

the existing and proposed mining operations are the major sources of criteria pollutants within the CESA. The modeling for the Proposed Action, which is representative of the Off-Site Transfer of Ore Concentrate for Processing Alternative, as well as the Ruby Hill Mine, shows that the levels of these pollutants below the applicable standards. The Off-Site Transfer of Ore Concentrate for Processing Alternative would not result in a significant cumulative impact to air resources. The RFFAs would result in additional emissions similar to those currently emitted by the existing operations within the CESA. In addition, the major sources of pollutants (except for motor vehicle emissions) within the CESA would operate under permit conditions established by the BAPC and therefore would not be significant.

#### 4.7.5 Visual Resources

Mining disturbance has included open pit and underground operations with WRDFs, heap leach ore processing, ore milling and processing, tailings disposal, and exploration (drilling, trenching, sampling, and road construction). Past surface disturbance is 200 acres, present disturbance is **2,681** acres, with approximately **1,439** acres of disturbance anticipated under the RFFAs. Past and present actions, as well as RFFAs associated with agricultural actions have surface disturbance totaling approximately 29,496 acres. Past and present actions, as well as RFFAs associated with utilities and infrastructure actions have surface disturbance totaling approximately 51,823 acres. Past and present actions, as well as RFFAs associated with general development actions have surface disturbance totaling approximately 16,074 acres. These actions total approximately **101,713** acres of disturbance within the approximately 645,000-acre CESA for visual resources.

There are many actions that have an effect on the visual resources within the vicinity of the Project Area. The BLM's visual management for the Project Area allows for substantial change to the visual characteristics of the area. Therefore, the cumulative impacts to visual resources from the Off-Site Transfer of Ore Concentrate for Processing Alternative, along with the past and present actions and the RFFAs would not be significant; however, activities to minimize the visual effects are incorporated in the Project reclamation plan. In addition, VRM classes do not establish management direction and should not be used as a basis for constraining or limiting surface disturbing activities.

#### 4.7.6 Soils

Total past actions, present actions, and RFFAs would result in up to approximately **18,320** acres of surface disturbance that would affect soil resources. The past actions are generally not subject to any reclamation activities. The present actions and RFFAs associated with mineral, geothermal, and oil and gas operations are subject to reclamation requirements, which would minimize any impacts; however, all other present actions and RFFAs would not be subject to reclamation requirements. The CESA for soil resources covers approximately 262,490 acres. Therefore, all actions within the CESA would affect approximately **seven** percent of the soil resources within the CESA.

#### 4.7.7 Vegetation Resources

Total past actions, present actions, and RFFAs would result in up to approximately **23,820** acres of surface disturbance that would affect vegetation. The past actions are generally not subject to

any reclamation activities. The present actions and RFFAs associated with mineral, geothermal, and oil and gas operations are subject to reclamation requirements, which would minimize any impacts; however, all other present actions and RFFAs would not be subject to reclamation requirements. The CESA for vegetation covers approximately 262,490 acres. Therefore, all actions within the CESA would affect approximately 21 percent of the vegetation within the CESA. The Off-Site Transfer of Ore Concentrate for Processing Alternative would disturb approximately three percent of the CESA. The amount of area that would not be reclaimed (734 acres) associated with the open pit of the Off-Site Transfer of Ore Concentrate for Processing Alternative represents less than **four** percent of the total surface disturbance resulting from past, present, and RFFAs. The vegetation communities within the CESA are similar to those within the Project Area and common in the region. The cumulative and incremental effect of vegetation removal or modification would be below the level of significance.

The four special status plant species with potential habitat within the Project Area (Beatley buckwheat, least phacelia, Monte Neva Indian paintbrush, and windloving buckwheat) also have potential habitat within the CESA. None of these species has been documented as occurring within the CESA; however, no systematic survey has been completed. The cumulative effect and incremental loss of potential habitat for the four special status plant species resulting from past and present actions, proposed actions, and RFFAs would be below the level of significance.

#### 4.7.8 Noxious Weeds, Invasive and Nonnative Species

Total past actions, present actions, and RFFAs would result in up to approximately **18,320** acres of surface disturbance that would affect vegetation, noxious weeds, and invasive, nonnative species. The past actions are generally not subject to any reclamation activities. The present actions and RFFAs associated with mineral operations are subject to reclamation requirements, which would minimize any impacts; however, all other present actions and RFFAs would not be subject to reclamation requirements. The CESA for noxious weeds and invasive, nonnative species covers approximately 262,490 acres. Therefore, all actions within the CESA would affect approximately **seven** percent of the vegetation within the CESA. The Off-Site Transfer of Ore Concentrate for Processing Alternative would disturb approximately three percent of the CESA. The amount of area that would not be reclaimed (734 acres) associated with the open pit for the Off-Site Transfer of Ore Concentrate for Processing Alternative represents less than **five** percent of the total surface disturbance resulting from past, present, and RFFAs.

An infestation of noxious weeds and invasive, nonnative species that starts in one project may expand to outside areas and increase the chance of the introduction of noxious weeds and invasive, nonnative species to other disturbed locations. The **applicant committed practices** identified to reduce the potential impacts of the Off-Site Transfer of Ore Concentrate for Processing Alternative would help to control noxious weed establishment and spread within and adjacent to the Project Area; therefore, the cumulative and incremental effect of surface disturbance on noxious weed management would be below the level of significance.

#### 4.7.9 Wetlands and Riparian Zones

Total past actions, present actions, and RFFAs would result in up to approximately **18,320** acres of surface disturbance that would affect vegetation; however, this disturbance is likely to occur in vegetation communities other than the riparian community. The past actions are generally not

subject to any reclamation activities. The present actions and RFFAs associated with mineral operations are subject to reclamation requirements, which would minimize any impacts; however, all other present actions and RFFAs would not be subject to reclamation requirements. The CESA for wetlands and riparian zones covers approximately 262,490 acres; therefore, all actions within the CESA would affect approximately **seven** percent of the vegetation within the CESA, which includes an indirect affect to approximately four acres of riparian vegetation community. The Off-Site Transfer of Ore Concentrate for Processing Alternative would disturb approximately three percent of the CESA. The amount of area that would not be reclaimed (734 acres) associated with the open pit for the Off-Site Transfer of Ore Concentrate for Processing Alternative represents less than **five** percent of the total surface disturbance resulting from past, present, and RFFAs. The cumulative and incremental effect to wetlands and riparian zones would be significant.

#### **4.7.10 Livestock Grazing and Production**

Total past actions, present actions, and RFFAs would result in up to approximately **619,054** acres of surface disturbance in the CESA; however, approximately **44,094** acres of surface disturbance is, or would be, associated with habitat stabilization, rehabilitation, and rangeland improvements, which would result in positive impacts to livestock grazing and production in the CESA. The majority of the **619,054** acres would be reclaimed and available for livestock grazing after the completion of reclamation activities. Approximately 781 AUMs would be lost in the Project Area due to the enclosure which is six percent of the current active grazing preference.

#### **4.7.11 Wild Horses**

Total past actions, present actions, and RFFAs would result in up to approximately **18,058** acres of surface disturbance that would affect wild horses. The majority of this disturbance is associated with mining operations and is subject to reclamation requirements, which would minimize any impacts; however, all other present actions and RFFAs would not be subject to reclamation requirements. The CESA for wild horses covers approximately 253,610 acres. Therefore, all actions within the CESA would affect approximately **seven** percent of the vegetation within the CESA. The Off-Site Transfer of Ore Concentrate for Processing Alternative would disturb approximately three percent of the CESA. The amount of area that would not be reclaimed (734 acres) associated with the open pit for the Off-Site Transfer of Ore Concentrate for Processing Alternative represents less than **five** percent of the total surface disturbance resulting from past, present, and RFFAs. The implementation of mitigation measures identified in Chapter 3 of this EIS limit the loss of habitat and water sources to wild horses in the Project Area by development of six water sources; therefore, the cumulative and incremental effects to wild horses would be below the level of significance.

#### **4.7.12 Land Use**

The current uses of the public lands within the Project Area are similar to those within the CESA and common to the region. The cumulative and incremental effect of the permanent loss of public lands managed for multiple uses within the CESA would be below the level of significance; however, under the RFFA, of the sale of a major portion of the Project Area, land use and access through that portion of the Project Area would be substantially changed.

#### **4.7.13 Recreation and Wilderness Study Area**

Total past actions, present actions, and RFFAs would result in up to approximately **993,032** acres of surface disturbance that would affect recreation, as well as potential indirect effects to high use recreation locations associated with the Roberts Creek drainage. The CESA for recreation and wilderness covers approximately 1,970,179 acres; therefore, approximately **50** percent of the CESA would be impacted. The present actions and RFFAs associated with mineral operations and other activities on BLM-administered lands are subject to reclamation requirements, which would restore areas for future use and minimize the long-term impacts. In addition, approximately 44,094 acres of surface disturbance is, or would be, associated with habitat stabilization and rehabilitation, which would result in positive impacts to recreation and wilderness in the CESA; therefore the quality of the area available for future recreational opportunities would be improved, and there would be no unmitigated loss of a unique recreational resource. While any one, or all, of the activities occurs there would be a reduction in the quality of the recreational or wilderness experience in portions of the CESA.

It is not known which activities, other than the Off-Site Transfer of Ore Concentrate for Processing Alternative, may result in restrictions to access of recreation areas, but very few restrictions are anticipated. The permanent access restriction as a result of the Off-Site Transfer of Ore Concentrate for Processing Alternative would account for only 0.4 percent of the CESA; therefore, the cumulative and incremental effect of the permanent access restriction from public lands managed for multiple uses within the CESA would be below the level of significance.

#### **4.7.14 Auditory Resources**

Each of the identified individual projects within the CESA, including the proposed mining operations, contributes noise to the natural environment. Since the Off-Site Transfer of Ore Concentrate for Processing Alternative is the principal and dominant noise generating activity within the CESA, the potential impacts are less than significant (Section 3.16.3.3), and any present actions and RFFAs would be dispersed throughout the CESA, none of the projects including the Off-Site Transfer of Ore Concentrate for Processing Alternative would result in a significant cumulative impact to the auditory resources.

#### **4.7.15 Socioeconomic Values**

The identified projects within the CESA, including the Off-Site Transfer of Ore Concentrate for Processing Alternative, would have a net beneficial impact on social and economic values in Eureka County. As stated in Section 3.17, EML has and would continue to coordinate with Eureka County to address these impacts and minimize the short-term fiscal impacts on the County.

#### **4.7.16 Environmental Justice Effects**

Initial analysis concluded that the potential effects of the Project would not be expected to disproportionately affect any particular population. Environmental effects that may occur at a greater distance, such as auditory resource or air impacts, would affect the area's population equally, without regard to nationality or income level. Since no disproportionate effects on an

identified minority population results from the Off-Site Transfer of Ore Concentrate for Processing Alternative or the RFFAs, no further environmental justice analyses are required.

#### **4.7.17 Hazardous Materials**

The present actions and RFFAs within the CESA, including the proposed mining operations, contribute to potential hazardous materials effects to the natural environment. Since the Proposed Action is the principal hazardous materials generating activity within the CESA, the potential impacts are less than significant (Section 3.19.3.3), and any existing action and RFFAs such as traffic on SR 278 would be dispersed throughout the CESA, there would be no significant cumulative hazardous materials impact.

#### **4.7.18 Historic Trails**

The identified projects within the CESA, including the Off-Site Transfer of Ore Concentrate for Processing Alternative have an impact on the visual setting for the historic trail by adding visual elements that may detract from the experience of those using the trail. These impacts are significant. In addition, there is no mitigation that could reduce the impact to less than significant. In addition, under the RFFA of the sale of a major portion of the Project Area, access through that portion of the Project Area could be eliminated.

#### **4.7.19 Cultural Resources**

The identified projects within the CESA, including the Off-Site Transfer of Ore Concentrate for Processing Alternative have a direct physical impact on the cultural resources and an indirect impact on the visual setting for specific cultural resources that are potentially significant. Within the cumulative effects viewshed APE, a total of 436 eligible and unevaluated historic (361) and multi-component (75) sites with a historic component would be visually impacted. This number includes 152 officially eligible historic sites and 39 officially eligible multi-component sites with a historic element within the Project APE (Table 3.21-1). Impacts to these sites would be mitigated through the implementation of a treatment plan. Outside of the Project APE and within the viewshed APE, an additional 245 eligible or unevaluated historic and historic component sites may be adversely impacted. All adverse effects under the NHPA and direct and indirect impacts under NEPA to known-eligible properties identified within the Project APE would be mitigated in accordance with the PA and the treatment plan prepared for the Project. Any previously unknown-eligible properties that may be discovered during construction activities would be mitigated in accordance with the PA. Therefore, no additional mitigation or monitoring is proposed. No residual adverse effects are anticipated, as all known-eligible sites would be mitigated in accordance with the PA and the treatment plan prepared for the Project. Any previously unknown-eligible properties that may be discovered during construction activities would be mitigated in accordance with the PA.

#### **4.7.20 Native American Traditional Values**

The identified projects within the CESA, including the Off-Site Transfer of Ore Concentrate for Processing Alternative have an impact on Native American Traditional Values, which include pine nut gathering and water resources. Although this alternative would not result in the removal of any piñon-only woodlands, the Off-Site Transfer of Ore Concentrate for Processing

Alternative's removal of piñon trees and limiting of access to other piñon trees in piñon-juniper woodlands within the fenced Project Area, relative to all other impacts to piñon trees, is not readily quantifiable; however, it is likely less than one percent of all the piñon trees within piñon-only and piñon-juniper woodlands in the CESA. In addition, the cumulative effect to piñon trees, relative to the total number of piñon trees within the Native American Traditional Values CESA is small (Figure 4.3.3) The Proposed Action's potential effect to water resources from ground water pumping, as shown on Figure 4.4.2, which is representative of the ground water pumping effects of the Off-Site Transfer of Ore Concentrate for Processing Alternative, is isolated from the ground water pumping associated with the other mining operations within the Native American Traditional Values CESA. Figure 4.4.2 also shows the location of projects within the CESA where the removal or retrieval of prehistoric artifacts have occurred or may have occurred. Figure 4.4.2 does not show any potential effects from ground water pumping associated with agricultural operations. The Off-Site Transfer of Ore Concentrate for Processing Alternative's potential effects to water resources is incrementally a small percent of the total potential effect to water resources from ground water pumping operations.

#### **4.7.21 Wildlife and Fisheries Resources**

Total past actions, present actions, and RFFAs would result in up to approximately **954,808** acres of habitat disturbance in the CESA; however, approximately 44,094 acres of habitat disturbance is, or would be, associated with habitat stabilization, rehabilitation, and rangeland improvements that would result in positive impacts to wildlife and fisheries resources in the CESA. Significant cumulative impacts to the wildlife and fisheries habitat in the CESA would not be anticipated because the vast majority of land would be reclaimed. Even though none of the perennial drainages, including those that support sport fisheries, would appear to be affected hydrologically, there is a potential to affect stream flow through ground water pumping from the Off-Site Transfer of Ore Concentrate for Processing Alternative and thus affect the fisheries. Due to the widely dispersed nature of the existing and reasonably foreseeable individual mining projects within the CESA, cumulative noise and traffic impacts would not cause a substantial disturbance to wildlife populations or critically reduce use of their habitat.

Mitigation for impacts to wildlife resources is presently in Chapter 3 of this EIS and includes measures to protect greater sage-grouse, LCT, and migratory birds. Impacts to other wildlife and fisheries resources are below the level of significance.

#### **4.7.22 Transportation and Access**

The current access of the public lands within the Project Area are similar to those within the CESA and common to the region. The current transportation uses in the vicinity of the Project Area are similar to those with the CESA and common to the region. The cumulative and incremental effect of the permanent loss of public lands managed for multiple uses (734-acre area of the open pit) within the CESA would be below the level of significance; however, under the RFFA, of the sale of a major portion of the Project Area, access through that portion of the Project Area would be substantially changed.

### 4.7.23 Forest Products

Total past actions, present actions, and RFFAs would result in up to approximately **15,913** acres of surface disturbance that would affect forest products. The past actions are generally not subject to any reclamation activities. The present actions and RFFAs associated with mineral, geothermal, and oil and gas operations are subject to reclamation requirements, which would minimize any impacts; however, all other present actions and RFFAs would not be subject to reclamation requirements. The CESA for forest products covers approximately 515,000 acres. Therefore, all actions within the CESA would affect approximately **three** percent of the vegetation within the CESA. The Proposed Action would disturb approximately three percent of the CESA. The amount of area that would not be reclaimed (734 acres) associated with the open pit for the Off-Site Transfer of Ore Concentrate for Processing Alternative represents less than **five** percent of the total surface disturbance resulting from past, present, and RFFAs. The vegetation communities within the CESA are similar to those within the Project Area and common in the region. The cumulative and incremental effect of vegetation removal or modification would be below the level of significance.

## 4.8 Slower, Longer Project Alternative Impact Analysis

The resources that may be cumulatively impacted by the Slower, Longer Project Alternative when combined with the past actions, present actions, and RFFAs include air quality, soils, water, vegetation, wildlife and fisheries, special status species, wetlands and riparian zones, livestock grazing and production, land use authorizations and access, visual, socioeconomics, geology and minerals, noxious weeds and invasive nonnative species, recreation and wilderness, historic trails, cultural resources, Native American Traditional Values, hazardous materials, and wild horses. The cumulative impacts under the Slower, Longer Project Alternative would be similar to the Proposed Action, due to similarity in size and scope of the operations under the alternative. The Slower, Longer Project Alternative would have a lesser incremental increase in cumulative impacts to some other resources (socioeconomics and air resources) compared to the Proposed Action due to the extended time frame over which this alternative would occur.

### 4.8.1 Water Resources - Water Quantity

Cumulative impacts to water resources within the study area are considered from surface water, ground water, and water quantity perspectives. Assessment of cumulative impacts from present actions and RFFAs that are developed would be incorporated into the periodic ground water flow model and pit lake chemistry model updates as specific activities and associated water resource impacts evolve and are quantified by data collection under the Integrated Monitoring Plan, as outlined in Section 2.1.16 of this EIS.

#### 4.8.1.1 Surface Water Quantity

Cumulative activities indirectly affecting the surface water resources through the pumping of ground water was evaluated with ground water modeling of the cumulative actions that were modeled beyond 2200 (Montgomery et al. 2010). Figure 4.4.1 depicts the ten-foot drawdown contour for the cumulative actions scenario, at year 2055, using the Proposed Action. Based on the analysis of the Slower, Longer Project Alternation in Section 3.2 of this EIS, the cumulative actions scenario using the Slower, Longer Project Alternative would be similar to, and possibly

greater than the analysis using the Proposed Action. This analysis identifies a number of springs and streams on the western flank of the Diamond Mountains, the northern end of Diamond Valley, in the Roberts Mountains and in Kobeh Valley that are within the ten-foot drawdown contour and thus their flows would be potentially diminished.

