

# Environmental Assessment Wyo-Ben, Inc. Bear Creek Plan of Operations Modification (WYW-153897) – Pit 176G Extension and Update to WDEQ Permit 321C for Bentonite Mining

*Location:* T. 53 N., R. 93 W., Section 14

*Applicant/Address:* Wyo-Ben, Inc., P.O. Box 1072, Greybull, Wyoming 82426



Wind River/Bighorn Basin District, Cody Field Office, Wyoming



October 2010

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**BLM/WY/PL-11/002+1330**

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## 1.0 INTRODUCTION

### **1.1 Background**

The BLM has received a Plan of Operations Modification/Update (WYW-153897) from Wyo-Ben, Inc., seeking approval to expand their mining operations located five miles northeast of Greybull, Wyoming. Prior to submitting the Plan Modification, Wyo-Ben, Inc. drilled exploratory holes (under a Notice of exploratory drilling for bentonite) and collected baseline data on vegetation, wildlife, soils, overburden, and hydrology. This Plan Modification would add a total of five acres of disturbance to their existing Wyoming Department of Environmental Quality – Land Quality Division (WDEQ-LQD) Permit 321C located in Big Horn County, Wyoming, over the life of the operation (see map 1). The five acres of proposed mining would all be located completely on BLM-managed federal land in the Cody Field Office area. On public land, new bentonite mining is proposed on the unpatented Fir 60 and Fir 61 claims within an amended WDEQ State Permit 321C mine area.

Wyo-Ben, Inc. was first issued Permit 321C by the WDEQ-LQD in 1974. Since that time, numerous amendments and updates to the permit have been approved by the WDEQ-LQD. Wyo-Ben, Inc. has currently disturbed about 6,670 acres of land in the Bighorn Basin. NEPA analyses have been conducted whenever public lands were proposed for new mining since 1981.

### **1.2 Purpose and Need**

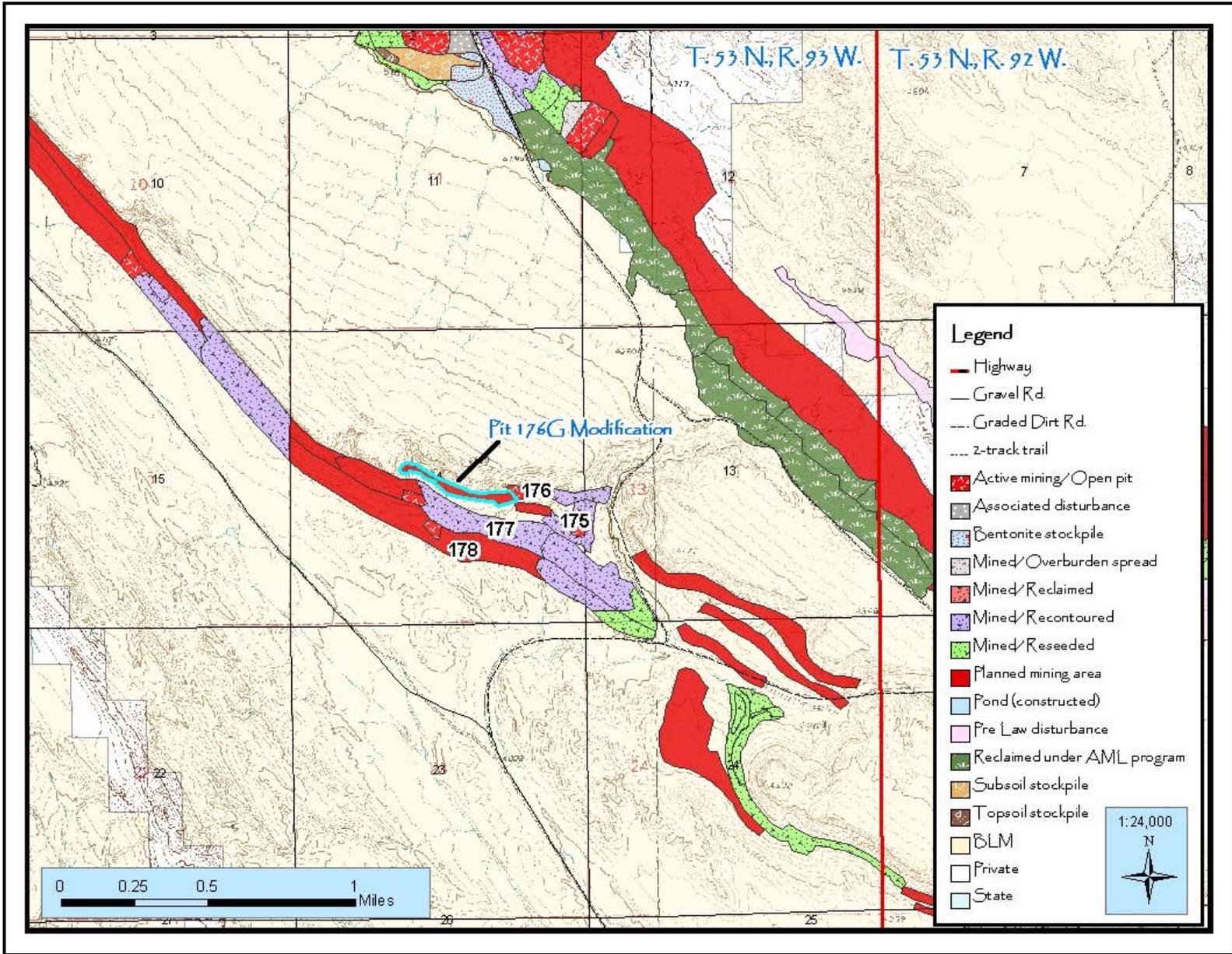
The Federal Land Policy and Management Act of 1976 (43 USC 1732) requires the Secretary to prevent unnecessary or undue degradation of the public lands from operations conducted under the Mining Laws (1872), as amended. BLM regulations at 43 CFR 3809 were developed to prevent unnecessary or undue degradation, and require that claimants/operators mining on public (BLM) lands submit a Plan of Operations, post a reclamation bond with the State of Wyoming and the BLM, obtain approval prior to conducting operations, and adhere to the performance standards described in 43 CFR 3809.420.

Wyo-Ben, Inc. has submitted a Plan of Operations Modification to their original mine plan seeking approval to expand their bentonite mining operations. In accordance with the rights of entry and use under the Mining Laws as amended, and the requirements in the regulations at 43 CFR 3809, the BLM must review the Plan of Operations to determine whether it is adequate to prevent unnecessary or undue degradation.

### ***Decision to be Made***

The Authorized Officer (AO), in this case the BLM-Cody Field Manager, must determine whether or not the Proposed Action with attached stipulations, mitigation and monitoring measures, could result in significant impact to the human environment. If not, this determination would be documented in a “Finding of No Significant Impact” (FONSI) as a part of the EA. If impacts are determined to be significant, preparation of an acceptable Environmental Impact Statement would be necessary, prior to Plan Modification approval.

- (1) Approve the Plan of Operations Modification as submitted, with necessary stipulations, mitigation and monitoring measures determined during review;
- (2) Disapprove/withhold approval of the Plan of Operations Modification because it would result in unnecessary or undue degradation.



**Map 1. Wyo-Ben, Inc.'s Pit 176G Modification area (red polygon with blue outline).**

### **1.3 Issues identified during scoping**

Issues identified during the scoping process include the following:

- 1) Air quality could be affected by the dust and exhaust generated by the burning of fossil fuels associated with bentonite mining.
- 2) Bentonite mining could increase sedimentation, bentonite and water run-off into surface and ground water as well as into wetlands, riparian areas, floodplains, and aquatic habitats.
- 3) Area soils took thousands of years to develop and would be disturbed by the proposed mining.
- 4) Revegetating areas disturbed by mining would be difficult due to changes in post-mining soil characteristics, the area's dry climate, and the presence of invasive weeds.
- 5) Potential spreading of invasive weed species through the proposed mining process.
- 6) A raptor nest is present in the area and nesting success could be affected by the proposed mining disturbance.
- 7) The disturbance caused by the proposed bentonite mining would potentially affect suitable habitat for mountain plover and Migratory Birds of High Federal Interest.
- 8) Bentonite mining would affect wildlife habitat and use in the proposed mining area.
- 9) Bentonite mining would increase the number of roads into the proposed mining area.
- 10) Allotment boundary fences exist in the proposed Modification area, and would need to be maintained and kept in operating condition or trespass livestock issues may evolve.

### **1.4 Relationship to Statutes, Regulations, Policies, Plans or Other Environmental Analyses**

This Plan of Operations Modification has been reviewed to determine if the Proposed Action conforms with the approved Cody Resource Management Plan (RMP)/Land Use Plan relative to locatable minerals actions, as required by 43 CFR 1610.5. The Cody RMP provides that, except for specific areas identified as closed, the planning area is open to staking of mining claims and operation of the mining laws for locatable minerals (pg. 21, Record of Decision (ROD)/RMP). The area proposed for new mining under this Plan Modification has not been withdrawn from mineral entry, and is therefore open to mining claim location, and subsequent mineral development, after proper review and approval. The Proposed Action is in conformance with the Cody RMP ROD, signed November 8, 1990.

The No Action alternative (Alternative I) would not be in conformance relative to the mining laws, and would require amendment of the Cody RMP. The BLM is required under the mining laws, and regulations at 43 CFR 3809, to review mining Plans of Operation for compliance with the surface management regulations, and to ensure that the mining plan will not cause unnecessary and undue degradation. (*Mining laws* means the Lode Law of July 26, 1866, as amended (14 Stat. 251); the Placer Law of July 9, 1870, as amended (16 Stat. 217); and the Mining Law of May 10, 1872, as amended (17 Stat. 91); as well as all laws supplementing and amending those laws, including the Building Stone Act of August 4, 1892, as amended (27 Stat. 348); the Saline Placer Act of January 31, 1901 (31 Stat. 745); the Surface Resources Act of 1955 (30 U.S.C. 611–614); and the Federal Land Policy and Management Act of 1976 (43 U.S.C. 1701 *et seq.*)).

On April 17, 2007, Wyoming BLM Instruction Memorandum No. WY-2007-018 was issued entitled "Resource Management Plan (RMP) Maintenance Action: Incorporation of the Bureau of Land Management's (BLM) Programmatic Biological Evaluation (BE) for the Mountain Plover (*Charadrius montanus*) and the United States Fish and Wildlife Service (FWS) Inter-agency Coordination Memorandum into Field Office (FO) Resource Management Plans (RMPs) by Maintenance Action". This IM conveyed the FWS Memorandum on mountain plover conservation measures, as well as the BLM Wyoming Programmatic Biological Evaluation of the Mountain Plover, and applies to the existing Cody ROD dated November 1990.

The Wyoming Department of Environmental Quality-Land Quality Division (WDEQ-LQD) administers and enforces all state statutes and regulations on land disturbances dealing with mining and reclamation within Wyoming. The WDEQ-LQD has the authority to require permitting and licensing of all operator actions of surface mines. Each mine and mine/permit area is required by statute and regulation to be covered by a reclamation bond in the event the operator is unable to fulfill reclamation requirements. Wyo-Ben, Inc. is covered by such a bond, which is reviewed annually by the WDEQ-LQD and the BLM to ensure it is adequate to cover reclamation of all mining disturbance. The WDEQ-LQD's authority derives from the Wyoming Environmental Quality Act. The WDEQ-LQD permits non-coal mines under the LQD Non-Coal regulations which are related to Article 4 of the Wyoming Environmental Quality Act (W.S. 35-11-401 through 437).

If implementation of the proposed action would result in the placement of fill or dredge material in a pond, wet meadow, stream channel, or any other water feature (livestock reservoirs and pits excluded), Wyo-Ben, Inc. would coordinate with the U.S. Army Corps of Engineers (COE) to determine if the feature is a "jurisdictional" wetland or a "Water of the U.S." and whether a Clean Water Act (CWA) Section 404 Permit would be needed. The WDEQ-WQD is responsible for administering Section 401 of the CWA in the State of Wyoming. According to Federal and State law, activities that will result in surface disturbance in excess of 1-acre, require a Storm Water Discharge Permit (SWDP), and associated Storm Water Pollution Prevention Plan (SWPPP) from the State of Wyoming. The mining plans analyzed in this EA propose to disturb more than one acre, and therefore the project proponent (Wyo-Ben, Inc.) coordinated with the WDEQ-WQD, to obtain the necessary SWDP(s) and associated SWPPP(s), and comply with their provisions.

## **2.0 PROPOSED ACTION AND ALTERNATIVES**

### **2.1 Alternative I – No Action**

The No Action alternative would be that the BLM would not review or approve Wyo-Ben, Inc.'s Bear Creek Plan of Operations Modification – Pit 176G Extension. Wyo-Ben, Inc.'s proposed new mining in the proposed area would not be approved, no mining would occur, and impacts to resources would stay as current condition. This alternative would result in non-conformance with the Cody RMP and 43 CFR 3809 regulations.

### **2.2. Alternative II – Proposed Action**

#### **(1) Operator Information (as per 43 CR 3809.401(b)(1)):**

The operator for the proposed Plan of Operations Modification is Wyo-Ben, Inc.

#### **(2) Description of operations (as per 43 CFR 3809.401(b)(2)):**

The mining activity proposed with this Modification consists of one proposed pit sequence, the Canadian Bed, and would begin immediately with the approval of the Modification. The average mining depth for this bed would be 30 feet. It is anticipated that mining of all pits and reclamation of associated disturbances would be completed through seeding within five years of commencement. Reclamation success leading to bond release by WDEQ, along with BLM consensus, could possibly take up to fifteen years or longer, depending on many factors. Companies are eligible for bond release five years after reclamation is complete. Table 1 includes a listing of projected legal descriptions and disturbance acreages for each proposed pit sequence (see also map 1). All topsoil and subsoil would be salvaged and stored to preserve biological integrity.

**Table 1. Projected Disturbance Location and Acreage.**

<b>PIT NO./SEQUENCE</b>	<b>LOCATION</b>	<b>ACREAGE</b>
176G Canadian Bed	T. 53 N., R. 93 W., Sec. 14	5.0
Total Proposed Pit Disturbance		5.0

Bentonite mining under the proposed Modification would use the castback/highwall reduction method. Figure 1 (below) shows a model of the castback system. In this process, topsoil and subsoil would be first separately removed in areas of planned disturbance and then stockpiled in an area free of possible contaminants, including bentonite and overburden. Overburden from the first open pit (phase 1) of a pit sequence would usually be piled and contoured adjacent to the first open hole (sometimes referred to as an out-of-pit overburden stockpile or OOPS). Once the bentonite would be removed from phase 1, overburden (minus the topsoil and subsoil which have already been removed and stockpiled) from the next open pit of the sequence (phase 2) would be cast into the open hole of phase 1. Reclamation takes place concurrently; after backfilling, the pit would be recontoured, topsoiled, and seeded. This process would repeat itself until the end of the pit sequence.

Bentonite usually initiates at the outcrop and progresses down dip to some economical depth or to a point where the seam disappears. Economical depth would be determined by stripping ratios and equipment cost. When the overburden becomes too hard, dozers would be used to break up the overburden through ripping. Once the overburden would be removed, the bentonite seam would be ripped and dried in place or picked up using scrapers and stockpiled on a nearby drying pad. After moisture content drops to about 20% of its in-place level, it would be hauled to the plant for processing.

After backfilling, the area would be recontoured to match, as much as possible, the original topographic contours. Then, the recontoured overburden would be prepared to receive the salvaged subsoil and topsoil. Once the sub and topsoils are spread and prepared, the disturbed area would be seeded as per the terms of the BLM and DEQ-LQD-approved reclamation plan.

If, at the end of a pit sequence, overburden would not be available from another phase of mining, material needed to fill the last hole would be acquired by reducing the highwall's steep grade, also known as a highwall reduction. A highwall reduction would be accomplished by removing top and subsoil adjacent to the last phase, and dozing the underlying material adjacent to the highwall into the open hole of the last phase. After contouring the last phase, soil would be spread over the area using both material from the highwall reduction area, and a partial amount of saved soil from two or three previous phases. The area of disturbance in the highwall reduction would be determined by the following three factors: the depth of the highwall of the last phase, the size of the phase, and the amount of swelling of overburden as it breaks up during mechanized removal from the previous phase. In general, a tall highwall would require more disturbance in the highwall reduction area. Similarly, larger pits would require a larger reduction disturbance.

Figure MP-2

### Cast Back Mining System

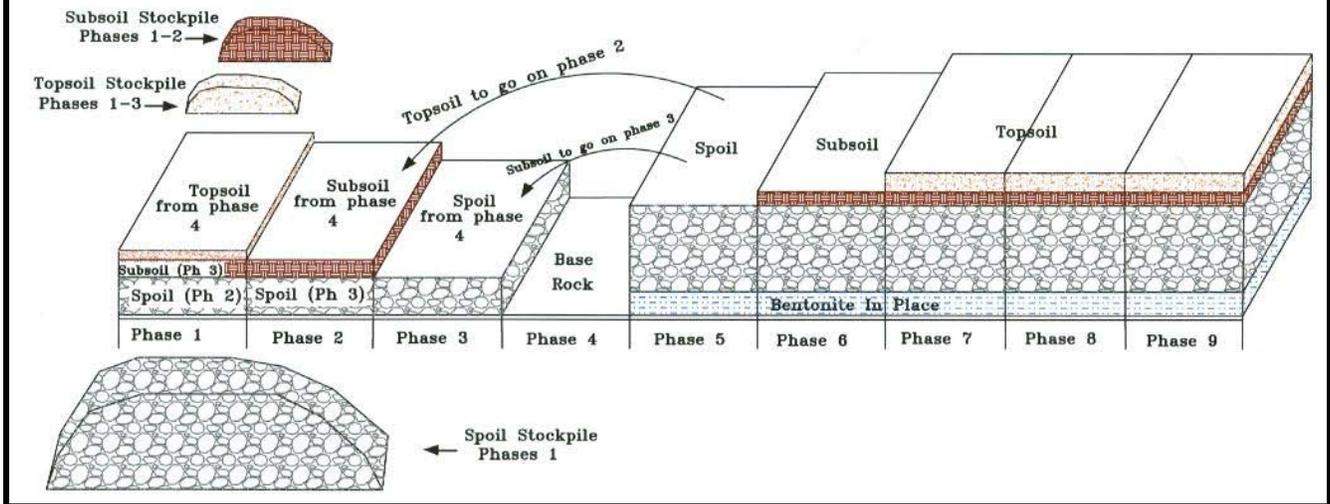


Figure 1. Schematic of a castback mining sequence. (Wyo-Ben, Inc.)

