Environmental Assessment

American Colloid Company – Pete Plan of Operations (WYW-155962) and Amendment to WDEQ Permit 322C for Bentonite Mining

DOI-BLM-WY-020-2013-0038-EA

September 2013

BLM

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

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BLM/WY/PL-13/032+1330

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1.0 INTRODUCTION

1.1 Background

The Bureau of Land Management (BLM) received a Plan of Operations (WYW-155962 Modification) from American Colloid Company (ACC), seeking approval to expand their mining operations located seventeen miles east of Lovell, Wyoming in T. 55 N., R. 93 W. Sections 5, 7, 8, 9, 16 and 17. Prior to submitting this Plan Modification, ACC 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 614.8 acres of disturbance to the existing Wyoming Department of Environmental Quality (WDEQ) – Land Quality Division (LQD) Permit 322C located in Bighorn County, Wyoming over the life of the operation (see Map 1). Of the 614.8 acres of proposed mining, 122.1 acres would be located on BLM-managed federal land administered by the Cody Field Office (CYFO) area (T. 55 N., R. 93 W. Sections 8 and 17) and the remaining 492.7 acres would be on ACC patented land (T. 55 N., R. 93 W. Sections 5, 7, 8, 9, 16, and 17). On public land, new bentonite mining is proposed on the unpatented Pete and Sue claims within an amended and updated WDEQ State Permit 322C mine area.

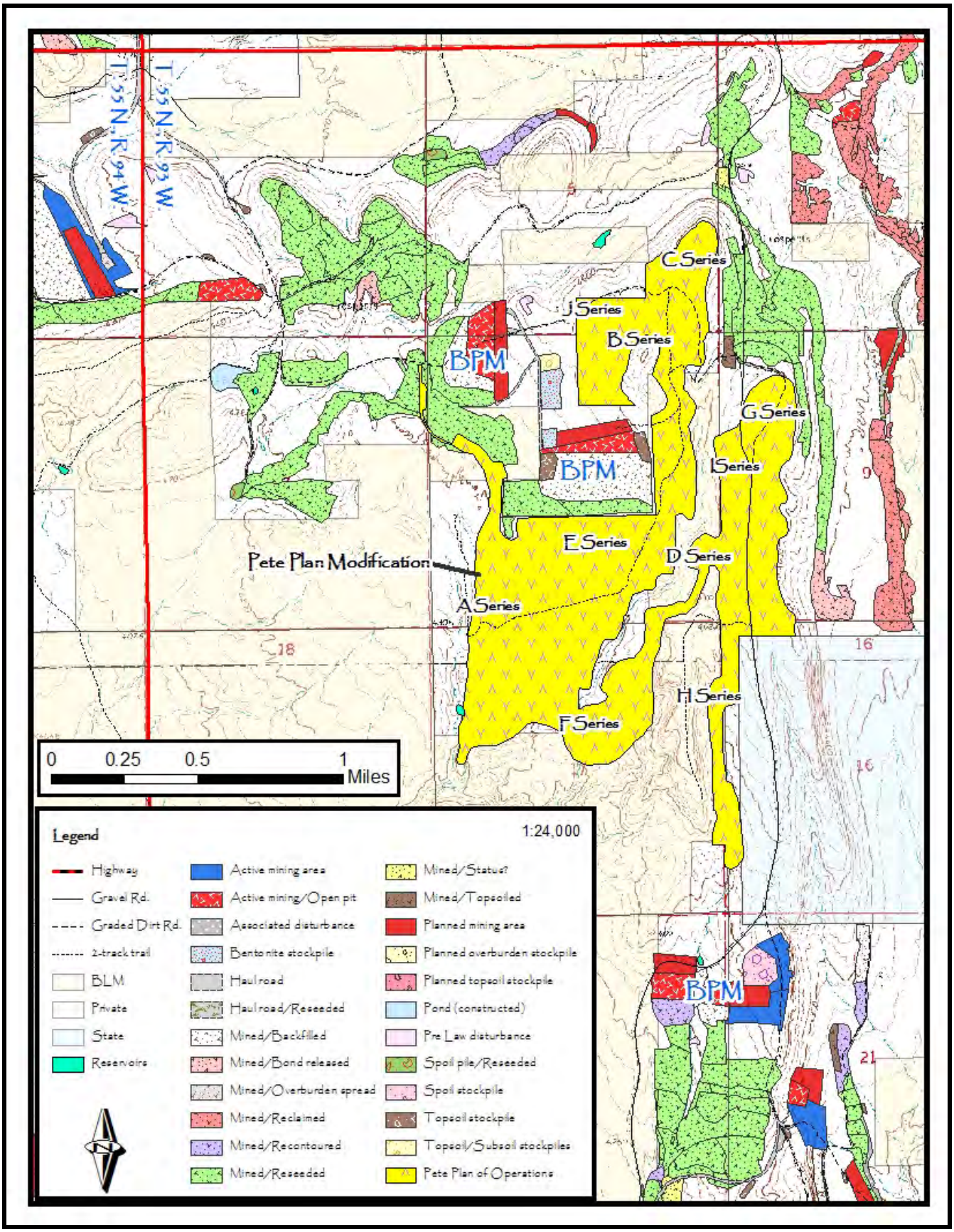
ACC was first issued Permit 322C by the WDEQ-LQD in 1974. Since that time, numerous amendments and updates to the permit have been approved by the WDEQ-LQD. ACC has currently disturbed approximately 3,300 acres of land in the Bighorn Basin (*ACC, 2012 Annual Report*). Of that total, approximately 2,538 acres (77%) have been mined, reseeded and are still bonded, 360 acres (11%) have been reclaimed and released from bond, and 400 acres (12%) are part of current active mining areas in the basin. A National Environmental Policy Act (NEPA) analyses has been conducted whenever public lands were proposed to be mined since 1981.

1.2 Purpose and Need

The purpose of the proposed project is to allow ACC to develop its mining claims on BLM-managed lands in T. 55 N., R. 93 W. Sections 8 and 17. The need for this project is established by the BLM's responsibility to the rights of entry and use under the Mining Laws (1872), as amended, and the requirements in the regulations at 43 CFR (Code of Federal Regulations) §3809 to review the submitted Plan of Operations Modification to ensure the prevention of unnecessary or undue degradation and proper reclamation bonding.

Decision to be Made

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



Map 1. ACC's Pete Plan of Operations Modification area (represented by yellow "Pete Plan of Operations" feature in the Legend).

1.3 Issues identified during scoping

Internal scoping conducted in the BLM CYFO by an interdisciplinary team was completed in December of 2012. No mine plan revisions were requested during internal scoping. No unusual environmental issues were identified relative to the proposed mine plan. The EA was listed on the Wyoming BLM State Office NEPA Register webpage on January 8, 2013, which notified the public of the impending mine plan. Internal scoping resulted primarily in the following BLM specialist concerns:

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 would modify the hydrology associated with the area mined that 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 would be disturbed and altered 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) Invasive weed species could spread through the proposed mining process.
6) The disturbance caused by the proposed bentonite mining would affect suitable habitat for mountain plover and other migratory bird species.
7) Bentonite mining would affect wildlife habitat, including important antelope winter range, and use in the proposed mining area.
8) Bentonite mining would increase the number of roads into the proposed mining area, which could increase human disturbance to cultural and wildlife resources.
9) Trespass livestock issues may evolve if the allotment boundary fence that exists in the proposed Modification area would not be maintained and kept in operating condition.
10) The proposed mining would cause a temporary loss of forage for livestock and wildlife until the mined areas would revegetate adequately.

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 has not been withdrawn from mineral entry; therefore it is 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 BLM is required under the mining laws and the surface management regulations at 43 CFR 3809, to review Plans of Operation for compliance with the regulations and to ensure the mining plan would not cause unnecessary and undue degradation as defined in 43 CFR§ 3809.5. The No Action Alternative (Alternative I) could only be selected should the proposed Plan Modification result in unnecessary and undue degradation of the public lands.

Mining laws means the Lode Law of July 26, 1866, as amended (14 Statute 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. (United States Code) 611–614); and the Federal Land Policy and Management Act of 1976 (43 U.S.C. 1701 *et seq.*).

RMP Maintenance: 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.

State Statutes and the WDEQ-LQD and BLM Memo of Understanding (MOU): The 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. ACC 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).

Clean Water Act Compliance: 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, ACC 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.

Herbicide Use Compliance: The use of herbicides and their application on cheatgrass was analyzed in the Vegetation Treatments Using Herbicides on Bureau of Land Management Lands in 17 Western States Programmatic Environmental Impact Statement (2007).

Sage Grouse Instruction Memorandum Compliance: On Feb. 10, 2012, the BLM Wyoming State Office issued Instruction Memorandum (IM) WY-2012-019 entitled "Greater Sage-Grouse Habitat Management Policy on Wyoming Bureau of Land Management (BLM) Administered Public Lands Including the Federal Mineral Estate." Mining activities regulated on federal surface or federal mineral estate may not be affected by this new sage grouse IM. The following narrative was taken from pages 18-19 of the Wyoming Instruction Memorandum WY-2012-019:

> Locatable Mineral Activities (applies to actions under 43 CFR 3809 only): Notices or Plans of Operation, or modifications thereto, submitted following the issuance of this guidance:

> As part of the 15 day completeness review of notices [or modifications thereto] and 30 day completeness review of plans of operations [or modifications thereto], the proposed project area(s) where exploration, development, mining, access and reclamation would take place should be reviewed for overlap of sage-grouse core areas in the corporate GIS database."
>
> If there is overlap, the BLM AO may notify the operator of ways that they may minimize impacts to core area habitats and request the operator to amend its notice or plan to include such measures. The request to amend the submitted notice or plan of operations must make clear that the operator's compliance is not mandatory and that including such measures is not a requirement for completeness of either the notice or a plan of operations, nor is it a condition of acceptance of the notice or approval of the plan of operations.

Standards for Healthy Rangelands and Guidelines for Livestock Grazing Management: The general health of rangelands managed by the BLM is measured by the standards set in the Standards for Healthy Rangelands and Guidelines for Livestock Grazing Management (1997).

2.0 PROPOSED ACTION AND ALTERNATIVES

2.1 Alternative I – No Action

Under the No Action alternative, the BLM would not approve ACC's Pete Plan of Operations Modification if it determined that it would cause unnecessary or undue degradation (as per federal regulations at 43 CFR 3809.5). ACC's proposed new mining in the Pete area would not be approved and no new mining would occur.

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 is American Colloid Company (ACC).

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

The Pete Plan of Operations Modification is proposed to have a ten-year mine life, which would commence upon its approval. Of the 614.8 acres of proposed mining for bentonite clay, 122.1 acres would be located on BLM-managed federal land administered by the Cody Field Office (CYFO) area (T. 55 N., R. 93 W. Sections 8 and 17) and the remaining 492.7 acres would be on ACC patented land (T. 55 N., R. 93 W. Sections 5, 7, 8, 9, 16, and 17) in Bighorn County, Wyoming. This location is approximately 15 miles east of ACC's Lovell, Wyoming Plant. Approximately 60 acres per year would be disturbed over the life of the mine.

Mining activities would include surveying in pit areas, stripping and stockpiling topsoil and subsoil, removal of overburden from the clay bed(s), stripping and hauling of product (bentonite), backfilling the pit with overburden, recontouring the area, and final reclamation including spreading sub- and topsoils, followed by seeding. During mining operations, temporary parking and fueling of equipment, as well as stockpiling of overburden and bentonite, would occur in some areas; topsoil in these areas would have been cleared and stockpiled.

Bentonite mining would typically be conducted using the cast-back method, where, after top and subsoil removal and salvage, overburden from a pit would be used to backfill the adjacent preceding pit that had been mined out. In other words, pit reclamation would take place concurrently with product mining where possible. Mining would generally consist of mining small pits (one to three acres in size) in a cut and fill procedure. First, topsoil and subsoil would be stripped with scrapers in two separate lifts, and stockpiled separately, or live spread directly onto previously backfilled pits. Topsoil and subsoil from all affected areas would be salvaged prior to disturbance. Occasionally, the first pit in a sequence would produce an out-of-pit spoil pile (OOPS) that may or may not be used as backfill material into a subsequent pit. After backfilling the pit with overburden, the surface would be graded to mirror the original topographic contour, topsoiled, and reseeded as per the proposed Modification mine and reclamation plan.

The bentonite bed would be removed with rubber-tired front-end loaders. It would be either field dried, stockpiled on a pad of overburden adjacent to the pit, or hauled immediately to the Lovell facility for processing, using loaders and haul trucks. Containment berms or basins would be constructed around any bentonite stockpiles. ACC uses the following equipment: D-8, D-9L, D10N, D11N, and D-9N Caterpillars, Caterpillar 637 scrapers, Caterpillar 980 front-end loaders, 140G or 16G motor graders, over-the-road belly dump haul trucks, and PC 308 excavators.

Topsoil and subsoil stockpiles would be clearly marked with signs reading "TOPSOIL" and "SUBSOIL." Stockpiles that would be left in place for more than one year would be seeded. Stockpiles would be reseeded in the spring or fall following initial seeding, if erosional stability is compromised due to insufficient vegetation establishment. Topsoil that would not be stockpiled would be live spread (directly spread onto previously backfilled and contoured areas). The following seed mix would be used on topsoil stockpiles left in place for more than one year:

Seed Species	**Rate-lb PLS/acre**
Thickspike wheatgrass (*Elymus lanceolatus*)	1.0
Slender wheatgrass (*Elymus trachycaulus*)	5.0
Russian wildrye (*Psathyrostachys juncea*)	1.0
Annual Sunflower (*Helianthus annuus*)	0.5
Cover Crop*	10.0
	17.5 lb PLS/acre

**barley, winter wheat, or annual ryegrass*

Western wheatgrass or streambank wheatgrass could be substituted for thickspike and slender wheatgrass, as they may do better with the low precipitation in the proposed mine area.

Thickness of the bentonite beds within the Pete Modification area is on average two feet thick. The average overburden thickness in the proposed pit sequences would be on average 31 feet but would range from one to 45 feet, with pit volumes ranging from approximately 20,000 to 50,000 cubic yards of overburden per pit. Overburden would be ripped with a dozer and removed using scrapers. Overburden from the first pit would be stockpiled, and each subsequent pit would be backfilled into the previous open pit, unless otherwise noted on Mine Plan Modification Sequence Maps. Three permanent OOPS piles would be constructed: one in T. 55 N., R. 93 W., Section 8 (B and C Series), one in T. 55 N., R. 93 W., Section 16 (I and G mining series), and one in T. 55 N., R. 93 W., Section 17 (F and E mining series). This OOPS pile would be contoured to blend with the surrounding topography. No material would be pushed or dumped over any steep escarpment, during the mining operation.

Replacement of overburden in the backfilled pits would be designed to create the most conducive reclamation substrate for revegetation as possible. In order to accomplish replacing the uppermost overburden back in its relative position, ACC would use a "tiered" system of backfilling open pits. This would consist of placing poor quality overburden from the overburden stockpile of the first pit on approximately half of the pit floor. The upper portion of the pit being excavated would then be placed on top of the poor quality overburden to bring it up to grade. The lower portion of overburden from the pit being excavated would then be placed on the remaining half of the pit floor, which would result in a "tiered" or "stair step" effect. This procedure would enable the overburden closest to the bentonite to be buried as deeply as possible. In some of the overburden samples for the Pete Modification area, overburden suitability increased with depth. ACC would handle the overburden to place the most suitable overburden material nearest the surface.

