Baker Habitat Restoration and Fuel Reduction Project

Environmental Assessment No. DOI-BLM-OR-V050-2013-014

Baker Resource Area
3285 11th Street
Baker City, OR 978140

June, 2013

BLM
Vale District

NATIONAL SYSTEM OF PUBLIC LANDS

As the Nation's principal conservation agency, the Department of the Interior has responsibility for most of our nationally owned public lands and natural resources. This includes fostering the wisest use of our land and water resources, protecting our fish and wildlife, preserving the environmental and cultural values of our national parks and historical places, and providing for the enjoyment of life through outdoor recreation. The Department assesses our energy and mineral resources and works to assure that their development is in the best interest of all our people. The Department also has a major responsibility for American Indian reservation communities and for people who live in Island Territories under U.S. administration.

TABLE OF CONTENTS

1 Introduction

1.1 Title

Baker Habitat Restoration Project
Environmental Assessment (EA) No: DOI-BLM-OR-V050-2013-015

1.2 Background

The Vale District Bureau of Land Management (BLM) proposes to implement a multi-year, phased fuels management and habitat restoration project in the Baker Resource Area. The Baker Habitat Restoration Project Area (Map 1) encompasses approximately 45,000 acres of BLM lands and 1700 acres of Oregon Department of Fish and Wildlife lands. It is composed of six discrete units (Auburn, Hereford, Pine Creek, Burnt River Canyon, Shirttail, and Durkee)(Map 2) that are situated approximately 7 to 25 air miles southwest to southeast of Baker City, Oregon. The Auburn Unit (Map 3) is accessed by the Old Auburn Road. The Hereford Unit (Map 4) is accessed by the Water Gulch Road and other private and BLM roads. The Pine Creek Unit (Map 5) is accessed by the Pine Creek Road. The Burnt River Canyon Unit (Map 6) can be accessed by the Burnt River Canyon Road and numerous BLM and Forest Service Roads. The Durkee Unit (Map 7) can be accessed by the Iron Mountain Road, Hindman Road, and other BLM Roads. The Shirttail Unit (Map 8) is accessed by the Shirttail Creek Road, Plano Road, Sisley Creek Road, and other BLM roads.

Land use in the vicinity of the Project Area dramatically shifted in the early1860's with discoveries of gold in the Burnt River Canyon and Auburn areas by miners passing through the area en route to mining districts in Nevada. With the discovery of gold, placer mining operations sprung up along most of the drainages and slopes in the Project Area and mining camps were built at various locations including Auburn and the mouth of Clark's Creek. In many cases, riparian vegetation was stripped away or markedly reduced in drainages and wet meadows by hydraulic placer mining or dredging operations. Heavy livestock grazing that occurred in the region in the late 19th and early 20th centuries removed fine fuels from rangeland communities, thereby reducing fire frequency, intensity, and area burned. Fire suppression also contributed toward exclusion of fire as tactics and technologies advanced over time. Exclusion of fire in conjunction with favorable climate facilitated the expansion of western juniper and other conifers into rangeland and riparian ecological communities throughout eastern Oregon. Increasing the distribution and density of western juniper within these plant communities can severely alter historic biodiversity, hydrologic cycles, wildlife habitat, and nutrient cycling (Bates *et. al.*, 1999).

The lack of frequent, low intensity fire, in concert with other factors, has allowed western juniper to encroach into the shrublands and grasslands where juniper was much less abundant historically. (Miller, *et. al.*, 2007), identified three transitional phases of western juniper development which include:

Phase I – trees are present but shrubs and herbs are the dominant vegetation that influence ecological processes (hydrologic, nutrient and energy cycles) on the site.

Phase II – trees are co-dominant with shrubs and herbs and all three vegetation layers influence ecological processes on the site.

Phase III – trees are the dominant vegetation and the primary plant layer influencing ecological processes on the site.

This encroachment process eventually leads to the loss of shrubs and grasses from under the developing juniper stand. This loss of shrubs and grasses negatively affects a wide variety of wildlife species and overall biological diversity, and is especially detrimental to deer, elk, bighorn sheep and other species which consume grasses and shrubs (Miller *et. al.,* 1995, Bunting *et. al.*, 1987, Miller *et. al.,* 2005). Much of the proposed Project Area is in the stage of juniper encroachment that if juniper were removed, the shrubs and grasses could re-establish healthy grasslands and shrublands without the need to re-seed or plant. However, if the juniper encroachment process is allowed to continue unchecked, it could become much more difficult and costly to re-establish healthy shrubland and grassland plant communities once juniper begins to dominate these sites.

Additionally, the reduction of periodic fire from the landscape along with fire suppression activity has affected dry upland forest stands composed of ponderosa pine and Douglas fir. Prior to 1890, the fire return interval in lower elevation fire-adapted forests common to the southern Blue Mountains varied between five and twenty-three years (Agee 1994). The low intensity/high frequency disturbance regime favored development of fire-resistant trees such as large ponderosa pine and, to a lesser extent, larger Douglas-fir. It also favored development of open stands with scant ladder fuels. Exclusion of wildland fire has resulted in overstocked stand conditions, high levels of forest litter, fuel accumulations, increased ladder fuels, and increased proportions of fire-intolerant trees such as Douglas-fir and grand fir (Hann *et. al.,* 1997). Unmanaged and overcrowded forested stands in the northwest are susceptible to infestations of insects and disease outbreaks that can diminish stand vigor (Agee 1993). There is an increasing realization that the forests and woodlands of the Blue Mountains evolved with fire and that historical conditions were often more resilient and sustainable than current conditions.

1.3 Name and Location of Preparing Office

Bureau of Land Management
Vale District
Baker Field Office

1.4 Purpose and Need

The purpose of the project would be to move 43,600 acres (Map1) of sagebrush-steppe, 3,700 acres of mixed conifer forests, and 200 acres of riparian communities toward desired conditions (further detailed under the objectives section) while reducing hazardous fuels present in the area. Acreage includes 1700 acres of Oregon Department of Fish and Wildlife land that is being analyzed and would be treated under the proposed action. The Project Area includes the communities of Auburn, Hereford, and Durkee, Oregon which were identified in the Baker County Community Wildfire Protection Plan (CWPP) (2004) as communities at risk. The plan included recommendations for treatments to reduce hazardous fuels. In addition, Bridgeport, Oregon is a community of interest in the Baker County CWPP.

The Project Area is adjacent to and intermixed with private lands. Some of the adjacent private landowners are treating both juniper and dry mixed conifer communities on their lands, through agreements and grants with the USDA Natural Resource Conservation Service, Oregon Watershed Enhancement Board, Oregon Department of Forestry and Oregon Department of Fish and Wildlife. A collaborative strategy would be sought, including a landscape management approach which addresses watershed enhancement, habitat restoration and rehabilitation, and hazardous fuel reduction for treatments within this Project Area.

The need for action is due to juniper expansion into much of the open sagebrush, riparian and forest habitat in the Project Area to the extent that it is negatively affecting desired resource conditions and values.

Specifically:

1. There is a need to improve the vigor and resiliency of fire-dependent ecological communities to wildfire, insects, disease, and other disturbances. Epidemic levels of insect infestations and large wildfires can cause widespread vegetation mortality that has a profound effect on forest health and can also adversely affect visual quality, wildlife habitat, stream sedimentation, and timber values.

2. There is a need to reduce the horizontal and vertical fuel continuity and loading of forests and woodlands to reduce the chances of a ground fire becoming a crown fire, and a small fire becoming a stand-replacement wildfire. This would not only help protect life, property, and resource values on private and public lands, but would also provide for fire fighter safety.

3. There is need to remove encroaching juniper to restore sagebrush, mountain shrub, grass and forest communities, while maintaining old growth juniper (Figures 1,2,3, and 4).

4. There is a need to reduce predator perches within critical wildlife habitat throughout the Project Area. Specifically, there are sage-grouse leks (breeding area) within the Project Area that are being encroached on by juniper, fir, and pine.

5. There is a need to improve the quality and productivity of browse and forage species available to wildlife in the Project Area. Bunchgrasses, shrubs and forbs, important forage for elk, mule deer, bighorn sheep, domestic livestock and avian species, are reduced in plant communities undergoing conversion to juniper woodlands and in closed canopy mixed conifer forest stands (Miller *et. al.*, 2005). Additionally, key wildlife vegetative browse species such as bitterbrush and mountain mahogany are known to decline under the influence of juniper and conifer encroachment (Miller *et. al.*, 2000, Miller *et. al.*, 2005).

Figure 1. Rye Valley. 1890.

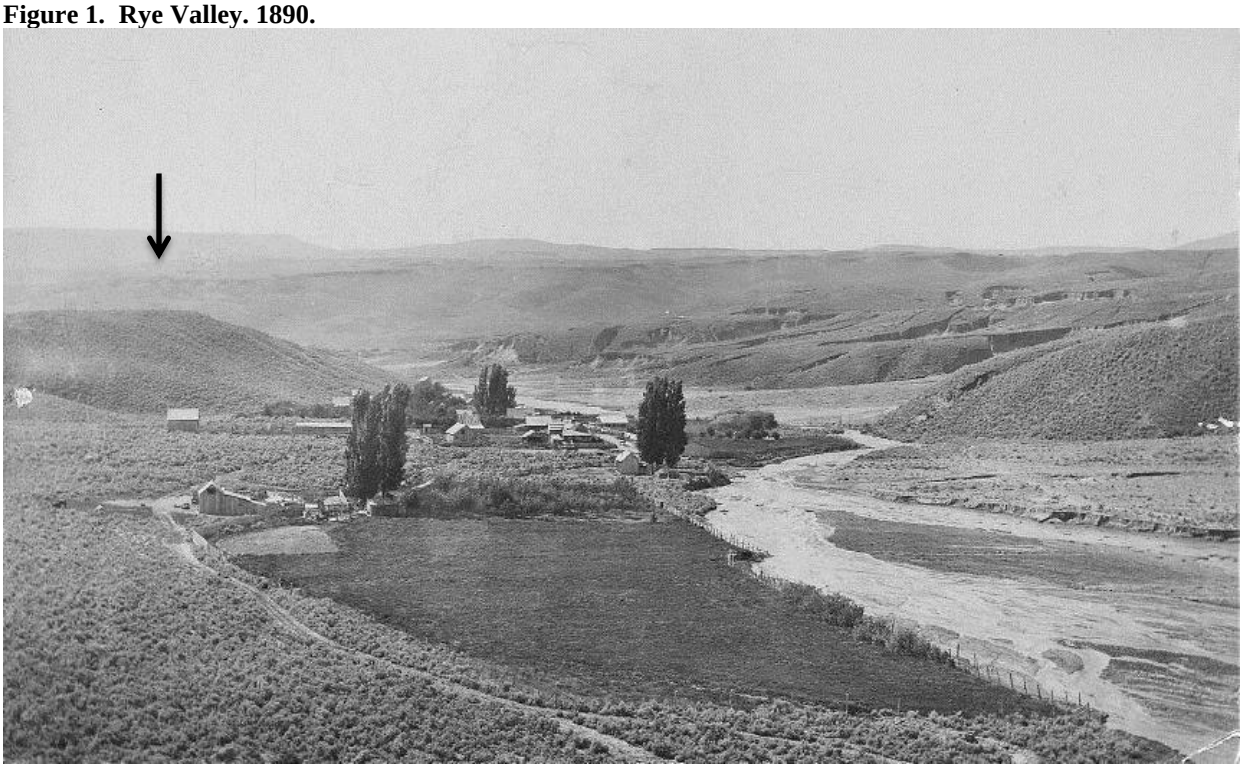


Figure 2. Juniper expansion in the Project Area, Rye Valley, 2010.

Figure 3. Sheep Mountain looking north into Project Area 1973

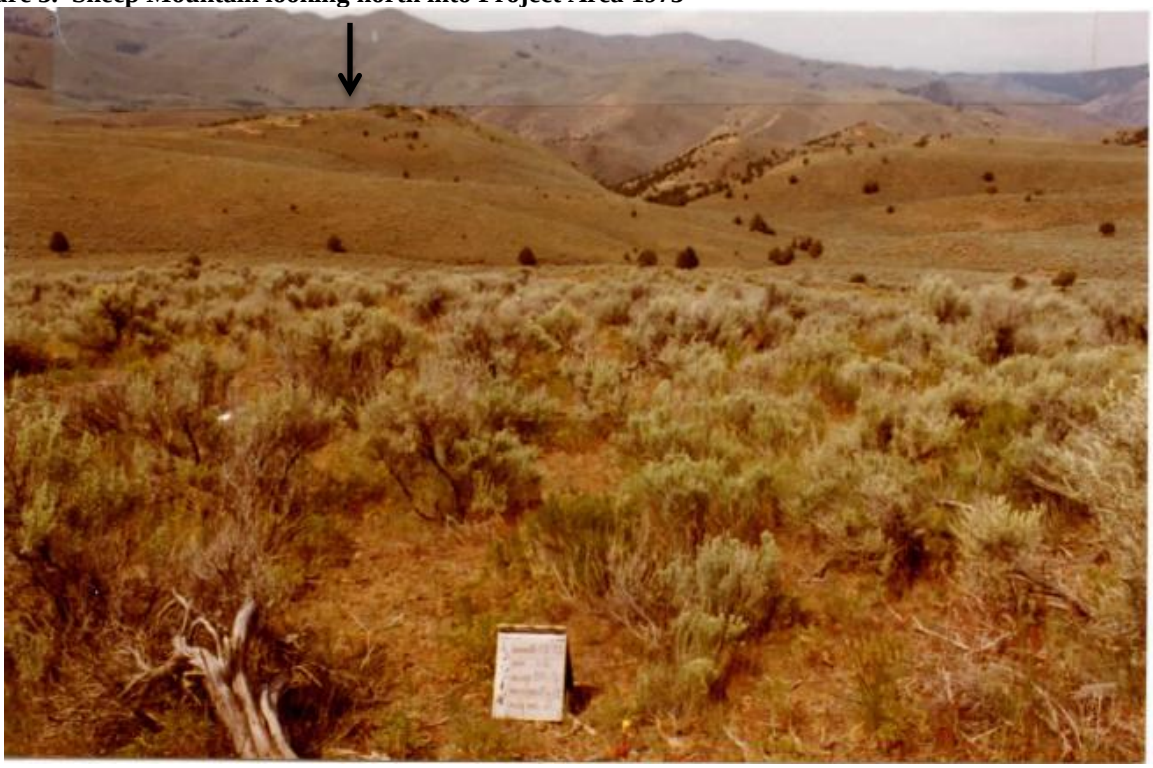
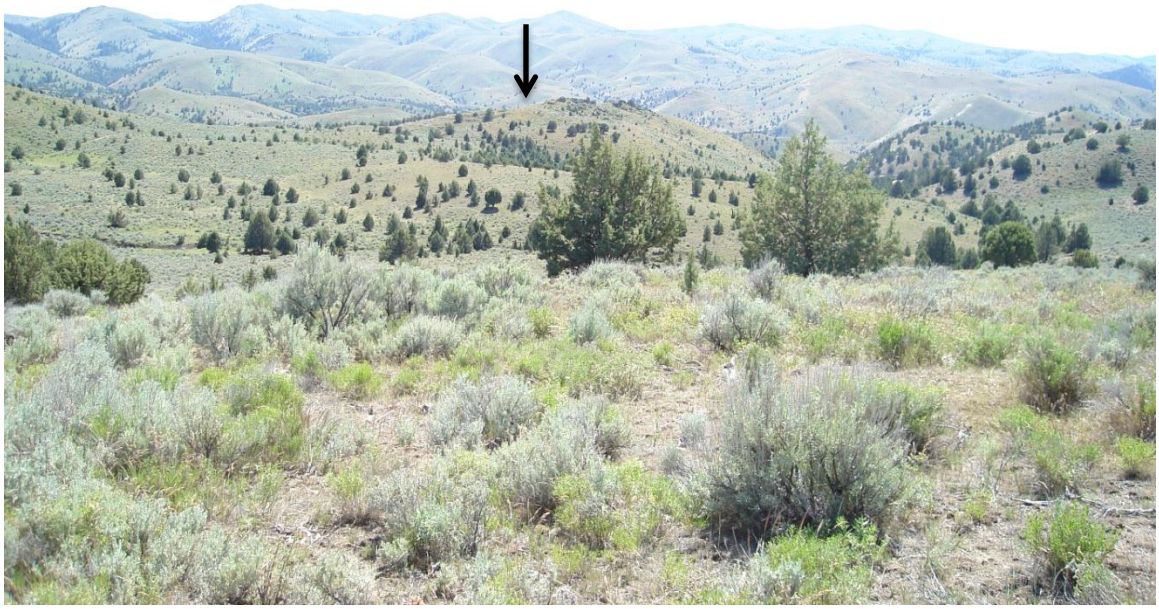


Figure 4. Sheep Mountain looking North into Project Area 2009



1.5 Scoping and Public Involvement

Comments were solicited from individuals and groups during the scoping period. The project area includes five individual projects that were originally identified by the Oregon Department of Fish and Wildlife as critical sage grouse and big game winter range habitat needing improvement and were sent to the public for input in 2008 as individual projects. These individual projects have been incorporated into this project and are being analyzed in this NEPA document. An additional scoping letter for the consolidated project was mailed to the public and interested cooperators in the spring of 2010. Comments and issues raised during the scoping process were used during the final project development and/or incorporated into the project by means of adding mitigation measures and project design features and/or modifying the proposal where feasible.

1.6 Issues Considered but not Analyzed in Detail

1. An alternative that would use only prescribed fire to accomplish fuels management and conifer reduction needs identified in the Project Area was considered but not developed for further analysis because it would not meet the purpose and need. Specifically, some of the forested stands in the Project Area have high tree densities and without pre-treatment the risk of the prescribed fire escaping and becoming a stand replacement fire is substantially increased. Furthermore, only using prescribed fire to treat juniper encroachment within sagebrush-steppe and riparian communities would not allow for sufficient retention of shrubs that are important sources of wildlife browse, cover and connectivity.

2. An alternative removing fewer trees was considered, but eliminated from detailed analysis. Expansion of juniper and other conifers is common across the Project Area and surrounding landscape. Juniper density would be reduced under this alternative, but tree distribution across the Project Area would not be altered. The remaining juniper would still provide numerous, well-distributed predator perches and facilitate a rapid progression back towards a dominant woodland-type habitat. This Alternative would not restore the openness of the sagebrush steppe and would provide limited beneficial impacts to the sagebrush community and specifically greater sage-grouse habitat; and therefore, this alternative would not meet the purpose and need of the project.

3. Removal of domestic livestock grazing was considered, but also eliminated from detailed analysis. Prior to the Taylor Grazing Act of 1936 and improved livestock management, unregulated grazing removed the fine fuels necessary to carry fire across rangelands and kill encroaching juniper. In the absence of fire, juniper was able to rapidly spread into previously open grassland and shrubland areas and dominate the habitat across much of southeastern Oregon. Current grazing management does not appear to be a required mechanism to promote juniper expansion on arid western rangelands (Soule' and Knapp, 1999). Burkhardt and Tisdale (1976) found little relationship between range condition of big sagebrush-grass stands and the rate of juniper invasion. Expansion of juniper into big sagebrush communities appears to be directly related to the cessation of periodic fires (Burkhardt and Tisdale, 1976), and is not directly influenced by livestock grazing. Although juniper expansion has occurred, current grazing practices have not been identified as a causal factor and the cessation of such activities

would not reduce encroached juniper, therefore, this alternative would not meet the purpose and need of the project. The need for livestock grazing adjustments would continue to be considered during periodic evaluation of grazing permits and Standards of Rangeland Health and Guidelines for Livestock Grazing Management and is beyond the scope of this project.

4. It was suggested that domestic sheep grazing adjacent to the treatment area be addressed in this EA. This issue is unrelated to the proposed habitat restoration activities and is beyond the scope of this project and would be addressed during periodic evaluation of grazing authorizations and evaluation of Standards of Rangeland Health and Guidelines for Livestock Grazing Management.

5. Commercial harvest of timber stands was considered but also eliminated from detailed analysis because it is economically infeasible. Specifically, within the Project Area there is approximately 3,700 acres of timber stands on public lands. Of these lands, only 200 acres are commercially viable due to accessibility, proximity, steepness, and limited commercial volume. Based on these restrictions the economic viability of commercial harvest within the Project Area is extremely limited therefore commercial harvest was eliminated from further analysis.

1.7 Topics Not Addressed in this EA

Resources and issues potentially affected by the Proposed Action and the alternatives have been reviewed. Resources/issues that may be affected have been addressed in Chapter 3. The following elements and issues are either not present or would not be affected by the proposed action or alternatives:

- Native American Religious Concerns – not affected
- Wild and Scenic Rivers - not present
- Hazardous Wastes – not affected
- Prime or Unique Farmlands – not present
- Environmental Justice – not affected
- Federal or state species listed as threatened or endangered – not present
- Wilderness, Wilderness Study Areas and lands with Wilderness Characteristics – not present
- Areas of Critical Environmental Concern – not present
- Wild Horses – not present
- Caves and Karsts – not present

1.8 Conformance

The Baker Habitat Restoration and Fuels Management Environmental Assessment (EA) is tiered to the Baker Resource Management Plan (RMP) and Record of Decision (ROD), which was approved July, 12 1989. This proposal has been reviewed to determine if it conforms with the Baker RMP/ROD, terms and conditions as required by 43 CFR 1610.5. This proposal has been found consistent with all applicable terms, conditions, standards, and guidelines specified in the Baker RMP/ROD.

This EA considers the environmental consequences of the proposed action, an alternative action and No Action Alternative in order to provide sufficient evidence for determining whether the anticipated impacts would require the preparation of an Environmental Impact Statement (EIS).

Project Objectives and Decision Factors

The Baker RMP/ROD provides management direction for each resource value over the Baker Resource Area as a whole, and then in a site specific way for each resource by geographic unit. The purpose and need for action is consistent with Baker RMP/ROD management direction for Livestock Grazing Management, Riparian Area Management, Forest Management, Wildlife and Fisheries Habitat Management, Soil, Water, and Air Management and Fire Management. It is also in conformance with the vegetation and habitat resource condition objectives provided for the Burnt River, Pritchard Creek, Baker County and Pedro Mountain Geographic Units. Management direction provided in the RMP/ROD that supports fuels management and ecological restoration activities in the Project Area are outlined in this section. Specific project objectives that address RMP/ROD management direction by moving toward a desired condition as follows:

- Riparian Area Management Direction (RMP, p. 16): Management actions within riparian areas would include measures to protect or restore natural function.

Objectives

- Reduce live conifer density within stands of riparian hardwoods by 90 percent.
- Increase the density of aspen suckers in those habitat types by 50 percent.
- Maintain or enhance in-channel watershed function, connection to riparian habitat, flow and hydrology.
- Maintain or restore riparian habitat and ecological function.

- Wildlife and Fisheries Habitat Management Direction (RMP, p. 18): Habitat Management Plans (HMP) will be developed for economically important wildlife species including mule deer, antelope, bighorn sheep, and sage grouse. Primary emphasis of the HMP will be to ensure availability of palatable shrubs and thermal cover for deer on crucial winter ranges in Baker County.

Objectives

- Reduce conifer (especially western juniper) encroachment into key wildlife habitat dominated by mountain mahogany, aspen, bitterbrush or sagebrush by 90 percent while maintaining or enhancing sagebrush and mountain shrub habitat values.
- Increase forage available to big game and other wildlife on public and state owned lands in the Project Area while retaining adequate cover.

- Soil, Water and Air Management (RMP, p. 32): Soils will be managed to maintain productivity and minimize erosion. Those watersheds or portions of watersheds, where potential for either significant improvement or further degradation exists will be intensively managed to improve soil, water, and air resources.

Objectives

- Move mountain big sagebrush / bunchgrass plant communities and hydrological conditions within the Project Area toward pre-settlement conditions by reducing live western juniper density in these communities by a mean total of 70 percent.
- Move Wyoming big sagebrush / bunchgrass plant communities and hydrological conditions within the Project Area toward pre-settlement conditions by reducing live western juniper density in the communities by a mean total of 70 percent.

➢ Forest Management (RMP, p. 35): Precommercial thinning and other cultural practices, will be performed, as funding permits, to maintain the allowable cut and to benefit other resources, particularly wildlife and watershed values.

Objectives

- Increase spacing in regenerating conifer stands to 12-16ft (would depend on site condition).
- Increase spacing in intermediate/mature conifer stands to 16-20ft (would depend on site condition and density of commercial sized trees).
- Reduce encroaching juniper in aspen, Curlleaf mountain mahogany, and conifer dominated stands by 80- 95 percent.
- Reduce encroaching conifer in aspen and Curlleaf mountain mahogany dominated stands by 70-90 percent.

➢ Fire Management (RMP, p. 40): Prescribed fire, planned or unplanned ignitions, will be used to meet other resource objectives, for example: manipulate plant succession, increase habitat diversity, promote nutrient cycling, reduce fuel loads, control insect and disease infestation, control unwanted vegetation, and to reintroduce fire into a natural role.

Objectives

- Reduce canopy closure in warm-dry forest and woodland stands to a mean total of 30 percent across the landscape.
- Reduce surface fuels in warm-dry forested stands from seven tons per acre to approximately three tons per acre.
- Reduce canopy closure in cool-dry forest stands to a mean total of 50 percent across the landscape.
- Reduce surface fuels in cool-dry forested stands from seven tons per acre to approximately three tons per acre.
- Reduce basal area of cool-dry forest stands so that treated stands are within a range of 60-80 square feet.
- Reduce the woody fuel loading within western juniper encroached mountain big sagebrush communities in the Project Area. Reduce one hour and ten hour time lag fuels by a mean total of 90 percent and 100 hour fuels by a mean total of 75 percent.

These additional decision factors would be relied upon by the Deciding Official in selecting between the No Action Alternative and the action alternatives.

1. The degree to which the alternative responds to direction provided in the Baker RMP/ROD, the National Fire Plan, and the 10 year Comprehensive Strategy.
2. The degree to which the alternatives achieve project objectives in a cost–effective and safe manner.

2 Proposed Action and Alternatives

Project Design Elements: The following project design elements would apply to both action alternatives:

- Protect cultural resource values throughout the life of the project. Archaeological sites would be avoided within the mechanical treatment units and activity generated fuels would not be piled within the boundaries of sites. Sites with combustible constituents would be protected during the deployment of prescribed fire by black-lining resources and use of appropriate ignition techniques. The District Fire Archaeologist would review burn plans prior to project implementation. Project implementation would cease if new cultural resources are encountered within treatment areas and District cultural resource staff would be notified. Prior to resuming work, historic property documentation and evaluation would be completed. Mitigation plans would be developed in consultation with the State Historic Preservation Office (SHPO) if necessary.

- Protect special status vegetation species throughout the life of the project. As needed, a no treatment buffer of up to 200-feet may be placed around special status plant sites to avoid impacts from herbicides and surface disturbing activities (e.g., skid trails, non-commercial thinning, pile burning, biomass removal, etc.) A botanist would be involved with final lay out of the units prior to implementation to assure that disturbance to documented special status plant sites is avoided.

- Protect special status wildlife species (terrestrial and avian) habitat throughout the life of the project. Structures or areas with special status species habitat value identified during wildlife surveys would be protected during project implementation. The Baker Resource Area wildlife biologist would review burn plans prior to project implementation.

- Avoid the use of broadcast burning (A prescribed fire in areas with little or no forest stand present. Generally, broadcast burning is used in grasslands, shrublands, and juniper woodlands for restoration and fuels reduction purposes) in areas dominated by nonnative annual grasses.

- Assess the need for treatment of individual aspen stands and if needed the type of treatments to apply using Aspen Management Decision Flowchart for the Blue Mountains, from *Aspen Biology, Community Classification, and Management in the Blue Mountains* (USFS PNW-GTR-806, May 2010).

- Avoid placing skid trails, slash accumulations, or burn piles in low sagebrush plant communities.

- Sites that lack sufficient understory species, such as fully developed juniper woodlands (Phase III), or areas that have burned at a high severity may require seeding following a prescribed fire treatment to attain the desired post-fire response. Mixtures of native grass, forb, and shrub seed may be applied to designated areas with aerial or ground-based methods. Candidate sites for seeding would be determined on a case-by-case basis as monitoring data is gathered.

- Pastures that have been treated with a jackpot burning would be rested for a period of at least two growing seasons to allow for recovery of understory species. Additional rest may be prescribed if needed to meet resource objectives.

- In forested stands no downed logs greater than 12 inches diameter and no snags greater than 15 inches diameter at breast height (dbh) would be intentionally burned in any unit.

- Cutting and burning of juniper with old growth characteristics or obvious wildlife occupation (cavities or nests) would be avoided. Old-growth juniper would be determined using structural characteristics of the tree. Specific characteristics include: broad, non-symmetrical tops, deeply furrowed bark, twisted trunks or branches, dead branches and spike tops, large lower limbs, trunks containing narrow strips of cambium, hollow trunks, large trunk diameters relative to tree height, and branches covered with bright yellow green lichen (Miller 1999).

- Invasive juniper would be treated aggressively within a three mile buffer around greater sage-grouse leks. Treatment methods should be limited to cutting, piling and or jackpot burning within the lek buffer areas. Mechanical treatments within the buffered areas should not take place between March 1 and May 30th. All created fuels would be lopped to a level below four feet. Prescribed fire activities should not take place between April 1 and June 30. Each lek can be evaluated on a case by case basis by an ODFW biologist for entry during these times.

- Prior to treatment of a unit noxious weed populations in the area would be inventoried. Weed populations identified in or adjacent to the Project Area would be treated in accordance with the Vale District Standard Operating Procedures (SOPs) for noxious weed treatment.

- Following all treatments, the areas would be monitored for noxious weed invasions (See Appendix 1, Project Monitoring Plan). Weed populations that are identified in the Project Area would be treated in accordance with the Vale District Standard Operating Procedures for noxious weed treatment. All pertinent Standard Operating Procedures and Mitigating Measures from the Vegetation Treatments Using Herbicides on BLM Lands in Oregon ROD (Oct 2010) would be observed during implementation (Appendix 2. pp. 457-467).

- All vehicles and equipment used during implementation would be cleaned before and after treatments to guard against spreading noxious weeds.

- Prescribed burning would follow the Oregon State Smoke Management Plan in order to protect air quality and reduce health and visibility impacts on designated areas.

- All burns would be planned based on either instructions given by, or in consultation with the Oregon Department of Forestry (ODF) and the State Implementation Plan (Smoke Implementation Plan) for prescribed fires. Coordination with other prescribed fire projects occurring at the same time may be required.

- All constructed fire line would be dug by hand to a width of no more than two feet wide and down to mineral soil. Fire line would be water barred and have removed material placed back in the line if on slopes steeper than 40 percent or visible in areas of VRM II (Visual Resource Management).

- Prior to burning around any large diameter trees (e.g., greater than 24 inches) all large diameter debris and duff within 4-10 feet of the bole would be pulled away.