Finally, if the overburden in the next-to-last phase has a high swell factor, which is permanent, there would be more material to go into the last phase of mining. This opportunity, when present, would minimize the area of disturbance required for the highwall reduction. Wyo-Ben, Inc. intentionally does and for the proposed mining, would continue to reduce the size of its phases of mining as they progress through the pit sequence, so the last phase would usually be smaller than the first phases of mining. This would reduce the area that may be in need of overburden through the highwall reduction process.

Castback mining is a technique Wyo-Ben, Inc. would use, that is more beneficial than other techniques both environmentally and economically. The castback mining and highwall reduction processes provide ecological and economic pragmatism by promoting live topsoil distribution, as well as eliminating the need for long-distance transport of the original overburden from phase 1. In many cases this distance can exceed one mile.

Castback mining is more environmentally friendly when compared to traditional techniques because the disturbance footprint is substantially reduced and the spoil from one pit is immediately cast back into the previously mined out pit. This allows for more concurrent reclamation because “live” topsoil and subsoil placement is possible. With “live” placement, a source of microfauna and seed is available, thus the potential for reclamation success is greatly enhanced. When topsoil and subsoil are stockpiled for an extended period of time, seeds and microfauna die, the amount of organic matter decreases, and other chemical and physical soil changes occur, which degrade the topsoil’s ability to support desirable vegetation. Castback mining minimizes the need for topsoil and subsoil stockpiling. Wyo-Ben Inc.’s implementation of the castback method would be enhanced by decreasing active pit size as mining progresses, which would reduce the impact on the topsoil and subsoil resource. As well as salvaging top and subsoil, Wyo-Ben, Inc. would also salvage material below subsoil that is chemically and physically beneficial or neutral to vegetation establishment. This practice would allow them to put a buffer between the more detrimental spoil material and the top and subsoil, to increase the chance of establishing desirable vegetation.

In other already approved mine areas, due to various economic or physical factors Wyo-Ben, Inc. has not disturbed the entire area shown in the proposals. This results in fewer acres of surface disturbance than originally proposed. Also, the width of disturbance would be based on the geologic dip of the bentonite bed of interest. Steeply dipping beds usually result in a narrower pit than flatter-lying beds. When practical, Wyo-Ben, Inc. would leave mosaics of undisturbed lands within the proposed pit sequence or between adjacent pit sequences which would enhance reclamation efforts by serving as a seed source for the disturbed area, and would act to slow water runoff and reduce erosion and sedimentation. Equipment campsites would be located on lands to be affected by subsequent phases and would be moved onto contoured areas as mining progresses.

Table 2 lists specific volumes, disturbance acreages, number of castback phases, and projected mining dates for the proposed pit extension.

**Table 2. Projected Disturbance Acreage and Mining Dates.**

<b>Proposed Pits Beds No. of Phases</b>	<b>Projected Opening Date</b>	<b>Projected Ending Date</b>	<b>Approximate Disturbance Per Year</b>	<b>Average Overburden Per Phase</b>	<b>Proposed Disturbance Acreage</b>
176G Mowry Canadian Bed 11 Phases	2010	2014	1.0 Acres	11,000 cyd	5.0
Total Proposed Disturbance Area					5.0

Access to these pits would be provided by a small, existing spur road extending from Wyo-Ben Inc.'s existing Haul Road 55 into existing Pit 176G. The haul road through the proposed mine area would be constructed entirely within the proposed pit area, so no new land disturbance would result solely from haul roads. No culverts would be necessary for access through the extension area. Roads on public lands would be constructed according to BLM specifications.

Temporary hydrologic diversions would comply with WYDEQ-LQD Noncoal rules, Chapter 3, Section 2(e)(ii)(F) to allow passage of peak runoff from a 2 year, 6 hour precipitation event in a non-erosive manner. Permanent diversions would comply with WYDEQ-LQD Noncoal rules, Chapter 3, Section 2(e)(iv), in that they would have sufficient capacity for peak runoff from a 100 year, 6 hour precipitation event. If necessary, sediment control fabric fences would be installed at discharge points into natural channels. These structures would be moved periodically to accommodate active mining.

**(3) Reclamation Plan (as per 43 CFR 3809.401(b)(3):**

The reclamation/revegetation process would be designed to restore a mosaic vegetation scheme consisting of site specific dominance of various shrubs and grasses with a diverse species composition. Additional revegetation goals would include site stabilization/erosion control and visual aesthetics. Land use restoration goals would include wildlife habitat, livestock grazing, and ecosystem and watershed function. Vegetation would be reestablished on all pre-mine vegetated areas disturbed by construction, reconstruction or maintenance activities at the first available window of opportunity. This may mean waiting until the fall planting season to help ensure the success of vegetation establishment.

Reclamation backfill would be achieved during the castback mining process using variously sized Caterpillar tractor-scrappers depending on availability. Wyo-Ben, Inc.'s mining contractors typically use Caterpillar 631 and 637 tractor-scrappers. These would be supplemented with Caterpillar tractor-dozers ranging from D-8 to D-11 in size. The dozers would be used for backfilling, contouring, and drainage construction.

Final reclamation contours would be consistent with those necessary to reestablish the projected post-mining land use goals. Final slopes and surface contours would approximate pre-disturbance gradients and would blend with adjacent topography. Through drainage would be reestablished in all backfilled phases. Ephemeral channels that would be impacted by this proposed mining activity would be temporarily directed around open pits during active mining stages. Channel design for both temporary and permanent diversions would match pre-mine channel gradients and sinuosity and would be constructed to ensure a stable transition between native and reclaimed reaches. Temporary diversions would comply with Noncoal rules, section 2(e)(ii)(F) to allow passage of peak runoff from a 2 year, 6 hour precipitation event in a non-erosive manner. Permanent diversions (including reconstructed channels and adjacent topography) would comply with Noncoal rules, section 2(e)(iv), to be erosionally stable during the passage of the peak run-off from a 100 year, 6 hour precipitation event.

Reclamation backfill would follow the castback mining sequence illustrated in Figure 1. Following recontouring, all compacted surfaces would be ripped to improve water infiltration and retention. Subsoil and topsoil would be replaced from stockpiles or hauled directly during the castback mining sequence.

All available soil would be saved for reclamation during the initial stripping part of mining (approximately 3,000 cyds). Soils would be saved by one of two methods. Soils would be stockpiled with topsoil and subsoil being stockpiled separately and signed to distinguish the two qualities. Alternatively, soils would be spread directly on a previously backfilled and contoured phase of mining, behind the current phase, when a new phase of mining would be opened (spreading soils live or “live-spreading”). Due to the limited amount of topsoil in this area, subsoil would be saved separately from topsoil to allow a buffer between the topsoil and the more chemically detrimental spoil material. Replacing 18 inches or more of topsoil and subsoil results in the most reclamation success; anything less than 18 inches does not leave enough growth medium for plant roots.

Soils and overburden considered during testing to be potentially adverse to ground and/or surface water and plants would be managed to minimize their impact to the environment and potential rooting zones. This would include backfilling deleterious material above groundwater zones but well below the surface, to minimize the chance of any wicking, percolation, drainage, migration, or capillary draw.

Where necessary on initial pit cuts, out-of-pit spoil stockpiles would be contoured in-place and used for temporary bentonite and soil stockpile locations. Final reclamation of these areas would include deep-ripping, spreading topsoil/subsoil and seeding. Wyo-Ben, Inc. would comply with the reclamation requirements listed in WYDEQ-LQD Non-coal rules, Chapter 13, Section 3(a)(vi).

Seedbed preparations would include deep-ripping after soil replacement to break up the surface and loosen the soil. Additional surface manipulations such as deep parallel furrows or pitting may be used to enhance moisture harvesting capacities of the areas receiving seed. Seed mixtures would be broadcast seeded. In general, seeding would be conducted in the fall and early winter (prior to freeze-up) to take full advantage of fall, winter and spring moisture. Wyo-Ben, Inc. may attempt spring seeding on areas where live topsoil has been directly placed during winter months to reduce destruction of native species volunteering during the first growing season and prior to what would be the fall seeding period. Although no negative grazing impacts are anticipated on newly seeded areas, attempts would be made to coordinate timing of use with the grazing permittee if problems develop.

Reclamation of haul roads would be accomplished by contouring to restore drainage patterns, remove culverts, and blend with surrounding topography. These areas would then be deep-ripped, subsoiled/topsoiled and seeded.

Composition of the proposed seed mixture is detailed below.

<u>Seed Species</u>	<u>Rate-lb PLS/acre</u>
Gardner saltbush ( <i>Atriplex gardneri</i> )	5.0
Russian wildrye ( <i>Psathyrostachys juncea</i> )	3.5
Indian ricegrass ( <i>Oryzopsis hymenoides</i> )	2.0
Sandberg bluegrass ( <i>Poa sandbergii</i> )	3.0
Bottlebrush Squirreltail ( <i>Elymus elymoides</i> )	3.0
Biscuitroot ( <i>Lomatium ambiguum</i> )	0.5
Annual Sunflower ( <i>Helianthus annuus</i> )	1.0
<u>Rocky Mountain Beeplant (<i>Cleome serrulata</i>)</u>	<u>0.5</u>
	18.5 lb/acre

Wyo-Ben, Inc. would comply with the requirements listed in Noncoal rules, Chapter 13, Section 3 (a) (vi) regarding the timeliness of reclamation. Wyo-Ben, Inc. would consider alternative techniques for the reclamation in order to achieve bond release. These may include fencing, mulching, alternative seed mixtures, cheatgrass, Russian olive, and tamarisk control, hydro seeding, or other methods that would require BLM and DEQ approval prior to the application. Cheatgrass spraying, if necessary, would entail the use of either Rodeo® or Plateau herbicide applied at BLM-approved rates using calibrated spray tank, truck, backpack sprayer, and/or ATV sprayer. These are both BLM-approved chemicals. Herbicide would be applied in either late summer or early autumn. All label restrictions would be followed, and a Pesticide Use Proposal (PUP) would be submitted to the BLM-CYFO prior to application. The use of these pesticides and their application on cheatgrass was analyzed in the Vegetation Treatments Using Herbicides on Bureau of Land Management Lands in 17 Western States Programmatic EIS (2007).

Wyo-Ben, Inc.'s proposed mining would mine through an existing allotment boundary fence, as well as the natural barrier ridge that divides the allotments. Wyo-Ben, Inc. would work with the BLM-CYFO to maintain the integrity of the fence to prevent trespass issues during the proposed mining and to ensure the allotment boundary was reestablished post-mining.

**(4) Monitoring Plan (as per 43 CFR 3809.401 (b)(4)):**

Wyo-Ben, Inc. would utilize contractors to conduct the mining and reclamation operations. The Wyo-Ben, Inc. mining supervisor would work with the contractor's field supervisors to ensure that mining would be being conducted in a lawful and environmentally responsible manner. He also would supervise and direct the reclamation of pits. Monitoring of field operations and contact with contractor's field supervisors would occur on an almost daily basis.

MBHFI and Mountain Plover nest searches would be conducted prior to any initial surface disturbing activities during the dates April 15 to July 15.

Wyo-Ben, Inc. monitors all its reclaimed lands post closure for off-site sedimentation, erosion and seeding failures. Off-site sedimentation would be controlled by installation of straw bale or fabric check dams into affected drainages. Unacceptable erosion would be repaired at the first available opportunity. Past repair by Wyo-Ben, Inc. has mostly been accomplished by reconstructing the drainage and lining it with erosion control fabric, rock, or installation of rock gabions. Finally, seeding would be monitored on a regular basis. If Wyo-Ben, Inc. finds vegetation establishment inadequate after three to five growing seasons, Wyo-Ben, Inc. would determine the reason for failure and mitigate the problem.

**(5) Interim Management Plan (as per 43 CFR 3809.401(b)(5)):**

In the event Wyo-Ben, Inc. would temporarily close a pit, interim management procedures to stabilize the site would be implemented as follows: berms would be placed in all areas around the pit phase where a highwall occurs. A berm would also be installed at the ramps of the pit to prevent entrance. Temporary water diversions would be made around the pit to prevent water from entering the particular pit phase. Bentonite stockpiles and stockpiles with potential deleterious material (spoil piles, etc.) would be bermed to prevent off-site sedimentation. Drainages that have the potential to receive deleterious material if the constructed berms would fail would have check dams installed. Berms would be stable, making the check dams precautionary, backup measures. If soil stockpiles are expected to be in place for an extended period due to the temporary closure of the pit, they would be seeded with BLM approved species to minimize erosion and loss of soil biological viability. All equipment and supplies would be kept within the disturbance area. Any fuel storage tanks would either have a perimeter berm or would be placed within an excavated containment pit to control any potential spills. Finally, the pit area would be monitored on a regular basis to determine if problems are occurring that need to be addressed.

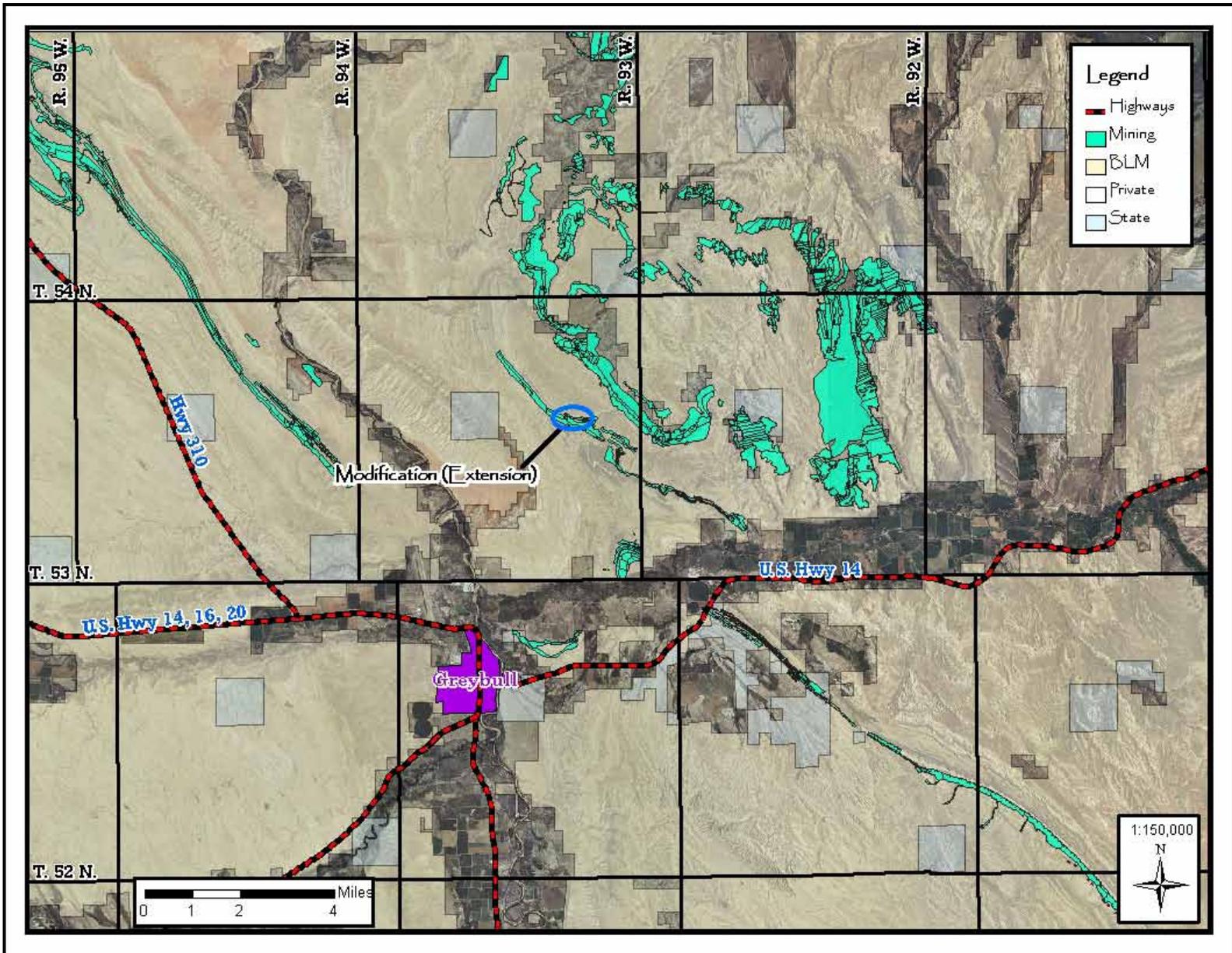
### **3.0 AFFECTED ENVIRONMENT**

#### **Introduction**

This chapter presents the potentially affected existing environment (i.e., the physical, biological, social, and economic values and resources) of the impact area as identified during scoping and/or the Interdisciplinary Team process. This chapter provides the baseline for comparison of impacts/consequences described in Chapter 4.

Resource issues or concerns, which may be affected by the proposed action, and are further described in this EA, are presented in Table 3 (below). Rationale for those issues/concerns which would not be affected or adversely affect are also listed in Table 3.

