with native vegetation and treatments to stimulate growth of the understory. Treatments that reduce the risk of wildfire, including hazardous fuels treatments, control of noxious weeds and invasive non-native vegetation, and create fire and fuel breaks would reduce the risk of erosion resulting from wildfire and its effects on water quality. Thus, none of the alternatives would result in a significant long-term (greater than 5 years) accelerated erosion from watershed slopes or increased sedimentation in streams or ponds.

None of the treatments proposed under the alternatives should lead to significant uncontrolled stream channel and bank instabilities. However, stream channel improvements are not proposed under Alternative D, and only about 8 miles of degraded streams would be treated under Alternative C. Thus, it is likely that the number of miles of streams with stream and bank channel instability within the 3 Bars Project Area and CESA would continue to increase under Alternative D, while there would be little improvement in stream and bank channel stability under Alternative C, long term.

As discussed in the Mount Hope Project EIS, mining, agriculture, and other activities in the CESA are predicted to have a significant impacts to surface and groundwater quantity, including 2 perennial stream segments and 22 springs (USDOI BLM 2012b:4-48 to 4-50); these impacts could last 100 years or more. To reduce these impacts, the BLM identified several mitigation measures, including installation of new wells or deepening of existing wells, development of existing water sources, including springs, and fencing to protect water sources (USDOI BLM 2012b:19-22). Short-term, 3 Bars Project restoration treatments also could contribute to localized, minor declines in groundwater levels, especially in large-scale fire treatment areas. However, these declines would likely not exceed seasonal fluctuations in water levels. Long term, 3 Bars Project treatments should result in improved surface water flows and groundwater recharge. Thus, the effects of 3 Bars Project treatments would not, by themselves, result in a significant cumulative effect to water resources.

3.9.4 Mitigation

Water resources would benefit from mitigation measures identified in Section 3.17.4 (Livestock Grazing Mitigation). No mitigation or monitoring measures are recommended specifically for water resources.

3.10 Wetlands, Floodplains, and Riparian Zones

3.10.1 Regulatory Framework

This section discusses the laws and regulations that apply to wetlands, floodplains, and riparian zones potentially affected by the 3 Bars Project. These resources are considered valuable natural resources that provide habitat for a variety of dependent plant and wildlife species.

3.10.1.1 Definition of Wetlands

Wetlands are defined by the U.S. Army Corps of Engineers (USACE) and USEPA in 33 CFR § 328.3 and 40 CFR § 230.3 as those areas that are inundated or saturated by surface or ground water at a frequency and duration sufficient to support, and under normal conditions do support, a prevalence of vegetation typically adapted for life in saturated soil conditions. Wetlands generally include swamps, marshes, bogs, wet meadows, and similar areas.

The USACE's *Wetland Delineation Manual* defines a three parameter approach to delineating jurisdictional wetlands. In order for an area to be considered a jurisdictional wetland it must support each of the three wetland parameters: hydric soils, wetland vegetation, and wetland hydrology (USACE 1987).

Hydric soils are defined as "soils that are saturated, flooded, or ponded long enough during the growing season to develop anaerobic conditions that favor the growth and regeneration of hydrophytic vegetation." Wetland (hydrophytic) vegetation is defined as any macrophyte that grows in water or on a substrate that is at least periodically deficient in oxygen as a result of excessive water. The *Wetland Delineation Manual* requires that, in most cases, more than 50 percent of the dominant vegetation include species that meet the wetland plant technical criteria. Wetland hydrology, although the driving force for wetland formation, is the most obscure attribute to define. Wetland hydrology encompasses all hydrologic characteristics of areas that are periodically inundated or have soil saturated to the surface at some time during the growing season (USACE 1987).

3.10.1.2 Definition of a Riparian Zone

BLM Manual 1737, *Riparian-Wetland Area Management*, defines a riparian zone as a form of wetland transition between permanently saturated wetlands and upland areas (USDOI BLM 1992a). These areas exhibit vegetation or physical characteristics reflective of permanent surface or subsurface water influence. Lands along, adjacent to, or contiguous with perennially and intermittently flowing rivers and streams, glacial potholes, and the shores of lakes and reservoirs with stable water levels are typical riparian zones. Excluded are such sites as ephemeral streams or washes that do not exhibit the presence of vegetation dependent upon free water in the soil.

3.10.1.3 Definition of a Floodplain

The geomorphic floodplain is that area starting at or just above the bankfull elevation of the stream channel, where frequent flood events spill out of the channel. The floodplain is inundated relatively frequently, such as once every 1 to 3 years. The floodplain is normally a relatively flat topographic feature adjacent to the stream channel that allows floodwaters to spread out and thus dissipate energy. When flood energy is dissipated, floodwater velocity is reduced and sediments begin to settle out. All of this happens best when the active riparian floodplain is properly vegetated with riparian grasses, sedges, shrubs, and trees. The root masses of these plants anchor them into the floodplain and hold the sediments in place. The above ground parts of these riparian plants help to physically disrupt and retard the energy of floodwater and to trap and stabilize sediments.

3.10.1.4 Sections 401 and 404 of the Clean Water Act

The USACE regulates the discharge of dredged or fill material into waters of the U.S. under Section 404 of the Clean Water Act. Section 404 prohibits the discharge of dredged or fill material into waters of the United States, (including wetlands) without a permit from the USACE. The regulations and policies of the USACE mandate that the filling of wetlands be avoided unless it can be demonstrated that no practicable alternatives (to filling wetlands) exist.

Section 401 of the Clean Water Act requires that an applicant applying for a USACE permit for the discharge of dredge or fill material must also obtain a water-quality certificate from the appropriate state agency that states that their activity is consistent with the state's water quality standards and criteria. The conditions in the certificate are incorporated into the USACE permit. Section 401 certifications are issued by the Nevada Division of Environmental Protection.

3.10.1.5 Executive Orders

Two Executive Orders apply to wetlands and floodplains:

- Executive Order 11990, *Protection of Wetlands* – agencies are to minimize destruction, loss, or degradation of wetlands, and enhance and preserve the natural and beneficial values of wetlands; and
- Executive Order 11988, *Floodplain Management* – addresses activities in floodplains and management of multiple resources comprising floodplain values.

3.10.2 Affected Environment

3.10.2.1 Study Methods and Analysis Area

Study methods employed in the preparation of this section include review of baseline information, a reconnaissance-level site visit, project-specific vegetation mapping, and agency coordination. Several sources were reviewed in the preparation of this section, including USGS topographic and USFWS National Wetland Inventory maps; aerial photographs; documents prepared for nearby projects, including the Falcon to Gonder EIS (EDAW 2001, 2002), AECC (USDOI BLM 2009a), and Mount Hope Project EIS and references cited therein (USDOI BLM 2012c); discussions with BLM resource specialists; Geographic Information System shapefiles provided by BLM resource specialists for spring inventories and riparian monitoring; site-specific studies conducted on the 3 Bars Project area; and site visits.

The analysis area for direct and indirect effects to wetlands, floodplains, and riparian zones lies within the 3 Bars Project area. The analysis area for cumulative impacts to wetlands, floodplains, and riparian zones includes the Hydrologic Unit Code 10 watersheds wholly, or partially within, the project area (**Figure 3-1)**. This area includes parts of the drainages and groundwater basins as defined by the Nevada Department of Water Resources and identified in **Figure 3-23**.

3.10.2.2 Wetlands

No formal delineation of wetlands has been done for the project area. Based on the USFWS National Wetlands Inventory, approximately 2,363 acres of wetlands are found on the project area (USFWS 2012). Wetlands in the 3 Bars Project area include saline flats or playas, and wetlands associated with surface water features, including stream channels and reservoirs Wet meadows on the project area are dominated by hydrophytes such as Nebraska sedge, spikerush, alkali bluegrass, foxtail barley, clustered field sedge, and Baltic rush.

3.10.2.3 Riparian Zones

Approximately 96 miles of perennial stream are on the project area. These include Denay Creek, Henderson Creek, McClusky Creek, Roberts Creek, and Vinini Creek (**Figure 3-23**). There are also 2,327 miles of intermittent/ephemeral streams. The USGS does not distinguish between intermittent and ephemeral streams within the project area. The majority of streams classified as intermittent on the 3 Bars Project area do not have seasonal water, but only have water occasionally and would be classified as ephemeral. These streams may have associated riparian habitat. Riparian zones in the project area have vegetation dominated by wild rose, narrow-leaf willow,

narrow-leaf cottonwood, red-osier dogwood, and water birch. Aspen characterizes some of the mountainous riparian zones.

3.10.2.4 Floodplains

Federal Emergency Management Agency (FEMA)-designated Zone A flood hazard areas, which would be flooded during a 100-year, 24-hour runoff event, have been delineated in low-lying areas in the northern, eastern, and southern parts of the project area. Based on historical maps, the major Zone A delineations occur along Pine Creek, Henderson Creek, and lower Pete Hanson Creek in the northern part of the project area. All of the lower-elevation areas along Slough Creek, Coils Creek, and lower Roberts Creek are within floodplains (FEMA 2012). These zones range from approximately one-eighth to one-quarter mile wide along the individual streams, and coalesce to form broad flood zones up to 2 or 3 miles wide along the valley floors. No FEMA flood hazard Zone A delineations occur in the central or western part of the project area.

3.10.2.5 Proper Functioning Condition Surveys

Proper Functioning Condition surveys have been conducted by the BLM for wetlands and riparian zones on the project area. A wetland area or riparian zone is considered to be in Proper Functioning Condition when adequate vegetation, landform, or large woody debris ARE present to:

- dissipate stream energy associated with high water flows, thereby reducing erosion and improving water quality;
- filter sediment, capture bedload, and aid floodplain development;
- improve floodwater retention and groundwater recharge;
- develop root masses that help to stabilize streambanks against cutting action;
- develop diverse ponding and channel characteristics to provide the habitat and the water depth, duration, and temperature necessary for fish production, waterfowl breeding, and other uses; and
- support greater biodiversity.

If a wetland or riparian zone is not in Proper Functioning Condition, it is placed into one of three other categories (BLM 1998a):

- **Functional-at-risk** – Riparian or wetland areas are in functional condition, but an existing soil, water, or vegetation attribute makes them susceptible to degradation.
- **Nonfunctional** – Riparian or wetland areas clearly are not providing adequate vegetation, landform, or large woody debris to dissipate stream energy associated with high flows, and thus are not reducing erosion, improving water quality, or meeting other goals mentioned above.
- **Unknown** – Riparian or wetland areas where managers lack sufficient information to make any form of determination.

Functional-at risk areas may be placed into other sub-categories, depending on whether an upward trend toward attaining, or a downward trend away from, Proper Functioning Condition can be determined.

Proper Functioning Condition ratings for the 3 Bars ecosystem for those streams and wetlands that have been rated are:

- Proper Functioning Condition - 47 miles of stream and 58 acres of wetlands.
- Functioning-at-risk with upward trend - 35 miles and 13 acres.
- Functioning-at-risk with trend not apparent - 34 miles and 29 acres.
- Functioning-at-risk with downward trend - 37 miles and 61 acres.
- Non functioning - 26 miles and 6 acres.

Factors contributing to degraded conditions include headcuts and knickpoints within deeply incised channels that are lowering the water table and drying out nearby wet meadows and riparian areas; altered runoff and infiltration regimes; bank shearing and terracing; channel erosion; poor sinuosity, width/depth ratio, and gradient along the stream reach; roads impacting stream flow; degradation by livestock and wild horses; frost heaving; lack of stream-floodplain connections; insufficient type or amount of vegetation to protect streambanks and slow discharge velocity; and noxious weeds and other invasive non-native vegetation (USDOI BLM 2009a, b).

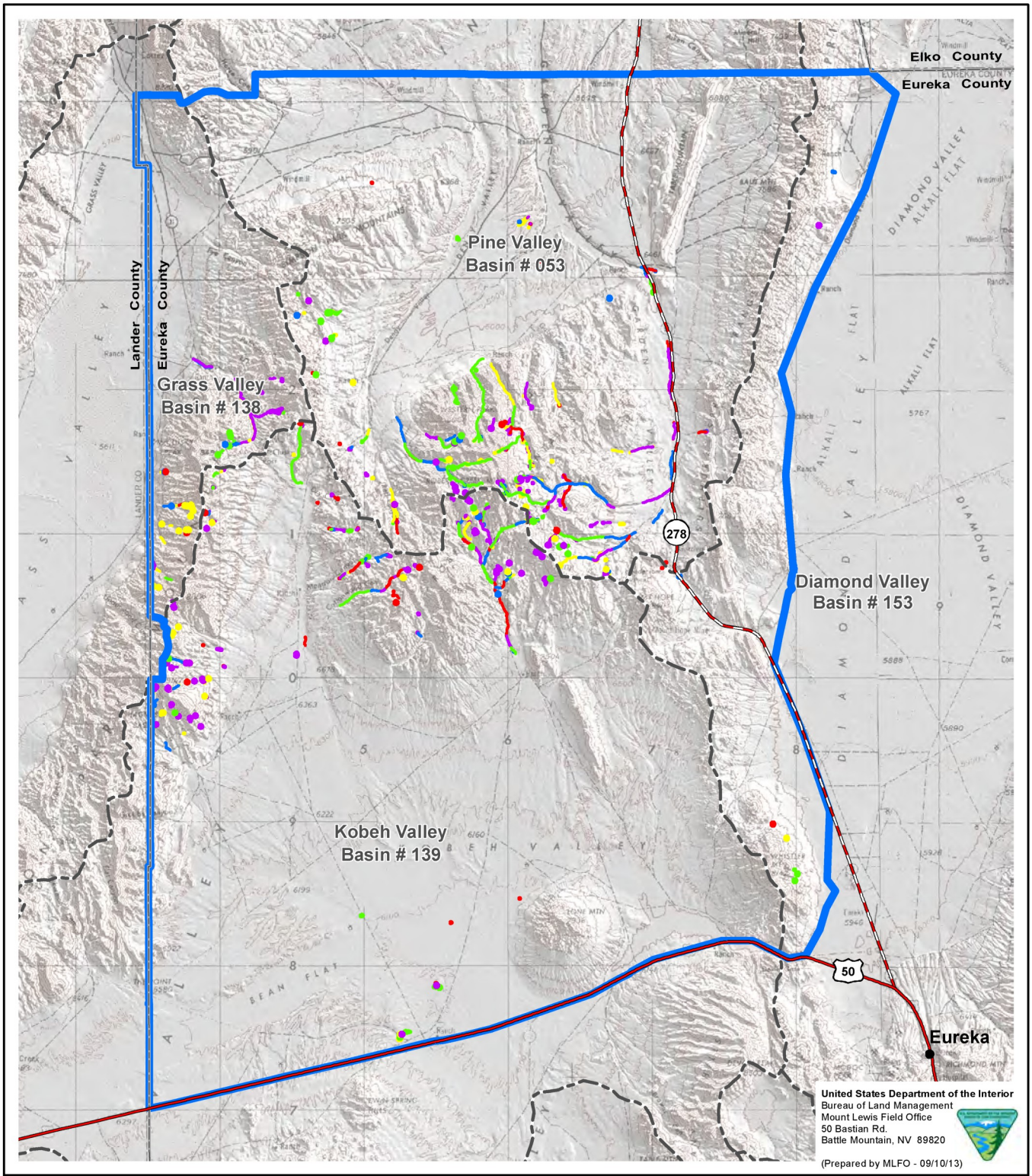
A number of riparian or wetland areas on the Roberts Mountains are not at Proper Functioning Condition or are functional-at-risk conditions with actively upward trends (**Figure 3-25**). Similar areas are more widely scattered in the Simpson Park Mountains. Pinyon-juniper expansion and/or encroachment are occurring in the Pete Hanson Creek and Birch Creek areas on the northern Roberts Mountains. Parts of Indian Creek and Indian Springs, a complex of sites in the northwestern part of the project area, and several sites in the Vinini and Henderson Creek drainages, are the major areas at Proper Functioning Condition. Other streams and springs are generally in a Functioning-at-risk condition; many have no observable trend, or are in a downward trend.

3.10.3 Environmental Consequences

3.10.3.1 Key Issues of Concern Considered during Evaluation of the Environmental Consequences

Key issues of concern that pertain to wetlands, floodplains, and riparian zones were identified in the AECC and during scoping. These issues include:

- Concerns about the impacts of the various treatments on wetlands and riparian zones.
- Impacts of livestock on wetlands and riparian zones.
- The potential that desertification is making riparian zones less resilient.
- Questions about hot season use of riparian and wetland areas for grazing.
- Recommendations that the BLM remove wild horses, cut trees, and construct enclosures in meadow areas.
- Streams, springs, and meadows are functioning at less than the Proper Functioning Condition.



Legend

Proper Functioning Condition Rating

- Proper Functioning Condition
- Functioning-at-risk with Upward Trend
- Functioning-at-risk with Trend Not Apparent
- Functioning-at-risk with Downward Trend
- Non-functioning
- 3 Bars Project Area

Source: NDWR 2012, BLM 2013h.

3 Bars Ecosystem and Landscape Restoration Project

Figure 3-25

Proper Functioning Condition Rating

0 1 2 3 4 5 10 Miles

0 1 2 3 4 5 10 Kilometers

N

No warranty is made by the Bureau of Land Management as to the accuracy, reliability, or completeness of these data for individual 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 notice.

3.10.3.2 Significance Criteria

- Impacts to wetlands, floodplains, and riparian zones would be considered significant if BLM actions resulted in one or more of the following:The destruction, loss, or long-term (greater than 10 years) degradation of wetlands, floodplains, or riparian zones.
- A long-term reduction in the flood-attenuation functions of floodplains.
- A long-term reduction in the functions of wetlands or riparian zones, a long-term reduction of the acreage of riparian and wetland areas in Proper Functioning Condition, or a downgrade of Functioning-at-risk riparian or wetland areas to a downward trend or to nonfunctional.

3.10.3.3 Direct and Indirect Effects

3.10.3.3.1 Direct and Indirect Effects Common to All Action Alternatives

Restoration treatments would focus on stabilizing streambanks and channels, reducing erosion, improving water flows, restoring native fire resilient vegetation, reconnecting streams with their floodplains, and restoring natural channel dimension, pattern, and profile. Wetland, floodplain, and riparian zone treatments have effects in common with Soil Resources (Section 3.8), Water Resources (Section 3.9), Native and Non-invasive Vegetation Resources (Section 3.11), Fish and other Aquatic Organisms Resources (Section 3.14), and Wildlife Resources (Section 3.15). Thus, adverse and beneficial effects associated with those resources, primarily those for Riparian Treatments and Aspen Treatments, would also apply to wetland, floodplain, and riparian zone resources and the reader is encouraged to also review those sections.

Adverse Effects

Various treatments under the alternatives have the potential to adversely affect nearby wetlands, floodplains, and riparian zones. Adverse effects associated with vegetation removal in wetlands and riparian zones were discussed in the 17-States PER (USDOI BLM 2007c:4-28 to 4-29). Removal of vegetation and soil disturbance associated with treatments could lead to increased soil erosion and surface water runoff, which could lead to channel alterations and sedimentation in wetlands and riparian zones. Removal of vegetation could also decrease the amount of rainfall captured by plants, detritus, and soil, potentially leading to increased stormwater flows and runoff velocity in streams and indirectly affecting wetlands and riparian zones. Increased light and disturbance tend to favor early successional species, including noxious weeds and other invasive non-native vegetation. By leaving slash and other downed woody debris from treatments on the ground as mulch, runoff and erosion would be slowed and more water would infiltrate into the ground.

One important function of wetlands and floodplains is to dissipate the energies associated with flood events, thereby reducing erosion, capturing nutrient rich sediment, and improving water quality. Increased stormwater runoff can scour wetlands and floodplains and modify their morphology. Removal of vegetation may decrease resistance to overland flow. It would also decrease canopy interception of precipitation and evapotranspiration, which would increase the amount of free water. As a result, both increased runoff and increased infiltration would likely result. Siltation could reduce water quality and the amount of oxygen available to aquatic organisms. Siltation could also reduce the acreage of wetland and riparian habitat. Impacts associated with loss of vegetation would be short-term, as vegetation would soon return to treated areas. The BLM would reseed or replant wetland and riparian zones where the

native plant community is unlikely to recover and occupy the site, and restrict livestock, wild horse, and wild ungulate access to treatment areas until establishment goals have been reached.

Beneficial Effects

Vegetation treatments would be used, to varying degrees, to help restore targeted wetlands and riparian zones to Proper Functioning Condition and to increase stream flows. Treatments would include stream bioengineering, structures such as deflectors and weirs, road and culvert modifications, removal of pinyon-juniper from aspen stands and historical riparian zones, hand planting of native species, and use of temporary and permanent fencing to restrict livestock, wild horse, and wild ungulate access to treatment areas. These treatments, which would be designed specifically to improve the functions of targeted wetland and riparian zones, would be expected to have a beneficial effect on these areas. Excluding livestock, wild horses, and wild ungulates from treatment areas using fencing would reduce soil disturbance in treatment areas and allow native vegetation to recover.

Removal of pinyon-juniper may improve water flows in streams and water yields at spring sources and in near-surface aquifers. Hand planting native species would benefit wetland and riparian zones by providing additional vegetation that would help prevent erosion, protect streambanks, and provide habitat for wildlife.

3.10.3.3.2 Direct and Indirect Effects under Alternative A (Preferred Alternative)

Riparian Treatments

Approximately 63 miles of streams have been identified as Functioning-at-risk with no trend or a downward trend, or Nonfunctional. Riparian zone treatments would focus on restoring stream and habitat functionality in those streams where both the morphology and structural integrity of the stream channel, plant species composition, soil structure, or other conditions within the riparian zone have been compromised by past actions. The BLM proposes to restore streams by removing, or reducing the effects of, causative factors that have led to stream degradation, and implementing bioengineering, streambank stabilization, and other methods that utilize structures which manipulate stream power to meander degraded and incised water courses in ways that restore stream functionality.

Adverse Effects

Manual treatments proposed for riparian zones would generate a relatively small amount of ground disturbance. Treatments include placement of rocks, gravel, logs, and other bioengineered structures in streams to manipulate water flow, and plantings along the streambank. Some associated erosion and sedimentation into aquatic habitats would occur over the short-term, as degraded channels are induced to evolve back towards a stable dimension, pattern, and profile. Additionally, if noxious weeds and other invasive non-native vegetation are present on treatment sites, or brought to the site by workers or their equipment, they could increase as a result of disturbance.

Many of the mechanical treatments would occur within stream channels, where heavy equipment would be used to improve the structural integrity of the stream channel. The potential impacts of mechanical treatments on wetlands and riparian zones are discussed in the 17-States PER (USDOI BLM 2007c:4-29 to 4-30). Adverse effects would likely be associated with soil disturbance, vegetation removal, and any potential release of petroleum products from vehicles into aquatic systems. Use of heavy equipment in and near wetlands and riparian zones is likely to cause ground disturbance that could lead to a temporary increase in erosion. The use of heavy equipment can also result in soil compaction, particularly in areas of moist soils, which can increase surface runoff from the treated areas, reduce soil porosity, and limit water infiltration. Spills resulting from fueling, equipment maintenance, and operation could

adversely affect water quality and the health of wetland or riparian zones. These effects would be minimized through the use of SOPs, including maintaining a 300-feet buffer between the fueling area and water bodies (**Appendix C**).

Within the Frazier Creek Unit and Henderson Unit project groups, all pinyon-juniper within 200 feet of riparian zones or within historic floodplains would be removed, except on south or west facing slopes lacking shrubs or herbaceous vegetation. This could cause short-term soil disturbance and erosion and increase surface water flows until ground cover re-established. Use of mulch and other erosion controls on treatment sites would reduce these effects.

Prescribed fire could be used in riparian zones as one method of removing encroaching pinyon-juniper. Prescribed fire could be used in all treatment groups except the Black Spring and Denay Pond groups. Fire treatments would be limited to the larger riparian management units. It is expected that prescribed fire would kill other vegetation in addition to the target pinyon-juniper trees, including shrubs and deciduous trees, and could lead to an increase in fire-adapted weeds. Therefore, prescribed fire could potentially result in a short-term reduction in native vegetation within wetland and riparian areas. Prescribed fire could temporarily increase soil and water temperatures, and ash and debris from fires could enter these habitats. Fires could also consume or degrade peat soil, change the vegetation composition and structure of an area, and increase erosion and turbidity in wetlands and riparian zones. In general, however, prescribed fires would have fewer impacts than wildfires as they are of low severity and can be controlled to occur in one particular area (USDOI BLM 2007c 4-31 to 4-32). In addition, prescribed fires can reduce the occurrence and severity of wildfires.

Many riparian treatment areas are within, or in close proximity to, aspen, pinyon-juniper, or sagebrush treatment areas as discussed below. Treatments in upland areas, especially those on hillslopes and involving the thinning or removal of pinyon-juniper, have the potential to adversely affect downslope riparian habitat. For example, removal of pinyon-juniper or other vegetation on nearby upland habitat could cause a short-term increase in surface water flows and soil erosion, leading to increased flows and sedimentation in streams. This could occur if a large precipitation event occurs before mulch is applied, and could generate erosion and sedimentation that could affect wetland, floodplain, and riparian habitats. By using slash and other woody debris from treatments as mulch, or having a vegetated buffer between upland treatment areas and water bodies, these effects to streams and other water bodies from upland treatments should be greatly reduced.

Beneficial Effects

It is expected that all of the proposed treatments in wetlands, floodplains, and riparian zones would have long-term beneficial effects on wetland and riparian habitats by restoring the natural processes that lead to Proper Functioning Conditions.

Efforts to restore optimal channel dimension, pattern, and profile would help to improve surface water quality, attenuate peak runoff, capture sediment, increase groundwater recharge and base flow, expand riparian acreage, and support healthy, soil stabilizing, riparian vegetation. By restoring streams to stable channel types, reducing runoff, and increasing infiltration, water should stay on the land longer to the benefit of deep-rooted riparian/wetland vegetation, resulting in expanded riparian zones and more stable streams. Stream incision, which can be caused by a loss of stream sinuosity associated with increased runoff and/or decreased soil stabilizing vegetation, has caused groundwater to drain to the lower stream level along many proposed treatment streams, causing nearby areas to dry out. By creating conditions that reduce channel incision, induce sinuosity and bank storage, and reduce surface runoff and increasing infiltration, deep-rooted herbaceous species that are being lost in many riparian zones should benefit.

The BLM would remove pinyon-juniper that is encroaching into riparian zones. Treatments to remove pinyon-juniper from riparian management units may increase water yield and groundwater recharge, to the benefit of wetland vegetation, fish and other aquatic species, and wildlife (Buckhouse 2008, deBoodt 2008). Pinyon and juniper are not riparian species, and are not as effective as native vegetation in stabilizing soil. If field investigations indicate that it would be beneficial to the system, logs and other woody debris would be placed into streams to slow water flows, induce meandering, and create wetland and riparian habitat. Pinyon-juniper that are cut down could also be removed from the site for firewood, fence posts, and other uses.

Many riparian treatment areas are within or in close proximity to upland treatment areas. Although treatments upslope from riparian zones could have short-term adverse effects on stream flows and water quality, long term, these treatments should be beneficial. Studies have shown that runoff from sites dominated by pinyon-juniper is up to 15 percent greater than from sites without pinyon-juniper and that removal of pinyon-juniper that is encroaching into riparian habitat can improve streamflow. Buckhouse (2008) and deBoodt (2008) found that in areas where all junipers were cut from a watershed, late season spring flow, days of recorded ground flow, and late season soil moisture increased compared to pretreatment conditions.

Surface water runoff may increase short term from removal of vegetation, especially encroaching pinyon-juniper in Phase II and III stands, because there is often minimal ground cover and shrub vegetation below pinyon-juniper trees, and less rainfall would be intercepted by foliage after tree removal (Lossing 2012). As ground cover and low shrubs re-establish on treatment sites, however, surface runoff and peak discharge should decrease, and infiltration should increase, to the benefit of riparian and wetland habitat downslope. As a result, flows may last longer into the summer months at some springs and in perennial or intermittent streams where dense, deep-rooted pinyon-juniper or other stands were treated. By reducing the magnitude of peak discharges, the chances of stream restoration treatments succeeding due to moderating water flows would greatly increase.

Because riparian treatment success in part depends upon successful completion of treatments upslope, the BLM would attempt to conduct treatments at similar times for treatment areas in close proximity to ensure that treatment impacts occur at about the same time, rather than over many years, and to ensure that treatments are integrated cohesively. For example, slash and other woody debris from pinyon-juniper treatments upslope from a riparian treatment area could be used as mulch to slow runoff on the pinyon-juniper treatment area, but also to provide logs and other woody debris for use in or near streams.

Prescribed fire and wildland fire for resource benefit would be used to slow pinyon-juniper encroachment, which would decrease runoff and evapotranspiration and increase infiltration and shallow subsurface recharge. This would help to increase base streamflows, expand riparian extents, and decrease the damaging effects of high peak discharges. Other beneficial effects include decreasing hazardous fuels, triggering germination of certain native plant species, stimulating growth of new vegetation, and creating wildlife habitat. Fire may also increase the levels of certain nutrients utilized by plants by raising soil pH and burning woody material. Finally, trees near streams that are removed by fire would become standing wood that would ultimately become large woody debris in stream channels, which could provide important habitat for fish (USDOI BLM 2007c:4-31). It is expected that appropriately planned prescribed fires would be low intensity and unlikely to carry in the damp soils and vegetation of wetlands. Over the long term, with the planned control of noxious weeds and other invasive non-native vegetation, replanting as needed, and better grazing management, it is expected that native species would return and potentially increase in abundance in wetlands and riparian zones.

Treatments that reduce hazardous fuels and create fire and fuel breaks would benefit wetlands and riparian zones by reducing the potential for catastrophic wildfires and resultant loss of high quality wetland and riparian habitat. Hazardous fuels reduction would also decrease the likelihood that wildfire suppression activities would be needed in or near aquatic habitats.

The BLM would use protective fencing, but not other treatments, to restore riparian habitats at Denay Pond, Lone Spring, and Treasure Well. The BLM would provide a water gap within the fencing to allow livestock to access a portion of these perennial water sources.

Aspen Treatments

Adverse Effects

The RM-A7, RM-A2, and RM-A5 aspen treatment units are partially or wholly within the larger Upper Henderson, Roberts Creek, and Upper Vinini Creek riparian units, respectively. Where projects overlap, riparian projects are typically limited to stream channel work, removal of nearby upland vegetation, plantings, and fencing, whereas aspen projects include pinyon-juniper removal, fencing, and disturbance to stimulate aspen suckering. In the areas of overlap, riparian zones and associated wetland areas may be subject to multiple project disturbances although the BLM would try to minimize multiple treatment disturbance by conducting treatments within the same general area at the about the same time.

Beneficial Effects

Aspen treatment projects would be expected to benefit riparian habitats by encouraging the growth of aspen communities. Aspen contributes to the stability of streams and provides shade and important wildlife habitat for a wide diversity of species (Shepperd and Mata 2005; see also Section 3.15). Therefore, riparian functions would be improved by aspen treatment projects.

Actions that stimulate or enhance aspen suckering and sucker survival should improve the health of aspen stands, and, longer term, reduce the amount of dead and decaying vegetation in these stands that could provide fuel for a wildfire. The BLM also proposes to remove pinyon-juniper trees near aspen stands to create or enhance fire and fuel breaks to control wildfire spread. Although prescribed fire could be used in aspen stands, fire would be used sparingly because it is often difficult to conduct prescribed fires in aspen due to the high fuel-moisture conditions in aspen stands (Tausch et al. 2009).

Protective fencing would benefit areas with aspen sprouts that are heavily grazed. This should benefit aspen, as past studies have shown that aspen stands that are protected from herbivory successfully regenerate and form multi-aged stands without fire or other disturbance. It is believed that ungulate herbivory is the main reason that aspen has declined in central Nevada and on the 3 Bars Project area (Kay 2001, 2002, 2003), although Jones (2010) found that livestock herbivory on aspen could be reduced by using early season grazing and providing mineral supplements in areas with aspens. The BLM typically protects treated stands until the stand density is 1,500 stems per acre and sapling reach at least 7 feet in height. Typically, objectives are met in 3 to 5 years as a result of exclusion.

Pinyon-juniper Management

Approximately 938 acres of riparian treatments and 53 acres of aspen treatments could occur within a larger pinyon-juniper treatment project boundary, and could be affected by treatment actions within the larger area. These include

about 535 acres (Roberts Creek Unit) associated with Upper Roberts Creek Unit, 235 acres (Roberts Creek Unit) associated with the Atlas Unit, and 118 acres (Frazier Creek, Upper Henderson, RM-A7, and RM-A9 units) associated with the Frazier and Vinini Corridor units. Pinyon-juniper treatments could also occur near riparian habitats that have not been targeted for improvements under riparian enhancement projects.

Adverse Effects

Widespread removal of pinyon-juniper stands could result in substantial ground disturbance, which, if a large precipitation event occurs before mulch is applied, could generate erosion and sedimentation that could affect wetland, floodplain, and riparian habitats. Where mulching and shredding is used as a mechanical treatment, the material left on the site would cover bare, exposed soil to help encourage infiltration, capture sediment, and reduce runoff.

Beneficial Effects

It is expected that over the long term, restoration of historic vegetation communities would benefit wetlands, floodplains, and riparian zones and lead to increased biodiversity in these areas. As discussed under Riparian Treatments, thinning and removal of pinyon-juniper and re-establishment of low-growing herbaceous and shrub cover, especially in Phase II and III stands, should substantially reduce surface runoff and increase water infiltration. This would help to reduce peak flows, and associated channel incision and streambank instability, and increase base flows, which would provide water to streams for longer periods of time and better water quality, to the benefit of riparian and aquatic vegetation.

Thinning pinyon-juniper to improve sagebrush habitat and creating fuel breaks would encourage riparian growth and reduce the risk of wildfire in riparian zones within the Atlas, Frazier, Upper Roberts Creek, and Vinini units. Additionally, pinyon-juniper treatments, including thinning, removal of dead and diseased vegetation, and creation of fire and fuel breaks would reduce the risk of catastrophic wildfire. Catastrophic wildfire could burn through large sections of riparian and wetland communities, killing vegetation and minimizing the functions of these areas, including water retention and streambank stability, which in turn could affect wetlands and riparian zones within the burn area.

Sagebrush Treatments

Approximately 522 acres of riparian treatments could occur within the larger sagebrush treatment project boundaries, and could be affected by treatment actions within the larger area. These include approximately 363 acres associated with the Lower Henderson 1 and 3 units and 134 acres associated with the Lower Vinini Creek Unit, which are within the Table Mountain Unit.

Sagebrush treatments could also occur near riparian habitats that have not been targeted for improvements under riparian enhancement projects. Only a few areas of perennial streams and seeps/springs are found within proposed sagebrush treatment areas. The Rocky Hills project area includes two springs that are targeted for treatment under riparian enhancement projects. The West Simpson Park project area includes seven seeps/springs and a small stretch of perennial stream. The Three Corners project area includes seven seeps/springs. The Table Mountain project area includes two large stretches of Henderson Creek, which are also targeted for treatment under riparian enhancement projects. The Roberts Mountain Pasture Unit includes one spring that is targeted for treatment under the Mud Spring riparian enhancement project. No perennial streams (indicating riparian zones) or springs/seeps have been mapped in any of the remaining proposed sagebrush project areas. Therefore, sagebrush treatments in the Alpha, Coils Creek,

Kobeh East, Nichols, South Simpson, and Whistler Sage units should not impact wetlands and riparian zones, although it is possible that unmapped wetlands, seeps, or springs occur in these areas.

Adverse Effects

In the sagebrush treatment areas that include riparian zones and wetlands, adverse effects from the various treatment methods could potentially occur. Prescribed fire would be used on only a limited number of acres to treat sagebrush in the Three Corners Unit, but prescribed fire could be used on hundreds of acres annually to control non-native vegetation, including cheatgrass, on the Rocky Hills, Table Mountain, West Simpson Park, and Whistler Sage units. Prescribed fire over large acreages could result in loss of organic material on a site, exposing mineral soil, and sometimes forming hydrophobic soil layers that would slow water infiltration. About half of the acreage on the Rocky Hills and West Simpson Park units is moderately to highly susceptible to fire damage, however, the likelihood of a prescribed fire removing substantial amounts of organic material and causing formation of a hydrophobic layer is low in areas dominated by cheatgrass because of the limited amount of vegetation on the site.

Use of grazing could adversely affect riparian zones and wetlands, as discussed in the PER (USDOI BLM 2007c: 4-30). Affected areas would primarily occur in the Table Mountain Unit, where livestock could be used to remove cheatgrass and other non-native vegetation. Direct effects could include alteration of stream channel/wetland morphology and loss of native wetland or riparian vegetation. The action of animal hooves would cause some disturbance, shearing, and compaction of soil, increasing its susceptibility to both water and wind erosion. Severe compaction often reduces the availability of water and air to the roots and plant vitality. Biomass, vigor of native plants, and species diversity could all be reduced. The degree of effect would be dependent on the timing, duration, and intensity of grazing.

Beneficial Effects

Successful control of noxious weeds and invasive non-native plants in wetlands and riparian zones associated with sagebrush treatments would lead to improved conditions in these habitats over the long term. Treatments that thin the sagebrush canopy and promote the development of understory vegetation, and plantings on or near riparian management areas, would improve riparian habitat and water quality and nearby upland habitat.

Most of the riparian management acreage associated with sagebrush habitat is found on the Table Mountain Unit. Treatments in this unit would focus on thinning sagebrush to encourage the growth of forbs and grasses, removal of encroaching pinyon-juniper, and control of noxious weeds and other invasive non-native vegetation. Improvement in understory vegetation cover would reduce the risk of erosion and sedimentation in nearby streams, while removal of pinyon-juniper could improve water flows and availability in streams. Sites with a large component of noxious weeds and invasive non-native plants may be at a higher risk for erosion than sites that support native vegetation. Non-native vegetation on the 3 Bars Project area is associated with historic wildfires and with rehabilitation of burned areas following wildfires. Treatments can benefit wetland, floodplain, and riparian habitats if vegetation removal reduces the risk of catastrophic fire.

3.10.3.3.3 Direct and Indirect Effects under Alternative B (No Fire Use Alternative)

About half as many acres would be treated under Alternative B as under Alternative A, primarily due to the higher costs associated with manual and mechanical treatments. Nearly all wetland, riparian, and aspen habitat, and stream channel restoration could be done using manual and mechanical methods. Thus, acreage and miles of wetland, riparian, aspen, and stream channel restoration work done under Alternative B would be similar to that done under

Alternative A. Under this alternative, the BLM would likely be able to restore a similar amount of Non-functioning and Functioning-at-risk wetlands and riparian zones to Proper Functioning Condition as under Alternative A.

Without use of prescribed fire and wildland fire for resource benefits, the effectiveness of some treatments could be reduced, but for many treatments there would be no difference in the outcome between alternatives. Fire treatments could lead to a short-term increase in erosion and stream sedimentation, and the spread of noxious weeds and other invasive non-native vegetation. These risks would not occur under this alternative, but the inability to use fire could reduce the effectiveness of pinyon-juniper removal in some areas. The inability to use fire may result in less improvement in water flows in streams due to fewer acres of pinyon-juniper removal, fewer long-term benefits to wetlands and riparian zones from development of more fire resilient vegetation after use of prescribed fire, and greater risk of catastrophic wildfire, under Alternative B than Alternative A. The BLM would also be less likely to reduce hazardous fuels and burn piles of slash, which would increase the risk of catastrophic wildfire under this alternative compared to Alternative A. The BLM would also have less success under Alternative B than Alternative A in slowing pinyon-juniper encroachment into riparian and other habitats; slowing the spread of noxious weeds and other invasive non-native vegetation; restoring fire as an integral part of the ecosystem, developing fire and fuel breaks; and reducing the risk of catastrophic wildfire.

3.10.3.3.4 Direct and Indirect Effects under Alternative C (Minimal Land Disturbance Alternative)

Under Alternative C, the BLM would treat about a fourth as much acreage as would be treated under Alternative A. As a result, effects to wetlands and riparian zones from treatments would be much lower than under Alternatives A and B. By not being able to use mechanical treatments, there would be no risk of sedimentation into streams and wetlands from erosion caused by mechanical treatments.

Wetland and riparian restoration treatments would largely consist of hand installation of fencing, hand replanting, and removal of pinyon-juniper with chainsaws. The BLM would be unable to use mechanical methods to address headcuts and stream incision through grade stabilization structures and streambank bioengineering. It would also be more difficult for the BLM to transport and place logs and woody debris from felled pinyon-juniper into streams, remove slash that could pose a fire risk, restore fire as an integral part of the ecosystem, develop fire and fuel breaks, and reduce the risk of catastrophic wildfire.

While an improvement in wetland and riparian function would be expected across all treated areas, the level of improvement would likely be less than under Alternatives A and B, and it is possible that some areas would not be restored to Proper Functioning Condition with only manual methods. Benefits associated with improvements to upland community types would be less than under Alternatives A and B, since a much smaller portion of the project area would be treated, and the reduction in wildfire risk would also likely be lower.

3.10.3.3.5 Direct and Indirect Effects under Alternative D (No Action Alternative)

There would be no direct effects to wetlands, floodplains, or riparian zones under this alternative as no treatments would be authorized under this alternative. The BLM would not conduct stream bioengineering treatments; create fire and fuel breaks; thin and remove pinyon-juniper to promote healthy, diverse stands; treat large-scale infestations of noxious weeds and other invasive non-native vegetation, especially cheatgrass; restore fire as an integral part of the ecosystem; or reduce the risk of a large-scale wildfire. The processes that create knickpoints, headcuts, and unstable streambanks would remain active, there would be few benefits to deep-rooted vegetation near streams, and there would be little improvement in stream flows. Thus, the health of wetlands, floodplains, and riparian zones would

continue to deteriorate and few improvements would be seen in water quality and quantity in these areas. Because degraded channel morphology is a primary factor causing stream habitats to not function properly, Non-functioning and Functioning-at-risk wetlands and riparian zones would persist in the 3 Bars Project area.

3.10.3.4 Cumulative Effects

The CESA for wetland, floodplain, and riparian zone resources is approximately 1,841,698 acres and includes those watersheds at the Hydrologic Unit Code 10 level that are all or partially within the 3 Bars Project area (**Figure 3-1**). Approximately 92 percent of the area is administered by the BLM, 6 percent is privately owned, and 2 percent is administered by the Forest Service. There are approximately 77,629 acres of wetlands (2,363 acres on the 3 Bars Project area and 75,266 acres on other portions of the CESA; most of the non-3 Bars wetland acreage is associated with a large playa that is usually dry but has soils typical of wetlands), 5,261 miles of perennial and intermittent/ephemeral streams (2,423 miles within the 3 Bars Project area, 2,728 miles within other portions of the CESA), and 1,116 springs and seeps (334 within the3 Bars Project area, 782 within other portions of the CESA) within the CESA. Past and present actions that have influenced wetland, floodplain, and riparian zone activity in the 3 Bars ecosystem are discussed in Section 3.2.2.3.3.

3.10.3.4.1 Cumulative Effects under Alternative A (Preferred Alternative)

Past land uses in the CESA have resulted in the degradation of wetlands, riparian zones, and floodplains and reduced their functions. In particular, the BLM has indicated that roads, historic grazing regimes, and pinyon-juniper encroachment have negatively affected riparian and wetland functions and values, water quantity and timing, and water quality (USDOI BLM 2009a). Livestock often congregate near streams, springs, and wetlands, causing the loss of riparian habitat and forage, and degrade of stream channels and their ability to function properly and provide abundant and high quality water. Livestock have also been identified as a major contributor to the loss of aspen stands in the Great Basin and on the 3 Bars Project area (Kay 2001, 2002, 2003).

The BLM would continue ongoing management reviews to determine if livestock grazing management is resulting in utilization levels that are moderate to severe and adversely impact to forage and other rangeland resources, and if needed, would determine if changes in the current terms and conditions of the grazing permit would be required to maintain the long-term success of the proposed treatments.

High concentrations of wild horses have the potential to affect the success of treatments, especially within the Roberts Mountain HMA. The BLM would conduct wild horse gathers, conduct AML reviews and adjustments, remove excess animals and use fertility control, adjust HMA boundaries, remove fencing, improve water developments, and implement habitat projects that help to keep distribute wild horses more evenly across the rangeland.

Proposed 3 Bars Project treatments would help to reduce land disturbance and restore degraded habitats, and discourage establishment and expansion of noxious weeds and other invasive non-native vegetation, especially on riparian and aspen habitats. The BLM also proposes to install fencing to limit livestock, wild horse, and wild ungulate access to treatment areas, although water gaps would be incorporated into fencing along streams to allow these animals to access water. These actions should help to improve water quality in affected streams, restore streams to Proper Functioning Condition, and improve riparian habitat. The measures that the BLM would take to minimize livestock and wild horse impacts to treatment areas are discussed in more detail in Section 3.17.4 (Livestock Grazing Mitigation), and in **Appendix C**.

The BLM would continue to use ground-based herbicide applications to remove noxious weeds and invasive non-native vegetation, and aerial-based application methods to remove cheatgrass, and would restore burned areas under the Burned Area Emergency Stabilization and Rehabilitation program, under existing authorizations on about 1,000 acres annually. These treatments should not have a direct effect on wetlands, floodplains, and riparian zones unless they cause erosion, or there is an accidental spill of an herbicide into a water body. These treatments would help to reduce hazardous fuels, slow the spread of noxious weeds and other invasive non-native vegetation, and reduce surface runoff and erosion associated with burn sites on about 1,000 acres annually, potentially to the benefit of wetlands, floodplains, and riparian zones. Herbicides could be transported in runoff to water bodies and effect wetland, floodplain, and riparian vegetation, but the BLM would use buffers between water bodies and treatment areas and/or carefully select the timing of applications and types of herbicide to minimize or avoid these risks.

