s 6 and 7, Appendix D). Heli-portable drill rigs would be used in non-accessible areas and areas with slopes generally steeper than 30 percent (see photo’s 8-11, Appendix D). Based on preliminary estimates and initial staking efforts, approximately 80 percent of the source points would utilize vibroseis, 6 percent would be buggy-drilled shot points, and 14 percent would use shot points drilled using the heli-portable drill rigs. The following sections provide additional details regarding project activities.

2.2.2.1 Shot Hole Source Generation

BBC would use the detonation of explosives set in the drilled shot holes to create a portion of the seismic-energy for this seismic survey project. Two types specialized equipment would be used to drill these shot holes including: 1) a buggy mounted drill (buggy drill) and 2) a small, portable drill transported via sling below a helicopter (heli-portable drill). These specialized pieces of equipment would drill a 3.500 inch hole to a maximum depth of approximately forty (40) feet, with the resulting “shot” hole loaded with approximately ten (10) pounds of explosive made expressly for seismic exploration and containing approximately 60 percent vibrogel.

BBC would use up to a maximum of three (3) buggy drills to drill approximately 143 (+/-) shot holes (6% of the 2,521 total source points) in areas not accessible to the vibroseis buggies. The buggy drills would travel off-road along the source line(s) as staked in the field by the surveying crew to the extent possible for this project. No clearing or grading of the travel route along the source lines would be allowed except in those cases where existing crossings or erosional features would need to be repaired in order to facilitate buggy access on/along existing roads and trails. The repair of existing roads and trails for access would be conducted within the existing travel way disturbance and with the prior approval of the BLM.

These buggy drills are articulated, four-wheel drive, off-road transport vehicles with mounted drills, equipped with low pressure tires, and weighing between 19,000 and 28,000 pounds. The tread width on these low pressure tires varies by tire brand but would range from two (2) to three (3) feet in width with each tire exerting a contact pressure of approximately nine (9) pounds per square inch (psi) or less on the ground surface. Total buggy width would be approximately ten feet plus the tire width on each side. Two styles of buggy drills may be utilized for drilling operations on the RP3DSS project depending upon availability including:

- 1) a completely self contained buggy drill with compressors and water tanks mounted directly on the buggy frame; or
- 2) a buggy drill with a second compressor buggy that would travel behind and work in conjunction with the drill.

It is anticipated that for every mile of source line, an additional mile of travel would be required to provide the buggy drills with the flexibility to maneuver around topographic features and to avoid sensitive surface resources which may be encountered on/along the source line. While these “avoidance” maneuvers would utilize existing roads and trails in the area to the extent possible, it is also anticipated that much of this maneuvering would be cross-country in order to minimize overall off-road travel on/along each respective source line. When/where possible, the buggy drills would proceed from one source line to the next with a single pass and, as mentioned above, would utilize existing roads and trails to the extent possible in order to minimize the overall amount of off-road travel. A skewed approach would be utilized for access to/from these existing roads and trails in a weaving pattern for a short distance in order to minimize the visual impacts associated with access to from these roads/trails. ATVs may be also utilized as part of the drilling operation to facilitate the access to/from individual source points and also to deliver needed personnel, parts and equipment as necessary.

Approximately six (6) heli-portable drilling rigs would be utilized for those source points located in more rugged terrain that cannot be reached safely by the buggy drills (see photo 8, Appendix D). These drill rigs would be transported to/from the source point location(s) by helicopter and would account for approximately 363 (14%) of the total source points. Heli-portable drilling operations are not suited for drilling through shallow water tables or loose soil materials (alluvium). As a consequence, heli-portable drills would not typically be used in areas expected to have high water tables or alluvial deposits. Although these heli-portable drill rigs are “self-leveling”, provisions would need to be made on steeper slopes to provide for a stable working platform in order to anchor the rig. In these cases, a small area (generally no larger than 6’ X 6’) would be prepared with hand

tools in order to provide a “lip” designed to stabilize one end of the drill platform at the drilling location (see photo 10, Appendix D). In the majority of these cases, the disturbed area would be approximately 3’ X 3’ in overall size; however, for the purposes of this document and in order to provide a consistent number for the disturbance estimate, we will use 36 square feet for the maximum amount of surface disturbance surrounding each heli-portable drill hole.

After placing the explosive charge in the shot hole, a shot hole-plug would be placed in the hole as specified in the rules and regulations of the Wyoming Oil and Gas Conservation Commission (WOGCC) for seismic exploration. Providing that no water is encountered while drilling, the hole would be back-filled with drill cuttings to within three feet of the surface and a non-metallic plug would be installed in the hole. The remaining three feet of the hole would then be backfilled back to the surface and covered with the remaining drill cuttings. Any excess drill cuttings would be mixed with soil and spread over the surrounding area. In the event that water is encountered during the drilling operation, the appropriate WOGCC procedures would be followed. The down-hole explosives (shots) would be detonated individually and the sound wave reflections recorded by a series of recording station lines (usually eight to sixteen lines). Shot point detonation would be controlled by a central control truck stationed on or adjacent to an existing road/trail and a source point coordinator who would be positioned within sight of and at a minimum safe distance from the shot hole to be detonated. In some cases, the source point coordinator may be the same person operating the central control truck. Prior to detonation of each hole, it would be determined that there are no people or animals in the vicinity of the hole. In the unlikely event that the detonated explosive blows the plug and the drill cuttings out of the hole (blowout), the shot hole would be re-plugged as part of cleanup and demobilization.

A primary powder magazine would be located at one of the staging areas in the southern portion of the RP3DSS project area for the storage of explosives to be used in the individual shot holes. Explosives would be removed from the primary magazine on a daily basis to charge shot holes drilled each day and these explosives would be moved as close as possible to the working area on existing roads/trails by truck in a Type 3 Portable Magazine. Buggy drills would be supplied with explosives as necessary from a buggy powder truck at the nearest road intersection to where they are working as necessary and the explosives would be placed in an approved magazine mounted directly to the buggy. For the heli-portable drills, a helicopter would be used to transport the portable magazine to the drills, where the explosives would be placed in an approved magazine mounted directly to the drill. The helicopter would then deliver the magazine back to the powder truck. Use of the helicopter to transport explosives within the overall RP3DSS project area would be kept to a minimum.

Transportation, storage and handling of explosives would be in strict compliance with applicable state and federal laws, rules and regulations relating thereto. Local and BLM law enforcement and fire department officials would be notified of the proposed storage and use of explosives within the RP3DSS project area.

2.2.2.2 Buggy Mounted Vibroseis Source Generation

Buggy vibrators would be used as the energy source for the remaining portion of the seismic survey and would account for approximately 2,015 (80%) of the total source points. These vibrators are well suited for use in much of the terrain/topography to be encountered within the RP3DSS project area. Four vibrator buggies, traveling in either a staggered or “Flying V” formation (except as noted below), would travel bumper-to-bumper (approximately 10-15 feet apart for safety considerations), stopping to vibrate at each surveyed source point in sequence and in context with the overall source generation plan (see photo’s 2-5, Appendix D). The “Flying V” is formed by two front vibrator buggies side by side and two trailing vibrator buggies each offset to the outside approximately one half vehicle width. A staggered formation would not employ the Flying V formation but would stagger tracks in an offset box formation as much as is practicable (for the purposes of this document “Flying V” and “staggered” are interchangeable terms from this point forward). The net effect of these formations is that surface impacts associated with the vehicle tracks are spread out minimizing surface damage and providing for quicker recovery times.

Due to topographic constraints and other considerations, staggering and/or the Flying V formation may not be feasible in some areas and may be modified to an in-line formation when or as necessary. Minor adjustments to the formation may be made as necessary during the course of the project in order to minimize surface disturbance or as directed by the BLM. When traveling in line, the vibrators would utilize a slightly weaving route when feasible in order to minimize the visibility of their tracks. On existing roads and trails, the vibrator buggies would travel in an in-line, bumper-to-bumper formation. A vibrator scout on an ATV may be utilized to assist the vibrators in acquiring the source lines and to ensure that the vibrator buggies stay on the selected source routes. One set of four vibrators would be utilized for the project to facilitate the recording operation.

There is the potential for BBC to conduct night-time operations within the overall RP3DSS project area in order to facilitate trouble shooting activities and also to take advantage of slack wind conditions for recording purposes should high winds prevail in the daylight hours on those days when actual recording operations are planned. Night-time operations would be limited to vibroseis source generation/acquisition with the vibroseis buggies moving at reduced speeds between source points. During the daylight hours, the vibroseis buggies would be expected to travel between source points at speeds ranging between seven and ten miles per hour (mph) - these average speeds would be reduced by approximately 50% for night-time operations and would be conducted under artificial lighting conditions with off-road lighting provided by the buggies. For safety reasons, the routes would be pre-scouted during the daylight hours prior to source generation activities using ATVs. Implementation of night-time operations would also shorten the overall length of time required for project completion. Depending on where these nocturnal activities are conducted, equipment lights may be visible to motorists traveling along U.S. Highway 14-16-20 in conjunction with night-time operations.

To generate ground vibration waves, a buggy vibrator would lower a 7 x 4 foot metal pad onto the ground surface at a pressure of 15.4 psi. The buggy vibrator would then cause the pad to pulse or shake thereby generating a series of ground vibrations. Modern vibrator electronics provide force control on the 7x4 foot metal pad resulting in consistent ground contact and minimizing surface

disturbance and compaction. Duration and frequency of buggy vibrator shaking would range from a few seconds to several minutes and up to 120 hertz, respectively.

Each 4-wheel drive buggy vibrator would weigh about 62,000 pounds and would be equipped with standard flotation tires approximately 36 inches in width. Surface contact pressures on the ground surface would be approximately 15 psi for each tire. No additional clearing or grading of the existing roads and trails are proposed. Buggy vibrators (and drills) would only be refueled at the designated staging areas and on existing roads/trails or source line/road intersections during seismic survey operations.

2.2.3 Data Acquisition

Recording equipment would be transported to the field and to the various staging areas (including the helicopter landing zones) by truck using existing roads and trails. Sufficient equipment to lay out up to 6 geophones per receiver station, one length of seismic cable, and appropriate battery and field recording boxes would be placed in reinforced nylon cache bags at selected staging areas/helicopter landing sites and flown to pre-determined, flagged locations for stations along each receiver line. It should be noted that the potential use of new digital geophones and related equipment could reduce the overall number of geophones required per receiver station from 6 to 1, which would reduce the overall amount of equipment to be ferried in/out of the field during the data acquisition process.

Typically, one helicopter at a time would be used for the various phases of the project, and would operate only in daylight hours ferrying the heli-portable drills and receiving-station cache bags in separate operations. The helicopter would move four to six cache bags at a time suspended from a long line. The helicopter would operate at a minimum altitude of approximately 100 feet above the receiver line and deposit one bag at a time using GPS pin flag locations provided by the surveyors. Helicopters may also be utilized to transport crew personnel throughout the RP3DSS project area as needed. Should heli-portable drilling operations overlap with crew start-up, there is the possibility that two helicopters could be airborne at the same time - one transporting crew members to their individual work areas while the second is supporting heli-portable drilling operations.

Ground crew members would walk to the first dropped cache bag on their receiver line and prepare the cables and geophones. Seismic cable and attached geophones would be laid out by hand around each station in a pre-determined pattern. The geophones are mounted on an integral four-inch spike that would be inserted into the soil using foot pressure. Once the geophones have been placed, the crew member would then proceed on foot to the second bag and repeat the set up process. Stations, cable and geophones would be laid out in this manner at each station along each individual receiver line across the project area (see Map 2, Appendix A). Up to 16 lines of 108 geophone stations would be active at any given time throughout data acquisition operations. Upon completion of data acquisition (recording) operations in an "active" receiver line area, the deployed cable, geophones and related equipment would be retrieved on foot, bagged, and flown back to the primary staging area to have the equipment serviced as necessary and would then flown back out to a new receiver location.

Approximately 35-50 crew members would conduct daily operations for a minimum of 12 to 14 hours per day until project completion and, in some instances, crew operations may also be conducted after dark. Crew members would be organized into field groups of 4 to 6 personnel per group and these groups would operate at intervals of 2 to 3 miles from each other throughout the project area. A troubleshooting crew consisting of 2 to 4 people both on foot and utilizing ATV's would be deployed to troubleshoot and repair any electrical/wiring problems that may develop with the cable or geophones on active receiver lines during operations.

The recording truck containing the data acquisition control equipment would be located on or adjacent to an existing road, trail or staging area within the overall project area to initiate the source generation for the active receiver site locations during data recording periods. A "Tap Line" cable would be run perpendicular to the recording equipment lines in order to allow for communication between the receiver lines and the recording truck.

2.2.4 Support Operations and Staging Areas

All equipment would be initially brought to the project area by 12 to 20 transport trucks/tractor trailers as part of project mobilization. The transportation of trucks and equipment to/from the project area would be in strict compliance with Wyoming Department of Transportation rules and regulations regarding the transport of over-weight and/or over-size vehicles. Equipment to be used in the geophysical operation would generally include the following:

- 1) 1 one-ton recording truck,
- 2) 1 coordinators truck,
- 3) 1 one-ton battery/staging truck,
- 4) up to 3 buggy drills,
- 5) 5 buggy vibrators (4 working vibrators and one standby vibrator unit),
- 6) up to 6 heli-portable drills,
- 7) 2 fuel bowsers;
- 8) 6 four wheelers/quads,
- 9) 4 one-ton equipment trucks,
- 10) 2 crew transport vans,
- 11) 1 mechanic/fuel truck and trailer,
- 12) 1 vibe mechanic truck and trailer,
- 13) 2 helicopter support and fuel trucks,
- 14) 2 helicopters,
- 15) 1 project manager truck and ATV,
- 16) 1 recording crew manager truck,
- 17) 2 highboy equipment trailers, and
- 18) miscellaneous support vehicles.

Operation of most support vehicles, including pickups, would be limited to existing roads and trails and vehicles would travel at speeds within set speed limits (25 mph) on main access roads and at slower speeds deemed appropriate for conditions on more remote roads and trails. A repair-buggy may need to travel off-road should a drill or vibrator buggy need repair and could not return to a

staging area or road/trail for needed repairs. The repair vehicle would limit travel to routes/areas surveyed and cleared previously for cultural and paleontological resources.

Typically one primary staging area would be utilized within the overall RP3DSS project area with several smaller, remote “satellite” staging areas established for use in the overall operation. These staging areas would be located on previously disturbed areas such as abandoned well pads or bladed areas when operationally feasible and to the extent possible and would typically occupy an area of approximately 90,000 square feet (300’ X 300’) or less in size. The satellite staging areas would typically be somewhat smaller than the primary staging area and would have much less human activity than the primary area. The staging areas would be strategically located throughout the overall project area and would provide for temporary placement of crew equipment; cable and geophone trailers; fuel for the helicopter, vibroseis/drill buggies, and support trucks; landing pad(s) for the helicopter; and parking for crew transport vehicles. The primary staging area would also be used to prepare and bag equipment prior to the equipment being flown out to the receiver lines via helicopter. A coordinator’s truck (usually located at one of the staging areas), would direct helicopter operations, including ferrying equipment to/from the receiver lines and transport of project personnel to/from the project area as necessary.

2.2.5 Project Activities and Schedule

Seismic survey activities are generally expected to proceed systematically from the south edge of the project area to the north with source generation activities typically limited to the active recording “patch” or area that is covered by geophones at any given time. Specific activities in the proposed order of occurrence would include:

- 1) The drilling of shot holes and placement of explosives is planned to trend generally from south to north as dictated by the terrain and other restrictions. The buggy and heli-portable drilling operations may or may not overlap depending on crew availability. The buggy drilling operations would typically commence prior to heli-portable operations. Based on initial estimates, drilling activity would require approximately three to six weeks prior to the commencement of source acquisition activities.
- 2) Initial placement of a minimum of 8 recording lines would begin the recording process. Additional lines would be laid out until there are sufficient recording lines to record a full “patch” which would be on the order of 16-20 lines. Veritas may lay more lines depending on local area logistics and equipment inventory.
- 3) Controlled source generation and recording would begin shortly after placement of the initial grouping of receiver stations/geophones. Time between shot-hole detonations is typically a minimum of 5-10 minutes but can take longer depending on terrain and accessibility of shot points to the source point coordinator. Several source point coordinators may be utilized to detonate and record the shot holes as necessary or available. Shot points on a source line situated between two central receiver lines within the “patch” would be detonated individually. Shot detonation activities would progress between the same two central receiver lines until all source points in this corridor have been acquired. Source generation would then proceed to the

next leading receiver line corridor. Buggy vibrator shaking would occur intermittently as called for in the sequence of the program assigned.

As source generation progresses, trailing receiver lines outside of the active recording “patch” are picked up and moved in front of (leap-frog) the lead receiver lines.

- 4) Source generation and recording is expected to take approximately 45 days. The duration of the complete survey is projected to be approximately 80 days including mobilization and demobilization. Within this definition of complete survey time, the survey shall be considered to be initiated when the first shot hole is drilled.

2.2.6 Workforce

A work crew comprised of 15 to 20 workers would be required for approximately three to four weeks during the initial drilling phase of operations. Upon completion of drilling operations, a work crew of 35 to 50 workers would be required for approximately 45 days to mobilize and complete data acquisition. A small crew of 4 to 6 personnel would be on site for up to two weeks following data acquisition for demobilization and clean-up.

2.2.7 Disturbance Estimates

The proposed RP3DSS project would result in total short-term surface disturbance equal to approximately 505 acres, or 1.8 percent of the estimated 28,160 acre project area (see Table 2.1), where surface disturbance is defined as any physical disturbance that directly or indirectly impacts biological and physical surface resource values. With this definition in mind, actual surface disturbance resulting from buggy drill and vibrator travel would typically consist of two, 36 inch wide tracks (total disturbance of approximately six feet per buggy) from the buggies. The use of flotation tires on the buggies with surface contact pressures ranging between 9 and 15 psi would minimize the direct and/or indirect impacts to biological and physical resources encountered on/along the route with these impacts primarily limited to:

- the crushing of grass/shrub stems encountered on cross-country routes;
- some visible soil disturbance from vehicle passage due primarily to the lugs (cleats) on the flotation tires - particularly in areas devoid of or with sparse vegetative cover; and
- minor rutting may occur in loose soils devoid of vegetative cover or in those cases where sudden precipitation events overtake source generation activities and equipment must be moved back to existing roads/staging areas until soil conditions are more favorable. Again, for the purposes of this document, rutting is defined as tracks worn by wheels or through habitual passage, with ruts less than four (4) inches considered to be minor rutting.

Table 2.1

Source Generation and Associated Surface Disturbance

Surface Ownership	Activities/Facilities	Source Points		Disturbance	
		Number	Percentage	Acreage ¹	Percentage ²
Federal	Buggy Drill	143	5.7%	8.67	0.031
	Vibroseis (assume all Flying V)	1899	75.3%	460.36	1.635
	Heli-Portable Drill	339	13.4%	0.28	0.001
	Staging Areas	-----	0.0%	7.12	0.025
State	Buggy Drill	0	0.0%	0.00	0.000
	Vibroseis (assume all Flying V)	116	4.6%	28.12	0.100
	Heli-Portable Drill	24	1.0%	0.02	< 0.001
	Staging Areas	-----	0.0%	0.00	0.000
Private	Buggy Drill	0	0.0%	0.00	0.000
	Vibroseis (assume all Flying V)	0	0.0%	0.00	0.000
	Heli-Portable Drill	0	0.0%	0.00	0.000
	Staging Areas	-----	0.0%	0.00	0.000
TOTAL		2521	100.0%	504.57	1.793

¹ Basis for assessment of acreage of disturbance by seismic source:

Buggy Drill. Distance between shot points would be 220 feet which is multiplied by a factor of 2.0 to account for tortuosity of the route between source points, multiple passes, and travel between lines; width of maximum possible disturbance from passage of buggy drill vehicle would be six feet; surface disturbance at a shot point would be kept within the disturbance area for buggy drill activity; 220 feet x 2.0 x 6 feet x number of shot points ÷ 43,560 square feet per acre = number of acres of disturbance.

Vibrator Buggy (Flying V Formation). Distance between shot points would be 220 feet which is multiplied by a factor of 2.0 to account for tortuosity of the route between source points, multiple passes, and travel between lines. The width of maximum possible disturbance from a single passage of one vibroseis buggy vehicle would be approximately 6 feet; surface disturbance at a vibration point would be kept within the disturbance area for vibroseis activity; 220 feet x 2.0 x 6 feet x 4 parallel buggies x number of shot points ÷ 43,560 square feet per acre = number of acres of disturbance.

Heli-Portable Drill. Area of activity and possible disturbance would occur within a 6-foot square centered on the helicopter-placed drill and the shot hole location; 36 square feet x number of shot holes ÷ 43,560 square feet per acre = number of acres of disturbance (this figure not utilized in disturbed area total because of uncertainty of heli-portable usage - the acreage overage used in vibroseis estimates will more than compensate for heli-portable estimate).

Staging Areas, Magazine Sites and Drill Staging. Including one Main Staging Area for recording crew activities (up to approximately 300 feet x 300 feet) and one Magazine Site/Staging Area (up to approximately 300 feet x 300 feet) would be utilized as well as approximately 13 smaller, secondary locations (up to approximately 100 feet x 100 feet) for equipment bagging, helicopter landing zones, portable magazines, and drill staging.

Note: Disturbance estimates for buggy drill and buggy vibrator tire widths have been calculated at an average of 3 feet wide. Drill and vibrator tires vary and actual widths may be wider or narrower.

² Percentage of total 28,160 acre project area

The crushing of grass/shrub stems and “visible” tracks are expected in conjunction with routine seismic survey activities. These impacts are expected to be apparent immediately following seismic survey activities, but will diminish through time (TRC 2007). Minor rutting as defined above is possible, particularly in areas devoid of vegetation or where loose soils are encountered, but would not be expected to be commonplace or widespread in nature. Major rutting (ruts in excess of four inches) would be avoided to the greatest extent possible, but is possible under certain meteorological conditions as outlined above. BBC would take every precaution to ensure that surface disturbances resulting from off-road activities are limited to the crushing of vegetation and minor soil disturbances related to tire configurations. In cases where soil conditions (wet and/or saturated soils) are such that rutting may occur, operations would be suspended and the equipment would be moved back to existing roads or staging areas until such time as cross-country operations could proceed with a minimal amount of surface disturbance. Any major rutting that occurred in conjunction with the proposed geophysical operation would be reclaimed and reseeded as directed by the AO. As summarized in Table 2.1, total surface disturbance resulting from buggy drill and vibrator travel was multiplied by a factor of 2.0 to account for travel corridors, double passes, and travel between lines. Four vibroseis buggies would travel in a staggered “Flying V” formation to the extent practicable. Even though single-track vibroseis formations would be utilized in some areas, all vibroseis activity has been assumed to be the staggered or “Flying V” formation for the purposes of estimating surface disturbance.

Operations on existing roads (as applicable) would use an in-line formation as the vibroseis buggies would not be able to spread out into a staggered or “Flying V” formation. Drill buggies would travel single-file along the source lines from drill point to drill point. As discussed in Section 2.2.2.1, there may be a need to repair existing roads and trails within the overall RD3DSS project area in order to facilitate buggy access. These repairs would be confined to the existing, previously disturbed travel way and would not result in any new surface disturbance on/along these existing roads and trails. BBC would obtain prior approval from the BLM for all proposed repairs to existing roads and trails. No “road” construction or bladed crossings would be allowed in conjunction with the proposed seismic survey project and no surface disturbance would result from pedestrian receiver point placement and recording, with this pedestrian-based activity meeting the criteria for classification as “casual use”.

The disturbance estimates contained in Table 2.1 are based upon the assumption that all vibroseis activities would be conducted in a staggered or “Flying V” formation. This formation results in a disturbance estimate that is higher than estimates based upon the use of a singular linear formation. However, this formation has been chosen in order to address BLM preferences concerning staggering of tracks, which has been shown to reduce overall surface impacts. The disturbance estimates contained in Table 2.1 for vibroseis source generation also assume all travel to be “cross-country”. As stated above, the vibroseis buggies would use existing roads and trails within the overall project area to the extent possible and the degree of use would ultimately reduce these disturbance estimates accordingly.

Of the 505 acres of total short-term surface disturbance, approximately 477 acres (95%) of the disturbance would occur on federal surface estate and approximately 28 acres (5%) of the disturbance would occur on surface estate owned by the State of Wyoming. No surface disturbing activities (source points or staging areas) are proposed on privately-owned surface estate. The 477

acres of disturbance on federal lands would constitute approximately 1.69 percent of the total project area and approximately 1.83 percent of the total federal surface estate (26,040 acres) within the overall project area.

Any surface disturbance resulting from project-related activities including, but not necessarily limited to, repeated vehicle use of staging areas, heli-portable drill pad installation, inadvertent rutting along source lines, etc. would be repaired and re-seeded with a seed mixture appropriate for the area as recommended by the AO. Repair of existing disturbances would involve leveling of ruts and limited leveling of other irregularities where necessary (including access routes, staging areas and shot points) as approved by the AO. Repairs would be conducted using hand tools or small, motorized pieces of equipment (such as a bobcat or skid steer) with AO approval. Once these areas have been repaired, the disturbed areas would be seeded as discussed above.

Surface disturbance associated with the installation of the watering trough identified in Section 2.2.1 is expected to be minimal considering that the trough would be placed, to the extent possible and practical, on a previously disturbed area within the southern portion of the RP3DSS project area. Installation of the trough may require some minor leveling where the tank would be placed, with this leveling accomplished with the aid of hand tools and small, motorized equipment as mentioned above. As a consequence, no acreage figures are provided for the installation of the thirty foot trough as the amount of disturbance associated with trough installation would be negligible, with the trough remaining in place following the conclusion of the geophysical operation.