<b>Resource, Issue, and/or Concern</b>	<b>May Affect</b>
Air Quality	X
Cultural Resources, Native American Religious Concerns	X
Water (Surface and Ground)/Floodplains	X
Wetlands/Riparian/Aquatic Resources	X
Geology/Minerals	X
Paleontological Resources	X
Soils	X
Vegetation	X
Invasive, Non-native Plant Species	X
Wildlife/Migratory Birds/Raptors	X
Threatened & Endangered/ BLM Sensitive Species	X
Livestock Grazing, Range	X
Socioeconomics	X



Map 2. Area map of lands surrounding the Wyo-Ben, Inc. Pit 176G Modification area.

### **3.1 Air Quality**

No site-specific air quality data are available from the Pit 176G Modification area; however, air quality in the area is considered to be good, and is in compliance with state and national ambient air quality standards. The air-shed within the Pit 176G Modification area is classified as Class II, which allows concentrations of some air pollutants to increase to accommodate regional economic development.

The primary air-borne pollutant in the area is Particulate Matter (PM) in the form of fugitive dust (uncontrolled wind-carried particulates) generated from natural and human sources. Total suspended particulate matter (TSP) is the only contaminant for which long-term data are available (BLM, 1988) - the long-term mean for TSP at Lovell is 32 micrograms per cubic meter. The 24-hour Wyoming Ambient Air Quality Standard (WAAQS) for particulate matter <10 microns in diameter (PM<sub>10</sub>) is 150 (g/m<sup>3</sup>)<sup>3</sup>, and the 24-hour WAAQS standard for particulate matter <2.5 microns in diameter (PM<sub>2.5</sub>) is 65 (g/m<sup>3</sup>)<sup>3</sup>. Particulate matter includes dust, soot and other tiny bits of solid materials that are released into and move around in the air. Particulates are produced by many sources, including burning of gasoline and diesel fuels, incineration of garbage, mixing and application of fertilizers and pesticides, road construction, industrial processes such as steel making, mining operations, oil and gas fields, agricultural and forest burning, and operation of fireplaces and woodstoves. Emission levels in northwest Wyoming are much lower than levels in highly developed and industrialized areas.

Other contaminants that may be present in trace to small amounts include hydrogen sulfide (H<sub>2</sub>S), sulfur dioxide, nitrogen oxide, carbon dioxide, and vaporous hydrocarbons. Visibility in the region is typically very good (>70 miles) and fine particulates (PM) are generally considered to be the main source of visibility degradation. Additional climate data can be found in Appendix A and additional air quality data can be found in Appendix B.

### **3.2 Cultural**

A Class III cultural resource inventory meeting the requirements of the Wyoming State Historic Preservation Office (WYSHPO) Format, Guidelines, and Standards for Reports for the proposed mining area was conducted by ACR Consultants, Inc. in August of 2009. Intensive inspection identified no cultural resources. The Class III report was found to meet the Secretary of the Interior's Standards for Archaeology and Historic Preservation, and resulted in a No Effect determination in accordance with the Wyoming State Protocol between the BLM State Director, and the WYSHPO.

#### ***Native American Religious Concerns***

The area under consideration contains no known or identified areas or locations of religious or cultural concern to Native Americans. No traditional gathering areas have been reported near the current proposal.

### **3.3 Water Quality (Surface and Ground)/Floodplains**

The proposed Pit 176G Modification would be located on the slopes above an ephemeral channel that drains about 4 miles into Shell Creek, which then flows about 4 miles before it joins the Bighorn River. Information obtained from the State Water Engineer's Office online database indicates that there are several reservoirs that have current water rights within one mile of the proposed Pit 176G Modification area. The database indicates that there are no ground water wells located within a one mile radius. Additionally, no ground water was encountered during exploratory drilling in the proposed Pit 176G Modification area.

The lower part of Shell Creek is on the current Wyoming 303d list of Impaired Waterbodies due to high levels of coliform bacteria.

### **3.4 Wetlands/Riparian/Aquatic Resources**

According to the National Wetlands Inventory Map, there are approximately 3 wetlands located within one-half mile from the proposed mining area. Of these wetlands, none lie within the area proposed for mining. All three of the wetlands are associated with man-made reservoirs in unnamed drainages. Two of the reservoirs are semi-permanently flooded, while the third is seasonally flooded. All three of these wetlands lie upstream from the proposed mining. There are areas along the unnamed drainage below the proposed mining that support riparian-wetland vegetation. This unnamed drainage flows into Shell Creek, which then flows into the Bighorn River. Both of these streams have well developed riparian and wetland areas along their banks and support a diverse assemblage of aquatic and semi-aquatic flora and fauna including game and non-game fish, mammals, birds, reptiles, amphibians, and invertebrates.

### **3.5 Geology/Minerals**

The Bighorn Basin is bounded by the Bighorn Mountains to the east, the Owl Creek Mountains to the south, and the Absaroka Mountains to the west. The Bighorns and the Owl Creeks are a result of the Laramide Orogeny that occurred from the end of the Cretaceous Period through the beginning of the Tertiary Period. The various anticlines and synclines found in the Bighorn Basin formed during the Laramide Orogeny, a mountain-building event that took place during Late Cretaceous to Eocene time approximately 80 to 40 million years ago (mya). The Absarokas are a result of volcanic activity that began about 50 mya. The center of the basin is filled with flat-lying Eocene sediments (55-34 mya), with progressively more complex folding and faulting in Mesozoic (250-65 mya) and Paleozoic (542-251 mya) strata as the flanks of the mountains are approached.

In the Bighorn Basin, commercial bentonite is limited to middle-lower Cretaceous strata, identified as the Thermopolis, Mowry, and Frontier Formations. These bentonite-bearing strata are generally composed of sodium bentonite beds of varying thicknesses, interbedded with gray, marine shales and claystones which were deposited in the Cretaceous Interior Seaway around 100 million years ago. The proposed Pit 176G Modification proposes to mine the Canadian Bed of the Mowry shale.

**OVERBURDEN:** Overburden sampling characterizes soils and rock units below the surface to determine if their exposure to potential ground or surface water would adversely affect the environment and whether the overburden may be suitable soil for plants. Overburden considered adverse to ground or surface water and plants would generally be managed to minimize its impact to the environment and potential rooting zones. This would include entombing unsuitable material above groundwater zones and well below the surface to prevent any wicking or capillary draw. Drill hole samples taken by Wyo-Ben, Inc. while collecting baseline data, determined that groundwater was not present to the depth of mining therefore would not be a major concern.

Overburden associated with each bed was sampled by Wyo-Ben, Inc. and InterMountain Laboratories in five-foot increments to the contact with the top of the bentonite. Samples of overburden in the Modification area were tested for several parameters including pH, percent saturation, conductivity, calcium, magnesium, sodium, sodium absorption ratio (SAR), and acid-base potential (ABP). The data indicates saline and sodic conditions in the Canadian Bed, which is discussed further in Section 3.8 Soils.

**MINERAL RESOURCES:** Bentonite is the only locatable mineral found in this area. No commercially valuable mineral materials such as sand and gravel, or flagstone, are located in the proposed Pit 176G Modification area. No oil and gas leases are known to be located within this area. No solid leasable minerals such as coal or trona occur in the area.

### **3.6 Paleontological Resources**

The Potential Fossil Yield Classification (PFYC) for the area proposed to be mined is rated as a Class 3a. The geologic formation in the area is the Mowry shale. The geologic formations to be mined (Mowry Shale Formation) represent ancient sedimentation in and along a Cretaceous-age interior seaway that covered most of Wyoming at that time. Vertebrates did occupy this seaway, notably marine and terrestrial reptiles, and various types of fish. Multiple types of invertebrates also occupied these ancient environments. The Cretaceous Mowry Shale is known for its abundance of fossil fish scales in certain units.

### **3.7 Soils**

This soil resource inventory was conducted by Mr. Dave Buscher of Buscher Soil and Environmental Consulting, Inc., and by Mr. Matt Call of Wyo-Ben, Inc. in Wyo-Ben's Pit 176G Modification area. An Order I soil survey was conducted on areas proposed to be affected by mining activities and corresponds to the proximity of the bentonite beds. A more general level Order III survey was conducted on adjacent areas not intended to be affected. This soil inventory was a refinement of the ongoing, preliminary mapping by the Natural Resource Conservation Service (NRCS). Soil series, map unit descriptions, and soil interpretation records for series and families were expected to occur in the study area, were obtained from the NRCS to assist in soil identification, mapping, and interpretations. The soil series used were based on field observations and laboratory results. Soils were tested for pH, electrical conductivity (EC), saturation percent, calcium, magnesium, sodium, the sodium adsorption ration (SAR), and texture.

The area is dominated by shallow soils derived from shale and colluvium. Most of the soils contain a suite of neutral salts, such as the sulfates, carbonates, and chlorides of sodium and calcium. In addition, some have a considerable amount of exchangeable sodium, and with the salts they are classified as saline-sodic soils. Soils derived from sedimentary rocks have a clay texture.

Excess sodium indirectly affects plant growth through deterioration of soil structure. This breakdown of soil structure could result in restricted water movement, aeration, root elongation and seeding emergence and development. High level of salt in the soil also increases the hold that the soil has on water, which limits the vegetation that can occupy the site to only those that can extract the water they need to survive. It also affects ability of many plant species to extract nutrients. Soils with higher SAR tend to support saline-tolerant vegetation, such as those found in Gardner's saltbush communities.

Many of the soils in the proposed mining area contain a thin surface layer that is marginally suitable as topsoil. Subsoils, however, are generally unsuitable due to high exchangeable sodium (high SAR) and some have a high amount of salts that are more soluble than gypsum (high EC).

**Table 4. Soil and topsoil types and depth in the Modification area.**

Soil Map Unit Code	Soil Map Unit Name	% Slope	Depth of Topsoil (in)	Salvage Depth Topsoil/Subsoil (in)	Acres
<b>Shallow Soils Derived from Shale and Colluvium</b>					
41D-3	Lithic Torriorthents	20 - 35	19	6/0	1.0
43E-1	Bributte (taxadjunct)	20 - 45	19	2/0	3.0
44E-3	Lithic Torriorthents	15 - 50	19	6/0	0.6
51F-0	Barren Shale Lands		0	0/0	0.4

The BLM-CYFO provisional soil data indicates that the soil in the proposed project area is a Mudray Variant (50%)-Larim Variant (25%) Complex, 6-60 Percent Slopes. Badlands and rock outcrops make up the remaining 25% of the soil map unit. This soil complex has some characteristics that constrain reclamation such as: moderate to moderately slow permeability, very low available water capacity, and the soils are shallow having restrictive layers (lithic and paralithic bedrock) between 4 and 20 inches below the surface. The Mudray Variant soil has high pH (moderately to very strongly alkaline) and sodium, is moderately saline, and supports a Shallow Clayey 5-9" ecological site. The Larim Variant soil has a pH range between 6 and 9 (slightly acidic to strongly alkaline), little or no sodium/salinity, and supports a Shallow Loamy 5-9" ecological site.

### **3.8 Vegetation**

Vegetation community mapping for this study area was initiated in the summer of 2002, by Matthew Call and Adam Collins of Wyo-Ben, Inc., using the line transect sample method. Map unit boundaries were identified in the field and initially marked on aerial photographs and then transferred into electronic format. The following three vegetation map units were identified and mapped in the study area: Gardner's Saltbush, Rubber Rabbitbrush, and Barren Outcrop.

#### **1) Gardner's Saltbush:**

This vegetative unit generally occurs on shallow, salt-affected soils associated with bentonitic shale outcrops. Terrain is variable, with slopes ranging from 0 to 50 percent on varied aspects. Vegetation dominance varies from a near monoculture of Gardner's saltbush to areas with increased abundance of several understory species including prickly pear cactus (*Opuntia polyacantha*), black seepweed (*Suaeda niger*), bud sagebrush (*Artemisia spinescens*), and platyschkurhia (*Platyschkurhia integrifolia*).

Grasses include bottlebrush squirreltail (*Sitanion hystrix*), needle and thread (*Hesperostipa comata*), Sandberg bluegrass (*Poa sandbergii*), and Indian ricegrass (*Achnatherum hymenoides*). This vegetation unit also contains occasional shrub dominated inclusions along small bisecting drainages and isolated small pockets of deeper soils. These inclusions are generally dominated by Wyoming big sagebrush (*Artemisia tridentata*), greasewood (*Sarcobatus vermiculatus*) and rubber rabbitbrush (*Ericameria nauseosa*) and occupy less than five percent of the overall vegetation unit.

#### **2) Rubber Rabbitbrush:**

This vegetative unit is dominated by rubber rabbitbrush. Wyoming big sagebrush is present mainly along the drainages that run through this unit. Gardner saltbush and prickly pear cactus are the most common understory species, but like most vegetation in this unit, they are scarce in occurrence. Occasional bottlebrush squirreltail grass is found, but is also scarce. Soils are shale clay in texture with a great deal of shale flakes littering the ground. Slope aspect is south to southwest with an average 35% grade.

#### **3) Barren Outcrop Complex:**

This vegetation unit is dominated by the following three vegetation map units: Barren Outcrop (70%), Mixed Shrub Complex (20%), and Gardner's Saltbush (10%). The Barren Outcrop unit consists of areas mostly devoid of vegetation. Small inclusions consisting of black seepweed and Gardner's saltbush (*Atriplex gardneri*) occur intermittently throughout this unit. Soils tend to be mostly salty and sodic-affected clay, although areas of barren rock outcrops are also included within this unit. Slopes are highly variable, ranging between 0 and 60 percent with varied aspects. The Mixed Shrub Complex occurs across a wide variety of soils, topographic aspects, and slopes. Vegetation dominance within this map unit ranges dramatically reflecting that diversity.

In general, this vegetation unit is dominated by three large shrub species: Wyoming big sagebrush, rubber rabbitbrush, and greasewood; all of which occur either alone or in various combinations of abundance and dominance. Other locally abundant shrubs include bud sagebrush (*Artemisia spinescens*), broom snakeweed (*Gutierrezia sarothrae*), shadscale saltbush (*Atriplex confertifolia*), winterfat (*Ceratoides lanata*), and Gardner's saltbush. Occasional areas of perennial grass abundance include Sandberg bluegrass, Indian ricegrass, needle and thread grass, and bottlebrush squirreltail (*Sitanion hystrix*). Other common understory species include prickly pear cactus and platyschkuhria.

### **3.9 Invasive, Non-native Plant Species**

Though there are invasive weed species present, including cheatgrass, halogeton, and other non-natives, native plants are still the dominant species in the proposed mining area. Weed species present are capable of quickly invading an area after a surface disturbance.

### **3.10 Wildlife/Migratory Birds/Raptors**

WILDLIFE: Wyo-Ben, Inc. conducted wildlife surveys, compiled a species list, and provided this list to the U.S. Fish and Wildlife Service (USFWS) as well as the Wyoming Game and Fish Department. Agency responses indicated concern for the following species: nesting raptor species, migratory birds, and mountain plovers.

A few of the non-BLM-Sensitive wildlife species that use this area include mule deer, pronghorn antelope, coyote, jackrabbits, cottontail rabbits, Ord's kangaroo rats, olive-sided pocket mice, short horned lizards, sagebrush lizards, prairie rattlesnakes, golden eagles, red-tailed hawks, horned larks, and vesper sparrows. For many of the small mammals and reptiles, the proposed mine area contains their whole home range. Songbirds migrate to the area to breed, nest and spend the summer. The horned lark, corvids, and raptors are some of the few species that spend the full year in the region, however they still migrate to different habitats and are still considered migratory. Ungulates typically move through the area, utilizing it, as well as other habitat in the region as corridors, places to find food, and places to rear young. This area is used by antelope throughout the year, as well as mule deer in the winter. The area is not crucial winter range for either of these species.

RAPTORS: At least two golden eagle nests have been identified in the sandstone cliffs located about two and a half miles northwest of the Pit 176G Modification area.

MIGRATORY BIRDS: Many migratory sagebrush obligate species use this area including the following: sage sparrows, sage thrashers, horned larks, vesper sparrows, Brewer's sparrows, mountain plovers, and loggerhead shrike. These songbirds mate, nest, and over-summer in the areas proposed to be mined. They also frequently return to the same area year after year.

### **3.11 Threatened & Endangered Species/ BLM Sensitive Species**

THREATENED & ENDANGERED SPECIES: Site surveys have determined that no Threatened or Endangered plant or animal species (gray wolf, lynx, grizzly bear, black-footed ferret and Ute's ladies tresses) or Candidate species (yellow-billed cuckoo and sage grouse) are located in the Pit 176G area. Mountain plover, which are again proposed to be listed on the Threatened and Endangered Species List, are currently considered to be a BLM Sensitive species and are protected under the Migratory Bird Treaty Act (MBTA), 16 U.S.C. 703. The proposed mining area contains mountain plover nesting habitat.

BLM SENSITIVE SPECIES: Several BLM Sensitive species use the general area including the following: mountain plover, sage sparrows, sage thrashers, Brewer's sparrows, loggerhead shrike, Townsend's big-eared bats, spotted bats, white-tailed prairie dogs, and northern leopard frogs.

Northern leopard frogs are present in ponds and drainages with permanent water downstream of the proposed mine area. Yellowstone cutthroat trout also reside downstream of the proposed action in Shell Creek and the Bighorn River.

### **3.12 Livestock Grazing, Range**

The Lower Bear Creek BLM grazing allotment #01015 and the North Shell Group Allotment #01538 contain the proposed mining. In the Lower Bear Creek Allotment, two of the 14,290 acres (11,303 acres of BLM managed land) in the allotment are proposed to be mined. There are 600 animal unit months (AUMs) currently permitted for livestock grazing in this allotment, stocked at 18.8 acres/AUM. It is a winter grazing allotment, with the option of spring grazing once every three years. In the North Shell Group Allotment, about three of the 21,600 acres (17,833 acres of BLM managed land) in the allotment are proposed to be mined. There are 1,029 public AUMs permitted for livestock grazing in this allotment, stocked at 17 acres/AUM. This allotment has a three-year grazing rotation: spring, fall, rest. The ridge that Wyo-Ben, Inc. proposes to mine acts as a natural barrier between these two allotments.