Because the removal of the various grades of bentonite would be subject to customer needs, weather conditions, and mining efficiency, mine plan details would be subject to revision at the actual time of mining, for example, one sequence could be mined before another, pit numbering could change, or the exact placement of stockpiles could vary somewhat.

After the removal of bentonite from a pit, the pit would be backfilled and contoured to blend into surrounding topography, and ephemeral drainages would be re-established. Subsoil and topsoil would be replaced in preparation for seeding. Subsoil and topsoil would be livespread whenever possible in the process of concurrent reclamation with mining described above.

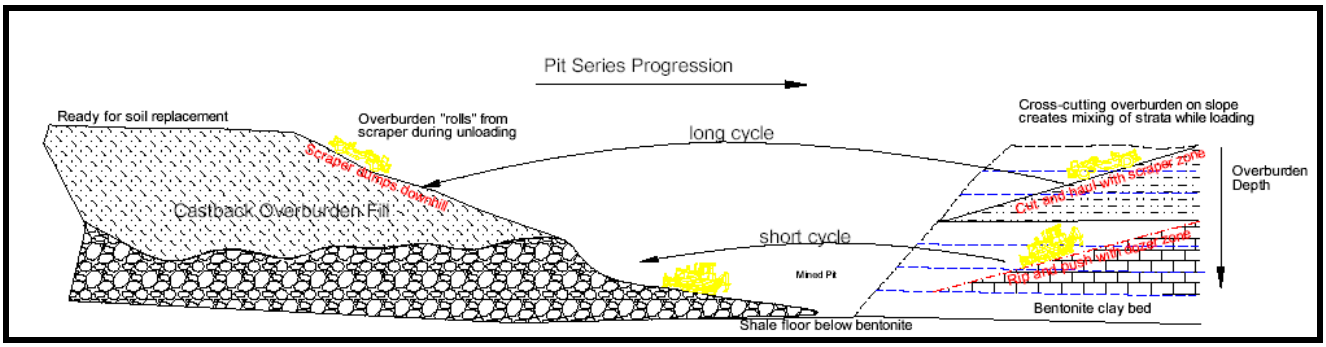


Figure 1. Schematic of the tiered scraper/dozer mining operation (ACC).

Access to the proposed Pete Modification area would be via existing ACC and BPM haul roads. Access to some mine series would be across proposed and backfilled pits, which would be reclaimed as mining concludes in an area. No newly-developed haul road spurs would remain after completion of mining, unless desired by the land managers, the BLM. ACC would construct short in and out of pit spur roads, which could require culverts. Although no streams or major channels would be crossed, culverts could be necessary to allow the surface water flow to pass underneath a road. Dust suppression would be required on haul roads, using water trucks as necessary or required. Water would be collected from ACC's plant storm water pond and canal or other approved water collection sites.

ACC would implement a Spill Contingency and Countermeasure Plan for their mine sites, which would be followed in the event of a fuel or deleterious material spill. Fuel would be delivered to the mine sites, and stored in mobile tanks that are relocated as necessary, as mining equipment would move throughout the Pete Modification area. Containment berms would be constructed around any fuel tanks, which would be located within an area where topsoil has been removed, thereby creating a secondary containment basin.

If a spill would occur, mine personnel would be instructed to make sure the site is safe, stop additional spilling, ensure containment of spilled materials, and contact the company's environmental representative. The clean-up process would be completed with the appropriate earth moving equipment depending on the size of the spill. Disposal of the contaminated material would be coordinated by ACC environmental personnel at an approved land-farm in accordance with State and Federal regulations. If mined bentonite would be unintentionally spilled onto native land during mining operations, mine personnel would be instructed to immediately remove the material and further clean the site to ensure that deleterious effects would be minimized. If the magnitude of the spill would require the use of earth moving equipment to remove the bentonite, ACC would work with the BLM and the WDEQ-LQD to ensure any disturbance would be properly reclaimed once the bentonite has been removed from the area.

Ephemeral drainages would be temporarily diverted around active mine areas. Surface flow would be temporarily diverted around mining activity with v-ditches and/or berms, so as to have minimal effects on watersheds. Ditches would be triangular in shape and would be a minimum of 1.5 feet deep with 2:1 side slopes. Soil that would be derived from the ditch cut would be placed on the down slope side of the ditches which would create a berm. If the ditch would capture flow from a drainage area larger than a single watershed or would remain in place for a significant period of time, a scraper could be used to construct the ditch to ensure there would be adequate available capacity. The scraper-constructed ditch would have a bottom width of approximately twelve feet with 1:1 side slopes. After mining completion, all interceptor ditches would be graded out to blend into surrounding topography, topsoiled, and seeded. If necessary, rows of straw bales or sediment fences would be installed on the temporary diversions to reduce erosion, protect undisturbed land from sediment deposition, and ensure that no sediment from mine lands contaminates surface waters. Temporary hydrologic diversions would comply with WDEQ-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 WDEQ-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.

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

As required by the regulations, reclamation would take place concurrently with mining operations. Reclamation would begin within two years and be completed within four years of the date the lands were affected. If bentonite is field dried, reclamation would begin within three years and be completed within five years of the date the land is affected. In cases with an in-pit haul road, the sides of the road would be reclaimed, and enough topsoil would be retained to reclaim the road. Topsoiled areas would be seeded as soon as possible to prevent weed establishment.

During mining operations, ACC would salvage all available topsoil and subsoil from the proposed Pete Modification disturbance areas. These soils would be salvaged in separate lifts. Soil would be direct haul "live-spread" on backfilled pits whenever and wherever possible, to reduce stockpiling times.

Rubber-tired scrapers would backfill open pits in a tier system described in the mine plan above. During final contouring, the tiers would be filled and blended to surrounding topography. Past experience has shown that the "swelling" of the replaced overburden would compensate for the volume of the removed bentonite bed in many reclaimed pits. Reclaimed land would be contoured to blend in with the surrounding topography, and slopes would not be steeper than 4:1 which would provide stabilization against wind and water erosion. Through drainage would be restored in all areas. The three proposed OOPS piles would be contoured to blend with the surrounding topography. Final reclamation slopes of the permanent overburden pile would not exceed a 4:1 slope and would be designed for long term stability, including for potential erosion from wind and rain.

Post mine, temporary hydrologic diversions would be removed and ephemeral drainages would be reestablished. Reconstruction of the drainages would be accomplished by using scrapers or graders to construct flat-bottomed swales that meander as much as practical and are at least as long as the native channels. Where possible, the bottom of the replaced channel would be located on the reclaimed pit floors to mimic pre-existing bedrock conditions. The average slope would potentially be reduced further by placing water bars in the channel to encourage meandering. Reclaimed channels would be feathered to tie into native channels in order to ensure the transition zone remains stable. Any culverts that would be placed in the haul road spurs during mining activities would be removed during reclamation activities.

Any roads constructed on public land during the proposed mining would be reclaimed unless the BLM requests that they remain. Reclamation of the roads would include removal of culverts, fills, and surfacing materials, and grading to blend with native topography. Compacted areas would be ripped with a motor patrol to de-compact the road bed prior to application of subsoil, topsoil, and seed.

Topsoil and subsoil would be spread over all areas where it was salvaged during mining activities in preparation for revegetation. Areas where backfilled overburden would be compacted due to multiple scraper passes would be ripped with a motor patrol prior to spreading soils. The soil would be replaced by rubber-tired scrapers in two lifts in the reverse order of removal. The soil would then be bladed in preparation for seeding. This would be followed by disking or immediate seeding. Seeding would be done with a tractor pulling a broadcast seeder mounted on a chisel plow/furrower followed by a chain dragging perpendicular to the direction of travel. This method would leave a moderately rough seedbed to capture and hold water and help protect against wind erosion. The chain would provide a light soil covering for a portion of the seed. In areas where significant soil compaction would occur, such as topsoil stockpile locations, seeding would be preceded by ripping with a motor patrol. Ripping and seeding operations would be done along the contour or perpendicular to the prevailing winds whenever possible. Generally, seeding would take place between October 1st and mid-April. While late fall would be the preferred planting season, weather conditions and the number of acres scheduled for seeding would largely dictate the actual time of seeding in any given year. Seeding would occur during the first fall/winter after topsoil has been replaced.

Portions of the land in the proposed Pete Modification area are important habitat to wildlife that depend upon the presence of Wyoming big sagebrush; thus, the reestablishment of Wyoming big sagebrush would be a priority. To achieve this, a series of “Sagebrush Enhancement Areas” would be created on one acre per every 20 acres of disturbed land that was baseline mapped as Big Sagebrush/Gardner Saltbush vegetation. Baseline vegetation maps can be viewed in the Pete Plan of Operations. The enhancement areas would be established on areas where ACC would create microtopographic features designed to reduce wind exposure and maximize moisture collection. The enhancement areas would be seeded with the Sagebrush Enhancement Area Seed Mix (listed below).

Three seed mixes, including the Sagebrush Enhancement Area Seed Mix, and their alternate species lists are described below. The standard seed mix would be used unless seeding in an area that supported sagebrush pre-mining. The first seed mix listed is the “Standard Seed Mix,” which is followed by an alternate species list which contains species that could be substituted into the Standard Seed Mix. The second seed mix is the “Big Sagebrush Seed Mix,” which is followed by an alternate species list which contains additional species that could be substituted into the Big Sagebrush Seed Mix. The Big Sagebrush Seed Mix would be used where sagebrush was dominant in the pre-mine vegetation communities. Topographic areas that would be prone to catch and hold moisture would be targeted with the Big Sagebrush Mix along with an extra 1.0 lb Pure Live Seed (PLS) of sagebrush that would be seeded separately.

The Sagebrush Enhancement Area Seed Mix consists mostly of Wyoming big sagebrush, but also includes other species that would also provide ground cover that would help to reduce erosion and out-compete weeds. If significant sagebrush germination and persistence would not occur, other techniques such as reseeding with Zeba treated seed, transplants, soil amendments, or other techniques identified by research or practice would be utilized.

The "Alternate Species" lists would provide ACC with other species they could substitute into their seed mixes in order to better match a site's soil or precipitation requirements. ACC also would utilize the alternate seed species if they find that certain species they have listed in their two seed mixes have not grown well in other similar areas they have reclaimed. The PLS seeding rates are based on broadcast seeding. If drill seeding methods would be used, the rate would be reduced by 30 to 40 percent, except for Wyoming big sagebrush.

(1) ACC Pete Standard Seed Mix

Seed Species	Rate-lb PLS/acre
Thickspike Wheatgrass (*Elymus lanceolatus lanceolatus*)	2.0
Western Wheatgrass (*Pascopyrum smithii*)	2.0
Bottlebrush Squirreltail (*Elymus elymoides*)	2.0
'Secar' Bluebunch Wheatgrass (*Pseudoroegneria spicata*)	2.0
Indian Ricegrass (*Oryzopsis hymenoides*)	1.0
Sand Dropseed (*Sporobolus cryptandrus*)	0.1
Russian Wildrye (*Psathyrostachys juncea*)	2.0
Shadscale (*Atriplex confertifolia*)	2.0
Gardner Saltbush (*Atriplex gardneri*)	4.0
'Natrona' Fourwing Saltbush (*Atriplex canascens*)	4.0
Rubber Rabbitbrush (*Ericameria nauseosa*)	0.5
Fringed Sagebrush (*Artemisia frigida*)	0.5
Scarlet Globemallow (*Sphaeralcea coccinea*)	0.5
Annual Sunflower (*Helianthus annuus*)	1.0
Blue Flax (*Linum lewisii*)	0.5
Rocky Mountain Beeplant (*Cleome serrulata*)	0.5
	24.6 lb PLS/acre

ACC Pete Alternate Species for the Standard Seed Mix

Seed Species	Rate-lb PLS/acre
Streambank Wheatgrass (*Elymus lanceolatus riparius*)	2.0
'Pryor' Slender Wheatgrass (*Elymus trachycaulus*)	2.0
Sandberg Bluegrass (*Poa secunda*)	2.0
Alkali Sacaton (*Sporobolus airoides*)	0.5
Big Sagebrush (*Artemisia tridentata*)	1.0
Winterfat (*Krascheninnikovia lanata*)	0.5
Sweet Vetch (*Hedysarum spp.*)	0.5
Desert Parsley (*Lomatium spp.*)	0.5
American Vetch (*Vicia americana*)	1.0
Western Yarrow (*Achillea millefolium*)	1.0

(2) ACC Pete Big Sagebrush Seed Mix

Seed Species	Rate-lb PLS/acre
Thickspike Wheatgrass (*Elymus lanceolatus lanceolatus*)	1.0
Sandberg Bluegrass (*Poa secunda*)	0.5
Bottlebrush Squirreltail (*Elymus elymoides*)	2.0
'Secar' Bluebunch Wheatgrass (*Pseudoroegneria spicata*)	1.0
Sand Dropseed (*Sporobolus cryptandrus*)	0.1
Russian Wildrye (*Psathyrostachys juncea*)	1.0
Shadscale (*Atriplex confertifolia*)	2.0
Gardner Saltbush (*Atriplex gardneri*)	4.0
Fourwing Saltbush (*Atriplex canascens*)	3.0
Big Sagebrush (*Artemisia tridentata*)	1.0
Winterfat (*Krascheninnikovia lanata*)	0.5
Fringed Sagebrush (*Artemisia frigida*)	0.5
Annual Sunflower (*Helianthus annuus*)	0.5
Scarlet Globemallow (*Sphaeralcea coccinea*)	0.5
American Vetch (*Vicia americana*)	0.5
Rocky Mountain Beeplant (*Cleome serrulata*)	0.5
	18.6 lb PLS/acre

ACC Pete Alternate Species for the Big Sagebrush Seed Mix

Seed Species	Rate-lb PLS/acre
Streambank Wheatgrass (*Elymus lanceolatus riparius*)	1.0
'Pryor' Slender Wheatgrass (*Elymus trachycaulus*)	1.0
Alkali Sacaton (*Sporobolus airoides*)	0.5
Western Wheatgrass (*Pascopyrum smithii*)	2.0
Indian Ricegrass (*Oryzopsis hymenoides*)	1.0
Rubber Rabbitbrush (*Ericameria nauseosa*)	0.5
Blue Flax (*Linum lewisii*)	0.5
Sweet Vetch (*Hedysarum spp.*)	0.5
Desert Parsley (*Lomatium spp.*)	0.5
Western Yarrow (*Achillea millefolium*)	0.5

(3) ACC Pete Sagebrush Enhancement Area Seed Mix

Seed Species	Rate-lb PLS/acre
'Secar' Bluebunch Wheatgrass (*Pseudoroegneria spicata*)	4.0
Bottlebrush Squirreltail (*Elymus elymoides*)	0.8
Indian Ricegrass (*Oryzopsis hymenoides*)	2.3
Sandberg Bluegrass (*Poa secunda*)	0.5
Fourwing Saltbush (*Atriplex canascens*)	3.0
Fringed Sagebrush (*Artemisia frigida*)	0.05
Rubber Rabbitbrush (*Ericameria nauseosa*)	0.4
Shadscale (*Atriplex confertifolia*)	3.0
Winterfat (*Krascheninnikovia lanata*)	2.0
Wyoming Big Sagebrush (*Artemisia tridentate wyomingensis*)	4.0
Annual Sunflower (*Helianthus annuus*)	0.5
Western Yarrow (*Achillea millefolium*)	0.05
Scarlet Globemallow (*Sphaeralcea coccinea*)	0.25
Rocky Mountain Beeplant (*Cleome serrulata*)	0.9
	21.7 lb PLS/acre

ACC Pete Alternate Species for the Sagebrush Enhancement Seed Mix

Seed Species	Rate-lb PLS/acre
Streambank Wheatgrass (*Elymus lanceolatus riparius*)	4.75
'Pryor' Slender Wheatgrass (*Elymus trachycaulus*)	3.5
Alkali Sacaton (*Sporobolus airoides*)	0.1
Western Wheatgrass (*Pascopyrum smithii*)	4.5
Sweet Vetch (*Hedysarum spp.*)	1.0
Desert Parsley (*Lomatium spp.*)	1.0
American Vetch (*Vicia americana*)	1.0

Changing market conditions or new vegetation species information would potentially require adjustments to the seed mix at the time of actual seeding. Alternative species and rates are also shown here in the event some substitutions would need to be made. Variations on the proposed mix or listed substitutions would have prior approval from WDEQ-LQD and, where public lands are involved, the BLM. Limited seeding would occur where no topsoil has been replaced, which would be in areas that had no topsoil present prior to the proposed mining disturbance. These areas would be graded to blend in with surrounding reclamation and native topography, and micro sites such as swales and depressions that would likely accumulate moisture and support vegetation would be selected for seeding. Targeted seeding would include seeding black greasewood, big sagebrush, or rabbitbrush at a rate of 1.0 lbs PLS/acre.