2.2.8 Demobilization

The demobilization task would proceed concurrently with data acquisition. All pin flags, flagging, lathe and other “trash” would be gathered daily as the field groups and crew members complete data-acquisition portions of the project. ATV’s would be utilized to clean up flagging on/along the source lines and all “trash” would be collected at points on roads or trails and transported by vehicle to staging areas where personnel would organize materials, handle equipment, and dispose of used/unusable materials. A follow up or “trash” crew would make a complete sweep of the project area to ensure that no trash or equipment has been left behind upon completion of data acquisition. This task would be completed within about 5 days subsequent to the conclusion of data acquisition.

2.2.9 Project Design Features

Project Design Features (PDFs) are appropriate actions or measures designed to avoid, minimize, rectify, reduce, eliminate, or compensate for adverse environmental impacts (40 CFR 1508.20). PDFs may consist of Operator (Applicant) Committed Practices which are standard operating procedures and “best management practices” incorporated into the Proposed Action by the project proponent or they may be requirements imposed by the approving agency that reflect the statutory requirements of federal, state, and local laws, rules and regulations.

Appendix B contains those regulatory requirements applicable to the RP3DSS project that have been identified by BLM and which would be incorporated as conditions of approval in the approved NOI - should the AO ultimately determine that the geophysical project may proceed.

2.3 THE NO ACTION ALTERNATIVE

The *National Environmental Policy Act* of 1969 (NEPA) requires that the “No Action” alternative be considered in all environmental documents. Under the No Action Alternative, the BLM would deny the NOI for the RP3DSS project, while allowing other land and resource uses to continue without the impacts which would be associated with geophysical operations in the overall project area. Denial of the geophysical permit is not, however, a denial of all future geophysical exploration activities in the area. Under the No Action Alternative, future geophysical exploration of those lands included within the RP3DSS project area could occur as authorized by existing management direction contained in the Cody Resource Area RMP, which includes the requirement for site-specific NEPA analysis on all proposals.

Based upon the above, selection of the No Action Alternative would deny the geophysical proposal as currently submitted, but would allow BLM to consider future geophysical exploration project proposals on a case by case basis through individual Notices of Intent and site specific environmental analysis thereof.

2.4 ALTERNATIVES CONSIDERED BUT NOT ANALYZED IN DETAIL

2.4.1 Alternate Water Source for Wild Horses

Early discussions with BLM concerning the need to provide an alternate water source for wild horses displaced from traditional watering points along Dry Creek included a proposal to clean one or more existing reservoirs located north of the pasture division fence with at least one of these reservoirs located west of Red Point, in the Red Point (#03067) Allotment. Water in these refurbished reservoirs was thought to represent a more natural setting for horse watering purposes.

These refurbished reservoir(s) would have been filled with water prior to the start of the seismic survey project with adequate water levels for horse watering purposes subsequently maintained for the duration of the geophysical project. The addition of bentonite or bentomat to some reservoir(s) may have been required to prevent water loss through seepage. All work required for cleaning out these reservoirs would be conducted within the existing surface disturbance associated with initial reservoir construction - any excavated silt would be placed on the reservoir dike and subsequently dressed as required by the AO. Water would be trucked from Cody with the number of truck trips required to fill and maintain water levels in said reservoir(s) based upon the capacity thereof and subsequent horse use.

Based upon subsequent discussion, it was determined that this alternative was probably not feasible or practical from several standpoints, not the least of which was the difficulty expected in cleaning

these old reservoirs and ensuring that the reservoirs would ultimately hold water for the duration of the project. The need for heavy equipment (including large track hoes and bulldozers) was anticipated in conjunction with the refurbishing of these reservoirs and recent weather events in the area may have precluded the use of heavy equipment within the bed of the reservoirs themselves, making the cleaning project problematic at best. The ability of the reservoirs to hold water following cleaning was also a consideration. The use of bentonite or bentomat for sealing purposes as originally contemplated has proven to be an ineffective method of sealing reservoirs in many instances and the use of a plastic or vinyl liner is cost prohibitive for this particular application. Secondly, there could have been a potentially large increase in the amount of human activity required to clean these reservoirs, to subsequently fill them with water, and then to maintain adequate water levels for daily horse use during the course of the actual geophysical operation.

2.4.2 Use of Heli-Portable Equipment for Source Acquisition Off Existing Roads and Trails

In addition to the proposed action and the no action alternatives, BLM also considered the use of helicopters to facilitate the drilling of shot holes off existing roads and trails as an alternative to the use of buggy-mounted drills and vibroseis for source acquisition. Use of heli-portable drills project-wide would eliminate the need for off-road travel along the source lines by drill and vibroseis buggies, but would dramatically increase the use of helicopters for geophysical operations thereby rendering the project uneconomic. In addition, there are major concerns with expanded helicopter usage over the entire project area as said use would increase the amount of time that wild horses would be subjected to stressors (e.g., noise, presence, etc.) associated with these aerial operations. As a consequence, this alternative was dropped from further analysis.

3.0 AFFECTED ENVIRONMENT

3.1 INTRODUCTION

This chapter describes the affected environment in the vicinity of the Proposed Action (the project area) as it exists today. This description is organized by resource with descriptive information taken from a wide range of sources including the BLM and various other federal and state agencies and has been guided by management issues identified by BLM's CYFO, public scoping, and by interdisciplinary analyses of the project area. The critical elements of the human environment as defined by BLM Manual 1790.1 (BLM 1988, 1999) and any potential affects arising from implementation of the Proposed Action are listed in Table 3.1.

Table 3.1

Critical Elements of the Human Environment ¹

Critical Element	Status in Project Area	Addressed in EA
Air Quality	Potentially Affected	Yes ²
Areas of Critical Environmental Concern	None Present	No
Cultural Resources	Potentially Affected	Yes
Environmental Justice	Not Affected	No
Farmlands (prime or unique)	None Present	No
Floodplains	None Present	No
Invasive, Non-Native Species	Present	Yes
Native American Religious Concerns	Not Affected	No
Threatened and Endangered Species	Potentially Affected	Yes
Wastes (hazardous or solid)	Not Affected	No
Water Quality	Potentially Affected	Yes ²
Wetlands/Riparian Habitat	Potentially Affected	Yes ²
Wild and Scenic Rivers	None Present	No
Wilderness	None Present	Yes ³

¹ From the BLM NEPA Handbook H-1790-1 (BLM 1988, 1999).

² Addressed briefly in Section 3.2: Environmental Elements Considered with Minor Effects

³ Addressed briefly in Section 3.2 in response to BCA wilderness proposal

As indicated above Critical Elements of the Human Environment including Air Quality, Water Quality, Wetlands/Riparian Habitat and Wilderness issues will be discussed briefly in Section 3.2 (Environmental Elements Considered with Minor Effects). Otherwise, the critical elements that are

either not present within the RP3DSS project area or that would not be affected by project-related activities will not be addressed further in this document.

Other resources identified for consideration as potentially affected by the proposed RP3DSS project include paleontological resources, public health and safety, soils, vegetation, range, recreation, visual resources, wild horses and wildlife (see Appendix B). With the exception of public health and safety and visual resource management concerns, these issues are described in Chapter 3.0 and are analyzed in detail in Chapter 4.0. Issues raised concerning potential impacts to the public health and safety in and the viewshed (visual integrity) of the affected area resulting from the proposed RP3DSS project are addressed in Section 3.2.

3.2 ENVIRONMENTAL ELEMENTS CONSIDERED WITH MINOR EFFECTS

The following resources would not be adversely affected by implementation of the Proposed Action. As a consequence, these resources will be addressed briefly in this section but will not be addressed in Chapter 4.0 (Environmental Consequences).

3.2.1 Air Quality

Seismic survey operations are typically short-term in nature and the emissions resulting from equipment utilized primarily in source generation is therefore transient in nature. Previous analyses of the impacts of seismic survey activities on ambient air quality have generally concluded that geophysical activities have a negligible impact upon air quality (BLM 2006c, 2007a, 2007b) and results primarily from the creation of fugitive dust associated with vehicular traffic on area roads and trails. In this regard, BBC has agreed to apply water or magnesium chloride to existing roads as necessary to reduce fugitive dust from vehicle traffic. Staging areas would be watered as necessary to reduce fugitive dust emissions - magnesium chloride would not be used on the staging areas for dust suppression purposes. Considering that air quality within Park County is in compliance with federal and state ambient air quality standards and that no permits or authorizations are required from the Air Quality Division, Wyoming Department of Environmental Quality for project related activities, the proposed RP3DSS project is not expected to violate ambient air quality standards. As a consequence, impacts to air quality will not be discussed further in this document.

3.2.2 Public Health and Safety

Concern has been expressed by the public through the scoping process regarding health and safety issues related to the proposed RP3DSS project. These concerns have largely been addressed in Chapter Two and were either incorporated directly into the Proposed Action or recommended in the Project Design Features contained in Appendix B as follows.

1. Transport of trucks and equipment to/from the project area would be in strict compliance with Wyoming Department of Transportation rules and regulations regarding the transport of over-weight and/or over-size vehicles.

2. Safety-warning signs would be placed on main access roads to make the public aware of road traffic related to project activities. Signs warning the public of project activity would be located at the closest primary road intersections on either side of the next day's planned drilling activity. No road closures are proposed, and any short-term delays on use of roads would be communicated to the public by signs and flagmen.
3. Explosives would be stored and handled in strict conformance with applicable state and federal laws, rules and regulations pertaining thereto.
4. The public would be asked to maintain a safe distance from operating equipment and from staging areas where helicopter or other motorized activities are taking place.
5. Vehicles would travel at speeds within set speed limits (25 mph) on main access roads and at slower speeds appropriate for conditions on more remote roads and trails. Slower speeds would also be used in conjunction with night-time operations.
6. A shot-point coordinator would be utilized in conjunction with the detonation of explosives and said officer would be responsible for ensuring that the area was clear prior to detonation.

Considering the safety features incorporated into the project proposal (see Appendix B), there is a negligible risk to the public from seismic survey activities. As a consequence, the potential impacts to the public health and safety will not be discussed further in this document.

3.2.3 Visual Resources

The proposed RP3DSS project area includes three different Visual Resource Management (VRM) categories including:

- VRM Class II. The management objectives of this class is to retain the existing character of the landscape. The level of change to the characteristic landscape should be low. Management activities may be seen, but should not attract the attention of the casual observer. Any changes must repeat the basic elements of form, line, color, and texture found in the predominant natural features of the characteristic landscape.

Approximately 7,317 acres or 26.0% of the overall RP3DSS project area falls within the Class II VRM classification.

- VRM Class III. The management objectives of this class is to partially retain the existing character of the landscape. The level of change to the characteristic landscape should be moderate. Management activities may attract attention but should not dominate the view of the casual observer. Changes should repeat the basic elements found in the predominate natural features of the characteristic landscape.

Approximately 11,363 acres or 40.4% of the overall RP3DSS project area falls within the Class III VRM classification.

- VRM Class IV. The management objectives of this class is to provide for activities which require major modification of the existing character of the landscape. The level of change to the characteristic landscape can be high. These management activities may dominate the view and be the major focus of viewer attention. However, every attempt should be made to minimize the impact of these activities through careful location, minimal disturbance, and repeating the basic elements.

Approximately 9,480 acres or 33.6% of the overall RP3DSS project area are included with the Class IV VRM area.

The seismic survey activities proposed in conjunction with the RP3DSS project are temporary in nature in that they would occur over a very short period of time and would not result in management activities that alter or change the characteristic landscape, regardless of the particular landscape (VRM) class affected by project related activities. Surface disturbances associated with the proposed RP3DSS project are considered to be minimal at best and would be virtually undetectable once the actual recording phase of operations has been completed (TRC 2007). Seismic survey activities in the 7,317 acre Class II VRM area would not conform with the objectives for that area on a short-term basis from the standpoint that seismic activities would likely attract the attention of casual observers during operations; however, as stated above, these activities are short-term in nature and the characteristic of the landscape would return to “pre-project initiation” levels once the project has been completed. There would be no long-term or permanent alterations of the characteristic landscapes in any of the three VRM classes encountered within the RP3DSS project area. As a result, the impact of the Proposed Action on visual resources within the overall project area is considered to be extremely low and would not violate the management objectives for these areas in the long term. As a consequence, visual resources will not be discussed further in this document.

3.2.4 Water Resources

The majority of the natural water features within the proposed project area have an ephemeral or intermittent moisture regime. Water is present in Dry Creek year round, but only because of water discharged by oil/gas production activities taking place within the watershed. The quality of the surface water associated with the ephemeral and intermittent drainages within the proposed project area is generally within the range expected for streams of this type given the geology, soils, vegetation types and level of surface disturbance that is present within the respective drainage basins. The amount of suspended solids being transported by water within the proposed project area is likely to be somewhat elevated because of the surface disturbance associated with human-related activities that have occurred and/or are occurring in the area.

The quality of the surface water found in Dry Creek is being modified by the water being discharged within the watershed. Laboratory analysis of several water samples taken near the upstream boundary of the proposed RP3DSS project area between 1988 and 2004 documented pH readings between 7.5 and 8.2 standard units (SU) and Total Dissolved Solid (TDS) concentrations between 2,630 and 10,538 mg/l. In comparison, water sampling conducted in 2006 on nearby Dry Creek

tributaries had pH values between 7.4 and 7.8 SU and TDS concentrations between 200 and 300 mg/l.

The proposed project area is situated in an area that experiences numerous thunderstorms during the warmer months. Some of these storms can be quite strong, producing considerable precipitation over a relatively short period of time. Some of these storms cause flash flooding in area drainages. On average, Dry Creek experiences at least one of these heavy flood events every summer.

Operational measures incorporated into the Proposed Action or recommended in the Project Design Features contained in Appendix B would minimize the potential impact to water resources and resultant water quality resulting from seismic survey activities throughout the proposed RP3DSS project area. As a consequence, impacts to water resources will not be discussed further in this document.

3.2.5 Wetland/Riparian Habitat

Numerous reservoirs exist throughout the overall RP3DSS project area, many of which may now be dry or will go dry as the summer progresses due to the continued drought being experienced throughout the western United States. Historically, these reservoirs may have had riparian habitats associated therewith during normal or above-normal precipitation years, but again these habitats may have now shrunk in size due to the prolonged drought conditions. Cottonwoods and willows may still be present; however, in some cases this “riparian” habitat may consist primarily of invasive, non-native species such as salt cedar. Riparian habitat is known to exist along Dry Creek in the southeastern corner of the overall seismic survey project area and also in conjunction with existing water developments in the extreme western portion of the seismic survey project area. Approximately 1.5 linear miles of the Dry Creek drainage were eliminated from the RP3DSS project area due primarily to concerns regarding wild horses, leaving approximately 1.75 linear miles of the Dry Creek drainage remaining within the project area as currently proposed.

Riparian/wetland plant species found along Dry Creek within the proposed project area include: tri-square bulrush (*Scirpus americanus*), alkali bulrush (*Scirpus maritimus*), Baltic rush (*Juncus balticus*), foxtail (*Hordeum jubatum*/spp), riparian wheatgrass (*Elymus lanceolatus*), wild licorice (*Glycyrrhiza lepidota*) and silver buffaloberry (*Shepherdia argentea*). Narrowleaf and/or plains cottonwood (*Populus angustifolia/deltoids*), coyote willow (*Salix exigua*) and currents (*Ribes spp.*) are found on some oxbows and/or ephemeral tributaries near their confluences with Dry Creek. Salt cedar (*Tamarix spp.*) is common and a few Russian olives (*Elaeagnus angustifolia*) are present in the plant community along this part of Dry Creek. Plants found on the first and second terraces along Dry Creek include alkali sacaton (*Sporobolus airoides*), green rabbitbrush (*Chrysothamnus viscidiflorus*), inland saltgrass (*Distichlis spicata*), riparian wheatgrass, wild licorice, sorrel (*Rumex spp.*), big sagebrush (*Artimisia tridentate*), greasewood (*Sarcobatus vermiculatus*) and salt cedar. Non-game fish including lake chubs (*Couesius plumbeus*), white suckers (*Catostomus commersoni*), and fathead minnows (*Pimephales promelas*) were collected from Dry Creek several miles upstream of the proposed project area. Beaver (*Castor Canadensis*), muskrats (*Ondatra zibethicus*) and several other mammal/bird species also use the habitat associated with Dry Creek.

Operational measures incorporated into the Proposed Action or recommended in the Project Design Features contained in Appendix B would minimize the potential impact to wetlands and associated riparian habitats from seismic survey activities throughout the proposed RP3DSS project area. As a consequence, impacts to wetland and riparian habitats will not be discussed further in this document.

3.2.6 Wilderness Study Area

As shown on Map 3 (Appendix A), the northwestern corner of the RP3DSS project area is approximately 2.75 miles southeast of the southernmost portion of the McCullough Peaks Wilderness Study Area (WSA). While seismic survey activities within the RP3DSS project area may be visible from the McCullough Peaks WSA, these activities would be extremely short-term in nature and would not result in the disturbance of surface lands included within the WSA or alter the characteristics of lands included within the proposed WSA which could ultimately preclude the area from future consideration as wilderness by the Congress of the United States.

3.2.7 Biodiversity Conservation Alliance Proposed Wilderness Area

During scoping, BLM received information, maps and photographs from Biodiversity Conservation Alliance (BCA) on an area directly adjacent to the existing McCullough Peaks WSA which has been recommended for special management by BCA. Approximately 7,856 acres in the northern portion of the RP3DSS project area are included within this special management area - which has been proposed as an extension of the McCullough Peaks WSA by BCA. Of these 7,856 acres, approximately 85.5% (6,714 acres) are currently subject to existing oil and gas leases and these leases are currently open to oil/gas exploration and development activities in accordance with the terms and conditions of the respective leases and subject to any conditions of approval that may result from future NEPA analyses of proposed oil/gas exploration activities on these lands. This area has been subjected to surface disturbance in the past as evidenced by the network of roads and trails that have been constructed into/within the general area with selected roads and trails remaining open for ORV and motorized vehicle use (BLM 2004).

As previously discussed, no new roads would be constructed within the proposed RP3DSS project area and surface disturbances associated with source acquisition would be minimal. Consequently, implementation of the Proposed Action would not materially alter the characteristics of the landscape (surface lands) within the BCA proposed extension to the McCullough Peaks WSA.

In this regard, it should be noted that BLMs authority to designate new WSAs has expired and any evaluation of the BCA wilderness proposal would be a land management planning decision conducted under FLPMA. The BLM has determined that the BCA proposal is out of scope with this environmental assessment and does not meet the purpose and need of the Proposed Action.

3.3 CULTURAL AND PALEONTOLOGICAL RESOURCES

3.3.1 Cultural Resources

A file search was conducted by Kail Consulting Ltd. on March 5, 2007 through the Wyoming State Historic Preservation Office (SHPO) for those sections potentially affected by the proposed RP3DSS project. All sections potentially affected by the seismic survey project were included in the search regardless of surface ownership. The subject file search revealed that 26 separate inventories had been conducted in portions of 35 individual sections within the overall project area. These inventories resulted in the identification of 16 cultural sites as indicated in Table 3.2.

Table 3.2

Prior Class III Cultural Inventories in the RP3DSS Project Area

Sections Surveyed	# of Surveys	Eligible Sites ¹		Sites Not Eligible		Eligibility Unknown		Isolates
		Prehistoric	Historic	Prehistoric	Historic	Prehistoric	Historic	
35	26	0	2	6	2	2	4	6

¹ The eligible historic sites referenced above include segments of the Bridger Trail and the Wiley Canal

Of the 16 sites identified in the overall project area to date, none (0%) are eligible prehistoric sites, 12.5% are eligible historic sites, 37.5% are non-eligible prehistoric sites, 12.5% are non-eligible historic sites, and the remaining 37.5% are sites of undetermined eligibility (both prehistoric and historic). According to the file search from SHPO, approximately 134 acres have been inventoried within the RP3DSS project area to date (excluding recent surveys and linear surveys, which were not enumerated in the file search received from SHPO). A recent cultural resource inventory that was conducted within the RP3DSS project area, but that was not included in the recent file search, involved an inventory of 57.8 acres in conjunction with two exploratory wells proposed by Bill Barrett Corporation. No cultural materials were identified in conjunction with these inventories and the wells were subsequently withdrawn pending acquisition of the seismic survey data.

Approximately 2,300 feet of the Bridger Trail falls within the proposed RP3DSS project area in Section 1 of Township 53 North, Range 98 West. The remainder of the Bridger Trail falls outside of the proposed seismic survey project area. Likewise, approximately 9,600 feet of the Wiley Canal also falls within the proposed RP3DSS project area, with these portions of the canal located in Sections 2 and 11 of Township 52 North, Range 99 West in the extreme southeastern portion of the project area.

A cultural inventory of the proposed RP3DSS project area was conducted by ARCADIS U.S., Inc. (ARCADIS) in May and June of 2007. The cultural inventory resulted in the evaluation of 21 sites within the inventoried area, including 12 previously recorded sites and 9 newly-discovered cultural resource sites. Four of these sites are recommended for inclusion on the National Register of Historic Places (NRHP), 16 are recommended as not eligible for inclusion on the NRHP and one site remains unevaluated. Proposed geophysical activities in the RP3DSS project area were rerouted around the potentially eligible and unevaluated sites to avoid disturbance of and potential impacts thereto.

3.3.2 Paleontological Resources

The RP3DSS project area is situated in an area dominated by outcrops and subcrops of the Eocene Willwood Formation, which represents an ancient river floodplain depositional environment as shown on Map 4 (Appendix A). The Willwood Formation is well known as a world-class mammalian fossil deposit and is studied by numerous universities and colleges throughout the United States and the world. The Willwood Formation contains one of the best known records of Eocene mammalian fauna and has the most detailed biostratigraphic resolution, with more than 1,100 fossil mammal localities, and over 100,000 mammal fossils tied to measured sections within the Bighorn Basin (Bown et al. 1994).

A paleontological inventory of the proposed RP3DSS project area was conducted by ARCADIS U.S., Inc. (ARCADIS) in May of 2007. The paleontological inventory resulted in the discovery of 34 new paleontological localities within the inventoried area. The inventory encompassed approximately 19.5 miles of linear survey (150 foot wide corridor) and 339 heli-portable source point locations (150 foot diameter) on federal lands within the RP3DSS project area. Proposed geophysical activities in the RP3DSS project area were rerouted around scientifically important paleontological resources identified in conjunction with this inventory to avoid disturbance of and potential impacts thereto.

3.4 GEOLOGY AND MINERALS

3.4.1 Geologic Setting of the Project Area

The RP3DSS project area is situated in the central portion of the Bighorn Basin of northwest Wyoming, roughly half way between the towns of Cody and Greybull. The Bighorn Basin is a northwest to southeast trending elliptical basin bounded on the northeast and east sides by the Pryor and Bighorn mountains, on the south side by the Owl Creek and Bridger mountains, on the southwest side by the Washakie range, on the west side by the Absaroka and Beartooth ranges and is open to the north into Montana.

The RP3DSS project area is situated southeast of the McCullough Peaks, encompassing a large area of rolling, gently bisected topography in its southern portion, contrasting with much steeper, highly eroded badland-type topography in the northern portion. The badland escarpment that separates the

northern and southern portions of the project area forms part of the headwaters of Whistle Creek, a tributary to the Shoshone River.

3.4.2 Surface Stratigraphy and Geologic Structure of the Project Area

The entire RP3DSS project area is situated on the Eocene Willwood Formation, a thick deposit of interbedded varicolored siltstones, mudstones, paleosols and sandstones. The Willwood Formation (Willwood Fm.) is several thousand feet thick in this area and overlies the Paleocene Fort Union Formation, which does not crop out within the project area. In the southern portion of the project area, the Willwood Fm. is generally overlain by vegetation and native soils, with a veneer of limestone colluvium weathered from the McCullough Peaks area to the northwest overlying the formation in some areas. The Willwood Fm. is beautifully exposed in a steep escarpment along the northern portion of the project area.

No geologic structures such as faults, anticlines or synclines are visible at the surface in the RP3DSS project area; however, subsurface geologic structures have been tested in the area via past oil and gas drilling (discussed in the next section). Structurally, the project area is situated east of the Oregon Basin thrust fault, a major north-south trending reverse fault that forms a major subsurface boundary along the western portion of the Bighorn Basin. It is also situated at the northwest terminus of the Five Mile anticlinal trend, a fifty (50) mile long northwest-trending structure that courses diagonally across the basin ending north of Worland, Wyoming.

3.4.3 Previous Oil and Gas Exploration Activity in the Project Area

The RP3DSS project is situated in an area that is relatively unexplored for oil or gas resources. The few wells that have been drilled in the area are briefly discussed below. The project area overlies what is known in the oil and gas industry as the “Basin Center Gas Play”. According to Fox and Dolton (1996), this unconventional play is characterized by gas trapped in an extensive basin-center accumulation in sandstones of Paleocene and uppermost Cretaceous age in deep portions of the basin. It is treated as a low-permeability (“tight”) unconventional gas sandstone play, and is characterized by over pressuring due to active in-place generation of gas from the Fort Union, Lance, Meeteetse and Mesaverde formations.

Extensive basin-centered gas accumulations have been identified in many Rocky Mountain basins that formed during the Laramide Orogeny (Late Cretaceous through Eocene). Many of these deeper gas accumulations are over pressured due to volumetric increases in gas as a result of in-situ hydrocarbon generation from Cretaceous coals, carbonaceous shales and marine shales interbedded with sandstone reservoir rocks. This condition has been documented in the Cretaceous Mesaverde Formation and other Cretaceous rocks in the Bighorn Basin (Johnson and Finn 1998).

Past drilling in this area has tested gas resources in Cretaceous rocks at depths of ranging between 11,000 and 18,000 feet. Published reports indicate gas shows were found in Cretaceous Lance, Meeteetse, Mesaverde, Mowry, Muddy Sandstone and Cloverly (Dakota) strata. Those exploratory wells previously drilled within the overall project area were not drilled deep enough to test Jurassic,

Triassic or Paleozoic-age strata. To date, three wells have been drilled within the overall seismic survey project area with all of these wells plugged and abandoned following drilling operations. As discussed in Section 3.3.1, BBC staked two exploratory wells within the RP3DSS project area in 2006 and filed Notices of Staking thereon with the CYFO. Following the on-site inspections, BBC elected to withdraw these wells from further consideration prior to the submittal of each individual Application for Permit to Drill (APD). Table 3.3 contains specific information concerning these wells.