Land development, mineral development, and oil, gas, and hydrothermal exploration and development could affect about 15,500 acres in the reasonably foreseeable future, including about 8,335 acres of disturbance associated with the Mount Hope Project. These projects could disturb wetlands, riparian zones, and floodplains on a small portion of this land through soil disturbance, water diversion, pumping of groundwater, filling, and removal of vegetation.

As discussed in the Mount Hope Project EIS under Wetland and Riparian Zones (USDOI BLM 2012c:Section 3-11), and in this EIS under Water Resources (Section 3.9), there is concern that pumping of water for future livestock and domestic uses, mining, and agricultural could reduce surface water flows in streams and wetlands associated with the Diamond Mountains, Diamond Valley, Roberts Mountain, Kobeh Valley, and Pine Valley. Although the Mount Hope Project EIS determined that effects on streams and wetlands would not be significant, it did find that effects to groundwater resources from the mine project and other water users could be significant within the CESA.

Catastrophic wildfire can affect wetlands by causing extensive burns, which may potentially include wetland and riparian vegetation, particularly during drought conditions when soils and vegetation are dry. About 140,000 acres could burn within the CESA over the next 20 years, based on acreage burned since 1985. While large fire events have been sporadic within the CESA since 1985, on average 6,900 acres have burned annually. The wide-scale removal of riparian and wetland vegetation by fire would be expected to return affected areas to early-successional conditions, and could reduce structural diversity of wetland and riparian habitats. Wide-scale removal of vegetation would also result in increased sedimentation into wetlands and riparian zones.

Hazardous fuels reduction, habitat improvement, and noxious weeds and other invasive non-native vegetation management projects on the 3 Bars Project and other areas within the CESA would occur on approximately 142,000 acres (127,000 for the 3 Bars Project and 15,000 for other hazardous fuels projects in the CESA), or about 8 percent of the CESA. These treatments would lead to short-term increases in soil erosion and surface water runoff, but long-term benefits to water quality and possible water flows. Pinyon-juniper removal within riparian zones could lead to increased water flows, and allow native vegetation to re-establish along streambanks. Long term, 3 Bars Project actions should make a substantial contribution toward improving wetland, floodplain, and riparian zone conditions within the CESA and help to offset adverse effects to these resources from other reasonably foreseeable future actions under Alternative A.

3.10.3.4.2 Cumulative Effects under Alternative B (No Fire Use Alternative)

Under Alternative B, effects from non-3 Bars Project reasonably foreseeable future actions on wetlands, floodplains, or riparian zones would be similar to those described under Alternative A. However, by not using fire on the 3 Bars

Project area, there would be no effects to wetland and stream water quantity and quality from fire on several thousand acres annually within the CESA.

The BLM would be limited to manual and mechanical methods such as use of chainsaws and disking and plowing, and using livestock to control non-native vegetation on several hundred acres annually within the CESA. These methods could result in more soil disturbance and erosion and inherent water quality issues than would the use of fire. The Table Mountain and West Simpson Park units are on rugged terrain, and use of mechanical equipment to control cheatgrass would be difficult and erosion potential from treatments would be great, especially on the West Simpson Park Unit.

The BLM would conduct hazardous fuels reduction and habitat improvement projects using manual and mechanical methods on about 63,000 acres within the 3 Bars Project area, and on about 15,000 acres in other portions of the CESA, or about 4 percent of acreage within the CESA. Wetland, stream and floodplain habitat should improve within the 3 Bars Project area and within the CESA, although not to the extent as would occur under Alternative A.

3.10.3.4.3 Cumulative Effects under Alternative C (Minimal Land Disturbance Alternative)

Under Alternative C, effects from non-3 Bars Project reasonably foreseeable future actions on wetlands, floodplains, or riparian zones would be similar to those described under Alternative A. Adverse, short-term effects to wetlands, riparian zones, and floodplains associated with the use of fire and mechanized equipment would not occur under Alternative C. By not being able to use mechanical methods and fire to reduce hazardous fuels and create fire and fuel breaks, the risk of wildfire and its effects on wetlands, floodplains, and riparian zones would likely increase on the 3 Bars Project area.

The BLM would conduct hazardous fuels reduction and habitat improvement projects using manual methods on about 32,000 acres within the 3 Bars Project area, and on about 15,000 acres in other portions of the CESA, or about 3 percent of acreage within the CESA. Only about 100 acres of wetland and riparian habitat, and 1 mile of stream habitat, would be restored annually on the 3 Bars Project area. Wetland, riparian, and floodplain habitat should improve within the 3 Bars Project area and within the CESA, but not to the extent as would occur under Alternatives A and B.

3.10.3.4.4 Cumulative Effects under Alternative D (No Action Alternative)

Under Alternative D, effects from non-3 Bars Project reasonably foreseeable future actions on wetlands, floodplains, or riparian zones would be similar to those described under Alternative A. There would be no cumulative impacts to wetlands, floodplains, or riparian zones as no treatments would be authorized under this alternative. The BLM could conduct stream bioengineering treatments; create fire and fuel breaks; thin and remove pinyon-juniper to promote healthy, diverse stands; slow the spread of noxious weeds and other invasive non-native vegetation, especially cheatgrass; restore fire as an integral part of the ecosystem; and reduce the risk of a large-scale wildland fire under existing and future authorizations, but only on about 1,500 acres annually under current and reasonably foreseeable future authorizations. Given the low acreage of habitat treated annually, and because factors causing streams and wetlands to not function properly would remain, including soil erosion, stream channel instability, spread of noxious weeds and other invasive non-native vegetation, pinyon-juniper encroachment, and wildfire, improvement to wetland, floodplain, and riparian functions within the CESA would be least under this alternative.

3.10.3.5 Unavoidable Adverse Effects

An increase in soil erosion and surface water runoff could result from vegetation removal, and could lead to channel erosion and sedimentation in wetlands, floodplains, and riparian zones (Ott 2000). The rate of runoff would be influenced by the precipitation rate, soil type, and proximity to the treated area. All vegetation removal activities could disturb the soil and reduce the amount of vegetation binding to the soil, potentially causing erosion and increased sedimentation to wetlands, floodplains, and riparian zones, although the use of mulching could minimize these effects.

The removal of vegetation would decrease the amount of rainfall captured by plants, detritus, and soil, potentially leading to increased stormwater flows and runoff velocity in wetland and riparian zones. Increased stormwater runoff can scour streams, modify their morphology, and affect the distribution and abundance of aquatic organisms within the area. Siltation of wetlands could reduce water quality and the amount of oxygen available to aquatic organisms. In addition, siltation could reduce the acreage of wetland and riparian habitat (USDOI BLM 2007c:4-243).

3.10.3.6 Relationship between the Local Short-term Uses and Maintenance and Enhancement of Long-term Productivity

Removal of vegetation could cause a short-term increase in soil erosion and surface water runoff, which could impact wetlands, floodplains, and riparian zones. Successful control of noxious weeds and other invasive non-native plants in these areas, however, would lead to improved conditions in these habitats over the long term. The eventual growth of desirable vegetation in treated areas would moderate water temperatures, buffer the input of sediment from runoff, and promote channel stability in riparian zones. Project activities would also enhance the acreage of streamside wetlands by reconnecting streams to their floodplains. Ongoing efforts for the BLM to restore wetlands, floodplains, and riparian zones would enhance the function of treated areas in the project area, and would help increase the miles of streams and acres of wetlands that would be classified by the BLM as Proper Functioning. Improvement of riparian, floodplain, and wetland habitat would also benefit Lahontan cutthroat trout and other species of concern, such as greater sage-grouse, that depend on these habitats for their survival.

3.10.3.7 Irreversible and Irretrievable Commitment of Resources

There would be no irreversible or irretrievable commitment of wetland, floodplain, or riparian resources. Although there would be short-term impacts to these resources from the proposed project treatments, these impacts would not be irretrievable and would be reversed if restoration treatments were successful (USDOI BLM 2007c:4-251).

3.10.3.8 Significance of the Effects under the Alternatives

Based on the significance criteria presented in Section 3.10.3.2, it is not expected that direct, indirect, or cumulative effects from the 3 Bars Project would result in a significant adverse cumulative effect to wetlands, floodplains, or riparian zones under any of the alternatives.

None of the reasonably foreseeable future actions should result in the significant destruction or loss of wetlands. For upland treatments with the potential to remove large areas of vegetation (fire and mechanical), the BLM would maintain vegetated buffers between the treatment area and wetlands. If noxious weeds or other invasive non-native vegetation were removed from wetlands, the affected area would be replanted or reseeded to encourage recovery of native species. Some degree of wetland degradation would be possible as a result of land development, and

sedimentation, reduced vegetative cover, and physical disturbance associated with hazardous fuels and habitat restoration treatments within the CESA. However, these effects would be short-term in duration, and wetlands would eventually recover to their original or an improved condition.

Removal of vegetation within floodplains could minimize the flood attenuation functions of floodplains, as there may be increased overland flow to streams and increased risk of flooding. However, these effects would only last until the treatment sites recover, or are restored through reseeding or replanting. Maintaining vegetated buffers between treatment areas and water bodies would help to preserve some flood attenuation functions of floodplains.

The majority of stream restoration treatments would be done in streams with little to no stream-floodplain connections. Thus, historical floodplains would only experience flows during very rare high magnitude discharge events. Treatments to improve the structural integrity of stream channels would likely improve the flood attenuation functions of those areas over the long term.

None of the actions under the alternatives would result in a long-term reduction in the functions of wetlands or riparian zones, a long-term reduction in the acreage of riparian and wetland areas in Proper Functioning Condition, or a downgrading of Functional-at-risk riparian or wetland areas to a negative trend or Nonfunctional. Removal of vegetation in these areas, or nearby upland areas, could temporarily reduce certain functions, including the ability to dissipate overland flow, improve floodwater retention and groundwater recharge, stabilize streambanks against cutting actions, and provide habitat for a diversity of wildlife. All of these functions factor into the Proper Functioning Condition of a wetland or riparian zone. These adverse effects would be short-term, and over the long term, the affected areas would return to their original or improved functioning condition.

3.10.4 Mitigation

Wetlands, floodplains, and riparian zones would benefit from mitigation and monitoring measures identified in Section 3.17.4 (Livestock Grazing Mitigation). No mitigation or monitoring measures are recommended specifically for wetlands, floodplains, and riparian zones.

3.11 Native and Non-invasive Vegetation Resources

3.11.1 Regulatory Framework

3.11.1.1 Special Status Species

The Endangered Species Act of 1973 provides for conserving federally listed endangered and threatened plant species, and plant species proposed for federal listing. The Act also requires that federal agencies consult with the USFWS to ensure that any actions they authorize, fund, or carry out are not likely to jeopardize the continued survival of a listed species or result in the adverse modification or destruction of its critical habitat. Critical habitat is a specific area or type of area that is considered to be essential for the survival of a species, as designated by the USFWS under the Act.

In addition to administering conservation programs for listed species and species proposed for listing under the Act, the BLM also administers programs for sensitive species under guidance from Manual 6840, *Special Status Species Management* (USDOI BLM 2008h). BLM Special Status Species are federal candidate species for listing as threatened or endangered under the provisions of the Act, and those designated by the Director or individual State

Directors as BLM sensitive. Conservation of BLM sensitive species means the use of programs, plans, and management practices to minimize or eliminate threats affecting the overall condition of the species, and/or improve the condition of the species' habitat.

3.11.1.2 Federal Laws

Other federal laws pertaining to noxious and invasive non-native weeds include the Lacey Act as amended (18 USC § 42), the Carson-Foley Act of 1968 (Public Law 90-583), the Federal Noxious Weed Act of 1974, as amended by the Food, Agriculture, Conservation, and Trade Act of 1990 (Section 1453, "Management of Undesirable Plants on Federal Lands," USC §2801 et seq.), the Federal Plant Pest Act (7 USC § 150aa et seq.), and the Plant Protection Act of 2000 (7 USC § 7701 et seq.), as amended by the Noxious Weed Control and Eradication Act of 2004 (Public Law 108-412).

3.11.1.3 BLM Guidance and Regulations

BLM Handbook H-1740, *Integrated Vegetation Management* (USDOI BLM 2008b) provides guidance on the management of vegetation on public lands and discusses the use of treatment methods for ensuring management success.

3.11.1.4 Resource Advisory Council Guidance

The BLM Nevada Northeastern Great Basin Resource Advisory Council, as chartered by the USDOI to promote healthy rangelands, has developed Standards and Guidelines for grazing administration on about 16.2 million acres of public lands in Nevada. Included in the Standards and Guidelines are guidelines for vegetation management. These include guidelines to control noxious weeds and other invasive non-native vegetation, including cheatgrass; limit grazing in salt desert plant communities to very early season or dormant season; create and maintain a diversity of sagebrush age and cover classes; maintain healthy stands of pinyon-juniper and ensure a combination of stand stages; and use native vegetation to reclaim sites (USDOI §2007b).

3.11.1.5 Woodlands

The Federal Land Policy and Management Act of 1976 and BLM Manual 5000-1, *Forest Management Public Domain* (USDOI BLM 1991b), include requirements for planning and implementing forestry and woodland projects. Additionally, 43 CFR §5400 regulates the sale of forest products harvested from public lands.

3.11.1.6 Prime Farmlands

Prime farmland, as defined by 7 CFR § 657.5 "is land that has the best combination of physical and chemical characteristics for producing food, feed, forage, fiber, and oilseed crops and that is available for these uses. It has the combination of soil properties, growing season, and moisture supply needed to produce sustained high yields of crops in an economic manner if it is treated and managed according to acceptable farming methods. In general, prime farmland has an adequate and dependable water supply from precipitation or irrigation, a favorable temperature and growing season, an acceptable level of acidity or alkalinity, an acceptable content of salt or sodium, and few or no rocks. Its soils are permeable to water and air. Prime farmland is not excessively eroded or saturated with water for long periods of time, and it either does not flood frequently during the growing season or is protected from flooding" (USDA Natural Resources Conservation Service 2000).

3.11.2 Affected Environment

3.11.2.1 Study Methods and Analysis Area

Several sources were reviewed in the preparation of this section, including USGS topographic and USFWS National Wetland Inventory maps; aerial photographs; USDA Natural Resources Conservation Service soil survey for Eureka County (USDA Natural Resources Conservation Service 2012); documents prepared for nearby projects, including the Falcon to Gonder EIS (EDAW 2001, 2002), AECC (USDOI BLM 2009a), and Mount Hope Project EIS and references cited therein (USDOI BLM 2012c); BLM Special Status Species list and Nevada Heritage Program Special Status Plant Species database; range allotment studies conducted by the BLM; discussions with BLM resource specialists; Geographic Information System shapefiles provided by BLM resource specialists for spring inventories and riparian monitoring; site-specific studies conducted on the 3 Bars Project area; and site visits.

In 2010 and 2011, two studies were conducted to obtain additional information on rangeland and woodland health on the 3 Bars ecosystem. Based on these studies, two reports were prepared: 1) a *3 Bars Ecosystem and Landscape Restoration Project Pinyon-juniper Assessment* that provided the results from an assessment of pinyon-juniper stands within the 3 Bars ecosystem (AECOM 2011a); and 2) a *Landscape Restoration Project Rangeland Health Report* that provided the results of a 2010 to 2011 evaluation of rangeland health on approximately 532,000 acres within the 3 Bars ecosystem (Eastern Nevada Landscape Coalition and AECOM 2012). In addition, the BLM has conducted rangeland health studies on remaining portions of the 3 Bars Project area not evaluated during 2010 and 2011 studies.

The soil surveys for Eureka, Lander, and White Pine counties (USDA Natural Resources Conservation Service 2012), vegetation mapping done by the BLM, and vegetation surveys done for this project by the Mount Lewis Field Office and its consultants (AECOM 2011a, b, Eastern Nevada Landscape Coalition and AECOM 2012), were used to describe the vegetation on the 3 Bars Project area. Grassland included wildfire burn areas in the northern Simpson Park Mountains (1999 Trail Canyon Fire Area) and the 2012 Frazier Fire wildfire burn area, and historic crested wheatgrass seedings. The pinyon-juniper vegetation type was based on those areas having Phase II and III pinyon-juniper stands (see Section 3.11.2.2.8 for a discussion of pinyon-juniper phases).

The USDA Natural Resources Conservation Service (2012) soil survey was used to determine the ecological site descriptions for the project area. Rangeland landscapes are divided into ecological sites for the purposes of inventory, evaluation, and management. An ecological site, as defined for rangeland, is a distinctive kind of land with specific physical characteristics that differs from other kinds of land in its ability to produce a distinctive kind and amount of vegetation. A description of the ecological site descriptions can be found in Appendix B of the *Landscape Restoration Project Rangeland Health Report* (Eastern Nevada Landscape Coalition and AECOM 2012). The ecological site descriptions are based on physiographic, climatic, vegetative, and soil factors for each soil association.

The ecological site descriptions were then grouped by associated dominant vegetation type (overstory and understory species) into broader vegetation cover types to characterize the Potential Natural Community for each plant association. The Potential Natural Community is defined as the biotic community that would become established on an ecological site if all successional sequences were completed without interference by people under the present environmental conditions (Habich 2001).

The BLM Special Status Species list was reviewed to determine which special status plant species could occur in the project area. These were supplemented with notes taken during the project site visit and kick-off meeting. In addition,

Geographic Information System shapefiles of previously documented special-status plant occurrences were obtained from the Nevada Natural Heritage Program. The Nevada Natural Heritage Program maintains a database on the general location and status of Nevada's sensitive plants, animals, and natural biological communities. The Nevada Native Plant Society list of plant species of concern was also reviewed. The Nevada Native Plant Society is a non-profit organization that functions in an advisory capacity to state and federal agencies regarding Nevada native plants and their distributions. The Nevada Native Plant Society has created six categorical designations of plants to identify their respective concern for these species. These designations do not afford legal status or protection for the species, but the lists produced by Nevada Native Plant Society are utilized by agencies in their planning processes for activities that may impact the species or habitat.

Surveys conducted in support of the Mount Hope Project EIS were reviewed for information on special status plant species. Focused surveys for special status plant species were conducted on the majority of the Mount Hope Project area by SRK in June, 2005, and during the bloom period in 2006 (SRK 2007a). These surveys targeted Beatley buckwheat, an imperiled species, least phacelia, a BLM sensitive species, and wildloving buckwheat, a BLM Special Status Species. In addition, spring areas with potential habitat for least phacelia in the project area were visited quarterly during water sampling activities (SRK 2007a). Field surveys were conducted in the well field, powerline, and transmission line areas in mid-July and August 2007 (SRK 2007b). A special status plant survey in the Kobeh Valley portion of the project area was conducted in July 2008 (Great Basin Ecology 2008), and the USFWS (USDOI USFWS1993) has conducted surveys for Monte Neva paintbrush, a state critically endangered species, on portions of the 3 Bars Project area.

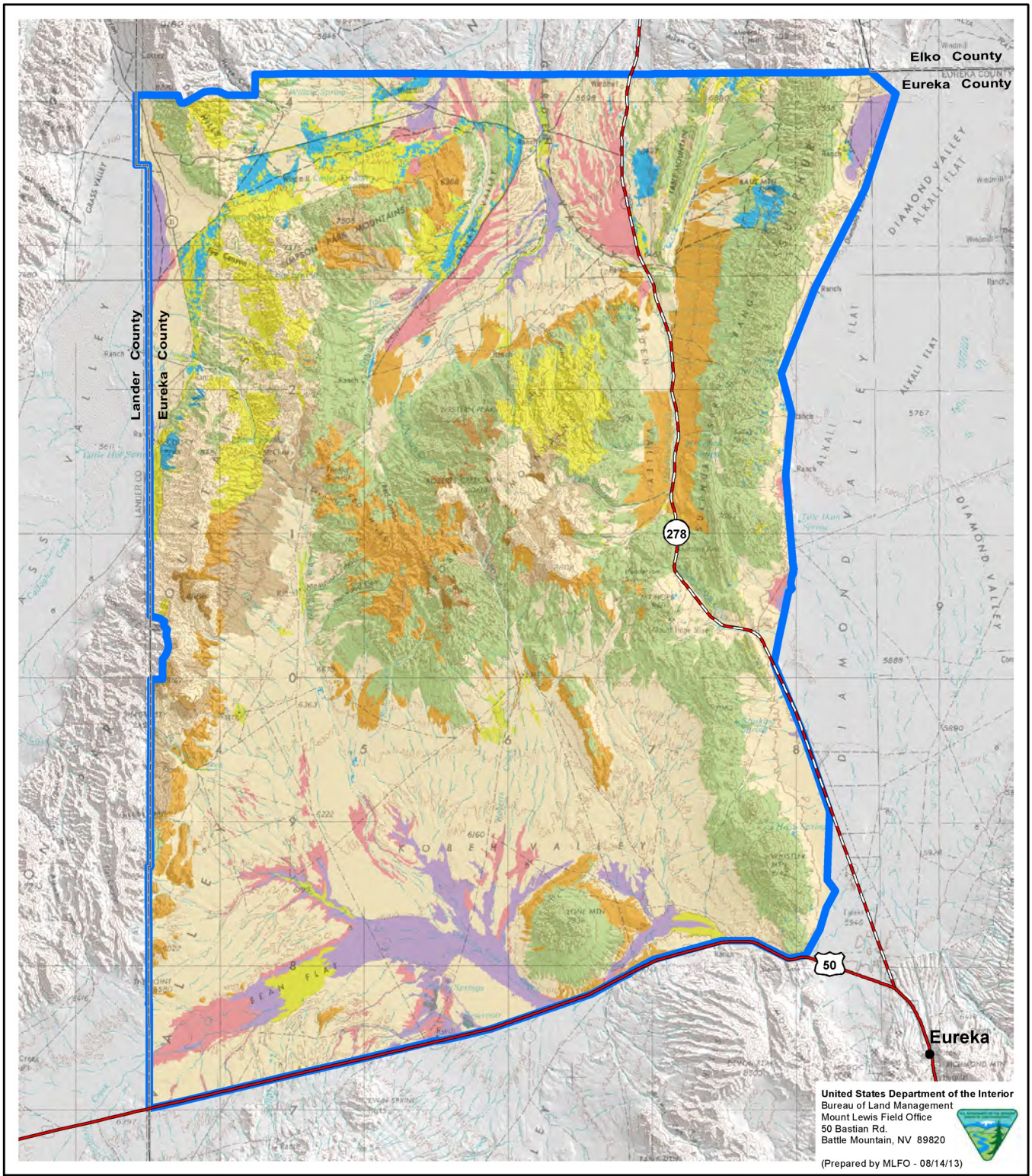
The study area for direct, indirect, and cumulative impacts to native and non-invasive vegetation, including woodlands, is the 3 Bars Project area. The CESA for cumulative impacts to native and non-invasive resources includes the Hydrologic Unit Code 10 watersheds wholly, or partially within, the project area (**Figure 3-1**).

3.11.2.2 Vegetation Communities

Major vegetation community types in the 3 Bars Project area include pinyon-juniper woodland, mountain mahogany woodland, aspen, big sagebrush, low sagebrush, black sagebrush, greasewood, salt desert scrub, grasslands, and cheatgrass (a non-native plant; **Figure 3-26**, **Table 3-22**). Information on noxious weeds and other invasive and non-native vegetation, including cheatgrass, is provided in Section 3.12.

One of the objectives of the 3 Bars Project is to restore lands to achieve 75 percent of their Potential Natural Community based on the status of key plant species. A Potential Natural Community is defined as the biotic community that would become established on an ecological site if all successional sequences were completed without interference by people under the present environmental conditions (Habich 2001). Seral status is an expression of the condition of the vegetation community and is useful in determining whether an area is progressing toward its Potential Natural Community. The Potential Natural Community is considered achieved with the presence of 77 to 100 percent of the desired key species in a plant community. **Figure 3-27** and **Table 3-22** show the location and extent of major expected vegetation communities, based on ecological site description, in the project area.

Each of the major vegetation communities shown in **Figures 3-26 and 3-27** is briefly described below, followed by a discussion of the ecological health of these communities in the project area, as determined by rangeland health assessments conducted by Eastern Nevada Landscape Coalition and AECOM (2012) and the BLM pinyon-juniper mapping (AECOM 2011a), and discussions with BLM resource specialists.



Legend

Vegetation Community

- Big Sagebrush[d]
- Black Sagebrush[d]
- Low Sagebrush[d]
- Greasewood[d]
- Invasive Species[a,c]
- Mountain Mahogany[d]
- *Grassland[a,b,d]
- +Pinyon-juniper[c]
- Salt Desert Scrub[d]
- Pits, Playas, or Water[d]
- 3 Bars Project Area

Source: [a]USGS 2004; [b]BLM 2012g; [c]AECOM 2011a,b; [d]USDA NRCS 2012.
*Grassland is comprised of native, fire induced, and man-made grass cover.
+Pinyon-juniper represents phase 2/3 successional stages only.

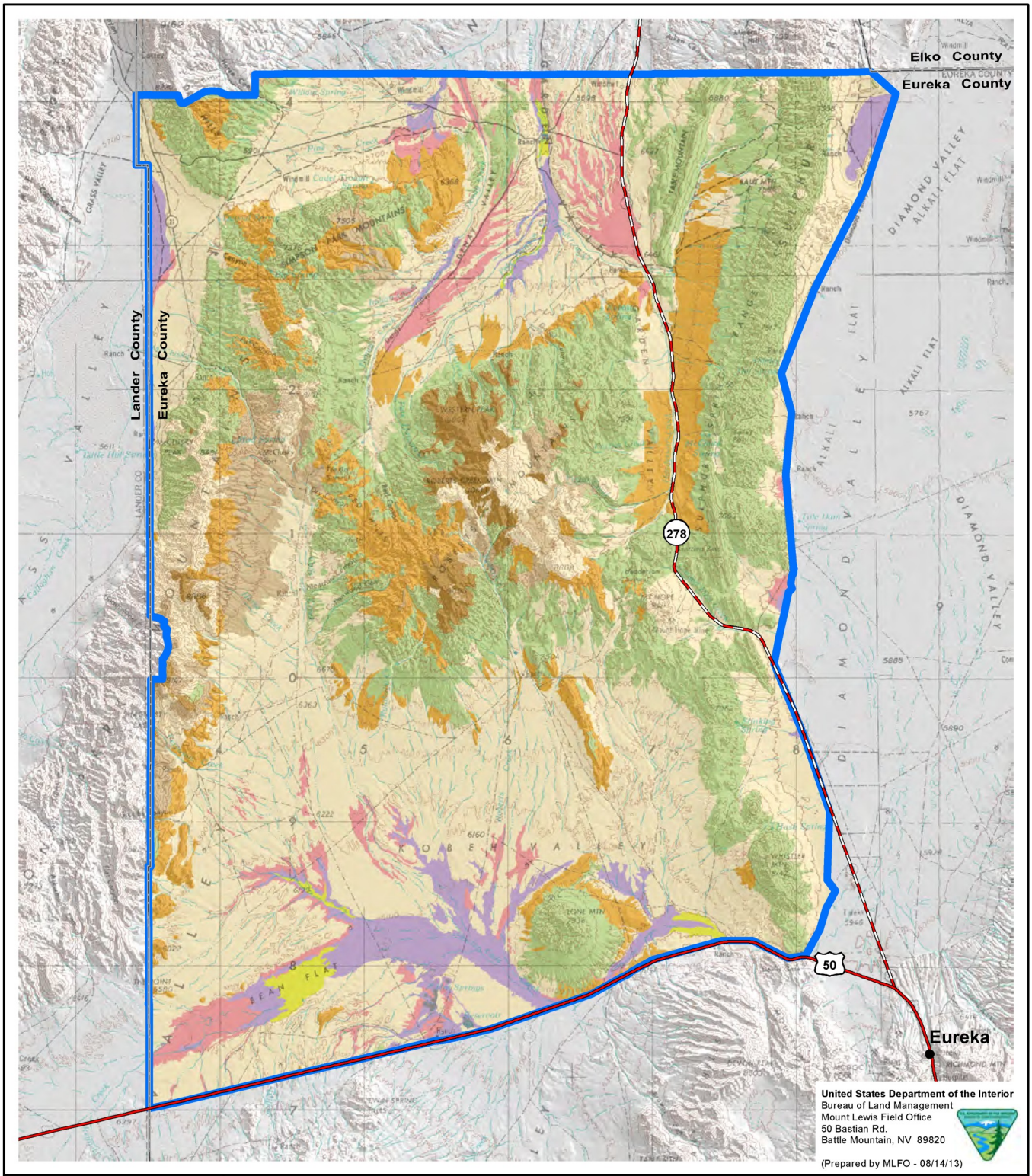
3 Bars Ecosystem and Landscape Restoration Project

Figure 3-26

Current Vegetation Communities

0 1 2 3 4 5 10 Miles
0 1 2 3 4 5 10 Kilometers
N

No warranty is made by the Bureau of Land Management as to the accuracy, reliability, or completeness of these data for individual 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 notice.



Legend

Vegetation Community

- Big Sagebrush
- Black Sagebrush
- Low Sagebrush
- Greasewood
- Mountain Mahogany
- Native Grassland
- Pinyon-juniper
- Salt Desert Scrub
- Pits, Playas, or Water
- 3 Bars Project Area

Source: USDA NRCS 2012.

3 Bars Ecosystem and Landscape Restoration Project

Figure 3-27

Major Vegetation Communities in the 3 Bars Project Area based on Ecological Site Data

0 1 2 3 4 5 10 Miles

0 1 2 3 4 5 10 Kilometers

N

No warranty is made by the Bureau of Land Management as to the accuracy, reliability, or completeness of these data for individual 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 notice.

TABLE 3-22

Current and Expected Vegetation Types within the 3 Bars Project Area

Vegetation Community	Actual		Expected		Difference between Actual and Expected Vegetation
	Acres	Percent	Acres	Percent	
Big Sagebrush	345,372	46.1	354,082	47.2	-8,709
Greasewood	31,642	4.2	32,392	4.3	-750
Low Sagebrush	23,228	3.1	28,914	3.9	-5,686
Black Sagebrush	62,109	8.2	77,148	10.3	-15,039
Mountain Mahogany	4,275	0.6	13,730	1.8	-9,455
Grassland	52,146	7.0	4,433	0.6	47,713
Pinyon-juniper	190,357	25.4	209,176	27.9	-18,819
Pits, Playas, and Water	378	0.1	384	0.1	-6
Salt Desert Scrub	28,061	3.7	29,552	3.9	-1,491
Non-native Vegetation	12,242	1.6	0	0.0	12,242
Total	**749,810**	**100.0**	**749,810**	**100.0**	**0**

[1] Grassland is defined as those areas comprised of native, fire-induced, and man-made grass cover.
[2] Pinyon-juniper vegetation type is based on those areas having Phase II and III pinyon-juniper stands (see Section 3.11.2.2.8 for a discussion of pinyon-juniper phases).
Sources: AECOM (2011a, b), USDA Natural Resources Conservation Service (2012).

3.11.2.2.1 Grassland

Grasslands occur throughout the Great Basin on dry plains and mesas. On the 3 Bars Project area, this community occurs between 5,500 and 6,200 feet amsl. These grasslands occur in lowland and upland areas, and may occupy swales, playas, mesa tops, plateaus, alluvial flats, and plains, but sites are typically dry. According to the USDA Natural Resources Conservation Service ecological site data, native grassland dominated by alkali sacaton is expected to cover about 4,433 acres, or 0.6 percent of the 3 Bars Project area (USDA Natural Resources Conservation Service 2012). Other associated species may include alkali cordgrass, Indian ricegrass, three-awn grasses, blue grama grass, needle-and-thread, and Muhly grass. The community may also include scattered shrubs and dwarf-shrubs sagebrush, saltbush, blackbrush, species of joint fir or Mormon tea, snakeweed, and winterfat.

The grassland community is comprised of three ecological sites. Characteristics of these sites are shown in **Table 3-23**. Semi-desert native grassland typically occurs on well-drained sandy or loamy-textured soils derived from sedimentary parent materials, but soil types are quite variable and may include fine-textured soils derived from igneous and metamorphic rocks.

Grassland in the project area suffers from a lack of diversity, and some areas have been taken over by cheatgrass. About 4,433 acres of the project area should consist of native grassland. Over 52,000 acres are currently categorized as grassland, however, most (over 47,000 acres) of these acres consist of areas burned by wildfire, or occupied by non-native grasses (primarily crested wheatgrass) planted by man. Management actions proposed for sagebrush communities are also expected to indirectly enhance native grasslands, as they would increase the abundance of native bunchgrasses throughout the project area, providing additional forage and seed sources, while removing non-native grasses.

3.11.2.2.2 Big Sagebrush

The big sagebrush vegetation type is present on alluvial fans, hillsides, and ephemeral drainages. This vegetation type occurs at elevations between 5,500 and 10,000 feet amsl in the 3 Bars Project area. Approximately 407,481 acres, or 54.3 percent, of big sagebrush is found on the project area. According to the ecological site description, big sagebrush communities should cover about 354,082 acres, or 47.2 percent of the 3 Bars Project area. The dominant overstory vegetation, depending on the location, is either basin big sagebrush, Wyoming big sagebrush, or mountain big sagebrush. Understory species commonly associated with big sagebrush communities includes basin wildrye, Thurber's needlegrass, greenstem paperflower, bluebunch wheatgrass, mountain brome, Letterman's needlegrass, Indian ricegrass, and needle-and-thread (USDA Natural Resources Conservation Service 2012). Other species may include bottlebrush squirreltail, rabbitbrush, Sandberg bluegrass, lupine, rabbitbrush, winterfat, and antelope bitterbrush.

The Wyoming big sagebrush type is a prevalent vegetation type in the project area, and generally dominates the lower to mid-elevation zones in Kobeh Valley. Based on the USDA Natural Resources Conservation Service (2012) soil surveys, the rangeland health assessment conducted in support of the project, other rangeland health data from the BLM, and ecological site descriptions for upland vegetation communities, big sagebrush communities in the 3 Bars Project area show low grass production. While some desirable forbs and grasses occur, they only amount to a low percentage of overall vegetation. The dominant shrub, Wyoming big sagebrush, is appropriate for the site, but production is often low (Eastern Nevada Landscape Coalition and AECOM 2012). For most ecological sites in this type, grass species have the potential to comprise over 50 percent of vegetative composition, with shrubs being at or below 50 percent of the total composition. On several sites, primary grasses, including bluebunch wheatgrass and needle-and-thread, are absent.

The big sagebrush community is comprised of 11 ecological sites. Characteristics of these sites are shown in **Table 3-24**. The decline in abundance and health of the sagebrush community is a major concern within the 3 Bars ecosystem. Generally, the big sagebrush community in the 3 Bars Project area suffers from the following concerns (USDOI BLM 2009a, Eastern Nevada Landscape Coalition and AECOM 2012):

- Most (if not all) sampled sites examined in the rangeland health assessments lacked an understory of native bunchgrasses, and those that support bunchgrasses typically only support one species.
- Many sites lack an understory of native perennial forbs.
- Shrub diversity on most sites is less than desirable and below what the ecological site would allow.
- Some areas are characterized by monocultures of sagebrush or bitterbrush.
- Some areas have been overtaken by cheatgrass as a result of wildfire.
- Some areas suffer from invasions of noxious weeds and other invasive non-native vegetation.

In addition, large areas that are dominated by big sagebrush have experienced extensive encroachment from pinyon-juniper woodland.

TABLE 3-23

Ecological Sites for Grassland Community

Ecological Site Community	Site Descriptor	Soil Type	Potential Native Community	Plant Community Dynamics
Alkali sacaton-alkali cordgrass Sandberg bluegrass-alkali sacaton	R024XY043NV	Wet meadow 6 to 8 inches	The plant community is dominated by alkali bluegrass, alkali sacaton, Baltic rush, and inland saltgrass. Potential vegetative composition is about 85 percent grasses and 15 percent forbs.	Where management results in abusive grazing use by livestock or horses, woody plants often increase, especially rabbitbrush species. Inland saltgrass and Baltic rush increase and may eventually dominate the site. Foxtail barley, annual mustards, and other undesirable forbs and grasses are species likely to invade this site.
Tufted hairgrass	R025XY005NV	Wet meadow	The plant community is dominated by tufted hairgrass. Nevada bluegrass, alpine timothy, Sierra clover, and meadow sedges are important plants associated with this site.	Where management results in chronic, repetitive, multi-year improper grazing, tufted hairgrass composition is reduced with foxtail barley, rushes, sedges, and forbs such as wild iris, cinquefoil, and yarrow increasing on the site. Willows and roses often increase in the overstory. Redtop, Kentucky bluegrass, thistles, and quackgrass are species likely to invade this site. Where stream channels become entrenched, the water table is lowered and a more drought tolerant plant community occurs. Vegetation includes cattail, bulrush, spike rush, reedgrass, and water-loving sedge.
Alkali sacaton-alkali cordgrass	R028BY002NV	Saline meadow	The plant community is dominated by alkali sacaton. Alkali cordgrass, alkali bluegrass, and sedges are important associated plant species. Potential vegetative composition is about 85 percent grasses and grass-likes, 10 percent forbs, and 5 percent shrubs.	As ecological condition declines, inland saltgrass and Baltic rush increase, as alkali sacaton and alkali bluegrass decrease. Where severe stream entrenchment occurs, the potential for this site is lost due to change in soil moisture balance. Typically, this site is succeeded by the plant community characterized in the Saline Bottom (028BY004NV) site description following severe stream down cutting.

TABLE 3-24

Ecological Sites for Big Sagebrush Community

Ecological Site Community	Site Descriptor	Soil Type	Potential Native Community	Plant Community Dynamics
Wyoming big sagebrush/Thurber's needlegrass	R024XY005NV	Loamy 8 to 10 inches	The plant community is dominated by Thurber's needlegrass and Wyoming big sagebrush. Potential vegetative composition is about 55 percent grasses, 5 percent forbs, and 40 percent shrubs.	Where management results in chronic, repetitive, multi-year improper grazing by livestock or horses, Thurber's needlegrass composition declines and is replaced by bluegrasses and bottlebrush squirreltail as the dominant understory grasses. Cheatgrass and other annuals will often dominate the understory as Wyoming big sagebrush and Douglas' rabbitbrush increase in the overstory with degraded ecological condition. Where site degradation has been fire-induced, broom snakeweed and rabbitbrush often dominate the site. Repeated burning of the plant community at intervals less than 10 to 15 years results in complete site dominance by annuals (primarily cheatgrass and tansy mustard) and the near total absence of woody plants, including sagebrush.
Wyoming big sagebrush/basin wildrye	R024XY006NV	Dry floodplain	The plant community is dominated by basin wildrye. Basin big sagebrush and black greasewood are other important species associated with this site. Potential vegetative composition is about 70 percent grasses, 5 percent forbs, and 25 percent shrubs.	Where management results in chronic, repetitive, multi-year improper grazing by livestock or horses, basin wildrye is replaced by woody plants. Rubber rabbitbrush, black greasewood, and basin big sagebrush increase as ecological condition declines. Russian thistle and cheatgrass are species likely to invade this site.

TABLE 3-24 (Cont.)

Ecological Sites for Big Sagebrush Community

Ecological Site Community	Site Descriptor	Soil Type	Potential Native Community	Plant Community Dynamics
Big sagebrush/ bluebunch wheatgrass-Thurber's needlegrass	R025XY014NV	Loamy 10 to 12 inches	The plant community is dominated by bluebunch wheatgrass, Thurber's needlegrass, and big sagebrush. Potential vegetative composition is about 65 percent grasses, 10 percent forbs, and 25 percent shrubs.	Where management results in chronic, repetitive, multi-year improper grazing, big sagebrush and Douglas' rabbitbrush become dominant with increases of bottlebrush squirreltail and Sandberg bluegrass in the understory. Cheatgrass and annual mustards are plants likely to invade this site.
Wyoming big sagebrush/bluebunch wheatgrass-Thurber's needlegrass	R025XY019NV	Loamy 8 to 10 inches	The plant community is dominated by Thurber's needlegrass, bluebunch wheatgrass, and Wyoming big sagebrush. Potential vegetative composition is about 65 percent grasses, 5 percent forbs, and 30 percent shrubs.	As ecological condition declines, big sagebrush and rabbitbrush become dominant with an increase of Sandberg's bluegrass, bottlebrush squirreltail, phlox, and other and mat-forming forbs in the understory. Cheatgrass, halogeton, Russian thistle, and annual mustards are species likely to invade this site. Utah juniper will invade this site where it occurs adjacent to these woodland areas.
Wyoming big sagebrush-black sagebrush/Indian ricegrass	R025XY025NV	Chalky knoll	The plant community is dominated by Indian ricegrass, Wyoming big sagebrush, and black sagebrush. Shrubs dominate the aspect of the site. Antelope bitterbrush, spiny hopsage, and bottlebrush squirreltail are other important species associated with this site. Potential vegetative composition is about 40 percent grasses, 10 percent forbs, and 50 percent shrubs.	As ecological condition declines, rabbitbrush and littleleaf horsebrush increase in density while Indian ricegrass and other perennial grasses are reduced in the understory. Cheatgrass, annual mustards, Russian thistle, halogeton, and Utah juniper are species likely to invade this site.

TABLE 3-24 (Cont.)

Ecological Sites for Big Sagebrush Community

Ecological Site Community	Site Descriptor	Soil Type	Potential Native Community	Plant Community Dynamics
Basin big sagebrush/ basin wildrye	R028BY003NV	Loamy bottom 10 to 14 inches	The plant community is dominated by basin wildrye. Potential vegetative composition is about 85 percent grasses, 5 percent forbs, and 10 percent shrubs.	As ecological condition declines, basin big sagebrush and rabbitbrush increase within the plant community as basin wildrye and Nevada bluegrass decrease. With continued site degradation, rubber rabbitbrush becomes the dominant plant. Species most likely to invade this site are cheatgrass, annual mustards, and thistle.
Big sagebrush/Thurber's needlegrass-greenstem paperflower	R028BY007NV	Loamy 10 to 12 inches	he plant community is dominated by Thurber's needlegrass, bluebunch wheatgrass and big sagebrush. Potential vegetative composition is about 65 percent grasses, 10 percent forbs, and 25 percent shrubs and trees.	Where management results in chronic, repetitive, multi-year improper grazing, big sagebrush, rabbitbrush, bottlebrush squirreltail, and Sandberg bluegrass increase, while Thurber's needlegrass, bluebunch wheatgrass, and other desirable forage species decrease. Cheatgrass readily invades this site following disturbances. Singleleaf pinyon and Utah juniper invade this site where it occurs adjacent to pinyon-juniper woodlands. When pinyon-juniper occupy this site, they compete with other species for available light, moisture, and nutrients. If pinyon-juniper canopies are allowed to close, they can eliminate all understory vegetation.

TABLE 3-24 (Cont.)

Ecological Sites for Big Sagebrush Community

Ecological Site Community	Site Descriptor	Soil Type	Potential Native Community	Plant Community Dynamics
Wyoming big sagebrush/Indian ricegrass-needle-and-thread	R028BY010NV	Loamy 8 to 10 inches	The plant community is dominated by Wyoming big sagebrush, Indian ricegrass, and needle-and-thread. Potential vegetative composition is about 50 percent grasses, 5 percent forbs, and 45 percent shrubs and trees.	As ecological condition declines, Wyoming big sagebrush and Douglas' rabbitbrush increase, while Indian ricegrass and needle-and-thread decrease. Various annual species are likely to invade this site. Utah juniper readily invades this site where it occurs adjacent to this woodland. When Utah juniper occupies this site it competes with other species for available light, moisture, and nutrients. If Utah juniper canopies are allowed to close, they can eliminate all understory vegetation.
Mountain big sagebrush/basin wildrye	R028BY024NV	Loamy bottom 14+ inches	The plant community is dominated by basin wildrye. Potential vegetative composition is about 85 percent grasses, 5 percent forbs, and 10 percent shrubs.	As ecological condition declines, mountain big sagebrush and rabbitbrush increase within the plant community as basin wildrye, slender wheatgrass, and Nevada bluegrass decrease. With continued site degradation, rubber rabbitbrush may become the dominant plant. Species most likely to invade this site are cheatgrass, annual mustards, and thistle.
Mountain big sagebrush/mountain brome-Letterman's needlegrass	R028BY029NV	Loamy 16+ inches	The plant community is dominated by mountain brome and Letterman's needlegrass. The visual aspect is dominated by mountain big sagebrush in association with a variety of mountain browse shrubs.	As ecological condition declines, mountain big sagebrush and snowberry become dominant, while mountain brome and Letterman's needlegrass decrease.

TABLE 3-24 (Cont.)

Ecological Sites for Big Sagebrush Community

Ecological Site Community	Site Descriptor	Soil Type	Potential Native Community	Plant Community Dynamics
Mountain big sagebrush/bluebunch wheatgrass	R028BY030NV	Loamy 12 to 16 inches	The plant community is dominated by bluebunch wheatgrass and mountain big sagebrush. Potential vegetative composition is about 55 percent grasses, 10 percent forbs, and 35 percent shrubs and trees.	As ecological condition declines, rabbitbrush and big sagebrush become more prevalent and may eventually dominate the site as condition further declines. Shallow-rooted bluegrasses, bottlebrush squirreltail, and arrowleaf balsamroot increase in the understory as condition deteriorates. Cheatgrass is the species likely to invade this site. Singleleaf pinyon and Utah juniper readily invade this site. In the absence of natural fire, pinyon-juniper will increase on this site and may eventually dominate the plant community.