The cumulative impacts to surface water resources from the Slower, Longer Project Alternative and RFFAs for ground water development would be significant. The Slower, Longer Project Alternative portion of the cumulative impacts is also considered significant and specific mitigation measures for the Slower, Longer Project Alternative effect are identified in Section 3.2.7.3. The cumulative actions, exclusive of the Slower, Longer Project Alternative, particularly the agricultural actions in Diamond Valley also have a significant effect on the surface water resources in Diamond Valley. No mitigation measures are proposed for these effects because the BLM does not have any regulatory authority over those actions.

#### 4.8.1.2 Ground Water Quantity

Ground water modeling of the cumulative activities affecting the ground water resources was conducted through year 2055 (Montgomery et al. 2010). Figure 4.4.1 depicts the ten-foot drawdown contour for the cumulative actions scenario. This analysis identifies a number of wells in Diamond Valley and Kobeh Valley that are within the ten-foot drawdown contour and thus their flows would be potentially diminished.

The cumulative impacts to ground water resources from the Slower, Longer Project Alternative and RFFAs for ground water development would be significant. Slower, Longer Project Alternative portion of the cumulative impacts is also considered significant and specific mitigation measures for the Slower, Longer Project Alternative effect are identified in Section 3.2.6.3. The cumulative actions, exclusive of the Slower, Longer Project Alternative, particularly the agricultural actions in Diamond Valley also have a significant effect on the ground water resources in Diamond Valley. No mitigation measures are proposed for these effects because the BLM does not have any regulatory authority over those actions.

#### 4.8.2 **Water Resources - Water Quality**

Cumulative impacts to water resources within the study area are considered from surface water, ground water, and water quality perspectives. Assessment of cumulative impacts from present actions and RFFAs that are developed would be incorporated into the periodic ground water flow model and ground water chemistry model updates as specific activities and associated water resource impacts evolve and are quantified by data collection under the Integrated Monitoring Plan.

##### 4.8.2.1 Surface Water Quality

The past, present, and RFFAs would potentially directly affect surface water resources through increased erosion and sedimentation. The mining-related cumulative actions would be required to implement erosion control measures that would limit their contribution to the cumulative impacts. Grazing has its own set of requirements that minimize effects to surface water quality. Dispersed recreation actions would not have the same requirements and thus would have a

proportionally greater affect on surface water resources by removing vegetation and decreasing bank stability near streams and springs.

#### 4.8.2.2 Ground Water Quality

Any potential cumulative impacts to ground water quality from the Slower, Longer Project Alternative, along with the past and present actions and the RFFAs for ground water would not be significant, based on the criteria in Section 3.2. The only two actions that have a quantitative assessment of potential ground water quality impacts are the Slower, Longer Project Alternative and the Ruby Hill Mine.

### 4.8.3 **Geology and Mineral Resources**

Mining disturbance has included open pit and underground operations with WRDFs, heap leach ore processing, ore milling and processing, tailings disposal, and exploration (drilling, trenching, sampling, and road construction). Past surface disturbance is 200 acres, present disturbance is **4,917** acres, **with** approximately 1,727 acres of disturbance anticipated under the RFFAs. This totals **6,644** acres of disturbance within the 1,809,522-acre CESA.

Mining is a major activity in the area, and it is likely that exploration activities and mining would continue. Additional impacts would result from the creation in the foreseeable future of additional open pit mining operations with WRDFs and processing facilities. The direct impacts affecting geology and mineral resources of the Slower, Longer Project Alternative due to the open pit mining would be the permanent removal of the identified mineral resources. The cumulative impacts to geology and mineral resources from the Slower, Longer Project Alternative and RFFAs for mineral development would not be significant. No mitigation is proposed.

### 4.8.4 **Air Resources**

Each of the identified individual projects within the CESA, including existing and proposed mining operations, emit air pollutants. With the possible exception of motor vehicle emissions, the existing and proposed mining operations are the major sources of criteria pollutants within the CESA. The modeling for the Proposed Action, which is representative of the Slower, Longer Project Alternative, as well as the Ruby Hill Mine, shows that the levels of these pollutants below the applicable standards. The Slower, Longer Project Alternative would not result in a significant cumulative impact to air resources. The RFFAs would result in additional emissions similar to those currently emitted by the existing operations within the CESA. In addition, the major sources of pollutants (except for motor vehicle emissions) within the CESA would operate under permit conditions established by the BAPC and therefore would not be significant.

### 4.8.5 **Visual Resources**

Mining disturbance has included open pit and underground operations with WRDFs, heap leach ore processing, ore milling and processing, tailings disposal, and exploration (drilling, trenching, sampling, and road construction). Past surface disturbance is 200 acres, present disturbance is **2,681** acres, **with** approximately 1,439 acres of disturbance anticipated under the RFFAs. Past and present actions, as well as RFFAs associated with agricultural actions have surface

disturbance totaling approximately 29,496 acres. Past and present actions, as well as RFFAs associated with utilities and infrastructure actions have surface disturbance totaling approximately 51,823 acres. Past and present actions, as well as RFFAs associated with general development actions have surface disturbance totaling approximately 16,074 acres. These actions total approximately **101,713** acres of disturbance within the approximately 645,000-acre CESA for visual resources.

There are many actions that have an effect on the visual resources within the vicinity of the Project Area. The BLM's visual management for the Project Area allows for substantial change to the visual characteristics of the area. Therefore, the cumulative impacts to visual resources from the Slower, Longer Project Alternative, along with the past and present actions and the RFFAs would not be significant; however, activities to minimize the visual effects are incorporated in the Project reclamation plan. In addition, VRM classes do not establish management direction and should not be used as a basis for constraining or limiting surface disturbing activities.

#### 4.8.6 Soils

Total past actions, present actions, and RFFAs would result in up to approximately **18,320** acres of surface disturbance that would affect soil resources. The past actions are generally not subject to any reclamation activities. The present actions and RFFAs associated with mineral, geothermal, and oil and gas operations are subject to reclamation requirements, which would minimize any impacts; however, all other present actions and RFFAs would not be subject to reclamation requirements. The CESA for soil resources covers approximately 262,490 acres. Therefore, all actions within the CESA would affect approximately **seven** percent of the soil resources within the CESA.

#### 4.8.7 Vegetation Resources

Total past actions, present actions, and RFFAs would result in up to approximately **23,820** acres of surface disturbance that would affect vegetation. The past actions are generally not subject to any reclamation activities. The present actions and RFFAs associated with mineral, geothermal, and oil and gas operations are subject to reclamation requirements, which would minimize any impacts; however, all other present actions and RFFAs would not be subject to reclamation requirements. The CESA for vegetation covers approximately 262,490 acres. Therefore, all actions within the CESA would affect approximately 21 percent of the vegetation within the CESA. The Slower, Longer Project Alternative would disturb approximately three percent of the CESA. The amount of area that would not be reclaimed (734 acres) associated with the open pit of the Slower, Longer Project Alternative represents less than **four** percent of the total surface disturbance resulting from past, present, and RFFAs. The vegetation communities within the CESA are similar to those within the Project Area and common in the region. The cumulative and incremental effect of vegetation removal or modification would be below the level of significance.

The four special status plant species with potential habitat within the Project Area (Beatley buckwheat, least phacelia, Monte Neva Indian paintbrush, and windloving buckwheat) also have potential habitat within the CESA. None of these species has been documented as occurring within the CESA; however, no systematic survey has been completed. The cumulative effect and

incremental loss of potential habitat for the four special status plant species resulting from past and present actions, proposed actions, and RFFAs would be below the level of significance.

#### 4.8.8 Noxious Weeds, Invasive and Nonnative Species

Total past actions, present actions, and RFFAs would result in up to approximately **18,320** acres of surface disturbance that would affect vegetation, noxious weeds, and invasive, nonnative species. The past actions are generally not subject to any reclamation activities. The present actions and RFFAs associated with mineral operations are subject to reclamation requirements, which would minimize any impacts; however, all other present actions and RFFAs would not be subject to reclamation requirements. The CESA for noxious weeds and invasive, nonnative species covers approximately 262,490 acres. Therefore, all actions within the CESA would affect approximately **seven** percent of the vegetation within the CESA. The Slower, Longer Project Alternative would disturb approximately three percent of the CESA. The amount of area that would not be reclaimed (734 acres) associated with the open pit for the Slower, Longer Project Alternative represents less than **five** percent of the total surface disturbance resulting from past, present, and RFFAs.

An infestation of noxious weeds and invasive, nonnative species that starts in one project may expand to outside areas and increase the chance of the introduction of noxious weeds and invasive, nonnative species to other disturbed locations. The **applicant committed practices** identified to reduce the potential impacts of the Slower, Longer Project Alternative would help to control noxious weed establishment and spread within and adjacent to the Project Area; therefore, the cumulative and incremental effect of surface disturbance on noxious weed management would be below the level of significance.

#### 4.8.9 Wetlands and Riparian Zones

Total past actions, present actions, and RFFAs would result in up to approximately **18,320** acres of surface disturbance that would affect vegetation; however, this disturbance is likely to occur in vegetation communities other than the riparian vegetation community. The past actions are generally not subject to any reclamation activities. The present actions and RFFAs associated with mineral operations are subject to reclamation requirements, which would minimize any impacts; however, all other present actions and RFFAs would not be subject to reclamation requirements either because of their perpetual nature or lack of state or federal statutory requirements for reclamation. The CESA for wetlands and riparian zones covers approximately 262,490 acres; therefore, all actions within the CESA would affect approximately **seven** percent of the vegetation within the CESA, which includes an indirect impact to approximately five acres of riparian vegetation community. The Slower, Longer Project Alternative would disturb approximately three percent of the CESA. The amount of area that would not be reclaimed (734 acres) associated with the open pit for the Slower, Longer Project Alternative represents less than **five** percent of the total surface disturbance resulting from past, present, and RFFAs. The cumulative and incremental effect to wetlands and riparian zones would be below the level of significance. Mitigation for this alternative is outlined in Section 3.11.3.7.

#### 4.8.10 Livestock Grazing and Production

Total past actions, present actions, and RFFAs would result in up to approximately **619,054** acres of surface disturbance in the CESA; however, approximately **44,094** acres of surface disturbance is, or would be, associated with habitat stabilization, rehabilitation, and rangeland improvements, which would result in positive impacts to livestock grazing and production in the CESA. The majority of the **619,054** acres would be reclaimed and available for livestock grazing after the completion of reclamation activities. Approximately 781 AUMs would be lost in the Project Area due to the enclosure which is six percent of the current active grazing preference.

#### 4.8.11 Wild Horses

Total past actions, present actions, and RFFAs would result in up to approximately **18,058** acres of surface disturbance that would affect wild horses. The majority of this disturbance is associated with mining operations and is subject to reclamation requirements, which would minimize any impacts; however, all other present actions and RFFAs would not be subject to reclamation requirements. The CESA for wild horses covers approximately 253,610 acres. Therefore, all actions within the CESA would affect approximately **seven** percent of the vegetation within the CESA. The Slower, Longer Project Alternative would disturb approximately three percent of the CESA. The amount of area that would not be reclaimed (734 acres) associated with the open pit for the Slower, Longer Project Alternative represents less than **five** percent of the total surface disturbance resulting from past, present, and RFFAs. The implementation of mitigation measures identified in Chapter 3 of this EIS limit the loss of habitat and water sources to wild horses in the Project Area by development of six water sources; therefore, the cumulative and incremental effects to wild horses would be below the level of significance.

#### 4.8.12 Land Use

The current uses of the public lands within the Project Area are similar to those within the CESA and common to the region. The cumulative and incremental effect of the permanent loss of public lands managed for multiple uses within the CESA would be below the level of significance; however, under the RFFA, of the sale of a major portion of the Project Area, land use and access through that portion of the Project Area would be substantially changed.

#### 4.8.13 Recreation and Wilderness Study Area

Total past actions, present actions, and RFFAs would result in up to approximately **993,032** acres of surface disturbance that would affect recreation, as well as potential indirect effects to high use recreation locations associated with the Roberts Creek drainage. The CESA for recreation and wilderness covers approximately 1,970,179 acres; therefore, approximately **50** percent of the CESA would be impacted. The present actions and RFFAs associated with mineral operations and other activities on BLM-administered lands are subject to reclamation requirements, which would restore areas for future use and minimize the long-term impacts. In addition, approximately 44,094 acres of surface disturbance is, or would be, associated with habitat stabilization and rehabilitation, which would result in positive impacts to recreation and wilderness in the CESA; therefore the quality of the area available for future recreational opportunities would be improved, and there would be no unmitigated loss of a unique

recreational resource. While any one, or all, of these activities occurs there would be a reduction in the quality of the recreational or wilderness experience in portions of the CESA.

It is not known which activities, other than the Slower, Longer Project Alternative, may result in restrictions to access of recreation areas, but very few restrictions are anticipated. The permanent access restriction as a result of the Slower, Longer Project Alternative would account for only 0.04 percent of the CESA; therefore, the cumulative and incremental effect of the permanent access restriction from public lands managed for multiple uses within the CESA would be below the level of significance.

#### **4.8.14 Auditory Resources**

Each of the identified individual projects within the CESA, including the proposed mining operations, contributes noise to the natural environment. Since the Slower, Longer Project Alternative is the principal and dominant noise generating activity within the CESA, its potential impacts are less than significant (Section 3.16.3.3), and any present actions and RFFAs would be dispersed throughout the CESA, none of the projects including the Slower, Longer Project Alternative would result in a significant cumulative impact to the auditory resources.

#### **4.8.15 Socioeconomic Values**

The identified projects within the CESA, including the Slower, Longer Project Alternative, would have a net beneficial impact on social and economic values in Eureka County. As stated in Section 3.17, EML has and would continue to coordinate with Eureka County to address these impacts and minimize the short-term fiscal impacts on the County.

#### **4.8.16 Environmental Justice Effects**

Initial analysis concluded that the potential effects of the Project are not expected to disproportionately affect any particular population. Environmental effects that may occur at a greater distance, such as auditory resource or air impacts, would affect the area's population equally, without regard to nationality or income level. Since no disproportionate effect on an identified minority population results from the Slower, Longer Project Alternative or the RFFAs, no further environmental justice analyses are required.

#### **4.8.17 Hazardous Materials**

The present actions and RFFAs within the CESA, including the proposed mining operations, contribute to potential hazardous materials effects to the natural environment. Since the Proposed Action is the principal hazardous materials generating activity within the CESA, its potential impacts are less than significant (Section 3.19.3.3), and any existing action and RFFAs such as traffic on SR 278 would be dispersed throughout the CESA, there would be no significant cumulative hazardous materials impact.

#### **4.8.18 Historic Trails**

The identified projects within the CESA, including the Slower, Longer Project Alternative have an impact on the visual setting for the historic trail by adding visual elements that may detract

from the experience of those using the trail. These impacts are significant. In addition, there is no mitigation that could reduce the impact to less than significant. In addition, under the RFFA of the sale of a major portion of the Project Area, access through that portion of the Project Area could be eliminated.

#### **4.8.19 Cultural Resources**

The identified projects within the CESA, including the Slower, Longer Project Alternative have a direct physical impact on the cultural resources and an indirect impact on the visual setting for specific cultural resources that are potentially significant. Within the cumulative effects viewshed APE, a total of 436 eligible and unevaluated historic (361) and multi-component (75) sites with a historic component would be visually impacted. This number includes 152 officially eligible historic sites and 39 officially eligible multi-component sites with a historic element within the Project APE (Table 3.21-1). Impacts to these sites would be mitigated through the implementation of a treatment plan. Outside of the Project APE and within the viewshed APE, an additional 245 eligible or unevaluated historic and historic component sites may be adversely impacted. All adverse effects under the NHPA and direct and indirect impacts under NEPA to known-eligible properties identified within the Project APE would be mitigated in accordance with the PA and the treatment plan prepared for the Project. Any previously unknown-eligible properties that may be discovered during construction activities would be mitigated in accordance with the PA. Therefore, no additional mitigation or monitoring is proposed. No residual adverse effects are anticipated, as all known-eligible sites would be mitigated in accordance with the PA and the treatment plan prepared for the Project. Any previously unknown-eligible properties that may be discovered during construction activities would be mitigated in accordance with the PA.

#### **4.8.20 Native American Traditional Values**

The identified projects within the CESA, including the Slower, Longer Project Alternative have an impact on Native American Traditional Values, which include pine nut gathering and water resources. Although this alternative would not result in the removal of any piñon-only woodlands, the Slower, Longer Project Alternative's removal of piñon trees and limiting of access to other piñon trees in piñon-juniper woodland within the fenced Project Area, relative to all other impacts to piñon trees, is not readily quantifiable; however, it is likely less than one percent of all the piñon trees within the piñon-only and piñon-juniper woodlands in the CESA. In addition, the cumulative effect to piñon trees, relative to the total number of piñon trees within the Native American CESA is small (Figure 4.3.3) The Proposed Action's potential effect to water resources from ground water pumping, as shown on Figure 4.4.2, which is representative of the ground water pumping effects of the Slower, Longer Project Alternative, is isolated from the ground water pumping associated with the other mining operations within the Native American CESA. Figure 4.4.2 also shows the location of projects within the CESA where the removal or retrieval of pre-historic artifacts have occurred or may have occurred. Figure 4.4.2 does not show any potential effects from ground water pumping associated with agricultural operations. The Slower, Longer Project Alternative's potential effects to water resources is incrementally a small percent of the total potential effect to water resources from ground water pumping operations.

The Roberts District is located on the west flank of the Simpson Park Mountains and was discovered in 1870. Minor production occurred around 1910. Between 1948 and 1962 Au (114 ounces), Ag (417 ounces), Cu, Pb, and Zn were produced with an approximate value of \$5,961 (1962 dollars).

The Union District is located on the north flank of the Sulphur Springs Range and was discovered in 1886. The main production occurred between 1915 and 1918 with a value of \$175,802 (1918 dollars). In 1951, production included Ag (375 ounces) and Pb with a value of \$1,896 (1951 dollars) and in 1952 production of Ag (381 ounces) and Pb with a value of \$1,221 (1952 dollars).

The Newark District is located on the eastern flank of the Diamond Mountains and was discovered in 1866. Production occurred sporadically between 1867 and 1957. Between 1942 and 1944 W ore production was valued at \$73,000. The total value of the historic production in 2006 dollars (using the CPI to adjust for inflation) is \$870,681,793 for the Newark District. This value is likely conservative because data from the districts with multiple years of production were adjusted for inflation based on the last year of production. Surface disturbance associated with these operations has not been quantified; however, the value is likely in the range of several hundreds to a few thousand acres.