Table 3.3

Oil/Gas Wells Drilled or Proposed in the RP3DSS Project Area to Date

Operator	Well Name & Number	Legal Location of Well		Well Status ²
		Quarter	Section, Township, Range	
Michigan Wisconsin P/L Co. ¹	Gillmore Hill Unit #1-10	NE ¹ / ₄ NE ¹ / ₄	Section 15, T52N, R98W	P&A
Texas Pacific Oil Company ¹	Red Point #1	SW ¹ / ₄ SW ¹ / ₄	Section 30, T53N, R98W	P&A
Bill Barrett Corporation	Red Point Federal #13-31	NW ¹ / ₄ SW ¹ / ₄	Section 31, T53N, R98W	P/W
Husky Oil Company ¹	Stonebarn #14-25	SE ¹ / ₄ SW ¹ / ₄	Section 25, T53N, R99W	P&A
Bill Barrett Corporation	Red Point Federal #42-36	SE ¹ / ₄ NE ¹ / ₄	Section 36, T53N, R99W	P/W

1 From the Wyoming Oil and Gas Conservation Commission Computerized Database (www.wogcc.state.wy.us)

2 P&A = Plugged and Abandoned; P/W = Permit withdrawn prior to approval

3.5 RANGE MANAGEMENT

3.5.1 Grazing Allotments and Existing Range Improvements

The 26,040 acres of public land included within the RP3DSS project area encompass portions of six separate grazing allotments which are administered by the CYFO. Table 3.4 provides general information concerning each grazing allotment within the RP3DSS project area including allotment number, allotment name, number of acres, permitted grazing periods, permitted animal types and numbers for each respective allotment. The Red Point and Reclamation 15 Allotments are currently on a rest/rotation grazing system.

Existing range improvements on those federal lands included within the overall seismic survey project area include buried water pipelines, fences (pasture and allotment/boundary fences), numerous reservoirs (many of which may currently be dry due to the ongoing drought), one spring box, two stock tanks and two water wells. Table 3.5 provides a listing of the two permitted water wells that occur within the seismic survey project area.

Table 3.4

Grazing Allotments and Schedules on Public Lands in the RP3DSS Project Area

Allotment Number	Allotment Name	Acres in Project Area	Grazing Periods	Animal Type	Animal Numbers
01002	Whistle Creek	2,739	05/01 to 07/01	Cattle	130
			10/15 to 10/28	Cattle	1000
01060	East/West	6,525	04/01 to 06/30	Cattle	494
			10/15 to 12/20	Cattle	100
01069	Peaks 1069	2,941	11/01 to 02/28	Cattle	400
			11/25 to 02/28	Cattle	915
03067	Red Point	11,907	04/15 to 10/15	Cattle	178
03088	Reclamation 15	1,920	03/25 to 07/10	Cattle	39
			08/15 to 11/24	Cattle	41
03112	Stone Barn 15	2,557	11/20 to 02/13	Cattle	466

Table 3.5

Permitted Water Wells within the RP3DSS Project Area

Water Well Name	Permit Number	Well Depth	Legal Location of Water Well			
			Quarter	Section	Township	Range
Texas Pacific #1	P29466W	781'	SW¼SW¼	30	53 North	98 West
Red Barn #1	P44159W	Not Reported	SE¼SW¼	25	53 North	99 West

Source: Wyoming State Engineer’s Office Computerized Water Rights Database (www.seo.state.wy.us)

3.5.2 Invasive, Non-Native Species

Past inventories of public lands within the proposed RP3DSS project area have identified infestations of the invasive, non-native species along the McCullough Peaks Road, Whistle Creek Road and along adjacent routes. Invasive, non-native species identified in conjunction with these inventories include the following species:

- Black henbane (*Hyoscyamus niger*),
- Canada thistle (*Cirsium arvense*),

- Cheatgrass (*Bromus tectorum*),
- Common burdock (*Arctium minus*),
- Field bindweed or creeping jenny (*Convolvulus arvensis*),
- Halogeton (*Halogeton glomeratus*),
- Houndstongue or gypsyflower (*Cynoglossum officinae*),
- Musk thistle (*Carduus nutans*),
- Russian olive (*Elaeagnus angustifolia*),
- Spotted knapweed (*Centaurea maculosa*), and
- Whitetop or hoary cress (*Cardaria draba* and *Cardaria pubescens*).

In addition to the above, salt cedar (*Tamarix ssp.*) is present on many of the reservoirs and drainages in the general area and Russian knapweed (*Centaurea repens*) has been identified outside of the RP3DSS project area on the north side of the McCullough Peaks along Deer Creek (BLM 2004). Of the above species, only Canada thistle, houndstongue, musk thistle, Russian knapweed, salt cedar, spotted knapweed and whitetop (hoary cress) have been designated as noxious weeds by the State of Wyoming [Wyoming Statute (W.S.) 11-5-102(a)(xi)]. Black henbane has been included on the Declared List of Weeds and Pests for Park County in accordance with the Wyoming Weed and Pest Act of 1973 [W.S. 11-5-102(a)(vii & viii)] (WSWT 2003, 2007).

3.6 RECREATION

The RP3DSS project area is a popular recreational area in that the area is relatively close to Cody and is comprised of a large, contiguous block of public lands. Popular activities in the area include hiking, mountain biking, horseback riding, all-terrain vehicle (ATV) use, wildlife and wild horse viewing and photography, hunting, rock hounding, nature photography, and study of the archaeology and history of the area.

The CYFO has issued 18 Special Recreation Permits (SRPs) that authorize commercial guided, recreational activities in the McCullough Peaks and RP3DSS project areas. Fifteen of these SRPs authorize commercial outfitting and guiding operations for antelope and deer hunting on BLM-managed lands included within Antelope Hunt Area 78 and Deer Hunt Area 122. These particular hunt areas are very large and extend well beyond the McCullough Peaks and the RP3DSS project areas. Actual hunting use by commercial SRP holders in the RP3DSS project area is low. The remaining 3 SRPs authorize interpretive tours in the McCullough Peaks area for the viewing of wild horses. Only one of these permit holders conducts regular trips into the RP3DSS project area for the purpose of viewing wild horses.

Recreational access into and within the area is governed by the McCullough Peaks Travel Management Plan (BLM 2004), which established a management prescription for off-road vehicle (ORV) use in the 119,839 acre travel management planning area.

The RP3DSS project area falls within Antelope Hunt Area 78 and Deer Hunt Area 122. The proposed seismic survey area also falls within Elk Hunt Area 65; however, elk are not normally present in the project area and project-related activities would not impact elk hunting opportunities therein. Table 3.6 provides a synopsis of the antelope and deer hunting seasons and quotas established by the Wyoming Game and Fish Commission for 2007 in the RP3DSS project area.

Table 3.6

Big Game Hunting Seasons in the RP3DSS Project Area

Species	Hunt Area	Hunt Type	2007 Permits	2007 Season Dates
Antelope	78	1	50 any antelope	09/01 - 09/15
Deer	122	General	Unlimited ¹	11/01 - 11/11
Deer	122	General	Unlimited ²	11/12 - 11/18
Deer	121/122	1	25 any white-tailed deer	11/01 - 11/30
Deer	122	6	50 doe or fawn white-tailed deer	11/01 - 11/30

¹ Antlered deer off private land, any deer on private land

² Antlerless white-tailed deer

Upland game bird and small game hunting is a popular activity within the overall RP3DSS project area with local sportsmen and sportswomen pursuing species including chukar, gray (Hungarian) partridge, greater sage grouse, mourning doves, pheasant and rabbits. Some waterfowl hunting may also occur within the overall project area.

3.7 SOILS

The soils and the vegetative communities they support within the RP3DSS project area reflect the desert environment in which they were formed. They can be broadly classified as haplargids, haplocalcids and torriorthents. Both soils and vegetative communities are highly complex and varied, changing rapidly over relative short distances. The soils support nine ecological sites listed in Table 3.7. The soils in the northern portion of the project are characterized by “badland” topography. Broadly speaking, these soils support a salt desert shrub plant community with intermingled sagebrush-bunchgrass plant communities. These soils are shallow to moderately deep and typically have clay loam and clay surface textures; deeper sandy soils are intermingled throughout this northern portion of the project area. Slopes are 0 to 100 percent.

Table 3.7

Ecological Sites within the RP3DSS Project Area
(USDA NRCS 5-9 “ Bighorn Basin Precipitation Zone)

Common Name	Symbol	Reference Number
Gravelly	Gr	R032XY112WY
Lowland	LL	R032XY128WY
Loamy	Ly	R032XY122WY
Shale	Sh	R032XY154WY
Saline Lowland	SL	R032XY138WY
Saline Upland	SU	R032XY144WY
Shallow Clayey	SwCy	R032XY158WY
Shallow Loamy	SwLy	R032XY162WY
Shallow Sandy	SwSy	R032XY166WY
Sandy	Sy	R032XY150WY

In the southern portion of the project area the landscape gently rises to the north. Here the soils tend to support a sagebrush-bunchgrass plant community. Hills and ridges with steeper slopes supporting a salt desert shrub plant community breakup the landscape. Soil depths are shallow to deep. Soil surface textures tend to be loams, sandy loams and clay loams. The more gentle slopes range from 0 to 15 percent while slopes up to 60 percent are not uncommon on the hills and ridges.

Soils within the overall RP3DSS project area are comprised of approximately 17 different soils or soil mapping units as described in Table 3.8. Table 3.9 enumerates soil suitability/susceptibility ratings for geophysical activities.

3.8 VEGETATION

The Wyoming Gap Analysis Project (GAP) mapped landcover in polygons throughout the state of Wyoming (Merrill et al. 1996). Each polygon was assigned a primary cover-type and most were also assigned a secondary cover-type (see Appendix E). According to GAP, landcover on uplands areas throughout much of the RP3DSS project area consist of a mix of Saltbush Fans and Flats type (dominated by Gardner saltbush) and the Desert Shrub cover-type (a mix of several shrub species) or the Wyoming Big Sagebrush type (a mix of grasses and forbs with $\geq 25\%$ of the cover attributed to *Artemisia tridentata wyomingensis*). The Wyoming Big Sagebrush type is also a primary cover-type in the area (WYNDD 2007).

Primary cover types encountered within the overall seismic survey project area include a mix of Wyoming big sagebrush and saltbush. Secondary cover types include Wyoming big sagebrush and desert shrub.

Table 3.8

Soil Map Units Encountered on Public Lands within the RP3DSS Project Area

Map Unit	Name of Soil Mapping Unit	Acres	Soil Limitations
95	Uffens Variant loam, 0 to 6 percent slopes	89	Slight
102	Badland	9,382	Slope, depth, rutting
293	Forkwood-Cushman Dry-Hiland Association, 0 to 15 percent slopes	5,119	Slope
315BE	Willwood-Preatorson-Rock Outcrop complex, 3 to 60% slopes	171	Slope
326BE	Clapper-Clapper Variant complex, 0 to 90 percent slopes	898	Slope depth
327	Clapper-Copeman complex, 0 to 10% slopes	102	Slight
350	Shingle-Thedalund-Midway complex, 0 to 30 percent slopes	205	Slope, depth, rutting
368AC	Lostwells-Kinnear complex, 0 to 10 percent slopes	876	Slight
371AD	Persayo-Greybull clay loams, 0 to 30 percent slopes	9	Slope, depth, rutting
372CD	Worland-Persayo-Oceanet complex, 2 to 45 percent slopes	692	Slope, depth, sandy
377	Midway-Shingle-Rock Outcrop complex, 0 to 40 percent slopes	966	Slope, sandy
382	Worland Variant-Tassel complex, 2 to 30 percent slopes	207	Slope, sandy
467BD	Pavillion-Persayo-Kinnear complex, 2 to 30 percent slopes	1,831	Slope, rutting
468	Pavillion-Oceanet-Kinnera complex, 2 to 30 percent slopes	68	Slight
471	Bributte-Persayo-Rock outcrop complex, 0 to 60 percent slopes	3,465	Slope, depth, rutting
548A	Fluvents, 0 to 3 percent slopes	383	Flooding
569	Uffens-Meeteetse-Muff complex, 0 to 10% slopes	919	Slight

Table 3.9

Soil Suitability/Susceptibility Ratings for Geophysical Activities

Hazard Type	Risk of Hazard		
	Slight	Moderate	Severe
Water Erosion	1-10% slopes	11-25% slopes	> 25% slopes
Loss of Soil Productivity	Soil depth > 40"	Soil depth 20-40"	Soil depth < 20"
Blowing Hazard ¹	-----	Sandy, very fine sandy loams	Sandy soils ²
Rutting Hazard ³	-----	Silts, silt and sandy clay loams	Clays and loamy soils ⁴
Dust Hazard - Powder ⁵	-----	Loams	Silts, silty loams, very fine sand

¹ Sandy soils

² Loamy sands, loamy fine sands, fine sands, very fine sands, sands, coarse sands

³ Wet conditions, clayey soils

⁴ Clay loams, clays, silty clays, silty clay loams, silty clays, sandy clays

⁵ Silty soils

The primary plant species found in conjunction with these landcover types include Wyoming big sagebrush (*Artemisia tridentata wyomingensis*), Gardner's saltbush (*Atriplex gardneri*), greasewood (*Sarcobatus vermiculatus*), bluebunch wheatgrass (*Pseudoroegneria spicata*), western wheatgrass (*Pascopyrum smithii*), needle-and-thread grass (*Stipa comata*), Indian ricegrass (*Oryzopsis hymenoides*), blue grama (*Bouteloua gracilis*), and Sandberg bluegrass (*Poa secunda*) (BLM 2004). Plant species that are expected to comprise the majority of the potential natural plant communities associated with the ecological sites (see Table 3.7) encountered within the RP3DSS project area are listed in Table 3.10.

3.9 WILD HORSE MANAGEMENT AREA

Portions of the proposed RP3DSS project area fall within the McCullough Peaks Herd Management Area (HMA) which is administered by the CYFO (see Map 5, Appendix A). This HMA encompasses approximately 109,814 acres of both federal and non-federal lands in both Big Horn and Park Counties including the eastern half of the McCullough Peaks Wilderness Study Area. The population objective or "appropriate management level" (AML) for this particular HMA is to maintain a population of horses ranging between 70 and 140 animals with an average population of approximately 100 wild horses as identified in the RMP (BLM 1990). Currently the horse population in the McCullough Peaks HMA is estimated at approximately 144 animals, with 50 to 80 of these horses utilizing portions of the RP3DSS project area intermittently throughout the year. Thirty of these horses live almost exclusively within the proposed project area on a year-round basis.

3.10 WILDLIFE

The overall seismic survey project area includes habitat for a variety of both game and non-game species including year-long habitat for both antelope and deer; however, there are no identified crucial big game habitats within the RP3DSS project area. As a consequence, impacts to big game species will not be discussed further in this document due to the temporary nature of the Proposed Action.

3.10.1 Raptor Species

An active golden eagle (*Aquila chrysaetos*) nest has recently been identified in the northeast corner of the proposed RP3DSS project area. While there are no other known raptor nests within the RP3DSS project area, there is a potential for the occurrence of historic raptor nests within the overall project area boundary that have not been previously identified.

Burrowing owls (*Athene cunicularia*) have been observed within the overall RP3DSS project area and there is potential nesting habitat located therein. Please refer to section 3.10.3 for additional information concerning the potential occurrence of burrowing owls within the overall seismic survey project area.

Table 3.10

Plant Species Expected to Occur in the RP3DSS Project Area by Ecological Site

Plant Common Name	Plant Scientific Name	Life Form	NRCS Ecological Sites 5-9" Bighorn Basin Precipitation Zone
Aster	<i>Eucephalus spp</i>	PNF	LL
Dock	<i>Rumex spp</i>	PNF	LL
False carrot	<i>Turgenia spp</i>	PNF	Ly, Sy, SwCy, SwLy, SwSy
Fleabane	<i>Erigeron spp</i>	PNF	Ly, Sy, SwLy, SwSy
Larkspur	<i>Delphinium spp</i>	PNF	Gr, SwLy, SwSy
Milkvetch	<i>Astragalus spp</i>	PNF	SU, Sh
Paintbrush	<i>Castilleja spp</i>	PNF	Ly, SwLy
Phlox	<i>Phlox spp</i>	PNF	Gr, Ly, LL, SL, Sy, SwCy, SwLy, SwSy
Princesplume	<i>Stanleya spp</i>	PNF	Sh
Salsify	<i>Trogopogon spp</i>	PNF	SU
Scarlet globemallow	<i>Sparaclea coccinea</i>	PNF	Gr, Ly, Sy, SwCy, SwLy, SwSy
Textile onion	<i>Allium textile</i>	PNF	Ly, SL, SU, Sy, SwCy, SwLy, SwSy
Woody aster	<i>Xylorhiza spp</i>	PNF	SL, SU, Sh
Alkali sacaton	<i>Sporobolus airoides</i>	PNG	SL, Sh
Basin wildrye	<i>Leymus cinereus</i>	PNG	LL, SL
Blue grama	<i>Bouteloua gracilis</i>	PNG	Ly, LL, SL, Sh, SwCy, SwLy, SwSy
Bluebunch wheatgrass	<i>Pseudoroegneria spicata</i>	PNG	Gr, Ly, Sy, Sh, SwCy, SwLy, SwSy
Bottlebrush squirreltail	<i>Elymus elymoides</i>	PNG	Gr, Ly, LL, SL, SU, Sh, SwCy, SwSy
Canada wildrye	<i>Elymus Canadensis</i>	PNG	LL, SL
Indian ricegrass	<i>Achnatherum hymenoides</i>	PNG	Gr, Ly, LL, SL, SU, Sy, Sh, SwCy, SwLy, SwSy
Inland saltgrass	<i>Distichlis spicata</i>	PNG	SL
Mat Muhly	<i>Muhlenbergia richardsonis</i>	PNG	SL
Needleandthread grass	<i>Hesperostipa comata</i>	PNG	Gr, Ly, Sy, SwLy, SwSy, LL
Prairie junegrass	<i>Koeleria macrantha</i>	PNG	Gr, Ly, Sy, SwCy, SwLy, SwSy, LL
Prairie sandreed	<i>Calamovilfa longifolia</i>	PNG	LL
Riparian wheatgrass	<i>Elymus lanceolatus</i>	PNG	Ly, Sy, SwLy, SwSy
Sandberg's Bluegrass	<i>Poa secunda</i>	PNG	Gr, Ly, LL, SL, SU, Sh, SwCy, SwLy, SwSy
Slender wheatgrass	<i>Elymus trachycaulus</i>	PNG	LL
Thickspike wheatgrass	<i>Elymus lanceolatu</i>	PNG	Ly, Sy, SwLy SwSy
Western wheatgrass	<i>Pascopyrum smithii</i>	PNG	Gr, Ly, LL, SL, SU, Sy, Sh, SwCy, SwLy, SwSy
Threadleaf sedge	<i>Carex filifolia</i>	PNGL	Ly
Upland sedges	<i>Carex spp</i>	PNGL	Gr, SwLy, SwCy, SwSy
Winterfat	<i>Krascheninnikovia lanata</i>	PNHS	Gr, Ly, SU, Sy, Sh
Big Sagebrush	<i>Artemisia tridentate</i>	PNS	Gr, Ly, LL, Sy, SwCy, SwLy, SwSy
Birdfoot sage	<i>Artemisia pedatifida</i>	PNS	SU, Sh, SwCy
Bud sage	<i>Picrothamnus spp</i>	PNS	SU, Sh, SwCy

Table 3.10 - Continued

Plant Species Expected to Occur in the RP3DSS Project Area by Ecological Site

Plant Common Name	Plant Scientific Name	Life Form	NRCS Ecological Sites 5-9" Bighorn Basin Precipitation Zone
Gardner's saltbush	<i>Atriplex gardneri</i>	PNS	SU, Sh, SwCy
Greasewood	<i>Sarcobatus vermiculatus</i>	PNS	SL, SU
Green rabbitbrush	<i>Chrysothamnus viscidiflorus</i>	PNS	Ly, Sy, SwCy, SwLy
Rubber rabbitbrush	<i>Ericameria nauseosa</i>	PNS	Ly, LL, SL, Sy, SwSy
Shadscale	<i>Atriplex confertifolia</i>	PNS	SL, SwSy
Silver buffaloberry	<i>Shepherdia argentea</i>	PNS	LL
Silver sagebrush	<i>Artemisia cana</i>	PNS	SwSy
Skunkbush sumac	<i>Rhus trilobata</i>	PNS	LL
Spiny hopsage	<i>Grayia spinosa</i>	PNS	Sy
Wood's rose	<i>Rosa woodsii</i>	PNS	LL
Yucca	<i>Yucca spp</i>	PNS	Gr
Narrowleaf cottonwood	<i>Populus angustifolia</i>	PNT	LL

Life Form Key: PNF = Perennial Native Forb
 PNG = Perennial Native Grass
 PNGL = Perennial Native Grass-Like
 PNHS = Perennial Native Half-Shrub
 PNS = Perennial Native Shrub
 PNT = Perennial Native Tree

3.10.2 Threatened and Endangered Species

Threatened and/or endangered (T/E) species include those species which are in danger of extinction due to drastic population declines and which have subsequently been listed as threatened or endangered pursuant to the *Endangered Species Act* (ESA) of 1973 (as amended). Those T/E species identified by the U.S. Fish and Wildlife Service (USFWS) which may potentially occur within the general area are identified in Table 3.11.

A search of the Wyoming Natural Diversity Database (WYNDD) covering Townships 52 and 53 North, Ranges 98 and 99 West on April 11, 2007 did not identify the presence of any of the T/E species listed in Table 3.11 within the search area in recent times (WYNDD 2007). Considering that there have been no recorded observations of these species within the project area in recent times, these T/E species are not expected to occur within the RP3DSS project area based upon the following:

Table 3.11

Federally Listed Threatened and Endangered Species and Their Potential Occurrence within the RP3DSS Project Area

Common Name	Classification	Scientific Name	Federal Status ¹	Potential Occurrence in Project Area ²
Black-footed ferret ³	Mammal	<i>Mustela nigripes</i>	E	X
Canada lynx	Mammal	<i>Lynx Canadensis</i>	T	X
Gray wolf ⁴	Mammal	<i>Canis lupus</i>	N	R
Grizzly bear ⁴	Mammal	<i>Ursus arctos horribilis</i>	T	X
Bald eagle ⁴	Bird	<i>Haliaeetus leucocephalus</i>	T	O
Ute ladies'-tresses	Plant	<i>Spiranthes diluvialis</i>	T	X

¹ Federal status: E = listed as federally endangered
T = listed as federally threatened
N = listed as a nonessential, experimental population for re-introduction purposes

² Species occurrence:
O = occasional; this species may occur in the RP3DSS project area during specific times of the year and may be locally common when suitable food is available; generally not present for extended periods.
R = rare; species may occur in the RP3DSS project area for just a few days or hours (e.g., stopping over during migration), or the species has only occasionally or rarely been sighted in the RP3DSS project area. Encounters during the proposed action are very unlikely.
X = unlikely; there has been no recent historical record of the species' occurrence in the RP3DSS project area; probability of encountering the species during project-related activity is very unlikely.

³ The USFWS has given Park County blanket clearance for black-footed ferrets.

⁴ Proposed for removal from federal listing.

- The proposed project area does not include critical, essential, or designated habitat for any of these listed species, or crucial habitat for the prey of any of these listed species (in the case of the gray wolf, the RP3DSS project area is outside of the identified recovery area for wolves in northwestern Wyoming);
- The occurrence of any of these species within the project area would be unlikely or occasional at best, if indeed present, as the area contains very poor habitat for any of these listed species;
- The duration of the seismic survey activity is relatively short-term in nature;
- The probability of disturbance is extremely low based on occurrence; and

- The worst-case effect would be temporary disturbance or displacement.

As a consequence, these T/E species will not be discussed further in this analysis.

3.10.3 BLM Sensitive Species

BLM sensitive species are generally those species that are in need of special management considerations. Table 3.12 contains a listing of those BLM sensitive species that may occur in Wyoming and their habitat preferences. BLM sensitive animal and plant species potentially occurring in the RP3DSS project area include long-eared myotis, Townsend's big-eared bat, white-tailed prairie dog, ferruginous hawk, greater sage-grouse, long-billed curlew, mountain plover, burrowing owl, sage thrasher, Brewer's sparrow and sage sparrow. Five of these sensitive species are more likely to occur within the RP3DSS project area than the remaining species based upon both prior observations and a review of habitat types therein. These species include burrowing owl, greater sage-grouse, mountain plover and white-tailed prairie dog. A brief discussion of each of these five (5) individual species, including incidental observations of both burrowing owls and mountain plovers in the overall project area taken from the Wyoming Natural Diversity Database (WYNDD 2007), are presented below:

- Burrowing owl (*Athene cunicularia*). Burrowing owls inhabit grasslands, basin-prairie shrublands and agricultural areas nesting in existing mammal burrows, especially those of prairie dogs (WGFD 1999). There is one recorded observation within the inventoried area dated August 1, 1984.

There is a potential for burrowing owl nesting activity within the existing white-tailed prairie dog (*Cynomys leucurus*) colonies known to exist within the RP3DSS project area.

- Greater sage-grouse (*Centrocercus urophasianus*). There are six historic greater sage grouse leks or lek complexes (primary lek with one or more satellite leks in the general vicinity) known to exist within or directly adjacent to the RP3DSS project area including:
 - 1) Bridger Butte 2,
 - 2) Cripple Dog Reservoir,
 - 3) Cripple Dog Swale,
 - 4) Stone Barn,
 - 5) Emblem Bench 2, and
 - 6) Emblem Bench 3.

