MILLER HOMESTEAD FIRE EMERGENCY STABILIZATION AND REHABILITATION PLAN ENVIRONMENTAL ASSESSMENT

DOI-BLM-OR-B060-2012-0047-EA

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Stabilization and Rehabilitation Plan Environmental Assessment (EA)
DOI-BLM-OR-B060-2012-0047-EA

CHAPTER I. INTRODUCTION: PURPOSE OF AND NEED FOR ACTION

A. Background

This Environmental Assessment (EA) for the Miller Homestead Fire Emergency Stabilization and Rehabilitation Plan (ES&R) analyzes the potential impacts of proposed stabilization and rehabilitation activities on the human environment on Bureau of Land Management (BLM) administered lands managed by the BLM Burns District Office, as well as on portions of the Malheur National Wildlife Refuge (further referred to as Refuge) managed by the United States Fish and Wildlife Service (USFWS), and privately owned land. This EA will analyze the potential impacts of the ES&R Plan.

All projects proposed in the ES&R Plan that are prescribed, funded, or implemented by Federal agencies on Federal, State, or private lands are subject to compliance with the National Environmental Policy Act (NEPA) in accordance with the guidelines provided by the Council on Environmental Quality (CEQ) Regulations (40 CFR 1500-1508). This EA has been developed in accordance with the CEQ regulations, Departmental Manual (DM) 516, USFWS NEPA Reference Handbook 550 FW (Chapters 1 and 2) and BLM's NEPA Handbook H-1742-1. Miller Homestead Stabilization actions proposed on BLM lands, involving the agency's permitting, funding, or implementation, must comply with regulations set forth in the *Department of the Interior Manual Part 516 (DM 11),* and policies described in *BLM Handbook H-1742-1*.

The Miller Homestead Fire started on July 8, 2012 in Harney County, Oregon, as the result of lightning associated with dry thunderstorms. The wildfire started approximately 12 miles west of Frenchglen, Oregon, and began burning in grass and brush on BLM land. The fire was estimated at 2,800 acres the evening of July 8 and grew to 11,600 acres by the evening of July 9. On July 10, the fire largely expanded to the west, increasing in size to 45,000 acres, and was threatening at least three residences, numerous outbuildings, livestock, grazing allotments, and the community of Frenchglen. A portion of Highway 205, south of Frenchglen, was closed in the afternoon due to wildfire along the highway and smoky conditions. Sporadic winds, high temperatures, and low fuel moisture, along with rocky terrain resulted in the fire spreading to the north, northwest, and south, increasing in size to 60,000 acres on July 11. On July 12, the fire continued to spread on three fronts spreading to the north and west, increasing in size to 67,760 acres in the morning. In the afternoon strong, gusty winds, high temperatures and extremely dry fuels pushed the fire to the north, and northeast, burning actively into the night. The fire spread rapidly through grasses, sagebrush, and western juniper stands, bringing the total fire size to 110,000 acres. By the end of the day on July 13, the fire had spread to 156,391 acres. On July 14, growth of the fire was minimal, with most of it occurring on the northeastern perimeter, and the fire increased to its final size of 160,801 acres. The fire was contained on July 24, 2012, after having burned 146,798 acres of BLM-managed land, 12,794 acres of privately owned land, and 1,209 acres of Refuge. See Appendix A,

Map 1 – Burns District Boundary for the general location of the Fire, Map 2 - Fire Growth July 8, 2012 to July 13, 2012 for a visual of daily fire growth throughout the incident, and Map 3 – Surface Jurisdiction for land ownership within the fire perimeter.

The Miller Homestead Fire burned through elevation ranges from about 4,200 feet up to 5,440 feet, with precipitation zones of 10 inches to 15 inches (with the majority of the area within the 10 inches-12 inches range). Eleven allotments and numerous pastures, affecting seven permittees were also burned, at least in part. The major vegetative communities this fire burned through consisted of Wyoming big sagebrush (*Artemisia tridentata Nutt. ssp. wyomingensis* Beetle & Young) or low sagebrush (*Artemisia arbuscula* Nutt.) overstory with the perennial understory dominated by bluebunch wheatgrass (*Pseudoroegneria spicata* (Pursh) Á. Löve ssp. spicata), Thurber's needlegrass (*Achnatherum thurberianum* (Piper) Barkworth), bottlebrush squirreltail (*Elymus elymoides* (Raf.) Swezey), and Indian ricegrass (*Achnatherum hymenoides* (Roem. & Schult.) Barkworth).

B. Purpose of and Need for Action

The purpose of action is to stabilize and rehabilitate the area burned by the Miller Homestead Fire, help reduce the risk of future high-intensity wildlife events, and reduce potential impacts to existing infrastructure, including:

1) Minimize threats to life or property (rangeland and related range improvements; potential flood and debris flows, etc.);
2) Protect cultural resources from looting or vandalism;
3) Stabilize soils and reduce offsite soil loss by establishing ground cover of desirable perennial vegetation in order to compete with annual grasses and noxious weeds, reduce the likelihood of new weed establishment, reduce the potential for accelerated soil erosion (both wind and water), and promote the recovery of sage-grouse and pygmy rabbit habitat;
4) Protect road resources by allowing continued water flow through culverts and ditches;
5) Reduce the risk of noxious weed and annual grass infestations by utilizing the Early Detection/Rapid Response (EDRR) method;
6) Reduce the risk of rock and soil movement from the burned area, downslope to Highway 205;
7) Ensure wild horse habitat needs continue to be met while limiting use of the burned portion of the Herd Management Area (HMA);
8) Protect burned areas from wild horse and livestock grazing until objectives (three plants per square meter) are met;
9) Reduce fine fuels within the burned area to protect the area from future high-intensity wildfire;
10) Repair or replace damaged minor facilities needed for management of wild horses and livestock, including fences and a spring development;
11) Continue to provide water sources for wildlife; and
12) Protect ROW infrastructure from future wildfires

There are numerous issues present in the area burned by the Miller Homestead Fire. The need for the Action is:

1) Greater sage-grouse (*Centrocercus urophasianus*), a candidate for Federal listing as Threatened or Endangered and a BLM Special Status Species (SSS), are found within the treatment area. The area is densely populated by sage-grouse, with 147,133 acres (91 percent of the burned area) within the fire perimeter designated as Preliminary Priority Habitat and 11,728 acres (7 percent of the burned area) designated as Preliminary General Habitat. There are six known sage-grouse breeding grounds (leks) within the fire perimeter, and eight additional leks within four miles of the fire perimeter. The majority of the burned area is also pygmy rabbit (*Brachylagus idahoensis*) habitat. Pygmy rabbit are also a sagebrush obligate and BLM SSS.

2) The majority of this fire burned through Wyoming big sagebrush and low sagebrush sites. Full, natural recovery of these sites may take over 100 years. The fire removed most of the aboveground plant material and exposed the soil surface to the forces of wind and water, and future erosion events. Over 91 percent of the burned area is susceptible to erosion from wind or water (Web Soil Survey, 2012). Human life and safety may be put at risk in the area during storm events that cause erosion, transport sediment and debris, and increase rock fragmentation. The fire burned through rim rock that runs adjacent to Highway 205, which is downslope of the rim. The loss of vegetation within this area has decreased the stability of rocks in the rim and on the slope, increasing potential for rock fragmentation and movement. Post fire, during the dry hot months of August and September, and to a certain extent October, depending on the year, soils are susceptible to wind erosion with no vegetation or biological soil crusts to hold them in place. The location of the fire adjacent to Highway 205, and including multiple major county roads, makes blowing dust and sand from the burned area a hazard to motorists traveling along these roads. Appendix B – Miller Homestead Related Photos provides examples where movement of rock has previously resulted in boulders rolling to Highway 205, and of wind erosion occurring within the burned area.

3) As the fall precipitation begins, generally starting in October, soils susceptible to water erosion become vulnerable to overland flow which transports valuable seed containing top soil away from the area (Soil Survey Staff 2012). In addition, with no vegetation to help capture water on the site, the amount of runoff post fire is larger than pre-fire, increasing the potential for erosion to occur on the site and within drainages, taking with it soil and other objects in its path. There are multiple roads that cross drainages. In areas with high risk for water erosion, sediment may clog culverts, increasing the potential for road washouts posing a risk to vehicles and human safety. The community of Frenchglen is located just outside the fire perimeter, and sits at the bottom of a steep drainage that begins within the fire perimeter. In 2008, western juniper trees located within this

drainage, just upslope from Frenchglen, received a cut and leave treatment. A period of high precipitation resulting in erosion and runoff within the burned area, may result in large quantities of water travelling down this drainage, moving these cut junipers into the community creating human life and safety risks. See Appendix C - Climate Data.

4) Large amounts of vegetation within the fire perimeter burned, leaving vast, continuous areas of bare ground, and increasing the probability that noxious and invasive plants (primarily cheatgrass and medusahead) become established. Annual grasses capitalize on the newly released nutrients post fire and are able to capitalize on early spring moisture, allowing these species to out-compete desirable native species and, within a few years, dominate the burned site with little or no chance of rehabilitation. The entire burned area was scattered with cheatgrass (*Bromus tectorum* L.) prior to the fire, and medusahead (*Taeniatherum caput-medusae* (L.) Nevski) is in the vicinity of the fire and near the site of the fire camp. This puts the burned area at a high risk of becoming dominated by these annual grasses, especially the dry Wyoming big sagebrush areas, which are not expected to recover naturally. If the burned area becomes dominated by annual grasses, the risk of subsequent fires is higher due to increased fine fuel loads, resulting in an additional risk to human life and property, especially to the three ranches that are located within the fire perimeter and the community of Frenchglen which is located approximately one mile outside the fire perimeter. Currently, a number of large-scale examples exist on our District demonstrating what happens to annual grass infested lands that are not effectively treated after a fire. Example; where burned areas were not seeded, or seeded with native species only, and are now infested and/or dominated by annual grasses (cheatgrass or medusahead) include portions of: 1) Crane Allotment - Antelope and Middle pastures, burned in the 2006 Titus Fire (not seeded); 2) Crane Allotment - Rim Pasture and Emmerson Allotment - West Pasture, burned in the Uncontrol Fire in 1983 (not seeded); 3) River Allotment - Upland, River, Carey Tables, and Lake Pastures (not seeded) and Upton Mountain Allotment - Upton Mountain Pasture (seeded with native species), burned in the 2007 Bartlett Mountain Fire; 4) North Catlow Allotment - N. Catlow Winter Pasture, burned by the Guano fire in 1985 (not seeded); 5) South Catlow and Basque Hills Allotment, burned in 1998 by the Raz Lewis fire (portions not seeded, and portions seeded by native species); 6) East Warm Springs Allotment – Plateau Pasture, burned by the Jackass Fire in 1985 (not seeded); 7) Second Flat Allotment – Lower Flat Pasture, burned in 2007 Egley Complex (not seeded); and 8) West Sagehen Allotment, burned in the 1990 Pine Springs Basin and 2007 Egley Complex Fire (not seeded). Within the perimeters of many of the fires listed above, areas were seeded with desirable non-native species, or desirable non-native – native seed mixes, which were successful and have fewer annual grass species. These are a few examples found within the Burns District, many other examples, both on and off the Burns district exist.

5) In addition to cheatgrass, there are eight known noxious weed species present within the perimeter and numerous noxious weed sites just outside the perimeter of the fire. Due to the presence of cheatgrass and noxious weed species within the burned area, and medusahead rye infestations adjacent to the burned area, along with the fact that the fire made site resources readily available for weed infestation, there exists a need to control these annual grasses and other noxious weeds. Control of these species would increase the potential for establishment of desirable plants. See Map 12 for known weed infestation areas within, and in the vicinity of, the Miller Homestead Fire.

6) Burned areas often need to be protected from grazing by wild horses and livestock in order to allow perennial vegetation to become reestablished. New, temporary fences may be required to protect these areas, especially in large pastures that were not fully consumed by the fire. Fences were damaged to varying extents as the fire burned through allotment boundary and pasture fences. These fences are needed to protect the area from grazing, as well as management of wild horses and livestock once grazing within the burned area is resumed.

7) A pipeline, that was part of a spring development and provided water to a trough and a reservoir, was destroyed, as was a wildlife guzzler. Wildlife relies on manmade water sources in the area in order to make the naturally dry area suitable habitat.

8) Both prehistoric and historic cultural sites exist within the Miller Homestead Fire perimeter. These include approximately 40 sites on BLM-managed land and 12 sites on Refuge, including a Civilian Conservation Corps camp, homesteads, grave sites, and lithic scatters. Since the fire removed protective cover vegetation from these sites, it is important that protective measures are taken to ensure sites remain intact.

9) Numerous powerlines and Right-of-Way (ROW) infrastructure areas exist within the fire perimeter. Protection against future fires for the ROW infrastructures is needed to provide continued electrical power and communication services to the surrounding communities and residences.

C. Resource Objectives

The following management objectives are from the Three Rivers Record of Decision/Resource Management Plan (ROD/RMP), date approved September 1992.

- Soil Management (RMP 2-15): SM1 - "Prevent deterioration of soil resources by ensuring the BLM-administered lands are in stable or upward observed apparent trend categories as outlined in BLM Handbook H1734-2." SM1.2 - "Rehabilitate burned areas where erosion hazard is high and/or natural revegetation potential is low." SM2 - "Rehabilitate areas with specific localized soil erosion problems and reduce accelerated (human influenced) sediment delivery to fluvial systems."

- Biological Diversity (RMP 2-20): BD1 - "Maintain viable populations of native plants and animals well distributed throughout their geographic range." BD3 - "Maintain representative examples of the full spectrum of ecosystem's biological communities, habitats, and their ecological processes. Provide for the increase of scientific understanding of biological diversity and conservation."
- Grazing Management (RMP 2-33): GM1.2 - "…Stocking levels will be reviewed and adjusted, if necessary and in accordance with the results of monitoring studies…" GM1.3 - "Utilize rangeland improvements, as needed, to support achievement of multiple-use management objectives…"
- Wild Horses (RMP 2-43): WHB1 - "Maintain healthy populations of…wild horses and burros in the Warm Springs HMA."
- Vegetation (RMP 2-51): V1 - "Maintain, restore, or enhance the diversity of plant communities and plant species in abundance and distributions, which prevent the loss of specific native plant community types or indigenous plant species within the RA." V1.6 - Apply approved weed control methods including manual, biological, and chemical control methods…in an integrated pest management program to prevent the invasion of noxious weeds into areas presently free of such weeds and to improve the ecological status of sites which have been invaded by weeds…"
- Special Status Species (RMP 2-56): SSS2 - "Maintain, restore or enhance the habitat of candidate, State of Oregon listed and other sensitive species to maintain the populations at a level which avoid endangering the species and the need to list the species by either the State of Oregon or Federal Government." SSS3 - "Ensure that BLM-authorized actions within the RA do not result in the need to list SSS or jeopardize the continued existence of listed species…"
- Wildlife (RMP 2-66): WL2.4 - "Provide water in mule deer summer range where that habitat component is deficient." WL3 - "Manage forage production to support big game population levels identified by Oregon Department of Fish and Wildlife (ODFW)." WL7 - "Restore, maintain, or enhance the diversity of plant communities and wildlife habitat in abundances and distributions which prevent the loss of specific native plant community types or indigenous wildlife species habitat within the RA." WL7.5 - "Adjust overall grazing management practices as necessary to protect SSS and to maintain or enhance their habitat…" WL7.13 - "Provide water for wildlife species in areas where that habitat component has been specifically identified as deficient."
- Cultural Resources (RMP 2-152): CR1 - Protect the cultural and paleontological values in the RA from accidental or intentional loss, while providing special emphasis to high value sites and conserving those resources of overriding scientific or historic importance."

The following management objectives are from the Andrews Management Unit ROD/RMP, date approved August 2005.

- Soil Management (RMP-21): Goal 1 - "Manage soils on public lands to maintain, restore, or improve soil erosion classes, watershed health, and areas of fragile soils."

- Vegetation (RMP-24): "Manage vegetation to achieve and maintain healthy watersheds."
- Rangelands (RMP-30): Goal 1 - "Maintain, restore or improve the integrity of desirable vegetation communities including perennial, native, and desirable introduced plant species. Provide for their continued existence and normal function in nutrient, water, and energy cycles." Goal 2 - "Manage rangeland habitats so that forage, water, cover, structure, and security necessary to meet the life history requirements of wildlife are available on public lands."
- Noxious Weeds Inventory and Treatment (RMP 31): Goal - "Control the introduction and proliferation of noxious weeds and reduce the extent and density of established populations to acceptable levels."
- Special Status Species (RMP-34): "Maintain, restore, or improve Special Status plant populations and animal habitats; manage public lands to conserve or contribute to the recovery of threatened or endangered species; and prevent future ESA listings."
- Wildlife (RMP-33): Goal - Provide diverse, structured, resilient, and connected habitat on a landscape level to support viable and sustainable populations of wildlife, fish, and other aquatic organisms."
- Cultural Resources (RMP-40): Goal 1 - "Preserve, protect, and manage cultural resources in accordance with existing laws, regulations, and Executive Orders, in coordination/ consultation with the Burns Paiute Tribe, other American Indian tribes, Harney County Historical Society and other heritage groups to make cultural resources available for appropriate uses by present and future generations."
- Wild Horses (RMP-50): Goal - Manage and maintain healthy wild horse herds in established HMAs at Appropriate Management Levels to maintain a thriving natural ecological balance between wild horse populations, wildlife, livestock, vegetation resources, and other resource values…"
- Grazing Management (RMP-54): Goal - "Manage for a sustained level of livestock grazing while maintaining healthy public land resources."
- Wildland Fire Management (RMP-57): Goal 2 - Restore and maintain the integrity of ecosystems consistent with appropriate fire regimes and land uses."

The following management objective is from the Jack Mountain Communication Site Management Plan, date approved August 2000.

- Standards (IV, J.1): "…any structure or facility which is covered by a flammable material or which contains flammable materials will have a zone around the structure cleared of all vegetation for a distance of 20 feet."

D. Decision to be Made

The BLM will decide which, if any, burned area stabilization and rehabilitation activities will occur within the Miller Homestead Fire area.

E. Conformance with Land Use Plans

The proposed treatments are in conformance with the 1992 Three Rivers ROD/RMP and 2005 Andrews Management Unit ROD/RMP, even though they are not specifically provided for, because they are clearly consistent with the goals and objectives stated under Resource Objectives above.

The proposed action also conforms to the 2005 Burns Interagency Fire Zone Fire Management Plan (Burns FMP). The Burns FMP on Page 114 states that "Emergency stabilization and rehabilitation process for fires on the Burns District of the BLM would follow current Department of Interior and BLM guidance (IM-ID-2004-008) and the BLM Emergency Fire Rehabilitation Handbook, H-1742-1 (USDI 2002)." The proposed action is consistent with resource objectives of that plan and with other Federal, State, local, and tribal laws, regulations, policies, and plans to the maximum extent possible.

F. Consistency with Other Authorities

The Proposed Action has been designed to conform to the following documents, which direct and provide the framework for management of BLM lands within Burns District:

- Taylor Grazing Act (43 U.S.C. 315), 1934
- The NEPA (42 U.S.C. 4320-4347), 1970
- Wild Free-Roaming Horses and Burros Act (16 U.S.C. 1331-1340), 1971
- Federal Land Policy and Management Act (43 U.S.C. 1701), 1976
- Public Rangelands Improvement Act (43 U.S.C. 1901), 1978
- August 12, 1997 Standards for Rangeland Health and Guidelines for Livestock Management for Public Lands Administered by the BLM in the States of Oregon and Washington
- 1998 Burns District Noxious Weed Management Program EA (OR-020-98-05)
- 2000 Jack Mountain Communication Site Management Plan EA (OR-025-00-32)
- 2007 Vegetation Treatments Using Herbicides on BLM lands in 17 Western States ROD (National Veg. Final Environmental Impact Statement (FEIS))
- 2010 Vegetation Treatments Using Herbicides on BLM Lands in Oregon Record of Decision (ROD) (Oregon Veg. FEIS)
- Greater Sage-grouse and Sagebrush-steppe Ecosystems Management Guidelines (BLM-2000)
- BLM National Sage-grouse Habitat Conservation Strategy (2004)
- Clean Water Act (33 U.S.C. 1251 - 1376; Chapter 758; P.L. 845, June 30, 1948; 62 Stat. 1155)
- Clean Air Act, 42 U.S.C. 7470, et seq., as amended
- National Historic Preservation Act (16 U.S.C. 470)
- State, local, and Tribal laws, regulations, and land use plans

- Executive Order 12372, Intergovernmental Review
- Executive Order 13112, Invasive Species
- Instruction Memorandum WO-2012-043, Greater Sage-Grouse Interim Management Policies and Procedures issued December 27, 2011.

G. Identified Emergency Stabilization and Rehabilitation Issues

During the initial meeting with the Burns District Interdisciplinary Team (IDT) on July 17, 2012, the BLM Burns District Office identified the following resource issues potentially affected by the fires and/or suppression activities:

- spread of known noxious and invasive weed populations (especially annual grasses) into, and within, the burned area;
- impacts of potential flood and debris flow to the community of Frenchglen and along Highway 205;
- potential flood and debris flows on Highway 205, Foster Flat Road, Jack Mountain Road, Matties Ark Road and other heavily used roads within and adjacent to the burned area;
- potential flood flows of intermittent creeks and drainages from within the burned area;
- potential impacts to socioeconomics including livestock forage loss and temporary nonuse for grazing;
- impacts to range improvements including fencelines and water developments;
- loss of sage-grouse and pygmy rabbit habitat, both BLM SSS;
- impacts to habitat for big game species including mule deer, bighorn sheep, and antelope;
- impacts to known historic and archaeological resources
- potential for soil erosion from both wind and water;
- potential for increased rock fragmentation on the rim upslope of Highway 205
- ROW infrastructure

H. Public Involvement/Scoping

On August 6, 2012 the BLM hosted a field trip to the Miller Homestead Fire area. The field trip included representatives from the Oregon Natural Desert Association, the Nature Conservancy, the Sierra Club, Harney County Court, ODFW, Congressman Greg Walden's office, Eastern Oregon Agricultural Research Center (EOARC), Oregon State University Extension Service, USFWS, and Refuge. Participants were provided with a general idea of what rehabilitation efforts the BLM would plan for, including seeding and possible seeding species. Discussion on the need for soil stabilization and rehabilitation in the area, and questions from participants occurred during the field trip. On August 23, these participants were updated on the fire stabilization and rehabilitation efforts, including more specifics on ES&R efforts that were submitted in the ES&R for the Miller Homestead Fire. Participants were informed that the ES&R plan does not constitute a Decision, and that proposed treatments/actions would be analyzed, as needed in an EA.

Contact information was provided if any members of the interested public had specific questions or comments.

In addition to the field trip, affected permittees have been met with on an individual basis and are ongoing. Discussion with other governmental agencies, including Refuge, ODFW, USFWS, and the Burns Paiute Tribe are also ongoing.

I. Issues Considered but not Analyzed Further

1. Wilderness Characteristics

Wilderness characteristics have been found not to be present within the fire perimeter and will not be analyzed in this EA for the following reasons:

In 2003, BLM reviewed current conditions and citizen information submitted for the lands that currently do not have a Wilderness Study Areas (WSA) or wilderness designation within the Andrews Resource Area (RA), including the BLM lands contained in the Keg Springs citizens' wilderness proposal area, and updated the wilderness inventory. Pursuant to 40 C.F.R. § 1502.21, the BLM hereby incorporates its wilderness inventory update by reference. The wilderness inventory update considered the standard wilderness criteria of size, naturalness, and outstanding opportunities for solitude or primitive and unconfined recreation, as described in Section 2(c) of the Wilderness Act. The BLM used multiple resources to complete the wilderness inventory update, including an in-house interdisciplinary team with field knowledge of the areas, aerial photographs, BLM databases containing records of Rights-of-Way, mineral leases, mining claims, road improvements, and vegetation treatments, and other tools to make their findings. BLM staff made site visits to the field where more information was needed to validate their inventory findings. No changes to conditions within this area were identified that would modify the findings of the 1980 intensive inventory that had evaluated the presence of wilderness characteristics on BLM-administered lands. The Andrews/Steens RMP confirmed no new areas within the fire perimeter were found to have wilderness characteristics. The 9th Circuit Court of Appeals in December 2010 upheld BLM's findings that these parcels do not possess wilderness values.

In 2009, in response to a proposed wind development project (though outside of citizen proposed WSA areas), two units, Jack Mountain Unit and Jackass Butte Unit were inventoried. Both of these units fall within the fire perimeter, and both were found not to have wilderness characteristics.

The remaining acres within the fire perimeter have not been individually updated since the original 1980 intensive inventory. However, for those acres that are within the Andrews RA, it was determined in the 2005 Andrews Management Unit RMP that these lands do not contain wilderness characteristics and no changes have occurred since the 1980 intensive inventory that would make them

suitable for WSA or wilderness designation. Summaries of the 1980 intensive inventory for the remaining acres are listed below.

Summary of BLM's Findings:

- Keg Springs Inventory Unit (2003, 44,501 acres within the fire perimeter): A portion of this proposed unit falls within the Three Rivers RA. Four parcels within this area do not meet the size requirement, while 5 parcels do meet the size requirement. Of those meeting the size requirement, three of the parcels and half of a fourth parcel were found to have naturalness. However, none of the remaining units were found to have outstanding opportunities for recreation or solitude. Therefore, the unit does not have wilderness characteristics present.

- Jack Mountain Inventory Unit (2009, 11,737 acres): This unit is sufficient size to have wilderness characteristics; however, it was not found to have naturalness due to the presence of numerous, substantially noticeable developments. No outstanding opportunities for primitive recreation or solitude were found. Therefore, the unit does not have wilderness characteristics present.

- Jackass Butte Inventory Unit (2009, 16,052 acres): This unit was found to be of sufficient size to have wilderness characteristics and be in an overall natural condition. However, it was not found to possess outstanding opportunities for solitude or primitive and unconfined recreation. Therefore, the unit does not have wilderness characteristics present.

- Frenchglen Inventory Unit 2-55, Black Rim Inventory Unit 2-56, Taylor Cabin Inventory Unit 2-59A, South Bollenbaugh Inventory Unit 2-93A (1980): These units meet the size requirement for wilderness; however, they have numerous, substantially noticeable developments and do not appear to be in a natural condition. In addition, the units do not offer outstanding opportunities for solitude or primitive and unconfined recreation. Therefore, these units do not have wilderness characteristics present.

- Jackass Creek Inventory Unit 2-57A, South Bollenbaugh Inventory Unit 2-93B (1980): These units meet the size requirement for wilderness. While they have developments, they are not substantially noticeable and the units appear to be in a natural condition. However, these units do not provide outstanding opportunities for solitude or primitive and unconfined recreation. Therefore, the units do not have wilderness characteristics present.

2. Greenhouse Gas Emissions and Climate Change

Greenhouse Gas Emissions and Climate Change will not be analyzed in this EA for the following reason:

The Burns District has considered greenhouse gas emissions and climate change in several Allotment Management Plans (Cluster AMP, page 6, 2011; Cottonwood Creek AMP, page 9, 2011; and Chalk Hills AMP, page 8, 2010) and all have concluded the emission does not merit reporting as they fall well below the threshold of 25,000 metric tons. Estimates for grazing cattle typically range from 80 to 101 kilograms of methane per year per animal (Environmental Protection Agency (EPA), 2009) or 6.7 to 9.2 kilograms of methane per month. This analysis will assume a methane emission rate of 8 kilograms of methane per Animal Unit Month (AUM). Assuming that methane has a global warming potential 21 times carbon dioxide (EPA 2009, p. ES-3), each AUM results in 0.168 metric tons of carbon dioxide equivalent. In order to meet or exceed the 25,000 metric ton threshold, over 148,809 AUMs would have to be authorized. The total permitted AUMs within the burned area, and any AUMs that may occur under Temporary Nonrenewable Use would fall well below this level.

Changes in greenhouse gas levels affect global climate. Forster et al. 2007 (pp. 129-234), reviewed scientific information on greenhouse gas emissions and climate change, and concluded that human-caused increases in greenhouse gas emissions are extremely likely to have exerted a substantial warming effect on global climate. The U.S. Geological Survey (USGS), in a May 14, 2008 memorandum to the USFWS, summarized the latest science on greenhouse gas emissions 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.

CHAPTER II. ALTERNATIVES INCLUDING THE PROPOSED ACTION

All alternatives have been fully analyzed in Chapter III of this EA. A Decision will be made by the District Manager, whom may choose to proceed with any one of the alternatives analyzed or a combination of portions of multiple alternatives.

A. Actions Common to All Alternatives

1. Cultural Protection

Approximately 40 known cultural heritage sites on BLM-managed land and an additional 12 sites on the Refuge (including a Civilian Conservation Corps camp) were burned during this fire, including both historic and prehistoric sites. The area has been utilized historically and prehistorically by Native Americans, as well as by numerous ranchers and homesteaders over the last 150 years. Since the fire removed covering vegetation, artifacts on the surface will be easy to see for

several years post fire; therefore, there is a high risk of illegal surface collection and acts of vandalism. As perennial vegetation becomes established on the site, this risk will decrease. The Burns District BLM Law Enforcement Officer and USFWS law enforcement will increase patrol in the Miller Homestead Fire until vegetation becomes established enough to cover cultural heritage sites and the risk of surface collection or vandalism decreases.

2. Juniper Hand Piling

In a drainage immediately east of the fire perimeter and west of the community of Frenchglen there is an area (approximately 20 acres) that received a cut and leave juniper treatment in 2008. Due to the increased risk of large runoff events, these downed trees now pose a threat to the community of Frenchglen. In order to reduce the risk of these trees being moved into the community of Frenchglen, the downed trees in this area will be hand piled outside the major drainage channel. This will be done by the Burns Interagency Fire Zone in the fall/winter of 2012. The Miller Homestead Fire removed vegetation throughout most of the burn area, leaving large areas of only mineral soil. Without vegetation to help capture precipitation and slow water runoff, large runoff events are expected. Since these downed juniper trees are near the bottom of the drainage and less than 0.25 miles from the community of Frenchglen, they are at risk of being moved into the community, posing a risk to human safety. This action was previously analyzed in the Lavoy Tables Prescribed Fire CX OR-08-026-034 and will not be analyzed within this document.

B. Alternative A: No Action

The No Action Alternative is to let all portions of the burned areas recover naturally without management. All resources would be left to the unmanaged processes of erosion and vegetation (included invasive species) establishment. No closures of the burned area to wild horse or livestock grazing would occur. None of the treatments proposed in the Miller Homestead Fire ES&R Plan would be carried out unless they are provided for under other NEPA documents. Under the existing Burns District's Noxious Weed Management Program EA, the Burns District is not authorized to use the most effective herbicides to treat annual grasses and other noxious weeds analyzed in the Oregon Veg. FIES.

C. Alternative B: Proposed Action – Full Implementation of the Miller Homestead Fire Emergency Stabilization and Burned Area Rehabilitation Plan

The Proposed Action was developed by the BLM IDT in order to address identified resource concerns following the Miller Homestead Fire.

1. Adaptive Management and Flexibility

Adaptive management is a system of management practices based on clearly identified outcomes and monitoring to determine if management actions are meeting desired outcomes; and, if not, facilitating management changes that would best ensure outcomes are met. Adaptive management recognizes that knowledge about natural resource systems is sometimes uncertain and, in this context, adaptive management affords an opportunity for improved understanding. Knowing uncertainties exist in managing for sustainable ecosystems, some changes in management may be authorized based on the previous year's monitoring and current year's climatic conditions.

Rangeland monitoring is a key component of adaptive management. As monitoring indicates changes in management are needed to meet resource objectives, changes agreed upon by the IDT would be implemented.

2. Monitoring

Monitoring the success of treatments would take place within the Miller Homestead Fire perimeter. Monitoring would be implemented in treatment areas to determine success of treatments and the need for future treatments.

Monitoring for vegetation, including seedings and planting, would be implemented beginning in fall 2012 by establishing photo and study plots, and visually inspecting the area. At least one plot per vegetation treatment type would be established. Existing monitoring plots would be utilized when possible. The plots would be read and photos taken in the spring of 2013, 2014, and 2015. The vegetation treatments would continue to be monitored on a 5-10 year rotation with regular allotment monitoring. This monitoring would determine the success of seedings and plantings, the status of native plants, annual grasses, and weeds, and whether the soil surface is being protected. Existing plots, located outside of treatment areas, would be used as control plots, and would be monitored on the same schedule as the new monitoring plots. See Appendix A, Map 11 for estimated locations of new monitoring plots and Appendix D: Monitoring Protocol.

Monitoring for treatment needs (i.e. culvert/ditch cleanout, catchment basin cleanout, etc…) would occur on a semi-annual basis, and may include photographs. This monitoring would determine if treatments are necessary or not.

Monitoring for weeds would occur with Early Detection/Rapid Response, and for small infestations would include immediate treatment.

Compliance monitoring would also be conducted for the livestock and wild horse closure.

3. Project Design Elements

Project Design Elements (PDEs) were developed to aid in meeting project goals and objectives. These features are nonexclusive and are subject to change based on site-specific terrain characteristics (topography and vegetation). Changes, additions or deletions would be made through coordination with appropriate BLM specialists and approved by the District Manager. The Industrial Fire Precaution Levels (IFPLs) will be followed during construction, where appropriate.

- Cultural resource inventories would be conducted on areas proposed for ground disturbing stabilization and rehabilitation treatments (new fence construction, drill seeding, etc.). These inventories would be conducted prior to implementation of the proposed ground disturbing stabilization and rehabilitation treatments in order to identify and avoid any cultural resources needing protective measures. Inventories would be in accordance with the State Protocol Agreement between the Oregon BLM and the Oregon SHPO. All cultural resources would be recorded on agency approved site forms and plotted on maps. Resources, except those previously determined *Not Eligible* by the agency and SHPO would be flagged for avoidance during stabilization and rehabilitation activities. Flagged sites would be either hand seeded or seeded via All-Terrain Vehicle (ATV) during stabilization and rehabilitation activities. Flagging would be removed as soon as possible after stabilization and rehabilitation treatments to minimize the potential for looting and vandalism. New fence construction would avoid cultural sites.

- The risk of noxious weed introduction would be minimized by ensuring all equipment (including all machinery, 4-wheelers, and pickup trucks) is cleaned prior to entry to the sites, minimizing disturbance activities, and completing follow-up monitoring, to ensure no new noxious weed establishment occurs. Should noxious weeds be found, appropriate control treatments would be performed in conformance with the 1998 Burns District Noxious Weed Program Management EA/DR OR-020-98-05 or subsequent Decision. Herbicide use would conform to federally approved manufacturers' herbicide labels as well as the streamside, wetland, and riparian habitat herbicide restrictions. Appropriate mitigation measures contained in Table 2 of the Final Vegetation Management EIS and Environmental Report (ROD, October 2007), or its successor, would be utilized as a part of the project design. The Burns Paiute Tribal Council will be notified in advance of any herbicide spraying so that individuals gathering roots in the area where the spraying had occurred would know that they should stay clear of the area. Herbicide would not be used on any special status plant populations.

- All proposed wire fences, constructed within 1.25 mile of a lek or known seasonal use area (i.e. spring exclosures), would include reflective clips on the wire to enhance visibility and reduce potential mortality from sage-grouse hitting the fence.
- Proposed fences would not be constructed within 0.6 miles of active sage-grouse leks or known seasonal use areas.

- Escape ramps would be repaired or installed in troughs to minimize accidental drowning by migratory birds and other wildlife.

- Fences would be constructed to BLM specifications.

- All seed would meet BLM standards for weeds, germination, and purity.

4. Proposed Emergency Stabilization and Burned Area Rehabilitation Treatments

a. Aerial Seeding

Approximately 3,500 acres within the Miller Homestead Fire would be aerially seeded. The area to be seeded is adjacent to Highway 205 and consists of a rim and steep slope leading down to the highway. The goal of the treatment is to establish protective ground cover of perennial vegetation to protect the exposed soils from wind and water erosion, and to stabilize the rim rock, decreasing the risk of rocks entering the highway. The majority of this area is unsuitable for drill seeding due to rockiness, slope, and the presence of cultural sites. Seeding would be done utilizing aircraft in the late fall to early winter. The aerial seed mix would consist of species selected for specific characteristics, as well as on the types, previous vegetation, and ecological sites within the area. See Appendix A, Maps 4, 5, and 6 for General Vegetation, General Soils, and Ecological Sites within the burned area, respectively. The seed mix was selected by the IDT, taking treatment goals into consideration. The mix would contain: Forage kochia (*Bassia prostrata* (L.) A.J. Scott), Bluebunch wheatgrass, Great Basin Wild Rye (*Leymus cinereus* (Scribn. & Merr.) Á. Löve), crested wheatgrass (*Agropyron cristatum* (L.) Gaertn.), and western wheatgrass (*Pascopyrum smithii* (Rydb.) Á. Löve). When possible, regional seed sources would be utilized. Table 1 shows the planned seed mix with the estimated pure live seed (PLS) pounds per acre and percent composition for each species.

Table 1: Aerial Seed Mix

SPECIES	%PLS[1]	% of Mix	PLS Lbs./Ac.	PLS Lbs.	Bulk Lbs./Ac.	Bulk Lbs.
Crested Wheatgrass - Hycrest	0.81	61.3	4.90	17,164	6.05	21,200
Bluebunch Wheatgrass - Anatone	0.77	4.9	0.33	1,147	0.43	1,500
Basin Wildrye - Trailhead	0.77	1	0.07	235	0.09	300
Western Wheatgrass - Rosana	0.76	28.2	2.54	8,892	3.34	11,700
Forage Kochia - Immigrant	0.51	4.6	0.05	161	0.09	300

See Map 8 for the proposed aerial seeding location. The exact seeding location may vary due to on the ground conditions prior to seeding occurring.

b. Ground Seeding

This treatment consists of drill seeding approximately 22,000 acres on the Miller Homestead Fire. The seeding would be done utilizing rangeland drills, or in areas of cultural concern or limited access by four wheelers with broadcast seeders with or without a chain harrow may be used. Seeding would occur in the fall and early winter of 2012, and possibly into 2013 (weather dependent). A combination of native and desirable non-native species would be utilized in the seed mixes. Seed mixes were selected by the IDT with utilization of each mix determined by the given site's risk for annual grass establishment (i.e. "high cheatgrass risk" and "extreme cheatgrass risk") and the potential to reestablish Wyoming big sagebrush (primarily if Wyoming big sagebrush had existed on the site prior to the fire). The extreme cheatgrass risk mix would be for areas at lower elevations and/or southern aspects where cheatgrass has been observed establishing *very* aggressively following disturbance, and/or on sites known to have high densities of cheatgrass before the fire. The second mix, the high cheatgrass risk mix (with sagebrush), would be for the types of ecological sites where cheatgrass has been observed aggressively establishing, and had cheatgrass present before the fire. Areas that would be selected to be seeded are expected to show large increases in annual grasses if left untreated. These sites are located along roads that were regularly used during fire suppression activities and would also be at risk of additional annual grass seeds being transferred to the site. Soil data, ecological site data, vegetation data, and previous knowledge of the area would be used in selecting seeding sites. See Appendix A, Maps 4, 5, and 6 for General Vegetation, General Soils, and Ecological Sites within the burned area, respectively. Approximately 17,000 acres would be seeded using the extreme cheatgrass risk mix and an additional 1,500 acres (approximately) would be the extreme cheatgrass risk mix plus Wyoming big sagebrush seed. Where possible, these areas may be seeded

[1] PLS=Pure Live Seed

in strips, with one strip being the extreme cheatgrass mix, and the alternating strips being Wyoming big sagebrush, rather than directly adding the sagebrush to the mix. Approximately 3,500 acres would be seeded with the high cheatgrass risk mix (with sagebrush). An additional 912 acres of Wyoming big sagebrush would be seeded alone, at a target rate of 0.2 PLS Lbs./Ac. All sites that would be seeded with sagebrush would be selected based on the chance of seeding success. These include north slopes, deeper soils, ecological sites, and the presence of Wyoming big sagebrush on the site prior to the fire. Rangeland drills would be set to maximize the chance of success for each seed mix/species. A portion of the tubes on the drills may be pulled to increase variation for seed sites and reduce the visual impression of vegetative rows across the treatment area. The species in these seed mixes were selected for specific characteristics. They include: western yarrow (*Achillea millefolium* L.), Wyoming big sagebrush, crested wheatgrass, Great Basin wild rye, indian ricegrass, bottlebrush squirreltail, bluebunch wheatgrass, lewis flax (*Linum lewisii* Pursh), dryland alfalfa (*Medicago sativa* L.), and forage kochia. When possible, regional seed sources would be utilized. See Map 7 for possible locations of seedings by seed mix. The drill seeding locations and specific seed mixes in each location may vary depending on ground characteristics; all drill seeding would occur within the Miller Homestead Fire Perimeter. Estimated seed mixes are shown the tables 2, 3, and 4 below.