- Skid trails and landings would be approved by an employee of the Bureau of Land Management prior to biomass removal and utilization.

- Skid trails and landings would be water barred and re-seeded with native species.

- Within 50' from the bole of all large diameter (e.g., greater than 24 inches) ponderosa pine/Douglas fir/Western larch all non-commercial trees would be removed, a minimum spacing in this area is not required. Exceptions would be in Curlleaf mountain mahogany and aspen stands where larger trees may be girdled or felled for downed woody debris.

- Berms, large boulders, and other kinds of barriers would be placed at strategic locations as needed after biomass processing to prevent off-highway vehicles from driving in the treated area and causing erosion.

- To avoid IPS bark beetle infestations non-commercial thinning would occur from July 1 to early December 1 (ponderosa pine dominated stands only).

- In areas of VRM II (Visual Resource Management) all stumps would be flush cut and covered lightly with soil to reduce visibility within 150 feet of high use roads. Then from 150 feet out to 250 feet, cut trees at angles so that stump cut is not visible from high use roads.

- Only hand-thinning treatments, hand piling, and pile burning (A prescribed fire that burns material piled either by hand or mechanical resulting from fuel management activities – are burned during the wetter months to reduce damage to residual stand and to confine fire to the size of the pile. Piling allows for the material to cure, producing less smoke and rapid consumption when burned.) would be allowed within default or modified RMA widths. With the exception of chainsaws, no mechanized treatments would occur within default or modified RMA widths.

- Within default or modified RMA widths, timber would be directionally felled and retrieved by lifting, left downed in place, or strategically placed where suggested by ID team specialists.

- Biomass haul in all units would be restricted to dry or frozen ground conditions to prevent potential increases in sediment delivery to stream channels or wetlands.

- Ground-based skidding systems would not be used on slopes greater than 35percent.

- Skidding material down or across stream channels or draws that collect and convey water shall not occur. Ground disturbing activities would be limited to 10 percent exposed soil or less within riparian ecosystems.

- Utilize existing stream crossings (i.e., fords) where possible. New crossings would need to be approved by the fisheries biologist or other aquatic resource ID team specialist(s).

- Minimize the number of stream crossings and cross streams at right angles to the main channel.

- To minimize detrimental soil conditions total acreage impacted (compaction, puddling, displacement, and severe burning) would not exceed 12 percent of the total acreage within the biomass treatment area including landings and system roads.

- Utilize old landings and skid trails to the extent possible, or try to locate landings on previously disturbed sites such as roads, road shoulders, and borrow pits. Landings would be located on level ground and would not require excavation.

- New landings, designated skid trails, staging, and decking would not occur in RMAs, unless there are no reasonable alternatives, in which case they should be constructed outside the active floodplain.

- Prohibit storage and mixing of fuels and other chemicals, including refueling, within RMAs unless there are no other practicable alternatives. Refueling sites and storage areas within or adjacent to an RMA must have an approved refueling and spill containment plan.

- When under-burning ignition would occur outside of RMAs. Fire would be allowed to back into the RMAs.

- When creating burn piles within RMAs, locate the piles a minimum of 25 feet from the top of the streambank or steep slope break adjacent to the stream channel or wetland.

2.1 Alternative 1 - No Action

Under this alternative, there would be no large scale application of prescribed fire, juniper cutting or thinning of forestlands. Conversion of rangelands to juniper woodlands and the continuation of overstocked forestlands within the Project Area would continue over time. Management under the No Action Alternative would proceed under the current Baker RMP and all other relevant policy direction.

2.2 Alternative #2 - Proposed Action

The proposed action is to treat juniper/conifer encroachment on approximately 43,600 acres and to non-commercially thin select timber stands on 3,700 acres (Map 9). Biomass removal and utilization of cut materials could occur on approximately 2,500 acres (Map 10). These acres are comprised of both BLM and ODFW lands. Some treatment areas may need maintenance and possible re-entry within 7-10 years of the initial treatment. An example would be partial cutting within a Phase III juniper stand to reduce runoff and increase re-establishment of native grasses and shrubs; once native vegetation is partially re-established the stand may be re-entered and thinned again.

Vegetation Treatments

The proposal is to mechanically treat encroaching juniper, complete non-commercial thinning, and biomass removal and utilization of cut materials within the Project Area.

Once juniper is cut down, follow-up treatments include a combination of limbing boles, scattering branches, jackpot burning, or piling and burning to reduce the impact of post-settlement juniper expansion into open sagebrush, mountain shrub, aspen and riparian

communities in the Project Area. These proposed treatment areas are displayed on (Map 9). Maintenance of existing sagebrush, mountain shrub and herbaceous vegetation is a primary goal.

Follow-up treatments would be dependent on concentrations of downed wood after initial cutting. The amount of down wood is expected to be closely associated with the stage of woodland succession; however, this may vary depending on other factors, such as the level of public harvest of downed wood.

Once juniper is controlled at a site, it would be maintained at desired levels through periodic future treatments. Juniper established prior to Euro-American settlement (pre-settlement juniper), juniper with cavities or other signs of obvious wildlife use, small juniper hidden by sagebrush, and the juniper seed already on the ground would remain following treatment. Future treatments would be dependent on the rate of new recruitment from these sources, but would likely occur within twenty years of initial treatment. Subsequent treatments are expected to be less expensive and cause less ground disturbance if implemented in the early stages of juniper expansion.

Juniper growing in inaccessible or fire-sheltered areas (e.g., rocky cliffs) and some young replacement trees near pre-settlement trees would also be excluded from cutting. These exceptions would be identified on a site specific basis during field project layout. With these exceptions, it is anticipated that approximately 85-95 percent of juniper trees would be cut under the proposed action.

Non-commercial thinning (< 9 inches) would be completed and then a variety of other fuels treatments would be implemented (Map 9). These can include hand piling, machine piling, lop and scatter, biomass removal, and or prescribed fire. Once desired conditions are met they would be maintained by reentering into the stand area and retreating.

Total acres treated under each method were derived from GIS data, satellite imagery, and some field verification. However, not every acre can be accounted for across the landscape, and juniper distribution and density is highly variable within some areas of the Project Area. Minor modifications to treatment areas are likely, and would occur during layout.

Treatment Descriptions

Juniper Cut/Lop/Scatter: Juniper growing at low densities or consisting primarily of small trees (Phase I) would be mechanically cut and left in place where there would be negligible risks of fire spread associated with increasing hazardous fuels. Due to the crown width of some trees, cut juniper is often taller than standing juniper. In this case, branches of cut juniper could be removed and scattered to limit vertical height of cut trees to less than four feet. The intent is to eliminate competition between juniper and the sagebrush-bunchgrass communities, minimize the number of potential perches for avian predators, and accelerate the breakdown of cut juniper. This treatment area boundary incorporates acres that do not contain trees due to the low density and scattered nature of juniper expansion. However, this large area was delineated partly for ease of description and partly to account for small trees not identified during project development or field visits. This treatment would be the primary treatment method applied, covering approximately 36,000 acres.

Juniper Cut/Limb/Jackpot Burn: Juniper growing at moderate to high densities (Phase II) would be cut down, and branches protruding vertically above four feet in height would be limbed and stacked on top of the bole. This pile would be jackpot burned in one to three years after drying. Jackpot burning would be used where fuel loads are discontinuous or in isolated areas with higher fuel concentrations. Jackpot burning would consist of personnel with drip torches or other ignition sources walking through treatment areas and lighting concentrations of cut juniper. Burning by this method would reduce the fuels and minimize impacts relative to burning of larger machine-pile slash. Jackpot burning would only be conducted under conditions when the fire is unlikely to spread or impact desirable vegetation, such as when the ground is frozen or wet during late fall, winter, or spring. This treatment is conducive to maintaining the shrub and herbaceous component on the site. A mixture of native grasses, forbs, and shrub species may be seeded as needed following burning. This would be the second most used treatment and cover approximately 4,500 acres.

Juniper Cut/ Pile/Burn: Juniper growing at moderate to high densities (Phase II-III) would be cut, left in place, and later machine or hand piled prior to being burned. Areas with continuous fuel concentrations or areas potentially creating hazardous conditions for future fire suppression efforts (e.g. near roads), would be piled one to four years after cutting. Heavy equipment (e.g., grapple-equipped excavators) would pile the slash on slopes less than 40 percent and being. Machine piles are typically 12 feet tall by 16 to 22 feet wide. To limit soil disturbance and reduce potential risk of soil erosion, machine piling would occur when soil conditions are dry or the ground is frozen. Pile burning would only be conducted under conditions when the fire is unlikely to spread or impact desirable vegetation, such as when the ground is frozen or wet during late fall, winter, or spring. This would be the least utilized treatment in the Project Area, covering not more 3,400 acres.

Non-Commercial Thinning

Within the warm-dry forest treatment areas (e.g., ponderosa pine and Douglas fir dominated), ladder fuels would be reduced sufficiently enough to interrupt the initiation of a crown fire by reducing the density of understory trees so that they are spaced at an average of 22 feet. Additional objectives of this treatment include reducing the potential for crown fires by reducing canopy closure to a mean total of 30 percent; and raising canopy base height to a mean of 20 feet above ground surface.

The non-commercial thinning would target stands composed primarily of small diameter (<9 inch diameter) conifers to reduce stocking and fuel laddering on forested sites. Thinning would favor the retention of earlier seral, fire tolerant species, which could result in cutting a larger, later seral species in favor of retaining a smaller, early seral species (e.g., ponderosa pine/Douglas fir/Western Larch are the most desired species and juniper is the least desirable species). The thinning activity would break up fuel continuity by removing understory and overstory trees from some patches while retaining small stands of trees in other patches. Fuels generated by thinning activities would be treated by piling and burning, mechanical crushing or whole tree yarding (WTY). An underburn would be conducted within ten years of thinning treatment to further reduce ground fuels (e.g., litter, twigs, branches <3 inches) in the same stands.

If economically feasible, non-commercial material generated by thinning activities would be removed for biomass utilization[1]. Otherwise, the treatment would include a follow-up application of piling (hand or machine) and burning, and then underburning to reduce surface fuels. The objective for the prescribed fire phase of the treatment would be to reduce surface fuels by a mean total of more than 50 percent in treated units. Existing roads, natural barriers, and less than three miles of two foot wide fire line will be used as control measures in the underburn area. This treatment would cover approximately 3,700 acres.

Riparian/Aspen, Conifer / Juniper Removal

Within riparian stands all non-commercial sized conifer trees (< 9 inches dbh) and juniper (all trees not considered old growth) would be felled. Commercial sized conifers would be girdled or felled and left as woody debris; in some cases large (e.g., > 24 inches dbh) diameter conifers would be retained. None of the commercial sized trees would be sold as timber or biomass. Within riparian stands there would be no mechanical equipment operating off existing roads; therefore, biomass utilization would be restricted within these areas. If existing roads are located adjacent to these habitats it would be possible to reach with a grapple pile to remove excessive biomass. This treatment covers approximately 50 miles of riparian areas (Map 11) and scattered aspen stands. In some areas the riparian and or aspen stands may need to be fenced and have riparian hardwood species or other native vegetation planted.

In addition to conifer removal, some aspen stands would require fencing for protection, decadent aspen removal and/or prescribed burning to ensure stimulation of regenerating shoots. After a period of 3 to 4 years, if root sprouting does not occur, it can be assumed that the above ground stems are inhibiting sprouting; therefore, overstory aspen stems would be felled and/or prescribed burned. Fire stimulates suckering by removal of the aspen overstory (which alters the hormone balance) and by post fire warming of the soil associated with reduced crown shading. Suckers thrive in the abundance of light and generally outgrow other tree species that regenerate by seed (Swanson *et.al.* 2010).

Curlleaf Mountain Mahogany, Thinning and Conifer/Juniper Removal

There are two different types of Curlleaf mountain mahogany treatments: 1) removal of all conifers within a mahogany stand, and 2) thinning of all conifers within mountain mahogany groupings within conifer dominated stands.

Thinning of conifer trees would occur in Curlleaf mountain mahogany groupings located within conifer dominated stands. Mahogany groupings are defined as a group of 3 or more trees greater than 2ft in height. All non-commercial trees (< 9inches dbh) and juniper (all trees not considered old growth) would be removed within 16ft of the mahogany group.

Removal of conifers would occur in stands dominated by mountain mahogany greater than 5 acres in size. All non-commercial sized conifer trees within mahogany stands would be felled. Within mountain mahogany stands there would be limited mechanical equipment operations; therefore, biomass utilization would be restricted within these areas. Pre-authorization for trails and landings would be required.

[1]. **Biomass Utilization**: Materials grown in forest or woodland environments that are by-products of land management, restoration, or fuel reduction treatments (historically non-utilized or under-utilized material).

Removal of old mahogany may be necessary in stands with many decadent mahogany stems per acre and minimal regeneration. Thinning of old trees would occur in small, randomly placed and shaped openings to allow associated shrub species to be released and the establishment of urlleaf seedlings (Davis and Brotherson 1991).

Biomass Utilization

If economically feasible, non-commercial and juniper material generated by thinning activities would be removed for biomass utilization. Treatment options may include hand falling with chain saws, use of rubber-tired or tracked equipment, such as skidders, feller bunchers, harvester-forwarders, tractors, or similar equipment. Selection of harvest methods would be based on slope, access, and least potential for soil disturbance and damage to the ecosystem. Biomass removal would primarily take place in Phase II and III juniper, be limited to existing access and slopes less than 40 percent. Approximately, 2,500 acres (5 percent) of the Project Area have slopes 40 percent or less and adequate road access.

Mechanical equipment would move the cut vegetation from the harvest sites to designated staging areas (e.g., existing roads, pullouts, and landings) via skid trails. The material could either be hauled off site or ground on site then transported to a biomass plant or other facility. It would be necessary to create skid trails into the Project Area to access harvest sites and transport vegetation from the harvest sites to the designated staging areas/landings for further processing and loading. No new roads would be built and the number of new trails into the Project Area would be minimized.

2.3 Alternative #3 – No Commercial Biomass Utilization

This alternative would be the same as Alternative 2 with the exception that commercial biomass utilization would not take place anywhere in the Project Area. In this alternative, areas that biomass would have been removed in Alternative 2 would instead be machine piled, left in place or jackpot burned. All other aspects of this alternative would be identical to the proposed action.

2.4 Short-term and Long-term Assumptions Common to all Alternatives

This EA makes reference to short-term and long-term environmental effects resulting from various actions and impacts. For analysis purposes, short-term refers to consequences that would end in less than 5 years and long-term refers to consequences that would (1) persist for 5 years or more and (2) would continue out into the foreseeable future, barring some unforeseen change or management intervention.

2.5 Assumptions for Cumulative Impact Assessment

The Council on Environmental Quality (CEQ) defines cumulative effects as the impact on the environment which results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (federal or non-federal) or person undertakes such other actions (40 CFR 1508.7). The cumulative assessment area encompasses approximately 340,000 acres.

Past and Present Actions

Mining, livestock grazing, wildfire, fire suppression, timber harvest, juniper cutting, wildlife, off highway vehicle (OHV) travel, road construction (including Interstate 84) and road maintenance

are among the past and present actions that have had both short and long-term effects on vegetation in the assessment area. The past mining activities have had their greatest impact in areas of hydraulic mining where water is used to blast the rocks and gravels from streambeds to recover gold. The Auburn area has been heavily impacted by historic hydraulic mining. There are 29 active mining claims covering approximately 37,000 acres. Mining is currently taking place on approximately 16,800 acres. These mining sites are required to be reclaimed pursuant to their mining plan of operations. Most of the mining sites are located within mountain and basin big sagebrush communities which have high site potential for reclamation. In fact, some of the historic mining tailings have naturally re-vegetated with native grasses, forbs and shrubs. All BLM lands in the area are leased for livestock grazing. Since 1980 there have been 233 wildfires which have burned approximately 40,000 acres. Timber harvest or thinning has occurred on approximately 39,500 acres (9,000 private, 500 BLM, 30,000 FS). Juniper cutting has taken place on 8,500 acres (4,500 BLM, 4,000 private)

Reasonable Foreseeable Actions

Foreseeable actions in the assessment area include similar continuing levels of mining, livestock and wildlife utilization, OHV use, and road maintenance. Additional new actions which potentially could take place include:

- Horizon Wind Energy development covering 6,250 acres, actual disturbed area would be much less;
- Timber thinning and/or harvest on approximately 9,000 acres of private land;
- Juniper cutting on approximately 5,000 private acres;
- Boardman to Hemingway Power line right of way covering approximately 1,323 acres in the Project Area.
- Mormon Basin Fuels Project 15,289 acres BLM fuels project
- Oregon Vegetation Treatment EIS Vale Step Down
- Pine Creek Mine (which lies directly within the project area)

3 Affected Environment and Environmental Consequences

3.1 Air Quality

Affected Environment

Under the Clean Air Act, BLM administered lands were given Class II air classification, which allows moderate deterioration caused by new pollution. BLM would manage all public lands as Class II unless they are reclassified under the provisions of this Act.

Air quality in the area associated with Baker Habitat Restoration Project area is generally good. The Strawberry Mountain Wilderness Area, an area designated as a Class 1 air shed under the Clean Air Act (42 U.S.C. § 7475 (d)(2)(B)), is approximately 35 air miles west of the Project Area. The Eagle Cap Wilderness Area is approximately 32 miles north of the Project Area. Designation as a Class 1 air shed allows only very small increments of new pollution above existing air pollution levels.

Smoke emissions from prescribed burning would generally dissipate to the north, south and east of the plan area, in the direction of the most common winds. Prevailing winds are out of the West North West in the summer months and are southerly for the rest of the year. Weather, as illustrated by wind, moves into the Project Area generally from the southwest or west and exits the Project Area to the northeast or east. Periods of degraded air quality can occur though typically these events are short-lived. These events are usually associated with development of a stable air mass and/or cold air inversion over the Project Area. The greatest occurrence of such phenomena is during the winter months and less so during the spring and fall. Smoke from wildfires and to a lesser degree prescribed fires are also a considerable source of degraded air quality when they occur, primarily from particulate matter contained in smoke. Smoke from wood burning stoves can cause periods of degraded air quality during the winter heating season, usually associated with the stable air and/or inversion phenomenon mentioned above.

3.1.1 *Alternative 1 - No Action*

Under the No Action Alternative no treatments would occur. If left untreated, juniper would continue to expand into more areas and become dense stands that suppress shrubs and herbaceous vegetation. Forested stands would continue to accumulate fuel. The potential for more severe wildfires to occur would be greater and require a longer recovery period. The impact to air quality would be greater from a wildfire than prescribed fire. Wildfires would burn longer, consume more biomass, and produce more smoke and particulate matter. The community of Baker, Hereford, and Durkee and surrounding rural residences could be impacted from higher concentrations of particulates in the air, resulting in respiratory discomfort.

3.1.2 *Alternative 2 - Proposed Action*

The Proposed Action would produce smoke from slash pile burning, and dust from mechanical treatments. Impacts to air quality from pile burning could range from reduced visibility, to pneumonic irritation, and smoke odor affecting people in proximity to the project area. These impacts generally last from one to three days, with most impact occurring during the actual ignition phase, lasting from one to a few days depending on number of slash piles ignited. Residual smoke produced from burnout of large fuels, or slower burning fuel concentrations, could occur lasting for one to three days following the ignition phase. Impacts to air quality from mechanical treatments would be airborne dust generated while operating equipment and road use for implementation of projects. These impacts would be limited to the immediate area around the equipment and end when operations stop.

The areas of greatest impact from burning would be those downwind and down drainage from the Project Area. A wind vector analysis and review of topographic features indicated these areas are typically south, southeast and east, respectively of the Project Area. The amount of impact would be dependent on atmospheric conditions at the time of ignition. Pile burning would be conducted when atmospheric stability and wind conditions promote smoke dispersion into the atmosphere and transport out of the area. In addition, burning would be planned when diurnal wind conditions limit the amount of smoke pooling in canyons and valleys. The highest impact area from mechanical treatments would be the immediate Project Area and on unimproved roads (i.e., dirt) used in association with the project. Removal of cut trees for biomass would cause fewer disturbances to air quality than heavy equipment, and reduce the amount of biomass burned on site. This Alternative could potentially result in less air quality impacts than

Alternative 3, depending on the amount of cut trees removed from the site. All burning activities would comply with the Oregon State Smoke Management Plan and the Clean Air Act, no air quality effects would be expected to exceed the National Ambient Air Quality Standards (NAAQS). Burning would occur in uplands away from populated areas for vegetation management objectives. While the preferred disposal of hazardous fuels is to be used as commercial product or biomass energy sources, burning would be done where those options are not feasible due to access or economic factors. Areas in conifer forest environments are more likely to contain piles for burning than rangeland ecosystems. Piles would be burned in the spring or fall after some precipitation has been received to limit the potential for fire spread, but while the larger material in the piles is still dry enough to burn. Dry fuels burn cleaner and hotter than wet fuels; therefore, less smoke is produced. All burning would be done under desirable weather conditions to meet objectives for risk reduction and fuel consumption, and to minimize smoke impacts to populated areas and protect visibility in Class 1 areas (the Eagle Cap Wilderness and Strawberry Wilderness). Despite mitigation measures to reduce impacts, smoke would still be visible, and could cause a temporary localized exceedance of particulate matter standards or result in impaired visibility.

3.1.3 *Alternative 3 - No Commercial Biomass*

Effects are similar to Alternative 2; however there could be more smoke produced because there could potentially be more fuel remaining on site due to lack of biomass removal and more of a need for prescribed fire.

3.1.4 *Cumulative Impacts*

The cumulative effect on air quality in the Project Area and surrounding communities from prescribed fires conducted on adjacent private lands to reduce fuel loadings will be short-term (one to two days), localized and could range from negligible to moderate. Fugitive dust from roads with current traffic use would produce short-term local effects of negligible intensity. With proper management and remediation, there is no projected irreversible or irretrievable air quality impacts associated with the proposed management actions.

3.2 Soils

Affected Environment

The following soils information is from the Baker County Soil Survey (NRCS 1997). Soils in the Project Area are highly variable, reflecting both parent material and soil development. Soil complexes mapped for the Project Area include Snaker-Lovline-Darkcanyon, Virtue-Poall-Encina, Durkee-Ateron, Snell-Roostercomb-Lostbasin-Ateron, Segundo-Piersonte-Inkler, and Tolo-Klicker Associations.

Upland soils tend to be shallow on steep slopes and moderately deep too deep on benches and flats. Coarse fragments are common throughout the profile, particularly on shallow soils. Riparian flood plain soils are formed in deep alluvium and colluvium. Floodplain soils are recent and variable. The surface layers range from loamy sand to very cobbly loam and the underlying layers range from extremely gravely sands to very cobbly loams. The substratum permeability ranges from moderate to very rapid.

Most of the valley bottom land is moderately well drained to poorly drained and has a high water table in the spring and early summer.

Parent materials are an important factor in the formation of soils that may differ widely both in mineral composition and hardness, affecting soil texture and the rate of mineral breakdown. Most of the volcanic, sedimentary, and metasedimentary-derived soils in the Project Area have fine to medium textures.

Many of the soils in the Project Area are volcanic in origin. Columbia River basalts are common, as are ash flow tuffs (i.e., pyroclastic rock formed from hot volcanic ash). Soils formed from Columbia River Basalts generally have high infiltration rates and moderate permeability. Soils influenced by the deposition of silty volcanic ash from the eruption of Mount Mazama 6,700 years ago are generally highly productive when they have good vegetative cover but are erosive if vegetative cover is removed. Sedimentary rocks such as lacustrine (lakebed) deposits can also be highly erosive as are loess soils. The Project Area also contains granitic rocks, sedimentary rocks, and metamorphic rocks (both metasedimentary and metavolcanic). Granitic rocks tend to be highly erosive, and water infiltration is generally high with moderate percolation. Soils derived from metamorphic rocks are not as erosive as granite soils, are very low in clay, and have high infiltration and percolation rates.

Soils are most vulnerable to water erosion on steep slopes and are primarily located in the Burnt River Canyon. Overall, close to 30 percent of the Project Area have soils vulnerable to water erosion. No treatment would occur in areas identified by the BLM as being highly vulnerable to water erosion.

Biological Crusts consist of small plants and bacteria that grow together on the soil surface. The more common of these are cyanobacteria, green algae, lichens, mosses, and microfungi. Shallow soils with lower vascular plant cover often support a wide variety of cyanobacteria, mosses, and lichens. Biological soil crusts are effective in reducing wind and water erosion of soil surfaces. This is especially important in sagebrush communities such as Wyoming big sagebrush where there is generally a lower amount of vegetative groundcover than in grasslands or forested areas. In addition to reducing erosion and soil stabilization, biological crusts add nitrogen to the soil that is readily taken up by surrounding plants.

3.2.1 *Alternative 1 - No Action*

As the transition continues from shrub-steppe communities toward juniper woodlands there would be reduced vegetation cover, litter and increased bare ground. The net result of change would be an increased vulnerability to accelerated erosion, site instability, and decreased watershed function.

Selection of the No Action Alternative would likely lead to combined impacts to soil resources from juniper expansion and vegetation loss. Specifically juniper would continue to expand and there would be a loss of shrubs, grasses, and forbs. The loss of forage would lead to more bare ground which increases the amount of soil exposed to wind and water effects, and would lead to increased risk of soil erosion.

3.2.2 *Alternative 2 - Proposed Action*

Pile burning may cause small areas of high-intensity soil scorching where large concentrations and machine piles occur. Total area affected would be less than 1 percent of the Project Area. High-intensity fire would kill some plants and may alter physical soil characteristics over a small area of the piles. Areas of greatest impact would be directly below juniper trunks and large branches. In the short-term surface erosion could slightly increase on portions of burned areas,

especially if there is an extreme rain event before vegetation starts to regenerate. However, the limited burn areas and retention of live root systems of herbaceous and root sprouting plants throughout the Project Area would reduce the possibility of any accelerated erosion. To reduce impacts from pile burning, piles would only be burned when soils are saturated, frozen, or covered in snow. Areas of biomass removal would be subject to mechanical equipment and soil disturbance primarily on skid trails and landing areas. These areas would be subject to increased soil compaction and erosion. These impacts are expected to be minor due to the short duration of the biomass utilization activity and to the limited area (2,500 acres) suitable for biomass utilization. In the long-term soil stability would be enhanced due to reduction of juniper cover and the subsequent increase in grasses, forbs and shrubs.

3.2.3 *Alternative 3 - No Commercial Biomass*

Impacts would be similar to Alternative 2, except soil disturbance, compaction and erosion that would take place as a result of biomass utilization would not occur. More jackpot and pile burning could take place which could increase soil exposure in the short term.

3.2.4 *Cumulative Impacts*

Past actions, such as from wildfires and other soil disturbing activities, have increased soil erosion on areas outside the proposed Project Area. Past actions combined with the lack of treatments within the proposed Project Area has increased soil erosion vulnerability, especially if large unplanned disturbances such as wildfires, wind events or precipitation events were to occur. The implementation of present and future treatments would increase soil stability in the area as vegetative diversity and ground cover would persist. Through planned treatments, natural disturbances would be smaller in size and manageable and would reduce soil erosion levels over the long term. Cumulative impacts from implementing the Proposed Action, Alternative Action or a combination thereof, combined with present and future actions would improve the overall stability of soils and their resistance to erosion. Improving soil cover and stability by improving vegetative conditions through the implementation of various treatments would improve the overall watershed stability which would indirectly reduce cumulative impacts to soil resources.

3.3 Vegetation

Affected Environment

Sagebrush Steppe

Vegetation within the Project Area is dominated by big sagebrush (*Artemisia tridentata vaseyana, tridentata and wyomingensis*), and low sagebrush (*A. arbuscula*). These types of sagebrush form a complex mosaic across the landscape in varying sizes. Presence of low or big sagebrush is dependent on soil type and depth. Encroachment of western juniper (*Juniperus occidentalis*) is also common across the Project Areas.

Low sagebrush is most often found on shallow soils with either a restrictive layer or bedrock within twelve inches of the soil surface. Low sagebrush sites tend to be low to moderately productive because of shallow soils. Low sagebrush occupies slightly lower productivity sites with shallower soils with more rock on the surface.

Herbaceous species found in association with low sagebrush includes bluebunch wheatgrass (*Pseudoroegneria spicata*), Idaho fescue (*Festuca idahoensis*), Thurber's needlegrass (*Achnatherum thurberianum*), bottlebrush squirreltail (*Elymus elymoides*), and Sandberg's bluegrass (*Poa secunda*). Forbs commonly found on the site include arrowleaf balsamroot (*Balsamorhiza sagittata*), taper tip hawksbeard (*Crepis acuminata*), false dandelion (*Agoseris glauca*), prairie lupine (*Lupinus lepidus*), Hood's phlox (*Phlox hoodii*), low pussytoes (*Antennaria dimorpha*), and cushion buckwheat (*Eriogonum ovalifolium*).

Deeper soil areas are dominated by one of three subspecies of big sagebrush including basin big sagebrush (*Artemisia tridentata* ssp. *tridentata*), Wyoming big sagebrush (*Artemisia tridentata* ssp. *wyomingensis*), and mountain big sagebrush (*Artemisia tridentata* ssp *vaseyana*). These sagebrush species are usually associated with deeper soils compared to low sagebrush species. Herbaceous plant composition is similar to other sagebrush types, but mountain big sagebrush plant communities tend to have a higher density and cover of large perennial grasses and deep-rooted perennial forbs.

Wyoming big sagebrush occurs on drier sites than basin big sagebrush and mountain big sagebrush. The associated plant community is often less diverse than mountain or basin big sagebrush plant communities due to shallower soil and less precipitation. Winward (1983) noted relatively few perennial forbs in undisturbed Wyoming big sagebrush plant communities compared to other sagebrush types. Herbaceous plant species are similar to low sagebrush. Within in the Project Area common perennial grasses associated with Wyoming big sagebrush are Thurber's needlegrass and blue bunch wheatgrass; common perennial forbs are Hood's and long-leaf phlox (*Phlox longifolia*). Cheatgrass (*Bromus tectorum*) is most common in the Wyoming big sagebrush plant communities within the Project Area and there are areas where cheatgrass dominates the plant community. Gray rabbitbrush, littleleaf horsebrush (*Tetradymia glabrata*) and granite prickly phlox (*Linathus pungens*) are shrubs found in association with Wyoming big sagebrush.

Mountain big sagebrush occurs on sites that are more productive than Wyoming big sagebrush sites. Soils are often deep, well drained on mountain slopes. Plant diversity and productivity is greater than on Wyoming big sagebrush sites. Herbaceous plant composition is similar to other sagebrush types, but mountain big sagebrush plant communities tend to have a higher density and cover of large perennial grasses and deep-rooted perennial forbs. Idaho Fescue and bluebunch wheatgrass would often be found as soil depth and elevation increase. Gray rabbitbrush, wax current (*Ribes cereum*), antelope bitterbrush (*Purshia tridentata*), and mountain snowberry (*Symphoricarpos oreophilus*) are commonly found in association with mountain big sagebrush. Mountain big sagebrush plant communities have a greater grass and forb component than the drier Wyoming big sagebrush plant communities.