Table 3.12

Wyoming BLM Sensitive Species and Habitat Preferences

Species		Preferred Habitat	Likely to Occur ¹
Common Name	Scientific Name		
Mammals			
Dwarf shrew	<i>Sorex nanus</i>	Mountain foothill scrub, grasslands	N
Long-eared Myotis	<i>Myotis evotis</i>	Conifer and deciduous forests, caves and mines	N
Spotted Bat	<i>Euderma maculatum</i>	Cliffs over perennial water, basin-prairie shrub	N
Townsend's Big-eared Bat	<i>Corynorhinus townsendii</i>	Forests, basin-prairie shrub, caves and mines	N
Pygmy Rabbit	<i>Brachylagus idahoensis</i>	Basin-prairie and riparian shrub	N
White-tailed Prairie Dog	<i>Cynomys leucurus</i>	Basin-prairie shrub, grasslands	Y
Swift Fox	<i>Vulpes velox</i>	Grasslands	N
Birds			
White-faced Ibis	<i>Plegadis chihi</i>	Marshes, wet meadows	N
Trumpeter Swan	<i>Cygnus buccinator</i>	Lakes, ponds, rivers	N
Northern Goshawk	<i>Accipiter gentiles</i>	Conifer and deciduous forests	N
Ferruginous Hawk	<i>Buteo regalis</i>	Basin-prairie shrub, grassland, rock outcrops	Y
Greater Sage-grouse	<i>Centrocercus urophasianus</i>	Basin-prairie shrub, mountain-foothill shrub	Y
Long-billed Curlew	<i>Numenius americanus</i>	Grasslands, plains, foothills, wet meadows	Y
Yellow-billed Cuckoo	<i>Coccyzus americanus</i>	Open woodlands, streamside willow and alder groves	N
Burrowing Owl	<i>Athene cunicularia</i>	Grasslands, basin-prairie shrub	Y
Sage Thrasher	<i>Oreoscoptes montanus</i>	Basin-prairie shrub, mountain-foothill shrub	Y
Loggerhead Shrike	<i>Lanius ludovicianus</i>	Basin-prairie shrub, mountain-foothill shrub	Y
Brewer's Sparrow	<i>Spizella breweri</i>	Basin-prairie shrub	Y
Sage sparrow	<i>Amphispiza billineata</i>	Basin-prairie shrub, mountain-foothill shrub	Y
Baird's Sparrow	<i>Ammodramus bairdii</i>	Grasslands, weedy fields	N
Mountain Plover	<i>Charadrius montanus</i>	Shortgrass, great basin-foothills grassland, and sagebrush-grasslands	Y
Amphibians			
Northern Leopard Frog	<i>Rana pipiens</i>	Beaver ponds, permanent water in plains and foothills	N
Boreal Toad	<i>Bufo boreas boreas</i>	Pond margins, wet meadows, riparian areas	N
Spotted Frog	<i>Rana pretiosa ssp.</i>	Ponds, sloughs, small streams	N
Plants			
Evert's Wafer-Parsnip	<i>Cymopterus evertii</i>	Coarse volcanic soils or sandstone outcrops dominated by cushion plants or sparse shrublands	N
Absaroka Beardtongue	<i>Penstemon absarokensis</i>	Sparsely vegetated openings on steep slopes of loose volcanic rubble or outcrops of dry andesitic volcanic rock	N
Cary Beardtongue	<i>Penstemon caryi</i>	Calcareous rock outcrops and rocky soil	N
Persistent Sepal Yellowcress	<i>Rorippa calycina</i>	Sandy soils on riverbanks and shorelines	N
Shoshonea	<i>Shoshonea pulvinata</i>	Shallow, stony calcareous soils of exposed limestone outcrops, ridgetops and talus slopes	N

¹ Key: Y = Likely to occur in or in the vicinity of the RP3DSS project area based on habitat and WYNDD data (2007).
N = Not likely to occur in or in the vicinity of the RP3DSS project area based on habitat and WYNDD data (2007).

The Bridger Butte 2 lek is located approximately 3,750 feet east of the eastern boundary of the RP3DSS project area and the Stone Barn lek is located approximately 800 feet west of the western boundary of the RP3DSS project area boundary. The other four leks are all located within the boundaries of the seismic survey project area. Approximately 4.8% (1,361 acres) of the RP3DSS project area falls within 1/4 mile of an existing greater sage grouse lek and approximately 73.5% (20,706 acres) of the project area falls within a two mile radius of one or more of these leks.

- Long-billed curlew (*Numenius americanus*). Long-billed curlews nest on the ground around water or emergent vegetation and inhabit (forage) in the sagebrush-grasslands of the eastern great plains, great basin-foothills, mountain foothills, and wet-moist meadow grasslands (BLM 2005, WGFD 1999 (WDFD 1999)). There are no recorded observations of long-billed curlew within the RP3DSS project area and nesting activity has not been documented therein (WYNDD 2007).
- Mountain plover (*Charadrius montanus*). Mountain plover are a ground-nesting species that inhabit the high, dry, short-grass plains east of the Rocky Mountains as well as the sagebrush grasslands throughout Wyoming (BLM 2005, WGFD 1999), and are documented to breed throughout Wyoming, especially in prairie dog colonies (WGFD 1999). Incidental observations of mountain plovers within the RP3DSS project area include three individual birds observed on May 28, 1986 and a single bird observed on May 29, 1986 in separate locations (WYNDD 2007). Mountain plover nesting activity has not been documented within the RP3DSS project area.
- White-tailed prairie dog (*Cynomys leucurus*). There are several small white-tailed prairie dog colonies scattered throughout the southern portion of the proposed RP3DSS project area. The aggregate size for these scattered colonies is estimated to be approximately 20 acres in total size based upon previous mapping efforts. However, it should be noted that occupied habitat (burrows) in prairie dog colonies expands and contracts on an annual basis in response to environmental factors including disease, precipitation, predation and recruitment.

3.10.4 Migratory Birds

As stated in Section 3.7, the Wyoming Gap Analysis Project (GAP) mapped landcover in polygons throughout the state of Wyoming (Merrill et al. 1996). Based upon the GAP data, habitats for migratory birds within the overall RP3DSS project area may be classified as a shrub-steppe habitat type. Wyoming Partners in Flight (PIF) priority species potentially occurring within the shrub-steppe (SS) habitat type are listed in Table 3.13 (Nicholoff 2003). In this regard, the RP3DSS project area lies within an area directly north of latitude 44°27'30" N and directly west of longitude 108°32'30" W. Species distribution as reported in The Atlas of Birds, Mammals, Reptiles and Amphibians in Wyoming (WGFD 1999) includes a compilation of observations mapped by latitude and longitude, with the State of Wyoming divided into 28 different regions, where these observations are reported within a specific region of the state. These regions are based upon a one degree separation of both latitude and longitude. As a consequence, the RP3DSS project area falls with Wyoming Distribution Area (latilongs) 3 as defined by the WGFD (1999).

Table 3.13

**List of Partners In Flight (PIF) Priority Bird Species
Potentially Found Within the RD3DSS Project Area**

Common Name	Scientific Name	Habitat Type	Distribution Area ¹
-------------	-----------------	--------------	--------------------------------

Level I Species (Conservation Action)

Ferruginous Hawk	<i>Buteo regalis</i>	SS	B
Greater Sage Grouse	<i>Centrocercus urophasianus</i>	SS	B
Mountain Plover	<i>Charadrius montanus</i>	SS	B
Brewer's Sparrow	<i>Spizella breweri</i>	SS	B
Sage Sparrow	<i>Amphispiza belli</i>	SS	B
McCown's Longspur	<i>Calcarius mccownii</i>	SS	B

Level II Species (Monitoring)

Black-chinned Hummingbird	<i>Archilochus alexandri</i>		N
Loggerhead Shrike	<i>Lanius ludovicianus</i>	SS	B
Sage Thrasher	<i>Oreoscoptes montanus</i>	SS	B
Vesper Sparrow	<i>Pooecetes gramineus</i>	SS	B
Lark Sparrow	<i>Chondestes grammacus</i>	SS	B
Lark Bunting	<i>Calamospiza melanocorys</i>	SS	B
Grasshopper Sparrow	<i>Ammodramus savannarum</i>	SS	O

Level III Species (Local Interest)

Common Poorwill	<i>Phalaenoptilus nuttallii</i>	SS	O
Say's Phoebe	<i>Sayornis saya</i>	SS	B

¹ Definitions for those symbols used to report Wyoming avian distribution are as follows:

B: Nest or young dependent upon parent birds observed.

b: Circumstantial evidence of breeding.

O: The species has been observed, but there was no evidence of nesting.

N: The species has not been observed in the area.

Avian distribution data contained in The Atlas of Birds, Mammals, Reptiles and Amphibians in Wyoming (WGFD 1999) for the PIF priority species potentially occurring within the RP3DSS

project area is included in Table 3.13. Only those birds that have been classified by WGFD (1999) as confirmed breeders (nest and/or young observed), with circumstantial evidence of breeding (nest and/or young not located), or that have been observed at any time (season) within the general area (but without any evidence of breeding) are included in the list. Breeding Bird Survey (BBS) data for survey routes within Wyoming were included in this database (WGFD 1999).

Most of the birds listed in Table 3.13 typically nest either on the ground or in shrubs during the period from mid-April through mid-July; thus activities associated with the Proposed Action may have the potential to destroy individual nests, eggs and/or young of some of these species. Projected losses are indeterminate as there are no Breeding Bird Survey (BBS) routes located within the immediate vicinity of the RP3DSS project area which could provide information on breeding bird densities within the shrub-steppe habitat encountered within the RP3DSS project area.

Concerns regarding the decline of both migratory and non-migratory bird populations both locally and on a continental scale have resulted in a nationwide bird conservation planning effort. Management goals and objectives for bird conservation are found in the following documents:

- 1) Land Bird Strategic Plan;
- 2) Presidential Executive Order (EO) 13186 dated January 17, 2001; and
- 3) Proposed Memorandum of Understanding associated with the above Presidential EO.

Bird Conservation Plans prepared at the state and regional levels also include objectives for bird conservation. As evidenced by EO 13186, there has been national direction to implement actions that incorporate these goals.

4.0 ENVIRONMENTAL IMPACTS

4.1 INTRODUCTION

In accordance with 40 C.F.R. 1502.16, this chapter of the EA includes a discussion of the potential environmental consequences of the Proposed Action and No Action Alternative on each of the affected resources. An environmental impact is defined as a change in the quality or quantity of a given resource due to a modification in the existing environment resulting from project-related activities. Impacts may be beneficial or adverse, may be a primary result (direct) or secondary result (indirect) of an action, and may be permanent and long-term or temporary and of a short duration. Impacts may vary in degree from a slight discernible change to a total change in the environment. This impact assessment assumes that all Project Design Features (PDFs) referenced in Appendix B would be successfully implemented. If such measures are not successfully implemented, additional impacts may occur.

4.2 CULTURAL AND PALEONTOLOGICAL RESOURCES

Cultural resources, including archaeological and historic sites, on lands subject to federal authority are protected by various laws and regulations commencing with the *Antiquities Act* of 1906. Specific directives concerning Cultural Resource Management can be found in *Archaeology and Historic Preservation: Secretary of the Interior's Standards and Guidelines* (Federal Register 1983) and BLM Manual Section 8100. Prior to the initiation of any federal action, cultural resources must be inventoried and evaluated to determine their eligibility for inclusion in the NRHP. NRHP criteria (36 CFR 60.4) for determining eligibility define four (4) criteria of significance based upon "...the quality of significance in American history, architecture, archaeology, and culture present in districts, sites, buildings, structures, and objects of state and local importance that possess integrity of location, design, setting, materials, workmanship, feeling, and association; and that:

- are associated with events that have made a significant contribution to the broad patterns of our society; or
- are associated with the lives of persons significant in our past; or
- embody the distinctive characteristics of a type, period, or method of construction, or that represent the work of a master, or that possess high artistic values, or that represent a significant and distinguishable entity whose components may lack individual distinction; or
- have yielded, or may be likely to yield, information important in prehistory or history”.

Cultural properties are generally not eligible for inclusion in the NRHP if they lack diagnostic artifacts, subsurface remains, or structural features. Furthermore, sites that cannot be placed in a temporal context or shown to be related to other sites are usually not eligible and therefore are discharged from management.

4.2.1 Proposed Action

As indicated in Section 3.3.1, 26 cultural inventories have been previously conducted within the proposed RP3DSS project area covering approximately 192 acres (linear surveys were not quantified in the records search), resulting in the identification of eight prehistoric sites and eight historic sites. None of the prehistoric sites identified were recommended as eligible for nomination to the National Register of Historic Places (NRHP), six were considered as non-eligible sites, and the remaining two sites were not evaluated for eligibility. Of the historic sites identified in conjunction with these surveys, two were contributing segments of the Bridger Trail and abandoned Wiley Canal, two sites were determined to be ineligible for nomination, and the eligibility of the four remaining sites was not determined.

Use of vibroseis technology for source acquisition would account for approximately 80% of the overall source points proposed in conjunction with the RP3DSS project, with buggy-drilled shot holes accounting for an additional 6% of the total source points. As stated in Section 2.2.2, the vibroseis and drill buggies would be equipped with “flotation” tires which exert minimal surface pressures (≤ 15 psi), thereby minimizing the possibility for any inadvertent disturbance to or destruction of cultural sites or vertebrate and scientifically important paleontological materials encountered on/along the source lines. Table 4.1 provides a comparison of surface pressures exerted by equipment expected to be used in the seismic survey operation as compared to livestock and wildlife species that inhabit the project area (BLM 2006b).

Table 4.1

Comparison of Surface Pressures Exerted by Equipment and Animals in the RP3DSS Project Area

Surface Pressure Source Vehicle/Animal ¹	Surface Pressure in Pounds/Square Inch (psi)
Drill Buggies ²	9 psi
Vibroseis Buggies ²	15 psi
Recording Truck	50 psi
Four Wheel Drive Truck (3/4 ton)	30 psi
All Terrain Vehicle (ATV)	4 psi
Antelope	8 psi
Cow	10 psi
Deer	8 psi
Horse	8 psi

1 From the Four Bear Field 3D (Vibroseis) Environmental Assessment (BLM 2006b)

2 Surface pressures revised from the Four Bear EA to reflect the current proposal

As demonstrated in Table 4.1, surface pressures exerted by the vibroseis and drill buggies would be approximately 1.5 times (150%) greater than the surface pressure exerted by an individual cow, 1.67 times (167%) greater than the surface pressure exerted by an individual horse and 1.88 times (188%) greater than the surface pressures exerted by antelope and deer. Compared to the surface pressures exerted by four-wheel drive vehicles (30 psi) or the recording truck (50 psi), the comparable surface pressures exerted by the vibroseis and drill buggies are considerably less than for these trucks (which would be confined to existing roads and trails) and only slightly greater than surface pressures exerted on the ground surface by livestock and wildlife in the overall project area.

The drilling of shot holes would result in a minimal amount of actual surface disturbance surrounding each individual shot point, with this disturbance limited to a few square feet surrounding the drill hole. As stated in Section 3.3, cultural and paleontological resource inventories have been within the proposed RP3DSS project area and reports documenting the results of the cultural and paleontological inventories have been prepared and forwarded to the CYFO for review. As a result of these inventories, geophysical activities proposed in conjunction with the RP3DSS project have been revised to avoid eligible (and/or unevaluated) cultural sites and vertebrate and scientifically important paleontological resources encountered on/along the lines as originally staked. Considering that these cultural and vertebrate and scientifically important paleontological resources have been avoided by project-related activities, ARCADIS has subsequently recommended cultural/paleontological clearance for the project. These facts, combined with the Project Design Features (PDFs) recommended in Appendix B should virtually eliminate the potential for any adverse impacts to any heretofore unknown cultural or vertebrate and scientifically important paleontological resources resulting from seismic survey activities.

4.2.2 No Action Alternative

Under the No Action Alternative, there would be no project-related surface disturbances beyond those levels previously approved within the RP3DSS project area and impacts to cultural and paleontological resources would remain at current levels.

4.2.3 Proposed Mitigation Measures

Because the proposed RP3DSS project would have no impacts on potentially eligible cultural and/or vertebrate and scientifically important paleontological resources in the area, no additional mitigation measures are recommended other than the PDFs referenced in Appendix B.

4.3 GEOLOGY AND MINERALS

The potential environmental consequences resulting from the Proposed Action and No Action Alternatives are discussed below.

4.3.1 Proposed Action

Approval of the NOI and the subsequent initiation of 3D seismic survey operations within the project area would have a minimal impact upon the surface geology and/or mineral deposits in the area. Geophysical data generated from the proposed 3D seismic project could enhance the ability of BBC to drill successful oil/gas wells on existing leases within the area thereby reducing the probability of economic failures in the future. However, while processing of the geophysical data obtained from this seismic survey project could ultimately enhance successful exploration activities on these lands, additional permits and corresponding environmental review would be required prior to the approval of subsequent drilling operations on federal surface and/or mineral estate within the overall RP3DSS project area. Any subsequent environmental review would include an analysis of the potential environmental effects of drilling operations on the surface and sub-surface geology of the affected area.

4.3.2 No Action Alternative

Under the No Action Alternative, the 3D seismic survey would not be approved, there would be no project-related impacts to the surface geologic or sub-surface mineral resources within the RP3DSS project area, and impacts to these resources would remain at current levels.

4.3.3 Proposed Mitigation Measures

Because the proposed RP3DSS project would have negligible or minimal impacts on surface geology and mineral resources in the area, no additional mitigation measures are recommended other than the PDFs referenced in Appendix B.

4.4 RANGE MANAGEMENT

4.4.1 Proposed Action

Seismic survey activities as proposed within the RP3DSS project area would likely have a negligible impact upon livestock grazing and livestock operators within the survey area. Surface disturbance estimated in Table 2.1 would be largely limited to short-term forage loss through the crushing effects of the tires on the native vegetation. The potential displacement of livestock within the respective grazing allotments, harassment of domestic livestock in conjunction with seismic survey activities, and the potential for traffic-related fatalities are considered to be minimal at best when one considers that drilling and source acquisition activities would generally be conducted during a period of time outside of the permitted grazing schedules for the affected allotments or when selected allotments are in a rest/rotation phase for the affected area. (see Table 3.4).

No “road” construction or bladed crossings would be allowed in conjunction with the proposed seismic survey project; consequently, potential surface disturbing activities on the 477 acres of

federal surface estate and 28 acres of state of Wyoming surface estate would be primarily limited to the effects of vehicular traffic crossing these lands in conjunction with source generation operations. As indicated above, the use of flotation tires on the buggies would minimize the impacts to vegetation thereby lessening the overall loss of available forage on the affected lands. Considering that a maximum force of 15 psi would be exerted by each tire on the ground surface (15.4 psi for the actual vibrator plates), vegetative disturbance would be primarily limited to the crushing of grass/shrub stems without damaging the root structure thereof or the ability of the affected plants to regenerate.

As indicated in Section 3.5, there are numerous range improvements within the overall RP3DSS project area including fences, reservoirs, spring boxes, stock tanks, water pipelines and water wells located on federal lands within the overall seismic survey project area. Offset distances have been recommended for avoidance of these improvements for source generation activities in order to protect the structural integrity thereof (see Appendix B). Given the nature of the proposed seismic survey project, potential impacts to existing range improvements would primarily be limited to any allotment or boundary fences encountered along the source and receiver lines. Adherence to the Project Design Features recommended in Appendix B should preclude any long-term or lasting impacts to those range improvements encountered on federal lands within the seismic survey project area.

4.4.2 Invasive, Non-Native Species

The invasion of newly-disturbed areas by invasive non-native plant species would be a potential impact resulting from surface disturbing activities associated with the RP3DSS project. Several species of invasive non-native plant species have become established on disturbed sites throughout northwestern Wyoming. As indicated in Section 3.5.2, some of the more common weed species which could be expected to invade disturbed surfaces within the RP3DSS project area include black henbane, Canada thistle, cheatgrass, common burdock, field bindweed (creeping jenny), halogeton, houndstongue (gypsyflower), musk thistle, Russian knapweed, spotted knapweed and whitetop (hoary cress). If allowed to become established, infestations of these invasive, non-native species could provide seed sources for the invasion of neighboring lands and could impact forage production on these affected lands. However, considering the somewhat limited amount of surface disturbance which would be associated with geophysical activities associated with the RP3DSS project and the PDFs outlined in Section 2.2.9 and Appendix B, potential infestations of invasive, non-native species would be controlled thereby preventing the establishment of these species within or adjacent to the seismic survey area as a result of project-related activities.

4.4.3 No Action Alternative

Under the No Action Alternative, there would be no project-related impacts to grazing or range improvements within the RP3DSS project area and impacts to range resources would remain at current levels.

4.4.4 Proposed Mitigation Measures

Because the proposed RP3DSS project would have negligible or minimal impacts on range resources (including range improvements) in the area, no additional mitigation measures are recommended other than the PDFs referenced in Appendix B.

4.5 RECREATION

The RP3DSS project area encompasses a large block of federal surface estate in close proximity to the town of Cody, Wyoming. This relatively large block of contiguous public land provides excellent opportunities for a wide variety of casual, dispersed recreational opportunities (e.g., camping, hiking, hunting, birding, wildlife and wild horse viewing, horseback riding, mountain biking, etc.) in a relatively undisturbed setting that is reasonably close not only to the Cody area but to other populated areas in the northern end of the Big Horn Basin including the town of Powell. There are no special recreation management areas or developed recreational sites in the overall project area and there are ample recreational opportunities on public lands elsewhere in Park County that would not be affected by the geophysical activities proposed in the RP3DSS project area. However, the project area does include locations where the public and the commercial SRP permittees are able to view wild horses.

4.5.1 Proposed Action

As stated in Section 3.6, the overall seismic survey project area provides a multitude of recreational opportunities for the general public including supervised wild horse tours which are conducted under Special Recreation Permits (SRPs) issued by the CYFO. Impacts to unsupervised recreational opportunities within the RP3DSS project area would include the potential disruption of recreational pursuits such as hiking, biking, bird watching and rock hounding activities that could be adversely affected by the intensive operations particularly associated with source generation. These impacts would be especially acute to those recreational users who visit the area looking specifically to enjoy the solitude of undeveloped open spaces. These same aesthetic values could also be impaired for those users participating in supervised recreational activities within the overall project area in conjunction with those permitted activities allowed under the SRP. To minimize impacts to wild horse viewing operators, the BLM would identify and authorize additional locations for the SRP permittees to use for commercial wild horse viewing activities during geophysical operations.

Hunting activities and harvest opportunities within the overall project area for pronghorn antelope may be affected by seismic survey activities as intensive geophysical (source acquisition) activities associated with the seismic survey project may extend beyond the season opening date of September 1, 2007 as shown in Table 3.8. Hunters entering the area on/about September 1 in pursuit primarily of antelope may find that the animals are more wary than normal due to their recent and continued exposure to human activity associated with source generation activities and the presence of geophysical activities in the area may diminish the experience for those hunters choosing to pursue pronghorn within the seismic survey project area. However, Antelope Area 78 is a very large area

and extends well beyond the boundaries of the RP3DSS project and hunters holding limited quota licenses for Area 78 would have the option of moving to a geographic area within their permitted hunt area but outside of the RP3DSS project area boundary should they so choose. Considering that the proposed RP3DSS project is a “one-time” activity, the impacts of the seismic survey upon antelope hunting activities would be short-term in nature and would be confined to the 2007 season.

Seismic survey activities proposed in conjunction with the RP3DSS project would most likely have the biggest effect on organized wild horse viewing activities being conducted under the SRP mentioned above and may ultimately have a negative effect on the tour operator for the 2007 season if horses are displaced from traditional viewing areas and the tour operator is not able to access areas holding wild horses for viewing purposes. Again, this would be a short-term impact as source generation and recording activities are a one-time occurrence that would be completed within approximately 45 days. Should the horses remain in the overall area, then viewing opportunities would not be lost and the only impact upon the scheduled recreational activity would be a potential degradation of the aesthetic qualities of the experience as it relates to experiencing solitude and open spaces in the west. However, it should be noted that both tolerance and perceptions of industrial activity varies among individuals and while some individuals may find the seismic activity to be intrusive, thereby affecting the overall quality of their experience, other individuals may find the activity to be interesting and the observed activities may add to the quality of their overall experience.

Considering the short-term nature of the proposed geophysical project, we do not anticipate any lasting or long-term adverse effects to recreation or recreational users in the overall project area.

4.5.2 No Action Alternative

Under the No Action Alternative, there would be no project-related impacts to recreation or recreational opportunities within the RP3DSS project area and impacts to recreation would remain at current levels.

4.5.3 Proposed Mitigation Measures

Because the proposed RP3DSS project would have negligible or minimal impacts on recreational opportunities in the area, no additional mitigation measures are recommended other than the PDFs referenced in Appendix B.

4.6 SOILS

4.6.1 Proposed Action

Approximately 505 acres of “disturbance” would occur on public and state trust lands within the overall RP3DSS project area, with approximately 489 acres or 97% of this “disturbance” attributable

to vibroseis source generation. The remaining 16 acres or 3% of this “disturbance” would be attributable to the drilling of shot holes and use of staging areas. No earth moving activities are proposed in conjunction with the geophysical exploration activities proposed herein and wholesale soil disturbance is not anticipated. As discussed above, surface disturbances associated with the Proposed Action would be primarily limited to the effects of vehicular traffic crossing public lands in conjunction with source generation operations. Depending upon soil conditions at the time of the seismic survey project, the effects of this vehicular traffic would be minimal considering the proposed use of “flotation” tires on the vibrator and drill buggies but would increase as slope increases (see Table 4.1). The Project Design Features recommended in Appendix B limit vehicular activities to slopes of 30% or less and are designed to minimize soil disturbance (rutting). Should actual source generation activities occur during periods of significant precipitation (summer thunderstorms), the possibility of rutting does exist. The extent of the rutting would depend upon the soil types encountered and their individual characteristics, slopes encountered on/along the individual source lines, and the vibroseis buggy array (single line or staggered/Flying V formation) - with rutting expected to be less evident on sandy or shallow, rocky soils as opposed to deeper loams and clay loam soils or on shallow slopes as opposed to steeper hillsides. Any ruts would be repaired and reseeded as indicated in Section 2.2.7 or directed by the AO.