3.11.2.2.3 Low Sagebrush

The low sagebrush community is dominated by low sagebrush. Common understory species are bluebunch wheatgrass and Idaho fescue (USDA Natural Resources Conservation Service 2012). Other overstory species commonly found in this community include Nevada ephedra and rabbitbrush, while dominant understory species include squirreltail and cheatgrass. On the 3 Bars Project area, low sagebrush occurs on the alluvial fans, hillslopes, and bottom areas at lower to mid-elevations (6,000 to 8,800 feet amsl). The low sagebrush community covers about 23,228 acres, or 3.1 percent of the project area. According to the ecological site description, low sagebrush communities should cover about 28,914 acres, or 3.9 percent of the 3 Bars project area.

The low sagebrush community is comprised of three ecological sites. Characteristics of these sites are shown in **Table 3-25**. Issues associated with health of the low sagebrush community are similar to those discussed above for big sagebrush, however low sagebrush is much less widespread in the project area.

3.11.2.2.4 Black Sagebrush

The black sagebrush community is dominated by black sagebrush. Common understory species are bluebunch wheatgrass, Indian ricegrass, and needle-and-thread. In the 3 Bars Project area, black sagebrush occurs on summits and slideslopes of lower piedmont slopes and low hills on all exposures, alluvial fans, hillsides, and bottom areas at low to mid-elevations (5,000 to 6,500 feet amsl). The black sagebrush community covers about 62,109 acres, or 8.2 percent of the project area. According to the ecological site description, black sagebrush communities should cover about 77,148 acres, or 10.3 percent of the 3 Bars project area.

The black sagebrush community is comprised of three ecological sites. Characteristics of these sites are shown in **Table 3-26**. Issues associated with health of the black sagebrush community include a lack an understory of native bunchgrasses, and those that support any bunchgrasses typically only support one species, lack of an understory of native perennial forbs, and pinyon-juniper expansion.

3.11.2.2.5 Greasewood

Black greasewood scrub dominates the southern end of the Kobeh Valley at elevations ranging from 5,500 to 6,200 feet amsl. The northern portion of the project area also supports stands of greasewood in low-lying areas. The characteristic overstory shrub is black greasewood. Greasewood is considered a phreatophyte (i.e., a plant that sends its roots into the water table and depends on a constant supply of groundwater). Common understory grasses in greasewood communities include alkali sacaton, salt grass, and basin wildrye. The greasewood community covers about 31,642 acres, or 4.2 percent of the project area. According to the ecological site description, greasewood is expected to cover about 32,392 acres, or 4.3 percent of the project area (USDA Natural Resources Conservation Service 2012). Because greasewood occurs on extremely alkaline substrates, which are generally less suitable for other competing vegetation types, the actual distribution of greasewood in the project area is very similar to what would be expected for its ecological site. The project does not include specific proposed management actions for greasewood communities.

The greasewood community is comprised of four ecological sites. Characteristics of these sites are shown in **Table 3-27**. Cheatgrass invasion is the primary issue affecting the greasewood community.

TABLE 3-25

Ecological Sites for Low Sagebrush Community

Ecological Site Community	Site Descriptor	Soil Type	Potential Native Community	Plant Community Dynamics
Low sagebrush/ Idaho fescue-bluebunch wheatgrass	R025XY017NV	Claypan12 to 16 inches	The plant community is dominated by Idaho fescue, bluebunch wheatgrass, and low sagebrush. Potential vegetative composition is about 60 percent grasses, 15 percent forbs, and 25 percent shrubs.	As ecological condition declines, dwarf sagebrush species and Douglas' rabbitbrush become dominant with increases of bottlebrush squirreltail, Sandberg bluegrass, and mat forming forbs in the understory. Cheatgrass is the species most likely to invade this site.
Low sagebrush/ greenstem paperflower-Thurber's needlegrass	R028BY037NV	Claypan 12 to 14 inches	The plant community is dominated by bluebunch wheatgrass, Thurber's or western needlegrass and low sagebrush. Potential vegetative composition is about 50 percent grasses, 10 percent forbs, and 40 percent shrubs and trees.	As ecological condition declines, rabbitbrush and low sagebrush become dominant with increases of bottlebrush squirreltail and Sandberg bluegrass. Singleleaf pinyon and Utah juniper invade this site where it occurs adjacent to these woodlands. When juniper and pinyon occupy this site, they compete with other species for available light, moisture and nutrients. If pinyon-juniper canopies are allowed to close, they can eliminate all understory vegetation.
Low sagebrush-black sagebrush/ bluebunch wheatgrass	R028BY038NV	Mountain ridge 14+ inches	The plant community is dominated by bluebunch wheatgrass, muttongrass, and low or black sagebrush. Black sagebrush is typically restricted to the ridge crest areas where soil depth is most limiting. Potential vegetative composition is about 45 percent grasses, 10 percent forbs, and 45 percent shrubs.	As ecological condition declines, low sagebrush, black sagebrush, and Douglas' rabbitbrush become dominant with increases of Sandberg bluegrass and phlox in the understory. Phlox, goldenweed, and other mat-forming forbs are usually the dominant herbaceous species on sites in lower condition. Cheatgrass is the species most likely to invade this site.

TABLE 3-26

Ecological Sites for Black Sagebrush Community

Ecological Site Community	Site Descriptor	Soil Type	Potential Native Community	Plant Community Dynamics
Black sagebrush/Indian ricegrass/needle-and-thread	R028BY011NV	Shallow calcareous loam 8 to 10 inches	The plant community is dominated by black sagebrush, Indian ricegrass, and needle-and-thread. Potential vegetative composition is about 50 percent grasses, 5 percent forbs, and 45 percent shrubs.	As ecological condition declines, black sagebrush, rabbitbrush, and shadscale increase, while perennial grasses, palatable shrubs, and forbs decrease. Cheatgrass and halogeton are species likely to invade on this site. Rodent activity is typically evidenced by small patches dominated by spiny hopsage. Utah juniper readily invades this site where it occurs adjacent to these woodlands. When Utah juniper occupies this site, it competes with other species for available light, moisture, and nutrients. If tree canopies are allowed to close, they can eliminate all understory vegetation.
Black sagebrush/Indian ricegrass/needle-and-thread	R028BY016NV	Shallow calcareous slope 8 to 10 inches	The plant community is dominated by black sagebrush, Indian ricegrass, and needle-and-thread. Potential vegetative composition is about 40 percent grasses, 5 percent forbs, and 55 percent shrubs and trees.	As ecological condition declines, black sagebrush, small rabbitbrush, and shadscale increase, while perennial grasses and forbs are reduced in the understory. Cheatgrass, Russian thistle, and halogeton are species likely to invade this site. Utah juniper readily invades this site where it occurs adjacent to these woodlands. When Utah juniper occupies this site, it competes with other species for available light, moisture, and nutrients. If the juniper canopy is allowed to close, it can eliminate all understory vegetation.
Black sagebrush/bluebunch wheatgrass	R028BY027NV	Shallow calcareous slope 14+ inches	The plant community is dominated by bluebunch wheatgrass and black sagebrush. Potential vegetative composition is about 65 percent grasses, 10 percent forbs, and 25 percent shrubs.	Black sagebrush and rabbitbrush will increase, while bluebunch wheatgrass and other desirable grasses will decrease with excessive use by cattle and horses. With excessive use by sheep, black sagebrush, muttongrass, and forbs decrease as bluebunch wheatgrass initially increases.

3.11.2.2.6 Salt Desert Scrub

Salt desert scrub vegetation typically occurs in saline areas along drainages, margins of lake beds and marshes, and on flats and basins. In the 3 Bars Project area, this community occurs at elevations between 5,500 and 6,200 feet amsl. The salt desert scrub community covers about 28,061 acres, or 3.7 percent of the project area. According to the ecological site description, salt desert scrub dominated by shadscale is expected to cover about 29,552 acres, or 3.9 percent of the 3 Bars Project area (USDA Natural Resources Conservation Service 2012). Other species present in this community include Indian ricegrass, squirreltail, bud sagebrush, iodine bush, halogeton, spiny hopsage, salt grass, and rock willow. The overall composition for sites with this vegetation type shows that they often have low grass production. The dominant grass species, such as bottlebrush squirreltail and Indian ricegrass, are often absent from the sites (Eastern Nevada Landscape Coalition and AECOM 2012). However, this community is relatively limited on the 3 Bars Project area, and no management actions specific to salt desert scrub are proposed.

The salt desert scrub community is comprised of four ecological sites. Characteristics of these sites are shown in **Table 3-28**.

3.11.2.2.7 Aspen

Since European settlement, the occurrence of aspen in the American West has declined from nearly 10 million acres to 4 million acres (about a 60 percent decline). Eighty percent of remaining aspen stands are being invaded by native conifers. In a study of 100 aspen stands in southeastern Oregon, northeastern California, and northwestern Nevada, 12 percent of the aspen stands were completely replaced by western juniper. These stands were identified as previously being dominated by aspen based on the high density of dead aspen logs in the understory. In addition, post-settlement western juniper was the dominant tree species in 23 percent of the stands and common to co-dominant in 42 percent of the aspen stands (Miller et al. 2005).

Quaking aspen occurs in isolated stands in riparian habitats within the project area and is found in deep to very deep soils (see **Figure 3-26**). The aspen community covers 533 acres, or 0.1 percent of the 3 Bars Project area (USGS 2004, USDOI BLM 2010d, USDA Natural Resources Conservation Service 2012). Aspen communities have the highest biodiversity of any upland forest type in the Intermountain West, supplying important wildlife forage, cover, and nesting sites (Finch and Ruggiero 1993).

Aspen are clonal, relying on root sprouting to reproduce and spread. They are also fire-adapted, and require periodic disturbance such as fire to stimulate root suckering and reduce competition from conifers (Bartos and Mueggler 1979, 1981, Bartos et al. 1991, 1994, Shepperd 1993, Shepperd and Smith 1993; *all in* Kay 2001). Successful aspen seeding is rare; according to Kay (2001) there hasn't been suitable climatic condition for aspen seedling success for thousands of years. Because aspen trees are short-lived, ongoing regeneration is important for the long-term persistence of aspen stands.

A 2001 study of aspen stands in the Roberts Mountains area concluded that aspen are generally in poor condition and that many stands are not readily regenerating (Kay 2001). The BLM has also observed that aspen regeneration and recruitment are below their potential throughout the 3 Bars Project area. While fire suppression may be a contributing factor, ungulate herbivory of new growth from root suckers appears to be the primary factor preventing successful regeneration of aspen stands. Aspen regeneration is a key management concern and aspen enhancement is one of the primary goals of the 3 Bars project.

TABLE 3-27

Ecological Sites for Greasewood Community

Ecological Site Community	Site Descriptor	Soil Type	Potential Native Community	Plant Community Dynamics
Greasewood/basin wildrye	R024XY007NV	Saline bottom	The plant community is dominated by basin wildrye. Black greasewood is the dominant shrub. Potential vegetative composition is about 70 percent grasses, 5 percent forbs, and 25 percent shrubs.	Where management results in excessive grazing use by livestock, rabbitbrush, and black greasewood increase and become the dominant vegetation in lower condition classes. Inland saltgrass increases as condition declines and usually dominates the understory during low ecological conditions.
Greasewood/basin wildrye-saltgrass	R024XY011NV	Sodic flat 6 to 8 inches	The plant community is dominated by black greasewood. Potential vegetative composition is about 25 percent grasses, 5 percent forbs, and 70 percent shrubs.	Herbaceous understory is reduced or eliminated and the site becomes a nearly pure stand of black greasewood. Halogeton, fivehook bassia, and annual mustards are species likely to invade this site.
Greasewood/basin wildrye-alkali sacaton	R028BY004NV	Saline bottom	The plant community is dominated by basin wildrye and alkali sacaton. Potential vegetative composition is about 80 percent grasses and grass-like plants, 5 percent forbs, and 15 percent shrubs.	As ecological condition declines, black greasewood and rubber rabbitbrush increase, while basin wildrye and alkali sacaton decrease. With further site degradation, rubber rabbitbrush typically becomes the dominant species.
Greasewood/alkali sacaton-saltgrass	R028BY020NV	Sodic flat 5 to 8 inches	The plant community is dominated by black greasewood, alkali sacaton and inland saltgrass. Vegetation on this site is normally restricted to coppice mound areas that are surrounded by playa-like depressions or nearly level, usually barren, interspaces. Potential vegetative composition is about 15 percent grasses, 5 percent forbs, and 80 percent shrubs.	As ecological condition declines, the herbaceous understory is reduced or eliminated and the site becomes a community of halophytic shrubs dominated by black greasewood. Halogeton and annual mustards are species likely to invade this site.

TABLE 3-28

Ecological Sites for Salt Desert Scrub Community

Ecological Site Community	Site Descriptor	Soil Type	Potential Native Community	Plant Community Dynamics
Shadscale saltbush-bud sagebrush/ squirreltail-Indian ricegrass	R024XY002NV	Loamy 5 to 8 inches	The plant community is dominated by shadscale, bud sagebrush, and Indian ricegrass. Potential vegetative composition is about 25 percent grasses, 5 percent forbs, and 70 percent shrubs.	Where management results in chronic, repetitive, multi-year improper grazing by livestock or horses, shadscale increases in density while Indian ricegrass and bud sagebrush composition is reduced. With further site degradation, shadscale may become dominant to the extent of a nearly pure stand. Cheatgrass, halogeton, and tansy mustard are likely to invade this site.
Shadscale saltbush-rock willow/ squirreltail	R024XY003NV	Sodic terrace 6 to 8 inches	The plant community is dominated by shadscale and black greasewood. Potential vegetative composition is about 10 percent grasses, 5 percent forbs, and 85 percent shrubs.	Where management results in chronic, repetitive, multi-year improper grazing by livestock or horses, black greasewood and seepweed increase in density as perennial grass species decline. Russian thistle, annual mustards, and halogeton are species likely to invade disturbed areas on this site.
Winterfat/Indian ricegrass	R028BY013NV	Silty 8-10 inches	The plant community is dominated by winterfat and Indian ricegrass. Potential vegetative composition is about 30 percent grasses, 5 percent forbs, and 65 percent shrubs.	As ecological condition declines, bottlebrush squirreltail and shadscale increase as winterfat and Indian ricegrass decrease. With further site deterioration, cheatgrass, halogeton and annual mustards invade the interspace areas between shrub species. On heavily disturbed sites, these annual species, particularly halogeton, become dominant. Soils of this site are easily eroded and gullies often form, interrupting the overland flow patterns. As gullies begin to form, this site grades into the Silty Plain (028BY054NV) or Loamy Fan 8-1 inches (028BY045NV) sites.
Shadscale saltbush/ Indian ricegrass-squirreltail	R028BY017NV	Loamy 5 to 8 inches	The plant community is dominated by Indian ricegrass, bottlebrush squirreltail, and shadscale. Potential vegetative composition is about 30 percent grasses, 5 percent forbs, and 65 percent shrubs	As ecological condition declines, shadscale increases in density, while Indian ricegrass, bottlebrush squirreltail, and bud sagebrush compositions are reduced. With further site degradation, shadscale may become dominant to the extent of a nearly pure stand. Cheatgrass, halogeton, and tansy mustard are species likely to invade this site.

3.11.2.2.8 Mountain Mahogany Woodland

Curl-leaf mountain mahogany woodlands occur in hills and mountain ranges of the intermountain basins. This vegetation type occurs on rocky outcrops or escarpments and forms small- to large-patch stands in woodland areas. Most stands occur as shrublands on ridges and steep rimrock slopes, but may also occur as small trees in steppe areas. The mountain mahogany woodland community covers about 4,275 acres, or 0.6 percent of the project area. According to the USDA Natural Resources Conservation Service (2012) ecological site description, mountain mahogany woodland is expected to cover about 13,730 acres, or 1.8 percent of the 3 Bars Project area. Elevations range from 6,800 to 9,800 feet amsl. Curl-leaf mountain mahogany, mountain big sagebrush, greenstem paperflower, and Thurber's needlegrass are characteristic species of this vegetation community. Other associated species may include antelope bitterbrush, manzanita, gooseberry, or snowberry. Scattered junipers or pines may also occur. Curl-leaf mountain mahogany is a slow-growing, drought-tolerant species that generally does not resprout after burning and needs the protection from fire that rocky sites provide. In some instances, mountain mahogany is being impacted by pinyon-juniper encroachment or infilling, making this species more susceptible to impacts from fire. Mountain mahogany stands in the project area appear to be in fairly healthy condition, and no management activities specifically targeting mountain mahogany communities are proposed.

The mountain mahogany community is comprised of two ecological sites. Characteristics of these sites are shown in **Table 3-29**.

3.11.2.2.9 Pinyon-juniper Woodland

Pinyon-juniper woodlands generally occur on steep south-trending hillsides and mountains at all aspects, between 5,500 and 8,600 feet amsl. This vegetation type generally occurs on shallow, loamy soils with high percentages of coarse fragments. Singleleaf pinyon pine and Utah juniper dominate the overstory. The understory is often nothing more than barren soil in dense stands of pinyon-juniper. According to the ecological site description for this association, the potential natural vegetation includes Thurber's needlegrass, bluebunch wheatgrass, black sagebrush, Mountain big sagebrush, Indian ricegrass, and greenstem paperflower (USDOI BLM 2012c, Eastern Nevada Landscape Coalition and AECOM 2012). Other shrubs present include antelope bitterbrush and rabbitbrush. Additional grasses include Sandberg bluegrass, bottlebrush squirreltail, Idaho fescue, and basin wildrye.

The pinyon-juniper community is comprised of nine ecological sites. Characteristics of these sites are shown in **Table 3-30**.

Based on the project-specific mapping, pinyon-juniper woodlands cover approximately 190,357 acres, or 25.4 percent of the project area. These include areas with Phase II and III stands (see below for a description of phases), but not Phase I stands. According to the ecological site description, this vegetation type would be expected to be present on approximately 209,176 acres or 27.9 percent of the project area. The difference (approximately 18,819 acres) shows that pinyon-juniper is less common that it was historically. This may reflect, in part, the extensive use of pinyon-juniper in the making of charcoal in the late 1800s (see Section 3.11.2.6), and recent fires (1999 to present), that removed a substantial acreage of pinyon-juniper on the Simpson Park Mountains and Sulphur Spring Range and on Roberts Mountains. However, if Phase I stands are also considered, there are about 118,000 more acres with pinyon-juniper than would be expected under normal conditions. The Phase I acreage demonstrates the rapid expansion of pinyon-juniper woodland in the project area at the expense of other potential natural vegetation.

TABLE 3-29

Ecological Sites for Mountain Mahogany Community

Ecological Site Community	Site Descriptor	Soil Type	Potential Native Community	Plant Community Dynamics
Curl-leaf mountain mahogany/mountain big sagebrush/ greenstem paperflower-Thurber's needlegrass	R028BY042NV	Mahogany thicket	The plant community is dominated by curl-leaf mountain mahogany, but trees such as singleleaf pinyon pine, Utah juniper, white fir, and limber pine may occur sporadically in the overstory canopy. Mountain big sagebrush and snowberry are the principal understory shrubs. Bluebunch wheatgrass and Thurber's needlegrass are the most prevalent understory grasses. Total overstory canopy cover exceeds 45 percent. Understory vegetation comprises less than 10 percent of the total site production. Potential vegetative composition for the understory is about 55 percent grasses, 10 percent forbs, and 35 percent shrubs. The overstory of curl-leaf mountain mahogany is about 85 percent of the total site production.	As ecological condition declines, the understory grasses and forbs are reduced as mountain big sagebrush and snowberry increase. Heavy utilization by livestock and/or wildlife will cause the reproduction and overall production of curl-leaf mountain mahogany to be severely impacted. Cheatgrass is the species most likely to invade this site.
Curl-leaf mountain mahogany/mountain big sagebrush/ greenstem paperflower-needlegrass	R028BY043NV	Calcareous mahogany savanna	The plant community is dominated by curl-leaf mountain mahogany. Mountain big sagebrush is the principal understory shrub. Bluebunch wheatgrass, western needlegrass, Columbia needlegrass, and Letterman's needlegrass are the most prevalent understory grasses. Total overstory canopy cover is less than 50 percent. Understory vegetation comprises about 20 percent of the total site production. Potential vegetative composition for the understory is about 55 percent grasses, 10 percent forbs, and 35 percent shrubs. Overstory trees and tree-like shrub composition is about 80 percent of the total site production.	As ecological condition declines, understory grasses and forbs are reduced as mountain big sagebrush and Douglas' rabbitbrush increase. Heavy utilization by livestock and wildlife will result in most of the foliage of the mountain mahogany growing above the reach of browsing animals and will severely limit production. Cheatgrass is the species most likely to invade this site.

TABLE 3-30

Ecological Sites for Pinyon-juniper Community

Ecological Site Community	Site Descriptor	Soil Type	Potential Native Community	Plant Community Dynamics
Singleleaf pinyon-Utah juniper/mountain big sagebrush/ bluebunch wheatgrass-Thurber's needlegrass	F024XY049NV	NA	An overstory canopy cover of 20 to 35 percent is assumed to be representative of tree dominance on this site in the pristine environment. Wildfire is recognized as a natural disturbance that influenced the structure and composition of the climax vegetation of this woodland site. This site is dominated by singleleaf pinyon pine and Utah juniper. Mountain big sagebrush is the principal understory shrub. Bluebunch wheatgrass, Indian ricegrass, and Thurber's needlegrass are the most prevalent understory grasses. Overstory tree canopy composition is about 50 to 70 percent Utah juniper and about 30 to 50 percent singleleaf pinyon pine. Understory vegetative composition is about 60 percent grasses, 10 percent forbs, and 30 percent shrubs and young trees when the average overstory canopy is medium (20 to 35 percent). Average understory production ranges from 300 to 700 pounds per acre with a medium canopy cover. Understory production includes the total annual production of all species within 4.5 feet of the ground surface.	NA

TABLE 3-30 (Cont.)

Ecological Sites for Pinyon-juniper Community

Ecological Site Community	Site Descriptor	Soil Type	Potential Native Community	Plant Community Dynamics
Utah juniper-singleleaf pinyon/ Wyoming big sagebrush/Thurber's needlegrass	F024XY050NV	NA	An overstory canopy of 20 to 35 percent is assumed to be representative of tree dominance on this site in the pristine environment. Wildfire is recognized as a natural disturbance that strongly influenced the structure and composition of the climax vegetation of this woodland site. This site is dominated by Utah juniper and singleleaf pinyon pine. Wyoming big sagebrush is the principal understory shrub. Thurber's needlegrass, bluebunch wheatgrass, and bluegrasses are the most prevalent understory grasses. Overstory tree canopy composition is about 60 to 80 percent Utah juniper and about 20 to 40 percent singleleaf pinyon. Understory vegetative composition is about 50 percent grasses, 10 percent forbs, and 40 percent shrubs and young trees when the average overstory canopy is medium (20 to 35 percent). Average understory production ranges from 200 to 500 pounds per acre with a medium canopy cover. Understory production includes the total annual production of all species within 4.5 feet of the ground surface.	NA

TABLE 3-30 (Cont.)

Ecological Sites for Pinyon-juniper Community

Ecological Site Community	Site Descriptor	Soil Type	Potential Native Community	Plant Community Dynamics
Singleleaf pinyon-Utah juniper/black sagebrush/Thurber's needlegrass-bluebunch wheatgrass	F024XY051NV	NA	An overstory canopy of 20 to 35 percent is assumed to be representative of tree dominance on this site in the pristine environment. Wildfire is recognized as a natural disturbance that strongly influenced the structure and composition of the climax vegetation of this woodland site. This site is dominated by singleleaf pinyon pine and Utah juniper. Black sagebrush is the principal understory shrub. Bluebunch wheatgrass, bluegrass, Thurber's needlegrass and Indian ricegrass are the most prevalent understory grasses. Overstory tree canopy composition is about 50 to 70 percent Utah juniper and about 30 to 50 percent singleleaf pinyon. Understory vegetative composition is about 35 percent grasses, 15 percent forbs, and 50 percent shrubs and young trees when the average overstory canopy is medium (20 to 35 percent). Average understory production ranges from 250 to 500 pounds per acre with a medium canopy cover. Understory production includes the total annual production of all species within 4.5 feet of the ground surface.	NA

TABLE 3-30 (Cont.)

Ecological Sites for Pinyon-juniper Community

Ecological Site Community	Site Descriptor	Soil Type	Potential Native Community	Plant Community Dynamics
Singleleaf pinyon-Utah juniper/black sagebrush/ mountain big sagebrush/ Thurber's needlegrass-bluebunch wheatgrass	F024XY051NV/ F024XY049NV	NA	An overstory canopy of 20 to 35 percent is assumed to be representative of tree dominance on this site in the pristine environment. Wildfire is recognized as a natural disturbance that strongly influenced the structure and composition of the climax vegetation of this woodland site. This site is dominated by singleleaf pinyon pine and Utah juniper. Black sagebrush is the principal understory shrub. Bluebunch wheatgrass, bluegrass, Thurber's needlegrass and Indian ricegrass are the most prevalent understory grasses. Overstory tree canopy composition is about 50 to 70 percent Utah juniper and about 30 to 50 percent singleleaf pinyon. Understory vegetative composition is about 35 percent grasses, 15 percent forbs, and 50 percent shrubs and young trees when the average overstory canopy is medium (20 to 35 percent). Average understory production ranges from 250 to 500 pounds per acre with a medium canopy cover. Understory production includes the total annual production of all species within 4.5 feet of the ground surface.	NA

TABLE 3-30 (Cont.)

Ecological Sites for Pinyon-juniper Community

Ecological Site Community	Site Descriptor	Soil Type	Potential Native Community	Plant Community Dynamics
Utah juniper/ Wyoming big sagebrush/ bluebunch wheatgrass-Thurber's needlegrass	F025XY059NV	NA	This site is dominated by Utah juniper. Wyoming big sagebrush is the principal understory shrub. Bluebunch wheatgrass, Thurber's needlegrass, Indian ricegrass, and bluegrasses are the most prevalent understory grasses. Phlox and milkvetch are common understory forbs. Overstory tree canopy composition is 100 percent Utah juniper. An overstory canopy cover of 20 to 35 percent is assumed to be representative of tree dominance on this site in the pristine environment. Wildfire is recognized as a natural disturbance that strongly influenced the structure and composition of the climax vegetation of this woodland site. Understory vegetative composition is about 50 percent grasses, 20 percent forbs, and 30 percent shrubs and young trees when the average overstory canopy is medium (20 to 35 percent). Average understory production ranges from 200 to 500 pounds per acre with a medium canopy cover. Understory production includes the total annual production of all species within 4.5 feet of the ground surface.	NA

TABLE 3-30 (Cont.)

Ecological Sites for Pinyon-juniper Community

Ecological Site Community	Site Descriptor	Soil Type	Potential Native Community	Plant Community Dynamics
Singleleaf pinyon-Utah juniper/black sagebrush/ bluebunch wheatgrass-Indian ricegrass	F028BY060NV	NA	An overstory canopy of 20 to 35 percent is assumed to be representative of tree dominance on this site in the pristine environment. Wildfire is recognized as a natural disturbance that strongly influenced the structure and composition of the climax vegetation of this woodland site. This site is dominated by singleleaf pinyon pine and Utah juniper. Black sagebrush is the principal understory shrub. Bluebunch wheatgrass, bluegrass, Thurber's needlegrass, and Indian ricegrass are the most prevalent understory grasses. Overstory tree canopy composition is about 50 to 70 percent Utah juniper and about 30 to 50 percent singleleaf pinyon. Understory vegetative composition is about 35 percent grasses, 15 percent forbs, and 50 percent shrubs and young trees when the average overstory canopy is medium (20 to 35 percent). Average understory production ranges from 250 to 500 pounds per acre with a medium canopy cover. Understory production includes the total annual production of all species within 4.5 feet of the ground surface.	NA

TABLE 3-30 (Cont.)

Ecological Sites for Pinyon-juniper Community

Ecological Site Community	Site Descriptor	Soil Type	Potential Native Community	Plant Community Dynamics
Singleleaf pinyon-Utah juniper/ Wyoming big sagebrush/ bluebunch wheatgrass-Indian ricegrass	F028BY061NV	NA	An overstory canopy of 20 to 35 percent is assumed to be representative of tree dominance on this site in the pristine environment. Wildfire is recognized as a natural disturbance that strongly influences the structure and composition of the climax vegetation of this woodland site. This site is dominated by Utah juniper and singleleaf pinyon pine. Wyoming big sagebrush is the principal understory shrub. Bluebunch wheatgrass and Thurber's needlegrass are the most prevalent understory grasses. Overstory tree canopy composition is about 50 to 70 percent Utah juniper and about 30 to 50 percent singleleaf pinyon. Understory vegetative composition is about 50 percent grasses, 10 percent forbs, and 40 percent shrubs and young trees when the average overstory canopy is medium (20 to 35 percent). Average understory production ranges from 200 to 500 pounds per acre with a medium canopy cover. Understory production includes the total annual production of all species within 4.5 feet of the ground surface.	NA

TABLE 3-30 (Cont.)

Ecological Sites for Pinyon-juniper Community

Ecological Site Community	Site Descriptor	Soil Type	Potential Native Community	Plant Community Dynamics
Singleleaf pinyon-Utah juniper/mountain big sagebrush/ bluebunch wheatgrass	F028BY062NV	NA	This site is dominated by singleleaf pinyon and Utah juniper. An overstory canopy of 20 to 35 percent is assumed to be representative of tree dominance on this site in the pristine environment. Mountain big sagebrush is the principal understory shrub. Bluebunch wheatgrass, Indian ricegrass, and Thurber's needlegrass are the most prevalent understory grasses. Overstory tree canopy composition is about 50 to 70 percent Utah juniper and about 30 to 50 percent singleleaf pinyon. Understory vegetative composition is about 60 percent grasses, 10 percent forbs, and 30 percent shrubs and young trees when the average overstory canopy is medium (20 to 35 percent). Average understory production ranges from 300 to 700 pounds per acre with a medium canopy cover. Understory production includes the total annual production of all species within 4.5 feet of the ground surface.	NA

TABLE 3-30 (Cont.)

Ecological Sites for Pinyon-juniper Community

Ecological Site Community	Site Descriptor	Soil Type	Potential Native Community	Plant Community Dynamics
Singleleaf pinyon-Utah juniper/ mountain big sagebrush/ bluebunch wheatgrass-Thurber's needlegrass-greenstem paperflower	R028BY007NV/ F024XY049NV	Loamy 10 to 12 inches	The understory plant community is dominated by Thurber's needlegrass, bluebunch wheatgrass, and big sagebrush. Potential vegetative composition is about 65 percent grasses, 10 percent forbs, and 25 percent shrubs and trees. An overstory canopy of 20 to 35 percent is assumed to be representative of tree dominance on this site in the pristine environment. Wildfire is recognized as a natural disturbance that strongly influenced the structure and composition of the climax vegetation of this woodland site. This site is dominated by singleleaf pinyon and Utah juniper. Black sagebrush is the principal understory shrub. Bluebunch wheatgrass, bluegrass, Thurber's needlegrass, and Indian ricegrass are the most prevalent understory grasses. Overstory tree canopy composition is about 50 to 70 percent Utah juniper and about 30 to 50 percent singleleaf pinyon. Understory vegetative composition is about 35 percent grasses, 15 percent forbs, and 50 percent shrubs and young trees when the average overstory canopy is medium (20 to 35 percent). Average understory production ranges from 250 to 500 pounds per acre with a medium canopy cover. Understory production includes the total annual production of all species within 4.5 feet of the ground surface.	Where management results in chronic, repetitive, multi-year improper grazing, big sagebrush, rabbitbrush, bottlebrush squirreltail, and Sandberg's bluegrass increase, while Thurber needlegrass, bluebunch wheatgrass, and other desirable forage species decrease. Cheatgrass readily invades this site following disturbances. Singleleaf pinyon pine and Utah juniper invade this site where it occurs adjacent to pinyon-juniper woodlands. When pinyon and juniper occupy this site they compete with other species for available light, moisture, and nutrients. If pinyon-juniper canopies are allowed to close, they can eliminate all understory vegetation.

NA = Not applicable.

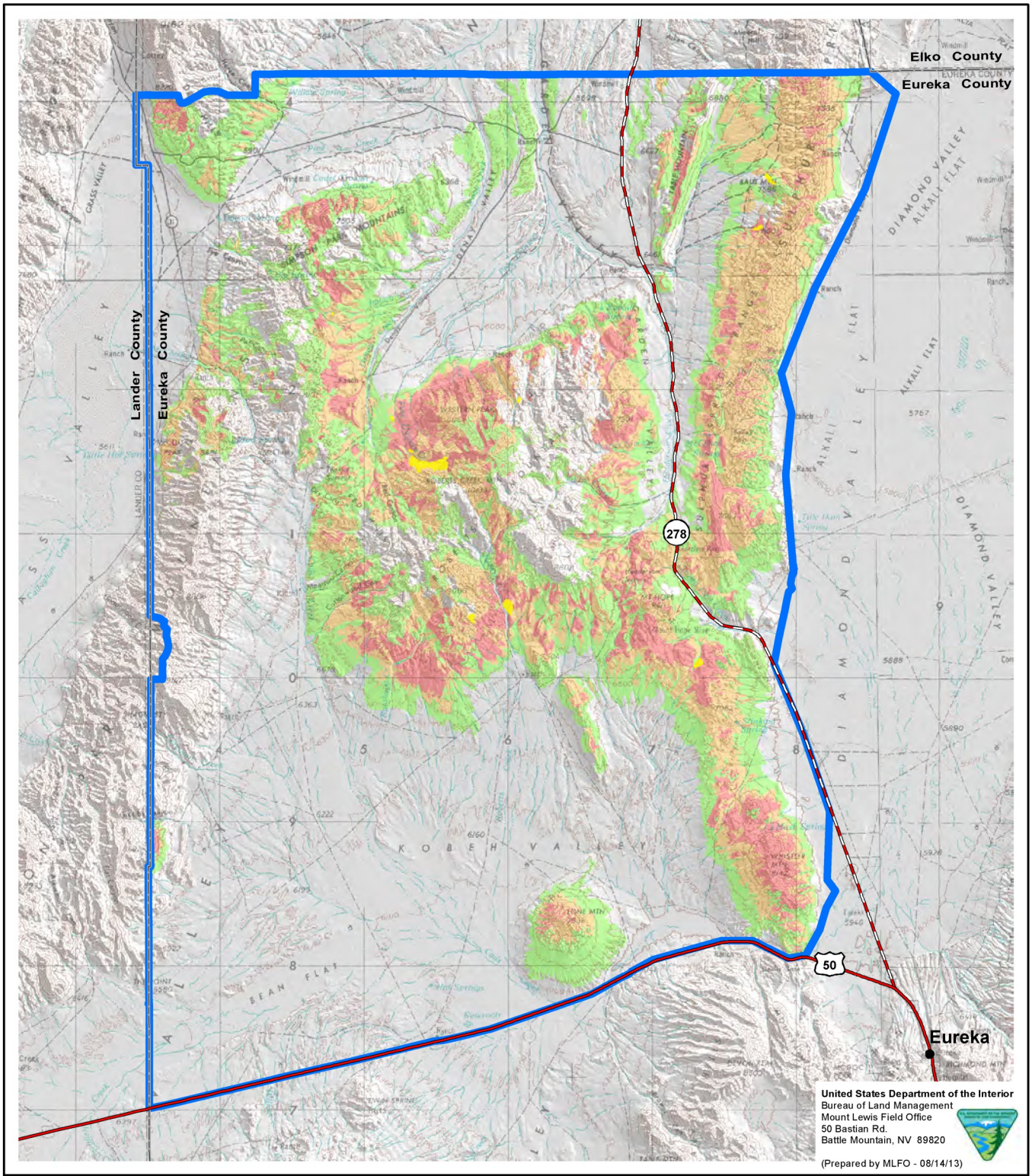
One resource management focus of the 3 Bars project is the overall distribution and structure of pinyon-juniper woodlands within the project area. In the Great Basin, pinyon-juniper have expanded outside of their historical range, and the density of trees has increased in older stands. Since the advent of fire suppression, there has been a migration of pinyon-juniper habitat into sagebrush steppe communities. Sagebrush on much of the 3 Bars Project area has also been replaced with pinyon-juniper woodlands (USDOI BLM 2009a, 2012c, AECOM 2011a, Eastern Nevada Landscape Coalition and AECOM 2012). Many of these indicators have been observed in Phase III (or late successional) pinyon-juniper woodlands, which generally have a high density of trees and buildup of fuels. The BLM considers two classification schemes when assessing the condition of pinyon-juniper woodlands. One scheme is based on historical types of pinyon-juniper vegetation (Romme et al. 2007), and one is based on transitional phases of woodland succession for mountain big sagebrush associations (Miller et al. 2008). These classification systems are summarized in **Table 3-31**.

Generally, areas of potential expansion are areas in which pinyon-juniper woodlands have not historically been present. These areas are targeted by the BLM for treatments to restore historical community types. Phase III woodlands have the greatest tree density, and the greatest amount of canopy fuels, which puts them at increased risk for loss from high intensity fires (Tausch 1999 *in* Miller et al. 2008). According to Miller et al. (2008), however, treatments in Phase I and II expansion woodlands to halt their succession to Phase III woodlands may be more successful and cost-effective than treatments in Phase III woodlands. **Figure 3-28** differentiates expansion areas from areas of historic occurrence. Based on this mapping, approximately 46 percent of areas with trees are in Phase I, 35 percent are in Phase II, and 19 percent are in Phase III (AECOM 2011a). However, pinyon-juniper trees occupy only a portion of the area delineated into phases, especially for areas dominated by Phase I and II pinyon- juniper. In Phase I areas, grasses, forbs, and shrubs comprise much, if not most of the area. Areas of recent pinyon-juniper expansion seem to be most prevalent at the lowest elevations, where topography is gentle (AECOM 2011a).

Old growth pinyon-juniper stands are 140 years old or greater. Because age is difficult to estimate from tree core samples from Utah juniper trees, cores from singleleaf pinyon pines are typically used to determine the age of a particular stand of trees. Old-growth pinyon-juniper stands tend to occur on slopes, ridges, and inaccessible areas (i.e., areas not easily logged; AECOM 2011a). Areas having old growth pinyon-juniper woodlands are Indian Springs, Pete Hanson Creek, higher elevations on steep slopes, and the northern portion of the Sulphur Spring Range. Based on sample tree cores from the 3 Bars Project area, the majority of old-growth trees are between 160 and 200 years old, and as old as 290 years (AECOM 2011a). As discussed in Section 3.11.2.6, much of the older pinyon-juniper was harvested to make charcoal for the mining industry in the mid-1800s.

The following indicators of decline in the health of pinyon-juniper woodlands have been observed within the project area:

- Lack of understory species diversity, and absence or decline in associated woodland species (e.g., aspen, bitterbrush, and curl-leaf mountain mahogany).
- Widespread occurrence of Fire Regime Condition Class II and III (fire regimes that have been moderately or significantly altered from their historical range) due to excessive fuel loadings.
- Decreased tree vigor and pine nut production.
- Increased pathogen infestations resulting in greater than 20 percent ongoing mortality within a given stand.
- Stand conditions in excess of 1,200 trees per acre in several watersheds.



Legend

Pinyon-juniper Succession

- Phase I
- Phase II
- Phase III
- Pinyon-juniper Old Growth
- 3 Bars Project Area

Source: AECOM 2011a.

3 Bars Ecosystem and Landscape Restoration Project

Figure 3-28

Pinyon-juniper Phase Classes

0 1 2 3 4 5 10 Miles

0 1 2 3 4 5 10 Kilometers

N

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Original data were compiled from various sources. This information may not meet National Map Accuracy Standards.
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- Expansion onto adjacent range sites and encroachment into the interspaces within woodland sites including important wildlife and greater sage-grouse habitats.

Many of these indicators have been observed in Phase III (or late successional) pinyon-juniper woodlands, which generally have a high density of trees and buildup of fuels.

3.11.2.3 Allotment Vegetation and Monitoring Studies

Rangeland systems common to the 3 Bars ecosystem consist of shrublands with a bunchgrass understory (Eastern Nevada Landscape Coalition and AECOM 2012). Overall, the area is experiencing issues with invasive annual grass species (mainly cheatgrass) that are altering the fire regime, as discussed in Section 3.12 (Noxious Weeds and other Invasive Non-native Vegetation). Large wildfires, caused by a buildup of cheatgrass and shrubs, are compromising the health of the sagebrush-steppe habitat. The encroachment of pinyon-juniper woodlands is also compromising the health of the sagebrush-steppe habitat.

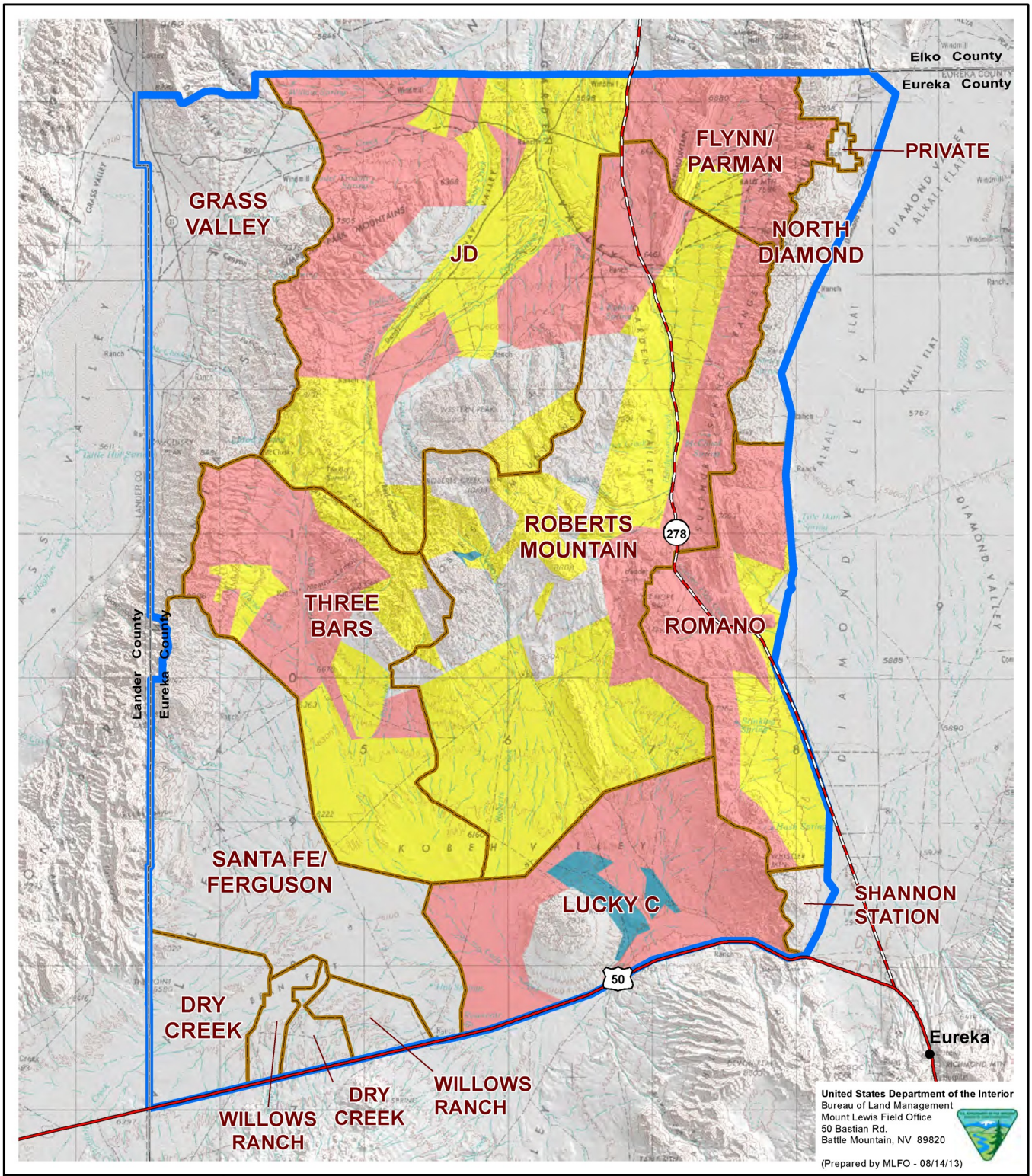
TABLE 3-31

Pinyon-juniper Classification Schemes

Classification	Description
Historical Based System[1]	
Persistent Woodlands	Vary from sparse stands of small trees growing in poor substrates to relatively dense stands of large trees on productive sites. However, by definition they are communities in which pinyon pine and/or juniper are dominant species (historically and currently).
Pinyon-juniper Savannas	Predominantly found on gentle upland and transitional valley locations, where soil conditions favor grasses (or other grass-like plants), but can support at least some tree cover.
Areas of Potential Expansion	Occur when pinyon pine and juniper expand into new areas where they were not found historically.
Transitional Phases of Woodland Succession System[2]	
Phase I (early)	Trees are present, but shrubs and herbs are the dominant vegetation that influence ecological processes on the site.
Phase II (mid)	Trees are co-dominant with shrubs and herbs, and all three vegetation layers influence ecological processes on the site.
Phase III (late)	Trees are the dominant vegetation and the primary plant layer influencing ecological processes on the site.

[1] Romme et al. (2007).
[2] Miller et al. (2008).

Rangeland health studies were conducted in six allotments between December 2010 and September 2011 (**Figure 3-29**). Seventy Key Management Areas (KMAs) within these allotments were assessed for their ecological status. These areas were selected because they met the following criteria:



Legend

Successional Status

- Early (0-25%)
- Mid (25-50%)
- Late (51-76%)
- Not Available
- Allotment Boundary
- 3 Bars Project Area

Source: BLM 2012g, ENLC and AECOM 2012.