Western Juniper

Western juniper is commonly found throughout the Project Area. Locally pockets of old-growth junipers occur, generally in areas with sparse surface fuels. These trees are generally characterized as having an irregularly shaped crown, partially dead areas of the canopy and main trunk, deeply furrowed bark, yellow to yellow-green lichen in canopy, cavities in trunk, and big

limbs. Understory plants include sagebrush, Bluebunch wheatgrass, Sandberg bluegrass, and a number of perennial and annual forbs.

Western juniper can also be found encroaching on deeper soil areas in the Project Area. These areas are often associated with mountain big sagebrush. Miller and others (2005) believe expansion of western juniper into mountain big sagebrush plant communities of eastern Oregon began in the late 1870s. Research conducted nearby on Steen's Mountain in Harney County, Oregon, found that over 90 percent of the current standing trees began growth prior to 1900 (Miller and Rose 1995). The expansion of western juniper has occurred at the expense of associated vegetation.

Most of the western juniper stands within the Project Area are in Phase I (36,000 acres). Lesser portions of the Project Area are in Phases II (7,600 acres) and III (< 300 acres). The total time to move from Phase I to Phase III varies by site, but Miller and Rose (1999) estimate a western juniper stand approaches canopy closure within 70 to 90 years of tree establishment on productive sites and 120 to 170 years on drier sites. Most of Project Area would be classified as a drier site based on the plant communities present.

Western juniper has also been found to be expanding into Wyoming and low sagebrush sites. Although juniper expansion occurred simultaneously in other habitat types, the rate of encroachment is much slower in low sagebrush than on big sagebrush sites. Establishment of western juniper within the low sagebrush sites interrupts the short stature of the plant community.

Riparian/Aspen Vegetation

Within the Project Area there are numerous scattered aspen stands and riparian communities. Though occupying relatively small areas within vast landscapes, aspen woodlands provide essential habitat for many wildlife species (Maser *et. al.*, 1984, DeByle 1985) and contain a high diversity of understory shrub and herbaceous species. Aspen are generally recognized as having more lush undergrowth than neighboring coniferous forests (Mueggler 1985). The herbaceous vegetation occurs as a multilayered mixture of shrubs, forbs, and grasses and consists of a broad combination of species. Vegetation within these areas includes wet and mesic meadows dominated by herbaceous vegetation and reaches dominated by willows or aspen. Because of the lack of disturbance (i.e. fire) nearly all of the aspen and riparian vegetation is being encroached by conifers, primarily juniper. The encroachment has led to decadent stand conditions in both aspen and riparian vegetative stands. Competition, from the encroaching conifer trees for light, water, and nutrients, has resulted in the current decadent condition of these two vegetation communities.

Forest Vegetation

There are approximately 3,700 acres of mixed conifer timber stands within the treatment area. The stands are mostly small discontinuous stringers on north facing slopes. Typical understory species that generally occur with mixed conifer forests and pine woodlands include mountain big

sagebrush, bluebunch wheatgrass, Idaho fescue, snowberry, mountain mahogany, and bitterbrush. These forested stands are also being encroached by juniper.

The dry forest communities represented within the Project Area are generally overstocked with trees from a long-term maintenance standpoint. In 2008, areas adjacent and within the Project Area were visited by the USFS entomologist the findings included elevated risk of insect and disease outbreaks due to overstocking and drought. Specifically, Spiegel (2008) found:

"The current bark beetle-caused mortality reflects this. We found pine engraver (Ips species) caused mortality in smaller, sapling-sized trees. Larger trees supported both western pine beetles (Dendroctonus brevicomis) and mountain pine beetles (Dendroctonus ponderosae). These bark beetles, while always present in very low numbers throughout the range of pines, occasionally build up high populations in response to trees stressed by factors such as drought, crowding, root disease, or dwarf mistletoe. The widespread drought in the Blue Mountains from 2-6 years ago led to increased stress in all forest types. The current high populations of bark beetles developed in response to the drought and the chronic overcrowding in these stands. While second-growth and younger pines are all currently experiencing elevated mortality, the older pines and Douglas-firs have not yet had recent mortality. Populations are elevated here but not yet in outbreak. The risk of mountain pine beetle and western pine beetle causing mortality in these larger pines is high while the stocking remains high. Many similar areas in the Blue Mountains have recently suffered significant mortality by beetles in their large, old pine."

"Tree density management is the highest priority in these stands. All of the stands we visited were overstocked and the current bark beetle mortality is a result of tree stress caused by overstocking and past recent drought. It is fortunate that mortality of the larger, historical trees has not yet occurred. There is still time to treat these stands before the older trees succumb to competition stress and are attacked by bark beetles. We saw both red-needled trees, trees that had been attacked in 2007 or early 2008, and green-attacked trees, trees that had been attacked in 2008 and would produce the generation to attack trees in 2009. Mountain pine beetles can sustain population levels while experiencing over 97percent mortality. Without significant moisture or thinning to ease the competition stress in these stands, mortality here will continue and can be expected to expand into the large, old pines."

Currently, Basal Area (BA) within the forested stands ranges between 10 and 240 Square Feet/Acre and the weighted average of ponderosa pine and Douglas fir stands are 108 and 124 Square Feet/Acre, respectively. The stocking rates for the dominant vegetation types within the Project Area are as follows (Powell 1999):

Table 1. Basal Area targets (based on 10" quadratic mean diameter) within the different Plant Associations, by species. In parentheses are the Stand Density Index. When there are multiple species a weighted average would be used to determine the proper basal area target.

Plant Association	Douglas-Fir		Ponderosa Pine		Western Larch	
	UMZ[2]	LMZ[3]	UMZ	LMZ	UMZ	LMZ
PSME/CAGE2	100 (211)	67 (141)	41 (86)	27 (58)	N/A	N/A
PSME/CARU	94 (198)	63 (132)	58 (122)	39 (82)	N/A	N/A
PSME/SYAL	88 (185)	59 (124)	71 (151)	48 (101)	73 (154)	49 (103)
PSME/SYOR2	N/A	N/A	85 (180)	57 (120)	N/A	N/A
PIPO/FEID*	N/A	N/A	30 (62)	20(42)	N/A	N/A
PIPO/CAGE2	N/A	N/A	39 (82)	26(55)	N/A	N/A
PIPO/CARU	N/A	N/A	73(154)	49(103)	N/A	N/A
PIPO/CELE/FEID-AGSP	N/A	N/A	15(32)	10(21)	N/A	N/A
PIPO/AGSP	N/A	N/A	18(38)	12(26)	N/A	N/A

*Denotes the most dominant timber plant association.

Currently, the weighted average of ponderosa pine and Douglas fir stands are greater than the recommended BA. Without increased moisture or thinning to ease the competition stress in these stands, mortality here would continue and can be expected to expand into the large, old pines.

3.3.1 *Alternative 1 - No Action*

Sagebrush Steppe / Western Juniper

Plant communities would continue on a predicted successional transition to fully-developed juniper woodlands. As described in the section above, most plant communities are in early and mid-transitional stages of juniper woodland development. As plant communities proceed toward juniper woodlands, community structure and composition would change altering community processes such as hydrology, nutrient cycling, and energy flow. As woodlands move from mid- to late stages of development, thresholds are approached or crossed. These thresholds include 1) significant decline in shrubs, 2) a decline in fire potential, 3) reduced tree mortality to fire due to increasing tree size, 4) decline in berry production, and 5) a potential decline in herbaceous cover and diversity dependent on soils and other site factors (Miller *et. al.*, 1996).

Riparian and Aspen

Riparian and aspen communities would continue to decline as a result of continued encroachment of juniper. Conifers compete with aspen and riparian vegetation for available moisture. Although juniper does not transpire year-round in the colder climate of eastern Oregon as it does in warmer winter areas (Jeppesen 1978), it does get a big jump in water use during early spring because it is an evergreen species (Miller and Schultz 1987). Advantageous use of soil moisture by juniper reduces understory vegetation, plant reestablishment, and vigor

[2] UMZ: Upper Management Zone
[3] LMZ: Lower Management Zone

(Jeppesen1978). Juniper surface roots may extend outward considerable distance from the main stem depriving other vegetation of available soil moisture. When conifers overtake aspen communities, less water is available to the watershed, biomass of understory vegetation is significantly reduced, and the diversity of wildlife and plant species declines. The greatest concern is the loss of aspen communities once a conifer community becomes established because aspen does not readily establish from seed (McDonough 1985, Mitton and Grant 1996).

Forest Vegetation

As fuel loading continues to increase, the potential for a high severity stand replacing wildfire, occurring under extreme situations, and causing extensive plant mortality and soil sterilization increases. The recovery period following a stand replacing fire would take several decades, increasing the risk of noxious weed and cheatgrass invasion. Additionally, the risk of mountain pine beetle and western pine beetle causing mortality in ponderosa pine (large and small) would remain high while the stocking remains high.

3.3.2 *Alternative 2 - Proposed Action*

Sagebrush Steppe / Western Juniper

Sagebrush and other shrubs recover after conifer control (Barney and Frischknecht, 1974; Tausch and Tueller, 1990). Removal of western juniper on encroached systems can result in a rapid increase in herbaceous production and cover (Bates et al. 1998, Bates et al. 2000), and influence on site-ecological processes such as increased water capture and storage (Pierson et al. 2007) and nutrient cycling (Bates et al. 2002). Removal of juniper by cutting and burning would create or maintain open sagebrush plant communities with composition of diverse associations of grasses and forbs. Juniper would be reduced to levels typical of more pre-settlement conditions. Reducing juniper stocking would result in increased herbaceous and shrub species composition and structural diversity. Cutting and burning of juniper would release herbaceous components of plant communities and many shrubs would be retained, and subsequently released from competition with juniper following treatment.

Intense heat resulting in some plant mortality would occur on some localized areas where piles are burned. This effect would primarily be limited to areas directly beneath juniper trunks and large branches. Permitted removal of cut juniper would reduce the potential for soil sterilization due to the reduction of juniper slash to be burned. The Proposed Action also includes seeding of native grasses, forbs, and shrubs if needed within the treated areas to accelerate plant community recovery. Potential benefits of nutrients released during burning would be reduced as some juniper is removed as biomass. However, extensive amounts of juniper would still remain on site for later burning.

Riparian / Aspen

Removal of conifers would reduce density and consequently competition for light, water, and nutrients which would allow regeneration of riparian and aspen vegetation communities. Overall, the impacts to riparian and aspen communities are expected to be positive; specifically, the aspen, riparian shrubs and herbaceous cover and species richness would be enhanced and fuel loading would be reduced.

Forest Vegetation

Non-commercial thinning and prescribed burning would decrease density of overstocked stands within the Project Area. It is expected that stands would move from weighted averages of 108 and 124 Square Feet/Acre in ponderosa pine and Douglas fir dominated stands, respectively, to more historical densities (averaging close to 60-100 Square Feet/Acre). Additionally, lower stand densities would directly reduce the risk of insect and disease outbreaks within the forested stands of the Project Area. Thinning around large diameter trees would limit risk of mortality by reducing competition/stress and fuel loading. There is potential in certain areas to protect, promote, and enhance stands of large diameter trees.

3.3.3 *Alternative 3 - No Commercial Biomass*

Sagebrush Steppe / Western Juniper

Impacts would be similar to the proposed action except that more material that would have been utilized as biomass would remain on site machine piled, or jackpot burned after juniper cutting.

Riparian / Aspen

Impacts would be similar to the proposed action.

Forest Vegetation

Impacts would be similar to the proposed action.

3.3.4 *Cumulative Impacts*

Sagebrush Steppe / Western Juniper

Cumulative impacts are the effects on the environment which result from the incremental impacts of actions in this EA when added to other past, present and reasonably foreseeable actions. Under many situations, uncontrolled wildfires affect continuous expanses of vegetation and habitat, leaving minimal mosaic to the burn pattern. Rehabilitation efforts are generally expensive and difficult due to the lack of species diversity in many plant communities which have burned. Long-term changes in ecological conditions affect vegetative diversity and habitat quality. Past actions to adjust livestock and wildlife use on vegetation combined with present and future actions to implement various fuels and vegetation treatments would allow for an improvement in vegetative recruitment, establishment, production, vigor and diversity and help facilitate the establishment of the natural (historic) fire regimes and improve habitat conditions for many species of wildlife. Implementing the Proposed Action, Alternative Action or a combination thereof, combined with present and future actions, would improve the overall condition of vegetative communities, their resiliency to future disturbance and provide a mosaic of differing ecological conditions which would reduce and minimize cumulative impacts.

Forest Vegetation

Cumulative impacts would be the same for both action alternatives. The overstocked/dense conditions within the Project Area are primarily due to past fire and timber management. Past fire and timber management practices have influenced stand structure and function within the

Project Area. For example, timber management in some stands specified the removal of most of the large, old, and early seral, fire tolerant species such as ponderosa pine, western larch and Douglas-fir. Limited, if any, interim management has occurred since stands were initially logged/thinned, which has led to stands of dense regeneration as well as the expansion of juniper into forested communities. To compound the situation further, the overstocked ponderosa pine is experiencing mortality due to a combination of commandra blister rust, mountain pine beetle and Western pine beetle infestations, which increases fuel loading.

The combined effect of limited management and/or natural fire has exacerbated the insect/disease activity and fuel loading, which has increased the need for current fuels and timber management. Implementation of either action alternative would reduce the adverse impacts of prior management activity/inactivity within the Project Area.

Previous and future timber harvests on private within Burnt River drainage lands, fuels reduction thinning or non-commercial thinning, would not directly alleviate the problems of overstocking, insect/disease, and fuel loading within the Project Area. However, they would break up the fuel continuity between BLM and private lands by altering the forest structure and density. The combined effect of these timber harvests and thinning projects would have a short-term adverse effect (e.g., less than 5 years) on forest aesthetics; however, there would also be a short-term beneficial effect by reducing fuel continuity.

3.4 Noxious Weeds

Affected Environment

The majority of invasive species occur primarily along the roads and in areas of previous disturbance. There have been some systematic weed inventories conducted in the Project Area, mostly associated with leafy spurge in the Burnt River unit. The most common weeds in the Project Area include Leafy spurge (Euphorbia esula), Scotch thistle (Onopordum acanthium), Canada thistle (Cirsium arvense), Bull thistle (Cirsium vulgare), Spotted knapweed (Centaurea stoebe), Diffuse knapweed (Centaurea diffusa), Rush skeletonweed (Chondrilla juncea), Cheatgrass (Bromus tectorum), Medusahead wildrye (Taeniatherum caput-medusae) , Mediterranean sage (Salvia aethiopis), and Whitetop (Lepidium draba).

3.4.1 *Alternative 1 - No Action*

Under the No Action Alternative, there would be fewer disturbances in the area, which would limit the potential introduction of new weeds and the spread of existing infestations in the area. However, as juniper density increased so would the risk of noxious weed establishment and spread which would perpetuate site degradation throughout the Project Area. These weakened plant communities would be less able to compete with weeds, thus creating favorable conditions for noxious weed establishment and spread. Sagebrush-bunchgrass plant communities would continue to progress toward less diverse juniper woodland or shrub plant communities. Wildfires that occur in these communities tend to be severe enough to kill large numbers of understory plants, which further increases the susceptibility of the Project Area to noxious weed and cheatgrass invasion.

3.4.2 *Alternative 2 - Proposed Action*

Initially, mechanical treatments, use of prescribed fire, and removal of cut juniper/conifers could open up areas for weed colonization by creating disturbed habitat that may favor noxious weed establishment. However, a study conducted in Oregon (Bates et al 2005) shows that cheatgrass production increases from two to four years after treatment and decreases to a level statistically similar to non-treated juniper stands 13 years after treatment. Therefore, under the proposed action a short-term increase in cheatgass production would be expected immediately after treatments in the project area, but cheatgrass presence on treated sites would be statistically similar to the non-treated areas in the long-term. The same study documents an increase in perennial grass production when compared to no treatment sites. Bates et al 2005 found that if 2-3 perennial bunchgrasses per square meter are present prior to treatment, it is sufficient for natural recovery and results in higher production of perennial grasses and forbs when compared to the control plots.

There would be some increased risk of new weed infestations from public gathering of juniper boughs, firewood, and other treatment byproducts. The public cannot be effectively required to maintain relatively weed free vehicles like BLM or contractors; consequently, this increases the potential for weed introductions or spread. However, it is expected there would be only minimal increases in the long-term risk of introduction of new weed populations or expansion of existing weed populations as a result of implementing the Proposed Action because the project design elements would be followed. There would be comprehensive botanical surveys conducted prior to implementation of this proposed project. Monitoring for noxious weeds would occur for two years post-treatment and any weeds found would be treated using an integrated weed management approach in accordance with the Vegetation Treatments Using Herbicides on BLM Lands in Oregon EIS.

Overall, management actions which promote healthy shrub-steppe, forest, riparian, and open woodlands would reduce the threat of large-scale wildfires. These vegetative communities would be more resistant to noxious weed introduction and spread than declining plant communities or communities impacted by a large wildfire.

3.4.3 *Alternative 3 - No Commercial Biomass*

Impacts are expected to be similar to the proposed action although the risk of spread of invasive species would be slightly less due to the reduction of surface disturbing activities associated with Biomass activities not taking place. Areas of jackpot burning and machine piling would increase which would slightly increase the potential for the spread of invasive species.

3.4.4 *Cumulative Impacts*

Past actions such as timber harvests, intensive cattle grazing, mining, and road building within the Project Area have led to infestations and spread of noxious weeds. In addition, wildfire exacerbated the problem by removing competing native vegetation thereby increasing weed spread.

Current/future management activities such as thinning, juniper removal, seedings, and timber harvest consider the risk of weed introduction and spread and are subject to standard operating procedures designed to minimize weed introduction and spread and thus are not expected to

cause additive impacts. Instead these proposed treatments are expected to improve the vigor and diversity of native vegetation communities which would increase their ability to compete with and prevent establishment and spread of noxious weeds.

The possibility of future wildfire in the area is expected, as are additional management activities. Noxious weeds could be expected to be detected in the area following proposed actions or future unplanned disturbances due to nearby detected infestations outside the proposed Project Area. With planned disturbances such as mechanical treatments or other treatment methods, opportunities for detecting additional noxious weed infestations prior to disturbance could occur. Implementing the Proposed action, Alternative Action or a combination thereof would improve the ability of the vegetation community to compete with and prevent noxious weed and invasive species establishment through the development of a more vigorous, diverse and productive community. Completing additional treatments over time would reduce the potential of invasions from noxious weeds or invasive species over a large area. Proposed treatments would make the areas more resistant to noxious weed and invasive species invasion and establishment by increasing the density and composition of perennial understory species which compete with the undesirable species. The overall cumulative impacts from all past, present and future actions are expected to be minimal.

3.5 Special Status Plant Species

Affected Environment

The rare species databases for WA/OR BLM GeoBOB (Geographic Biotic Observations), ORBIC (Oregon Biodiversity Information Center), and the Forest Service's NRIS (Natural Resource Information System) were all examined to determine previously documented special status plant locations within or in close proximity to the Project Area.

There are no federally listed threatened or endangered plant species known or suspected to occur in the Project Area.

In addition, there are no Sensitive plants previously documented to occur in the Project Area. Previously documented special status plant locations within five air miles of the Project Area are: one occurrence of rustic paintbrush (*Castilleja flava* var. *rustica*), sixteen locations of Snake River goldenweed (*Pyrrocoma radiata*), two locations of stalked-leaf monkey flower (*Mimulus patulus*), nine locations of Cordilleran sedge (*Carex cordillerana*), two locations of Malheur Prince's plume (*Stanleya confertiflora*), one location of crenulate moonwort (*Botrychium crenulatum*), and two locations of mountain moonwort (*Botrychium montanum*) (Table 2).

Previously 2,473 acres of special status plant surveys have been completed in the proposed Project Area as part of the Pine Creek Fuels and Burnt River Fuels projects in 2003, 2004, and 2007. No special status plants were found during these surveys. Approximately 3,893 acres of the Project Area were surveyed over five days in July 2010 and five days in May – June 2011. The survey areas were located in the Auburn unit and Water Gulch unit. Some areas of shrink-swell clays looked like potential habitat for Malheur Prince's plume although none was observed. Special status plant surveys would be required for the remainder of the project treatment areas prior to implementation.

One population of stalked-leaved monkeyflower was located consisting of three plants total. The site is less than 1/10 acre in size, located along a small intermittent stream in the Water Gulch area, which was running water in June 2011.

Table 2. Special status plants have potential to occur within the proposed Project Area based upon habitats present in the Project Area and habitat preferences of these plants. This includes seven special status plant species (in bold type below) that were previously documented to occur within five air miles of the Project Area

Common Name (Scientific Name)	Habitat	Survey Time
Wallowa ricegrass (*Achnatherum wallowaensis*)	Shallow rocky soils often with low sagebrush	Jun-Aug
Upward-lobed moonwort (*Botrychium ascendens*)	Mesic meadows, shrublands, and roadsides	June-July
Crenulate moonwort (*Botrychium crenulatum*)	**Mesic meadows, shrublands, forests, and roadsides**	**June-July**
Western moonwort (*Botrychium hesperium*)	Mesic meadows, shrublands, forests, and roadsides	June-July
Skinny moonwort (*Botrychium lineare*)	Mesic meadows and roadsides	Jun-Aug
Moonwort (*Botrychium lunaria*)	Mesic meadows, shrublands, forests, and roadsides	Jun-Aug
Mountain moonwort *(Botrychium montanum)*	**Mesic forests**	**Jun-Aug**
Twin-spike moonwort (*Botrychium paradoxum*)	Mesic meadows, shrublands, forests, and roadsides	Jun-Aug
Cordilleran sedge (*Carex cordillerana*)	**Rocky slopes, usually in shade of trees and shrubs**	**Jun-Aug**
Retrorse sedge (*Carex retrorsa*)	Floodplain forests, swamps, streamsides, wet thickets, and wet meadows	Jun-Aug
Rustic paintbrush (*Castilleja flava* var. *rustica*)	**Sagebrush steppe**	**Jun-Aug**
Salt heliotrope (*Heliotropium curassavicum)*	Saline or alkaline habitats at low elevations	May-Jul
Cusick's lupine (*Lupinus lepidus* var. *cusickii*)	Whitish tuffaceous deposits in sagebrush steppe	Jun-Jul
Membrane-leaved monkeyflower (*Mimulus hymenophyllus*)	Cliffs and talus slopes in forests or grasslands	Jul-Sept
Stalked-Leaved Monkeyflower (*Mimulus patulus*)	**Riparian areas in forests or grasslands**	**Apr-Jul**

Common Name (Scientific Name)	Habitat	Survey Time
Many-flowered Phlox (*Phlox multiflora*)	Open or wooded often rocky places, from the foothills to above timberline	May-Aug
Oregon semaphore grass (*Pleuropogon oregonus*)	Streambanks, wet meadows and marshes	Apr-May
Snake River goldenweed (*Pyrrocoma radiata*)	**Sagebrush steppe often on calcareous soils**	**May-Aug**
Malheur Prince's plume (*Stanleya confertiflora*)	**Heavy clay areas within sagebrush steppe**	**May-Jun**
Violet suksdorfia (*Suksdorfia violacea*)	Cliffs and talus slopes in coniferous forests	Jun-Jul
Douglas clover (*Trifolium douglasii*)	Moist to wet meadows and forested wetlands, and streambanks	Jun-Jul

3.5.1 *Alternative 1 - No Action*

Possible direct and indirect effects of the No Action Alternative could include loss of habitat due to conifer encroachment for special status plant species that are dependent on open sagebrush steppe and riparian habitats. Potential special status plants habitat within the Project Area associated with open habitats in the sagebrush steppe include Snake River goldenweed, Cusicks lupine, rustic paintbrush, Wallowa ricegrass, and Malheur prince's plume. With no action these special status plants could be negatively impacted by uncharacteristic severe wildfire event. Possible impacts would be adverse and long-term.

3.5.2 *Alternative 2 - Proposed Action*

Negative direct impacts to special status plants are not expected to occur due to the project design features that would provide for buffers and avoidance of special status plant sites, should any be discovered within the project area.

The indirect effects of removing the overstory juniper/conifers above special status plants sites would change the microclimate at these sites. Specifically, it can be assumed that more sunlight would reach these sites, relative humidity would be reduced, soil moisture could also be reduced due to increased evapotranspiration, and wind speeds would be increased. The environmental requirements for most special status plants are not known. Some special status plant species do not occur in open areas without trees; instead, they only occur in areas with overstory trees and filtered sunlight. It is highly probable that the proposed action of overstory tree removal and the resultant changes in microclimate would make these sites less habitable to special status plants. Four special status plants are an exception to this. Malheur Prince's plume, Snake River goldenweed, Wallowa ricegrass, and rustic paintbrush all occur in open sagebrush steppe habitats. It is probable that juniper removal would help to maintain open sage steppe habitats that are preferred by these four taxa. The indirect effects of the proposed skidding of trees for biomass have the potential to increase the abundance and distribution of nonnative weedy plants in the Project Area by increasing the areas of soil disturbance in the Project Area. The indirect effects of prescribed burning of fuel jackpots also have the potential to create new unoccupied open habitats for weedy nonnative plants. The burning of jackpots of cut juniper also creates

areas of increased nitrogen availability that nonnative annual grasses can better utilize than native perennial bunchgrasses. Both skidding of biomass material and burning of jackpots could increase the abundance and distribution of weedy plants, which could create a source of increased competition for special status. These potential negative short term indirect effects would be minimized by project specific design features. Indirect effects would be both positive and negative to potential special status plant habitat depending upon individual plant requirements. Overall effects are expected to be positive in the long term due to more stable plant communities with reduced risk from conifer encroachment and uncharacteristic severe wildfire.

3.5.3 *Alternative 3 - No Commercial Biomass*

The potential direct and indirect impacts to special status plants would be slightly less than those described under the Proposed Action Alternative because there would be no skid trail construction for biomass hauling, with one possible exception. It is probable that there would be more prescribed fire under the no commercial biomass alternative because there would be more fuel left on site for disposal. The probable greater acreage of prescribed fire under this alternative could result in increased open habitats and greater available nitrogen for nonnative weedy plants.

3.5.4 *Cumulative Impacts*

The timeframe for past Cumulative Effects to special status plants is 150 years. This is the time when mining brought white settlements to the area and increased impacts to special status plants. The geographic extent of the Cumulative Effects analysis is the federal lands within a five-mile radius of the Project Area. The five-mile cumulative effects boundary is assumed to include the potential dispersal distance for any special status plants that may occur in the Project Area. There are virtually no protections for special status plants on private lands and there is little information available about the occurrence of special status plants on private lands, thus, the analysis is limited to federal lands.

Mining, livestock grazing, fire suppression, herbicide application, timber harvest, juniper cutting, concentration of elk in feeding areas, off highway vehicle (OHV) travel, road construction (including Interstate 84) and road maintenance are the past and ongoing actions that have had both short and long-term effects on special status plants in the area. There are 29 active mining claims in the area. All BLM lands in the area are leased for livestock grazing. These past and present activities have likely had the following impacts on special status plants: loss of habitat, fragmentation of habitat, and direct injury, or mortality of individuals. The past mining activities have had their greatest impact in areas of hydraulic mining where water is used to blast the rocks and gravels from streambeds to recover gold. The Auburn area has been heavily impacted by historic hydraulic mining.

The Boardman to Hemingway Powerline is proposed for construction through a small part of the area. There are three wind-testing sites in the area. There is proposed juniper cutting and timber harvest on 15,289 acres of BLM lands in the Mormon Basin Fuels project adjacent to the project area. Livestock grazing and OHV travel are expected to continue in the analysis area. All of the reasonably foreseeable future actions in the area create varying amounts of ground disturbance, which has the potential to increase the spread of nonnative weedy plants, and thus increased herbicide applications to control these weeds. These impacts have the potential to result in

fragmentation or loss of habitat, direct injury, or mortality of individuals, and they are all long-term effects.

A portion of two proposed (under the draft Baker Resource Management Plan) special status plant ACECs are within the cumulative effects analysis area. One ACEC is being proposed for Snake River goldenweed and the other is for Cusick's lupine. If these ACECs are designated, they would have long-term beneficial impacts on the special status plants that occur there because they have specific management actions for special status plants.

Overall effects due to this project are expected to be positive in the long term due to more stable plant communities with reduced risk from conifer encroachment and uncharacteristic severe wildfire.

3.6 Aquatic Resources

Affected Environment

The hydrologic analysis focused on surface water resources within six watersheds. The Project Area lies within the Alder Creek-Pritchard Creek, Big Creek-Burnt River, Clarks Creek-Burnt River, Burnt River Canyon-Burnt River, Burnt River, and Sutton Creek-Powder River watersheds.

The majority of the Project Area is within the Burnt River subbasin with a minor portion in the Powder River subbasin. The Burnt River subbasin is located in the northwest portion of the Middle Snake Ecological Province. The subbasin is defined by the Blue Mountains to the west, the Snake River to the east, the Burnt River Mountains to the south, and the Powder River drainage to the north. The Burnt River flows generally east to the community of Bridgeport (River Mile (RM) 48), turns northeast to the community of Durkee (RM 28), then southeast through Weatherby (RM 18.5) and Huntington (RM 2.5) to join the Snake River at RM 328. Major streams flowing into the Burnt River below Unity Reservoir are Camp, Big, Pritchard, and Dixie Creeks. Dixie Creek begins in the southern portion of the subbasin, flowing southeast through Rye Valley then east to join the Burnt River at RM 12.

Proper functioning condition (PFC) surveys are local surveys completed by the BLM and used as baseline data for channel stability and riparian condition. The condition of the channel and riparian vegetation exerts a strong control over water quality for temperature and fine sediment. Slightly under 50 percent of streams surveyed in the Burnt River subbasin are at PFC or functional at risk with an upward trend. In addition to grazing, there are many streams impacted from mining, reservoirs, channelization, and roads.

Stream Flow

The timing and amount of spring runoff is dependent on snow pack depth and condition, as well as spring weather factors such as temperature and rainfall. Seasonal peak flows generally occur in late April and early May. Most surface and groundwater use is for irrigation, as there are about 80 water right holders in the Burnt River subbasin. Past records indicate that peak flows occur in late spring and are driven by snowmelt. Base flows on perennial and intermittent streams are sustained by groundwater discharge and springs throughout the summer and fall. Ephemeral drainages receive water from runoff during spring runoff and rainfall events.