As depicted in Tables 3.8 and 3.9, soils pose moderate to severe limitations throughout the project area. The Soil Suitability/Susceptibility Ratings for Geophysical Activities were developed by BLM using the National Soil Survey Handbook, soil maps and on-the-ground knowledge of soils, plant communities and landscapes in the Bighorn Basin. Based on this methodology, 80% of the soils pose one or more limitations to a project such as this. These limitations do not preclude geophysical operations from being conducted, but instead support the need to implement best management practices. Steep slopes, and the potential for accelerated erosion following surface disturbance, are by far the most limiting soil characteristic. Shallow soils, common throughout the project area, are often found in association with areas of steeper slopes. These shallow soils are susceptible to loss of productivity, were accelerated erosion to occur. Areas of sandy soils are susceptible to blowing following surface disturbance. The more ‘clayey’ soils are susceptible to rutting when seismic operations are conducted during wet soil conditions. Though ‘powdery’ soils are not common in the project area, fugitive dust could still present problems during seismic operations.

As discussed in Section 2.2.7, soil disturbance resulting from project-related activities would be largely confined to some visible soil disturbance from vehicle passage due primarily to the lugs (cleats) on the flotation tires - particularly in areas devoid of or with sparse vegetative cover. A post-project evaluation of visual surface impacts resulting from geophysical operations conducted in Hot Springs, Park and Washakie Counties in 2006 found that “there was no evidence that vehicles were operated during periods of saturated soil conditions when surface ruts greater than 4 inches would occur along straight travel routes. Recording was, in fact, halted during seismic exploration due to rain and saturated soil conditions. Some cleat marks were observed during the post-project survey. The cleat marks were about 1.5 inches deep and will likely disappear after a few precipitation events” (TRC 2007). As a consequence, we would not expect any adverse or long-term impacts to those soils encountered on federal lands within the overall seismic survey project area.

4.6.2 No Action Alternative

Under the No Action Alternative, there would be no project-related impacts to soils within the RP3DSS project area and impacts to soils would continue at current levels.

4.6.3 Proposed Mitigation Measures

Because the proposed RP3DSS project would have negligible or minimal impacts on soils in the area, no additional mitigation measures are recommended other than the PDFs referenced in Appendix B.

4.7 VEGETATION

Vegetation (cover types) encountered within the overall RP3DSS project consist primarily of a shrub steppe complex consisting primarily of Wyoming big sagebrush and desert shrub (see Appendix E).

4.7.1 Proposed Action

As discussed under Section 4.4, impacts to vegetation resulting from seismic survey operations would primarily be limited to the crushing effects of vehicular traffic crossing the affected lands in conjunction with source generation activities. As indicated above, the use of “flotation” tires on the buggies would minimize the impacts to vegetation thereby lessening the overall loss of available forage on the affected lands. Table 4.1 (page #46) provides a comparison of surface pressures exerted by equipment expected to be used in the seismic survey operation as compared to livestock and wildlife species that inhabit the project area. Considering that a force of 15 psi (or less) would be exerted by each tire on the ground surface (15.4 psi for the actual vibrator plates), vegetative disturbance would be primarily limited to the crushing of grass/shrub stems without damaging the root structure thereof or the ability of the plants to regenerate in the next growing season. In this regard, the post-project evaluation of visual surface impacts resulting from geophysical operations conducted in Hot Springs, Park and Washakie Counties in 2006 referenced above found that the “vibroseis buggies and buggy-mounted drills did crush some vegetation along some of the source lines, but for the most part the source lines were difficult/impossible to identify without GPS locational information just 6.5 months after the project was completed” (TRC 2007). As a consequence, we would not expect any adverse or long-term impacts to the vegetation encountered on federal lands within the overall seismic survey project area.

4.7.2 No Action Alternative

Under the No Action Alternative, there would be no project-related impacts to existing vegetation within the RP3DSS project area and impacts to vegetation would continue at current levels.

4.7.3 Proposed Mitigation Measures

Because the proposed RP3DSS project would have negligible or minimal impacts on vegetation in the area, no additional mitigation measures are recommended other than the PDFs referenced in Appendix B.

4.8 WILD HORSE MANAGEMENT AREA

As discussed in Section 3.8, the proposed RP3DSS project area falls within the McCullough Peaks HMA, with the current horse population estimated to be approximately 144 animals.

4.8.1 Proposed Action

The public has expressed concern about harassment of horses resulting from seismic survey activities within the project area. Whether geophysical activities (including the low-level aerial transportation of equipment to/from the area and the vehicular activity associated with source generation) would be tolerated by the horses and if so, to what degree, is unknown. Those horses that utilize the RP3DSS project area on a regular basis (or live in the area almost exclusively) have probably developed some tolerance of human activity due to current activity levels within the area (including activities associated with the existing SRPs). So long as there is no deliberate harassment of the horses by the geophysical operator, it is presumed that the horses will acclimate to the activity around them. From an operational standpoint, BBC would make every effort to avoid direct impacts to those horses that choose to remain in the area. During the aerial phase of operations, helicopters would fly at low altitudes (< 500') because it is impractical to do otherwise from an operational and safety standpoint; however, when horses are observed in the direct line of flight, the pilot would make every effort to deviate around the horses and would also endeavor to maintain a one-half (0.5) mile buffer between the aircraft's line of flight and the horses.

The most intensive human activity would occur in conjunction with source generation. In this regard, source generation in the lowland areas of the HMA would utilize vibroseis buggies. These buggies would travel along the source lines at speeds ranging between seven and ten miles per hour (mph) during the daylight hours and would stop periodically to "vibrate" as described in Section 2.2.2. At these speeds any horses in the area would have ample opportunity to move away from the equipment. Moreover, once the horses learn that the buggies do not represent a direct or immediate threat, their level of tolerance may well increase.

Operations in the southeastern corner of the RP3DSS project area may displace horses from traditional watering points along Dry Creek. Considering the ongoing drought and the general lack of surface water throughout much of the RP3DSS project area, this could result in displacement of the horses from the area. In order to minimize the potential impact of this displacement on the horses, BBC has committed to provide an alternate water source within the overall RP3DSS project area at a point to be mutually agreed upon by both BBC and the AO. This alternate water source would provide an available and reliable source of fresh water during the geophysical operation at a

point removed from Dry Creek, yet strategically located to allow the horses the continued use of the area until such time as the seismic survey has been completed and the horses can return to their normal watering patterns. Considering the PDFs identified in Appendix B, combined with the large expanse of area within the HMA that would not be affected by geophysical activities, it is unlikely that the proposed seismic survey project would have a lasting and/or detrimental effect upon the McCullough Peaks wild horse herd.

4.8.2 The No Action Alternative

Under the No Action Alternative impacts to wild horse populations in the area would continue at current levels.

4.8.3 Proposed Mitigation Measures

Because the proposed RP3DSS project would have negligible or minimal impacts on wild horses within the project area, no additional mitigation measures are recommended other than the PDFs referenced in Appendix B.

4.9 WILDLIFE

The RP3DSS project area provides habitat for a variety of both game and non-game species, including antelope, mule deer, raptors, upland game and migratory birds, predators and furbearers. The principal impacts likely to be associated with the proposed geophysical activity would include potential displacement of wildlife species from preferred habitats and the potential loss of wildlife habitat as a result of project activities. Impacts on local wildlife populations would result from direct removal or alteration of habitat, increased human presence associated with geophysical exploration activities and direct wildlife/human interaction.

4.9.1 Proposed Action

Impacts on local wildlife populations could result from direct removal or alteration of habitat, increased human presence associated with geophysical exploration activities, and direct wildlife/human interaction. Activities associated with the RP3DSS project could temporarily impact approximately 505 acres of wildlife habitat, consisting mostly of shrubs, grasses and forbs. This would result in a proportionate reduction in the amount of herbaceous and browse forage available to herbivorous species such as antelope and mule deer, as well as a reduction in nesting, feeding and security habitat for game birds (e.g., sage grouse) and those smaller vertebrate species that may inhabit the affected areas. As discussed in Section 4.7.1, impacts to wildlife habitat would result primarily from the effects of vehicular traffic and would generally be limited to the crushing of grass/shrub stems without damaging the root structure thereof. As a consequence, these impacts would be short-term in nature as the plants would maintain the ability to regenerate themselves.

4.9.1.1 Raptor Species

As stated in Section 3.9.2, there is one active golden eagle (*Aquila chrysaetos*) nest known to exist within the overall seismic survey project area. Golden eagles are typically early nesters and it is likely that any young produced from this nest in 2007 would fledge prior to the initiation of intensive source generation activities (Call 1978). Moreover, the topography where the nest is located would generally preclude any direct disturbance to the nest in conjunction with receiver line placement. Nonetheless, avoidance of the nest would be recommended in accordance with standard BLM guidelines to ensure nesting success as appropriate. Likewise any heretofore unknown raptor nests identified within the overall project area during the course of the geophysical operation would also be avoided as stated above.

4.9.1.2 BLM Sensitive Species

BLM sensitive species that may occur within the RP3DSS project area include burrowing owl (*Athene cunicularia*), greater sage-grouse (*Centrocercus urophasianus*), long-billed curlew (*Numenius americanus*), mountain plover (*Charadrius montanus*), and white-tailed prairie dog (*Cynomys leucurus*). Observations of both burrowing owls and mountain plovers within the inventory area are few and suitable nesting habitat for these species is limited. Considering that seismic survey (source generation) activities are not scheduled to begin until sometime around mid July, impacts to ground-nesting birds should not occur as the nesting season for these species would have passed by the time that these operations commence and any chicks produced in conjunction with nesting activities would be mobile. Considering that cross-county source generation activities conducted during the daylight hours would be conducted at speeds ranging between seven and ten mph and night time operations would be conducted at somewhat reduced speeds, it is unlikely that ground-nesting birds or their young would be inadvertently crushed in conjunction with source generation activities. The white-tailed prairie dog colonies located within the overall RP3DSS project area are generally isolated and relatively small in size and can easily be avoided, thereby eliminating impacts to the colonies and any burrowing owls that may reside therein.

Of the six greater sage grouse (*Centrocercus urophasianus*) lek complexes identified in Section 3.9.1, four occur within the boundaries of the RP3DSS project area, one (Bridger Butte 2) is located approximately 0.7 miles to the east of the project area boundary, and one (Stone Barn) is located approximately 800 feet west of the western project area boundary. Historic breeding activity at these leks is summarized in Table 4.2. The Cripple Dog Swale and Emblem Bench leks are thought to be satellites to the larger Cripple Dog Reservoir lek and are lumped into the Cripple Dog lek complex. Numbers of grouse may fluctuate at these satellite leks from year to year based upon the overall grouse population - when the population is high, excess males may be forced to use these satellite leks for breeding activity due to competition from the older, more dominant males at the primary lek. As a consequence, activity at these “satellite” leks fluctuates from year to year and may actually reflect population trends at the time in the complex area.

Considering the number of leks within or directly adjacent to the overall project area and the fact that approximately 73.5% of the overall RP3DSS project area falls within two miles of one or more

leks, it is reasonable to assume that suitable nesting (sagebrush) habitat within the overall project area would hold nesting hens during the 2007 nesting season. Initiation of intensive geophysical operations in potential nesting habitat (without application of the PDFs referenced in Appendix C) could disrupt this nesting activity resulting in nest abandonment and subsequent nest failure or the actual loss of nests from off-road vehicular traffic in nesting habitat. However, the lack of perennial surface water within much of the RP3DSS project area could act as a limiting factor for suitable greater sage grouse nesting and early brood-rearing habitat in those areas removed from reliable water sources and associated riparian habitat necessary for brood-rearing purposes in drought years. Water availability varies from year to year and generally would not be a limiting factor solely for nesting activity, but could be a limiting factor for successful recruitment (brood rearing) as water is essential for chick survival and the riparian habitats associated with water are essential for the production of the insect life that represents the predominate diet of young grouse.

Table 4.2

**Sage Grouse Breeding Activity in the RP3DSS Project Area
for the Ten Year Period from 1998 through 2007**

Lek Name	Strutting Activity Observed at Lek ¹									
	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
Bridger Butte 2	A	A	A	A	A	A	A	A	A	A
Cripple Dog Reservoir	A	A	A	A	A	A	A	A	A	A
Cripple Dog Swale	U	A	A	I	I	I	I	A	I	A
Stone Barn	U	U	U	I	U	I	I	U	A	A
Emblem Bench 2	U	U	U	A	A	A	U	U	A	U
Emblem Bench 3	U	U	A	I	I	I	A	I	A	U

¹ Legend:

- A = Lek was active.
- I = Lek was checked at least once during the breeding season and no birds were observed.
- U = Lek was not checked during breeding season and activity for that year is unknown.

The post-project evaluation of visual surface impacts resulting from geophysical operations conducted in Hot Springs, Park and Washakie Counties in 2006 referenced above found that "...disturbance/destruction of sagebrush was minimal and below that likely to affect habitat suitability for greater sage grouse or any other species" (TRC 2007). Considering the fact that source acquisition activities will likely be conducted outside of the nesting season for greater sage grouse, combined with the general lack of long-term impacts to sagebrush habitats in the area, it is unlikely that the geophysical project would have an adverse effect upon sage grouse nesting and early brood-rearing habitats in this or future years.

4.9.1.3 Migratory Birds

As previously discussed, surface disturbing activities associated with the Proposed Action would result in the initial disturbance of approximately 505 acres of shrub-steppe habitat on federal lands which would provide a source of food, security cover and nesting habitat for many of the species listed in Table 3.13. This disturbance would be short-term in nature and would be limited primarily to the crushing of vegetation in conjunction with cross-country vehicular traffic. Considering the relatively small percentage of total surface disturbance proposed within the 28,160 acre RP3DSS project area, the actual magnitude of direct habitat loss and subsequent displacement would be minimal at best. The displacement of bird species to adjacent, undisturbed habitats, while difficult to predict, would be relatively short-term in nature given the overall duration of source generation activities associated with the Proposed Action. Moreover, the breeding and nesting season for most of these migratory bird species will have concluded by the time that intensive seismic survey (source generation) activities commence, thereby eliminating the potential for disruption of actual nesting activities.

4.9.2 The No Action Alternative

Under the No Action Alternative impacts to wildlife species within the overall project area would continue at existing levels without any additional impacts that may result from the proposed geophysical activity.

4.9.3 Proposed Mitigation Measures

Because the proposed RP3DSS project would have negligible or minimal impacts on wildlife within the project area, no additional mitigation measures are recommended other than the PDFs referenced in Appendix B.

4.10 CUMULATIVE IMPACTS ANALYSIS

4.10.1 Introduction

The CEQ regulations (40 CFR 1500-1508) define the impacts and effects that must be addressed and considered by Federal agencies in satisfying the requirements of the NEPA process. This includes direct, indirect and cumulative impacts:

- Direct effects are caused by the action and occur at the same time and place (40 CFR 1508.8).
- Indirect effects are caused by the action and are late in time or farther removed in distance, but are still reasonably foreseeable. Indirect effects may include growth inducing effects and other effects related to induced changes in the pattern of land use, population density or growth rate, and related effects on natural systems (40 CFR 1508.8).

- Cumulative impact is the impact on the environment, which results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (Federal or non-federal) or person undertakes such other actions. Cumulative impacts can result from individually minor but collectively significant actions taking place over a period of time (40 CFR 1508.7).

4.10.1.1 Direct Effects

The direct effects of the Proposed Action have been described in Chapter 2.0 and analyzed in Chapter 4.0 and consist of approximately 505 total acres of “surface disturbance” in conjunction with the RP3DSS project and where the term surface disturbance is defined as “...any physical disturbance that directly or indirectly impacts biological and physical surface values” (see Section 2.2.7).

4.10.1.2 Indirect Effects

The indirect effects of the Proposed Action are negligible in that geophysical activities involve a very limited amount of new or actual surface disturbance and spatially temporary in nature. While seismic survey projects vary in size, the indirect effects are minimal based upon the definition provided above. Examples of indirect effects would be a future increase in the distribution of invasive, non-native species in and/or adjacent to the project area based upon seed transport into the area via geophysical equipment. Another example would be accelerated erosion and subsequent sedimentation in area streams resulting from new surface disturbing activities that are not reclaimed. In the case of the RP3DSS project, the potential for indirect effects occurring subsequent to demobilization and reclamation is not anticipated in part due to the temporary nature of the project and the Project Design Features incorporated into the project proposal.

4.10.1.3 Past, Present and Reasonably Foreseeable Future Actions

Past actions in the project area include grazing, rights-of-way administration, oil and gas exploration/development, recreation, wild horse administration and other multiple uses. Specific past actions include the following:

- Oil/Gas Exploration Activity (drilling). Previous oil/gas exploration activity within the RP3DSS project area has been documented in Table 3.3. These wells were plugged, abandoned and subsequently reclaimed some years ago;
- Oil/Gas Exploration Activity (seismic). There have been at least three geophysical projects conducted in portions of the proposed RP3DSS project area since 1982 including: 1) the H.R. Exploration Seismic Project conducted in 1982; 2) the Sefel Geophysical BH1-106 Seismic Project conducted in 1983; and 3) the Schlumberger Bighorn Basin 2D Seismic Project conducted in 2000. There have probably been other geophysical projects conducted in the

general area in the years preceding 1982 but there are no records available to identify these projects.

- Oil/Gas Pipelines. Marathon Oil Company owns and operates a natural gas pipeline that traverses the eastern portion of the RP3DSS project area (Right-of-Way Grant #WYW-020826);
- Range Improvements. Range improvements within the overall RP3DSS project area include the construction of allotment fences, vegetative treatments (prescribed burns), and water development projects including the construction/installation of stock reservoirs, spring boxes, pipelines, watering troughs, etc.
- Recreation. BLM has issued a number of Special Recreation Permits which authorize recreational activities such as guided big game hunting and wild horse interpretive tours (see Section 3.6)

Present actions in and adjacent to the RP3DSS project area are primarily limited to existing/proposed oil/gas exploration activity being undertaken by Wesco Operating, Inc. as follows:

- Bridger Trail #2A: SW $\frac{1}{4}$ SW $\frac{1}{4}$ of Section 2, Township 53 North, Range 98 West. Spudded on August 2, 2006, drilled to 11,723 feet and subsequently completed in the Meeteetse Formation. The well has been completed and is currently shut-in.
- West Branch #1: SE $\frac{1}{4}$ SW $\frac{1}{4}$ of Section 11, Township 53 North, Range 98 West. Well proposed to 13,700 feet to test the productive potential of the Meeteetse Formation. The APD for the subject well is currently being processed by the CYFO.

In addition, it should be noted that Wesco Operating, Inc. has recently formed a 24,960.81 acre federal exploratory unit (West Branch Unit) in portions of Townships 53 and 54 North and Ranges 97 and 98 West in Big Horn and Park Counties, Wyoming. A portion of the West Branch Unit extends into the northeastern corner of the RP3DSS project area and encompasses all or portions of Sections 26, 27, 34, 35 and 36 in Township 53 North, Range 98 West or approximately 2,549 acres within the RP3DSS project area.

There are no other known oil/gas or other activities currently proposed or on-going within or directly adjacent to the proposed RP3DSS project area.

Reasonably foreseeable future actions within or directly adjacent to the RP3DSS project area include a proposed BLM interpretive trail and parking area for wild horse viewing is being planned. This project would alleviate dangerous parking on Highway 14, 16, 20, and would help to educate the public about the wild horse program. There are no other actions currently proposed within the RP3DSS project area.

As indicated in Section 3.4.3, Bill Barrett Corporation staked two exploratory wells in the RP3DSS project area and filed Notices of Staking with the CYFO for these wells in 2006. Both Notices of Staking were subsequently withdrawn from further consideration by BBC prior to their filing the actual Applications for Permit to Drill. Presumably, the Notices of Staking were withdrawn pending

acquisition and interpretation of geophysical data for those federal oil/gas leases owned/controlled by BBC in the Red Point area. As stated in Sections 1.3.1 and 2.1, the data generated from the proposed seismic survey will be used to identify potential sub-surface geologic targets that may contain commercial quantities of oil and/or natural gas. If attractive targets are identified as a result of this seismic survey, it is possible that BBC would move forward with the exploration of these identified formations through the permitting process for exploratory drilling operations. As previously stated, any future drilling activity would be subject to additional NEPA analysis. On the other hand, should interpretation of the seismic data fail to identify a potentially attractive sub-surface target, it is entirely possible that no further activity would be planned. The three seismic surveys referenced above apparently did not result in exploratory drilling activity as no wells have been drilled in the actual RP3DSS project area since 1978 (WOGCC 2007).

4.10.2 Cumulative Impacts

Cumulative impacts are impacts which are likely to occur due to the proposed action in combination with other ongoing activities in the area, recently constructed projects in the area, and projects which would likely be implemented in the area in the near future. Pursuant to NEPA, the BLM must consider the cumulative impacts of the Proposed Action in conjunction with other ongoing oil/gas exploration activities within the general area. In addition, unrelated activities within the overall project area which might have an adverse impact upon existing natural resources in the area and, consequently, which would further contribute to the overall degradation of the human environment must be considered in the analysis of cumulative impacts as well.

Cumulative impacts resulting from the proposed RP3DSS project and the Wesco Operating, Inc. wells would include a short-term loss of vegetation and associated AUMs along with the displacement of wildlife species from those areas subjected to intense human activity associated with each particular action. Implementation of the proposed RP3DSS project would not increase long-term cumulative impacts to the human environment in the area as the geophysical project is very short-term in nature and would only result in a negligible impact to the natural resources of the area.

As discussed above, there are no direct or indirect effects of the proposed project that would contribute to the cumulative impacts to the human environment other than those issues discussed in the analysis section of Chapter 4. The past actions that have occurred in the overall project area all occurred some time ago and the disturbances (impacts) associated therewith have long since been reclaimed and would not add to the cumulative impact of the proposed RP3DSS project upon the human environment. Likewise, present and reasonably foreseeable future actions as described above are somewhat limited in scope and would only increase cumulative impacts minimally. As to future oil/gas exploration and development in the area it is possible, but not probable, that a drilling proposal could develop as a result of geophysical data acquisition. Past geophysical operations in the area apparently failed to identify a viable drilling prospect. There are no other known activities either ongoing or proposed within or directly adjacent to the RP3DSS project area that would add to the cumulative impacts of the seismic survey project.

The results of this analysis are consistent with a report prepared by the Washington Office, BLM (BLM 2006c) compiled and analyzed the conclusions reached in NEPA documents for 244 seismic projects authorized on federal lands from October 1, 2000 through September 3, 2005, including 105 projects in Wyoming (or 43 percent of the projects analyzed). The subject report concluded that “In all 244 records submitted for geophysical exploration, none of the projects predicted individual or cumulative significant impacts. Two records did report that actual impacts were not the same as those predicted, however, neither resulted in significant impacts. For the other 242 records, results were as predicted and no significant impacts occurred from the geophysical exploration activity. As such, none of the 244 records resulted in significant impacts”.

4.11 RESIDUAL IMPACTS

The term “residual impacts” refers to those impacts remaining after all reasonable mitigation has been applied. The disturbance of approximately 505 acres of soil and related wildlife habitat resulting from geophysical activities within the proposed RP3DSS project area would constitute a short-term impact, particularly when one considers that approximately 97% of this “disturbance” (489 acres) would be attributable to vibroseis source generation activities - which would primarily result in the crushing of native vegetation with little or no actual soil disturbance. The remaining 16 acres of surface disturbance on federal lands would result primarily from the drilling of shot holes and the use of pre-disturbed areas to the greatest extent possible for the primary or main staging areas. Those areas disturbed in conjunction with the drilling of shot holes would be raked and seeded in accordance with direction from the AO (as discussed in Section 2.2.7) and the secondary staging areas would also be reseeded as directed by the AO. Establishment of vegetative cover in these disturbed areas would eliminate any residual impacts in association with the proposed geophysical exploration activity.

5.0 CONSULTATION AND COORDINATION

5.1 BACKGROUND

The Red Point 3D Seismic Survey Project Environmental Assessment was prepared by Anderson Environmental Consulting (AEC), an independent environmental consulting firm, with the guidance, participation and independent evaluation of the BLM. A list of the personnel responsible for document preparation, and their individual responsibilities are provided in Section 5.3.

5.2 PUBLIC PARTICIPATION

As indicated in Section 1.6, an open process has been employed for the determination and scope of the issues addressed in this environmental document. Public scoping was conducted in compliance with the procedural requirements of the Council on Environmental Quality (CEQ) rules and regulations for the implementation of NEPA (40 CFR 15001.7). Activities associated with the implementation of the public scoping process are summarized below.

1. A scoping statement was released by the CYFO on 02/28/2007 in order to identify the issues related to the proposed RP3DSS project. The scoping statement was sent to those government offices, elected officials, public land users and user groups identified as having a potential interest in the proposed project, included the mailing list and also included notice of a public meeting scheduled for 03/19/2007 in Cody, Wyoming. The scoping statement was also posted electronically on BLM's external website for public review and comment.
2. BLM issued a press release on 03/12/2007 advising of a public scoping meeting to be held in Cody, Wyoming on 03/19/2007. The press release was forwarded to local and regional newspapers in Billings, MT; Cody, WY; Greybull, WY; Powell, WY; and Worland, WY. The press release was published in the following newspapers on the date(s) indicated:
 - a) the Billings Gazette on 03/15/2007;
 - b) the Cody Enterprise on 03/26/2007; and
 - c) the Powell Tribune on 03/15/2007.
3. As discussed above, an informal open house was held in the Community Room of the Bighorn Federal Savings Bank in Cody, Wyoming on Monday, March 19, 2007 from 4:00 p.m. to 7:00 p.m. to acquaint the public with the proposed project and to answer any questions that arose in conjunction therewith. The open house was attended by approximately 20 individuals, including representatives of both the BLM and Bill Barrett Corporation.