Table 2: Extreme Cheatgrass Risk Mix

SPECIES	%PLS	% of Mix	PLS Lbs./Ac.	PLS Lbs.	Bulk Lbs./Ac.	Bulk Lbs.
Crested Wheatgrass - Hycrest	0.81	69.7	5.59	95,052	6.90	117,350
Bluebunch Wheatgrass - Anatone	0.77	6.0	0.53	9,078	0.69	11,800
Basin Wildrye – Trailhead	0.77	3.7	0.19	3,145	0.24	4,100
Indian Ricegrass - Nezpar	0.76	1.9	0.09	1,453	0.11	1,900
Bottlebrush Squirreltail - SI (Harney, OR)	0.68	0.80	0.04	654	0.06	950
Lewis Flax - SI (Columbia, OR)	0.76	0.80	0.02	255	0.02	300
Western Yarrow	0.81	0.40	0.002	36	0.002	45
Alfalfa - Ladak	0.81	10.2	0.41	6,953	0.50	8,600
Forage Kochia - Immigrant	0.51	6.5	0.10	1,657	0.19	3,250

Table 3: Extreme Cheatgrass Risk Mix with Sagebrush

SPECIES	%PLS	% of Mix	PLS Lbs./Ac.	PLS Lbs.	Bulk Lbs./Ac.	Bulk Lbs.
Crested Wheatgrass - Hycrest	0.81	57.2	5.58	8,374	6.89	10,350
Bluebunch Wheatgrass - Anatone	0.77	5.0	0.50	750	0.65	950
Basin Wildrye - Trailhead	0.77	0.9	0.07	108	0.09	100
Indian Ricegrass - Nezpar	0.76	0.8	0.06	96	0.08	150
Bottlebrush Squirreltail - SI (Harney, OR)	0.68	0.6	0.04	58	0.06	100
Lewis Flax - SI (Columbia, OR)	0.76	0.6	0.01	18	0.02	50
Western Yarrow	0.81	0.4	0.002	3	0.003	5
Alfalfa - Ladak	0.81	8.0	0.41	612	0.50	750
Forage Kochia - Immigrant	0.51	6.5	0.10	145	0.19	300
Wyoming Big Sagebrush	0.16	20	0.20	300	1.25	1,875

Table 4: High Cheatgrass Risk Mix with Sagebrush

SPECIES	%PLS	% of Mix	PLS Lbs./Ac.	PLS Lbs.	Bulk Lbs./Ac.	Bulk Lbs.
Crested Wheatgrass - Hycrest	0.81	40	3.20	11,200	3.95	13,800
Bluebunch Wheatgrass - Anatone	0.77	23	1.62	5,659	2.10	7,350
Basin Wildrye - Trailhead	0.77	1.5	0.11	367	0.14	500
Indian Ricegrass - Nezpar	0.76	2.5	0.18	612	0.23	800
Bottlebrush Squirreltail - SI (Harney, OR)	0.68	1.3	0.08	273	0.12	400
Lewis Flax - SI (Columbia, OR)	0.76	1.0	0.02	70	0.03	100
Alfalfa - Ladak	0.81	6.5	0.33	1,137	0.40	1,400
Forage Kochia - Immigrant	0.51	4.2	0.01	51	0.03	100
Wyoming Big Sagebrush	0.16	20	0.20	700	1.25	4,360

c. Seedling Planting

Sagebrush seedlings (plugs) would be planted on approximately 9,082 acres where the sagebrush was killed by the fire, with approximately 440 plants per acre, arranged to maximize future seed spread. Gathered big sagebrush seed would be sent to a nursery for growing a portion of the seedlings, in order to have some site adapted plants available for reestablishment. Seedlings would be planted by contractors or volunteers in the spring. Sagebrush plugs (or bare root stock) planting would be done by hand. Sites would be selected that have soils conducive to hand planting and that have a favorable moisture regime. The identified possible locations for sagebrush planting were selected by determining which sites had the highest chance of success based on suitable soil conditions (indicated by soil survey data), site conditions (precipitation,

aspect, etc.), opportunity for spread (slope), and known Wyoming big sagebrush present prior to the burn (based on ecological site inventory data - i.e. the vegetation included dominance or co-dominance by big sagebrush prior to burn). The areas for planting would be prioritized following the recommendations from the Sage-Grouse Conservation Team Meeting on September 24, 2012, which include the leks with high breeding abundance (bird numbers), leks with increasing or stable attendance, areas lacking a sagebrush seed source within 3 miles of a lek, and the creation of "stepping stones" of habitat between lek sites and mesic (brood-rearing) sites. See Map 7 for the possible locations of sagebrush planting.

d. Erosion Control Structures

The Miller Homestead Fire burned through multiple major ephemeral drainages and burned to bare soil in many areas. Up to 200 erosion control structures (hillslope or in channel treatments) would be placed within or upslope of appropriate drainages. Structures would be constructed of weed-free straw or rock, placed on the surface (no ground disturbance) and anchored with metal posts to resist movement. Height, width, and position would depend on channel morphology and potential for water movement. Contour wattles and check dams would be constructed according to National Resource Conservation Service guidelines (United States Department of Agriculture (USDA) 2004 and USDA 2012). Contour wattles are also known as fiber rolls, bio-logs, or straw tubes. They are man-made cylinders of compressed, weed free straw or other fiber, are generally 8 to 12 inches in diameter and 20 to 25 feet long. The casing is jute, nylon, or other photo degradable materials. They are installed in a shallow trench forming a continuous barrier along the contour (across the slope) to intercept water running down a slope. Check dams are a small dam structure that is used to slow down the flow of water and reduce sedimentation, while allowing increased water absorption into the soil. These structures would be located in critical areas of high risk where the threat of sedimentation would cause problems to downstream values. Check dams would only be placed in small drainages (ephemeral or intermittent) with a channel gradient of less than 30 percent, they would not be placed in any incised drainages. Contour wattles may be placed on slopes 50 percent or less. Specific types and locations of erosion control structures would be determined by a BLM Hydrologist, familiar with erosion in arid areas.

Along Highway 205, a sediment fence up to 1,000 feet long would be placed in order to stop sediment from moving downslope and entering the highway corridor. The exact location and type of fence would be determined by members of the IDT with input from the BLM Hydrologist.

The most common type of sediment fence would be a silt fence, anchored with stakes, with the bottom of the fence set into the soil.

Existing catchment basins would be cleaned to collect sediment and ash that is transported down slope by precipitation until plant cover increases enough to protect the site, and sediment movement returns to pre-fire levels. Cleaning would be necessary to ensure that these basins continue to function properly, it may be necessary to clean them multiple times.

A dozer or excavator would be utilized to clean the catchment basins. Disturbance during cleaning would not be greater than what occurred during initial construction. No new catchment basins would be constructed. Cleanout would begin in October to prepare for fall rains. As catchment basins fill with sediment, they would be cleaned as needed, allowing them to continue to collect sediment and ash. Only catchment basins existing within the fire perimeter or downstream from the burned area would be cleaned.

See Map 9 for estimated areas of check dams, the sediment fence, and locations of catchment basins existing within the burned area.

e. Road Protection and Maintenance

Culverts within the burned area would be cleaned, as needed, and ditches located along 45 miles of roads within and adjacent to the burned area would be spot cleaned to ensure that runoff is able to continue flowing through the culverts and ditches, and that no pooling occurs due to clogged culverts, which could result in roads being washed out. Culverts would be cleaned using water pumped at high pressure. Ditches would be cleaned using a road grader. Disturbance would be no more than what occurred during initial ditch construction. See Map 9 for the location of 15 known culverts that may be cleaned. Roads would be spot maintained in areas damaged during suppression activities. Roads would be returned to a condition similar to the condition prior to the fire. This may include blading, grid rolling, and the placement of spot rock.

f. Fence Maintenance and Construction

The Miller Homestead Fire burned through multiple allotments and pasture boundary fences that are needed to keep livestock and wild horses out of the burned area until objectives are met and pre-fire management resumed. Approximately 50 miles of 4-wire fence would be reconstructed along identified portions of the fire. Fence reconstruction may be as minimal as the construction of replacement H-braces and rock cribs, but may be as large as full fence replacement, depending on the severity of the fire. In all fence reconstruction, metal materials would be used to the

extent possible. One small exclosure fence around a known grave would be replaced, possibly with a decorative fence.

In addition, 20 miles of new temporary (removable) fence would be constructed to keep wild horses and livestock out of the majority of the burn and the reseeded area until grazing is allowed to resume. Approximately 10.5 miles of protection fence is needed in the Native Pasture of the East Warm Springs Allotment and within Warm Springs HMA. The remaining 9.5 approximate miles of new fence is needed in the Keg Springs Pasture of the Keg Springs Allotment to regulate livestock movement within the pasture, protect a seeded area, and allow for proper management of the seeded area. When possible, natural topographic features (rims) would be used in place of fence. All fencing would be required to limit domestic livestock and wild horse grazing until objectives are met. If objectives are not met after two growing seasons, the probability of success would be reevaluated and new management actions would be considered following appropriate NEPA analysis. Cattleguards would be installed where the fence crosses main roads, including the Foster Flat/Matties Ark and Jack Mountain roads. Where possible, temporary cattleguards would be utilized to limit ground disturbance. The proposed cattleguards would be located at points where a gate would be ineffective due to the amount of traffic these roads receive and the likelihood of a gate being left open (or damaged if locked), allowing wild horses and livestock back into the protected area. Gates would be installed at all other places the fence crosses roads, as well as in locations needed for proper management of wild horses and livestock.

See Map 9 for locations of estimated locations of temporary protection fences, predicted cattleguard locations, and additional fence construction points.

Removal of these protection fences would occur when they are no longer needed to keep wild horses and livestock out of the area and they are no longer needed for management of burned and seeded areas. This would generally coincide with meeting rehabilitation objectives. Removal of the fence in the East Warm Springs Allotment would open up the entire Warm Springs HMA to use by wild horses following recovery of the site.

g. Wild Horse Relocation

Once the protection fence is completed, it would be necessary for the wild horses within the protected area to be relocated from the burned portion to the unburned portion of the HMA, using a helicopter, to provide necessary forage while allowing vegetation recovery in the burned areas. The relocation of wild horses from this area may require multiple flights to

move all wild horses, and then relocate any wild horses that manage to get back into the area.

h. Water Hauling

The protection fence would separate wild horses from many of the reliable water sources within the HMA. In order to ensure water availability to the wild horses, water would have to be hauled into the HMA during the period the protection fence is in place. Water would be distributed throughout the HMA, to provide the most access to it for wild horses, while limiting ground disturbance.

i. Range Improvement Reconstruction

One spring development and one wildlife guzzler were damaged or destroyed during the wildfire. These developments would be reconstructed or replaced, restoring the functionality of these water sources.

j. Weed Treatments

Within the Miller Homestead Fire, 8 species of noxious weeds, totaling 59.6 acres, were present prior to the fire, in addition to areas of cheatgrass. These species include whitetop, scotch thistle, Canada thistle, bull thistle, dalmation toadflax, perennial pepperweed, Russian knapweed, and Mediterranean sage. The fire burned in areas where annual grass is common in the community and medusahead and other noxious weeds are known to be present adjacent to the burned area, including near the location of the fire camp. In many areas within the fire, it burned to mineral soil leaving a receptive seed bed for the expansion of invasive species. During the first year, the portion of the burn that is the highest risk for noxious weeds would be inventoried. This inventory would focus on identifying areas of noxious weeds as well as areas where it appears that annual grasses are becoming dominant. The majority of this inventory would be in the portion of the burn directly adjacent to Highway 205 and along the major roads within the fire perimeter. This inventory would determine the extent of noxious weed expansion, and small areas would be spot treated, on the ground, with the appropriate approved herbicides and mix ratios, or effective mechanical treatment, to prevent expansion when possible. See Table 5 below for possible herbicides, rates, affected species, and season and method of application. Only treatments allowable on Oregon BLM lands in conformance with standard operating procedures and mitigation measures would be used (Appendix E). Herbicides and adjuvant would also be used in compliance with label instructions.

Through an Assistance Agreement, the BLM would utilize the Strategic Weed Attack Team (SWAT) for Early Detection and Rapid Response (EDRR). Large areas of noxious or invasive weeds, if found, would be identified and treated in subsequent years. The Burns District Weeds Specialist would work with the SWAT crew to inventory and spray identified weed patches. Identified areas would be mapped and entered into GIS. Large patches would be mapped for future treatments. During the second and third year following the fire, the entire burn area would be inventoried, with focus along roads, facilities, seeding, and planting locations. Large areas mapped previously would be planned to be treated either on the ground or aerially.

Due to the infestation of Mediterranean Sage along Highway 205, and partially within the fire perimeter, it is expected that the Mediterranean sage would take advantage of the favorable conditions and expand further into the burn area. Due to the size of the existing Mediterranean sage infestation, the Burns District Weed Specialist is proposing treatment on approximately 300 acres surrounding it. Perennial pepperweed and Canadian thistle are present in large infestations on the east boundary of the fire and on Malheur National Wildlife Refuge lands directly adjacent to the fire. There is a high probability that these weeds would spread into the burned areas and would require treatment. Mediterranean Sage and other noxious weed species would be treated as needed using the most appropriate approved herbicide.

Since cheatgrass was previously present in the fire area, in varying amounts, it is expected that it would take advantage of the favorable conditions to increase throughout the burn. If monitoring shows that large areas are becoming dominated by these annual grasses, they would be treated by broadcasting on the most appropriate, approved, herbicide, Imazapic, at 6 oz./acre along with a drift control adjuvant also at 6 oz./acre. These treatments, if monitoring shows that they are necessary, would occur by helicopter (up to 7,000 acres) or fixed wing aircraft (up to 23,000 acres). The helicopter treatments are necessary for areas that have rough topography and other hazards that prevent the use of fixed wing application. The fixed wing aircraft would provide the broadcast application on areas that have less topographic variation. Aerial application of herbicides would be done by contract. Application of Imazapic would occur from late summer to early fall in 2013 and 2014 to reduce potential impacts to the establishment and survival of seeded species.

See Map 10 for predicted weed treatment areas. No large, aerial broadcast treatments would occur the first year. This would allow the BLM to determine where exactly these treatments would need to occur, if at all. The treatment areas were selected based on existing weed/annual grass

infestations and the potential of the site to become invaded by annual species. Not all 30,000 acres mentioned above and shown on Map 10 would be treated. Treatment would occur only in areas with weed infestations, and only if needed.

In addition to the currently authorized herbicides, additional herbicide treatments that would be used to treat noxious weeds are shown in Table 5, along with the potential target species. The weed species shown in the table are not inclusive and other weed species may be treated with the below herbicides if it is determined to be the most effective herbicide for that species.

Table 5: Potential Herbicide Treatments

Herbicide & Rate	Season/Method of Application	Examples of Weed Species
Chlorsulphuron: Telar XP (1 oz./ acre; 0.047 lbs./acre of active ingredient Chlorsulphuron) + *2,4-D* (1 qt./acre; 0.95 lbs./acre of active ingredient 2,4D)	Typical application window is during rosette to early flower stage. Sometimes apply in fall on fall rosettes. Application method would be low-boom or spot spray.	Mediterranean Sage Biennial thistles
Chlorsulphuron: Telar XP (1 oz./ acre; 0.047 lbs./acre of active ingredient Chlorsulphuron) + *2,4-D* (1 qt./acre; 0.95 lbs./acre of active ingredient 2,4D)	Typical application window is full flower stage. Application method would be low-boom or spot spray.	White top
Chlorsulphuron: Telar XP (1 oz./ acre; 0.047 lbs./acre of active ingredient Chlorsulphuron) + *2,4-D* (1 qt./acre; 0.95 lbs./acre of active ingredient 2,4D)	Typical application window is full flower stage. Application method would be low-boom or spot spray.	Perennial pepperweed
Chlorsulphuron: Telar XP (1 oz./ acre; 0.047 lbs./acre of active ingredient Chlorsulphuron) + *2,4-D* (1 qt./acre; 0.95 lbs./acre of active ingredient 2,4D)	Typical application window is during rosette to early flower stage. Sometimes apply in fall on fall rosettes. Application method would be low-boom or spot spray.	Canada thistle
Clopyralid: Transline (1 pt./acre; 0.37 lbs./acre of active ingredient Clopyralid); may add *2,4-D* (1 qt./acre; 0.95 lbs./acre of active ingredient 2,4D); may add *Chlorsulphuron:* Telar	Typical application window for this type of treatment would be fall (late season) when desirable vegetation is least susceptible to damage. Application method would be low-boom or spot spray.	Canada Thistle

XP (1 oz./ acre; 0.047 lbs./acre of active ingredient Chlorsulphuron)		
Imazapic: Plateau (6 oz./acre; 0.178 lbs./acre of active ingredient Imazapic)	Typical application window is early fall. Application method would be by low-boom or aerial spray. Aerial spray would be limited to infestations 100 acres or greater and/or on smaller infestations where access is limited.	Annual invasive species (including cheatgrass/ medusahead)

A ground applied sterilant would also be used to treat the areas around power poles, which were dozed to protect the pole, in order to prevent weeds from establishing in those disturbed sites and protect the power poles from burning if a future fire occurs. In addition, a ground applied sterilant could be used to treat the areas for 20 feet around communication facilities' flammable structures to protect against damage if threatened by future fires. Clearing of vegetation around structures was previously analyzed in EA OR-025-00-32.

k. Biological Thinning

When an area is not grazed following a fire, or when grazing is occurring at low levels, fine fuels accumulate, putting an area at risk for a large scale wildfire. As noted in 43 CFR 4190.1 Effect of wildfire management Decision. "(a) Notwithstanding the provisions of 43 CFR 4.21(a)(1), when BLM determines that vegetation, soil or other resources on the public lands are <u>at substantial risk of wildfire</u> due to drought, <u>fuels buildup</u>, or other reasons, or at immediate risk of erosion or other damage due to wildfire, <u>BLM may make a rangeland wildfire management decision effective immediately</u>…Wildfire management includes but is not limited to: (1) Fuel reduction or fuel treatment such as …biological thinning methods…; and (2) projects to stabilize and rehabilitate lands affected by wildfire." Under these regulations, biological thinning would be allowed to occur within the affected allotments in order to biologically thin (by removal) fine fuels and reduce the risk of wildfire.

Biological thinning would be authorized in areas where total utilization of above ground biomass of fine fuels is less than 40 percent after seed set when grasses become dormant, putting the site at substantial risk of wildfire. Biological thinning may also be authorized in areas that become infested with annual grasses. Biological thinning would follow Smith et al. 2012 "Green and Brown" guide recommendations for using Ecologically-Based Invasive Plant Management. This would mean biological thinning would not be allowed when perennial species enter the

boot stage until perennial grasses leave the flowering and seed development stage. While the "Green and Brown" guide is focused on annual grasses, the recommendations are made to protect perennial species, and therefore would be applicable to all biological thinning.

Biological thinning would only be authorized if it would not damage ecological processes, and had full IDT consensus and management approval. During periods of biological thinning, fuel in areas receiving treatment would be monitored on a weekly basis, at a minimum, to ensure no ecological damage is occurring and to monitor the percentage of fuel reduction that has occurred. Monitoring would consist of installing temporary utilization cages approximately 5 feet by 5 feet in the treatment area, which would not be treated. The Ocular Estimate Method of utilization would be used as described in BLM Technical Reference 4400-3 Rangeland Monitoring: Utilization Studies. Biological thinning would cease when monitoring shows above ground biomass of fine fuels is reduced by 50 percent (including any reduction caused by permitted livestock grazing, wild horse use, and wildlife).

Biological thinning would be allowed using a cooperative agreement, outlining the terms and conditions mentioned in this document, as well as any other terms and conditions that may be needed depending on the specific site. The specific area where biological thinning is to occur would be identified on a map and included in the cooperative agreement. Supplements and water, if needed, would be allowed to be placed in these areas to help manage the movement of livestock while meeting their nutrient requirements. Where possible, these would be placed in areas of existing disturbance such as reservoirs, roadways, and salting locations. When placed outside of these areas, cultural and botanical clearances would occur, and identified sites would be avoided. Any use occurring outside of the treatment area may be subject to trespass actions. If trespass actions are carried out, that operator would no longer be authorized to participate in biological thinning treatments. If at any point the cooperative agreement is violated, biological thinning would immediately cease and that operator would no longer be authorized to participate in biological thinning treatments. Biological thinning permitting would occur under 43 CFR 4130.5(b)(1) which allows the authorized officer to authorize free use when the primary objective is "the management of vegetation to meet resource objectives…".

l. Wild Horse and Livestock Grazing Closure

The majority of the burned area, including all seeded areas, would be temporarily closed to wild horses and domestic livestock grazing until the

vegetation objective of three plants per square meter[2] are met. Photo and trend monitoring would occur to determine when objectives are met. These objectives would be determined met on a specific location basis (i.e. one pasture or use area may be reopened to grazing while another pasture or use area remains closed). If after two growing seasons objectives are not met, the probability of success would be reevaluated and new management actions would be considered following appropriate NEPA analysis. If objectives are not met due to site dominance by annual grasses, than the livestock grazing closure may be partially lifted to allow biological thinning to occur, as described above.

D. Alternatives Considered but not Fully Analyzed

Alternatives considered but not analyzed in detail include: 1) Different native seed mixes that would exclude the use of desirable perennial non-natives such as crested wheatgrass and forage kochia; and 2) Exclusion of specified herbicides in the proposed action developed to treat noxious weeds, and 3)No construction of temporary fences.

1) Analyzing alternatives that exclude desirable perennial non-natives would be ineffective because research and land management experience have found that crested wheatgrass and forage kochia are better able to establish and/or grow in the presence of invasive annual grasses that occur on ecological sites found within the Miller Homestead Fire perimeter with low precipitation. These vegetative communities are generally comprised of Wyoming big sagebrush, low sagebrush, bluebunch wheatgrass, and Thurber's needle grass. Research shows (and local experience agrees) that attempts to rehabilitate disturbed sites in Wyoming big sagebrush steppe using native species alone have poor success (Hulet et al. 2010; James et al. 2011; Davies et al. in press). In most cases these invasive species establish, or reestablish, in disturbed sites, and fill niches of Wyoming big sagebrush steppe species within three years following failed rehabilitation efforts (Morris et al. 2009; Hulet et al. 2010). Desirable non-native species, such as forage kochia and crested wheatgrass, aid in vegetative restoration, soil stabilization, diversification, wildlife habitat restoration, and long-term suppression of invasive species in degraded Wyoming big sagebrush ecological sites (Monaco et al. 2003; Clements et al. 1997; Davies et al. 2010; Davies et al. in press).

2) Analyzing alternatives that exclude specified herbicides in the proposed action would be ineffective because it has been found through research and trend monitoring that allowing noxious weeds to grow and reproduce results in their spread and establishment of homogenous exotic weed plant communities. An example is an injunction that prevented the use of Imazapic to control medusahead rye, an invasive exotic annual grass, which has now spread and established across the Burns District. The Burns District has trend and

[2] Objective was established in the 2012 Miller Homestead Post-Fire Recovery Plan for Emergency Stabilization and Burned Area Rehabilitation.

photographic monitoring data in conjunction with scientific research that shows the decline in native perennial and annual plant communities specific to Wyoming big sagebrush steppe (Davies 2010). Research has found that by treating noxious weeds such as medusahead rye with herbicides and revegetating the area with desirable plant species can significantly increase a plant community's diversity, resilience to disturbance, and resistance to noxious weed spread and establishment (Davies 2010; Davies and Sheley 2011). By excluding specific herbicides, effective treatment of weed species would also be excluded, and would not meet the purpose and need of this EA.

3) Analyzing alternatives that exclude the construction of temporary fences to control wild horses and livestock would be ineffective at meeting the purpose and need of fire rehabilitation. Without fences to control wild horses and livestock grazing it would be much harder, if not impossible, to stabilize soils and reduce offsite soil loss by establishing ground cover of desirable perennial vegetation in order to compete with annual grasses and noxious weeds, reduce the likelihood of new weed establishment, reduce the potential for accelerated erosion (both wind and water), and promote the recovery of sage-grouse and pygmy rabbit habitat, protect burned areas from wild horse and livestock grazing until vegetative objectives (three plants per square meter), or reduce fine fuels within the burned area to protect the area from future high intensity wildfire.

CHAPTER III. AFFECTED ENVIRONMENT AND ENVIRONMENTAL CONSEQUENCES

This environmental consequences section presents the potential changes to the environment resulting from implementation of the alternatives. This chapter describes all expected effects, including direct, indirect, and cumulative effects, on resources from enacting the proposed alternatives.

Direct and indirect effects, plus past actions, become part of the cumulative effects analysis; therefore, use of these words may not appear. The Reasonably Foreseeable Future Actions (RFFAs) for this site are continued livestock grazing, wild horse management, weed treatments, road maintenance, and recreation activities; these are also relevant to cumulative effects and are discussed under each resource, as applicable. Past and RFFAs vary under each resource because spatial and temporal scales address different variables (i.e. wildlife would be set at a large scale due to wildlife movement while upland vegetation would be set at a smaller scale where local management of the allotment has a direct affect).

The IDT reviewed the elements of the human environment, as required by law, regulation, Executive Order, and policy, to determine if they would be affected by any of the alternatives. An IDT has reviewed and identified issues and resources affected by the alternatives. The results are summarized in the Table 5. Affected elements are in bold.

Table 6: Elements Affecting the Human Environment

Elements of Human Environment	Status	If Not Affected, why? If Affected, Reference Applicable EA Section
Areas of Critical Environmental Concern (ACECs)	Not Present	There are no ACECs within the perimeter of the Miller Homestead Fire.
Air Quality (Clean Air Act)	Not Affected	Department of Environmental Quality (DEQ) is responsible for air quality permit requirements at facilities and for operations in Oregon. DEQ currently requires no air quality permit for existing operations in the project area. The dust produced from animal movement, drill seeding, range improvement construction, and vehicle use would be intermittent and not measurable.
American Indian Traditional Practices	Not Affected	No American Indian Traditional Practices areas are known to occur within the perimeter of the Miller Homestead Fire
Cultural Heritage	**Affected**	**See Chapter III, Part A.1**
Environmental Justice (Executive Order 12898)	Not Affected	The Proposed Action and No Action alternatives would not have disproportionately high and adverse human health or environmental effects on minority populations and low-income populations; as such populations do not exist within the project area.
Farmlands (prime or unique)	Not Present	No concerns have been disclosed.
Fisheries	Not Affected	There are no perennial streams within BLM-managed portion of the Miller Homestead Fire. This document is not proposing treatments on the portions of the Refuge that contain fish.
Flood Plains (Executive Order 13112)	Not Present	There is no occupancy or modification of flood plains and no risk of flood loss.
Grazing Management and Rangelands	**Affected**	**See Chapter III, Part A.2**
Hazardous or Solid Waste	Not Present	No concerns have been disclosed.
Lands and Realty	Not Affected	Treatment of vegetation around right-of way structures and sites is currently covered in the Rights-of-Way grants/leases and site plans. The new products identified in the proposed action, if selected, would be available for treatment in addition to currently approved products. The normal operation and maintenance of these facilities would not be affected.
Migratory Bird Treaty Act (Executive Order 13186)	**Affected**	**See Chapter III, Part A.3**
Noxious Weeds (Executive Order 13112)	**Affected**	**See Chapter III, Part A.4**
Paleontology	Not Affected	No alternative would have an affect beyond what has occurred in the past.
Recreation and Visual Resources	Not Affected	The only affects would be under wildlife opportunities for hunting and viewing under the "No Action Alternative", see the wildlife section for affects. The "Proposed Action" would not result in any permanent affects to recreation or visual resources.
Riparian Zones, Wetlands, and Water Quality (Executive Order 11990)	**Affected**	**See Chapter III, Part A.5**
Social and Economic Values	**Affected**	**See Chapter III, Part A.6**

Soils and Biological Soil Crusts (BSCs)		**Affected**	**See Chapter III, Part A.7**
SSS and Habitat	**Wildlife**	**Affected**	**See Chapter III, Part A.8**
	Plants	Not Affected	No SSS are known to exist within the perimeter of the Miller Homestead Fire. If SSS plants are found during project implementation, these sites would be avoided.
	Fish	Not Affected	There are no Fish SSS or Habitat on BLM-managed land portion of the Miller Homestead Fire. This document is not proposing treatments on the portions of the Refuge that contain fish.
T/E Species or Habitat	Wildlife	Not Present	There are no known T/E wildlife species found within the perimeter of the Miller Homestead Fire.
	Plants	Not Present	No known T/E plant species found within the perimeter of the Miller Homestead Fire.
	Fish	Not Present	There are no T/E Fish Species or Habitat within the perimeter of the Miller Homestead Fire.
Upland Vegetation		**Affected**	**See Chapter III, Part A.9**
Wild Horses		**Affected**	**See Chapter III, Part A.10**
Wild and Scenic Rivers (WSRs) / Wilderness		Not Present	There are no Wild and Scenic Rivers or Wilderness within the perimeter of the Miller Homestead Fire.
Wilderness Study Areas (WSAs)		Not Present	There are no Wilderness Study Areas within the perimeter of the Miller Homestead Fire.
Wilderness Characteristics		Not Present	See Chapter I, Part I.1
Wildlife / Locally Important Species and Habitat		**Affected**	**See Chapter III, Part A.11**

A. Resources

1. Cultural Heritage

Affected Environment: Cultural Heritage

The area affected by the Miller Homestead wildfire has been utilized by Native Americans for thousands of years and more recently, by European settlers. Often there are no written records of who these people were, where they originated, or how they exploited the available resources. This is especially true of the Native Americans who had no written language. Preservation of the material culture they left behind is critical for understanding and maintaining their connection to the landscape.

There are 51 previously documented cultural heritage sites located on BLM or Refuge managed land, within the perimeter of the Miller Homestead wildfire. Of these, 30 are prehistoric sites. These sites range from lithic scatters which are indicative of stone tool re-manufacture to larger sites that contain evidence of long-term use such as rock shelters. One site consists of 30 hopper mortars, 8 metate, 17 manos, and six pestles. This large collection of groundstone within one site is indicative of long-term use for food collection and processing. There are several rock shelters within the area that contain evidence of prehistoric life. One rock shelter contained a packrat midden which was extracted by Washington

State University. Discovered within the midden was a mano which contained vegetative material that dated to 4300 BP. Another rock shelter was the subject of a University of Oregon student's Master's thesis. There are several petroglyph sites located within the fire boundary. Although there is no solid evidence as to their purpose, it is often thought that rock art may have been used for communication or for spiritual purposes.

There are five sites that consist of rock features. This includes three rock walls and two stacked rock cairns. As there is no cultural material associated with any of these sites, it is difficult to provide an exact age on these sites; however, the presence of lichen found on the cairns would indicate advanced age for these features.

A historic wagon road is also located within the perimeter of the fire. This road is believed to have been utilized during the late 1800s as a way to access the upland areas from the Donner and Blitzen Valleys. During more recent times, it has provided access to gather juniper for firewood and fencing.

Fifteen historic sites have been documented within this area. There are three multicomponent sites containing a mixture of both historic and prehistoric items and nine refuse scatters. One of the refuse scatters contained materials dated to 1885. Two homesteads are documented for this area. One homestead consists of a stone-lined well, a stone lined dugout or cellar, refuse scatter, and earthen dam. The other homestead is the old Oliver Homestead which was burned over during the 2011 Meadow Flat fire. Although no wooden structures remained, a well head, refuse scatter, machinery parts, and glass fragments were located. There are also two small rock stacks within the homestead site that appear to be graves although no markers were located. One site was a Civilian Conservation Corps camp, which dates from 1937 to 1942.

Environmental Consequences: Cultural Heritage

Effects Common to All Alternatives:

Wind and water erosion are common to both alternatives. Alternative A would result in the possibility of both short and long term erosion whereas Alternative B would result in possible short term (1 to 2 years) erosional processes.

a. <u>Alternative A: No Action</u>

Cultural resources, primarily in the form of prehistoric lithic scatters and historic homestead archaeological sites, would be affected under the No Action alternative. Wind and water erosion would be enhanced by the lack of vegetation cover and sites with the potential to have buried materials could be exposed across their surface and to 4"-8" below ground. This effect on buried cultural material, be it buried historic

features or living surfaces where prehistoric people camped, would result in the loss of horizontal as well as vertical integrity and, ultimately, scientific data. Exposing new artifacts at these sites is also an attraction to illegal artifact collectors, also resulting in a loss of data.

In some instances, wind and water erosion could bury prehistoric and historic sites and obscure the traces of their existence. This effect can be seen as a positive development, protecting the affected sites from artifact collectors and sealing their former surface artifacts in place. Site burial is not expected to be common and would only occur at sites located on the windward edge of unburned vegetation or where sediment collects under normal circumstances

b. Alternative B: Proposed Action

Ground seeding and seedling planting would affect cultural resources by surface disturbance of 3”-6” in depth. Drills are capable of seeding to a 3” depth, depending on settings, and along furrow lines cultural material could be horizontally and vertically moved, somewhat disturbing the sites’ surface and shallow subsurface integrity. There is a possibility that individual artifacts would be broken or crushed within furrow lines and under rubber tractor tires, especially when the tractors are turning. Seedling planting would affect cultural sites at each planting site, anticipated to measure 4”-6” in diameter and 6” in depth. This effect could result in horizontal and vertical movement of unknown cultural material at each planting site, thus affecting site integrity. Nonetheless, these effects are not as great as the wholesale loss of sediment through wind and water erosion. Reestablishing vegetative cover would reduce erosion at these sites and reduce site visibility to illegal artifact collectors.

Prior to ground disturbing work, sites would be surveyed for cultural sites, and, if found, sites would be flagged for avoidance. Hand or ATV seeding at all avoided cultural sites within the rehabilitation area would reduce the effects of rangeland drilling and hand planting to an acceptable level and reduce short and long term wind and water erosion effects by establishment of acceptable plant species in the seeding mix. ATV seeding could cause slight (1”) compaction of site sediments and move artifacts up to 1” horizontally or vertically. There is a slight possibility that ATV seeding could cause artifact breakage.

Alternative B would have fewer short and long-term direct and indirect effects than the No Action Alternative A.

New fence construction could result in similar disturbance as seeding via ATV. Slight sediment compaction and movement of artifacts would be expected when driving ATVs within sites during fence construction.

An indirect effect of new fence construction is the likelihood of livestock trailing creating paths along the new fence corridors. Livestock trailing paths could result in a disturbance area up to 3 feet wide and 15 inches deep. Prehistoric cultural material such as waste material from flake stone tool manufacture, ground stone tools or features such as fire hearths or rock rings made of small rocks within this pathway could be moved within the path or broken and a loss of site integrity could result in sites with buried components. Livestock paths through historic sites could disturb refuse dumps and historic features such as low rock walls.

Fence reconstruction could cause the same direct and indirect effects as new fence construction but the effects would be situated in the same locations as the old fences destroyed in the fire. It is expected new effects would occur over previously disturbed sediments and thus cause no new effects to cultural resources. This would also be true for areas of road protection and maintenance, range improvement reconstruction, and water hauling.

Most of the catchment basins developed on Burns BLM managed lands were constructed decades ago and have not been inventoried for cultural resources prior to construction. Catchment basins at playa lakes and near permanent water sources indirectly affect cultural resource sites because livestock tend to loaf around these basins. These loafing or congregation areas can affect cultural resources, particularly buried sites, through horizontal and vertical displacement of artifacts up to 18 inches deep, reduce vegetative ground cover thus accelerating wind and water erosion and artifact breakage.

Cultural resources routinely inventory catchment basins that are located in playa lakes, near permanent water sources and at stream confluences.

Wild horse relocation would not affect cultural resources beyond what is currently occurring since wild horses would just be relocated to a different part of the HMA.

Biological thinning itself would not affect cultural resources beyond what is currently occurring under annual permitted grazing management, since annual grazing allows utilization of up to 50 percent current year's growth. The placement of water and supplements would not have any affect since they would be placed in currently disturbed areas, such as reservoirs, roadways, and existing salting locations. If water would be placed outside of a disturbed area, the location would be surveyed prior to placement, and would only be placed in areas where no cultural resources were found, resulting in no effect to cultural resources.

2. Grazing Management and Rangelands

Affected Environment: Grazing Management and Rangelands

The fire burned through twelve livestock grazing allotments, strongly impacting ten of them. Table 7 shows the allotments, associated pastures, and approximate acreage per pasture that the fire burned through. Additional private land pastures, outside of allotments, were also burned but are not included in this table. Decisions that may be made in association with this document would affect federal land only; privately owned land would not be affected by any Decision.