The drainage network transports surface water, groundwater, and sediment and has a channel and road component. Perennial fish-bearing streams within the project area include Auburn, Ayers, Big, Cattail, Cave, Clarks, Deer, Durkee, Indian, Lawrence, Marble, McClellen, Pine, Poker, Pritchard, Schlinkman, Shirttail, and Webfoot Creeks; all of which eventually flow into either the Burnt or Powder Rivers. Roads transport surface flow as well as intercept subsurface water (through flow) and can divert these waters into road ditches and eventually into adjacent streams, which can adversely impact fish, fish habitat, and water quality. Therefore, the amount of roads, road design, road use, road maintenance, and road drainage structures are important components of fish habitat and water quality management.

Water Quality

The existing water quality of streams within the project area has been influenced by both recent and historic logging, mining, grazing, recreation, and farming practices. Waters in Oregon that do not attain State of Oregon standards are considered "water quality limited" and are included on Oregon's 303(d) List of Water Quality Limited Water bodies (i.e., 303(d) list). The most current 303(d) list for Oregon which was approved by the Environmental Protection Agency (EPA) is the 2004/06 list (DEQ 2006).

For streams listed on the 303(d) list, the State of Oregon must calculate total maximum daily loads (TMDL) for a particular water quality-impaired stream. However, the State of Oregon has not yet started to develop a TMDL for the Burnt River subbasin. When the State of Oregon initiates the TMDL process, the BLM would be involved with the development and implementation of the TMDL as outlined in the Forest Service and Bureau of Land Management Protocol for Addressing Clean Water Act Section 303(d) Listed Waters (FS/BLM 1999).

Fisheries

The only known resident salmonid fish species within the analysis area are redband trout (*Oncorhynchus mykiss gairdneri*) and rainbow trout (*Oncorhynchus mykiss*). Redband trout are listed as a sensitive species by the US Fish and Wildlife Service (USFWS) and the BLM Oregon/Washington Region. No designated critical habitat or fish species listed as threatened or endangered under the Endangered Species Act (ESA) is supported within the analysis area.

Redband trout occupy most of the fish-bearing streams within the project area and are widely distributed throughout the Burnt River subbasin. Though current distribution and abundance data is limited, current and historical distribution of redband trout is relatively static. And although management and land use activities have affected the seasonal use of habitat within some reaches of the subbasin, redband trout continue to utilize a good percentage of the habitat historically available to the species. Redband trout can tolerate water temperatures between 56° F and 70° F. Spawning takes place primarily in the spring, although studies and field investigations of other inland populations indicate that redband trout can spawn throughout the year where water conditions allow (ODFW 1990-1995). This is most likely to occur in spring-fed systems, where water temperature is essentially constant.

There are several habitat attributes considered to be the main drivers of fish production and sustainability: riparian condition, channel stability, habitat diversity, sediment load, high and low flow frequency, high temperature, and pollutants. Of these attributes, the ones that the BLM BRA can manage for are all stream characteristics except high and low flows, which are highly variable and solely dependent on weather, snow accumulation, and irrigation.

Riparian Management Areas (RMAs)

RMAs are portions of watersheds where riparian-dependent resources receive primary management emphasis. RMAs are not intended to be treated as 'no management' zones, since treatments may be essential to achieving or maintaining desired riparian and aquatic conditions. RMAs include riparian corridors, wetlands, intermittent, perennial, and headwater streams, and other areas where "proper" ecological function is crucial for maintaining water, sediment, woody debris, and nutrient delivery to the system, so that they function within the natural range of variability.

RMA width is a function of site condition and is based on potential to affect aquatic and riparian function and value. This strategy allows for adjustment of RMA widths to reflect site-specific conditions while also recognizing watershed-wide riparian conditions and trends. The widths of RMAs shall be adequate to protect the stream from non-channelized sediment inputs and sufficient in size to deliver organic matter and woody debris, as well as to provide stream shade and bank stability. RMA dimensions may be modified or adjusted via watershed analysis, or where stream reach data and/or site-specific analysis supports a modification to default RMA dimensions, including during project-level planning.

With the exception of units where RMA dimensions have been modified as a result of site-specific analysis or the presence of roads, the following default RMA dimensions would be implemented on all units within the Project Area within the following four categories of stream or water body:

Category 1: Fish-bearing streams
Category 2: Perennial non-fish bearing streams
Category 3: Ponds, lakes, reservoirs, and wetlands greater than one acre
Category 4: Intermittent or seasonally flowing streams and wetlands less than one acre, and unstable areas (i.e., landslides and landslide-prone areas).

Category 1 RMAs consist of the stream and the area on either side of the stream extending from the edges of the active stream channel to the top of the inner gorge, or the extent of the Rosgen flood-prone area width (Rosgen 1996), or to the outer edges of riparian vegetation, or to the extent of unstable source areas, or 300 feet slope distance on both sides of the stream channel, whichever is greatest.

Category 2 RMAs consist of the stream and the area on either side of the stream extending from the edges of the active stream channel to the top of the inner gorge, or the extent of the Rosgen flood-prone area width (Rosgen 1996), or to the outer edges of riparian vegetation, or to the extent of unstable source areas, or 150 feet slope distance on both sides of the stream channel, whichever is greatest.

Category 3 RMAs consist of the body of water or wetland and the area to the outer edges of riparian vegetation, or to the extent of the seasonally saturated soil, or 150 feet slope distance from the edge of the maximum pool elevation of constructed ponds and reservoirs, or from the edge of the wetland, pond, or lake, whichever is greatest.

Category 4 RMAs consist of the intermittent or seasonally flowing stream channel or wetland to the extent of unstable source areas, or to the outer edges of riparian vegetation, or 50 feet slope distance on both sides of the stream channel or from the edge of the wetland, pond, or lake, whichever is greatest.

3.6.1 *Alternative 1 - No Action*

Under the No Action Alternative stream temperature and sediment in the Project Area would be expected to either stay the same or increase. Factors contributing to an increase in water temperature would include high intensity wildfire and sediment supplied by continued channel incision. Left in its current condition, the upland and riparian conifer density would leave watersheds susceptible to high intensity and high severity wildfire. The loss of overstory in the riparian area (e.g., conifers, riparian shrubs, and graminoids) as a result of a wildfire represents a risk of long-term reduction in shade contribution and a long-term increase in stream temperatures within and downstream of the project area. Furthermore, high intensity and high severity wildfire would increase sediment inputs into the streams due to erosion of upland soils leading to elevated stream water temperatures.

Rates of stream bank and stream bed erosion associated with channel incision would continue at current levels or increase due to conifer encroachment and loss of riparian woody species under the no action alternative. Conifer encroachment into the riparian area would continue and increasingly inhibit riparian woody and herbaceous species success. Riparian species not only provide shade but have root densities that stabilize banks, promote channel sinuosity, and maintain bank erosion rates appropriate for landscape position. The continued loss of riparian species represents a risk of continued or increased sediment inputs into streams due to headcuts, channel incision, and channel bank and bed erosion.

The magnitude, timing, duration, pattern and variability in stream discharges under the No Action Alternative would continue to vary as a function of climatic variability, channel morphology, roads, vegetative cover, grazing, mining, drainage-network density, and wildfire. A large wildfire would change overstory, understory, and ground cover abundance and community structure, thereby increasing runoff and sediment delivery to streams. Continued loss of riparian woody and herbaceous species cover would further decrease floodplain recharge and late season flows.

Channel morphology and stream bank stability are expected to continue along their current trajectories under the no action alternative. Expanding conifers into the riparian area would continue to shade out desirable riparian vegetation leading to further channel incision, decreased sinuosity, increased headcutting and degradation of fisheries habitat.

3.6.2 *Alternative 2 - Proposed Action*

The combined activities within thinning units (i.e. Underburning, jackpot and pile burning, conifer cutting) would not alter water and riparian resources because the treatment areas are physically separated by standard or site specific buffers that adequately trap sediment, promote infiltration, and are free of channelized flow. There would be no decrease in the amount of shade provided to the stream or streambank stability, so stream temperatures would not increase over current conditions. The maintenance of current bank resistance from roots means that the channel's sensitivity to instream erosion would remain the same and there would be no

additional channel incision or widening as a result of the harvest. Therefore, there would be no changes in water depths or stream velocities for a given discharge.

There is little potential for these treatments to contribute sediment into a stream channel because there are sufficient distances and ground cover between the channels and activities to effectively trap any sediment that might leave the site via overland flow. No increase in runoff would be expected because the low-moderate intensity fire would not remove large overstory or create hydrophobic soils. In addition, the activities would not result in a reduction in stream bank and/or bed stability over current conditions. At present, the major source of sediment in some of the streams is natural erosion of the stream banks and channel bed.

Thinning of trees can increase openings in the forest canopy, which in turn can lead to greater accumulations of snow in these openings than would occur in an undisturbed forest. Warm rain-on-snow events can melt this increased snowpack quickly and result in higher than normal flows. Since the proposed project involves non-commercial thinning and prescribed burning, not all trees would be harvested, therefore openings created in the forest canopy would be small. The trees left on site are expected to respond to the thinning with increased growth due to the reduction in competition. This growth from the trees left on site would result in the incremental chance of a temporary increase in snowpack (e.g., < 10 years). Furthermore, with the relatively small amount of non-commercial thinning (3,700 acres) and the fact that project sites are spread out between six different watersheds, no measurable increase in peak flows from the proposed activity is anticipated.

Increases in base flows due to removal of vegetation are expected to be minimal and short term (e.g., < 5 years). An increase in base flow can be expected after harvesting of trees in forested areas since the harvested trees are no longer using water from the site; however, the remaining trees may use more water than they had previously. Additionally, increased grass and brush cover is expected, which would also utilize more water. No increase in runoff would be expected due to underburning because a low-moderate intensity fire would not remove large overstory or create hydrophobic soils. Thus, the combined activities in the thinning units would have no effect on stream discharge (i.e., magnitude, timing, duration, pattern, and variability).

Conifer cutting to remove encroaching juniper would have no effect on stream temperatures, sediment inputs, discharge patterns, or channel bank and bed stability from current conditions. The reduction in overstory canopy would not decrease shade to streams. Removal of juniper by manual cutting causes minimal ground disturbance that could expose soils to erosion. Buffers would maintain stream bank and bed stability at current conditions and therefore would not result in channel widening or incision, both of which can lead to increases in stream temperatures and sediment inputs. While the hydrologic response of juniper removal is variable and not well understood, there is anecdotal evidence that show increased discharge in streams and springs following juniper removal (Miller *et. al.,* 2005). Should base flows increase and extend later into the hot season following treatment, there would be measurable beneficial effects to water and riparian resources, including a potential reduction in stream temperatures, narrower stream channels, wider riparian areas, and improved bank stability due to riparian vegetation expansion.

Jackpot and pile burning in mountain big sagebrush, Wyoming sagebrush, bunchgrass, and mountain shrub communities would have no short-term adverse effects on water and riparian resources because there would be effective buffers between burned areas and the channel. No increase in runoff would be expected because the low-moderate intensity would not create

hydrophobic soils. If or when erosion was to occur following burning of juniper - sagebrush steppe communities, it would typically occur within the first 18 months following prescribed fire (Wright *et. al.,* 1976). However, erosion in sagebrush steppe communities most often takes place during storm events in mid-late summer. Burning in the fall would minimize or negate short-term impacts allowing adequate spring growth of vegetation cover to stabilize bare ground before storms events occur the following season. Furthermore, the burns would occur at low to moderate intensity to prevent the development of hydrophobic soils (except in pockets) and maintain some ground cover. Thinning and fire treatments in this project would not affect aquatic habitat for fish or fish populations in the area. Although a non-measureable, negligible amount of sediment would reach fish bearing streams, no instream structures would be removed, and there would be no effect to streambank and channel stability. Reduction of conifers within standard and site-specific buffers would be done according to the project design features and would allow rapidly growing riparian woody species to increase and improve fisheries habitat over the long-term. Riparian species provide higher bank stability functions and would promote increased sinuosity, groundwater storage, and late season flows.

3.6.3 *Alternative 3 - No Commercial Biomass*

Impacts would be similar to the proposed action with the exception that surface disturbing activities associated with biomass removal would not take place and more jackpot burning would be done.

3.6.4 *Cumulative Impacts*

Past and current land use activities within riparian areas include, but are not limited to, livestock use, mining, water diversions, road construction and maintenance, noxious weed infestations, recreational activities (including off-highway travel), fence construction along riparian areas, uncontrolled wildfire, and rights-of-way construction. Most of the existing land use activities are expected to continue to some extent in the future and would continue to impact riparian/wetland areas in a similar fashion. Current vegetative treatments combined with future vegetative treatments would assist in improving overall riparian/wetland health. Riparian and fisheries management policy and guidance would also help to reduce overall impacts to riparian resources.

Past and present placer mining impacts are visible in riparian areas within the project area on both private and BLM land. Future placer mining is expected on BLM lands over the next 10-20 years. Historic placer mining has left excessive sediment throughout riparian areas within the project area, where riparian vegetation remains scant and dominated by colonizers. The proposed alternative would implement activities on a small portion of this area and, consequently, contribute negligible and non-measurable impacts on upland hydrology, stream water quality, and riparian condition.

As described in the Forest and Forest Health effects analysis, past timber harvest activity occurred on approximately 39,500 acres of public and private land between 1950 and 2010. The existing roads from these past activities would be used for access for this project. Due to the small scale of this project (based on treatment unit size and distribution), project implementation would not add to cumulative effects on riparian or fisheries resources within the analysis area.

Historic livestock grazing on allotments within the project area have left select streams in the areas vulnerable to unraveling during future high flow events. These stream systems are

showing favorable responses to changes in current grazing management; therefore it is expected that implementation of this project would not add to cumulative effects within the analysis area.

Past, present, and reasonably foreseeable future actions would have minimal impact on water quality above the natural fluctuations resulting from seasonal events. Implementing the Proposed Action, the Alternative Action or a combination thereof would result in impacts similar to those already discussed in their respective sections. Future vegetation treatment actions, combined with present actions, should improve the overall watershed stability. Combining past, present, and future treatments should minimize cumulative impacts to water quality by improving watershed stabilization and vegetation conditions. Improved vegetative conditions and overall resource and watershed stabilization should minimize the amount of sedimentation that could be deposited into riparian and wetland areas, which would minimize the cumulative impacts to water quality, riparian habitat, and fisheries habitat.

3.7 Wildlife/Wildlife Habitat and Special Status Wildlife Species

Affected Environment

Wildlife habitat types present and management considerations

The Baker Habitat Restoration and Fuels Reduction Project is predominately comprised of sagebrush steppe habitat and a network of streams and are intermediate in nature. No true juniper woodlands are present; however, there are areas that have encroaching Phase I and II western juniper. Given the dominance of sagebrush steppe habitat, the following upland wildlife habitat management documents provide important insight and guidance relevant to the analysis area: (1) BLM national sage-grouse habitat conservation strategy (USDI 2004, (2) Greater Sage-grouse Conservation Assessment and Strategy for Oregon (Hagen 2005 and updated ODFW 2011), and (3) BLM Technical Note 417 Assessing Big Sagebrush at Multiple Spatial Scales (Karl and Sadowski 2005).

All documents listed above describe desirable habitat conditions and promote actions needed to conserve greater sage-grouse. In addition, each document highlights the importance of managing public land in a way that would support communities of sagebrush steppe species at the landscape level. According to Maser *et. al.*, (1984), about 100 to 190 species of rangeland wildlife either breed or feed within big sagebrush habitats, depending upon shrub structural characteristics. Other published documents also indicate substantial wildlife reliance upon sagebrush for all or part of their life history requirements. For instance, even though black-tailed jackrabbits (*Lepus californicus*) are not considered true sagebrush obligates, on public land they are often most often associated with sagebrush cover and they are an important prey species for raptors or other mammalian predators. Thus, the ecological web for wildlife in sagebrush steppe is quite complex and BLM management decisions must go beyond considerations that address true sagebrush-dependent species only.

Sagebrush dependent wildlife either known to occur or very likely to occur within the analysis area include the following:

- *Birds* – greater sage-grouse (*Centrocercus urophasianus*), sage sparrow (*Amphispiza belli*), brewer's sparrow (*Spizella breweri*), vesper sparrow (*Pooecetes gramineus*), black-throated sparrow (*Amphispiza bilineata*), lark sparrow (*Chondestes grammacus*), loggerhead

shrike (*Lanius ludovicianus*), green-tailed towhee (*Pipilo chlorurus*), and sage thrasher (*Oreoscoptes montanus*).

- *Mammals* - sagebrush vole (*Lemmiscus curtatus*) and American pronghorn (*Antilocapra americana*). Sagebrush voles have a strong affinity for sagebrush but may occur in areas lacking sagebrush overstory if grass understories are dense and well developed.

By practicing good land use stewardship BLM would likely benefit multiple species of wildlife and avoid the future need for listing animals under protection of federal or state ESA. Habitat restoration and promotion of healthy wildlife communities can be met by accomplishing the following:

1. Limit the geographic extent of grassland habitats, or those rangelands that support less than 5 percent sagebrush canopy cover. Sagebrush shrubland habitats ($\geq$ 5 percent sagebrush canopy cover) typically support much more diverse wildlife communities than grasslands (< 5 percent sagebrush canopy cover) (Karl and Sadowski 2005).

2. Promote healthy riparian habitat conditions by removing juniper competition in sagebrush communities.

Endangered Species Act (ESA) Considerations

According to the best available records and field observations, no established federal or state listed species currently occur within the analysis area. However, there is potential supporting habitat for gray wolves. Gray wolves (canis lupus) are listed as endangered under the ESA (1973), but because there are no documented denning or rendezvous sites and the project would not change habitat distribution or change prey opportunities, there would be no effect or need to consult with USFWS under section 7 of the federal ESA. Several unlisted species present are of concern to the USFWS and BLM.

Relatively common wildlife species present

Representative non-game species include: Black-tailed jackrabbit (*Lepus californicus*), American badger (*Taxidea taxus*)), Belding ground squirrel (*Belding ground squirrel*), red-tailed hawk (*Buteo jamaicensis*), golden eagle (*Aquila chrysaetos*), Luzuli bunting (*Passerina amoena*), yellow warbler (*Dendroica petechia*), sage sparrow (*Amphispiza belli*), common nighthawk (*Chordeiles minor*), Cooper's hawk (*Accipiter cooperi*), and great horned owl (*Bubo virginianus*).

Neotropical and Migratory Bird Species

Under Executive Order 13186, the BLM is mandated to strive to protect, restore, enhance, and manage habitats of migratory birds, and prevent the further loss and degradation of habitats on public lands. The BLM also has the responsibility to adhere to the mandates set forth under the Migratory Bird Species Act of 1918, which implements various treaties and conventions between the U.S. and Canada, Japan, Mexico, and the former Soviet Union for the protection of migratory birds. Under the act, it is unlawful to pursue, hunt, take, capture (or kill) a migratory bird except as permitted by regulation (16 U.S. Code 703-704). In addition to the executive order and Migratory Bird Species Act, the BLM has a Memorandum of Understanding with Partners in

Flight to stimulate and support an active approach to conservation of land birds in Oregon and Washington states. The overall goal of Partners in Flight bird conservation planning is to ensure long-term maintenance of healthy populations of native land birds.

The Project Area provides habitat for neotropical migratory land birds (birds that migrate that are not waterfowl or birds associated with wetland areas) that prefer sagebrush, grassland, and juniper woodland habitats. Migratory bird species use suitable habitat in this area for nesting, foraging, and resting as they pass through on their yearly migrations. Migratory bird species use suitable habitat in this area for nesting, foraging, and resting as they pass through on their yearly migrations; however, no formal monitoring for migratory birds has been conducted within the project area. Grassland and sagebrush associated species present seasonally include horned lark (*Eremophila alpestris*), Brewer's sparrow (*Spizella breweri*), sage thrasher (*Oreoscoptes montanus*), loggerhead shrike (*Lanius ludovicianus*), and sage sparrow (*Amphispiza belli*). Woodland associated species that may be found within the amendment area or project boundaries include gray flycatcher (*Empidonax wrightii*), dusky flycatcher (*Empidonax oberholseri*), dark-eyed junco (*Junco hyemalis*), and chipping sparrow (*Spizella passerina*). Large, old juniper trees in the Project Area may support cavity nesting species, such as mountain bluebird (*Sialia currucoides*), northern flicker (*Colaptes auratus*), and American kestrel (*Falco sparverius*). Other species observed or expected to occur in the Project Area include American robin (*Turdus migratorius*), brown-headed cowbird (*Molothrus ater*), western meadowlark (*Sturnella neglecta*), and ferruginous hawk (*Buteo regalis*). In areas where juniper is in an intermediate stage of transition to woodlands, migratory bird diversity and richness is relatively high.

Table 3. Wildlife of management importance according to season of use and key habitat characteristics.

Wildlife of Management Importance within Baker Habitat Restoration and Fuels Reduction Project	**Season of Use**	**Principal Habitat Dependency for Forage, Cover, Structure, and Security**
American pronghorn Rocky Mountain mule deer ferruginous hawk	Spring through fall	Mixed shrublands and grasslands
*greater sage-grouse	Spring through Winter	Shrublands Winter use – at least 10% sagebrush canopy cover Nesting use – at least 15%-25% or more sagebrush canopy cover Brooding- canopy cover of at least 15% of grasses and forbs
*sagebrush vole, *Brewer's sparrow, *horned lark, *western meadowlark, *black-throated sparrow, *sage sparrow, *loggerhead shrike, *sage thrasher	Spring through summer	Shrublands At least 10% sagebrush canopy cover

Wildlife of Management Importance within Baker Habitat Restoration and Fuels Reduction Project	Season of Use	Principal Habitat Dependency for Forage, Cover, Structure, and Security
Rocky Mountain mule deer yellow warbler	Spring through fall	Woody riparian species such as willow and herbaceous species such as grasses, forbs, sedges, and rushes.
* Species associated with shrub steppe habitats that are at risk throughout the west that have declined substantially in the Interior Columbia Basin area since historical times.		

Special status wildlife narratives and species of local importance

There are five BLM special status wildlife species known to breed on public land, uses public land for part of their life history requirements , or has potential habitat located within the Project Area. These species include: pygmy rabbit (*Brachylagus idahoensis*), greater sage-grouse (*Centrocerus urophasianus),* pallid bat (*Antrozous pallidus*), Townsend's big-eared bat (*Corynorhinus townsendii*), and big game (mule deer and elk).

Brief life history narratives for special status wildlife or habitat are as follows:

Pygmy rabbit

Systematic searches for pygmy rabbits have occurred in northeast Oregon within Malheur County (personal communication, Michelle Caviness Vale District lead wildlife biologist 2011). The search found that the rabbits are using habitat that is not typically associated with pygmy rabbits. Characteristically, pygmy rabbits require dense (normally >25percent canopy cover) Wyoming, basin, or mountain big sagebrush for both shelter and food (Green and Flinders 1980). They prefer soils that are loose enough to excavate burrows, but compact enough to keep their shape (Galber et al 2001). Burrow systems are typically constructed at the base of big sagebrush plants, reinforcing the vital role of sagebrush to pygmy rabbit survival and primary food source (Galber et al 2001). Although they eat more than just sagebrush, they are considered a sagebrush-dependent species (Weiss and Verts 1984). However, surveys within the northern portion of Malheur County have found that pygmy rabbits are using high elevation sites with shallow soils in areas that have less that 20 percent canopy cover. Furthermore, mountain big sagebrush and bittercherry was the dominant vegetation community surveyed (personal communication, Michelle Caviness Vale District lead wildlife biologist 2011). The area surveyed does not fit a typical pygmy rabbit habitat model (i.e., Wyoming big sagebrush, shallow soils, a canopy cover less than 20 percent). The Baker Habitat Project has isolated pockets of habitat that would support non-typical pygmy rabbit habitat similar to what was surveyed in Malheur County.

Greater Sage-Grouse

For this analysis, the BLM used the Oregon Conservation Strategy (Hagen 2011), 12 month finding from USFWS (2010), and greater sage-grouse monographs (Connelly et al. 2011) to develop design features as well as contribute to the scientific background of greater sage-grouse (hereafter referred to as sage-grouse).

Sage-grouse represent a focal species for sagebrush conservation because they are sagebrush obligates that select habitats at multiple spatial scales (Stiver et al. 2006). Within these different spatial scales, there is considerable information for home ranges and populations (Schroeder et al. 2004; Connelly et al. 2004). To fulfill their lifecycle needs, sage-grouse can move several miles that encompass different types of habitats (Connelly et al. 2011). The spatial scales are broken into four orders (broad, mid, landscape, and site-specific scales) in which sage-grouse select habitat for their life-history needs. Conservation for sage-grouse is a scale-dependent process whereby priority landscapes are identified across the species range (broad-scale) and appropriate conservation actions are implemented within seasonal habitats to benefit populations (landscape/site-scale).

Broad-scale (First order)

On a broad-scale, sage-grouse historically lived in the sagebrush-steppe regions of southern British Columbia, Canada, and throughout eastern Washington and Oregon (Schroeder et al. 2004). However, because of habitat loss, degradation, and fragmentation, available habitat for sage-grouse has declined to nearly half of what was historically documented (Aldridge et al. 2008). Habitat loss has affected broad-scale population distribution with some areas experiencing a decline of 45-85 percent and site-specific declines of 17-92 percent (Connelly et al. 2000; Aldridge and Brigham 2001; Aldridge et al. 2008; Connelly et al. 2004; Hagen 2011).

Mid-scale (Second order)

Five sage-grouse populations have been identified in Oregon. The sage-grouse within the Baker Resource Area are part of the Northern Great Basin population, which is managed by four states (Oregon, Idaho, Nevada and Utah). The State of Oregon accounts for approximately 30 percent of the Northern Great Basin population. Although this population's lek count has not changed statistically since 1980, two large increases and two subsequent declines have occurred since that time (Hagen 2011). The Baker Field Office manages 194,070 acres of sage-grouse habitat, which accounts for 1.6 percent of the population within the State of Oregon.

Fine-scale (Third order)

Fine-scale takes into account seasonal use areas and/or home ranges of sage-grouse associated with a lek or group of leks. Seasonal habitat availability, connectivity, and anthropogenic disturbances are also described at this scale. The BLM uses the Baker Resource Area administrative boundary as the area for the landscape scale because ODFW reports lek trend data using BLM-administrative boundaries instead of at the subpopulation level (Hagen 2011).

Fifty-two lek sites have been identified in the Baker Resource Area. The data from ODFW shows an overall non-statistically significant negative trend in average number of males per lek since 1980 (Hagen 2011). However, ODFW has documented a slight increase in 2009 and 2010 and a decline from 2011-2012. There are only two known lek sites within the project area.

Site-specific (Fourth order)

Habitat suitability at the site-specific scale describes the more detailed vegetation of seasonal habitat characteristics such as canopy cover and height of sagebrush (nesting and wintering), the associated understory vegetation (nesting, early-brooding), and vegetation associated with

riparian areas, wet meadows, and other mesic habitats adjacent to sagebrush (late-brooding/summering) (Stiver et al. 2006). The Baker Habitat Restoration and Fuel Reduction Project will treat all sage-grouse life stages habitat, but to what extent is not currently known. The vegetative community within the Baker Habitat Restoration and Fuel Reduction Project area consists of mountain big/basin big sagebrush with an understory of bluebunch wheatgrass, Idaho fescue, and bottlebrush squirrel tail which is capable of providing the vegetation structure needed for nesting (Braun et al 1977; Braun et al 2005; Connelly et al 2000). These grasses are also important in providing screening cover for brood-rearing (France et al 2008). Sagebrush density and stature is especially important during winter (Homer et al 1993). Areas that have dense canopy cover or sagebrush that is at least 10-12 inches above snow level would provide both food and cover for wintering sage-grouse within the Project Area (Hagen 2011). Alternatively, low sagebrush may also provide some wintering habitat if sagebrush is kept clear of snow (ODFW 2011). In general, sage-grouse would use western or southern facing aspects that have at least 20 percent density sagebrush cover (Homer et al 1993).

There are no known wintering areas within the Project Area. However, there are some areas that would be suitable habitat for winter use because sagebrush density, stature, and aspect would be consistent to sage-grouse needs. Wintering areas are the most difficult habitats to map for sage-grouse (Stiver *et. al.,* 2010). Wintering areas may be located in inaccessible regions, may vary based upon weather and may be found long distances from other known habitats (e.g. lekking, nesting, brooding). However, within the Project Area in higher elevations sagebrush stands are relatively unfragmented so nesting, brooding, and wintering habitat areas could potentially occur in close proximity.

The USFWS identified seven threats to destruction, modification or curtailment of habitat or range which are 1) habitat conversion for agriculture, urbanization and infrastructure, 2) fire, 3) invasive plant and juniper encroachment, 4) grazing, 5) energy development, 6) climate change and 7) habitat fragmentation. For this analysis, the focus will be threat (3) invasive plants and juniper encroachment. A full analysis of the seven threats to sage-grouse habitat is available in the Pedro Mountain EA (USDI 2012).

Pallid bat

Pallid bats are found in arid deserts, juniper woodlands, grasslands, and sagebrush shrub-steppe habitats that often have a rock outcrop component with water nearby. They are less abundant in evergreen and mixed conifer woodlands; however, they utilize edge habitat that have these characteristics (Crampton and Barclay 1998). They typically roost in rock crevices, less often in caves, tree hollows, and abandoned mines. Roosting habitat often favored by this bat (i.e., crevices in cliffs and rock outcrops) provides protection from many kinds of disturbance. Lands within the project area provide steep rocky banks that would be congruent to pallid bat habitat needs. Bat surveys in close proximity to the project area have documented that hoary bats and big and little brown bats inhabit this area, but pallid bats have not been caught.

Townsend's big-eared bat

Townsend's big-eared bats use a variety of habitats, almost always near caves or other roosting areas (Sherwin et al 2000). They can be found in pine forests and arid desert scrub habitats. Lands within the project area provide suitable roosting and foraging habitat congruent to Townsend's big-eared bat habitat needs. Bat surveys in close proximity to the project area have documented that hoary bats and big and little brown bats inhabit this area, but Townsend's big-eared bat have not been caught.

Big game

The Baker Habitat Restoration and Fuel Reduction Project Area offer a variety of habitats which big game would find suitable for their life-history needs. Some common big game species within the Project Area include: mule deer, elk, and pronghorn. In fact the entire Project Area is classified as deer and elk winter range. Some other less common big game species found within the Project Area are bear, cougar and California bighorn. Careful application of juniper reduction treatments would conserve and benefit big game habitat. Encroaching juniper is degrading sagebrush habitat to various degrees throughout much of the area, and negatively impacting sagebrush associated species.

Assumptions common to all alternatives

The minimum shrub composition requirements for primary wildlife species under all EA alternatives include the following:

- Sagebrush steppe at < 5 percent shrub canopy cover, or predominantly grassland communities: American pronghorn, horned lark.