The scoping notice referenced above solicited public comment on the proposed geophysical project for a period of thirty days commencing on 02/28/2007 and ending on 03/30/2007. Specific comments received in conjunction with public scoping included 101 emails, 7 letters, 3 faxes and 2

written comments received during the public meeting in Cody. There was some overlap in these comments in that 15 comments were emailed multiple times to the CYFO or were forwarded to the BLM in writing as well. A matrix containing a synopsis of the major issues identified in conjunction with the public scoping process is contained in Appendix C.

Native American consultation included sending letters and scoping notices to representatives of eleven Native American tribes. More than eighty follow-up contacts were made with approximately thirty tribal representatives. Several of these representatives asked to review the environmental assessment and representatives of one tribe visited the proposed RP3DSS project area.

5.3 LIST OF PREPARERS

Table 5.1 identifies the BLM personnel associated with the review of this EA.

Table 5.1

Interdisciplinary Team for the BLM

Name	Responsibility
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Cody Field Office

Mary D'Aversa	Assistant Field Manager
Patricia Hatle	Wild Horse/Range Management Specialist
Gretchen Hurley	Geology and Minerals, Paleontology
Shirley Bye-Jech	Outdoor Recreation Planner
Gerald G. Jech	NRS - Watershed and Aquatics
Ann Perkins	Planning and Environmental Coordinator
Dennis Saville	Wildlife Biologist, Weed Coordinator
Vic Seefeldt	NRS - Minerals
Bill Wilson	GIS Specialist

Worland Field Office

Mike Bies	Cultural/Historic Resources
Steve Kirakofe	NRS - Soils and Hazardous Materials
Don Ogaard	Planning and Environmental Coordinator
Alberta Settle	Civil Engineer
Andrew Tkach	Public Information Officer

Wyoming State Office

Dale Hanson	Paleontologist
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Table 5.2 identifies those companies and associated personnel responsible for the preparation of the environmental assessment document.

Table 5.2
List of EA Preparers

Name	Company Affiliation	Responsibility
Robert M. Anderson	Anderson Environmental Consulting	Project Manager, EA Preparation
Randy Blake	TRC Environmental Corporation	GIS Mapping

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7.0 ABBREVIATIONS AND ACRONYMS

AEC	Anderson Environmental Consulting
AML	Appropriate Management Level
AO	Authorized Officer
APD	Application for Permit to Drill
ARPA	Archaeological Resources Protection Act
ATV	All Terrain Vehicle
AUM	Animal Unit Month
BATF	Bureau of Alcohol, Tobacco and Firearms
BBC	Bill Barrett Corporation
BCA	Biodiversity Conservation Alliance
BBS	Breeding Bird Survey
BLM	Bureau of Land Management
BMP	Best Management Practices
CEQ	Council on Environmental Quality
CFR	Code of Federal Regulations
CYFO	Cody Field Office
DR	Decision Record
EA	Environmental Assessment
EIS	Environmental Impact Statement
EO	Executive Order
ESA	Endangered Species Act
FONSI	Finding of No Significant Impact
FLPMA	Federal Land Policy Management Act
FOOGLRA	Federal Onshore Oil and Gas Leasing Reform Act
FOOGRMA	Federal Onshore Oil and Gas Royalty Management Act
GPS	Global Positioning System
HMA	Herd Management Area
MLA	Mineral Leasing Act
mph	Miles per Hour
NEPA	National Environmental Policy Act
NOI	Notice of Intent
NHRP	National Historic Preservation Act
NRHP	National Register of Historic Places
ORV	Off-Road Vehicle
OSHA	Occupational Safety and Health Administration
PDF	Project Design Feature
PIF	Partners in Flight
PPE	Personal Protection Equipment
psi	Pounds per Square Inch
RMP	Resource Management Plan
ROD	Record of Decision
RP3DSS	Red Point 3D Seismic Survey
SHPO	State Historic Preservation Officer
SRP	Special Recreation Permit
SS	Sagebrush Steppe
SU	Standard Unit

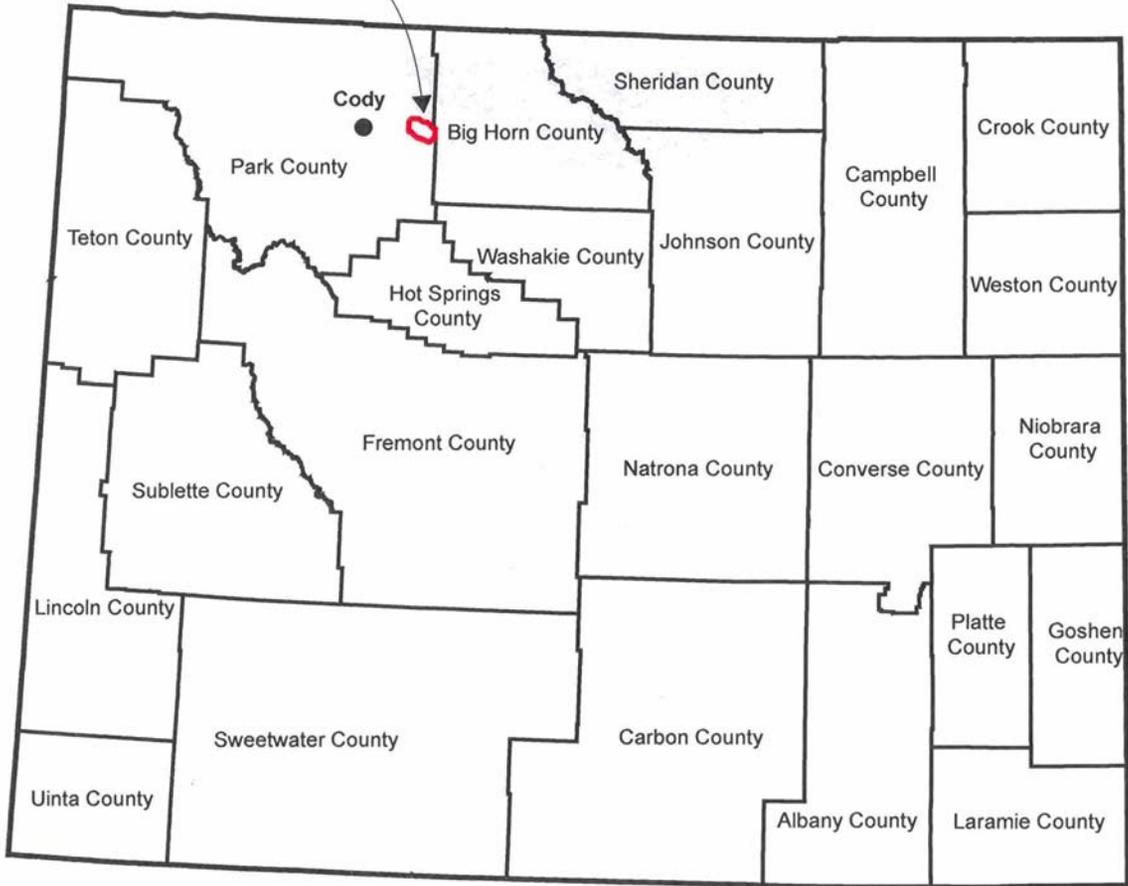
T/E	Threatened and Endangered Species
TDS	Total Dissolved Solids
USC	United States Code
USDI	U.S. Department of the Interior
USFWS	U.S. Fish and Wildlife Service
VRM	Visual Resource Management
WDOT	Wyoming Department of Transportation
WGFD	Wyoming Game and Fish Department
WOGCC	Wyoming Oil and Gas Conservation Commission
WSA	Wilderness Study Area
WSWT	Wyoming State Weed Team
WYNDD	Wyoming Natural Diversity Database

APPENDIX A

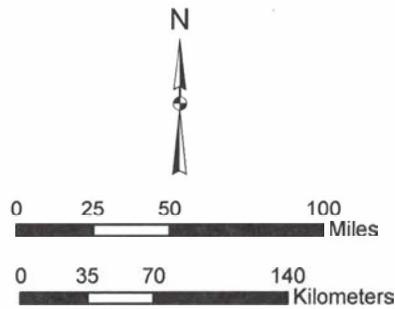
Project Maps

Project Location

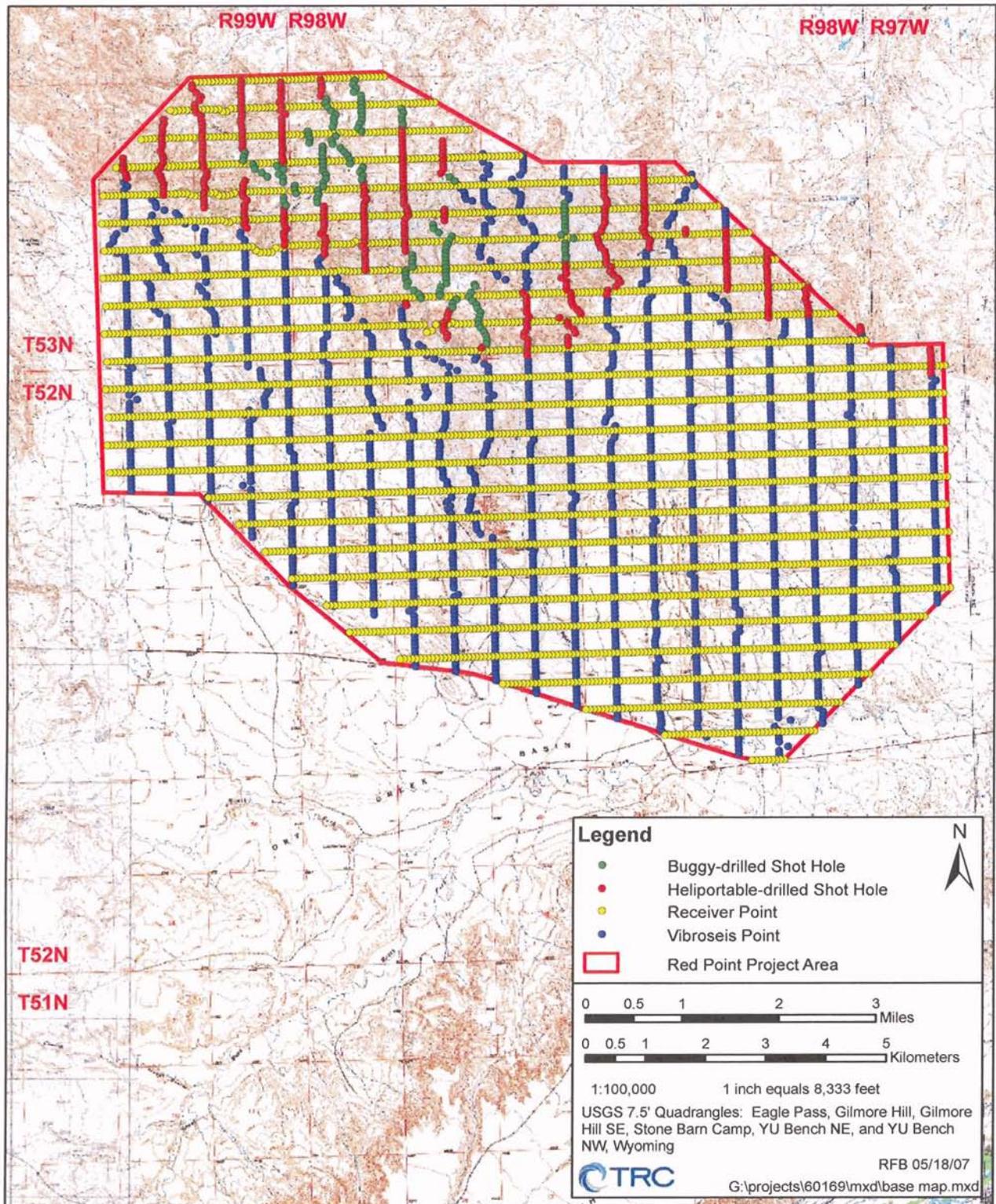
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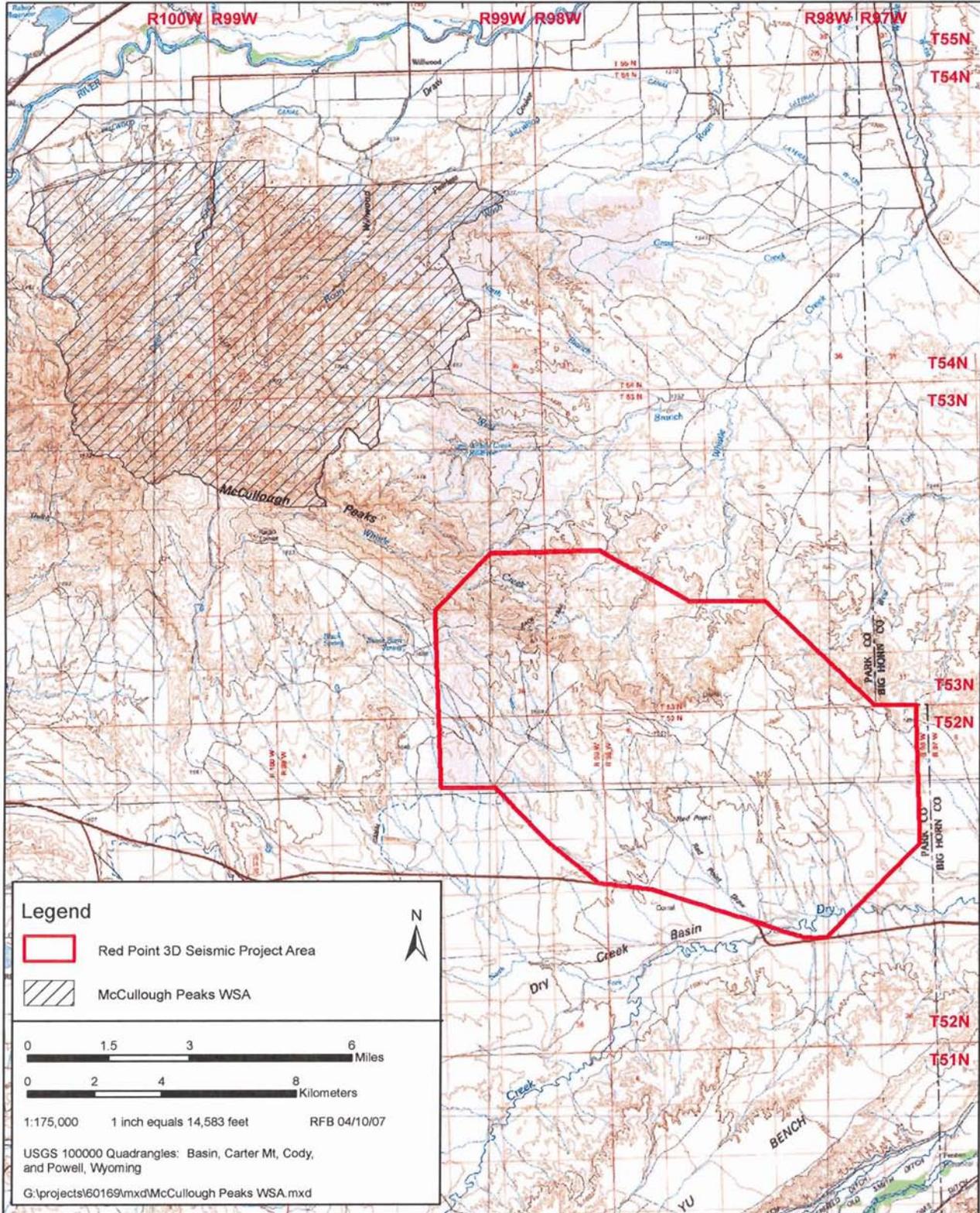
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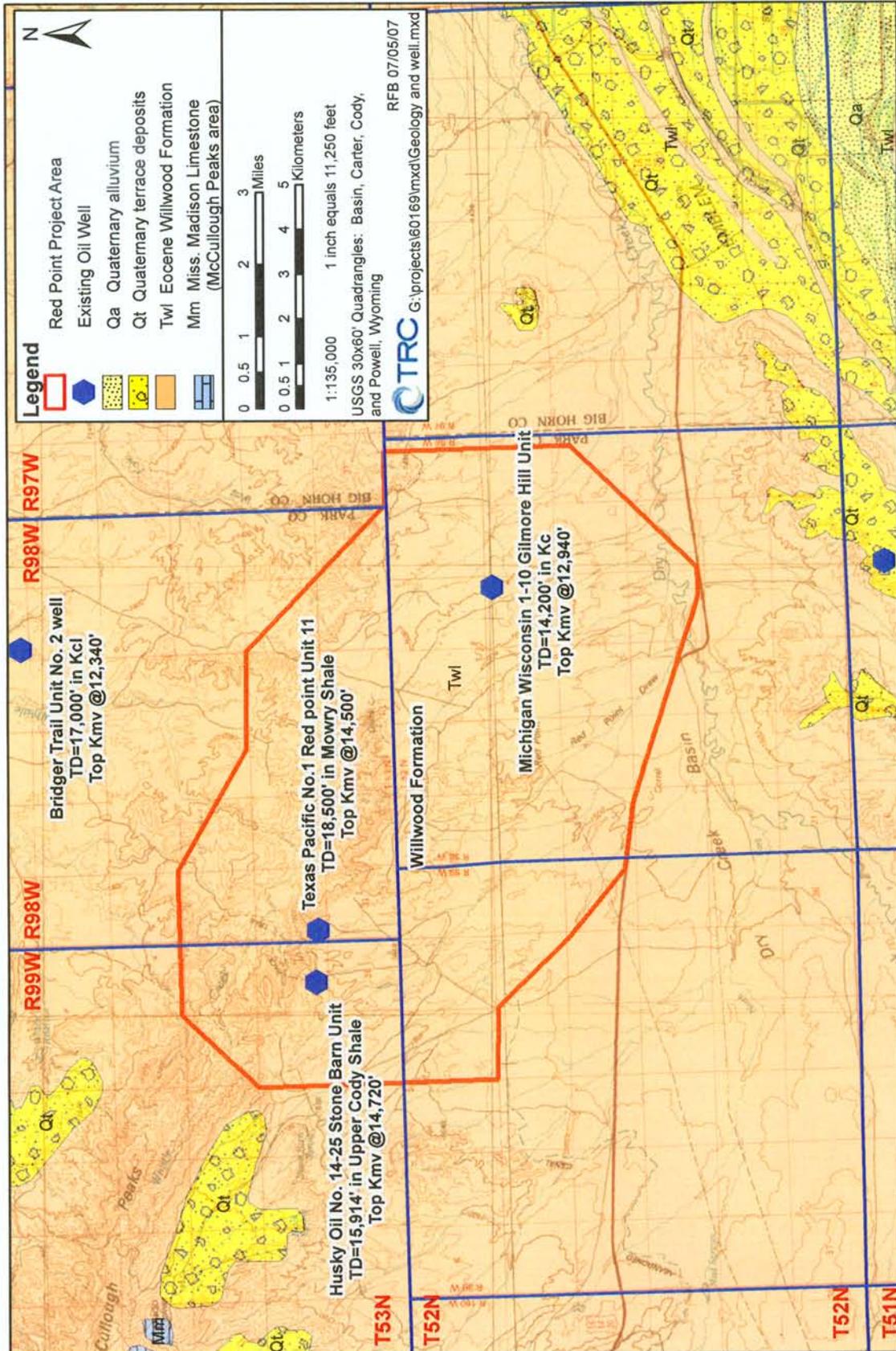
Map 1: General Vicinity



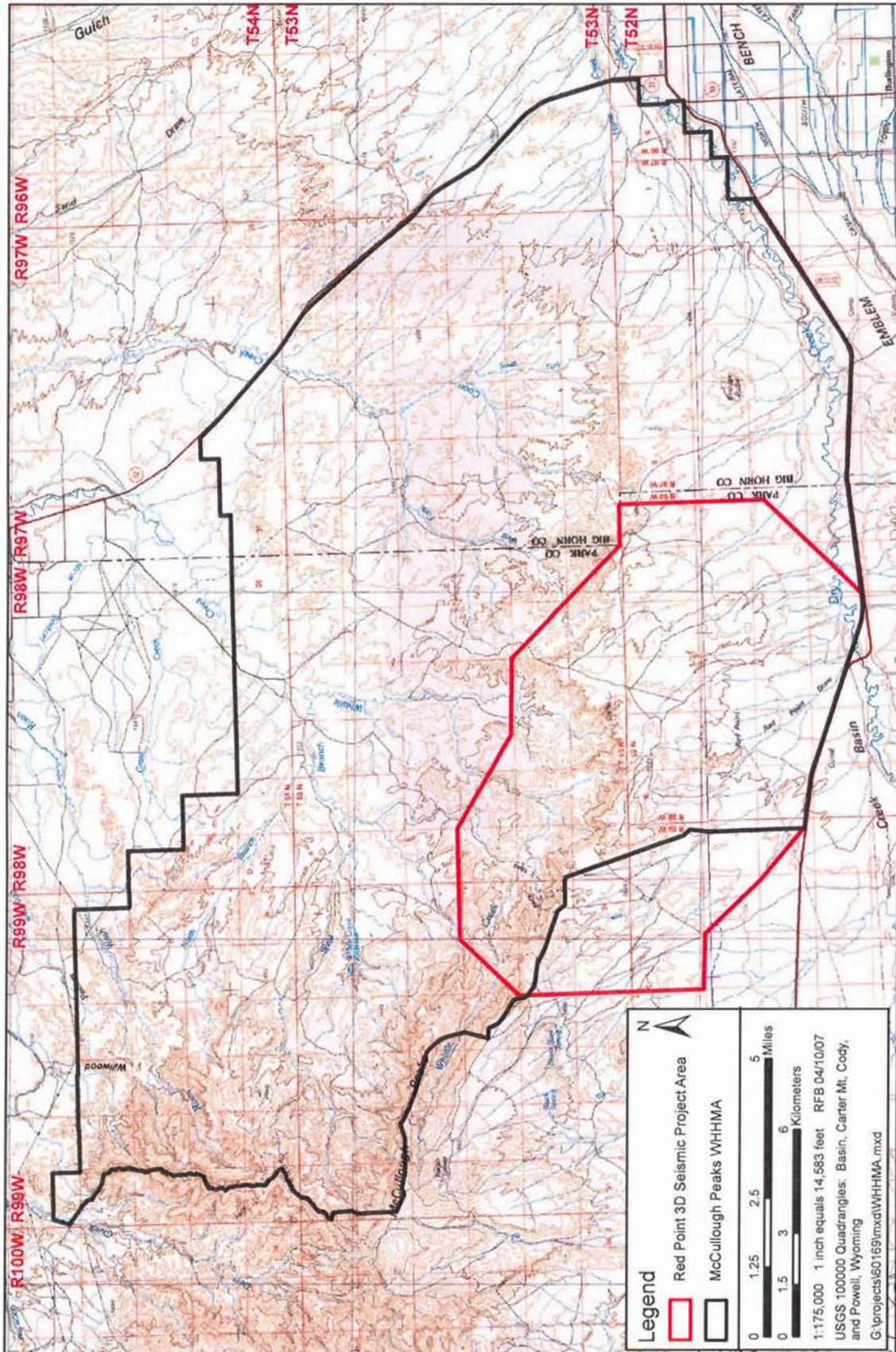
Map 2: Red Point Project Area



Map 3: McCullough Peaks Wilderness Study Area



Map 4: Surface Geologic Map of the Project Area



Map 5: McCullough Peaks Wild Horse HMA

APPENDIX B

Project Design Features

PROJECT DESIGN FEATURES

Introduction

Project Design Features (PDFs) are appropriate actions or measures to avoid, minimize, rectify, reduce, eliminate or compensate for adverse environmental impacts (40 CFR 1508.20). These PDFs were an integral part of the proposed action design (and alternatives) prior to completing the effects analysis. These PDFs reflect requirements of federal, State of Wyoming and local laws; regulatory requirements; management plan requirements; as well as best management practices, surface use requirements, protective measures, and standard operating procedures based on scientific research data and past experience with similar actions. The literature cited in Section 6.0 of the EA and BLM monitoring and evaluation reports, as well as past experience relating to resource protection and other similar geophysical projects where these PDFs have been implemented, monitored and evaluated, support the contention that they are highly effective. All PDFs are an integral part of the selected alternative, will become conditions of approval contained in the authorization allowing the geophysical activity, and will be implemented as part of this action.

The BLM will have an agency representative (permit administrator, compliance specialist/inspector) during field operations on BLM-administered public lands to inspect, monitor and administer the permit/field operation. The agency representative will work with the applicant to ensure total implementation and compliance with all PDFs, to monitor their effectiveness in eliminating or reducing environmental impacts based on direct observation and assessment of their implementation, and to alter implementation and direct immediate changes to PDFs as necessary and appropriate to insure their maximum effectiveness in the protection of resources and users. The designated agency representative, will not be able to shut down the project unless/until they have notified and received concurrence from the Authorized Officer (AO). The AO is the Field Manager, Michael P. Stewart, or his acting when he is not available.

While geophysical seismic survey operations are underway, the agency representative will prepare a daily monitoring report. A final monitoring and compliance report will be prepared at the conclusion of the project. In addition to ensuring implementation/compliance, monitoring will allow gathering of additional information on the actual impacts resulting from such a project, and will provide additional information as to the relevance, applicability, and effectiveness of the PDFs as applied to future projects.

The BLM will also conduct a post-project assessment/final inspection of the seismic lines (both source and receiver lines) to determine if any mitigation/rehabilitation is necessary on public lands. Should the BLM identify areas requiring mitigation/rehabilitation (i.e., trails created as a result of operations, etc.) during or post-operation, the authorized operator shall work with the BLM to develop an acceptable mitigation plan.