Table 7: Allotments and Pastures Burned

Allotment Number	Allotment Name	Pasture Name	Total Pasture Acreage	Acres Burned per Pasture
7001	East Warm Springs	Native	149,762	49,820
		Jack Creek	2,592	1,613
		Matt Davies	1,523	1,523
		Plateau	3,273	1,475
		Spite Field	2,832	2,410
		Private	4,757	1,338
6029	Keg Springs	Keg Springs	35,506	33,133
		Walls Lake Seed	5,663	5,496
6111	Dunbar FFR[3]	Dunbar FFR	801	801
		Home Field	1,746	1,746
6031	Lavoy Tables	Lavoy Tables	12,384	12,384
		Savoy Lake	16,173	16,173
		P Hill	3,891	1,292
		Highway 205	3,661	2,422
2690	Turkey FFR	Turkey FFR	1,111	1,111
6117	Kaser FFR	Kaser Place	1,297	1,289
6030	Reicken's Corner	Sand Hollow Seeding	1,702	271
		Gene Miller Seed	2,296	442
		Reicken's Corner	5,873	1,263
6121	Neuschwander FFR	Miller	2,005	493
6001	North Catlow	Rock Creek	175,615	20,755
		South Duhaime	3,386	74
		North Duhaime	4,048	2
6114	Rock Creek FFR	Desert Field	437	1
		Miller Homestead	1,395	1,395
		North Catlow	6,557	1,279
6128	Konek FFR	Mormon Place	364	2
6125	Roaring Springs FFR	Roaring Springs	199,565	4

[3] Fenced Federal Range

East Warm Springs Allotment contains 192,682 acres of public and private land. The 192,682-acre allotment is divided into 13 pastures, and currently has four grazing authorizations. The permitted seasons of use are from April 11 through August 31, and total permitted AUMs is 7,594 AUMs. Only four of the 13 pastures were burned during the Miller Homestead Fire and will be discussed. These pastures were the Native, Jack Creek, Spite Field and Plateau pastures. Native Pasture grazing management is designed so that the pasture is used every year after June 1 and utilized until August 31. Due to the large size of this pasture, permittees are assigned use areas. Average actual use from the last three years (2009, 2010, and 2011) is approximately 4,369 AUMs. Approximately 33 percent of this pasture was burned during the Miller Homestead Fire. Jack Creek Pasture grazing management is designed so that the pasture is used every other year in the months of April and May. Average actual use from the last three grazed years (2005, 2008, and 2010) is approximately 302 AUMs. The Miller Homestead Fire burned approximately 62 percent of the Jack Creek Pasture. Plateau Pasture grazing management is designed so that the pasture is used every other year in the months of April and May. Average actual use from the last three grazed years (2006, 2008, and 2010) is approximately 268 AUMs. Approximately 45 percent of this pasture was burned. Spite Field Pasture grazing management is designed so that the pasture is used every other year in the months of April and May. Average actual use from the last three grazed years (2007, 2009, and 2011) is approximately 248 AUMs. Approximately 85 percent of this pasture was burned. This allotment is in the Improve (I) selective management category defined as areas where 1) present range condition is unsatisfactory; 2) allotments have moderate to high resource production potential and are producing low; 3) serious resource-use conflicts/controversy exists; 4) opportunities exist for positive economic return from public investments; and/or 5) present management appears unsatisfactory (BLM 1992). For the East Warm Springs Allotments identified objectives applicable to the burned area being 1) improve and maintain big game habitat in satisfactory condition; 2) protect SSS or its habitat from impact by BLM-authorized actions; 3) improve and maintain erosion condition in moderate or better erosion condition; and 4) maintain or improve rangeland condition and productivity (BLM 1992).

Keg Springs Allotment contains 41,169 acres of public and private land. This allotment is divided into two pastures with a single grazing authorization. Under the existing authorization, the current season of use is from April 1 through October 5, for 1,864 AUMs. Average actual use from the last three grazed years (2009, 2010, and 2011) is approximately 1,782 AUMs. The Keg Springs Pasture was burned 93.3 percent and Walls Lake Seed Pasture was burned 97.1 percent. Grazing management within this allotment is designed to provide periodic growing season rest to vegetation by utilizing a deferred rotation. This allotment is in the "I" selective management category with resource concerns identified as noxious weeds and Greater sage-grouse (BLM 2005).

Lavoy Tables Allotment contains 40,287 acres of public and private land. This pasture is divided into six pastures, of which three (Lavoy Tables, Savoy Lake, and Turkey) pastures were completely burned. P Hill and Highway 205 pastures were partially burned with 33 percent and 66 percent of the pastures burned, respectively. One pasture was not burned. This allotment has one grazing authorization, with a season of use of April 1 through October 31 for 1,653 permitted AUMs. Average actual use from the last three grazed years (2009, 2010, and 2011) is approximately 1,602 AUMs. Grazing management within this allotment is designed to provide periodic growing season rest to vegetation by utilizing a deferred rotation. This allotment is in the "I" selective management category with resource concerns applicable to the burned area identified as noxious weeds, Greater sage-grouse, and juniper encroachment (BLM 2005).

North Catlow Allotment contains 199,261 acres of public and private lands. Of the four pastures, three were burned. Of those, only Rock Creek Pasture was impacted with over 20,000 acres (11.8 percent) burned. The other two pastures, South Duhaime and North Duhaime, only had less than 2.2 percent and 0.01 percent burned, respectively, and these pastures would not be impacted by rehabilitation efforts. This allotment has one grazing authorization, with a season of use from February 1 through January 31 for 4,417 permitted AUMs. Average actual use from the last three grazed years (2009, 2010, and 2011) is approximately 2,070 AUMs. Grazing management within this allotment is designed to be grazed following seed ripe each year. This allotment is in the "I" selective management category with resource concerns applicable to the burned area identified as noxious weeds and Greater sage-grouse (BLM 2005).

Reicken's Corner Allotment contains 9,871 acres of public and private lands. This allotment consists of three pastures, all of which were partially burned during the Miller Homestead Fire. There is one grazing authorization for this allotment with a season of use of April 1 through October 31, with 689 permitted AUMs. Average actual use from the last three grazed years (2009, 2010, and 2011) is approximately 357 AUMs. Grazing management within this allotment is designed to provide periodic growing season rest to vegetation by utilizing a deferred rotation. This allotment is in the Maintain (M) selective management category, which is defined as areas where 1) present range condition is satisfactory; 2) allotments have moderate or high resource production potential and are producing near their potential (or trend is moving in that direction); 3) no serious resource-use conflicts/controversy exist; 4) opportunities may exist for positive economic return from public investments; and/or 5) present management appears to be satisfactory (BLM 1992). Resource concerns identified within this allotment are noxious weeds and Greater sage-grouse (BLM 2005).

Four of the grazing allotments impacted by the fire are considered FFR allotments due to the large percentage of private land within them. Dunbar FFR is 79 percent private[4], with one authorization, a season of use of April 1 through

[4] All percentages in this paragraph are based on total acres, not forage production.

November 15, and 68 permitted AUMs. Neuschwander FFR is 68 percent private, with one authorization, a season of use of April 1 through April 30, and 42 permitted AUMs. Rock Creek FFR is 90 percent private land, with one authorization, a season of use of April 1 through September 27, and 148 permitted AUMs. The Turkey FFR is 59 percent private land, with one authorization showing a permitted season of use of November 1 through March 31 with 25 permitted AUMs. As FFR allotments, these allotments are placed in the custodial (C) selective management categories, meaning it was determined that 1) present range condition is not a factor; 2) have low resource production potential, and are producing near their potential; 3) limited resource-use conflicts/controversy exist; 4) opportunities for positive economic return on public investment do not exist or are constrained by technological or economic factors; and/or 5) present management appears satisfactory or is the only logical practice under existing conditions (BLM 1992). No resource concerns have been identified for any of these FFRs (BLM 2005).

Two of the allotments (Konek FFR and Roaring Springs FFR) in the above table had fewer than 5 acres burned each. In addition, though the Kaser FFR was 99.3 percent burned. All of these FFRs contain less than 3 percent BLM-managed land[5]. These allotments are all in the "C" selective management category.

S&Gs were met in all of the allotments prior to the fire. Cattle numbers within these allotments fluctuate annually, as long as the AUMs of total active use on the grazing authorization are not exceeded.

Table 8 shows the utilization that has occurred within the affected allotments and pastures from 2002-2011. Utilization is calculated by determining which category vegetation falls into at any given point. The categories are No Use (0-5 percent), Slight (6-20 percent), Light (21-40 percent), Moderate (41-60 percent), Heavy (61-80 percent), and Severe (81-100 percent). Utilization is total utilization and includes wildlife, livestock and wild horse use. In areas where wild horses are known to congregate, utilization levels may be over 50 percent late in the year. In concentrated areas around reliable, late-season water sources, monitoring results may show higher utilization. Since FFR allotments contain large amounts of private property, utilization is not regularly determined and therefore FFRs are not included in the table. Pastures within allotments that are mostly private ownership have also been removed from the table due to lack of information available.

[5] This percentage is based on total acres, not forage production.

Table 8: Utilization 2002-2011

Allotment Number	Allotment Name	Pasture Name	Utilization %									
			2011	2010	2009	2008	2007	2006	2005	2004	2003	2002
7001	East Warm Springs	Native	28	35	40	31	35	-	29	45	37	21
		Plateau	-[6]	32	-	-	-	50	-	60	-	-
		Spite Field	-	-	31	-	-	-	41	-	28	-
		Jack Creek	-	21	-	-	-	-	48	-	40	-
6029	Keg Springs	Keg Spring	24	29	31	38	-	46	38	61	-	-
		Walls Lake Seed	11	17	23	6	23	-	28	23	-	-
6031	Lavoy Tables	Lavoy Tables	36	50	41	39	14	40	43	50	53	-
		P-Hill	29	54	41	46	48	48	50	46	51	-
		Savoy Lake	38	-	45	38	42	45	43	40	55	-
6001	North Catlow	North Duhaime	35	-	40	45	40	50	45	45	50	-
		Rock Creek	36	36	44	43	45	49	42	45	38	-
		South Duhaime	-	40	-	-	34	34	42	-	-	-
06030	Reicken's Corner	Gene Miller Seed	35	25	21	66	48	-	36	-	-	-
		Reicken's Corner	34	35	8	23	-	59	19	42	-	-
		Sand Hollow Seed	35	25	32	16	-	51	25	58	-	-

Cheatgrass is known to be present within all impacted allotments. Recent research suggests properly managed livestock grazing is an effective tool that can be used to maintain healthy plant communities while reducing vegetative impacts resulting from wildfires (Davies et al. 2010, Patton et al. 2007, McNaughton 1993). Light to moderate livestock grazing can be used as a tool to decrease litter accumulation, indirectly preventing cheatgrass invasion by increasing the ability of the community to tolerate fire (Davies et al. 2009). Davies et al. (2009) also found grazing exclusion decreases the ability of the native herbaceous community

[6] Dashes within the table signify that the pasture was rested during that year or no utilization data was collected.

to tolerate fire due to the accumulation of fine fuels which can result in increased mortality of desirable vegetation during fire events. Davies (2010) found wildfires that occur in areas without grazing would "increase the probability of post fire exotic plant invasion by increasing the risk of fire-induced mortality of perennial bunchgrasses." In fact, livestock grazing, when properly managed at moderate levels, may help protect the sagebrush communities, which is turn helps the wildlife species dependent upon them (Davies et al. 2010). It is essential plant communities be managed in a way that maintains or improves plant health, vigor, and stability across a community (Anderson et al. 1990). Increased plant vigor means better protection of the soil surface, and assures greater root volume below the surface. The more rain that falls and enters the soil, the less is lost as runoff, and so more moisture is available for plant growth (Dietz 1988).

Anderson and McCuistion (2008) found grazing management, when upland birds are present, should be flexible, but limited to a light to moderate use (30-50 percent utilization), using deferred or rest-rotation grazing to limit grazing disturbances during critical bird life stages such as nesting. They concluded light to moderate use can increase forb quality and quantity since grazing can delay the maturation of forbs, extending their availability throughout the growing season (Anderson and McCuistion 2008). Adams et al. (2004) suggests grazing encourages the height and cover of sagebrush and other native species during nesting seasons, and light grazing is used to create patches in the vegetation, increasing the herbage of species preferred by sage-grouse, especially during nesting and brood-rearing. Sage-grouse often prefer the lightly grazed areas and desired grazing intensity should be light to moderate to meet their needs for litter and cover (Adams et al. 2004).

Environmental Consequences: Grazing Management and Rangelands:

Effects Common to All Alternatives:

For the purposes of this analysis, the Cumulative Effects Analysis Area (CEAA) for livestock grazing management consists of the allotments/pastures that would be affected by rehabilitation efforts. Past and present actions, such as those described in *Affected Environment*, have influenced the existing environment within the CEAA. Past and RFFAs that have affected livestock grazing management are found in Table 9.

Table 9: Grazing Management Past and RFFAs[7]

ACTION	PAST ACTIONS			FUTURE ACTIONS		
	ACRES	MILES	NUMBER	ACRES	MILES	NUMBER
Wildfire Starts	---	---	74	Unknown	---	Unknown
Wildfires	59,640[8]	---	27	Unknown	---	Unknown
Fences	---	294	---	---	None	---
Fence Removal	---	Unknown	Unknown	---	5.5	2
Pipeline	---	10.5	---	---	None	---
Exclosures	67	---	3	None	---	None
Water Developments	---	---	109	---	---	3
Materials Sites	---	---	12	None	---	None
Cutting	1,800	---	10	None	---	None
Piling	22	---	1	509	---	3
RX Burning	2,386	---	4	558	---	2
Seeding	15,478	---	12	902	---	1

RFFAs in the CEAA that may contribute to cumulative effects to livestock grazing include livestock grazing under the current permits, ongoing maintenance of existing range improvements, wild horse utilization, periodic wild horse gathers to maintain horse numbers within the AML, wildlife use, hunting and other recreational pursuits, and ongoing noxious weed treatments.

a. Alternative A: No Action

Under the no action alternative seeding of desirable species that help stabilize soils, invasive weed control, fence maintenance and construction, catchment cleaning, and construction of check dams, along with all other stabilization and rehabilitation efforts identified under the proposed action would not take place. Without seeding and spraying to control invasive species, noxious weeds would become established, and annual grasses may become dominant on the site. Weeds and the annual grasses cheatgrass and medusahead rye have little forage value. While cheatgrass has nutritive value and is palatable before seed ripe, this drops quickly following seed ripe. Medusahead is a poor forage species for both livestock as well as wildlife and has low palatability because of its high silica content. If this burned area is not treated and managed to prevent weedy species from becoming dominant in the area, range condition and ecological processes would decline while erosion and soil loss increased, making it less likely that the site would recover from the burn naturally. Without recovery of desirable perennial species, forage on the site would be greatly reduced for wildlife, wild horses, and livestock. Carrying

[7] This table, and all Past and RFFAs tables throughout the document, does not include unplanned or speculative actions. This table and all Past and RFFAs tables throughout this document are estimated based on currently available information, and are subject to change.
[8] Many of these acres overlap due to different fires in different years

capacity of the burned area, for all demands, would begin to decline as desirable species are replaced with non-desirable species. In addition, the increase in annual species would greatly increase the amount of fine fuels present on the site. This would increase the fire return interval, making wildfires more common, and decreasing the ability of desirable species to recover.

Under this alternative, the burned areas would not be closed to grazing by livestock or wild horses. Animals would continue to be allowed to graze the area as they have in the past. Studies have found livestock prefer green vegetation to cured vegetation since it is more nutrient rich; cured stems have lower crude protein and digestibility levels (Ganskopp and Bohnert 2005). This behavior has been observed by both livestock and wild herbivores (Ganskopp et al. 1992). Herbel and Nelson (1966) found cattle would often graze plants with both green and dry portions, but they would try to select for the green portions and the dry portions would often drop out of their mouth. Ganskopp and Bohnert (2005) noted research shows cattle are aware of one cured stem within a green bunchgrass and that they are 40 percent more likely to reject grazing plants that have cured stems (considered wolfy) than those plants with no cured stems. They also found cattle were 2.3 times more likely to select areas of vegetation with mostly green stems (old growth had been previously removed) than areas with wolfy plants that had mixtures of green and cured stems (Ganskopp and Bohnert 2005). In a study done by Ganskopp et al. (1992) cattle showed an avoidance to plants that had as few as three cured stems which contributed to as low as 4 percent of the total plant biomass. Ganskopp et al. (1992) speculate cattle use visual cues to make these selections, which is why they found a lack of response during dormancy since current years' growth and previous years' growth are visually similar. This preference for green stems can result in livestock often grazing the same area year after year and/or multiple times in the same grazing season, in order to take advantage of the higher quality forage, resulting in damage to the plants that are repeatedly grazed, moving the site towards a loss of vigor or decadence of the grazed species. Since the Miller Homestead fire removed all cured vegetation (with the exception of vegetation on unburned islands) wild horse and livestock use would prevent full recovery of the burned area. Due to the decreased vigor this would also result in increased niches for weedy species. These factors would result in an even lower carrying capacity on the site. As monitoring shows decreases in carrying capacity decreases annual AUMs authorized would have to be reduced in order to prevent ecological damage.

Without the maintenance of existing fences damaged by the fire, management of livestock in specific pastures would be impossible, as would accomplishing the rest period following fire, which allows vegetation to recover. By not constructing the approximately 10.0-mile

fence that would split the Native Pasture within the East Warm Springs Allotment, the entire pasture would have to be rested until the objective are met, when only approximately one third of the pasture was actually burned. However, wild horses would still be present to graze the in the burned and seeded area, likely increasing the amount of time it would take to meet objectives.

Without the construction of sediment traps and catchment cleaning, livestock, wild horses and wildlife watering sources would rapidly fill with sediment, which then limits the water holding capacity of these facilities and therefore reduces available water across pastures. Overtime, this would result in water and temporary troughs having to be utilized, or removal of some of all of the grazing animals (wild horses and livestock).

No rangeland improvements (i.e., permanent, drift or boundary fences, catchment basins, pipelines) would be repaired or cleaned. Vehicular activity would increase spread of weeds within the fire perimeter. These areas would become infested with primarily annual grasses. Without aerial and ground spray as a weed control measure, infestation of annual grasses would continue to spread resulting in reduction in perennial vegetation and forage available to grazing animals.

Biological thinning of fine fuels would not occur under this alternative. The BLM would not benefit from fine fuel reduction of the area, putting it at risk of another substantial sized wildfire, which would result in additional livestock closures and temporary loss of AUMs.

b. Alternative B: Proposed Action

Under the proposed action seeding of desirable species would help stabilize soils, and limit invasive species infestation, while ensuring that the forage is available to allow the permittees to continue to use the permitted AUMs for each allotment. Since grazing would not be allowed until objectives are met, the permittees would lose approximately 5,982 AUMs annually (based on permitted AUMs and percent of allotment burned), until grazing is allowed to resume.

By maintaining existing fences damaged by the fire, management of livestock following the rest period could continue as authorized prior to the fire. Also by maintaining fences of pastures adjacent to the burned area, unburned BLM and private land pastures could continue to be grazed as scheduled without livestock moving into the burned areas. The new protection fences would allow the permittees to continue to graze livestock in the unburned areas adjacent to the burned area.

Catchment basin cleaning and spring reconstruction would ensure that livestock have viable water sources when grazing is allowed to occur in the grazed area. Water hauling, while needed to temporarily replace water sources in the burned area is for wild horses, it would also be additional water sources for livestock, when present.

The construction of check dams would not affect grazing.

Weed treatments, including imazapic application, would allow good range condition to be maintained, and forage quality and carrying capacity for all demands within the burned area to remain stable.

Weed treatments and road maintenance are temporary actions which typically occur once or a few times a year in an area, and generally result in short-term (less than a day) impacts (e.g. displacement) of animals in the immediate area of the treatments may occur. Weed management helps controls noxious weeds and other invasive species. These two activities would not cumulatively contribute measurable adverse impacts to livestock as they would be temporarily fenced out of the treatment area when these actions would occur.

Under this alternative, biological thinning would occur. This would allow fine fuels to be removed up to 50 percent (above ground biomass). This would reduce the risk of wildfire within the affected allotments. Few fires would result in fewer opportunities for weedy species to become established and dominate sites, while allowing desirable vegetation to become established, ensuring that livestock grazing would be able to continue to occur at levels permitted.

All alternatives would achieve the RMP (p. 53) objective to "Manage for a sustained level of livestock grazing while maintaining healthy public land resources," but some degree of uncertainty would remain with respect to full use of authorized AUMs from year-to-year and would require an increased level of monitoring to make sure ecological damage did not occur.

3. Migratory Birds

Affected Environment: Migratory Birds

The sagebrush steppe present prior to the wildfire supported several species of sagebrush obligate and facultative migratory birds, including sage thrasher (Oreoscoptes montanus), sage sparrow (Amphispiza belli), Brewer's sparrow (Spizella breweri), and loggerhead shrike (Lanius ludovicianus). Other species commonly occurring in sagebrush habitat in the area include mountain bluebird (Sialia currucoides), vesper sparrow (Pooecetes gramineus), horned lark

(Eremophila alpestris), and western meadowlark (Sturnella neglecta). Raptors found in or near the project area include, golden eagle (Aquila chrysaetos), red-tailed hawk (Buteo jamaicensis), ferruginous hawk (Buteo regalis), American kestrel (Falco sparverius), prairie falcon (Falco mexicanus), long-eared owl (Asio otus), short-eared owl (Asio flammeus), and western burrowing owl (Athene cunicularia). Species listed by the US Fish and Wildlife Service as Birds of Conservation Concern that occur in the area are golden eagle, ferruginous hawk, loggerhead shrike, sage thrasher, Brewer's sparrow, and sage sparrow (USFWS 2008).

The Miller Homestead fire eliminated nearly all migratory bird habitat within the perimeter, with the exception of a few small islands of vegetation that did not burn. Migratory birds in the area may utilize these small islands, edges of the burn perimeter, and areas adjacent to water sources in search of forage, but most birds were displaced by the nearly complete loss of vegetation in the burned area. Birds well adapted to grassland habitat, such as horned lark and western meadowlark, would likely be able to return the following spring as grasses and other herbaceous plants quickly recover to provide suitable habitat. Migratory bird diversity will increase slowly over the next several years to decades, as shrub cover, especially sagebrush, starts to expand from the sagebrush plant in the small islands within the fire and along the perimeter. Sagebrush vegetation will likely require several decades or more to recover to the point where it once again supports sage sparrows and other sagebrush obligate species.

The Miller Homestead fire is the dominant factor influencing the affected environment for migratory birds, but other actions have helped shape the existing conditions. Other past and present actions affecting the area include road and fence construction, water developments, powerline construction, facility construction, livestock and wild horse grazing, and recreation. These actions and events can have mixed effects on migratory birds and their habitat depending on the species. Livestock and wild horse grazing are the most widespread and long-term actions occurring within the affected environment; however, both are managed and monitored to facilitate sustainable multiple use, including maintenance of migratory bird habitat. Developed water sources are generally beneficial for migratory birds, and may have improved distribution or increased populations of some species in the area. Roads, fences, and powerlines are a potential threat to migratory birds in the area due to collisions or loss or degradation of habitat. These structures may also provide advantageous singing or hunting perches or nesting structures that improve habitat for some species, such as ravens and golden eagles. Density of roads, fences, and powerlines is relatively low across the project area compared to other areas. One communication facility was constructed on a rim overlooking the state highway, and has affected the habitat in that localized area. Effects of past wildfires, vegetation treatments, and weed control treatments are not as readily apparent since the Miller Homestead fire, but these have also influenced the resiliency of the habitat and its ability to recover from the wildfire.

Environmental Consequences: Migratory Birds

Effects Common to All Alternatives:

The CEAA for migratory birds extends up to ten miles beyond the fire perimeter to account for the regular movements of the wider ranging migratory birds. The total acreage of the fire area plus the CEAA is approximately 820,295 acres. Vegetation in the CEAA is also dominated by sagebrush steppe, although it does encompass some wetland habitat associated with the Malheur National Wildlife Refuge. Migratory bird species residing in the area typically have much smaller regular movements than ten miles; therefore, most effects to migratory birds or their habitat would occur within or immediately adjacent to the burned area, and would diminish over time and as the distance from the project area increases. Beneficial effects of habitat recovery would increase over time, but would likely require several decades or more to fully recover to conditions present prior to the fire. Past and present actions and events, such as those described in the Affected Environment, have also influenced the existing environment within the CEAA. RFFAs or events within the CEAA include wild horse use, livestock grazing, weed management, road maintenance, restoration treatments associated with the North Steen Ecosystem Restoration Project, wildfires, and recreation. Several of these are similar to actions and events in the project area, and general effects for most of these are described in the Affected Environment section for Migratory Birds and SSS. RFFAs that may contribute to cumulative effects with this project are carried through analysis in the Environmental Consequences for each alternative, and include vegetation management associated with the North Steens Ecosystem Restoration project and ongoing District weed treatments.

a. Alternative A: No Action Alternative

This alternative would leave the entire burned area to recover without active management intervention. Grassland adapted migratory species may benefit during the first several years following the fire due to the substantially increased amount of habitat available. There would be no rest from livestock or wild horse grazing, resulting in potentially severe damage to recovering native forbs and grasses, leading to poor quality forage over time, and less vegetative diversity within the burned area. Without active management, the area is at risk of invasion by noxious weeds and annual grasses, and even migratory bird species adapted to open grasslands would eventually be displaced from these degraded communities. Lack of active management would increase the risk of invasive species eventually becoming dominant and altering the habitat potential from a sagebrush-grass codominance to a herbaceous dominance with the main components being cheatgrass and potentially medusahead rye. Under this scenario, healthy, native sagebrush steppe communities

may not fully recover or would require a long time (potentially 100 years or more) to return to their former vigor and cover.

Authorized weed treatments (not the proposed action) would continue to occur as part of the normal District weed management strategy, but would be limited to the four currently authorized chemicals for treatment. The current restrictions on type of herbicides used may reduce the size of the area treated and the effectiveness of the treatment, leaving much of the burned area vulnerable to the negative effects of noxious weeds and other invasive species, relative to the proposed action. None of the currently authorized herbicides is selective for annual grasses, such as medusahead and cheatgrass, which are two of the biggest threats to persistence of sagebrush steppe and its associated wildlife community (Hagen 2011). Establishment and spread of these invasives may contribute to a shortened fire return interval, which would slow or even prevent the full recovery of sagebrush steppe, a critical habitat component for several Birds of Conservation Concern.

Vegetation treatments authorized in the North Steens Ecosystem Restoration project area would also continue to occur. Detailed effects of these treatments were analyzed in that Environmental Analysis. Some of the effects include temporary displacement or reduced use by migratory birds in treated areas for short periods, but these treatments (e.g. juniper cuts, pile burning) would result in fairly immediate and long-term beneficial effects through habitat maintenance and restoration. Migratory birds displaced by the Miller Homestead fire, especially sagebrush associated species, may find suitable habitat in the North Steens treatments areas over the next several years. However, selection of this alternative would not actively improve the rate or increase the success of habitat recovery, nor would it contribute cumulatively to the beneficial long-term effects of the North Steens Ecosystem Restoration project to SSS or their habitat.

b. Alternative B: Proposed Action

This alternative would implement the Miller Homestead Fire Emergency Stabilization and Burned Area Rehabilitation Plan. The proposed actions will assist in mitigating some of the detrimental effects of the fire on habitat for migratory bird species. The wildfire severely reduced populations of migratory birds, as well as their habitat, in the burned area. Grassland adapted species may return and occupy the several areas next spring as herbaceous vegetation recovers, but sagebrush and shrub associated species would avoid the area until adequate patches of sagebrush steppe reestablish. Effects of some of the proposed action (e.g. fence construction) may result in some potential direct effects (temporary displacement) to migratory birds, but implementation of many of the

proposed actions would occur in the fall and winter when there are fewer species and individuals present.

Drill seeding 22,300 acres and aerial seeding approximately 3,500 acres in the fall and early winter would increase the rate of establishment and recovery of perennial vegetation to protect the exposed soils from wind and water erosion. Seeding of selected uplands and the few riparian sites in the area would help to stabilize soils in strategic areas across the burn and help limit the spread of invasive species. The four seed mixes selected would minimize the introduction and spread of invasive grasses, such as cheatgrass, and would reestablish Wyoming big sagebrush communities on several of the sites where it existed prior to the fire. Seeding Wyoming sagebrush as proposed would create patches of sagebrush habitat scattered throughout the fire and encourage movement across the burned area by some of the smaller bird species that prefer to make shorter flights and remain in close proximity to hiding cover.

This alternative would allow for the use of more selective herbicides that are effective at controlling noxious weeds and invasive annual grasses, while limiting collateral damage to native and desirable non-native plants. Non-target desirable plants may be harmed, but risk would generally be limited to vulnerable (depending on selected herbicide) plants in the immediate treatment area, and have no effect on overall abundance or diversity of migratory bird habitat. Application of the proposed herbicides using Standard Operating Procedures (SOPs) would not only improve the success of the seeding effort, it would help protect native plants that survived the fire. These native plants provide a valuable seed source adapted to the local environment, which further enhances the ability of the native plant community to recover (Leger 2008) and provide a more diverse habitat for migratory birds. Implementation of this alternative would result in maintenance or improvement and a more rapid recovery of more acres of migratory bird habitat compared to the No Action Alternative.

Migratory birds may be impacted through direct or indirect contact or ingestion of chemicals or exposed plant, water, or animals, including insects. The proposed herbicides have a wider treatment window, allowing more flexibility in timing of treatments in order to avoid vulnerable periods for birds, such as during the nesting period. Based on the findings of the Ecological Risk Assessments and following Standard Operating Procedures, the potential risk to birds from ingestion or direct contact would be negligible, especially at the population level. Sagebrush obligate migratory birds or birds strongly associated with sagebrush or shrublands, such as sage thrasher and sage sparrow, are even less likely to be affected due lack of adequate habitat to support populations following the fire. Discussion and links to Ecological Risk Assessments for the proposed

herbicides are available in the Vegetation Treatments Using Herbicides on BLM Lands in Oregon FEIS (Oregon Veg EIS, Appendix 8, pp. 605-608, Appendix 9, pp. 632, 633, 642) and the Vegetation Treatments Using Herbicides Programmatic Final Environmental Impact Statement (chlorsulfuron and imazapic only, National Veg EIS, Appendix C). Imazapic and Chlorsulfuron had risk levels below the Level of Concern (LOC) for all evaluated wildlife under all scenarios (Oregon Veg. FEIS pp. 4-247-250). The risk assessment for clopyralid indicates there is little to no risk to terrestrial animals (SERA 2005, National Veg. EIS p 4-106).

Imazapic: Herbicide treatments using Plateau in the fall at a rate of 6oz/acre would pose no risk to wildlife species (National Veg. FEIS pp. 4-103). Risk quotients for terrestrial wildlife were all below the most conservative LOC of 0.1, indicating that direct spray of Imazapic is not likely to pose a risk to terrestrial animals (National Veg. FEIS pp. 4-105).

Chlorsulfuron: The Vegetation Treatments using Herbicides on BLM Lands in Oregon (FEIS; July 2010) presents information on risks associated with wildlife species in Table 3-14 (Volume 1, pp. 96-97. This Table shows the results of BLM-evaluated herbicide risk categories for wildlife species including small mammals, pollinating insects, fish (pond and stream), aquatic invertebrates (pond and stream), large and small mammalian and avian herbivores, insectivores, and carnivores. The table shows zero risk to any of those categories from chlorsulfuron.

Clopyralid: The Vegetation Treatments using Herbicides on BLM Lands in Oregon (FEIS; July 2010) presents information on risks associated with wildlife species in Table 3-15 (Volume 1, pp. 98-99). This Table shows the results of United States Forest Service (USFS)-evaluated herbicide risk categories for wildlife species including small mammals, pollinating insects, fish (pond and stream), aquatic invertebrates (pond and stream), large and small mammalian and avian herbivores, insectivores, and carnivores. The table shows zero risk from clopyralid to most categories except for small animals directly sprayed, consumption of contaminated insects by small mammals, and susceptible fish species from a direct spill where the risks were low.

Approximately 200 erosion control structures (check dams) would be placed in major drainages to help control runoff that will occur at these sites. Road and trail water diversions would be utilized to aid in this effort, with 15 culverts and spot maintenance (additional to regular road maintenance) of ditches along 45 miles of road. Road maintenance would not fragment migratory bird habitat as it would only occur on existing roads and within the already disturbed area of the road prism. The proposed actions to service catchment basins and water control structures and re-seed the upper slopes of the drainages would also help hold soil in

place and prevent sedimentation and ash run-off. The proposed seeding and soil management actions would stabilize more sediment across the landscape providing a stable foundation for plants to root and grow. This would result in faster recovery of usable habitat for migratory birds in a shorter time than if the soil were allowed to be continually displaced by erosional mechanisms.

Fence, gate, and cattle guard maintenance and reconstruction would occur as needed to exclude livestock from the burned area until vegetation objectives are met. Approximately 11.4 miles of new fencing along the boundary of the fire, 20 miles of new temporary fencing to control movement of livestock and wild horses, 38 miles of fencing in the interior of the fire, 2 temporary cattle guards, and an unspecified number of gates would be maintained or constructed as needed. Fences create a collision hazard to migratory birds, marking fences as proposed with reflective warning devices, may reduce the risk of collision in some areas. Even with the proposed new and temporary fences, the density across the project area would remain relatively low, compared to the average density of many places in the west. The majority of the burned area, including all seeded areas, would be temporarily closed to wild horses (would be relocated after fence maintenance/construction occurred), and the entire area would be closed to domestic livestock grazing until vegetation objectives are met. Protection from livestock grazing through fencing and rest would help allow for faster recovery of affected vegetative communities.

One spring development and one wildlife guzzler that were damaged or destroyed in the wildfire would be repaired or reconstructed. Water sources are critical to migratory birds in areas of limited water, such as the burned area, especially in drought years. Repairing or replacing these facilities and removing sediment from catchment basins will improve water storage capacity and availability for migratory birds, as well as other wildlife species. Hauling water will have no effect on sage-grouse or pygmy rabbits as long as all vehicular traffic is contained on preexisting roads.

Wyoming big sagebrush seedling (plugs) planting would occur on approximately 9,082 acres where sagebrush mortality occurred due to the fire. Locations for the plug plantings would maximize the chances of success, and are based on soil survey data, vegetative communities present prior to wildfire, and potential vegetative communities based on ecological site descriptions. Fire kills sagebrush plants and sagebrush seeds in the soil, and suppresses recovery because Basin, Mountain, and Wyoming big sagebrush are not root-sprouting shrubs (Tisdale & Hironaka 1981). Postburn recovery periods for these three big sagebrush taxa can be long, especially following large wildfires, because they must reestablish from seed. For example, Baker (2006, 2011) approximated post fire recovery

for Mountain big sagebrush from 35–100 or more years and Wyoming big sagebrush from 50–120 years based on a combination of cover and density values from various studies. Planting plugs is expected to jumpstart this recovery effort because it typically has a higher survival rate than seeded sagebrush and decreases the period required to achieve reproductive maturity, resulting in less time needed for Wyoming big sagebrush to reach sufficient cover percentages to begin to provide usable habitat for several species of migratory birds, including several Birds of Conservation Concern.

Biological thinning is the reduction of fine fuels by the removal by livestock. When above ground biomass of fine fuels is reduced by 50 percent (includes any reduction by permitted livestock grazing, wild horse use, and wildlife) biological thinning would cease. In areas dominated by annual grasses (80 percent or higher), biological thinning would be allowed to reduce fine fuels by 70 percent. Use of this method would help to control any blooms of invasive species such as cheat grass, and allow for the recruitment of shrubs and sagebrush; reducing the risk of future large scale wildfires, resulting in useable sage brush habitat for sage brush obligate species of migratory birds.

Cumulative effects of the proposed action in regards to migratory birds as a whole are expected to be beneficial in the long term (10+ years), with livestock and wild horse grazing not occurring for two years during the growing season. This is expected to allow for the recovery of the health and vigor of vegetation in burned and seeded areas, providing greater hiding and nesting cover and eliminating potential disturbance or trampling relative to the No Action alternative. Other RFFAs that may contribute to cumulative effects include vegetation treatments of the North Steens Ecosystem Restoration Project. Detailed effects of these treatments were analyzed in that Environmental Analysis. Some of the effects include temporary displacement or reduced use by most migratory bird species in treated areas for a short period, but some of these treatments (e.g. juniper cuts, pile burning) would result in fairly immediate and long-term beneficial effects through habitat maintenance and restoration. Even with implementation of the Miller Homestead fire proposed actions, recovery of sagebrush habitat would likely require many years. In the interim, some of sagebrush obligate and facultative species displaced by the loss of habitat in the Miller Homestead fire may benefit from the habitat restoration treatments of the North Steens project. Grassland adapted species will likely return to the Miller Homestead fire area due to the substantial increase in available open grassland habitat. However, some of the treatments (e.g. broadcast burn) proposed in the North Steens project may contribute to cumulative beneficial impacts to grassland associated species.

Selection of this alternative would actively improve the rate and increase the success of habitat recovery, and would contribute cumulatively to the beneficial long-term effects of the North Steens Ecosystem Restoration project to migratory birds and their habitat.

4. Noxious Weeds

Affected Environment: Noxious Weeds

Our database currently lists 8 noxious weed species totaling 188.2 acres within a 1 mile radius of the Miller Homestead Fire. These weed sites are expected to be a source of introduction into the area burned by the wildfire. The numbers and acreages associated with each are displayed in Table 10:

Table 10: Noxious Weed Distribution

Noxious Weed Species	Acres
Bull thistle	0.002
Canada thistle	16.4
Dalmatian toadflax	0.007
Diffuse knapweed	0.8
Mediterranean sage	151.3
Perennial pepperweed	0.11
Scotch thistle	18
Whitetop	1.5
Totals	***188.2***

Environmental Consequences: Noxious Weeds

Effects Common to All Alternatives:

The CEAA for this analysis is the area within a one-mile distance of the perimeter of the Miller Homestead Fire boundary, although it is possible that wind-borne weed seeds could travel farther than that to land in areas burned during the wildfire.

Roads are particularly susceptible to new introductions of weeds and spread of existing infestations through normal vehicle traffic as well as traffic associated with suppression efforts on the fire. Treatments that keep the roads free of weeds should be a high priority. New introductions can spread quickly in disturbed areas infesting previously weed free areas. Livestock and wildlife are known to spread weed seed as they move across the area. Areas where livestock and wildlife congregate, such as reservoirs and mineral sites, are in a state of constant disturbance and thus more susceptible to new weed introductions.

a. Alternative A: No Action

The likelihood of noxious weeds increasing within the burned area is very high if no action occurs. Once established, noxious weeds are difficult and expensive to control or eliminate. An early seral plant community, such as a post-fire plant community, is much more susceptible to weed introduction and spread. The burned areas could also become a source of weed contamination for adjacent areas. The same weed vectors that transport noxious weeds into the burned area could distribute noxious weeds from the burn to other areas.

b. Alternative B: Proposed Action

The control of noxious weeds would help the successful establishment of seeded/planted species as well as increase the vigor of existing native perennial plants contributing to the long-term ecological stability of the plant communities in this area.

The Vegetation Treatments Using Herbicides on BLM Lands in Oregon ROD October 2010 (Oregon Veg. ROD), Vegetation Treatments on BLM Lands in 17 Western States ROD September 2007 (National Veg. ROD), and the March 1, 2011 Order Amending Injunction [Case No. 83-cv-6272-AA (US District Court)] provide new information that enable BLM districts in Oregon to utilize 13 new active ingredients for the treatment of noxious weeds, in addition to the 4 active ingredients currently available (2,4-D, dicamba, glyphosate, and picloram) under the Burns District's Noxious Weed Management Program EA (OR-020-98-05).

Under the proposed action, herbicide treatments within the project area could include the currently available herbicides plus the following new products: Plateau (Imazapic), Telar XP (chlorsulfuron), and Transline (clopyralid). The product to be used on individual infestations would be determined based on weed species, phenology, and type of location, status of desirable vegetation present and environmental conditions.