- Sagebrush steppe at $\geq$ 5 percent shrub canopy cover, or predominantly shrubland communities: greater sage-grouse, brewer's sparrow, sage thrasher, green-tailed towhee, gray flycatcher, ferruginous hawk, sagebrush vole, pygmy rabbit (hypothetical), western meadowlark, black-tailed jackrabbit, and mule deer.

Magnitude of Impacts

- Negligible impacts are defined as: impacts on wildlife species would be at or below the level of detection, and the changes would be so slight that they would not be of any measurable or perceptible consequence to individuals or the population as a whole.

- Minor impacts are defined as: the impacts on wildlife species would be detectable but localized, small, and of little consequence to the population of any species. Mitigating measures, if needed to offset adverse effects, would be simple and successful.

- Moderate impacts are defined as: the impacts on special status wildlife would be readily detectable and localized, with potential consequences at the population level. Mitigating

measures, if needed to offset adverse effects, would be extensive and would probably be successful.

- Major impacts are defined as: impacts on special status wildlife would be obvious and would result in substantial consequences to the populations in the region. Extensive mitigating measures would be needed to offset adverse effects, and their success would not be guaranteed. Actions that would likely result in effects to special status species of this severity would not be authorized or undertaken.

3.7.1 *Alternative 1 - No Action*

Pygmy rabbit

Pygmy rabbits are in decline throughout their range due to habitat loss, habitat degradation, and fragmentation (Weiss and Verts 1984). The No Action Alternative would have a higher probability compared to all alternatives of converting Wyoming big sagebrush stands into non-native annual grass as well as western juniper (Miller 1994). Non native grasses and juniper invasion has been identified as some of the factors contributing to the reduction of suitable pygmy rabbit habitat and is a probable factor causing the decline in pygmy rabbits population (Gabler *et. al.,* 2001; Rowland *et. al.,* 2008). Rowland *et. al.,* (2008), found that the expansion of juniper woodlands is partially responsible for the decline of western North Americans sagebrush especially in quality of the ecosystems. Therefore, it is expected that under this alternative the most acres of potential pygmy rabbit habitat could be converted into a vegetative community that may not support pygmy rabbit habitat.

Greater Sage-Grouse

The continuation of western juniper encroachment would be expected to further diminish already weakened perennial grasses and likely invite further occupation of invasive annuals or noxious weeds in the Project Area. Because native grasses and forbs provide important lateral and overhead hiding cover for ground-nesting birds for concealment and juniper would provide perching sites for predatory birds (e.g. hawks and ravens) would diminish ground-nesting bird habitat quality (Belsky 1996). It is probable that without habitat restoration more suitable sage-grouse nesting habitat would be lost through juniper and conifer encroachment.

The primary habitat found within Project Area includes lekking, nesting, brooding, and wintering habitat.

A sage-grouse is classified as a sagebrush obligate species because sage-grouse require sagebrush during all stages of their life-history needs (McAdoo and Back 2001). Research has found that habitat suitability for sage-grouse depends on the structural complexity of habitat; which is dependent on seasonal movements, spatial arraignments, size of habitat, and the vegetation condition (McAdoo and Back unknown). Research has found that maintaining and/or restoring sagebrush shrub and native grass communities has helped improve overall sage-grouse habitat be reducing nest predation by increasing screening cover and food availability (Braun *et. al.,* 2005; France *et. al.,* 2008).

The No Action Alternative would not maintain vegetation structural components needed to conceal sage-grouse while nesting and brooding. Specifically, Alternative 1would favor early to mid-seral grasses (e.g. Sandberg bluegrass, bottlebrush squirreltail, and bluebunch wheatgrass) and non-native annual grasses (e.g. cheatgrass) which are not considered optimal habitat for sage-grouse nesting and brood rearing habitat (Braun *et. al.,* 2005; Crawford *et. al.,* 2004). It is expected that sage-grouse nest predation would be the greatest in Alternative 1 because the high risk of converting native sagebrush stands to a nonnative annual grass communities which would reduce screening cover for nesting and brooding. In addition, phase II and III stands of juniper are not conducive to any sage-grouse life-cycles because of reduced sagebrush, and increased perch sites for predators therefore, it is expected that food and habitat availability for sage-grouse during all life stages would be the lowest under Alternative 1.

Pallid bat

Pallid bat habitat includes juniper woodlands and sage-brush steppe therefore the BLM believes all alternatives would have no effect to Pallid bat. Therefore, Pallid bat will not be further analyzed.

Townsend's big-eared bat

Townsend's big-eared bat habitat includes juniper woodlands and sage-brush steppe therefore the BLM believes all alternatives would have to effect to Townsend's big-eared bat. Therefore, Townsend's big eared bat will not be further analyzed.

Big Game

The risk of devastating wildfire to the summer range and critical winter range within the Project Area would remain high. Western juniper encroachment into key winter and fall mule deer browse areas would result in the eventual loss of the shrub understory which would make the area nearly unusable by big game. Loss of shrubs as a cover for mule deer could make deer retreat to less favorable areas; this would affect both residential and migrating big game herds. Losing high quality big game forage especially in the summer and fall translates into higher fawn mortality which is important to the populations in the general area.

In addition to the increased risk of high severity fire, current habitat conditions increases the risk of non-native annual grass and further juniper invasion by reducing the vigor of native perennial grasses and changing a community ecotype and fire regime (Brewer *et. al.,* 2008; Miller 1994). Increasing the acres of non-native annual grass and western juniper would reduce the amount of winter forage for big game wildlife. Specifically, mule deer rely on lower elevation sagebrush for winter forage (Nicholson *et. al.,* 1997). If undesirable non-native grasses were to occupy this area and fire frequency increases the sagebrush component would reduce from the current level of 10-20 percent to 0-5 percent; this would be further compounded by greater fire severity because of additional juniper fuels. This reduction in sagebrush would reduce the winter survivability of mule deer (Clements and Young 1997).

Conversion into a juniper woodland and invasion of non-native annual grass can also have an adverse effect to elk habitat because annual grasses are generally lower nutrition (McCorquodale *et. al.,* 1986). Specifically, elk diet consists of grasses which can include non-native annuals. Production of non-native annual grass can vary significantly from year to year depending on amount of precipitation. In addition, non-native annual grass is only palatable during the early spring and late fall whereas native vegetation is palatable during all seasons. Therefore, if the Project Area converted to non-native annual grass vegetation mid spring to early fall habitat would be lost.

Under existing management, juniper and conifer encroachment within wildlife habitat is common within this Project Area. Existing specialized area, like aspen clones, occur in even-aged stands that are likely to disappear over the next few decades unless new recruitment occurs. Reduction in aspen communities is further compounded by encroaching juniper accelerating aspen loss within the Project Area. Western juniper is a strong competitor for available moisture and nutrients and it would eventually replace aspen with juniper woodland habitat. Thus, the removal of juniper encroachment in aspen communities in order to protect important riparian wildlife habitat values including forage, cover, structure, and surface water would be moderately beneficial.

General Wildlife

Under this alternative general wildlife habitat would continue to decline because of juniper encroachment. Expanding juniper stands which in time will reduce native shrub, forb and grass species. To date, juniper encroachment has lowered the habitat complexity for wildlife converting some areas to juniper dominated stand. If not treated, plant communities would continue to transition toward juniper woodlands with reduced herbaceous understory. Browse species (bitterbrush, big sagebrush) would continue to decrease in quantity, health, and vigor. This would decrease habitat quality for general wildlife that utilize sagebrush habitats. In addition the expansion of juniper would reduce sagebrush and bunchgrasses; effecting small mammal habitat (a prey base for larger predators).

Although juniper expansion may initially benefit migratory bird diversity by increasing habitat available for tree nesting species, extensive encroachment would lead to decreased diversity as large areas of sagebrush habitat are converted to dense stands of juniper with little understory (Miller *et. al.,* 2005). Selection of this alternative would not impact migratory birds over the long-term (<10 years); however, as juniper advances into adjacent habitat, grassland and sagebrush associated species would begin to avoid the area because it would only offer a monoculture of juniper with little prey base for food.

Although Alternative 1 would offer short-term effects for migratory birds species the choice of this alternative would not out-weigh long-term adverse effects to special status and general wildlife habitat. Without treatment the conversion of sagebrush steppe communities into a monoculture of juniper is evident. Habitat complexity and diversity for wildlife would be reduced increasing the potential of a stand replacing fire which would create an adverse long-term impact that is moderate to major in magnitude.

3.7.2 *Alternative 2 - Proposed Action*

Pygmy rabbit

Alternative 2 would be consistent with maintaining high plant vigor in native late succession perennial bunchgrasses and maintain sagebrush by the reduction of juniper. The increase in plant vigor on public lands would reduce the probability of native stands of mountain big sagebrush converting to non-native annual grass as compared to Alternative 1. However, invasion of non-native annual grass is expected to increase on adjacent private lands under Alternative 2 (see cumulative effects section). Therefore, Alternative 2 would result in higher quality pygmy rabbit habitat on public lands as compared to Alternative 1.

Greater Sage-Grouse

This Project Area can support all lifecycles for sage-grouse. However, current research has identified a need to improve nesting and brood rearing habitats to reduce predation and increase food availability (e.g. forbs) for juvenile sage-grouse (Gregg *et. al.*, 1994; Beck *et. al.*, 2000; France *et. al.*, 2008). Under the Proposed Action, restoration of wildlife habitat would be consistent with maintaining a vegetation structural component needed to conceal sage-grouse while nesting and brooding. This alternative would also interrupt the progression of juniper towards Phase III which the BLM does not considered sage-grouse habitat because of the amount of perch-sites for predatory birds and little screening cover for hiding. Therefore, interruption of a sagebrush community progression to Phase III would have a moderate to major beneficial effect on sage-grouse habitat.

Big Game

As opposed to the No Action Alternative, habitat restoration under Alternative 2 would increase habitat quality for big game animals within the Project Area. Reducing the juniper within the Project Area would help increase the diversity and complexity of the habitat used by big game wildlife species. Reduction of the risk of devastating wildfire would be a benefit to the summer range in higher elevations and critical winter range along the bench within the Project Area. The project would also set western juniper encroachment back which would retain mule deer key browse species or allow it to become more abundant and vigorous. Retention or re-establishment of shrubs as a cover for mule deer is an important benefit that would result from the proposed treatment. The treatment would be important for local deer and also migratory deer. Retaining high quality mule deer forage especially in the summer and fall translates into better fawn survival that is important to the populations in the general area. Encroaching juniper displaces perennial native grasses used for foraging and Alternative 2 would reduce juniper therefor increasing habitat values for big game that would be moderately beneficial for big game wildlife species.

General Wildlife

The Proposed Action would interrupt the progression of sagebrush communities moving towards Phase III juniper woodland that would be at risk of complete loss of sagebrush and other vegetation critical for wildlife species. Treatments would remove perches used by avian predators while maintaining or stimulating the herbaceous understory. All habitat components for wildlife that use a sagebrush habitat community would improve as a result of juniper reduction treatments. Areas of Wyoming and mountain big sagebrush and low sagebrush sites currently considered to be marginal or unsuitable for sagebrush obligates due to juniper expansion would return to functional condition. Removal of cut juniper may cause some short-term disturbance, but would primarily be limited to areas near roads. Disturbance would diminish over time as easily accessible juniper is removed by the public and remaining concentrations are jackpot burned or piled and burned.

Overall, the Proposed Action would help enhance habitat for both special status and general wildlife species by interrupting the progression of encroaching juniper. This would be beneficial in maintaining a habitat community that has a native grass and shrub component. This alternative would provide long-term beneficial impacts that are moderate in magnitude for wildlife species.

3.7.3 *Alternative 3 - No Commercial Biomass*

Alternative 3 would be the similar to Alternative 2 for all special status and general wildlife species except removed juniper would be left on site, machine piled or jackpot burned. Juniper left on site would benefit some wildlife species such as small mammals and some species of birds. However, left biomass may potentially block wildlife from foraging native grasses left under the biomass. Furthermore, left biomass would also provide perching opportunities for predatory birds. Therefore, Alternative 3 would provide long-term beneficial impacts that are slightly lower in magnitude to both general wildlife and special status species habitat when compared to Alternative 2.

3.7.4 *Cumulative Impacts*

Historic and current livestock management has had the greatest impact on existing rangeland health conditions. Most of the Project Area has crossed an ecological threshold which is causing rapid change in the health of the ecosystem. By crossing an ecological threshold signifies the need of intensive treatments (e.g., cutting, using herbicide and seeding with desirable vegetation) would help restore wildlife habitats. These impacts, combined with historic ground disturbing activities (i.e., mining, road construction, and off highway vehicle use) have resulted in adverse effects to vegetative communities in some areas. Subsequently, in the terms of wildlife, adverse impacts has led to decreased amounts of forage/browse, inadequate shrub/tree canopy cover, and species composition for vegetation in some allotment pastures within the Project Area.

However, not all disturbances have been adverse for wildlife habitats. For example, the occurrence of juniper reduction and prescribed fires has reopened areas where perennial grasses historically grew creating more forage for wildlife use. This would be especially important for wildlife in areas that have not crossed an ecological threshold and have received treatments.

Similar to public lands, resource conditions on private lands have been largely affected by livestock grazing followed by any ground disturbing projects and/or fire.

Past and Present Actions

Pygmy rabbit

Recent pygmy rabbit surveys within the Vale BLM district indicates that habitat is primarily located intact native mountain and basin big sagebrush communities. In addition, pygmy rabbits have also been found in Phase I juniper stands that are encroaching into native mountain big sagebrush communities (Personal Communication, Caviness 2010). Past fire management has resulted in juniper encroachment into pygmy rabbit habitat. Most of the encroaching juniper is classified as Phase I or II which can support rabbit habitat however if left unchecked these stands can reach Phase III where shrub and grass component would be lost causing soils to be unstable and not suitable for rabbit burrows.

Greater Sage-Grouse

Fragmentation of sagebrush habitats has been cited as the primary cause of the decline of greater sage-grouse populations (USFWS 2010). Greater sage-grouse are a landscape scale species, requiring large expanses of sagebrush to meet all seasonal habitat requirements (Connelly *et. al.,* 2000). The USFWS analyzed potential factors that may affect the habitat or range of the greater sage-grouse and determined that habitat loss and fragmentation resulting from wildfire, invasive plants species, energy development, and infrastructure development are the primary threats to the species (USFWS 2010). The negative effects of fragmentation on greater sage-grouse habitat are diverse and include reduced lek (courtship site) persistence, lek attendance, winter habitat use, recruitment, yearling annual survival, and female nest-site choice. It has been estimated that sage-grouse habitat has been reduced by 44 percent from the species' historically occupied range (Stiver *et. al.*, 2006). Federal lands (primarily the BLM) make up about 72 percent of the current total range of the species. While this means that federal land management agencies are primarily responsible for habitat management (Connelly *et. al.*, 2004), privately owned lands provide critical seasonal habitats (e.g. wintering and nesting) for many populations. In Oregon, sage-grouse population data has demonstrated an overall decline since the 1940s (Connelly *et. al.,* 2000; Hagen 2005).

Currently, the encroachment of juniper in the upper elevation mountain big sagebrush community is threatening sage-grouse nesting/brood rearing and wintering habitat within the Project Area by changing habitat into habitat sage-grouse would not use. Specifically, sage-grouse avoid areas with overhead visual obstructions consistent with a Phase II or III juniper stand (Crawford *et. al.,* 2004; Beck *et. al.*, 2003). Research has shown that sage-grouse populations respond to habitat change over large spatial scales rather than small-scale management (Aldridge and Boyce 2007; Walker *et. al.*, 2007). Therefore, to address the effects to sage-grouse a larger scale than the Project Area is needed. The Natural Resource Conservation Service (NRCS) has worked with private land owners resulting in 9,000 acres of juniper control in Baker County (Personal Communication, Travis Bloomer 2011) and the BLM has treated 1600 acres throughout Baker County in Sage Grouse habitat. These projects have

improved sage-grouse breeding, nesting, brood rearing and wintering habitats for birds that may rely on habitat outside of the Project Area for part of their habitat needs.

Big Game

Most of the lower elevation big game winter habitat within the Project Area has been converted to agricultural lands. The conservation of remaining winter range big game habitat on both private and public lands is important for local big game herds. The reduction of 10,600 acres (9000 acres private lands and 1600 acres public lands) of juniper has been beneficial for big game habitat within the Baker Resource Area administrative boundary.

Reasonable Foreseeable Actions

There are four identified foreseeable actions that would affect wildlife (both special status and general) in the future. These actions are juniper reduction, livestock management, wind development, and mining. Each action can have adverse or beneficial effects to wildlife and wildlife habitat. A cumulative analysis for each species follows.

Pygmy rabbit

Future projects within the Project Area and surrounding private and public lands would have beneficial effects for pygmy rabbit habitat. It is expected that juniper reduction projects on both BLM and private lands would have a beneficial effect to pygmy rabbits by reducing perch trees for predatory birds and preventing encroaching juniper to reach Phase III stage where native understory vegetation would not be sufficient to maintain soil stability around burrows.

Greater Sage-Grouse

Current research indicates that sage-grouse habitat needs to be managed on a mid-scale therefore reasonable foreseeable actions would be addressed within every Project Area that has sage-grouse habitat. Future projects within the Project Area and surrounding private and public lands would have both adverse and beneficial effects to sage-grouse. Specifically, both NRCS and BLM juniper reductions projects would continue to improve sage-grouse nesting, brooding, and winter habitat on a landscape scale. The NRCS has worked with private land owners resulting in 9,000 acres of juniper control in Baker County (Personal Communication, Travis Bloomer 2011) and the BLM has treated 1,600 acres. The juniper reduction treatments were located within the Baker subpopulation. This reduction in juniper encroachment would reduce the probability of converting native sagebrush community to juniper woodlands. Therefore reducing future sage-grouse habitat fragmentation would result in moderate beneficial effects to the Baker subpopulation. Reduction of juniper is a landscape scale approach to improving nesting, brood rearing and wintering sage-grouse habitat and is expected to reduce predation by predatory birds.

In addition, livestock management would be evaluated in the upcoming grazing environment assessments for surrounding geographical units (GUs). Improving rangeland health by developing grazing systems that promotes high native perennial grass vigor and adequate

screening cover, combined with the effect of the proposed action, would improve sage-grouse nesting, brood rearing and wintering habitats and should reduce nest predation (Holloran *et. al.*, 2005; Crawford *et. al.*, 2004).

There is 6,250 acres that are suitable for wind energy development and may be developed in the future. Although, 6,250 acres is a small portion of the analysis area repercussions from energy development would expand further than the working site. Direct effects would remove mountain big sagebrush vegetative communities and potentially increase propagation of non-native annual grasses reducing rangeland health. It is expected that increases in non-native annual grass would be localized to 100 meters from roads and other ground disturbing actions necessary for wind development (Larson 2002). Future wind energy development and transmission line right of ways are expected to have adverse effects to sage-grouse habitat to both the Baker and East Central Oregon subpopulation. The largest adverse effect to sage-grouse is one proposed Boardman to Hemingway 500kv transmission route and Lime Wind energy project. It is expected that both of these projects would directly remove sage-grouse habitat on public and private lands within the Baker Resource Area boundary. In addition, the Boardman to Hemingway 500kv transmission may also subdivide the northern most portion of the Baker subpopulation. If this were to occur, wintering sites and the Virtue sage-grouse complex may be fragmented from the East Central Oregon subpopulation.

Future mining is expected to be confined to the 16,500 acres that have been historically or is presently being worked; with the largest contiguous area being approximately 3,250 acres. Once cessation of mining has occurred, all disturbed areas are required to be reclaimed. A majority of present the mining sites are located within Mormon Basin adjacent to the Project Area which has a high site-potential for reclamation for vegetation. During the mining process it is likely that wildlife including sage-grouse would avoid these areas. However, upon successful reclamation sage-grouse that would avoid the area would likely return to mined sites.

Big Game

Juniper reduction projects on both private and BLM lands and aspen restoration projects within the Project Area would improve the forage availability for big game wildlife. NRCS has indicated that there are many projects with private landowners that would reduce juniper encroachment and improve rangeland health conditions. A reduction in juniper and improvement in rangeland health would be beneficial for big game in enhancing habitat complexity.

Mining within the Project Area is expected to be confined to 16,500 acres and would cause some displacement within the area while the operation is being taken place. Within the Project Area, restoration of 47,000 acres of forage would be equivalent to 25 percent of the wintering habitat that is being analyzed within this EA. The BLM is expecting that mining would not cause adverse effect to wintering habitat for big game and upon successful reclamation the big game would likely return to the mined sites.

3.7.5 *Overall Cumulative Effects*

Alternative 1 - No Action

Pygmy rabbit

The overall cumulative effects to pygmy rabbit habitat takes into account effects caused by past, present, and future land management in the Project Area. This alternative would result in the degradation of approximately 43,000 acres of potential pygmy rabbit habitat because of juniper encroachment. It is expected that No Action would have moderate adverse effects to potential pygmy rabbit a habitat.

Sage-Grouse and Big game

The overall cumulative effects to sage-grouse and big game habitat which takes into account both beneficial and adverse effects caused by past, present, and future land management in the Project Area would result in the degradation of sage-grouse and big game habitat with juniper encroachment being the biggest contributor to degradation of wildlife habitat. Within this alternative there would be no planned juniper reduction and mine reclamation (expected to improve the vegetative community for 44,400- 46,200 acres; this would be beneficial to wildlife habitat). However, wind energy development and active mining would adversely affect 22,750 ground acres of habitat. Although acres suggested may be small, the amount of areas that would potentially displace wildlife and its effects are unknown. What is known is that wildlife (i.e., mainly birds and bats) would be most affected by this type of development.

Because of the lack beneficial effects of juniper reduction combined with the adverse effects of not improving livestock management and wind energy development overall cumulative effects to wildlife are expected to be long-term, adverse, and moderate in magnitude; effecting 100 percent of the Project Area regardless of land ownership. It is expected that the No Action alternative would have moderate to major adverse effects to sage-grouse and big game habitat.

Alternative 2 - Proposed Action

Pygmy rabbit

If the Proposed Action is implemented there would be meaningful reduction of juniper within the Project Area (approximately 47,000 acres treated). Treatment of juniper would likely encourage high plant vigor in native late seral perennial bunch grasses. Since pygmy rabbit within the Vale District are found in late seral native stands of mountain big sagebrush it is likely that the Proposed Action would be a viable alternative to support potential pygmy rabbit habitat by reducing juniper encroachment.

This alternative would result in beneficial effects because the removal of juniper would help to restore sagebrush vegetative communities that pygmy rabbits are potentially found. It is expected that the Proposed Action would have moderate beneficial effects to potential pygmy rabbit habitat.

Sage-Grouse and Big game

The effects of the Proposed Action would be similar as described in the pygmy rabbit section above. Private lands are an integral part of wildlife habitat and are implementing juniper treatments on their lands that would help restore sage-grouse and big game habitat. It is expected that the Proposed Action would help to add to or reestablish sage-grouse habitat that has been impact from Phase I and II juniper encroachment. The treatment of juniper is expected to increase native plant vigor and screening cover for nesting and brooding sage-grouse on public lands. It is expected that the Proposed Action would have moderate to major beneficial effects to sage-grouse and big game habitat.

Alternative 3 - No Commercial Biomass

Pygmy rabbit, Sage-grouse, and Big game

Alternative 3 is similar to the Proposed Action in that there would be a modification of management to improve the Project Area by the reduction of juniper; however, the biomass would be left on site, machine piled, or jackpot burned. Facilitation of sagebrush if biomass was left onsite would take longer to achieve since the biomass would take up the physical space of where the sagebrush would re-vegetate. Although this alternative may not be as beneficial it would still interrupt encroaching juniper within the Project Area. Therefore, the overall cumulative effects within the Project Area would be beneficial that is minor to moderate in magnitude.

3.8 Livestock Grazing

Affected Environment

Grazing allotments within the Project Area include: Old Auburn, French Gulch, Poker Gulch, North Hereford, Hawry Flat, Cow Creek, Brown Rocks, Big Creek, Brannon Gulch, Cornet Creek, Auburn, Mill Gulch, Juniper Hill, South Bridgeport, North Bridgeport, Durkee, Upper Hill Creek, Iron Mountain, Horseshoe, Pritchard Creek, Iron Gulch, Vandecar, Hollowfield Canyon, Lost Basin, Shirttail Creek, Fur Mountain, and Sisley Creek.

3.8.1 *Alternative 1 - No Action*

Sagebrush/bunchgrass plant communities would continue to transition into western juniper woodlands. Continued juniper expansion would cause corresponding reductions in desired shrub and herbaceous plant cover and density. This would lead to reductions in key forage plant species production and increased competition for forage between wildlife and livestock. Grazing pressure would increase and repeat defoliation would likely occur on remaining desired forage species. This would result in reduced plant vigor and production of these species, and open up niches for less desirable annual species (cheatgrass, medusa head, etc.) and noxious weeds. Reduced forage production would reduce carrying capacity for all grazers (wildlife and livestock) on these sites. Over time, permanent reductions in livestock stocking rates may be necessary to continue to meet Rangeland Health Standards and allotment specific resource objectives.

3.8.2 *Alternative 2 - Proposed Action*

Herbaceous vegetation would respond positively to proposed treatments with increased production, plant cover and density. As a result, these plant communities would become more efficient at utilizing site resources, thus, reducing potential for establishment of less desirable same as above species such as cheatgrass. Increased forage production would increase carrying capacity for all grazers and reduce competition for forage between wildlife and livestock. This would promote enhanced livestock distribution and more even utilization patterns across the allotments. Overall, rangeland health would improve with juniper removal. Permitting biomass removal of woodland products would have no measureable effects to grazing management.

Project Design Elements include an assessment of the vegetation response to treatments to determine if rest from grazing is needed. If rest is needed, there would be short-term adverse impacts to permittees from moving cattle herds to different areas during the rest period (or possible temporary downsizing of cattle herds). Beneficial long-term impacts from the resulting improved rangeland would outweigh the adverse short-term impacts.

3.8.3 *Alternative 3 - No Commercial Biomass*

Under this alternative impacts would be the same as the Proposed Action.

3.8.4 *Cumulative Impacts*

Livestock grazing in the region has evolved and changed considerably since it began in the 1870's and is one factor that has created the current environment (e.g., juniper and conifer encroachment). At the turn of the century, large herds of livestock grazed on unreserved public domain in uncontrolled open range. Eventually, the range was stocked beyond its capacity, causing changes in plant, soil and water relationships. Some speculate that the changes were permanent and irreversible, turning plant communities from grasses and other herbaceous species to shrubs and trees. Protective vegetative cover was reduced, and more runoff brought erosion, rills and gullies. In response to these problems, livestock grazing reform began in 1934 with the passage of the Taylor Grazing Act. Subsequent laws, regulations and policy changes have resulted in adjustments in livestock numbers, season of use and other management actions. The proper management of livestock grazing is one of many important factors in ensuring the protection of public land resources. Present actions combined with reasonably foreseeable future treatments could mitigate impacts to vegetation, soils and water relationships by improving the health, vigor and recruitment of perennial grasses, forbs and shrubs; increasing ground cover to improve soil stability, reduce erosion potential and improving water quality; and increasing the quantity and quality of forage for livestock use which would promote herd health and economic stability. Over a period of time, forage conditions would improve which would benefit long-term livestock grazing management. Overall, adverse cumulative impacts would be negligible, if anything, cumulative impacts would be beneficial.

3.9 Visual Resources

Affected Environment

The Project Area is located within VRM (Visual Resource Management) classifications II, III, and IV but does not occur within any designated VRM Class I areas. With the limited identification of any class III or IV areas in the Baker RMP (1989), it is difficult to identify accurate acreages assigned to either of these classifications. However, an estimate of the acreages affected by this project shows that the majority of the treatment areas are contained within VRM Class III/IV (approximately 32,000 acres) with a lesser amount in VRM Class II (approximately 8,600 acres). The objective of the assigned VRM Classes is as follows:

- **VRM Class II** – objectives are to retain the existing character of the landscape. The level of change to the landscape characteristics should be low. Management activities may be seen but should not attract the attention of the casual observer. Any changes must conform to the basic elements of form, line, color, and texture found in the predominant natural features of the characteristic landscape.
- **VRM Class III** – objectives are to partially retain the existing character of the landscape. Management activities may attract attention but should not dominate the view of the casual observer.
- **VRM Class IV** – objectives are to provide for management activities that require major modifications of the existing character of the landscape. Management activities may dominate the view and be the major focus of view attention. However, every attempt should be made to minimize the impact of these activities through carefully locating activities, minimizing disturbance, and designing the projects to conform to the characteristic landscape.

The Proposed Action would occur primarily in the drainages, peaks and plateaus of Burnt River Canyon and areas near Hereford, Oregon. Additional treatment areas would occur in the Pritchard Creek and Gold Hill areas adjacent to Interstate 84. The key visual factors of all of these areas include high topographic relief displayed in steep canyons, prominent cliffs and massive rock outcrops in the sections occurring in the Burnt River Canyon and western units, while the eastern units along the interstate in conjunction with the Auburn area unit to the north are dominated by rolling, semi-steep terrain of sagebrush hills with riparian draws and limited timber. Some prominent high points and rock outcrops exist in these areas; however their topographic variations are not as dramatic as the Burnt River Canyon units. All of the areas have striking color variations included in large basaltic rock outcrops (gray/brown/black) with the higher elevations holding timber covered mountains, stringers of timber in draws and canyons, sagebrush covered plateaus or rolling hills, and varying degrees of riparian vegetation. In the spring and fall of the year, visitors can see high color variations in vegetation, with velvety light green hills covered with wildflowers in the spring, and striking contrast in colors from aspen stands, gallery forests, conifers and shrub species in the fall. Topographic, geologic and vegetative textures range from soft, smooth and contiguous in the sections associated with the rolling semi-rugged hills of the lower elevations to harsh and diverse textures of the higher elevations and significant drainages associated with the Burnt River Canyon.

3.9.1 *Alternative 1 - No Action*

Under the No Action alternative, there would be no impacts resulting from prescribed activities and the view shed would remain as it has in the past. Fuel loads as well as vegetative components would not be improved and therefore the chances of a view shed altering fire event would not be abated. Large and intense fire events can not only alter the normal or accustomed landscapes, they can also be of such intensity in areas of high fuel loading that they completely change the vegetative diversity which often decreases the quality of landscapes scenery. Without treatment or the occurrence of wildfires, visual resources could be affected over the long-term (>50 years) due to the loss of plant community diversity and structure on the landscape from expansion juniper. Impacts under this alternative would be adverse, minor to moderate in magnitude at local levels and long term.