General Conditions

1. Compliance. The applicant is responsible for complying with all federal, state and local laws and regulations.
2. Violations. For willful, flagrant, or major violations of the terms of the NOI, the offending individual (pilot, crew members, drill operators, etc.) as well as the applicant will be issued a warning notice, a violation notice, or cited into court, depending on the severity of the infraction.
3. Indemnification. The applicant shall indemnify the United States against any liability for damage to lives or property arising from the occupancy or use of federal lands under this authorization.
4. Operator representative. The applicant or their designated representative(s) shall be present on the premises at all times when the operations are being conducted on federal lands. The applicant will notify the AO or his/her designated representative in writing advising who their representative(s) will be.
5. Final NOI and project maps. When the project has been finalized in design and routes have been selected based on resource concerns or avoidance, the proponent shall furnish the BLM with a revised NOI and final project maps.
6. Pre-work coordination. The applicant and their selected geophysical contractor will be present at a pre-field work meeting with BLM to read all stipulations of the permit.
7. GPS mapping in helicopter. A GPS unit will accompany the helicopter and a weekly map depicting flight paths will be sent to the BLM GIS coordinator during activities. The file format should be a projected shapefile or ArcInfo coverage, which is consistent with Bureau policy.
8. Notification to proceed. The applicant shall inform the AO or his/her designated representative 3 days in advance of when work will begin on the project.
9. Daily progress reports. Daily progress reports shall be submitted to the AO or his/her designated representative providing information on the following:
 - Progress of the day - shot hole, vibroseis, and buggy.
 - Projection of the next day's schedule and area to conduct exploration.
 - Charges that have been shot, and the area cleared of all explosives, litter, and other materials used during the operation.
 - Blowouts that have been (or need to be) plugged.

- Misfires.
 - What worked/what did not work.
10. Project completion statement. When the statement of project completion is submitted, it shall state, *“All explosives stored or not used in the blasting operation have been destroyed or removed from federal lands”*.
 11. Land survey markers. The applicant shall protect all land survey markers.
 12. Cutting of trees/shrubs. No cutting of trees/shrubs will be authorized for this action.
 13. Crew camping. Crews shall not camp or reside on federal lands during the course of the project.
 14. Extension of operating period. No extension is stated or implied. Any extension of time beyond the expiration date must be in compliance with this site-specific NEPA documentation relative to the project. If due to unforeseen circumstances, an extension in time to complete the project is requested by the applicant, and that extension of time intrudes into the period of time outside of that evaluated in this document; additional site-specific NEPA analysis and a separate decision document will be required to address the proposal.

Right to Suspend Operations

1. Flagrant or willful violations. Operations will be suspended for flagrant or willful violations of terms of the NOI that are rated as “hazardous” or “major” until such time as the problem is cured to the satisfaction of the AO or his/her designated representative.
2. Public health and safety. Operations will be suspended when in the opinion of the AO or his/her designated representative such action is necessary to insure public health and safety.
3. Fire danger. The AO may suspend operations during periods of extreme fire danger, when warranted by conditions, (i.e., large fire activity on unit, severe shortage of resources, high potential for fire starts, fuel moistures are extremely low, etc.).
4. Game and fish violations. Operations may be suspended for game and fish statute violations (i.e., harassment with aircraft), as the applicant is responsible to insure employees on duty adhere to all state and federal wildlife laws.
5. Soil resource protection. Operations will be suspended if when in the opinion of the AO or his/her designated onsite representative determines that weather conditions or soil/slope conditions may result in unacceptable soil damage in excess of that analyzed in the EA document.

6. Wild Horse and Burro Act violations. Operations will be suspended under the “Wild Horse and Burro Act”, as defined in 43 CFR § 4700.0-5(f), which states, “...*any intentional or negligent action or failure to act that causes stress, injury, or undue suffering to a wild horse...and is not compatible with animal husbandry practices accepted in the veterinary community*”.

Cultural/Historical Resource Protection

1. Site avoidance. Standard site avoidance (by all vehicles including ORVs) entails a 32.8-meter (100 foot) or more buffer zone around all eligible and unevaluated sites. Vehicle/equipment traffic on federal lands will be confined to a corridor 100 feet wide (50 feet either side of the flagged centerline) along off-road routes and roads and trails which have been inventoried for cultural resources and which are free of significant or unevaluated cultural resources. Avoidance of cultural sites not located near or accessed by existing roads will be achieved by means of flagged cross-country site avoidance routes.
2. Employee notification. All of the applicant’s employees and their contractors shall be informed before commencement of project operations of critical elements of compliance with the Archeological Resources Protection Act (ARPA) and the National Historic Preservation Act (NHPA); and that any effects on, defacement of, or removal and/or disturbance of archaeological, historical, or sacred material shall not be permitted. Violation of the laws that protect these resources will be treated as a law enforcement/administrative disciplinary action.
3. Discovery of cultural resources. If subsurface cultural resources are found during project operations, all work in the vicinity of the resource shall cease and the applicant shall notify the AO immediately. The applicant shall implement appropriate measures requested by that agency to protect the resource until it can be adequately evaluated.
4. Discovery of human remains. If human remains are encountered during project operations, all work in the vicinity of the remains shall cease and the remains shall be protected from further exposure or damage. The applicant shall notify the AO immediately of such a discovery.
5. Native American Religious Concerns. Sites of potential Native American concern are subject to special measures, as specified below:
 - Avoidance offset distance - cairns and/or stone circles. Regardless of surface ownership, all known sites containing prehistoric cairns and/or stone circles shall be avoided by all vehicles by a minimum distance of 100 feet. If features are located near an existing roadway, a temporary fence/barrier will be erected, and the existing road will continue to be used.
 - Avoidance offset distance - rock art. Regardless of surface ownership, all known sites containing rock art shall be avoided by all vehicles by a minimum distance of ¼ mile (1,320 feet). If rock art is located near an existing roadway, a temporary fence/barrier will be erected, and the existing road will continue to be used.

- Discovery of new sites. If any additional sites of potential Native American religious concern (e.g., rock art, vision quest structures, human burial sites, prehistoric cairns, stone circles) are identified by the applicant's personnel within 500 feet of any proposed off-road travel route regardless of surface ownership, the AO shall be promptly notified. The need for special mitigative measures and/or additional Native American consultation shall be determined by the AO.

Explosives Handling and Blasting Operation Requirements

1. Standard operating procedure. The applicant shall perform all work with explosives in such a manner as not to endanger life or property.
2. Transportation/storage/marketing. The method of storing and handling explosives and flammable materials shall be in accordance with Occupational Safety and Health Administration (OSHA), U.S. Bureau of Alcohol, Tobacco, and Firearms (BATF), and U.S. Department of Transportation (DOT) regulations. Explosives and detonator caps shall be stored in a designated area in secure magazines. Signage for the magazines shall not be placed on the magazines, but on adjacent posts or other permanent structures. All storage places for explosives and flammable material shall be marked in accordance with applicable regulations.
3. Loss/theft of explosives. In case of the loss or theft of explosives, the BLM and the Park County Sheriff shall be notified immediately.
4. Blasting in/near ROWs. Flagmen or warning devices shall be used while operations are being conducted within or adjacent to road right-of-ways.
5. Safety personnel requirement. Observers, guards, or flagmen shall be posted at safe distances during blasting operations. There shall be a minimum of two crew members observing each detonated shot hole. The shot point coordinator shall wear PPE as prescribed by regulation or Company policy. The shot point coordinator shall ascertain that no personnel, public, wildlife or livestock are within 200 feet or the visual horizon of the hole to be detonated prior to detonation.
6. Posting of operating area. Roads/trails leading into the area shall be posted by the permittee stating, "Seismic Crew Ahead" or some similar verbiage.
7. Disposal of litter. No explosives boxes or prima cord reels shall be left in the field nor may they be burned on federal lands.

Fire Prevention and Reporting Measures

1. Emergency fire response plan. The applicant shall coordinate project activities with appropriate fire-response agencies. The applicant shall prepare a brief but specific instruction plan (crew contingency plan) for emergency fire response and shall submit it to the AO or his/her

- designated representative for concurrence. The crew contingency plan will include a fire communications protocol for contacting the BLM and/or other appropriate agencies (i.e., Park County) in the event of a fire.
2. Fire reporting. The applicant shall report all fires to the Fire Dispatcher in Cody, Wyoming at 307-578-1250 or 1-800-295-9954.
 3. Fire extinguishers. All vehicles shall be equipped with fire extinguishers and shovels.
 4. Staging areas and water buckets. Helicopter landing zones at each staging area shall be equipped with fire extinguishers. In addition, each helicopter shall have a 100-gallon water bucket should the helicopters be needed to fight a fire in the area, regardless of the fire's source.
 5. Buggy requirements. Off-road buggies shall be diesel powered (no catalytic converters).
 6. Vehicles with catalytic converters. Vehicles with catalytic converters will be restricted to existing roads and motorized trails; parking or idling will not be permitted in portions of roads or trails with taller vegetation as determined by the AO or his/her designated representative.
 7. Portable generators. Portable generators used in the project area will be required to have spark arresters.
 8. Personnel fire briefing. The following direction shall be provided to all field personnel:
 - Vehicle fire prevention inspections. All brush build-up around mufflers, radiators, headers, and other engine parts will be avoided; periodic checks shall be conducted to prevent this build-up.
 - Smoking. Smoking will only be allowed in company vehicles and/or designated smoking areas; all cigarette butts shall be placed in appropriate containers and not thrown on ground or out windows of vehicles.
 - Fires. Cooking, campfires, or fires of any kind will not be allowed.
 9. Spark arresters. All ATVs will be equipped with spark arresters.

Floodplains, Wetlands, and Riparian Zone Protection

1. Shot hole restrictions. Drilling of shot holes for geophysical exploration is prohibited where:
 - Artesian wells are suspected.
 - In wetland or riparian areas where perennially high water tables exist.
 - In areas where and when soils are saturated.

- Immediately upslope from springs or bogs.
- 2. Surface disturbance. Drilling, off-road vehicular use (including ATVs), or any other surface-disturbing activity will be prohibited within 150 feet of the high water mark of any perennial body of water or riparian/wetlands areas on federal lands. Helicopters shall be used to drop equipment to support placement of recording lines to reduce surface disturbance. Intermittent and ephemeral channels shall be avoided.
- 3. Stream crossings. All vehicle stream crossings will be designated and approved by the AO or his/her designated representative prior to use. All stream crossings will be selected to minimize streambed and bank damage.
- 4. Vegetation removal. No wetland/riparian vegetation shall be removed during any phase of the project.
- 5. Drill hole log. A log of all holes drilled shall be kept; noting the presence of water, the depth if possible, and if an artesian aquifer has been tapped.

Geology/Mineral Facilities Protection

1. Offset from oil/gas facilities. Shot holes shall be located a minimum of 300 feet from oil/gas wells and pipelines, unless written permission to encroach closer has been given by the owner.
2. Offset from mining operations. No shot holes shall be placed in any active mining operation, including gravel pits.

Helicopter Operation Requirements

1. Discretionary authority to require helicopter support. The AO or his/her designated representative will have the discretionary authority to require helicopter drilling or helicopter support at any time as conditions dictate, in order to protect resources or provide for human health and safety.
2. Helicopter use. Helicopter landing, loading, and staging areas, and aerial flight line avoidance, shall be coordinated with the AO or his/her designated representative to insure public safety and minimize wildlife/wild horse disturbance prior to use.
3. Staging area locations. Landing/staging areas for support of operations will be located as to allow a reasonable distance for gaining the required altitude for over flights.
4. Over-flights of developments. Direct over-flights of buildings, dwellings, developed areas, recreation areas, and other areas of human concentration shall be avoided.

5. Avoidance of occupied raptor nests. No helicopter activities will be permitted within three quarter (3/4) mile or the visual horizon (whichever is closer) of active raptor nests during the July 1 to July 31 time period, in accordance with CRA RMP ROD (Raptor Decisions). Flights will be re-routed around nest sites if they are occupied.
6. Over-flights of private lands. Helicopters shall maintain FAA required distances for over-flights of residences, buildings, and other private land facilities.
7. Over flights of unoccupied raptor nests. Direct helicopter over-flights of unoccupied raptor nests will not be permitted.
8. Wildlife and wild horse disturbance. Helicopters shall not harass or disturb wildlife species and/or wild horses to the maximum extent possible. This means helicopter pilots shall not go out of their way to observe or photograph wildlife/wild horses; helicopter pilots shall take deliberate evasive action to avoid wildlife/wild horses when observed.
9. Daily work hours. Helicopter use in support of operations on federal lands, excluding travel to/from overnight parking areas and operational staging areas, shall be limited to the time period beginning one hour after sunrise and ending one hour before sunset in order to minimize disturbance to public land users and wildlife/wild horses. The excluded crepuscular hours represent important wildlife activity periods.
10. Dropped loads. Any sling loads or other materials intentionally jettisoned for safety purposes or accidentally dropped from helicopters shall be immediately retrieved.

Livestock /Range Facility Protection

1. Notification of grazing permittees. The applicant is charged with the responsibility of notifying grazing permittees prior to entering their allotments. Affected grazing permittees are listed in the EA; addresses are available from the AO upon request.
2. Fence crossings. The applicant shall make every effort to avoid disturbing or altering fences. Gates shall be used when possible. All gates within the project area shall be left as they are found, with the exception of those gates along U.S Highway 14, 16, 20 and Wyoming Highway 32, which will require gates to be closed at all times. If a fence must be crossed, it shall be let down or cut (as determined by the AO or his/her designated representative), crossed, and immediately put back to original functionality.
3. Gates to be shut at all times along highway. All gates along U.S. Highway 14, 16, 20 and Wyoming Highway 32 must be in a closed position at all times.
4. Livestock water facility offset. Shot holes shall be located a minimum of one-quarter (1/4) mile from any water well, flowing spring, reservoir or stock water pipeline, regardless of ownership, in accordance with WOGCC Guidelines [Chapter 4, Sect. 6 (r)(i)], unless written consent to encroach closer is obtained from the surface owner.

5. Repair of range/livestock facilities. Any and all facilities damaged, destroyed or removed in connection with this geophysical exploration operation shall be immediately restored to original condition or replaced with a similar facility.
6. Personnel instruction. Personnel associated with the project shall be instructed to minimize contact with and avoid harassment of livestock.

Night Time Activities

1. Twenty-four (24) hour notice. The BLM will require 24 hours advance notification for areas where night time work is expected to occur.
2. Areas where night-time activities are not allowed. In specified areas, as mapped on the Cody Field Office GIS database, night time activities will not be allowed unless permission is granted by the BLM otherwise.
3. BLM approved biologist. A BLM approved wildlife biologist or trained personnel may be required to survey prior to night time operations, to identify potential concerns and avoidance measures or verify species are not present.

Paleontological Resource Protection

1. Collecting. The project proponent/Operator is responsible for informing all persons associated with this project including employees, contractors and subcontractors under their direction that they shall be subject to prosecution for damaging, altering, excavating or removing any vertebrate fossil objects on site. Collection of vertebrate fossils (bones, teeth, turtle shells) is prohibited without a permit. Unlawful removal, damage, or vandalism of paleontological resources will be prosecuted by federal law enforcement personnel.
2. Discovery. If vertebrate paleontological resources (fossils) are discovered on BLM-administered lands during 3D seismic project operations, the Operator shall suspend operations that could disturb the materials, and immediately contact the AO or his/her designated representative. The AO would arrange for evaluation of the find within an agreed time frame and determine the need for any mitigation actions that may be necessary. Any mitigation would be developed in consultation with the Operator, who may be responsible for the cost of site evaluation and mitigation of project effects to the site. If the operator can avoid disturbing a discovered site, there is no need to suspend operations; however, the discovery shall be immediately brought to the attention of the AO.
3. Avoidance. All vertebrate or scientifically important paleontological resources deemed to be of scientific value found as a result of the project baseline inventory will be avoided during operations. Avoidance in this case means “No vibroseis or heli-portable drilling/shot hole source generation within a distance of at least 50 linear feet of the outer edge of the paleontological locality as marked on the ground”.

Public and Crew Safety

1. Advance notice of operations. The applicant shall notify the AO or his/her designated representative in advance of conducting operations, and provide notice of all locations and times that work is being planned.
2. Avoidance of public land users and/or recreationists. The applicant shall avoid, to the maximum extent possible, working in the immediate vicinity of hunters, hikers, and other public land users known to be utilizing the area. Survey crew/staff shall keep the public a safe distance away from all shooting and all buggy activity.
3. Vehicle limitations. With the exception of buggies and ORV support vehicles (ATVs) as approved in the decision, vehicle traffic (excluding ORVs) will be limited to existing open roads and two-track trails. Vehicles shall travel at speeds within set speed limits of main access roads, and at slower speeds appropriate for conditions on more remote roads and two-track trails.
4. Signs. Safety-warning signs shall be placed on main access roads to make the public aware of road traffic related to project activities. Signs warning the public of project activity shall be located at the closest primary road intersections on either side of the next day's planned drilling activity. No road closures are proposed, and any short-term delays on use of roads shall be communicated to the public by signs and flagmen.
5. Wearing of safety vests. The applicant shall require all crew members to wear orange and yellow safety vests to make them easily visible to all recreationists for safety purposes.
6. Helicopter over flights. Helicopters are prohibited from flying directly over developed recreation areas, trailheads, parking areas, or recreationists in accordance with FAA regulations.

Reclamation

1. 3150 Manual. The Project Design Features of the approved NOI are considered met if there is evidence that the disturbed area is stable and that vegetation is or will become established to the same degree as the immediately adjacent area. Vegetation establishment normally takes two years or longer following reseeding. While BLM is waiting for vegetation to become established, bond liability is not released. A letter to the operator explaining the reason for the delay in bond release will be sent. If reclamation is inadequate the operators bond should not be attached until all attempts to notify them of the need to correct a deficiency is exhausted.
2. Seed mixture. The BLM will provide the operator with an approved seed mixture prior to the commencement of reseeding activities.
3. Reclamation locations. The locations for reclamation efforts will be discussed and agreed upon between the BLM and the operator during or after the completion of the project.

Rights-of-Way Protection

1. Offset from rights-of-way. Shot holes shall be offset at industry accepted distances from rights-of-way, as set forth by the International Association of Geophysical Contractors to avoid disturbance to utility, access road, canal/drainage, and other land and realty features.

Sanitation, Clean-up and Rehabilitation Requirements

1. Cleanup scheduling. The project clean-up phase shall proceed concurrently with the recording phase. Equipment, pin flags, lathe, flagging, trash and any other materials brought in by the seismic crews shall be removed as the recording crew works through the project area.
2. Proper trash disposal. Trash shall not be burned or buried. Trash shall be packed out and disposed of properly at a Wyoming DEQ approved disposal site. No explosives boxes or prima cord reels shall be left in the field nor may they be burned on federal lands.
3. Staging area trash disposal. Storage containers are required for all refuse or garbage that may contain attractants. At staging areas, litter containers (for non-attractant litter) with functional, protective lids from wind shall be in use at all times. Litter shall be placed in containers immediately and not left on the ground to be policed at a later time.
4. Sewage disposal. Self-contained portable sewage disposal units shall be provided and used at staging areas. Contents of these units shall be disposed of at appropriate facilities. Away from staging areas, individuals shall bury human waste in holes six to eight inches deep.

Soils Protection

1. Offset from bodies of water:
 - a. Drilling, off-road vehicular use, or any other surface disturbing activity is prohibited within 150 feet of the high water mark of any perennial body of water on federal lands to minimize impacts to soils in areas with high water erosion potential.
 - b. Drilling of shot holes in or within 25 feet of intermittent and ephemeral channels shall be avoided.
 - c. Channels having banks two feet or greater will not be crossed.
 - d. Washes or alluvial valleys will not be crossed when wet.
2. ORV slope restrictions. No off-road vehicle use will be permitted on slopes greater than 30 percent (RMP guideline) or where terrain or soils dictate otherwise. Equipment deployment,

- pickup, troubleshooting, and other operations will be accomplished on foot and/or with helicopter support on slopes greater than 30%.
3. Offsetting ATV routes. Vehicle travel along shot point and receiver lines shall be limited to the minimum number of passes necessary to accomplish project objectives. Should multiple passes become necessary in any given area, vehicle travel paths shall be offset along seismic lines and access routes to minimize compaction.
 4. Suspension during wet weather. The applicant shall not conduct vehicle operations during periods of saturated ground conditions when surface rutting could occur. Operations will be suspended if the AO or his/her designated representative determines that weather conditions or soil/slope conditions may result in rutting beyond that analyzed in the EA document.
 5. Vehicles. The spinning of all vehicle wheels shall be avoided where possible to minimize the potential for soil displacement and impacts to soils.
 6. Dust abatement. If the need arises as a result of seismic traffic, as determined by the AO or his/her designated representative, water shall be applied to roads and staging areas to reduce fugitive dust resulting from vehicle traffic. Chemicals that may be damaging to existing plant life or subsequent efforts to rehabilitate disturbed areas, such as staging areas, will not be used.

Vegetation Protection

1. General vegetation:

- a. Vehicle pass limitations. Off-road vehicle travel along shot hole source lines, receiver lines, and access routes shall be limited to the minimum necessary to accomplish project objectives.
- b. Vehicle track offsets. Should more than one vehicle pass be necessary in any given area, vehicle paths shall be offset where practical to minimize impacts to vegetation.
- c. Discretionary authority to require helicopter support. The AO or his/her designated representative will have the discretionary authority to require helicopter drilling or helicopter support at any time as conditions dictate, in order to protect resources or provide for human health and safety.

2. Noxious plants//Invasive, non-native species:

- a. Equipment washing prior to entering project area. To prevent the introduction and spread of new weeds, all equipment, including on-road and off-road equipment, shall be thoroughly power-washed to remove weed seed and soil (that may contain weed seed) prior to transporting the equipment to the project area and commencing operations on public lands.

- b. Crew training. Crew members shall be provided with information, including photographs, on noxious weeds known or with potential to occur in the project area so they can identify and avoid areas of infestation.
 - c. Cleaning after weed contamination. Should crew members encounter existing noxious weeds within the project area; equipment and/or vehicles exposed to the weeds shall be cleaned using compressed air prior to entry into other areas.
 - d. Reclamation/reseeding. The applicant shall reclaim and reseed all off-road areas disturbed by geophysical operations as directed by the AO or his/her designated representative. Reclamation efforts may include disking or ripping the ground surface, reseeding and mulching. Best management practices will be used in the re-vegetation efforts to insure a higher success rate in problematic weed areas (i.e., south facing slopes and high wind and water erosion areas).
3. Trees and Timber:
- a. Tree avoidance. Shot holes and vehicle traffic shall be offset around individual trees and, where possible, entire tree stands, as these can sometimes occur in tight clusters.
 - b. Cutting of trees. Cutting of trees shall not be permitted.

Visual Impact Minimization Requirements

- 1. Offsetting off-road vehicle travel paths. Vehicle travel paths shall be offset to minimize visual as well as soil/water impacts. To the maximum extent feasible, the applicant shall offset side-by-side all off-road vehicle traffic (buggies and ATVs) over a 50-foot wide swath on either side of the staked seismic line, so that one vehicle does NOT drive the same path as another vehicle to prevent the creation of trails or two-track roads.
- 2. Maintaining visual quality of fences. When crossing fences, crews shall use gates whenever possible and shall notify the AO or his/her designated representative if fences need to be cut for access. All fence crossings where fences are cut shall be rebuilt and stretched back to original conditions immediately after crossing to minimize impacts to visuals and livestock containment.
- 3. Slope limitation for wheeled vehicles. In order to minimize visual impacts as well as to minimize impacts to soil/water, no off-road drill buggy or ORV operations will be conducted in areas containing slopes greater than thirty percent (30%).
- 4. Suspending operations during wet conditions. Use of roads, other than those adequately protected by an all weather surface, shall be prohibited when the road prism is wet to prevent visual impacts and impacts to soil/water caused by rutting and gullyng. Use of maintained roads may be necessary to move/evacuate personnel when wet, and if rutting in excess of that analyzed occurs, such roads will be rehabilitated as soon as practical thereafter. These conditions generally occur from late March to late June, but can occur at any time of the year.

The AO or his/her designated representative will temporarily suspend operations requiring ground-based vehicles when these conditions exist.

5. Rehabilitation. Roads or areas damaged by vehicle use shall be rehabilitated to minimize visual impacts in accordance with specifications established by the AO or his/her designated representative.
6. Drill hole cuttings. Hand raking of topsoil and the remaining cuttings at drill holes shall be conducted to minimize visual impacts as determined by the AO or his/her designated representative.
7. Raking of tracks. Driving of any wheeled vehicles in areas void of vegetation and having soils where tracks could be long-lasting (i.e. bentonite) shall be avoided, or the area hand-raked immediately after use to reduce the visual impact. Buggy drill operators shall approach open road and trail crossings at reduced angles to make tracks less noticeable to recreationists. When deemed necessary by the AO or his/her designated representative, all visible vehicle tracks departing from existing roads shall be raked out to the original contour to disguise the seismic lines and discourage use by off-road vehicles (ORVs).
8. Signing/barricading line entry points. In order to discourage the future use of seismic lines for unauthorized ORV/ATV travel, signs and barricades shall be placed at access points to seismic lines as deemed necessary by the AO or his/her designated representative. Natural barriers such as rocks and/or dead vegetation will also be used to the extent available in place of signs and/or artificial barriers.

Wastes (Hazardous or Solid) Requirements/Reporting

1. Storage. Storage of fuel and lubricants shall be temporarily stored in transportable containment trailers at locations within staging areas to minimize potential for accidental releases/spills.
2. Hazardous waste spills. Major hazardous waste spills shall be reported immediately to the AO or his/her designated representative, and the applicant shall clean up spills in accordance with all applicable regulatory guidelines and as outlined in the applicant's Emergency Response/Contingency Plan, which is on file with the BLM.
3. Minor spills. All spills or leaks of diesel fuel, hydraulic fluid, lubricating oil, and coolant, including contaminated soil material, shall be excavated to an appropriate container and transported to an approved disposal site.
4. Site cleanup. The applicant shall clean up all project lath, flagging, solid waste, and incidental trash as operations proceed through an area. The collected trash shall be hauled to a WDEQ approved disposal site.