3 Bars Ecosystem and Landscape Restoration Project

Figure 3-29

Current Rangeland Conditions

0 1 2 3 4 5 10 Miles

0 1 2 3 4 5 10 Kilometers

N

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Original data were compiled from various sources. This information may not meet National Map Accuracy Standards.
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- representative of larger areas of interest;
- contained within a single ecological site and plant community;
- contain key species; and
- capable of responding to management action that would be indicative of a response on a larger scale.

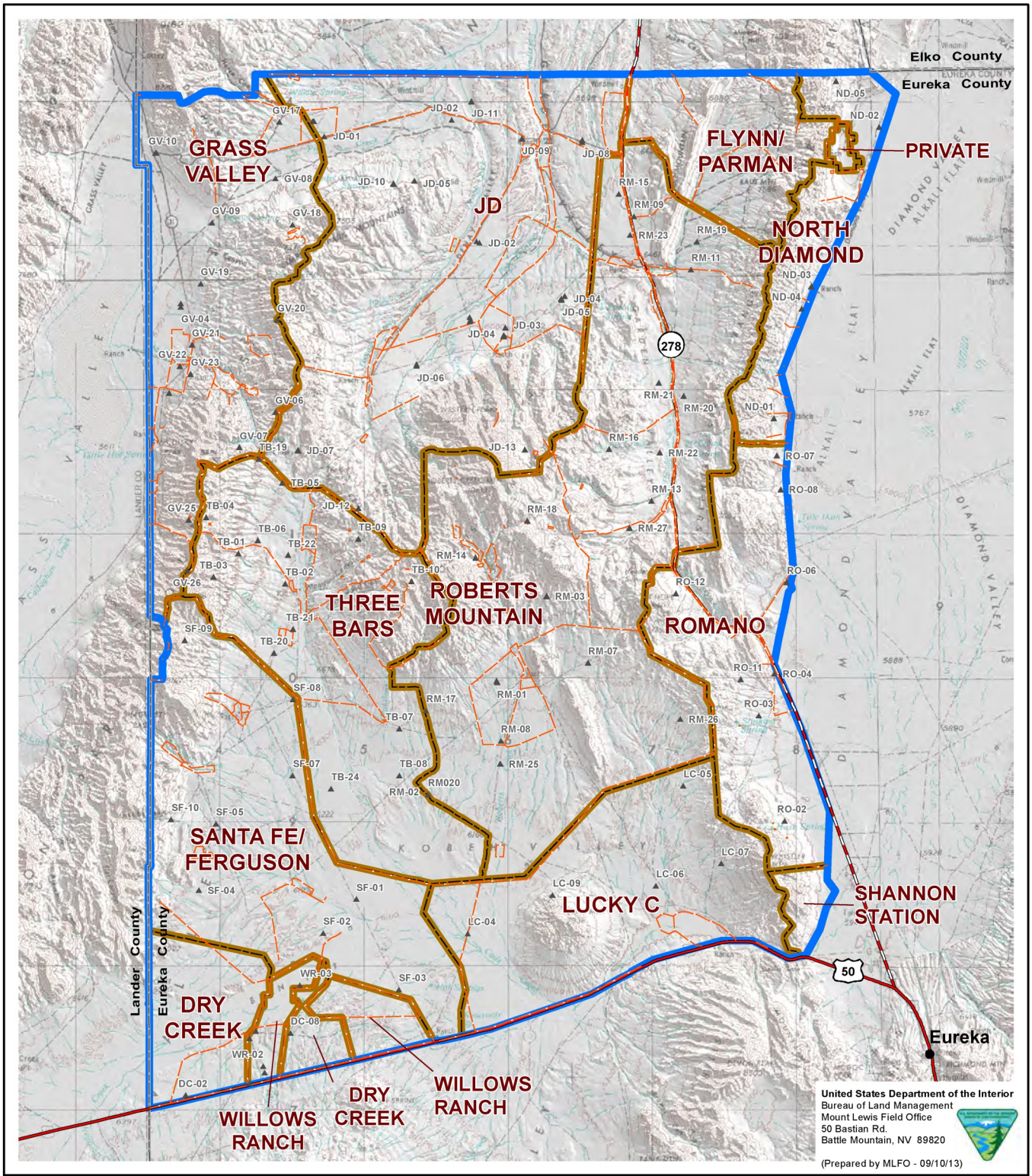
The results of these studies were discussed in the *Final 3 Bars Ecosystem and Landscape Restoration Project Rangeland Health Report* (Eastern Nevada Landscape Coalition and AECOM 2012). This report provides an overview assessment of rangeland health in the 3 Bars ecosystem as well as a more detailed analysis of six allotments that span the project area from the northern to southern extent. The analysis focused on the assessment of individual KMAs within each allotment; the condition of the KMA was extrapolated to the entire allotment. Within these KMAs, three parameters were used to measure overall rangeland health—production, desired dominant species, and Potential Natural Community for grass, forb, and shrub species.

Production is a measurement of the above-ground weight of the sampled vegetation. Desired dominance refers to the species types that should be present on an ecological site given its stage of succession. The Potential Natural Community is a measurement of composition, not to be confused with production. A site could be experiencing high production, but have low Potential Natural Community, if it is only producing a single grass, forb, or shrub species.

One of the objectives of the 3 Bars Project is to restore the functionality of the plant communities within the project area. The similarity index is used to compare the present state of vegetation on an ecological site in relation to the kinds, proportions, and amounts of vegetation expected for the site. For many areas within the project area, the goal is to restore the state of the plant community to a condition that is considered to be in a mid- to late-successional status. However, desired plant communities may be developed on a treatment-by-treatment basis depending on site-specific conditions and needs (e.g., use of non-native desired species to combat cheatgrass). After management objectives have been developed, one specific plant community may be identified as the desired plant community. Once the desired plant community has been identified, it is appropriate to determine the similarity index of the existing community to the desired plant community. Successional status is determined by the similarity index, which is expressed as the percentage of a plant community that is on the site compared to the Potential Natural Community for that site. Early successional status indicates that 0 to 25 percent, mid-successional status indicates that 26 to 50 percent, and late successional status indicates that 51 to 76 percent of the plant community is presently on the site compared to the Potential Natural Community. The Potential Natural Community occurs when 77 to 100 percent of the Potential Natural Community is on the site. **Figure 3-30** shows successional status on the 3 Bars Project area. **Tables 3-32** to **3-37** discuss some of the vegetation concerns and plant community status at each of the KMAs.

3.11.2.3.1 Flynn/Parman Allotment

The Flynn/Parman Allotment consists of terrain ranging from moderately sloping hills to low mountains. Vegetation in the lower elevations includes big sagebrush with an understory of Sandberg's bluegrass, bottlebrush squirreltail, and Indian ricegrass. Mid-elevation vegetation includes pinyon-juniper and big sagebrush with an understory of bottlebrush squirreltail, Nevada bluegrass, and western wheatgrass. The vegetation at upper elevations includes pinyon-juniper with understories of bluebunch wheatgrass, basin wildrye, Thurber's needlegrass, and antelope bitterbrush. Five wildfires have occurred in this allotment since 1994, ranging from 61 to 3,275 acres, and have resulted in some of the area being infested with cheatgrass (see Section 3.12, Noxious Weeds and other Invasive Non-native Vegetation). Four of these fire sites were re-seeded with a mixture of native and non-native species.



Legend

- Key Management Area
- Fence
- Allotment Boundary
- 3 Bars Project Area

Source: BLM 2012h, 2013i.

3 Bars Ecosystem and Landscape Restoration Project

Figure 3-30

Range Allotments and Key Management Areas

0 1 2 3 4 5 10 Miles

0 1 2 3 4 5 10 Kilometers

N

No warranty is made by the Bureau of Land Management as to the accuracy, reliability, or completeness of these data for individual 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 notice.

3.11.2.3.2 Roberts Mountain Allotment

The Roberts Mountain Allotment consists of terrain ranging from level valleys to high mountains. The vegetation in the valleys includes big sagebrush with an understory of Sandberg's bluegrass, bottlebrush squirreltail, and Indian ricegrass. Vegetation at mid-elevations includes pinyon-juniper, big sagebrush, and low sagebrush with an understory of bottlebrush squirreltail, Thurber's needlegrass, and Nevada bluegrass. Vegetation at upper elevations includes pinyon-juniper, mountain mahogany, willow, aspen, big sagebrush, and low sagebrush with an understory of bottlebrush squirreltail, Thurber's needlegrass, and Nevada bluegrass. Since 1954, five vegetation treatments have been applied; they include three crested wheatgrass seedings between 1954 and 1956 totaling 8,425 acres, an herbicide treatment application in 1965 totaling 2,111 acres, and pinyon-juniper thinnings in 2008 and 2009 totaling 1,660 acres. Additionally, a fire burned 627 acres in 2006.

3.11.2.3.3 JD Allotment

The JD Allotment consists of terrain ranging from flats and rolling hills to high mountains. Several seeps, springs, and streams are found in the mid to upper elevations, supporting willow and aspen stands. Vegetation in the lower elevations includes Wyoming big sagebrush, shadscale, and budsage with an understory of Sandberg's bluegrass and bottlebrush squirreltail. Vegetation in the higher elevations consists of pinyon-juniper, low sagebrush, and some mountain mahogany with an understory of Sandberg's bluegrass, bottlebrush squirreltail, Thurber's needlegrass, and bluebunch wheatgrass. Since 1961, nine seedings, eight wildfires, two mechanical treatments, and one herbicide treatment application have occurred, as follows:

Seedings (11,133 acres)

1961 = 888 acres of crested wheatgrass
1964 = 1,692 acres of crested wheatgrass
1966 = 698 acres of crested wheatgrass
1985 = 1,383 acres of crested wheatgrass
1994 = 1,642 acres of native and non-native species
1995 = 838 acres of native and non-native species
1996 = 385 acres of native and non-native species
1999 = 2,250 acres of crested wheatgrass
2000 = 1,357 acres of native and non-native species

Fires (34,581 acres)

JD Fire 1985 = 1,128 acres
Simpson Fire 1994 = 1,663 acres (reburned in the 1999 Trail Canyon Fire)
Mud Fire 1996 = 385 acres (reburned in the 1999 Trail Canyon Fire)
Trail Canyon Fire 1999 = 17,694 acres
Tonkin Fire 2000 = 1,357 acres
Tonkin Fire 2006 = 72 acres
JD Fire 2006 = 210 acres
Frazier Fire 2012 = 12,072 acres

TABLE 3-32

Flynn/Parman Allotment Key Management Areas

Allotment	KMA Number	Grass Composition (%)		Forb Composition (%)		Shrub Composition (%)		Major Concerns
		Desired	Actual	Desired	Actual	Desired	Actual	
Flynn / Parman	FJ1	50	27	5	60	45	12	This site is rated as early seral primarily due to the lack of desired perennial grass and shrubs. The primary and secondary perennial grass species are absent from the site. The dominant perennial grass found on the site is Sandberg's bluegrass; while desirable, it should not be the dominant perennial grass species for this site, based on the Ecological Site Description (ESD). Production of forbs is above the Potential Natural Community (PNC) for the site, with the dominant species being arrowleaf balsamroot.
	FJ2	50	25	5	60	45	13	This site was recently disturbed by a wildfire, and is rated as early seral primarily due the lack of desired shrubs and perennial grasses. The dominant shrub species are missing from the site, and many of the desired perennial grasses are present but well below PNC. Production for forbs is well above PNC, however the dominant forb species, spiny phlox, is an undesirable forage species.
	FP1	50	56	5	39	45	5	This site is rated as early seral, primarily due to the lack of desired shrubs. The dominant shrub species, Wyoming big sagebrush, is on the site but is not abundant. Production of forbs is above PNC; however, the dominant forb species, spiny phlox, is an undesirable forb species. It is important to note that this site has a much larger juniper component than is represented by the production study. The ESD for this site states that juniper readily invades this type of site where it is adjacent to woodlands, and when juniper occupies this site, it competes for other species for nutrients and available light. Where juniper canopies are allowed to close juniper can cause the elimination of understory vegetation.

TABLE 3-32 (Cont.)

Flynn/Parman Allotment Key Management Areas

Allotment	KMA Number	Grass Composition (%)		Forb Composition (%)		Shrub Composition (%)		Major Concerns
		Desired	Actual	Desired	Actual	Desired	Actual	
Flynn/ Parman	FP2	50	58	5	38	45	<1	This site has been disturbed by a wildfire, and is rated as early seral primarily due the lack of desired shrubs and perennial grasses. The dominant shrub species are missing from the site, as well as the primary and secondary grasses. Production of forbs is above PNC, however, the dominant forb species, spiny phlox, is an undesirable forage species.
	FP3	55	29	10	64	30	5	This site appears to have been disturbed, although the cause of the disturbance is uncertain. It is rated as early seral primarily due the lack of desired shrubs and perennial grasses. The dominant shrub species are missing from the site, and many of the desired perennial grasses are missing or present but below PNC. Production for forbs is above PNC, however, the dominant forb species, spiny phlox, is an undesirable forage species.
	FP4	65	73	10	19	25	<1	This site has been disturbed by a wildfire, and is rated as early seral primarily due the lack of desired shrubs, perennial grasses, and forbs. The dominant shrub species are missing from the site. In addition, the site is missing some desired perennial grasses. Production for forbs is above PNC, however, the dominant forb species, spiny phlox, is an undesirable forage species

TABLE 3-33

Roberts Mountain Allotment Key Management Areas

Allotment	KMA Number	Grass Composition (%)		Forb Composition (%)		Shrub Composition (%)		Major Concerns
		Desired	Actual	Desired	Actual	Desired	Actual	
Roberts Mountain	RM7	65	14	10	8	25	78	This site is rated as mid-seral primarily due to the lack of desired perennial grasses and forbs. The primary and secondary perennial grass species are absent from the site. The dominant perennial grass found on the site is crested wheatgrass. While desirable, it should not be the dominant perennial grass species for this site, based on the ESD. Production of forbs is below PNC for the site.
	RM9	65	17	10	26	25	57	This site is rated as early seral primarily due to the lack of desired perennial grasses and forbs. The primary and secondary perennial grass species are absent from the site. The dominant perennial grass found on the site is crested wheatgrass. While desirable, it should not be the dominant perennial grass species for this site, based on the ESD. No desirable forbs are found at the site.
	RM11	50	31	5	2	45	67	This site is rated as late seral primarily due to the lack of desired perennial grass and forbs. The dominant perennial grasses found on the site are squirreltail and Sandberg's bluegrass; while desirable, they should not be the dominant perennial grass species for this site, based on the ESD. Several desirable forbs are found at the site, but production for these plants is low.
	RM14	55	7	10	23	35	70	This site is rated as late seral primarily due to the lack of a desired perennial grass. The dominant perennial grasses listed on the ESD (with the exception of bluebunch wheatgrass) are found on the site, but production is low. In addition, the site is lacking its secondary shrub, antelope bitterbrush.

TABLE 3-33 (Cont.)

Roberts Mountain Allotment Key Management Areas

Allotment	KMA Number	Grass Composition (%)		Forb Composition (%)		Shrub Composition (%)		Major Concerns
		Desired	Actual	Desired	Actual	Desired	Actual	
Roberts Mountain	RM18	45	9	10	60	45	30	This site is rated as late seral primarily due to the lack of desired perennial grasses. The dominant perennial grasses listed on the ESD (with the exception of bluebunch wheatgrass and pine needlegrass) are found on the site, but production is extremely low.
	RM19	50	10	5	4	45	86	This site is rated as late seral primarily due to the lack of desired perennial grasses and forbs. The dominant perennial grasses listed on the ESD (with the exception of needle-and-thread) are found on the site, but production is low. Desirable perennial forbs are found at the site, but production is low.
	RM20	50	4	5	19	45	77	This site is rated as late seral primarily due to the lack of desired perennial grass and forbs. The dominant perennial grasses listed on the ESD are absent from the site. Several other desirable perennial forbs (milkvetch, hawksbeard, and long leaf phlox) are found on the site, but production is low.
	RM21	50	7	5	12	45	81	This site is rated as late seral primarily due to the lack of desired perennial grass. The dominant perennial grasses listed on the ESD (with the exception of needle-and-thread) are found on the site, but production is low.
	RM22	50	7	5	4	45	89	This site is rated as late seral primarily due to the lack of desired perennial grass and forbs. The dominant perennial grasses listed on the ESD are not on the site, only two perennial forbs are found the site, and production is low.
	RM23	50	7	5	<1	45	83	This site is rated as mid-seral primarily due to the lack of desired perennial grass and forbs. The dominant perennial grasses listed on the ESD (with the exception of Thurber's needlegrass) are found on the site, but production is low. The site is lacking in desirable perennial forbs.

TABLE 3-33 (Cont.)

Roberts Mountain Allotment Key Management Areas

Allotment	KMA Number	Grass Composition (%)		Forb Composition (%)		Shrub Composition (%)		Major Concerns
		Desired	Actual	Desired	Actual	Desired	Actual	
Roberts Mountain	RM25	50	3	5	1	45	96	This site is rated as mid-seral primarily due to the lack of desired perennial grasses and forbs. The dominant perennial grasses listed on the ESD (with the exception of needle-and-thread) are found on the site, but production is low. Only one perennial forb is found on the site, and production is low.
	RM26	50	28	5	7	45	64	This site is rated as PNC primarily due to the presence of desirable perennial grasses and forbs.
	RM27	50	9	5	24	45	67	This site is rated as late seral primarily due to the lack of desired perennial grasses. The dominant perennial grasses listed on the ESD (with the exception of needle-and-thread) are found on the site, but production is low.
	RM108	65	21	10	5	25	74	This site is rated as mid-seral primarily due to the lack of desired perennial grass and forbs. The dominant perennial grasses listed on the ESD are not found on the site. Crested wheatgrass dominates the site. Several perennial forbs are found on the site, but production is low.
	RM208	50	1	5	1	45	98	This site is rated as mid-seral primarily due to the lack of desired perennial grasses and forbs. The dominant perennial grasses listed on the ESD are lacking on the site. Only one perennial forb was found on the site, and production is low.
	RM308	60	6	10	2	30	92	This site is rated as mid-seral primarily due to the lack of desired perennial grasses and forbs. The dominant perennial grasses listed on the ESD are lacking on the site. Perennial forbs are on the site, but production is low.

Chaining after the Trail Canyon re-seeding 1999 = 17,744 acres

Chemical and mechanical treatment applications

Ester 2,4-D aerial spray 1966 = 1,796 acres
Chaining after the Trail Canyon re-seeding 1999 = 17,744 acres
Hand thinning of pinyon-juniper 2008 = 2,209 acres

3.11.2.3.4 Three Bars Allotment

The Three Bars Allotment consists of terrain ranging from valley bottoms to high mountains. Vegetation in the lower elevations includes Wyoming big sagebrush with an understory of Sandberg's bluegrass, bottlebrush squirreltail, and Indian ricegrass. Vegetation in the higher elevations consists of pinyon-juniper, Wyoming big sagebrush, mountain big sagebrush, and black sagebrush with an understory of bottlebrush squirreltail, Thurber's needlegrass, Indian ricegrass, Great Basin wildrye, Idaho fescue, and Nevada bluegrass. Two fires have occurred within the Three Bars Allotment; the Trail Canyon Fire in 1999 that burned 3,490 acres, and the HaHa Fire in 2005 that burned 24 acres.

3.11.2.3.5 Romano Allotment

The Romano Allotment consists of terrain ranging from valley bottoms to low mountains. Vegetation in the lower elevations includes Wyoming big sagebrush with an understory of Sandberg's bluegrass, bottlebrush squirreltail, and Indian ricegrass. Vegetation in the mid-range elevations consists of pinyon-juniper and Wyoming big sagebrush with an understory of bottlebrush squirreltail, Nevada bluegrass, and western wheatgrass. Vegetation at higher elevations consists of pinyon-juniper with an understory of bluebunch wheatgrass, basin wildrye, Thurber's needlegrass, and antelope bitterbrush. There are scattered occurrences of cheatgrass within the Romano Allotment (see Section 3.12, Noxious Weeds and other Invasive Non-native Vegetation).

3.11.2.3.6 Lucky C Allotment

The Lucky C Allotment consists of terrain ranging from valley bottoms to low mountains. Vegetation on the lower elevations includes black greasewood with an understory of basin wildrye and inland saltgrass. Vegetation at mid-range elevations consists of Wyoming big sagebrush and basin big sagebrush with an understory of needle-and-thread grass and Indian ricegrass. Vegetation at higher elevations consists of black sagebrush with an understory of Indian ricegrass and needle-and-thread grass. Pinyon-juniper is found on Lone Mountain.

The following six allotments (Dry Creek, Grass Valley, North Diamond, Santa Fe/Ferguson, Shannon Station, and Willows Ranch) were not part of the *Final 3 Bars Ecosystem and Landscape Restoration Project Rangeland Health Report* (Eastern Nevada Landscape Coalition and AECOM 2012). Health assessments and evaluations have been conducted by the BLM, with the exception of the Santa Fe/Ferguson allotment, and the results follow.

3.11.2.3.7 Dry Creek Allotment

The Potential Natural Communities for the Dry Creek Allotment consist of Wyoming big sagebrush with an understory of Indian ricegrass and needle-and-thread grass at the lower elevations; black sagebrush with an understory of Indian ricegrass and needle-and-thread grass at the mid-elevations; and low sagebrush with an understory of

TABLE 3-34

JD Allotment Key Management Areas

Allotment	KMA Number	Grass Composition (%)		Forb Composition (%)		Shrub Composition (%)		Major Concerns
		Desired	Actual	Desired	Actual	Desired	Actual	
JD	JD1	55	6	5	18	40	41	This site is rated as mid-seral primarily due to the lack of desired perennial grasses and forbs. The dominant perennial grasses listed on the ESD are lacking on the site. No perennial forbs are found on the site.
	JD2	25	3	5	15	70	82	This site is rated as mid-seral primarily due to the lack of desired perennial grasses and forbs. The dominant perennial grasses listed on the ESD are lacking on the site. No perennial forbs are found on the site.
	JD3	50	<1	5	0	45	100	This site is rated as mid-seral primarily due to the lack of desired perennial grasses and forbs. The dominant perennial grasses listed on the ESD are lacking on the site.
	JD4	65	63	5	0	30	37	This site is rated as early seral primarily due to the lack of desired perennial grasses and forbs. The dominant perennial grasses listed on the ESD are lacking on the site. Crested wheatgrass is the dominant grass. No perennial forbs are on the site.
	JD5	55	54	5	<1	40	63	This site is rated as early seral primarily due to the lack of desired perennial grasses and forbs. The dominant perennial grasses listed on the ESD are lacking on the site. No perennial forbs were found on the site.
	JD6	50	10	5	0	45	90	This site is rated as early seral primarily due to the lack of desired perennial grasses and forbs. The dominant perennial grasses listed on the ESD are lacking on the site. No perennial forbs were found on the site.
	JD7	65	9	10	82	25	9	This site is rated as mid-seral primarily due to the lack of desired perennial grasses and shrubs. The dominant perennial grasses listed on the ESD are lacking on the site. Shrubs are on the site, but production is low.

TABLE 3-34 (Cont.)

JD Allotment Key Management Areas

Allotment	KMA Number	Grass Composition (%)		Forb Composition (%)		Shrub Composition (%)		Major Concerns
		Desired	Actual	Desired	Actual	Desired	Actual	
JD	JD8	40	30	10	<1	50	70	This site is rated as late seral primarily due to the lack of the production of desired perennial grasses and shrubs. Grass production is lower than desired, but several desirable species are present. No desirable forbs are on the site.
	JD9	65	94	5	5	30	0	This site is rated as early seral primarily due to the lack of desired perennial grasses, forbs, and shrubs. The dominant perennial grasses listed on the ESD are lacking on the site. No perennial forbs are on the site. The dominant grass is crested wheatgrass, which is a non-native seeded species.
	JD10	50	15	5	0	45	85	This site is rated as early seral primarily due to the lack of desired perennial grasses and forbs. The dominant perennial grasses listed on the ESD are lacking on the site. Perennial forbs were found on the site during nested frequency studies, but not during production studies.
	JD11	25	12	5	13	70	73	This site is rated as late seral primarily due to the lack of production of desired perennial grasses and shrubs. The dominant perennial grasses listed on the ESD are on the site but production is low. No perennial forbs were found on the site. Only one shrub, shadscale saltbush, was found during the production studies.
	JD12	55	44	10	41	35	15	This site is rated as mid-seral primarily due to the lack of desired perennial grasses and shrubs. Perennial grass production is low, and one of the dominant perennial grasses listed on the ESD is lacking on the site. Several desirable perennial forbs are found on the site. Shrub production is low, and antelope bitterbrush was not found on the site.

TABLE 3-34 (Cont.)

JD Allotment Key Management Areas

Allotment	KMA Number	Grass Composition (%)		Forb Composition (%)		Shrub Composition (%)		Major Concerns
		Desired	Actual	Desired	Actual	Desired	Actual	
JD	JD13	55	17	10	67	35	16	This site is rated as mid-seral primarily due to the lack of desired perennial grasses and low shrub production. The dominant perennial grasses listed on the ESD are lacking on the site, and the perennial grasses that are present have low production. A variety of desirable shrubs is on the site, but production is low.
	JD14	50	32	5	24	45	44	This site is rated as early seral primarily due to the lack of desired perennial grasses and forbs. The dominant perennial grasses listed on the ESD are lacking on the site, and only one perennial forb was found on the site.
	JD15	55	48	5	22	40	30	This site is rated as early seral primarily due to the lack of desired perennial grasses and low shrub production. The dominant perennial grasses listed on the ESD are lacking on the site. Shrub production is low and the secondary shrub was not found on the site.
	JD16	65	58	10	29	25	13	This site is rated as early seral primarily due to the lack of desired perennial grasses, forb, and shrub production. The dominant perennial grasses listed on the ESD are lacking on the site. Perennial forbs are found on the site, but production is low. Shrub production is low, and the secondary shrub was not found on the site.
	JD17	40	69	5	0	55	29	This site is rated as early seral primarily due to the low production of desired perennial grasses and shrubs. Needle-and-thread, one of the dominant perennial grasses listed on the ESD, is lacking on the site. No perennial forbs were detected during production. Shrub production is low.

TABLE 3-34 (Cont.)

JD Allotment Key Management Areas

Allotment	KMA Number	Grass Composition (%)		Forb Composition (%)		Shrub Composition (%)		Major Concerns
		Desired	Actual	Desired	Actual	Desired	Actual	
	JD18	55	52	10	15	35	33	This site is rated as early seral primarily due to the low production of desired perennial grasses, forbs, and shrubs. The dominant perennial grasses listed on the ESD are lacking on the site. Production of forbs is low, despite the presence of several desirable species. The secondary shrub was not found on the site, and mountain big sagebrush has low production.
	JD19	65	21	10	21	25	58	This site is rated as early seral primarily due to the low production of desired perennial grasses, forbs, and shrubs. The dominant perennial grasses listed on the ESD are lacking on the site. Production for forbs is high, and includes several desirable species. No desirable shrubs are present.

TABLE 3-35

Three Bars Allotment Key Management Areas

Allotment	KMA Number	Grass Composition (%)		Forb Composition (%)		Shrub Composition (%)		Major Concerns
		Desired	Actual	Desired	Actual	Desired	Actual	
Three Bars	BI2	65	21	10	15	25	64	This site is rated as early seral primarily due to the lack of desired perennial grasses and forbs. The primary perennial grass species is absent from the site. The desirable grasses present are only found in small amounts. Production of forbs and shrubs is above PNC.
	TB1	50	24	10	10	40	66	This site is rated as early seral primarily due to the lack of desired perennial grasses. The primary and secondary perennial grass species are absent from the site. The desirable grasses present are only found in small amounts. Production of forbs is below PNC and the production of shrubs is above PNC.
	TB2	65	37	10	37	25	26	This site is rated as early seral primarily due to the lack of desired perennial grasses. The primary and secondary perennial grass species are absent from the site. Many of the perennial grasses found on the site have low production. Production of forbs and shrubs is above PNC.
	TB3	65	6	10	79	25	15	This site is rated as early seral primarily due to the low production of desired perennial grasses and shrubs. The primary and secondary perennial grass species are absent from the site. Desirable shrub composition is below PNC.
	TB4	55	15	10	82	35	3	This site is rated as early seral primarily due to the lack of desired perennial grasses and shrubs. The primary and secondary perennial grass species are absent from the site. The desirable grasses present are only found in small amounts. Production of shrubs is below PNC.

TABLE 3-35 (Cont.)

Three Bars Allotment Key Management Areas

Allotment	KMA Number	Grass Composition (%)		Forb Composition (%)		Shrub Composition (%)		Major Concerns
		Desired	Actual	Desired	Actual	Desired	Actual	
Three Bars	TB6	50	51	10	8	40	41	This site is rated as early seral primarily due to the lack of desired perennial grasses. The primary and secondary perennial grass species are absent from the site. Bluegrass and squirreltail are the dominant grasses on the site, and while they are desirable grasses, they should not be the dominant grasses for this site. The desirable grasses present are only found in small amounts. Production of forbs and shrubs is close to PNC.
	TB7	50	50	5	1	45	49	This site is rated as early seral primarily due to the lack of desired perennial grasses and forbs. The primary and secondary perennial grass species are absent from the site. The primary grass on the site was Sandberg's bluegrass and while desirable, it should not be the dominant grass species for this site. In addition, the site lacks the desired production for forbs and Wyoming big sagebrush.
	TB8	50	<1	5	0	45	100	This site is rated as mid-seral primarily due to the lack of desired perennial grasses and forbs. The primary and secondary perennial grass species are absent from the site. Only one grass, squirreltail, is on the site, and it has very low production. Shrub production is above PNC.
	TB9	45	43	10	41	45	16	This site is rated as late seral primarily due to the amount of production of the perennial grasses and forbs. However, this site is lacking the primary and secondary perennial grass species. The dominant grass species is bluegrass, and while desirable, it should not be the dominant grass on the site. Sagebrush production is also low on this site.

TABLE 3-35 (Cont.)

Three Bars Allotment Key Management Areas

Allotment	KMA Number	Grass Composition (%)		Forb Composition (%)		Shrub Composition (%)		Major Concerns
		Desired	Actual	Desired	Actual	Desired	Actual	
Three Bars	TB10	45	43	10	16	45	41	This site is rated as late seral primarily due to the production of the perennial grasses, forbs, and shrubs.
	TB19	45	35	10	57	45	8	This site is rated as mid-seral primarily due to the amount of production of perennial grasses and forbs. However, this site is lacking the primary and secondary perennial grass species. The dominant grass species was bluegrass, and while desirable, it should not be the dominant grass on the site. Sagebrush production was not observed on this site.
	TB20	65	22	10	46	25	32	This site is rated as early seral primarily due to the lack of production of the perennial grasses and variety of forbs and shrubs. The primary and secondary perennial grass species were not found on the site. The main forb species found on the site was spiny phlox, and while desirable, it should not be the dominate forb on the site. The secondary shrub, antelope bitterbrush, is absent from the site.
	TB21	65	39	10	39	25	22	This site is rated as early seral primarily due to the lack of perennial grasses and variety forbs. This site is lacking the primary grass species listed on the ESD for the site. The only forb observed on the site was spiny phlox; it should not be the dominant forb species. Antelope bitterbrush, the secondary shrub, was not found on the site.
	TB22	65	56	10	37	25	7	This site is rated as mid-seral primarily due to the amount of production of the perennial grasses and shrubs. However, this site is lacking the secondary perennial grass species listed on the ESD. Shrub production was found to be low on this site and the secondary shrub was not detected.

TABLE 3-35 (Cont.)

Three Bars Allotment Key Management Areas

Allotment	KMA Number	Grass Composition (%)		Forb Composition (%)		Shrub Composition (%)		Major Concerns
		Desired	Actual	Desired	Actual	Desired	Actual	
Three Bars	TB24	50	36	5	13	45	51	This site is rated as early seral primarily due to the lack of production of the perennial grasses. The primary grass is present in only a small amount, and the secondary grass was not found on the site. The dominant grass species was bluegrass, and while desirable, it should not be the dominant grass on the site.

TABLE 3-36

Romano Allotment Key Management Areas

Allotment	KMA Number	Grass Composition (%)		Forb Composition (%)		Shrub Composition (%)		Major Concerns
		Desired	Actual	Desired	Actual	Desired	Actual	
Romano	RO2	50	33	5	13	45	50	This site is rated as mid-seral primarily due to the lack of production of the perennial grasses. Both the primary and secondary grasses are present, but only in small amounts. The dominant grass species is bluegrass, and while desirable, it should not be the dominant grass on the site.
	RO3	55	58	10	9	35	33	This site is rated as mid-seral primarily due to the lack of variety of perennial grasses and shrubs and the low production of forbs. The secondary grass (Indian ricegrass) was not found on the site and the site is dominated by needle-and-thread. Only one perennial forb was detected in measurable amounts. The site was also missing its secondary shrub (fourwing saltbush).
	RO4A	50	52	5	2	45	35	This site is rated as early seral primarily due to the lack of production of native perennial grasses and forbs. The primary grass (Indian ricegrass) was not detected on the site, and the secondary grass is only present in a small amount. Only one perennial forb (milkvetch) was found and only in trace amounts.
	RO4B	50	100	5	0	45	0	This site is rated as early seral due to the lack of production of the native perennial grasses, forbs, and shrubs. The only species found on the site was a non-native seeded species, crested wheatgrass.
	RO6	30	4	5	36	65	60	This site is rated as mid-seral primarily due to the lack of production of the perennial grasses, forbs, and shrubs. Perennial grass production is low, and no perennial forbs were found on the site. The dominant shrub, shadscale saltbush, is low.

TABLE 3-36 (Cont.)

Romano Allotment Key Management Areas

Allotment	KMA Number	Grass Composition (%)		Forb Composition (%)		Shrub Composition (%)		Major Concerns
		Desired	Actual	Desired	Actual	Desired	Actual	
Romano	RO7	50	37	5	24	45	39	This site is rated as early seral primarily due to the lack of production of the perennial grasses, forbs, and shrubs. The primary grass was found in only trace amounts and the secondary grass is absent from the site. Several perennial forbs were found on the site, but forb production is dominated by bur buttercup, an undesirable annual forb. Shrub production is below PNC.
	RO8	50	42	5	0	45	58	This site is rated as early seral primarily due to the lack of production of perennial grasses. The primary grass is present in small amounts, but the secondary grass was not found. The dominant grass species was bluegrass, and while desirable, it should not be the dominant grass on the site. No perennial forbs were found.
	RO11	55	16	10	46	35	37	This site is rated as mid-seral primarily due to the lack of production of the perennial grasses. Both the primary and secondary grasses are present, but only in small amounts. The dominant grass species is bluegrass, and while desirable, it should not be the dominant grass on the site.
	RO12	65	49	10	36	25	15	This site is rated as early seral primarily due to the lack of production of the perennial grasses and shrubs. Both the primary and secondary grasses were not found. The dominant grass species is bluegrass, and while desirable, it should not be the dominant grass on the site. Big sagebrush production is below PNC, and the secondary shrub, antelope bitterbrush, was not detected.

Thurber's needlegrass and bluebunch wheatgrass and Utah juniper and singleleaf pinyon pine communities in the upper elevations.

3.11.2.3.8 Grass Valley Allotment

The Potential Natural Communities for the Grass Valley Allotment in the lower elevations consist of alkali sacaton, saltgrass, alkali bluegrass, basin wildrye, and black greasewood in the poorly drained areas and Wyoming big sagebrush, shadscale, and budsage, with an understory of Indian ricegrass, bottlebrush squirreltail, and bluegrass on the alluvial fans. The mid-elevation Potential Natural Communities consist of pinyon-juniper, curl-leaf mountain mahogany, black sagebrush, mountain big sagebrush, and low sagebrush with an understory of bluebunch wheatgrass, Idaho fescue, Thurber's needlegrass, bottlebrush squirreltail, Nevada bluegrass, and basin wildrye. The higher elevation Potential Natural Communities consist of mountain big sagebrush, snowberry, serviceberry, and low sagebrush with an understory of mountain brome, Thurber's needlegrass, basin wildrye, Idaho fescue, and bluegrass. Portions of the Grass Valley Allotment were burned in the 1999 Trail Canyon Fire and are now dominated by cheatgrass.

3.11.2.3.9 North Diamond Allotment

The Potential Natural Communities for the North Diamond Allotment in the lower elevations consist of alkali sacaton, saltgrass, and alkali bluegrass in the poorly drained areas and big sagebrush with an understory of Indian ricegrass, bottlebrush squirreltail, and bluegrass in the remainder of the lower elevations. Mid-elevation Potential Natural Communities consist of pinyon-juniper communities and the Potential Natural Communities in the higher elevations have mountain big sagebrush, antelope bitterbrush, snowberry, serviceberry, and curl-leaf mountain mahogany with an understory of bluebunch wheatgrass, various needlegrass species, Indian ricegrass, and bottlebrush squirreltail.

3.11.2.3.10 Santa Fe/Ferguson Allotment

The Potential Natural Communities for the Santa Fe/Ferguson Allotment consist of Wyoming big sagebrush with an understory of Indian ricegrass and needle-and-thread grass, and salt desert scrub dominated by shadscale, Indian ricegrass, and squirreltail, and greasewood with alkali sacaton and salt grass at the lower elevations. Black sagebrush, with an understory of Indian ricegrass and needle-and-thread grass, is found at the mid-elevations.

3.11.2.3.11 Shannon Station Allotment

The Potential Natural Communities for the Shannon Station Allotment in the lower elevations consist of alkali sacaton, saltgrass, and alkali bluegrass in the poorly drained areas and big sagebrush with an understory of Indian ricegrass, bottlebrush squirreltail, and bluegrass in the remainder of the lower elevations. Mid-elevation Potential Natural Communities consist of pinyon-juniper communities and the Potential Natural Communities in the higher elevations consist of mountain big sagebrush, antelope bitterbrush, snowberry, serviceberry, and curl-leaf mountain mahogany with an understory of bluebunch wheatgrass, various needlegrass species, Indian ricegrass, and bottlebrush squirreltail.

TABLE 3-37

Lucky C Allotment Key Management Areas

Allotment	KMA Number	Grass Composition (%)		Forb Composition (%)		Shrub Composition (%)		Major Concerns
		Desired	Actual	Desired	Actual	Desired	Actual	
Lucky C	LC4	35	40	5	0	60	60	This site is rated as early seral primarily due to the lack of production of the perennial grasses, forbs, and shrubs. The species composition is acceptable for this site type, but the actual production is low.
	LC5	55	79	10	8	35	13	This site is rated as mid-seral primarily due to the lack of production of the perennial forbs and shrubs. Only one perennial forb was detected. Shrub production is below PNC, and the secondary shrub, fourwing saltbush, was not detected.
	LC6	50	33	5	23	45	44	This site is rated as early seral primarily due to the lack of production of the perennial grasses and shrubs. The species composition is acceptable for this site type, however actual production is low.
	LC7	50	21	5	30	45	49	This site is rated as early seral primarily due to the lack of production of the perennial grasses and shrubs. The species composition is acceptable for this site type, however actual production is low.
	LC9	50	28	5	45	45	27	This site is rated as early seral primarily due to the lack of production of the perennial grasses and shrubs. The species composition is acceptable for this site type.

3.11.2.3.12 Willows Ranch Allotment

The Potential Natural Communities for the Willows Ranch Allotment consist of Wyoming big sagebrush with an understory of Indian ricegrass and needle-and-thread grass, salt desert scrub dominated by shadscale, Indian ricegrass, and squirreltail, greasewood with alkali sacaton and salt grass, and grassland dominated by alkali sacaton, alkali cordgrass, Indian ricegrass and three-awn grasses at the lower elevations. Black sagebrush, with an understory of Indian ricegrass and needle-and-thread grass, is found at the mid-elevations.

3.11.2.4 Special Status Plant Species

No focused special status plant surveys have been conducted in support of this project. The BLM Special Status Species list for the Battle Mountain District includes 40 plant species that have the potential to occur in the District. A USFWS species list (USDOI USFWS 2011) by county was reviewed in support of this analysis. No federally listed plants are known to occur in Eureka County and none are expected to occur on the project area. In addition, the BLM obtained data from the Nevada Natural Heritage Program (2012) on special status species occurrence on the 3 Bars Project area. Information on plant species that may occur within the 3 Bars Project area is provided in **Table 3-38**. Of the six species listed in the table, the Nevada Natural Heritage Program has records of three occurring within the 3 Bars Project area—Beatley buckwheat, least phacelia, and one-leaflet Torrey milkvetch. Beatley buckwheat, a BLM Sensitive Species, is known from Roberts Mountains, with an additional mapped occurrence immediately northwest of the project area. Least phacelia, a BLM Sensitive Species, is also known from Roberts Mountains. One-leaflet Torrey milk vetch is known from the southern end of the Kobeh Valley, near U.S. Highway 50. Lahontan beardtongue, a BLM Sensitive Species, has been documented from the area near the intersection of U.S. Highway 50 and Nevada State Route 278 near the southeastern corner of (but outside of) the project area.

According to BLM resource specialists, the Monte Neva paintbrush (state listed as critically endangered) is only found in riparian areas associated with hot springs at low elevations within the greasewood-rabbitbrush-sand dropseed community. The only known location with this habitat type within the 3 Bars Project area is Hot Springs Hill north of U.S. Highway 50 in the Santa Fe Ferguson Allotment. Of the low elevational riparian treatment areas in Kobeh Valley, including Lone Mountain Spring, Mud Spring, and Treasure Well, none have the appropriate characteristics for the Monte Neva paintbrush. The USFWS has conducted surveys in the general area of Hot Spring Hill, including the three spring areas, and found no evidence of Monte Neva paintbrush (USDOI USFWS 1993).

None of these special status plant species have been found within proposed 3 Bars treatment areas, although one mapped occurrence of Beatley buckwheat is within approximately 1,300 feet of the proposed Upper Vinini Creek riparian treatment area. Although not mapped within proposed project areas, sensitive species could still occur in these areas, since surveys for these species have not been conducted for the 3 Bars project. None of these species were found during any of the focused Mount Hope Project special status species plant surveys.

3.11.2.5 Special Woodland Products

The BLM allows the harvest of Christmas trees and fuel wood from any location within the 3 Bars Project area. For commercial users, the BLM would issue a permit for the harvest of Christmas trees or fuel wood and would assign the user to a specific area where pinyon-juniper occurs. The public and commercial users may harvest pine nuts and native seeds within designated harvest areas, as identified in the Shoshone-Eureka RMP, by permit. The locations of allowable harvest areas are shown in **Figure 3-31**.

TABLE 3-38

Special Status Plant Species that may Occur on the 3 Bars Project Area

Common Name	Scientific Name	Habitat	Status[1]
Beatley buckwheat	*Eriogonum beatleyae*	Rock outcrops	BLM Sensitive and NNHP S2
Lahontan beardtongue	*Penstemon palmeri* var. *macranthus*	Moist washes, roadsides, and canyon floors	BLM Sensitive and NNHP S2
Least phacelia	*Phacelia minutissima*	Wetlands (including riparian zones, aspen stands, and sagebrush swales)	BLM Sensitive and NNHP S2
Monte Neva paintbrush	*Castilleja salsuginosa*	Wetlands; travertine hot spring mounds	Nevada Critically Endangered and NNHP S1
Nevada willowherb	*Epilobium nevadense*	Pinyon-juniper slopes with limestone outcrops or talus	BLM Sensitive and NNHP S2
One-leaflet Torrey milkvetch	*Astragalus calycosus* var. *monophyllidius*	Sagebrush	NNHP S2

[1] Nevada Natural Heritage Program (NNHP) S1 = critically imperiled and especially vulnerable to extinction or extirpation due to extreme rarity, imminent threats, or other factors (state rank indicator); NNHP S2 = Imperiled due to rarity or other demonstrable factors (state rank indicator).
Sources: Nevada Natural Heritage Program (2001, 2010, 2012), USDOI BLM (2012c).