The amount of seed applied to public land would be calculated using the Pure Live Seed (PLS) ratio for each seed lot used. The PLS ratio is derived by multiplying a seed lots' purity by its germination rate (example: 0.95 purity x 0.95 germination = 0.9 PLS ratio). Thus, to have two pounds PLS of Indian ricegrass in a mix, divide "two" by the PLS ratio that was determined for the lot of Indian ricegrass seed being used. The result equals the amount of bulk seed needed which would always be greater than the pounds of PLS desired. (Example: if 2 lbs of PLS Indian ricegrass seed is needed divide 2 by the PLS ratio for the lot of Indian ricegrass seed being used, i.e., 2/0.9 = 2.2 lbs bulk seed is needed.) PLS ratios would be determined for each seed lot to be used in a specific mix to determine the amount of bulk seed that is needed.

Seed would be stored properly to preserve its viability and would be used within twelve months of the most recent viability test. Seed that would be stored longer than twelve 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 would comply with the current BLM seed policy in IM-2006-073 (see Appendix C). Also per IM-2006-073, *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 would be certified to be cheatgrass and noxious weed seed-free.

Newly seeded areas may be protected from grazing livestock by either fencing the reclaimed land or by reaching a grazing management agreement with the landowners. Reseeding or inter-seeding efforts would be considered after four consecutive years of evidence that the initial seeding attempt failed. However, if erosion problems would become evident due to lack of vegetation during the four-year evaluation period, efforts to stabilize the erosion, including reseeding, would commence as soon as field conditions allow.

Noxious weed encroachment on reclaimed areas would be controlled within the parameters set forth in WDEQ Regulations Chapter 3, Section 2(d)(ix). On BLM-managed public lands, a Pesticide Use Permit (PUP) and written permission would be obtained from the Authorized Officer prior to the use of herbicides. Cheatgrass spraying, if necessary, would be applied in late summer or early fall using BLM-approved chemicals at BLM-approved rates using calibrated spray tank, truck, backpack sprayer, and/or ATV sprayer. All label restrictions would be followed, and a PUP would be submitted to the BLM Worland Field Office 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 Environmental Impact Statement (EIS) (2007).

Reclamation standards would continue to be met as per WDEQ Regulations Chapter 3, Section 2 (d)(vi). ACC would use the extended reference area concept to evaluate revegetation success. At the time of final bond release, the reclaimed land would be compared to the undisturbed, native land adjoining the bond release parcels and/or to pre-mine photos and environmental data. Methods for evaluation of reclamation success would follow the standards mutually agreed upon by ACC and WDEQ-LQD at the time of final bond release. When BLM-managed lands are involved, the BLM would be involved in the evaluation process.

Reclamation would be determined successful as outlined in WDEQ-LQD Rules and Regulations, Chapter 3 Section 2 at the time of final bond release, which states,

> The Administrator shall not release the entire bond of any operator until such time as revegetation is completed, if revegetation is the method of reclamation as specified in the operator's approved reclamation plan. Revegetation shall be deemed to be complete when: (1) the vegetation species of the reclaimed land are self-renewing under natural conditions prevailing at the site; (2) the total vegetation cover of perennial species (excluding noxious weed species) and any species in the approved seed mix is at least equal to the total vegetation cover of perennial species (excluding noxious weed species) on the area before mining; (3) the species diversity and composition are suitable for the approved post-mining land use; and (4) the requirements in (1), (2) and (3) are achieved during one growing season, no earlier than the fifth full growing season on the reclaimed lands. The Administrator shall specify quantitative methods and procedures for determining whether equal total vegetation cover has been established and procedures for evaluating post-mining species diversity and composition.

ACC's proposed mining would mine through an existing fence that divides grazing allotments. If the allotment boundary fence would be no longer effective as a livestock barrier from the proposed mining, ACC would be responsible to maintain a working barrier, which may include temporary fencing that would act as the division between allotments. ACC would maintain the fence's integrity to prevent livestock trespass issues during and after the proposed mining. Fences would be rebuilt to a BLM standard four wire fence. The top three wires would be barbed and the bottom would be a smooth wire that would be, at a minimum, 16 inches off the ground.

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

The mine site would be monitored for excessive erosion from storm water runoff which could impact surface water quality. Monitoring frequency would coincide with significant precipitation events. Highwalls of open pits would be monitored for stability by mining and environmental personnel.

Topsoil would be salvaged from a buffer zone around all pits to ensure that any highwall slump would not result in loss of topsoil resources. Backfilled areas would also be monitored for sediment releases. Reclamation would be monitored for erosional problems, vegetation establishment and the presence of noxious weeds which would need to be controlled. On BLM-managed land, a Pesticide Use Proposal and written approval would be obtained from a BLM Authorized Officer prior to any treatments. Air quality would be visually monitored for dust, and ACC would maintain a steady road watering program wherever hauling activities would occur.

Mine sites would be inspected by ACC personnel on a regular basis. ACC's surveyors, mining manager, and environmental personnel would visit mine sites frequently. The mining manager would coordinate the mining activity with the site foreman, who would be on site daily to ensure proper operations would be followed according to plan and schedule. Areas of concern, such as erosional problems, would be communicated to the foreman and manager directly from operators and other observers. The proposed Pete project area would be monitored for nesting wildlife prior to any new mining disturbance, and as necessary between April 15 and July 15, to verify the presence or absence of sage-grouse, their leks, nests and/or brood rearing sites, mountain plover, golden eagles, other nesting raptor species such as burrowing owls, Threatened or Endangered species, and migratory birds.

(5) Interim Management Plan (as required per 43 CFR 3809.401(b)(5)):
Periods of inactivity would occur at mine sites as the earthmoving equipment moves among different sites throughout Permit 322C to provide the plant with the correct clay qualities. Prior to moving equipment from an active mine site, berms and ditches would be constructed to divert surface water around the active mine area. Containment basins would be utilized to collect storm water runoff from temporary overburden piles or bentonite stockpiles. Topsoil would be salvaged from a buffer zone around pits to ensure topsoil resources would not be at risk in the event of a highwall slump. Berms would also be employed to barricade pit highwalls for safety of humans and wildlife.

Temporary overburden stockpiles typically exhibit physical and chemical characteristics that are not conducive to vegetation growth, particularly high Sodium Absorption Ratio (SAR) values. All overburden stockpiles would be constructed on areas where soil materials would have been previously salvaged to prevent contamination of soil and surface material that would eventually be used for reclamation. A twelve foot wide buffer around these stockpiles would prevent overburden from sloughing onto adjacent vegetated land and also would contain any storm water runoff. Berms would be used around topsoil and overburden piles where necessary. When mining resumes, unsuitable materials would be handled as described in the mine plan.

All equipment would be moved from the site once the area would be determined safe, stable, and clean. Occasionally a piece of earthmoving equipment undergoing repair may be left in the area while waiting for parts. Informal monitoring of these sites typically would occur as mining and environmental personnel travel between the different mine sites throughout Permit 322C.

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 or environmental 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 1 (below).

Table 1.	
Resource, Issue, and/or Concern	**May Affect**
Air Quality	X
Cultural Resources and Native American Religious Concerns	X
Water (Surface and Ground) and Floodplains	X
Wetlands, Riparian, and Aquatic Resources	X
Geology and Minerals	X
Paleontological Resources	X
Soils	X
Vegetation	X
Invasive, Non-native Plant Species	X
Wildlife, Migratory Birds, and Raptors	X
Threatened & Endangered Species and BLM Sensitive Species	X
Livestock Grazing and Range Management	X
Socioeconomics	X
Recreation and Visual Resource Management	X

3.1 Air Quality

No site-specific air quality data are available from the Pete 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 (NAAQS). The air-shed within the Pete 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. The 24-hour Wyoming Ambient Air Quality Standard (WAAQS) for particulate matter <10 microns in diameter (PM_{10}) is 150 $(g/m^3)^3$, and the 24-hour WAAQS standard for particulate matter <2.5 microns in diameter ($PM_{2.5}$) is 65 $(g/m^3)^3$. 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_2S), 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 Resources and Native American Religious Concerns

A series of Class III cultural resource inventories 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 Llano Consultants in 2003, 2006, and 2010. The various inventories encountered no cultural resources and will result in a No Effect determination in accordance with the Wyoming State Protocol between the BLM State Director and the WYSHPO.

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) and Floodplains

The proposed Pete Modification would be located on the slopes above ephemeral channels, which drain into the Bighorn River. At its closest, the proposed mine area is within four miles of the Bighorn River. Several ephemeral channels within small headwater areas (less than 40 acres) run through the proposed mine area. Instability within the drainage system is indicated through channel headcutting, degradation, and bank slumping. In many places, the channels have eroded down to bedrock. Information obtained from the State Engineer's Office online database indicate that there are twelve water wells within a three-mile radius and eleven permitted surface water rights within a half mile radius of the Pete Modification area, none of which lie within the proposed mining area. Two man-made reservoirs are located within one-tenth of a mile of the proposed mining area. The proposed Pete Modification area lies at least 1.5 miles from the nearest alluvial aquifer. Water was encountered in one of ACC's exploratory drill holes within the proposed Modification area, however, since it was encountered near a channel (which is not proposed to be mined) ACC believed it to be runoff from up gradient areas that infiltrated, reached clay, and traveled laterally into the stream bed where the hole was drilled. The quantity of water encountered was minimal and the area would be avoided. The shallowest known bedrock aquifer, the Muddy Sandstone, is at least 500 feet below the surface in the Pete Modification area.

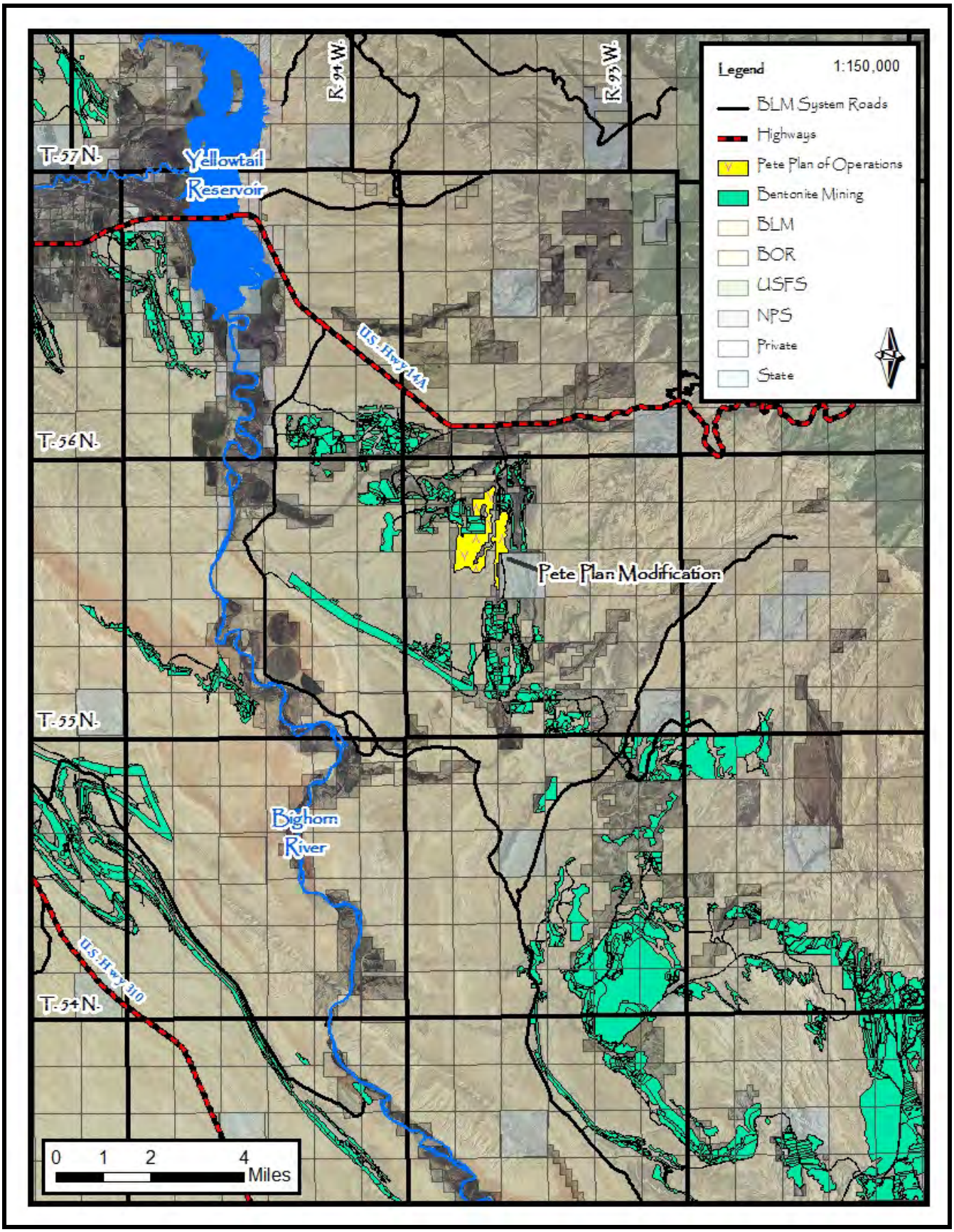
3.4 Wetlands, Riparian and Aquatic Resources

There are no wetlands located within the proposed mining area. There are areas along the unnamed drainage below the proposed mining that support riparian-wetland vegetation. The unnamed ephemeral drainages that run through the proposed mine area flow into larger unnamed drainages and eventually into the Bighorn River. These larger drainages have 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.

3.6 Geology and 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 Pete Modification proposes to mine the Mowry Shale.



Map 2. Area map of lands surrounding the ACC Pete Plan of Operations Modification area.

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.

Samples of overburden in the proposed Pete 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 moderately unsuitable SAR, percent saturation and pH levels in portions of the Mowry Shale, which is typical for the Bighorn Basin.