Imazapic (specifically Plateau) is currently the best choice for the treatment of cheatgrass and medusahead rye in Burns District. The Ecological Risk Assessments for Imazapic can be found in the Oregon Vegetation Treatments Using Herbicides FEIS Table 3-12 (Volume 1. pp. 94) and Table 3-14 (Volume 1 pp. 96-97). The Ecological Risk Assessments for Imazapic can also be found in the National Veg. FEIS, Appendix C (pp. C-26, 32, 49, 69, and 70). All applicable Standard Operating Procedures (SOPs) and Mitigating Measures from the Oregon Veg. ROD (Attachment A pp. 33-45) would be incorporated (see Appendix C).

Plateau applied in the fall at 6 oz./acre (0.178125 pounds/acre of active ingredient Imazapic) just below the maximum rate of 0.1875 pounds/acre analyzed by the Oregon Veg. FEIS (CH 3, pp. 60) and National Veg. FEIS (Appendix C-9) was selected to treat medusahead rye, because it has effective short-term residual control on this noxious weed. Additionally there would be low risk to perennial non-target vegetation during fall treatments at a rate of 6oz/acre (Davies 2010).

Imazapic would have moderate risk to no risk to the health of upland vegetation (Vegetation Treatments Using Herbicides on Bureau of Land Management Lands in 17 Western States FEIS June 2007 [National Veg. FEIS] pp. 4-49 & 53). Applications of 6oz/acre would be below the maximum rate authorized to treat infested sites (Vegetation Treatments Using Herbicides on BLM Lands in Oregon FEIS July 2010 [Oregon Veg. FEIS] C-9). Risk to the health of terrestrial and special status plants at this application rate from direct spray would have moderate risk, off-site drift low risk (special status spp.) and no risk (terrestrial), surface runoff no risk, and wind erosion no risk. However, it has been observed that fall applications with 6oz/acre Imazapic would further reduce the risk from moderate to low from direct spray on non-target plant species because these plants are dormant (Davies 2010; Davies and Sheley 2011). Imazapic would reduce medusahead rye and allow existing native and seeded native and non-natives the opportunity to compete for available resources such as water, nitrogen and other nutrients, and regrow or establish.

Chlorsulfuron: The Ecological Risk Assessments for Chlorsulfuron can be found in the Oregon Vegetation Treatments Using Herbicides FEIS Table 3-12 (Volume 1. pp. 94) and Table 3-14 (Volume 1 pp. 96-97). The Ecological Risk Assessments for Chlorsulfuron can also be found in the National Veg. FEIS, Appendix C (pp. C-23, 30, 39, 59, and 60). All applicable SOPs and Mitigating Measures from the Oregon Veg. ROD (Attachment A pp. 33-45) would be incorporated (see Appendix C).

Chlorsulfuron (specifically Telar XP) is one of the most effective herbicides available for treatment of white top and perennial pepperweed. It is also very effective on thistles and Mediterranean sage. Effectiveness at more diverse phonologic windows can be enhanced when included as part of a tank-mix with either 2,4-D, picloram or clopyralid to treat thistles. Typical application rate for this product is 1.3 oz./acre (0.035# ai/ac). Risk to the health of terrestrial and special status plants at this application rate from direct spray would have high risk, off-site drift low risk (special status spp.), low risk to birds and mammals, slight risk to fish, and very low risk to terrestrial invertebrates, surface runoff, and wind erosion. Chlorsulfuron is used at very low pounds of active ingredient per acre. Efficacy on the mustards (white top and pepperweed) is vastly

superior to 2,4-D/dicamba. When included in a tank mix with very low rates of either 2,4-D, picloram (one pt./acre), or clopyralid (.5 pint/acre) herbicide efficacy is enhanced over much broader phonological stages of the target weeds using greatly reduced pounds of active ingredient per acre.

Clopyralid: The Ecological Risk Assessments for Clopyralid can be found in the Oregon Veg. FEIS, Table 3-13 (Volume 1 pp. 95) and Table 3-15 (Volume 1 pp. 98-99). All applicable SOPs and Mitigating Measures from the Oregon Veg. ROD (Attachment A pp. 33-45) would be incorporated (see Appendix C).

Clopyralid (specifically Transline) typically applied at 2/3 pint/acre (0.25# ai/acre) can be a very effective herbicide for treating knapweeds and thistles, especially Canada thistle, with much less non-target damage to desirable trees, shrubs, and forbs then picloram, particularly when applied in the fall. It can be added to tank mixes with Chlorsulfuron or 2,4-D and enhance efficacy over a broader array of phenological stages for treatment of target weeds. Risk to the health of susceptible terrestrial and special status plants at this application rate from direct spray would have high risk, off-site drift low risk (special status spp.) and no risk (terrestrial), and surface runoff no risk.

On the Burns District, as part of standard operating procedure areas burned by wildfire are monitored for at least two years post-fire. Any weeds found are treated using the most appropriate methods. Treatment areas are monitored annually to document efficacy and determine additional treatment needs. Where herbicide treatments are necessary, using these new products, either alone or in combination with other currently available products, would provide us the best tools available to ensure effective, timely management of noxious weeds in this area. By controlling noxious weeds, we enhance the potential for success of rehabilitation of the project area following the disturbances from the 2012 wildfires.

Aerial seeding will have no impact on noxious and invasive weeds. This is a no-impact action and will not create ground disturbance, nor will it track in weed sources from outside the perimeter of the fire due to vehicle use. Establishing native and desirable non-native species will prevent the introduction and spread of weedy species by preventing access to limited resources.

Ground seeding has the potential to increase the number of noxious and invasive weed species within the perimeter of the fire. The ground disturbing nature of the activity creates a hospitable environment for weed seed to establish. The use of vehicles off road increase the potential of

weed seed being transported into previously uninfested areas. Vehicles are vectors for weed infestation. The risk of introduction and spread of noxious and invasive weed species is negligible compared to the benefit resulting from establishing native and desirable non-native species. Following the project design features will mitigate the majority of the risk, however, the risk of spread will still exist.

Noxious and invasive weeds could be transported via the vehicles used to construct and/or place erosion control structures. The risk of introduction and spread of noxious and invasive weed species is negligible compared to the benefits to the safety of human life and property and the prevention of soil loss. Following the project design features will mitigate the majority of the risk, however, the risk of spread will still exist.

Road protection and maintenance could contribute to the introduction and spread of noxious and invasive weed species through vehicle during these activities. The risk of introduction and spread of noxious and invasive weed species is negligible compared preventing unauthorized off road travel by vehicles that have not be cleaned and would therefore have a higher potential to introduce and spread noxious and invasive weed species. Following the project design features will mitigate the majority of the risk, however, the risk of spread will still exist.

Noxious and invasive weeds could be transported via the vehicles used to construct, repair or maintain fencing and other range improvements; however, the risk is negligible compared to the benefit of preventing unauthorized use by livestock and wild horses which could lead to over utilization and a further increase in the introduction and spread of noxious and invasive weed species. Following the project design features will mitigate the majority of the risk, however, the risk of spread will still exist.

Horse relocation will prevent the spread and introduction of noxious and invasive weed species into the burned area by preventing wild horses from trailing through habitat that is highly susceptible to invasion.

Biological thinning, the use of livestock, as a weed treatment is used to reduce the vigor and quantity of noxious and invasive weed species. This method decreases the amount of chemical necessary to treat current and future infestations and decreases the risk to native species from herbicides. Livestock can be vectors for the introduction and spread of noxious and invasive weed species, however, diminishing the vigor and quantity of cheatgrass outweighs the possibility of infestation. Monitoring and treatment on a regular basis for noxious and invasive weed species will occur on an annual basis further reducing the risk of establishment and spread.

Closures to grazing and wild horses until objectives are met will prevent the spread of noxious and invasive weed species by allowing native and desirable non-native species time to establish and develop. Healthy, desirable vegetation is more competitive against weedy species than vegetation that is stressed due utilization before it can properly establish.

5. Riparian Zones, Wetlands, and Water Quality

Affected Environment: Riparian Zones, Wetlands, and Water Quality

Portions of Jackass Creek, Walls lake Reservoir, Clover Swale, Middle Donner und Blitzen River and Lower Donner und Blitzen River watersheds (5th Field HUC) were burned (Table 12).

Table 11: Percentage of watersheds (Fifth field HUC) burned in Miller Homestead Fire.

Watershed Name	Total Acres in Watershed	Acres Burned	% of Watershed Burned
Jackass Creek	124,306	43,019	34.6%
Walls Lake Reservoir	239,006	74,414	31%
Clover Swale	107,675	24,521	22.8%
Middle Donner und Blitzen River	148,545	18,839	12.7%
Lower Donner und Blitzen River	85,182	5	.006%

All drainages within the fire perimeter on BLM land are depicted as intermittent or ephemeral on USGS 7.5 minute topographic maps except for a .25 mile segment of Jackass Creek and Walls Lake. Local knowledge indicates these portions are often dry by August. Riparian zones are limited to these areas as well as small springs and other intermittent stream sections within the watersheds. While not on BLM managed land (and therefore not included in this EA), the eastern edge of the fire perimeter boarders Warm Springs Canal on USFWS refuge lands. This canal eventually leads to the Donner und Blitzen River. The Donner und Blitzen River does provide habitat for redband trout (a Bureau SSS).

Environmental Consequences: Riparian Zones, Wetlands, and Water Quality

Effects Common to All Alternatives:

For the purpose of this analysis, the CEAA for Riparian Zones, Wetlands, and Water Quality extends to the watershed level (5th field HUC) beyond the allotment boundary.

Past, present and RFFAs in the CEAA that may contribute to cumulative effects to riparian habitat and water quality include livestock grazing, noxious weed treatments, wildfire, sediment load from road crossings, conifer thinning/cutting,

wildfire, and prescribed burning. Adherence to the Guidelines for Livestock Grazing Management on BLM-managed lands would minimize/negate cumulative effects from livestock grazing. Sediment loading from road crossings are planned to be addressed on a site-specific basis and fixed as funding allows. Past and RFFAs that have affected Riparian Zones, Wetlands, and Water Quality are found in Table 13. Approximately 50 percent of CEAA has now been affected by wildfire (past wildfires and Miller Homestead fire combined).

Table 12: Riparian Zones, Wetlands, and Water Quality Past and RFFAs

ACTION	PAST ACTIONS			FUTURE ACTIONS		
	ACRES (% of watershed)	MILES	Number	ACRES (% of watershed)	MILES	Number
Wildfires	352,216 (50%)	---	---	Unknown	----	----
Open Roads	---	1287.7	---	----	None	-----
Water Developments	---		524	---	None	8
Juniper Cutting	11,133 (1.6%)	---		15,959 (2.3%)	---	---
RX Burning	24,739 (3.5%)	---		23,427 (3.3%)	---	---
Seeding	87,598 (12.4%)	---		62,067 (8.8%)	---	---

a. Alternative A: No Action

Soils exposed after a fire are prone to erosion. Impairment to water quality could happen if a large runoff event occurs before ground cover becomes re-established. Under this alternative, no road maintenance would occur, sediment delivery to drainages would be expected to increase as roads deteriorate. Under this alternative no fence reconstruction/construction would occur. This would result in livestock (when present) and wild horses (year round) having access to the Jack Creek (Riparian) Pasture. While Jackass Creek and other unnamed drainages within this pasture are all intermittent, grazing of them prior to vegetation becoming established and soils stabilizing could result in increased erosion and sediment delivery within the drainages. Under this alternative, the spring development would not be repaired, including the protection fence, resulting in wild horses (year round) and livestock (when present) utilizing and potentially damaging the spring source.

Wildfires also promote the spread of annual grasses. Annual grass dominance then promotes greater fire return intervals because it highly flammable and increases fuel loads across the landscape (D'Antonio 1992). Under the no action alternative, sediment movement downslope and greater wildfire intervals are expected to occur. The effects of increased annual grass populations to water quality and riparian zones would occur from multiple, repeated wildfire disturbances occurring over a broad timeframe. As fire frequencies increase across the landscape,

potential impacts to water quality from increased erosion and turbidity would occur more frequently.

b. Alternative B: Proposed Action

The proposed actions include a variety of methods aimed to reduce upland erosion and sediment delivery caused or exacerbated by the Miller Homestead wildfire. Thus, the Proposed Actions, in general, would minimize negative effects to water quality from the wildfire. Benefits to riparian and aquatic environments downslope would occur from the upland and near-channel treatments that are designed to stabilize soil, minimize rill and gully erosion. Treatments for soil stabilization (including seeding and planting) and road maintenance and protection, would protect water quality by minimizing erosion and post-fire sediment delivery to stream channels by directed water off the roadway. Temporary fence construction and new fence construction (along with the wild horse and livestock closure) would prevent wild horses and livestock from entering the burned area, allowing vegetation to recover, soils to stabilize, and reducing sediment delivery to drainages.

In-channel treatments would be implemented to modify sediment and water movement in ephemeral or small-order channels, to prevent flooding and debris torrents that may affect downstream values at risk. In-channel structures slow water flow and allow sediment to settle out; sediment would later be released gradually as the structure decays. (Robichaud et al 2000). If not properly installed or maintained, hay bale dams can cause more damage than if they were not used at all (Robichaud et al.) NRCS guidelines would be followed to minimize this risk. Dams would only be placed in ephemeral or small order drainages.

Hillslope treatments (seeding, planting, and contour wattles) should improve hydrologic function of the watershed as the site becomes re-vegetated with desirable species. Contour Wattles increase infiltration, add roughness, reduce erosion, and help retain eroded soil on the slope. Straw Wattles should be effective for a period of one to two years, providing short term protection on slopes where permanent vegetation would be established to provide long term erosion control (USDA 2012).

The herbicide application design features would minimize impacts to riparian vegetation and water quality. Impacts would be minimized in intermittent streams because they are protected by 10-foot (ground-hand), 25-foot (ground-vehicle), and 100-foot (aerial) buffers (1991 Vegetation Treatment on BLM Lands FEIS, p. 3-43). Impacts may occur, however, in ephemeral streams, which often do not have buffers. Herbicides applied directly to them usually are picked up in stream flow by the first storm large enough to create flow in the channels. The 2007 National

Vegetation FEIS pp. 4-28, Table 4-9 quantifies the off-site movement potential of the chemicals incorporated in the Proposed Action. Groundwater leaching potential of the four chemicals ranges from low to high while surface water runoff is low for all four chemicals. Even if an herbicide has runoff or leaching potential, the likelihood of it reaching a body of water also depends on site characteristics. For example, if a persistent herbicide with a high potential for leaching to groundwater was used at a site with low annual precipitation, and the depth to groundwater was over 100 feet, the overall potential for that herbicide to reach groundwater before degrading would be quite low (2001 National Veg. FEIS, pp. 4-26). General site characteristics of the proposed project area coupled with current buffer protections help to minimize accidental direct application or drift at concentrations high enough to impair water quality. Risk to non-target riparian vegetation associated with herbicide use would be minimized by the current stream buffering standards. Treatment accuracy increases as application methods change from aerial to boom (vehicle) to spot (hand), thus decreasing the risk for accidental direct spray or drift onto non-target species. As long as standard operating procedures for stream buffering and chemical application are followed there is no measurable risk to water resources and wetlands/riparian areas.

Biological thinning would reduce the risk of large scale wildfires in the area, decreasing the risk of future sedimentation resulting from wind and water erosion following wildfires. While biological thinning may occur in drainages, timing would be restricted to periods when it would not result in ecological damage to the drainage, and it would not result in a measurable amount of sedimentation.

Spring reconstruction would allow the developed spring to continue functioning, drawing wild horses and livestock to the trough and reservoir, and ensuring the spring source and associated riparian area would be protected from wild horse and livestock utilization.

Wild horse relocation, water hauling, and guzzler reconstruction would have no effect.

6. Social and Economic Values

Affected Environment: Social and Economic Values

Livestock raising and associated feed production industries are major contributors to the economy of Harney County. The highest individual agricultural sales revenue in the county is derived from cattle production (65 percent), which is inextricably linked to the commodity value of public rangelands. The cattle

industry provided $54,553,000 in sales in Harney County in 2011 compared to $44,161,000 in 2010 [Oregon State University (OSU), Extension Service, 2011].

"Quality of life" is very individual when determining what is valued in a lifestyle and what features make up that lifestyle. 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. Primary recreation activities in the area are antelope hunting and camping. Other recreation activities are rock-hounding, photography, wildlife viewing, wild horse viewing and driving for pleasure.

In addition to local recreation use, the undeveloped, open spaces in the county are themselves a tourist attraction and contribute a "sense of place" for many. The attachment people feel to a setting, typically through a repeated experience, provides them with this sense of place. Attachments can be spiritual, cultural, aesthetic, economic, social or recreational.

Tourism also contributes revenue to local businesses. The Steens Mountain area is central to Harney County tourism. A 2007 study found local economic effects associated with recreation visits to Malheur National Wildlife Refuge totaled approximately 4.4 million dollars during 2006 (Carver and Caudill 2007). Hunting and other types of dispersed outdoor recreational experiences contribute to the local economy on a seasonal basis. Fee hunting and recreation alone contributed $110,000 to Harney County in 2009 (http://oain.oregonstate.edu, 2009).

Currently affected allotments are licensed for 16,214 AUMs at $1.35/AUM (subject to change on a grazing year basis).

There are currently numerous wooden power poles inside and within one-mile of the perimeter of the Miller Homestead fire, and one communications site. During the fire event, the ground around approximately fifteen of these poles was bladed to create bare-ground to protect poles from burning. Providing continued electrical power and communication services to the surrounding communities and residences is important to the residents of the area.

Environmental Consequences: Social and Economic Values

Effects Common to All Alternatives:

The CEAA for this project is southern Harney County. RFFAs such as grazing, recreational pursuits, horse gathers, noxious weed treatments and cutting and prescribed burning to reduce hazards fuels and restore habitat would continue

under all alternatives. Implementation of any of the alternatives in combination with the above listed RFFAs is not expected to measurably contribute to cumulative effects.

The North Steens Ecosystem Restoration Project is a landscape juniper treatment RFFA having potential to improve rangeland health including improved habitat for Greater sage-grouse and increase forage production for wildlife, wild horses, and livestock, thereby, maintaining or possibly increasing economic opportunities and fostering more desirable recreation opportunities with associated economic benefits to the local economy. Rangeland improvement could also bring about increased sustainability for livestock operations, further improving the local economy and supporting a well-established, local, rural-oriented social fabric.

The North Steens 230-kV Transmission Line Project combined with the effects of this project would affect social and economic values in Harney County. Expected effects include hiring of local residents during construction of the wind farm, transmission line, and rangeland improvements. In turn, wages would be spent in the local communities, particularly Burns and Hines, Oregon. Local residents of Diamond would see job opportunities including jobs during the maintenance phase of the wind farm.

a. Alternative A: No Action

Under the No Action Alternative, the area affected by the Miller Homestead Fire would be left to reclaim naturally. If left to reclaim naturally, it is expected invasive species and noxious weeds such as medusahead would establish and spread. Medusahead is a poor forage species for both livestock and wildlife. If not treated, range conditions would decline as this species begins to dominate native plant communities. Because of the low forage quality of medusahead, carrying capacity for all demands, including wildlife, within the fire perimeter and beyond would begin to decline as desirable species are replaced with aggressive noxious weeds. According to the FEIS for Vegetation Treatments using Herbicides on BLM Lands in Oregon, July 2010, livestock carrying capacity could be reduced by 35 to 90 percent from weed infestations lowering yield and quality of forage (page 321).

Potential exists for rangelands to move toward a downward trend. Poorer range conditions could lead to lower weaning weights or a reduction in overall cattle numbers affecting the economics of the affected ranchers, as well as the chance of the BLM permanently reducing permitted AUMs on the allotments.

The Federal government would not collect grazing permit fees from the permittees until monitoring indicates livestock can resume grazing.

No contracts for construction or supplies would be purchased from local vendors under this alternative; therefore, no new revenue would be generated.

At the same time, public lands in and around the allotment would also continue to contribute social amenities such as open space and recreational opportunities (including hunting, hiking, sightseeing, and camping). These amenities enhance local communities and tourism, though the specific contribution of these allotments is not known.

No herbicide treatments around the bases of power poles would occur, leaving them vulnerable to future wildfire events. Only the use of the four previously analyzed chemicals would be used within the fire area. Without the use of effective chemicals to reduce invasive plants, BLM and surrounding lands are affected in a variety of negative ways. Infestations can reduce recreational land values and the spiny species can cause human health problems (FEIS, Vegetation Treatments Using Herbicides on BLM Lands in Oregon, 7/2010, page 321). In addition, invasive plants can have a negative effect on observation-based tourism, as the wildlife and wildflowers that people come to enjoy and photograph are crowded out by invasive plants (FEIS, page 321).

No road maintenance would occur allowing for roads to deteriorate and create safety concerns. Lack of maintenance would affect those interested in driving for pleasure and ranchers who rely on those roads for grazing management. However, those who prefer limited access within any area would add to their solitude and social values.

b. Alternative B: Proposed Action

Under the proposed action seeding of desirable species that help stabilize soils and control invasive weeds would maintain good range condition, forage quality and carrying capacity for all demands.

This alternative could utilize contracts to rebuild fences, construct sediment traps, drill seed, aerially seed, and cleanout water catchments. To contract all rangeland improvements under this alternative the cost is estimated to be over $8,000,000. Contracting projects would provide economic opportunities for local contractors and suppliers.

The affected permittees would be required to find alternative forage for approximately 5,982 AUMs, until the seeded areas have met objectives of three plants per square meter and range improvements have been repaired. Replacement forage for 5,982 AUMs [Fair Market Value for AUMs is

between $17 and $25[9] (compared to BLM AUMs at $1.35/AUM] which would cost approximately $101,694 using the lower AUM rate to replace the existing AUMs on an annual basis. Hay to replace the 5,982 AUMs would require approximately 1,496 tons (1 ton of hay per cow per 4 months or 0.25 ton per AUM). Current cost of hay is averaging $125 to $250/ton. The cost to feed hay to replace the AUMs would be approximately $187,000 to $374,000 plus labor on an annual basis.

No effects to a visitor's experience or opportunities are expected by implementing the Proposed Action.

Treating the bases of wooden power poles within one mile of the perimeter of the wildfire with the herbicide WeedBlast (Bromacil+Diuron) would help protect the poles and the infrastructure they represent from damage by future wildfires.

Management of invasive plants affects the goods, services and uses provided by BLM lands (FEIS, page 321). The BLM would be perceived as a more equal partner in weed control efforts with the means to use a wider range of herbicides. Wildland fire-related costs could be reduced because of the additional invasive grass treatments (FEIS, page 325) and biological thinning. Biological thinning treatments would also foster partnerships between operators and the BLM.

Continued maintenance of roads would allow for continued enjoyment of driving for pleasure, hunting and grazing administration. However, some may feel the presence of roads within any area affects their solitude and their social values.

7. Soils and Biological Soil Crusts

Affected Environment: Soils and Biological Soil Crusts

Eight general soil types have been identified within the Miller Homestead Fire. Table 13 contains a description of each type, by acres, within the fire perimeter.

Table 13: Soil Types in the Miller Homestead Fire

Soil Type	Description	Acres
Fury-Skunkfarm-Housefield	Somewhat poorly drained to very poorly drained, very deep soils found on lake plains.	299
Merlin-Observation-Lambring	Well drained, shallow, moderately deep, and very deep soils that are found on shrub- and grass-covered hills and mountains. Hazard of water erosion.	1,496

[9] Fair Market Value for private AUMs includes full care of livestock while on private lands v. the permittee must provide complete care of livestock while grazing on BLM-administered lands including fence maintenance and salting.

Poujade-Ausmus-Swalesilver	Moderately well drained and somewhat poorly drained, very deep soils found on lake terraces and lake plains.	1,950
Felcher-Skedaddle	Well drained, very shallow to moderately deep soils found on mountains and hills. Generally high potential for water erosion.	7,122
Spangenburg-Enko-Catlow	Very deep, somewhat poorly-drained, hydric soils of basins and playas. Low potential for water erosion, moderate to high potential for wind erosion.	9,590
Reallis-Vergas-Lawen	Well-drained, very deep soils, formed on high lake terraces and fan terraces. Potential for erosion from wind.	12,974
Ninemile-Westbutte-Carryback	Well-drained, shallow and moderately deep soils formed in residuum and colluvium on tablelands. Generally moderate to high potential for erosion from water, moderate potential from wind erosion.	14,372
Raz-Brace-Anawalt	Well-drained, shallow or moderately deep soils formed in residuum and colluvium on tablelands. Moderate to high potential for water erosion.	112,581

Approximately 126,953 acres (79 percent) of the Miller Homestead Fire is composed of claypan soils in the Ninemile-Westbutte-Carryback and Raz-Brace-Anawalt general soil series. The primary characteristic of these soils is a dense, compact, slowly permeable layer in the subsoil, having much higher clay content than the overlying material, from which it is separated by a sharply defined boundary. Claypans are usually hard when dry, and plastic and sticky when wet. These soils limit or slow the downward movement of water. Erosion potential is slight to moderate for wind and moderate to high for water. Within the burned area, mountain big sagebrush and low sagebrush are dominant shrubs on claypan soils, usually with Sandberg's bluegrass, bluebunch wheatgrass, Thurbers needlegrass, bottlebrush squirreltail, and Idaho fescue being the dominant grasses. Forb diversity and density can be quite high on these soils.

Loamy soils in the Reallis-Vergas-Lawen series comprise approximately 12,974 acres (8 percent) of the allotment. Erosion potential is slight for water and moderate for wind. These soils are on slopes generally less than 25 percent and support vegetation communities including Wyoming big sagebrush, low sagebrush, needlegrass species, and bluebunch wheatgrass.

Spangenburg-Enko-Catlow has a loamy sand texture and encompasses approximately 9,590 acres (6 percent) and is found in low lake terraces. These sites generally support communities consisting of basin or Wyoming big sagebrush, wildrye, Thurber needlegrass, indian ricegrass, and needleandthread grass. These sites have potential for both wind erosion.

The Miller Homestead Fire burned through plant communities where biological soil crusts were known to be present. However, the area has not been inventoried to determine the extent or specific types of crusts present in the burned area.

Biological Soil Crusts (BSCs) are specialized organisms that occupy the nutrient-poor zones between vegetation clumps in many types of upland, arid vegetation communities. Biological Soil Crusts function as living mulch by retaining soil moisture, discouraging annual weed growth, reducing wind and water erosion, fixing atmospheric nitrogen, and contributing organic material to soil fertility (USDI TR 1730-2, 2001). The BSCs include such organisms as mosses, lichens, green algae, microfungi, cyanobacteria, and other bacteria. Presence and general health of BSCs are reflected in a site's soil surface stability and (USDI TR 1730-2, 2001) biological productivity, which in turn is a reflection of BSC contribution to ecological processes supporting these elements.

Potential types, cover area, and species composition of BSCs are influenced by a number of physical and biotic site-specific factors. Species composition is sensitive to subtle changes in soil chemistry (Ponzetti and McCune 2001), especially with respect to lichen species. Cover area by BSCs is generally greater at drier sites at lower elevations, especially salt desert shrub communities not subjected to periodic seasonal flooding and Wyoming big sagebrush sites. Several factors generally influencing the distribution and vigor of BSCs, include elevation, precipitation (timing and amount), soils and topography, disturbance, vascular plant community structure, ecological gradients and microhabitats. Potential cover by BSCs is generally inhibited by wetter conditions that support vigorous cover by vascular plants at higher elevations (USDI TR 1730-2, 2001). Because BSCs increase infiltration of precipitation, as well as trap microscopic and macroscopic nutrient particles, the reduction in the diversity and cover of microbiotic crusts may disrupt the ecological processes of the nutrient and hydrologic cycles and energy flow, as well as site stability and resistance to undesirable species such as cheatgrass (Pellant 1996).

Within the allotment, dense vascular vegetation (especially mountain big sagebrush), accumulating plant litter, and high herbaceous plant density are the primary limitations to potential BSC cover (USFS 2000 ICBEMP Supplemental Draft EIS). The BSC cover is expected to be highest on soils with fine-textured silt, silt loam, and clay surface layers, where low sagebrush grows. Rangeland health assessments found short mosses to be the most common BSC type within the allotment. Foliose lichens are present on north slopes with deeper soils, usually in association with mountain big sagebrush communities. In areas of low sagebrush and shallower soils, the nitrogen fixing lichen, *Collema*, is present in varying degrees.

Grazing (livestock and wild horses) has occurred in the allotment for over 100 years. Effects to soil compaction and BSCs from grazing within the allotment are greatest around water and mineral supplement sites, and along frequent travel corridors, and are lowest on slopes steeper than 30 percent, areas with low forage quality or quantity, very rocky sites, and areas farthest from water and supplements. Over 90 percent of the allotment is in slopes 0 to 12 percent;

therefore, on 90 percent of the allotment, slope is not expected to be a factor in determining use by livestock and wild horses.

Vegetation serves as obstruction which slow down the movement of runoff and allow more moisture to be absorbed into the soils; by trapping this moisture, the sediments and nutrients that are in the runoff are also trapped (Wilcox and Breshears 1995, Tongway and Ludwig 1997, Schlesinger et al. 2000, Wilcox et al. 2003a). When fire reduces/removes vegetation, especially on hillsides, runoff increases along with sediment losses (Wilcox et al. 2003a, Ludwig et al. 2005). When these sediments are transported into waterways, the downstream water quality and biota can be effected (Townsend and Douglas 2000, Burrows and Butler 2001). The loss of water capturing vegetation also reduces ecohydrological function (Ludwig et al. 2005). Frequent fires on a site can result in decreases in vegetation abundance and vigor, modifying runoff and erosion processes (Beeson et al. 2001, Johansen et al. 2001). Bailey and Copeland (1961) found that surface runoff can increase by more than 70 pecent following severe wildfires that remove more than 90 percent of the ground cover. Peak flow as a result of storms has been known to increase by as much as 9600 percent following fire (Anderson et al. 1976). The establishment of vegetation on burned sites as soon as possible is the most economical way to reduce soil loss and sedimentation and increase water infiltration (Rice et al. 1965, Miles et al. 1989).

Environmental Consequences: Soils and Biological Soil Crusts

Effects Common to All Alternatives:

For the purposes of this analysis, the CEAA for soils and BSCs is the fire perimeter. Past and present actions and events have influenced the existing environment within the CEAA. RFFAs in the CEAA that may contribute to cumulative effects to soils and BSCs include livestock grazing, hunting, and other recreational pursuits. Erosion potential by both water and wind will are impacts common to all alternatives.

a. Alternative A: No Action

Under the No Action alternative, soils have a higher potential for erosion due to both wind and water. Loss of seed bearing top soil would prevent native vegetation from re-establishing leaving habitat open for noxious and invasive weeds. If weeds establish, the likelihood of biological soil crusts re-establishing is minimal. Noxious and invasive weeds, particularly cheatgrass and medusahead rye, tend to form mats in the inner spaces between bunch grasses and shrubs where biological soil crusts generally inhabit. Soil crusts provide necessary functions in the high desert such as slowing overland flow and allowing water to infiltrate into the soil and stabilizing soils by providing a root mass which holds soil particles in place. Without biological soil crusts, ecosystems may

transition into annual grasslands and lose the unique biodiversity associated with native species. Under this alternative, roads will not be maintained leading to off road travel which will prevent soil crusts from redeveloping and will compacts soils preventing vegetation regrowth. Unmaintained roads are more susceptible to erosion, both wind and water and could provide a point source for further degradation across the landscape leading to increased soil and BSC loss.

b. Alternative B: Proposed Action

Under the Proposed Action, soils and biological soil crusts would stabilize allowing vegetation and soil crusts to reestablish which in turn would trend ecological functions back towards rangeland standards.

Aerial seeding would allow fragile soils along the rim to stabilize using native vegetation and desirable non-native vegetation. The area along the rim is susceptible to increased erosion, especially via overland flow and runoff due to the steepness of the rim. Aerial seeding would further protect the soils and any remaining soil crusts because the application of seed would cause no additional disturbance to the soil. Soil crusts would take anywhere from 1 to 50+ years to reestablish depending on species; however, seeding with desirable species, native and non-native, would provide the needed habitat required for BSCs to begin this process. Seeding, instead of allowing the area to come back "naturally" would prevent the spread of noxious and invasive weed species into the burned area. Noxious and invasive weeds, while able to stabilize soils in some cases, prevent the development of biological soil crusts and out-compete native vegetation.

Ground seeding would provide the same benefits as aerial seeding, although would greater disturbance to soils and the remaining soil crusts. The disturbance caused by the rangeland drills and tractors is outweighed by the positive impacts associated with seeding native and desirable non-native species which would provide soil stabilization and habitat for biological soil crusts to re-establish. Potential soil loss will be greatly diminished by accelerating vegetative regrowth.

Installing soil stabilization mechanisms and cleaning out catchment basins would prevent valuable topsoil from being re-deposited across roadways and from being washed down drainages. Keeping soils on site to facilitate the recovery of native vegetation is a key component in post fire rehabilitation.

Benefits to soils and biological soil crusts are neutral for cleaning out ditches and culverts.

Temporary fencing, gates and cattleguards would allow for soils and biological soil crusts to stabilize and reestablish by preventing livestock and wild horses from trailing across fragile soils and congregating in areas where resources are available. The installation of temporary fencing, gates and cattleguards would temporarily disturb soils, but as vegetation regrows, impacts would no longer be visible. Removal of temporary structures would again impact soils and biological soil crusts, but those impacts would not be measurable and would disappear within one to two growing seasons. There may be impacts to vegetation on the non-burned side of the temporary fencing by cattle and wild horses trailing along the newly constructed fence. These impacts would diminish when the fence is removed.

Soils would be impacted in the areas where guzzlers are repaired and replaced or newly constructed. Soil disturbance during the repair/replacement and construction would not be measurable compared to the long term impacts associated with high concentrations of wildlife and livestock. The soils in these areas would be compacted due to high usage by both wildlife and livestock. Biological soil crusts would not develop or re-establish in these areas.

Closing of allotments within the burn perimeter would allow a rest period for soils and biological soil crusts during which they can begin to stabilize and re-establish. Closing the allotments, or portions thereof, would allow native vegetation to grow further stabilizing soils and providing habitat for biological soil crusts.

Weed treatments would provide another tool for soil stabilization by allowing native and non-native desirable vegetation an opportunity to establish which would assist in stabilizing soils and provide habitat for biological soil crusts. Impacts to soils would not be measurable from herbicides; however, there is very little information available which shows the impacts to biological soil crusts from use of herbicides. Any short term impacts to soils or biological soils crusts would be outweighed by the long term benefits of herbicides on noxious and invasive weeds by allowing native and non-native desirable vegetation to establish, stabilize soils and provide habitat.

Planting of Wyoming big sagebrush seedlings would cause minimal, short term impacts to soils and biological soil crusts. Disturbance to soils would be visible for no more than two growing seasons with the benefit of long term soil stabilization and the creation of inner space habitat for biological soil crusts the end goal.

Biological thinning would have minimal impacts on soils and would have long term benefits to biological soil crusts. The purpose of biological

thinning is to allow for fine fuel reduction, including annual grasses; cheatgrass especially occupies the same habitat needed by biological soil crusts. By biologically thinning fine fuels, densities would be reduced and native vegetation, specifically bunch grasses, would have a greater opportunity to establish and provide the inner spaces necessary for the re-establishment of biological soil crusts. Since biological thinning would only occur following recommendations in the "Green and Brown" guide, perennial vegetation would be protected and promoted.

Road maintenance would protect fragile soils and developing biological soil crusts by keeping vehicle traffic on designated roads and preventing unnecessary off road travel. Maintenance would also prevent excessive road erosion which could lead to soil and BSC degradation outside the roadbeds by being a point source for overland flow due to water erosion.

8. Special Status Species

Affected Environment: Special Status Species-Wildlife

There are no known federally Threatened or Endangered species or federally designated Critical Habitat found within or in the vicinity of the Miller Homestead Fire (project area). The U.S. Fish and Wildlife determined that greater sage-grouse (*Centrocercus urophasianus*) were warranted for listing, but precluded by higher priority listing actions (12-Month Finding) (*Federal Register 75:55* (March 23, 2010) p. 13910). Greater sage-grouse (*hereafter* sage-grouse) are a Candidate species, and are managed under the BLM SSS direction guidance. The BLM guidance is to conserve this SSS species and their habitats and shall ensure that actions authorized, funded, or carried out by the BLM do not contribute to the need for the species to become listed.

Several SSS occur or have potential habitat that was impacted by the wildfire and is in the project area, but only greater sage-grouse and pygmy rabbit (*Brachylagus idahoensis*) are sagebrush obligates with documented occurrences and substantial acres of habitat lost due to the wildfire. Pallid bat (*Antrozous pallidus*), Townsend's big-eared bat (*Corynorhinus townsendii*), fringed myotis (*Myotis thysanodes*), and spotted bat (*Euderma maculatum*) are other SSS potentially occurring in the project area. However, these bat species have not been documented in the area, are not as strongly associated with sagebrush habitat, and typically roost in areas that are protected from fire. Additionally, these bat species are active primarily active only at night and migrate out of the area in the fall or some individuals may remain and hibernate through the winter (Verts and Carraway 1998). Therefore, SSS bats are not likely to be affected by the project and are not carried through for detailed analysis.

Virtually all (99 percent) of the project area is within Preliminary Priority or Preliminary General sage-grouse habitat. There are six leks within the fire

perimeter and eight additional leks (comprising five lek complexes) within four miles of the fire perimeter. Approximately eighty percent of sage-grouse hens nest within four miles of leks (*in* Hagen 2011). Pygmy rabbit habitat is not as well delineated in this area. However, based on several documented observations of pygmy rabbits, data from soil surveys, and the vast extent of the open sagebrush communities present prior to the fire much of the burned area supported suitable or potential habitat.

Sagebrush is a critical habitat component for sage-grouse and pygmy rabbits, especially in the winter when sagebrush constitutes more than 90 percent of their diet (Hagen 2011, Weiss and Verts 1984). A few small, unburned "islands" of sagebrush survived within the fire perimeter, but the wildfire killed the vast majority of sagebrush plants. The burned area now provides virtually no cover and forage for these two species. Most individuals that survived the fire and avoided predation immediately after the fire have been displaced into sagebrush steppe outside the fire perimeter. Sage-grouse and pygmy rabbits may find limited forage near the edge of the fire, but most individuals will likely to avoid the area, especially during the winter months, until the sagebrush recovers to the extent it once again provides adequate hiding cover and forage. The unburned "islands" of sagebrush within the fire perimeter are generally too small to provide suitable habitat, but may provide short-term refuge for some individuals. Sage-grouse have been observed returning to leks in burned areas in subsequent seasons, but the size of the area burned in the Miller Homestead fire and distance to sagebrush cover will likely diminish or possibly eliminate use of existing leks in the burned area for several years or decades. The wildfire also decreased the potential nesting habitat for birds attending leks within at least four miles of the burned area.

The "Greater Sage-Grouse Conservation Assessment and Strategy for Oregon" (Strategy) (Hagen 2011) has an action item to "Reduce negative impacts of wildfire on sage-grouse through prompt and appropriate habitat reclamation or rehabilitation." The Strategy recognizes the need for prompt and appropriate rehabilitation following a wildfire to prevent additional threats and damage to sage-grouse habitat and has the following conservation guidelines this rehabilitation from Page 101:

1) Wildfires burning >10 acres of sage-grouse habitat should be evaluated to determine if seeding is necessary to recover ecological processes and achieve habitat objectives.