### **3.13 Socioeconomics**

The proposed mining area is located in Big Horn County, Wyoming. The closest community is the town of Greybull. Greybull is located about 5 miles southwest from the proposed Modification area and has a population of 1,739 people. In 2008, the estimated population of Big Horn County was 11,322 people. Communities in Big Horn County include Basin (the county seat), Burlington, Byron, Cowley, Deaver, Emblem, Frannie, Greybull, Hyattville, Kane, Lovell, Manderson, and Otto. Big Horn County covers 3,137 square miles and has a population density of 3.7 people per square mile. In the last three decades of the 1900s, its population grew by 8 percent. Since 2000, its population dropped by 1.2 percent. The area has a strong agricultural economy, which includes farming (corn, sugar beets, alfalfa, barley, beans, hay) and ranching (cattle, sheep, horses). This area is also used for recreational purposes, such as hunting and off-highway vehicles.

Data from the State of Wyoming Economic Analysis Division indicate that mining accounts for 6% of the jobs, and 15% of the personal income in Big Horn County. This statistic indicates that employment in the mining sector is higher-paying than the county average. Mining had an average wage per job of \$44,439.00. Per capita income grew by 27.4 percent between 1993 and 2003 (adjusted for inflation). The depression of the U.S. economy in 2009 severely reduced the mining workforce, though as mining activity begins to increase at the beginning of 2010, mine workers have been brought back on.

In 1999 in Big Horn County, approximately 391 people were employed directly by the mining industry. Wyo-Ben, Inc. has approximately 70 employees, the majority of which live in Greybull. Wyo-Ben, Inc. contracts with various Big Horn County service companies to conduct mining activities within their permitted areas. These service companies provide heavy equipment and labor to strip and salvage soil and overburden, expose, mine and haul the clay, and conduct reclamation and seeding.

Livestock grazing has been, and continues to be, a major resource-use activity on BLM-administered public lands in the Cody Field Office and around the proposed mining areas analyzed in this EA. Grazing has occurred in the proposed mining area for over 100 years.

## **4.0 ENVIRONMENTAL EFFECTS**

### **4.1 Direct and Indirect Impacts**

#### **4.1.1 ALTERNATIVE I - NO ACTION**

##### **Air Quality**

There would be no additional effect on current air quality under Alternative I, because the proposed Pit 176G Modification would not be approved.

##### **Cultural and Historical Resources/Native American Religious Concerns**

Currently, potential impacts to cultural resources include unauthorized surface collection and looting. Under the No Action Alternative, these potential impacts would remain at similar levels to the existing. There would be no additional impacts on Cultural Resources under Alternative I, because surface disturbance under the proposed Pit 176G Modification would not be approved.

No impacts to Native American Religious concerns would occur under the No Action alternative, as the BLM would take no action that would adversely affect these areas or locations without consultation with the appropriate Native Americans.

##### **Water (Surface and Ground)/Floodplains**

There would be no effect on surface water, ground water, or floodplains because the proposed Pit 176G Modification mining would not be approved. Alternative I, proposes the least affect on surface water, as there would be no surface disturbance, leaving the vegetation, soil, and natural drainage patterns in place to naturally control surface water.

##### **Wetlands/Riparian/Aquatic Resources**

There would be no effect on wetlands, riparian areas, or other aquatic resources under Alternative I, because the proposed Pit 176G Modification mining would not be approved.

##### **Geology/Minerals**

There would be no effect on the geology or minerals of the area under Alternative I, because the proposed Pit 176G Modification mining would not be approved.

##### **Paleontological Resources**

There would be no effect on paleontological resources under Alternative I, because the proposed Pit 176G Modification mining would not be approved.

##### **Soils**

There would be no effect on soils under Alternative I, because the proposed Pit 176G Modification mining would not be approved.

##### **Vegetation**

There would be no effect on vegetation under Alternative I, because the proposed Pit 176G Modification mining would not be approved.

##### **Invasive, Non-native Plant Species**

There would be no new effects on invasive and non-native species under Alternative I, because the proposed Pit 176G Modification mining would not be approved. By choosing Alternative I, there would be a lower chance that this area would be affected by invasive weed species, as no new disturbance would occur.

### **Wildlife/Migratory Birds/Raptors**

There would be no effect on wildlife under Alternative I, because the proposed Pit 176G Modification mining would not be approved. Wildlife use of the area would continue at current levels because the disturbance and habitat loss would not occur. There would be no effect on migratory birds under Alternative I, because the proposed Pit 176G Modification mining would not be approved. Nesting raptors would not be disturbed by mining or temporarily lose habitat near their nests.

### **Threatened and Endangered Species/BLM Sensitive Species**

There are no known Threatened or Endangered species located in the proposed mining area. Also, BLM Sensitive Species, such as the mountain plover, would not lose any habitat or potential suitable habitat.

### **Livestock, Grazing, Range**

There would be no effect on livestock, grazing, or range because the proposed Pit 176G Modification mining would not be approved. Cattle and wildlife grazing in the area would not decrease and the forage would not change to post-mining vegetation species.

### **Socioeconomics**

There would be an affect to Wyo-Ben, Inc. and its employees if Alternative I, was selected because the company would not have access to the bentonite resource; if the bentonite could not be mined, the workers could lose their jobs. The supply of bentonite may be reduced, potentially causing a rise in the price of bentonite products, affecting those who use them.

## **4.1.2 ALTERNATIVE II - PROPOSED ACTION**

### **Air Quality**

The air quality of the local area would be impacted for the life of the mine (5 years) due to the effects of the Proposed Action. Soil and overburden stripping, blasting, and bentonite mining and hauling would result in an increase in the amount of particulate matter, fugitive dust, and fossil fuel combustion-related air pollution entering the air in the local area. Dust suppression measures would be required of Wyo-Ben, Inc., in order to control fugitive dust emissions.

These measures would include the application of dust suppression water or other BLM-approved dust suppressants to the mine area and haul roads, using water trucks as needed, during mining and hauling activities. The reduction in vegetation and related soil disturbance would result in a lowered capacity for carbon sequestration. In areas that have been reclaimed but have not fully revegetated, dust would be kicked up by wind until enough vegetation was present to stabilize soils and particulates. Trucks on the haul roads would continue to increase the amount of dust in the air until the roads were reclaimed or were no longer used as haul roads. There is no proposed mitigation for release of combustion-related byproducts of operating heavy equipment and haul trucks to mine and transport the bentonite.

The Air Quality Standard #6 for Healthy Rangelands in Wyoming would fail if the WDEQ determined that the air quality associated with the proposed mine area was impaired and that the proposed mining was determined to be the main causal factor.

### **Cultural and Historical Resources/ Native American Religious Concerns**

There would be no impacts to cultural resources under the Proposed Action. Any other unknown cultural resources that exist in the proposed mining area that were not detected by the Class III cultural survey would be reported to the BLM when found by Wyo-Ben, Inc., as required in the Cultural Resources Stipulations found below in Section 4.2.2.

Improvement of haul roads could facilitate access to and within the project area, thereby increasing potential for additional unauthorized surface collection and looting.

If any areas or locations of traditional gathering areas, or religious or of cultural concern to Native Americans are subsequently identified or become known through the Native American notification or consultation process they would be considered during the implementation phase. The BLM would take no action that would adversely affect these areas or locations without consultation with the appropriate Native Americans.

### **Water (Surface and Ground)/Floodplains**

Surface water could be affected by the Proposed Action. During the proposed mining process, natural drainage patterns would be temporarily disrupted, altering drainages and modifying overland flow. Due to the loss of vegetation, biological crusts, and desert pavement, run-off from the proposed mining areas may transport more sediment and other pollutants to downstream water features than the area did before it was mined. The runoff coming from the mine area may also be more acidic/salty than the pre-disturbance runoff because of the increased exposure of acidic/salty sub-soils exposed by mining. Larger ephemeral channels (those having drainage basins greater than 5 acres) would be temporarily directed around open pits during active mining stages and straw bale sediment barriers would be utilized as sedimentation control measures.

In order to control sediment and runoff, fabric fences or certified weed-free straw bale check dams would be installed at discharge points into natural channels. These structures would be moved as needed to accommodate active mining areas. Through drainage would be required to be reestablished during final reclamation. Channel design for both temporary and permanent diversions would match pre-mine channel gradients and cross-sectional shapes and dimensions. After reclamation, drainage would temporarily be affected until vegetation and soils recover to pre-mine conditions.

Floodplains would be affected by the proposed mining. The proposed mining area would be bermed until the reclamation process begins (recontouring, topsoiling, and reseeding). The berm would prevent water run-off and sediment from leaving the pit and open mining area and flowing out into the floodplain; its construction is part of the mitigation proposed in the Pit 176G Modification and included in Wyo-Ben, Inc.'s Storm Water Discharge Permit (SWDP) and Storm Water Pollution Prevention Plan (SWPPP). The berms would prevent overland water flow and sedimentation from impacting the floodplain, which may have occurred had the berms not been in place. Water diversions created during the mining process would allow water to flow around the proposed mining area.

Floodplains would be also affected during the reclamation process; until vegetation establishes and holds the soil and water in place, there would be more overland water flow and sedimentation onto floodplains than there had been prior to the proposed mining. Prior to seeding, Wyo-Ben, Inc. would micro-recontour the land surface to create small pits or rows on the soil surface. This contouring method slows or traps flowing water and sediment, slowing runoff and erosion, creating micro-environments that encourage seed germination and growth.

Ground water may be affected by the proposed mining. It could be affected either by water infiltration in the proposed mining area or by pollutants in haul road run-off that may find its way into the ground water. It would not be likely that ground water would be directly affected through infiltration in the pits. Pits would be dug an average of 30 feet deep, and the nearest static water well (located 4 miles away) depth is 20 feet deep, and located next to the Bighorn River.

Not only is there a few dozen feet of material above the water table to filter out any pollutants, but the water would have to penetrate through the remaining bentonite in the ground, which swells and has almost zero permeability once it is wet; water would be more likely to evaporate than to infiltrate. If runoff increases, there would be less water infiltration into the soil. This would have long-term effects on ground water recharge and discharge to area drainages, springs, and seeps.

If water escapes Wyo-Ben, Inc.'s berms and runs off site, it may eventually make it into the groundwater. Sediment and other pollutants could be transported from the site by wind, water, or mining related activities (bentonite on haul truck tires falling off out of the mine area) could introduce mining related pollutants into water that may eventually make it into ground water.

The Wyoming Water Quality Land Health Standard #5 would fail if the WDEQ determined that the quality of the waters associated with the proposed mine area were impaired and that the proposed mining was determined to be the main causal factor.

Water resource mitigation is included in Wyo-Ben, Inc.'s Pit 176G Plan of Operation Modification submission. Wyo-Ben, Inc. would also follow the specifications of their current Storm Water Discharge Permit (SWDP) and Storm Water Pollution Prevention Plan (SWPPP) to facilitate compliance with Section 401 of the CWA.

### **Wetlands/Riparian Areas/Aquatic Resources**

The Proposed Action may affect downstream riparian areas, wetlands, aquatic habitat, and associated biota by modifying water flow regimes. This may include increasing or decreasing peak and/or base flows, sediment and nutrient regimes, and natural watershed inputs, as well as increasing salts, which would lower the pH (acidity) of the water, or by introducing new pollutants such as petroleum products, or herbicides. Invasive, non-native plant species that become established on or near the proposed mine area may spread to downstream or downwind riparian areas wetlands, and/or aquatic habitat which could weaken the plant communities and ultimately system stability and functionality. Water relations in areas infested by invasive, non-native plant species may be modified causing additional flow and sediment disruptions.

If the riparian-wetland areas associated with the proposed mine area were affected due to the proposed mining (determined to be Functioning at Risk or Non-functional), they could fail the Wyoming Riparian-Wetland Land Health Standard #2.

Mitigation that addresses these potential effects is incorporated in the Pit 176G Plan of Operation Modification submission and Wyo-Ben, Inc.'s Storm Water Discharge Permit (SWDP) and Storm Water Pollution Prevention Plan (SWPPP).

### **Geology/Minerals**

**OVERBURDEN:** Overburden may have an effect on the proposed mining area if the bentonitic "ash," or the bentonite clay not of the proper quality for industry, would come into contact with subsoil or topsoil. This could happen in the removal, the storage, or the reclamation process. When the "ash" contaminates the soil, the soil's acidity level rises and it becomes uninhabitable by plants. When situations like this occur, the revegetation step in reclamation can be very difficult.

If it would be shown that a particular pit has the potential for "acidic, deleterious or toxic material" near the surface, Wyo-Ben, Inc. would attempt to cover the material with at least two feet of a more neutral spoil material from adjacent pits in a lateral castback procedure, or bury that layer deeper in the profile during backfill.

**LOCATEABLE MINERALS:** Under the Proposed Action, the commercial quantities of bentonite would be removed from beds in the Canadian Bed of the Cretaceous Mowry Formation. Mining would disrupt the natural stratigraphic order of beds within the open pit areas, and disturb overburden, as well as top and subsoil profiles, as described in the mine plan. No other locateable mineral resources would be affected by the Proposed Action.

**SALEABLE MINERAL MATERIALS:** The Proposed Action would have a minimal impact on the limited saleable mineral resource located on public lands proposed to be mined. No commercially important deposits of sand and gravel, decorative rock, flagstone, or other saleable materials are known in the Pit 176G Modification area.

**LEASEABLE MINERALS:** Because no active leaseable minerals/oil and gas leases are present in the Pit 176G Modification area, access to leasable mineral resources would not be impacted as a result of the Proposed Action.

### **Paleontological Resources**

Paleontological resources in the proposed mining area may be affected under the Proposed Action, which would involve mining in the Mowry Shale. This formation is rated as a Potential Fossil Yield Classification (PFYC) of 3a, meaning that it occasionally contains significant vertebrate fossils, though they are not found with great frequency. Standard paleontological stipulations listed in Section 4.2.2 would be applied to the Proposed Action, which would mitigate impacts if paleontological resources are encountered during the proposed mining. If fossils are found during the excavation, mining activities would come to a halt, the BLM geologist would be notified, and Wyo-Ben, Inc. would then be advised as to what further actions would be required to protect the paleontological resource.

Stipulations would be attached to this document to protect any paleontological resources that might be found on the proposed permit area. If scientifically significant vertebrate fossil materials are discovered, Wyo-Ben, Inc. would be required to suspend all operations that might further disturb such materials, and immediately contact the BLMs Authorized Officer (Cody Field Manager) so the fossil resource could be investigated and assessed. Significant scientifically valuable fossil resources would be removed from the area prior to resumption of mining. Stipulations to protect paleontological resources would be attached to any approval letter.

### **Soils**

Soils in the area would be permanently affected by the proposed mining activity. Soils currently present in the proposed mining area took thousands of years to develop, due to the harsh environment and the bentonitic parent material. By disturbing them, a complex ecosystem would be disrupted. The integrity of the soils could be preserved by properly separating and storing suitable topsoil from subsoil, overburden, and especially from bentonite and “ash” stockpiles. If topsoil would be exposed to bentonite or “ash” materials, it would become contaminated and no longer able to support life.

WDEQ regulations require that all soil stockpiles be separated from all other materials by a buffer zone of at least a bulldozer width to prevent contamination. Organisms living in the topsoil have a relatively short lifespan when soil is stockpiled, due to the disturbance of normal processes including the following: lack of oxygen, lack of new organic material, lack of water, and the increase in depth to surface. Because of this, topsoil must be redistributed within a few months of being stockpiled in order for the soil to maintain a functioning ecosystem. These microorganisms prevent water and wind erosion, hold water in the soil, and prevent weed establishment.

The castback mining system is designed to quickly reclaim disturbed areas so topsoil remains viable and will more easily support re-vegetation efforts. Live-spreading is currently the best method for reclamation because topsoil that is removed from an open pit is immediately placed on the area that has already been mined, backfilled and recontoured. This preserves many of the topsoil's important biological and physical qualities. Wyo-Ben, Inc. would attempt to use live-spreading of topsoil whenever possible and would try to stockpile topsoil for as short of a time as possible before respreading it. Wyo-Ben, Inc. would also seed its topsoil stockpiles to prevent weed growth, reduce erosion, and maintain the soil's biological integrity. The loss of topsoil biological viability, as a result of stripping and stockpiling, would increase as the length of stockpiling time increases (loss would occur very rapidly at first and then gradually taper off), depth of stockpile, and having no or little deeply-rooted plant growth.

Most of the soils in the proposed Pit 176G Modification area contain a thin surface layer that is marginally suitable as topsoil. Subsoils, however, are generally unsuitable due to high exchangeable sodium (high SAR) and some have a high amount of salts that are more soluble than gypsum (high EC). Because of this, only portions of the topsoil of different soil units could be used as suitable topsoil and subsoil material for reclamation. Wyo-Ben, Inc. proposes to salvage saline sodic or saline-sodic subsoils, and keep them segregated from suitable topsoils. Saline-sodic, saline or sodic subsoil would be used as subsoil only, on sites to be reclaimed post-mining. No material would be salvaged as topsoil from areas devoid of vegetation. Topsoil replacement would take place to proper depths to allow re-establishment of vegetation. Replaced topsoil would be left in a roughened state to increase micro-topography, and enhance moisture harvesting capacity of the soil. Soil amendments, such as but not limited to gypsum, straw, or woodchips, may potentially be used by Wyo-Ben, Inc., with BLM approval, to create a soil chemistry that would be more amenable to plant growth.

Areas of rock litter or desert pavement frequently form where wind and water erosion washes away the soil and leaving the rock cap. The cap then prevents further erosion of the soil or subsoil in the area. Once the proposed mining has taken place and the land has been reclaimed (areas considered barren of vegetation pre-mining are not required to be reseeded post-mining by WDEQ), this rock litter layer may no longer be present, increasing the soil on the surface that has the potential to be eroded from the area.