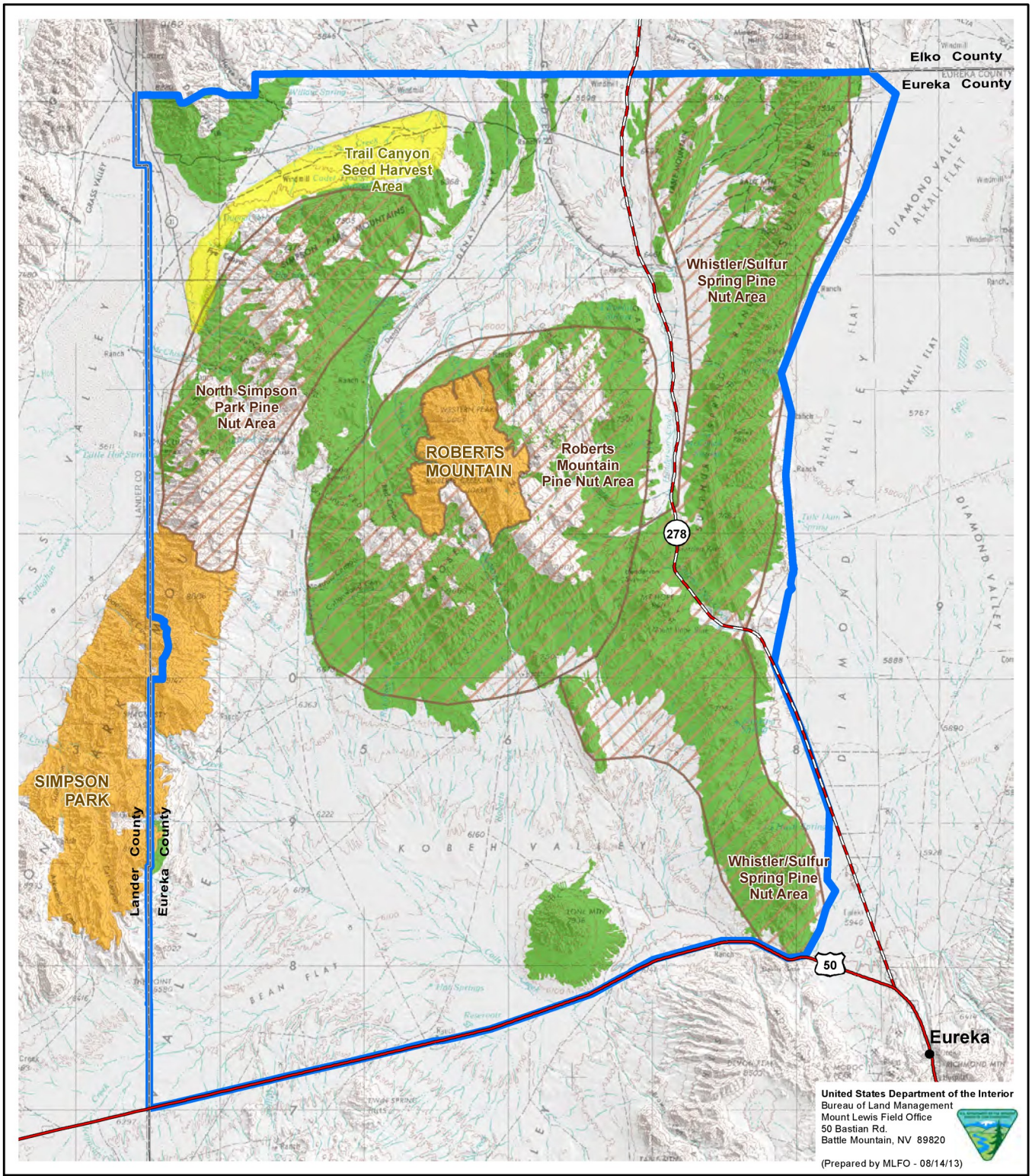
3.11.2.5.1 Woodland Products

Harvested fuel wood includes deadwood (dead branches or wood) and greenwood (living branches or wood). Juniper trees are commonly harvested for use as fence posts. The public may harvest fuel wood (green or dead), posts, or Christmas trees anywhere on public lands within the 3 Bars Project area, except WSAs, while commercial harvest is handled on a case-by-case basis and requires site-specific NEPA documentation and a permit from the Mount Lewis Field Office. Juniper posts and other types of greenwood must be harvested within designated harvest units. Species approved for commercial and personal harvest include singleleaf pinyon pine and Utah juniper, with permits for a limited amount of curl-leaf mountain mahogany also available. The vast majority of woodland product harvest is wood cutting by private individuals.

Commercial wood harvest permits are fairly uncommon in the 3 Bars Project area. Based on data from 1996 through 2011, the Battle Mountain District issued only 11 commercial harvest permits for cutting within Eureka County. During this same period, only one permit for commercial harvest for posts was issued.

3.11.2.5.2 Christmas Trees

The public may harvest Christmas trees from most unrestricted public land through permit, while commercial harvest is handled on a site-specific basis with site-specific NEPA documentation and requires a permit from the Mount Lewis Field Office. The most common species allowed for harvest are singleleaf pinyon pine and Utah juniper. Between 1997 and 2010, the Battle Mountain District issued permits to cut between 114 and 402 Christmas trees annually. In most years, between 100 and 200 trees were cut within the District.



Legend

- Private Fuelwood and Christmas Tree Harvest Area
- Seed Harvest Area
- Commercial Pine Nut Sale Area
- Wilderness Study Area
- 3 Bars Project Area

Source: AECOM 2011a; BLM 2012i, 2013d,e.

3 Bars Ecosystem and Landscape Restoration Project

Figure 3-31

Forest Products (Private Fuelwood, Pine Nuts, Christmas Trees, and Seed Harvest)

0 1 2 3 4 5 10 Miles

0 1 2 3 4 5 10 Kilometers

N

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Original data were compiled from various sources. This information may not meet National Map Accuracy Standards.
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3.11.2.5.3 Pine Nuts

Pine nuts, which are produced by singleleaf pinyon pines, are collected for personal use and commercial purposes. Families may collect up to 25 pounds of pine nuts per year without a permit; a permit is required for collection of additional nuts. All woodland areas within the 3 Bars Project area are open to the public for harvest of pine nuts (**Figure 3-31**). All pine nuts intended for resale require a permit/contract. The three designated areas in the 3 Bars Project area for commercial pine nut harvest (North Simpson Park, Roberts Mountains, and Whistler/Sulphur Spring) total approximately 303,300 acres. The amount of commercial pine nut harvest is variable from year to year, depending on the yearly crop. The BLM does not have information about harvest of pine nuts by individuals, as a permit is not required. Based on data from 1996 through 2011, permits for commercial pine nut harvest were issued in fiscal years 1998, 1999, and 2010. A total of six permits were issued for Eureka County over this period.

3.11.2.5.4 Seed Harvest

Commercial harvesters collect seed from plants within the 3 Bars Project area. The project area contains one designated harvest unit for commercial seed harvest, Trail Canyon, which is approximately 14,200 acres. Seed harvest typically occurs in the late summer to early fall months. The most commonly harvested seeds are from big sagebrush, shadscale, four-wing saltbush, Indian ricegrass, and forage kochia. The highest level of demand for native seed typically follows catastrophic wildfires in the region, when seed is needed for stabilization and/or restoration of impacted areas.

3.11.2.6 Historic Use of Pinyon-juniper Woodlands

The production of charcoal and cordwood was one of the area's most significant industries, and it resulted in substantial changes to the environment as it existed before 1850. The furnaces of the Eureka Mining District and other mines within the area required tremendous quantities of charcoal. In addition, cordwood and lumber were needed for other purposes such as construction. Pinyon-juniper cordwood was also used for fuel by the Eureka & Palisade Railroad until 1890, when the railroad switched to coal. Within the 3 Bars Project area, cordwood for the Eureka & Palisade Railroad was cut into 4-foot lengths and delivered by contractors to stations along the route (Zeier 1985). By far the largest consumer of charcoal was the Eureka mills. In 1880, at the height of mining within the Eureka District, the mills consumed a total of 1.25 million bushels of charcoal. These operations included the vast majority of the 3 Bars Project area. Young and Budy (1979:117 *cited in* Zeier 1985:18) stated that:

…the demand for charcoal was so great that deforestation became a severe problem. From our estimates of wood yield, 4,000 to 5,000 acres of woodland had to be cut annually to supply the mills. By 1874 the mountain slopes around Eureka were denuded of pinyon and juniper for a radius of twenty miles. By 1878 the average hauling distance from (charcoal) pit to smelter was 35 miles.

3.11.3 Environmental Consequences

3.11.3.1 Key Issues of Concern Considered during Evaluation of the Environmental Consequences

Key issues of concern pertaining to native and non-invasive vegetation types were identified in the AECC and during scoping. These include the following:

- Plant communities that are below their Potential Natural Community and desired vigor.
- Decline of aspen, mountain mahogany, and other important plant community components resulting from a failure of these species to regenerate or establish in historic or new habitats.
- The need to assess the success of rehabilitation projects after treatments.
- Too much loss of forested vegetation, based on the BLM's interpretation of what desired conditions are.
- Reference is made to "phase class" and "fire regime condition," but very little discussion was given to ecological condition classes within the concept of the range of natural variability, or the place of old-growth/persistent pinyon-juniper on the landscape.
- Loss of mature and old-growth pinyon-juniper in the project area.
- Reducing stand density and distribution of Utah juniper to benefit pinyon pine.
- The potential for mechanical disturbance and injury to pinyon pines to promote insects and pathogens.
- Concerns regarding alteration of the sagebrush and pinyon-juniper communities, as these are suffering from past and ongoing disturbances.
- Concerns regarding the recovery and viability of listed, rare, and imperiled species found on the 3 Bars Project area, including special-status plant species.
- The potential for treatments to cause invasion of weedy species into woodlands, or juniper expansion.
- Concern regarding the use of exotics, such as crested wheatgrass, to restore burned areas.
- The need for scientific justification for the desired conditions for woodlands.
- Concerns about the use of fire in native plant communities and success of past fire management activities.
- Concern that the typical response to fire is to place a fence, which is often permanent, around the perimeter of a burned area.
- Describe the success of past fire management activities.

3.11.3.2 Significance Criteria

The following would have a significant adverse effect on native and non-invasive vegetation:

- Take of a federally listed plant species or increased mortality of a proposed or candidate plant species.
- Local extirpation of a rare or sensitive species not currently listed under the Endangered Species Act.
- Long-term loss or degradation of a unique or high quality plant community.
- A measurable long-term reduction in diversity within a high quality plant community.
- An overall decline in woodland health.
- A reduction in aspen regeneration or recruitment.
- A long-term reduction in the amount of special woodland products such that harvest of these resources would be limited or precluded.

- A long-term loss of access to woodland resources.

Analysis for vegetation communities was conducted by overlaying Geographic Information System shapefiles of the proposed treatment areas with the baseline data for vegetation types derived from project specific mapping or from the ecological site data (USDA Natural Resources Conservation Service 2012) as described above. Temporary and permanent impacts were identified and compared to the thresholds established above.

3.11.3.3 Direct and Indirect Effects

3.11.3.3.1 Direct and Indirect Effects Common to All Action Alternatives

Adverse Effects

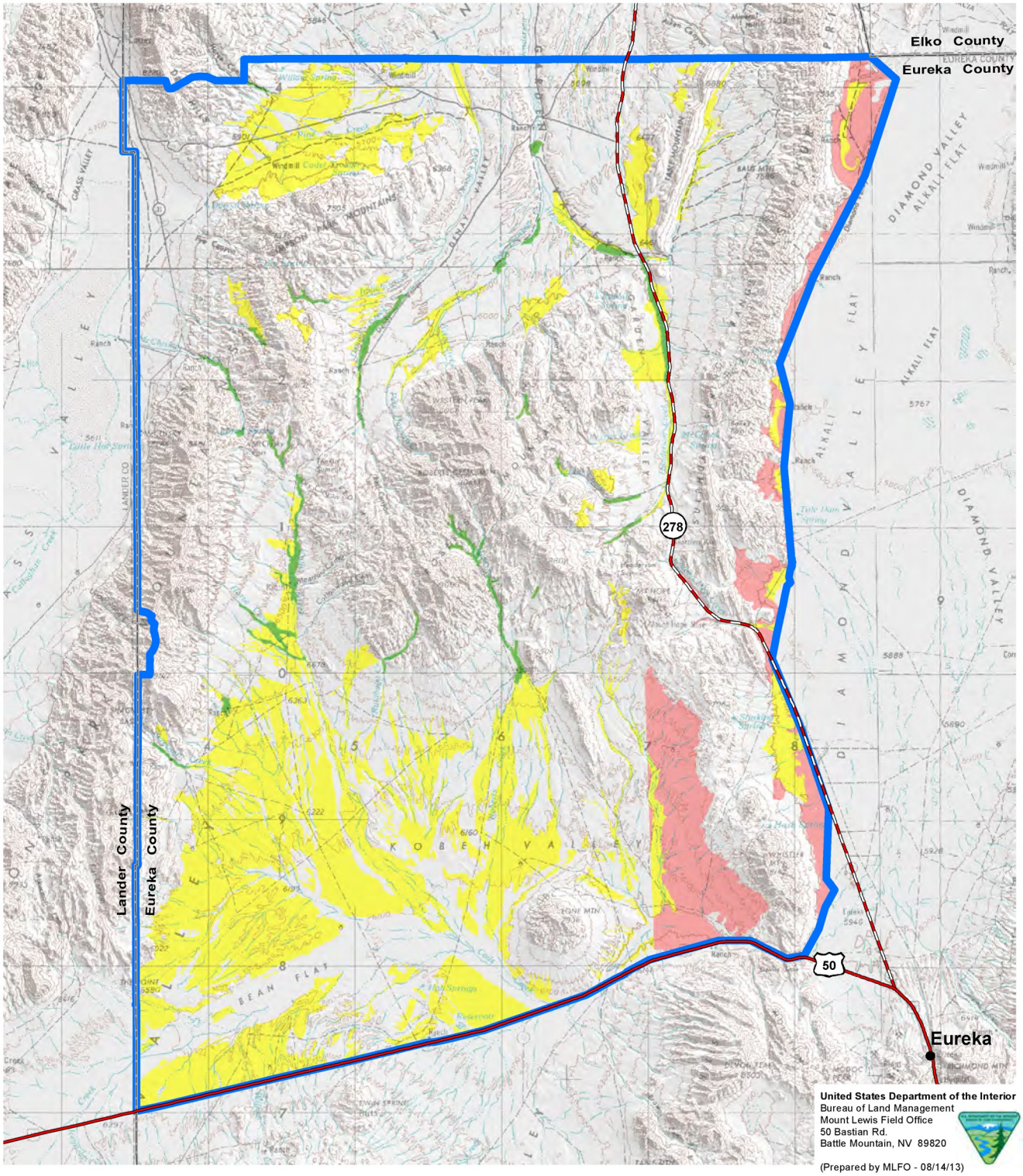
Vegetation removal treatments can create conditions that result in a temporary loss of some desirable or more mature vegetation through inadvertent removal of non-target vegetation. Removal of target and non-target vegetation could also cause soil disturbance that favors the introduction and spread of noxious weeds and other invasive non-native vegetation, to the detriment of native species. The BLM would implement vegetation treatments to thin and remove pinyon-juniper. Removal of pinyon-juniper could reduce the amount of pine nuts, wood, and other woodland products available for commercial and individual harvest. Thinning and removal of pinyon-juniper also would result in dead wood and slash material that, if not removed, mulched, or burned, could provide fuel for a wildfire.

The locations of prime farmlands within the 3 Bars Project area are shown on **Figure 3-32**. There are no prime farmlands on BLM-administered land within the treatment areas because the BLM does not allow for irrigation on public land. Aspen treatments should not impact prime farmland because only a small area would be treated. Pinyon-juniper treatments could affect the prime farmland along Coils Creek from pinyon-juniper treatments in Dry Canyon and Cottonwood/Meadow Creek. Prime farmland along Denay Creek could be affected by the Tonkin North and South Units pinyon-juniper treatments. Prime farmland could also be affected by the Henderson 1 and Roberts Creek units riparian treatments, the Vinini Corridor, Upper Roberts, and Atlas Units pinyon-juniper treatments, and Table Mountain Unit sagebrush treatment. Effects of the treatments, if any, would primarily be related to short-term erosion and its effects on water quality that could result from upland and riparian zone treatments.

Beneficial Effects

All proposed treatments or combinations of treatments are designed to enhance native plant (re)establishment, and therefore would be expected to have a beneficial impact on native vegetation by increasing the extent of native plant communities in the project area. Treatments that benefit native plant communities could potentially provide habitat that is more suitable for rare and sensitive plant species. Treatments would result in improved health and vigor of riparian, aspen, and sagebrush communities. As treatments restore the functionality of the ecosystem, the system would become more resistant to invasion by noxious weeds and other invasive non-native vegetation, drought, and wildfire. As the health of the system improves, native species would make greater contributions to the health and recovery of the system and serve as an important seed source for areas adjacent to treatment sites. Over time, this would allow the 3 Bars Project area to recover from past disturbances.

The degree of the benefit provided by project treatments would depend on how effective the treatment is at controlling the target species and/or enhancing desired vegetation. In some cases, a combination of methods (such as mechanical methods to remove the species followed by fire to reduce the seedbank) may be required to effectively control the target species and manage native vegetation over the long term. Temporary fencing may also be required,



Legend

Farmland Classification

- Prime Farmland if Irrigated
- Prime Farmland if Irrigated and Reclaimed of Excess Salts and Sodium
- Farmland of Statewide Importance
- 3 Bars Project Area

Source: USDA NRCS 2012.

3 Bars Ecosystem and Landscape Restoration Project

Figure 3-32

Farmland Classification

0 1 2 3 4 5 10 Miles

0 1 2 3 4 5 10 Kilometers

N

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to protect native plant communities from the adverse effects of grazing or trampling by livestock, wild horses, and wild ungulates until desirable vegetation has established. Therefore, while some benefit is expected under all the treatments, the level of benefit is expected to vary by alternative, as some methods are more effective than others, and some of the alternatives allow for application of a wider variety of tools and for treatment of much larger areas. More discussion of the effectiveness of the various treatment methods is provided in the 17-States PER (USDOI BLM 2007c:2-12 to 2-19).

All treatments that reduce the buildup of hazardous fuels would help reduce the risk of wildfire in the 3 Bars Project area. Therefore, these treatments would be expected to have a long-term benefit by reducing the likelihood that a catastrophic wildfire could burn sensitive plant species and high quality native plant communities, such as sagebrush, desert salt scrub, native grasslands, and native woodlands.

Fuels reduction treatments and creation of fuel and fire breaks would all reduce the risk of catastrophic wildfire in pinyon-juniper and sagebrush habitat. The reduced risk of wildfire would be expected to benefit sagebrush and pinyon-juniper communities, which are generally adversely affected by large wildfires. In pinyon-juniper habitats, wildfires tend to kill all pinyon pines and junipers that are burned, regardless of size (Romme et al. 2007). Pinyon-juniper sites that are dominated by trees have a large component of canopy fuels and reduced ground fuels as a result of a reduced shrub layer. This fuel distribution promotes infrequent, high intensity fires over more frequent and moderate fires (Miller et al. 2008). The reduced risk would benefit Phase III woodlands with a dominance of canopy fuels, many of which occur on soil types that historically supported pinyon-juniper and may have a component of old growth pinyon-juniper. A large fire would be expected to result in loss of sagebrush and pinyon-juniper woodlands over a large geographic area, potentially including old-growth trees and persistent woodland stands. Reduced catastrophic wildfire risk would also benefit woodland products associated with pinyon-juniper communities. Reduced densities of trees could lead to improved health of treated stands by reducing competition, promoting regeneration, and decreasing the risk of infestation by pathogens and insects (Marcus et al. 2011). High tree densities appear to contribute to pinyon Ips and mistletoe, which may be the result of resource limitation and close proximity of trees, although site conditions may be the most important factor (Greenwood 2006). Additionally, treatments that target pinyon-junipers infested with pathogens and pests in the North and South Tonkin units would help improve the health of these stands.

Thinning pinyon-juniper woodlands would be expected to benefit pine nut production by reducing spacing between trees. Space between trees allows the crowns of pinyon pines to develop fully, which typically results in more pine nut production (USDOI BLM and Colorado Wood Utilization and Marketing Program 2008). Additionally, fuels reduction treatments would decrease the risk of a wildfire burning pinyon pines that bear harvestable pine nuts. Long-term, treatments should benefit nearby prime farmlands by reducing upslope erosion and risk of a severe wildfire.

3.11.3.3.2 Direct and Indirect Effects under Alternative A (Preferred Alternative)

Riparian Treatments

Adverse Effects

Project activities have the potential to disturb vegetation at treatment sites, and therefore could result in the temporary loss of riparian and wetland vegetation. Mechanical treatments typically result in widespread soil disturbance in treated areas, as discussed in Section 3.8.3 of this EIS and in the 17-States PER (USDOI BLM 2007c:2-14). Machinery used in mechanical treatments could result in inadvertent removal of native vegetation. The risks for loss

and damage to riparian and wetland vegetation would be greatest in project groups with the largest acreage and that employ the most extensive mechanical treatments (project groups that include streambank earthwork as well as pinyon-juniper removal: Frazier Creek group, Roberts Creek group, and Henderson above Vinini Unit). For the Denay Pond group, the disturbance associated with mechanical treatments would be minimal, since only fence installation would occur.

The BLM may use prescribed fire in Lahontan cutthroat trout occupied drainages under stipulations developed through the Endangered Species Act Section 7 process. The effectiveness and potential impacts of prescribed fire are discussed in the 17-States PER (USDOI BLM 2007c: 4-36, 4-54). Native riparian or wetland vegetation present in these treatment areas could be affected by the use of prescribed fire in the short term. However, these communities would be expected to either not burn well, due to their moisture level, or otherwise recover quickly. A combination of treatments and implementation of SOPs would help to prevent the spread of noxious weeds and other invasive non-native vegetation following prescribed fire. Planting or seeding of native vegetation would help expand riparian corridors and streamside wetlands. Relevant SOPs would include keeping fires as small as possible while still meeting the treatment objectives, and reseeding or replanting burned areas to favor desirable species. Pre-treatment surveys for special status species would allow the BLM to design prescribed fire treatments to avoid or minimize impacts to these species.

Riparian treatments are proposed to occur in areas identified as harvest units for Christmas trees, greenwood, and pine nuts. Within riparian treatment areas, only pinyon-juniper removal would be expected to affect woodland products. Pinyon-juniper removal would occur over a very small portion (less than 1 percent) of designated harvest areas for Christmas trees, pine nuts, and green wood (shown in **Figure 3-31**). These treatments would affect a fraction of a percent of the total woodland products harvest acreage within the 3 Bars Project area, and would not constitute a measurable reduction in special woodland products available for harvest.

Ground-disturbing activities could impact special status plant species, if any are present in the proposed riparian treatment areas. No federally listed plant species are known or likely to occur in treatment areas, but several BLM Special Status Species could potentially occur in wetland and riparian zones within the project area. BLM policy requires the Mount Lewis Field Office to survey treatment sites for listed and other special status species prior to conducting ground-disturbing activities. Pre-treatment surveys would allow the BLM to avoid or minimize impacts to these species when implementing project treatments.

Beneficial Effects

In the long term, treatments are expected to result in an expansion of riparian and wetland habitat, (re)establishment of riparian and wetland habitat where these communities have been lost or diminished due to erosion, incising, and herbivory, and protection of riparian habitats from wildfire. Native riparian vegetation is much more resilient to wildfire than riparian corridors that have been taken over by upland vegetation such as pinyon-juniper or sagebrush. Efforts by the BLM to enhance wetland and riparian vegetation would help to increase the number of miles of stream and acres of wetlands that are in Proper Functioning Condition.

Pinyon-juniper would be removed from the riparian zone for treatment areas within the Frazier Creek and Garden Spring groups using manual and mechanical methods and prescribed fire. The total treatment area involving pinyon-juniper removal would be approximately 2,682 acres, although removal of pinyon-juniper would not occur over this entire area. Treatments would target pinyon-juniper where it is encroaching into sagebrush habitat along riparian zones (Phase I - 769 acres and Phase II – 524 acres), but riparian management treatments would also occur along

streams in areas dominated by Phase III pinyon-juniper (296 acres). Treatments targeting pinyon-juniper would result in the loss of these woodland species. However, these treatments would benefit riparian vegetation.

Removal of pinyon-juniper in Phase II and III stands could provide trees for greenwood cutting. Use of fire and mechanical methods to thin and remove pinyon-juniper in Phase II and III stands should improve riparian zone health and functionality.

Aspen Treatments

Adverse Effects

The effects associated with manual treatments would be low in aspen treatment areas, since a minimal amount of soil disturbance would occur. Standard Operating Procedures would be implemented to prevent the spread and establishment of noxious weeds and other invasive non-native vegetation, and slash would be left onsite to promote seedling and sapling establishment and to promote infiltration. There could be loss of non-target vegetation.

As noted by Kay (2003), while fire usually has a beneficial effect on aspen by stimulating root suckering and killing invading conifers, the condition and trend of aspen in north central Nevada, in general, is not related to the absence of fire.

Ground-disturbing activities could impact special status plant species, if any are present in the proposed aspen treatment areas. No federally listed plant species are known or likely to occur in the project area, but several BLM Special Status species could potentially occur within aspen treatment units within the project area. BLM policy requires the Mount Lewis Field Office to survey treatment sites for listed and other special status species prior to conducting ground disturbing activities. Pre-treatment surveys would allow the BLM to avoid or minimize impacts to these species when implementing project treatments.

Beneficial Effects

Mechanical methods and fire would promote aspen suckering through hormonal stimulation. Treatment of aspen stands with mechanical treatment and fire is expected to enhance the rejuvenation of existing stands and would result in an expansion of the total area occupied by aspen stands and increased vigor of stands in comparison to current conditions. In some cases, mechanical methods would be used to remove pinyon-juniper to reduce competition for resources. Cutting trees and ripping the root mass stimulates sprouting, which is a much more reliable and cost-effective method of regenerating aspen than planting seedlings or encouraging natural reseeding. Prescribed fire would promote regeneration by providing hormonal stimulation, removing competing vegetation, warming the soil surface, and releasing nutrients that contribute to the growth of sprouts (Sheppard 2008). Both aspen and invading pinyon-juniper will die from prescribed fires, but aspen is a fire-loving species that sprouts profusely following a burn (Sagebrush Sea Campaign 2007).

Removal of pinyon-juniper trees in aspen stands has the potential to result in damage or disturbance to existing aspen. However, aspen are known to respond well to disturbance, which stimulates suckering and treatment/cutting of mature trees is part of proposed treatments in some projects, such as RMA-5, JD A-1, and TB-A.

Removal of conifers would allow sunlight to reach the woodland floor and warm the soil, thereby stimulating aspen sprouting, and could also create conditions that allow aspen to expand into surrounding areas. In mixed aspen-conifer

stands, combining mechanical treatments and prescribed fire may be the most effective means of regenerating aspen, by providing hormonal stimulation and reducing competition (Sheppard 2008).

Protective fencing that reduces herbivory from livestock would benefit areas that contain aspen sprouts. Studies have suggested that the downward trend in aspen communities in north-central Nevada, including the 3 Bars Project area, is not related to climatic variation, fire suppression, woodland succession, or browsing by mule deer, but is related to past and present levels of livestock grazing (Kay 2002, 2003). Fencing the aspen stand would protect aspen sprouts, thus allowing the aspen stand to regenerate and form multi-aged stands without using fire or other disturbance.

Pinyon-juniper Treatments

Adverse Effects

Potential adverse effects associated with manual treatments in pinyon-juniper habitats are discussed in the 17-States PER (USDOI BLM 2007c:4-49). These treatments could result in small amounts of trampling or accidental removal of non-target plants. Additionally, there would be minor risks associated with spills of oil and fuels from hand-held equipment. The overall effects to native communities would be minimal and short term in duration. Use of manual methods would allow the BLM to avoid old-growth trees during treatments, and would cause minimal soil disturbance and associated risks for establishment and spread of noxious weeds and other non-native invasive species. However, increased light availability on the site and shading of desirable understory plants by heavy slash could provide conditions that favor invasive species (Tausch et al. 2009). Slash piles could lead to the infestation of healthy trees by Ips beetles if placed too close to the base of trees (Marcus et al. 2011). Additionally, the understory response following treatments may be delayed by several years, and slash left behind on site would have the potential to increase fuel loads and create a fire hazard for a minimum of 2 years (Tausch et al. 2009). Chainsaw cutting in juniper woodlands has been correlated with increased shrub and grass cover, which may include at least an initial increased cover of cheatgrass on sites where a seed source for this species is present (Miller et al. 2005). Fire risks associated with slash would be mitigated to some degree by associated programs to use felled trees for posts, mulch, biomass, or other uses, and following manual treatments with pile and slash burning.

Potential adverse effects associated with mechanical treatments are discussed briefly in the 17-States PER (USDOI BLM 2007c:4-47). Most pinyon-juniper would be removed using mechanical methods and prescribed fire and wildland fire for resource benefits. Mechanical treatments are often used to reduce tree dominance in Phase II and III woodlands, but could also be used with chainsaws in Phase I stands if the equipment does not harm the sagebrush community. However, mechanical treatments make seedbed preparation and sowing difficult when the site requires revegetation (Tausch et al. 2009). In some cases, non-native species might be used in order to prevent cheatgrass establishment and spread. Mechanical treatments can result in substantial soil disturbance that favors noxious weeds and other non-native, invasive species, as discussed for riparian treatments. However, when mechanical treatments are applied in combination with seeding, the associated soil disturbance can increase the establishment and success of seeded species (Miller et al. 2005). Heavy equipment could also impact desirable understory vegetation (Tausch et al. 2009) including special status species, and contribute to soil erosion and compaction (Miller et al. 2005). While mechanical treatments can be used on stands of trees, they can also be used on individual trees, allowing old-growth trees to be avoided. Generation of slash and associated fire risks would be similar to those discussed for manual treatments, although more slash is likely to be generated using mechanical methods. Large amounts of slash in late Phase II and Phase III stands create a fire hazard for a minimum of 2 years and can limit the mobility of domestic and wild large herbivores (Tausch et al. 2009). In some areas, the creation of fire and fuel breaks could also lead to noxious weeds and other invasive non-native vegetation establishment and spread.

Chaining and thinning are the most common methods for reducing pinyon-juniper cover in the western U.S. (Tausch and Hood 2007). The BLM could use Ely chains to uproot trees and shrubs, to create seedbeds, to top and prune large shrubs, and to cover seed. Generally, the chain would pass through the treated area in one direction. Following the first passing of the chain, seeding may occur. After seeding has occurred, the chain would pass through the treatment area in a direction opposite that of the first pass. This second pass is considered double chaining, and completely uproots the knocked over vegetation from the first pass, furrows the trees into rows, and helps to cover seed and create seed-to-soil contact for any reseeding effort. Trees in mature, even-aged stands can be removed more effectively and efficiently by chaining than those in uneven aged stands. Chaining is one of the few ways to effectively treat late Phase II and III habitats and effectively promote the establishment of seeded species. Chaining could be used on the 3 Bars Project area to create fuel breaks, disrupt the continuity of fuels within the pinyon-juniper community, and remove trees killed in prescribed fire activities within treatment areas identified to enhance greater sage-grouse habitat.

Small junipers can be killed more effectively than the more flexible pinyons, and chaining during the winter months would increase mortality. Chaining is especially effective during the cold winter months, when stems become brittle, the ground is frozen and often snow-covered, and chained trees are more likely to be removed. In some cases when junipers are knocked over and have some roots still within the soil, they may continue to grow from the original stump or stem. In these cases junipers may return on the site a lot earlier than pinyons or junipers developing from seed (Stevens 1999, USDOI BLM 2012c).

Mechanical treatments such as chaining generally increase herbaceous biomass, but this improvement in forb and grass cover may disappear after about 25 years as pinyon-juniper reestablishes on the site (Tausch and Hood 2007). Follow-up maintenance treatments with chainsaws or a roller chopper are typically required within 10 to 20 years of treatment initiation to remove trees that have persisted from the initial chaining. Use of mechanical equipment can also be limited by terrain (Miller et al. 2005), and as discussed under Soil Resources (Section 3.8), much of the area targeted for pinyon-juniper management is not suitable for chaining or shredding because of steep slopes and other factors. Chaining could also cause the loss of desirable vegetation, and lead to invasion of the site by noxious weeds and other invasive non-native vegetation. Thus, chaining would likely be used on a limited basis in the 3 Bars Project area.

The BLM would utilize fire as one means of removing and thinning pinyon-juniper from treatment sites, especially on areas with steep slopes or where stand replacement is desired. Prescribed fire could be used as a treatment tool in nearly all of the proposed treatment areas. Prescribed fire could be used on several thousand acres annually, although prescribed fires and wildland fire for resource benefits use would generally be limited to less than 1,000 acres at any one time. In addition, the BLM would utilize wildland fire for resource benefit in the Sulphur Spring Wildfire Management Unit. In this unit, the BLM would allow a wildfire to burn in areas where natural fire would benefit multiple resources and fuel loads exceed 2 tons per acre in shrublands and 10 tons per acre in pinyon-juniper woodlands, with individual fire size not to exceed 1,000 acres. The general effects of fire on pinyon-juniper woodlands are discussed in the 17-States PER (USDOI BLM 2007c:4-37 to 4-40). These include a short-term decrease in desirable vegetation and increase in noxious weeds and other invasive non-native vegetation.

Prescribed fire treatments can produce desirable results on sites with woodlands in Phases I and II particularly when there is an abundance of perennial natives in the understory (Tausch et al. 2009). The BLM plans to conduct most burns on Phase II or Phase III sites to initiate stand replacement and to avoid impacts to shrubby vegetation including sagebrush. These sites generally have a depleted understory, thus 1) fire may be difficult to carry through the stand as

a result of limited ground and ladder fuels, 2) treatment may be more costly due to the need for higher inputs, and 3) site response may be less predictable and has a lower potential for success (for example, more annuals versus perennials may establish as a response to fire compared to treating sites that are in earlier stages of woodland succession). Where tree dominance is high and woodlands are contiguous, crown fires can rapidly cover large areas. When pinyon pines dominate, their bark can easily carry fire into the crown. When weeds, such as cheatgrass, are present on the site, risk of failure is increased, especially if the site is warm and dry, or where soils are shallow or fine-textured. Hydrophobicity can be a problem directly beneath the tree canopy resulting in limited seedling establishment and increased soil erosion (Tausch et al. 2009). Thus, to limit these risks, the BLM may also use mechanical treatments to increase native herbaceous vegetation prior to burning and improve the potential for successful prescribed fire treatments.

Treatments in the Sulphur Spring Wildfire Management Unit would restore fire as an integral part of the ecosystem and improve plant species diversity. By reducing fuel accumulations and creating canopy openings in the pinyon-juniper, sagebrush and other shrub species and forbs and grasses should increase. Re-introduction of fire is preferred to non-fire treatments for habitat restoration, where feasible. Although wildland fire for resource benefits would have a substantial impact on wildlife and their habitat in both the short and long term, controlling pinyon-juniper without the re-introduction of periodic fire (such as cutting western juniper trees), despite providing ecological and hydrologic benefits, may not result in full restoration. The underlying proximate cause of pinyon-juniper expansion, the absence of periodic fire, remains. Eventually, especially if pinyon-juniper is nearby, and if other conditions remain the same (i.e., continued livestock grazing), the site would be invaded again and pinyon-juniper problems would re-emerge (Kerr and Salvo 2007).

Regardless of the cause of the fires in pinyon-juniper habitat, some post-burn restoration and management may be needed. After broadcast burns, the BLM may need to reseed burned areas with forbs, grasses, and shrubs. Based on past reseeding treatments conducted for several wildfires burns in the District, seeding and planting of native and non-native vegetation may have limited success, especially during drought years and native release of seeds may be the primary mechanism for site revegetation. However, in areas with sufficient moisture, seedings have been successful and have resulted in an abundance and diversity of forbs, grasses, and shrubs. For example, at the Fluffy Flat wildland fire site, 11.4 percent of vegetation was comprised of seeded species and seedling survivorship was 54 percent 3 years after seeding (USDOI BLM 2011e). To ensure vegetation restoration success, the BLM may prohibit livestock access to the area through grazing closure decisions that are effective upon issuance. The BLM may also use temporary fencing, including electric fencing, which has been used effectively at wildfire restoration sites to improve revegetation success by excluding livestock, wild horses, and wild ungulates (USDOI BLM 2009d, e, 2010e, f, g, h, i, j, 2011e, f).

Grasses and forbs would benefit from prescribed fire and would be the first to revegetate the site. If non-native annual grasses and forbs occur on a site prior to fire, and if fire intensity is high, then non-native annual grasses and forbs would be the first to establish after a fire. Without other treatments, non-native annual grasses and forbs may dominate the site (USDOI BLM 2012b). The BLM generally has had good success in controlling non-native vegetation and allowing native vegetation to establish on sites treated using prescribed fire on the 3 Bars Project area (see Section 3.12.3.3). However, some sites could require seeding or other rehabilitation efforts following the fires, or it could take decades following a fire to fully establish all desired vegetation including understory vegetation and mixed-aged stands of pinyon-juniper.

Vegetation succession after fire would also vary depending on the canopy cover and site conditions. While regrowth of native understory species is rapid and vigorous when the canopy cover is relatively open, poorer native regrowth would be expected on sites with fewer understory plants and a depleted seed bank. On these sites, reseeding and/or a combination of treatment types would be necessary.

Pinyon-juniper enhancement projects would occur within designated harvest units for woodland products. There is a large degree of overlap between harvest units and pinyon-juniper treatment areas. Trees would be removed from these areas, although not over the entire acreage. As a result of thinning treatments, the number of pinyon-juniper trees within harvest areas would be reduced, although woodland products would still be available over portions of treatment areas. Treatments would affect approximately 26 percent of the total designated woodland products harvest area. Removal of pinyon pines and juniper from these areas would eliminate or limit the ability to harvest woodland products there.

Ground-disturbing activities could impact special status plant species, if any are present in the proposed pinyon-juniper treatment areas. No federally listed plant species are known or likely to occur in the project area, but several BLM Sensitive Species could potentially occur within pinyon-juniper treatment units within the project area (**Table 3-38**). BLM policy requires the Mount Lewis Field Office to survey treatment sites for listed and other special status species prior to ground-disturbing activities. Pre-treatment surveys would allow the BLM to avoid or minimize impacts to these species when implementing project treatments.

Beneficial Effects

Selective cutting by the BLM or public (greenwood cutting) using chainsaws would remove trees throughout the designated units with minimal effects on other vegetation. Some debris would be left on-site following selective cutting treatments. In dense stands, large amounts of debris would be piled and burned on-site. Burning piles on-site would remove the large volumes of fuel from the site, reducing the threat of large-scale stand replacing fire.

Mechanical treatments such as mulching and shredding would be done on tree-dominated sites that have sufficient desired understory vegetation. The advantages of mechanical removal of trees include flexibility in timing the treatment application and the ability to precisely control treatment boundaries or targeted trees. For example, old-growth trees can be better protected if manual or mechanical methods are used than if fire is used (Tausch et al. 2009). Residual woody vegetation would be left on-site and would consist of slash/wood chips created from shredders. Wood chips scattered across the site would allow for increased infiltration and water retention and decreased soil erosion. When compared to the bare soils under closed canopy woodlands, shredding treatments would increase water retention, infiltration, seedling protection, and establishment. The decomposition of woody plant material should also improve soil nutrient content that could enhance seedling recruitment and establishment and the long-term viability of the grass and shrub community, as well as provide protection to the soil resource (Brockway et al. 2002, USDOI BLM 2012b).

This treatment method would alter vegetation communities on the site and would favor grasses and forbs over shrubs and trees. Reduced competition and ground disturbance may allow native seed banks to aid in the reestablishment of native species. Areas to be treated with this method would consist of tree dominated areas with little desired understory vegetation.

Chaining combined with seeding would reduce the cover of existing vegetation and allow a more diverse plant community with higher production of grasses, forbs, and shrubs to establish. Double chaining would furrow downed

trees and would promote wildlife access to the site following seeding establishment. Residual woody vegetation, which would consist of slash/biomass created from scattered trees from the chaining treatment, would provide protection to regenerating grasses, forbs, and shrubs. Slash and biomass left on-site would also provide shade for singleleaf pinyon pine seedlings and increase the establishment of pinyon on the site. Therefore, vegetation would respond and revegetate the site faster when compared to burned areas.

Compared with other methods of mechanical treatment (plowing, disking), or the use of fire, chaining can be used selectively to reduce tree density without disrupting herbaceous understory plants and non-target areas. Chaining can leave considerable litter on the surface, which improves watershed protection by retaining surface moisture and increasing the amount of infiltration (Stevens 1999). Chaining is also effective in breaking the continuity of fuel sources and can be used as a method to develop effective fuel breaks, thus minimizing the risk of catastrophic fire. Chaining and other mechanical methods that thin young pinyon-juniper would benefit older age classes and promote stand health and reduce the incidence of disease. Removal of younger trees would also reduce the potential for crown fires that could lead to the complete loss of the pinyon-juniper stand.

While pinyon-juniper can be controlled without the use of prescribed fire or wildland fire for resource benefits, non-fire methods generally do not provide long-term control if pinyon-juniper remains nearby. Fire treatments, including thinning, piling, and burning, typically can remove more trees per unit cost than shredding and mulching, while leaving less woody debris on the ground that could serve as fuel for a wildfire (Gottfried and Overby 2011). Studies suggest that dense stands of Phase II and III pinyon-juniper, where most BLM fire treatments would occur, cannot be managed effectively by fire alone, but must also be treated mechanically to increase herbaceous vegetation that fuels the fire (Ansley and Rasmussen 2005, Tausch and Hood 2007, Tausch et al. 2009). Thus, the BLM would use manual and mechanical methods, in addition to fire, for those units with Phase II and III stands that are proposed for treatment with fire.

Treatments to reduce hazardous fuels, increase canopy spacing among pinyon-juniper, remove diseased trees, remove encroaching pinyon-juniper, and create fire and fuel breaks would help to reduce wildfire risk to the benefit of native vegetation. Monitoring at the Red Hills hazardous fuels reduction site has shown that the risk of wildfire was reduced from a “very high to extreme” risk to “low” risk at 35 monitoring sites, and “low to moderate” risk at 5 sites, after 3 years. A variety of desirable forbs, grasses, and shrubs were observed re-colonizing treatment areas, and fuel breaks were still viable (USDOI BLM 2008i).

The BLM would restore fire as an integral part of the ecosystem, improve species diversity, and reduce hazardous fuels on the Sulphur Spring Wildfire Management Unit by using wildland fire for resource benefit. The BLM would allow fire to burn on about 20 to 40 percent of the area, but generally burns would be limited to small acreages to create a mosaic of habitats and to create fuel breaks. By keeping burned areas small, the risk of a cheatgrass infestation would be much less. Several wildfires have occurred in this area in recent years due to dense fuel accumulations and pinyon-juniper cover. In recent years, the BLM has used chainsaws, mowers/shredders, and prescribed fire to create fuel breaks and remove diseased pinyon-juniper (USDOI BLM 2009a). By reducing fuel accumulations and opening up the canopy cover, sagebrush and other shrub cover should increase, a more natural fire regime would be restored in the area, and the risk of future wildfires would be diminished. Both prescribed fire and wildland fire for resource benefit could be used year-round, although prescribed fire treatments tend to be conducted during fall through spring and outside of the migratory bird breeding season.

A large amount of downed logs and woody debris would result from pinyon-juniper management and could be used for firewood. By thinning and removing pinyon-juniper, competition among remaining trees for water and other

resources would decline, stand health would improve through reduced competition, and the remaining pinyon pines should be able to produce more nuts.

Sagebrush Treatments

Of the treatments in pinyon-juniper-dominated communities, about 75 percent would occur in Phase I stands. Therefore, the vast majority of project treatments would occur in areas that support, or have supported, sagebrush, and areas where pinyon-juniper encroachment into the sagebrush community is occurring. Based on guidance from the Connelly et al. (2000) and Wyoming Game and Fish Department (2010) to reduce impacts to greater sage-grouse from habitat change, no more than 20 percent of a unit would be treated within intact sagebrush communities. The BLM would treat up to 50 percent of the unit in units dominated by non-native vegetation in an effort to restore native species in areas of historic importance to greater sage-grouse.

Adverse Effects

Projects to thin sagebrush (Alpha group), reduce herbaceous dominance (Rocky Hills Unit), open the sagebrush canopy (Table Mountain 2 Unit group), and treat cheatgrass (West Simpson Park Unit), would potentially have short-term adverse effects on sagebrush habitats. However, provided project objectives are met, the long-term goal of these activities is to improve the quality of sagebrush habitats. In some cases, the species composition at treatment sites would change, as sagebrush enhancement projects would focus on the components of greater sage-grouse habitat. For instance, at the Rocky Hills Unit, where there are extensive stands of crested wheatgrass and forage kochia, the BLM would conduct treatments to minimize the non-native herbaceous component and increase the sagebrush and native herbaceous component. For the Table Mountain 2 Unit group, mature sagebrush communities with a minimal understory component would be thinned to reduce shrub cover and promote the growth of forbs and grasses.

Other sagebrush projects (Table Mountain 1 and Three Corners) would involve removal of Phase I and II pinyon pine and juniper from sagebrush habitats. These treatments would have an adverse effect on pinyon-juniper woodlands by reducing the overall cover of these habitat types. The goal of most of these treatments is to restore sagebrush habitat in areas where sagebrush should occur based on ecological site description reference, desired state, or management objective. The long-term result of the treatments would be a reduction in pinyon-juniper and an increase in sagebrush. However, if the treatments do not continue indefinitely, it is likely that over time, pinyon-juniper would once again expand into sagebrush habitats.

Manual and mechanical treatments would have the potential to disturb sagebrush habitats, with potential impacts similar to those discussed for other community types. Ground disturbance associated with mechanical treatments would occur in all of the sagebrush project areas. These treatments could potentially result in trampling and inadvertent removal of non-target plants, as well as soil disturbance that could favor the establishment and spread of cheatgrass and other noxious weeds and invasive non-native vegetation. The greatest risk for adverse effects would occur where the largest ground areas are disturbed, and where weed seeds are already present. In the western U.S., the effects of chaining, especially to remove pinyon-juniper in sagebrush stands, are still visible 30 to 40 years after treatment (Peters and Cobb 2007).

Prescribed fire treatments would be designed to create a mosaic of habitat types and would not be used to thin or remove pinyon-juniper. Although fire would be expected to adversely affect sagebrush communities by killing mountain big sagebrush, not all of the vegetation in the burned area would be affected, as fire kills in patches rather than by thinning (Baker 2006). Fire is also likely to increase the dominance of cheatgrass and other introduced annual

grasses in areas where these species are present pre-burn. The fire interval for mountain big sagebrush is about 70 to 200 years (Baker 2006).

Biological control has been identified for use in the Table Mountain, Rocky Hills, and West Simpson Park units. Targeted grazing would be used to maintain firebreaks to help reduce wildfire risk in these areas. Grazing can contribute to the spread of noxious weeds and other invasive non-native vegetation through preferential grazing of native vegetation over noxious weeds and other invasive non-native vegetation, and by movement of noxious weeds and other invasive non-native vegetation into uninfested areas via livestock feces (USDOI BLM 2007c). Therefore, there would be some risk of establishment or spread of noxious weeds and other invasive non-native vegetation in treated sagebrush sites if these species are already present in the grazed areas, or if the livestock are brought in from an area where these species occur.