3.9.2 *Alternative 2 - Proposed Action*

Under the Proposed Alternative, fire, fuels and vegetation management would alter the visual resources and would have adverse impacts to the scenic aesthetics of the landscapes within the Project Area. However, in general, most of these impacts are short-term and would not dominate the view sheds of the Project Area. The proposed action and design elements as well as a combination of types of treatments, the short-term and some long-term impacts from implementation quickly change visually as vegetation re-establishes itself and softens the impacts of the prescribed activities. Landscapes would be visually altered by fire scars and stumps from tree removal without constituting long-term detrimental impacts on the VRM values as the vegetation component would quickly incorporate or obscure the remaining impacts. The effects of juniper cutting would be temporary, lasting until cut trees are removed from the site by the public or burned. Stumps would be cut to blend in with surrounding vegetation heights. After three to four years, most needles would fall off and further reduce visual impacts from any remaining juniper. Upon completion of the project, visual resources and the aesthetic character should be enhanced as regeneration of deciduous shrubs and grasses takes place and overall diversity increases. Positive effects to VRM would be noticeable after two to four years by retention of vigorous and healthy stands of open sagebrush communities. Long-term, VRM improvements would occur due to creation of a variety of visual patterns, forms, and textures due to changes in the vegetation components. Adverse minor to moderate short-term impacts, with some long-term components such as burnt snags, stumps and debris would occur from the management of Fire and Fuels at the local level. Beneficial impacts would range from negligible to minor in the short term depending on the size, location and vegetation component of management activities and minor to moderate in the long-term from reduced fuel loading and increased vegetative diversity.

3.9.3 *Alternative 3 - No Commercial Biomass*

Impacts to the visual resources under this alternative would be the same as the Proposed Action, except that under this alternative there would be no additional impacts associated with commercial biomass extraction.

3.9.4 *Cumulative Impacts*

For the proposed project and alternatives, it is not expected that there would be any significant cumulative impacts to the visual resources within the Project Area.

3.10 Recreation

Affected Environment

Within the Project Area, most recreational activities are dispersed in nature which occurs throughout the Project Area with the exception of the Burnt River Area that has been classified as an Extensive Recreation Management Area. Although there are no established camping facilities or specifically managed recreational opportunities within the Project Area, the consolidated acreage of public lands existing within the Project Area directly draws a moderate amount of use, as well as the indirect uses such as driving for pleasure, sightseeing and photography created by the small portion of the Snake River/Mormon Basin Back Country Byway contained within the western portion. Additionally, the association with the Auburn Elk Feeding Station in the Auburn unit also draws an additional but limited amount of sightseeing to the area. The large tracts of public lands offer more varied and primitive recreational opportunities in a remote setting that ranges from timbered highlands to sage brush plateaus and riparian drainages. In 1991, the Snake River-Mormon Basin Back Country Byway was designated by Congress under the National Scenic Byways Program of the Federal Highway Administration. Although only a small segment of this byway exists within the Project Area, this component of the National Back Country Byway system attracts local, regional and non-regional visitors who wish to experience the scenic views, history, and remote nature of this byway loop. The BLM lands associated with the Auburn Elk Feeding Station offer a unique opportunity for big game wildlife viewing during the winter months. For the remaining portions of the Project Area, recreational activities include sightseeing, driving for pleasure, picnicking, camping, hiking, hunting (big game and upland bird), fishing, horseback riding, OHV use, and some limited snowmobile use in the winter. BLM-administered lands in the Project Area are open to recreation uses, however some private land roads, which would allow access to other segments of public lands, are gated or physically blocked, which, restricts certain uses of or access to public land. Within the Burnt River Canyon, OHV use is limited to roads and trails with no cross country travel being authorized. The remaining portions of the Project Area have no motorized use restrictions identified in the Baker RMP (BLM 1989) and are classified as "open". Recreational opportunities and use of the public lands within the Project Area are considered to be seasonal and at moderate levels with uses being primarily in the form of hunting, camping, sightseeing, and driving for pleasure.

3.10.1 *Alternative 1 - No Action*

Under this alternative, recreation activities would occur as they have in the past and the impacts from fire events would range from being isolated and short-term in nature, to more severe, long-term and landscape altering under more intense fire events. The adverse impacts from fire events, although aesthetically changing in some cases, is more readily accepted by recreationist as a component of the natural environment and does not negatively impact recreational pursuits for the long-term as vegetation and associated recreation re-establish themselves. Hunting, camping, wildlife viewing, driving for pleasure as well as other recreational pursuits quickly

rebound in areas of fire events, regardless of whether those events are natural or prescribed. Overall, the impacts to recreation from the management of fire and fuels under this alternative would be minor to moderately adverse but short-term at local levels. Over several decades as juniper infill and expansion continues displacing sagebrush-bunchgrass plant communities Selection of the No Action Alternative would likely lead to degraded conditions for recreational hunting and wildlife viewing through loss of suitable habitat for big game and subsequent decline in populations in the area, and loss of diversity of both wildlife and vegetation.

3.10.2 *Alternative 2 - Proposed Action*

Under the Proposed Action, there would be short-term adverse impacts from temporary road, primitive road or trail closures by tree felling, biomass extraction, prescribed fire activity, and safety needs as well as the immediate effects of the vegetation and fuel treatments. Implementation of this alternative could temporarily displace recreational users and could affect recreation opportunities and experiences by changing the landscapes scenic attractiveness and the availability for use of areas identified for treatment. However, providing prompt rehabilitation from fire management activities and vegetative treatments would minimize any long-term adverse impacts to recreation by reducing the displacement time of recreational pursuits associated with the Project Area. Beneficial impacts would be seen from the implementation of the proposed management actions as the recreation quality and quantity is improved through condition and health of area vegetation which often attracts recreationists. Other beneficial impacts occur as these areas are protected from hazardous fuel levels which reduce the chance of uncontrolled/high intensity fires that can change landscapes and alter recreational opportunities. Although recreation uses quickly adapt to areas of fire events, changes or increases in these uses also result as the landscape improves due to fire and fuels management. Beneficial impacts both direct and indirect occur as higher quality/quantities of recreation opportunities such as driving for pleasure, big game hunting, and wildlife viewing develop in response to habitats improvement. Impacts would be adverse in the short term, beneficial in the long term, and range from negligible to moderate in magnitude at the local levels.

3.10.3 *Alternative 3 - No Commercial Biomass*

Impacts would be the same as the Proposed Alternative with the exception that adverse impacts associated with the extraction of commercial biomass would not occur. By eliminating this action, the duration of road closures, safety restrictions, and general work activities would be lessened, thereby reducing the length of time disturbances would impact the various recreational resources of the area.

3.10.4 *Cumulative Impacts*

Varieties of recreational opportunities have occurred within the project area for decades and will continue to persist in this area for the foreseeable future. Both past and present vegetation treatments as well as any future treatments would be expected to improve the overall habitat and vegetative conditions of the project area over the long term. This improvement in the vegetative structure would directly and indirectly improve the quality and quantity of recreational activities such as hunting, camping and driving for pleasure. Cumulative impacts to the area would be beneficial, minor to moderate and long term.

3.11 Cultural Resources

Affected Environment

The Baker Habitat Restoration project area has most likely been occupied by humans to some extent for the last 12,000 years. Upland ecosystems in the Blue Mountains played an important role in hunter – gatherer subsistence – settlement patterns during the ethnographic and prehistoric periods (Ames and Marshall 1981, Walker and Sprague 1998). Archaeological evidence indicates that populations along the Snake River relied on housepits and bulk storage food storage by approximately 4200 years before present (B.P.). (Meatte 1990). This is believed to represent a shift toward a semi-sedentary subsistence pattern and may also be the prehistoric period of most intensive occupation in the region. Dooley Mountain is central to the project treatment areas and it provided a source of high quality toolstone to hunter-gatherers operating in the southern Blue Mountains throughout prehistory (McDonald 1985).

Fur trappers and explorers passed through the Burnt and Powder River drainages in the early 1800s, followed by a rush to northeastern Oregon by miners. In the Powder River watershed a major gold strike on Griffin Gulch in 1861 led to the establishment of a major mining camp at Auburn, located just north of the current project area. By 1863 Auburn had grown into a fully developed town site with general stores, lumber mills, blacksmith shops and a school and was populated by over 6000 miners. Mining in the upper Powder River Valley was heavily dredged. Although mining in the Burnt River watershed was never reached the intensity of the neighboring Powder River, the El Dorado Ditch was constructed between 1863 and 1873 to supply water from the Upper Burnt River to placer mines near Malheur City and Amelia (Stewart and Stewart, 1956). The ditch was primarily constructed by Chinese labor and it was over 100 miles in length. Agricultural development followed the late 19th century mining boom in the region and cattle ranchers acquired bottom lands in the Burnt and Powder River valleys to produce hay for winter feed. The first attempts at irrigation consisted of direct run-of-the-river diversions into farm ditches, without the benefit of storage. As agriculture in the region developed, the river usually dried up during July and August, leaving no water to mature crops.

Toll roads and later the railroad supplied access to the area and allowed goods to be moved to markets. By 1868, roads extended up the Burnt River from the present site of Huntington on the Snake River (Hiatt 1970). By the late 19th century, a toll road connected the Burnt River Valley to the Powder River while passing over the summit of Dooley Mountain. By 1884, the Union Pacific transcontinental railroad had reached the Snake River east of Huntington, providing a shipment point for ore and other supplies important to early economic development of the area (Robertson 1991). The Oregon Short Line Railroad ran up the Burnt River Canyon, connecting with the mainline at Huntington.

The Baker Habitat project area lies within areas of interest to the Burns Paiute and the Confederated Tribes of the Umatilla Indian Reservation (CTUIR) Indian tribes. A portion of the project area is within territory ceded to the United States federal government by the CTUIR in the Treaty with the Walla Walla, Cayuse, and Umatilla of 1855. The Burns Paiute and the CTUIR are federally recognized Indian tribes. The BLM is obligated to fulfill trust obligations to the CTUIR while managing lands and resources ceded by the tribes in the treaty of 1855. Further, the National Environmental Policy Act and other authorities require that federal

agencies consider the impact of their actions on cultural uses of the natural environment such as those practiced by present-day communities of American Indians. The BLM has signed memorandums of understanding with the CTUIR and the Burns Paiute that outline a means for consultation and coordination between the BLM and the tribes during the environmental planning process. Consultation with the CTUIR and the Burns Paiute has not resulted in the documentation of any specific concerns over traditional or cultural uses of the project area by either tribe. A general concern regarding cultural plant habitat has been recorded during previous tribal consultation efforts. Traditional plant habitat along the Powder and Burnt rivers contains hardwood shrubs of interest to the tribe such as chokecherry, willow, and aspen.

Numerous surface surveys for cultural resources have been conducted on lands involved in the Baker Habitat Project area of potential effect since 1980. Previous surveys within the project area resulted in the identification of 47 archaeological sites[4]. Prior to project implementation, additional Class II cultural resource inventory[5] and consultation of the Burns Paiute and CTUIR tribes would be required to comply with the terms of the Protocol for Managing Cultural Resources on Lands Administered by the Bureau of Land Management in Oregon. The Protocol describes how the BLM and the Oregon State Historic Preservation Office (SHPO) will cooperate under a national Programmatic Agreement to meet the requirements of Section 106 of the National Historic Preservation Act.

There are 13,400 unsurveyed acres within the Baker Habitat project area considered "High Probability" for the occurrence of cultural resources. Many historic properties documented in the vicinity of the project area contain or are adjacent to accumulations of hazardous fuels.

3.11.1 *Alternative 1 - No Action*

Under the No Action alternative, there would be no direct effect on cultural resources identified in the Baker County Habitat Restoration Project Area as no thinning or prescribed fire activities would be implemented. However, with no implementation of fuels reduction activities, archaeological and architectural resources identified in the area would continue to be in jeopardy of damage or destruction by wildfire.

Floral resources that are important within the traditional practices of the Burns Paiute and CTUIR tribes would remain in their present condition. Habitats that may be important to the continuation of tribal traditional practices in the area would remain in jeopardy of disturbance by large-scale intense wildfire events and wildfire suppression.

3.11.2 *Alternative 2 - Proposed Action*

Under the proposed action, cultural resources would most likely not sustain any direct or indirect adverse effect. Project design elements are in place to protect identified archaeological resources from the direct effects of mechanical disturbance and fire-related damage. Secondary effects of

[4] **Archaeological Site:** A place that has the potential to yield information important to scientific or scholarly studies of history or prehistory.

[5] **Class II Cultural Resource Inventory**: A sample based field survey designed to characterize the density, diversity, and distribution of cultural resource properties in an area of potential effect.

mechanical disturbance, such as erosion of site deposits, will likewise be avoided through the observation of project design elements.

In the long-term, cultural resources in the vicinity of the project area would benefit from fuels reduction treatments as archaeological resources and built historic resources would become less likely to sustain damage from a severe wildfire event and fire suppression activities.

Implementation of the proposed action may also increase the distribution and density of riparian vegetation stands that are important for the practice of Burns Paiute and CTUIR tribal traditions. The proposed action would not have any impact on the culturally important root crops in the project area since such habitats are typically characterized by sparse grass/low shrub fuel models. Threats posed by wildfire to traditionally important habitats would be immediately reduced.

3.11.3 *Alternative 3 - No Commercial Biomass*

Under this alternative to the proposed action, cultural resources would most likely not sustain any direct or indirect adverse effect. Project design elements are in place to protect identified archaeological resources from the direct effects of mechanical disturbance and fire-related damage. Secondary effects of mechanical disturbance, such as erosion of site deposits, would likewise be avoided through the observation of project design elements.

In the long-term, cultural resources in the vicinity of the project area would benefit from fuels reduction treatments as described under Alternative 2, the Proposed Action. However, long term benefits to cultural resources described under the proposed action would not be fully realized as more heavy fuels (unburned juniper boles and limbs) would remain in the project area rather than being completely removed through biomass utilization. It would be less likely that buried archaeological resources are inadvertently disturbed under Alternative 3, since there would be much less mechanical disturbance to the ground surface.

Implementation of alternative 3 would increase the distribution and density of riparian vegetation important to traditional cultural practices of the CTUIR and Burns Paiute tribes in a manner similar to that described in the Proposed Action.

3.11.4 *Cumulative Impacts*

In the long-term, cultural resources would benefit from the combined effects of fuels reduction and restoration treatments currently being implemented or planned in the vicinity of the project area. The effects of the Baker Habitat Restoration and Fuels Reduction Project would combine with effects of projects such as Vale District Vegetation management Step Down Projects, The Mormon Basin Fuels Management Project, and the NRCS western juniper management projects on privately owned lands to reduce risks posed by wildland fire to cultural resources.

Traditionally important stands of plants in the vicinity of the Baker-Malheur county boundary would likewise benefit cumulatively from implementation of restoration and fuels management projects in the area.

3.12 Social and Economic

Affected Environment

Baker County is sparsely populated rural county with strong economic ties to the natural resources of the county. As of 2010, Baker County had a population of 16,134 (5.3 people per square mile). Since 2000 population has decreased by 3.6 percent (U.S. Census Bureau 2010). Most of the population is located near the two major highways of the region, Interstate 84 and Highway 20. In Baker County, federal land ownership is mixed with U.S. Forest Service managing 33 percent of the land and the BLM managing 19 percent. Total federal land ownership is 52 percent of the County (DOI 2008). Farming, ranching, logging, and recreation are the primary economic activities of the county. As of 2009, the median household income in Baker County is $37,120. Approximately 19.4 percent of the Baker County residents have an income below the poverty line

Lifestyle features can be determined by historical activities of the area, career opportunities and the general cultural features of the geographical area. Quality of life issues are subjective and can be modified over time with exposure to other ways of living. Recreation is a component of most lifestyles in the area and includes driving for pleasure, camping, backpacking, fishing, hunting, hiking, horseback riding, photography, wildlife viewing, and sightseeing. These activities contribute to the overall quality of life for residents.

In addition to local recreation use, the undeveloped, open spaces in the county are themselves a tourist attraction. Hunting and other types of dispersed outdoor recreational experiences contribute to the local economy on a seasonal basis. Fee hunting and recreation are important contributors to the local and regional economy.

3.12.1 *Alternative 1 - No Action*

Under the No Action Alternative no service or stewardship contracts would be granted and no supplies would be purchased for the purpose of project implementation. There would be a loss of forage for livestock and wildlife due to juniper encroachment affecting livestock operators, hunting, and wildlife viewing opportunities.

3.12.2 *Alternative 2 - Proposed Action*

The Proposed Action may utilize stewardship and service contracts to cut juniper and conifer, biomass utilization and machine piling. As a result local employment would be increased. Purchase of supplies and equipment necessary for implementation of the Proposed Action from community merchants would constitute a local economic benefit.

Biomass utilization would provide materials for variety of purposes from energy, hog fuel for industry or other commercial uses. Designated wood harvest areas in the Project Area would allow the public to utilize cut juniper for poles and firewood and juniper boughs for decorative uses.

Improved rangeland health increases forage production for livestock and wildlife thereby increasing economic benefits to ranch operators and fostering more desirable recreation opportunities such as hunting and wildlife viewing.

3.12.3 *Alternative 3 - No Commercial Biomass*

Impacts under this alternative would be similar to the Proposed Action with the exception of the loss of economic opportunities associated with biomass utilization.

3.12.4 *Cumulative Impacts*

Social and Economic cumulative impacts under both action alternatives would be positive for the Project Area and surrounding communities by providing additional opportunities for jobs and monetary inputs into local economies.

3.13 Transportation and Access

Affected Environment

The proposed Project Area may be accessed by numerous BLM, USFS and county roads, State Hwy 245, 07 and 30, and in some sections Interstate Highway 84, from a variety of locations. However, access primarily occurs from the Burnt River Road, Hwy 245 and Interstate 84. Access from Interstate 84 is provided from Hwy 30, the Burnt River road exit near Durkee, and the Weatherby exit, which allows access to the majority of the public lands affected by the proposed project. Additionally, a small segment of the Snake River/Mormon Basin Back Country Byway can be reached near Bridgeport via the Burnt River Road on the western edge of the Project Area. The various native surface roads (BLM, USFS, County) existing throughout the Project Area, allow for use of the public lands by the general public as well as for administrative and private uses. BLM administered lands in the Project Area are open to public access as long as that access is by legal means and by authorized methods. Some access is restricted either from private land controls which are usually in the form of gates or boulders, or from BLM administrative easements that do not allow for general public use. Off-road restricted areas exist within the Burnt River Canyon section of the proposed Project Area. OHV use in this area is "limited" to roads and trails with no cross country travel being authorized. The remaining portions of the Project Area have no motorized use restrictions designated in the Baker RMP (BLM 1989) and are classified as "open". Vehicle use levels occurring within the Project Area are generally at low to moderate levels. Use of the transportation system within the Project Area is seasonal in nature and coincides with weather and road conditions, hunting use periods, or seasonal travelers in search of sightseeing opportunities.

3.13.1 *Alternative 1 - No Action*

Under the No Action Alternative there would be no effects to private or BLM-administered lands as a result of human disturbance. No proposed treatments would occur. There would be no road damage associated with project implementation.

3.13.2 *Alternative 2 - Proposed Action*

Under the Proposed Action, short-term adverse impacts would occur to the transportation and access of the proposed Project Areas as roads, primitive roads and trails are temporarily closed or limited to provide for human health and safety during prescribed fire activities and vegetative treatment operations. However, beneficial impacts to the transportation network would result as roads and primitive roads within the Project Area are maintained or improved to facilitate fire and fuels management objectives. This improvement to the transportation network would allow for more and varied vehicle uses for the general public access. Impacts would be adverse but

minor in the short-term with long-term beneficial impacts ranging from minor to moderate in magnitude at the local levels.

Some project activities such as cutting, piling, and burning are necessary during late fall, winter and early spring when narrow windows are available between fire season and deep snow. During these times the road surface and soils may be saturated and unfrozen. In these cases, even light traffic can create ruts, drive-arounds, and other damage to the road and adjacent soils and vegetation. These ruts become channels for runoff causing additional damage to the road and off-site erosion and sedimentation. This can result in safety and liability issues associated with public use of the road.

Powdering of the road may occur during the dry periods when project work is ongoing. This creates dust and visibility problems but is generally confined to the local area. In extreme cases deep dry ruts and dust pockets in the roads develop causing affects similar to those that occur from wet season traffic. Heavy traffic during the dry season also loosens the soil making it easier to erode away during the wet season.

Permitting the public to remove cut juniper and timber would contribute to impacts on roads. Lands adjacent to roads would be impacted to the extent the public drives off-road to access cut juniper. Based upon observations made after similar vegetation management projects, a long-term increase in OHV traffic following treatment is not expected within the project area.

3.13.3 *Alternative 3 - No Commercial Biomass*

Impacts to road systems under this action would be not change the current condition of the road systems.

3.13.4 *Cumulative Impacts*

Additional cumulative impacts would be negligible under either Action Alternative as no new roads would be constructed and use of existing roads would be of a limited short-term nature.

3.14 Fire Management

Affected Environment

The Project Area lies within the Burnt River, Pritchard Creek, Pedro Mountain, and Baker Scattered Tracts Fire Management Units (FMU).

Following coarse-scale definitions developed by Hardy *et. al.,* (2001) and Schmidt *et. al.,* (2002), the natural (historic) fire regimes of major vegetative communities have been classified based on average number of years between fires (fire frequency) and fire severity (amount of replacement) on dominant overstory vegetation.

The five fire regime classifications for fire and fuels management purposes include:

> I: 0 to 35-year frequency and low (surface fires most common) to mixed severity (less than 75 percent of the dominant overstory vegetation replaced);

II: 0 to 35-year frequency and high (stand replacement) severity (greater than 75 percent of the dominant overstory vegetation replaced);

III: 35 to 100+ year frequency and mixed severity (less than 75 percent of the dominant overstory vegetation replaced);

IV: 35 to 100+ year frequency and high (stand replacement) severity (greater than 75 percent of the dominant overstory vegetation replaced);

V: 200+ year frequency and high (stand replacement) severity.

There are three main Fire Regimes within the Project Area. Drier Wyoming big sagebrush plant communities experience periodic fires once every 35 to 75 years and fires burn with high intensity (all aboveground vegetation removed). This would be classified as a FR IV. Mountain big sagebrush plant communities experience fires on a more regular basis than Wyoming big sagebrush plant communities. A fire would burn mountain big sagebrush stands once every 15 to 35 years, FR II. These fires also remove all aboveground vegetation and would be classified as stand replacing. Low sagebrush plant communities experience fire on a much longer return interval due to the low productivity of the site. Fires would burn through a low sagebrush plant community once every 150 to 200 years, FR V. The fire return interval (average number of years between fire events) is also dependent on the physical location of a plant community. A 100-acre patch of mountain big sagebrush within a large landscape of low sagebrush would probably burn on a less frequent basis than a landscape patch dominated by mountain big sagebrush alone.

Over the last 150 years the role of fire has been altered by a number of natural- and human-caused factors. With this reduction in fire, western juniper has encroached into sagebrush plant communities. Fire has become less frequent in most mountain big sagebrush communities over the last 150 years due to subtle changes in climate, introduction of domestic livestock and active fire suppression. This has allowed western juniper to establish and in some cases dominate mountain big sagebrush plant communities. The same condition has occurred in low sagebrush plant communities, but because of the inherently low site productivity, expansion has been slower.

In contrast to the mountain big sagebrush and low sagebrush areas, Wyoming big sagebrush plant communities have experienced an increase in the level of fire over the last 150 years. Introduction of cheatgrass is the driving factor. Cheatgrass has invaded much of the Wyoming big sagebrush plant communities in the western United States. Cheatgrass is capable of growing in interspace areas that would be either bare ground or covered with microphytic soil crusts in high seral Wyoming big sagebrush plant communities. Cheatgrass provides a continuous fuel bed and allows fires to move through plant communities that would not carry fire except under extreme conditions once every 35 to 75 years. Once cheatgrass establishes and a fire burns through the sagebrush plant community, annual grass dominates the site and facilitates more frequent fires. In areas of southeastern Oregon, fires are occurring once every 3 to 5 years. Under this fire return interval, all perennial plants are eventually removed from the plant community and only annuals persist. The Project Area has no large patches of annual plant

dominated communities. However, existing Wyoming big sagebrush plant communities have a strong component of cheatgrass. If the area burns, the post-fire plant community could be dominated by cheatgrass. The plant community would be setup for frequent fires in the future and loss of desirable perennial plants.

3.14.1 *Alternative 1 - No Action*

The fire return interval would increase as understory vegetation decreases over time. Fire regimes would shift toward an IV or V throughout the Project Area, resulting in stand replacing fires with high severity fire effects. Fires would be more difficult to suppress and costs of suppression would increase.

3.14.2 *Alternative 2 - Proposed Action*

The Proposed Action would restore fire regimes to more historic conditions to create a more diverse plant community and successional stages. Plant communities would be dominated by grasses and shrubs allowing for easier suppression compared to tree-dominated plant communities. The number of piles burned and suppression costs would be reduced; however, this is dependent on the amount of cut juniper removed from the area by biomass removal.

3.14.3 *Alternative 3 - No Commercial Biomass*

The Proposed Action would restore fire regimes to more historic conditions to create a more diverse plant community and successional stages. Plant communities would be dominated by grasses and shrubs allowing for easier suppression compared to tree-dominated plant communities. The number of piles and jackpots burned and prescribed fire costs would be increased.

3.14.4 *Cumulative Impacts*

The potential exists for future wildfire events in the area, as does additional habitat and fuels management activities. The possibility also exists for wildland fire use as a resource management tool. With planned disturbances such as future habitat improvement and fuels reduction projects through chemical, mechanical, prescribed fire and possible wildland fire use reducing the risks of large, uncontrolled wildfire would be possible. Overall, cumulative impacts from all past, present and future actions would result in a moderate to major reduction in fuels. The reduction in fuels would then lead to the lowered risk of large fires in the future.

3.15 Climate Change and Greenhouse Gas Emissions

Climate influences where and how vegetation grows through variation in environmental factors that include atmospheric temperature, precipitation, wind, and humidity. Global temperature has been increasing along with atmospheric concentrations of carbon dioxide over the last several decades and is expected to continue through this century. Regional climate has become warmer and wetter with reduced snowpack, and continued change is likely. Climate change would be highly sensitive to specific changes in the amount and timing of precipitation, but specific changes in the amount and timing of precipitation are too uncertain to predict at this time. Because of this uncertainty about changes in precipitation, it is not possible to predict changes in vegetation types and condition, wildfire frequency and intensity, stream flow and wildlife habitat.

According to the United States Environmental Protection Agencies website:

"Important scientific questions remain about how much warming will occur, how fast it will occur, and how the warming will affect the rest of the climate system including precipitation patterns and storms." Answering these questions would require advances in scientific knowledge in a number of areas:

- Improving understanding of natural climatic variations, changes in the sun's energy, land-use changes, the warming or cooling effects of pollutant aerosols, and the impacts of changing humidity and cloud cover.
- Determining the relative contribution to climate change of human activities and natural causes.
- Projecting future greenhouse emissions and how the climate system would respond within a narrow range.
- Improving understanding of the potential for rapid or abrupt climate change. "

The U.S. Geological Survey, in a May 14, 2008 memorandum to the U.S. Fish and Wildlife Service, summarized the latest science on greenhouse gases and concluded that it is currently beyond the scope of existing science to identify a specific source of greenhouse gas emissions or sequestration and designate it as the cause of specific climate impacts at a specific location. This makes the spatial scale for analysis as global, not local, regional or continental.

3.15.1 *All Alternatives*

Juniper and mixed conifer biomass varies considerably across the Project Area. Above ground biomass of juniper in "cut and scatter treatments" (36,000 acres) is approximately 1-3 tons per acre, and the areas planned for pile burning both juniper and conifer (11,000 acres) are estimated to average from 1.5 to 15 tons per acre. The biomass consumed during pile-burning is estimated to result in direct emission of 2.2 tons per acre of carbon dioxide. Therefore, the proposed action would result in the direct emission of a total of 107,893 tons of carbon dioxide from the 48,000 acre Project Area. This is a conservative estimate because much of the juniper proposed to be piled and burned is in various stages of Phase II transition, with an estimated biomass between 0.43 and 15.0 tons per acre. Pile-burning would occur over ten year period, consuming juniper slash from an estimated 800 to 1500 acres each year and emitting 107,893 tons of carbon dioxide per year. This estimated emission level is well below the reporting levels of the EPA rule on mandatory reporting of greenhouse gases (40 CFR 98.2; 74 FR 56374, Oct. 30, 2009), and would only occur over a ten year period during project implementation.

Thinning of 47,600 acres of juniper and mixed conifer and pile-burning of 11,000 acres of juniper and mixed conifer within the Project Area would result in a loss of carbon storage capacity in aboveground vegetation, but may not have much effect on belowground carbon pools (Rau *et. al.*, 2010). The retention of sagebrush, herbaceous vegetation, pre-settlement juniper, and the subsequent growth of new plants would maintain carbon pools. Herbaceous vegetation would begin to re-occupy pile-burned areas within three to five years, while the sagebrush would likely take fifteen years of more before it starts to provide canopy cover. This vegetation growth

would help to offset the carbon loss from juniper cutting, and return the site to conditions more typical of those present prior to Euro-American settlement of the area.

Fuel consumption during project implementation would be minimal, not contributing a meaningful amount to the carbon calculation. These carbon input and sequestration assumptions and potential effects on climate at any significant or practically measurable scale, daily, seasonally, annually, or a longer time scale for Baker County, Oregon, the Pacific Northwest, or larger region would be undetectable and indistinguishable from other simultaneously occurring carbon fluxes.

Greenhouse gas emissions from the proposed action and alternatives would be so small as to be negligible. The proposed action would generate less than 111,093 metric tons of carbon dioxide equivalent emissions from implementation activities (burning, cutting). This includes burning of fuel and transportation for implementation activities (320 metric tons carbon dioxide equivalent) as well as emissions from prescribed burning (108 metric tons CO_2 equivalent). This represents approximately 0.0000004 percent of current total global emissions (25 billion metric tons) and 0.00002 percent of current U.S. emissions (6 billion metric tons). These emissions would be so small that its incremental contribution to global and national emissions would be so small that they would not merit reporting under the EPA rule on mandatory reporting of greenhouse gases.

Some scientists hypothesize that woodland expansion could result in large increases in carbon storage within the interior west (Norris et al. 2001; Hibbard et al. 2003; Canadell and Raupach 2008; McKinley and Blair 2008). It is possible that increasing tree cover could temporarily increase biomass and carbon storage; however, due to the frequency of fire in Great Basin ecosystems (15–100 yr), researchers believe that expansion woodlands should not be considered long-term carbon storage because carbon in biomass is released to the atmosphere during fire and subsequent decomposition (Miller and Tausch 2001; Canadell and Raupach 2008; Hurteau and North 2009).

Project effects to carbon storage and emissions as greenhouse gases would be applied to all action alternatives. The difference between Action Alternatives and No Action with regard to carbon analysis and greenhouse gas emissions is too small to be discernible because the Action Alternatives and No Action are similar with respect to the features that would affect carbon storage and emissions (acres, vegetation, prescribed fire emissions vs. wildfire emissions, emissions from implementation equipment vs. emissions from fire suppression equipment).