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 Pete 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, meaning there is moderate potential to find fossils. The geologic formation in the area is the Mowry shale. The geologic formation to be mined (Mowry Shale Formation) represents 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

Soils mapping, profile descriptions, sampling, and taxonomic classification for the Pete area were conducted in accordance with procedures and standards of the National Cooperative Soil Survey (Soil Survey Staff 1993, 1999, and 2004; and Schoeneberger et. al. 2002). Initial mapping units were identified using the United States Geological Survey (USGS) 7.5' Cottonwood Canyon topographic quadrangle and the Natural Resources Conservation Service (NRCS) air-photo base, Order 3 soil survey maps. The proposed mine area is located on portions of Map Sheet 2BB-242 of the unpublished Big Horn County Soil Survey (Richards 2000 and 2007, and Kiracofe 2000 and 2007). The soil resources of the proposed mine area were investigated by ACC's contractors in June 2000 and April 2007 and were mapped at the detailed Order 1-2 level of intensity. Soil samples were collected and sent to Inter-Mountain Laboratories in Sheridan, Wyoming, for analysis.

The soil laboratory analyses included: pH, electrical conductivity (EC); saturation percent; calcium, magnesium, and sodium (meq/l); calculation of Sodium Adsorption Ratio (SAR); organic matter percent; and soil texture (percent sand, silt, and clay). Most of the unsuitable subsoils with a high SAR are saline-sodic, which means they contain appreciable quantities of neutral salts and enough sodium ions to affect most plants. 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.

The proposed Pete Modification area is within a mesic soil temperature regime (mean annual temperature about 45° F to 50° F.) and a typic-aridic soil moisture regime (mean annual precipitation about 5 to 9 inches). The permit area is characterized by the presence of very shallow, shallow, and moderately deep soils.

Table 2. Soil depths and suitability in the proposed Pete Modification area.

Map Unit Name	Total Soil Depth (in)	Total Salvage Depth (in)	Topsoil/Subsoil Salvage (in)	Limitations to Deeper Salvage
Chipeta gravelly clay, 2 to 20% slopes	13	13	6/7	Shale bedrock
Emblem gravelly loam, 2 to 6% slopes	26	14	6/8	45% + coarse (rock) fragments below 14”
Persayo very channery loam, 2 to 20% slopes	8	8	4/4	Shale bedrock
Persayo-Chipeta-Rock Outcrop Complex, 2 to 20% slopes	3 to 4	3	3/0	Shale bedrock
Apron Variant very gravelly sandy clay loam, 2 to 25% slopes	40+	24	12/12	High percent (>45%) of coarse rock fragments below 24”
Larim Variant very gravelly loam, 2 to 30% slopes	40+	24	12/12	High percent (>45%) of coarse rock fragments below 24”
Shale-Bentonite Outcrop	0	0	0/0	No soil to salvage
Reclaimed Land	12	12	6/6	Weathered overburden soil

Table 3. Soil depths in the proposed Pete Modification area.

			Soil salvage depth (in)		Respread Thickness (in)		
Soil Type	Acres	Percent of Affected Area	Topsoil	Subsoil	Topsoil	Subsoil	Total
Chipeta	30.53	4.97	6	7	6	7	13
Emblem	131.52	21.36	6	8	6	8	14
Persayo	254.10	41.28	8	8	8	8	16
Persayo-Chipeta-Rock	60.05	9.75	3	0	3	0	3
Apron Variant	18.11	2.94	12	12	12	12	24
Larim Variant	5.06	0.82	12	12	12	12	24
Shale-Bentonite Outcrop	101.66	16.51	0	0	0	0	0
Reclaimed Land	9.45	1.53	6	6	6	6	12
Disturbed Land	4.32	0.70	6	6	6	6	12
TOTAL	614.80						

According to the BLM soil survey data, the proposed mine area is composed of the Mudray Variant (50%) – Larim Variant (25%) Complex, a well-drained, shallow soil with 0-30% slopes in a Very Shallow – Gravelly range site in a five to nine inch precipitation zone; the Larim Variant (50%) – Labou (25%) Complex, a well-drained, shallow soil with 0-30% slopes in a Gravelly – Shallow Loamy range site in a five to nine inch precipitation zone, and Badlands, a well-drained, very shallow soil with 0-100% slopes.

3.8 Vegetation

Vegetation community types were defined and delineated by Don Dahlgren, Environmental Consultant, based on dominant vegetation species. The following vegetation units were identified and mapped in the study area: Bentonite/Shale Outcrops, Rubber Rabbitbrush, Big Sagebrush/Gardner’s Saltbush, and Reclaimed Lands.

Table 4. Vegetation community acreage summary for the proposed Pete Modification area.

Vegetation Community	Affected Acres (Acres)
Bentonite/Shale Outcrop	61.09
Rubber Rabbitbrush	119.05
Big Sagebrush/Gardner Saltbush	424.39
Reclaimed Lands	10.26
TOTAL	614.8

1) Bentonite/Shale Outcrop (61.09 acres):
This community type is predominantly non-vegetated, with shallow to steep slopes. Dominant inclusions consisted of Gardner's saltbush (*Atriplex gardneri*) on slopes and benches, and black greasewood.

2) Rubber Rabbitbrush (119.05 acres):
This community type occurred in small areas with variable slopes and differing aspects. A high percentage of bare ground and outcrops are common. This community includes inclusions of Wyoming big sagebrush. Rubber rabbitbrush (*Chrysothamnus nauseosus*) is the dominant vegetation observed at 12.5% of the community. Total vegetative cover within this community averages 35.1%.

3) Big Sagebrush/Gardner's Saltbush (424.39 acres):
This community type is dominated by a mixture of big sagebrush (*Artemisia tridentata*) and Gardner's saltbush. Total vegetative cover within this community averages 60.6%, with Gardner's saltbush accounting for 7.0% all vegetative cover and big sagebrush for 8.4%. Other prevalent species found within this community include needle and thread grass (*Hesperostipa comata*) and Sandberg bluegrass (*Poa secunda*).

3) Reclaimed Lands (10.26 acres):
Reclaimed lands consist of areas where backfilling, contouring, soil replacement, and annual seeding (partial bond release) has occurred. This community is primarily Gardner's saltbush.

The majority of land within the proposed mining area lies within three ecological site descriptions, all in the five to nine inch precipitation zone for the Bighorn Basin, as follows: Very Shallow (VS), Gravelly (Gr), and Shallow Loamy (SwLy).

3.9 Invasive, Non-native Plant Species

Though there are invasive weed species present, including cheatgrass, halogeton, salt cedar, and other non-native weed species, native plants are still the dominant species in the proposed mining area. Weeds are most common in disturbed areas.

3.10 Wildlife, Migratory Birds, and Raptors

WILDLIFE: ACC 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 (WGFD) during consultation. Agency responses indicated concern for the following: wintering antelope, sagebrush obligate species, migratory birds, sage-grouse, 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, plains spadefoot toads, golden eagles, red-tailed hawks, northern harriers, turkey vultures, ravens, horned larks, and vesper sparrows. For many of the small mammals, amphibians, 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 mule deer and antelope throughout the year. The area is crucial winter range for antelope. An allotment fence that runs through the area proposed to be mined is a netwire fence. This type of fence creates a barrier and prevents antelope from moving through the area.

RAPTORS: In the proposed mine area there are no known raptor nests. The ridges in and around the proposed mining area provide nesting habitat that could be used by golden eagles.

MIGRATORY BIRDS: Many migratory sagebrush obligate species use this area including the following: sage sparrows, lark sparrows, sage thrashers, horned larks, vesper sparrows, Brewer's sparrows, rock wrens, western meadowlarks, 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 and BLM Sensitive Species

THREATENED & ENDANGERED SPECIES: Site surveys have determined that no Threatened or Endangered plant or animal species (lynx, grizzly bear, black-footed ferret and Ute's ladies tresses) are located in the proposed Pete Modification area. The greater sage-grouse is a Candidate species which has been observed in the proposed mine area, though the nearest lek is over five miles away.

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, and spotted bats. Persistent sepal yellowcress, a BLM Sensitive plant species, may also be present in and around seasonal wetlands, reservoirs, or stream channels in the area. Mountain plover, which were recently proposed to be listed on the Threatened and Endangered Species List, are currently considered to be a BLM Sensitive species and are still protected under the Migratory Bird Treaty Act (MBTA), 16 U.S.C. 703. The proposed mining area contains mountain plover nesting habitat.

3.12 Livestock Grazing and Range Management

The Crystal Creek BLM grazing allotment #01023, the Himes Group Allotment #01031, and the Lovell Group 1 Allotment #01032 contain the proposed mining. In the Crystal Creek Allotment, approximately 42 of the 18,643 acres (12,862 acres of BLM-managed land) in the allotment are proposed to be mined. There are 300 public animal unit months (AUMs) currently permitted for livestock grazing in this allotment, stocked at 42 acres/AUM. An AUM is defined as the amount of forage necessary for the sustenance of one cow or its equivalent for a period of a month. Generally 600 to 800 pounds dry weight of forage is used per AUM. This allotment has a three-year grazing rotation: spring, fall, rest. In the Himes Group Allotment, approximately 238 of the 19,820 acres (18,835 acres of BLM-managed land) in the allotment are proposed to be mined. There are 507 public AUMs permitted for livestock grazing in this allotment, stocked at 37 acres/AUM. This allotment has a three-year grazing rotation: spring, fall, rest. In the Lovell Group 1 Allotment, approximately 335 of the 14,502 acres (10,436 acres of BLM-managed land) in the allotment are proposed to be mined.

There are 175 public AUMs permitted for livestock grazing in this allotment, stocked at 60 acres/AUM. This allotment has a three-year grazing rotation: spring, fall, rest. There are two days of trailing each spring and fall annually. ACC proposes to mine through portions of the fences between these three allotments. Part of this fence is constructed with netwire, which is not consistent with BLM standard four wire fence construction.

3.13 Socioeconomics

The proposed operation is located in Big Horn County, Wyoming. The closest community is the town of Lovell. Lovell is located about 15 miles northwest from the proposed Modification area and has a population of 2,367 people. In 2010, the estimated population of Big Horn County was 11,696 people. Communities in Big Horn County include Basin (the county seat), Burlington, Byron, Cowley, Deaver, Emblem, Frannie, Greybull, Hyattville, Shell, Lovell, Manderson, and Otto. Big Horn County covers 3,137 square miles and has a population density of 3.7 people per square mile. Between 1970 and 2010 its population grew by 14 percent. Between 2000 and 2011, its population increased by three percent. The area has a strong agricultural economy, which includes farming (corn, sugar beets, alfalfa, barley, beans, hay) and ranching (cattle, sheep, horses).

Data from the State of Wyoming Economic Analysis Division indicate that mining (including oil and gas) accounts for 14.9% of the jobs, and 16.7% of the personal income in Big Horn County. This statistic indicates that employment in the mining sector is higher-paying than the county average. Per capita income grew by 15.6 percent between 2000 and 2010 (adjusted for inflation). In 2011, Lovell's population was 2,367 people, and the estimated median annual income in 2009 was about $42,102 (Source: http://www.city-data.com/city/Lovell-Wyoming.html). In 2011, mining employment provided an average wage per job of $54,659 (WEAD 2012). The recession of the U.S. economy in 2009 reduced the mining workforce, as can be seen in these numbers, though mining activity has begun to increase since the beginning of 2010. In Big Horn County in 2011, approximately 638 people were employed directly by the mining industry (including oil and gas) in the county according to the Wyoming Economic Analysis Division. ACC has approximately 120 employees working at their Lovell mine and mill. ACC 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.

This area is also used for recreational purposes, such as hunting, hiking, rock hounding, and off-highway vehicles, as well as for other values such as driving for pleasure in an aesthetically pleasing environment, finding solitude, and wildlife viewing. The Bighorn Basin has an active tourism industry from people visiting Yellowstone National Park and the Bighorn Canyon Recreation Area, among other attractions. The scenery along the way to these areas adds to the enjoyment of both visitors and local residents.

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.

3.14 Recreation and Visual Resource Management (VRM)

RECREATION: The majority of the proposed mine area is on BLM-administered public lands that have no specific recreation management prescriptions or designations, although recreational use is recognized in the area. A small portion of the proposed mine area is located within BLM-administered public lands managed under the West Slope of the Bighorns Special Recreation Management Area (SRMA).

SRMA objectives are to maintain and enhance the identified desired recreational opportunities, settings, experiences, and beneficial outcomes. Recreational activities observed in the project area include driving for pleasure/OHV use, hunting, hiking, rock hounding, and other similar types of dispersed activities. However, private lands are within the proposed mine area, which limits recreational opportunities, unless permission is granted from the surface owners.

The recreational settings within the area are semi-primitive motorized, or middle to front country, which can be described as:

- On or near primary highways, and within ½ mile of low-clearance or passenger vehicle routes;
- Areas within the project area the character of the natural landscape is retained, whereas other areas the landscape is partially modified, but none overpower the natural landscape;
- Social component of the project area is middle country, where 7–14 encounters/day off travel routes (e.g., staging areas) and 15–29 encounters/day on travel routes;
- Four-wheel drives are observed in most of the area, whereas other portions of the project area have observed two-wheel drive vehicles are predominant.

VRM: The proposed mine area is located on BLM-administered public lands identified as visual resource inventory (VRI) Class III and IV. The area is within a scenic quality rating unit (SQRU) recently inventoried and scored with a scenic quality B rating, low sensitivity levels, and is within the foreground/middle ground distance zone. The SQRU consist of the foothills of the Bighorn Mountains to the east, and expands west to the Bighorn River. The eastern SQRU contains exposed slopes and fairly rugged topography and is dissected by numerous drainages. It is exposed and is in view from the surrounding areas to the extent that any significant surface-disturbing activity would be visible. The unit is an attraction for hunters and other recreationists, as well as important wildlife habitat, particularly for big game species. There is a certain expectation among Bighorn Basin residents that management should reflect those values. While the overall visual sensitivity for the western portion of the SQRU, where the proposed mine area is located, is rated as low, the public values the area for many other uses including ranching, wildlife habitat, and recreation. These multiple uses are observed in this area, primarily being bentonite mining and agricultural activities. Management objectives allocate this area for multiple uses, which are recognized and observed by visitors. Class III objectives are to partially retain the existing character of the landscape. The level of change to the characteristic landscape should be moderate. Class IV objectives are to provide for management activities which require major modification of the existing character of the landscape. The level of change to the characteristic landscape can be high.

4.0 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 Pete Modification would not be approved. Particulate matter and other contaminants from exhaust would not be emitted into the air by equipment or haul trucks used in the proposed mining process.

Cultural Resources and 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 Pete 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) and Floodplains
There would be no effect on surface water, ground water, or floodplains because the proposed Pete 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 and Aquatic Resources
There would be no effect on wetlands, riparian areas, or other aquatic resources under Alternative I because the proposed Pete Modification mining would not be approved, so the proposed surface disturbance would not occur.

Geology and Minerals
There would be no effect on the geology or minerals of the area under Alternative I because the proposed Pete Modification mining would not be approved, so the proposed surface disturbance would not occur.

Paleontological Resources
There would be no effect on paleontological resources under Alternative I because the proposed Pete Modification mining would not be approved, so the proposed surface disturbance would not occur.

Soils
There would be no effect on soils under Alternative I because the proposed Pete Modification mining would not be approved, so the proposed surface disturbance would not occur.