> *a) If seeding is necessary, managers should use appropriate mixtures of sagebrush, native grasses and forbs and appropriate non-native perennials, that will increase the probability of recovering ecological processes and habitat features of the site.*

b) Wyoming big sagebrush sites should be re-seeded or planted with seedlings of Wyoming big sagebrush when available.

c) Wildfires burning >10 acres of habitat that is at high risk of annual grass invasions should be seeded with an appropriate mixture to reduce the probability of cheatgrass establishment.

2) Although planting shrub species is more common now than in the past, sagebrush should be included in fire rehabilitation seeding mixtures or as seedlings as often as possible.

3) The seed supply of native species is generally limited when large acreages burn. Land managers should encourage development of native seed banks (both in the private and government sectors).

4) If native plant and sagebrush seed is unavailable crested wheatgrass can be planted in lieu of native species or as a mixture with native species, because it is readily available, can successfully compete with cheatgrass, and establishes itself more readily than natives.

a) If crested wheatgrass is planted initially specific efforts or plans are needed to interseed native grasses, forbs and shrubs in the rehabilitation area. This might include an initial seed-mix of 1 to 2 lbs. per acre of crested wheatgrass mixed with natives.

5) If cheatgrass or other exotic plant species are present before a fire occurs, they are likely to become more dominant post-fire if the area is not properly rehabilitated (but see suppression activities above). Rehabilitation techniques that decrease the probability of cheatgrass invasion are needed.

6) Drought can impact the success of a rehabilitation project. Post-treatment monitoring will be needed to determine if rehabilitation efforts need to be repeated if initial attempts fail.

These excerpts are not inclusive of all guidelines in the Strategy, but are the most pertinent to this document.

IM 2012-043 Greater Sage-Grouse Interim Management Policies and Procedures has the following to say about Wildfire Emergency Stabilization and Burned Area Rehabilitation:

In Emergency Stabilization and Burned Area Rehabilitation plans, prioritize re-vegetation projects to (1) maintain and enhance unburned intact sagebrush habitat when at risk from adjacent threats; (2) stabilize soils; (3)reestablish hydrologic function; (4) maintain and enhance biological integrity; (5) promote

plant resiliency; (6)limit expansion or dominance or invasive species; and (7) reestablish native species.

Increase post-fire activities through the use of integrated funding opportunities with other resource programs and partners.

In areas burned within the past 5 years, ensure that effectiveness monitoring outlined in post-fire stabilization and rehabilitation plans continues and report the results as outlined in WO-IM-2010-195. Post-fire stabilization and rehabilitation monitoring should continue until post-fire objectives are met.

The Miller Homestead wildfire is the dominant factor influencing the affected environment for SSS, but other actions have helped shape the affected environment and its ability to recover from the wildfire. Other past and present actions that have influenced the affected environment to varying extents for sage-grouse and pygmy rabbit include road and fence construction, water developments, powerline construction, vegetation treatments, facility construction, livestock and wild horse grazing, other wildfires, weed treatments, and recreation. Livestock and wild horse grazing and associated activities (e.g. spring and well development, reservoir construction, etc.) are the most widespread and ongoing activities across the affected environment, but both activities are managed and monitored to facilitate sustainable multiple use, including maintenance of sage-grouse and pygmy rabbit habitat. Roads and fences in the project area are at relatively low densities compared to other areas (Connelly et al. 2004). One communication facility was constructed on a rim overlooking the state highway, and there are a few small distribution lines within the burn perimeter that have diminished the quality of SSS habitat. Effects of past wildfires, vegetation treatments, and weed control treatments are not as apparent following the Miller Homestead fire, but have also influenced the affected environment and its resiliency to disturbances such as the wildfire.

Environmental Consequences: Special Status Species-Wildlife

Effects Common to All Alternatives:

For the purposes of this analysis, the CEAA considered for SSS extends up to ten miles beyond the fire perimeter to encompass the regular movements of wide-ranging sage-grouse. The Greater Sage-grouse Conservation Assessment and Strategy for Oregon (State Strategy) (Hagen 2011) contains data for movement of sage-grouse that is site specific to the state of Oregon, with an overall average (6 sites) of 10.3 km (6.4 miles) with some outliers moving greater than 30 km (18.6 miles) during the extreme winter of 2008. The choice to use a 10 mile buffer for cumulative effects would be more than adequate to contain the average while accounting for a percentage of the outliers. The total acreage of the fire area plus the CEAA is approximately 820,295 acres. Vegetation in the CEAA is dominated by sagebrush steppe, although it does encompass some wetland habitat associated

with the Malheur National Wildlife Refuge. Most effects to sage-grouse and pygmy rabbits or their habitat in the CEAA would be limited to within or immediately adjacent to the burned area, and would diminish over time and as the distance from the project area increases. Most disturbance effects would also occur primarily during implementation or immediately after and then rapidly diminish over time. Beneficial effects of habitat recovery would increase over time, but would likely require several decades or more to fully recover to conditions present prior to the fire. RFFAs potentially affecting sage-grouse within this area are presented in Table 15.

Past, present, and reasonably foreseeable actions or events within this area include wild horse and livestock grazing, weed management, fence and reservoir maintenance, road maintenance, restoration treatments associated with the North Steens Ecosystem Restoration Project, wildfires, and various recreational activities. Livestock and wild horse grazing typically have more potential influence on sage-grouse and pygmy rabbit habitat than disturbance effects on these two species. However, livestock and wild horse grazing are managed activities in this area, and are designed to prevent resource damage while providing for sustainability of sage-grouse and other wildlife populations. Livestock and wild horse grazing would not result in measurable cumulative impacts with the proposed treatments. Regularly scheduled weed treatments and road maintenance are temporary actions that typically occur once or a few times a year in an area, and generally result in some short-term (less than a day) impacts (e.g. displacement) to animals in the immediate area of the treatment. These two activities would not cumulatively contribute to measurable adverse impacts to SSS populations. Fences damaged in the fire would be rebuilt and developed water sources would be maintained to facilitate continued management of livestock and wild horse grazing. These actions combined may result in short-term disturbances during implementation, but are temporary and would not result in additional habitat loss nor contribute to cumulative impacts to SSS.

Wildfires occurring over the past thirty-two years have directly impacted fourteen percent and fifteen percent of the Miller Homestead fire and CEAA respectively, and sagebrush steppe in these areas is in varying stages of recovery depending on time since the burn and site conditions prior to the burn. Wildfires will occur in the future and vary in size and intensity, but predicting the timing, location, and effects is not feasible. Most recreational use may cause displacement or altered behavior of some animals. However, due to the dispersed and temporary nature of most recreational activity in this area and the limited off-road use in the area, it is unlikely that recreational use would contribute to measurable cumulative effects on SSS populations or habitat in this area. The State of Oregon manages hunting, and at established bag limits, this activity is also unlikely to have a cumulative effect on sage-grouse populations (Hagen 2011). RFFAs that may contribute to cumulative effects with this project are carried through analysis in the Environmental Consequences for each alternative, and include vegetation

management associated with the North Steens Ecosystem Restoration project and ongoing District weed treatments.

The Greater Sage-grouse Conservation Assessment and Strategy for Oregon (State Strategy) (Hagen 2011) was reviewed for effects analysis, rehabilitation strategies, and conservation measures for this EA. The State Strategy considered and incorporated where appropriate the U.S. Fish and Wildlife's 12-Month Findings for Petitions to List the Greater Sage-Grouse (Federal Register 75:55 (March 23, 2010) p. 13910-14014) and the Greater Sage-Grouse: Ecology and Conservation of a Landscape Species and Its Habitats (Sage-grouse Monograph) (Knick and Connelly, eds. 2011). The Sage-grouse Monograph is recognized by USFWS as the primary source of science for the 12-Month Findings for Petitions to List the Greater Sage-Grouse referenced above.

Table 14: Special Status Species - Wildlife Past and RFFAs

ACTION	PAST ACTIONS			FUTURE ACTIONS		
	ACRES	MILES	NUMBER	ACRES	MILES	NUMBER
Wildfire Starts	---	---	224	---	---	Unknown
Wildfires	107,267	---	56	Unknown	---	Unknown
Open Roads	---	785	---	---	None	---
Fences	---	457	---	---	6.2	---
Water Developments	---	---	235	---	---	None
Cutting	8,264	---	32	17,063	---	21
RX Burning	54,305	---	62	16,555	---	21
Seeding	32,542	---	43	1,960	---	4

a. Alternative A: No Action Alternative

This alterative would leave the entire burned area to recover on its own without any form of active management intervention. This would increase the risk of invasive species establishment and spread, converting the habitat from a sagebrush-grass codominance to an herbaceous dominance with the main components being cheatgrass and potentially medusahead rye. There would be no rest from livestock or wild horse grazing resulting in potentially severe impacts to recovering native forbs and grasses, leading to poor quality forage, less vegetative diversity within the fire area, and the greater likelihood of future fires. Under this scenario, sagebrush may not recover or would require a long time (potentially 100 years or more) to return to its former vigor and cover, and once again provide usable habitat for sage dependent species, such as sage-grouse and pygmy rabbit. This would lead to a long-term (potentially >100 year) downsize in localized populations of both species, possibly contributing to the need for listing. Regular weed treatments (not the proposed action) would continue to occur as part of the normal District weed management strategy, but would be limited to the four currently authorized chemicals

for treatment. The current restrictions on type of herbicides used may reduce the size of the area treated and the effectiveness of the treatment, making the burned area more susceptible to noxious weeds and other invasive species, relative to the proposed action. Establishment and spread of these invasives may contribute to a shortened fire return interval, which may slow or even prevent the recovery of sagebrush habitat for sage-grouse and pygmy rabbit.

Selection of this alternative would not actively improve the rate or increase the success of habitat recovery, nor would it contribute cumulatively to the beneficial long-term effects of the North Steens Ecosystem Restoration project to SSS or their habitat.

b. Alternative B: Proposed Action

This alternative would implement the Miller Homestead Fire Emergency Stabilization and Burned Area Rehabilitation Plan. The proposed actions will assist in mitigating some of the detrimental affects of the fire on SSS. The wildfire severely reduced the population of pygmy rabbits and sage-grouse primarily through habitat loss; therefore, the potential effects of the proposed action would generally not directly affect individuals or suitable habitat.

Drill seeding 22,300 acres and aerial seeding approximately 3,500 acres in the fall and early winter would increase the rate of establishment and recovery of perennial vegetation to protect the exposed soils from wind and water erosion. Seeding of selected uplands and the few riparian sites would help to stabilize soils in strategic areas across the burn, and help limit the spread of invasive species. The four seed mixes selected would minimize the introduction and spread of invasive grasses, such as cheatgrass, and would help reestablish Wyoming big sagebrush communities on several of the sites where it existed prior to the fire.

This alternative would allow for the use of more selective herbicides that are effective at controlling noxious weeds and invasive annual grasses, while limiting collateral damage to native and desirable non-native plants. Non-target desirable plants may be harmed, but risk would generally be limited to vulnerable (depending on selected herbicide) plants in the immediate treatment area, and have no effect on overall abundance or diversity of habitat. Application of the proposed herbicides using Standard Operating Procedures (SOPs) would not only improve the success of the seeding effort, it would help protect native plants that survived the fire. These native plants provide a valuable seed source adapted to the local environment, which further enhances the ability of the native plant community to recover (Leger 2008) and provide a more diverse habitat for wildlife species, including sage-grouse and pygmy

rabbit. Implementation of this alternative would result in maintenance or improvement and faster recovery of more acres of SSS habitat compared to the No Action Alternative.
Sage-grouse and pygmy rabbit may be impacted through direct or indirect contact or ingestion of chemicals or exposed plant, water, or animals, including insects. The proposed herbicides have a wider treatment window, allowing more flexibility in timing of treatments in order to avoid vulnerable periods for wildlife. Based on the findings of the Ecological Risk Assessments, following Standard Operating Procedures, and the likelihood of few or no sage-grouse and pygmy rabbits occurring in the proposed treatment area due to loss of habitat from the fire, the potential risk to these species from ingestion or direct contact would be negligible, especially at the population level. Discussion and links to Ecological Risk Assessments for the proposed herbicides are available in the Vegetation Treatments Using Herbicides on BLM Lands in Oregon FEIS (Oregon Veg EIS, Appendix 8, pp. 605-608, Appendix 9, pp. 632, 633, 642) and the Vegetation Treatments Using Herbicides Programmatic Final Environmental Impact Statement (chlorsulfuron and imazapic only, National Veg EIS, Appendix C). Imazapic and Chlorsulfuron had risk levels below the Level of Concern (LOC) for all evaluated wildlife under all scenarios (Oregon Veg. FEIS pp. 4-247-250). The risk assessment for clopyralid indicates there is little to no risk to terrestrial animals (SERA 2005, National Veg. EIS p 4-106).

Imazapic: Herbicide treatments using Plateau in the fall at a rate of 6oz/acre would pose no risk to wildlife species (National Veg. FEIS pp. 4-103). Risk quotients for terrestrial wildlife were all below the most conservative LOC of 0.1, indicating that direct spray of Imazapic is not likely to pose a risk to terrestrial animals
(National Veg. FEIS pp. 4-105).

Chlorsulfuron: The Vegetation Treatments using Herbicides on BLM Lands in Oregon (FEIS; July 2010) presents information on risks associated with wildlife species in Table 3-14 (Volume 1, pp. 96-97. This Table shows the results of BLM-evaluated herbicide risk categories for wildlife species including small mammals, pollinating insects, fish (pond and stream), aquatic invertebrates (pond and stream), large and small mammalian and avian herbivores, insectivores, and carnivores. The table shows zero risk to any of those categories from chlorsulfuron.

Clopyralid: The Vegetation Treatments using Herbicides on BLM Lands in Oregon (FEIS; July 2010) presents information on risks associated with wildlife species in Table 3-15 (Volume 1, pp. 98-99). This Table shows the results of United States Forest Service (USFS)-evaluated herbicide risk categories for wildlife species including small mammals, pollinating insects, fish (pond and stream), aquatic invertebrates (pond and stream),

large and small mammalian and avian herbivores, insectivores, and carnivores. The table shows zero risk from clopyralid to most categories except for small animals directly sprayed, consumption of contaminated insects by small mammals, and susceptible fish species from a direct spill where the risks were low.

Approximately 200 erosion control structures (check dams) would be placed in major drainages to help control runoff that will occur at these sites. Road and trail water diversions would be utilized to aid in this effort, with 15 culverts and spot cleaning of ditches along 45 miles of road. There would also be some spot maintenance of the major roads (additional to regular road maintenance) that had heavy use from fire activities. This would generally occur on a small portion of the 45 miles of road, when moisture and other environmental conditions allow. The proposed actions to service catchment basins and water control structures and re-seed the upper slopes of the drainages would also help hold soil in place and prevent sedimentation and ash run-off. The proposed seeding and soil management actions would stabilize more sediment across the landscape providing a stable foundation for plants to root and grow. This would result in recovery of usable habitat for sage-grouse and pygmy rabbit in a shorter time span than if the soil were allowed to be continually displaced by erosional mechanisms. Road maintenance would not fragment sage-grouse and pygmy rabbit habitat as it would only occur on existing roads within the already disturbed area of the road prism.

Fence, gate, and cattle guard maintenance and reconstruction would occur as needed to exclude livestock and wild horses from the burned area until objectives are met. Approximately 11.4 miles of new fencing along the boundary of the fire, 20 miles of new temporary fencing to control movement of livestock and wild horses, 38 miles of fencing in the interior of the fire, 2 temporary cattle guards, and an unspecified number of gates would be maintained or constructed as needed. Fences create a collision hazard to sage-grouse, but marking fences as proposed with reflective devices and avoiding construction within 0.6 miles, is expected to alleviate much of the potential for this to occur. The majority of the burned area, including all seeded areas, would be temporarily closed to wild horses (would be relocated after fence maintenance/construction occurred), and the entire area would be closed to domestic livestock grazing until vegetation objectives are met. Protection from livestock and wild horse grazing would help to allow for faster recovery of affected vegetative communities.

IM 2012-043 Greater Sage-Grouse Interim Management Policies and Procedures has the following conservation guidelines for fencing:

1. Evaluate the need for proposed fences, especially those within 1.25 miles of leks that have been active within the past 5 years and in movement corridors between leks and roost locations. Consider deferring fence construction unless the objective is to benefit Greater Sage-Grouse habitat, improve land health, promote successful reclamation, protect human health and safety, or provide resource protection. If the BLM authorizes a new fence, then, where appropriate, apply mitigation (e.g., proper siting, marking, post and pole construction) to minimize or eliminate potential impacts to Greater Sage-Grouse as determined in cooperation with the respective state wildlife agency.

2. To improve visibility, mark existing fences that have been identified as a collision risk. Prioritizing fences within 1.25 miles of a lek, fences posing higher risk to Greater Sage-Grouse as include those:

    a) On flat topography;
    b) Where spans exceed 12 feet between T-posts;
    c) Without wooden posts; or
    d) Where fence densities exceed 1.6 miles of fence per section (640 acres).

The "Greater Sage-Grouse Conservation Assessment and Strategy for Oregon" (Strategy) (Hagen 2011) has an action item to "Promote vegetation that supports nesting, brood-rearing and winter habitats including maintenance or recovery of shrub and herbaceous (native grasses and forbs) cover. Retain residual cover adequate to conceal sage-grouse nests and broods from predation, and plant communities that provide a diversity of plant and insect food sources." The Strategy recognizes that livestock management infrastructure can promote balanced grazing distributions and compatibility with sage-grouse needs and has the following conservation guidelines this rehabilitation from Page 104:

1) Construct new livestock facilities (livestock troughs, fences, corrals, handling facilities, "dusting bags," etc.) at least 1 km (0.6 mi.) from leks to avoid concentration of livestock, reduce collision hazards to flying birds, or eliminate avian predator perches.

a) Fences can be detrimental to local sage-grouse populations. Those fences identified as such or within 1.6 km (1mile) of an active lek or known seasonal use area should be marked with anti-strike markers.

The purpose of the temporary fencing proposed in this rehabilitation plan is to control the movement of livestock and wild horses to promote

resource protection, and provide for vegetation to stabilize the soils and prevent erosion as a result of the Miller Homestead Fire. These temporary fences will provide for long term benefit to sage-grouse by allowing the establishment of high quality, forb enriched, sage brush habitat in the future; without these fences the areas would likely result in grazing of plants attempting to recolonize an area that was denuded by fire. These fences would also lessen the chance that the fire area will be invaded by cheat grass, as it will allow the seeded vegetation to establish and grow without the pressure of grazing.

All fences will be outside of the 0.6 mile distance from leks to reduce collision hazards to flying birds (sage-grouse) contained in the conservation guidelines in the Oregon Sage-Grouse Conservation Strategy (Hagen 2011). The fences will be marked with anti-strike markers as directed in the sage-grouse instruction memorandum (IM 2012-043). With these measures taken, fence-marking efforts can reduce collisions by up to 83 percent in high risk landscapes (Stevens et. all, 2010). In order for the temporary fences to accomplish the purpose and need of this project and remain 1.25 miles away from leks would require 5-10 more miles of fence, which would have provided more chance of sage-grouse collisions.

One spring development and one wildlife guzzler that were damaged or destroyed in the wildfire would be repaired or reconstructed. Water sources are very important to wildlife in areas of limited water, such as the burned area, especially in drought years. Repairing or replacing these facilities and removing sediment from catchment basins will improve water storage capacity and availability for sage-grouse and pygmy rabbit, as well as other wildlife species.

Wyoming big sagebrush seedling (plugs) planting would occur on approximately 9,082 acres where sagebrush mortality occurred due to the fire. Locations for the plug plantings would maximize the chances of success, and are based on soil survey data, vegetative communities present prior to wildfire, and potential vegetative communities based on ecological site descriptions. Fire kills sagebrush plants and sagebrush seeds in the soil, and suppresses recovery because Basin, Mountain, and Wyoming big sagebrush are not root-sprouting shrubs (Tisdale & Hironaka 1981). Postburn recovery periods for these three big sagebrush taxa can be long, especially following large wildfires, because they must reestablish from seed. For example, Baker (2006, 2011) approximated post fire recovery for Mountain big sagebrush from 35–100 or more years and Wyoming big sagebrush from 50–120 years based on a combination of cover and density values from various studies. Planting plugs is expected to jumpstart this recovery effort because it typically has a higher survival rate than seeded sagebrush and decreases the period required to achieve reproductive

maturity, resulting in less time needed for Wyoming big sagebrush to reach sufficient cover percentages to begin to provide usable habitat for sage-grouse and pygmy rabbit as both hiding/nesting cover and as a critical food source during the winter season.

Biological thinning is the reduction of fine fuels by the removal by livestock. When above ground biomass of fine fuels is reduced by 50 percent (includes any reduction by permitted livestock grazing, wild horse use, and wildlife) biological thinning would cease. In areas dominated by annual grasses (80 percent or higher), biological thinning would be allowed to reduce fine fuels by 70 percent. Use of this method would help to control any blooms of invasive species such as cheat grass, and allow for the recruitment of shrubs and sagebrush; reducing the risk of future large scale wildfires, resulting in useable sage brush habitat for sage-grouse and pygmy rabbit.

Cumulative effects of the proposed action in regards to sage-grouse and pygmy rabbit is expected to be beneficial in the long term (10+ years), with livestock and wild horse grazing not occurring for two years during the growing season. This is expected to allow for the recovery of the health and vigor of vegetation in burned and seeded areas, providing greater cover, and nutrient source, to nesting and fledging birds; in a shorter time period than the no action alternative. Other RFFAs that may contribute to cumulative effects include vegetation treatments of the North Steens Ecosystem Restoration Project. Detailed effects of these treatments were analyzed in that Environmental Analysis. Some of the effects include temporary displacement or reduced use by sage-grouse in treated areas for a short period (during treatment), but these treatments (e.g. juniper cuts, pile burning) would result in fairly immediate and long-term beneficial effects through habitat maintenance and restoration.

Even with implementation of the Miller Homestead fire proposed actions, recovery of sagebrush habitat would likely require many years to recover to the extent that it provides usable sage-grouse habitat. In the interim, some of sage-grouse displaced by the Miller Homestead fire may move into and benefit from the habitat restoration treatments of the North Steens project. The topography and distance likely precludes movement of pygmy rabbits from the vicinity of the Miller Homestead Fire to the North Steens project area; therefore, there would be no cumulative effects to pygmy rabbits from these vegetation treatments.

Selection of this alternative would actively improve the rate or increase the success of habitat recovery, and would contribute cumulatively to the beneficial long-term effects of the North Steens Ecosystem Restoration project to sage-grouse and their habitat.

9. Upland Vegetation

Affected Environment: Upland Vegetation

The Miller Homestead Fire occurred within multiple precipitation zones ranging from 10” to 15”. The vegetative communities within the perimeter were comprised of Wyoming big sagebrush (Artemisia tridentata Nutt. ssp. wyomingensis Beetle & Young) or low sagebrush (Artemisia arbuscula Nutt.) overstory with the perennial understory dominated by bluebunch wheatgrass (Pseudoroegneria spicata (Pursh) Á. Löve ssp. spicata), Thurber’s needlegrass (Achnatherum thurberianum (Piper) Barkworth), bottlebrush squirreltail (Elymus elymoides (Raf.) Swezey), and Indian ricegrass (Achnatherum hymenoides (Roem. & Schult.) Barkworth). Research suggests that Wyoming big sagebrush re-establishes into burned areas from the outside edge inward at a very slow rate. It would be expected that it may take decades or more for the area burned by the fire to recover without treatment.

The major ecological sites found within the perimeter of the Miller Homestead Fire include:

Table 15: Ecological Sites

Ecological Site ID	Site Name	Dominant Vegetation	PPT Range
R023XY214OR	Claypan 10-12 PZ	Low Sage/Bluebunch wheatgrass	10-12"
R023XY300OR	South Slopes 10-12 PZ	Wyoming Big Sagebrush/Bluebunch wheatgrass	10-12"
R023XY220OR	Clayey 10-12 PZ	Wyoming Big Sagebrush/Bluebunch wheatgrass	10-12"
R023XY212OR	Loamy 10-12 PZ	Wyoming Big Sagebrush/Thurber's needlegrass	10-12"
R023XY213OR	Sandy Loam 10-12 PZ	Basin Big Sagebrush/Needle and Thread Grass	10-12"
R024XY018OR	Sandy Loam 8 - 10 PZ	Wyoming Big Sagebrush/Needle and Thread Grass/Indian Ricegrass	8-10"

While many of the ecological sites within the fire perimeter were in moderate to excellent condition, all sites had some degree of infestation from cheatgrass. The introduction of cheatgrass into the Great Basin and Upper Columbia River Basin has upset the ecological balance. Ecological processes such as energy flow, nutrient and hydrologic cycles, and structure and dynamics, result in fauna and flora having been adversely affected. In addition to the ecological implications associated with cheatgrass invasion, the impacts to land uses in the area are also significant (Pellant 1996). Cheatgrass was found by Knapp (1996) to dominate approximately one-fifth of the potential sagebrush-bunchgrass habitat. Secondary succession following disturbance is often caused by damage and destruction from

lagomorphs and rodent grazing (Knapp 1996), resulting in reduced competition for cheatgrass.

In 2007, it was estimated that more than 40 percent of sagebrush systems was is at a moderate to a high risk of becoming dominated by cheatgrass (Suring et al. 2005). Pellant and Hall (1992) considered annual grasses to be dominant and in a monoculture, when they made up 60 percent or more of the species composition by weight. Annual grass dominance alters ecosystem processes (D'Antonio and Vitousek 1992). Once annual grasses becomes dominant on a site, they create a bed of fine fuels, which can cause the fire cycle to increase to as often as every three to five year, perpetuating annual grass dominance and killing native perennial species (Whisenant 1990, Brooks and Pyke 2001, Brooks et al. 2004, Davies and Svejcar 2008, Pellant et al. 2004, Knapp 1996, Chambers et al. 2007) . The biotic communities most at risk to the impacts of the "cheatgrass-wildfire cycle" are the Wyoming big sagebrush and more mesic salt desert shrub plant communities (Peters and Bunting 1994; Pellant 1990). Not only is cheatgrass adapting to new environments, it is now being invaded by other noxious weeds (Pellant 1996). In the western United States, big sagebrush (*Artemisia tridentata*) steppe communities dominate approximately 60 million hectares (148 million acres) and comprise the largest vegetation type (Wambolt and Hoffman 2001). However, due to the invasion of exotic plants, fire has become a driving force in the ecology and management of sagebrush steppe communities. The high variability in cover and density of shrubs indicates the complexity of factors influencing recruitment and establishment of sagebrush from both natural populations and from artificial seeding (Lysne and Pellant 2004). If current sagebrush restoration efforts do not result in a more consistent establishment and persistence of this important shrub, large areas of sagebrush-steppe may be lost, and rehabilitation may no longer be a viable option (West 2000).

As annual species increase in density, the diversity of plant communities and the abundance of native species will decrease (Davies 2011). Following fires, resource availability increases on the site, including an increase in available nitrogen, which annual species are able to utilize quicker than perennial species (Davies et al. 2007, Stubbs and Pyke 2005, Blank et al. 1994, 1996, Monaco et al. 2003, Pellant 1996). This is especially true in the early spring since annual grasses begin actively growing while perennial species are still dormant or just beginning to initial growth (Pellant 1996). The risk of weed invasion increases in relation to increases in available resources (Sheley et al. 1999a, Sheley et al. 1999b, Davis et al. 2000, Svejcar 2003). In areas with Wyoming big sagebrush (low elevations), water availability is often very variable; cheatgrass is able to take grow and reproduce better than perennial species under these conditions (Suring et al. 2005). However, annual grasses are weak competitors against established perennial grasses (Chambers et al. 2007, Davies 2008, Humphrey and Schupp 2004). The establishment of perennial grasses in areas at risk for annual grass invasion, such as Wyoming big sagebrush sites, is essential to ensure ecological processes are maintained and prevent the site from becoming dominated by

annual grasses (Davies 2008, Beyers 2004, Keeley 2004, Hunter et al. 2006, Davies 2008, James et al. 2008, Bates et al. 2005, Davies et al. 2009).

Once annual grasses become established and dominate the site, returning the community to a desirable condition is rarely successful and very expensive (Vitousek et al. 1997, D'Antonio et al. 2001). Research has shown that the success of seedings are often minimal, especially when using native species and at low elevations (Hull 1974, Lysne and Pellant 2004, Mosley et al. 1999, Richards et al. 1998). Desirable native perennial bunchgrass species often have limited availability, are more expensive, and tend to have low establishment rates (Asay et al. 2001, Epanchin-Niell et al. 2009). The higher level of success, competitive ability (Sheley et al. 2001, Wirth and Pyke 2003, Borman et al. 1991, Bottoms and Whitson 1998) and lower costs for desirable non-native species makes its use common, especially in areas at risk of annual grass dominance (Boyd and Davies 2010). In addition, some desirable non-native species go into their dormant phase later in the year than native species, which may help reduce the rate of wildfires (Pellant 1990). Research has found that communities of desirable non-native species have carbon and nitrogen cycling and soil water availability that is comparable to what occurs in native communities (Chen and Stark 2000, Chambers et al. 2007). Research suggests that desirable non-natives in seedings are more likely to become established than native species, possibly due to the competitive ability of the desirable non-native species (Boyd and Davies 2010, Robertson et al. 1966, Hull 1974, Caldwell et al. 1985, Eissenstat and Caldwell 1987). The use of desirable non-native species is a viable option, especially in Wyoming sagebrush communities when the risk of annual grass invasion is high (Asay et al. 2001). The establishment of crested wheatgrass on Wyoming big sagebrush sites is much higher than the establishment of native species (Robertson et al. 1966, Hull 1974, Boyd and Davies 2010). Sheley and Carpinelli (2005) found that when crested wheatgrass and alfalfa were seeded into a community is able to resist invasion better than monocultures. While a fully native community would be the most desirable, transitioning to a native community from a desirable non-native community is much less problematic than transitioning it to a native community from a community dominated by annual grasses since desirable non-native species are able to maintain the ecological processes and soil component needed for the successful restoration of a native community (Cox and Anderson, 2004; Ewel and Putz, 2004). Also, it is uncommon for sagebrush to reestablish in areas dominated by cheatgrass, but research shows that it commonly becomes reestablished in crested wheatgrass stands (Frischknecht and Bleak 1957, McAdoo et al. 1989). Do to the different niches sagebrush and crested wheatgrass use, it is possible for sagebrush to coexist with crested wheatgrass once it becomes established (Gunnell et al. 2010). Clements et al. (2012) found that a seed mix with crested wheatgrass, Sherman big bluegrass, Indian ricegrass, bottlebrush squirreltail, forage kochia, alfalfa, and Wyoming big sagebrush had better establishment success based on number of plants per meter than the seeding crested wheatgrass, Sherman big bluegrass, or bottlebrush squirreltail when seeded alone. In fact, the Sherman big bluegrass and

bottlebrush squirreltail seeding's considered a failure (Clements et al. 2012). Another successful seeding of Clements et al. (2012) was done by seeding crested wheatgrass, bluebunch wheatgrass, forage kochia, and Wyoming sagebrush, where the grass species were drilled and shrub species were broadcast behind the drill. The area were this mix was used has also proven to be useful in stopping adjacent fires from burning through the site (Clements et al. 2012). Evans and Young (1978) found that plots seeded to desirable non-native wheatgrass species had more herbaceous species diversity four years after a wildfire than unseeded control plots. Clements et al. (2012) and Evans and Young (1978) also found that seedling recruitment was highest when seeding occurred in the fall following fire events. Evans and Young (1978) found that seedings must be protected from grazing in order to maximize establishment. Evans and Young (1977) found that in order for perennial vegetation to be maintained in areas with annual grasses, at least three plants per meter squared is needed.

Clements et al. (2012) found that the most efficient rate of imazapic application, for annual grasses, was 6 oz. per acre, as did Johnson and Davies (2011). Vencil (2002) found that the average persistence of imazapic in the soil is four months. Davies and Sheley (2011) found that the use of imazapic, a pre-emergence herbicide, on annual grasses controlled them, which in turn promoted native perennial vegetation. Fall application has been found to provide the best control of annual grasses (Monaco et al. 2005). Due to the differences in phenology, physiology, and the life cycles of annual grasses and perennial grasses, imazapic is able to control the annual grasses while minimizing any negative impacts on native species (Davies and Sheley 2011). Davies and Sheley (2011) also found that imazapic treatments negatively impacted annual forbs, but that the reduction in annual forbs was short-lived and were subsiding by the third growing season following treatment. Davies (2010) found that in areas dominated by annual grasses (medusahead), imazapic treated areas had more perennial bunchgrass cover than control areas untreated areas that were seeded, however, the density was the same at all plots. Elseroad and Rudd (2011) found that the common perennial species on plots treated with imazapic changed in response to the herbicide application over the course of the study, though they recognize that other research has shown imazapic to have some impact on perennial species, though it was generally an acceptable amount that was not damaging in the long run.

The amount and type of fuels on a site will influence the "risk, severity, continuity, and size, and the effectiveness of fire suppression efforts" of wildfire (Davies et al. 2010). In areas that do not receive grazing, the amount of fine fuels that accumulate is greater than on grazed rangelands; the more fine fuels, the larger the risk of wildfire (Davies et al. 2010). Research has shown that fine fuel accumulation as a product of grass production is positively correlated to an increase in fire occurrence and is an important component of fire spread (Miller and Urban 2000), and the reduction of these fuels is important in suppressing fire spread (Blackmore and Vitousek 2000). Livestock grazing removes fine fuels

from communities; therefore, when it is properly managed at moderate levels, it can decrease the risk of wildfires, as well as wildfire intensity and size, by decreasing the continuity of fine fuels, resulting in a decreased risk of annual grass invasion post-fire (Diamond et al. 2009, Davies et al. 2010a, Davies et al. 2009). This is likely due to moderate livestock grazing increasing the tolerance of the herbaceous species to fire, possibly due to the removal of litter from the plants crown which decreases the severity of the fire at the plants growing points (Davies et al. 2009, Davies et al 2010). When fires are of a low severity, they are less likely to result in annual grass invasion into the sagebrush communities (Davies et al. 2008, Davies et al. 2009). While heavy grazing can damage sagebrush communities, research has found that moderate levels of grazing, when it is not grazed during the growing season, do not negatively impact these communities (West et al. 1984, Courtois et al. 2004, Manier and Hobbs 2006). The strategic use of livestock grazing can be used to provide opportunities to "suppress catastrophic wildfires or otherwise limit the spread of such fire events" (Davies et al. 2011). Research has demonstrated that using livestock to strategically graze annual grass communities could decrease the risk of a large, severe fire by reducing fine fuel loads and continuity of fine fuels to a point that fire would not carry across the strategically grazed area (Diamond et al. 2009). In order for Wyoming big sagebrush to remain a dominant component of a community, it is important that there is a long interval between fires (Lesica et al. 2007). Davies et al. (2010) found that areas that are not grazed are "more likely to burn, burn with less patches of unburned within the burn perimeter, and produce fires that would be difficult to suppress." This is what happened in the Miller Homestead Fire. Davies et al. (2009) also determined that fuel reduction may need to occur on sites that are not accumulating fuels above historic levels in order to improve their resilience when impacted by more-severe disturbances.

Livestock has been used to decrease fine fuel loads by the Idaho Fish and Game near Boise, Idaho, by the Idaho BLM, East Bay Regional Park District in San Francisco, California, in the Tahoe and Angeles National Forests in California, as well as in Arizona, New Mexico, and Texas (Davison 1996). Livestock as a tool in biological thinning reduce fuels do to hoof incorporation of fine fuels into the soil, as well as fine fuel reduction due to ingestion (Nadar et al. 2007). Smith et al. (2012), while focused on grazing annual grasses, provides recommendations that would also work when applied to perennial grasses with the goal being fine fuel reduction. The major recommendation in the "Green and Brown" guide is to graze when grazing would not impact the ability of perennial grasses to complete their reproductive cycle; specifically, grazing in the spring prior to perennial species entering the boot stage, and/or in the fall after perennial grasses flower and develop seed (Smith et al. 2012). This works as a treatment for annual grasses while removing fine fuels related to annual grasses, and for fine fuel reduction on perennial species since fine fuels are not a fire hazard until after seed development when the plants become dormant. In order for prescription grazing to be a useful biological thinning tool, it needs to result in damage to target

species (annual grasses) and limit damage to desirable species (Frost and Launchbaugh 2003, Smith et al. 2012)

Environmental Consequences: Upland Vegetation

Effects Common to All Alternatives:

For the purposes of this analysis, the CEAA for upland vegetation is the fire perimeter and the unburned area immediately adjacent to the burn perimeter. Past and present actions, such as those described in Affected Environment, have influenced the existing environment within the CEAA. RFFAs in the CEAA that may contribute to cumulative effects to upland vegetation include livestock grazing, wildlife use, hunting and other recreational pursuits, and wildfire.

Effects Common to All Action Alternatives:

None of the action alternatives allow for permanent changes in the AMPs, however, they all allow for a closure to livestock grazing until objectives are met. All action alternatives were developed by the IDT to assist the burned area in returning to pre-fire conditions. Erosion, both wind and water, are factors that affect all action alternatives.

a. Alternative A: No Action

Under the No Action alternative, no aerial seeding, ground seeding or seedling planting of desirable non-native and native species would occur. Soil stabilization measures would not be implemented leaving valuable top soil vulnerable to the forces of erosion. Wild horses and livestock would be permitted to utilize the burned area preventing desired vegetation from reaching maturity thus providing more available habitat for noxious and invasive weed species. Weeds would not be treated allowing existing infestations to grow and new infestations to establish. The No Action alternative would allow for further degradation within the burn perimeter.

b. Alternative B: Proposed Action

Under the Proposed Action, desirable vegetation would have a greater chance of establishment allowing the area within the burn perimeter to trend back towards pre-fire conditions.

Aerial seeding along the rim would establish native and non-native desirable vegetation in an area difficult to drill seed because of steepness, accessibility and hazards of boulders. This area is directly adjacent to the Malheur Wildlife Refuge which has copious amounts of noxious and invasive weeds, Seeding with native and non-native desirable species

would compete with these weed species and prevent further infestations. Seeding in this area would also stabilize soils prevent valuable top soil from washing down onto the highway as well as prevent rocks and boulders from becoming loose and rolling onto the highway. Reestablishing native and introducing desirable non-native species would provide habitat and food sources to the wildlife in the area. Using forage kochia in the seed mix would improve the likelihood of successful establishment of a desirable plant species that can stabilize the soils and compete with invasive annuals and noxious weeds to help reduce the risk of increased fire frequency (Harrison et al. 2002). By helping break up the fuel source and reduce fire frequency, forage kochia would facilitate the return of native plant communities, which is at higher risk of not occurring in these areas without management intervention.

Ground seeding would provide the same benefits as aerial seeding, however with a greater chance of success for establishment of desirable vegetation. Seeding would occur in those areas of the fire that have the largest infestation of cheatgrass or have the greatest risk of future infestation of noxious and invasive weeds with the expectation that by using an aggressive mix of crested wheatgrass, native and desirable non-native species the cheatgrass would not have an opportunity to become the dominant species within the burn perimeter. Wyoming big sagebrush seed would be added in areas where it had previously existed creating an "island" affect within the drill seeding area from which to provide a seed source for future establishment and wildlife habitat.