Impacts of the Proposed Action to soils would require mitigation (required by both BLM and LQD), as per the terms of any approved mining and reclamation plan(s) and as presented in the Pit 176G Modification application, discussed above under Section 2.2, and any accompanying mitigation measures. Associated disturbance relative to proposed mining would be kept to a minimum in order to prevent unnecessary and undue disturbance of and to native soil profiles.

Until successful reclamation of the soil occurs, the disturbed areas would have reduced soil stability and would fail Standard #1 for Healthy Rangelands in Wyoming.

### **Vegetation**

Vegetation would be directly affected by the Proposed Action. Native vegetation in all areas to be mined would be removed, along with the suitable topsoil that has established over time. After mining would be complete, subsoil and topsoil would be placed back on the surface. If the castback mining proceeds along in a timely manner, the soil biota and other microorganisms associated with healthy, living soil would still be alive to help the newly planted seeds reestablish. If the topsoil was left sitting in a stockpile for more than a few months, the likelihood that there would be any life left in the soil would be much lower, thus decreasing the ability of the soil to support plant life.

The success of the vegetation reclamation depends largely on the timeliness and cleanliness of the topsoil replacement process. Also, future topsoil quality and quantity depends on the establishment of vegetation.

Clearing many acres of land at a time leaves areas open to invasive weed species that establish quickly and flourish in disturbed areas. Speedy revegetation with native plants would be necessary to prevent a non-native weed invasion. Due to the decade-long drought and the saline soils of bentonite areas, revegetation in the area is often a slow process taking anywhere from two to twenty years or more. Any islands of native vegetation that would be left in the mined area would aid in the spread of native plants throughout the disturbance. Also, if topsoil would be replaced quickly, viable native seeds can sometimes still be present to reestablish themselves in the reclaimed areas.

The vegetation native to the proposed mining area is a hardy sort, growing in an area that few other plants are adapted to survive in. If reclamation would not be done correctly, a potentially different plant community could replace the native one. Often, even successful reclamation will result in a change from the existing native plant community for decades. Until upland vegetation on disturbed sites consist of plant communities appropriate to the site, which are resilient, diverse, and once again able to recover from disturbances, they would fail Standard #3 for Healthy Rangelands of Wyoming.

Impacts of the Proposed Action to vegetation would require mitigation (required by both BLM and DEQ-LQD), as per the terms of the Pit 176G Modification mining and reclamation plan, discussed above under Section 2.1, and any accompanying mitigation measures. According to Wyo-Ben, Inc.'s proposed reclamation plan, a vegetative community dominated by native shrubs and grasses would be reestablished over time. Mitigation measures would include the use of proper seed mixtures and seeding application rates, to help reestablish vegetation over time to pre-mine or better conditions. All seed used on public lands would be certified noxious weed-free by laboratory testing and would conform to BLM seed policy IM No. 2006-073; any hay or straw used for check-dam construction or mulching would be certified weed-free. Some reclaimed areas may need to be fenced to exclude livestock from grazing too heavily on newly-germinated or established seedlings in these areas. Additional revegetation goals include site stabilization, erosion control, and restoration of visual aesthetics.

Until successful establishment of native vegetation occurs, the mined areas would fail Wyoming Rangeland Health Standard #3, Vegetation.

### **Invasive, Non-native Plant Species**

Invasive and non-native plant species in the area would increase under the Proposed Action. When bulldozers remove the topsoil to expose the bentonite layers, all vegetation would be removed from that disturbed area as well. The reclamation process would involve revegetation of the area with a BLM-approved seed mix containing seeds of plant species similar to the native vegetation removed during mining. If seeding goes well and desirable vegetation grows quickly, it would be less likely that invasive weed species would enter or return to the area.

If the reclamation seeding has a hard time establishing, annual, invasive and/or non-native weed species would be more likely to spread throughout the disturbed area. Seeding the topsoil stockpile, which would be a required mitigation measure for this Modification, would decrease the potential for weeds to spread to and contaminate topsoil. Also, the Bighorn Basin has been in a drought for nearly a decade, increasing the likelihood for invasive and non-native seeds to be successful post-reclamation.

Some of the weed species that commonly establish in post-mining areas are as follows: cheatgrass (*Bromus tectorum*), halogeton (*Halogeton glomeratus*), Kochia (*Kochia scoparia*), and Russian thistle (*Salsola kali*). If cheatgrass establishes, it could form a monoculture, outcompeting native species, reducing species diversity, decreasing sagebrush establishment, and creating a volatile fuel source for fires. Halogeton can pull salt to the surface, creating a saline environment few native plants can survive in.

In order to decrease the spread of noxious weeds onto public lands, Wyo-Ben, Inc., would inventory all areas and access routes for the presence of weeds. Wyo-Ben, Inc. personnel would be trained to identify weeds and would conduct on-going monitoring of weeds. If invasive, non-native, or noxious species are found anywhere in the mine areas or on the haul roads, Wyo-Ben, Inc. would take action to remove the weeds with the help of Big Horn County Weed and Pest with coordination with the BLM Cody Field Office.

These weeds would be controlled/eradicated by use of BLM approved methods and herbicides, and their management would be the sole responsibility of Wyo-Ben, Inc.. Where weed infestations are noted on Federal lands associated with this Modification, all vehicle access would be limited to only necessary routes and would be controlled to minimize travel in the infested area until weed removal would be accomplished. Vegetation would be reestablished and weed-free seeds and hay would be used in the proposed mining area. Cleaning vehicles, equipment, and materials before they enter public land would help reduce the spread of undesirable plant species.

The following is a list of Wyoming State Listed Noxious Weeds that would need to be controlled should they begin to grow on the Pit 176G Modification area lands during mining and/or reclamation. Cheatgrass would also need to be controlled on the area disturbed under this Modification, should it begin to grow in mined or reclaimed areas. (Source: <http://www.wyoweed.org/statelist.html>)

- |   |  |
|---|--|
| 1) Field bindweed ( <i>Convolvulus arvensis</i> L.)           | 14) Musk thistle ( <i>Carduus nutans</i> L.)             |
| 2) Canada thistle ( <i>Cirsium arvense</i> L.)                | 15) Common burdock ( <i>Arctium minus</i> (Hill) Bernh.) |
| 3) Leafy spurge ( <i>Euphorbia esula</i> L.)                  | 16) Plumeless thistle ( <i>Carduus acanthoides</i> L.)   |
| 4) Perennial sowthistle ( <i>Sonchus arvensis</i> L.)         | 17) Dyers woad ( <i>Isatis tinctoria</i> L.)             |
| 5) Quackgrass ( <i>Agropyron repens</i> (L.) Beauv.)          | 18) Houndstongue ( <i>Cynoglossum officinale</i> L.)     |
| 6) Hoary cress ( <i>Cardaria draba &amp; pubescens</i> )      | 19) Spotted knapweed ( <i>Centaurea maculosa</i> Lam.)   |
| 7) Perennial pepperweed ( <i>Lepidium latifolium</i> L.)      | 20) Diffuse knapweed ( <i>Centaurea diffusa</i> Lam.)    |
| 8) Ox-eye daisy ( <i>Chrysanthemum leucanthemum</i> L.)       | 21) Purple loosestrife ( <i>Lythrum salicaria</i> L.)    |
| 9) Skeletonleaf bursage ( <i>Franseria discolor</i> Nutt.)    | 22) Saltcedar ( <i>Tamarix</i> spp.)                     |
| 10) Russian knapweed ( <i>Centaurea repens</i> L.)            | 23) Common St. Johnswort ( <i>Hypericum perforatum</i> ) |
| 11) Yellow toadflax ( <i>Linaria vulgaris</i> L.)             | 24) Common Tansy ( <i>Tanacetum vulgare</i> )            |
| 12) Dalmation toadflax ( <i>Linaria dalmatica</i> (L.) Mill.) | 25) Russian olive ( <i>Elaeagnus angustifolia</i> L.)    |
| 13) Scotch thistle ( <i>Onopordum acanthium</i> L.)           |  |

Wyo-Ben, Inc. would be responsible for managing all noxious and undesirable invading plant species in the reclaimed areas, including cheat grass, Russian olive, and tamarisk, until revegetation activities have been determined to be successful, and the bond has been released for a given area. If noxious or invasive weeds are encountered, the BLM and/or the Big Horn County Weed and Pest Department would be consulted by the operator/holder for control and eradication methods. A Pesticide Use Proposal (PUP) and written approval from the BLM Authorized Officer for the use of herbicides must be obtained prior to the use of herbicides on public land.

### **Wildlife/Migratory Birds/Raptors**

**WILDLIFE:** The Proposed Action would affect wildlife that live in or move through the proposed mining area. It may also affect the flora and fauna that use aquatic environments within and downstream of the proposed mining area. Movement through the area would become difficult as pits appear and disappear in places animals may have used to travel. Larger wildlife species, such as mule deer, pronghorn, and coyotes, would have to adapt and change their movement patterns to avoid the proposed mining area. Large areas of suitable habitat exist on public lands surrounding the mining areas to which game animals can move; big game populations would be affected by fragmentation and disruption from mining activities. The habitat would become less suitable for big game, especially pronghorn and mule deer.

Smaller animals such as badgers, rabbits, rodents, and reptiles whose home range is much smaller would be directly affected by the mining. Displaced animals would have to try to move to a new area, which may already be fully occupied, resulting in stress, extra competition, and probable mortality. An unknown number of these small animals would be lost during the mining either directly by machinery or indirectly through habitat loss; their numbers would probably not rise to current levels again until the disturbed area would be fully reclaimed to pre-mine conditions. Their returned presence in the reclaimed area would help increase the aeration and permeability of the soil and improve the overall health of the soils and vegetation.

If the Proposed Action is approved, wildlife would likely avoid the area until reclamation success was complete. If the vegetative community would be drastically changed post-mining, wildlife species using the area would change as well. The change in vegetative community from pre-mine conditions to post-mine conditions would represent a shift to plant species not specifically adapted to the local site and would provide lesser quality of habitat across all acres affected.

**RAPTORS:** The Proposed Action would affect golden eagles that have used the nest in the area, which was selected for as quality habitat to produce chicks. Mining activity around the established nests would be two and a half miles away and would be far enough away to not cause "take". Proposed mining would temporarily destroy nearby hunting areas, forcing the parents to travel further to find food. This would be a factor until the affected area would be reclaimed and small prey species have returned. Wyo-Ben, Inc. would be required to notify the BLM if any nesting raptors are spotted; the BLM biologist would then advise them to halt mining activity in that area until the young raptors have fledged and left the nest. This would provide short term protection of the nesting habitat only; over the long term, this habitat would be degraded for many decades.

**OTHER MIGRATORY BIRDS:** Migratory birds, including sagebrush obligate species would avoid the area until successful reclamation would be achieved. If the area would be fully reclaimed to conditions similar to pre-mining in one to many decades, the habitat may once again be suitable for these species, although less suitable than before.

### **Threatened & Endangered Species/BLM Sensitive Species**

**THREATENED & ENDANGERED SPECIES:** No Threatened or Endangered plant or animal species (gray wolf, lynx, grizzly bear, black-footed ferret and Ute ladies'-tresses) or Candidate species (yellow-billed cuckoo and sage grouse) are known to exist in the area and therefore would not be affected by the Proposed Action. There is potential for Ute ladies'-tresses to be in the area, although no population has ever been observed in the Bighorn Basin. The proposed mining would not occur in riparian areas, specifically wet floodplains that are commonly inundated, where these plants grow, thus making the potential these plants being present extremely low. There would be no effect on any listed or candidate species.

The Proposed Action would destroy mountain plover habitat until reclamation of the mined area would be complete. Full reclamation of area habitat would take many decades. Mountain plovers, which were recently again proposed to be listed on the Threatened and Endangered Species List, are also considered to be a BLM Sensitive Species and are protected under the Migratory Bird Treaty Act (MBTA), 16 U.S.C. 703. In conformance with the USFWS suggestions, Wyo-Ben, Inc. would conduct nest searches in mountain plover habitat prior to, and during ground disturbing activities between April 10<sup>th</sup> and July 10<sup>th</sup>. If nesting mountain plovers are found, mining operations would halt until BLM and USFWS would be consulted for further action. Through this monitoring, no mountain plovers or migratory birds would be knowingly harmed during the proposed mining process. Since Wyo-Ben, Inc. would agree to implement mitigation measures, this modification would not likely jeopardize the continued existence of this mountain plover population.

**BLM SENSITIVE SPECIES:** The Proposed Action would remove habitat, and cause fragmentation and wildlife avoidance of larger habitat areas for several BLM Sensitive species, including the following: mountain plover, sage sparrow, Brewer's sparrow, sage thrasher, loggerhead shrike, white-tailed prairie dog, sage-grouse, and northern leopard frogs. If the area would be fully reclaimed to conditions similar to pre-mining in one to many decades, the habitat may once again be suitable for these BLM Sensitive species although not as suitable as it was before it was mined. Habitat would also be fragmented, making adjacent habitat less suitable. Haul road traffic would also be introduced into an area where this disturbing activity has not been before. Additional weeds, disturbance, human activity, changes in water quality, modified hydrologic and sediment regimes, and habitat destruction would have negative impacts on BLM Sensitive species.

The Proposed Action may impact the watershed, affecting northern leopard frogs and Yellowstone cutthroat trout (YCT) present downstream of the proposed area by increasing sediment or changing the water chemistry. The stream sections that may be impacted by the proposed action are not important YCT spawning or nursery habitat, but do provide important adult and sub-adult winter habitat.

Past and present bentonite mining is a factor in grazing allotment failure of Standard 4 during the Standards and Guidelines Interdisciplinary review for wildlife habitat quality.

### **Livestock, Grazing, Range**

The Proposed Action would temporarily affect rangelands in the proposed mining areas. Until reseeded of the area would be successful, nearly one AUM would be removed from the grazing allotments. Wyo-Ben, Inc. has stated in its mine plan that all areas disturbed would be reseeded over a four year period. Since castback mining takes place in stages, the areas disturbed first would be the furthest along in the reclamation process. Reclamation could be successful if proper topsoil handling and drought do not make it exceptionally difficult for seedlings to germinate and grow. Once the reseeded would be successful, which can take one to many decades, vegetation would be reestablished well enough to provide forage for wildlife and livestock once again.

If the natural allotment boundary created by the ridge Wyo-Ben, Inc. plans to mine would be no longer effective as a livestock barrier post-mining, Wyo-Ben, Inc., in cooperation with the BLM-CYFO, would maintain a barrier that acts as the division between allotments. Wyo-Ben, Inc.'s proposed mining would also mine through an existing allotment boundary fence; the company would work with the BLM-CYFO to maintain its integrity to prevent trespass issues during the proposed mining.

Usually reclaimed mining areas are not fenced out of grazing allotments. Because of this, cattle are rarely prevented from grazing on reclaimed lands where seeds are trying to germinate and establish. This can be detrimental to both grazing and the mine reclamation effort.

Grazing before plants have established stresses seedlings and makes it very difficult for them to survive, spread, or create healthy rangeland. Grazing during the early stages of revegetation can lead to an increase of weed growth; native seeds in the seed mix are more desirable to cattle and are quickly grazed off, leaving the barren area to be established by weeds. Wyo-Ben, Inc. may install temporary fences around seeded areas that are in locations used heavily by cattle, in order to give seedlings a chance to establish. Wyo-Ben, Inc. would be responsible for installation, maintenance, and removal of these reclamation fences.

Wyo-Ben, Inc. would be responsible for successful reseeding and would be held accountable for the reseeding by WDEQ-LQD and the BLM until an acceptable vegetative community has established. Wyo-Ben, Inc. would work with the BLM-CYFO to maintain and/or replace the allotment boundary ridge and fence that run through the planned Modification area during and before completing the mining process.

### **Socioeconomics**

Under the Proposed Action, the proposed Pit 176G Modification would be approved and bentonite mining would proceed into the proposed mining area. The proposed mining area would be a job site for Wyo-Ben, Inc. workers in future years once Wyo-Ben, Inc. begins mining the area.

## **4.2 Mitigation/Monitoring/Stipulations**

The following items are mitigation measures and monitoring requirements that would be attached to any approval of the Proposed Action and are included in the Pit 176G Modification:

### **4.2.1 MITIGATION AND MONITORING**

#### ***Air Quality***

To control fugitive dust generated by haul trucks, roads would be kept watered by using a truck equipped with a spray bar or other BLM approved method. If blasting would be necessary, Wyo-Ben, Inc. would notify the BLM in advance, and fly rock and other particles would be kept to a minimum.

#### ***Reclamation Seed Mix***

Within 3-5 years following the mining of bentonite, Pit 176G would be recontoured, deep ripped, and seeded using the following PLS (pure live seed) mix:

<b><u>Seed Mix for Pit 176G Modification Area</u></b>	<b><u>Rate-lb PLS/acre</u></b>
<b><i>Shrubs:</i></b>	
Gardner saltbush ( <i>Atriplex gardneri</i> )	5.0
<b><i>Grasses:</i></b>	
Russian wildrye ( <i>Psathyrostachys juncea</i> )	3.5
Indian ricegrass ( <i>Oryzopsis hymenoides</i> )	2.0
Sandberg bluegrass ( <i>Poa sandbergii</i> )	3.0
Bottlebrush squirreltail ( <i>Elymus elymoides</i> )	3.0
<b><i>Forbs:</i></b>	
Biscuitroot ( <i>Lomatium ambiguum</i> )	0.5
Annual Sunflower ( <i>Helianthus annuus</i> )	1.0
Rocky Mountain Beeplant ( <i>Cleome serrulata</i> )	0.5
	18.5 lb PLS/acre

***Prior to any seed mix revisions, Wyo-Ben, Inc. would contact the BLM for approval of the proposed changes.***

The amount of seed applied to public land would be calculated on a Pure Live Seed (PLS) basis. Pounds of PLS equals the pounds of seed divided by the ratio of pure live seed in the mix; the result will always be less than 1.0. PLS is derived by multiplying purity by germination (example: 0.95 purity x 0.95 germination = 0.9 PLS). Thus, to have two pounds PLS of Indian Ricegrass in the mix, divide “two” by the PLS ratio, which will always increase the quantity needed (example: 2 lbs of seed/0.9 PLS = 2.2 lbs PLS). PLS determinations must be made for each plant species in a specific mix. Seed would be stored properly to preserve its viability and would be used within three months of the most recent viability test. Seed that has been stored longer than three months beyond the last viability test would be tested for viability again and the bulk pounds/acre rates would be adjusted to reflect any new PLS values before being applied to public land. All seed applied on BLM administered public lands must comply with the current BLM seed policy in IM-2006-073 (see Appendix C).