Vegetation
There would be no effect on vegetation under Alternative I because the proposed Pete Modification mining would not be approved, so the proposed surface disturbance would not occur.

Invasive, Non-native Plant Species
There would be no new effects of invasive and non-native species under Alternative I because the proposed Pete Modification mining would not be approved. By choosing Alternative I there would be less chance that this area would be affected by invasive weed species, as no new disturbance would occur.

Wildlife, Migratory Birds and Raptors
There would be no effect on wildlife under Alternative I because the proposed Pete 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 or raptors under Alternative I because the proposed Pete Modification mining would not be approved. Habitat would not be disturbed by mining.

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

Livestock Grazing and Range Management
There would be no effect on livestock, grazing, or range because the proposed Pete Modification mining would not be approved. Cattle 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 employees of ACC and its contractors if Alternative I was selected because the company would not have approval to mine the bentonite resource in the proposed mine area. The supply of bentonite may be reduced, potentially causing a rise in the price of bentonite products, affecting those who use them. No impact to livestock grazing would occur. If the proposed mine plan were not approved, the many recreation activities in the area, such as hunting, wildlife viewing, and driving for pleasure would not be affected. The area's scenery and solitude values would also be unaffected under Alternative I.

Recreation and Visual Resource Management (VRM)
There would be no effect on recreation or VRM because the proposed Pete Modification mining would not be approved. No resulting effects on recreation or VRM would be expected to occur beyond the current situation.

4.1.2 ALTERNATIVE II - PROPOSED ACTION

Air Quality
The air quality of the surrounding area would be impacted for the life of the mine (10 years) due to the effects of the Proposed Action. Elevated amounts of dust could continue to be generated even after the proposed mine area would be reclaimed until vegetation would reestablish adequately. 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 (soot, $C0_2$, CO, and O_3) entering the air in the local area. Dust suppression measures would be required of ACC, 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. 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 would be no proposed mitigation for the release of combustion-related byproducts of operating heavy equipment and haul trucks to mine and transport the bentonite.

The Air Quality Standard #6 (Air Quality) for Healthy Rangelands in Wyoming would fall below the threshold to meet the standard if the WDEQ determined that the air quality in the area was impaired. The source of the problem causing the standard to not be met could be due to the proposed mine activities, other area causes, or a combination of both. If the air quality would be impaired, and the proposed mining would be found to be the cause, BMP's would be implemented.

Cultural and Historical Resources and Native American Religious Concerns
There would be no impacts to significant 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 ACC, as required in the Cultural Resources Stipulations found below in Mitigation 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) and 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 and subsurface flow. Due to the loss of vegetation, biological crusts, and desert pavement, run-off from the proposed mining areas may transport more or less sediment, water, 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 and salty than the pre-disturbance runoff because of the increased exposure of acidic and salty sub-soils exposed by mining. Ephemeral channels would be temporarily directed around open pits during active mining stages by constructing diversion ditches.

In order to control sediment and runoff under the proposed action, water bars, sediment fences and/or certified weed-free straw bale check dams would be used for erosion control. Berms would also be installed around pits and haul roads. 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 Pete Modification Plan and included in ACC'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 also would be 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, ACC would micro-recontour the land surface where possible. 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.

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 post-reclamation, 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 would escape ACC's berms and run 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 (Water Quality) for Healthy Rangelands of Wyoming would fall below the threshold to meet the standard if the WDEQ determined that the quality of the waters associated with the watersheds in the area were impaired. The source of the problem causing the impairment could be due to the proposed mine activities, other area causes, or a combination of both. If the water quality in the area would be determined to be impaired, and the proposed mining would be found to be one of the causative agents, BMP's would be implemented to address the impairment. Water resource mitigation is included in ACC's Pete Plan of Operations Modification submission. ACC would also follow the specifications of their current Storm Water Discharge Permit (SWDP) and Storm Water Pollution Prevention Plan (SWPPP) to comply with Section 401 of the CWA and would coordinate with the USACE (COE) prior to placing fill in any water feature to facilitate compliance with Section 404 of the CWA.

Wetlands, Riparian Areas, and Aquatic Resources

Mitigation that addresses the following potential effects is incorporated in the Pete Plan of Operation Modification submission and ACC's Storm Water Discharge Permit (SWDP) and Storm Water Pollution Prevention Plan (SWPPP). The Proposed Action may affect downstream riparian areas, wetlands, aquatic habitat, and associated biota by modifying the hydrology and sediment regimes of the area's watersheds. Hydrologic modification may result in increasing or decreasing peak and 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 accidental spills of petroleum products or use of approved herbicides. Invasive, non-native plant species that become established on or near the proposed mine area may spread to downstream 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. Any upstream riparian areas, wetlands, aquatic habitat, and associated biota could be affected also, if the proposed mining activities cause headcutting of drainages.

If the riparian-wetland areas associated with the watersheds in the area were determined to be Functioning at Risk or Non-functional, they would fall below the threshold to meet the standard for the Wyoming Riparian-Wetland Land Health Standard #2 for Healthy Rangelands of Wyoming. Inability to meet the standard could be related to the proposed mining activities, other area factors, or a combination of both. If the proposed mining would be determined to be a factor contributing to the inability to meet the standard, BMP's would be implemented to address the issues. Mitigation that addresses these potential effects is incorporated in the Pete Plan of Operation Modification submission and ACC's Storm Water Discharge Permit (SWDP) and Storm Water Pollution Prevention Plan (SWPPP).

Geology and Minerals

OVERBURDEN: Overburden may have an effect on the proposed mining area under the Proposed Action 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. Some of ACC's overburden samples indicate some overburden with unsuitable, low pH values. These zones would be replaced deeper than the reclamation root zone.

LOCATEABLE MINERALS: Under the Proposed Action, the commercial quantities of bentonite would be removed from the F, E, and D Beds in the Cretaceous Mowry Formations. 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 Pete Modification area.

LEASEABLE MINERALS: There are no active leaseable minerals/oil and gas leases in the Pete 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. The Mowry 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, found in Stipulations Section 4.2.2, would protect any paleontological resources that might be found on the proposed mine area. If scientifically significant fossils (all vertebrate fossils and their tracks or traces, and some invertebrate or plant fossils identified as rare or important by the scientific community) are discovered, ACC 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 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 plan of operations approval letter.

Soils

Soils that would be disturbed by the proposed mining activity would be permanently affected. Soils 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. Some of the biological, physical, and chemical properties of the soil 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 reduce the capacity to support vegetation and to perform other functions.

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 as soon as possible within a few months of being stockpiled in order for the soil to maintain a functioning ecosystem. These microorganisms help to reduce 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. 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. ACC would attempt to use live-spreading of topsoil whenever possible and would try to stockpile topsoil for as short a time as possible before respreading it. ACC would also seed its topsoil stockpiles to prevent weed growth, reduce erosion, and maintain the soil's biological integrity. ACC would work closely with its equipment operators to manage and maintain the quality of suitable topsoil and cover materials.

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 WDEQ), as per the terms of any approved mining and reclamation plan(s) and as presented in the Pete 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 native soil profiles. The areas would be seeded in a timely manner to promote speedy plant growth and further reduce erosion.

Until successful reclamation of the soil occurs, the disturbed areas would have reduced soil stability and would fall below the threshold to meet Standard #1 (Soils) for Healthy Rangelands in Wyoming.

Vegetation

Vegetation would be directly affected by the Proposed Action. Native vegetation in all mined areas would be removed, along with the suitable topsoil that has developed over time. After mining is complete, subsoil and topsoil would be placed back on the surface. If the castback mining proceeds in a timely manner, some of 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 salvage and 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 areas' low precipitation (five to nine inches of mostly rain) and the very shallow, 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 is replaced quickly, viable native seeds would still be present which would aid in the reestablishment of native vegetation on the reclaimed areas.

The vegetation native to the proposed mining area is adapted to the local climate, soils, native herbivory, and other ecological variables unique to the area to be mined and has, in most instances, the best chance for returning disturbed areas to the desired state and future uses. If reclamation is not properly conducted, a different type of plant community could eventually replace the native one. Often, even successful reclamation will result in a change from the existing native plant community that occupied the site prior to being disturbed for decades. In some situations, one or more non-native plant species may have to be used to achieve the desired state and future uses. Until 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 fall below the threshold to meet Standards #3 (Upland Vegetation) and #4 (Wildlife) 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 Pete Modification mining and reclamation plan, discussed above under Section 2.1, and any accompanying mitigation measures. According to ACC'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 approved seed mixtures and seeding application rates that would comply with the current BLM Seed Policy to help reestablish vegetation over time to pre-mine or better conditions.

All seed used on public lands would be certified to be cheatgrass seed and noxious weed-free by certified laboratory testing and would conform to BLM seed policy IM No. 2006-073 (Appendix C); any hay or straw used for check-dam construction or mulching would be certified to be cheatgrass and noxious weed-free. Also per IM-2006-073, "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."

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.

Invasive, Non-native Plant Species

Invasive and non-native plant species in the area would increase over the short term under the Proposed Action. To expose the bentonite layers, topsoil would be scraped and stockpiled, and 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. It is less likely that invasive weed species would enter or return to the area if seeding is completed quickly to establish desirable vegetation.

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 Plan, would decrease the potential for weeds to spread to and contaminate topsoil. Some 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 would establish, it could form a monoculture, outcompeting native species, reducing species diversity, decreasing sagebrush establishment, and creating a volatile fuel source for fires. Halogeton pulls salt to the surface, creating a saline environment few native plants can survive.

These weeds would be controlled/eradicated by use of BLM approved methods and herbicides, and their management would be the sole responsibility of ACC. 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 is accomplished. Vegetation would be reestablished and weed-free seeds and hay for mulch would be used in the proposed mining area. Cleaning vehicles, equipment, and materials before they enter public land would help reduce the spread of invasive, non-native 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 Pete Modification area lands during mining and/or reclamation (WWPC, 2011). Cheatgrass would also need to be controlled in the proposed project area, should it begin to grow in mined or reclaimed areas.

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

ACC 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 would be determined to be successful, and the bond would be released for a given area. The use of untreated or unfiltered surface water for dust management has the potential to spread undesirable plant species. If noxious or invasive weeds would be encountered, the BLM and/or the Big Horn County Weed and Pest Department would be consulted by ACC for control and eradication methods. A Pesticide Use Proposal (PUP) and written approval from the BLM Authorized Officer for the use of herbicides would be obtained prior to the use of herbicides on public land.

Wildlife, Migratory Birds, and Raptors

WILDLIFE: The Proposed Action would affect wildlife that live near or move through the proposed mining area. It may also affect the flora and fauna that use aquatic and semi-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 during the proposed mining operation.

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 in and around the area to be mined would become less suitable during the proposed mining operation for pronghorn and mule deer due to fragmentation and disturbance.

Smaller animals, amphibians 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 habitat in 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 would be approved and implemented, wildlife would likely avoid the area until reclamation is successful. If the vegetative community is drastically changed post-mining, wildlife species using the area would likely change as well. The change in vegetative community from pre-mine conditions to post-mine conditions may result in a shift to plant species not specifically adapted to the local site and would provide different and lesser quality of habitat across all acres affected; however, wildlife use of the reclaimed area would likely increase over time. ACC's proposed seed mix has the objective to meet pre-mine vegetative conditions.

According to ACC's Pete Plan Modification, sagebrush enhancement areas would be established within the reclamation to reestablish sagebrush habitat for sagebrush obligate species and wintering antelope. These enhancement areas would be created on one acre per every 20 acres of disturbed land that was baseline mapped as a Big Sagebrush/Gardner Saltbush vegetation unit. ACC would create microtopography in these areas to maximize moisture collection and reduce wind exposure. The Sagebrush Enhancement Area Seed Mix, as outlined in the reclamation plan in The Proposed Action 2.2 and Mitigation, Monitoring, and Stipulations 4.2.1. If sagebrush reestablishment would not result from the Sagebrush Enhancement Area Seed Mix, additional techniques such as using Zeba ® treated seed, transplants, soil amendments, or other techniques identified by research or practice as likely means to increase sagebrush establishment success would be utilized.

ACC's proposed mining would remove an existing allotment fence that was constructed with net wire. Net wire fencing creates a boundary that limits the movement of antelope and other wildlife species. Where fence reconstruction would be necessary, ACC would rebuild to a BLM standard four wire fence. The top three wires would be barbed and the bottom would be a smooth wire that would be, at a minimum, 16 inches off the ground. This reconstruction of the net wire fence would improve habitat and wildlife movement through the area.

RAPTORS: Proposed mining would temporarily alter raptor hunting areas. This would be a factor until the affected area is reclaimed and small prey species have returned. The area ACC proposes to mine contains potential nesting locations. ACC would monitor the area for raptors between February 1st and July 31st and notify the BLM if any nesting raptors would be affected. Mining would stop if nesting birds are detected until the birds have fledged and can leave the nesting area unless an appropriate mitigation plan is developed with the BLM and the USFWS. This would provide short term protection of the habitat only; over the long term, this habitat would be degraded until reclamation is substantially complete.

OTHER MIGRATORY BIRDS: Migratory birds, including sagebrush obligate species, would avoid the area until successful reclamation is achieved. Assuming the area would be fully reclaimed to conditions similar to pre-mining at some point in the future, the habitat would once again be suitable for these species. In conformance with the BLM and USFWS suggestions, ACC would conduct nest searches in migratory bird habitat prior to and during ground disturbing activities between April 10th and July 15th. If nesting migratory birds are found, mining operations would halt until the BLM and the USFWS are be consulted for further action. ACC would implement mitigation and monitoring measures developed with the BLM and USFWS to prevent take of migratory birds and to comply with the Migratory Bird Treaty Act.

Threatened & Endangered Species and BLM Sensitive Species

THREATENED & ENDANGERED SPECIES: No Threatened or Endangered plant or animal species (lynx, grizzly bear, black-footed ferret and Ute ladies'-tresses) or Candidate species (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 to impact these plants extremely low. Sage-grouse (Candidate species) habitat would be fragmented and removed. Nesting and brood rearing habitat would be lost within five miles of non-Core Area leks.

BLM SENSITIVE SPECIES: The Proposed Action would remove or impact 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 and sage-grouse. Assuming the area is fully reclaimed to conditions similar to pre-mining at some point in the future, the habitat may once again be suitable for these BLM Sensitive species although possibly not as suitable as it was before it was mined based on the success of the proposed mitigation. 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 would remove mountain plover habitat until reclamation of the mined area would be complete. Full reclamation of area habitat would take many years. Mountain plovers, which were recently proposed to be listed on the Threatened and Endangered Species List, are now not considered proposed, but are still considered to be a BLM Sensitive Species and are protected under the Migratory Bird Treaty Act (MBTA), 16 U.S.C. 703. ACC would conduct nest searches in mountain plover and migratory bird habitat prior to and during ground disturbing activities between April 10th and July 15th. If nesting mountain plovers are found, mining operations would halt until BLM and USFWS are consulted for further action. Through this monitoring, mountain plovers or migratory birds would not likely be harmed during the proposed mining process.

Past and present bentonite mining can contribute to an allotment falling below the threshold of Standard #4 (Wildlife) for Healthy Rangelands of Wyoming if the rangeland fails to maintain adequate habitat conditions that support diverse plant and animal species. Indicators of Standard #4 may include but are not limited to noxious weeds, species diversity, age class distribution, population trends, and habitat fragmentation.