From the mid-1960s up to the present, mineral resource development within the CESA has principally been Au production from four mining operations: Gold Bar; Windfall; Tonkin Springs; and Ruby Hill. The Antelope district in the southern Roberts Mountains contains one main Au deposit (Gold Bar), five satellite deposits, and other resources. The Gold Bar deposit was discovered in 1983 and approximately 500,000 ounces of Au have been recovered from a resource of 1.6 million ounces. The properties are currently in closure. The Ruby Hill mine is located in the Eureka mining district and is currently operating. The West Archimedes portion of the Ruby Hill mine produced 755,000 ounces of Au between 1997 and 2002. Additional mineralized areas, including East Archimedes, Deep East, and Achilles, have been identified. The East Archimedes deposit at Ruby Hill had approximately 1.08 million ounces of proven and probable Au reserves at year end 2006. The Windfall-Rustler and Lookout Mountain (Ratto Canyon) mines are located in the southern portion of the Eureka mining district and exploration is currently ongoing. Au production of 200,000 ounces was recorded in 1993. The Tonkin Springs Mine property is located in the Roberts Mining District. Small scale mining and exploration occurred in the 1990s. A total of 100,000 ounces of Au reserve was defined in the early 2000s; however, no recent mining has occurred. The Tonkin Springs Mine is currently in closure.

**It appears that essentially all of the historic mining operations within the study area occurred in the Eureka Mining District and the disturbance associated with these operations is estimated to be approximately 200 acres.** Current minerals activities within all the CESAs are shown on Figure 4.3.5. There are approximately 163 Notice-level operations and 27 plans of operations that are authorized under 43 CFR 3809 by the BLM. **Past and present surface disturbance associated with sand and gravel operations is approximately 1,759 acres.** The total surface disturbance associated with these operations is 15,085 acres. This value includes the Au producing operations from the 1980s and 1990s.

#### 4.3.7.2 Reasonably Foreseeable Future Actions

**RFFAs for minerals projects include only those projects where the BLM has received a Plan of Operations and has been deemed complete.** An additional 10,177 acres of surface disturbance is reasonably foreseeable for future minerals activities.

#### 4.3.8 **Hazardous/Solid Waste and Hazardous Materials**

##### 4.3.8.1 Past and Present Actions

The past uses of hazardous materials include chemicals used at the historic Mount Hope mines. Use of these chemicals ceased in the 1950s, and any stored chemicals were removed by EML. Other past uses of hazardous materials include fuels and other petroleum products associated with the mining and exploration activities, which were used to maintain and operate the mining and exploration equipment and vehicles. Vehicles using SR 278 contain petroleum products. Maintenance of SR 278 by the NDOT has included the application of herbicides annually within the highway ROW to minimize vegetation. It is likely that some petroleum products have been spilled as the result of vehicle accidents on SR 278; however, the amounts are not readily quantifiable. SR 278 has been used in the past to transport hazardous materials, including petroleum, to nearby mining operations, towns, and ranches. Currently, there are approximately ten loads per day of fuels, cyanide solutions, acid, and explosives transported on SR 278 and U.S. Highway 50 (Enviroscientists 2011b).

There is a Class III waived landfill associated with the Ruby Hill Mine, which is within the one-mile buffer around the Hazardous Materials and Transportation and Access CESA. This landfill has been operated since the 1990s and only accepts non-liquid, non-hazardous, or non-putrescible wastes from the mining operation. The Eureka County Landfill, located to the northeast of the Town of Eureka, accepts non-hazardous wastes at an approximate average rate of 20 tpd and has a total area of approximately 40 acres. The BLM and Eureka County are currently working on plans to expand the landfill.

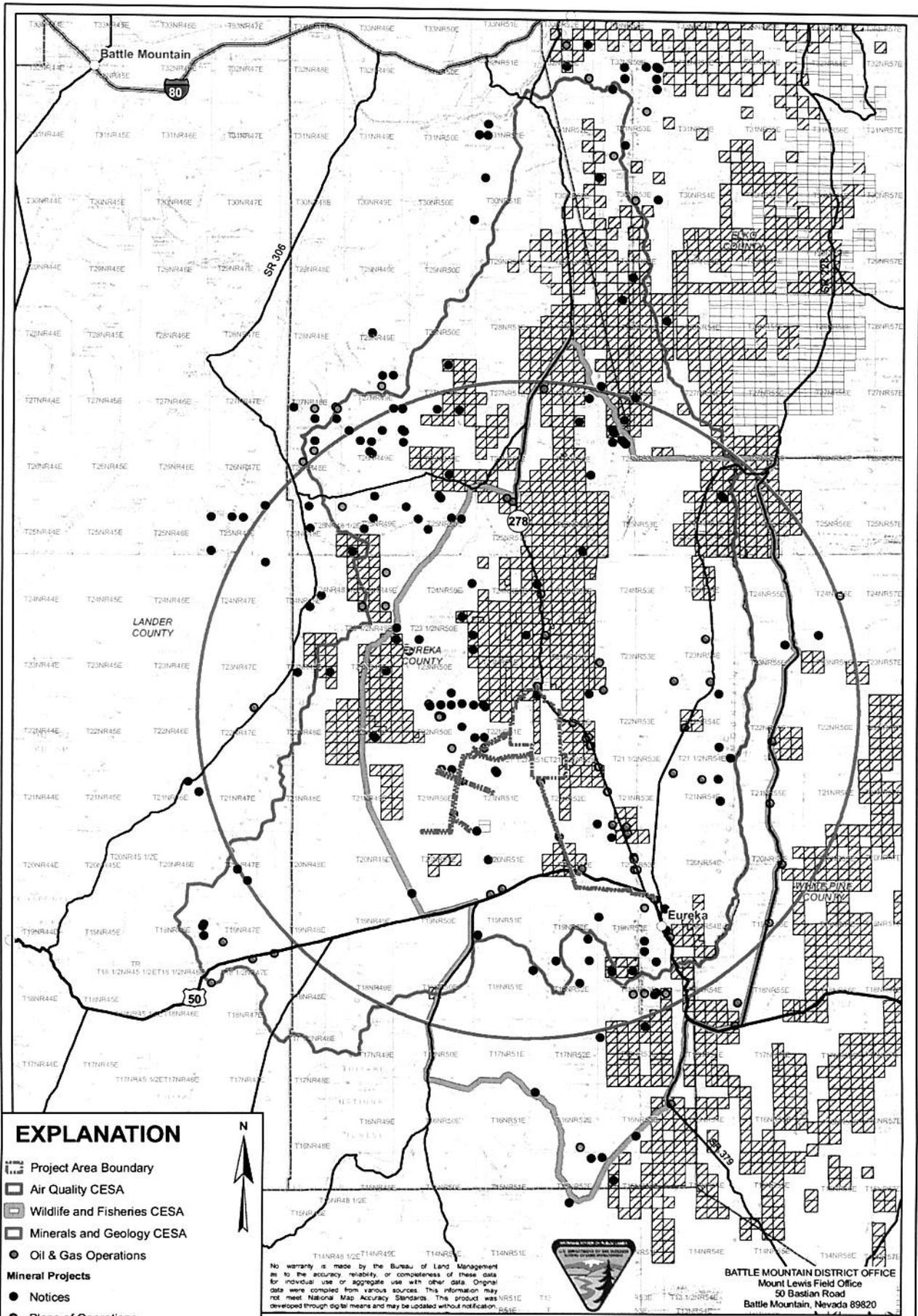
##### 4.3.8.2 Reasonably Foreseeable Future Actions

It is reasonable to expect that SR 278 would continue to be used as a transportation route for hazardous materials at levels that are consistent with, or somewhat greater than, current levels. In addition, the NDOT would continue with their application of herbicides within the SR 278 ROW. It is expected that the landfills at the mining operations would maintain their current size for the duration of the cumulative analysis; however, it is reasonable to expect that the Eureka Landfill would have up to a three-fold expansion in size and capacity.

#### 4.3.9 **Oil, Gas, and Geothermal Leasing and Development**

##### 4.3.9.1 Past and Present Actions

As shown on Figure 4.3.5, there are oil and gas leases throughout the CESAs for air, minerals, and wildlife. In addition, four oil fields have been developed in Pine Valley located in the northern portion of the minerals CESA (shown as a blue dot on Figure 4.3.5). All four of these



oil fields are located within the area of Eureka County administered by the Elko BLM and had a production of 3,369,329 barrels between 1990 and 2006.

Approximately 283 acres of surface disturbance is associated with the current oil and gas development. There is also one project involving drilling and exploration in Sections 7 and 9, T27N, R52E. **An oil spill in the Pine Valley oil field at the Blackburn well resulted in approximately 3.6 acres of surface disturbance associated with the spill (Personal Communication, Thomas Schmidt, BLM, June 6, 2012).**

The CESAs overlap the area analyzed in the EA for Oil and Gas Leasing within Portions of the Shoshone-Eureka Planning Area (NV063-EA06-092) (BLM 2006). The assessment area in that EA includes the eastern portion of the Shoshone-Eureka Planning Area with lands in the southern CESA portions of Eureka and Nye Counties. According to the Nevada Bureau of Mines and Geology Bulletin 104, historic interest in oil and gas exploration within the area has been limited (Garside et al. 1988). Between 1946 and 2004, 39 exploration wells were drilled (<http://www.nbmg.unr.edu> 2006). None of these wells resulted in production. The discovery of oil in Blackburn Field in Pine Valley in 1982 led to exploration interest in Eureka County, which had not seen interest prior to 1982. Although four oil fields have been developed within the area of Eureka County administered by the Elko BLM, no production wells have been developed within other portions of Eureka County. Production in the Railroad Valley area of Nye County led to increased interest as well; however, as of 2004, no exploration wells had been drilled in the Nye County portion of the CESAs.

As described in EA NV063-EA06-092, the overall potential for oil and gas exploration and development within the CESAs would be moderate to high because it is on a trend between the Pine Valley and Railroad Valley production wells. In addition, oil and gas interest has been increasing in the area. In the assessment area for EA NV063-EA06-092, an average of one exploration well was drilled per year between the years of 1980 and 2004 versus a total of 13 exploration wells drilled in the 33 years prior. Exploration interest since 1980 has focused specifically on Eureka County.

There are currently no geothermal leases within the CESAs.

#### 4.3.9.2 Reasonably Foreseeable Future Actions

As energy demands increase and advancements in exploration and drilling technology lead to development of previously unexplored resources, oil and gas leasing and exploration are likely to increase. Increased economic incentive may also lead to an increase in exploration and development as oil prices rise. EA NV063-EA06-092 assumes that an estimated two wells would be drilled each year over the next ten years and that one of the 20 wells would be viable for production. Based on this assumption, the total surface disturbance from exploration activity is estimated at 290 acres; exploratory well pad construction is estimated at 40 acres; disturbance from development of access roads is estimated at 240 acres; and gravel pit expansion associated with exploration is estimated at 2.5 acres. Surface disturbance from oil and gas exploration could total a maximum of 572.5 acres, of which 16.5 acres would not be reclaimed within the ten year scenario. The total surface disturbance from the nine production well pads is estimated at 18 acres; disturbance from the construction of production roads is estimated at 34 acres; and gravel pit expansion for oil and gas production is estimated at 2.5 acres. Surface disturbance

from oil and gas production over the ten-year planning period could total a maximum of 54.5 acres. For the portion of the oil and gas field that is within the Elko BLM jurisdiction the leasing of parcels for oil and gas is expected to continue in the future as energy demand continues to increase. No exploration or development permit applications for projects in the CESA have been submitted to the BLM. It is likely that there would be additional disturbance associated with oil and gas exploration and development in that region. All future proposed actions within the CESAs would be analyzed when a lessee submits plans for the action.

#### **4.3.10 Summary of Surface Disturbance**

The total surface disturbance associated with all past and present actions, as outlined above and summarized in Table 4.2-3, is 391,065 acres. The total surface disturbance associated with all RFFAs, as outlined above and summarized in Table 4.2-3, is 584,489 acres. Therefore, the total surface disturbance associated with all past actions, present actions, and RFFAs is 975,554 acres. The total surface disturbance associated with the Proposed Action is 8,355 acres.

#### **4.4 Evaluation of Potential Proposed Action Cumulative Impacts**

This section presents descriptions of the collective or additive impacts of combining past, present, and RFFAs associated with mineral development and other land uses in the southern Eureka County area. Past, present, and reasonably foreseeable future land uses and human caused and natural occurrences are described in Section 4.3. Potential cumulative effects for some resources are based on predictive modeling results (air quality and water quality/quantity) as described below.

Criteria for assessing the significance of potential impacts to the resources are the same as those presented in Chapter 3.

##### **4.4.1 Water Resources - Water Quantity**

Cumulative impacts to water resources within the study area are considered from surface water, ground water, and water quantity perspectives. Assessment of cumulative impacts from present actions and RFFAs that are developed would be incorporated into the ground water flow model and pit lake chemistry model as specific activities and associated water resource impacts evolve and are quantified by data collection under the Integrated Monitoring Plan, as outlined in Section 2.1.16 of this EIS.

###### **4.4.1.1 Surface Water Quantity**

Past Actions - The past actions that had the potential to affect surface water resources were mining-related and grazing-related actions. The past mining operations were of smaller scale and consisted of underground operations with limited surface disturbance. The other past actions that had the potential to affect surface water resources were agriculture related ground water pumping in Diamond Valley, which commenced in the late 1950s, and has associated indirect effects on spring and stream flows.

Present Actions - The present and Proposed Actions that would potentially affect surface water resources are grazing and mining-related actions. Through consumption and ground disturbance,

grazing by livestock and wild horses can affect surface water resources. These present mining related actions are surface mining operations that affect surface water resources by the pumping of ground water and associated indirect effects on spring and stream flows.

RFFAs - The RFFAs that have the potential to affect surface water resources are also grazing and mining-related actions. Through consumption and ground disturbance, grazing by livestock and wild horses can affect surface water resources. These RFFA mining-related actions would likely be surface mining operations that affect surface water resources by the pumping of ground water and associated indirect effects on spring and stream flows.

Cumulative activities indirectly affecting the surface water resources through the pumping of ground water was evaluated with ground water modeling of the cumulative actions that were modeled through the year 2055 (Montgomery et al. 2010). Figure 4.4.1 depicts the ten-foot drawdown contour for the cumulative actions scenario. This analysis identifies a number of springs on the western flank of the Diamond Mountains, the northern end of Diamond Valley, in the Roberts Mountains and in Kobeh Valley that are within the ten-foot drawdown contour and thus their flows would be potentially diminished.

The cumulative impacts to surface water resources from the Proposed Action and RFFAs for ground water development would be significant. The Proposed Action portion of the cumulative impacts is also considered significant and specific mitigation measures for the Proposed Action effect are identified in Section 3.2.3.3. The cumulative actions, exclusive of the Proposed Action, particularly the agricultural actions in Diamond Valley also have a significant effect on the surface water resources in Diamond Valley. No mitigation measures are proposed for the effects of this agricultural activity because the BLM does not have any regulatory authority over those actions.

#### 4.4.1.2 Ground Water Quantity

Past Actions - The past actions that had the potential to affect ground water resources were principally agriculture related ground water pumping in Diamond Valley, which commenced in the late 1950s. Other past actions that affect ground water included domestic production in the Town of Eureka and the surrounding area ranches in Diamond Valley, Kobeh Valley, and Pine Valley, ground water pumping for livestock use, and mineral production in the Eureka Mining District and at Mount Hope.

Present Actions - The present and Proposed Actions that would potentially affect ground water resources are the continued pumping for agriculture and domestic uses in Diamond Valley, Kobeh Valley, and Pine Valley, as well as mining-related actions in the Eureka Mining District. Ground water pumping for livestock use, wild horse use, and wildlife use is another set of present actions affecting ground water resources.

RFFAs - The RFFAs that have the potential to affect ground water resources are also agricultural, domestic use, livestock use, wild horse use, wildlife use, and mining-related actions. These RFFAs would likely continue to pump ground water from Diamond Valley, Kobeh Valley, and Pine Valley. For the analysis in this portion of the EIS it is assumed that the present actions would continue pumping at the authorized rates under the RFFA scenario.

Ground water modeling of the cumulative activities affecting the ground water resources was conducted through year 2055 (Montgomery et al. 2010). Figure 4.4.1 depicts the ten-foot drawdown contour for the cumulative actions scenario. This analysis identifies a number of wells in Diamond Valley and Kobeh Valley that are within the ten-foot drawdown contour and thus their flows would be potentially diminished.

The cumulative impacts to ground water resources from the Proposed Action and RFFAs for ground water development would be significant. The Proposed Action portion of the cumulative impacts is also considered significant and specific mitigation measures for the Proposed Action effects are identified in Section 3.2.3.3. The cumulative actions, exclusive of the Proposed Action, particularly the agricultural actions in Diamond Valley also have a significant effect on the ground water resources in Diamond Valley. No mitigation measures are proposed for these effects because the BLM does not have any regulatory authority over those actions.

#### **4.4.2 Water Resources - Water Quality**

Cumulative impacts to water resources within the study area are considered from surface water, ground water, and water quality perspectives. Assessment of cumulative impacts from present actions and RFFAs that are developed would be incorporated into the periodic ground water flow model and pit lake chemistry model updates as specific activities and associated water resource impacts evolve and are quantified by data collection under the Integrated Monitoring Plan.

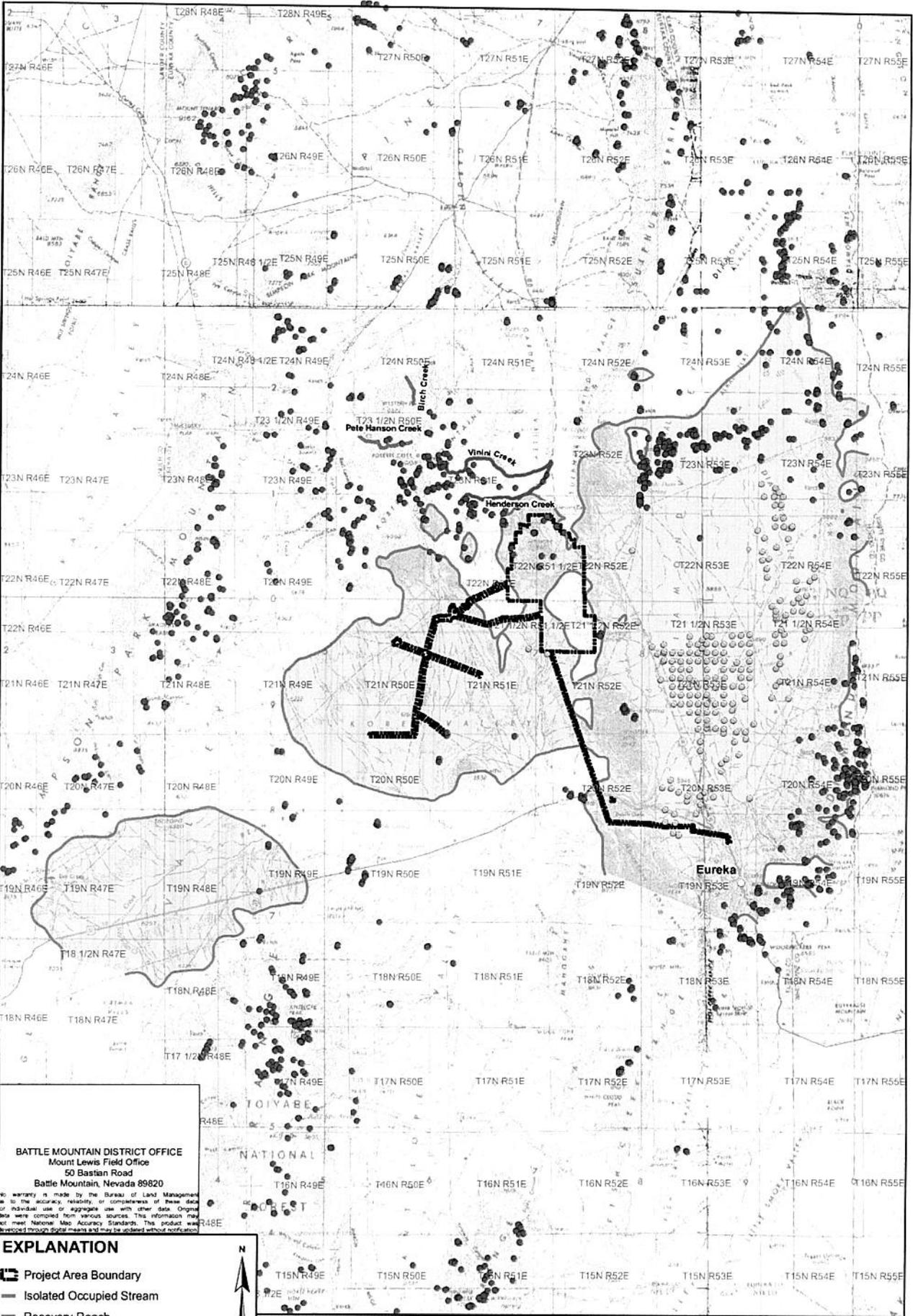
##### **4.4.2.1 Surface Water Quality**

**Past Actions** - The past actions that have affected surface water resources are primarily mining, ranching, wild horse actions, and agricultural operations. Past mining operations were of a smaller scale and consisted of underground operations with limited surface disturbance.