Sagebrush treatments would affect woodland products, as pinyon pine and juniper would be removed from these habitats. The proposed treatments would affect a relatively small portion (5 percent) of the total designated woodland product harvest area. This reduction in woodland product species would continue for as long as the BLM continued treatments to slow or reverse the encroachment of pinyon-juniper into sagebrush and other habitats.

Ground-disturbing activities could impact special status plant species, if any are present in the proposed sagebrush management areas. No federally listed plant species are known or likely to occur in the project area, but several BLM Sensitive Species could potentially occur within sagebrush treatment units within the project area (**Table 3-38**). BLM policy requires the Mount Lewis Field Office to survey treatment sites for listed and other special status species prior to ground disturbing activities. Pre-treatment surveys would allow the BLM to avoid or minimize impacts to these species when implementing project treatments.

Beneficial Effects

The purpose of mechanical treatments is to reduce the density of sagebrush and open up the sagebrush canopy to promote herbaceous understory development. Treatments could also help to create a mosaic of habitats based on sagebrush density and age. Davies et al. (2012) found that mowing sagebrush increased the understory herbaceous cover a few years after treatment in dense mountain sagebrush stands, but there was also an increase in noxious weeds and other invasive non-native vegetation. Mowing, particularly in Wyoming big sagebrush sites in Kobeh Valley, would be followed by broadcast seeding. Evidence has shown that follow-up treatments in low elevation Wyoming big sagebrush sites are needed to achieve desired results. The BLM would minimize soil disturbance as much as possible to reduce the potential for noxious weed and other invasive non-native vegetation establishment.

Pinyon-juniper removal projects at the Table Mountain and Three Corners units would likely have a beneficial effect on sagebrush habitats. Woodland encroachment into sagebrush communities can reduce the structural complexity of these communities, decrease the seed bank, and reduce fuels and the role of fire, such that tree recruitment is favored, and increase surface runoff and erosion (Miller et al. 2005 *in* Pierson et al. 2008). Therefore, removal of trees from these habitats would likely improve the quality of sagebrush habitats.

The BLM would use mechanical methods to create fuel breaks within homogeneous stands of sagebrush along roads or existing linear disturbances. In addition to providing openings for grasses and forbs to develop, treatments would also slow the spread of wildfire and resultant loss of native vegetation.

Prescribed fire would help to create a mosaic of habitat types and successional classes on the Three Corners Unit. However, treatments would occur on only a few acres annually, if at all, so that benefits to the sagebrush community

and to greater sage-grouse and other wildlife would be minor. Prescribed fire could also be used at the Table Mountain Unit to treat encroaching pinyon-juniper, and to remove dead cheatgrass and some of the cheatgrass mat in the northern portion of the unit prior to follow-up treatments with broadcast or drill seeding. These could include the planting of crested wheatgrass and forage kochia to help stabilize the site and prevent revegetation by cheatgrass. At some later point in time, the BLM would remove the crested wheatgrass and forage kochia and replace them with native species. Prescribed fire, along with broadcast seeding, could be used in the West Simpson Unit to control cheatgrass. Prescribed fire may also be used at the Rocky Hills Unit to aid in the removal of crested wheatgrass and forage kochia prior to follow-up broadcast seeding, drill seeding, or hand plantings in an effort to re-establish native shrub and herbaceous species within an historic greater sage-grouse area.

A limited amount of downed logs and woody debris would result from sagebrush treatments and could be used for firewood. Down trees could be made available for commercial woodcutting and biomass use, or biocharing, although it is unlikely that these uses would occur on the project area.

3.11.3.3.3 Direct and Indirect Effects under Alternative B (No Fire Use Alternative)

Under this alternative, the total acreage treated would be approximately half that of Alternative A. Effects to native plants and natural plant communities from mechanical methods would be similar to those under Alternative A, as similar amounts of mechanical treatments would likely be used.

Given that fire would not be used under this alternative, treatment programs might not be as effective as under Alternative A. Phase I and II pinyon-juniper woodlands would be targeted for treatments. Treatment programs would not include fire or a combination of fire and other methods, and they might not be as effective at meeting project objectives as under Alternative A. For example, if chaining cannot be combined with fire, repeat chaining or additional maintenance treatments may be required (Tausch et al. 2009). It would be difficult for the BLM to conduct pinyon-juniper and noxious weeds and other invasive non-native vegetation treatments on hillslopes, or over large acreages, using mechanical methods, where fire use treatments would be effective. Loss of pinyon-juniper and associated increase in sagebrush would be less than under Alternative A, as less acreage would be treated. The acreage of persistent woodlands and sagebrush habitats benefiting from treatments would be less than under Alternative A. Since treatment of Phase III woodlands would be minimal, these areas, which have the greatest risk for loss from high intensity fires, would remain at a high risk under this alternative.

More acres would be available for commercial and individual harvest of woodland products under Alternative B than under Alternative A. Some treatments to improve historic pinyon-juniper communities would occur, which could benefit future pine nut harvest in these areas, but the acreage benefiting from these treatments would be substantially lower than under Alternative A. Additionally the risk that a wildfire would burn large areas of woodland products would be greater under this alternative than under Alternative A.

Under Alternative B, it is unlikely that the BLM restore fire as an integral part of the ecosystem; and reduce extreme, very high, and high wildfire risks to moderate risk or less. As a result, it is likely that the amount of area meeting Potential Natural Community objectives would be less than would occur under Alternative A.

3.11.3.3.4 Direct and Indirect Effects under Alternative C (Minimal Land Disturbance Alternative)

Given that fire, mechanical methods, and livestock would not be used under this alternative, the BLM would have the fewest options for its treatment programs, and these programs would likely not be as effective as under the other alternatives. The BLM would be unable to combine treatment methods for optimal control of certain species and for

enhancement of native plant communities. Additionally, removal of fuel hazards would be least under this action alternative, and the risk of catastrophic wildfire would be greatest. Because this alternative is the most limited in terms of the tools available for large scale restoration, it is the least likely of the action alternatives to help attain larger ecosystem restoration goals for the 3 Bars Project area.

Under this alternative, only manual methods would be used to treat vegetation. Pinyon-juniper would be removed using chainsaws. Risks to non-target vegetation from treatments would be least under this alternative. Phase I woodlands and a limited acreage of Phase II woodlands would be targeted for treatments. As all treatments would be manual, their effectiveness would likely be lower than under the other alternatives. Additionally, the BLM would not be able to slash and pile burn following treatments to reduce the short-term fire hazard, although programs to use felled trees for posts, mulch, biomass, or other uses would help minimize the fire risk. Loss of pinyon-juniper and the associated increase in sagebrush would be less than under Alternatives A and B. The acreage of persistent woodlands and sagebrush habitats also benefiting from treatments would be less than under Alternatives A and B. Since Phase III woodlands likely would not be treated, these areas, which have the greatest risk for loss from high intensity fires, would remain at a high risk under this alternative.

Acres available for commercial and individual harvest of woodland products would be greater than under Alternatives A and B, based on the amount of area treated. Treatments to improve historic pinyon-juniper habitats would be low under this alternative. The risk that a wildfire would burn large areas of woodland products available for harvest would be greater than under Alternatives A and B. Long-term benefits to woodland products would be less under this alternative than Alternatives A and B.

As under Alternative B, it is unlikely that the BLM would restore fire as an integral part of the ecosystem; or reduce extreme, very high, and high wildfire risks to moderate risk or less or be able to increase the presence of native shrubs and herbaceous species in areas dominated by crested wheatgrass and forage kochia. In addition, the BLM would make little or no contribution toward developing fire and fuel breaks or reducing the risk of a large-scale wildfire under Alternative C. As a result, it is likely that the amount of area meeting Potential Natural Community objectives would be less than would occur under Alternatives A and B.

3.11.3.3.5 Direct and Indirect Effects under Alternative D (No Action Alternative)

There would be no direct impacts to native and non-invasive vegetation from 3 Bars Project treatments as no treatments would be authorized under this alternative. Under this alternative, the BLM would not create fire and fuel breaks; thin and remove pinyon-juniper to promote healthy, diverse stands; treat large-scale infestations of noxious weeds and other invasive non-native vegetation, especially cheatgrass; restore fire as an integral part of the ecosystem; or reduce the risk of a large-scale wildfire. Threats to ecosystem health under this alternative would be the continued decline of ecosystem health due to further decline in native understory species in the upland plant communities, further expansion of pinyon-juniper woodland into other communities, including sagebrush, riparian, and aspen habitats, and the continued increase of the risk for catastrophic wildfire as a result of high fuel loads. Given the low acreage treated annually (about 1,500 acres), there would be little or no improvement in the amount of acreage in Proper Functioning Condition.

3.11.3.4 Cumulative Effects

The CESA for native and non-invasive vegetation resources is approximately 1,841,698 million acres and includes those watersheds at the Hydrologic Unit Code 10 level that are all or partially within the 3 Bars Project area (**Figure**

3-1). Past and present actions that have influenced native and non-invasive vegetation activity in the 3 Bars ecosystem are discussed in Section 3.2.2.3.3.

3.11.3.4.1 Cumulative Effects under Alternative A (Preferred Alternative)

Historic overgrazing, introduction of cheatgrass, large wildfires, and other natural and human-caused factors have contributed to the departure of the plant communities from the Potential Natural Community across the 3-Bars ecosystem. This has led to a decrease in the functionality of ecological processes, thus reducing the resilience and resistance of these ecosystems to disturbance. The treatments proposed in the 3-Bars ecosystem are designed to provide the means needed for these ecosystems to recover.

In the short term, temporary fences may change the distribution of grazing by livestock, wild horses, and wildlife. As distribution patterns change, utilization would also change. Wildlife and wild horse utilization would decrease in treatment areas while temporary fences are in place, but would increase in other areas. Once the temporary fences are removed, wild horses and wildlife may be attracted to the treatment areas resulting in potentially higher use of the area than before. Temporary fences would exclude livestock, although AUMs would be temporarily suspended to prevent overuse in other areas.

According to utilization data, about 6 percent of the 3 Bars Project area is experiencing moderate to severe forage utilization (see Section 3.17.3). However, about 35 percent of proposed riparian zone treatment areas, 25 percent of pinyon-juniper treatment areas, and 48 percent of sagebrush treatment areas are experiencing moderate to severe forage utilization. In addition, about 1,600 acres within the Simpson Park Northeast Unit are experiencing moderate to severe forage utilization, although only about 150 acres would be treated within this unit.

The BLM would continue to use ground-based herbicide applications to remove noxious weeds and other invasive non-native vegetation, and aerial-based application methods to remove cheatgrass, and would restore burned areas under the Burned Area Emergency Stabilization and Rehabilitation program, under existing authorizations on about 1,000 acres annually. These treatments could have a short-term adverse effect on non-target vegetation. These treatments would have long-term beneficial effects by helping to reduce hazardous fuels, improve native vegetation, slow the spread of noxious weeds and other invasive non-native vegetation, and reduce surface runoff and erosion associated with burn sites.

All of the formulations of herbicide active ingredients would have the potential to adversely affect non-target vegetation under one or more exposure scenarios. The assessment completed for the 17-States PEIS found that the most likely mode of impact to non-target plants is via spray drift, particularly for aerial applications, and accidental exposure scenarios, such as a spill (USDOI BLM 2007b:4-44).

Land development, mineral development, and oil, gas, and hydrothermal exploration and development could affect about 15,000 acres in the CESA in the reasonably foreseeable future, including about 8,335 acres of disturbance associated with the Mount Hope Project, and from materials sites, roads, and rights-of-way for roads, pipelines, and power and telephone lines. Although some of the disturbance areas from these projects would be reclaimed, these activities would lead to long-term losses in native plant communities in the affected areas. No federally listed plant species are known or likely to occur in the CESA, but several BLM Sensitive Species occur within the CESA and could be impacted by reasonably foreseeable future actions under Alternative A.

An estimated 140,000 acres would be burned by wildfire within the CESA within the next 20 years, based on wildfire incidence since 1985. Wildfire could cause the wide-scale removal of vegetation in the CESA. Wildfires that are not

reseeded would return to early-successional conditions and would be left to recover naturally. In the absence of invasive species, the site may successfully revegetate if perennial grasses survive the fire, otherwise it would be necessary to reseed and control the invasive species with herbicide treatments to rehabilitate the site. Areas with intact plant communities would be more resilient to wildfire and may retain functionality of ecosystem processes. Areas with degraded plant communities may benefit from wildfire and the subsequent reseeding and herbicide treatments to restore functionality of ecosystem processes.

Short term, there would be loss of vegetation, particularly pinyon-juniper and non-native vegetation, and there could be an increase in noxious weeds and other invasive non-native vegetation. Long term, these treatments should result in vegetation that is more fire resilient, more abundant, and similar to the Potential Natural Community. Hazardous fuels and other habitat improvement treatments would occur on about 127,000 acres within the 3 Bars Project area, and on an additional 15,000 acres within other portions of the CESA under existing and future authorizations, or about 8 percent of the CESA. Noxious weed and other non-native vegetation treatments would remove vegetation that contributes to short return-interval fires and the loss of native vegetation. These treatments would help to reduce the risk of wildfire within the CESA. In addition, the BLM would conduct stream bioengineering and plantings on about 31 miles of stream to slow stream flow and create pools and wet meadows, to improve wetland and riparian vegetation and water flows and quality. Overall, there would be a net beneficial accumulation of effects from BLM treatments and treated areas would move toward their Potential Natural Community. These benefits would be greatest under Alternative A.

3.11.3.4.2 Cumulative Effects under Alternative B (No Fire Use Alternative)

Under Alternative B, effects from non-3 Bars Project reasonably foreseeable future actions on vegetation would be similar to those described under Alternative A. Under Alternative B, the inability to use prescribed and wildland fire for resource benefit would restrict BLM's ability to reduce wildfire risk, restore natural fire regimes, and influence vegetation communities on a large scale within the 3 Bars Project area. Prescribed fire would be limited to a few hundred acres annually in other portions of the CESA outside the 3 Bars Project treatment areas based on previous authorizations.

Short term, there would be disturbance to and loss of vegetation, particularly pinyon-juniper and non-native vegetation, and there could be an increase in noxious weeds and other invasive non-native vegetation. Long term, these treatments should result in vegetation that is more fire resilient, more abundant, and similar to the Potential Natural Community. Hazardous fuels and other habitat improvement treatments would occur on about 63,000 acres within the 3 Bars Project area, and on an additional 15,000 acres within other portions of the CESA under existing and future authorizations, or about 4 percent of the CESA. These treatments would help to reduce the risk of wildfire within the CESA. Overall, there would be a net beneficial accumulation of effects from BLM treatments and treated areas would move toward their Potential Natural Community. However, because the BLM would treat fewer acres, and would not be able to use fire, benefits to vegetation would be less under Alternative B than under Alternative A.

3.11.3.4.3 Cumulative Effects under Alternative C (Minimal Land Disturbance Alternative)

Under Alternative C, effects from non-3 Bars Project reasonably foreseeable future actions on native and non-invasive vegetation would be similar to those described under Alternative A. Under Alternative C, the BLM would only be able to use manual and classical biological control methods to treat vegetation. As a result, the BLM anticipates treating about one-fourth as many acres under Alternative C as under Alternative A. These methods would

cause little vegetation and soil disturbance and would also give the BLM greater control on the types and amount of vegetation that are removed.

By not being able to use mechanical methods and fire to improve the health and resiliency of native vegetation, reduce hazardous fuels, create fire and fuel breaks, and remove downed wood and slash, the risk of wildfire and its impacts on vegetation would likely increase on the 3 Bars Project area.

Hazardous fuels reduction and habitat improvement projects could occur on about 32,000 acres within the 3 Bars Project area. Fire and mechanized equipment could be used on about 15,000 acres in other portions of the CESA to improve native vegetation, remove hazardous fuels, and reduce the risk of wildfire. Collectively, about 3 percent of the CESA would be treated by the BLM.

There would still be a net benefit from BLM treatments and treated areas would move toward their Potential Natural Community on portions of the project area. Because the BLM would not be able to use fire and mechanical treatments, and fewer acres would be treated, benefits to vegetation under Alternative C would be less than under Alternatives A and B.

3.11.3.4.4 Cumulative Effects under Alternative D (No Action Alternative)

Under Alternative D, effects from non-3 Bars Project reasonably foreseeable future actions on native and non-invasive vegetation would be similar to those described under Alternative A. There would be no cumulative impacts to native and non-invasive vegetation from 3 Bars Project treatments as no treatments would be authorized under this alternative. The BLM could create fire and fuel breaks; thin and remove pinyon-juniper to promote healthy, diverse stands; slow the spread of noxious weeds and other invasive non-native vegetation using ground-based methods, especially cheatgrass; restore fire as an integral part of the ecosystem; and reduce the risk of a large-scale wildfire under current and reasonably foreseeable future authorized actions, but on a very limited acreage. Thus, factors that contribute to loss of native and non-invasive vegetation health and resiliency would remain, including spread of noxious weeds and other invasive non-native vegetation, pinyon-juniper encroachment, and wildfire, and would likely be greatest under this alternative. Under this alternative, the BLM would do little to move plant communities toward their Potential Natural Community.

3.11.3.5 Unavoidable Adverse Effects

The proposed vegetation treatments would cause unavoidable short-term disturbances to native and non-invasive vegetation communities by removing both target and non-target vegetation. In some cases, treatments would return all or a portion of the treated area to an early successional stage by freeing up resources such as light and nutrients. These adverse effects would be temporary and would consist of short-term losses of native vegetation and associated habitat values. The vegetation treatments would also have unavoidable adverse effects to pinyon-juniper habitats and woodland products harvest areas by substantially reducing the acreage of pinyon-juniper within the project area. These adverse effects are a goal of the treatment program, and are intended to be long term; in the absence of treatments, pinyon-juniper habitats would continue to expand.

3.11.3.6 Relationship between the Local Short-term Uses and Maintenance and Enhancement of Long-term Productivity

The proposed vegetation treatments would have short-term adverse impacts to existing vegetation, including native trees, shrubs, forbs, and grasses, as these could be removed during treatments. Treatments that remove or control noxious weeds and invasive non-native vegetation could provide immediate benefits to native species, such as increased access to water and nutrients and enhanced vigor from reduced competition with invasive species. Treatments that remove hazardous fuels from public lands would be expected to benefit the long-term health of plant communities in which natural fire cycles have been altered. The suppression of fire results in the buildup of dead plant materials (e.g., litter and dead woody materials), and often increases the density of flammable living fuels on a site. Treatments that restore and maintain fire-adapted ecosystems, and increase ecosystem functionality, through the appropriate use of mechanical thinning, use of wildland fire for resource benefit or prescribed fire, and other vegetation treatment methods, would decrease the effects of future wildfires on plant communities and improve ecosystem resilience and sustainability. Over the long term, treatments should also reduce the incidence and severity of wildfires across the project area.

Treatments that control populations of non-native species on public lands would be expected to benefit native plant communities over the long term by aiding in the reestablishment of native species. The degree of benefit would depend on the success of these treatments over both the short and long term. Some treatments are very successful at removing noxious weeds and other invasive non-native vegetation over the short term, but are not successful at promoting the establishment of native species in their place. In such cases, seeding and planting of native plant species would be beneficial. Plant communities that have declined substantially in geographic extent from historical to current periods (e.g., big sagebrush and bunchgrasses) would increase. Treatments would also manipulate the vegetation in the project area to more closely resemble the Potential Natural Communities and to counteract the invasion of sagebrush-steppe and other habitats by pinyon-juniper woodland.

Short-term uses are also discussed in other sections of this EIS, including the potential loss of fish and wildlife habitat, increase in noxious weeds and other invasive non-native vegetation, loss of rangeland for livestock and wild horse use, and loss of public use of lands for recreation, as a result of treatments to restore vegetation and other resources, reduce hazardous fuels, and reduce the risk of wildfire. Long term, treatments to reduce the risk of wildfire and restore habitat should enhance the resilience and health of the landscape and land productivity, and reduce the risk of future wildfire and resultant loss of natural and social resources. As discussed above, short-term uses and enhancement of long-term productivity would generally be in proportion to acres treated and methods used by the BLM.

3.11.3.7 Irreversible and Irretrievable Commitment of Resources

Loss of native vegetation and plant productivity as a result of treatments would persist only until vegetation was reestablished, usually within several growing seasons. Loss of pinyon-juniper communities would last for as long as treatments continue, and would not be irreversible and irretrievable.

3.11.3.8 Significance of the Effects under the Alternatives

Based on the significance criteria presented in Section 3.11.3.2 it is not expected that any of the proposed alternatives would have a significant direct, indirect, or cumulative adverse effect on native and non-invasive vegetation, provided the BLM adheres to the SOPs referenced in **Appendix C**, and provided that treatments are effective at accomplishing their intended outcome.

Because no federally listed, proposed, or candidate plant species are known or likely to occur within the proposed treatment areas within the CESA, take or increased mortality of these species should not occur. Several rare or sensitive species not currently listed under ESA are known to occur in the 3 Bars project area or nearby. None are known to occur within the proposed treatment areas, although populations could occur in these areas. Pre-treatment surveys for rare plants would identify whether these species are present and allow the BLM to design treatment programs to avoid or minimize effects to these species. Should these species be present, it is possible that limited mortality could occur, but local extirpation of these species would not occur as a result of project activities.

None of the action alternatives would result in a long-term loss or degradation of a unique or high quality plant community, a measurable reduction in diversity within a high quality plant community, or an overall decline in woodland health. As discussed throughout this section, while there could be some short-term impacts to native communities as a result of implementing treatments, over the long term the proposed treatments would help sustain and improve unique and high quality plant communities (sagebrush, historic pinyon-juniper, aspen). Woodland health in treated stands should improve over the long term, and aspen regeneration and recruitment should increase.

While all of the action alternatives would result in a long-term reduction in the amount of special woodland products available for harvest, the designated harvest areas within the Battle Mountain District are very large, and would still provide suitable access to and availability of pinyon-juniper woodlands used for commercial and individual harvest.

3.11.4 Mitigation

Native and non-invasive vegetation resources would benefit from mitigation and monitoring measures identified in Section 3.17.4 (Livestock Grazing Mitigation). No mitigation or monitoring measures are recommended specifically for native and non-invasive vegetation resources.

3.12 Noxious Weeds and other Invasive Non-native Vegetation

3.12.1 Regulatory Framework

3.12.1.1 Executive Order 13112

Executive Order 13112, Invasive Species (February 3, 1999), instructs federal agencies to prevent introductions of non-native invasive species, control their spread in a cost-effective and environmentally sound manner, and minimize the economic, ecological, and human health impacts that invasive species cause. The Invasive Species Council, made up of federal agencies and departments, oversees and facilitates implantation of the Executive Order. The Executive Order also instructs the Secretary of the Interior to establish an advisory committee comprised of local, state, tribal, and regional stakeholders.

3.12.1.2 Federal Laws

Federal laws pertaining to noxious and invasive weeds include the Lacey Act as amended (18 USC § 42), the Carson-Foley Act of 1968 (Public Law 90-583), the Federal Noxious Weed Act of 1974, as amended by the Food, Agriculture, Conservation, and Trade Act of 1990 (Section 1453, Management of Undesirable Plants on Federal Lands; USC § 2801 et seq.), the Federal Plant Pest Act (7 USC § 150aa et seq.), and the Plant Protection Act of 2000 (7 USC § 7701 et seq.), as amended by the Noxious Weed Control and Eradication Act of 2004 (Public Law 108-412).

3.12.1.3 Nevada Laws

Chapter 555 of the Nevada Revised Statute pertains to noxious weeds. The Nevada Department of Agriculture is responsible for jurisdiction, management, and enforcement of this state law. The law mandates that plants on Nevada's noxious weed list be controlled on both private and public lands. The law also calls for the establishment of county weed control districts, which are responsible for control and eradication of noxious weeds. The Diamond Valley Weed District coordinates weed control efforts on public and private lands in Eureka County. The Nevada state noxious weed list can be found at URL: http://agri.nv.gov/Plant/Noxious_Weeds/Noxious_Weed_List/.

3.12.1.4 BLM Guidance and Regulations

BLM Manual 9015, *Integrated Weed Management*, provides policy relating to the management and coordination of noxious weeds and other invasive non-native vegetation activities (USDOI BLM 1992b). The policy requires that ground-disturbing projects and projects that alter plant communities be assessed to determine the risk of introducing or spreading noxious weeds and other invasive non-native vegetation. If the risk is moderate or higher, a management program must be established.

Two documents identify broad objectives for management of vegetation on BLM-administered lands—*Partners against Weeds: An Action Plan for the Bureau of Land Management* (USDOI BLM 1996), and *Pulling Together: National Strategy for Invasive Plan Management* (USDOI BLM 1998b). Treatment activities at the local level are guided by the goals, standards, and objectives of land use plans developed for each BLM field office. The BLM's noxious weeds and other invasive non-native vegetation control program has three performance measures: inventory, treatment, and post-treatment effectiveness monitoring. BLM funding is associated with achievement of performance measure targets.

BLM Handbook H-1740, *Integrated Vegetation Management* (USDOI BLM 2008b), and the BLM Battle Mountain District's *Integrated Weed Management Plan Mt. Lewis Field Office and Tonopah Field Office* (USDOI BLM 2009b) direct management of noxious weeds and other invasive non-native plant species within the 3 Bars Project area. The Districts weed management plan is most concerned with State of Nevada noxious weeds and invasive annual grasses found on or with the potential to spread into the jurisdictional boundaries of the Battle Mountain District.

3.12.2 Affected Environment

3.12.2.1 Study Methods and Analysis Area

3.12.2.1.1 Study Methods

Information about the presence and distribution of noxious weeds and other invasive non-native vegetation was obtained from past noxious weeds and other invasive non-native vegetation inventory, treatment, and monitoring data, background documents, aerial photographs, visual surveys for cheatgrass conducted during late fall and winter 2009-2010, and rangeland health studies conducted during fall 2010 and summer 2011.

The Mount Lewis Field Office has conducted noxious weed surveys over much of the 3 Bars Project area. These surveys are concentrated in areas that have been disturbed by human factors, sensitive natural areas, high-risk areas (e.g., riparian and wetland areas), high resource value habitat (e.g., for greater sage-grouse), disturbed areas (e.g., roadsides and rangelands), and heavy public use areas (e.g., recreation sites). Noxious weeds and other invasive non-

native vegetation inventory, treatment, monitoring, mapping, and reporting are conducted by Mount Lewis Field Office resource specialists and community partners, including Eureka County, Diamond Valley Weed District, and through Bootstraps, a University of Nevada-Reno Cooperative Extension program developed specifically to conduct noxious weed treatments and inventory throughout the Battle Mountain District (USDOI BLM 2011g).

Rangeland health studies conducted by the BLM, and Eastern Nevada Landscape Coalition and AECOM (2012), included observations of noxious weeds and other invasive non-native vegetation within representative portions of the project area. Data collected during the studies included information about species composition and dominance within the sampling plots, including presence of canopy gaps, which provides some indication of the potential for invasion of the area by invasive species.

A cheatgrass assessment for the project identified areas of cheatgrass establishment and propagation, as well as areas at risk for new cheatgrass establishment, particularly fire scars. During field surveys conducted in late fall 2009, much of the project area was surveyed for cheatgrass monocultures by ecologists conducting other project-related fieldwork. Ecologists looked for and identified large cheatgrass infestations, and mapped their locations using Global Positioning System technology. Aerial photographs and BLM burn data were reviewed to delineate areas of apparent dense cheatgrass coverage on recent burn areas (post 1984), which are considered areas with a high potential for infestation by cheatgrass monocultures. In February 2010, areas of cheatgrass monoculture potential were surveyed for cheatgrass presence. Recent burn areas were also identified during these surveys. The mapping from these surveys was used to develop cheatgrass coverage polygons for the project area. The results were presented in the *3 Bars Ecosystem and Landscape Restoration Project Cheatgrass Assessment* (AECOM 2011b).

3.12.2.1.2 Study Area

The study area for direct, indirect, and cumulative impacts to noxious weeds and other invasive non-native vegetation is the 3 Bars Project area. The CESA for cumulative impacts to noxious weeds and other invasive non-native vegetation includes the Hydrologic Unit Code 10 watersheds wholly, or partially within, the project area (**Figure 3-1**).

3.12.2.2 Noxious Weeds and other Invasive Non-native Vegetation

The Battle Mountain District's noxious weed suppression efforts are concentrated on Russian knapweed, saltcedar (tamarisk), perennial pepperweed (tall white top), hoary cress, various thistle species, and on non-native annual grasses (USDOI BLM 2009b). Elongated mustard, which is not currently listed by the State as a noxious weed, is also of concern, as it is listed as a noxious weed in surrounding states and is found within Eureka County. The 3 Bars Project area is being closely watched for potential establishment and spread of this species.

3.12.2.2.1 Noxious Weeds

Coverage of noxious weed infestations in the 3 Bars Project area is approximately 12,242 acres, or 1.6 percent of the project area. Noxious weeds and non-native annual grasses occur sporadically, particularly infesting wildfire burn scars and other disturbance areas. Noxious weeds are concentrated around areas of high soil disturbance, including roadsides, and areas of soil/water disturbance associated with riparian resources. Areas with the greatest concentration of noxious weeds include the Henderson Creek area, Roberts Creek area, Ferguson Creek, and Gable and Willow Canyons. The most prevalent noxious weeds in the 3 Bars Project area are musk thistle and hoary cress.

As stated in the BLM Battle Mountain District's *Integrated Weed Management Plan Mt. Lewis Field Office and Tonopah Field Office* (USDOI BLM 2009b), the following areas are associated with noxious weeds and non-native invasive species on public lands in the Battle Mountain District.

- Along rights-of-way and improved dirt roads - hoary cress, Russian knapweed, and halogeton.
- Heavily trampled/disturbed rangeland - hoary cress, Russian/spotted knapweed, various thistles, salt cedar, and halogeton.
- Along waterways/flood zones – perennial pepperweed, salt cedar, hoary cress, and various thistles.
- Wildfire burn scars - cheatgrass, red brome, hoary cress, and various thistles.
- Open range - cheatgrass, medusahead rye, and red brome.
- Recreation/industrial - puncture vine and hoary cress.

Table 3-39 provides a summary of the noxious weeds that are known to occur within the 3 Bars Project area, and the recommended control methods for these species.

3.12.2.2.2 Cheatgrass Monocultures

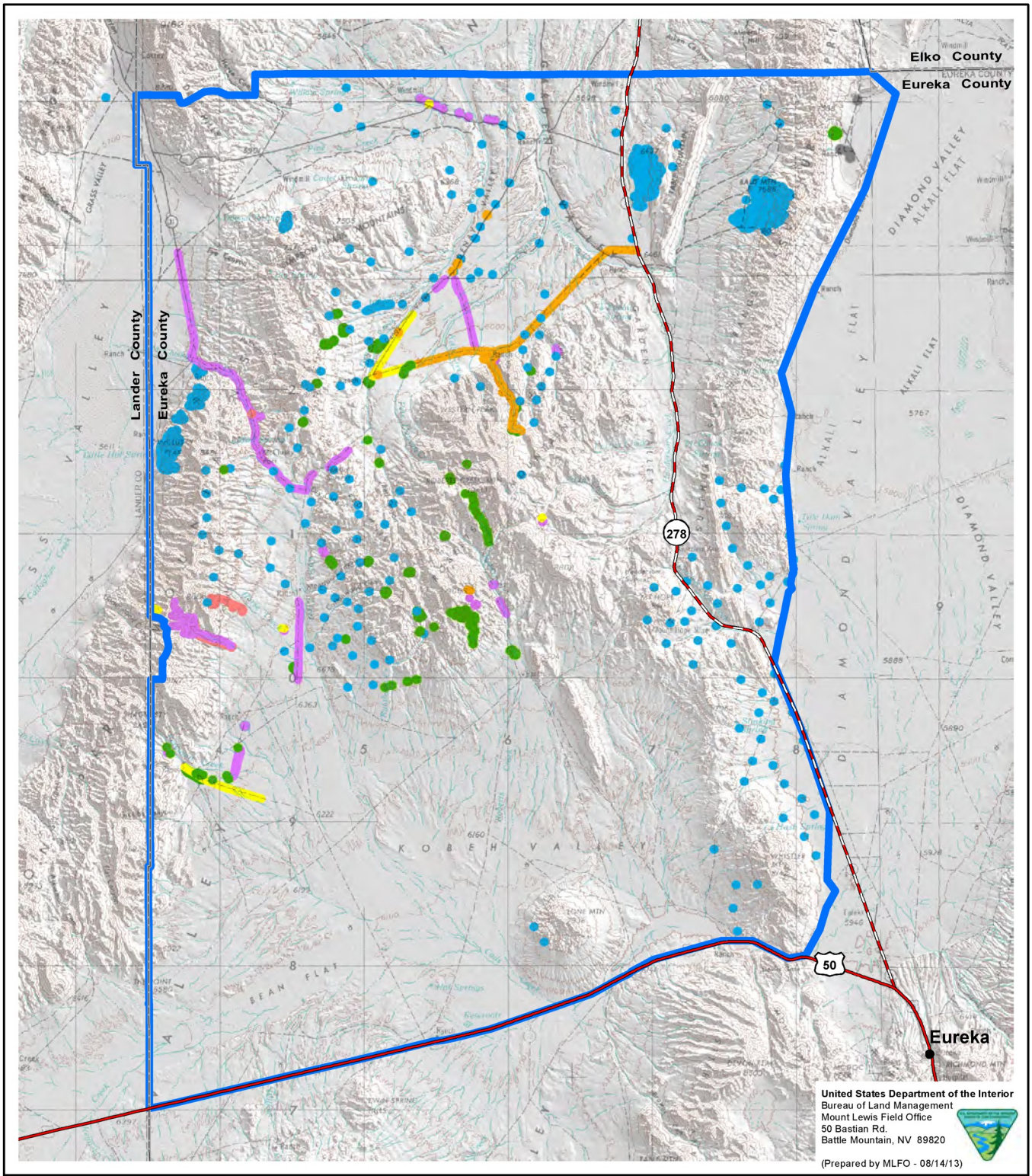
Because cheatgrass is so widespread and established in the range within the Battle Mountain District, surveys for this species are not normally conducted. However, areas of observed cheatgrass and areas with the potential for cheatgrass monocultures within the project area have been mapped, as shown on **Figure 3-33**. Mapped areas include relatively large cheatgrass monocultures in various former burn areas in the northern half of the project area. Large burn areas in the northern portion of the project area are considered areas of cheatgrass monoculture potential. However, the BLM has seeded many of these burn areas with non-native perennial grasses and forage kochia under the BLM Emergency Stabilization and Rehabilitation Program to combat cheatgrass expansion. During the rangeland health studies, cheatgrass was observed in sampling areas throughout the project area, with the greatest frequency of observance in areas that have been affected by wildfire (Eastern Nevada Landscape Coalition and AECOM 2012). Cheatgrass is likely present in other portions of the 3 Bars Project area, although not necessarily in quantities that warrant treatment.

3.12.3 Environmental Consequences

3.12.3.1 Key Issues of Concern Considered during Evaluation of the Environmental Consequences

Key issues of concern pertaining to noxious weeds and other invasive non-native vegetation were identified in the AECC and during scoping. These include the following:

- The potential for the return of invasive species (primarily cheatgrass) following treatments.
- The potential for disturbance associated with vegetation treatments to increase the abundance of invasive species, or result in the establishment of new invasive species populations.
- The role of livestock grazing and climate change on noxious weeds and other invasive non-native vegetation invasion.



Legend

- Black Henbane
- Cheatgrass
- Hoary cress
- Musk thistle
- Perennial pepperweed
- Russian knapweed
- Scotch thistle
- 3 Bars Project Area

Source: BLM 2010k, 2012g; AECOM 2011b.

3 Bars Ecosystem and Landscape Restoration Project

Figure 3-33

Cheatgrass and Other Weeds

0 1 2 3 4 5 10 Miles

0 1 2 3 4 5 10 Kilometers

N

No warranty is made by the Bureau of Land Management as to the accuracy, reliability, or completeness of these data for individual 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 notice.

- The potential for treatments to cause invasion of noxious weeds and other invasive non-native vegetation into woodlands, or juniper expansion.
- Avoid the use of prescribed fire and burn only in areas not at risk of exotic species invasion.
- Concern regarding the use of exotics, such as crested wheatgrass, to restore burned areas.
- Concern that the typical response to fire is to place a fence, which is often permanent, around the perimeter of a burned area.
- Who or what is threatened by the woody vegetation that is termed hazardous fuels, and is cheatgrass a hazardous fuel?
- Concerns about the use of herbicides in native plant communities.

TABLE 3-39

Noxious Weeds on the 3 Bars Project Area

Species	Typical Habitat	Control method
Black henbane	Open sites with well-drained soils. Roadsides, waste areas, field borders, and pastures.	Mechanical or manual methods prior to seed production; burning dry mature plants; and chemical control by using picloram or metsulfuron methyl.
Canada thistle	Wide range of environmental and soil conditions. Rangeland, pastures, waste areas, roadsides, and along waterways.	Repeated mechanical/manual methods prior to seed production; biological control; chemical control by using 2,4-D, clopyralid, dicamba, glyphosate, or using picloram.
Hoary cress	Disturbed alkaline soils. Pastures, fields, roadsides, rangelands, waste areas, and along waterways.	Manual removal; chemical control by using 2,4-D, chlorsulfuron, or metsulfuron methyl. Not effective: Mechanical control.
Musk thistle	Roadsides, pastures and waste areas.	Manual or mechanical methods after bolting but prior to flowering; biological control; chemical control by using 2,4-D, clopyralid, dicamba, chlorsulfuron, metsulfuron methyl, or picloram.
Perennial pepperweed	Moist sites. Floodplains, pastures, meadows, hay fields, and along waterways.	Chemical control by using 2,4-D, chlorsulfuron, glyphosate, imazapic, or metsulfuron methyl,. Not effective: Mechanical or prescribed fire treatments.
Russian knapweed	Broad range of sites. Rangeland, waste areas, roadsides, and along waterways.	Chemical control by using chlorsulfuron, clopyralid, or glyphosate. Not effective: Mechanical methods.
Saltcedar	Edges of waterways, lakes, and ponds.	Mechanical/manual control or prescribed fire combined with chemical application; biological control; chemical control by imazapyr, triclopyr, glyphosate, or imazapyr.
Scotch thistle	Pastures, rangelands, roadsides, and waste areas.	Mechanical or manual methods prior to flowering; chemical control by using 2,4-D, chlorsulfuron, clopyralid, dicamba, metsulfuron methyl, or picloram.

Source: University of Nevada Cooperative Extension (2010).

3.12.3.2 Significance Criteria

The following would have a significant adverse effect on vegetation:

- At the end of 10 years, an introduction of noxious weeds and other invasive non-native vegetation into a relatively weed free area at a moderate or high ecological risk, relative to baseline levels.
- At the end of 10 years, an expansion of noxious weeds and other invasive non-native vegetation within and outside of the treatment areas into a relatively weed free area at moderate or high ecological risk, relative to baseline levels.

3.12.3.3 Direct and Indirect Effects

3.12.3.3.1 Direct and Indirect Effects Common to All Action Alternatives

Adverse Effects

Vegetation removal treatments can create conditions that favor early successional species and also result in a temporary loss of more mature vegetation. Most noxious weeds are early successional species that benefit from light and disturbance (Baker 1986). All treatments that cause disturbance or remove plants from an area could lead to a competitive advantage for many noxious weeds and other invasive non-native vegetation, particularly if a seed source is present on the site. There is also some potential for noxious weeds and other invasive non-native vegetation seeds to be transported onto treatment sites on workers' shoes and clothing, with the plant materials used in rehabilitation projects, and on vehicles. It is expected that manual treatments would have a low potential for increasing noxious weeds and other invasive non-native vegetation coverage, given the minimal amounts of disturbance. To minimize these effects, the BLM would follow SOPs to prevent the inadvertent introduction and spread of noxious weeds and other invasive non-native vegetation, and monitor areas where soil is disturbed and where noxious weeds and other invasive non-native vegetation are inventoried or treated. The BLM would also inspect plant materials prior to planting to ensure that they are weed-free, and would identify and plant appropriate seed mixtures and plants suitable for specific habitats. It is assumed that the risks associated with manual treatments would be similar for all project groups.

Beneficial Effects

All treatments, or combinations of treatments, designed to control noxious weeds and other invasive non-native species would be expected to have a beneficial impact by reducing populations of these species. The reduction of fuel loads would decrease the risk of severe or repeat wildfires, thereby reducing the risk of spread of cheatgrass and other noxious weeds and other fire-dependent invasive non-native species. By removing these species, overall ecosystem health and functionality would improve, and by restoring rangeland health native species would be better able to compete with noxious weeds and other invasive non-native species.

3.12.3.3.2 Direct and Indirect Effects under Alternative A (Preferred Alternative)

Riparian Treatments

Adverse Effects

Some of the proposed projects could promote the establishment and spread of noxious weeds and other invasive non-native vegetation. Machinery used in mechanical treatments can result in inadvertent removal of native vegetation, and has the potential to spread seeds of noxious weeds and other invasive non-native vegetation. Furthermore, soil disturbance stimulates germination of noxious weeds and other invasive non-native vegetation seeds by providing physical cues that competing vegetation is absent (Cornell University Weed Ecology and Management Laboratory, no date). Additionally, vehicles and other mechanical equipment can damage or crush existing desirable riparian and wetland vegetation or bring propagules of non-native species into treatment areas and create sites for noxious weeds and other invasive non-native vegetation establishment (BLM 2007c:4-45). The risks for loss and damage to existing riparian and wetland vegetation and spread of noxious weeds and other invasive non-native vegetation would be greatest in project groups with the largest acreage and that employ the most extensive mechanical treatments (project groups that include streambank earthwork as well as pinyon-juniper removal (Frazier Creek group, Roberts Creek group, and Henderson above Vinini Unit). For the Denay Pond group, the disturbance associated with mechanical treatments would be minimal, since only fence installation would occur.

Beneficial Effects

Successful control of invasive plants in riparian zones using manual and mechanical methods would lead to improved conditions in these habitats over the long term. The eventual growth of desirable vegetation in treated areas would moderate water temperatures, buffer the input of sediment from runoff, and promote bank stability in riparian zones. Efforts by the BLM to enhance wetland and riparian vegetation would also help to increase the number of miles of stream and acres of wetlands that are in Proper Functioning Condition.

Aspen Treatments

Adverse Effects

The risks of introduction and spread of noxious weeds and other invasive non-native vegetation through manual and mechanical methods would be similar to those described for riparian zones. At all aspen treatment areas, the risks associated with manual treatments would be low, since a minimal amount of soil disturbance would occur, SOPs would be implemented to prevent the establishment and spread of noxious weeds and other invasive non-native vegetation, and slash would be left onsite to promote seedling and sapling establishment.

Treatment activities that cause soil disturbance and create open conditions, including mechanical methods and fire, could facilitate noxious weeds and other invasive non-native vegetation establishment and spread. These include project areas where pinyon-junipers would be removed (JD-A4 group and RM-A2 group). In areas where the mechanical treatments are limited to cutting aspen or ripping root masses, less disturbance would be expected given the targeted nature of these treatments. If not re-seeded properly, the disturbance from prescribed and wildland fire for resource benefit can also lead to the spread of cheatgrass and other fire-adapted noxious weeds and other invasive non-native vegetation.

Beneficial Effects

While noxious weeds and other invasive non-native vegetation control is not identified as part of the treatment design for these sites, the BLM could use manual and mechanical methods to treat noxious weeds and other invasive non-native vegetation that are present in aspen treatment areas. The presence of noxious weeds and other invasive non-native vegetation in the aspen understory should be considered before burning, as some noxious weeds and other invasive non-native vegetation, such as cheatgrass, sprout even faster than aspen after a fire, which may complicate recovery. By directly targeting noxious weeds and other invasive non-native vegetation in the course of completing other proposed treatments, the proposed project would have a beneficial effect on native plant communities.

Pinyon-juniper Treatments

Adverse Effects

Manual and mechanical treatments could cause soil disturbance that leads to the establishment and spread of noxious weeds and other invasive non-native vegetation, as increased light availability in the site and shading of desirable understory plants by heavy slash could provide conditions that favor invasive species (Tausch et al. 2009). Chainsaw cutting in juniper woodlands has been correlated with increased shrub and grass cover, which may include at least an initial increased cover of cheatgrass on sites where a seed source for this species is present (Miller et al. 2005). Fire risks associated with slash would be mitigated to some degree by associated programs to use felled trees for posts, mulch, biomass, or other uses, and following manual treatments with pile and slash burning. In some areas, the creation of fire and fuel breaks could also lead to noxious weeds and other invasive non-native vegetation establishment and spread.

Grasses and forbs would benefit from prescribed fire and would be the first to revegetate the site. If non-native annual grasses and forbs occur on a site prior to fire, and if fire intensity is high, then non-native annual grasses and forbs would be the first to establish after a fire. Without other treatments, such as the use of herbicides, non-native annual grasses and forbs may dominate the site (USDOI BLM 2012b). The BLM generally has had good success in controlling non-native vegetation and allowing native vegetation to establish on sites treated using prescribed fire on the 3 Bars Project area (see Section 3.11.3.3). However, some sites could require seeding or other rehabilitation efforts following the fires, or it could take decades following a fire to fully establish all desired vegetation including understory vegetation and mixed-aged stands of pinyon-juniper.