Soil stabilization measures such as check dams and sediment fences would prevent valuable seed laden top soil from leaving the site. Native seed persists in the soil and preventing its removal would only increase the establishment rate of native species and prevent the expansion of noxious and invasive weed species.

Temporary fences, gates and cattleguards would prevent livestock and wild horses from utilizing new growth on establishing native and non-native desirable species until objectives are met. While growing conditions would depend mostly on precipitation, preventing unnecessary disturbance, such as livestock and wild horse grazing, until objectives are met would increase success rates for establishment.

Reconstructing damaged guzzlers and pipelines and installing new guzzlers would provide and area of high livestock and wildlife concentration. These areas typically are void of vegetation; however the impact area is less than 1 percent of the total acreage within the burn perimeter and would not adversely affect vegetation as a whole. In the case of reconstructing damaged guzzlers and pipelines, these areas were

previously disturbed therefore impacts to vegetation would not be measurable.

Affects from closures would be similar to installing temporary fence. Removing livestock and wild horses from within the burn perimeter would allow vegetation objectives to be met sooner and prevent the spread of noxious and invasive weed species. Seedling planting of Wyoming big sagebrush would increase establishment rates providing critical habitat for wildlife. Seedlings would be planted using an "island" method with the expectation that these islands would provide a future seed source from the inside out towards the fire perimeter. Planting would occur in areas known to have had established Wyoming big sagebrush stands prior to the fire and were in the vicinity of known sage-grouse leks. This would increase the biodiversity within the fire perimeter and give Wyoming big sagebrush a greater chance at competing with invasive and noxious weeds.

Biological thinning is intended to reduce fine fuels, including annual grasses such as cheatgrass. Biological thinning of cheatgrass prior to native and desirable non-native vegetation meeting objectives would reduce competition from cheatgrass by removing the seed source by preventing germination and spread. Because the thinning would take place following recommendations in the "Green and Brown" guide, impacts to natives and desirable non-natives would be minimal. Reduction in competition from invasive species opens up previously occupied habitats allowing seeded species as well as seed stored in the soil to germinate and establish.

Road maintenance within, and directly adjacent to, the burn perimeter will prevent unnecessary off road travel by keeping vehicle traffic on designated roads thereby protecting fragile, newly establishing vegetation. Road erosion will be prevented by maintaining the roads and preventing loose soils and other debris from washing off roads and onto reestablishing vegetation.

10. Wild Horses

Affected Environment: Wild Horses

Approximately 58,183 acres (12 percent) of the 474,501-acre Warm Springs wild horse and burro HMA were burned in the Miller Homestead Fire. Appropriate management level (AML) for the HMA is a range from 111-178 wild horses and a maximum of 24 burros (111- 202 horses and burros total). The current herd size is estimated at 160 wild horses and burros within the HMA. Warm Springs HMA encompasses two grazing allotments (East Warm Springs and West Warm Springs), with the HMA boundary delineated by perimeter fences. A fence also separates the HMA to provide separate management of the two allotments,

however, horse and burro range is migratory across the HMA based on water availability.

Although the fire burned only 12 percent of the HMA, this portion of the HMA contained five reliable water sources (waterholes and a perennial spring) which supported a high percentage of the Warm Springs wild horse population. Prior to the fire, it is estimated that approximately 50-60 wild horses ranged within or 2-3 miles adjacent to the fire perimeter due to water availability in the area, and horses were observed in these same areas immediately following the fire. The Miller Homestead Fire removed nearly all vegetation which provided necessary forage and cover habitat for wild horses in this area. Burros do not range within or near the fire affected area, therefore, impacts to burros are not measureable and will not be further discussed.

The Miller Homestead Fire also burned approximately 731 acres of the 126,720 acre South Steens HMA. However, the acres burned did not affect South Steens horses as this area is separated from the HMA by two fences and Hwy 205, and horses do not use the area. Therefore, impacts to the management of South Steens HMA would not be measurable and will not be further discussed.

Environmental Consequences: Wild Horses

Effects Common to All Alternatives:

The CEAA for wild horses encompasses the Warm Springs HMA. Past and RFFAs which impact wild horses within the HMA include periodic wild horse gathers to maintain AML, authorized livestock grazing, construction of range improvements, weed treatments, and recreational use in the area. Actions which may contribute to cumulative effects with this project are carried through analysis in the Environmental Consequences for each alternative, and include authorized livestock grazing, construction of range improvements, rehabilitation seedings, and weed treatments.

a. Alternative A: No Action

Under the no action alternative, vegetation within the burned portion of the Warm Springs HMA would be left to recover naturally. Without the seeding of desirable plant species and herbicide treatments, it is expected the invasive annual grass species cheatgrass and medusahead rye would establish and replace native sagebrush steppe plant communities in these areas. Without the construction of temporary fences to relocate horses off of the burned area, horses would preferentially graze new growth of reestablishing herbaceous vegetation beginning the first growing season (spring 2013). Because wild horses develop home ranges around preferred water and foraging habitat, repeated utilization of new regrowth would preclude seed and root development on recovering

herbaceous vegetation. This would further promote the establishment and spread of less desirable annual grass dominated plant communities.

In the short-term (0-5 years), the conversion of these areas to annual grass dominated plant communities would reduce the quantity and quality of forage and cover habitat for wild horses within the HMA. In the long-term (5-10 years) the establishment and spread of invasive annual grass communities may contribute to a shortened fire return interval, which would slow or even prevent the full recovery of sagebrush steppe habitat within the HMA.

Without the maintenance of fire damaged fences around the perimeter of the HMA, wild horses would eventually roam outside of the HMA boundary onto adjacent BLM and private lands, and would be required to be removed or relocated back into the HMA. Without the construction of sediment traps and catchment cleaning, reservoirs and waterholes within the HMA would rapidly fill with sediment the first two years following fire. This would reduce storage capacity of these improvements, therefore reducing the quantity and quality of water available to sustain wild horses.

b. Alternative B: Proposed Action

Under the proposed action, management activities would occur to rehabilitate wild horse habitat within Warm Springs HMA. Aerial and ground based seeding of desirable perennial herbaceous and Wyoming big sagebrush plant species would increase the likelihood of desirable perennial vegetation establishing in areas with the highest risk of conversion to annual grass dominated plant communities. Upon successful establishment, these seeded species would provide more nutritious and palatable forage habitat for wild horses compared to annual grass communities, therefore maintaining or improving carrying capacity for all demands within the HMA. Aerial and ground-based application of effective herbicides would reduce establishment of annual species, therefore improving the likelihood of establishing desired seeded and naturally recovering plant species. Proposed action also includes the construction of approximately 10.5 miles of temporary barbed-wire fence to prevent livestock and wild horse grazing on naturally recovering and seeded plant species within the fire perimeter. Following construction of this fence, any wild horses remaining on the burned area would be likelihood relocated to the unburned portion of the HMA by helicopter driving. Direct impacts to wild horses include the stress associated with being herded out of the burned perimeter. The intensity of these impacts varies by individual, and is indicated by behaviors ranging from nervous agitation to physical distress. When being herded by the helicopter, injuries sustained by wild horses may include bruises, scrapes, or cuts to feet, legs, face, or body from rocks, brush or tree limbs. Rarely, wild horses encounter barbed wire fences and receive wire cuts. The maximum

distance wild horses would be driven out of the burned perimeter would be approximately seven miles.

Once herded to the unburned portion of the HMA, the proposed fence would preclude wild horse and livestock grazing on the burned area until establishment of seeded species and rehabilitation objectives are met. This is anticipated to occur by the third growing season following the fire (spring 2015). Indirect impacts to wild horses include displacement of horses to areas outside of their home range within the HMA. However, once rehabilitation objectives have been achieved, the temporary fence would be removed and wild horses would eventually move back into the project area and establish home ranges equivalent to pre-fire.

The construction of the temporary protection fence would have the indirect effect of separating wild horse from numerous reliable water sources. By being able to haul water, the temporary loss of these water sources would be mitigated.

The proposed aerial and ground-based seeding activities may cause temporary disturbance to wild horses ranging within or immediately adjacent to the treatment areas. The presence of vehicles/aircraft used in seeding could provoke a flight response and temporarily displace horses as they pass by, however these impacts would temporary and horses would return to their preferred ranges once activity subsides.

Biological thinning would reduce fine fuels and help reduce the occurrence of annual grasses. The reduction in fine fuels would decrease the risk of large, habitat destroying wildfires. This would protect the HMA, ensuring that future fires are of a low intensity that would benefit the wild horse habitat not destroy it.

11. Wildlife and Locally Important Species

Affected Environment: Wildlife and Locally Important Species

Collectively, a large amount of wildlife species could utilize suitable habitat on the affected area on a seasonal or yearlong basis. There are many mammal species, and several reptile and amphibian species that can typically be found in sagebrush habitats, grasslands, and riparian areas within the affected area.

The Miller Homestead fire eliminated nearly all wildlife habitats within the perimeter, with the exception of a few small islands of vegetation that did not burn. Wildlife such as mule deer (*Odocoileus hemionus*), pronghorn antelope (*Antilocapra americana*), and other ungulates in the area may utilize these small islands, edges of the burn perimeter, and areas adjacent to water sources in search of forage, but most ungulates were displaced by the nearly complete loss of

vegetation in the burned area. Ungulates and many other generalist and grassland adapted wildlife species would likely be able to return the following spring as grasses and other herbaceous plants quickly recover to provide suitable habitat. Vegetation mortality represents only a temporary loss of cover and forage. A portion of this habitat will re-sprout and/or regenerate from the seed bank. Many wildlife species, including mule deer and pronghorn, will likely gain some temporary benefit from the fires due to increased forage from higher proportions of grass and forb cover in burned areas. Sagebrush vegetation will likely require several decades or more to recover to the point where it once again provides adequate structure and diversity to provide thermal and hiding cover to various wildlife species that once inhabited the area.

The Miller Homestead fire is the dominant factor influencing the affected environment for wildlife species, but other actions have helped shape the existing conditions. Other past and present actions affecting the area include road and fence construction, water developments, power line construction, facility construction, livestock and wild horse grazing, and recreation. Livestock and wild horse grazing are the most widespread and long-term actions occurring within the affected environment; however, both are managed and monitored to facilitate sustainable multiple use, including maintenance of grasses and forbs to provide for wild ungulates and horses on the landscape. Developed water sources are generally beneficial for ungulates and numerous other wildlife species, and may have improved distribution or increased populations of some species in the area. Roads and fences are a potential threat to wildlife species in the area due to collisions or fragmentation of habitat. Density of roads, fences, is relatively low across the project area compared to other areas. Effects of past wildfires, vegetation treatments, and weed control treatments are not as readily apparent since the Miller Homestead fire, but these have also influenced the resiliency of the habitat and its ability to recover from the wildfire.

Mule deer are widespread throughout the fire and surrounding area; approximately 70,485 acres of mule deer habitat burned in the fire. The affected area provided both winter and summer range. The availability of winter range is a critical limiting factor for the affected mule deer herd.

Pronghorn antelope range widely throughout the burned and surrounding area. Because pronghorn antelope winter at lower elevations and the fires generally burned more intensely there, the winter range within the perimeter of fires suffered greater (>50 percent) vegetation mortality. However, burned areas represent a very small proportion of their entire range (including winter range) in the region.

Environmental Consequences: Wildlife and Locally Important Species

Effects Common to All Alternatives:

For the purposes of this analysis, the CEAA for wildlife extends up to 10 miles beyond the fire boundary to encompass regular movements of most animals that may be using the allotment. The total acreage of the burned area plus the CEAA is approximately 820,295 acres. Vegetation in the CEAA is also dominated by sagebrush steppe, although it does encompass some wetland habitat associated with the Malheur National Wildlife Refuge. The CEAA does not incorporate the entire annual use area for some animals, such as pronghorn and mule deer, because this information is not available nor is it expected to change the analysis. Beneficial effects of habitat recovery would increase over time, but would likely require several decades or more to fully recover to conditions present prior to the fire.

Past and present actions and events, such as those described in the Affected Environment, have also influenced the existing environment within the CEAA. Reasonably foreseeable future actions (RFFAs) or events within the CEAA include wild horse use, livestock grazing, weed management, road maintenance, restoration treatments associated with the North Steen Ecosystem Restoration Project, wildfires, and recreation. Several of these are similar to actions and events in the project area, and general effects for most of these are described in the Affected Environment section for Migratory Birds and SSS, and can be found in Table 15. RFFAs that may contribute to cumulative effects with this project are carried through analysis in the Environmental Consequences for each alternative, and include vegetation management associated with the North Steens Ecosystem Restoration project and ongoing District weed treatments.

a. Alternative A: No Action

There would be no actions taken on BLM lands within the burned areas, resulting in no disturbance to wildlife species. With no active, large-scale management intervention, the risk of rapid introduction and spread of noxious weeds and invasive annual grasses would increase. Once these invasives are well established, they start to out-compete native vegetation and dominate small areas then expand into other disturbed areas within the fire perimeter. Eventually, these larger patches start to expand into adjacent unburned habitat, increasing its susceptibility to wildfire occurrence. Plant communities dominated by invasive annual grasses increase the likelihood of more frequent wildfire occurrence, shortening the historic fire return interval. This shortened fire cycle reduces the potential for the area to recover to the shrub steppe habitat it was prior to the fire and achieving later seral stages necessary to provide adequate cover and forage for most wildlife species in the fire area. This plant

community would be unlikely to recover naturally, and would require extensive restoration effort before supporting suitable habitat for wildlife species.

Erosion would occur unabated, and result in even longer time frames required for sagebrush and associated understory plant communities to return to the health and vigor present prior to the fire, resulting in lower diversity and density overall.

Treatments for noxious and other weeds using currently authorized herbicides would still be permitted. The currently authorized herbicides are less effective than the proposed herbicides at targeting specific weed species while minimizing damage to adjacent non-target plants that provide wildlife habitat. None of the currently authorized herbicides is selective for annual grasses, such as medusahead rye and cheatgrass, which are two of the biggest threats to persistence of sagebrush steppe and its associated wildlife community (Hagen 2011).

b. Alternative B: Proposed Action

Aerial seeding (3,500 acres) would not cause ground disturbance and it would not affect existing wildlife habitat (e.g. unburned islands) remaining after the fire. This treatment is expected to stabilize soils and improve burned habitat in areas not suitable for drill seeding. Potential noise and visual disturbance associated with aerial seeding may cause temporary displacement or alter the activity level or behavior of some wildlife species. Disturbance effects would primarily be limited to the treated areas, where planes or helicopters would be flying closest to the ground. Disturbance effects from aerial seeding would be negligible and discountable on wildlife populations due to the relatively small (three percent) amount of area being treated within the burned areas, and the brief (few hours) amount of time required to spread the seed over the landscape. Most wildlife species would return to the area or resume activity once seeding is complete.

Ground seeding (22,912 acres) would occur primarily in lower elevation Wyoming or low sagebrush plant communities with a component or threat of medusahead or cheatgrass.

Fence, gate, and cattle guard maintenance and reconstruction would occur as needed to exclude livestock from the burned area until vegetation objectives are met. This will include approximately 11.4 miles of fencing along the boundary of the fire, 20 miles of new temporary fences to control movement of livestock and wild horses, 38 miles of fencing in the interior of the fire, 2 temporary cattle guards, and an unspecified number of gates as needed. There is the potential for fences to create a collision

hazard to wildlife, but most wildlife species either jump over or go under the fences. The majority of the burned area, including all seeded areas, will be temporarily closed to wild horses (would be relocated after fence maintenance/construction occurred) ,and the entire area would be closed to domestic livestock grazing until vegetation objectives are met. Protection from livestock grazing would help to allow for recovery of affected vegetative communities.

Repair or reconstruction of one spring development and one wildlife guzzler that were damaged or destroyed during the wildfire would occur. Water sources are very important to wildlife in areas of limited water, especially in drought years. Repairing or replacing these facilities will ensure water availability to wildlife in the area. Water troughs in the burned area would be inspected for presence and condition of escape ramps, and non-functioning or missing ramps would be maintained or replaced. Spot maintenance (additional to regularly scheduled maintenance) would likely occur on up to 45 miles of existing roads, but potential impacts would generally be limited to the localized area and only result in temporary displacement or avoidance of the area for some animals during implementation.

Wyoming big sagebrush seedling (plugs) planting will occur on approximately 9,082 acres where sagebrush mortality resulting from the fire occurred. Locations for the plug plantings were selected to maximize the chances of success, and are based on soil survey data, vegetative communities present prior to wildfire, and potential vegetative communities based on ecological site descriptions. Fire kills sagebrush plants and sagebrush seeds in the soil, and suppresses recovery because Basin, Mountain, and Wyoming big sagebrush are not root-sprouting shrubs (Tisdale & Hironaka 1981). Post burn recovery periods for these three big sagebrush taxa can be long because they must reestablish from seed. For example, Baker (2006, 2011) approximated post fire recovery for Mountain big sagebrush at 35–100 or more years and Wyoming big sagebrush at 50–120 years based on a combination of cover and density values from various studies. Planting plugs should jumpstart this recovery effort resulting in less time needed for Wyoming big sagebrush to reach sufficient cover percentages to be useful for wildlife species as both hiding cover and as a food source during the winter season.

This alternative would allow for the use of more selective herbicides that are effective at controlling noxious weeds and invasive annual grasses, while limiting collateral damage to native and desirable non-native plants. Non-target desirable plants may be harmed, but risk would generally be limited to vulnerable (depending on selected herbicide) plants in the immediate treatment area, and have no effect on overall abundance or diversity of wildlife habitat. Application of the proposed herbicides using

Standard Operating Procedures (SOPs) would not only improve the success of the seeding effort, it would help protect native plants that survived the fire. These native plants provide a valuable seed source adapted to the local environment, which further enhances the ability of the native plant community to recover (Leger 2008) and provide a more diverse habitat for wildlife species.

Wildlife may be impacted through direct or indirect contact or ingestion of chemicals or exposed plant, water, or animals. Proposed herbicides have a wider treatment window and would provide more flexibility in timing of treatments to avoid vulnerable periods for wildlife, such as early in the year when many young animals are less mobile. Based on the findings of the Ecological Risk Assessments and following SOPs (Appendix 2), the potential risk to wildlife from ingestion or direct contact is would be negligible, especially at the population level. Discussion and links to Ecological Risk Assessments for the proposed herbicides are available in the Vegetation Treatments Using Herbicides on BLM Lands in Oregon FEIS (Oregon Veg EIS, Appendix 8, pp. 605-608, Appendix 9, pp. 632, 633, 642) and the Vegetation Treatments Using Herbicides Programmatic Final Environmental Impact Statement (chlorsulfuron and imazapic only, National Veg EIS, Appendix C). Imazapic and Chlorsulfuron had risk levels below the Level of Concern (LOC) for all evaluated wildlife under all scenarios (Oregon Veg. FEIS pp. 4-247-250). The risk assessment for clopyralid indicates there is little to no risk to terrestrial animals (SERA 2005, National Veg. EIS p 4-106).

Imazapic: Herbicide treatments using Plateau in the fall at a rate of 6oz/acre would pose no risk to wildlife species (National Veg. FEIS pp. 4-103). Risk quotients for terrestrial wildlife were all below the most conservative LOC of 0.1, indicating that direct spray of Imazapic is not likely to pose a risk to terrestrial animals (National Veg. FEIS pp. 4-105).

Chlorsulfuron: The Vegetation Treatments using Herbicides on BLM Lands in Oregon (FEIS; July 2010) presents information on risks associated with wildlife species in Table 3-14 (Volume 1, pp. 96-97. This Table shows the results of BLM-evaluated herbicide risk categories for wildlife species including small mammals, pollinating insects, fish (pond and stream), aquatic invertebrates (pond and stream), large and small mammalian and avian herbivores, insectivores, and carnivores. The table shows zero risk to any of those categories from chlorsulfuron.

Clopyralid: The Vegetation Treatments using Herbicides on BLM Lands in Oregon (FEIS; July 2010) presents information on risks associated with wildlife species in Table 3-15 (Volume 1, pp. 98-99). This Table shows the results of United States Forest Service (USFS)-evaluated herbicide risk categories for wildlife species including small mammals, pollinating

insects, fish (pond and stream), aquatic invertebrates (pond and stream), large and small mammalian and avian herbivores, insectivores, and carnivores. The table shows zero risk from clopyralid to most categories except for small animals directly sprayed, consumption of contaminated insects by small mammals, and susceptible fish species from a direct spill where the risks were low.

Biological thinning is the reduction of fine fuels by the removal by livestock. When above ground biomass of fine fuels is reduced by 50 percent (includes any reduction by permitted livestock grazing, wild horse use, and wildlife) biological thinning would cease. In areas dominated by annual grasses (80 percent or higher), biological thinning would be allowed to reduce fine fuels by 70 percent. Use of this method would help to control any blooms of invasive species such as cheat grass, and allow for the recruitment of shrubs and sagebrush; reducing the risk of future large scale wildfires, resulting in useable sage brush habitat, while maintaining feed for wildlife species.

Implementation of this alternative would result in maintenance or improvement of more acres of wildlife habitat compared to the No Action Alternative.

Cumulative effects of the proposed action in regards to wildlife species as a whole are expected to be beneficial in the long term (10+ years), with livestock and wild horse grazing not occurring for two years during the growing season. This is expected to allow for the more rapid recovery of the health and vigor of vegetation in burned and seeded areas by allowing plants to spend two growing seasons building root reserves and seed. This would also eliminate potential disturbance from wild horse and livestock grazing and management activities associated with livestock grazing. Other RFFAs that may contribute to cumulative effects include vegetation treatments of the North Steens Ecosystem Restoration Project. Detailed effects of these treatments were analyzed in that Environmental Analysis. The treatments proposed in the North Steens project would help maintain or restore habitat for numerous wildlife species. However, due to the distance from those treatments to the Miller Fire ES&R project and the likely limited movement of most wildlife species between these two areas, the project would not contribute to measurable cumulative effects for most species. Potential exceptions are the larger animals in the area, mule deer and antelope, which may travel between these two areas during their seasonal or annual movements.

Selection of this alternative would actively improve the rate and increase the success of habitat recovery for many wildlife species, but may not contribute cumulatively to the beneficial long-term effects of treatments

associated with the North Steens Ecosystem Restoration project to most wildlife species.

B. Cumulative Effects

As the Council on Environmental Quality (CEQ), in guidance issued on June 24, 2005, points out, the "environmental analysis required under NEPA is forward-looking," and review of past actions is required only "to the extent that this review informs agency decision-making regarding the Proposed Action." Use of information on the effects on past action may be useful in two ways according to the CEQ guidance. One is for consideration of the Proposed Action's cumulative effects, and secondly as a basis for identifying the Proposed Action's effects.

The CEQ stated in this guidance that "[g]enerally, agencies can conduct an adequate cumulative effects analysis by focusing on the current aggregate effects of past actions without delving into the historical details of individual past actions." This is because a description of the current state of the environment inherently includes the effects of past actions. The CEQ guidance specifies that the "CEQ regulations do not require the consideration of the individual effects of all past actions to determine the present effects of past actions." Our information on the current environmental condition is more comprehensive and more accurate for establishing a useful starting point for a cumulative effects analysis, than attempting to establish such a starting point by adding up the described effects of individual past actions to some environmental baseline condition in the past that, unlike current conditions, can no longer be verified by direct examination.

The second area in which the CEQ guidance states that information on past actions may be useful is in "illuminating or predicting the direct and indirect effects of a Proposed Action." The usefulness of such information is limited by the fact that it is anecdotal only, and extrapolation of data from such singular experiences is not generally accepted as a reliable predictor of effects.

However, "experience with and information about past direct and indirect effects of individual past actions" have been found useful in "illuminating or predicting the direct and indirect effects" of the Proposed Action in the following instances: the basis for predicting the effects of the Proposed Action and its alternatives is based on the general accumulated experience of the resource professionals in the agency with similar actions.

The environmental consequences discussion described all expected effects, including direct, indirect, and cumulative, on resources from enacting the proposed alternatives. Direct and indirect effects plus past actions become part of the cumulative effects analysis; therefore, use of these words may not appear. In addition, the Introduction Section of this EA, specifically the Purpose of and Need for Action, identifies past actions creating the current situation.

RFFAs, also relevant to cumulative effects, include those Federal and non-Federal activities not yet undertaken, but sufficiently likely to occur, that a Responsible Official

of ordinary prudence would take such activities into account in reaching a decision. These Federal and non-Federal activities that must be taken into account in the analysis of cumulative impact include, but are not limited to, activities for which there are existing Decisions, funding, or proposals identified by the bureau. These RFFAs must fall within the geographic scope and timeframe of the analysis being prepared. Continued livestock grazing, weed treatments, road maintenance, recreation activities, and wild horse management are all RFFAs. The cumulative effects of these actions were thoroughly addressed throughout Chapter III, by resource, as applicable.

CHAPTER IV: CONSULTATION AND COORDINATION

A. Agencies and Individuals Consulted

Burns Paiute Tribe
Eastern Oregon Agricultural Research Center
Grazing Permittees
Malheur National Wildlife Refuge
Oregon Department of Fish and Wildlife, Hines, Oregon
United States Fish and Wildlife Service, Ecological Services, Bend, Oregon

B. Interdisciplinary Team

Jason Brewer, Wildlife Biologist (SSS-Animals, Migratory Birds, Wildlife)
Andy Daniels, Wildlife Biologist (SSS-Animals, Migratory Birds, Wildlife)
Lindsay Davies, Fisheries and Riparian Specialist (Riparian, Water Quality, Fisheries)
Justin DeCroo, Detailed Rangeland Management Specialist (Grazing)
Eric Haakenson, Outdoor Recreation Planner (Recreation, VRM)
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Rhonda Karges, District Planning and Environmental Coordinator (Social and Economics Values)
Ricky Knox, Rangeland Management Specialist (Grazing)
Tara McLain, Lands and Realty Specialist (Lands and Realty)
Caryn Meinicke, Natural Resource Specialist (Vegetation, Soils, BSCs, SSS-Plants)
Lesley Richman, District Weed Specialist (Noxious Weeds)
Rob Sharp, District Wild Horse Specialist (Wild Horses)
Scott Thomas, Archaeologist (Cultural Heritage)
Autumn Toelle, Rangeland Management Specialist (Lead Preparer, Grazing)
Linda Watts, Weed Specialist (Noxious Weeds)

C. Advisory

Bill Dragt, Supervisory Natural Resource Specialist – Three Rivers R.A.
Stacy Fenton, GIS Specialist
Rhonda Karges, Andrews Resource Area Field Manager
Casey O'Conner, Fuels Specialist
Matt Obradovich, District Biologist

Bill Pieratt, District Rangeland Management Specialist
Jeff Rose, Burns Associate District Manager
Rick Roy, Three Rivers Resource Area Field Manager
Cam Swisher, Supervisory Natural Resource Specialist – Andrews R.A.
Carolyn Temple, Fuels Archaeologist (Cultural Heritage)
Joe Toelle, Engineer

D. References

Adams, B.A., J. Carlson, D. Milner, T. Hood, B. Cairns, and P. Herzog. 2004. Beneficial grazing management practices for Sage-Grouse (*Centrocercus urophasianus*) and ecology of silver sagebrush (*Artemisia cana*) in southeastern Alberta. Technical Report, Public Lands and Forests Division, Alberta Sustainable Resources Development. Pub. No. T/049. 60pp.

Anderson, H.W., M.D. Hoover, and K.G. Reinhart. 1976. Forests and water: effects of forest management on floods, sedimentation, and water supply. General technical report PSW-18. U.S. Department of Agriculture Forest Service, Pacific Southwest Forest and Range Experiment Station, Berkeley, California.

Asay, K.H., Horton, W.H., Jensen, K.B., Palazzo, A.J., 2001. Merits of native and introduced Triticeae grasses on semiarid rangelands. Can. J. Plant Sci. 81, 45–52.

Bailey, R.W., and O.L. Copeland. 1961. Vegetation and engineering structures in flood and erosion control. In Proceedings, 13th Congress, September 1961, Vienna, Austria. International Union of Forest Research Organizations Paper 11-1.

Baker, W.L. 2006. Fire and restoration of sagebrush ecosystems. Wildlife Society Bulletin 34:177–185.

Baker, W.L. 2011. Pre--Euro-American and recent fire in sagebrush ecosystems. Pp 185-202 *in* S.T. Knick and J.W. Connelly (editors). Greater Sage-grouse: ecology and conservation of a landscape species and its habitats eds. 2011. Studies in Avian Biology (Vol. 38), University of California Press, Berkely, CA.

Bates, J.D., Miller, R.F., Svejcar, T.J., 2005. Long-term successional trends following western juniper cutting. Range. Ecol. Manage. 58, 533–541.

Beeson, P. C., S. N. Martens, and D. D. Breshears. 2001. Simulating overland flow following wildfire: mapping vulnerability to landscape disturbance. Hydrological Processes 15:2917-2930.

BLACKMORE, M., AND P. M. VITOUSEK. 2000. Cattle grazing, forest loss, and fuel loading in a dry forest ecosystem at Pu'u Wa'aWa'a Ranch, Hawai'i. Biotropica 32:625–632.

Blank, R. R., F. Allen, and J. A. Young. 1994. Extractable anions in soils following wildfire in a sagebrush-grass community. Soil Science Society of America Journal 58:564–570.

Blank, R. R., F. L. Allen, and J. A. Young. 1996. Influence of simulated burning of soil litter from low sagebrush, squirreltail, cheatgrass, and medusahead sites on water-soluble anions and cations. International Journal of Wildland Fire 6:137–143.

Borman, M.M., W.C. Krueger, and D.E. Johnson. 1991. Effects of established perennial grasses on yields of associated annual weeds. Journal of Range Management 44: 318-326.

Bottoms, R.M., and T.D. Whitson. 1998. A systems approach for the management of Russian knapweed (*Centaurea repens*). Weed Technology 12(2): 363-366.

Boyd, C.S. and K.W. Davies. 2010. Shrub Microsite Influences Post-Fire Perennial Grass Establishment. Rangeland Ecology and Management 63(2):248-252.

Brooks, M.L. and D.A. Pyke. 2001. Invasive plants and fire in the deserts of North America. Pages 1-14 *in* K.E.M. Galley and T.P. Wilson, editors. Proceedings of the invasive species workshop: the role of fire in the control and spread of invasive species. Fire conference 2000: the First National Congress on Fire Ecology, Prevention, and Management. Miscellaneous Publication No. 11, Tall Timbers Research Station, Tallahassee, Florida, USA.

Brooks ML, D'Antonio CM, Richardson DM, Grace JB, Keeley JE, DiTomaso JM, Hobbs RJ, Pellant M, Pyke D (2004) Effects of invasive alien plants on fire regimes. Bioscience 54:677–688.

Burrows, D. W., and B. Butler. 2001. Managing livestock to protect the aquatic resources of the Burdekin Catchment, North Queensland. Pages 95-101 in I. Rutherford, E. Sheldon, G. Brierley, and C. Kenyon, editors. The value of healthy streams. Proceedings of the Third Australian Stream Management Conference, Brisbane, Australia.

CALDWELL, M. M., D. M. EISSENSTAT, J. H. RICHARDS, AND M. F. ALLEN. 1985. Competition for phosphorus: differential uptake from dual-isotope-labeled soil interspaces between shrub and grass. Science 229:384–386.

Carver, E., and J. Caudill. 2007. *Banking on Nature 2006: The Economic Benefits to Local Communities of National Wildlife Refuge Visitation.* Division of Economics, U.S. Fish and Wildlife Service, Washington DC.

Chambers J.C., Roundy B.A., Blank R.R., Meyer SE, Whittaker A (2007) What makes Great Basin sagebrush ecosystems invasible by Bromus tectorum? Ecological Monographs 77:114–145.

Chen, J., Stark, J.M., 2000. Plant species effects and carbon and nitrogen cycling in a sagebrush-crested wheatgrass soil. Soil Biol. Biochem. 32, 47–57.

Clements, C.D., J.A. Young, D.N. Harmon, and M. Weltz. 2012. Research to Practical Use: On-the-Ground Successes. Rangelands 34(4):54-60.

Connelly, J. W., S. T. Knick, M. A. Schroeder, and S. J. Stiver. 2004. Conservation Assessment of Greater Sage-grouse and Sagebrush Habitats. Western Association of Fish and Wildlife Agencies. Unpublished Report. Cheyenne, Wyoming.

Courtois, D.R., Perryman, B.L., Hussein, H.S., 2004. Vegetation change after 65 years of grazing and grazing exclusion. J. Range Manage. 57, 574–582.

Cox, R.D., Anderson, V.J., 2004. Increasing native diversity of cheatgrass-dominated rangeland through assisted succession. J. Range Manage. 57, 203–210.

D'Antonio, C.M. and P.M. Vitousek. 1992. Biological invasions by exotic grasses, the grass/fire cycle, and global change. Annual Review of Ecology and Systematics 23:63-87.

D'Antonio, C.M., Levine, J., Thomsen, M., 2001. Ecosystem resistance to invasion and the role of propagule supply: a California perspective. J. Mediter. Ecol. 2, 233–245.

Davies, K.W., J.D. Bates, and R.F. Miller. 2007. Short-Term Effects of Burning Wyoming Big Sagebrush Steppe in Southeast Oregon. Rangeland Ecology and Management 60:515-522.

Davies, K.W. 2008 Medusahead dispersal and establishment in sagebrush steppe plant communities. Rangeland Ecology and Management 61:110–115.

Davies KW, Svejcar TJ (2008) Comparison of medusahead-invaded and noninvaded Wyoming big sagebrush steppe in southeastern Oregon. Rangeland Ecology and Management 61:623–629.

Davies, K.W., Sheley, R.L., Bates, J.D., 2008. Does prescribed fall burning Artemisia tridentata steppe promote invasion or resistance to invasion after a recovery period? J. Arid. Environ. 72, 1076–1085.

Davies, K. W., T. J. Svejcar, and J.D. Bates. 2009. Interaction of historical and nonhistorical disturbances maintains native plant communities. Ecological Applications 19(6): 1536-1545.

Davies, K.W. 2010. Revegetation of Medusahead-Invaded Sagebrush Steppe. Rangeland Ecology and Management 63(5): 564-571.

Davies, K.W., J.D. Bates, T.J. Svejcar, and C.S. Boyd. 2010. *Effects of Long-Term Livestock Grazing on Fuel Characteristics in Rangelands: An Example from the Sagebrush Steppe*. Rangeland Ecology and Management 63(6):662-669.

Davies, K.W. 2011. Plant community diversity and native plant abundance decline with increasing abundance of an exotic annual grass. Oecologia 167:481-491.

Davies, K.W., C.S. Boyd, J.L. Beck, J.D. Bates, T.J. Svejcar, and M.A. Gregg. 2011. Saving the Sagebrush Sea: An ecosystem conservation plan for big sagebrush plant communities. Biological Conservation 144:2573-2584.

Davies, K.W., and R.L. Sheley. 2011. Promoting Native Vegetation and Diversity in Exotic Annual Grass Infestations. Restoration Ecology 19(2): 159-165.

DAVIS, M. A., J. P. GRIME, AND K. THOMASON. 2000. Fluctuating resources in plant communities: a general theory of invisibility. Journal of Ecology 88:528–534.

Davison, J. 1996. Livestock Grazing in Wildland Fuel Management Programs. Rangelands 18(6): 242-245.

Diamond, J.M., Call, C.A., Devoe, N., 2009. Effects of targeted cattle grazing on fire behavior of cheatgrass-dominated rangeland in the northern Great Basin, USA. Int. J. Wildland Fire 18, 944–950.

EISSENSTAT, D. M., AND M. M. CALDWELL. 1987. Characteristics of successful competitors: an evaluation of potential growth rate in two cold desert tussock grasses. Oecologia 71:167–173.

Elseroad, A.C., and N.T. Rudd. 2011. Can Imazapic Increase Native Species Abundance in Cheatgrass (*Bromus tectorum*) Invaded Native Plant Communities? Rangeland Ecology and Management 64(4): 641-648.

Environmental Protection Agency. 2009. Inventory of U.S. Greenhouse Gas Emissions and Sinks: 1990 – 2007. U.S. EPA, Washington, D.C.

Epanchin-Niell, R., Englin, J., Nalle, D., 2009. Investing in rangeland restoration in the Arid West, USA: countering the effects of an invasive weed on the long-term fire cycle. J. Environ. Manage. 91, 370–379.

Evans, R. A.; Young, J. A. 1977. Weed control-revegetation systems for big sagebrush-downy brome rangelands. J. Range Manage. 30:331-336.

Evans, R.A., and J.A. Young. 1978. Effectiveness of rehabilitation practices following wildfire in a degraded big sagebrush-downy brome community. Journal of Range Management 31:185-188.

Ewel, J.J., Putz, F.E., 2004. A place for alien species in ecosystem restoration. Frontiers Ecol. Environ. 2, 354–360.

Federal Register 75:55 (March 23, 2010). 12-Month Findings for Petitions to List the Greater Sage-Grouse (*Centrocercus urophasianus*) as Threatened or Endangered. pp. 13910-14014.

Forster, P. et al. 2007. Changes in Atmospheric Constituents and in Radiative Forcing. In: Climate Change 2007: The Physical Science Basis. Contribution of Working Group I to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change [Solomon, S., D. Qin, M. Manning, Z. Chen, M. Marquis, K.B. Averyt, M. Tignor and H.L. Miller (eds.)]. Cambridge University Press, Cambridge, United Kingdom and New York, NY, USA.

Frischknecht, N.C., 1968. Factors influencing halogeton invasion of crested wheatgrass range. J. Range Manage. 21, 8–12.

Frost, R.A., and K.L. Launchbaugh. 2003. Prescription grazing for Rangeland Weed Management: A New Look at an Old Tool. Rangelands 25(6): 43-47.

Gunnell, K.L., Monaco, T.A., Call, C.A., Ransom, C.V., 2010. Seedling interference and niche differentiation between crested wheatgrass and contrasting native Great Basin species. Range. Ecol. Manage. 63, 443–449.

Hagen, C.A. 2011. *Greater sage-grouse conservation assessment and strategy for Oregon: a plan to maintain and enhance populations and habitat*. Oregon Department of Fish and Wildlife, Salem, USA.

Hull, A.C. 1974. Species for seeding arid rangeland in southern Idaho. Journal of Range Management 27:216–218.

Humphrey LE, Schupp EW (2004) Competition as a barrier to establishment of a native perennial grass (Elymus elymoides) in alien annual grass (Bromus tectorum) communities. Journal of Arid Environments 58:405–422.

Johansen, M. P., T. E. Hakonson, and D. D. Breshears. 2001. Post-fire runoff and erosion from rainfall simulation: contrasting forest with shrublands and grasslands. Hydrological Processes 15:2953-2965.

Johnson, D.E., M. Louhaichi, M. Carpinelli and D. Thomas. 2007. Impacts of Medusahead Wildrye Control upon Associated Native Plants. Final Report, USDI BLM contract number OSU-HAA013001. Department of Rangeland Ecology and

Management, 202 Strand Agriculture Hall, Oregon State University, Corvallis, OR. USA 16pp.

Johnson, D.D., and K.W. Davies. 2011. Revegetating Sagebrush Rangelands Invaded by Medusahead. Oregon Beef Council Report BEEF073. Oregon State University.