Seed would usually be planted in the fall or early winter (occasionally in early spring) as soon as possible after topsoiling. **All seed would be certified weed-free.** If Wyo-Ben, Inc. decides to try mulching, they must first contact the BLM for proper mulching techniques on Federal land and approval. Use of all species depends on seed availability in the year of seeding; changes to the seed mix are acceptable with prior authorization from the BLM.

### ***Reclamation and Visual Aesthetics***

Reclamation would be concurrent with mining as much as possible. After mining, disturbed areas under this Modification would be contoured to blend in with the adjacent surroundings and reseeded to support similar vegetation. Proper topsoil and subsoil salvage would be essential to ensure successful reclamation. Use of mine pit areas for bentonite drying would be kept to a minimum so that mine pits can be backfilled, recontoured and reseeded in a timely manner. Unnecessary and undue degradation of native soils and vegetation would not be allowed to occur as a result of bentonite mining under this Modification.

Within 3-5 years following completion of mining, disturbed areas would be recontoured to match the surrounding topography, reestablish drainages, and minimize erosion. The entire disturbed area with the exception of the main haul roads would be topsoiled and seeded using the seed mixes provided previously in this document. If necessary, topsoil stockpiles would be seeded in the fall or spring following placement.

### ***Grazing***

Wyo-Ben, Inc. would work in cooperation with the BLM-CYFO to upkeep the allotment boundary fence between the Lower Bear Creek and North Shell Group allotments that runs through the Modification area. Also, if the natural allotment boundary created by the ridge Wyo-Ben, Inc. plans to mine would no longer be effective as a livestock barrier post-mining, Wyo-Ben, Inc. would work with the BLM-CYFO to construct a fence to maintain the division of allotments.

### ***Sensitive Wildlife Species and Migratory Birds***

Nest searches would also be conducted for migratory birds between April 15th and July 15th. Mining would stop if nesting migratory birds are detected until the migratory birds have fledged and can leave the nesting area. Through this monitoring and mitigation, no mountain plovers or migratory birds would be knowingly harmed during the proposed mining process.

### ***Mountain Plover Breeding/Nesting Season Exception Protocol***

If a surface disturbing activity is requested to take place in mountain plover (MP) habitat (i.e.; areas with low, sparse vegetation, bare ground, prairie dog colonies, etc.) during the MP breeding/nesting season (April 10 - July 10), presence/absence surveys would be required. These surveys would take place within a ¼ mile buffer around the activity and must not occur during poor weather conditions (i.e., high winds, precipitation, etc.). The initial survey would begin on or after April 20 followed by a second survey 14 days later (earliest date for 2nd survey - May 4th). If cold, wet weather pushes the nesting period later into the spring, then the initial survey would also need to be pushed back accordingly. These two surveys will capture the vast majority of nesting MPs, with the intent of reducing the risk of concluding the site is not nesting habitat by an absence of nesting birds during a single survey. No surface disturbing activity would be allowed to occur until both surveys have been completed and one of the following two findings have taken place:

- If no MPs are found during either survey, then the disturbing activity must begin within 72 hours. If the disturbing activity doesn't commence within 72 hours, an additional survey will be required to check for late nesting MPs, which will start the clock again giving another 72 hour time period.
- If MPs are found during the first or second survey, then either:
  1. The activity can be postponed until July 10th with no additional surveys required;
    - or -
  2. Additional surveys could be done to locate active nests. Because of the colonial nature of MPs, the entire ¼ mile buffer area would need to be thoroughly surveyed. When nests are located the activity could commence after 37 days to allow the young MPs to hatch and be mobile, or the nest could be monitored and activity could commence after seven days post-hatching. If a brood of flightless chicks is observed, activities could commence after at least seven days.

### ***Raptor Nesting Sites***

In conformance with the USFWS consultation and BLM suggestions to not “take” protected species under the Migratory Bird Treaty Act and the Bald and Golden Eagle Protection Act, on the ground surveys would be conducted prior to any surface disturbing activities to ensure that no active raptor nests would be disturbed. Wyo-Ben personnel agree to mitigate potential impacts to raptors and raptor nesting sites by monitoring any nearby raptor nests in the spring of the year to determine species and activity status. The BLM would be notified if nest sites are discovered during mining activities; any active nest site would be evaluated for appropriate mitigation measures and buffer distance based on circumstances including: raptor species, nesting stage, activity, topography, and disturbance type. Generally, the Cody Field Office RMP states a ¾ mile buffer (or closer visual horizon) seasonal restriction, which could be applied depending on circumstances, from February 1st through July 31st for raptors and three zones of buffer restrictions for bald eagles. Results of monitoring would be reported and provided to the BLM.

### ***Noxious or Invasive Weeds***

Wyo-Ben, Inc. would be responsible for managing all noxious and undesirable invading plant species in the disturbed areas including, but not limited to cheat grass, Russian olive, and tamarisk, until the revegetation activities have been determined to be successful, and the bond has been released for a given area. If noxious or invasive weeds are encountered, the BLM and the Big Horn County Weed and Pest Department would be consulted by the operator for control and eradication methods. Written approval of the Pesticide Use Proposal submitted by Wyo-Ben Inc., from the BLM Authorized Officer must be obtained prior to usage of herbicides on public land. Newly arriving equipment would be cleaned free of plant material off site prior to arriving to the Pit 176G area.

## ***Roads***

All new roads would be constructed, and existing roads would be upgraded, according to BLM Manual Section 9113. Exceptions to this must be approved in writing by BLMs Authorized Officer.

### **4.2.2 STIPULATIONS**

Stipulations relative to the Proposed Action are discussed below. The best mitigation for the site has been included in the Proposed Action and described above.

(Note: The Authorized Officer as referred to below is the Field Manager of the BLM Cody Field Office)

### **Cultural Resources Standard Stipulations (compatible with the current 43 CFR 3809 regulations)**

The operator/holder is responsible for informing all persons associated with this project that they may be subject to prosecution for knowingly disturbing, altering, injuring, excavating, removing or destroying any historical or archaeological site, structure, building, or object on Federal lands.

The operator/holder shall immediately bring to the attention of the Authorized Officer any cultural resources that might be altered or destroyed on Federal lands by his/her operations. If archaeological, historical, or Native American resources are discovered, the operator/holder is to suspend all operations that further disturb such materials and immediately contact the Authorized Officer. Any such discovery shall be left intact until the operator/holder is told to proceed by the Authorized Officer.

The Authorized Officer shall evaluate the discoveries brought to his/her attention, take action to protect or remove the resource, and allow operations to proceed within 10 working days after notification to the Authorized Officer of such discovery. The decision as to the appropriate measures to mitigate adverse effects to cultural or paleontological resources shall be made by the Authorized Officer after consulting with the operator/holder.

Before a Plan of Operations is approved, the operator/holder is responsible for the cost of any investigations necessary, and any mitigation measures required by the Authorized Officer. The Authorized Officer would provide technical and procedural guidelines for the conduct of the required evaluation and mitigation. After the Plan of Operations is approved, or where a Plan of Operations is not involved, the Federal Government (BLM) shall have the responsibility and bear the cost of investigations and salvage of any cultural (and paleontological) values discovered by the operator/holder.

### ***Human Remains***

If human remains are discovered or suspected the operator/holder shall suspend operations immediately, physically guard the area, and notify BLM immediately.

### **Paleontological Resources Stipulations:**

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 fossils or other scientifically significant paleontological resources from the project area. Collection of vertebrate fossils (bones, teeth, turtle shells) or other scientifically significant paleontological resources 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 or other scientifically significant paleontological resources (fossils) are discovered on BLM-administered land during operations, the Operator shall suspend operations that could disturb the materials, stabilize and protect the site, and immediately contact the BLM Cody Field Office Manager (Authorized Officer). The Authorized Officer would arrange for evaluation of the find within an agreed timeframe 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 Authorized Officer.

3. **Avoidance:** All vertebrate or scientifically significant paleontological resources found as a result of the project/action will be avoided during operations. Avoidance in this case means “No action or disturbance within a distance of at least 50 feet of the outer edge of the paleontological locality”.

### **4.3 Residual Impacts**

#### *Alternative I: No Action*

There would be no residual impacts under the No Action Alternative, as the proposed mining would not be approved; there would be no new disturbance or impact on the land.

#### *Alternative II: Proposed Action*

The following are potential residual impacts that could occur as a result of the Proposed Action:

1) Though recontouring and reseeded of the land would follow the proposed mining process, the landscape would not look as it did prior to mining. Ridges would be lost or changed, reclaimed road beds may be present, drainages would be altered, and vegetation would be modified. This change in the Visual Resource may not be as aesthetically pleasing as the pre-mine landscape had been.

2) Reseeding would be done during the reclamation process of the Proposed Action, but the seeded species may not all reestablish. There would be residual effects on vegetation, as similar species to what existed pre-mining may not return over the short term or long term. Changes in soil characteristics would change the types of vegetation able to grow in the area. The revegetation would be especially difficult because the Bighorn Basin has been in a prolonged drought for the past 10 years. The proposed mine area could take decades after initiation of reclamation to achieve vegetative production and species diversity comparable to pre-mine conditions. It may take longer than 10 years to get bond release based on current methods, and pre-mine vegetative diversity and productivity may not be achievable as long as 30 to 50 years after initial disturbance. Also, the disturbed area would be very accommodating to weed species; some weed species cannot be eradicated from an area once they establish and would be present in the reseeded species for the future. Changes in vegetation would also affect surface water, soil stability and health, wildlife habitat quality and grazing.

3) The Proposed Action would involve the removal and then replacement of topsoil on the mined areas. This handling of topsoil would cause residual effects, as the biota within the soil and the soil's structure and chemistry would be modified during the process. Also, some of the soil would be lost to erosion during the proposed mining process. It may take decades before the soils would be able to function as they did before the area was mined and support a vegetative community. Changes in topsoil quality would have a residual effect on vegetation, surface water and related resources, wildlife habitat and grazing.

- 4) The Proposed Action would cause residual effects to wildlife populations, including those of migratory birds and BLM Sensitive Species, for decades. Even though the area would be reseeded, if the vegetation does not reestablish well or result in species similar to pre-disturbance conditions, wildlife would not be able to use the area as they did prior to mining. Also, habitat fragmentation will continue to occur throughout this, and surrounding, mine areas. Many wildlife species may not use undisturbed habitat within one mile or greater, of active mining areas. Over time, this would result in a much larger area in which use by wildlife could be lost, or greatly reduced.
- 5) The Proposed Action may have residual effects on livestock grazing if the vegetation does not reestablish after reclamation. Invasive weed species will also be given a chance to establish in the area, replacing native vegetation. If this happens, the number of AUMs in the allotments included in the proposed mining would likely be reduced for years until desirable vegetation reestablishes.
- 6) The Proposed Action would not result in any unavoidable residual impacts to cultural resources, unless such resources were located during mining or road construction and *not* reported to the BLM authorized officer. The Cultural Resource Stipulations listed in Section 4.2.2 would mitigate this residual impact. Improvement of haul roads could facilitate access to and within the project area, thereby increasing the potential for additional unauthorized surface collection and looting.
- 7) Removal of the bentonite resource under the Proposed Action would constitute an unavoidable long term, post-mining, irreversible and irretrievable (residual) impact on the locateable bentonite resource.

#### **4.4 Cumulative Impacts**

Cumulative impacts are discussed in the Cody Resource Management Plan (RMP) and Final Impact Statement, (1990). Typical activities are described in that document and are incorporated by reference into this environmental analysis.

Cumulative impacts are those that would result from the incremental impacts of the Proposed Action or Alternative I, 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 (40 CFR 1508.7). Cumulative impacts can result from individually minor, but collectively significant actions taking place over a period of time.

These reasonably foreseeable future actions refer to future action projections, or estimates, of what is likely to take place when a given proposed action is implemented. They are not part of the proposed action, but are projections being made so that future impacts, cumulative and otherwise, can be estimated as required by NEPA.

This Environmental Assessment has attempted to combine the results of internal scoping, describing the Affected Environment, and determining the Environmental Consequences, with incorporation of a Cumulative Effects Analysis (CEA), as per CEQ guidelines.

The geographic area analyzed for this CEA includes a relatively large area that spans approximately 3 miles in each direction around the proposed mine area (shown in CEA Maps 3, 4, and 5, below).

#### **4.4.1 PAST, PRESENT, REASONABLY FORESEEABLE FUTURE ACTIONS, AND INCREMENTAL EFFECTS**

Past, present and reasonably foreseeable future actions in the general Cumulative Effects Analysis Area (Maps 4, 5, and 6), as well as in the larger surrounding area in the Cody Field Office, are bentonite mining and livestock grazing. Therefore, these two major activities are discussed below as the primary land uses under analysis. The area also sustains recreational activities such as hunting, off-highway vehicle use, and other activities, but these land uses are not considered among the primary surface-disturbing land uses, and therefore, are not discussed below.

Cumulative effects are discussed below both generally for the eastern portion of the Cody Field Office, and for a more specific Cumulative Effects Analysis area as shown in Maps 4, 5, and 6.

The general analysis area selected for the Cumulative Effects Analysis (CEA) includes an area of approximately 6.5 miles in diameter, 33.2 square miles, or 21,248 acres out radially from the area of the Proposed Action (Maps 4, 5, and 6). This approach of generally delineating a CEA area has been accepted by the BLM field office management for the past 3 years as part of BLM's cumulative effects analyses. CEA area delineation will most likely be refined in the future, and use more of a watershed-based analysis area.

##### ***Past Actions:***

**BENTONITE MINING:** There are currently four companies mining bentonite in the Cody Field Office, and within the cumulative effects analysis area, including M-I Swaco, (M-I, L.L.C.), Wyo-Ben, Inc., Bentonite Performance Minerals (BPM), and American Colloid Company (ACC). Approximately 21,000 acres have been directly affected by bentonite mining in the Cody Field Office since it began in the 1960s. Approximately 13,020 acres (62%) of the 21,000 acres have been reclaimed and reseeded, leaving the balance (7,980 acres or 38%), as either active mining areas, areas that have been mined but pending reclamation, or as areas proposed for new mining. About 15% of all areas that have been disturbed by bentonite mining have been released from bond in the field office. Reclamation success has not kept pace with mining disturbance.

**LIVESTOCK GRAZING:** Livestock grazing has been, and continues to be, a major resource-use activity on BLM-administered public lands in the Cody Field Office and around the proposed mining areas analyzed in this EA. BLM grazing allotments are located throughout the entire field office, and grazing has occurred for over 100 years by cattle and sheep. It is difficult to quantify the actual direct and indirect impact that livestock grazing has had on the landscape, because much grazing occurred prior to BLM quantifying pre-grazing conditions. Improper grazing practices in general can have long-term effects to vegetative communities, including reduced species diversity, altered species composition, altered vegetative structure, altered abiotic processes (e.g., mean fire return interval), loss of topsoil, and increased invasibility of sagebrush communities (Crawford et al. 2004; Miller and Eddleman 2000). In the eighties and nineties, the livestock grazing was changed in the Lower Bear Creek and North Shell Group Allotments. Rotational grazing strategies, reductions in authorized use, and utilization limits for key plant species were implemented. These management changes have provided for adequate plant recovery time and leave ample residual vegetation following livestock grazing for watershed protection and wildlife habitat needs. Reclaimed areas can be impacted by livestock grazing if livestock are not fenced out of such areas. The effects of grazing can change from year to year depending upon how heavily the vegetation is grazed in relation to that year's vegetative forage produced. Annual forage produced varies depending on precipitation, and effects from previous years of grazing.

***Present Actions:***

**BENTONITE MINING:** Wyo-Ben, Inc. has currently affected or is planning to affect a total of 6,700 acres of land, of which, about 4,300 acres (~ 65%) have been reseeded and reclaimed and about 22% of that have been bond released. Of the reclaimed acres, about 1,500 have been recontoured, topsoiled, and have reestablished a native vegetative community sufficient enough to be bond released by the Wyoming Department of Environmental Quality (WDEQ). Currently, bentonite mining in the area is done by both Wyo-Ben, Inc, and M-I, L.L.C, and includes thousands of acres to the northwest, northeast, and southeast of the proposed mine area.

**LIVESTOCK GRAZING:** Within the cumulative effects analysis area analyzed in this EA (Maps 4, 5, and 6), are several active grazing allotments. The Pit 176G Extension area is located within the Lower Bear Creek and North Shell Group allotments, both which would temporarily lose less than one AUM until reclamation would be successful. Currently in the Lower Bear Creek Allotment, there are about 850 acres of land disturbed by bentonite mining, and 1050 more acres of approved mining that has not yet occurred (half of this allotment is located outside of the CEA boundary). Disturbance from mining has temporarily removed about 45 AUMs from livestock grazing, while the approved mining will remove another 55 AUMs. In the North Shell Group Allotment, there are about 1,750 acres of land disturbed by bentonite mining, of which about 400 have been bond released, and 1,250 more acres of approved mining that has not yet occurred (half of this allotment lie outside of the CEA boundary). Disturbance from mining is currently removing about 80 AUMs from livestock grazing, while the approved mining will remove another 70 AUMs. Collectively for both allotments, combining the current, as well as the planned mined acres, mining would reduce livestock forage by approximately 250 AUMs per year. It is estimated that all or a portion of 5,000 AUMs would be lost from livestock grazing over the next 20 years or more. Since reclamation of the mine areas occurs concurrently with mining, some AUMs are restored for grazing use, however as new land is disturbed, those AUMs are temporarily lost.