Cheatgrass could potentially increase in dominance following a fire. Over time, the presence of cheatgrass in an area can increase the frequency of fire, potentially altering the successional trajectory, such that the understory never progresses from annual grass to perennial grass and shrub/grass mix, and the community never returns to a perennial grass or woodland stage (Miller and Tausch 2001, Ansley and Rasmussen 2005). Therefore, fire treatments would be most successful on sites where perennial grasses are likely to recover and establish after treatment, and least successful on sites where cheatgrass is present. Increased dominance of cheatgrass is particularly a concern for the Sulphur Spring Wildfire Management Unit, where wildfires would be allowed to burn for resource benefit, and where cheatgrass is already present, including a large monoculture (see **Figure 3-33**). However, the BLM would take into account the potential for cheatgrass to respond to fire when managing wildland fires in this area. The BLM would also take into account the live fuel moisture conditions, weather conditions and trends, whether the fire would meet management objectives, and the fire return interval (i.e., if an area has recently burned, it would not be allowed to burn again until it is within the range of the normal fire return interval). Fires would be suppressed during periods of low fuel moisture, or in areas with large populations of cheatgrass. Since cheatgrass is present throughout the Sulphur

Spring Wildfire Management Unit, the potential for cheatgrass spread as a result of treatments exists. Rehabilitation following the treatment would be conducted in areas where native communities are unlikely to regrow after a fire. Additionally, all sites are monitored for at least 3 years to assess whether further action is needed.

Beneficial Effects

The predominant noxious weeds and other invasive non-native vegetation infestations in pinyon-juniper treatment areas are cheatgrass, musk thistle, and black henbane. Treatments directed at these and other weeds during the course of completing proposed pinyon-juniper enhancement projects would be expected to have a beneficial effect on ecosystem health.

The BLM would restore fire as an integral part of the ecosystem, improve species diversity, and reduce hazardous fuels on the Sulphur Spring Wildfire Management Unit by using wildland fire for resource benefit. The BLM would allow fire to burn on about 20 to 40 percent of the area, but generally burns would be limited to small acreages to create a mosaic of habitats and to create fuel breaks. By keeping burned areas small, the risk of a cheatgrass infestation is much less.

Sagebrush Treatments

Adverse Effects

Treatments to reduce herbaceous dominance (Rocky Hills Unit) and treat cheatgrass (West Simpson Park and Whistler Sage units) would potentially have short-term adverse effects on sagebrush habitats. However, provided project objectives are met, the long-term goal of these activities is to improve the quality of sagebrush habitats. In some cases, the species composition at treatment sites would change, as sagebrush enhancement projects would focus on the components of greater sage-grouse habitat. For instance, at the Rocky Hills Unit, the long-term result of the project would be to minimize the herbaceous component and increase the sagebrush component.

Manual and mechanical treatments would have the potential to disturb sagebrush habitats, with potential impacts similar to those discussed for other community types. Ground disturbance associated with mechanical treatments could occur on all of the sagebrush project areas. These treatments could potentially result in trampling and inadvertent removal of non-target plants, as well as soil disturbance that could favor the establishment and spread of cheatgrass and other noxious weeds and other invasive non-native vegetation. The greatest risk for adverse effects would occur where the largest ground areas are disturbed, and where noxious weeds and other invasive non-native vegetation seeds are already present. In the western U.S., the effects of chaining, especially to remove pinyon-juniper in sagebrush stands, are still visible 30 to 40 years after treatment (Peters and Cobb 2007).

Prescribed fire could increase the dominance of cheatgrass and other introduced annual grasses in areas where these species are present pre-burn. The fire interval for mountain big sagebrush is about 70 to 200 years, while it is about 100 to 240 years for Wyoming big sagebrush and 325 to 450 years for low sagebrush (Baker 2006). Where fire has occurred more often, sites are often dominated by non-native grasses, such as cheatgrass, with short fire cycles, as has occurred on the Table Mountain and West Simpson Park units. Where introduced annual grasses are present in very low quantities, there would be less risk of these grasses increasing after prescribed fire (Oregon State University 2012). Areas receiving prescribed fire treatments would be reseeded/planted with native vegetation, which would reduce the competitive advantage of cheatgrass.

Biological control has been identified for use in the Table Mountain, Rocky Hills, and West Simpson Park units. Light grazing would be used to maintain firebreaks to help reduce wildfire risk in these areas. Grazing can contribute to the spread of noxious weeds and other invasive non-native vegetation through preferential grazing of native vegetation over noxious weeds and other invasive non-native vegetation, and by movement of noxious weeds and other invasive non-native vegetation into uninfested areas via livestock feces (USDOI BLM 2007c). Therefore, there would be some risk of establishment or spread of noxious weeds and other invasive non-native vegetation in treated sagebrush sites if these species are already present in the grazed areas, or if the livestock are brought in from an area where these species occur. Using SOPs to prevent noxious weeds and other invasive non-native vegetation spread, monitoring, and follow-up treatments would help to minimize these risks.

Beneficial Effects

Prescribed fire could be used at the Table Mountain Unit to treat encroaching pinyon-juniper, and to remove dead cheatgrass and some of the cheatgrass mat in the northern portion of the unit prior to follow-up treatments with herbicide, which could be used under previous authorizations, and broadcast or drill seeding. Prescribed fire and broadcast seeding could be used on the West Simpson and Whistler Sage units to control cheatgrass. Prescribed fire may also be used at the Rocky Hills Unit to remove crested wheatgrass and forage kochia prior to follow-up broadcast seeding, drill seeding, or hand plantings.

Livestock could be used to biologically control cheatgrass. In all areas where the BLM would employ the use of livestock as a biological control, other control methods would also be used to restore ecologically functioning sagebrush habitat. These could include mechanical treatments such as disking and seeding. These efforts to reduce cheatgrass cover would have a beneficial outcome in these areas.

The Rocky Hills Unit was replanted with non-native crested wheatgrass and forage kochia after the 1999 Trail fire. Crested wheatgrass can establish with minimal seedbed preparation, can survive periods of drought, and can compete with weedy species. This species, however, is a prolific seed producer that can dominate a site and exclude native vegetation, including the native bunchgrasses and big sagebrush that offer better wildlife value (Monson 2002, Braun 2006). Forage kochia was originally introduced into the U.S. to compete with halogeton. It has since been shown to compete well against other aggressive, exotic annual noxious weeds and other invasive non-native vegetation such as cheatgrass, Russian thistle, and medusahead rye. Plantings of forage kochia can decrease densities of annual weeds, thus decreasing fire intervals of degraded rangelands while providing valuable forage to livestock and forage and cover for wildlife (Tilley et al. 2006).

Projects that target non-native vegetation, including cheatgrass, crested wheatgrass, and forage kochia would be beneficial for native vegetation, as they would help to restore native sagebrush communities in these areas that are currently dominated by a non-native species. Competition from these non-native species has limited sagebrush expansion in previously burned areas. The BLM proposes to restore areas seeded with crested wheatgrass and forage kochia to native vegetation. Non-native vegetation would be treated in strips. As treated strips are restored with native vegetation, additional strips would be treated. Pehrson and Sowell (2011) studied methods to eliminate crested wheatgrass and establish sagebrush. They found that no technique eliminated crested wheatgrass in a single application. Grazing and fire had no long-term impacts on crested wheatgrass. Mechanical treatments, such as plowing, disking, and cultivating reduced and eradicated crested wheatgrass, but invasive grasses followed treatments and made it difficult to establish native seeded species.

In some areas dominated by cheatgrass, the BLM may initiate a phased succession approach to restoration that includes treating the area with various methods, including mechanical treatments and prescribed fire, and then planting the area with crested wheatgrass and forage kochia to compete directly with remaining cheatgrass. Once these species have stabilized the site, the BLM would begin to convert the site back to native vegetation.

3.12.3.3.3 Direct and Indirect Effects under Alternative B (No Fire Use Alternative)

Given that fire would not be used under this alternative, treatment programs might not be as effective as under Alternative A. Because only mechanical and manual methods would be used, it would be difficult for the BLM to conduct hazardous fuels reduction, and noxious weeds and other invasive non-native vegetation treatments on steep hillslopes or over large acreages. The BLM would not be able to use fire to remove the mat of dead vegetation in cheatgrass-dominated areas, or to promote the health and resiliency of native vegetation. Thus, the wildfire risk would be greater under this alternative than under Alternative A, as would the potential for establishment and spread of noxious weeds and other invasive non-native vegetation.

3.12.3.3.4 Direct and Indirect Effects under Alternative C (Minimal Land Disturbance Alternative)

Given that fire and mechanical methods would not be used under this alternative, the BLM would have the fewest options for its treatment programs, and these programs would likely not be as effective as under the other action alternatives. The BLM would be unable to combine treatment methods for optimal control of cheatgrass and other noxious weeds and other invasive non-native vegetation. Because this alternative is the most limited in terms of the tools available for large scale restoration, it is the least likely of the action alternatives to help attain larger ecosystem restoration goals for the 3 Bars Project area.

Because only manual methods would be used, it is unlikely that the BLM would slow the spread of noxious weeds and other invasive non-native vegetation, including cheatgrass; restore fire as an integral part of the ecosystem; and reduce extreme, very high, and high wildfire risks to moderate risk or less. Thus, wildfire risk would be greater under this alternative than under Alternatives A and B, as would the potential for establishment and spread of noxious weeds and invasive non-native vegetation.

3.12.3.3.5 Direct and Indirect Effects under Alternative D (No Action Alternative)

There would be no direct effects to noxious weeds and other invasive non-native vegetation from 3 Bars Project treatments as no treatments would be authorized under this alternative. Under this alternative, the BLM would not create fire and fuel breaks; thin and remove pinyon-juniper to promote healthy, diverse stands; treat large-scale infestations of noxious weeds and other invasive non-native vegetation, especially cheatgrass; restore fire as an integral part of the ecosystem; or reduce the risk of a large-scale wildfire. Threats to ecosystem health under this alternative would be associated with the ongoing expansion of noxious weeds and other invasive non-native vegetation, continued decline of ecosystem health due to further decline in native understory species in the upland plant communities, further expansion of pinyon-juniper woodland into other communities, including sagebrush, riparian, and aspen habitats, and the continued increase of the risk for catastrophic wildfire as a result of high fuel loads. Given the low acreage treated annually, there would be little or no improvement in reducing the amount of acreage infested with noxious weeds and other invasive non-native vegetation.

3.12.3.4 Cumulative Effects

The CESA for noxious weeds and other invasive non-native vegetation is approximately 1,841,698 million acres and includes those watersheds at the Hydrologic Unit Code 10 level that are all or partially within the 3 Bars Project area (**Figure 3-1**). Past and present actions that have influenced noxious weeds and other invasive non-native vegetation activity in the 3 Bars ecosystem are discussed in Section 3.2.2.3.3.

3.12.3.4.1 Cumulative Effects under Alternative A (Preferred Alternative)

Historic overgrazing, introduction of cheatgrass, large wildfires, and other natural and human-caused factors have contributed to the departure of the plant communities from the Potential Natural Community across the 3-Bars ecosystem. This has led to a decrease in the functionality of ecological processes, thus reducing the resilience and resistance of these ecosystems to disturbance. The treatments proposed in the 3-Bars ecosystem are designed to provide the means needed for these ecosystems to recover.

In the short term, temporary fences may change the distribution of grazing by livestock, wild horses, and wildlife. As distribution patterns change, utilization would also change. Wildlife and wild horse utilization would decrease in treatment areas while temporary fences are in place, but would increase in other areas. Once the temporary fences are removed, wild horses and wildlife may be attracted to the treatment areas resulting in potentially higher use of the area than before. Temporary fences would exclude livestock, although AUMs would be temporarily suspended to prevent overuse in other areas.

The BLM would continue using ground-based herbicide applications to remove noxious weeds and other invasive non-native vegetation, and aerial-based application methods to remove cheatgrass, and would restore burned areas under the Burned Area Emergency Stabilization and Rehabilitation program, under existing authorizations. These treatments would help to reduce hazardous fuels, slow the spread of noxious weeds and other invasive non-native vegetation, and reduce surface runoff and erosion associated with burn sites on about 1,000 acres annually. The active ingredients in herbicide formulations could adversely affect non-target vegetation under one or more exposure scenarios, particularly for aerial applications, and accidental exposure scenarios such as a spill (USDOI BLM 2007b:4-47).

Agriculture, land development, mineral development, and oil, gas, and hydrothermal exploration and development could affect about 10,000 acres in the reasonably foreseeable future, including about 8,335 acres of disturbance associated with the Mount Hope Project. Although some of the disturbance from these projects would be reclaimed, these activities would lead to long-term losses in native plant communities in the affected areas, and entail disturbance that could facilitate the establishment and spread of noxious weeds and other invasive non-native vegetation.

Since 1985, approximately 7,000 acres have burned annually in the CESA, although the acreage burned annually is quite variable. It is projected that an additional 140,000 acres could be burned in the CESA during the next 20 years. A wildfire would cause the wide-scale removal of vegetation in the CESA, and would also lead to the spread of noxious weeds and other invasive non-native vegetation.

Hazardous fuels reduction, habitat improvement, and noxious weed and other invasive non-native vegetation control projects would occur on up to 142,000 acres (127,000 for the 3 Bars Project and 15,000 acres for other hazardous fuels projects in the CESA), or 8 percent of the CESA. As discussed under direct and indirect effects, these treatments would lead to short-term increases in noxious weeds and other invasive non-native vegetation.

Long term, these treatments should result in a reduction of noxious weeds and other invasive non-native vegetation and return of native and non-invasive vegetation that is more fire resilient, more abundant, and similar to the Potential Natural Community. These treatments would also help to reduce the risk of wildfire within the CESA, which often leads to the establishment and spread of noxious weeds and other invasive non-native vegetation.

3 Bars Project treatments would affect less than 1 percent of the CESA annually, and these effects should be beneficial long term. Thus, there would be a negligible short-term accumulation of adverse effects and minor long-term accumulation of benefits from 3 Bars Project actions combined with effects from other treatments.

3.12.3.4.2 Cumulative Effects under Alternative B (No Fire Use Alternative)

Under Alternative B, effects from non-3 Bars Project reasonably foreseeable future actions on noxious weeds and other invasive non-native vegetation would be similar to those described under Alternative A. The BLM would treat about half as many acres under Alternative B as under Alternative A, and less effort would be spent by the BLM on treatments to reduce wildfire risk and its impacts on vegetation, including the use of fire to restore natural fire regimes.

The use of mechanical treatments would give the BLM greater latitude to control various types of vegetation compared to fire treatments, but efforts to control cheatgrass and other noxious weeds and other invasive non-native vegetation would be difficult on steep slopes and over large acreages. Hazardous fuels reduction and habitat improvement projects could occur on about 63,000 acres within the 3 Bars Project area, and on about 15,000 acres within other portions of the CESA, or about 4 percent of the acreage within the CESA. Thus, the BLM would be less successful in controlling noxious weeds and other invasive non-native vegetation on the project area and in the CESA under Alternative B than under Alternative A.

3.12.3.4.3 Cumulative Effects under Alternative C (Minimal Land Disturbance Alternative)

Under Alternative C, effects from non-3 Bars Project reasonably foreseeable future actions on noxious weeds and other invasive non-native vegetation would be similar to those described under Alternative A. Under Alternative C, the BLM anticipates treating about one-fourth as many acres as under Alternative A. Adverse, short-term effects to vegetation associated with the use of fire and mechanized equipment would not occur under Alternative C.

By not being able to use mechanical methods, such as mowing, chopping, tilling, disking, harrowing, and drill seeding, the BLM would do little to reduce hazardous fuels, create fire and fuel breaks, treat areas with noxious weeds and other invasive non-native vegetation, or remove downed wood and slash. Thus, the risk of wildfire and spread of noxious weeds and other invasive non-native vegetation would remain high on the 3 Bars Project area and within the CESA. Only about 32,000 acres, or about 2 percent of the CESA, would be treated within the CESA. These treatments would benefit the 3 Bars ecosystem, but not to the extent as for Alternatives A and B.

3.12.3.4.4 Cumulative Effects under Alternative D (No Action Alternative)

Under Alternative D, effects from non-3 Bars Project reasonably foreseeable future actions on noxious weeds and other invasive non-native vegetation would be similar to those described under Alternative A. There would be no cumulative impacts to noxious weeds and other invasive non-native vegetation from 3 Bars Project treatments from this alternative as no treatments would be authorized under this alternative. The BLM could create fire and fuel breaks; thin and remove pinyon-juniper to promote healthy, diverse stands; slow the spread of noxious weeds and other invasive non-native vegetation, especially cheatgrass; restore fire as an integral part of the ecosystem; and

reduce the risk of a large-scale wildfire under current and reasonably foreseeable future authorized actions, but on a very limited acreage. Thus, factors that contribute to the spread of noxious weeds and other invasive non-native vegetation would remain, and would likely be greatest under this alternative.

3.12.3.5 Unavoidable Adverse Effects

The proposed vegetation treatments would cause unavoidable short-term disturbances to plant communities by removing both target and non-target vegetation. In some cases, treatments would return all or a portion of the treated area to an early successional stage by freeing up resources such as light and nutrients. These adverse effects would be temporary and would consist of short-term losses of native vegetation and associated habitat values.

3.12.3.6 Relationship between the Local Short-term Uses and Maintenance and Enhancement of Long-term Productivity

The proposed vegetation treatments would have short-term adverse impacts to non-target vegetation, including native trees, shrubs, forbs, and grasses, as these could inadvertently be removed during treatments. Treatments that remove or control noxious weeds and other invasive non-native vegetation could provide immediate benefits to native species, such as increased access to water and nutrients and enhanced vigor from reduced competition with invasive species. Over the long term, treatments should also reduce the incidence and severity of wildfire across the project area.

Treatments that control populations of noxious weeds and invasive and non-native species on public lands would be expected to benefit native plant communities over the long term by aiding in the reestablishment of native species. The degree of benefit would depend on the success of these treatments over both the short and long term. Some treatments are very successful at removing noxious weeds and other invasive non-native vegetation over the short term, but are not successful at promoting the establishment of native species in their place. In such cases, seeding and planting of native plant species would be beneficial.

3.12.3.7 Irreversible and Irretrievable Commitment of Resources

Loss of native vegetation and plant productivity as a result of treatments would persist only until vegetation was reestablished, usually within several growing seasons.

3.12.3.8 Significance of the Effects under the Alternatives

While treatments would result in short-term increases in populations of noxious weeds and other invasive non-native species such as cheatgrass, post-treatment control and rehabilitation are expected to slow the spread of noxious weeds and other invasive non-native vegetation. Under Alternative C, mechanical methods would not be used to target noxious weeds and other invasive non-native vegetation and vegetation control might be more difficult, although manual methods of weed control could still be used successfully, particularly if the treatment area is relatively small. Under Alternative A, the spread of cheatgrass following prescribed or wildland fire for resource benefit is of particular concern. Additionally, SOPs would require the BLM to address the potential proliferation of cheatgrass when planning burns or assessing rehabilitation needs post-burn. Since the significance criteria allow 10 years to control noxious weeds and other invasive non-native vegetation that are introduced as a result of treatments, additional monitoring beyond 3 years would be required to ensure that no further control is required beyond the standard 3-year monitoring period.

3.12.4 Mitigation

Noxious weed and other invasive and non-native vegetation control would benefit from mitigation and monitoring measures identified in Section 3.17.4 (Livestock Grazing Mitigation). No mitigation or monitoring measures are recommended specifically for noxious weed and other invasive non-native vegetation control.

3.13 Wildland Fire and Fire Management

Species diversity within a plant community depends on species composition, the adaptive traits of plants, the timing of fire, and the nature of fire as it moves through the community. The spatial arrangement of fuels and individual plants can be important to survival, particularly where fuels are unevenly distributed. Concentrations of live or dead fuels can generate high fire intensities and severities on relatively small sites, which can enhance or reduce diversity depending on the community. The areas within and surrounding the 3 Bars ecosystem are of high value to the Mount Lewis Field Office. The area has a high occurrence of wildfires with large fire potential in many places as demonstrated by past fire history and deviation from historic fire regimes. The Battle Mountain District provides aggressive initial attack for all fires within this area.

3.13.1 Regulatory Framework

The Battle Mountain District Fire Management Program is guided by the policies expressed in national policy documents and referenced in Chapter 1. District policy documents include the *Approved Resource Management Plan Amendment for Fire Management with Environmental Assessment and Decision Record Shoshone-Eureka Planning Area* (Shoshone-Eureka Fire Land Use Plan Amendment; USDOI BLM 2002a); and the 2004 *Battle Mountain District Fire Management Plan* (Fire Management Plan; USDOI BLM 2004a).

In addition, fire management guidance is provided by the following BLM documents:

BLM Manual 1740, *Renewable Resource Improvements and Treatments* (USDOI BLM 2008j), and BLM Manual Handbook H-1740-1, *Renewable Resource Improvement and Treatment Guidelines and Procedures* (USDOI BLM 2007g), provides guidance and procedures for management and treatment of renewable resources, including utilization of management prescribed fire and emergency fire rehabilitation.

BLM Handbook 1742, *Burned Area Emergency Stabilization and Rehabilitation* (USDOI BLM 2007h), provides guidance for emergency fire rehabilitation including measures to prevent accelerated soil erosion and establishment of noxious and invasive plant species, and post fire management of restoration areas.

BLM Manual 9212, *Fire Prevention*, is consistent with Departmental policy (910 Department Memorandum 1.4), and it is the BLM's policy that:

- Prevention of catastrophic wildfires is a high priority. Commitment to an effective wildland fire prevention program is expected at all levels within the Bureau.
- The wildfire prevention program shall be designed to minimize losses from fire consistent with resource objectives identified in RMPs.
- Wildfire prevention shall stress the analysis of risks, hazards and values and the development of specific educational, engineering, enforcement and administrative prevention actions.

- Wildfire prevention activities shall be coordinated with all federal, state, county, and municipal agencies.
- Each state and district office shall provide coordination, guidance, and assistance to achieve an aggressive wildfire prevention program and shall maintain and update as required a Wildfire Prevention Plan integrated with the Fire Management planning process.
- Wildfire Prevention Program funding shall be consistent with the identified needs as determined through a prevention analysis that is approved as an operational plan of the Fire Management Plan (BLM 9212-1).
- The BLM shall emphasize the use of hazardous fuel reduction techniques as part of the wildfire prevention program.

BLM Manual 9214, *Prescribed Fire Management*, and BLM Handbook H-9214-1, *Prescribed Fire Handbook*, describe the authority and policy for prescribed fire use on public lands administered by the BLM. It is BLM policy that:

- The role of fire and its potential use will be considered in establishing the management strategy for all ecosystems.
- Prescribed fires may be initiated by planned or unplanned (unscheduled) ignition.
- All prescribed fire (including hazard reduction) projects will support one or more approved land management objective(s) derived from the Bureau's land management planning process.
- The planning and execution of the prescribed fire will be funded by the benefiting program(s).
- Each prescribed fire project will have an approved Prescribed Fire Plan completed before ignition.
- Each prescribed fire will be managed and executed in conformance with the approved plan by qualified personnel. The term qualified will include experience, training, and physical fitness for key positions.
- Prescribed fire projects will comply with federal, state and local regulations and standards, including air quality and smoke management programs.
- Pre-burn, burn, and post-burn fuel and weather measurement(s) will be taken on all prescribed fire projects for planning purposes, prescription, compliance, and project evaluation. It may not be necessary to take post-burn weather measurements on fuel reduction projects.
- Pre-burn and post-burn monitoring will be conducted to determine whether resource and fire objectives are achieved, unless where previous documented experience is adequate to predict post-burn results.

The Eureka County Master Plan discusses fire management and makes these recommendations regarding burning within the County (Eureka County 2010):

- Prevent significant deterioration of the superior air quality found in Eureka County.
- Manage smoke from prescribed burns through techniques of smoke avoidance, dilution, and emission reduction, and limit unnecessary emissions from existing and new point and nonpoint sources through development and implementation of best management practices.
- Engage federal land management agencies in burn planning.
- Conduct prescribed burning at the maximum rate allowed by Clean Air Act and State regulations.

- Maintain records of both acreage and tonnage burned and compare to allowable values.
- Review burn plans for compliance with best management practices for point source emissions.
- Review burn calculations and plans to assure that air quality maximums are not exceeded.
- Evaluate whether prescribed burning plan conforms to the requirements and guidelines for air quality and smoke management being developed by the State of Idaho.
- Review best management practices as necessary to assure applicability and compliance.
- Conduct an annual review of the backlog of prescribed burns, pending applications, and requests for additional prescribed burns to incorporate them into the following year annual plan.

For wildfires, Eureka County supports the right for local citizens to protect their property from fires originating on state and federal lands. The County advocates active fire management on federal lands, including, where appropriate and in consultation with grazing permit holders, adjacent landowners, local volunteer fire fighters and Eureka County, a let-burn policy. The County is opposed to arbitrary and inequitable restriction of post-fire land use for recreation and livestock grazing. The County insists that all post-fire land use restrictions be adequately justified and based on peer-reviewed science (Eureka County 2010).

3.13.2 Affected Environment

3.13.2.1 Study Methods and Study Area

The following documents were important sources of information for this assessment:17-States PER (USDOI BLM 2007c); *Wildland Fire in Ecosystems Effects of Fire on Flora* (USDA Forest Service 2000); *Proceedings of the Invasive Species Workshop: The Role of Fire in the Control and Spread of Invasive Species* (Tall Timbers Research Station 2001); Shoshone-Eureka Fire Land Use Plan Amendment (USDOI BLM 2002b); Fire Management Plan (USDOI BLM 2004a); *Wildland Fire in Ecosystems: Fire and Non-native Invasive* Plants (USDA Forest Service 2008); and AECC (USDOI BLM 2009a). Information about the occurrence of wildland fires was obtained from historic records maintained by the Battle Mountain District Office, field surveys, and discussions with District fire management staff.

The study area for direct and indirect effects to resources affected by fire management activities lies within the 3 Bars Project area. The cumulative effects study area includes the Hydrologic Unit Code 10 watersheds within, or partially within, the project area (**Figure 3-1)**.

3.13.2.2 Fire Incidence in the 3 Bars Project Area

Since 1985, about nine fires have occurred annually within the project area, burning about 4,225 acres annually and about 520 acres per fire. The number of fires and acres burned was higher in the mid- to late-1990s than during the past decade (**Figure 3-34**, **Table 3-40**).

3.13.2.3 Fire Regimes and Fire Condition Classes in the 3 Bars Project Area

A ‘fire regime’ is the term given to the general pattern in which fires naturally occur in a particular ecosystem over an extended period of time. Fire regimes are based on a number of factors including frequency, intensity, size, pattern, season, and severity. Individual fires can vary greatly in severity, and the specific effects and risks caused by a fire

will depend on the specifics of its fire regime. As shown in **Table 3-41**, the BLM has identified five fire regimes, three of which occur in the 3 Bars Project Area.

A Fire Regime Condition Class (FRCC) is a classification of the amount of departure from the natural regime. The BLM has identified three FRCCs, as described in **Table 3-42**. Based on FRCCs, the BLM determines where to use fire and other treatment methods to restore public lands to their natural fire regime. For the 3 Bars Project, treatments are focused on FRCC II and III areas.

As discussed earlier, current fire regimes have deviated substantially from historical regimes, as shown in **Figures 3-35** and **3-36**, and **Tables 3-41** and **3-42**. Nearly 80 percent of lands on the project area were historically in Fire Regime IV, while nearly 90 percent of acreage is now within FRCC II. This has led to moderate to extreme risks for a catastrophic fire on the project area (**Figure 3-37**; USDOI BLM 2009a).

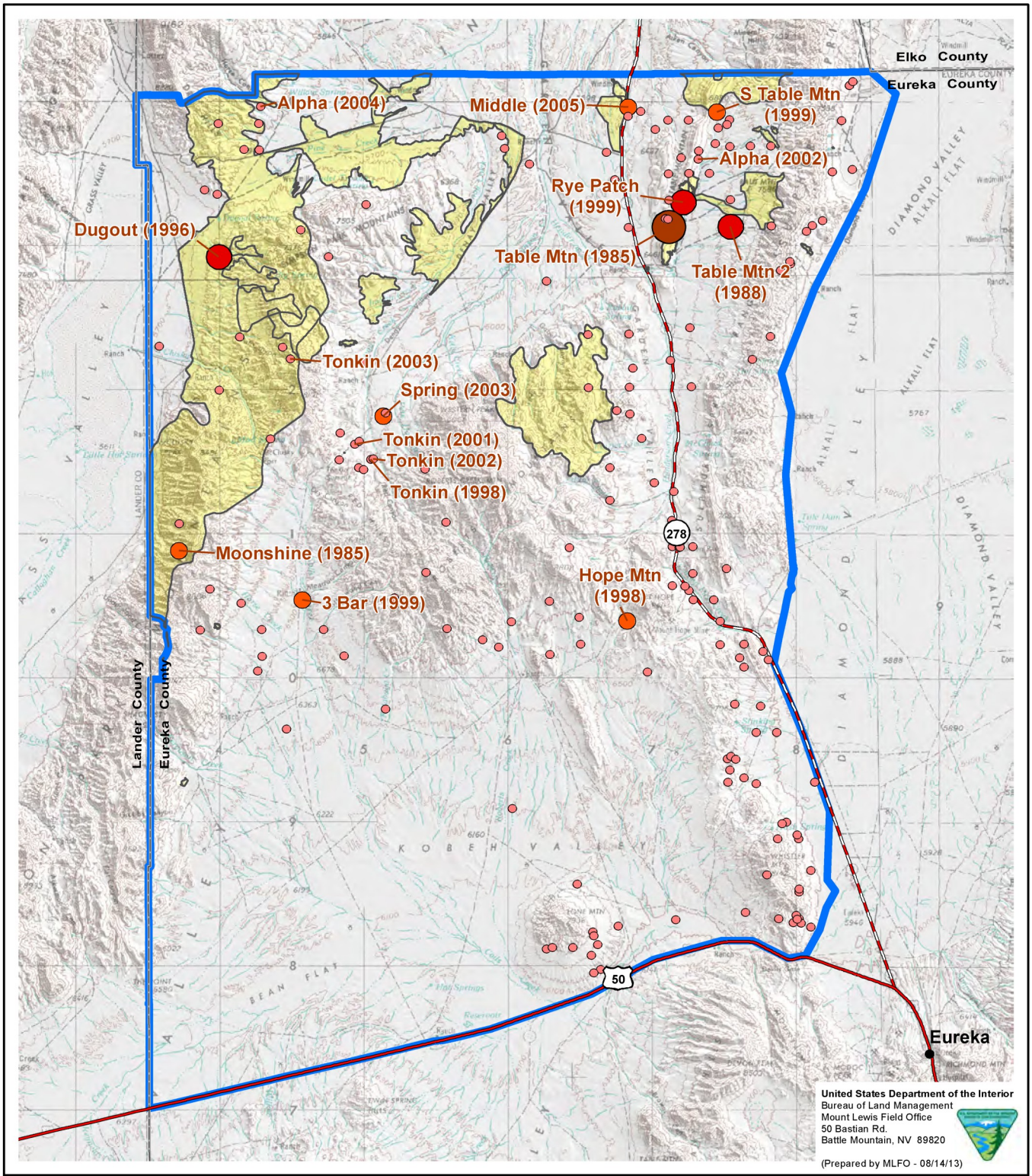
3.13.2.4 Resource Management Plan Amendments for Fire Management

In 2002, the BLM prepared an amendment to the Shoshone-Eureka RMP in order to address fire management. Under the Shoshone-Eureka Fire Land Use Plan Amendment Decision Record, the BLM decided to improve fire management within the planning area by restoring fire as an integral part of the ecosystem, improving the diversity of vegetation, and reducing fire fuel hazards. This would be accomplished through the use of prescribed fire and fire use for resource benefit, and by using mechanical treatments such as green strips, shaded fuel breaks, and tree thinning to reduce wildfire fuel hazards. By taking these actions, it was expected that the size and severity of future wildfires would be reduced (USDOI BLM 2002b:1, 9). This amendment was developed in response to the 1999 wildfire season, when 279,990 acres burned within the Battle Mountain District, substantially more acres than the average of 5,900 acres that burned annually during the previous 10 years.

TABLE 3-40

Fire History on the 3 Bars Project Area

Year	Number of Fires	Total Acres Burned	Year	Number of Fires	Total Acres Burned
1985	9	18,164	1999	16	74,164
1986	4	12	2000	11	1,396
1987	1	0	2001	14	10
1988	4	652	2002	12	6
1989	7	0	2003	15	31
1990	10	0	2004	6	2
1991	5	1	2005	21	227
1992	8	10	2006	8	909
1993	2	0	2007	7	52
1994	13	2,074	2008	7	172
1995	12	329	2009	0	0
1996	10	2,009	2010	1	1,208
1997	4	2	2011	4	71
1998	8	2,540	2012	1	12,073



Legend

Fire Starts (1985 - 2008)

- 0 - 10 ac.
- 10 - 100 ac.
- 100 - 1,000 ac.
- > 1,000 ac.

- Large Fire Perimeter (1985 - 2012)
- 3 Bars Project Area

Source: BLM 2012f,g.

3 Bars Ecosystem and Landscape Restoration Project

Figure 3-34

Fire History and Occurence

0 1 2 3 4 5 10 Miles
0 1 2 3 4 5 10 Kilometers
N

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Original data were compiled from various sources. This information may not meet National Map Accuracy Standards.
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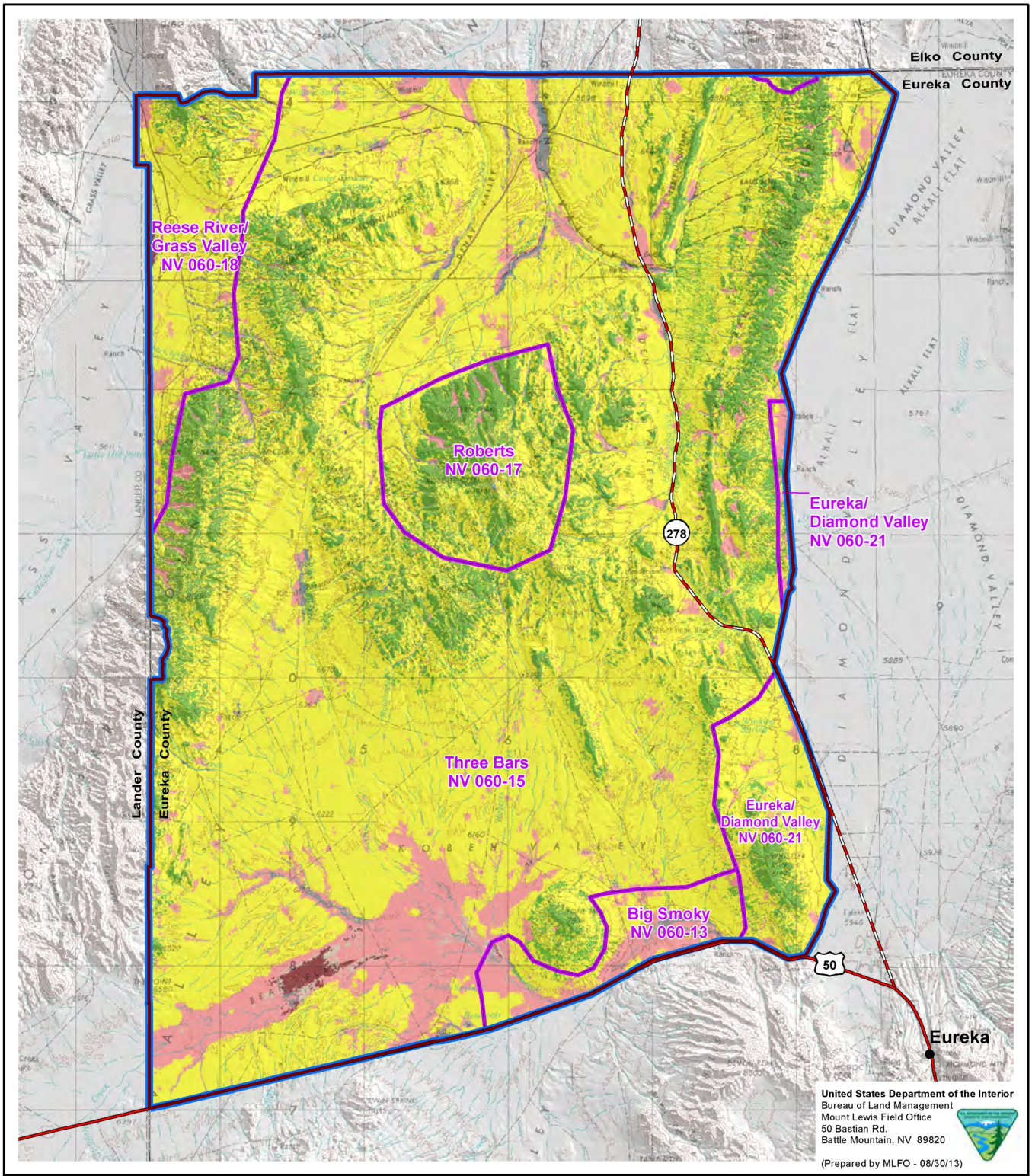

Legend

Natural Fire Regimes

- Fire Regime Group III
- Fire Regime Group V
- Fire Regime Group IV
- Barren
- Sparsely Vegetated
- Indeterminate Fire Regime Characteristics
- Fire Management Unit
- 3 Bars Project Area

Source: BLM 2012g.

3 Bars Ecosystem and Landscape Restoration Project

Figure 3-35

Natural Fire Regimes

0 1 2 3 4 5 10 Miles
0 1 2 3 4 5 10 Kilometers
N

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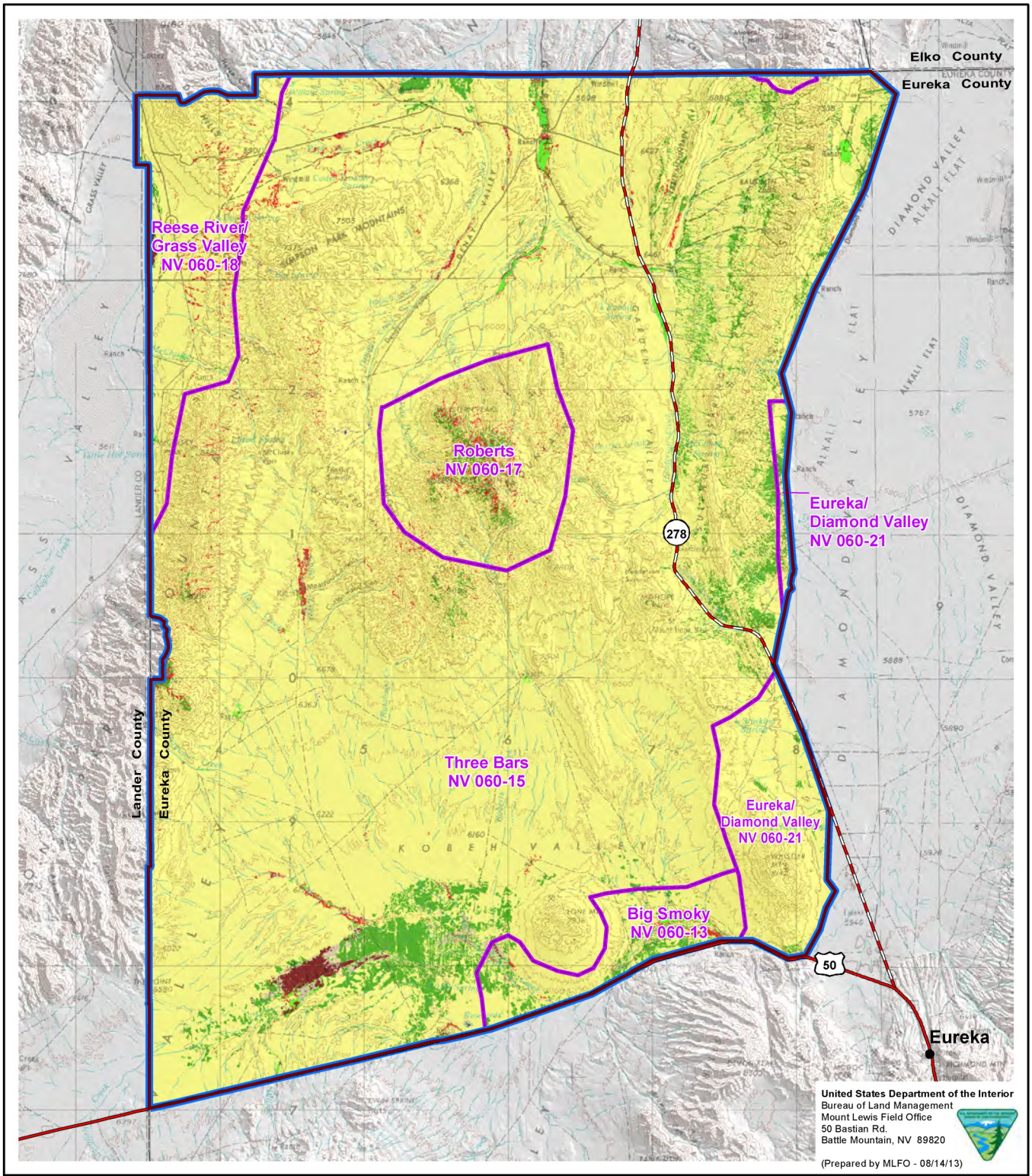

Legend

Current Fire Regime Condition Classes

- Condition Class 1
- Condition Class 2
- Condition Class 3
- Agriculture
- Barren
- Sparsely Vegetated
- Fire Management Unit
- 3 Bars Project Area

Source: BLM 2012g.

3 Bars Ecosystem and Landscape Restoration Project

Figure 3-36

Current Fire Regime Condition Classes

0 1 2 3 4 5 10 Miles

0 1 2 3 4 5 10 Kilometers

N

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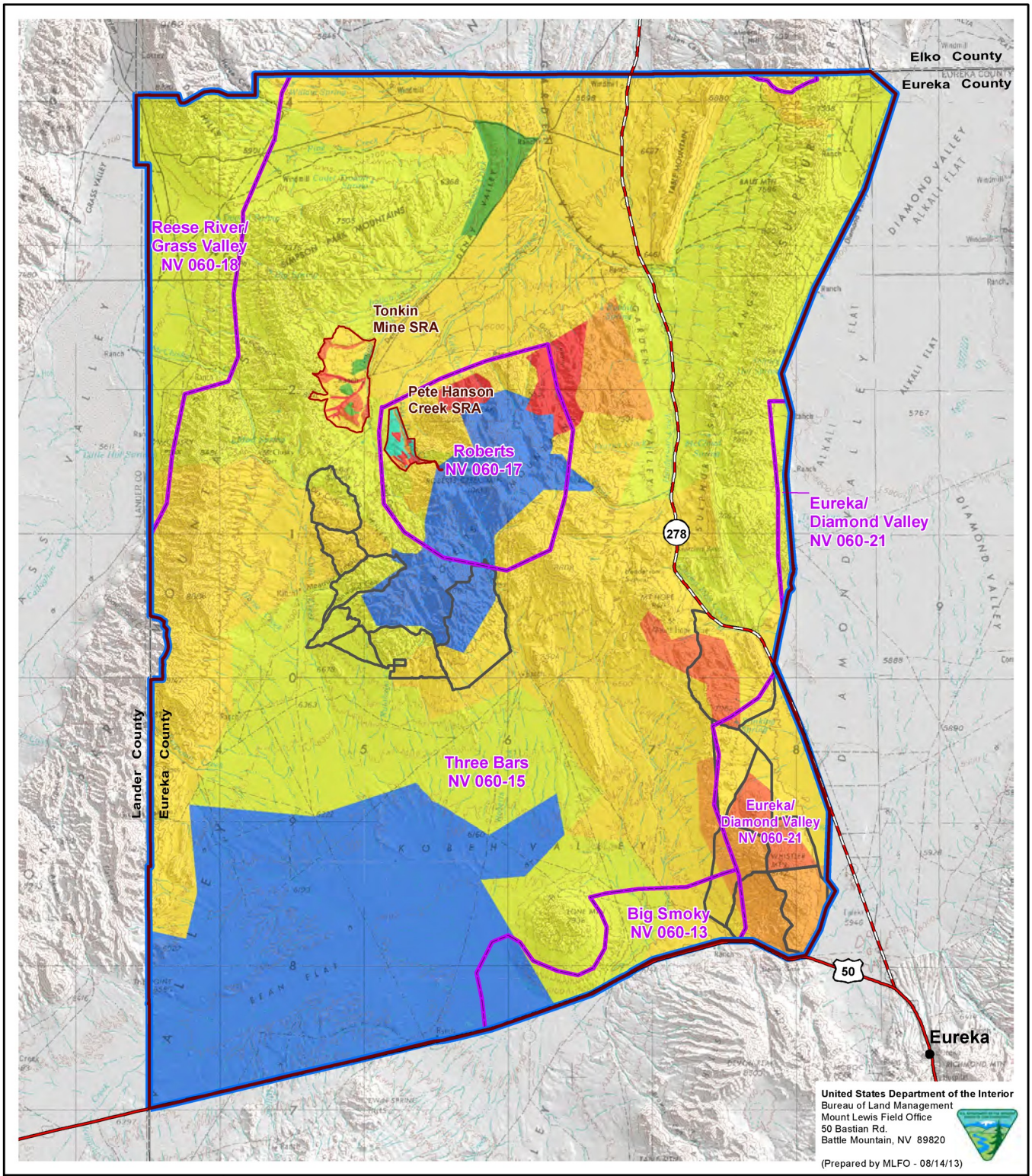

Legend

Fire Risk
- Low to Moderate
- Moderate
- Moderate to High
- High
- High to Very High
- Very High
- Very High to Extreme
- Extreme

- Current Identified "Strategic Areas" Site/Risk Assessment
- Strategic Areas - Ongoing Assessments
- Fire Management Unit
- 3 Bars Project Area

Source:BLM 2009a,f, 2012g.