**Present Actions** - The present and Proposed Actions that would potentially affect surface water resources are wild horse use, grazing and mining-related actions, as well as dispersed recreation. These present mining related actions are surface mining operations that affect surface water resources by excavating, modifying, or covering existing topographic and geomorphic features and by changing surface erosion characteristics. The present grazing and dispersed recreation actions affect surface water resources by removing vegetation and decreasing bank stability near streams and springs.

**RFFAs** - The RFFAs that have the potential to affect surface water resources are also wild horse use, grazing, and mining-related actions. These RFFA mining-related actions would likely be surface mining operations that affect surface water resources by excavating, modifying, or covering existing topographic and geomorphic features and by changes to surface erosion characteristics. The RFFA grazing actions affect surface water resources by removing vegetation and decreasing bank stability near springs and streams.

The past, present, and RFFAs would potentially directly affect surface water resources through increased erosion and sedimentation. The mining-related cumulative actions would be required to implement erosion control measures that would limit their contribution to the cumulative impacts. Grazing has its own set of requirements that minimizes effects to surface water quality. Dispersed recreation actions would not have the same requirements and thus would have a



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 Battle Mountain, Nevada 89820

No warranty is made by the Bureau of Land Management as to the accuracy, reliability, or completeness of these data for individual use or aggregate use with other data. Original data were compiled from various sources. The information presented meets National Map Accuracy Standards. This product was developed through digital means and may be updated without notification.

- EXPLANATION**
- Project Area Boundary
  - Isolated Occupied Stream
  - Recovery Reach
  - Spring/Seep
  - Well
  - 10-Foot Drawdown Contour at Year 44
  - Cumulative Action Scenario



0 1 2 3 4 5 Miles			
DESIGN: EMLLC	DRAWN: GSL	REVIEWED: RFD	
CHECKED: _____	APPROVED: _____	DATE: 08/09/2012	
FILE NAME: p1635_Fig 4.1_Cumulative 10foot Drawdown.mxd			

**BUREAU OF LAND MANAGEMENT**  
**MOUNT HOPE PROJECT**

DRAWING TITLE:  
**Cumulative Action Scenario - Projected Water Table Drawdown at Project Year 44, End of Year 2055, Relative to Pre-Development (1955) Conditions**  
 Figure 4.4.1

proportionally greater affect on surface water resources by removing vegetation and decreasing bank stability near streams and springs.

#### 4.4.2.2 Ground Water Quality

Past Actions - The past actions that had the potential to affect ground water quality were principally mining operations in the Eureka Mining District and at Mount Hope as well as agriculture related operations in Diamond Valley, which commenced in the late 1950s. Other past actions that affect ground water quality included activities associated with the Town of Eureka and the surrounding area ranches in Diamond Valley, Kobeh Valley, and Pine Valley. All these activities had the potential to discharge chemicals or materials that could migrate into the ground water and decrease ground water quality.

Present Actions - The present and Proposed Actions that would potentially affect ground water resources are the continued agriculture and domestic related activities in Diamond Valley, Kobeh Valley and Pine Valley, as well as mining-related actions in the Eureka Mining District. All these activities had the potential to discharge chemicals or materials that could migrate into the ground water and decrease ground water quality. In addition, the Ruby Hill Mine, which is located in the southern portion of Diamond Valley would create a pit lake at the end of mining.

The potential affects to ground water quality from this pit lake are discussed in the Ruby Hill Mine Expansion - East Archimedes Project Final Supplemental EIS (BLM 2005), which is incorporated herein by reference. The pit lake would be a terminal lake and act as a ground water sink.

RFFAs - The RFFAs that have the potential to affect ground water resources are the continued agriculture and domestic related activities in Diamond Valley, Kobeh Valley, and Pine Valley, as well as mining-related actions in the Eureka Mining District. All these activities would have the potential to discharge chemicals or materials that could migrate into the ground water and decrease ground water quality.

Any potential cumulative impacts to ground water quality from the Proposed Action, along with the past and present actions and the RFFAs for ground water would not be significant, based on the criteria above. The only two actions that have a quantitative assessment of potential ground water quality impacts are the Proposed Action and the Ruby Hill Mine. Both of these actions have ground water quality impacts that are not significant based on the analyses in this EIS and in BLM (2005).

#### 4.4.3 **Geology and Mineral Resources**

Past Actions - The past actions that had the potential to affect geology and mineral resources were mining-related actions. Most past mining operations were of a smaller scale and consisted of underground operations with limited surface disturbance. Most geology and mineral impacts resulted from a limited amount of mineral resource development activities, except for those activities in the vicinity of Eureka, which are outlined in Section 3.4.2. Historically, this area has been mined for Au, Ag, Pb, Cu, and Zn.

Present Actions - The present and Proposed Actions that would potentially affect geology and mineral resources are mining-related actions. These present mining related actions are surface mining operations that affect geology and mineral resources by excavating, modifying, or covering existing topographic and geomorphic features and by removing mineral resources.

RFFAs - The RFFAs that have the potential to affect geology and mineral resources are also mining-related actions. These RFFA mining-related actions would likely be surface mining operations that affect geology and mineral resources by excavating, modifying, or covering existing topographic and geomorphic features and by removing mineral resources.

Mining disturbance has included open pit and underground operations with WRDFs, heap leach ore processing, ore milling and processing, tailings disposal, and exploration (drilling, trenching, sampling, and road construction). Past **and** present disturbance is **approximately 4,917** acres, **with** approximately 1,727 acres of disturbance anticipated under the RFFAs. This totals **6,644** acres of disturbance within the 1,809,522-acre CESA, which is **approximately 0.4** percent of the area.

Mining is a major activity in the area, and it is likely that exploration activities and mining would continue. Additional impacts would result from the creation in the foreseeable future of additional open pit mining operations with WRDFs and processing facilities. The direct impacts affecting geology and mineral resources of the Proposed Action due to the open pit mining would be the permanent removal of the identified mineral resources. The cumulative impacts to geology and mineral resources from the Proposed Action and RFFAs for mineral development would not be significant. No mitigation is proposed.

#### 4.4.4 Air Resources

Past Actions - Prior to the implementation of the CAA, few if any measures to control or minimize impacts to air quality were required. Most mining operations were of smaller scale and consisted of underground operations with small disturbance footprints. Most air quality impacts from these operations consisted of the generation of fugitive dust during exploration road building, trenching, and mining operations, as well as agricultural operations and travel on dirt roads. An exception to this was the mineral processing operation in the Eureka area, which included furnaces that were fueled with locally produced charcoal. Air quality impacts from these operations were substantial, consisting of heavy particulates and metal emissions. In addition, the locally produced charcoal was generated by burning (baking) cut and stacked piñon and juniper trees, which generated particulate and VOC emissions. Another action that affects Air Resources is wildland fires, which contribute substantial amounts of particulates.

Present Actions - All the present emissions, including the Proposed Action, are located within the Diamond Valley, Kobeh Valley, and Pine Valley air basins. Impacts to air quality from mining-related activities would include the generation of fugitive dust from blasting, exploration drilling, road building, haul truck operations, and mining operations. Other air emissions would be generated from processing facilities and the burning of fossil fuels by heavy equipment and other vehicles, travel on dirt roads, recreation, and wildland fires. Agricultural operations and commercial operations also generate fugitive dust and combustion emissions.

RFFAs - Air quality impacts from RFFAs could include generation of fugitive dust during hard rock exploration, mineral development, and the development of oil and gas or geothermal operations. Emissions may also be generated from processing facilities, burning of fossil fuels by heavy equipment and other vehicles, vehicle travel on paved and unpaved roads, fugitive dust from travel on unpaved roads, and wildland fires. Some of these emissions would be localized and subject to BAPC air quality permits and compliance, development of mitigation measures, and implementation of **applicant committed practices**. Others would be more long term and basin wide.

Each of the identified individual projects within the CESA, including existing and proposed mining operations, emit air pollutants. With the possible exception of motor vehicle emissions, the existing and proposed mining operations are the major sources of criteria pollutants within the CESA. The modeling for the Proposed Action, as well as the Ruby Hill Mine (**Homestake Mining Company, Ruby Hill Project, Air Operating Permit Number AP1041-0713.03, Issued January 28, 2012**), shows that the levels of these pollutants are below the applicable standards. The Proposed Action would not result in a significant cumulative impact to air resources. The RFFAs would result in additional emissions similar to those currently emitted by the existing operations within the CESA. In addition, the major sources of pollutants (except for motor vehicle emissions) within the CESA would operate under permit conditions established by the BAPC and therefore would not be significant.

#### 4.4.5 Visual Resources

Past Actions - The past actions that had the potential to affect visual resources were mining-related actions. The past mining operations were of a small (Mount Hope underground) to moderate (Gold Bar Mine and Eureka Mining District) scale and consisted of underground and surface operations with limited to substantial surface disturbance. Other past actions include roads, powerlines, and buildings. Most visual resource impacts resulted from surface disturbance associated with the actions and the structures created by the actions.

Present Actions - The present and proposed actions that had the potential to affect visual resources are mining-related, agriculture related, and general development actions. The present mining operations include the Ruby Hill Mine, which is a surface operation with substantial surface disturbance. Most visual resource impacts resulted from surface disturbance associated with the actions and the structures created by the actions.

RFFAs - The RFFAs that had the potential to affect visual resources would be a continuation to the present mining-related, agriculture-related, utilities and infrastructure, and general development actions. Most visual resource impacts resulted from surface disturbance associated with the actions and the structures created by the actions.

Mining disturbance has included open pit and underground operations with WRDFs, heap leach ore processing, ore milling and processing, tailings disposal, and exploration (drilling, trenching, sampling, and road construction). Past surface disturbance is 200 acres, present disturbance is **approximately 2,681** acres, and approximately 1,439 acres of disturbance is anticipated under the RFFAs. Past and present actions, as well as RFFAs associated with agricultural actions have surface disturbance totaling approximately 29,496 acres. Past and present actions, as well as RFFAs associated with utilities and infrastructure actions have surface disturbance totaling

approximately 51,823 acres. Past and present actions, as well as RFFAs associated with general development actions have surface disturbance totaling approximately 16,074 acres. These actions total approximately **101,713** acres of disturbance within the approximately 645,000-acre CESA for visual resources.

There are many actions that have an effect on the visual resources within the vicinity of the Project Area. The BLM's visual management for the Project Area allows for substantial change to the visual characteristics of the area. In addition, VRM classes do not establish management direction and should not be used as a basis for constraining or limiting surface disturbing activities. Therefore, the cumulative impacts to visual resources from the Proposed Action, along with the past and present actions and the RFFAs would not be significant; however, activities to minimize the visual effects are incorporated in the Project reclamation plan **and mitigation identified in Section 3.7.3.**

#### 4.4.6 Soils

Past Actions - Past or historic mining operations within the CESA include a few operations from the 1860s through the 1970s, as well as modern operations from the 1980s. It appears that essentially all of the historic mining operations within the study area occurred in the Eureka Mining District. The disturbance to vegetation is estimated to be approximately 200 acres. None of that disturbance was reclaimed. The more modern operations within the study area include the Gold Bar Mine and the Ruby Hill Mine, which together total approximately 1,343 acres of surface disturbance to vegetation. The Gold Bar Mine operated between the 1980s and 1990s and only a portion of the operation was reclaimed, which included the redistribution of stockpiled growth media and reestablishment of soil resources and vegetation. The Ruby Hill Mine began operations in the 1990s and is currently in operation. Portions of the mine have undergone concurrent reclamation, including the redistribution of growth media and the reestablishment of soil resources. Other past actions that have affected soils resources include the development of roads, powerlines and other utilities, dispersed recreation, fences, development of cattle and wild horse water sources, agricultural activities, and land development and are estimated at 550 acres of surface disturbance that affect soil resources. Impacts to soil resources from these activities include burial, compaction, mixing, and erosion. The extent of these impacts varies with the type of activity.

Present Actions - Present actions include the ongoing Ruby Hill Mine, discussed above, as well as exploration activities under **28** notices, **one** plan of operations, **and two sand and gravel operations.** These are estimated at **938** acres that are not otherwise included under the past actions. The Proposed Action would include 8,355 acres of surface disturbance to soil resources. Other present actions that have an effect to soil resources are a continuation of those activities outlined under past actions. Impacts to soil resources from these activities include burial, compaction, mixing, and erosion. The extent of these impacts varies with the type of activity.

RFFAs - RFFAs within the CESA could result in up to approximately **6,934** acres of surface disturbance that would affect soil resources. These activities include up to 1,557 acres of surface disturbance associated with mineral operations and 5,377 acres associated with land sales and their subsequent development. Impacts to soils resources from these activities include burial, compaction, mixing, and erosion. The extent of these impacts varies with the type of activity.

Total past actions, present actions, and RFFAs would result in up to approximately **18,320** acres of surface disturbance that would affect soil resources. **Most of the past actions are not subject to any reclamation activities because they pre-date federal and state reclamation requirements.** The present actions and RFFAs associated with mineral, geothermal, and oil and gas operations are subject to reclamation requirements, which would minimize any impacts; however, all other present actions and RFFAs would not be subject to reclamation requirements either because of their perpetual nature or lack of state or federal statutory requirements for reclamation. The CESA for soil resources covers approximately 262,490 acres. Therefore, all actions within the CESA would affect approximately **seven** percent of the soil resources within the CESA.

#### 4.4.7 Vegetation Resources

Past Actions - Past or historic mining operations within the study area include a few operations from the 1860s through the 1970s, as well as modern operations from the 1980s. It appears that essentially all of the historic mining operations within the study area occurred in the Eureka Mining District. The disturbance to vegetation is estimated to be approximately 200 acres. None of that disturbance was reclaimed. The more modern operations within the study area including the Gold Bar Mine and the Ruby Hill Mine, which together total approximately 1,343 acres of surface disturbance to vegetation. The Gold Bar Mine operated between the 1980s and 1990s and only a portion of the operation was reclaimed, which included the redistribution of stockpiled growth media and reestablishment of soil resources and vegetation. The Ruby Hill Mine began operations in the 1990s and is currently in operation. Portions of the mine have undergone concurrent reclamation, including the redistribution of growth media and the reestablishment of soil resources. Other past actions that have affected vegetation include the development of roads, powerlines and other utilities, fences, development of cattle and wild horse water sources, livestock grazing, wild horse use, agricultural activities (both direct vegetation changes and changes to phreatophytic vegetation from water table drawdown), dispersed recreation, and land development and are estimated at 550 acres of surface disturbance. Impacts to vegetation from these activities include removal of vegetation, compaction, mixing, erosion of soils, and change in plant community structure and diversity. The extent of these impacts varies with the type of activity. The Bootstraps crew treated approximately 2,500 acres of piñon-juniper in the Willow and Vinini Creek drainages and in the Henderson Summit area in 2008 and 2009 under the Roberts Mountain Wildlife Habitat Enhancement Project EA completed in 2007.

Present Actions - Present actions include the ongoing Ruby Hill Mine, discussed above, as well as exploration activities under **28** notices, **one** plan of operations, **and two sand and gravel operations** which are estimated at **938** acres that are not otherwise included under the past actions. The Proposed Action would include 8,355 acres of surface disturbance to vegetation, as well as potential changes to phreatophytic vegetation and habitat for the Monte Neva Indian paintbrush from the water table drawdown. The Sulphur Springs Hazardous Fuels Reduction EA was completed in 2009 has been partially implemented. The EA allows for the removal/thinning of encroaching piñon-juniper from up to 3,000 acres of habitat containing healthy concentrations of bitterbrush. That part of the project has not yet been implemented. The BLM intends to initiate this project in 2011 with the Bootstraps crew, though most of the BLM's efforts would be focused on continuation of the Bald Mountain project initiated in 2010, if expected NRCS funding is approved. Other present actions that have an effect on vegetation are a continuation of those activities outlined under past actions. Impacts to vegetation from these activities include

removal of vegetation and compaction, mixing, erosion of soils, and change in plant community structure and diversity. The extent of these impacts varies with the type of activity.

RFFAs - RFFAs within the CESA could result in up to approximately **6,934** acres of surface disturbance that would affect vegetation. These activities include up to **1,557** acres of surface disturbance associated with mineral operations and **5,377** acres associated with land sales and their subsequent development. Impacts to vegetation from these activities include removal of vegetation and compaction, mixing, erosion of soils, and change in plant community structure and diversity. The extent of these impacts varies with the type of activity.

Total past actions, present actions, and RFFAs would result in up to approximately **23,820** acres of surface disturbance that would affect vegetation. The past actions are generally not subject to any reclamation activities. The present actions and RFFAs associated with mineral, geothermal, and oil and gas operations are subject to reclamation requirements, which would minimize any impacts; however, all other non-habitat restoration present actions and RFFAs (which total approximately **85,900** acres) would not be subject to reclamation requirements either because of their perpetual nature or lack of state or federal statutory requirements for reclamation. The CESA for vegetation covers approximately **262,490** acres. Therefore, all actions within the CESA would affect approximately **42** percent of the vegetation within the CESA. The Proposed Action would disturb approximately three percent of the CESA. The amount of area that would not be reclaimed (**734** acres) associated with the open pit of the Proposed Action represents less than **four** percent of the total surface disturbance resulting from past, present, and RFFAs. The vegetation communities within the CESA are similar to those within the Project Area and common in the region. The cumulative and incremental effect of vegetation removal or modification would be below the level of significance.