Water Quality Protection - Ground Water

1. Shot hole offset distance. Shot holes shall be located a minimum of one-quarter (1/4) mile away from any water well, flowing spring, reservoir or stock water pipeline regardless of ownership, in accordance with Wyoming Oil and Gas Conservation Commission (WOGCC) guidelines [Chapter 4, Section 6(r)(i)], unless written consent to encroach closer is obtained from the affected surface owner.

BLM has given permission to reduce this setback to 500 feet for water wells and springs and 100 feet for dams on federal lands.

2. Shot hole plugging. All shot holes shall be plugged in accordance with WOGCC rules and regulations, in order to prevent the potential interchange of surface and ground water.
3. Vibroseis offset distance. Vibroseis sites will be at least 200 feet from springs and water wells.
4. Vibroseis offset distance. Vibroseis sites will be at least 50 feet from dams.

Water Quality Protection - Surface Water

1. Shot hole offset distance. Surface-disturbing activities (i.e., shot hole drilling or ground vehicle use) shall not be conducted within 150 feet of the ordinary high water mark of live waters.
2. Stream crossings. All vehicle stream crossings will be designated and approved by the AO or his/her designated representative prior to use. All stream crossings will be selected to minimize streambed and bank damage.
3. Crossing washes. Washes or alluvial valleys shall not be crossed if water is visible in the channel.
4. Water sources. Water shall be collected from the closest approved source as needed, as approved by the appropriate onsite designated agency representative.
5. Vibroseis offset distance. Vibroseis sites will be at least 200 feet from springs and water wells.
6. Shot hole offset distance. Shot holes shall be located a minimum of 100 feet from dams.
7. Vibroseis offset distance. Vibroseis sites will be at least 50 feet from dams.

Wildlife Protection Requirements

1. Compliance with wildlife laws. The applicant shall observe all applicable wildlife restrictions. The applicant's crew members shall not harass, injure, or destroy wildlife within the project

- area. The applicant is responsible for ensuring that all crew members on duty adhere to all wildlife laws.
2. Helicopters and wildlife (also see helicopter section):
 - a. Wildlife disturbance. Helicopters shall not harass or disturb wildlife species to the maximum extent possible. This means helicopter pilots shall not go out of their way to observe or photograph wildlife; helicopter pilots shall take deliberate evasive action to avoid wildlife when observed, even if the possibility of disturbance is minimal.
 - b. Helicopter coordination. Helicopter landing, loading, and staging areas, as well as flight lines, shall be coordinated with the AO or his/her designated representative to insure public safety and to minimize wildlife disturbance prior to use.
 - c. Flight hours. All geophysical exploration operations using helicopters shall be limited to the time period from 1 hour after sunrise to 1 hour before sunset to minimize disturbance to wildlife and humans. The excluded crepuscular hours represent important wildlife activity periods.
 3. Raptor nests. No vehicle activities shall occur within 220 feet (1 receiver station) of an occupied raptor nest, and helicopters shall avoid direct over flights of unoccupied raptor nests to protect their structural integrity. No vehicle, drilling, or helicopter activities shall be conducted within three quarter (3/4) mile or the visual horizon (whichever is closer) of active nests during the July 1 to July 31 time period, in accordance with CRA RMP ROD (Raptor Decisions). Flights shall be rerouted around nest sites if they were occupied. The applicant shall have surveys conducted by qualified biologists to determine the status of nests present within the project area prior to conducting any ground or aerial activities within three quarter mile of any nest location during the restricted period.
 4. Sagebrush protection. To protect wildlife cover, vehicle routes shall, to the maximum extent practicable, avoid stands of tall sagebrush. Responsibility for this avoidance falls primarily on the survey crew. Stands of tall sagebrush are defined as areas in which the majority (more than 50%) of sagebrush plants are 18 inches or taller. Where sagebrush cannot be avoided the staggered formation for vehicles is preferred.
 5. Mountain plover/long-billed curlew nesting/brood rearing habitat. No geophysical exploration operations shall be conducted within one-quarter (1/4) mile of any active nests during the nesting season from April 10 through July 10. Should activities in suitable mountain plover/long-billed curlew habitat occur prior to July 10, the applicant shall have field surveys conducted by a qualified biologist, as necessary, to identify active nests for avoidance.
 6. Prairie dog protection. Shot holes shall not be drilled within 50 feet of known prairie dog burrow locations or within active colonies.

7. Sage grouse. Surface use is prohibited within a 2-mile radius of sage grouse leks from February 1 through July 31; as mapped on the Cody Field Office GIS database in order to protect sage and sharp tailed grouse nesting sites.
8. Burrowing owl. To protect important burrowing owl nesting habitat, activity or surface use will not be allowed from April 15 to August 15 within ¼ mile of active burrows.
9. Exception, waiver, or modification. Exception, waiver, or modification of limitations in any year may be approved in writing including documented supporting analysis, by the AO.
10. Timing restriction exceptions. If the proponent wishes to conduct surveys to verify presence or absence of wildlife species protected by timing stipulations; timing stipulations may be waived if the species is not present in the project area, as verified by the surveys.

Wild Horse Protection Requirements

1. Compliance with the Wild Horse and Burro Act. The applicant shall observe all applicable wild horse restrictions. The applicant's crew members shall not harass, injure, or destroy wild horses within the project area. The applicant is responsible for ensuring that all crewmembers on duty adhere to all wild horse laws, acts, or stipulations. Wild horses are federally protected and citations will be issued as appropriate.
2. Avoidance. Low-level flights over horses are prohibited unless absolutely necessary (eg., safety, accidents, etc.); the AO or his/her designated representative will be notified immediately of this type of incident. The pilot should allow for a minimum ½ mile buffer from helicopter to horse. If the helicopter causes the horses to run, the buffer may be increased. Helicopter flights are allowed only in the project area and outside the HMA (also see the Helicopter Operation Requirements).
3. Aerial operations. Aerial operations will be conducted in a manner that will minimize stress levels. Avoid unnecessary displacement and agitation of the horses and potential separation of small foals from their mares. Overall avoidance of the horse bands is the key.
4. When helicopter use is not appropriate. If helicopter activities are found incompatible with wild horses, use of foot, truck, or ATV may be substituted.
5. Helicopter flights. Helicopter flights will not begin until after July 15th, which is the nationally recognized end of the foaling season. However, this specific HMA may still have foaling mares.

APPENDIX C

Key Issues and Concerns Identified During the Scoping Period

KEY ISSUES AND CONCERNS IDENTIFIED DURING THE SCOPING PERIOD

ISSUE	BRIEF DESCRIPTION OF ISSUE	WHERE IS ISSUE ADDRESSED IN EA
Comments by Specific Resource Component		
Air Quality	Consider air, light, noise and water pollution	Chapter 3, Section 3.2.1; Appendix B
Cultural and Paleontological Resources	Potential impact to the Bridger Trail	Chapter 3, Section 3.3.1; Chapter 4, Section 4.2.1; Appendix B
	Protection of prehistoric cultural sites and artifacts	Chapter 3, Section 3.3.1; Chapter 4, Section 4.2.1; Appendix B
	Minimize damage to Willwood Formation	Chapter 3, Section 3.3.1; Chapter 4, Section 4.2.1; Appendix B
Fisheries	Potential impacts to native fish species	Not addressed as native fish species will not be impacted by project related activities
Geology and Minerals	No specific issues identified	Not applicable
Range Management	Interruption of livestock grazing	Chapter 3, Section 3.5.1; Chapter 4, Section 4.4.1; Appendix B
Invasive, Non-Native Species	Introduction and spread of weeds	Chapter 3, Section 3.5.2; Chapter 4, Section 4.4.2; Appendix B
Public Health and Safety	Increase awareness of hazards to the public	Chapter 2, Section 2.2.2.1; Appendix B
	Maintain safe working conditions in storage areas, particularly fuel storage	Chapter 2, Section 2.2.2.2; Appendix B
	Potential contamination from human waste	Appendix B
	Use of explosives	Chapter 2, Section 2.2.2.1; Appendix B
Recreation	Consider SRP/touring groups - give them alternative routes during geophysical activities	Outside the scope of this document
	Consider a study of recreation money verses oil and gas royalties	Outside the scope of this document
	Effects on hikers, mountain bikers and wild horse viewers during this tourist season	Chapter 3, Section 3.6; Chapter 4, Section 4.5; Appendix B
	Effects on area tourism	Outside the scope of this document
Soils	Minimize or do not allow damage to fragile soils	Chapter 3, Section 3.7; Chapter 4, Section 4.6; Appendix B
	Minimize impacts to soils from creation of new roads and two-track trails	Chapter 2, Section 2.2.7; Chapter 4, Section 4.4.1; Appendix B
	Potential contamination from equipment (oil/hydraulic) fluids	Appendix B
	Use wooden geo-mats for roads in sensitive soils	Not practical and outside the scope of this document
Vegetation	Consider reseeding all roads and two-track trails when done	Appendix B
Visual Resources	Effects of geophysical activity on open spaces and the aesthetics of the area	Chapter 3, Section 3.2.3
	Impacts in a Class II VRM area	Chapter 3, Section 3.2.3
	Potential impacts to the visual integrity of the area	Chapter 3, Section 3.2.3
Water Quality	Consider air, light, noise and water pollution	Chapter 3, Sections 3.2.1 and 3.2.4; Appendix B
	Potential contamination of surface water sources	Chapter 3, Section 3.2.4; Appendix B
Wetland/Riparian Habitat	Potential impacts to riparian areas	Chapter 3, Section 3.2.5; Appendix B

KEY ISSUES AND CONCERNS IDENTIFIED DURING THE SCOPING PERIOD

ISSUE	BRIEF DESCRIPTION OF ISSUE	WHERE IS ISSUE ADDRESSED IN EA
Comments by Specific Resource Component- Continued		
Wetland/Riparian Habitat	Potential impacts to water sources including ephemeral drainages	Chapter 3, Section 3.2.5; Appendix B
Wilderness Study Area	No seismic exploration in the McCullough Peaks WSA	Chapter 3, Section 3.2.6
	Maintain the wilderness characteristics of the McCullough Peaks WSA	Chapter 3, Section 3.2.6
Wild Horses	Consider cleaning and filling existing earthen reservoirs in the project areas	Chapter 2, Section 2.4.1; Chapter 4, Section 4.8.1
	Create buffer area/zones around foaling and rearing areas (i.e., safe zone)	N/A: Intensive geophysical activities will not be conducted during the foaling season
	Potential impacts to wild horse habitat and loss thereof	Chapter 4, Section 4.8
	Potential impacts to pregnant mares during foaling season	N/A: Intensive geophysical activities will not be conducted during the foaling season
	Potential for injury to or death of wild horses	Appendix B
	Provide alternate water sources during geophysical operations	Chapter 2, Section 2.4.1; Chapter 4, Section 4.8.1
	Restrict commercial wild horse tours during geophysical activities	Separate action – outside the scope of this document
	Consider addressing appropriate AML with the loss of habitat as a result of this project	Outside the scope of this document
Wildlife	Effects of geophysical activities on sage grouse breeding and nesting	Chapter 4, Section 4.9.1.2
	Potential for habitat fragmentation	N/A: no surface disturbance = no habitat fragmentation
	Potential impacts to big game parturition	N/A: intensive geophysical activities will not be conducted during the foaling season
	Potential impacts to pronghorn habitat including winter range	N/A: no mapped crucial big game winter range in the RP3DSS project area
	Potential impacts to migratory birds	Chapter 4, Section 4.9.1.3
	Potential impacts to nesting raptors	Chapter 4, Section 4.9.1.1; Appendix B
Non-Specific Comments		
BMP's and Mitigation	BLM should ensure enforcement of/compliance with BMP's, stipulations and mitigation measures	Appendix B
	Use USDA/USFS BMP's	Appendix B
BCA Proposed Wilderness Area	Potential Impacts to Wilderness (Study) Area proposed by BCA	Chapter 3, Section 3.2.7
Geophysical Activity	Do not allow seismic activity in this area	Outside the scope of this document
Oil/Gas Drilling	Impacts of drilling on McCullough Peaks area and wild horses	No oil/gas drilling proposed - outside the scope of this document
	Require directional drilling from a single well pad	No oil/gas drilling proposed - outside the scope of this document
Renewable Energy	Consider renewable energy instead of oil and gas exploration	Outside the scope of this document
Survey/Pre-work	Explain casual use and the Cody Field Office's interpretation of casual use	See definitions contained in 43 CFR § 3150.0-5

APPENDIX D

Descriptive Photographs of Various Project Components



Photo #1: Typical vibrator buggy in operation.



Photo #2: Vibrator buggies working in a staggered formation.



Photo #3: Vibrator buggies working.



Photo #4: Vibrator buggies working in formation - notice light tracks behind.



Photo #5: Vibroseis source generation activities – sagebrush crushing after one pass.



Photo #6: Buggy drill moving down existing two-track trail.



Photo #7: Typical buggy drill.



Photo #8: Heli-portable drilling equipment at staging area.



Photo #9: Aerial delivery of heli-portable drills to shot point.



Photo #10: Self-leveling portable drill rig with "lip" for stabilization.

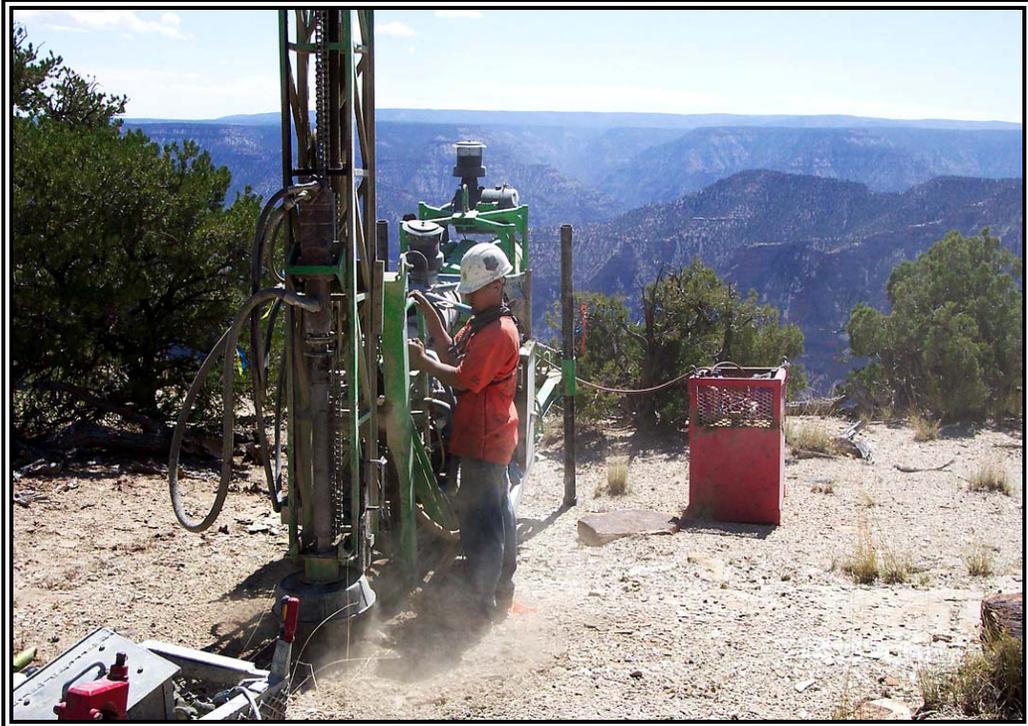
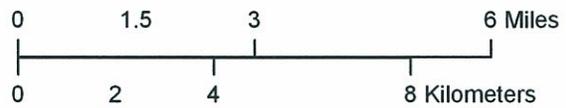
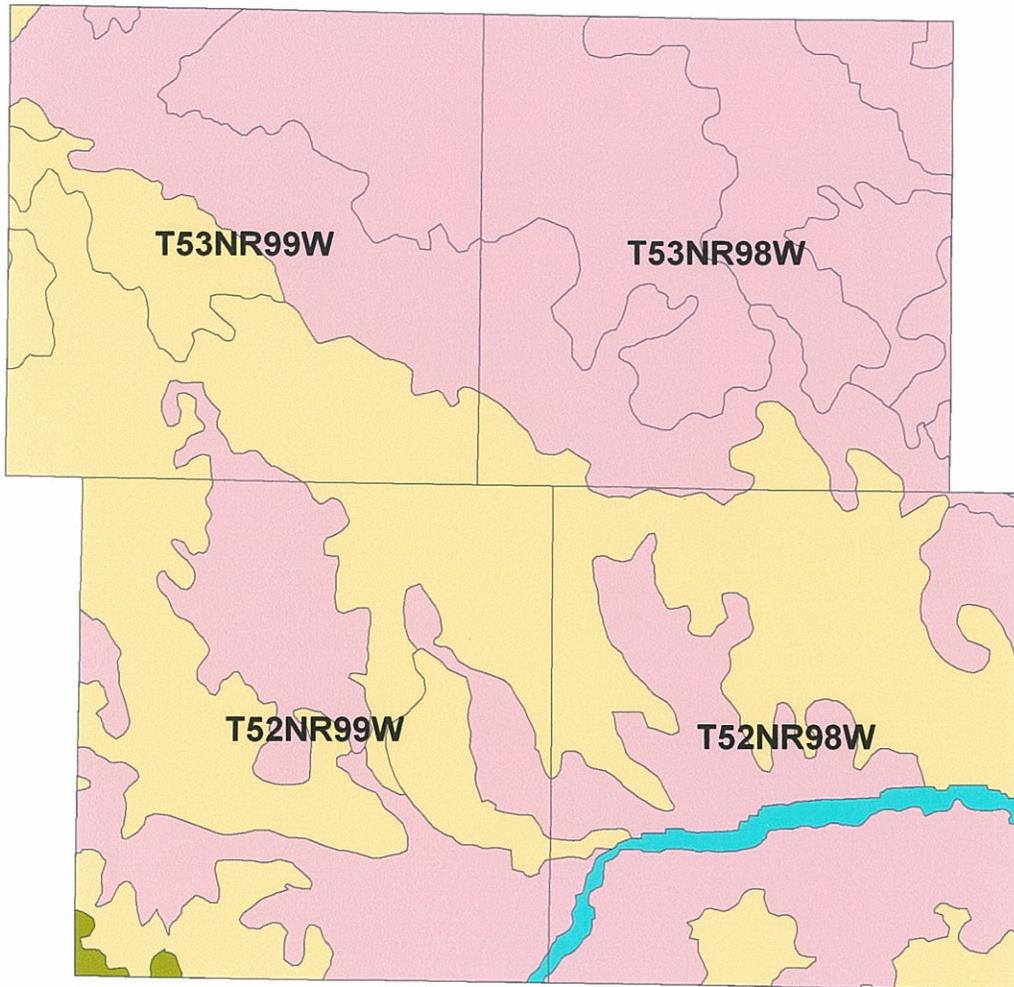
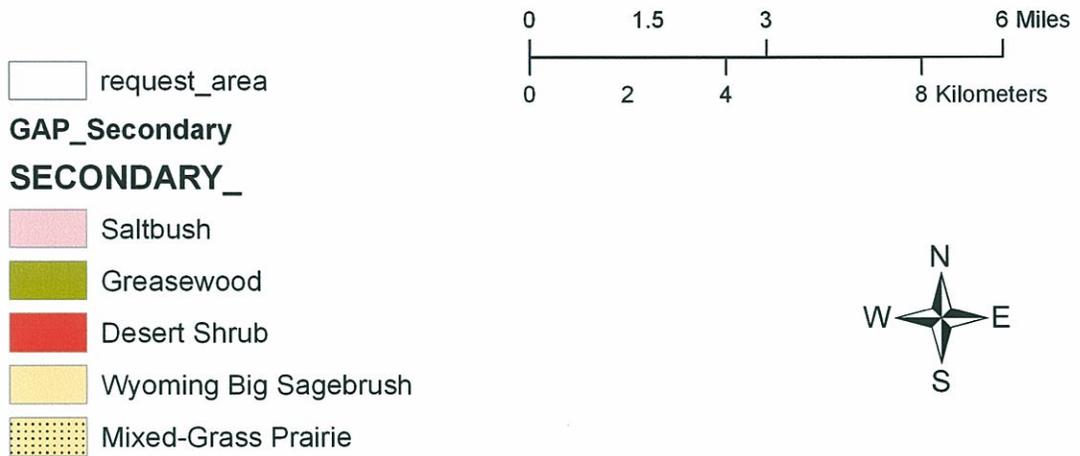
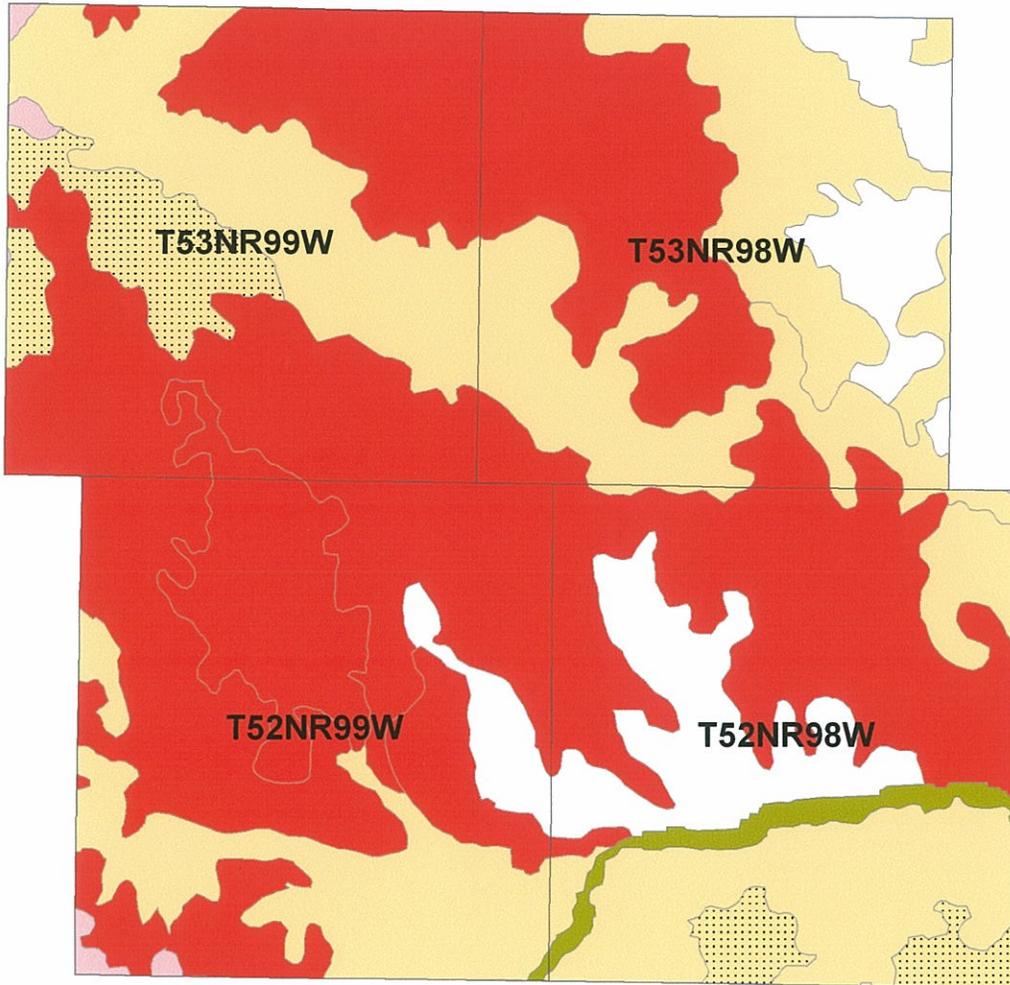


Photo #11: Portable drilling operations underway.

APPENDIX E

Wyoming GAP Analysis Cover Types for the Project Area





APPENDIX F

Monitoring Plan

MONITORING PLAN

Bill Barrett Corporation Red Point 3-D Seismic Survey Project

Overview and Administration

Monitoring is conducted to ensure that mitigative/protective measures discussed and analyzed in the Environmental Assessment (EA) as part of the proposed action (e.g., project design features, stipulations and/or terms and conditions of NOI approval) are implemented in the field.

Monitoring is also helpful for the project proponent, in that it will allow for on-site communication with the BLM on a regular basis should questions arise concerning the practical application of the mitigative/protective measures.

Agency representatives (CYFO-BLM), would inspect a portion of receiver lines, source lines and access routes during all phases of the project (including geophone placement, shot hole drilling and subsequent source acquisition). They would also monitor staging areas, helicopter use, wheeled vehicle use, vibroseis use, safety procedures, and other aspects of the operation (sanitation, communications, etc.).

The following monitoring measures will be undertaken as a framework for compliance during the seismic project:

1. At least one BLM designated representative will perform monitoring duties during work hours each day, seven days a week during operations until project completion and rehabilitation is completed.
2. Monitoring will be at the discretion of the Authorized Officer (AO) based on project status and resource risk.
3. While performing monitoring duties, each BLM designated representative will retain a copy of the NOI with the mitigative/protective measures. A copy of the Project Design Features from the EA will also be required during monitoring.
4. Each employee performing monitoring will write a monitoring report for the administrative file, for each day they monitor. The report should describe daily observations, problems, solutions, and any other items of note.
5. A BLM uniform will be worn by the BLM designated representative while performing field monitoring.

Monitoring Goals

Goals of project monitoring are geared towards:

- 1) operator compliance,
- 2) protection of public land resources, and
- 3) the improvement of future decision making.

Monitoring will also serve to foster innovative approaches for the resolution of operational issues should any develop during geophysical operations.

Goals are as follows:

1. Adequate communication, coordination and immediate correction of any unacceptable performance during seismic operations.
2. The agency representative will be familiar with the seismic project manager, permit agent and/or company representative. They will also have knowledge of the project area, access roads, restricted areas, and potential problem areas by requiring a brief on-the-ground tour of the project area prior to the start of operations.
3. The agency representatives should be in attendance and participate in planning/safety meetings during project operations.
4. The agency representatives should follow the same rules (terms and conditions of the NOI) as the operator.
5. Key road/line crossings and other key resource issues will be photographed; before and after.
6. Particular attention will be paid to the interaction between project helicopters and wild horse behavior.