The action alternatives of this project would treat juniper expansion in Phase I and Phase II stages of woodland succession through a combination of cutting and scattering slash or cutting and pile-burning slash. Carbon dioxide, a greenhouse gas, would be emitted during the treatment phase (fuel consumption and burning); after which new sagebrush and herbaceous vegetation growth would result in storage of carbon. Piling and burning juniper instead of broadcast burning in the Project Area as proposed would retain the existing carbon storage capability of sagebrush and herbaceous vegetation, as well as untreated pre-settlement trees and trees with obvious signs of wildlife use (i.e. cavities, raptor nests).

4 Irreversible or Irretrievable Commitment of Resources

There would be no irreversible or irretrievable commitments of resources associated with the proposed action.

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6 List of Agencies, Organizations, and Persons Notified

Oregon Dept. of Fish and Wildlife
Natural Resource Conservation Service
Baker Soil-Water Conservation District
Oregon Dept. of Forestry
Oregon Watershed Enhancement Board
United States Forest Service
Hells Canyon Preservation Council
Baker County
Burns Paiute Indian Tribe
Rocky Mountain Elk Foundation
Confederated Tribes of the Umatilla Indian Reservation

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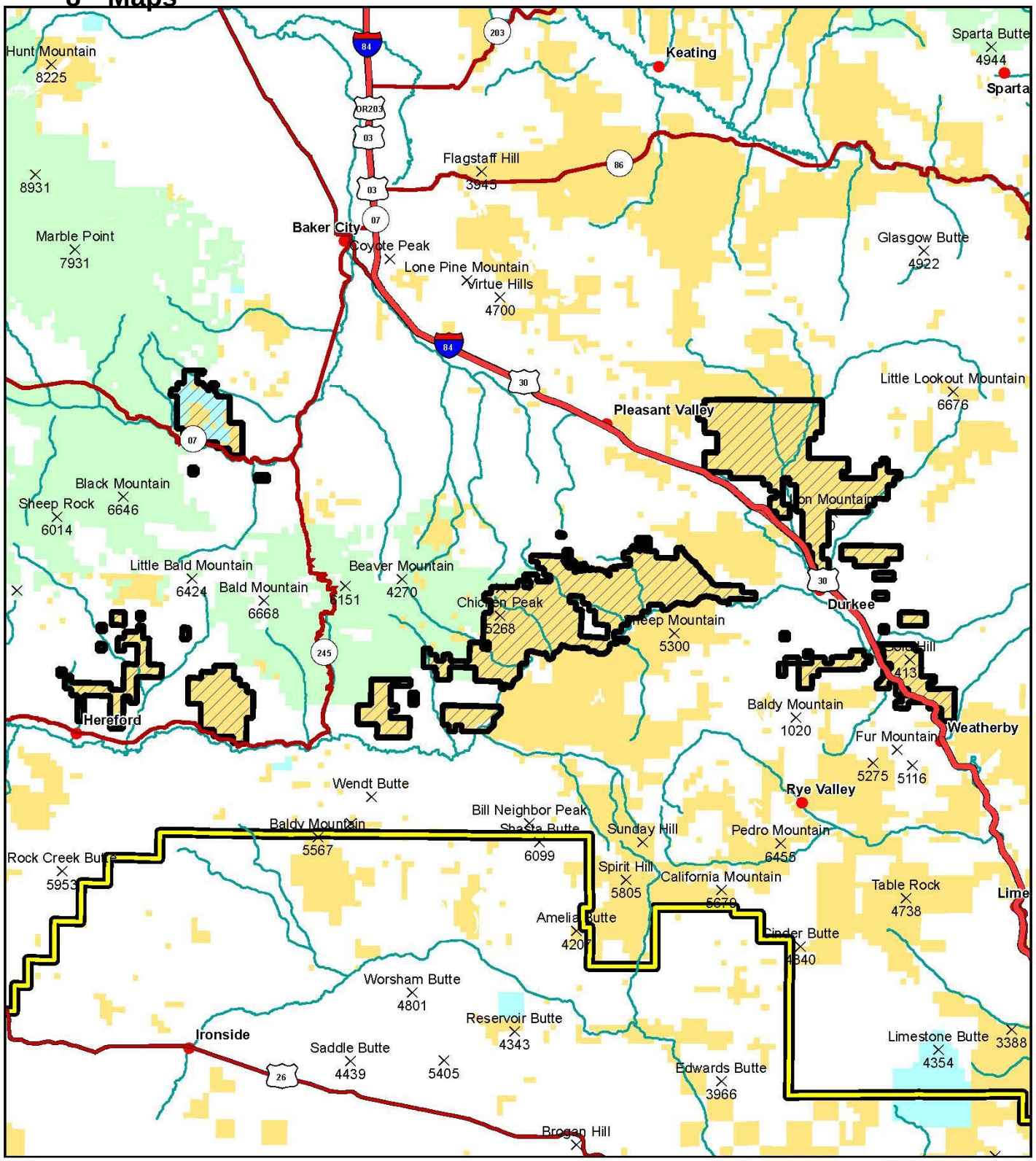
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8931
Marble Point
7931
Baker City
Coyote Peak
Lone Pine Mountain
Virtue Hills
4700
Flagstaff Hill
3945
Keating
Sparta Butte
4944
Sparta
Glasgow Butte
4922
Little Lookout Mountain
6676
Pleasant Valley
Black Mountain
Sheep Rock
6646
6014
Little Bald Mountain
6424
Bald Mountain
6668
Beaver Mountain
4270
Chicken Peak
5268
Sheep Mountain
5300
Durkee
Baldy Mountain
1020
Fur Mountain
5275
5116
Weatherby
Hereford
Wendt Butte
Baldy Mountain
5567
Bill Neighbor Peak
6099
Sunday Hill
Pedro Mountain
6455
Rye Valley
Rock Creek Butte
5953
Spirit Hill
5805
California Mountain
5679
Table Rock
4738
Amelia Butte
4207
Cinder Butte
4840
Worsham Butte
4801
Reservoir Butte
4343
Ironside
Saddle Butte
4439
5405
Limestone Butte
4354
3388
Edwards Butte
3966
Brogan Hill
Legend
BHR EA Project Area
Resource Area Boundary
INT
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Bureau of Land Management
U.S. Forest Service
Private
State Lands
0 2.5 5 10 Miles
0 5,500 11,000 22,000 Meters
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Vale District
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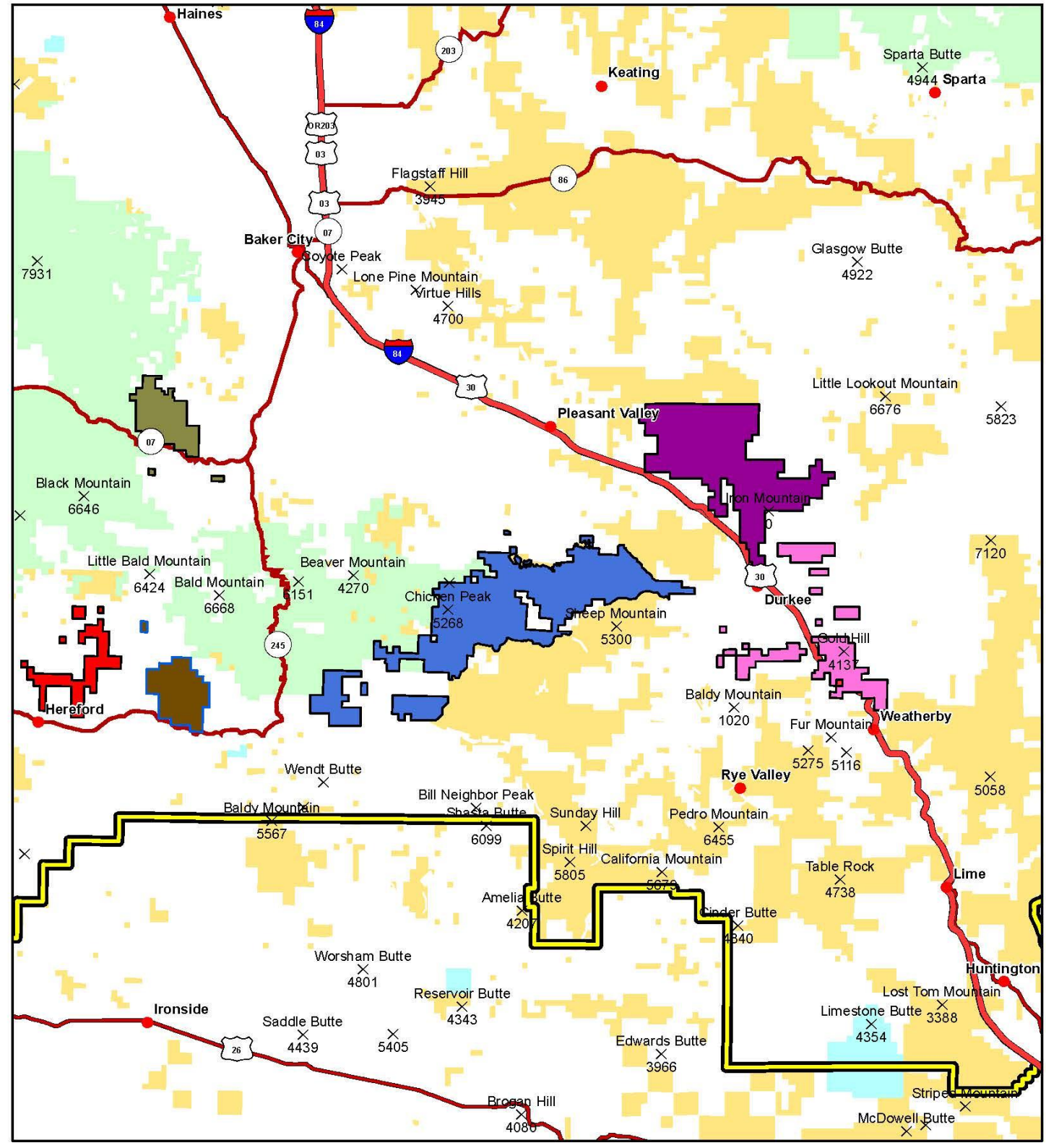
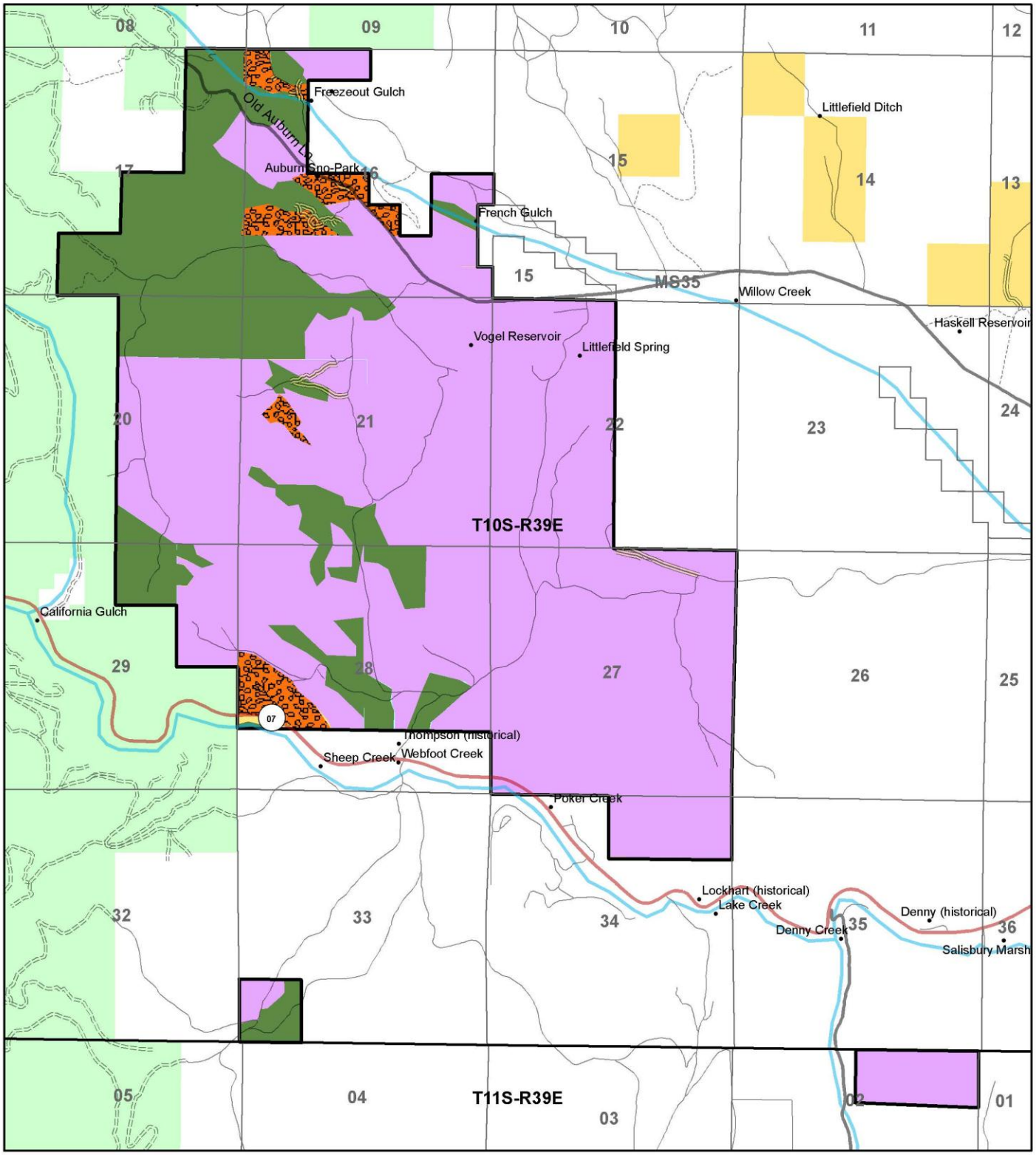
Baker County Habitat Restoration
Map 1 Project Area



Baker County Habitat Restoration
Sub-Units
Map 2



Legend

- Township and Range
- Sections
- Auburn Sub-Unit_BHR
- Biomass area
- PCT
- Auburn Phase 1
- Auburn Phase 2
- Streams 2006 303d
- INT
- STH
- USH
- County route
- Bureau of Land Management
- Forest Service
- Private road (no symbol)
- Not Known
- Bureau of Land Management
- U.S. Forest Service
- Private
- State Lands

0 0.3 0.6 1.2 Miles

0 500 1,000 2,000 Meters

N W E S

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Bureau of Land Management

Vale District

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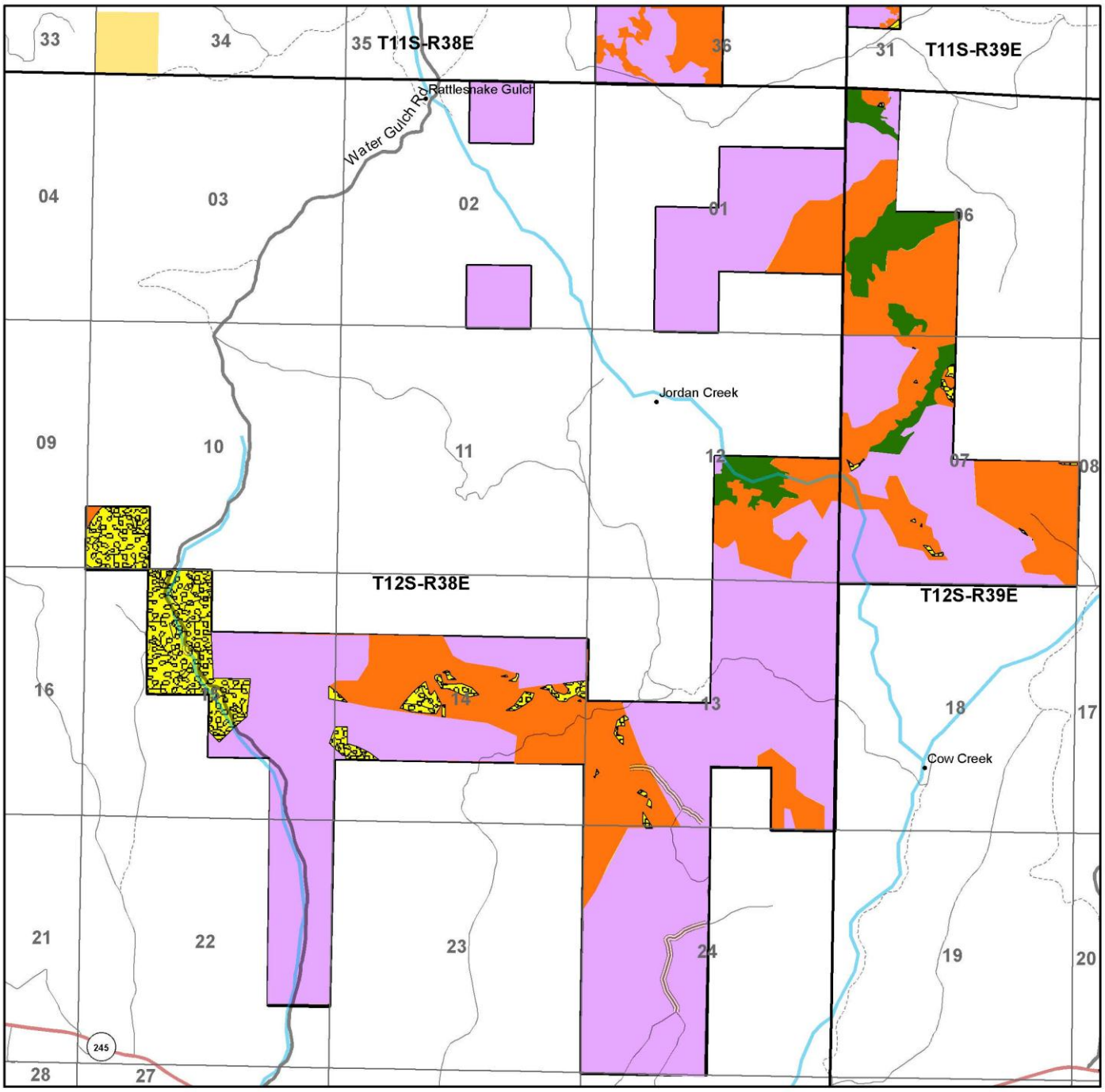
Baker County Habitat Restoration
Map 3 Auburn Unit



Legend

- Township and Range
- Sections
- Water Gulch Biomass
- water gulch machine pile real
- Water Gulch Junipr_cut_phasel
- Water Gulch Junipr_cut_phasell
- Water gulchPCT
- Hereford unit-BHR
- County route
- Bureau of Land Management
- Forest Service
- Private road (no symbol)
- Not Known

0 0.3 0.6 1.2 Miles

0 600 1,200 2,400 Meters

N W E S

Baker County Habitat Restoration
Map 4 Hereford Unit

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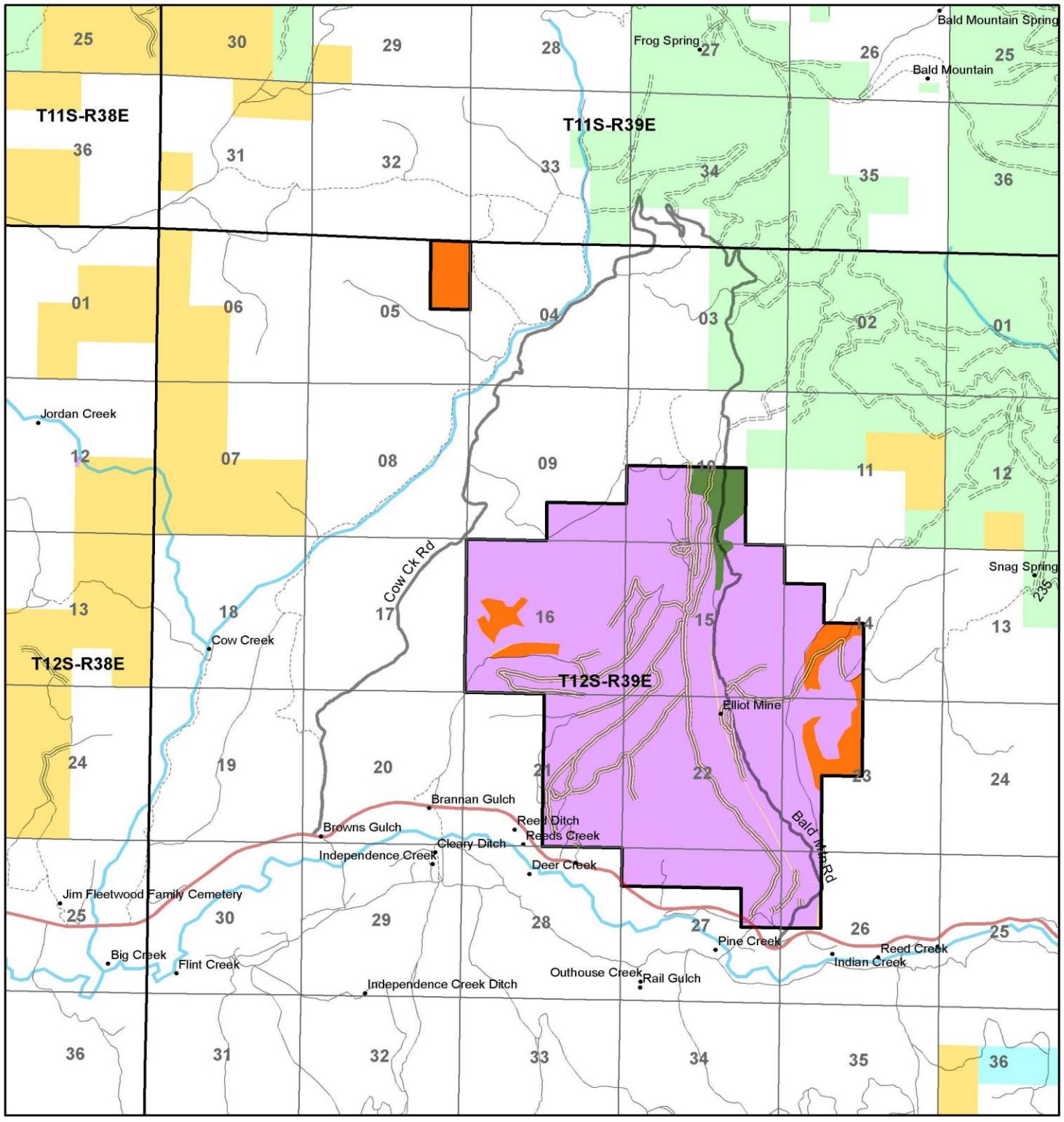


Legend

- Township and Range
- Sections
- Pine Creek Sub-Unit
- Junipr_cut_phasel
- Junipr_cut_phaseII
- PCT
- INT
- STH
- USH
- Bureau of Land Management
- U.S. Forest Service
- Private
- State Lands
- County route
- Bureau of Land Management
- Forest Service
- Private road (no symbol)
- Not Known

0 0.45 0.9 1.8 Miles

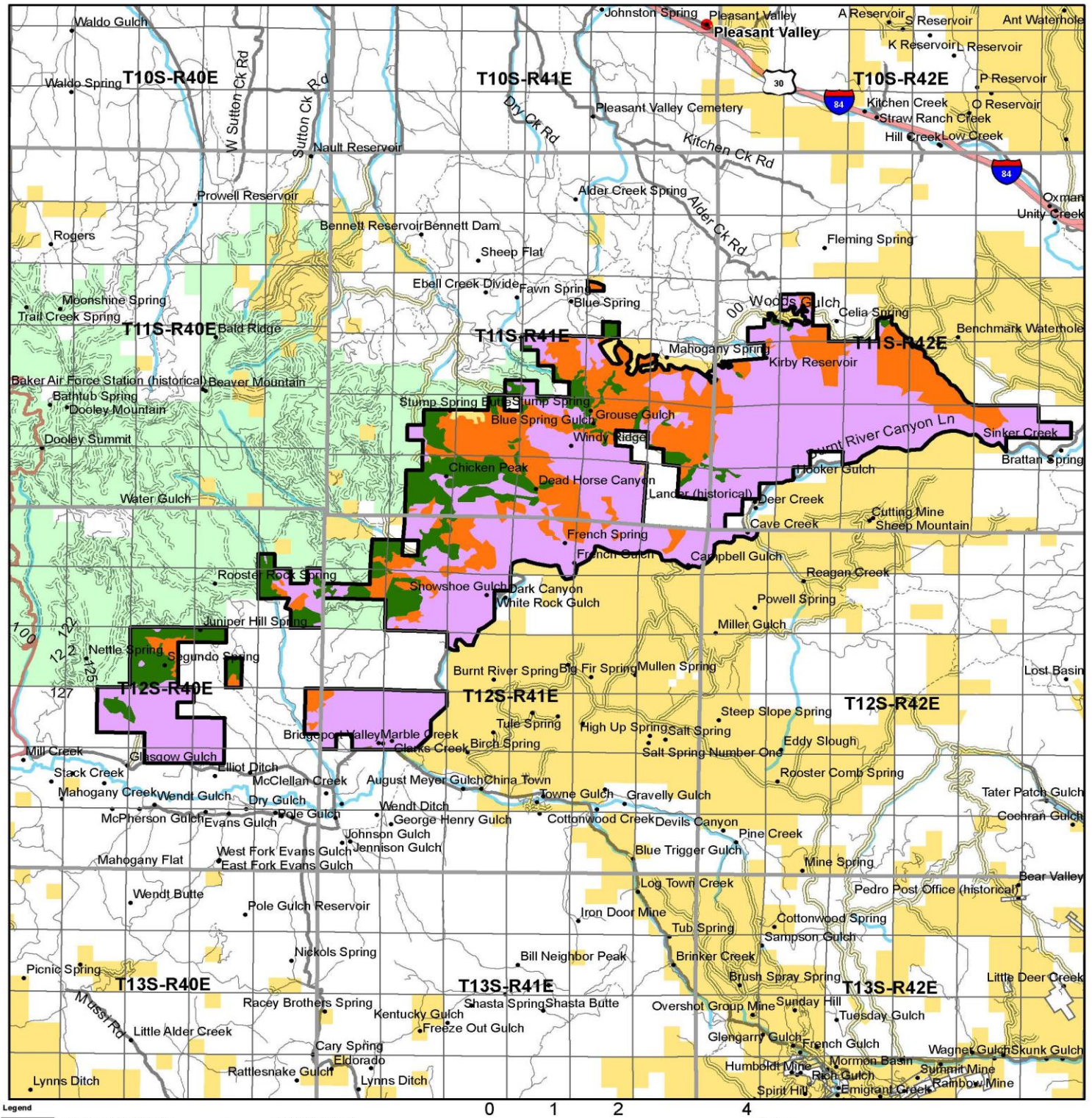
0 900 1,800 3,600 Meters

OREGON

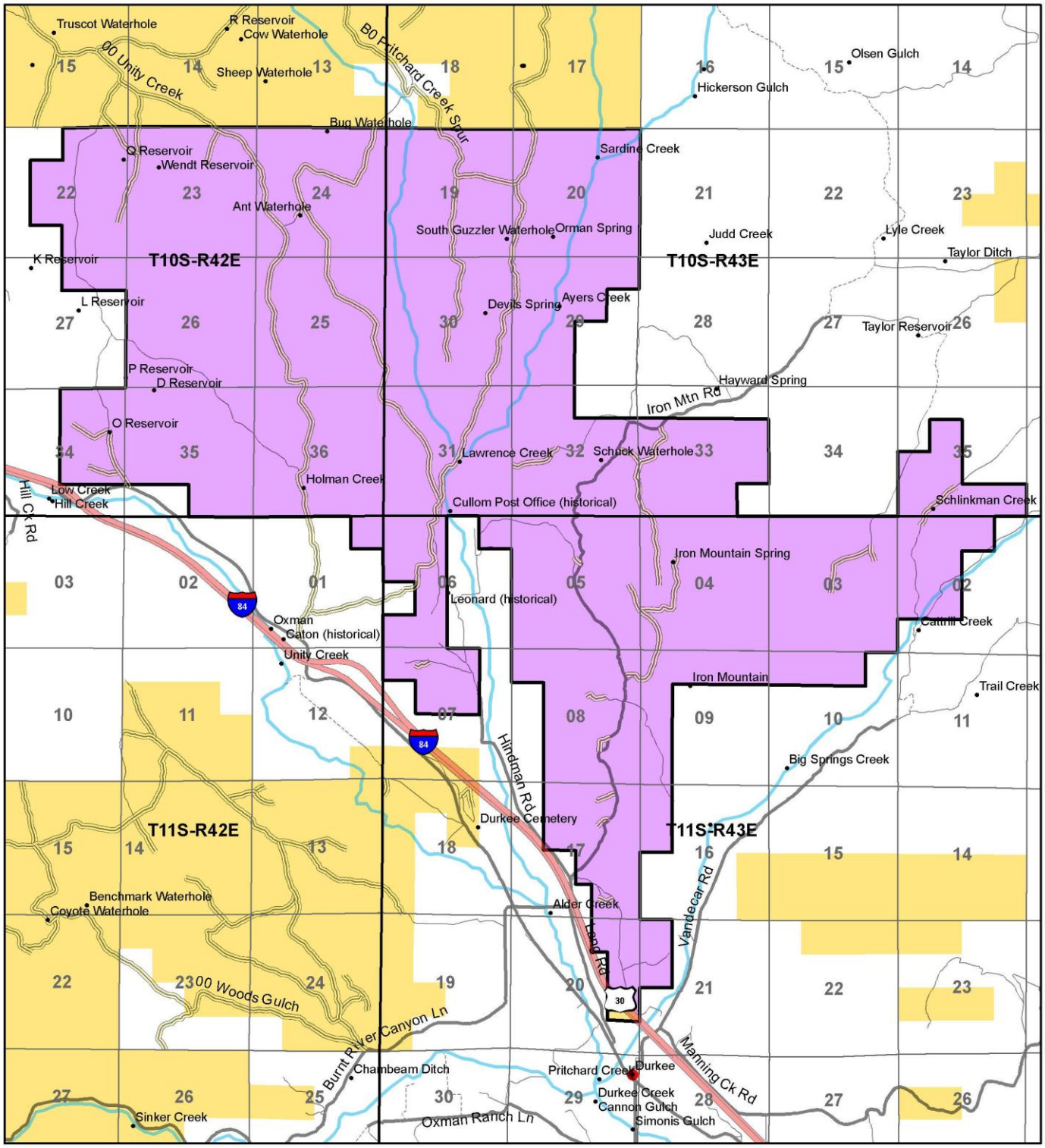
Baker County Habitat Restoration
Map 5 Pine Creek Unit

U.S. Department of Interior
Bureau of Land Management

Vale District
12/07/2012



Baker County Habitat Restoration
Map 6 Burnt River Canyon Unit



Legend

- Township and Range
- Sections
- Durkee Sub-Unit
- PCT
- Junipr Phasel
- Junipr Phasell
- INT
- STH
- USH
- County route
- Bureau of Land Management
- Forest Service
- Private road (no symbol)
- Not Known
- Bureau of Land Management
- U.S. Forest Service
- Private
- State Lands