The four special status plant species with potential habitat within the Project Area (Beatley buckwheat, least phacelia, Monte Neva Indian paintbrush, and windloving buckwheat) also have potential habitat within the CESA. None of these species has been documented as occurring within the CESA; however, no systematic survey has been completed. The cumulative effect and incremental loss of potential habitat for the four special status plant species resulting from past and present actions, proposed actions, and RFFAs would be below the level of significance.

#### **4.4.8 Noxious Weeds, Invasive and Nonnative Species**

Past Actions - Past or historic mining operations within the study area include a few operations from the 1860s through the 1970s, as well as modern operations from the 1980s. It appears that essentially all of the historic mining operations within the study area occurred in the Eureka Mining District. Surface disturbance creates an environment conducive to supporting noxious weeds and invasive, nonnative species. The disturbance to vegetation and potential impacts from noxious weeds and invasive, nonnative species is estimated to be approximately **200** acres. None of that disturbance was reclaimed. The more modern operations within the study area include the Gold Bar Mine and the Ruby Hill Mine, which together total approximately **1,343** acres of surface disturbance to vegetation and potential impacts from invasive, nonnative species and noxious weeds. The Gold Bar Mine operated between the 1980s and 1990s, and only a portion of the operation was reclaimed, which included the redistribution of stockpile growth media and the reestablishment of soil resources; however, approximately **11** acres of the old Ruby Hill mill site are currently infested with spotted knapweed, a NDOA Category A noxious weed. The Ruby Hill

Mine began operations in the 1990s and is currently in operation. Portions of the mine have undergone concurrent reclamation, including the redistribution of growth media and the reestablishment of soil resources. Other past actions that have resulted in the removal of vegetation include the development of roads, powerlines and other utilities, fences, development of cattle and wild horse water sources, agricultural activities, dispersed recreation, noxious weed control efforts, and land development and are estimated at 550 acres of surface disturbance. Impacts from these activities include the increased potential to introduce noxious weeds and invasive, nonnative species or spread existing populations of noxious weeds and invasive, nonnative species. The extent of these impacts varies with the type of activity.

Present Actions - Present actions include the ongoing Ruby Hill Mine, discussed above, as well as exploration activities under **28** notices, **one** plan of operations, and **two sand and gravel operations** which are estimated at **938** acres that are not otherwise included under the past actions. The Proposed Action would include 8,355 acres of surface disturbance to vegetation and noxious weeds and invasive, nonnative species. Other present actions that have an effect on vegetation and noxious weeds and invasive, nonnative species are a continuation of those activities outlined under past actions. Impacts from these activities include the increased potential to introduce noxious weeds and invasive, nonnative species or spread existing populations of noxious weeds and invasive, nonnative species. The extent of these impacts varies with the type of activity.

RFFAs - RFFAs within the CESA could result in up to approximately **6,934** acres of surface disturbance that would affect vegetation. These activities include up to **1,557** acres of surface disturbance associated with mineral operations and 5,377 acres associated with land sales and their subsequent development. Impacts from these activities include the increased potential to introduce noxious weeds and invasive, nonnative species or spread existing populations of noxious weeds and invasive, nonnative species. The extent of these impacts vary with the type of activity.

Total past actions, present actions, and RFFAs would result in up to approximately **18,320** acres of surface disturbance that would affect vegetation, noxious weeds, and invasive, nonnative species. The past actions are generally not subject to any reclamation activities. The present actions and RFFAs associated with mineral operations are subject to reclamation requirements, which would minimize any impacts; however, all other present actions and RFFAs would not be subject to reclamation requirements either because of their perpetual nature or lack of state or federal statutory requirements for reclamation. The CESA for noxious weeds and invasive, nonnative species covers approximately 262,490 acres. Therefore, all actions within the CESA would affect approximately **seven** percent of the vegetation within the CESA. The Proposed Action would disturb approximately three percent of the CESA. The amount of area that would not be reclaimed (734 acres) associated with the open pit of the Proposed Action represents less than **five** percent of the total surface disturbance resulting from past, present, and RFFAs.

An infestation of noxious weeds and invasive, nonnative species that starts in one project may expand to outside areas and increase the chance of the introduction of noxious weeds and invasive, nonnative species to other disturbed locations. The **applicant committed practices** identified to reduce the potential impacts of the Proposed Action would help to control noxious weed establishment and spread within and adjacent to the Project Area; therefore, the cumulative

and incremental effect of surface disturbance on noxious weed management would be below the level of significance.

#### 4.4.9 Wetlands and Riparian Zones

Past Actions - Past or historic mining operations within the study area include a few operations from the 1860s through the 1970s, as well as modern operations from the 1980s. It appears that essentially all of the historic mining operations within the study area occurred in the Eureka Mining District. The disturbance to vegetation is estimated to be approximately 200 acres. None of that disturbance was reclaimed. The more modern operations within the study area include the Gold Bar Mine and the Ruby Hill Mine, which together total approximately 1,343 acres of surface disturbance to vegetation. The Gold Bar Mine operated between the 1980s and 1990s, and only a portion of the operation was reclaimed, which included the redistribution of stockpiled growth media and reestablishment of soil resources and vegetation. The Ruby Hill Mine began operations in the 1990s and is currently in operation. Portions of the mine have undergone concurrent reclamation, including the redistribution of growth media and the reestablishment of soil resources. Other past actions that have affected vegetation and wetlands and riparian zones include the development of roads, powerlines and other utilities, fences, development of cattle and wild horse water sources, livestock and wild horse use of water sources, agricultural activities (both direct disturbance of vegetation and indirect effects due to ground water pumping), dispersed recreation, and land development and are estimated at 550 acres of surface disturbance. Impacts to wetlands would likely be substantially less than this because most of the disturbance was removed from the drainage where the wetland and riparian vegetation communities occur. Specific impacts to wetlands and riparian zones from these activities included the diversion of flows for mining or agriculture, the pumping of ground water that is the source for streams and springs, the filling of drainages with spoil material, the removal of vegetation, or water drawdown resulting from dewatering activities. The extent of these impacts varies with the type of activity, as well as the location and proximity to the wetland and riparian communities.

Present Actions - Present actions include the ongoing Ruby Hill Mine, discussed above, as well as exploration activities under **28** notices, **one** plan of operations, **and two sand and gravel operations** which are estimated at **938** acres that are not otherwise included under the past actions. The Proposed Action would include **8,355** acres of surface disturbance to vegetation and potential indirect effects to riparian and wetland vegetation. Other present actions that have an effect on wetlands and riparian zones are a continuation of those activities outlined under past actions. Impacts to wetlands would likely be substantially less than this because most of the disturbance was removed from the drainage where the wetland and riparian vegetation communities occur. Specific impacts to wetlands and riparian zones from these activities included the diversion of flows for mining or agriculture, the pumping of ground water that is the source for streams and springs, the filling of drainages with spoil material, the removal of vegetation, or water drawdown resulting from dewatering activities. The extent of these impacts varies with the type of activity. As discussed in Section 3.2, the water table drawdown resulting from the Proposed Action's mine dewatering system and ground water production systems is not expected to have a significant effect on riparian vegetation within the CESA.

RFFAs - RFFAs within the **CESA** could result in up to approximately **6,934** acres of surface disturbance that would affect vegetation, which could affect wetland and riparian areas. These

activities include up to 1,557 acres of surface disturbance associated with mineral operations and 5,377 acres associated with land sales and their subsequent development that could affect wetland and riparian areas. Impacts to wetlands would likely be substantially less than this because most of the disturbance was removed from the drainage where the wetland and riparian vegetation communities occur. Specific impacts to wetlands and riparian zones from these activities included the diversion of flows for mining or agriculture, the pumping of ground water that is the source for streams and springs, the filling of drainages with spoil material, the removal of vegetation, or water drawdown resulting from dewatering activities. The extent of these impacts varies with the type of activity.

Total past actions, present actions, and RFFAs would result in up to approximately **18,320** acres of surface disturbance that would affect vegetation; however, this disturbance is likely to occur in vegetation communities other than the wetland and riparian communities. The past actions are generally not subject to any reclamation activities. The present actions and RFFAs associated with mineral operations are subject to reclamation requirements, which would minimize any impacts; however, all other present actions and RFFAs would not be subject to reclamation requirements either because of their perpetual nature or lack of state or federal statutory requirements for reclamation. The CESA for wetlands and riparian zones covers approximately 262,490 acres; therefore, all actions within the CESA would affect approximately **seven** percent of the vegetation within the CESA. The Proposed Action would disturb approximately three percent of the CESA, which includes an indirect effect to approximately four acres of riparian vegetation community. The amount of area that would not be reclaimed (734 acres) associated with the open pit of the Proposed Action represents less than **five** percent of the total surface disturbance resulting from past, present, and RFFAs. The cumulative and incremental effect to wetlands and riparian zones would be significant. Mitigation for the Proposed Action is outlined in Section 3.11.3.3.

#### **4.4.10 Livestock Grazing and Production**

Past Actions - Past or historic mining operations within the study area include a few operations from the 1860s through the 1970s, as well as modern operations from the 1980s. It appears that essentially all of the historic mining operations within the study area occurred in the Eureka Mining District. The disturbance to livestock grazing and production is estimated to be approximately 200 acres. None of that disturbance was reclaimed. The more modern operations within the study area include the Gold Bar Mine and the Ruby Hill Mine, which together total approximately 1,343 acres of surface disturbance to livestock grazing and production. The Gold Bar Mine operated between the 1980s and 1990s, and only a portion of the operation has been reclaimed, which included the redistribution of stockpiled growth media and reestablishment of soil resources and vegetation. The Ruby Hill Mine began operations in the 1990s and is currently in operation. Portions of the mine have undergone concurrent reclamation, including the redistribution of growth media and the reestablishment of soils. Other past actions that have affected livestock grazing and production include the development of roads, powerlines and other utilities, fences, development of cattle and wild horse water sources, agricultural activities, and land development and are estimated at 550 acres of surface disturbance. Impacts to livestock grazing and production from these activities include removal of vegetation (i.e., forage and cover for livestock) and compaction, mixing, erosion of soils, and change in plant community structure and diversity. The extent of these impacts varies with the type of activity.

Present Actions - Present actions within the CESA with the potential to impact livestock grazing and production include the following activities: irrigation of crops, which is estimated to occur on approximately 28,736 acres; habitat stabilization and rehabilitation activities on approximately 3,226 acres; wildland fires, fuels management, and reseeding projects on approximately 2,087 acres; minerals activities on approximately 1,176 acres; and the Proposed Action, which would include 8,355 acres of surface disturbance to livestock grazing and production and fencing that would enclose 14,204 acres, eliminating approximately 781 AUMs. Wild horse management affects livestock grazing and production as a result of gathers and adjustments to AMLs. Wild horse management can also affect the composition and productivity of the forage. Impacts to livestock grazing and production from these activities include removal of vegetation (i.e., forage and cover for livestock) and compaction, mixing, erosion of soils, and change in plant community structure and diversity. The extent of these impacts varies with the type of activity.

RFFAs - RFFAs within the CESA with the potential to impact livestock grazing and production include the following activities: wildland fires, fuels management, and reseeding projects on approximately 522,500 acres; habitat stabilization and rehabilitation activities on approximately 44,094 acres; minerals activities on approximately 1,440 acres; and 5,857 acres associated with land sales and their subsequent development. Impacts to livestock grazing and production from these activities include removal of vegetation (i.e., forage and cover for livestock) and compaction, mixing, erosion of soils, and change in plant community structure and diversity. The extent of these impacts varies with the type of activity. Other actions that could either positively or negatively affect livestock grazing and production include the 3 Bars Landscape Restoration Project, wild horse management activities, recreational uses, dewatering activities associated with mining operations, ground water pumping associated with agricultural operations, and livestock uses.

Total past actions, present actions, and RFFAs would result in up to approximately 619,054 acres of surface disturbance in the CESA; however, approximately 40,094 acres of surface disturbance is, or would be, associated with habitat stabilization, rehabilitation, and rangeland improvements, which would result in positive impacts to livestock grazing and production in the CESA. The majority of the 619,054 acres would be reclaimed and available for livestock grazing after the completion of reclamation activities. Approximately 781 AUMs would be lost in the Project Area due to the enclosure as a result of the Project, which is six percent of the current active grazing preference.

#### 4.4.11 Wild Horses

Past Actions - Mining activity, oil and gas production, geothermal development, gravel pit expansion, road building, fencing, wild horse gathers, OHV use, and wind generation are all activities, which can impact wild horse distribution and seasonal movement throughout and between HMAs. Impacts to wild horses from these activities include removal of vegetation (1,348 acres) and forage, increased traffic, and displacement or disturbance from loud and sudden noises. Additional impacts to wild horses from these activities include changes in use and distribution patterns within HMAs. The extent of these impacts varies with the type of activity. Each activity results in incremental restrictions on free roaming behavior and over time may influence utilization patterns, genetic interchange, and use of water sources. Fences which exclude wild horse use may be constructed to protect riparian areas from overuse, exclude study

areas or seedings, or divide grazing allotments or pastures. These fences result in fragmentation of the HMA and habitat used by wild horses, and restricts use of the HMAs.

**Present Actions** - Present actions would include 14,204 acres of surface disturbance that would affect wild horses **within the fenced boundary**. Other present actions that have an effect on vegetation are a continuation of those other activities outlined under past actions. Impacts to wild horses from these activities include removal of vegetation and forage, increased traffic, and displacement or disturbance from loud and sudden noises. The extent of these impacts varies with the type of activity.

**RFFAs** - RFFAs within the **CESA** could result in minerals activities on approximately **1,556** acres and 950 acres associated with land sales and their subsequent development. Impacts to wild horses from these activities include removal of vegetation and forage, increased traffic, and displacement or disturbance from loud and sudden noises. The extent of these impacts varies with the type of activity. Other actions that could either positively or negatively affect wild horses include the 3 Bars Landscape Restoration Project, wild horse management activities, recreational uses, dewatering activities associated with mining operations, ground water pumping associated with agricultural operations, and livestock uses.

Total past actions, present actions, and RFFAs would result in up to approximately **18,058** acres of surface disturbance that would affect wild horses **within the CESA**. The majority of this disturbance is associated with mining operations and is subject to reclamation requirements, which would minimize any impacts; however, all other present actions and RFFAs would not likely be subject to reclamation requirements either because of their perpetual nature or lack of state or federal statutory requirements for reclamation. The CESA for wild horses covers approximately 253,610 acres. Therefore, all actions within the CESA would affect approximately **seven** percent of the vegetation within the CESA. The Proposed Action would disturb approximately three percent of the CESA. The amount of area that would not be reclaimed (734 acres) associated with the open pit of the Proposed Action represents less than five percent of the total surface disturbance resulting from past, present, and RFFAs. In addition, the Proposed Action may result in further fragmentation of the habitat used within these HMAs through construction of over 20 miles of pipeline, construction of additional powerline, additional access road and fences. The implementation of mitigation measures identified in Chapter 3 of this EIS limit the loss of habitat and water sources to wild horses in the Project Area by development of six water sources; therefore, the cumulative and incremental effects to wild horses would be below the level of significance.

#### **4.4.12 Land Use**

**Past Actions** - Past actions generally did not consider potential impacts to land use and access, unless those actions had an effect on private property, or rights granted by the federal government. However, past actions such as powerlines, fences, unpaved roads, SR 278, and the past mining operations at Mount Hope have had and continue to have some level of location-specific impact on land use and access.

**Present Actions** - The present actions are similar to the past actions and in most cases are continuations of the past actions. These actions also have a continuing location-specific effect on

land use and access. The Proposed Action would restrict land use and access through and within the Project Area.

RFFAs - Land use impacts from RFFAs could include limited or restricted use or access through specific areas from mineral exploration, mining, or fencing. These impacts would tend to be localized near the activities.

The current uses of the public lands within the Project Area are similar to those within the CESA and common to the region. The cumulative and incremental effect of the permanent loss of public lands managed for multiple uses within the CESA would be below the level of significance; however, under the RFFA, of the sale of a major portion of the Project Area, land use and access through that portion of the Project Area would be substantially changed.

#### 4.4.13 Recreation and Wilderness Study Areas

Past Actions - Past or historic mining operations within the CESA include a few operations from the 1860s through the 1970s, as well as modern operations from the 1980s. It appears that essentially all of the historic mining operations within the study area occurred in the Eureka Mining District. The disturbance is estimated to be approximately 200 acres. None of that disturbance was reclaimed. The more modern operations within the study area include the Gold Bar Mine and the Ruby Hill Mine, which together total approximately 1,343 acres of surface disturbance. The Gold Bar Mine operated between the 1980s and 1990s, and only a portion of the operation was reclaimed, which included the redistribution of stockpiled growth media and reestablishment of soil resources and vegetation. The Ruby Hill Mine began operations in the 1990s and is currently in operation. Portions of the mine have undergone concurrent reclamation, including the redistribution of growth media and the reestablishment of soil resources. Other past actions that have affected recreation and wilderness include the development of roads, wildland fires and fuels management, powerlines and other utilities, fences, development of cattle and wild horse water sources, agricultural activities, and land development. The cumulative disturbance associated with these activities is estimated at **391,065** acres. Impacts to recreation and wilderness from these activities include restrictions on access, noise, alterations to the visual characteristics, loss or displacement of wildlife, and impacts to surface waters and fishing. The extent of these impacts vary with the type of activity. In addition, this disturbance and associated effects on the recreational characteristics and wilderness values was likely minimal due to the different social values of the times.

Present Actions - Present actions include the ongoing Ruby Hill Mine, discussed above, as well as exploration activities under **86** notices, **three** plans of operations, and **39 sand and gravel operations**. These are estimated at **2,888** acres that are not otherwise included under the past actions. The Proposed Action would include 8,355 acres of surface disturbance. The Proposed Action would restrict access to 14,204 acres in the Project Area for the duration of the Project (approximately 70 years) and 734 acres in the long term. Other present actions that have an effect on recreation and wilderness are a continuation of the activities outlined under past actions. Impacts to recreation and wilderness from these activities include restrictions on access, noise, alterations to the visual characteristics, loss or displacement of wildlife, and impacts to surface waters and fishing; all of which diminishes the overall quality of the recreational or wilderness experience. The extent of these impacts varies with the type of activity.

RFFAs - RFFAs within the CESA could result in up to approximately **574,243** acres of surface disturbance that would affect recreation and wilderness. These activities include up to 44,094 acres of disturbance associated with habitat stabilization and rehabilitation, **522,500** acres associated with wildland fires, fuels management, and reseeding, **1,792** acres of surface disturbance associated with mineral operations, and 5,857 acres associated with land sales and their subsequent development. Impacts to recreation and wilderness from these activities include restrictions on access, noise, alterations to the visual characteristics, loss or displacement of wildlife, and impacts to surface waters and fishing; all of which diminishes the overall quality of the recreational or wilderness experience. The extent of these impacts varies with the type of activity.