Livestock Grazing and Range Management

The Proposed Action would temporarily affect 614.8 acres of rangelands in the proposed mining area. If the average disturbance of the 60 acres occurred per year, up to 1.5 new AUMS (600 to 800lbs of dry weight vegetation) would be lost each year until revegetation would occur on some or all of the acres disturbed. It is anticipated that vegetation would reestablish following reclamation but at an unknown rate when considering site potential and other environmental influences. 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 topsoil is handled properly and drought conditions do not make it exceptionally difficult for seedlings to germinate and grow. Once the reseeding is successful, which could take one to many decades, vegetation would be reestablished well enough to provide forage for livestock once again.

ACC is proposing to mine through approximately one mile of an existing allotment boundary fence; the company would work with the BLM-CYFO to maintain its integrity or construct a temporary fence to prevent trespass livestock issues during the proposed mining.

Usually, reclaimed mining areas are not fenced out of grazing allotments. Because of this, cattle rarely are 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 become established stresses seedlings and makes it very difficult for them to survive, spread, or create healthy rangeland. Livestock often pull up small plants and seedlings. 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 open to possible establishment by weeds. ACC may install temporary fences around seeded areas that are in locations used heavily by cattle, in order to give seedlings a chance to establish. ACC would be responsible for installation, maintenance, and removal of these reclamation fences.

ACC 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. ACC would work with the BLM-CYFO to maintain and/or replace the allotment boundary fence that runs through the Modification area during and before completing the mining process.

Socioeconomics

Under the Proposed Action, the proposed Pete Plan Modification would be approved and bentonite mining would proceed into the proposed mining area. The proposed mining area would be a job site for ACC employees and contractors in future years once ACC begins mining the area. AUMs available for livestock grazing would be temporarily reduced, as bentonite mining would remove available forage until the mined areas are successfully reclaimed. The grazing allotments would temporarily lose dozens of AUMs until successful reclamation would be achieved. The proposed action could temporarily disturb some recreational uses in the area. The mine would temporarily affect the immediate view from nearby roads for those appreciating local scenery near the proposed mine area until reclamation is successful. The proposed disturbance would not be visible from any paved roads. Wildlife viewing and hunting may be reduced in the short term, though post-reclamation or during non-disruptive activities, wildlife may still use the area. Over time, some recreational activities could improve with successful reclamation.

Recreation and Visual Resource Management (VRM)
RECREATION: Mining activities proposed within the SRMA boundary are not on BLM-administered public lands. The desired recreational resources identified on BLM-administered public lands within the SRMA would not be directly impacted by the mining activities. The greatest degree of effects to recreation from the proposed project would be observed in the immediate project area during mining activities. Impacts at the mining locations would further reduce the opportunity for local recreationists to enjoy the resources and opportunities the area's middle to front country and urban settings have to offer, such as ATV use, hunting, hiking, rock hounding, exploring, and sightseeing. Combined with current mining in the area, the settings would continue to alter to more front country setting, which could contradict with the desired recreational settings most of the users wish to pursue. These desired activities and experiences would have to be pursued in alternative and possibly less desirable areas. However, because of the surrounding private lands, the existing development around the project area, and the mining methods (castback method), it is not known how many users would be displaced. These effects, although anticipated to be minimal, would be present.

VRM: The proposed project would impact the scenic quality of the SQRU by eliminating and manipulating the natural elements of form, line, color, and texture exhibited from the landscape. Visual impacts could be observed by those traveling the bentonite access road that intersects the project area. Due to the front country and urban settings within the area, new major surface disturbing activities would not be readily recognized, but would be noticed by the degree of contrasts against the surrounding natural elements.

The SQRU is managed under VRM Class III and IV objectives. The objectives of these classes are to provide for management activities which require moderate to major modifications of the existing character of the landscape. The level of change to the characteristic landscape should be moderate in Class III, and can be high in Class IV, where management activities may dominate the view and be the major focus of viewer attention. However, every attempt should be made to minimize the impact of these activities through careful location, minimal disturbance, and repeating the basic elements. The rolling reclamation mining practices utilized by ACC would minimize immediate contrasting elements caused by surface disturbing activities, but cumulatively would introduce a high degree of contrast against the surrounding natural elements.

4.2 Mitigation, Monitoring and 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 Pete Plan Modification:

4.2.1 Mitigation and Monitoring

Air Quality
To control fugitive dust generated by haul trucks, roads will be kept watered by using a truck equipped with a spray bar or other BLM approved method. If blasting is necessary, ACC will notify the BLM in advance, and fly rock and other particles will be kept to a minimum.

Water Quality and Riparian-Wetland Area Management

If the proposed mining will result in the placement of fill or dredge material in a pond, wet meadow, stream channel, or any other water feature, ACC will 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. ACC will obtain authorization from the Department of the Army prior to disturbance of waters of the United States. ACC will also obtain, maintain and implement any Storm Water Discharge Permit(s) (SWDP) and associated Storm Water Pollution Prevention Plan(s) (SWPPP) required by the WDEQ-WQD, per 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 SWDP and a SWPPP.

Modification of the hydrology of riparian and wetland areas, including jurisdictional waters of the United States, will be avoided whenever possible. Where hydrology is modified, through drainage will be reestablished during final reclamation. Channel design for both temporary and permanent diversions will match pre-mine channel gradients and cross-sectional shapes and dimensions. In order to control sediment and runoff under the proposed action, fabric fences or certified weed-free straw bale check dams will be installed at discharge points into natural channels. Berms will be installed around pits and haul roads. Other BMPs would be used as needed.

Reclamation Seed Mix

Within 3-5 years following the mining of bentonite, the Pete Plan Modification pits will be recontoured, deep ripped, and seeded using one of the two approved seed mixes with potential substitute species from their respective alternate species lists. The standard seed mix will be used unless seeding in an area that supported sagebrush pre-mining. The first seed mix listed is the "Standard Seed Mix," which is followed by an alternate species list which contains species that can be substituted into the Standard Seed Mix. The second seed mix is the "Big Sagebrush Seed Mix," which is followed by an alternate species list which contains additional species that can be substituted into the Big Sagebrush Seed Mix. The third seed mix is the "Sagebrush Enhancement Seed Mix," which will be used where sagebrush was dominant in the pre-mine vegetation communities. Topographic areas that are prone to catch and hold moisture will be targeted with the Big Sagebrush Mix along with an extra 1.0 lb Pure Live Seed (PLS) of sagebrush that will be seeded separately. A series of "Sagebrush Enhancement Areas" will be created on one acre per every 20 acres of disturbed land that was baseline mapped as Big Sagebrush/Gardner Saltbush vegetation. If significant sagebrush germination and persistence does not occur, other techniques such as reseeding with Zeba treated seed, transplants, soil amendments, or other techniques identified by research or practice will be utilized.

The "Alternate Species" lists provide ACC with other species they can substitute into their seed mixes in order to better match a site's soil or precipitation requirements. ACC will also utilize the alternate seed species if they find that certain species they have listed in their two seed mixes have not grown well in other similar areas they have reclaimed. The PLS seeding rates are based on broadcast seeding. If drill seeding methods are used, the rate would be reduced by 30 to 40 percent, except for Wyoming big sagebrush.

(1) ACC Pete Standard Seed Mix

Seed Species	Rate-lb PLS/acre
Thickspike Wheatgrass (*Elymus lanceolatus lanceolatus*)	2.0
Western Wheatgrass (*Pascopyrum smithii*)	2.0
Bottlebrush Squirreltail (*Elymus elymoides*)	2.0
'Secar' Bluebunch Wheatgrass (*Pseudoroegneria spicata*)	2.0
Indian Ricegrass (*Oryzopsis hymenoides*)	1.0
Sand Dropseed (*Sporobolus cryptandrus*)	0.1
Russian Wildrye (*Psathyrostachys juncea*)	2.0
Shadscale (*Atriplex confertifolia*)	2.0
Gardner Saltbush (*Atriplex gardneri*)	4.0
'Natrona' Fourwing Saltbush (*Atriplex canascens*)	4.0
Rubber Rabbitbrush (*Ericameria nauseosa*)	0.5
Fringed Sagebrush (*Artemisia frigida*)	0.5
Scarlet Globemallow (*Sphaeralcea coccinea*)	0.5
Annual Sunflower (*Helianthus annuus*)	1.0
Blue Flax (*Linum lewisii*)	0.5
Rocky Mountain Beeplant (*Cleome serrulata*)	0.5
	24.6 lb PLS/acre

ACC Pete Alternate Species for the Standard Seed Mix

Seed Species	Rate-lb PLS/acre
Streambank Wheatgrass (*Elymus lanceolatus riparius*)	2.0
'Pryor' Slender Wheatgrass (*Elymus trachycaulus*)	2.0
Sandberg Bluegrass (*Poa secunda*)	2.0
Alkali Sacaton (*Sporobolus airoides*)	0.5
Big Sagebrush (*Artemisia tridentata*)	1.0
Winterfat (*Krascheninnikovia lanata*)	0.5
Sweet Vetch (*Hedysarum spp.*)	0.5
Desert Parsley (*Lomatium spp.*)	0.5
American Vetch (*Vicia americana*)	1.0
Western Yarrow (*Achillea millefolium*)	1.0

(2) ACC Pete Big Sagebrush Seed Mix

Seed Species	Rate-lb PLS/acre
Thickspike Wheatgrass (*Elymus lanceolatus lanceolatus*)	1.0
Sandberg Bluegrass (*Poa secunda*)	0.5
Bottlebrush Squirreltail (*Elymus elymoides*)	2.0
'Secar' Bluebunch Wheatgrass (*Pseudoroegneria spicata*)	1.0
Sand Dropseed (*Sporobolus cryptandrus*)	0.1
Russian Wildrye (*Psathyrostachys juncea*)	1.0
Shadscale (*Atriplex confertifolia*)	2.0
Gardner Saltbush (*Atriplex gardneri*)	4.0
Fourwing Saltbush (*Atriplex canascens*)	3.0
Big Sagebrush (*Artemisia tridentata*)	1.0
Winterfat (*Krascheninnikovia lanata*)	0.5
Fringed Sagebrush (*Artemisia frigida*)	0.5
Annual Sunflower (*Helianthus annuus*)	0.5
Scarlet Globemallow (*Sphaeralcea coccinea*)	0.5

American Vetch (*Vicia americana*)	0.5
Rocky Mountain Beeplant (*Cleome serrulata*)	0.5
	18.6 lb PLS/acre

ACC Pete Alternate Species for the Big Sagebrush Seed Mix

Seed Species	Rate-lb PLS/acre
Streambank Wheatgrass (*Elymus lanceolatus riparius*)	1.0
'Pryor' Slender Wheatgrass (*Elymus trachycaulus*)	1.0
Alkali Sacaton (*Sporobolus airoides*)	0.5
Western Wheatgrass (*Pascopyrum smithii*)	2.0
Indian Ricegrass (*Oryzopsis hymenoides*)	1.0
Rubber Rabbitbrush (*Ericameria nauseosa*)	0.5
Blue Flax (*Linum lewisii*)	0.5
Sweet Vetch (*Hedysarum spp.*)	0.5
Desert Parsley (*Lomatium spp.*)	0.5
Western Yarrow (*Achillea millefolium*)	0.5

(3) ACC Pete Sagebrush Enhancement Area Seed Mix

Seed Species	Rate-lb PLS/acre
'Secar' Bluebunch Wheatgrass (*Pseudoroegneria spicata*)	4.0
Bottlebrush Squirreltail (*Elymus elymoides*)	0.8
Indian Ricegrass (*Oryzopsis hymenoides*)	2.3
Sandberg Bluegrass (*Poa secunda*)	0.5
Fourwing Saltbush (*Atriplex canascens*)	3.0
Fringed Sagebrush (*Artemisia frigida*)	0.05
Rubber Rabbitbrush (*Ericameria nauseosa*)	0.4
Shadscale (*Atriplex confertifolia*)	3.0
Winterfat (*Krascheninnikovia lanata*)	2.0
Wyoming Big Sagebrush (*Artemisia tridentate wyomingensis*)	4.0
Annual Sunflower (*Helianthus annuus*)	0.5
Western Yarrow (*Achillea millefolium*)	0.05
Scarlet Globemallow (*Sphaeralcea coccinea*)	0.25
Rocky Mountain Beeplant (*Cleome serrulata*)	0.9
	21.7 lb PLS/acre

ACC Pete Alternate Species for the Sagebrush Enhancement Seed Mix

Seed Species	Rate-lb PLS/acre
Streambank Wheatgrass (*Elymus lanceolatus riparius*)	4.75
'Pryor' Slender Wheatgrass (*Elymus trachycaulus*)	3.5
Alkali Sacaton (*Sporobolus airoides*)	0.1
Western Wheatgrass (*Pascopyrum smithii*)	4.5
Sweet Vetch (*Hedysarum spp.*)	1.0
Desert Parsley (*Lomatium spp.*)	1.0
American Vetch (*Vicia americana*)	1.0

Prior to any seed mix revisions or substitutions, ACC will contact the BLM for approval of the proposed changes.

The amount of seed applied to public land will be calculated using the Pure Live Seed (PLS) ratio for each seed lot used. The PLS ratio is derived by multiplying a seed lots' purity by its germination rate (example: 0.95 purity x 0.95 germination = 0.9 PLS ratio). Thus, to have two pounds PLS of Indian ricegrass in a mix, divide "two" by the PLS ratio that was determined for the lot of Indian ricegrass seed being used. The result equals the amount of bulk seed needed which will always be greater than the pounds of PLS desired. (Example: if 2 lbs of PLS Indian ricegrass seed is needed divide 2 by the PLS ratio for the lot of Indian ricegrass seed being used, i.e., 2/0.9 = 2.2 lbs bulk seed is needed.) PLS ratios will be determined for each seed lot to be used in a specific mix to determine the amount of bulk seed that is needed. Seed will be stored properly to preserve its viability and will be used within twelve months of the most recent viability test. Seed that will be stored longer than twelve months beyond the last viability test will be tested for viability again and the bulk pounds/acre rates will be adjusted to reflect any new PLS values before being applied to public land. All seed applied on BLM administered public lands will comply with the current BLM seed policy in IM-2006-073 (see Appendix C). Also per IM-2006-073,

> 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.

Changing market conditions and/or new vegetation species information would potentially require adjustments to the seed mix at the time of actual seeding. Alternative species and rates also are shown here in the event some substitutions would need to be made. Variations on the proposed mix or listed substitutions would have prior approval from WDEQ-LQD and, where public lands are involved, the BLM. Seeding would generally not occur where no topsoil has been replaced, which would be in areas that had no topsoil present prior to the proposed mining disturbance. These areas would be graded to blend in with surrounding reclamation and native topography.

Seeding will take place between October 1st and mid-April. While late fall is the preferred planting season, weather conditions and the number of acres scheduled for seeding would largely dictate the actual time of seeding in any given year. Seeding will occur during the first fall/winter after topsoil has been replaced. **All seed will be certified to be cheatgrass and noxious weed seed-free**. If ACC would like to use 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 will be concurrent with mining as much as possible. After mining, disturbed areas under this Modification will be contoured to blend in with the adjacent surroundings and reseeded to support vegetation similar to the vegetation that was present on the site before it was mined. Proper topsoil and subsoil salvage will be essential to ensure successful reclamation. Use of mine pit areas for bentonite drying will 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 and other public resources will not be allowed to occur as a result of bentonite mining under this Modification. Within 3-5 years following completion of mining, disturbed areas will be recontoured to match the surrounding topography, reestablish drainages, and minimize erosion. The entire disturbed area with the exception of the main haul roads will be topsoiled and seeded using the seed mixes provided previously in this document. If necessary, topsoil stockpiles will be seeded in the fall or spring following placement.