***Reasonably Foreseeable Future Actions:***

**BENTONITE MINING:** Bentonite has become a very important locatable mineral, being used for kitty litter, drilling mud to lubricate oilfield drilling equipment, as a binding agent for taconite iron pellets, as well as for crayons, medicines, food thickeners, and cosmetics to name a few. Sodium-bentonite deposits in Wyoming make up about 70% of the world's known supply, suggesting that bentonite mining will continue well into the future in Wyoming and the Bighorn Basin. It is currently economical to remove up to 50-80 feet of overburden to extract the bentonite. The BLM estimates another 9,000 to 10,000 acres of bentonite mining related disturbances will be proposed by bentonite mining companies in the Cody Field Office area in the reasonably foreseeable future.

**LIVESTOCK GRAZING:** Livestock grazing on public lands has been occurring for over 100 years in the Bighorn Basin. The present kind and number of livestock and the number of days/seasons they graze are expected to continue in the future.

***Incremental effect of each Alternative***

***Alternative I***

Alternative I would not add to the incremental effects that already exist in the area because the proposed bentonite mining would not take place.

***Alternative II***

**Pit 176G Modification CEA Area - Incremental Impact of the Proposed Action**

The BLM Cody Field Office staff conducted a general cumulative effects analysis (CEA) for the Proposed Action under this EA, using GIS overlays and field inspections.

The general analysis area selected for the CEA includes an area of approximately 33.2 square miles, or 21,248 acres (roughly one Township and Range) out radially from the area of the Proposed Action (Maps 4, 5, and 6). This approach of generally delineating a CEA area has been accepted by the BLM field office management for the past 3 years as part of BLM's cumulative effects analyses. CEA area delineation will most likely be refined in the future, and use more of a watershed-based analysis area.

Within this CEA area, approximately 1,000 acres have been disturbed by bentonite mining (~4.7% of the total area); and approximately another 1,000 acres are planned for new mining (4.7% of the total area) over the next 15-20 years. The Proposed Action incrementally adds 5 acres of mining disturbance within the analysis area, or 0.02% of the total CEA area.

Several maps were generated using ArcMap9 GIS software, to overlay existing and known projected land uses, known wildlife/T&E/BLM Sensitive species habitats and nesting sites, and general vegetation communities, along with past, current and proposed bentonite mining and other land uses, in the area northeast of Greybull, WY. These maps are provided below as CEA Maps 3, 4 and 5.

Generally about 15% of the amount of land mined for bentonite in the field office has been successfully reclaimed (released from bond) since bentonite mining began in the 1960's. Approximately 85% of the land disturbed by bentonite mining is either "reclaimed" but not released from bond because it doesn't yet meet reclamation bond release standards, or in active mining, or proposed mining status. The bentonite companies continue to post larger and larger reclamation bonds each year in order to continue to mine, which is all that is required by the regulations. The BLM and the WDEQ will not release bonds until the reclamation meets specific standards.

### **Effect of Mining on Livestock Grazing**

Bentonite mining incrementally reduces the amount of vegetation, wildlife habitat, and livestock forage, and can effect ranching families and their life styles. Bentonite mining is encroaching on portions of these operations, in some cases increasing problems with use of existing range improvements, costing extra time and money to maintain range improvements, and gathering up livestock for various reasons that are associated with mining activities (i.e., gates left open, fences down, cattle guards filled with dirt from haul trucks, cattle traveling long distances on haul roads and into unauthorized areas, etc.). Presently in this CEA there are approximately 1,000 acres disturbed by mining, equating to some financial and operational losses to the permittees that graze livestock within the CEA area.

A total of 5 acres of public lands and the forage it produces for livestock grazing annually would be directly affected by the proposed Pit 176G Modification over time. Generally, AUMs available for livestock grazing would most likely continue to be temporarily reduced, as bentonite mining continues to remove available forage until reclamation is considered successfully completed. Depending on the number of acres of mining approved in the area, and the number of those acres that are mined at one time by various mining companies, local grazing allotments would potentially lose hundreds, if not thousands, of AUMs prior to successful reclamation.

It also equates to a loss of wildlife forage/habitat and ground cover. In another 15 years, loss of forage could nearly double in the CEA area depending on bentonite market conditions. If the amount of disturbed acreage continues to increase as expected, coupled with the amount of time needed for vegetation to reestablish after land reclamation, cumulative impacts will not only increase on the mined/disturbed areas, but also on the remaining undisturbed lands as demands increase for forage from those undisturbed lands.

### **Effect of Mining on Wildlife**

Wildlife habitat is lost and made less suitable through habitat loss, fragmentation, and degradation, until reclamation is successful. Wildlife populations were more resilient with higher populations and more available habitat prior to mining; impacts had less effect on wildlife and populations could compensate better to habitat loss. Species most affected by these incremental mining actions have been listed as BLM Sensitive species and now require conservation actions to stop further decline or possible placement on the Threatened and Endangered species list. The incremental effect of the Proposed Action, in addition to past and present disturbances, may further fragment and reduce population size and connectivity, possibly adding to the justification to warrant species listing under the Threatened and Endangered Species Act. Through these mining impacts, and other factors on the landscape, many allotments fail Standard 4 of Healthy Rangelands in Wyoming for wildlife habitat quality. Past, present, and future actions may cause more allotments to fail Standard 4. This proposed action would be a major consideration when assessing Rangeland Health.

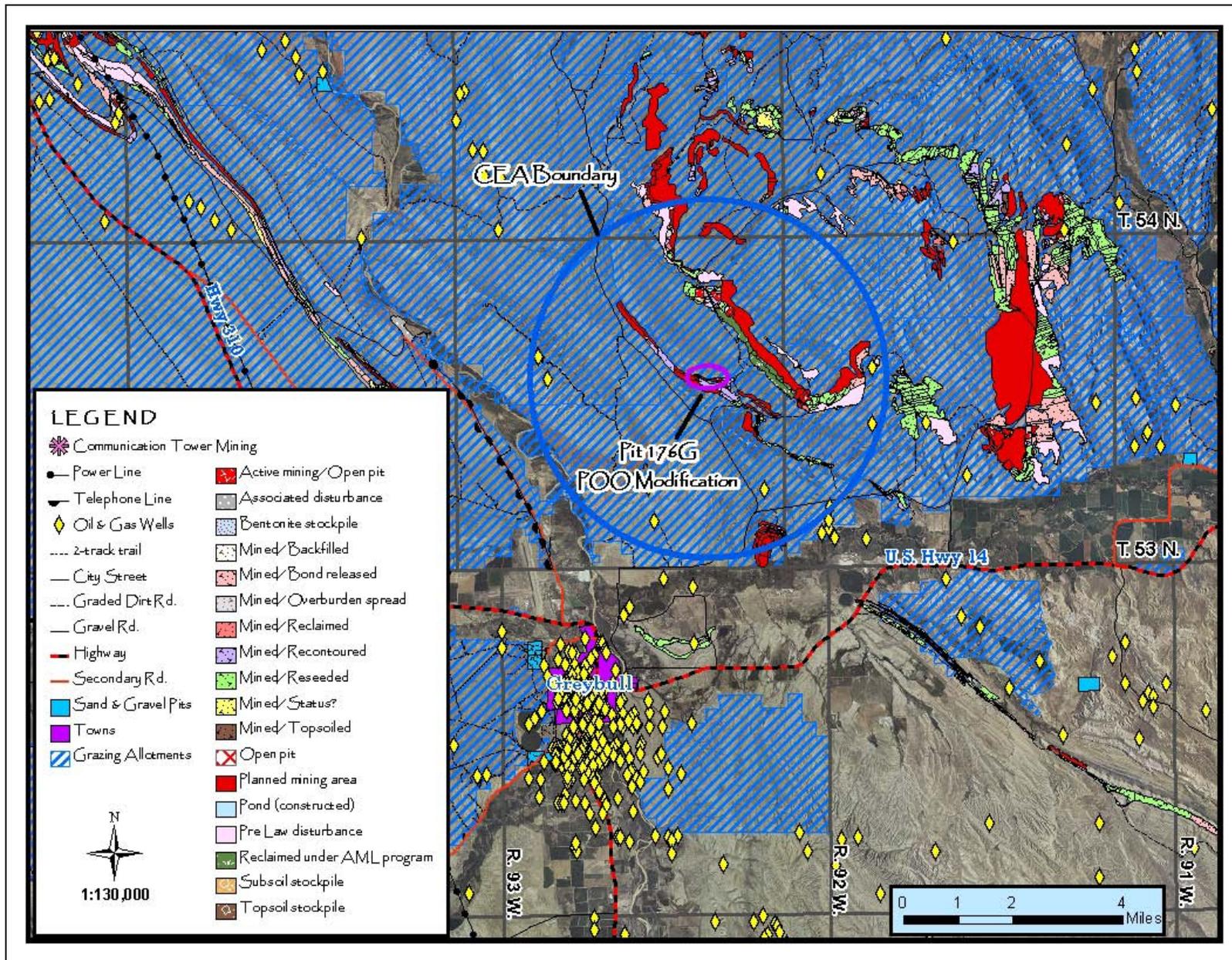
### **Effect of Mining on Water, Riparian-Wetland Areas, and Aquatic Habitats**

The mining and attendant road system disturbance and other environmental affects modify hydrology, sediment regimes, and water chemistry which cause impacts to water, riparian-wetland areas, aquatic habitats and the species that use them. As the surface disturbance associated with mining increases (and is not successfully reclaimed) water-related impacts incrementally accrue inside and outside of the CEA boundary.

### **Cumulative Effects Analysis Summary**

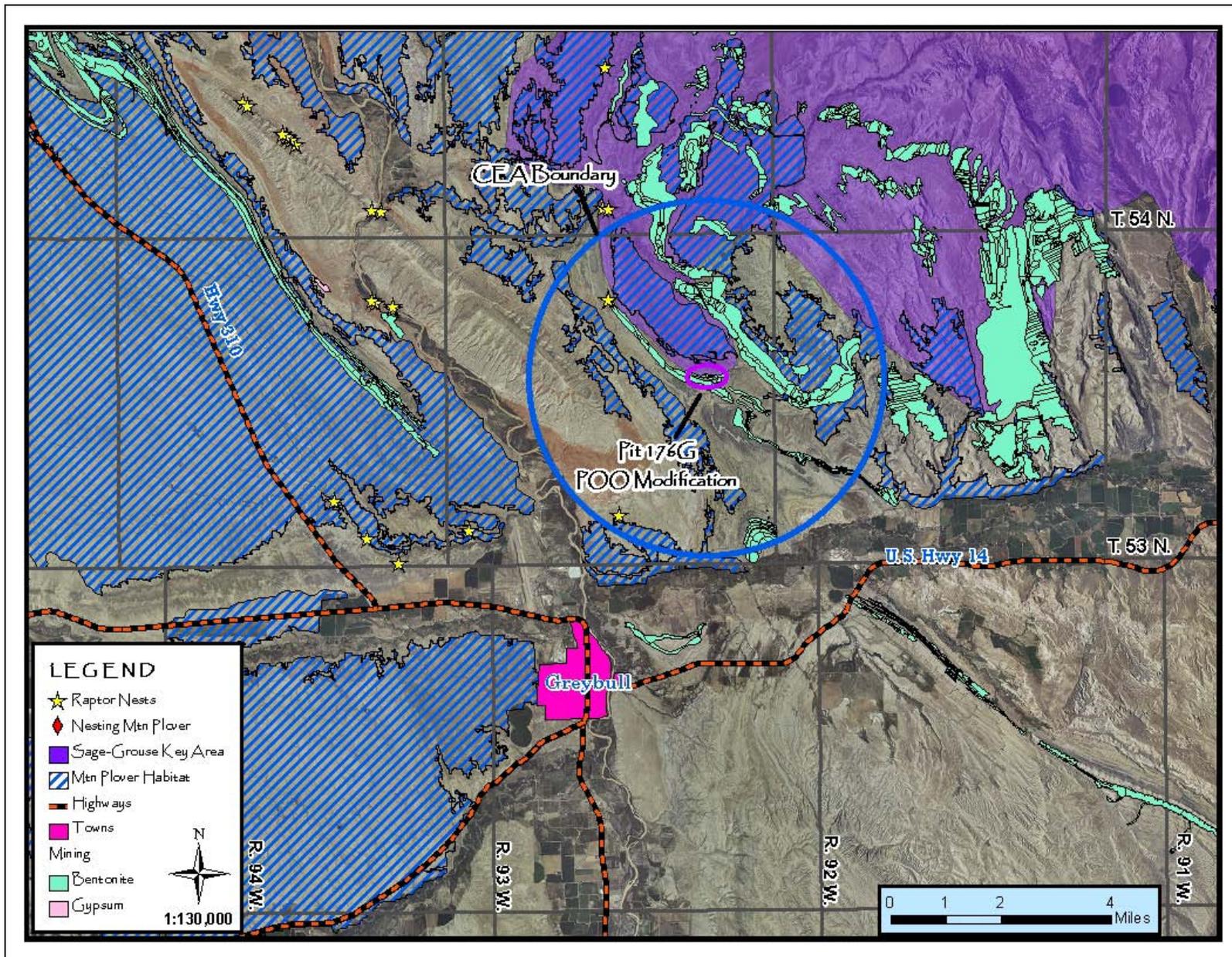
Relative to the chosen geographic scope for the Pit 176G Modification analysis, the following analysis is presented. Under the Proposed Action, the projected maximum incremental amount of new disturbance per year by Wyo-Ben, Inc. would be approximately one acre, anticipated over the five-year life of the mine. The Proposed Action would incrementally add five acres of mining disturbance within the CEA area, or 0.02% of the total CEA area. There are approximately 1000 acres of approved mining, not including the Pit 176G Modification, in the CEA area, which will be mined over the next two decades.

Under the Proposed Action, mining and reclamation occur concurrently as part of the castback method. Based on the known affected environment and environmental consequences of the Proposed Action; the cumulative effects analysis relative to the Proposed Action indicates that, at this time, the incremental effects of the Proposed Action, coupled with other existing and planned land uses on wildlife habitats/species, vegetation, and soils, could be mitigated or reduced over time, depending on recovery time, adequate precipitation, and reclamation success, using the stipulations, BMPs, mitigation and monitoring measures outlined in the proposed Mine and Reclamation Plans, if approved by the WDEQ-LQD and the BLM, and properly implemented by Wyo-Ben, Inc.



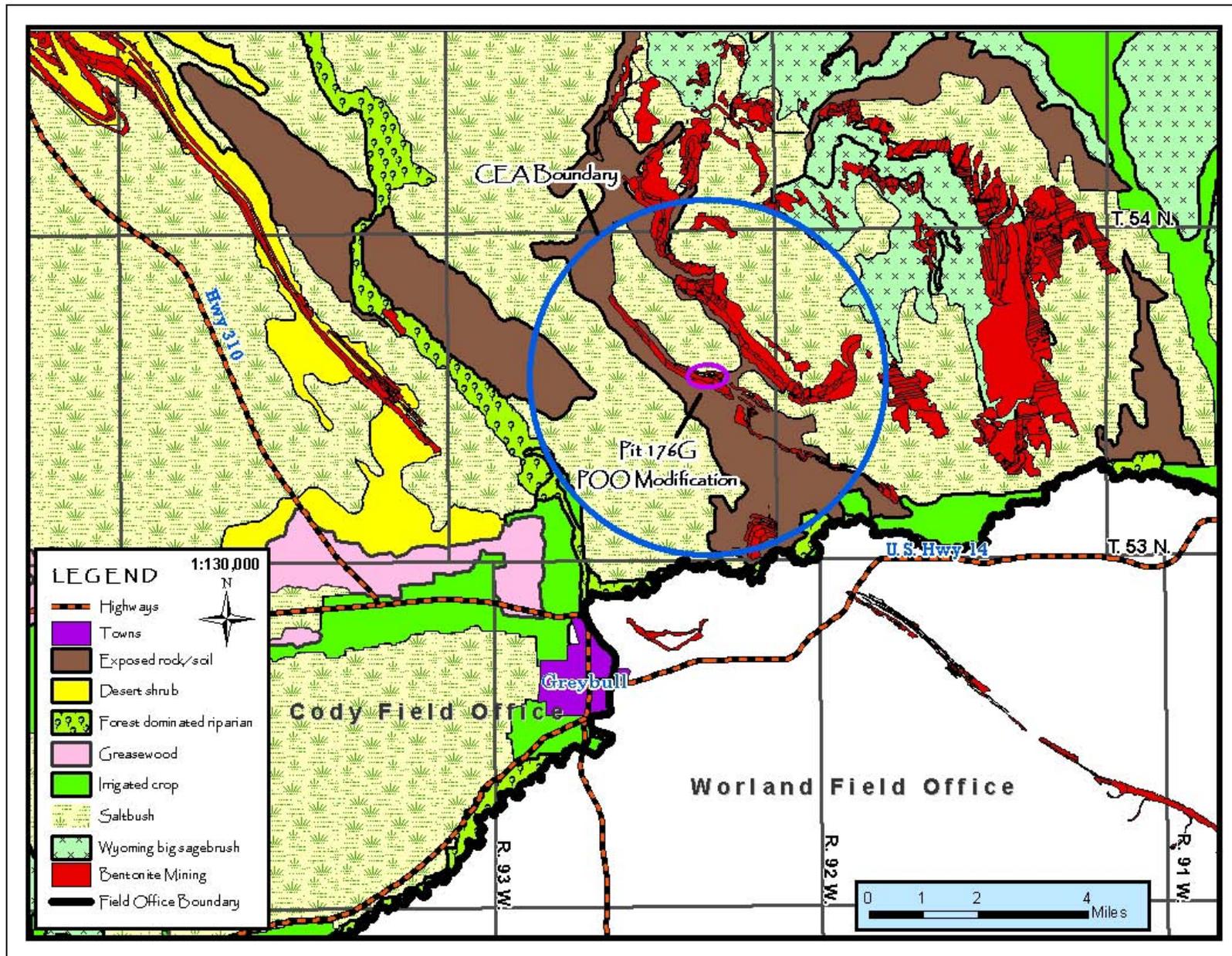
**Map 3. Land uses (existing and proposed) within the Pit 176G Modification Cumulative Effects Analysis Area** Grazing, bentonite mining (present and reasonably foreseeable future), sand and gravel mining, roads, and oil field development were analyzed.