Total past actions, present actions, and RFFAs would result in up to approximately **993,032** acres of surface disturbance that would affect recreation, as well as potential indirect effects to high use recreation locations associated with the Roberts Creek drainage. The CESA for recreation and wilderness covers approximately 1,970,179 acres; therefore, approximately **50** percent of the CESA would be impacted. The Roberts Mountain and Simpson Park WSAs are located within the CESA for recreation and wilderness. The only past action, present action, or RFFA that could be expected to effect the WSAs are wildland fires and livestock grazing and production. All other actions could not reasonably be expected to occur within the WSA. The present actions and RFFAs associated with mineral operations and other activities on BLM-administered lands are subject to reclamation requirements, which would restore areas for future use and minimize the long-term impacts. In addition, approximately 44,094 acres of surface disturbance is, or would be, associated with habitat stabilization and rehabilitation, which would result in positive impacts to recreation and wilderness in the CESA; therefore the quality of the area available for future recreational opportunities would be improved, and there would be, in the long term, no unmitigated loss of a unique recreational resource. During the time any one, or all, of the activities is occurring there would be a reduction in the quality of the recreational or wilderness experience in portions of the CESA.

It is not known which activities, other than the Proposed Action, may result in restrictions to access of recreation areas, but very few restrictions are anticipated. The permanent access restriction as a result of the Proposed Action would account for only 0.4 percent of the CESA; therefore, the cumulative and incremental effect of the permanent access restriction from public lands managed for multiple uses within the CESA would be below the level of significance.

#### **4.4.14 Auditory Resources**

Past Actions - Past actions generally did not consider potential impacts to auditory resources; however, any potential impacts from past actions would not persist, since any impacts would have been short term in nature and would not carry forward to the present.

Present Actions - The present actions within the CESA, including the Proposed Action are outlined in Section 3.16.2.2 and include Proposed Action activities, ranching, and traffic on SR 278.

RFFAs - Auditory resource impacts from RFFAs could include noise generation from mineral exploration and traffic on paved and unpaved roads. These impacts would tend to be localized near their noise sources.

Each of the identified individual projects within the CESA, including the proposed mining operations, contributes noise to the natural environment. Since the Proposed Action is the principal and dominant noise generating activity within the CESA, the potential impacts are less than significant (Section 3.16.3.3), and any present actions and RFFAs would be dispersed throughout the CESA, none of the projects including the Proposed Action would result in a significant cumulative impact to the auditory resources.

#### 4.4.15 Socioeconomic Values

Past Actions - Past or historic mining operations within the study area include a few operations from the 1860s through the 1970s, as well as modern operations from the 1980s. It appears that essentially all of the historic mining operations within the study area occurred in the Eureka Mining District. The more recent operations within the study area include the Gold Bar Mine and the Ruby Hill Mine. The Gold Bar Mine operated between the 1980s and 1990s and the Ruby Hill Mine began operations in the 1990s and is currently in operation. Other past actions that have affected socioeconomic values include the development of powerlines and other utilities, agricultural activities, recreation, and land development. Impacts to socioeconomic values from these activities include increased population, increased demand for public services, increased expenditures by Eureka County, increased employment opportunities, and increased revenues for Eureka County. The extent of these impacts vary with the type of activity and have not been quantified, however, the majority of the impacts from past activities do not have any ongoing impacts and are considered to be part of the existing social and economic climate.

Present Actions - The present actions that would impact socioeconomic values include the following: mineral development and exploration; grazing and agriculture; recreation; oil, gas, and geothermal development; and land development. Impacts to socioeconomic values from these activities include increased population, increased demand for public services, increased expenditures by Eureka County, increased employment opportunities, and increased revenues for Eureka County. The extent of these impacts varies with the type of activity and have not been quantified. As discussed in Section 3.17, the Proposed Action would result in significant impacts by inducing substantial growth, causing a substantial net increase in county expenditures, and creating a substantial demand for public services and housing. In addition, county revenues, in the form of tax and net proceeds receipts, would have a corresponding increase.

RFFAs - Socioeconomic values impacts would result from the following RFFAs: mineral development and exploration; recreation; land development (including land sales); grazing and agriculture; and oil, gas, and geothermal development. The extent of the impacts from these actions would depend on the type and size of the project. Specific projects that are planned include BLM land sales and the ensuing development of the lands, mineral development and exploration, and oil and gas leasing and development. **Additionally, the BLM has received Plans of Operations and is preparing EISs for the Bald Mountain Mine North and South Operations Area Projects and the Pan Mine Project, which have a potential effect on socioeconomics. The Bald Mountain Mine North and South Operations Area Projects propose to employ approximately 200 workers during construction. This number would decrease to approximately 100 employees during project operations. The Pan Mine Project proposes to employ approximately 160 workers during construction. This number would decrease to approximately 150 employees during project operations.** These actions would tend to increase the significant cumulative impact to socioeconomic values.

The identified projects within the CESA, including the Proposed Action, would have both beneficial and potentially adverse impacts on social and economic values in Eureka County. As stated in Section 3.17, EML has and would continue to coordinate with Eureka County to address these impacts and minimize the short-term fiscal impacts on the County.

#### **4.4.16 Environmental Justice**

Initial analysis concluded that the potential effects of the Project would not be expected to disproportionately affect any particular population. Environmental effects that may occur at a greater distance, such as auditory resource or air impacts, would affect the area's population equally, without regard to nationality or income level. Since no disproportionate effects on an identified minority population results from the Proposed Action or the RFFAs, no further environmental justice analyses are required.

#### **4.4.17 Hazardous Materials**

Past Actions - Past actions generally did not consider potential impacts from hazardous materials; however, any potential impacts from past actions would not persist, since any uses of hazardous materials would have been limited in scope based on the past uses in the CESA and would likely not carry forward to the present.

Present Actions - The present actions within the CESA are outlined in Section 3.19.2.2 and include mining activities, ranching, and truck traffic on SR 278.

RFFAs - Hazardous materials impacts from RFFAs could include spills and leaks from mineral exploration and traffic on paved and unpaved roads. These impacts would tend to be localized near their sources.

The present actions and RFFAs within the CESA, including the proposed mining operations, contribute to potential hazardous materials effects to the natural environment. Since the Proposed Action is the principal hazardous materials generating activity within the CESA, its potential impacts are less than significant (Section 3.19.3.3), and any existing action and RFFAs such as traffic on SR 278 would be dispersed throughout the CESA, there would be no significant cumulative hazardous materials impact.

#### **4.4.18 Historic Trails**

The Historic Trail CESA is the viewshed from the Pony Express Trail for a distance of approximately three miles away from the trail. This area encompasses approximately 69,061 acres (Figure 3.20.1).

Past Actions - Past actions did not consider potential effects on the historic trail, primarily because the historic trail designation had not been created; however, these past actions, such as powerlines, fences, unpaved roads, SR 278, and past mining operations at Mount Hope have had and continue to have impacts on the visual setting for the historic trail. In addition, past mining operations were not subject to reclamation laws. These impacts are significant.

Present Actions - The present actions are similar to the past actions, except for the Project mining operations, and in most cases are a continuation of the past actions. These actions also have a continuing effect on the visual setting for the historic trail. As outlined in Section 3.20, the Proposed Action has a significant effect on the historic trail.

RFFAs - Historic trail impacts from RFFAs could include visual effects from mineral exploration and traffic on paved and unpaved roads. These impacts would tend to increase the significant cumulative impact to the historic trail. Additionally, direct effects to the historic trail could occur from these RFFAs.

The identified projects within the CESA, including the Proposed Action have an impact on the visual setting for the historic trail by adding visual elements that detract from the experience of those using the trail. These impacts are significant; however, the Proposed Action has design features that have been developed to lessen the impact. In addition, there is no mitigation that could reduce the impact to less than significant. In addition, under the RFFA a majority of the Project Area is identified as Category 1 in the RMP for disposal. Therefore, a sale of a major portion of the Project Area is **possible** and access through that portion of the Project Area could be **affected**. **Site-specific analysis and public involvement would be required prior to any land disposal action and a more thorough examination of potential impacts to the Pony Express Trail would be done at that time. An assessment of those impacts would be a deciding factor in the consideration of any disposal action.**

#### 4.4.19 Cultural Resources

The area of cumulative analysis for cultural resources was defined in the PA to be the area in a 20-mile radius of Mount Hope, which covers an area of approximately 200,960 acres (Figure 3.7.1).

Past Actions – Most past actions did not consider potential effects on cultural resources. Projects and development disturbances conducted prior to 1966 (i.e., prior to NHPA) or those activities without a federal or state nexus generally did not identify or quantify cultural resource sites or impacts to them. These past actions, such as powerlines, fences, unpaved roads, SR 278, and mining operations may have had a direct physical effect on cultural sites. These activities have had and continue to have impacts on the visual setting for cultural resources. These impacts are potentially significant.

Present Actions - The present actions are similar to the past actions, and in most cases is a continuation of the past actions. These actions also have a continuing effect on the visual setting for cultural resources.

RFFAs - Cultural resource impacts from RFFAs could include indirect visual effects from mineral exploration and traffic on paved and unpaved roads. These impacts would tend to increase the significant cumulative impact to cultural resources. Additionally, direct effects to cultural resources from these are RFFAs could occur.

The identified projects within the CESA, including the Proposed Action have a direct physical impact on the cultural resources and an indirect impact on the visual setting for specific cultural resources that are potentially significant. Within the cumulative effects viewshed APE, a total of

436 eligible and unevaluated historic (361) and multi-component (75) sites with a historic component would be impacted. This number includes 152 officially eligible historic sites and 39 officially eligible multi-component sites with a historic element within the Project APE (Table 3.21-1). Impacts to these sites would be mitigated through the implementation of a treatment plan. Outside of the Project APE and within the viewshed APE, an additional 245 eligible or unevaluated historic and historic component sites may be adversely impacted. All adverse effects under the NHPA and direct and indirect impacts under NEPA to known-eligible properties identified within the Project APE would be mitigated in accordance with the PA and the treatment plan prepared for the Project. Any previously unknown-eligible properties that may be discovered during construction activities would be mitigated in accordance with the PA. Therefore, no additional mitigation or monitoring is proposed. No residual adverse effects are anticipated, as all known-eligible sites would be mitigated in accordance with the PA and the treatment plan prepared for the Project. Any previously unknown-eligible properties that may be discovered during construction activities would be mitigated in accordance with the PA.

#### **4.4.20 Native American Traditional Values**

**Past Actions** - Many past actions did not always consider potential effects on Native American Traditional Values, primarily because the management or consideration of this issue was not required. However, these past actions, such as powerlines, fences, unpaved roads, SR 278, wildland fires, and mining operations have resulted in the removal of piñon trees. The primary areas of past piñon tree removal include mining in the southern Roberts Mountains, northern Simpson Park Range and in the vicinity of Cortez, as well as wildland fires in the Cortez Range Commercial pine nut harvesting limits the amount of pine nuts that are available for Native American gathering in any given year. In addition, there are a number of projects that have resulted in the retrieval of prehistoric artifacts from public lands.

**Present Actions** - The present actions are similar to the past actions, except for mining operations, and in most cases are a continuation of the past actions. Present mining within the Native American CESA is focused in two areas; the Carlin Trend and the Cortez-Pipeline area. As shown on Figure 4.4.2, these two areas have ongoing dewatering operations that have the potential to affect a number of springs and perennial streams through decreased flows. The present mining operations have had a limited effect on piñon trees (Figure 4.3.3). However, present mining operations have resulted in the retrieval of prehistoric artifacts from public and private lands.

**RFFAs** - Impacts to Native American Traditional Values from RFFAs could include the removal of additional piñon trees.

The identified projects within the CESA, including the Proposed Action have an impact on Native American Traditional Values, which include pine nut gathering and water resources. The Proposed Action would not result in the removal of any piñon-only woodlands. The Proposed Action's removal of piñon trees and limiting of access to other piñon trees in piñon-juniper woodlands within the fenced Project Area, relative to all other impacts to piñon trees, is not readily quantifiable. It is likely less than one percent of all the piñon trees within piñon-only and piñon-juniper woodlands within the CESA. In addition, the cumulative effect to piñon trees, relative to the total number of piñon trees within the Native American Traditional Values CESA is small (Figure 4.3.3) The Proposed Action's potential effect to water resources from ground

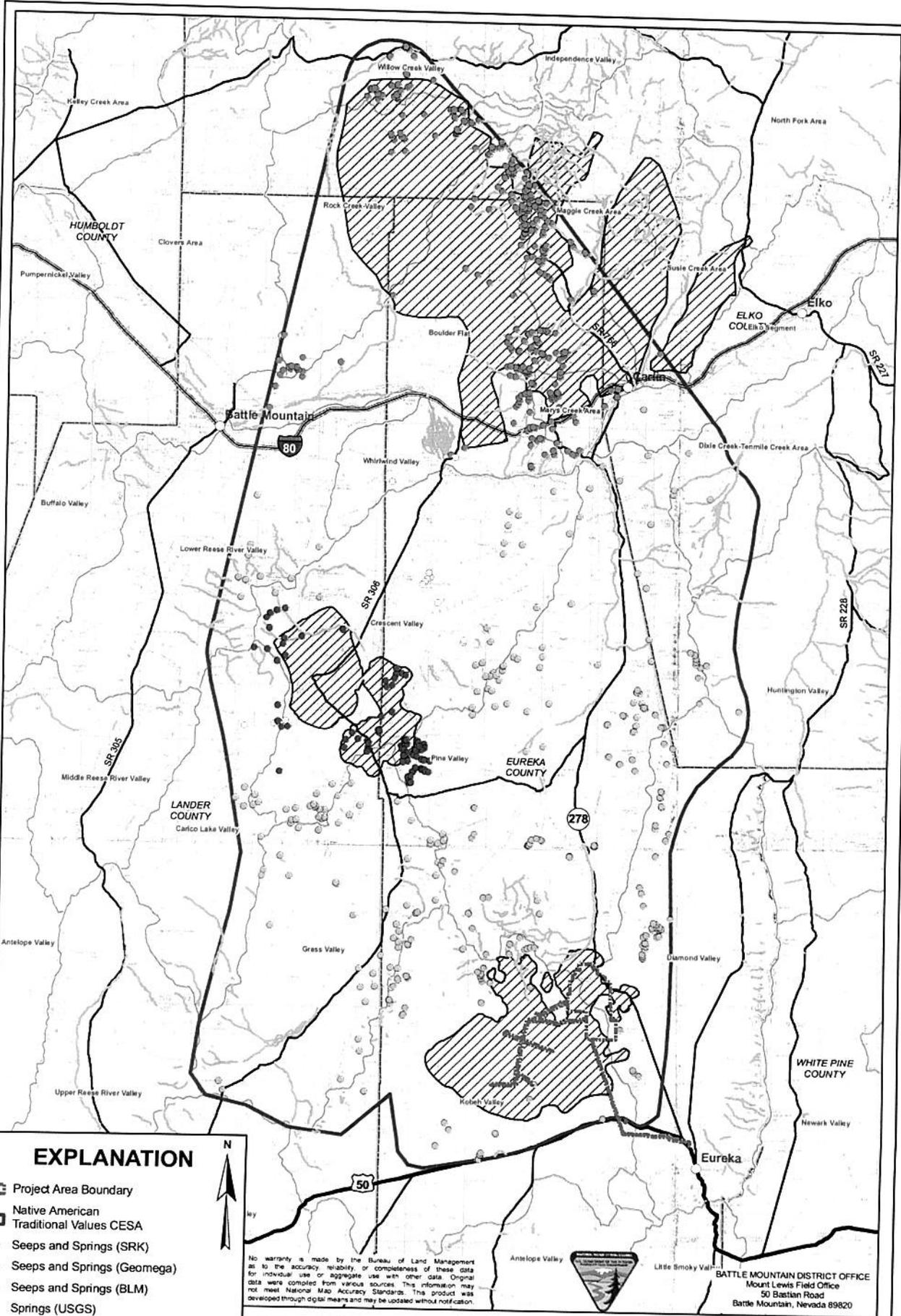
water pumping, as shown on Figure 4.4.2, is isolated from the ground water pumping associated with the other mining operations within the Native American Traditional Values CESA. Figure 4.4.2 also shows the location of projects within the CESA where the removal or retrieval of prehistoric artifacts have occurred or may have occurred. Figure 4.4.2 does not show any potential effects from ground water pumping associated with agricultural operations. The Proposed Action's potential effects to water resources is incrementally a small percent of the total potential effect to water resources from all ground water pumping operations.

#### 4.4.21 Wildlife and Fisheries Resources

Past Actions - Past or historic mining operations within the CESA include a few operations from the 1860s through the 1970s, as well as modern operations from the 1980s. It appears that essentially all of the historic mining operations within the study area occurred in the Eureka Mining District. The disturbance to habitat for wildlife and fisheries resources is estimated to be approximately 200 acres. None of that disturbance was reclaimed. The more modern operations within the study area include the Gold Bar Mine and the Ruby Hill Mine, which together total approximately 1,343 acres of surface disturbance **resulted in impacts** to wildlife and fisheries resources. The Gold Bar Mine operated between the 1980s and 1990s and only a portion of the operation was reclaimed, which included the redistribution of stockpiled growth media and reestablishment of soil resources and vegetation. The Ruby Hill Mine began operations in the 1990s and is currently in operation. Portions of the mine have undergone concurrent reclamation, including the redistribution of growth media and the reestablishment of soils. Other past actions that have affected wildlife and fisheries resources include the development of roads, powerlines and other utilities, agricultural operations, fences, development and use of cattle and wild horse water sources, agricultural activities, and land development, and are estimated at 550 acres of surface disturbance. Impacts to wildlife and fisheries resources from these activities are considered from a habitat and population perspective and include removal or modification of habitat, or loud and sudden noises that could result in displacement. A number of these past and present actions, such as roads, fences, agricultural development, may result in habitat fragmentation and migration route disruption, as well as affecting the success of reproduction. The extent of these impacts vary with the type of activity.

Past actions that may have affected the LCT recovery stream of Henderson Creek are livestock grazing and production, dispersed recreation, powerline development and maintenance, and mineral exploration. These actions continue to have the potential to degrade the habitat through siltation of the streams, the removal of vegetation adjacent to the stream, and a decrease in stream bank stability.