Livestock Grazing Management
ACC will work with the BLM-CYFO to upkeep the allotment boundary fence between the Crystal Creek, Lovell Group 1, and Himes Group grazing allotments. A temporary fence or fence realignment will be constructed along the allotment boundary where the proposed mining would disturb the existing fence. ACC will work with the BLM-CYFO to replace the allotment boundary fence that runs through the Modification area during and before completing the mining process. Where fence reconstruction is necessary, it will be rebuilt to a BLM standard four wire fence. The top three wires will be barbed and the bottom will be a smooth wire that is, at a minimum, 16 inches off the ground.

BLM Sensitive Wildlife Species, Raptors and Migratory Birds
As a precaution to not cause "take" of protected species under the Migratory Bird Treaty Act and the Bald and Golden Eagle Protection Act, which is illegal, ACC will conduct nest searches within 72 hours of disturbance in previously undisturbed areas for migratory birds and BLM Sensitive Species (which include mountain plover and greater sage-grouse) between April 10th and July 15th. Between February 1st and July 31st, ACC will monitor the area within 0.5 miles of the disturbance for nesting raptors on highwalls, cliffs, and trees. Mining will stop if nesting birds are detected until the birds have fledged and can leave the nesting area unless an appropriate mitigation plan is developed with the BLM and the USFWS. To mitigate for mining in pronghorn crucial winter range, BLM fencing standards will be followed when replacing fences (see Livestock Grazing Management above).

Noxious or Invasive Weeds
ACC will be responsible for preventing and managing all noxious and undesirable invading plant species in the disturbed areas including, but not limited to cheatgrass, 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 will be consulted by the operator for control and eradication methods. Written approval of the Pesticide Use Proposal submitted by ACC, from the BLM Authorized Officer must be obtained prior to usage of herbicides on public land. Newly arriving equipment will be cleaned free of plant material off site prior to arriving at the Pete Modification area. Certified noxious weed-free and cheatgrass-free seed will be used to seed the area during reclamation.

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 Mining Stipulations (compatible with the current 43 CFR 3809 regulations):
The operator 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 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 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 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.

Before a Plan of Operations is approved, the operator 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.

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

Paleontological Resources Stipulations:

1. **Collecting:** The project 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 reseeding 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 soils and vegetation would be modified.

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 proposed mine area could take decades after initiation of reclamation to achieve vegetative production and species diversity comparable to pre-mine conditions. The area would not function the same ecologically and would not provide the same values and benefits to society. It may take years to get bond release based on current methods, and pre-mine vegetative diversity and productivity may not be achievable for years after the 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 areas for the future. Changes in vegetation would also affect surface water, soil stability and health, CO_2 sequestration, 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. Only after successful reclamation would the soils be able to function as they did before the area was mined and support a diverse 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.

5) The Proposed Action may have residual effects on livestock grazing if the vegetation does not reestablish after reclamation. Invasive weed species would also be given a chance to establish in the area, replacing native vegetation. If this happens, the amount of livestock forage 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 RMP, Environmental Impact Statement, and ROD, (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 3, 4, and 5. 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 3, 4, and 5). This approach of generally delineating a CEA area has been accepted by the BLM field office management for the past 5 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 three companies mining bentonite within the cumulative effects analysis area, including Wyo-Ben, Inc., Bentonite Performance Minerals (BPM), and American Colloid Company (ACC). According to the 2013 Annual Reports of the four bentonite mine companies in the Cody Field Office, approximately 17,500 acres have been directly affected by bentonite mining in the Cody Field Office. Bentonite mining that has been done by all bentonite companies includes thousands of acres to the east, south, and west of the proposed mine area. According to mine company annual reports, approximately 12,850 acres (73%) of the 17,500 acres have been reclaimed and reseeded; around 925 acres (5%) were mined prior to the establishment of federal and state environmental law and were reclaimed by the Abandoned Mine Lands program; leaving the balance (3,710 acres or 21%) as active mining areas or areas that have been mined but are pending reclamation.

About 21% of all areas that have been disturbed by bentonite mining have been released from bond in the field office; approximately 11% of land disturbed by ACC has been applied for and released from bond. 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 Himes Group, Lovell Group 1, and Crystal Creek 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: ACC has currently affected a total of 3,300 acres of land, of which, about 2,900 acres (88%) have been reseeded and reclaimed. Of these reclaimed acres, approximately 360, or 11%, have been recontoured, "topsoiled," and possess a native vegetative community sufficient enough to be bond released by the Wyoming Department of Environmental Quality (WDEQ) and the BLM. Bentonite mining disturbs dozens of new acres of land in the area each year. Since reclamation is attempted to be concurrent with mining, companies try to reclaim as they progress. Within the cumulative effects analysis area analyzed in this EA (Maps 4, 5, and 6), are several active grazing allotments. The Pete Modification area is located within the Crystal Creek, Himes Group, and Lovell Group allotments, which could temporarily lose one (Crystal Creek), six (Himes Group), and five (Lovell Group) AUMs per year until reclamation from the Pete Modification would be successful. Over 90% of the CEA area is included in these three grazing allotments. Currently in the Crystal Creek Allotment, there are about 880 acres of land already disturbed by bentonite mining, of which about 11 acres have been bond released, in addition to 290 acres of approved mining that has not yet occurred, and 57 acres of proposed but not yet approved mining (70% of this allotment is located outside of the CEA boundary).

In the Himes Group Allotment, there are about 140 acres of land disturbed by bentonite mining, in addition to 600 more acres of approved mining that has not yet occurred, and 340 acres of proposed but not yet approved mining (65% of this allotment lies outside of the CEA boundary). In the Lovell Group Allotment, there are about 900 acres of land disturbed by bentonite mining, of which about 25 acres have been bond released, in addition to 40 more acres of approved mining that has not yet occurred, and 375 acres of proposed but not yet approved mining (60% of this allotment lie outside of the CEA boundary). Collectively for the three allotments, combining the current as well as the planned mined acres and considering a worst case scenario, mining would reduce potential livestock forage by 80 AUMs per year if all acres were disturbed concurrently. However, it is anticipated that some areas would be reclaimed simultaneously as other areas are being mined.

When considering the differences in site potential and other environmental factors, vegetation reestablishment would occur on an increasing portion of acres reclaimed but at an unknown rate.

LIVESTOCK GRAZING: Presently, the Crystal Creek Allotment is stocked for cattle grazing at 42 acres/AUM, the Himes Group Allotment is stocked at 37 acres/AUM, and the Lovell Group Allotment is stocked at 60 acres/AUM. The present kind and number of livestock and the number of days/seasons they graze are expected to continue. 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.

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 to 80 feet of overburden to extract the bentonite. The BLM estimates bentonite mining will continue with another 9,000 to 10,000 acres of bentonite mining related disturbances will likely be proposed by bentonite mining companies in the Cody Field Office area in the reasonably foreseeable future. There are nearly 6,500 acres of mining that have been approved but not yet mined, as well as 3,450 acres of proposed mining that have not yet been approved.

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 is 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 175 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 6 years as part of the BLM's cumulative effects analyses. Within this CEA area, the primary activities are bentonite mining and livestock grazing. The entire CEA area is utilized for livestock grazing (100%), and approximately 1,500 acres have been disturbed by bentonite mining (~7.0% of the total area); and approximately another 1,100 acres are planned or proposed for new mining (5.1% of the total area) over the next 10-15 years. The Proposed Action incrementally adds 614.8 acres of mining disturbance within the analysis area (21,248 acres), or 2.9% 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, and 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 east of Lovell, Wyoming. These maps are provided below as CEA Maps 3, 4 and 5.

According to the 2013 Annual Reports submitted by the four bentonite mine companies operating in the Cody Field Office, 17,500 acres of land have been disturbed by bentonite mining. Approximately 21% of the amount of land mined for bentonite in the field office has been successfully reclaimed to the extent that it was released from bond. Companies also report that 5% was pre-law disturbance (mined before state and federal environmental laws were in effect) and was reclaimed under the Abandoned Mine Lands program. Approximately 52% of land disturbed by bentonite mining is "reclaimed" but not released from bond because it doesn't yet meet reclamation bond release standards, leaving the remaining 21% of land in active mining status. In addition to the already disturbed areas, there are approximately 6,500 acres of mining that has been approved but not yet mined, as well as 3,450 acres of proposed mining that has not yet been approved. 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-LQD will not release bonds until the reclamation meets specific standards.

Livestock Grazing

Past, present, and future bentonite mining incrementally reduces the amount of livestock forage, and can affect ranching families and their life styles. Bentonite mining has and will continue to encroach 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 1,500 acres disturbed by mining, equating to some financial and operational losses to the permittees that graze livestock within the CEA area. With the addition of 1,100 more acres of approved and planned bentonite mining (614.8 acres from the proposed mining), approximately 12.2% of the CEA area would be disturbed by bentonite mining within the next 15 years.

A total of 614.8 acres of public lands and the forage it produces for livestock grazing annually would be directly affected by the proposed Pete 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 of AUMs prior to successful reclamation.

In another 15 years, loss of forage could increase by nearly two-thirds in the CEA area (in addition to the current 1,500 disturbed acres, 1,100 additional acres are approved but not yet mined or proposed) 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 or disturbed areas, but also on the remaining undisturbed lands as demands increase for forage from those undisturbed lands.

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 caused by area disturbances and development. Species most affected by these incremental actions (mining, livestock grazing, and development) 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 past, present, and future factors on the landscape, many allotments have failed and will continue to fall below the threshold to meet Standard #4 of Healthy Rangelands in Wyoming for wildlife habitat quality.

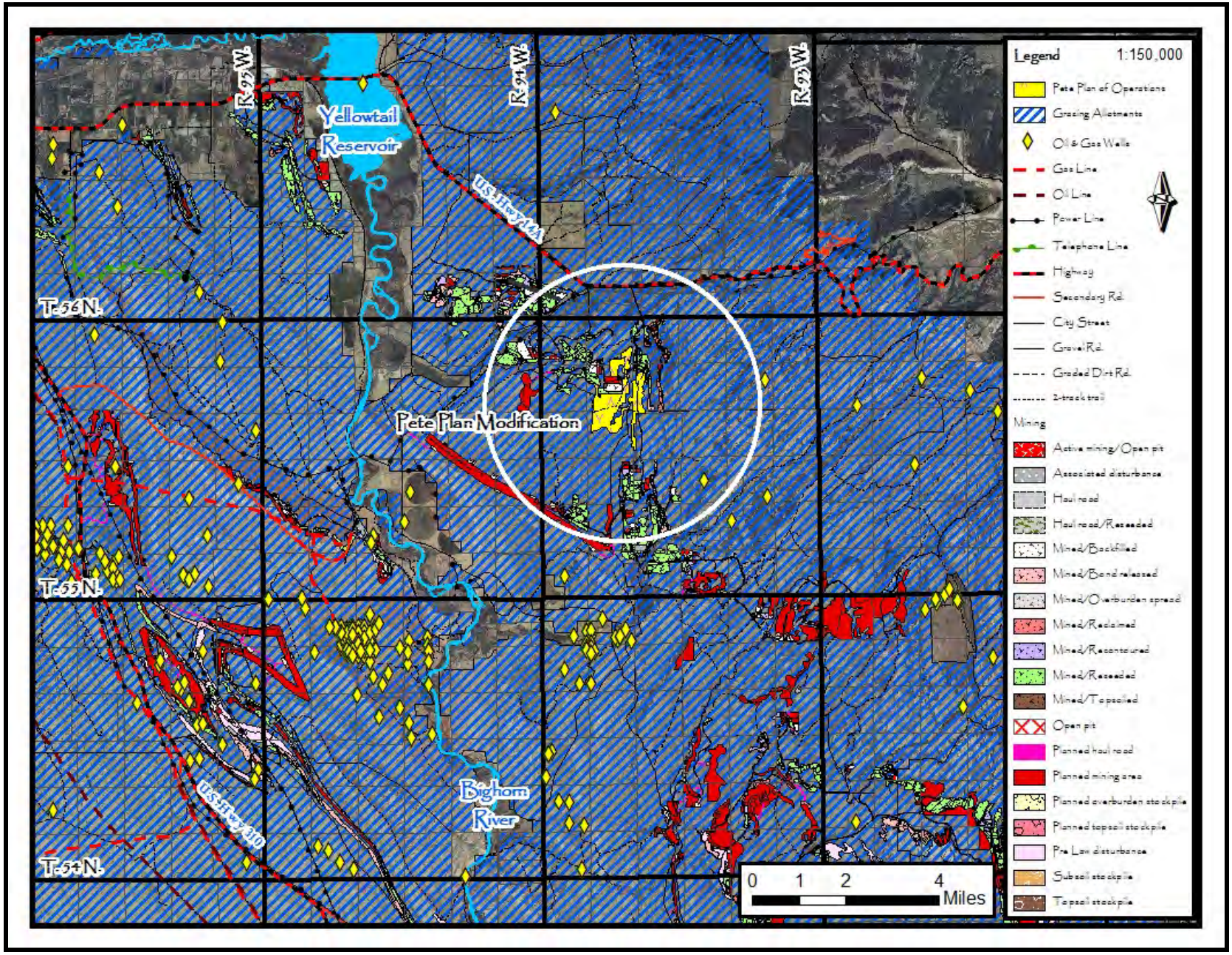
Soil, Water, Riparian-Wetland Areas, and Aquatic Habitats

The mining and attendant road system disturbance and other environmental effects from mining, livestock grazing, and other area developments modify hydrology, sediment regimes, and water chemistry which can cause impacts to water, riparian-wetland areas, aquatic habitats and the species that use them. Soil modifications would affect its important biological and physical viability. As the surface disturbance associated with mining and livestock grazing increases soil and water-related impacts incrementally accrue inside and outside of the CEA boundary.

Cumulative Effects Analysis Summary

Relative to the chosen geographic scope for the Pete Modification analysis, the following analysis is presented. Under the Proposed Action, the projected maximum incremental amount of new disturbance per year by ACC could be around 60 acres, anticipated over the ten-year life of the mine. The Proposed Action would incrementally add up to 614.8 acres of mining disturbance within the CEA area, or 2.9% of the total CEA area (21,248 acres). There are approximately 350 acres of approved mining and 750 acres of proposed, in the CEA area, which would be mined over the next two decades.