0 0.5 1 2 Miles

0 1,125 2,250 4,500 Meters

N W E S

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Bureau of Land Management

Vale District
12/07/2012

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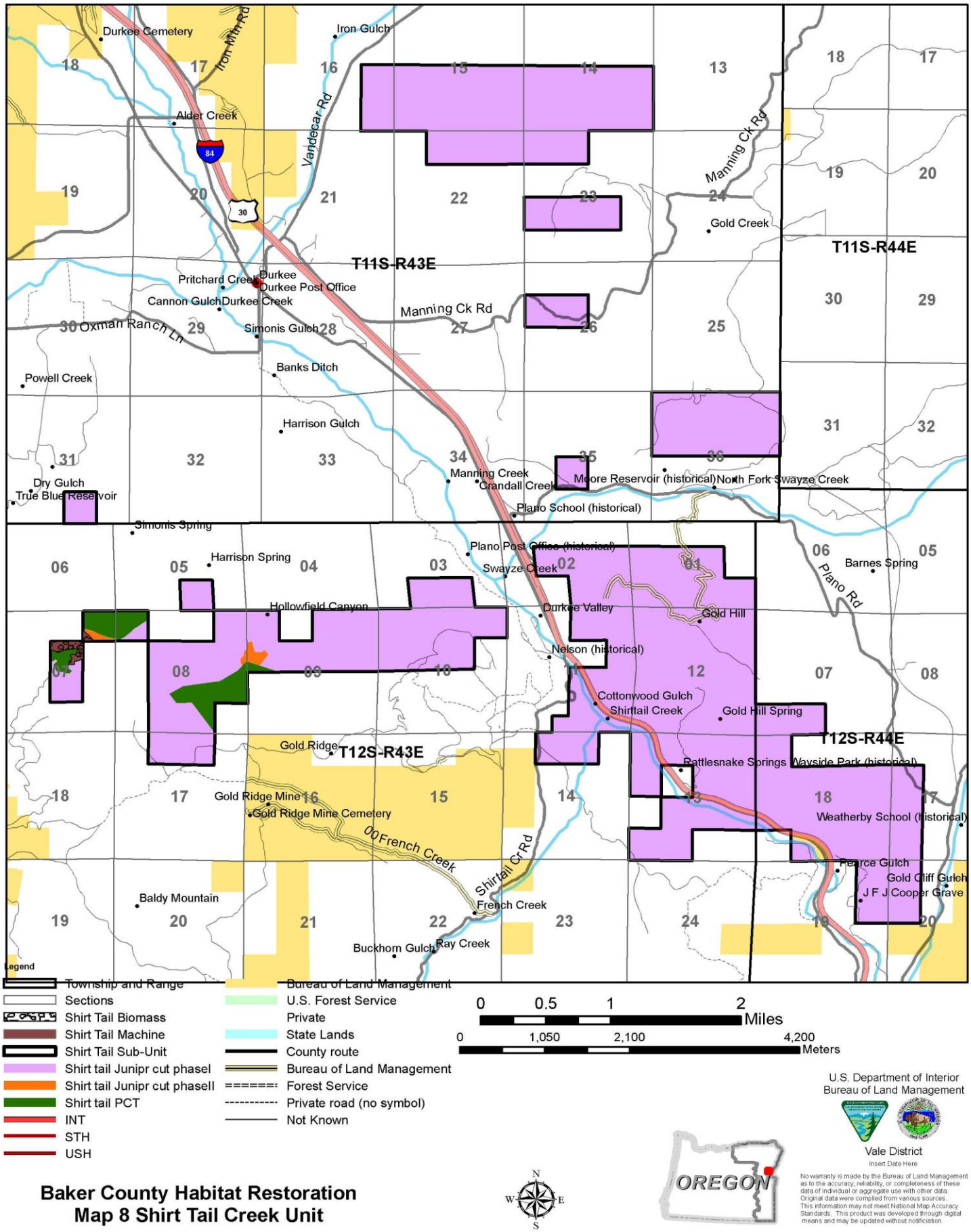
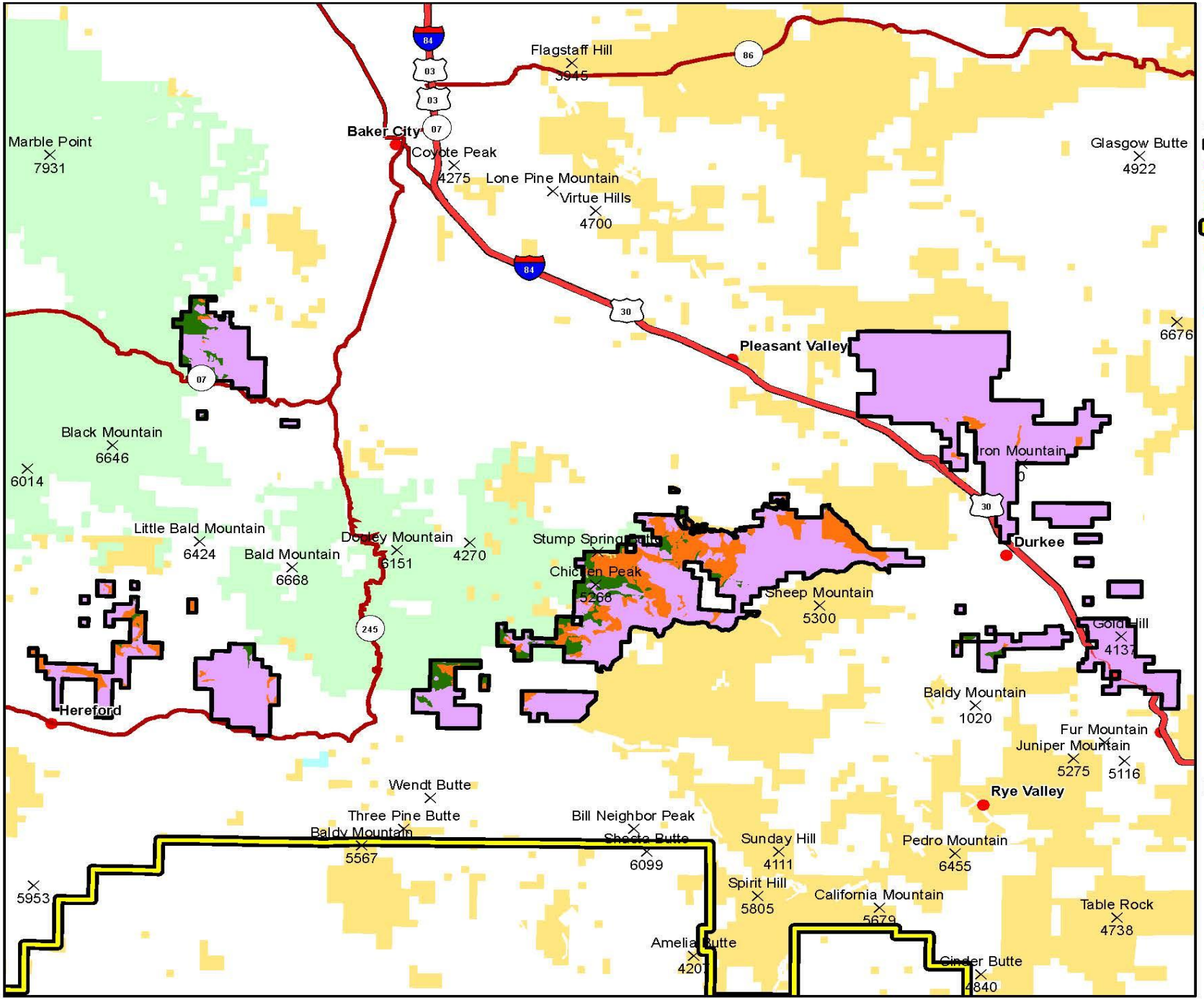
Baker County Habitat Restoration
Map 7 Durkee Unit



Baker County Habitat Restoration
Map 8 Shirt Tail Creek Unit



Baker County Habitat Alternative 2 & 3 Treatment Areas Map 9

Legend

- BHR-Project-Area
- Juniper cut phase I
- Junip cut phaseII
- PCT
- Resource Area Boundary
- Bureau of Land Management
- U.S. Forest Service
- Private
- State Lands

0 2,450 4,900 9,800 Meters

0 1 2 4 Miles

U.S. Department of Interior
Bureau of Land Management

Vale District

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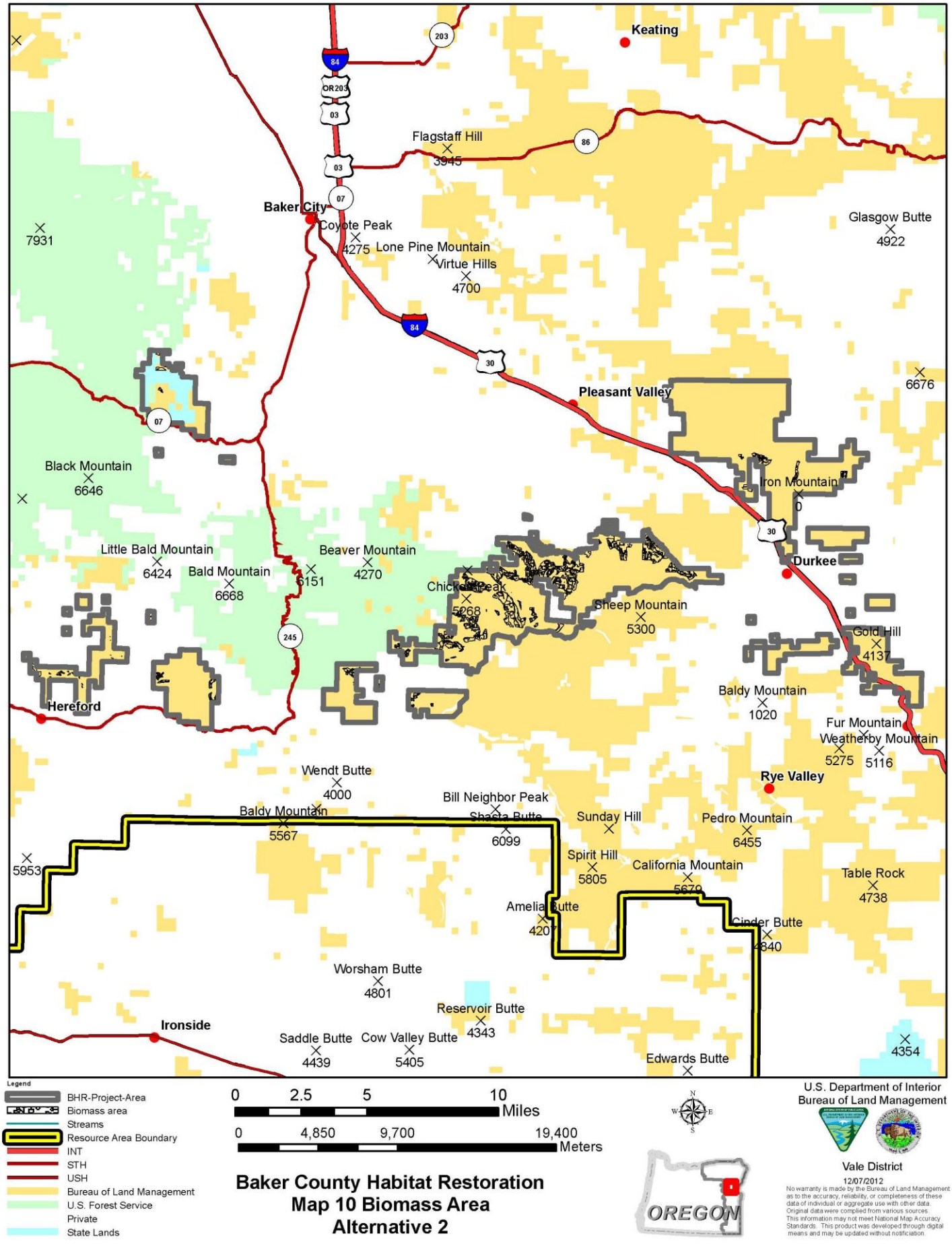
Keating
Flagstaff Hill
3945
Baker City
Coyote Peak
4275
Lone Pine Mountain
Virtue Hills
4700
7931
Glasgow Butte
4922
Pleasant Valley
6676
Black Mountain
6646
Iron Mountain
Durkee
Little Bald Mountain
6424
Bald Mountain
6668
Beaver Mountain
6151
4270
Sheep Mountain
5300
Gold Hill
4137
Baldy Mountain
1020
Hereford
Fur Mountain
Weatherby Mountain
5275
5116
Rye Valley
Wendt Butte
4000
Bill Neighbor Peak
Baldy Mountain
5567
Shasta Butte
6099
Sunday Hill
Pedro Mountain
6455
5953
Spirit Hill
5805
California Mountain
5679
Table Rock
4738
Amelia Butte
4207
Cinder Butte
4840
Worsham Butte
4801
Reservoir Butte
4343
Ironside
Saddle Butte
4439
Cow Valley Butte
5405
Edwards Butte
4354
Legend
BHR-Project-Area
Biomass area
Streams
Resource Area Boundary
INT
STH
USH
Bureau of Land Management
U.S. Forest Service
Private
State Lands
0 2.5 5 10 Miles
0 4,850 9,700 19,400 Meters
Baker County Habitat Restoration
Map 10 Biomass Area
Alternative 2
OREGON
U.S. Department of Interior
Bureau of Land Management
Vale District
12/07/2012
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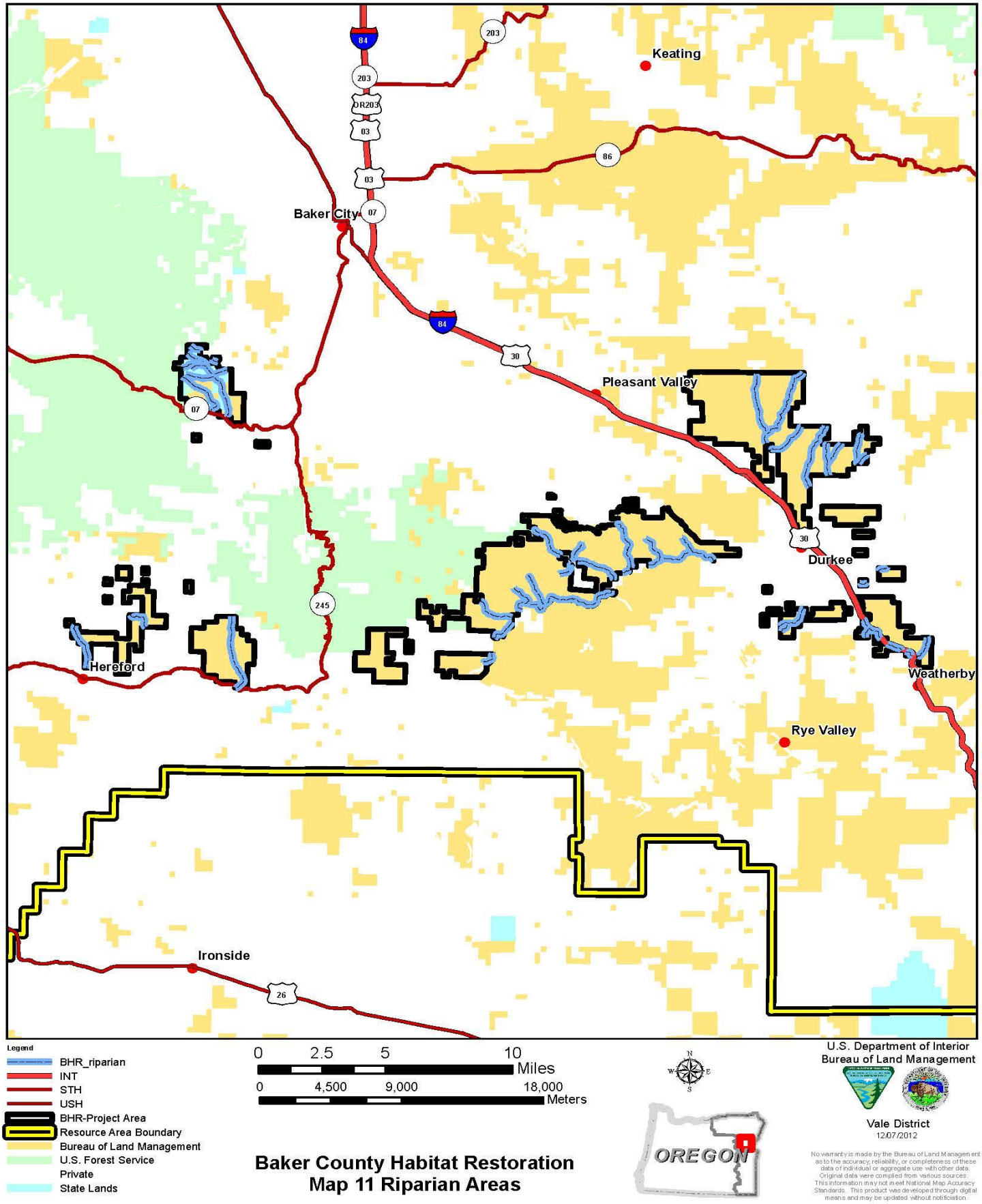

Baker County Habitat Restoration
Map 11 Riparian Areas

9 Appendices

Appendix 1: Baker Habitat Restoration and Fuels Management Project Management and Monitoring Plan

1. Introduction

This monitoring plan describes the activities that the Baker Field Office staff and Vale District Fire personnel would perform to ensure that prescribed burning and mechanized vegetation treatments conform to project design criteria and meet objectives established in Chapter II of EA OR-V050-2013-014. The plan guides implementation and effectiveness monitoring through the year 2020 for all burning and mechanical vegetation treatments described in the EA. Implementation monitoring assesses whether a project is implemented as designed while effectiveness monitoring is employed to address questions about the accomplishment of the specific treatment objectives and the long-term effectiveness of project design elements. This monitoring plan satisfies the monitoring needs described in the Baker Resource Management Plan and Final Environmental Impact Statement, as well as the prescribed fire monitoring requirement described in the Interagency Standards for Fire and Fire Aviation Operations 2012 (USDI – USDA).

This plan is not a decision document. If monitoring should determine that treatments outside the scope of the proposed action are necessary, then a separate site-specific environmental analysis and decision document may need to be prepared.

2. Coordination

Since many different resources would be monitored, respective managers and specialists would be involved with various aspects of the monitoring program. Scheduled monitoring visits and data collection would be dependent on treatment objectives, timing of implementation activities, and the responses of specific resources to fire and fire surrogates. For this reason, close and frequent coordination between resource specialists, implementation specialists, and management is essential.

3. Roles and Responsibilities

The following is a list of key personnel, and their responsibilities, involved in coordinating and implementing the Baker Habitat Restoration Monitoring Program.

<u>Baker Field Office Manager</u>

1) Updates the District Fuels Planner and/or Interdisciplinary Team of any significant issues raised by publics or stakeholders pertinent to monitoring program.

Fire SRNS

1) Serves as a liaison between the Vale BLM line officers, State Office and research personnel, and all other agency personnel.

District Fuels Specialist

1) Tracks and manages budget for monitoring activities on an annual basis.

2) Works with specialists to develop data collection protocols.

3) Ensures that information is forwarded to appropriate line officers, resource specialists, research personnel, and personnel from other agencies.

4) Works with Interdisciplinary Team (resource specialists).

5) Works with burn supervisors.

6) Works within Fire/Fuels and District organizations to secure critical personnel and resources for monitoring program.

Resource Advisors (Archaeologist, Botanist, Fire Ecologist, Wildlife Biologist, Noxious Weeds, Livestock Grazing, Aquatics, Forestry)

1) Conducts resource-specific implementation and effectiveness monitoring.

2) Maintains monitoring documentation and forwards documentation to the District Fuels Planner if necessary.

Project Prescribed Burn Boss

1) Conducts all implementation monitoring associated with prescribed burning that is not conducted by an onsite resource advisor.

2) Ensures monitoring is documented and forwards results to the District Fuels Planner if necessary.

Mechanical Treatment COR

1) Conducts all implementation monitoring associated with mechanical treatments (pine thinning, juniper cutting) that is not conducted by an onsite resource advisor.

2) Ensures monitoring is documented and forwards results to the District Fuels Planner if necessary.

Allotment Administrator (Range)

1) Conducts implementation monitoring to ensure that the desired post-fire understory vegetation response is achieved.

2) Maintains monitoring documentation and forwards documentation to the District Fuels Planner if necessary.

3) Coordinates and communicates with allotment permittees and adjacent landowners when necessary.

4) Ensures that pastures are rested for appropriate periods following prescribed fire treatments and that alternative forage is secured.

5) Works with burn supervisors and Juniper Pretreatment Project Inspector while planning juniper cut pretreatments, burn plan development, and prescribed fire implementation.

3. Results and Documentation

Monitoring results would be utilized to: 1) document fire and silviculture thinning effects; 2) evaluate the success or failure of treatments and project design elements; and 3) assess the potential for future treatments and project design elements. Monitoring results and documentation would be maintained by individual resource specialists in paper files, electronic databases, and possibly in a Geographic Information System. Results may also be kept in a prescribed fire project file or tracked with the Districts Monitoring Database and Analysis Tools by the District Fuels Specialist.

Table1. Baker Habitat Monitoring Program

Element	Implementation or Effectiveness Monitoring	Objective	Methods	Responsibility	Timing
Cultural Resources	Effectiveness	Evaluate the effectiveness of project design elements at protecting cultural resources.	Conduct monitoring visits at a sample of cultural resources (No more than 10% of total sites in Project Area) and compare post-burn conditions to conditions described in cultural resource databases. Possibly conduct pre-burn vs. post-burn artifact analyses.	Archaeologist	Within 1-year of treatment, with visits every 3 years if necessary
Rangeland	Implementation	Ensure that pastures adequately recovered following prescribed burn.	Coordination and communication with allotment permittees.	Allotment Administrator	After implementation of prescribed fire
Fuels Management	Effectiveness	Determine if fuels in treatment units are reduced sufficiently to meet treatment objective	Visually estimated burned areas, delineation with GPS.	District Fuels Planner	After implementation
Fuels Management	Implementation	Determine if weather conditions and prescribed fire parameters are within the range of variability.	Would monitor any site or time specific weather and fire criteria as identified in the project burn plan.	Rx Burn Boss	During Implementation

Element	Implementation or Effectiveness Monitoring	Objective	Methods	Responsibility	Timing
Smoke Plume (Air Quality)	Effectiveness	Determine trajectory and vertical dispersion of smoke plumes.	Visual observation of smoke plume from ground level. Coordination with neighbors and ODF Smoke Management. Assessment of wind speed and direction on day of implementation.	Rx Burn Boss	During and immediately after implementation
Wildlife Biology – Big Game Cover	Implementation	Determine if adequate big game cover remains in treatment units after implementation	Visual estimate.	Wildlife Biologist	During and immediately after implementation
Wildlife Biology – Avian	Implementation	Determine if sufficient snags and large downed wood (LWD) remain in treatment units after implementation	Count LWD and snags per acre in treatment units.	Wildlife Biologist	During and immediately after implementation
Botanical SSS	Implementation	Ensure that structures or areas with SSS habitat values are protected in treatment units.	Monitor activities such as mechanical treatments prior to burning, line construction, prescribed fire ignition, and , mop-up with visual observation, photography, and written description	Botanist	During and after implementation

Element	Implementation or Effectiveness Monitoring	Objective	Methods	Responsibility	Timing
Wildlife Biology – SSS	Implementation	Ensure that structures or areas with SSS habitat value are protected in treatment units. Ensure that juniper is treated properly in 3-mile buffer around identified sage-grouse leks.	Monitor activities such as mechanical implementation, prescribed fire ignition, and mop-up with visual observation, photography, and written description.	Wildlife Biologist	During and after implementation
Wildlife Biology – SSS	Effectiveness	Maintain sagebrush canopy cover on sage grouse winter habitats. Maintain herbaceous understory and increase forb composition in sage grouse breeding and brood-rearing habitat.	Habitat characterization using line intercept plots to measure canopy cover of sagebrush and herbaceous understory.	Wildlife Biologist	Post Implementation and every 2 years for 10 years.
Aquatics	Effectiveness	Ensure that large downed wood in riparian areas is maintained. Cut conifers in stream channel for downed wood recruitment if necessary all cut trees left in channel are top pointed downstream.	Monitor activities such as mechanical implementation, prescribed fire ignition visual observation, photography, and written description.	Fish Biologist	During and after implementation

Element	Implementation or Effectiveness Monitoring	Objective	Methods	Responsibility	Timing
Aquatics	Implementation	Ensure piles are constructed at least 50 feet from flood plain of water bearing streams.	Monitor Silvicultural Thinning Treatment within the Project Treatment Area.	Fish Biologist or Hydrologist and Mechanical Treatment COR	During and after implementation
Aquatics	Effectiveness	Evaluate riparian response to thinning, burning, planting, and other riparian treatments.	Conduct greenline monitoring.	Fish Biologist or Hydrologist	Pretreatment to gather baseline data and at 2, 5, and 8 years following treatment.
Juniper Mortality	Effectiveness	Determine if juniper mortality in treatment units meets determined objective.	Visual estimate.	Implementation Lead	During implementation and immediately after
Vegetation – Wyoming Sagebrush Juniper Encroachment Treatment	Effectiveness	Determine if acreage treatment target of 90-100% Wyoming/bunchgrass plant communities is attained.	Visual estimate, possibly using GPS delineation or aerial observation.	Resource Advisor	During or immediately after implementation
Vegetation – Mahogany/ bitterbrush/ and deciduous stands	Effectiveness	Determine if juniper mortality in bitterbrush, mahogany, and deciduous stands meets objectives.	Monitor during implementation, possibly using photography or written description.	Rx Burn Supervisor Mechanical Treatment COR	During and post implementation

Element	Implementation or Effectiveness Monitoring	Objective	Methods	Responsibility	Timing
Vegetation – Post-fire understory response	Implementation	Ensure that adequate understory seed source is available in prescribed fire treatment units.	Visual estimates, belt transects.	Allotment Administrator	Prior to implementation and/or immediately afterward
Vegetation – Bitterbrush Resprout	Effectiveness	Determine resprout success of burned bitterbrush shrubs.	Belt transects.	Wildlife Biologist	Preburn, 1-year following treatment, and at 3-year intervals for 12 years
Vegetation – Low /Ridged Sagebrush Enhancement Treatment	Effectiveness	Determine if acreage treatment target of 60-80% in low sagebrush/bunchgrass plant communities is attained.	Visual estimate, possibly using GPS delineation or aerial observation.	Resource Advisor	During or immediately after implementation
Forestry	Effectiveness	Determine if stand density objectives are attained following treatments.	Monitor unit during layout, mechanical treatment, and prescribed fire activity.	Forestry Specialist	During implementation
Aspen	Effectiveness	Determine if aspen stands are healthy and not being suppressed.	Visual estimates and Ensure that the Aspen management decision flowchart for the Blue Mountains from the book Aspen Biology, Community Classification, and management in the Blue Mountains is used.	Fuels Specialist and Forestry Specialist	Monitor pre, post, implementation and then 2, 5, and 10 yrs

Element	Implementation or Effectiveness Monitoring	Objective	Methods	Responsibility	Timing
Noxious Weeds	Implementation	Contain, control and/or eradicate existing infestations of noxious weeds. Prevent new infestations of noxious weeds from getting established in the area.	Obtain and maintain an inventory of weed locations within the area to help develop priority control objectives and methods.	Weed Coordinator	Continue prevention, early detection, treatment and monitoring of noxious weeds
Roads	Implementation	Ensure roads used during project implementation are returned to a state that is similar to prior condition.	Visual estimates.	Rx Burn Supervisor Mechanical Treatment COR	After implementation

Appendix 2: Riparian and Fisheries Design Features

Riparian Management Areas (RMAs)
RMAs are portions of watersheds where riparian-dependent resources receive primary management emphasis. RMAs are not intended to be treated as 'no management' zones, since treatments may be essential to achieving or maintaining desired riparian and aquatic conditions. RMAs include riparian corridors, wetlands, intermittent, perennial, and headwater streams, and other areas where "proper" ecological function is crucial for maintaining water, sediment, woody debris, and nutrient delivery to the system, so that they function within the natural range of variability.

RMA width is a function of site condition and is based on potential to affect aquatic and riparian function and value. This strategy allows for adjustment of RMA widths to reflect site-specific conditions while also recognizing watershed-wide riparian conditions and trends. The widths of RMAs shall be adequate to protect the stream from non-channelized sediment inputs and sufficient in size to deliver organic matter and woody debris, as well as to provide stream shade and bank stability. RMA dimensions may be modified or adjusted via watershed analysis, or where stream reach data and/or site-specific analysis supports a modification to default RMA dimensions, including during project-level planning.

With the exception of units where RMA dimensions have been modified as a result of site-specific analysis or the presence of roads, the following default RMA dimensions would be implemented on all units within the Project Area within the following four categories of stream or waterbody:

Category 1: Fish-bearing streams
Category 2: Perennial non-fish bearing streams
Category 3: Ponds, lakes, reservoirs, and wetlands greater than one acre
Category 4: Intermittent or seasonally flowing streams and wetlands less than one acre, and unstable areas (i.e., landslides and landslide-prone areas).

Category 1 RMAs consist of the stream and the area on either side of the stream extending from the edges of the active stream channel to the top of the inner gorge, or the extent of the Rosgen flood-prone area width (Rosgen 1996), or to the outer edges of riparian vegetation, or to the extent of unstable source areas[6], or 300 feet slope distance on both sides of the stream channel, whichever is greatest.

Category 2 RMAs consist of the stream and the area on either side of the stream extending from the edges of the active stream channel to the top of the inner gorge, or the extent of the Rosgen flood-prone area width (Rosgen 1996), or to the outer edges of riparian vegetation, or to the extent of unstable source areas, or 150 feet slope distance on both sides of the stream channel, whichever is greatest.

Category 3 RMAs consist of the body of water or wetland and the area to the outer edges of riparian vegetation, or to the extent of the seasonally saturated soil, or 150 feet slope distance from the edge of the maximum pool elevation of constructed ponds and reservoirs, or from the edge of the wetland, pond, or lake, whichever is greatest.

Category 4 RMAs consist of the intermittent or seasonally flowing stream channel or wetland to the extent of unstable source areas, or to the outer edges of riparian vegetation, or 50 feet slope distance on both sides of the stream channel or from the edge of the wetland, pond, or lake, whichever is greatest.

[6] Unstable source areas are defined as those areas that provide source for in-channel structure, which includes channel components that provide roughness, sediment capture and release, and instream habitat. These components can vary by vegetation and stream type, stream size, and ecologic zone.