*No warranty is made by the BLM for use of this data for purposes not intended by the BLM*



**Map 4. Raptor nest sites, Mountain Plover Habitat, and Sage-grouse Key Areas in the Pit 176G Modification Cumulative Effects Analysis Area**  
 The whole map frame includes potential sage-grouse habitat.

*No warranty is made by the BLM for use of this data for purposes not intended by the BLM*



**Map 5. Vegetation Types within the Pit 176G Modification Cumulative Effects Analysis Area**

*No warranty is made by the BLM for use of this data for purposes not intended by the BLM*

## **5.0 List of Preparers:**

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Geology

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## Appendix A – Climate

CLIMATE: Climate of the area is typical of cold desert regions of the inter-mountain west. The Pit 176G Plan of Operations area falls under normal conditions, in a 5-9 inch precipitation zone, and a 23-25 inch evapotranspiration zone. However, the entire Bighorn Basin has been experiencing a severe drought since 1999 with precipitation rates generally much lower than average (NCDC, 2006). Prior to the current drought conditions, climate in this area was typical of cold desert regions of the inter-mountain west, with long, cold winters; hot, dry summers and moderate to high winds.

Between 1948 and 2005, the mean average annual high temperature in the area was 58.9°F, and the mean average annual low temperature is 30.5°F (See Table 6 below). Average total annual precipitation during this time span is 6.53 inches. The table provides more specific average data on a monthly basis. The current drought, now in its 8<sup>th</sup> year, may be a result of a warming trend due to anthropomorphic climate changes that are affecting the entire globe (IPCC, 2007). This drought is forecast to persist into and beyond 2008 (NOAA, 2007 as per <http://www.noaanews.noaa.gov/stories2007/images/drought-outlook-03-15-2007b.jpg> ).

The following table provides a summary of climatic data for Greybull, Wyoming (located south of Lovell, WY) from 1948 to 2005 as recorded by the Greybull, Wyoming NCDC station:

**Table 6. Lovell, Wyoming (485770) Period of Record Monthly Climate Summary**

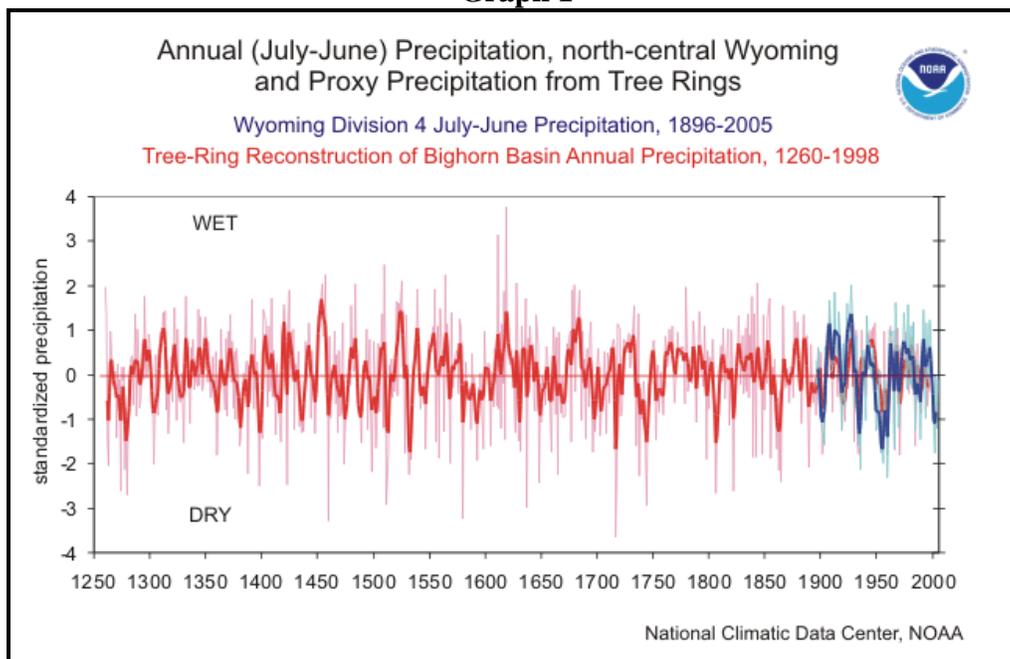
Period of Record : 8/ 1/1948 to 12/31/2005

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
Average Max. Temperature (F)	29.7	37.8	47.7	58.8	68.7	78.5	87.8	86.0	73.7	61.1	44.1	33.3	58.9
Average Min. Temperature (F)	5.1	12.1	21.0	30.9	41.5	49.5	54.7	51.7	41.0	30.6	18.9	9.0	30.5
Average Total Precipitation (in.)	0.22	0.16	0.30	0.65	1.14	1.18	0.65	0.55	0.69	0.53	0.24	0.21	6.53
Average Total SnowFall (in.)	3.9	2.1	2.2	0.9	0.1	0.0	0.0	0.0	0.5	0.6	1.3	4.4	16.0
Average Snow Depth (in.)	2	0	0	0	0	0	0	0	0	0	0	0	0

A National Climatic Data Center (NCDC) is located in Lovell, Wyoming. Graph 1 below (from the NCDC website - annual values in light blue, 5-year weighted average in dark blue) shows the average annual (July-June) precipitation, 1896-2005, for Wyoming Division 4 (which includes Lovell, WY). Several severe multi-year drought events can be seen in this record: around 1900; the mid-1930s Dust Bowl; the 1950s; and the last six years (1999-2005), all of which have been below the long-term average.

Also shown on Graph 1 below above is a 739-year tree-ring reconstruction (1260-1998) of Bighorn Basin annual precipitation (annual values in light red; 5-year smoothed values in dark red), developed by Gray et al. (2004). As per NCDC: “...this reconstruction is based on four long tree-ring chronologies (one Douglas-fir, three limber pine) from the Bighorn Basin, and was calibrated on an instrumental precipitation record (1907-1996) averaged from five long-term weather stations in the Bighorn Basin, four of which are within Wyoming Division 4: Buffalo Bill Dam, WY; Lovell, WY; Powell Field Station, WY; Worland, WY; and Bridger, MT. The reconstruction was calibrated on a 13-month “annual” period (June-June), but it correlates well with the Wyoming Division 4 annual (July-June) precipitation. Over their common period (1896-1996) the correlation is 0.602, indicating a high degree of shared variance. The precipitation units shown are standardized for comparison; negative values indicate below-average precipitation, and positive values indicate above-average precipitation.”

**Graph 1**



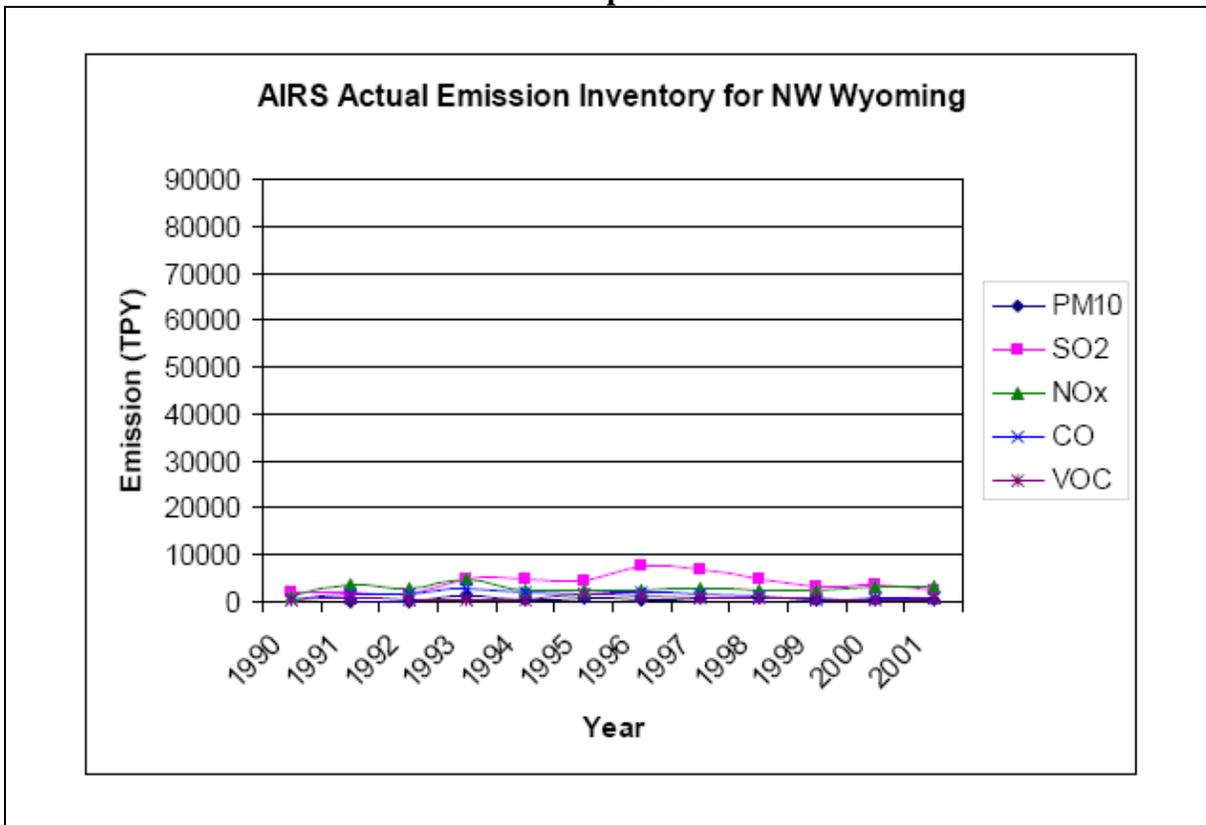
Average maximum temperatures for the Pit 176G area are during the months of June, July and August as expected, and average minimum temperatures are during the months of December, January and February. Average maximum and minimum temperatures are 60.9°F and 31.1°F, respectively. Average total precipitation for the area is 6.88 inches/year with most of this precipitation falling during the months of May and June. The nearby town of Lovell, Wyoming has average annual precipitation of 5-8”, approximately 50% of which falls between April and October. The remainder falls during the months of December through February in the form of snow and/or rain.

The proposed pits are located in the 5 to 9 inch precipitation zone (USDA-SCS, January, 1982). The average annual air temperature is 47 to 55 degrees Fahrenheit. The growing season for cool season species is approximately April 15 to June 30.

## Appendix B – Air Quality Data

Graph 2 and Table 7 below (1990-2001) are provided in Appendix G, Emissions Data Assessment of the WDEQ Air Quality Division report entitled “2003 Review Report on Wyoming Long Term Strategy for Visibility Protection in Class I Areas”. This report provides some general baseline data on air quality in northwest Wyoming. Emissions shown on the graph are particulate matter 10 (PM10), sulfur dioxide, carbon dioxide, nitrogen oxides, and volatile organic compounds. Most of these emissions are due to industry and the use of vehicles and equipment. PM10 is particulate matter with an aerodynamic diameter of up to 10 micrometers (about 1/7 the diameter of a single human hair). Particulate matter includes dust, soot and other tiny bits of solid materials that are released into and move around in the air. Particulates are produced by many sources, including burning of diesel fuels by trucks and buses, incineration of garbage, mixing and application of fertilizers and pesticides, road construction, industrial processes such as steel making, mining operations, agricultural and forest burning, and operation of fireplaces and woodstoves. Emission levels in northwest Wyoming are much lower than levels in highly developed and industrialized areas.

Graph 2



**Table 7**

NW WY Actual Emissions (tons per year) Big Horn, Hot Springs, Park, Teton, Washakie counties					
Year	PM10	SO2	NOx	CO	VOC
1985		3696	1784	325	76
1990		2149	1374	277	272
1991	38	2029	3434	1670	690
1992	143	1605	2855	1508	452
1993	1089	4842	4842	2920	393
1994	556	4967	2578	2167	504
1995	737	4316	2410	1480	1428
1996	603	7794	2378	1952	1259
1997	791	6975	2638	1639	919
1998	618	5021	2416	1334	732
1999	553	3342	2483	560	708
2000	542	3590	3027	644	602
2001	473	2532	3086	990	650

## Appendix C – BLM seed policy in IM-2006-073

UNITED STATES DEPARTMENT OF THE INTERIOR  
BUREAU OF LAND MANAGEMENT  
WASHINGTON, D.C. 20240  
January 20, 2006

EMS TRANSMISSION 01/27/2006  
Instruction Memorandum No. 2006-073  
Expires: 09/30/2007

To: All Field Officials

From: Director

Subject: Weed-Free Seed Use on Lands Administered by the Bureau of Land Management

Program Area: All programs which place seed, or approve the placement of seed on public lands.

Purpose: This Instruction Memorandum (IM) describes Bureau of Land Management (BLM) policy for the quality of seed purchased by BLM for use on public lands.

Background: The BLM Manual Section 1745 (1992) establishes policy and guidance for transplantation, augmentation, and reestablishment of habitat on public land utilizing native, and when necessary, introduced plant species. This action will comply with all Federal and State regulations, restrictions, and requirements governing the release and distribution of non-native exotic plants, including weed seeds.

BLM's Partners Against Weeds – An Action Plan for the Bureau of Land Management, January 1996, outlines BLM's plan to prevent and control the spread of noxious and invasive weeds on BLM lands. In addition, the 1999 Executive Order No. 13112 on Invasive Species states that each Federal agency shall not authorize, fund, or carry out actions that are likely to cause or promote the introduction or spread of invasive species in the United States.

The BLM obtains/purchases native or introduced plant seed, from seed producers and collectors for stabilization, rehabilitation, or restoration of public land. Prior to BLM accepting seed from any source, all seed must be tested for noxious weed seed at official state seed analysis labs. Noxious weed seed is not allowed in certified seed according to individual State's Department of Agriculture seed law and the Federal Seed Act. It has been acceptable for the seed lot (excluding species on the State and Federal noxious weed seed list) to contain from 0.5 percent to 2.0 percent of other "weed" seed depending on the State. "Other weed seed" is defined as any non-noxious weed seed, such as cheatgrass (downy brome) or Russian thistle, in the State(s) of concern. When purchased, all seed must also be of certified quality or source-identified.

Policy/Action: All Field Offices are required to use seed on public lands that contain no noxious weed seed and meets certified seed quality. All seed to be applied on public land must have a valid seed test, within one year of the acceptance date, from a seed analysis lab by a registered seed analyst (Association of Official Seed Analysts). The seed lab results shall show no more than 0.5 percent by weight of other weed seeds; and the seed lot shall contain no noxious, prohibited, or restricted weed seeds according to State seed laws in the respective State(s). The seed procured for use on public land will meet the Federal Seed Act criteria. Seed may contain up to 2.0 percent of "other crop seed" by weight which includes the seed of other agronomic crops and native plants; however, a lower percent of other crop seed is recommended. Copies of the seed lab test results, including purity and germination (viability) rate, must be forwarded to the appropriate BLM office prior to seed application. If the seed does not meet the BLM and State/Federal standard for noxious weed seed content or other crop seed allowances, it shall not be applied to public land. All seed test results must be retained in the seeding project file.

The BLM State contracts for seed may be more restrictive with "other weed seeds" of concern as deemed necessary.

All donated seed or seed used for "mitigation or restoration" by contractors per a reclamation plan must meet BLM's noxious weed seed policy prior to use on public lands.

An exemption will be allowed for small reclamation projects, less than 20 acres or not to exceed 200 pounds of seed, which have an approved BLM reclamation or rehabilitation plan or permit. The seed will be accepted if accompanied by

an official seed analysis report that provides documentation to show no noxious weed seed per State(s) weed law and no more than 0.5% other weed seeds. For this exception, any one of three seed test documents will be accepted:

1. A certified "blue" tag or tags.
2. An independent seed lab test.
3. A seed lab analysis supplied by a vendor either by seed lot or by seed mix.

Straw or mulches applied as part of seeding, stabilization, rehabilitation, or restoration projects on public lands must be certified to be weed seed-free.

Timeframe: Effective immediately.

Budget Impact: Approximately 80% of the seed used on public lands is purchased during a National Seed Buy (three times a year average) via a national seed contract. Under this contract, the seed must be tested prior to acceptance and payment. Therefore, there will be no new costs associated with the National Seed Buy. For offices and programs not currently testing their seed for noxious weeds or are approving project proponents to apply seed on public land without first testing for noxious weeds there will be a slight increase in the cost of seeding treatments. A typical seed test costs between \$120-220 per lot for purity, germination, and noxious weed seed analysis.

Manual/Handbook Sections Affected: None.

Coordination: Coordination for this IM has been with WO-200, WO-220, WO-230, WO-270, WO-310, ID-930, BC-660.

Contact: If you have any questions on policy, please contact Jack Hamby, National ES&R Program Lead, at (202) 452-7747 or via email at [Jack\\_Hamby@blm.gov](mailto:Jack_Hamby@blm.gov). Questions pertaining to seed test, viability, seed lot tags, or weed seeds should be directed to Scott M. Lambert, National Seed Coordinator, Idaho State Office, at (208) 373-3894 or by e-mail [Scott\\_Lambert@blm.gov](mailto:Scott_Lambert@blm.gov).

Signed by:  
Lawrence E. Benna  
Acting, Director

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