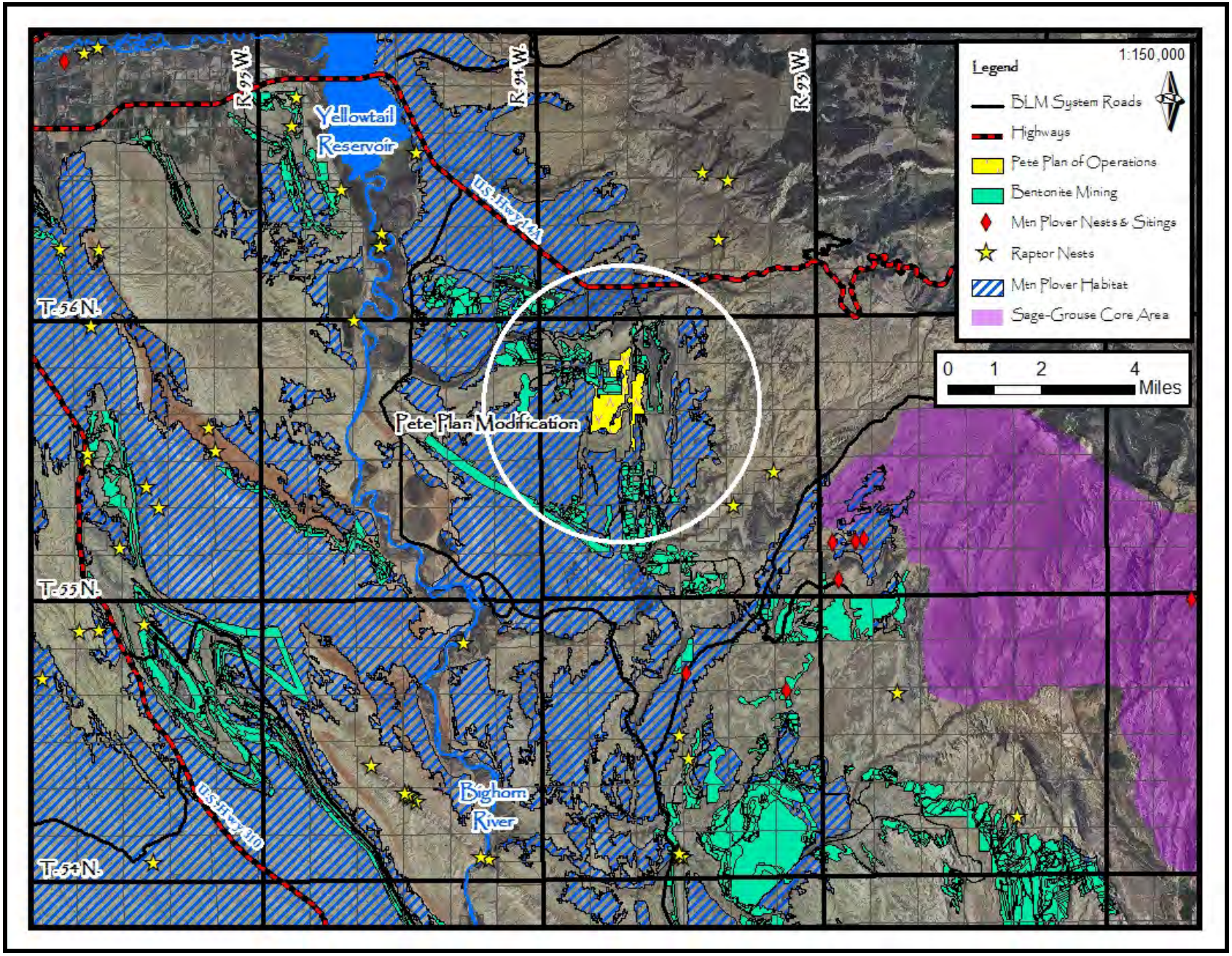
Under the Proposed Action, mining and reclamation occur concurrently as part of the castback method. Based on the known affected environment and environmental consequences of the Proposed Action; the cumulative effects analysis relative to the Proposed Action indicates that, at this time, the incremental 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 ACC.



Map 3. Land uses (existing and proposed) within the Pete Modification Cumulative Effects Analysis Area

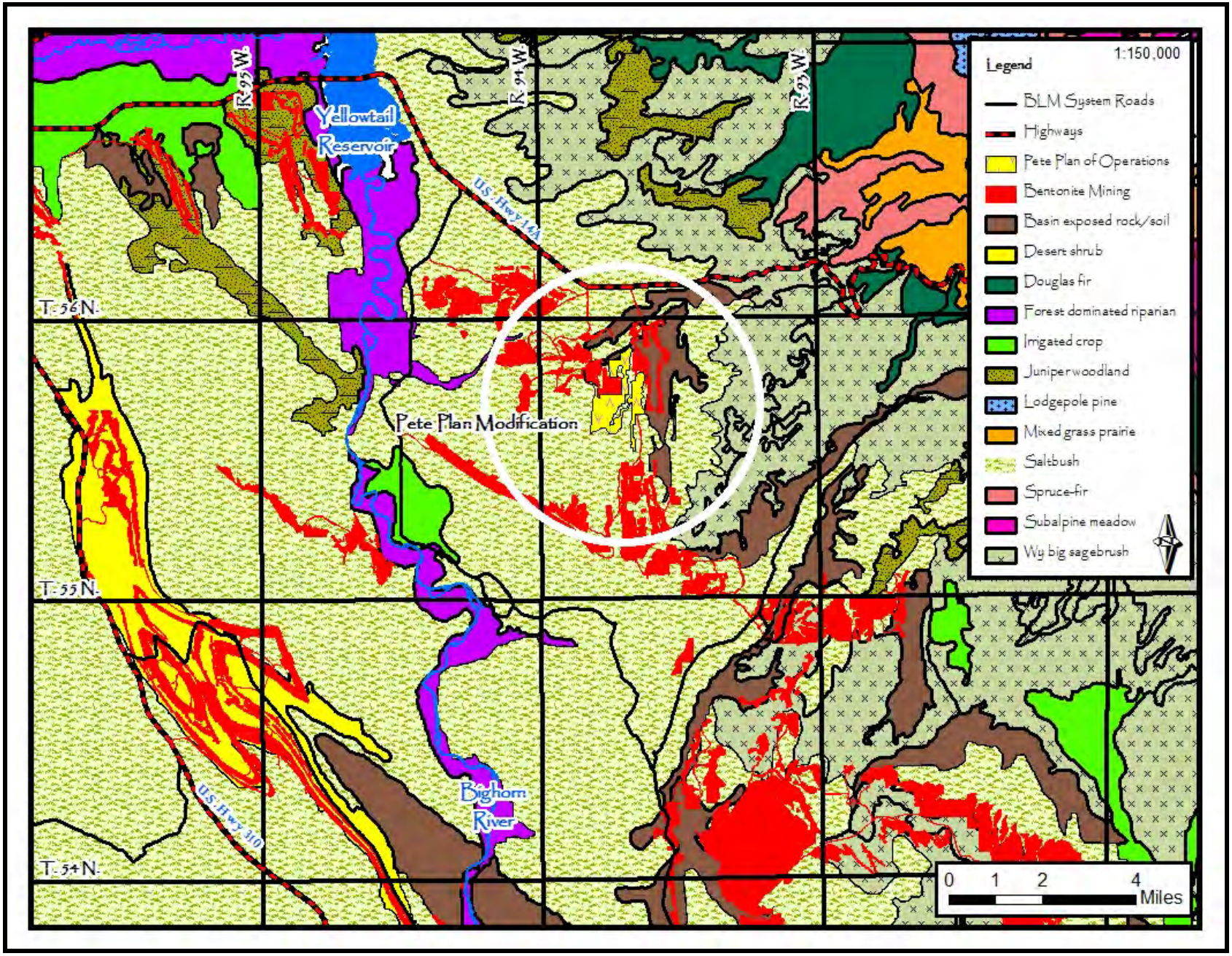
Grazing, bentonite mining (present and reasonably foreseeable future), roads, and oil field development were analyzed.

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 Core Areas in the Pete Modification Cumulative Effects Analysis Area

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 Pete Modification Cumulative Effects Analysis Area

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

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Appendix A – Climate

CLIMATE: Climate of the area is typical of cold desert regions of the inter-mountain west. The Pete Modification area falls under normal conditions, in a 5 to 9 inch precipitation zone. However, the entire Bighorn Basin has been experiencing a severe drought since 1999 with precipitation rates generally much lower than average (NCDC, 2011). Outside of 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.

Average maximum temperatures for the Pete Modification 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. Between 1897 and 2010, the mean average annual high temperature in the area was 59.0°F, and the mean average annual low temperature is 30.1°F (See Table 6 below). Average total precipitation for the area is 6.66 inches/year with most of this precipitation falling during the months of May and June. This area has average annual precipitation of 5 to 9 inches, approximately 80% 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 growing season for cool season species is approximately April 15 to June 30.

The following table provides a summary of climatic data for Lovell, Wyoming from 1897 to 2010 as recorded by the Lovell, Wyoming HPRCC station (2011):

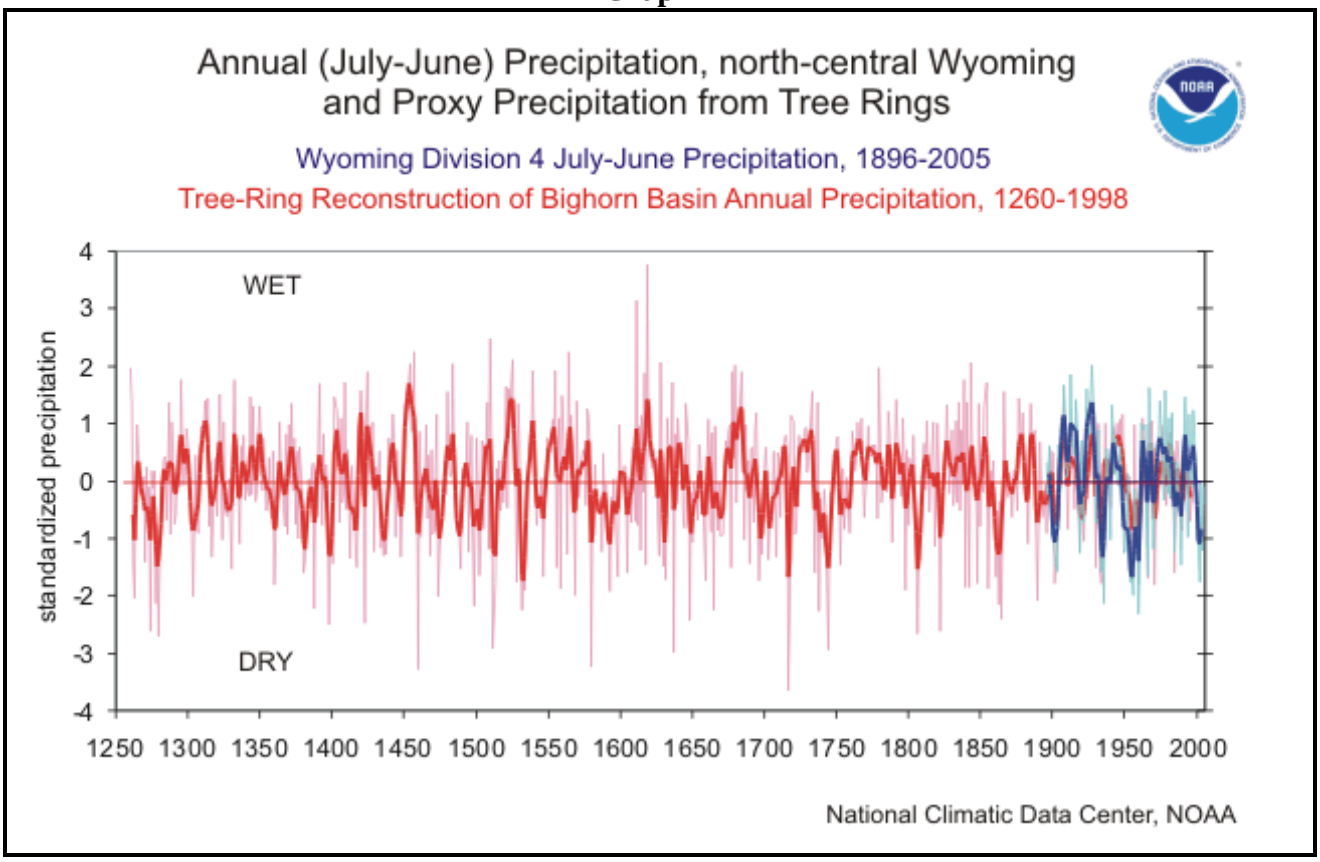
Table 6. Lovell, Wyoming (485770) Period of Record Monthly Climate Summary
Period of Record: 4/ 1/1897 to 9/30/2010

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
Average Max. Temperature (F)	29.5	36.8	47.5	59.3	69.2	78.9	88.3	85.9	73.9	61.1	44.8	33.1	59.0
Average Min. Temperature (F)	4.5	10.9	20.6	30.8	41.0	49.0	54.3	51.1	40.8	30.5	18.9	8.4	30.1
Average Total Precipitation (in.)	0.30	0.20	0.33	0.63	1.15	1.13	0.63	0.49	0.72	0.57	0.28	0.24	6.66
Average Total Snow Fall (in.)	4.2	2.5	2.5	1.3	0.2	0.0	0.0	0.0	0.4	0.7	1.7	3.9	17.5
Average Snow Depth (in.)	2	1	0	0	0	0	0	0	0	0	0	1	0

A National Climatic Data Center (NCDC) is located in Lovell, Wyoming. Graph 1 below shows the average annual (July-June) precipitation, 1896-2005, for Wyoming Division 4 (5-year annual values in light blue, 5-year weighted average in dark blue). *"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 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). 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



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

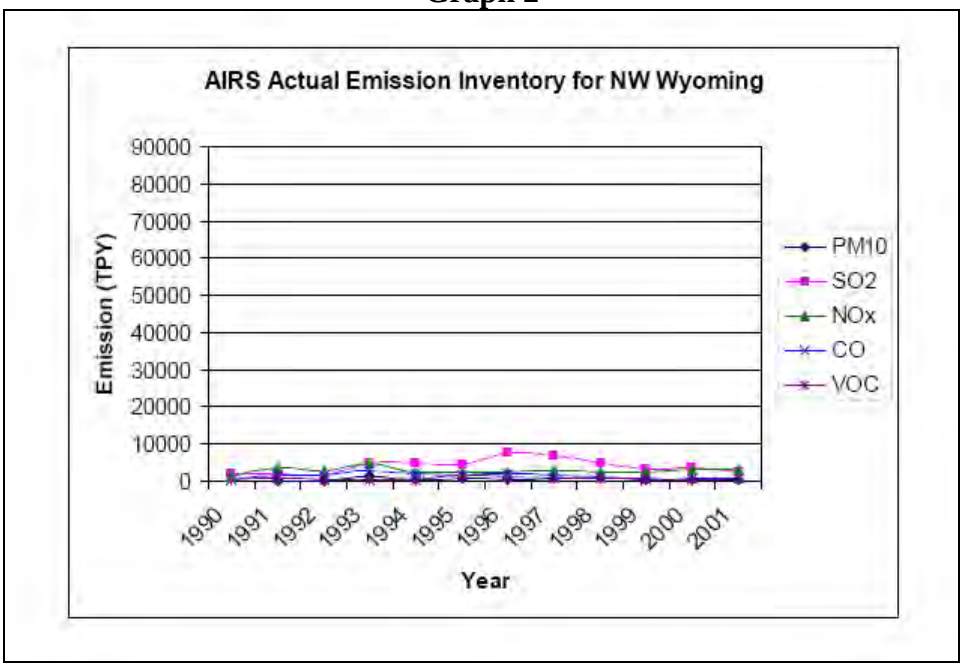


Table 7

NW WY Actual Emissions (tons per year) Big Horn, Hot Springs, Park, Teton, Washakie countes					
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. 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.

Signed by:
Lawrence E. Benna
Acting, Director

Authenticated by:
Robert M. Williams
Policy and Records Group,WO-560