Knapp, S.T., 1996. Cheatgrass (Bromus tectorum L.) dominance in the Great Basin Desert: history, persistence, and influences to human activities. Global Environ. Change 6, 37-52.

Knick, S.T., and J.W. Connelly (editors). 2011. Greater Sage-Grouse: Ecology and conservation of a landscape species and its habitats. Studies in Avian Biology Series (vol. 38), University of California Press, Berkeley, CA.

Leger, E.A. 2008. The adaptive value of remnant native plants in invaded communities: an example from the Great Basin. Ecological Applications 18(5):1226-1235.

Lesica, P., S.V. Cooper, and G. Kudray. 2007. Recovery of Big Sagebrush Following Fire in Southwest Montana. Rangeland Ecology and Management 60(3):261-269.

Ludwig, J.A., B.P. Wilcox, D.D. Breshears, D.J. Tongway, and A.C. Imeson. 2005. Vegetation Patches and Runoff-Erosion as Interacting Ecohydrological Processes in Semiarid Landscapes. Ecology 86(2): 288-297.

Lysne CR, Pellant M (2004) Establishment of aerially seeded big sagebrush following southern Idaho wildfires. Department of the Interior, Bureau of Land Management, Technical Bulletin 2004-01, Boise, ID.

Manier, D.J., Hobbs, N.T., 2006. Large herbivores influence the composition and diversity of shrub-steppe communities in the Rocky Mountains, USA. Oecologia 146, 641–651.

McAdoo, J.K., Longland, W.S., Evans, R.A., 1989. Nongame bird community responses to sagebrush invasion of crested wheatgrass seedings. J. Wildl. Manage. 53, 494–502.

Miles, S.R., D.M. Haskins, and D.W. Ranken. 1989. Emergency burn rehabilitation: cost, risk, and effectiveness. Pages 97-102 *in* N.H. Berg, technical coordinator. Proceedings of the symposium on fire and watershed management. General technical report PSW-GTR-109. U.S. Department of Agriculture Forest Service, Pacific Southwest Forest and Range Experiment Station, Berkeley, California.

MILLER, C., AND D. L. URBAN. 2000. Connectivity of forest fuels and surface fire regimes. Landscape Ecology 15:145–154.

Monaco, T. A., D. A. Johnson, J. M. Norton, T. A. Jones, K. J. Connors, J. B. Norton, and M. B. Redinbaugh. 2003. Contrasting responses of Intermountain West grasses to soil nitrogen. Journal of Range Management 56:289–290.

Monaco, T. A., T. M. Osmond, and S. A. Dewey. 2005. Medusahead control with fall- and spring-applied herbicides on Northern Utah foothills. Weed Technol. 19:653–658.

Mosley JC, Bunting SC, Manoukian ME (1999) Cheatgrass. In: Sheley RL, Petroff JK (eds) Biology and management of noxious rangeland weeds. Oregon State University Press, Corvallis Richards RT, Chambers JC, Ross C (1998) Use of native plants on federal lands: policy and practice. Journal of Range Management 51:625–632.

Nader, G., Z. Henkin, E. Smith, R. Ingram and N. Narvaez. 2007. Planned Herbivory in the Management of Wildfire Fuels. Rangelands 29(5): 18-24.

Pellant, M., 1990. The cheatgrass–wildfire cycle-are there any solutions? In: McArthur, E.D., Romney, E.M., Smith, S.D., Tueller, P.T. (Comps.), Proceedings-Symposium on Cheatgrass Invasion, Shrub Die-off, and Other Aspects of Shrub Biology and Management, 5–7 April 1989, Las Vegas, NV. Gen. Tech. Rep. INT-276. USDA Forest Service, Intermountain Research Station, Ogden, UT, pp. 11–18.

Pellant, M., and C. Hall. 1992. Distribution of two exotic grasses on intermountain rangelands: Status in 1992. *In*: S.B. Monsen, *op cit*, Ref 24, pp 109-112.

Pellant, M. 1996. Cheatgrass: The Invader that won the West. Interior Columbia Basin Ecosystem Management Project. Bureau of Land Management, Idaho State Office, Boise, Idaho.

Pellant M, Abbey B, Karl S (2004) Restoring the Great Basin desert, U.S.A.: integrating science, management and people. Environmental Monitoring and Assessment 99:169–179.

Ponzetti, J.M. and B.P. McCune. 2001. *Biotic Soil Crusts of Oregon's Shrub Steppe: Community of Composition in Relation to Soil Chemistry, Climate, and Livestock Activity.* The Bryologist 104(2):212-225.

PRISM Group. 2012. Data Explorer (Miller Homestead Fire, Oregon). Available online at http://prismmap.nacse.org/nn/. Accessed 8 August 2012.

Richards, R.T., J.C. Chambers, and C. Ross. 1998. Use of native plants on federal lands: policy and practice. Journal of Range Management 51:625-632.

Rice, R.M., R.P. Crouse, and E.S. Corbett. 1965. Emergency measures to control erosion after a fire on the San Dimas Experimental Forest. Pages 123-130 in Proceedings of the federal inter-agency sedimentation conference. Miscellaneous publication 970. U.S. Department of Agriculture, Washington D.C.

ROBERTSON, J. H., R. E. ECKERT, AND A. T. BLEAK. 1966. Response of grasses seeded in an Artemisia tridentata habitat in Nevada. Ecology 47:187–194.

Schlesinger, W. H., T. J. Ward, and J. Anderson. 2000. Nutrient losses in runoff from grassland and shrubland habitats in southern New Mexico: II. Field plots. Biogeochemistry 49:69-86.

SHELEY, R. L., S. KEDZIE-WEBB, AND B. D. MAXWELL. 1999a. Integrated weed management on rangeland. In: R. Sheley and J. Petroff [EDS.]. Biology and management of noxious rangeland weeds. Corvallis, OR: Oregon State University Press. p. 57–68.

SHELEY, R., M.MANOUKIAN, AND G. MARKS. 1999b. Preventing noxious weed invasion. In: R. Sheley and J. Petroff [EDS.]. Biology and management of noxious rangeland weeds. Corvallis, OR: Oregon State University Press. p. 69–72.

Sheley, R.L., J.S. Jacobs, and D.E. Lucas. 2001. Revegetating spotted knapweed infested rangeland in a single entry. Journal of Range Management 54:144-151.

Sheley, R.L., and M.F. Carpinelli. 2005. Creating Weed-Resistant Plant Communities Using Niche-Differentiated Nonnative Species. Rangeland Ecology and Management 58(5): 480-488.

Smith, B.S., Sheley, R.L., Svejcar, A.J. 2012. Grazing invasive annual grasses: the green and brown guide. Agricultural Research Service Publication. 36 p.

Soil Survey Staff, Natural Resources Conservation Service, United States Department of Agriculture. Web Soil Survey. Available online at http://websoilsurvey.nrcs.usda.gov/. Accessed 30 July 2012.

Stevens, B. S., K. P. Reese, and J. W. Connelly. 2010. Impacts of Fences on Greater Sagegrouse in Idaho: Collision, Mitigation, and Spatial Ecology. Thesis Research Progress Report. Unpublished.

Stubbs, M. M., and D. A. Pyke. 2005. Available nitrogen: a time-based study of manipulated resource islands. Plant and Soil 270:123–133.

Suring, L.H., M.J. Wisdom, R.J. Tausch, R.F. Miller, M.M. Rowland, L. Schueck, and C.W. Meinke. 2005. Modeling threats to sagebrush and other shrubland communities. Pages 114-149 *in* M.J. Wisdom, M.M. Rowland, and L.H. Suring,

editors. Habitat threats in the sagebrush ecosystems: methods of regional assessment and applications in the Great Basin. Alliance Communications Group, Lawrence, Kansas, USA.

SVEJCAR, T. 2003. Applying ecological principles to wildland weed management. Weed Science 51:266–270.

Tisdale, E.W. and M. Hironaka. 1981. The sagebrush-grass region: a review of the ecological literature. Idaho Forest, Range, and Wildlife Experimental Station. Bulletin No. 33. University of Idaho, Moscow. 31pp.

Tongway, D. J., and J. A. Ludwig. 1997. The conservation of water and nutrients within landscapes. Pages 13-22 in J. A. Ludwig, D. J. Tongway, D. O. Freudenberger, J. C. Noble, and K. C. Hodgkinson, editors. Landscape ecology, function and management: principles from Australia's rangelands. CSIRO Publishing, Melbourne, Australia.

Townsend, S. A., and M. M. Douglas. 2000. The effect of three fire regimes on stream water quality, water yield and export coefficients in a tropical savanna (northern Australia). Journal of Hydrology 229:118-137.

USFWS. 2008. Birds of Conservation Concern 2008. United States Department of Interior, Fish and Wildlife Service, Division of Migratory Bird Management, Arlington, Virginia. 85 pp.

Vencill, W.K. ed. 2002. Herbicide Handbook. 8th ed. Lawrence, KS: Weed Science Society of America. Pp. 249-250.

Verts, B.J. and L.N. Carraway. 1998. Land Mammals of Oregon. University of California Press, Berkeley and Los Angeles, California.

Vitousek, P.M., D´ Antonio, C.M., Loope, L.L., Rejmanek, M., Westbrooks, R., 1997b. Introduced species: a significant component of human-caused global change. N. Z. J. Ecol. 21, 1–16.

Weiss, N.T. and B.J. Verts. 1984. Habitat and distribution of pygmy rabbits (*Sylvilagus idahoensis*) in Oregon. Great Basin Naturalist. 44(4):563-571.

West, N.E., Provenza, F.D., Johnson, P.S., Owens, M.K., 1984. Vegetation change after 13 years of livestock grazing exclusion on sagebrush semidesert in west central Utah. J. Range Manage. 37, 262–264.

Whisenant, S.G. 1990 Changing fire frequencies on Idaho's Snake River Plains: Ecological and management implications. Pages 4-10 *in* E.D. McArthur, E.M. Romney, S.D. Smith, and P.T. Tueller, compliers. Proceedings: symposium on

cheatgrass invasion, shrub die-off and other aspects of shrub biology and management. USDA General Technical Report INT-276, Ogden, Utah, USA.

Wilcox, B. P., and D. D. Breshears. 1995. Hydrology and ecology of pinyon-juniper woodlands: conceptual frame-work and field studies. Pages 109-119 in Desired future conditions for pinyon-juniper ecosystems. USDA Forest Service, Rocky Mountain Forest and Range Experiment Station, Flagstaff, Arizona, USA.

Wilcox, B. P., D. D. Breshears, and C. D. Allen. 2003. Eco-hydrology of a resource-conserving semiarid woodland: effects of scaling and disturbance. Ecological Monographs 73:223-239.

Wirth, T.A., and D.A. Pyke. 2003. Restoring forbs for sage-grouse habitat: fire, microsites, and establishment methods. Restoration Ecology 11:370-377.

___1984. BLM. Utilization Study: Height-Weight Method. Technical Reference TR-4400-3.

___ 1988. BLM. *Rangeland Monitoring Handbook H-1734-2*. Oregon State Office, Portland, Oregon.

___ 1992. BLM. *Three Rivers Resource Management Plan, Record of Decision, and Rangeland Program Summary.* Burns District Bureau of Land Management.

___ 1997. BLM. *Standards for Rangeland Health and Guidelines for Livestock Grazing Management for Public Lands in Oregon and Washington.*

___ 1998. BLM. *Noxious Weed Management Program EA #OR-020-98-05.* Burns District Office.

___ 2001. BLM, USGS. TR-1730-2. *Biological Soil Crusts: Ecology and Management*. USDI, BLM Technical Reference.

___ 2004. BLM. *Andrews Management Unit and Steens Mountain Cooperative Management and Protection Area Proposed Resource Management Plan and Final Environmental Impact Statement.* Burns District BLM.

___ 2005. BLM. *Andrews Management Unit and Steens Mountain Cooperative Management and Protection Area Record of Decisions and Resource Management Plans.* Burns District BLM.

___2007. *Programmatic Environmental Impact Statement Vegetation Treatments Using Herbicides on Bureau of Land Management Lands in 17 Western States,* USDI , BLM, Washington Office, Washington, D.C.

___2010. BLM. Chalk Hills AMP/EA. Burns District.

___ 2011. *Final Environmental Impact Statement Vegetation Treatments Using Herbicides on BLM Lands in Oregon*, USDI, BLM, Oregon State Office.

___2011. BLM. Cottonweed Creek AMP/EA. Burns District.

___2011. BLM. Cluster AMP/EA. Burns District.

___2012. BLM. Miller Homestead Post-Fire Recovery Plan for Emergency Stabilization and Burned Area Rehabilitation. Burns District.

APPENDIX A
Maps

Map 1 – Burns District Boundary A-2
Map 2 – Fire Growth July 8, 2012 to July 13, 2012 ..... A-3
Map 3 – Surface Jurisdiction A-4
Map 4 – General Vegetation A-5
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Map 6 – Ecological Sites A-7
Map 7 – Drill Seeding and Sagebrush Planting A-8
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Map 10 – Projected Weed Treatment Areas A-11
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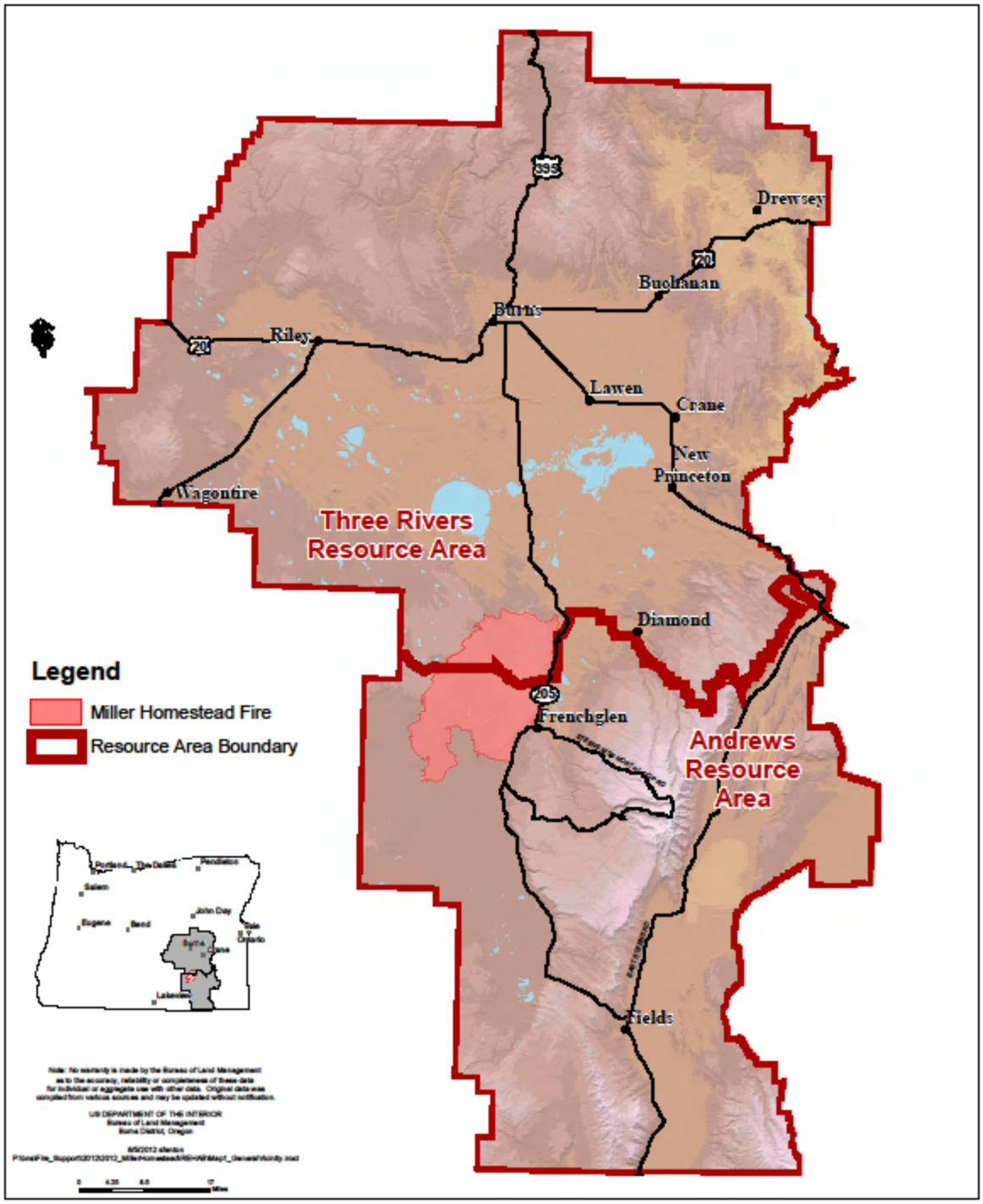
Map 12 – Known Weed Infestation Areas A-13

Map 1

Burns District Boundary

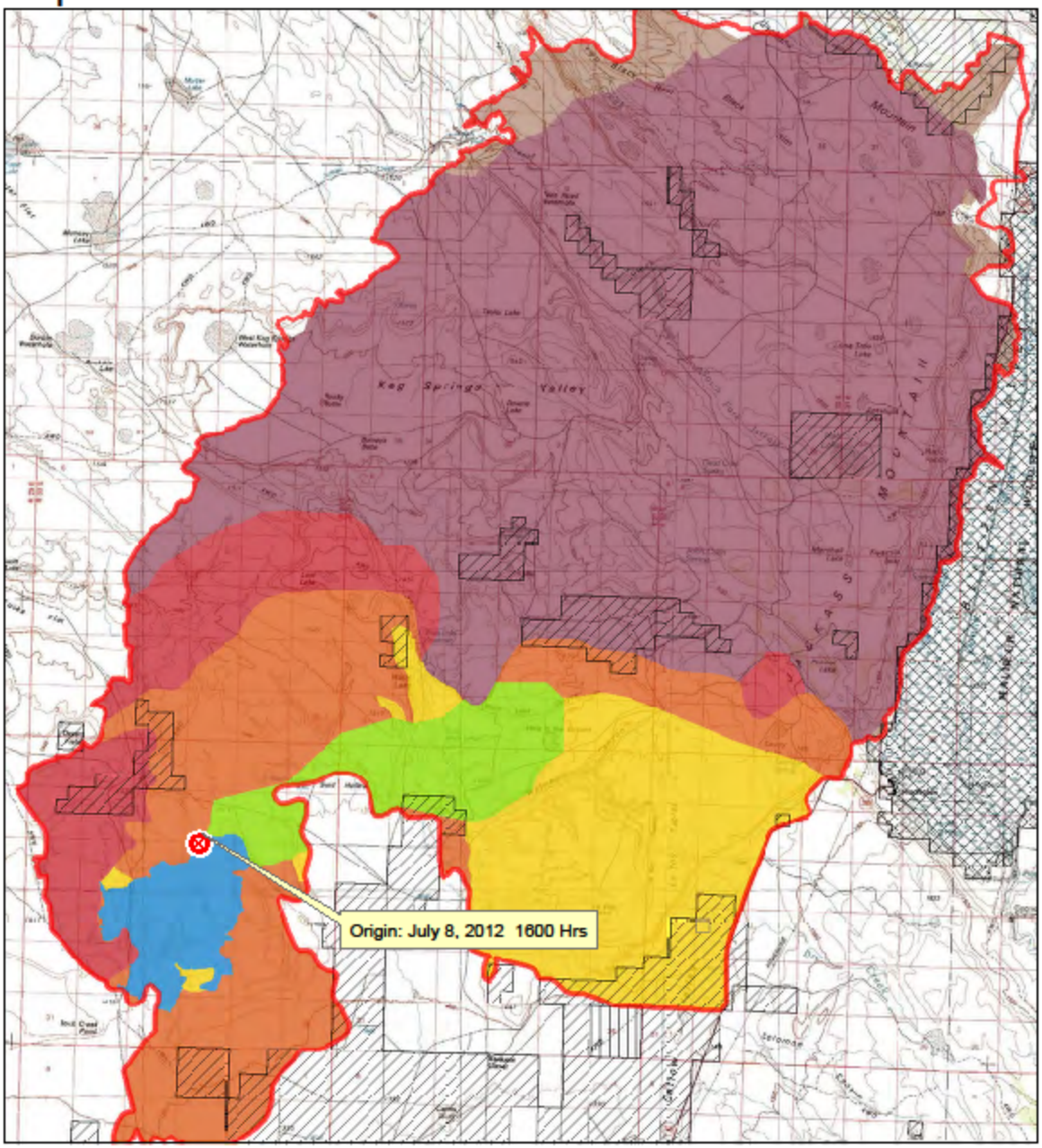
MILLER HOMESTEAD ESR



Fire Growth July 8, 2012 to July 13, 2012

Map 2

MILLER HOMESTEAD ESR



Final Fire Perimeter
July 8, 2012
July 9, 2012
July 10, 2012
July 11, 2012
July 12 -A.M., 2012
July 12 -P.M., 2012
July 13, 2012

Land Status
Bureau of Land Management
Private
State Agency
U.S. Fish and Wildlife Service

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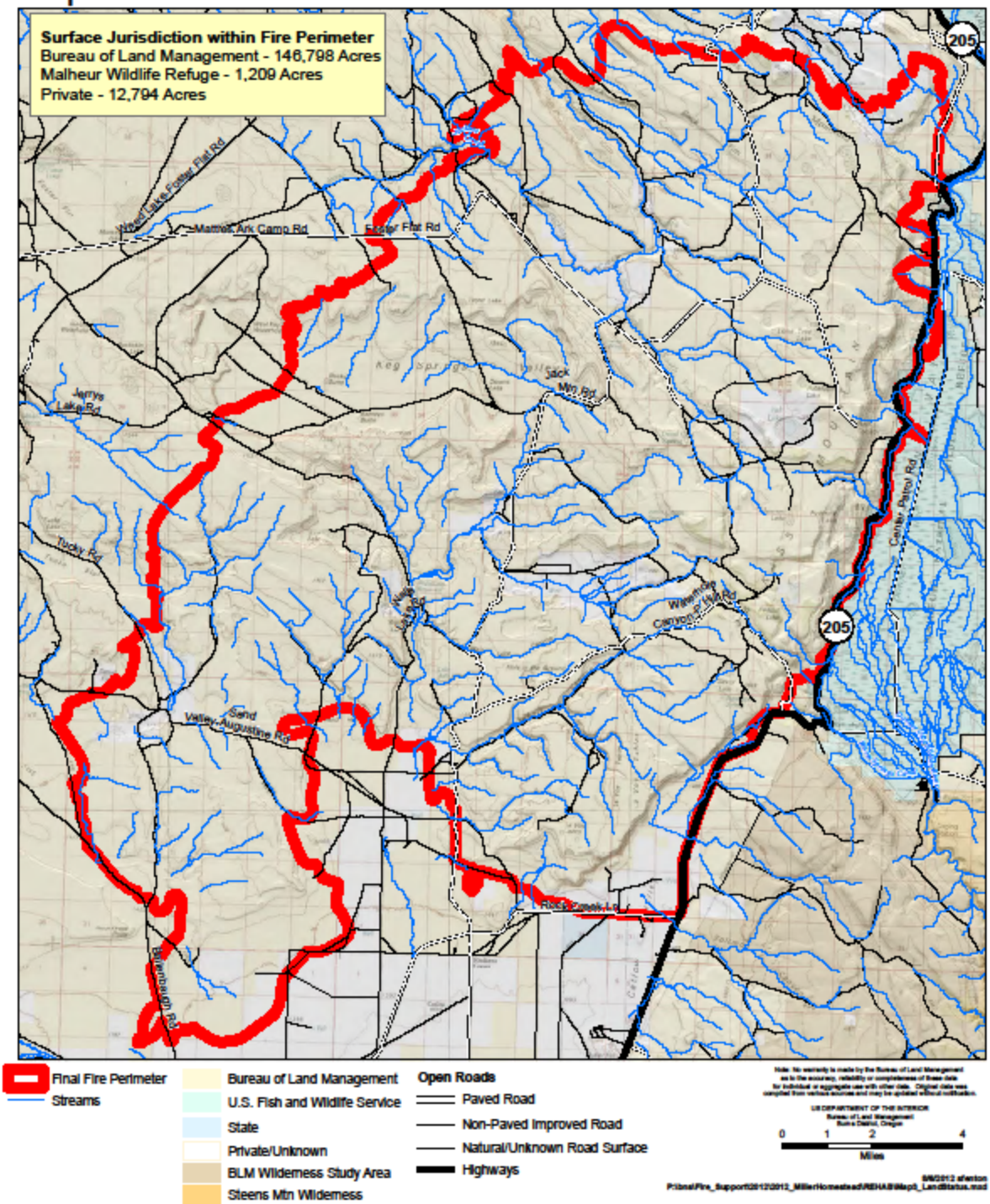
Miles

Surface Jurisdiction

MILLER HOMESTEAD ESR

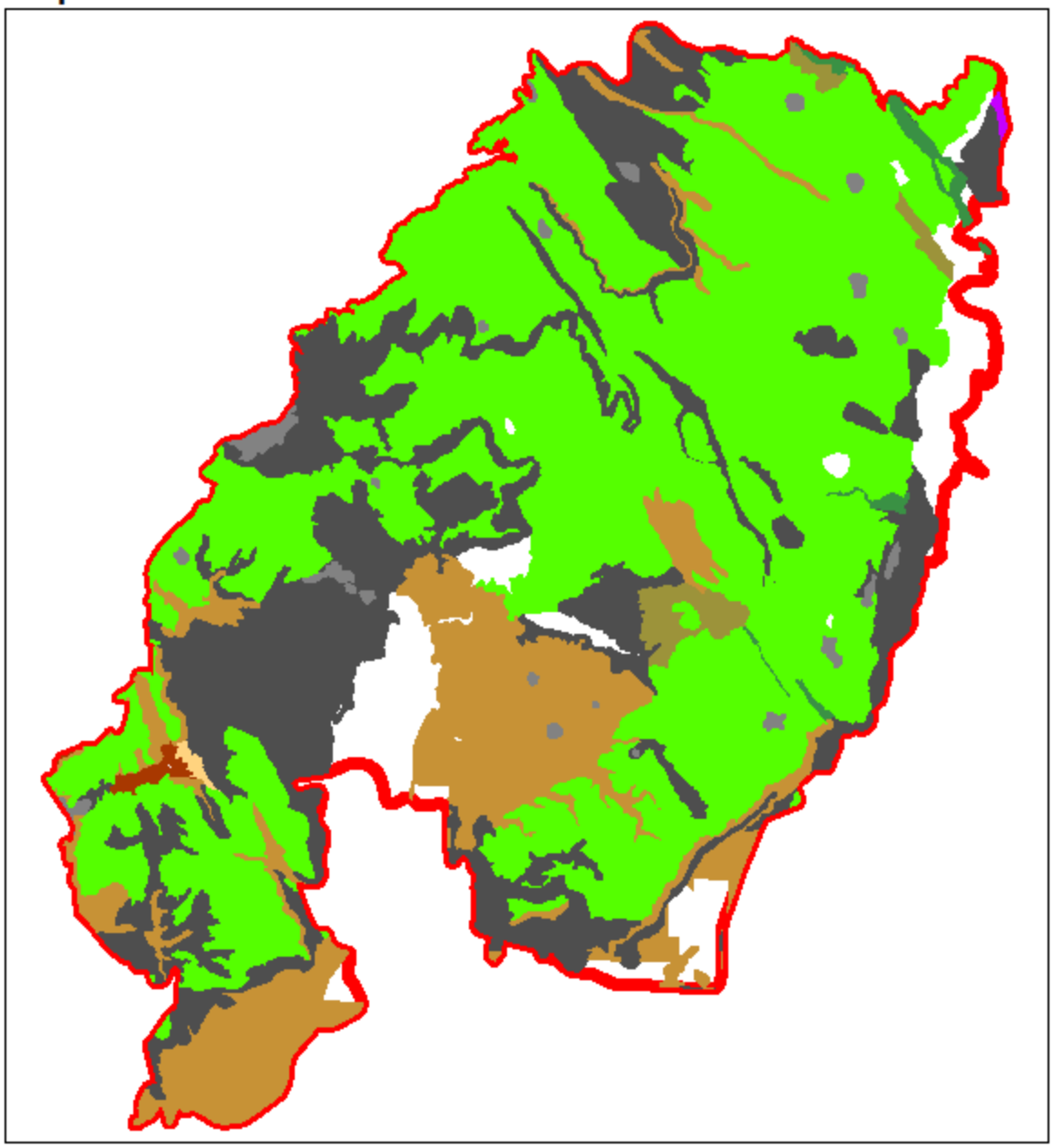
Map 3



Map 4

General Vegetation

MILLER HOMESTEAD ESR



Final Fire Perimeter
Big Sagebrush/Annual Grassland
Big Sagebrush/Crested Wheatgrass
Big Sagebrush/Perennial Grassland
Crested Wheatgrass
Juniper/Big Sagebrush
Juniper/Low Sagebrush
Low Sagebrush/Grassland
Rabbitbrush/Grassland
Silver Sagebrush/Grassland
Unassigned

Note: No warranty is made by the Bureau of Land Management as to the accuracy, reliability or completeness of these data for individual or aggregate use with other data. Original data was compiled from various sources and may be updated without notification.

US DEPARTMENT OF THE INTERIOR
Bureau of Land Management
Burns District, Oregon

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Miles

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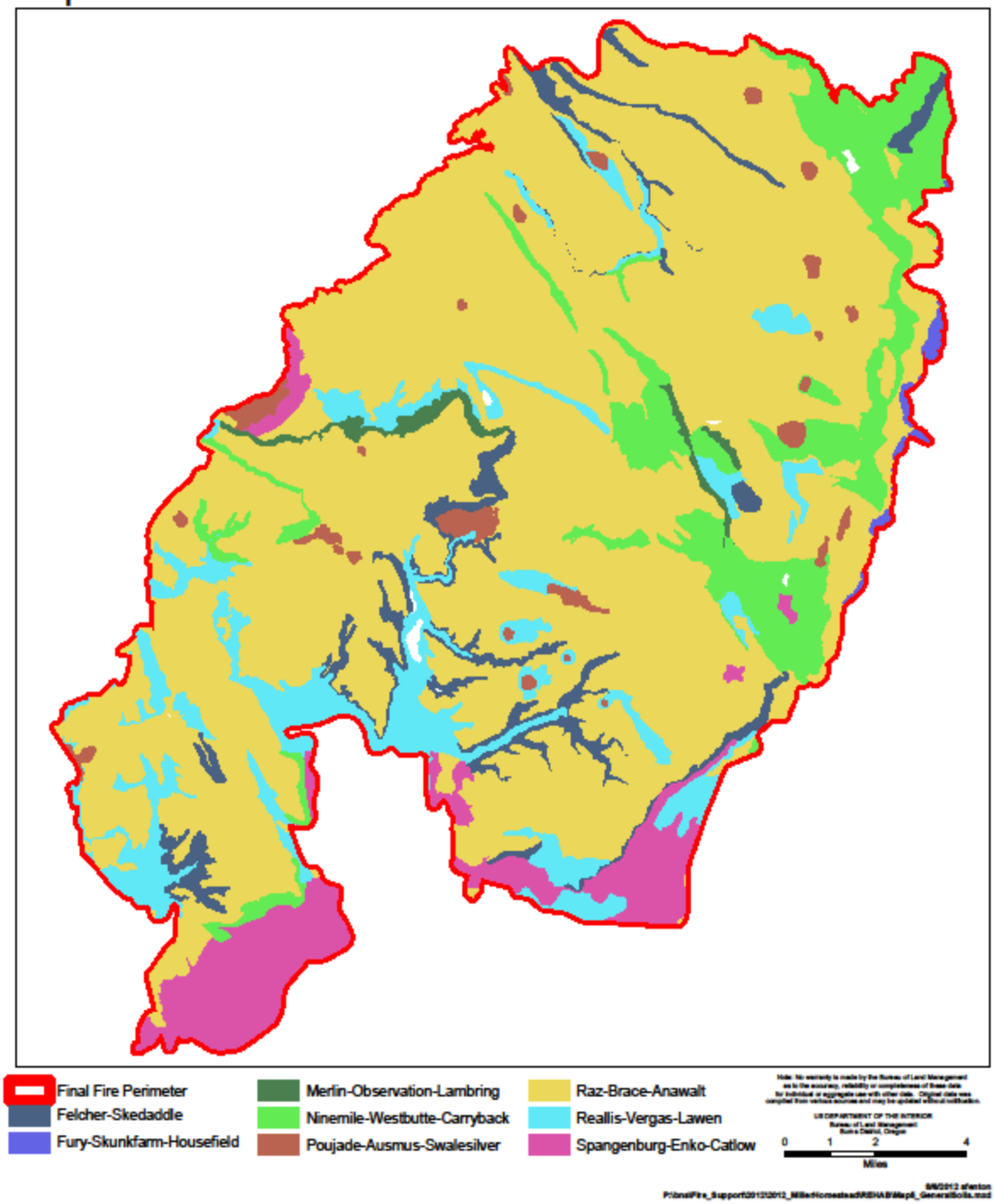
Map 5

General Soils

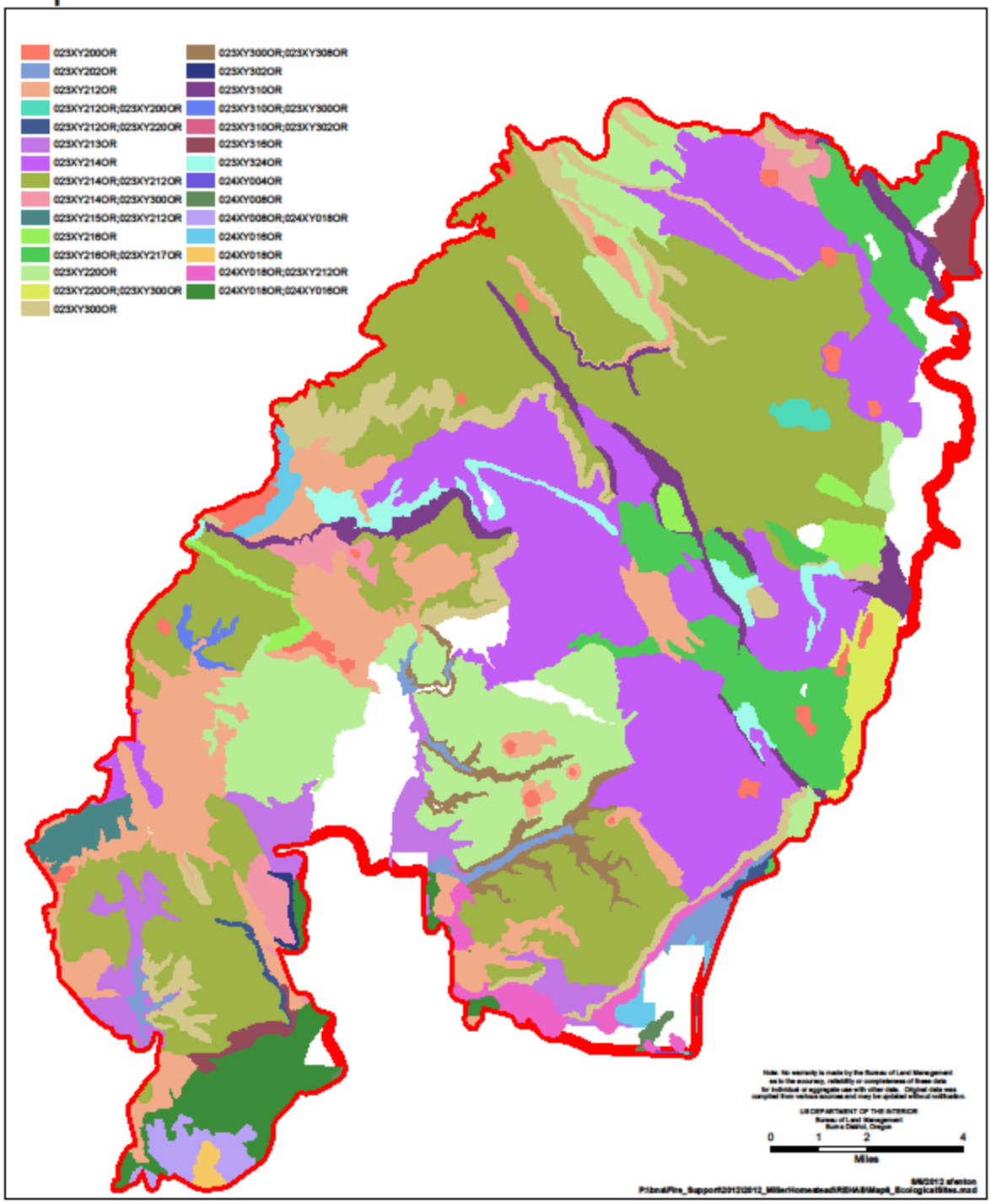
MILLER HOMESTEAD ESR



Ecological Sites

MILLER HOMESTEAD ESR

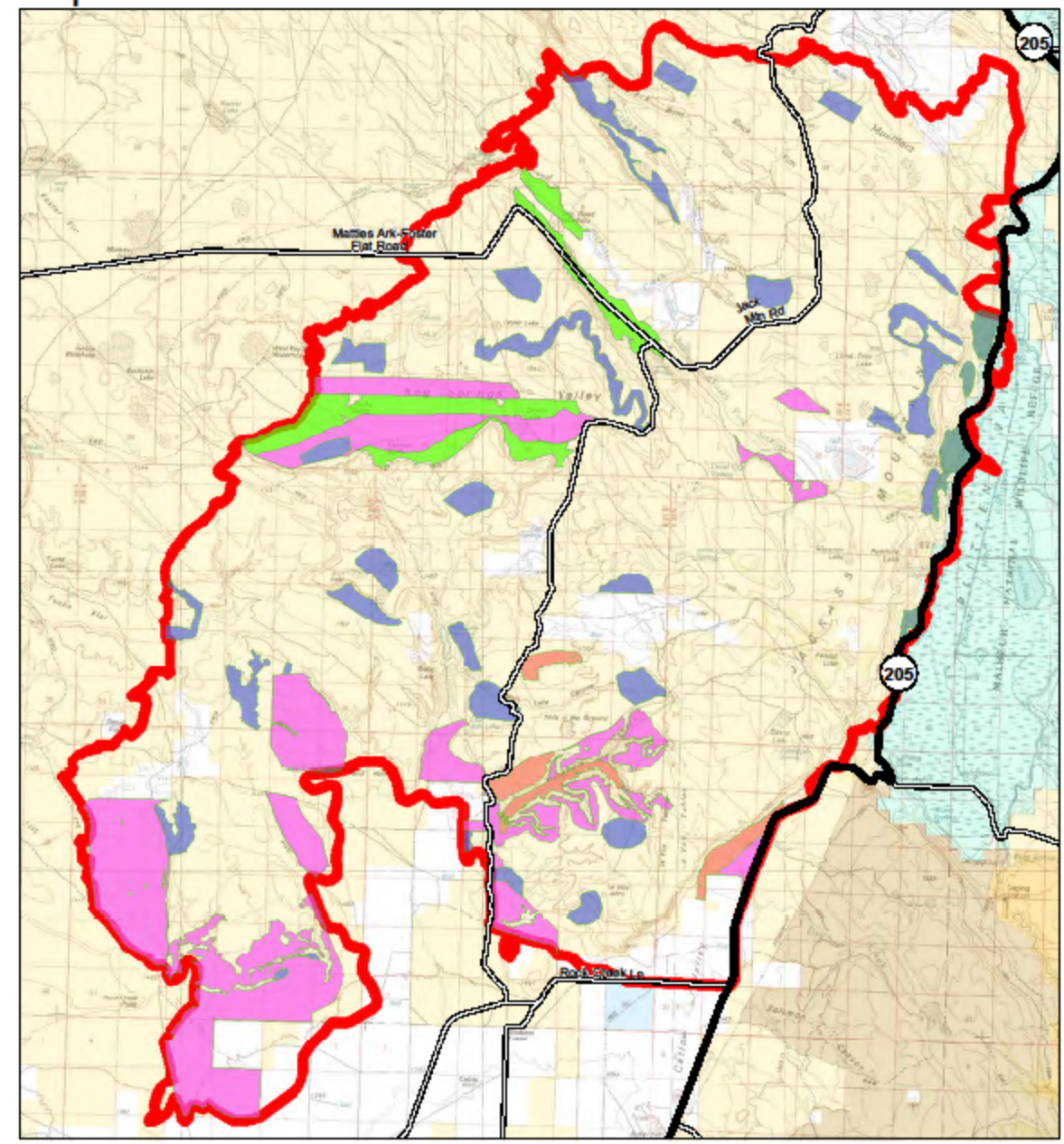
Map 6



Drill Seeding and Sagebrush Planting

Map 7

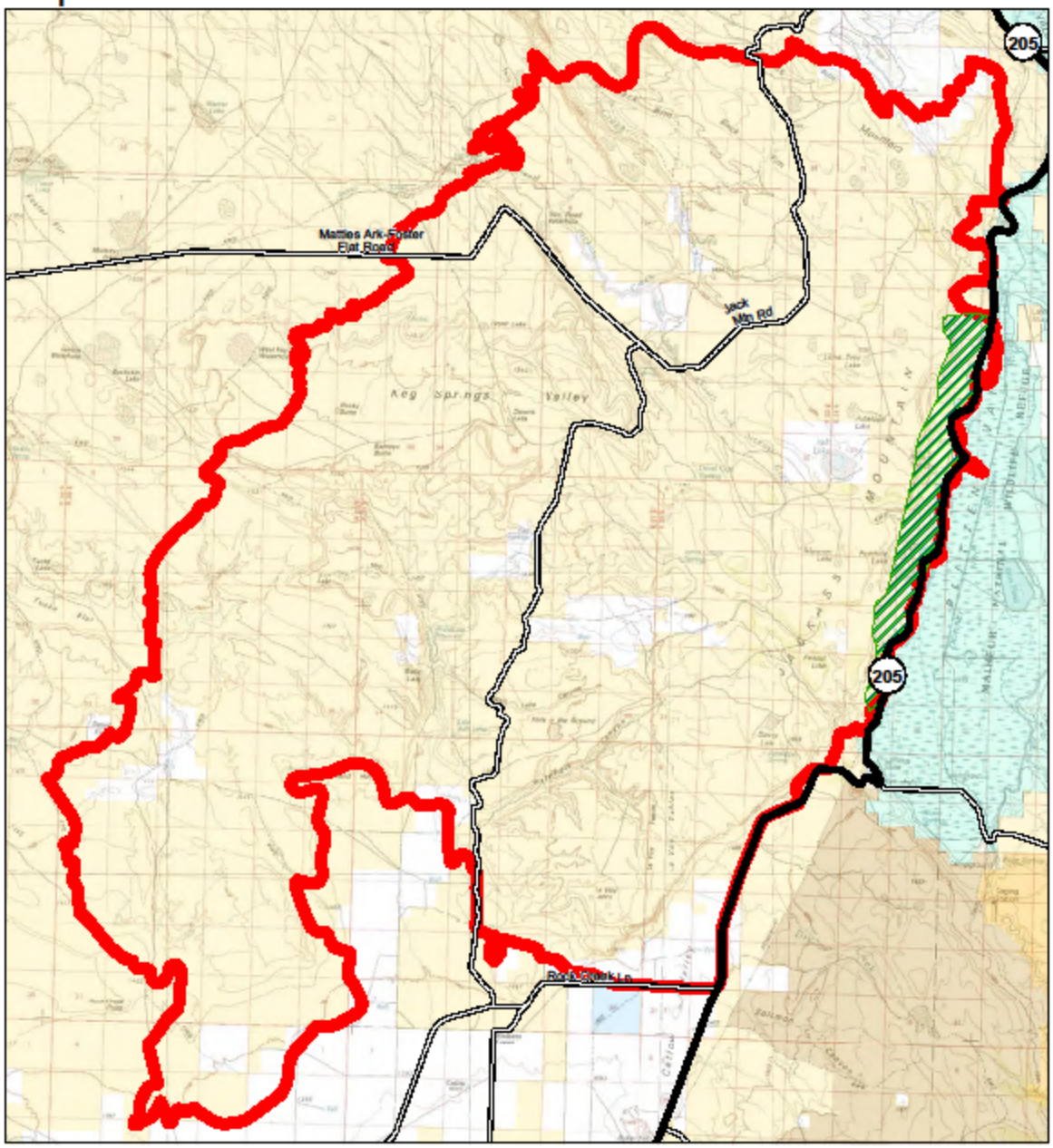
MILLER HOMESTEAD ESR



Map 8

Aerial Seeding

MILLER HOMESTEAD ESR



Aerial Seeding
Final Fire Perimeter

Bureau of Land Management
U.S. Fish and Wildlife Service
State
Private/Unknown
BLM Wilderness Study Area
Steens Mtn Wilderness

Not All Roads Are Shown
Highways

Note: No warranty is made by the Bureau of Land Management as to the accuracy, reliability or completeness of these data for individual or aggregate use with other data. Original data was compiled from various sources and may be updated without notification.