Present Actions - Present actions within the CESA with the potential to impact wildlife and fisheries resources include the following activities: grazing, agricultural, and forest products activities on 28,736 acres, utilities and infrastructure activities on 51,375 acres, oil and gas development on approximately 283 acres; habitat stabilization, rehabilitation, and wild horse management activities on approximately 3,248 acres; wildland fires, fuels management, and reseeded projects on approximately 283,270 acres; minerals activities on approximately 2,513 acres; mine hazardous/solid waste and mine hazardous materials on approximately 40 acres; the ongoing Ruby Hill Mine, discussed above; and the Proposed Action would include 8,355 acres of surface disturbance to wildlife and fisheries resources. Impacts to wildlife and fisheries resources from these activities are considered from a habitat and population perspective



**EXPLANATION**

- Project Area Boundary
- Native American Traditional Values CESA
- Seeps and Springs (SRK)
- Seeps and Springs (Geomega)
- Seeps and Springs (BLM)
- Springs (USGS)
- Geothermal Springs (BLM and Geomega)
- Perennial Stream Segment
- Areas of Dewatering
- Hydrographic Basin Boundaries



No warranty is made by the Bureau of Land Management as to the accuracy, reliability, or completeness of these data for individual use or aggregate use with other data. Original data were compiled from various sources. This information may not meet National Map Accuracy Standards. This product was developed through digital means and may be updated without notification.

0 1 2 4 6 8 10 12 14 16 Miles			
DESIGN: EMLLC	DRAWN: CVD/GSL	REVIEWED: RFD	
CHECKED: -	APPROVED: RFD	DATE: 08/02/2012	
FILE NAME: p1635_Fig4-2_Waters/NativeAmericanCESA.mxd			

**BUREAU OF LAND MANAGEMENT**  
**MOUNT HOPE PROJECT**

DRAWING TITLE  
**Perennial Waters and Areas of Dewatering within the Native American Traditional Values CESA**  
Figure 4.4.2

BATTLE MOUNTAIN DISTRICT OFFICE  
Mount Lewis Field Office  
50 Bastian Road  
Battle Mountain, Nevada 89820

and include removal or modification of habitat, or loud and sudden noises that could result in displacement. The extent of these impacts varies with the type of activity.

Present actions that may have affected the LCT recovery stream of Henderson Creek and the sports fishery in Roberts Creek are grazing actions, wild horse, piñon-juniper encroachment, and dispersed recreation. The Proposed Action does not have any surface disturbance within the Pete Hansen Creek drainage. These actions have the potential to degrade the habitat through siltation of the streams, removal of vegetation adjacent to the stream, and a decrease in stream bank stability.

RFFAs - RFFAs within the CESA with the potential to impact wildlife and fisheries resources include the following activities: oil and gas development on approximately 577 acres; wildland fires, fuels management, and reseeding, forest products projects on approximately 522,500 acres; habitat stabilization, rehabilitation, and wild horse management activities on approximately 44,094 acres; minerals activities on approximately 1,787 acres; 5,857 acres associated with land sales and their subsequent development; and mine hazardous/solid waste on approximately 80 acres. Impacts to wildlife and fisheries resources from these activities are considered from a habitat and population perspective and include removal or modification of habitat or loud and sudden noises that could result in displacement. The extent of these impacts vary with the type of activity. Other actions that could either positively or negatively affect wildlife and fisheries include the 3 Bars Landscape Restoration Project, wild horse management activities, recreational uses, dewatering activities associated with mining operations, ground water pumping associated with agricultural operations, and livestock uses.

RFFAs that may have affected the LCT recovery stream of Henderson Creek is grazing action and dispersed recreation. These actions have the potential to degrade the habitat through siltation of the streams, removal of vegetation adjacent to the stream, and a decrease in stream bank stability.

Total past actions, present actions, and RFFAs would result in up to approximately 954,808 acres of habitat disturbance in the CESA; however, approximately 44,094 acres of habitat disturbance is, or would be, associated with habitat stabilization, rehabilitation, and rangeland improvements that would result in positive impacts to wildlife and fisheries resources in the CESA. Significant cumulative impacts to the wildlife and fisheries habitat in the CESA would not be anticipated because the vast majority of land would be reclaimed. Even though none of the perennial drainages, including those that support sport fisheries, would appear to be affected hydrologically **by the other past, present and RFFA projects**, there is a potential to affect stream flow through ground water pumping from the Proposed Action and thus affect the fisheries. Due to the widely dispersed nature of the existing and reasonably foreseeable individual mining projects within the CESA, cumulative noise and traffic impacts would not cause a substantial disturbance to wildlife populations or critically reduce use of their habitat.

Mitigation for impacts to wildlife resources is presently in Chapter 3 of this EIS and includes measures to protect greater sage-grouse, LCT, and migratory birds. Impacts to other wildlife and fisheries resources are below the level of significance.

#### 4.4.22 Transportation and Access

Past Actions – The past actions that affected transportation and access center around actions that result in the movement of people and goods, as well as improvements to the transportation network itself. These actions include grazing activities, minerals development, land development and agricultural activities.

Present Actions – The present actions that affect transportations are essentially the same as those under the past actions. Section 3.24.2.2 outlines the current conditions associated with Transportation and access.

RFFAs - Transportation and access impacts from RFFAs could include limited or restricted use or access through specific areas from mineral exploration, mining, or fencing, or decreases in road quality. Transportation use would tend to be similar to those under the past and present actions. These impacts would tend to be localized near the activities.

The current access of the public lands within the Project Area are similar to those within the CESA and common to the region. The current transportation uses in the vicinity of the Project Area are similar to those with the CESA and common to the region. The cumulative and incremental effect of the permanent loss of public lands managed for multiple uses (734-acre area of the open pit) within the CESA would be below the level of significance; however, under the RFFA, of the sale of a major portion of the Project Area, access through that portion of the Project Area would be substantially changed.

#### 4.4.23 Forest Products

Past Actions - Past or historic mining operations include a few operations from the 1860s through the 1970s. It appears that essentially all of the historic mining operations occurred in the Eureka Mining District. The direct disturbance to forest projects is estimated to be approximately 200 acres. None of that disturbance was reclaimed. In addition, most of the trees in the surrounding mountain ranges were cut to produce charcoal for the smelting operations. Other past actions that have affected forestry products include the development of roads, powerlines and other utilities, fences, development of cattle and wild horse water sources, dispersed recreation, and land development and are estimated at 550 acres of surface disturbance. Impacts to forestry products from these activities include removal of vegetation, compaction, mixing, and erosion of soils. The extent of these impacts varies with the type of activity. The Bootstraps crew treated approximately 2,500 acres of piñon-juniper in the Willow and Vinini Creek drainages and in the Henderson Summit area in 2008 and 2009 under the Roberts Mountain Wildlife Habitat Enhancement Project EA completed in 2007.

Present Actions - Present actions include the ongoing Ruby Hill Mine, discussed above, as well as exploration activities under **52** notices, **three** plans of operations, **and four sand and gravel operations**, which are estimated at **1,308** acres that are not otherwise included under the past actions. The Proposed Action would include **8,355** acres of surface disturbance to vegetation, a significant portion of which is piñon and juniper. Other present actions that have an effect on forest products are a continuation of those activities outlined under past actions. The extent of the impacts varies with the type of activity. The Sulphur Springs Hazardous Fuels Reduction EA that was completed in 2009 has been partially implemented. The EA allows for the removal/thinning

of encroaching piñon-juniper from up to 3,000 acres of habitat containing healthy concentrations of bitterbrush. That part of the project has not yet been implemented. The BLM intends to initiate this project in 2011 with the Bootstraps crew, though most of the BLM's efforts would be focused on continuation of the Bald Mountain project initiated in 2010, if expected NRCS funding is approved.

RFFAs - RFFAs within the CESA would be similar to those under the present actions. Impacts to forestry products from these activities include removal of vegetation and compaction, mixing, and erosion of soils. The extent of these impacts varies with the type of activity. Other actions that could either positively or negatively affect forest products include the 3 Bars Landscape Restoration Project, wild horse management activities, recreational uses, dewatering activities associated with mining operations, ground water pumping associated with agricultural operations, and livestock uses.

Total past actions, present actions, and RFFAs would result in up to approximately **15,913** acres of surface disturbance that would affect forest products. The past actions are generally not subject to any reclamation activities. The present actions and RFFAs associated with mineral, geothermal, and oil and gas operations are subject to reclamation requirements, which would minimize any impacts; however, all other present actions and RFFAs would not be subject to reclamation requirements. The CESA for forest products covers approximately 515,000 acres. Therefore, all actions within the CESA would affect approximately **three** percent of the vegetation within the CESA. The Proposed Action would disturb approximately three percent of the CESA. The amount of area that would not be reclaimed (734 acres) associated with the open pit of the Proposed Action represents less than **five** percent of the total surface disturbance resulting from past, present, and RFFAs. The vegetation communities within the CESA are similar to those within the Project Area and common in the region. The cumulative and incremental effect of vegetation removal or modification would be below the level of significance.

#### **4.5 No Action Alternative Impact Analysis**

The resources that may be cumulatively impacted by the No Action Alternative include air quality, soils, water resources, vegetation, wildlife, special status species, visual, socioeconomics, noxious weeds and invasive-nonnative species, cultural, and wild horses; however, the cumulative impacts under the No Action Alternative are minimal compared to any of the action alternatives, including the Proposed Action. Activities under current authorizations would continue.

#### **4.6 Partial Backfill Alternative Impact Analysis**

The resources that may be cumulatively impacted by the Partial Backfill Alternative when combined with the past actions, present actions, and RFFAs include air quality, soils, water resources, vegetation, wildlife and fisheries, special status species, wetlands and riparian zones, livestock grazing and production, land use authorizations and access, visual, socioeconomics, geology and minerals, noxious weeds and invasive nonnative species, recreation and wilderness, historic trails, cultural resources, Native American Traditional Values, hazardous materials, and wild horses. The cumulative impacts under the Partial Backfill Alternative would be similar to the Proposed Action, due to similarity in size and scope of the operations under the alternative.

The Partial Backfill Alternative would have a slightly greater incremental increase in cumulative impacts to some of the resources (air resources and hazardous materials) due to the use and combustion of the fuel as part of the backfill operation and would result in less long-term surface disturbance compared to the Proposed Action due to the additional reclamation in the bottom of the backfilled open pit and less impact to water quantity and quality due to no development of a pit lake.

Criteria for assessing the significance of potential impacts to the resources are the same as those presented in Chapter 3. A discussion of the past actions, present actions, and RFFAs for each resource is incorporated in to Section 4.4 and are applicable to each resource discussion under this section.

#### **4.6.1 Water Resources - Water Quantity**

Cumulative impacts to water resources within the study area are considered from surface water, ground water, and water quantity perspectives. Assessment of cumulative impacts from present actions and RFFAs that are developed would be incorporated into the periodic ground water flow model and pit lake chemistry model updates as specific activities and associated water resource impacts evolve and are quantified by data collection under the Integrated Monitoring Plan, as outlined in Section 2.1.16 of this EIS.

##### **4.6.1.1 Surface Water Quantity**

Cumulative activities indirectly affecting the surface water resources through the pumping of ground water was evaluated with ground water modeling of the cumulative actions that were modeled beyond 2200 (Montgomery et al. 2010). Figure 4.4.1 depicts the ten-foot drawdown contour for the cumulative actions scenario, at year 2055, using the Proposed Action. Based on the analysis of the Partial Backfill Alternation in Section 3.2 of this EIS, the cumulative actions scenario using the Partial Backfill Alternative would be similar to, and no greater than the analysis using the Proposed Action. This analysis identifies a number of springs and streams on the western flank of the Diamond Mountains, the northern end of Diamond Valley, in the Roberts Mountains and in Kobeh Valley that are within the ten-foot drawdown contour and thus their flows would be potentially diminished.

The cumulative impacts to surface water resources from the Proposed Action and RFFAs for ground water development would be significant. The Partial Backfill Alternative portion of the cumulative impacts is also considered significant and specific mitigation measures for the Partial Backfill Alternative effect are identified in Section 3.2.5.3. The cumulative actions, exclusive of the Partial Backfill Alternative, particularly the agricultural actions in Diamond Valley also have a significant effect on the surface water resources in Diamond Valley. No mitigation measures are proposed for these effects because the BLM does not have any regulatory authority over those actions.

##### **4.6.1.2 Ground Water Quantity**

Ground water modeling of the cumulative activities affecting the ground water resources was conducted through year 2055 (Montgomery et al. 2010). Figure 4.4.1 depicts the ten-foot drawdown contour for the cumulative actions scenario. This analysis identifies a number of wells

in Diamond Valley and Kobeh Valley that are within the ten-foot drawdown contour and thus their flows would be potentially diminished.

The cumulative impacts to ground water resources from the Partial Backfill Alternative and RFFAs for ground water development would be significant. The Partial Backfill Alternative portion of the cumulative impacts is also considered significant and specific mitigation measures for the Partial Backfill Alternative effects are identified in Section 3.2.3.3. The cumulative actions, exclusive of the Partial Backfill Alternative, particularly the agricultural actions in Diamond Valley also have a significant effect on the ground water resources in Diamond Valley. No mitigation measures are proposed for these effects because the BLM does not have any regulatory authority over those actions.

#### **4.6.2 Water Resources - Water Quality**

Cumulative impacts to water resources within the study area are considered from surface water, ground water, and water quality perspectives. Assessment of cumulative impacts from present actions and RFFAs that are developed would be incorporated into the periodic ground water flow model and ground water chemistry model updates as specific activities and associated water resource impacts evolve and are quantified by data collection under the Integrated Monitoring Plan.

##### **4.6.2.1 Surface Water Quality**

The past, present, and RFFAs would potentially directly affect surface water resources through increased erosion and sedimentation. The mining-related cumulative actions would be required to implement erosion control measures that would limit their contribution to the cumulative impacts. Grazing has its own set of requirements that minimize effects to surface water quality. Dispersed recreation actions would not have the same requirements and thus would have a proportionally greater effect on surface water resources by removing vegetation and decreasing bank stability near streams and springs.

##### **4.6.2.2 Ground Water Quality**

Any potential cumulative impacts to ground water quality from the Partial Backfill Alternative, along with the past and present actions and the RFFAs for ground water would be significant, based on the criteria in Section 3.2, as a result of the backfilling of the open pit. The only two actions that have a quantitative assessment of potential ground water quality impacts are the Partial Backfill Alternative and the Ruby Hill Mine.

#### **4.6.3 Geology and Mineral Resources**

Mining disturbance has included open pit and underground operations with WRDFs, heap leach ore processing, ore milling and processing, tailings disposal, and exploration (drilling, trenching, sampling, and road construction). Past surface disturbance is 200 acres, present disturbance is **4,917** acres, **with** approximately 1,727 acres of disturbance anticipated under the RFFAs. This totals **6,644** acres of disturbance within the 1,809,522-acre CESA.

Mining is a major activity in the area, and it is likely that exploration activities and mining would continue. Additional impacts would result from the creation in the foreseeable future of additional open pit mining operations with WRDFs and processing facilities. The direct impacts affecting geology and mineral resources of the Partial Backfill Alternative due to the open pit mining would be the permanent removal of the identified mineral resources. The cumulative impacts to geology and mineral resources from the Partial Backfill Alternative and RFFAs for mineral development would not be significant. No mitigation is proposed.

#### 4.6.4 Air Resources

Each of the identified individual projects within the CESA, including existing and proposed mining operations, emit air pollutants. With the possible exception of motor vehicle emissions, the existing and proposed mining operations are the major sources of criteria pollutants within the CESA. The modeling for the Proposed Action, which is representative of the Partial Backfill Alternative, as well as the Ruby Hill Mine, shows that the levels of these pollutants below the applicable standards. The Partial Backfill Alternative would not result in a significant cumulative impact to air resources. The RFFAs would result in additional emissions similar to those currently emitted by the existing operations within the CESA. In addition, the major sources of pollutants (except for motor vehicle emissions) within the CESA would operate under permit conditions established by the BAPC and therefore would not be significant.

#### 4.6.5 Visual Resources

Mining disturbance has included open pit and underground operations with WRDFs, heap leach ore processing, ore milling and processing, tailings disposal, and exploration (drilling, trenching, sampling, and road construction). Past surface disturbance is 200 acres, present disturbance is **2,681** acres, **with** approximately **1,439** acres of disturbance anticipated under the RFFAs. Past and present actions, as well as RFFAs associated with agricultural actions have surface disturbance totaling approximately 29,496 acres. Past and present actions, as well as RFFAs associated with utilities and infrastructure actions have surface disturbance totaling approximately 51,823 acres. Past and present actions, as well as RFFAs associated with general development actions have surface disturbance totaling approximately 16,074 acres. These actions total approximately **101,713** acres of disturbance within the approximately 645,000-acre CESA for visual resources.

There are many actions that have an effect on the visual resources within the vicinity of the Project Area. The BLM's visual management for the Project Area allows for substantial change to the visual characteristics of the area. Therefore, the cumulative impacts to visual resources from the Partial Backfill Alternative, along with the past and present actions and the RFFAs would not be significant; however, activities to minimize the visual effects are incorporated in the Project reclamation plan. In addition, VRM classes do not establish management direction and should not be used as a basis for constraining or limiting surface disturbing activities.

#### 4.6.6 Soils

Total past actions, present actions, and RFFAs would result in up to approximately **18,320** acres of surface disturbance that would affect soil resources. The past actions are generally not subject to any reclamation activities. The present actions and RFFAs associated with mineral,

geothermal, and oil and gas operations are subject to reclamation requirements, which would minimize any impacts; however, all other present actions and RFFAs would not be subject to reclamation requirements either because of their perpetual nature or lack of state or federal statutory requirements for reclamation. The CESA for soil resources covers approximately 262,490 acres. Therefore, all actions within the CESA would affect approximately **seven** percent of the soil resources within the CESA.

#### 4.6.7 Vegetation Resources

Total past actions, present actions, and RFFAs would result in up to approximately **23,820** acres of surface disturbance that would affect vegetation. The past actions are generally not subject to any reclamation activities. The present actions and RFFAs associated with mineral, geothermal, and oil and gas operations are subject to reclamation requirements, which would minimize any impacts; however, all other present actions and RFFAs would not be subject to reclamation requirements. The CESA for vegetation covers approximately 262,490 acres. Therefore, all actions within the CESA would affect approximately 21 percent of the vegetation within the CESA. The Partial Backfill Alternative would disturb approximately three percent of the CESA. The amount of area that would not be reclaimed (207 acres) associated with the unbackfilled portion of the open pit of the Partial Backfill Alternative represents less than **one** percent of the total surface disturbance resulting from past, present, and RFFAs. The vegetation communities within the CESA are similar to those within the Project Area and common in the region. The cumulative and incremental effect of vegetation removal or modification would be below the level of significance.

The four special status plant species with potential habitat within the Project Area (Beatley buckwheat, least phacelia, Monte Neva Indian paintbrush, and windloving buckwheat) also have potential habitat within the CESA. None of these species has been documented as occurring within the CESA; however, no systematic survey has been completed. The cumulative effect and incremental loss of potential habitat for the four special status plant species resulting from past and present actions, proposed actions, and RFFAs would be below the level of significance.