3 Bars Ecosystem and Landscape Restoration Project

Figure 3-37

Current Risk of Catastrophic Fire and Threat to Resource Values

0 1 2 3 4 5 10 Miles
0 1 2 3 4 5 10 Kilometers
N

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Original data were compiled from various sources. This information may not meet National Map Accuracy Standards.
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TABLE 3-41

Fire Regime Descriptions (Historical Fire Regimes)

Group	Frequency	Severity	Severity Description	Number of Acres in Project Area
I	0 – 35 years	Low/mixed	Generally low-severity fires replacing less than 25 percent of the dominant overstory vegetation; can include mixed-severity fires that replace up to 75 percent of the overstory.	0
II	0 – 35 years	Replacement	High-severity fires replacing greater than 75 percent of the dominant overstory vegetation.	0
III	35 – 200 years	Mixed/low	Generally mixed-severity; can also include low-severity fires.	102,000
IV	35 – 200 years	Replacement	High-severity fires.	576,750
V	200+ years	Replacement/any severity	Generally replacement-severity; can include any severity type in this frequency range.	71,250

Estimated from LANDFIRE database.

In the amendment, the BLM developed fire management categories, ranging from wildland fire not appropriate and full suppression with an aggressive initial attack is recommended (Category A), to wildland fire is appropriate and there are no constraints (Category D). Under the fire management plan, most of the 3 Bars Project area dominated by pinyon-juniper vegetation was categorized as Category C. Under Category C, wildland fire is appropriate, but there are constraints on its use. In Category C areas, prescribed fire use tends to be site-specific and is designed to accomplish protection or improvement goals, and the desired future condition is a healthy ecosystem characterized by a good distribution and proportion of successional stages that would occur over time under a natural fire regime. The remainder of the 3 Bars Project area was categorized as Category B. Under this category, unplanned fire is likely to cause negative effects, but these effects may be mitigated through fuels management. Prescribed fire has limited use and mechanical treatments are normally preferred (USDOI BLM 2002b:10, 12).

3.13.2.5 Fire Management Plan

The purpose of the 2004 Fire Management Plan is to identify and integrate all wildland fire management guidance, direction, and activities required to implement national fire policy, the National Fire Plan, the Healthy Forest Restoration Act, and the Healthy Forest Initiative. The Fire Management Plan also reflects and integrates fire management direction from the Shoshone-Eureka RMP, and the Shoshone-Eureka Fire Land Use Plan Amendment.

Management direction allows for fire to be restored as an integral part of the ecosystem to meet resource management objectives on BLM-administered lands. The Fire Management Plan identifies and directs fire strategies to provide for firefighter safety, the protection of human life, and the safeguarding of private property through aggressive fire protection, reduction of hazardous fuels, and restoration of fire-damaged ecosystems.

TABLE 3-42

Fire Regime Condition Class Descriptions

Condition Class	Fire Regime	Risk of Losing Key Ecosystem Components	Vegetation Attributes	Acres in 3 Bars Project Area
I	Fire regimes are within historical range.	Risk of losing key ecosystem components is low.	Vegetation attributes are intact and function within an historical range.	45,000
II	Fire regimes on the land have been moderately altered from historical ranges. Fire return intervals have increased or decreased from historical frequencies by 1 or more return intervals, resulting in moderate changes to: • The size, frequency, intensity, or severity of fires; or • Landscape patterns.	There exists a moderate risk of losing key ecosystem components from fire.	Vegetation attributes have been moderately altered from the historical range of attributes.	625,000
III	Fire regimes on the land have been significantly altered from historical ranges. Fire return intervals have increased or decreased from historical frequencies by multiple return intervals, resulting in dramatic changes to: • The size, frequency, intensity, or severity of fires; or • Landscape patterns.	There exists a high risk of losing key ecosystem components from fire.	Vegetation attributes have been significantly altered from the historical range of attributes.	52,500

Estimated from LANDFIRE database.

Fire Management Plan Objectives

The Fire Management Plan identifies numerous objectives for managing fires in the project area. These include:

- Protection of human life, safety of wildland firefighters, and protection of human safety and health.
- Protection of private property and natural and cultural resources, including preventing the destruction of cultural properties from suppression actions.
- Protection of communities and associated infrastructure.
- Providing for vegetative and ecological diversity.
- Protection of important wildlife habitat from devastating wildland fire effects.
- Protection of all fisheries, including existing and historical Lahontan cutthroat trout habitats.
- Protection of HMA foaling areas during foaling seasons.

- Providing for vegetative and ecological diversity.
- Protection of important raptor nesting habitat.
- Protection of riparian zones from devastating wildland fire effects.
- Restoring fire as an integral part of the ecosystem.
- Utilize mechanical treatments to reduce wildfire fuel hazards.
- Fire is considered a natural and desirable element in WSAs. Interim guidance directs BLM to rely on methods least damaging to wilderness values, and to limit surface disturbance to the protection of life and private property. All WSAs are managed as Visual Resource Management Class I areas.
- Rehabilitation and restoration of all wildfires 300 acres or larger.

In addition, the Fire Management Plan identifies several objectives for managing prescribed fires in the project area. These are:

- Utilize prescribed fire to mitigate hazardous fuels to acceptable levels.
- Utilize prescribed fire to promote resource management to maintain the natural component of the ecosystem and restore fire as an integral part of the ecosystem.
- Utilize wildland fire for resource benefits to maintain important habitat and restore fire as an integral part of the ecosystem as approved by site-specific activity level document.
- Restore pinyon pine and juniper woodland density and coverage to the approximate values found under natural fire return intervals.

3.13.2.6 Fire Management Units

As discussed in the Fire Management Plan, the BLM has divided the Battle Mountain District into Fire Management Units (FMUs). A FMU is a specific land management area that is defined by fire management objectives, management constraints, topographic features, access, values to be protected, political boundaries, fuel types, and/or major fire regime groups. The Battle Mountain FMUs are scaled to best define predominate fire management objectives, physical characteristics, resource values, and fire planning attributes, including for lands within the 3 Bars Project area (USDOI BLM 2004a).

The 3 Bars Project area is part of five FMUs—Big Smoky (NV-060-13), Three Bars (NV-060-15), Roberts (NV-060-17), Reese River/Grass Valley (NV-060-18), and Eureka/Diamond Valley (NV-060-21; **Figure 3-36**). The following summarizes information from the 2004 Fire Management Plan.

3.13.2.6.1 Big Smoky (NV-060-13)

The Big Smoky FMU lies between the Toiyabe Mountain Range to the west, and the Toquima Mountain Range to the east. The FMU is 407,715 acres, of which 96 percent of acres are administered by the BLM; 19,758 acres are within the project area. Most of the vegetation is salt-desert shrub, but some sagebrush pockets exist. During 1980 to 2003, the average wildfire size was less than an acre and nearly all wildfires were started by lighting, with a few fires started by humans.

Wildfires typically occur during May through October. Temperatures during the fire season typically range from the mid-80s to the upper 90s °F with relative humidity typically in the teens or single digits. Summer thunderstorms bring frequent lightning and can bring brief heavy rains. Occasionally, dry or isolated thunderstorms plague the District with multiple ignitions.

Fire is an uncommon component of salt-desert shrub ecosystems as is abundant fine fuel loadings. Wind driven fires in the sagebrush can advance with high rates of spread and can cover vast distances quickly. Fires in the salt-desert shrub vary in intensity and are highly dependent on the presence of fine fuels. The presence of cheatgrass can dramatically shorten fire return intervals in all vegetative communities and cause fires to spread very quickly, but very little cheatgrass has been seen in this FMU. Live fuel moisture, pathogens, relative humidity, wind, and slope will greatly influence fire behavior in these desert fuel types.

The salt-desert scrub communities are Fire Regime IV and FRCC I. The sagebrush/grass communities are Fire Regime II and FRCC II.

3.13.2.6.2 Three Bars (NV-060-15)

The Three Bars FMU is in Lander and Eureka Counties and is 880,852 acres; approximately 618,601 acres are within the project area. The FMU is bound on the west by Grass Valley, on the south by the U.S. Highway 50, on the east by Diamond Valley, and on the north by the District Boundary. U.S. Highway 50 and State Highway 278 provide the primary access to this FMU. Over 97 percent of this FMU is administered by the BLM. The unit is rated as having high value habitat, with over 85 percent of vegetation comprised of pinyon-juniper and sagebrush. During 1980 to 2003, the average wildfire size was about 300 acres and nearly all wildfires were started by lighting, with a few fires started by humans.

Wildland fires typically occur during May through September. Maximum temperatures for this FMU rarely exceed 100 °F during this period. Frequent lightning storms bring moderate amounts of precipitation occur throughout the summer.

Fire behavior differs in the three fuel types found in this FMU. Fires in sagebrush, which is the dominant fuel type, historically were medium sized and of mixed severity. Recent sagebrush fires in this FMU have been medium sized fires but of high severity. Fires in pinyon-juniper stands are characterized by either single tree/small group fires or large, stand-replacing events. Salt-desert shrub fires typically only burn under severe conditions (i.e., high wind, low relative humidity, and with abundant fine fuel loading). Fire is a relatively uncommon component of salt-desert shrub fuel types. Living vegetation fuel moisture, pathogens, relative humidity, fine fuels, wind, and slope will greatly influence fire behavior in these fuel types. Fires in the sagebrush and salt-desert shrub types are generally easier to suppress than fires in the pinyon-juniper type.

The pinyon-juniper and sagebrush types are in Fire Regime II and FRCC II.

3.13.2.6.3 Roberts (NV-060-17)

The Roberts FMU consists of 39,192 acres in the Roberts Mountains of Eureka County, and these acres are within the project area. State Highway 278 and the Alpha Road provide the primary access to this FMU. One hundred percent of this FMU is administered by the BLM. The unit is rated as Special Management Area, with vegetation comprised mostly of pinyon-juniper, mountain shrub, and sagebrush. During 1980 to 2003, the average wildfire size was about 3 acres and nearly all wildfires were started by lighting.

Wildfires typically occur during May through September. Maximum temperatures for this FMU rarely exceed 100 °F during this period. Frequent lightning storms bring moderate amounts of precipitation during the summer.

Fire behavior differs in two main fuel types. Fires in the pinyon-juniper type are characterized by either single tree/small group fires or large stand replacing events. Fires in the sagebrush type are historically characterized by medium-sized fires of mixed severity. Lately, the trend has been medium- to large-sized fires of moderate to high severity. Living vegetation fuel moisture, pathogens, relative humidity, fine fuels, wind, and slope will greatly influence fire behavior in these fuel types. Fires in sagebrush are generally easier to suppress than fires in the pinyon-juniper type.

The pinyon-juniper type and sagebrush type are in Fire Regime II and FRCC II.

3.13.2.6.4 Reese River/Grass Valley (NV-060-18)

The Reese River/Grass Valley FMU lies in the northern portion of the District and is 843,149 acres; only a portion of the FMU is in the project area (40,501 acres). The portion of the FMU in the project area is bordered by U.S. Highway 50 on the south and the Dry Hills and the Cortez Mountains on the east. This FMU in the project area is administered by the BLM. Much of the unit contains cheatgrass. Fires are often quite large (greater than 1,000 acres) and are started by lighting and human causes.

Wildfires typically occur during May through October. Wind driven fires in the sagebrush can advance with high rates of spread and can cover vast distances quickly. Fires in the salt-desert shrub vary in intensity and are highly dependent on the presence of fine fuels. Fire is an uncommon component of salt-desert shrub ecosystems as is abundant fine fuel loadings. Areas where cheatgrass have invaded are at the highest risk for fire. The presence of cheatgrass can dramatically shorten fire return intervals in all vegetative communities and cause fires to spread very quickly. Living vegetation fuel moisture, pathogens, relative humidity, wind, and slope will greatly influence fire behavior in these fuel types.

The vast majority of the FMU occurs in valley locations. In these areas, diurnal winds and temperatures can vary greatly. These areas can experience 180-degree changes in slope and valley winds. Additionally, these locations are prone to intense heating (heat sinks) during the day and rapid cooling at night. Generally cool air flows to the lowest elevations at night, which are typically the valley locations. The mountains and valleys are aligned southwest to northeast, which is in concert with the typical prevailing wind direction. This FMU has a history of having large wildfires, most recently, the wildfires of 1999. The 1999 Antelope fire burned nearly 100,000 acres. Thunderstorms have been responsible for erratic and rapid fire spread during past fire events.

The sagebrush type is in Fire Regime II and FRCC III, and the salt-desert shrub communities are in Fire Regime IV and FRCC III.

3.13.2.6.5 Eureka/Diamond Valley (NV-060-21)

The Eureka-Diamond Valley FMU is 243,330 acres in Eureka County in the southern end of Diamond Valley; 30,573 acres are within the project area. The FMU is bound on the east by the Diamond Mountain Range, on the west by the Mountain Boy Range, on the north by Alkali Flat, and the south by the Fish Creek Range. U.S. Highway 50 and State Route 278 provide the primary access to this FMU. Seventy-nine percent of this FMU is administered by the BLM, while 20 percent is privately owned. The unit is rated as Wildland Urban Interface, with 74 percent of vegetation

comprised of pinyon-juniper, mountain shrub, and sagebrush, and 20 percent not having significant vegetation. During 1980 to 2003, the average wildfire size was about 500 acres and most wildfires were started by lighting.

Wildfires typically occur May through September. Maximum temperatures for this FMU rarely exceed 90 °F during the same period. Frequent lightning storms bring moderate to heavy amounts of precipitation during the summer.

Fires in the pinyon-juniper type are characterized by either single tree/small group fires or large stand replacing events. Fires in the sagebrush type are historically characterized by medium-sized fires of mixed severity. Living vegetation fuel moisture, pathogens, relative humidity, fine fuels, wind, and slope will greatly influence fire behavior in both of these fuel types. Diamond Valley is a heat sink for this FMU and could significantly alter fire behavior.

The pinyon-juniper type and sagebrush types are in Fire Regime II and FRCC II.

3.13.3 Environmental Consequences

3.13.3.1 Key Issues of Concern Considered during Evaluation of the Environmental Consequences

The following fire management issues were identified by the public during scoping:

- Concern that the BLM thinks it can impose fire and other treatments to restore the historical ranges of fire occurrence and achieve an artificially desired future condition.
- Fuels reduction should only occur in the wildland-urban interface or where there is a threat of significant wildfire.
- Assess whether seeding crested wheatgrass, grazing, and high stocking rates may result in more extensive and larger acreage fires.
- The BLM should develop a methodology to prioritize any treatments of hazardous fuels.
- The BLM needs to provide a full accounting of all fuels/fire/habitat projects conducted by the District in the past 10 years.

3.13.3.2 Significance Criteria

Impacts from the alternatives would be considered significant if they caused 1) a change from a lower FRCC to a higher FRCC (e.g., from FRCC I to FRCC II or FRCC II to FRCC III), 2) an increase in risk of loss of life or property from wildland fire, or 3) an increase in the risk of a catastrophic wildfire.

3.13.3.3 Direct and Indirect Effects

3.13.3.3.1 Direct and Indirect Effects Common to All Action Alternatives

Adverse Effects

In general, proposed treatments would have few adverse impacts on wildfire risk. It is possible that the use of vehicles to transport workers to the treatment site, or use of chainsaws or other gas-powered equipment could cause a spark that results in a wildfire. Vehicles could also transport noxious weeds and other invasive non-native vegetation seeds

and vegetative parts from a treatment site to other 3 Bars Project areas, resulting in noxious weeds and other invasive non-native vegetation spread and increased risk of wildfire. However, these risks would be minor as transport vehicles would contain fire extinguishers and other fire suppression equipment and would generally remain on roads. If slash or other woody material from woodland treatments were not disposed of properly, they could serve as an ignition source for a wildfire. To reduce this risk, felled trees would be disposed of by using trees for posts or as mulch, by selling trees for commercial biomass production, by placing logs in streams to slow water flow, or by burning piles or slash.

Beneficial Effects

Treatments that remove hazardous fuels from public lands would be expected to benefit the health of plant communities in which natural fire cycles have been altered. Fire suppression leads to the buildup of unhealthy and dead plant materials (e.g., litter and dead woody materials), and often increases the density of flammable living fuels on a site (e.g., dead branches on living shrubs or live plants, especially during dry periods) that can lead to crown fires (Cochrane et al. 2012). The resultant fires burn hotter, spread more quickly, and consume more plant materials than historical wildfires that occurred under conditions of lower fuel loading. In addition, human-caused wildland fires occur with greater frequency than they historically did, resulting in altered plant community structure. Treatments that restore and maintain fire-adapted ecosystems, through the appropriate use of mechanical thinning, fire use, and other vegetation treatment methods, would decrease the effects from fire to communities and improve ecosystem resilience and sustainability (USDOI BLM 2007c:4-53).

Creating and maintaining fire and fuel breaks would be a common objective of many of the treatments proposed on the 3 Bars ecosystem. This includes creating green strips and shaded fuel breaks to compartmentalize wildland fire and reduce the risk of a catastrophic wildfire. The BLM would use existing barriers/breaks to halt fire spread to the extent practicable, and use thinnings and plantings adjacent to barriers/breaks to enhance their effectiveness. Fire and fuel breaks would be created or enhanced under all alternatives, and would primarily be created using manual and mechanical methods.

3.13.3.3.2 Direct and Indirect Effects under Alternative A (Preferred Alternative)

Under Alternative A, the BLM would meet FMU objectives under the Fire Management Plan (USDOI BLM 2004a). The BLM would be able to reduce hazardous fuels, and create fire and fuel breaks to slow the spread of a wildfire. Because about 17 percent of the 3 Bars Project Area would be treated during the next 10 to 15 years, and nearly all proposed treatments would provide some benefit toward hazardous fuels reduction, the BLM estimates that the FRCC on about 95,000 acres would improve over the next 10 to 15 years under Alternative A.

Riparian Treatments

Adverse Effects

Prescribed fire treatments could jump fire boundaries and burn a larger area than planned. If fuels are anticipated to be insufficient to carry a prescribed fire, livestock grazing would be deferred for the growing season prior to the treatment. In addition, seeding may be needed, and livestock would need to be kept off of treated areas for at least 2 growing seasons after a prescribed fire, to promote the development of native forage and give forage ample time to recover (USDOI BLM 2007c:4-96).

Beneficial Effects

Riparian treatments would help to reduce the risk of wildfire by reducing hazardous fuels and restoring natural fire regimes in riparian zones. Manual and mechanical treatments would help restore and enhance riparian function, and improve the ability of streams and associated riparian, wetland, and floodplain habitat to serve as a fuel break. At Hash Spring and several other springs, and at project sites where Lahontan cutthroat trout habitat improvements would occur, the BLM would improve riparian habitat by removing pinyon-juniper using manual and mechanical methods or prescribed fire. Most pinyon-juniper removal would occur adjacent to roads or other fire breaks, or to create or enhance fuel breaks adjacent to riparian zones. Fuel and fire breaks would help to control the spread of wildfires.

Aspen Treatments

Some slash from pinyon-juniper treatments would be left in place to promote aspen suckering and seedling establishment, or to act as deadfall to limit livestock, wild horse, and wild ungulate movement into treatment areas. This woody material could provide fuel for a wildfire until it decomposes. However, this risk would be minimized by gathering up excess material and selling it to the public, or pile/slash burning the material.

Actions that stimulate or enhance aspen suckering and sucker survival should improve the health of aspen stands, and, long term, reduce the amount of dead and decaying vegetation in these stands that could provide fuel for a wildfire.

Pinyon-juniper Treatments

Adverse Effects

On the Lone Mountain area of Kobeh Valley, trees would be thinned primarily by using chainsaws. Downed trees and other woody material could serve as fuel for a wildfire. Slash from chainsaw treatments in late Phase II and Phase III woodlands can create a fire hazard for at least 2 years, and may open sites for introduction of invasive plant species (Tausch et al. 2009). Woody material from shredding treatments can also contribute to available fuels and often creates favorable conditions for noxious weeds and invasive non-native species (Gottfried and Overby 2011).

On the Atlas, Frazier, and several other units, pinyon-juniper would be removed using manual and mechanical treatments. If not disposed of properly, uprooted and downed trees and slash could provide fuels for a wildfire and serve as a conduit for carrying a wildfire between valley and mountain areas. To reduce this risk, felled trees would be used for posts or mulch, sold for commercial biomass utilization, placed in streams to slow water flow, or burned in piles or as slash.

Fire treatments could expose bare soil and allow noxious weeds and other invasive non-native vegetation, such as cheatgrass, to establish and spread. The BLM has conducted monitoring at prescribed fire treatment areas, and has found that noxious weeds and other invasive non-native vegetation may be found at treatment sites post-burn. At the Red Hills site, for example, very low to low densities of cheatgrass were seen at about half of the monitoring stations 1 year after the burn, especially in areas of high-severity burning (USDOI BLM 2008i). Noxious weeds and other invasive non-native vegetation could serve as fuel for a wildfire.

Beneficial Effects

Manual, mechanical, and fire treatments in pinyon-juniper management areas would provide several benefits. Creating and enhancing fuel breaks in pinyon-juniper stands would break up the continuity of fuel, moderate fire behavior, and reduce the risk of loss of habitat and other resources from a catastrophic wildfire.

The BLM would place downed logs into streams to slow water flow. Logs should help to expand the size of streams where gradients are more gradual, and these stream features could also serve as fuel breaks to slow the spread of wildfire.

On the Lower Pete Hanson, Cottonwood/Meadow Canyon, Dry Canyon, Three Bars Ranch, Tonkin North, and Whistler units, the focus of treatments would be on hazardous fuels reduction using manual and mechanical methods and prescribed fire. Much of the west slope of Roberts Mountains has not experienced a large-scale wildfire in over 100 years. These units have been identified as having high to very high risk of catastrophic wildfire, or in the case of the Tonkin North, Lower Pete Hanson, and Whistler units, very high to extreme wildfire risk (**Figure 3-36**). These units have moderate amounts of standing dead and dead down wood, excessive surface litter, and a closed canopy that is conducive for a crown fire (USDOI BLM 2009a). By increasing canopy spacing among pinyon-juniper, the potential for a crown fire would be less, while residual trees would provide surface shading that lowers fuel temperatures (Tausch et al. 2009).

Monitoring at the Red Hills hazardous fuels reduction project, which included prescribed fire and mechanical treatments, showed that treatments helped to reduce hazardous fuels and wildfire risk. The risk of wildfire was reduced from a “very high to extreme” risk to “low” risk at 35 monitoring sites, and “low to moderate” risk at 5 sites. The FRCC Rating was II before the burn, and was “low II” after the burn. A variety of desirable forbs, grasses, and shrubs were observed re-colonizing treatment areas, and fuel breaks were still viable (USDOI BLM 2008i).

Pathogens and pests, including mistletoe, have led to unhealthy pinyon-juniper stands in the Tonkin North and South units and a build-up of hazardous fuels. The BLM proposes to remove up to half of the trees using manual and mechanical means and prescribed fire. These projects would enhance the health and resilience of pinyon-juniper woodlands and reduce the amount of hazardous fuels and wildfire risk. In recent years, the BLM has conducted hazardous fuels reduction treatments in the Tonkin Springs area using chainsaws, bull-hogs, and feller-bunchers, and created fuel breaks using a rotary mower (USDOI BLM 2005b).

The BLM would restore fire as an integral part of the ecosystem and reduce hazardous fuels on the Sulphur Spring Wildfire Management Unit by using wildland fire for resource benefit. Several wildfires have occurred in this area in recent years due to dense fuel accumulations and pinyon-juniper cover. In recent years, the BLM has used chainsaws, mowers/shredders, and prescribed fire to create fuel breaks and remove diseased pinyon-juniper (USDOI BLM 2009a). By reducing fuel accumulations and opening up the canopy cover, sagebrush and other shrub cover should increase, a more natural fire regime would be restored in the area, and the risk of future wildfires would be diminished.

Regardless of the cause of the fires in pinyon-juniper habitat, some post-burn restoration and management may be needed. After broadcast burns, the BLM may need to reseed burned areas with forbs, grasses, and shrubs. Based on past reseeding treatments conducted for several wildfire burns in the District, seeding and planting of native and non-native vegetation may have limited success, especially during drought years, and native release of seeds may be the primary mechanism for site revegetation. However, in areas with sufficient moisture, seedings have been successful

and have resulted in an abundance and diversity of forbs, grasses, and shrubs (USDOI BLM 2011e). To ensure vegetation restoration success, the BLM may prohibit livestock access to the area through grazing closure decisions that are effective upon issuance. The BLM may also use temporary fencing, including electric fencing, which has been used effectively at wildfire restoration sites to improve revegetation success by excluding livestock, wild horses, and wild ungulates (USDOI BLM 2009a, d, 2010e, f, g, h, i, j, 2011e, f).

The BLM would carefully monitor prescribed fire treatment sites to ensure that cheatgrass and other invasive non-native vegetation does not become established on these areas. In general, burns at lower elevations are more likely to have noxious weeds and other invasive non-native vegetation issues than treatments at higher elevations. Monitoring for the Red Hills hazardous fuels reduction project 1 year after prescribed fire and mechanical treatments showed evidence of cheatgrass in areas where severe burning occurred, but no cheatgrass or other noxious weeds and invasive non-native vegetation in areas where burning was less severe (USDOI BLM 2008i). Cheatgrass and other noxious weeds and invasive non-native vegetation can be controlled on wildland fire sites using herbicides, but it may take several years before this vegetation is brought under control (USDOI BLM 2011e, f).

Sagebrush Treatments

Adverse Effects

Where trees or sagebrush are left on the ground as slash, or piled, the potential for this material to serve as fuel for a wildfire exists. Pinyon-juniper trees would be disposed of by using trees for posts or mulch, selling trees, or placing them in streams. Treatments of noxious weeds and other invasive non-native vegetation would result in dead vegetation that could provide fuel for a hazardous wildfire until the site was restored using native vegetation or crested wheatgrass or forage kochia.

Beneficial Effects

Treatments should lead to improved sagebrush habitat and sagebrush resiliency to fire, and open up the sagebrush canopy to slow fire spread and promote the development of an herbaceous understory that is resistant to fire. In intact sagebrush communities, only 20 percent of the area would be treated and the BLM would create a mosaic of sagebrush and herbaceous vegetation that would retard the spread of wildfire and provide habitat for greater sage-grouse.

At sites dominated by herbaceous or invasive species, such as the Rocky Hills, Table Mountain, West Simpson Park, and Whistler Sage units, the units could be treated using mechanical methods. The West Simpson Unit was burned during the 1999 Trail Canyon Fire, and has substantial cheatgrass cover and is in an area rated as high to very high for risk of a catastrophic wildfire. Cheatgrass is quite flammable during the summer, and efforts to eliminate it or slow its spread would help to reduce the risk of wildfire. Crested wheatgrass, forage kochia, and cheatgrass dominate the Rocky Hills unit, and the unit has little sagebrush habitat. The BLM would use mechanical methods (disking, chaining, and broadcast/drill seeding) to reduce herbaceous vegetation and promote the establishment of a native sagebrush community.

3.13.3.3.3 Direct and Indirect Effects under Alternative B (No Fire Use Alternative)

The risk of treatments causing a wildfire that spreads beyond treatment boundaries would be less under this alternative than Alternative A. Miles traveled by vehicles, the number of acres treated using manual and mechanical equipment, the amount of downed trees and slash material created, and the miles of fire and fuel breaks created would

be similar between this alternative and Alternative A. Because the BLM would not use prescribed fire to treat vegetation under this alternative, there would be no risk of a prescribed fire spreading beyond treatment boundaries.

Without the use of prescribed fire and fire for resource benefits, the BLM would be less likely to restore fire as an integral part of the ecosystem, reduce the risk of a large-scale wildfire, or reduce extreme, very high, and high wildfire risks to moderate risk or less than under Alternative A. About 8 percent of the 3 Bars Project area would be treated under this alternative. About 1,000 to 2,000 acres would be treated annually to reduce hazardous fuels, and the FRCC would be reduced on about 7,500 to 15,000 acres over the next 10 to 15 years. It is unlikely the trend toward large-sized fires of moderate to high severity in sagebrush and large stand-replacing fires in pinyon-juniper would slow or reverse in the long term, however, and the BLM would still need an aggressive wildland fire prevention and control program for the long term.

Treatments would help to meet some of the FMU objectives under the Fire Management Plan (USDOI BLM 2004a), but not to the same extent as they would under Alternative A. Manual and mechanical treatments would help to reduce hazardous fuels, protect and improve fish and wildlife habitat, and create fire and fuel breaks to slow the spread of a wildfire. Prescribed fire and fire for resource benefit are identified as important treatment options under the Fire Management Plan for all FMUs, except the Big Smoky FMU, but would be unavailable to the BLM as a management tool under this alternative.

3.13.3.3.4 Direct and Indirect Effects under Alternative C (Minimal Land Disturbance Alternative)

This alternative focuses on the use of treatments that would have minimal ground disturbance. Recovery of vegetation through this more passive management approach is expected to take longer than under active management, where treatments such as seeding with native species, establishing intermediate vegetation to control erosion, and use of fire to reduce hazardous fuels, would be expected to promote faster recovery.

Under this alternative, however, there would be no wildland fire risks associated with the use of prescribed fire. The BLM would not use mechanical equipment (other than vehicles to transport work crews to treatment sites), so there would be no risk of a wildland fire being started by tractors, mowers, and other mechanical treatment equipment. However, workers still would use chainsaws and other hand-held power equipment that could cause a spark and start a wildland fire. Large numbers of workers and their vehicles would be needed to accomplish proposed treatments under this alternative. Vehicle miles traveled would likely be greatest under this alternative. Downed trees and slash material from treatments would be difficult to remove without mechanical equipment or pile/slash burning.

The number of miles of fire and fuel breaks created under this alternative would be less than for Alternatives A and B, as the BLM would not be able to use mechanical equipment, such as bulldozers, mowers, and mulchers, and prescribed fire to create fire and fuel breaks. Fire and fuel break treatments would primarily be limited to stream and aspen habitats, or near roads, where pinyon-juniper would be removed to enhance or create new breaks.

Alternative C would not restore fire as an integral part of the ecosystem, reduce the risk of a large-scale wildfire, or reduce extreme, very high, and high wildfire risks to moderate risk or less. Only about 500 to 1,000 acres would be treated annually to reduce hazardous fuels, and the BLM estimates that the FRCC would be reduced on only about 3,750 to 7,500 acres over the next 10 to 15 years, fewer acres than under Alternatives A and B.

The BLM would not meet FMU objectives under the Fire Management Plan (USDOI BLM 2004a). Manual treatments could be used to create a few miles of fuel breaks to slow the spread of a wildland fire. Although the BLM could treat acreage using manual methods as proposed for each FMU, the BLM would not be able to conduct fire

treatments as recommended in the Fire Management Plan to reduce hazardous fuels and the risk of a catastrophic wildfire in FMUs.

3.13.3.3.5 Direct and Indirect Effects under Alternative D (No Action Alternative)

There would be no direct effects to wildland fire from 3 Bars Project treatments as no treatments would be authorized under this alternative. Under this alternative, the BLM would not meet the fire use purposes to 1) restore fire as an integral part of the ecosystem, 2) reduce the risk of a large-scale wildland fire, 3) reduce extreme, very high, and high wildland fire risks to moderate risk or less, and 4) develop fuel breaks within treatment and adjacent areas. Threats to ecosystem health that could lead to catastrophic wildfire under this alternative would be associated with the ongoing expansion of noxious weeds and other invasive non-native vegetation, continued decline of ecosystem health due to further decline in native understory species in the upland plant communities, further expansion of pinyon-juniper woodland into other communities, including sagebrush, riparian, and aspen habitats, and an increase of fuel loads. There would be no improvement in the FRCC on the 3 Bars Project area and the BLM would not meet FMU objectives.

3.13.3.4 Cumulative Effects

The CESA for wildland fire is approximately 1.84 million acres and includes those watersheds at the Hydrologic Unit Code 10 level that are all or partially within the 3 Bars Project area (**Figure 3-1**). Approximately 92 percent of the area is administered by the BLM, 6 percent is privately owned, and 2 percent is administered by the Forest Service. Past and present actions that have influenced wildland fire activity in the 3 Bars ecosystem are discussed in Section 3.2.2.3.3.

3.13.3.4.1 Cumulative Effects under Alternative A (Preferred Alternative)

Historic overgrazing, introduction of cheatgrass, large wildfires, and other natural and human-caused factors have contributed to the departure of the plant communities from the Potential Natural Community across the 3-Bars ecosystem. This has led to a decrease in the functionality of ecological processes, thus reducing the resilience and resistance of these ecosystems to disturbance. The treatments proposed in the 3-Bars ecosystem are designed to provide the means needed for these ecosystems to recover.

In the short term, temporary fences may change the distribution of grazing by livestock, wild horses, and wildlife. As distribution patterns change, utilization would also change. Wildlife and wild horse utilization would decrease in treatment areas while temporary fences are in place, but would increase in other areas. Once the temporary fences are removed, wild horses and wildlife may be attracted to the treatment areas resulting in potentially higher use of the area than before. Temporary fences would exclude livestock, although AUMs would be temporarily suspended to prevent overuse in other areas.

The BLM would continue to use ground-based herbicide applications to remove noxious weeds and other invasive non-native vegetation, and aerial-based application methods to remove cheatgrass, and would restore burned areas under the Burned Area Emergency Stabilization and Rehabilitation program, under existing authorizations on about 1,000 acres annually. These treatments could have a short-term adverse effect on non-target vegetation. These treatments would have long-term beneficial effects by helping to reduce hazardous fuels, improving native vegetation, slowing the spread of noxious weeds and other invasive non-native vegetation, and reducing surface runoff and erosion associated with burn sites on about 1,000 acres annually.

As discussed earlier, the BLM conducts fuel treatment projects under the direction of the Fire Management Plan. In addition to those areas identified under the proposed action, the BLM also proposes to treat hazardous fuels on an additional 8,300 acres in high to very high fire risk areas on and near the 3 Bars Project area. These include treatments in pinyon-juniper and sagebrush habitat using prescribed fire and manual and mechanical methods to remove pinyon-juniper, enhance wildlife habitat, and create fuel breaks.

Recreational use of the 3 Bars Project area increases the risk of a wildland fire due to accidental or intentional ignition of vegetation from a campfire, cigarette, hot vehicle muffler, or other human-caused ignition source. In addition, recreational users can spread noxious weeds and other invasive non-native vegetation that attaches to vehicles or to clothing or shoes, and can later cause new noxious weeds and other invasive non-native vegetation infestations and provide fuels for a wildland fire.

Land, mineral, oil, gas, geothermal, and other development would cause land disturbance and the spread of noxious weeds and other invasive non-native vegetation within the 3 Bars Project and nearby areas. Development would lead to additional human activity in the area, and increase the potential for a human-caused wildland fire. The BLM and other fire-fighting agencies would have to contribute labor and equipment to protect developments from loss of human life and property from wildfire, instead of allowing these areas to burn naturally.

Hazardous fuels treatments would occur on about 142,000 acres (9 percent) of lands within the CESA. Although this would still be a small portion of lands within the CESA, treatments would be targeted toward public lands with high to very high wildfire risk. Given that over 90 percent of acres impacted by future actions are focused on hazardous fuels reduction and resource management, treatments would reduce wildfire risk long term. At fire management treatment levels projected to occur in the CESA during the next 25 years under Alternative A, the BLM should meet the FMU objectives for most FMUs (USDOI BLM 2004a). The FRCC on about 142,000 acres would improve over the next 25 years.

3.13.3.4.2 Cumulative Effects under Alternative B (No Fire Use Alternative)

Under Alternative B, effects from non-3 Bars Project reasonably foreseeable future actions on wildfire would be similar to those described under Alternative A. The BLM anticipates treating about half as many acres under Alternative B as under Alternative A. Because the BLM would not use fire to treat vegetation on the 3 Bars Project area, the risk of a prescribed fire spreading beyond treatment boundaries would be less under this alternative than under Alternative A. However, the BLM would less able to restore fire as an integral part of the ecosystem, reduce the risk of a large-scale wildland fire, slow the spread of noxious weeds and other invasive and non-native vegetation, or reduce extreme, very high, and high wildfire risks to moderate risk or less under this alternative than under Alternative A on the 3 Bars Project area.

About 78,000 acres of vegetation would be treated to reduce hazardous fuels and improve rangeland health within the CESA, or about 4 percent of the CESA. This would include about 63,000 acres treated annually by the BLM on the 3 Bars Project area, and about 15,000 acres treated by the BLM on other areas within the CESA. Acres treated to reduce the FRCC under this alternative would be half that of Alternative A, and it is also less likely that the BLM would meet FMU objectives under the Fire Management Plan under this alternative than under Alternative A on the 3 Bars Project area.

3.13.3.4.3 Cumulative Effects under Alternative C (Minimal Land Disturbance Alternative)

Under Alternative C, effects from non-3 Bars Project reasonably foreseeable future actions on wildland fire would be similar to those described under Alternative A. The BLM anticipates treating about one-fourth as many acres under Alternative C as under Alternative A, mostly due to the higher costs associated with manual and classical biological control methods. The risk of treatments causing a wildland fire would be slightly less under this alternative than Alternative A. Because the BLM would not use fire to treat vegetation on the 3 Bars Project area, the risk of a prescribed fire spreading beyond treatment boundaries would also be less under this alternative than Alternatives A and B.

By not being able to use mechanical methods, such as mowing, chopping, tilling, disking, harrowing, and drill seeding, the BLM would do little to reduce hazardous fuels, create fire and fuel breaks, treat areas with noxious weeds and other invasive non-native vegetation, or remove downed wood and slash. Under Alternative C, the BLM would conduct fire management treatments on only about 2 percent of the CESA. This would include about 32,000 acres treated by the BLM to reduce hazardous fuels and wildfire risk on the 3 Bars Project area, and about 15,000 acres treated by the BLM elsewhere within the CESA. Only one-fourth as many acres would be treated to reduce the FRCC under this alternative as under Alternative A. It is also less likely that the BLM would meet FMU objectives under the Fire Management Plan under this alternative than under Alternatives A and B on the 3 Bars Project area.

3.13.3.4.4 Cumulative Effects under Alternative D (No Action Alternative)

Under Alternative D, effects from non-3 Bars Project reasonably foreseeable future actions on wildland fire would be similar to those described under Alternative A. There would be no cumulative effects on wildland fire from 3 Bars Project treatments as no treatments would be authorized under this alternative. The BLM could create fire and fuel breaks; thin and remove pinyon-juniper to promote healthy, diverse stands; slow the spread of noxious weeds and other invasive non-native vegetation, especially cheatgrass; restore fire as an integral part of the ecosystem; and reduce the risk of a large-scale wildfire, but on only about 1,500 acres annually under existing and reasonably foreseeable future authorizations.

Hazardous fuel levels would likely increase, and only a limited number of miles of fuel and fire breaks would be constructed under this alternative compared to the action alternatives. The trend toward large-sized fires of moderate to high severity in sagebrush, and large stand-replacing fires in pinyon-juniper, would likely increase. The BLM would do little to reduce the FRCC, and it is also less likely that the BLM would meet FMU objectives under the Fire Management Plan under this alternative than under the action alternatives on the 3 Bars Project area. Given the large number of utilities and infrastructure, mineral, oil, gas, geothermal, and other land developments that are reasonably foreseeable in the CESA, the need for an aggressive wildland fire prevention and control program to protect natural resources and public health and infrastructure could increase from current levels.

3.13.3.5 Unavoidable Adverse Effects

There is a risk, albeit small, of treatments causing a wildland fire. Although the BLM would implement SOPs to reduce this risk to near nil, it cannot be totally ignored. These risks include the potential for vehicles and manual and mechanical equipment to accidentally ignite a wildland fire. A prescribed fire or fire for resource benefit could expand beyond treatment boundaries and become a wildland fire that could adversely impact natural and social resources. Treatments would result in the production of downed trees and other woody material that could become hazardous fuels. Workers and their vehicles could transport noxious weeds and other invasive non-native vegetation outside the

treatment area, and this vegetation could become a hazardous fuel. Noxious weeds and other invasive non-native vegetation could also establish and spread in areas treated using prescribed fire and fire for resource benefit.

3.13.3.6 Relationship between the Local Short-term Uses and Maintenance and Enhancement of Long-term Productivity

As discussed throughout this EIS, all restoration treatments would likely result in short-term uses and adverse effects, but if treatments are even modestly successful, they would benefit land productivity long term; wildland fire management treatments are no exception. Short-term uses have been discussed in other sections of this EIS, including the potential loss of vegetation, loss of use of woodland products, loss of fish and wildlife habitat, increase in noxious weeds and other invasive non-native vegetation, loss of rangeland for livestock and wild horse use, and loss of public use of lands for recreation, as a result of treatments to restore vegetation and other resources, reduce hazardous fuels, and reduce the risk of wildfire. Long term, treatments to reduce the risk of wildfire should enhance the resilience and health of the landscape and land productivity, and reduce the risk of future wildfire and resultant loss of natural and social resources. As discussed above, short-term uses and enhancement of long-term productivity would generally be in proportion to acres treated and methods used by the BLM.

3.13.3.7 Irreversible and Irretrievable Commitment of Resources

Fire management actions could result in an irretrievable loss of resources if they are lost for a period of time and cannot be replaced without reclamation. For example, prescribed fire could be used to treat unhealthy pinyon-juniper. If the burn is severe enough, native vegetation could be lost and replaced by cheatgrass. However, the site could be reclaimed with seedings and plantings of native vegetation. The fact that the BLM is proposing to restore a degraded landscape in the 3 Bars Project area suggests that the landscape is resilient, and that natural and man-made causes that have led to resource losses that can be corrected and retrieved over time.

Prescribed fire and wildland fire for resource benefits, and possibly manual and mechanical methods, used for hazardous fuels reduction and to reduce wildland fire risk could result in the loss of old-growth pinyon-juniper stands that could be considered by some to be irreversible, because it would take several hundred years before old growth stands would again occur on the site.

3.13.3.8 Significance of the Effects under the Alternatives

Treatment actions under all of the alternatives would not lead to a significant increase in wildland fire risk on the 3 Bars Project area and CESA. Treatments would help maintain or reduce the FRCC in treatment areas, reduce the risk of loss of life or property from wildland fire, and reduce the risk of a catastrophic fire. However, the alternatives would differ substantially in the magnitude of improvements, and whether restoration actions taken under an alternative would be effective in lowering overall wildland fire risks within the 3 Bars ecosystem.

Substantially more acres within the CESA would be treated under Alternative A than the other alternatives, and over the next 10 to 15 years about 17 percent of the acreage on the 3 Bars Project area would be treated under this alternative. Thus, the potential for meaningful improvement in the landscape is greatest under this alternative. Under Alternative A, the potential for loss of life or property from wildland fire on the 3 Bars Project area would probably remain little changed from current conditions over the short term, but should decrease long term as fire return intervals in pinyon-juniper stands return to more natural cycles, hazardous fuels levels decrease, fire and fuel breaks are installed, and the landscape becomes more fire resilient. Although the change in overall FRCC would be slow,

long term it is likely that there would be a general shift in acreage from a higher FRCC to a lower one. It is also assumed that the risks of a catastrophic wildfire would decrease as resource conditions improve within the CESA due to fire management and other treatments under Alternative A.

Under Alternative B, the BLM would be limited to the use of manual, mechanical, and biological control methods and would treat about half as many acres (about 7,800 acres annually) within the CESA compared to Alternative A. Under this alternative, the potential for loss of life or property from wildland fire on the 3 Bars Project area would probably remain little changed from current conditions. The BLM would not be able to use prescribed fire and fire for resource benefits or herbicides to reduce hazardous fuels, but would be able to compartmentalize and slow the spread of wildland fire using manual and mechanical treatments to create fire and fuel breaks. Because fire would not be available to the BLM to help to restore nature fire cycles on the 3 Bars ecosystem, the ability of the BLM to improve ecosystem health and resiliency and reduce hazardous fuels would be limited.

Under Alternative C, the BLM would be limited to use of manual and classical biological control methods and would treat only one-fourth the acreage treated under Alternative A. Treatments would primarily focus on riparian and aspen restoration, removal of pinyon-juniper in Phase I and II woodlands, and sagebrush habitat manipulation. Little hazardous fuels reduction or noxious weed and other invasive non-native vegetation control would occur, and fire and fuel break treatments would be limited to areas adjacent to roads and streams. The BLM would have limited ability to reduce the risk of a catastrophic fire and to control its spread, and risks of loss of life or property from wildfire within the CESA would likely increase long term. Prescribed fire and fire for resource benefits would not be available to the BLM to help to restore nature fire cycles over portions of the 3 Bars ecosystem, and mechanical treatments would not be available for use to control or eliminate noxious weeds and other invasive non-native vegetation, create fire and fuel breaks, thin and remove pinyon-juniper that is encroaching into sagebrush habitat or is unhealthy, and to reseed disturbed areas. Thus, the ability of the BLM to improve ecosystem health and resiliency and reduce hazardous fuels would be more limited under Alternative C than the other action alternatives.

3.13.4 Mitigation

No mitigation measures are proposed for wildland fire risk.

3.14 Fish and Other Aquatic Resources

3.14.1 Regulatory Framework

Several laws protect fish and other aquatic resources and their habitats. The Sikes Act of 1974 authorizes the USDOI to plan, develop, maintain, and coordinate programs with state agencies for the conservation and rehabilitation of wildlife, fish, and game on public lands. The Fish and Wildlife Conservation Act of 1980 encourages federal agencies to conserve and promote the conservation of non-game fish and wildlife species and their habitats.

3.14.1.1 Endangered Species Act

In accordance with Section 7 of the Endangered Species Act, federal agencies must “insure that any action authorized, funded, or carried out by such agency is not likely to jeopardize the continued existence of any listed species or result in the destruction or adverse modification of critical habitat of such species.” The purpose of the Act is to provide a means for conserving the ecosystems upon which threatened and endangered species depend, and to provide a program for protecting these species. The Act defines an endangered species as a species that is in danger of