#### 4.6.8 Noxious Weeds, Invasive and Nonnative Species

Total past actions, present actions, and RFFAs would result in up to approximately **18,320** acres of surface disturbance that would affect vegetation, noxious weeds, and invasive, nonnative species. The past actions are generally not subject to any reclamation activities. The present actions and RFFAs associated with mineral operations are subject to reclamation requirements, which would minimize any impacts; however, all other present actions and RFFAs would not be subject to reclamation requirements. The CESA for noxious weeds and invasive, nonnative species covers approximately 262,490 acres. Therefore, all actions within the CESA would affect approximately **seven** percent of the vegetation within the CESA. The Partial Backfill Alternative would disturb approximately three percent of the CESA. The amount of area that would not be reclaimed (207 acres) associated with the unbackfilled portion of the open pit for the Partial Backfill Alternative represents less than two percent of the total surface disturbance resulting from past, present, and RFFAs.

An infestation of noxious weeds and invasive, nonnative species that starts in one project may expand to outside areas and increase the chance of the introduction of noxious weeds and

invasive, nonnative species to other disturbed locations. The **applicant committed practices** identified to reduce the potential impacts of the Partial Backfill alternative would help to control noxious weed establishment and spread within and adjacent to the Project Area; therefore, the cumulative and incremental effect of surface disturbance on noxious weed management would be below the level of significance.

#### 4.6.9 Wetlands and Riparian Zones

Total past actions, present actions, and RFFAs would result in up to approximately **18,320** acres of surface disturbance that would affect vegetation; however, the disturbance is likely to occur in vegetation communities other than the riparian vegetation community. The past actions are generally not subject to any reclamation activities. The present actions and RFFAs associated with mineral operations are subject to reclamation requirements, which would minimize any impacts; however, all other present actions and RFFAs would not be subject to reclamation requirements either because of their perpetual nature or lack of state or federal statutory requirements for reclamation. The CESA for wetlands and riparian zones covers approximately 262,490 acres; therefore, all actions within the CESA would affect approximately **seven** percent of the vegetation within the CESA. The Partial Backfill Alternative would disturb approximately three percent of the CESA, which includes an indirect effect to approximately four acres of riparian vegetation community. The amount of area that would not be reclaimed (207 acres) associated with the unbackfilled portion of the open pit for the Partial Backfill Alternative represents less than two percent of the total surface disturbance resulting from past, present, and RFFAs. The cumulative and incremental effect to wetlands and riparian zones would be significant. Mitigation for this alternative is outlined in Section 3.11.3.5.

#### 4.6.10 Livestock Grazing and Production

Total past actions, present actions, and RFFAs would result in up to approximately **619,054** acres of surface disturbance in the CESA; however, approximately **44,094** acres of surface disturbance is, or would be, associated with habitat stabilization, rehabilitation, and rangeland improvements, which would result in positive impacts to livestock grazing and production in the CESA. The majority of the **619,054** acres would be reclaimed and available for livestock grazing after the completion of reclamation activities. Approximately 781 AUMs would be lost in the Project Area due to the enclosure, which is six percent of the current active grazing preference.

#### 4.6.11 Wild Horses

Total past actions, present actions, and RFFAs would result in up to approximately **18,058** acres of surface disturbance that would affect wild horses. The majority of this disturbance is associated with mining operations and is subject to reclamation requirements, which would minimize any impacts; however, all other present actions and RFFAs would not be subject to reclamation requirements. The CESA for wild horses covers approximately 253,610 acres. Therefore, all actions within the CESA would affect approximately **seven** percent of the vegetation within the CESA. The Partial Backfill Alternative would disturb approximately three percent of the CESA. The amount of area that would not be reclaimed (207 acres) associated with the unbackfilled portion of the open pit for the Partial Backfill Alternative represents less than two percent of the total surface disturbance resulting from past, present, and RFFAs. The implementation of mitigation measures identified in Chapter 3 of this EIS limit the loss of habitat

and water sources to wild horses in the Project Area by development of six water sources; therefore, the cumulative and incremental effects to wild horses would be below the level of significance.

#### 4.6.12 Land Use

The current uses of the public lands within the Project Area are similar to those within the CESA and common to the region. The cumulative and incremental effect of the permanent loss of public lands managed for multiple uses within the CESA would be below the level of significance; however, under the RFFA, of the sale of a major portion of the Project Area, land use and access through that portion of the Project Area would be substantially changed.

#### 4.6.13 Recreation and Wilderness Study Area

Total past actions, present actions, and RFFAs would result in up to approximately **993,032** acres of surface disturbance that would affect recreation, as well as potential indirect effects to high use recreation locations associated with the Roberts Creek drainage. The CESA for recreation and wilderness covers approximately 1,970,179 acres; therefore, approximately **50** percent of the CESA would be impacted. The present actions and RFFAs associated with mineral operations and other activities on BLM-administered lands are subject to reclamation requirements, which would restore areas for future use and minimize the long-term impacts. In addition, approximately 44,094 acres of surface disturbance is, or would be, associated with habitat stabilization and rehabilitation, which would result in positive impacts to recreation and wilderness in the CESA; therefore the quality of the area available for future recreational opportunities would be improved, and there would be, in the long term, no unmitigated loss of a unique recreational resource. While any one, or all, of the activities is occurring there would be a reduction in the quality of the recreational or wilderness experience in portions of the CESA.

It is not known which activities, other than the Partial Backfill Alternative, may result in restrictions to access of recreation areas, but very few restrictions are anticipated. The permanent access restriction as a result of the Partial Backfill Alternative would account for only 0.4 percent of the CESA; therefore, the cumulative and incremental effect of the permanent access restriction from public lands managed for multiple uses within the CESA would be below the level of significance.

#### 4.6.14 Auditory Resources

Each of the identified individual projects within the CESA, including the proposed mining operations, contributes noise to the natural environment. Since the Partial Backfill Alternative is the principal and dominant noise generating activity within the CESA, the potential impacts are less than significant (Section 3.16.3.3), and any present actions and RFFAs would be dispersed throughout the CESA, none of the projects, including the Partial Backfill Alternative would result in a significant cumulative impact to the auditory resources.

#### 4.6.15 Socioeconomic Values

The identified projects within the CESA, including the Partial Backfill Alternative, would **have both a positive and potentially adverse** impact on social and economic values in Eureka

County. As stated in Section 3.17, EML has and would continue to coordinate with Eureka County to address these impacts and minimize the short-term fiscal impacts on the County.

#### **4.6.16 Environmental Justice Effects**

Initial analysis concluded that the potential effects of the Project would not be expected to disproportionately affect any particular population. Environmental effects that may occur at a greater distance, such as auditory resource or air impacts, would affect the area's population equally, without regard to nationality or income level. Since no disproportionate effects on an identified minority population results from the Partial Backfill Alternative or the RFFAs, no further environmental justice analyses are required.

#### **4.6.17 Hazardous Materials**

The present actions and RFFAs within the CESA, including the proposed mining operations, contribute to potential hazardous materials effects to the natural environment. Since the Proposed Action is the principal hazardous materials generating activity within the CESA, the potential impacts are less than significant (Section 3.19.3.3), and any existing action and RFFAs such as traffic on SR 278 would be dispersed throughout the CESA, there would be no significant cumulative hazardous materials impact.

#### **4.6.18 Historic Trails**

The identified projects within the CESA, including the Partial Backfill Alternative have an impact on the visual setting for the historic trail by adding visual elements that may detract from the experience of those using the trail. These impacts are significant; however, the impacts would be less than those under the Proposed Action since the Non-PAG WRDF would be removed and transported to the open pit. Even with these activities, the open pit highwall would remain visible from the trail. In addition, there is no mitigation that could reduce the impact to less than significant. In addition, under the RFFA of the sale of a major portion of the Project Area, access through that portion of the Project Area could be eliminated.

#### **4.6.19 Cultural Resources**

The identified projects within the CESA, including the Partial Backfill Alternative have a direct physical impact on the cultural resources and an indirect impact on the visual setting for specific cultural resources that are potentially significant. Within the cumulative effects viewshed APE, a total of 436 eligible and unevaluated historic (361) and multi-component (75) sites with a historic component would be visually impacted. This number includes 152 officially eligible historic sites and 39 officially eligible multi-component sites with a historic elements within the Project APE (Table 3.21-1). Impacts to those sites would be mitigated through the implementation of a treatment plan. Outside of the Project APE and within the viewshed APE, an additional 245 eligible or unevaluated historic and historic component sites may be adversely impacted. All adverse effects under the NHPA and direct and indirect impacts under NEPA to known-eligible properties identified within the Project APE would be mitigated in accordance with the PA and the treatment plan prepared for the Project. Any previously unknown-eligible properties that may be discovered during construction activities would be mitigated in accordance with the PA. Therefore, no additional mitigation or monitoring is proposed. No

residual adverse effects are anticipated, as all known-eligible sites would be mitigated in accordance with the PA and the treatment plan prepared for the Project. Any previously unknown-eligible properties that may be discovered during construction activities would be mitigated in accordance with the PA.

#### **4.6.20 Native American Traditional Values**

The identified projects within the CESA, including the Partial Backfill Alternative have an impact on Native American Traditional Values, which include pine nut gathering and water resources. Although this alternative would not result in the removal of any piñon-only woodlands, the Partial Backfill Alternative's removal of piñon trees and limiting of access to other piñon trees in piñon-juniper woodlands within the fenced Project Area, relative to all other impacts to piñon trees, is not readily quantifiable; however, it is likely less than one percent of all the piñon trees within piñon-only and piñon-juniper woodlands in the CESA. In addition, the cumulative effect to piñon trees, relative to the total number of piñon trees within the Native American Traditional Values CESA is small (Figure 4.3.3) The Proposed Action's potential effect to water resources from ground water pumping, as shown on Figure 4.4.2, which is representative of the ground water pumping effects of the Partial Backfill Alternative, is isolated from the ground water pumping associated with the other mining operations within the Native American Traditional Values CESA. Figure 4.4.2 also shows the location of projects within the CESA where the removal or retrieval of prehistoric artifacts have occurred or may have occurred. Figure 4.4.2 does not show any potential effects from ground water pumping associated with agricultural operations. The Partial Backfill Alternative's potential effects to water resources is incrementally a small percent of the total potential effect to water resources from ground water pumping operations.

#### **4.6.21 Wildlife and Fisheries Resources**

Total past actions, present actions, and RFFAs would result in up to approximately **954,808** acres of habitat disturbance in the CESA; however, approximately **44,094** acres of habitat disturbance is, or would be, associated with habitat stabilization, rehabilitation, and rangeland improvements that would result in positive impacts to wildlife and fisheries resources in the CESA. Significant cumulative impacts to the wildlife and fisheries habitat in the CESA would not be anticipated because the vast majority of land would be reclaimed. Even though none of the perennial drainages, including those that support sport fisheries, would appear to be affected hydrologically, there is a potential to affect stream flow through ground water pumping from the Partial Backfill Alternative and thus affect the fisheries. Due to the widely dispersed nature of the existing and reasonably foreseeable individual mining projects within the CESA, cumulative noise and traffic impacts would not cause a substantial disturbance to wildlife populations or critically reduce use of their habitat.

Mitigation for impacts to wildlife resources is presently in Chapter 3 of this EIS and includes measures to protect greater sage-grouse, LCT, and migratory birds. Impacts to other wildlife and fisheries resources are below the level of significance.

#### **4.6.22 Transportation and Access**

The current access of the public lands within the Project Area are similar to those within the CESA and common to the region. The current transportation uses in the vicinity of the Project Area are similar to those with the CESA and common to the region. The cumulative and incremental effect of the permanent loss of public lands managed for multiple uses (207-acre area of the non-backfilled highwall) within the CESA would be below the level of significance; however, under the RFFA, of the sale of a major portion of the Project Area, access through that portion of the Project Area would be substantially changed.

#### **4.6.23 Forest Products**

Total past actions, present actions, and RFFAs would result in up to approximately **15,913** acres of surface disturbance that would affect forest products. The past actions are generally not subject to any reclamation activities. The present actions and RFFAs associated with mineral, geothermal, and oil and gas operations are subject to reclamation requirements, which would minimize any impacts; however, all other present actions and RFFAs would not be subject to reclamation requirements. The CESA for forest products covers approximately 515,000 acres. Therefore, all actions within the CESA would affect approximately **three** percent of the vegetation within the CESA. The Proposed Action would disturb approximately three percent of the CESA. The amount of area that would not be reclaimed (207 acres) associated with the unbackfilled portion of the open pit for the Partial Backfill Alternative represents less than two percent of the total surface disturbance resulting from past, present, and RFFAs. The vegetation communities within the CESA are similar to those within the Project Area and common in the region. The cumulative and incremental effect of vegetation removal or modification would be below the level of significance.

### **4.7 Off-Site Transfer of Ore Concentrate for Processing Alternative Impact Analysis**

The resources which may be cumulatively impacted by the Off-Site Transfer of Ore Concentrate for Processing Alternative when combined with the past actions, present actions, and RFFAs include air quality, soils, water resources, vegetation, wildlife and fisheries, special status species, wetlands and riparian zones, livestock grazing and production, land use, transportation and access, visual, socioeconomics, geology and minerals, noxious weeds and invasive nonnative species, recreation and wilderness, historic trails, cultural resources, Native American traditional concerns, hazardous materials, forestry products, and wild horses. The cumulative impacts under the Off-Site Transfer of Ore Concentrate for Processing Alternative would be similar to the Proposed Action, due to similarity in size and scope of the operations under the alternative. The Off-Site Transfer of Ore Concentrate for Processing Alternative would have a lesser incremental increase in cumulative impacts to some other resources (socioeconomics and air resources) compared to the Proposed Action due to the processing of the concentrate outside of the air resources CESA and the reduced number of employees and economic activity.

#### **4.7.1 Water Resources - Water Quantity**

Cumulative impacts to water resources within the study area are considered from surface water, ground water, and water quantity perspectives. Assessment of cumulative impacts from present actions and RFFAs that are developed would be incorporated into the periodic ground water flow

model and pit lake chemistry model updates as specific activities and associated water resource impacts evolve and are quantified by data collection under the Integrated Monitoring Plan, as outlined in Section 2.1.16 of this EIS.

#### 4.7.1.1 Surface Water Quantity

Cumulative activities indirectly affecting the surface water resources through the pumping of ground water was evaluated with ground water modeling of the cumulative actions that were modeled beyond 2200 (Montgomery et al. 2010). Figure 4.4.1 depicts the ten-foot drawdown contour for the cumulative actions scenario, at year 2055, using the Proposed Action. Based on the analysis of the Off-Site Transfer of Ore Concentrate for Processing Alternation in Section 3.2 of this EIS, the cumulative actions scenario using the Off-Site Transfer of Ore Concentrate for Processing Alternative would be similar to, and no greater than the analysis using the Proposed Action. This analysis identifies a number of springs and streams on the western flank of the Diamond Mountains, the northern end of Diamond Valley, in the Roberts Mountains and in Kobeh Valley that are within the ten-foot drawdown contour and thus their flows would be potentially diminished.

The cumulative impacts to surface water resources from the Off-Site Transfer of Ore Concentrate for Processing Alternative and RFFAs for ground water development would be significant. The Off-Site Transfer of Ore Concentrate for Processing Alternative portion of the cumulative impacts is also considered significant and specific mitigation measures for the Off-Site Transfer of Ore Concentrate for Processing Alternative effect are identified in Section 3.2.5.3. The cumulative actions, exclusive of the Off-Site Transfer of Ore Concentrate for Processing Alternative, particularly the agricultural actions in Diamond Valley also have a significant effect on the surface water resources in Diamond Valley. No mitigation measures are proposed for these effects because the BLM does not have any regulatory authority over those actions.

#### 4.7.1.2 Ground Water Quantity

Ground water modeling of the cumulative activities affecting the ground water resources was conducted through year 2055 (Montgomery et al. 2010). Figure 4.4.1 depicts the ten-foot drawdown contour for the cumulative actions scenario. This analysis identifies a number of wells in Diamond Valley and Kobeh Valley that are within the ten-foot drawdown contour and thus their flows would be potentially diminished.

The cumulative impacts to ground water resources from the Off-Site Transfer of Ore Concentrate for Processing Alternative and RFFAs for ground water development would be significant. The Off-Site Transfer of Ore Concentrate for Processing Alternative portion of the cumulative impacts is also considered significant and specific mitigation measures for the Off-Site Transfer of Ore Concentrate for Processing Alternative effect are identified in Section 3.2.6.3. The cumulative actions, exclusive of the Off-Site Transfer of Ore Concentrate for Processing Alternative, particularly the agricultural actions in Diamond Valley also have a significant effect on the ground water resources in Diamond Valley. No mitigation measures are proposed for these effects because the BLM does not have any regulatory authority over those actions.

## 4.7.2 Water Resources - Water Quality

Cumulative impacts to water resources within the study area are considered from surface water, ground water, and water quality perspectives. Assessment of cumulative impacts from present actions and RFFAs that are developed would be incorporated into the periodic ground water flow model and ground water chemistry model updates as specific activities and associated water resource impacts evolve and are quantified by data collection under the Integrated Monitoring Plan.

### 4.7.2.1 Surface Water Quality

The past, present, and RFFAs would potentially directly affect surface water resources through increased erosion and sedimentation. The mining-related cumulative actions would be required to implement erosion control measures that would limit their contribution to the cumulative impacts. Grazing has its own set of requirements that minimize effects to surface water quality. Dispersed recreation actions would not have the same requirements and thus would have a proportionally greater affect on surface water resources by removing vegetation and decreasing bank stability near streams and springs.

### 4.7.2.2 Ground Water Quality

Any potential cumulative impacts to ground water quality from the Off-Site Transfer of Ore Concentrate for Processing Alternative, along with the past and present actions and the RFFAs for ground water would not be significant, based on the criteria in Section 3.2. The only two actions that have a quantitative assessment of potential ground water quality impacts are the Off-Site Transfer of Ore Concentrate for Processing Alternative and the Ruby Hill Mine.

## 4.7.3 Geology and Mineral Resources

Mining disturbance has included open pit and underground operations with WRDFs, heap leach ore processing, ore milling and processing, tailings disposal, and exploration (drilling, trenching, sampling, and road construction). Past surface disturbance is 200 acres, present disturbance is **4,917** acres, **with** approximately 1,727 acres of disturbance anticipated under the RFFAs. This totals **6,644** acres of disturbance within the 1,809,522-acre CESA.

Mining is a major activity in the area, and it is likely that exploration activities and mining would continue. Additional impacts would result from the creation in the foreseeable future of additional open pit mining operations with WRDFs and processing facilities. The direct impacts affecting geology and mineral resources of the Off-Site Transfer of Ore Concentrate for Processing Alternative due to the open pit mining would be the permanent removal of the identified mineral resources. The cumulative impacts to geology and mineral resources from the Off-Site Transfer of Ore Concentrate for Processing Alternative and RFFAs for mineral development would be significant. No mitigation is proposed.

## 4.7.4 Air Resources

Each of the identified individual projects within the CESA, including existing and proposed mining operations, emit air pollutants. With the possible exception of motor vehicle emissions,