US DEPARTMENT OF THE INTERIOR
Bureau of Land Management
Burns District, Oregon

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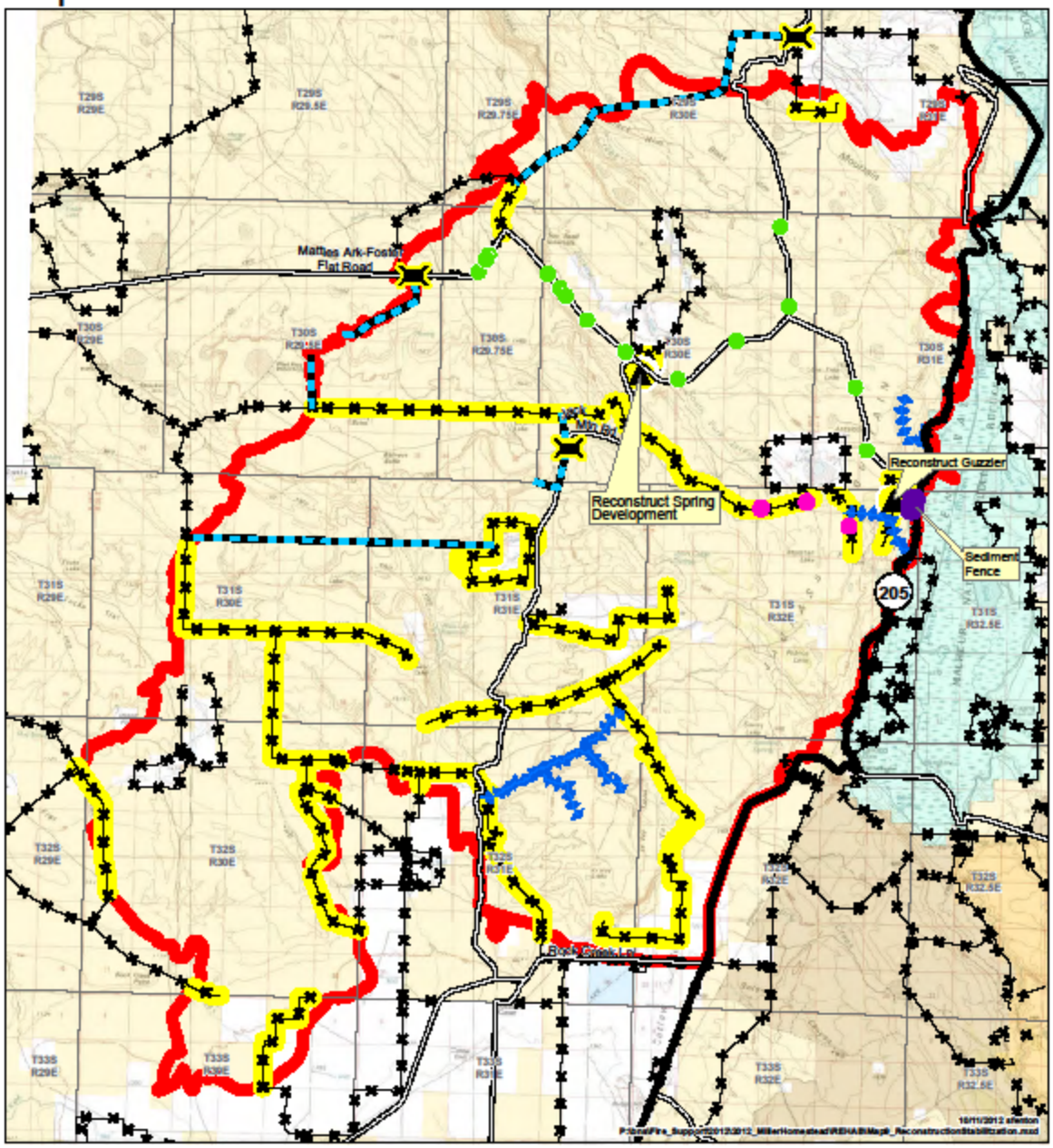
Reconstruction and Stabilization

MILLER HOMESTEAD ESR

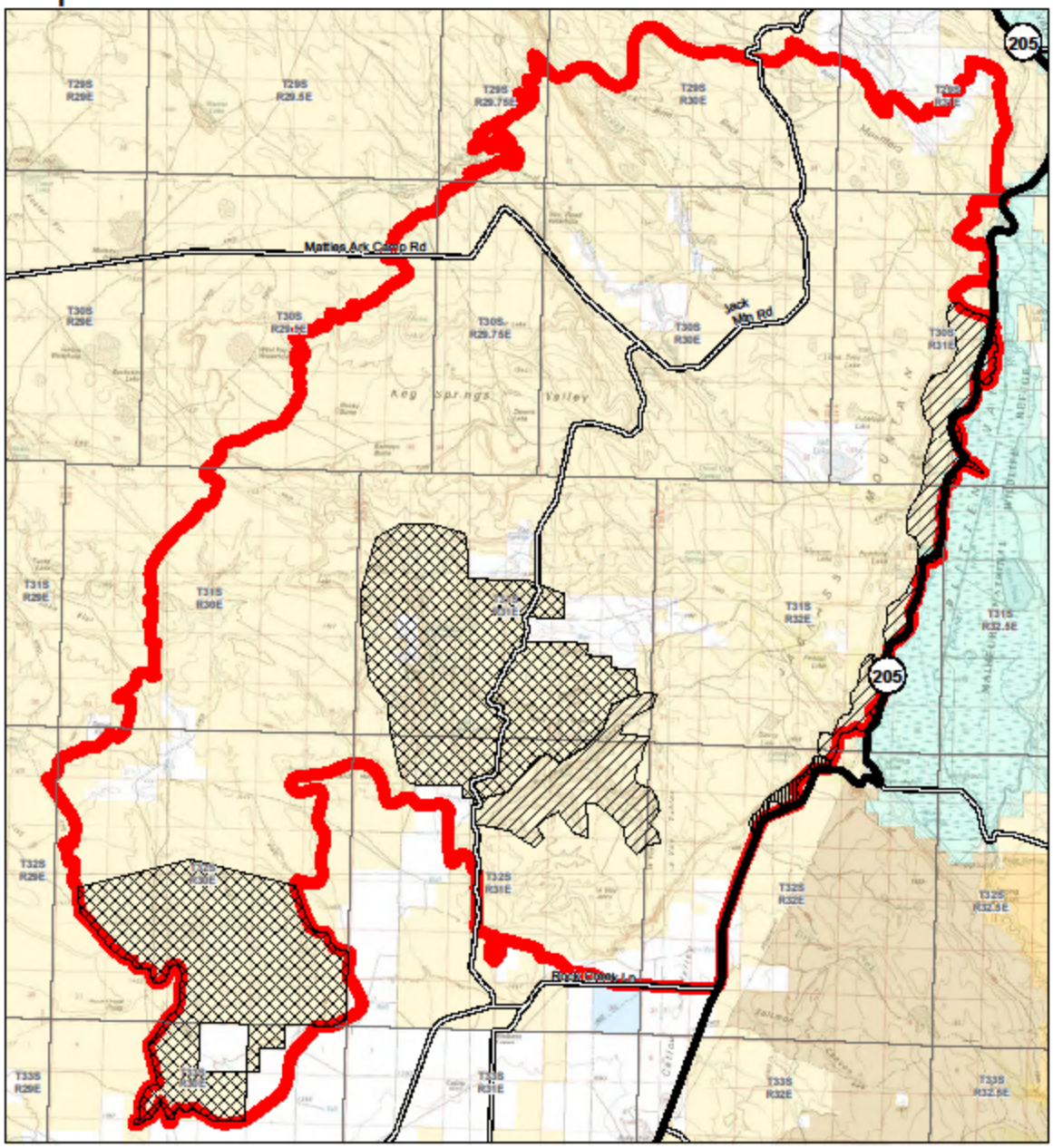
Map 9



Projected Weed Treatment Areas

MILLER HOMESTEAD ESR

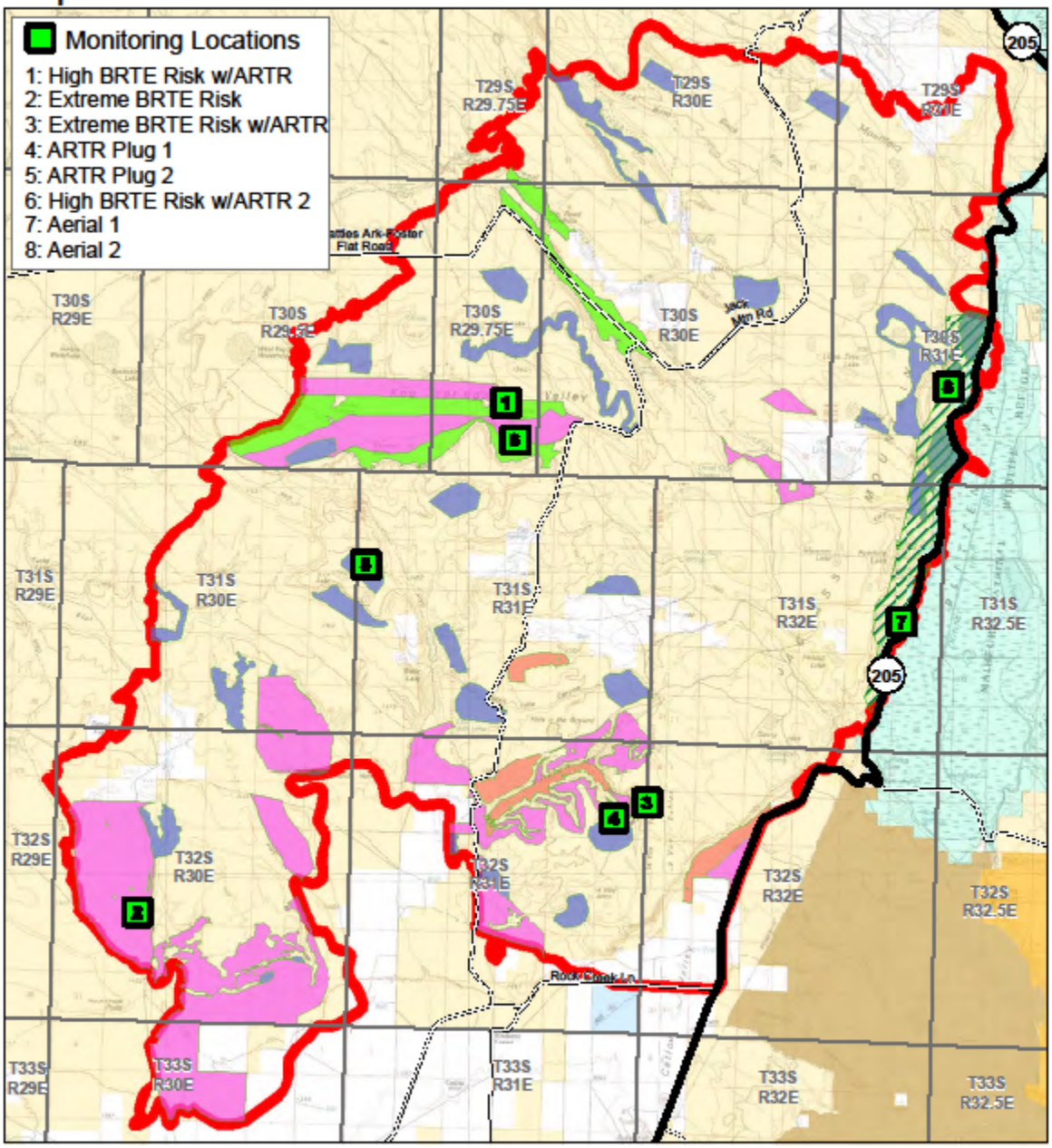
Map 10



Monitoring

MILLER HOMESTEAD ESR

Map 11



Aerial Seeding
Final Fire Perimeter

Bureau of Land Management
U.S. Fish and Wildlife Service
State
Private/Unknown
BLM Wilderness Study Area
Steens Mtn Wilderness

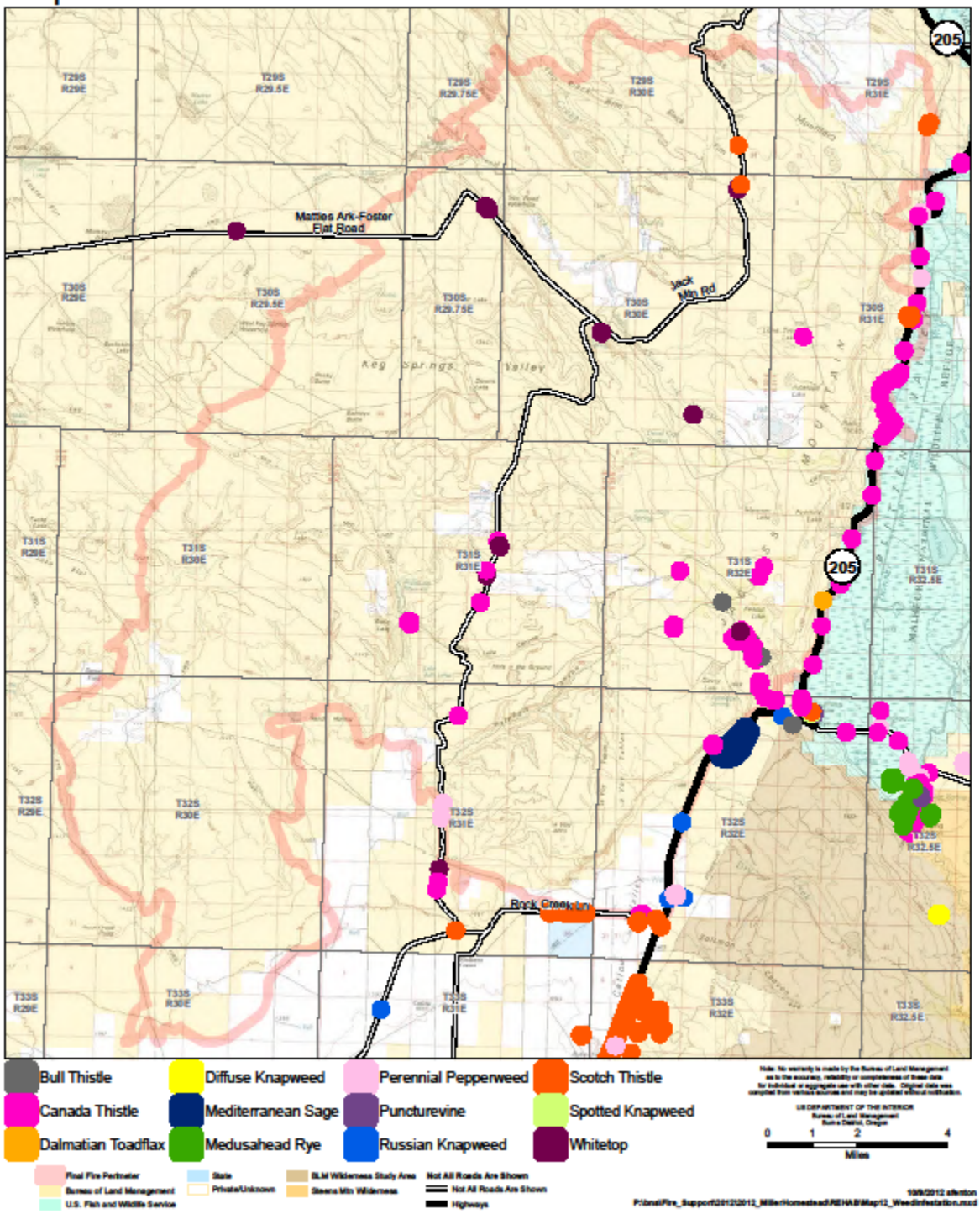
Open Roads
Not All Roads Are Shown
Highways

0 1 2 4
Miles

Known Weed Infestation Areas

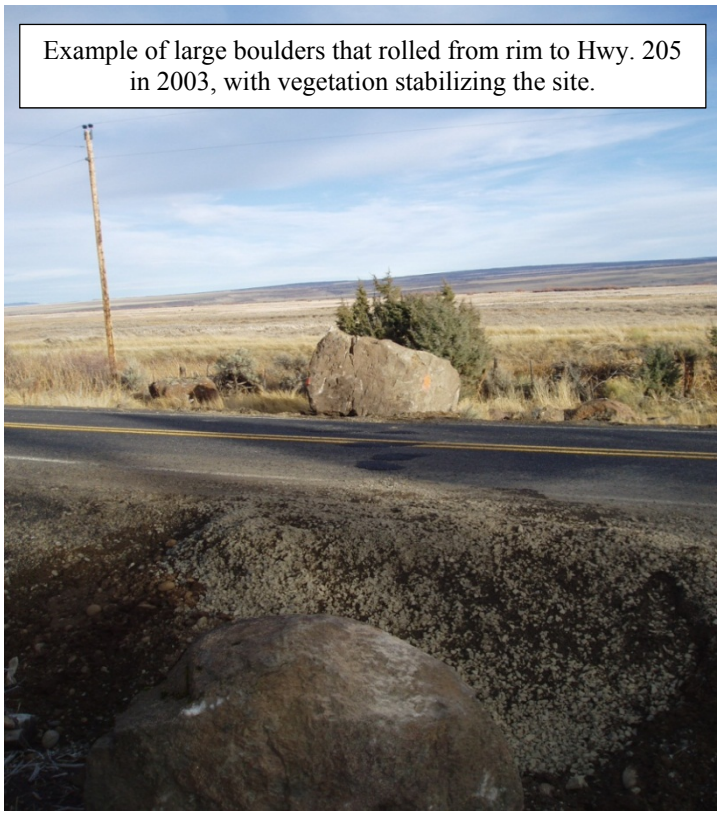
MILLER HOMESTEAD ESR

Map 12

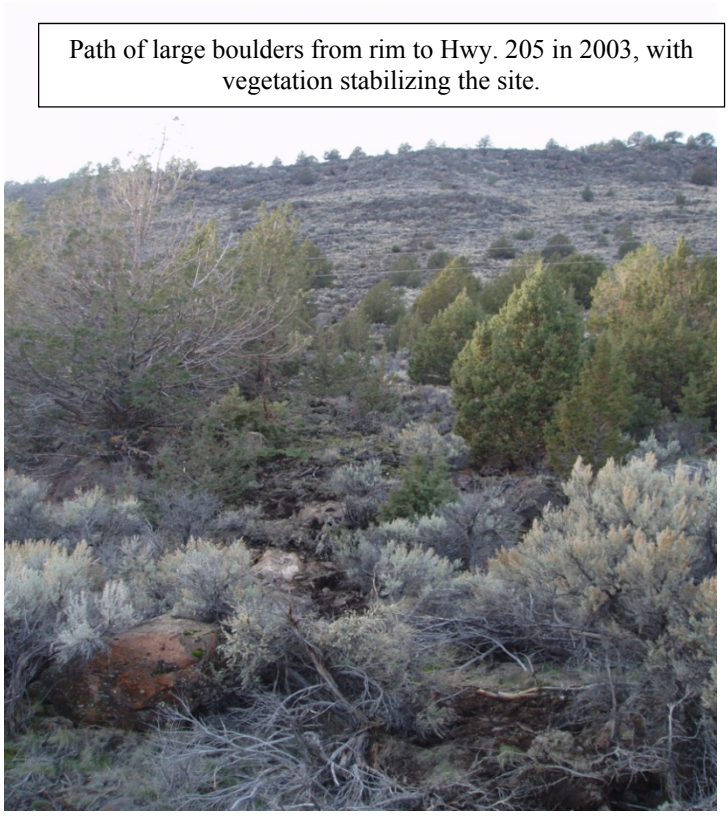


APPENDIX B
Miller Homestead Photos

Example of large boulders that rolled from rim to Hwy. 205 in 2003, with vegetation stabilizing the site.



Path of large boulders from rim to Hwy. 205 in 2003, with vegetation stabilizing the site.



Example of large boulder that rolled from rim across Highway 205 in 2003.

Greater sage-grouse in habitat Miller Homestead Fire burned.

Whirlwind removing topsoil from Miller Homestead Fire burned area.

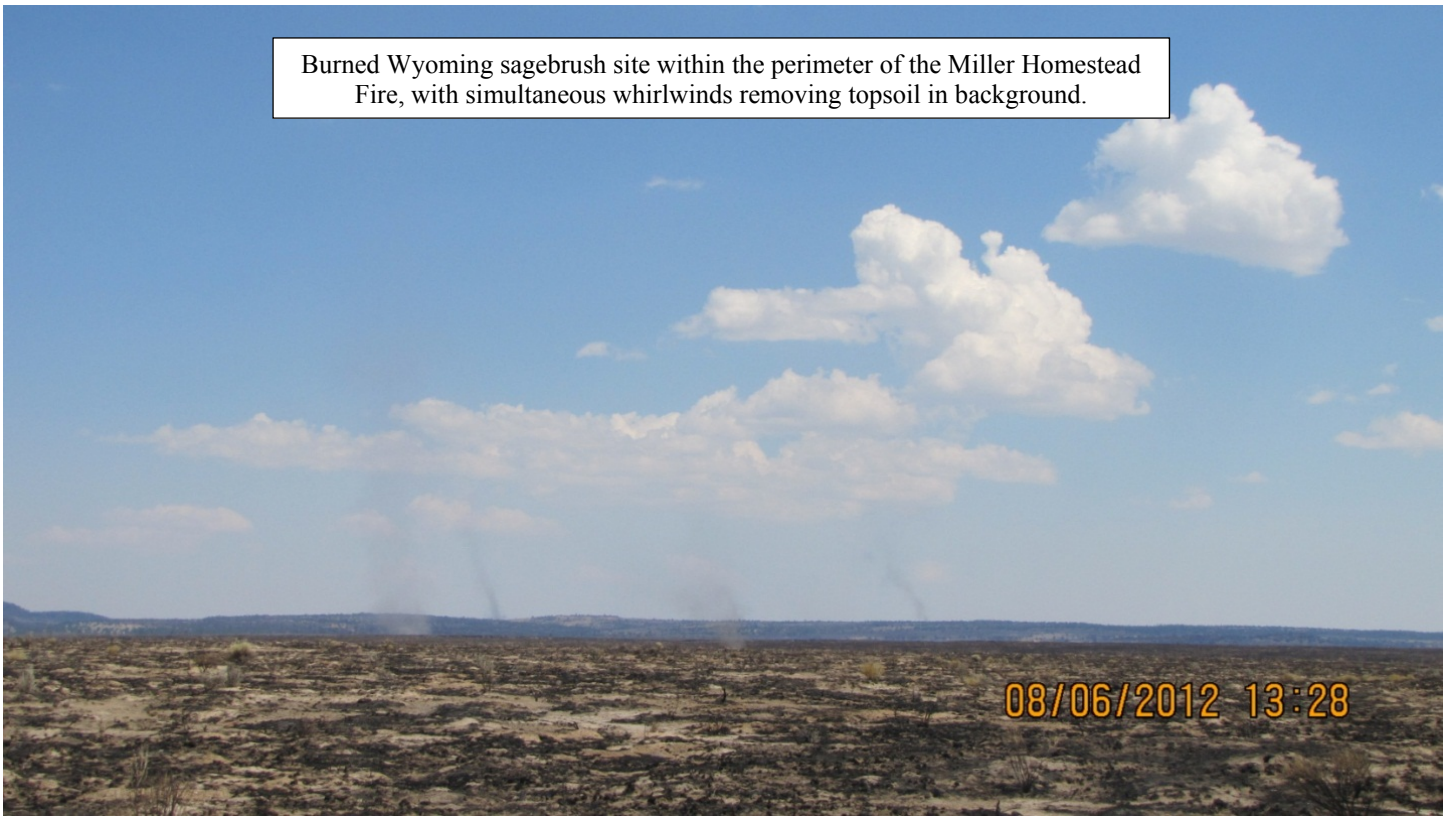
Multiple whirlwinds in background during interested public field trip removes topsoil from Miller Homestead Fire burned area.

Large topsoil removing whirlwind in burned area.

Multiple, large, topsoil removing whirlwinds in the area burned by Miller Homestead Fire.

Greater sage-grouse located on unburned island within the perimeter of the Miller Homestead Fire.

Wyoming sagebrush site burned to mineral soil in the Miller Homestead Fire.



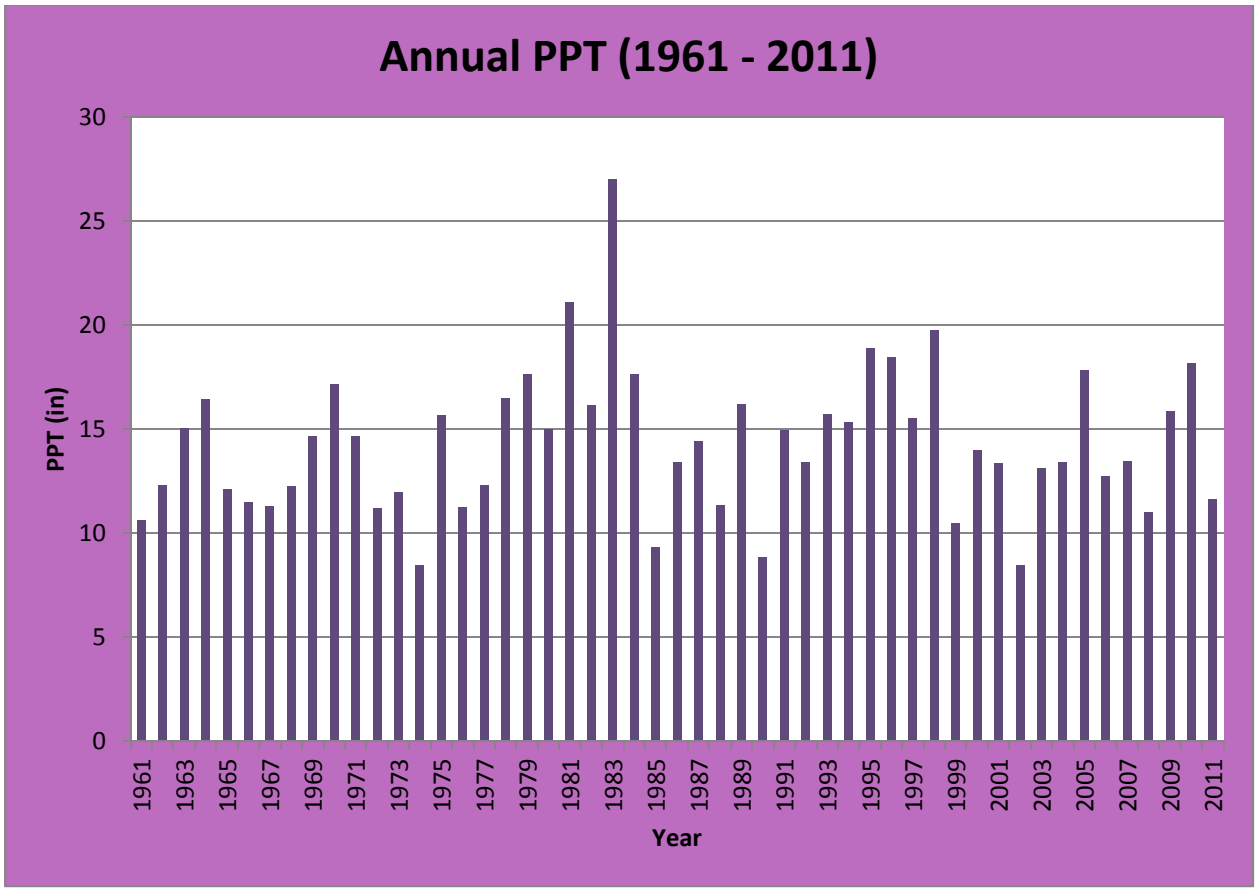
Burned Wyoming sagebrush site within the perimeter of the Miller Homestead Fire, with simultaneous whirlwinds removing topsoil in background.

A large cloud of ash and topsoil is visible as winds move across the area burned in the Miller Homestead Fire.

APPENDIX C
Climate Data for Miller Homestead Fire

Based on the coordinates, Lat: 42.9120063, Long: -119.02063, a point within the perimeter of the Miller Homestead Fire, over the last 50 years, 1961 – 2011, the average annual precipitation in the area of the Miller Homestead Fire has been 14.30 inches with the minimum annual precipitation recorded at 8.45 inches in 2002 and the maximum amount recorded at 27.04 inches in 1983. Typically, the driest months for the area of the fire include July, August, September and October where there have been no measureable amounts or precipitation. September and October tend to be the driest months with 4 and 3 years respectively of 0 inches of recordable precipitation. July and August have one year each of zero precipitation. November, December and May have been the wettest months with the majority of the November and December precipitation coming in the form of snow. May tends to be the wettest month averaging 1.84 inches over the last 50 years and tends to be a mix of rain and snow.
Temperatures over the last 50 years range from a monthly average low of 11.41°F in December of 1990 to a monthly average high of 89.51°F in August of 1967. The coldest months tend to be December, January, February and November respectively with the warmest months consisting of August, July, September and June respectively.

Coupled with high temperatures and low precipitation, the months of July, August and September are suitable for fires such as the Miller Homestead fire. Post fire, the dry hot months of August and September, and to a certain extent October, depending on the year, soils in the burn are susceptible to wind erosion with no vegetation or biological soil crusts to hold them in place. As the Fall precipitation begins, generally starting in October, soils susceptible to water erosion become vulnerable to overland flow which will transport valuable seed containing top soil away from the area. If seeds cannot establish and germinate, water erosion will continue across the area with the Spring precipitation and snow melt.


Annual PPT (1961 - 2011)
PPT (in)
30
25
20
15
10
5
0
1961
1963
1965
1967
1969
1971
1973
1975
1977
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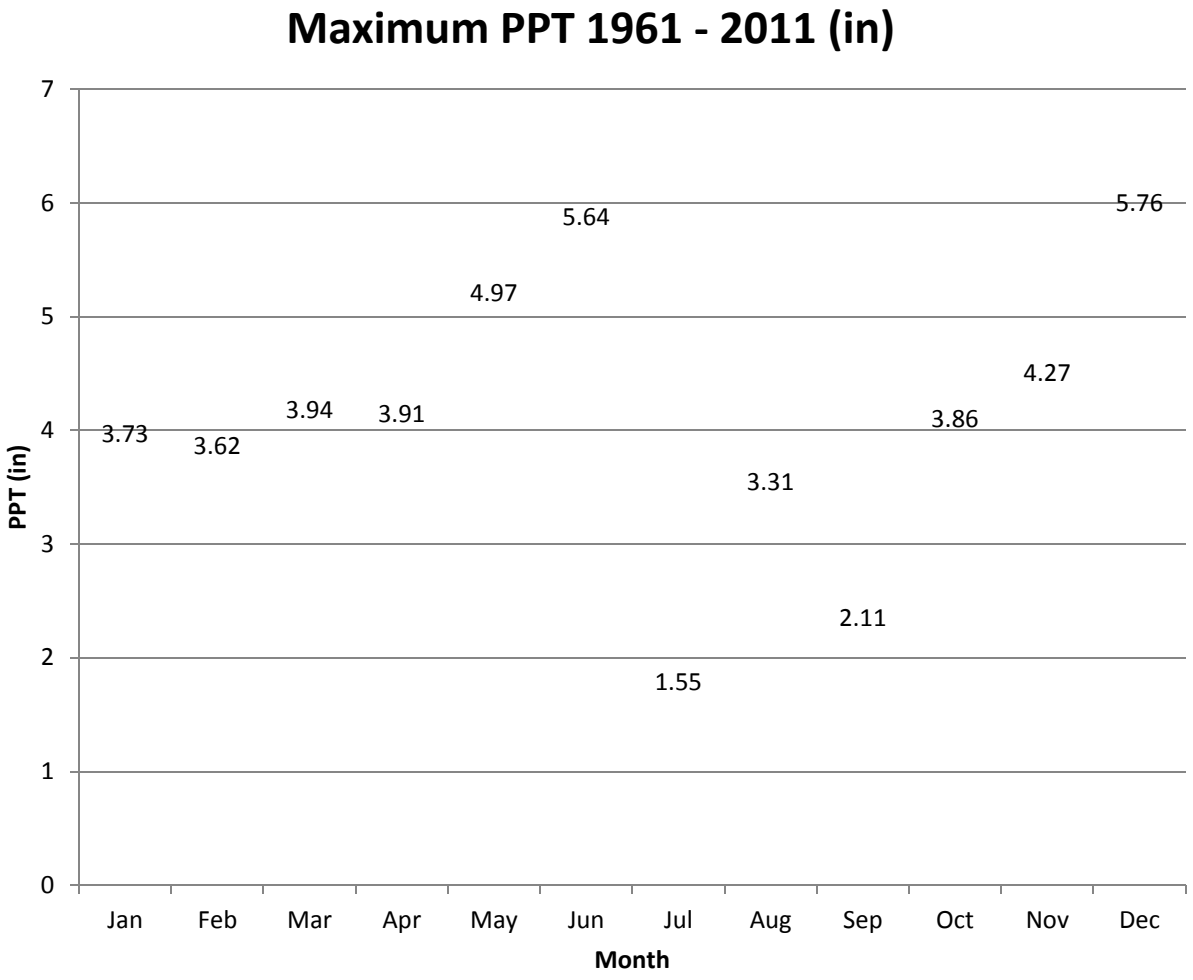
2003
2005
2007
2009
2011
Year


Maximum PPT 1961 - 2011 (in)
PPT (in)
7
6
5
4
3
2
1
0
3.73
3.62
3.94
3.91
4.97
5.64
1.55
3.31
2.11
3.86
4.27
5.76
Jan
Feb
Mar
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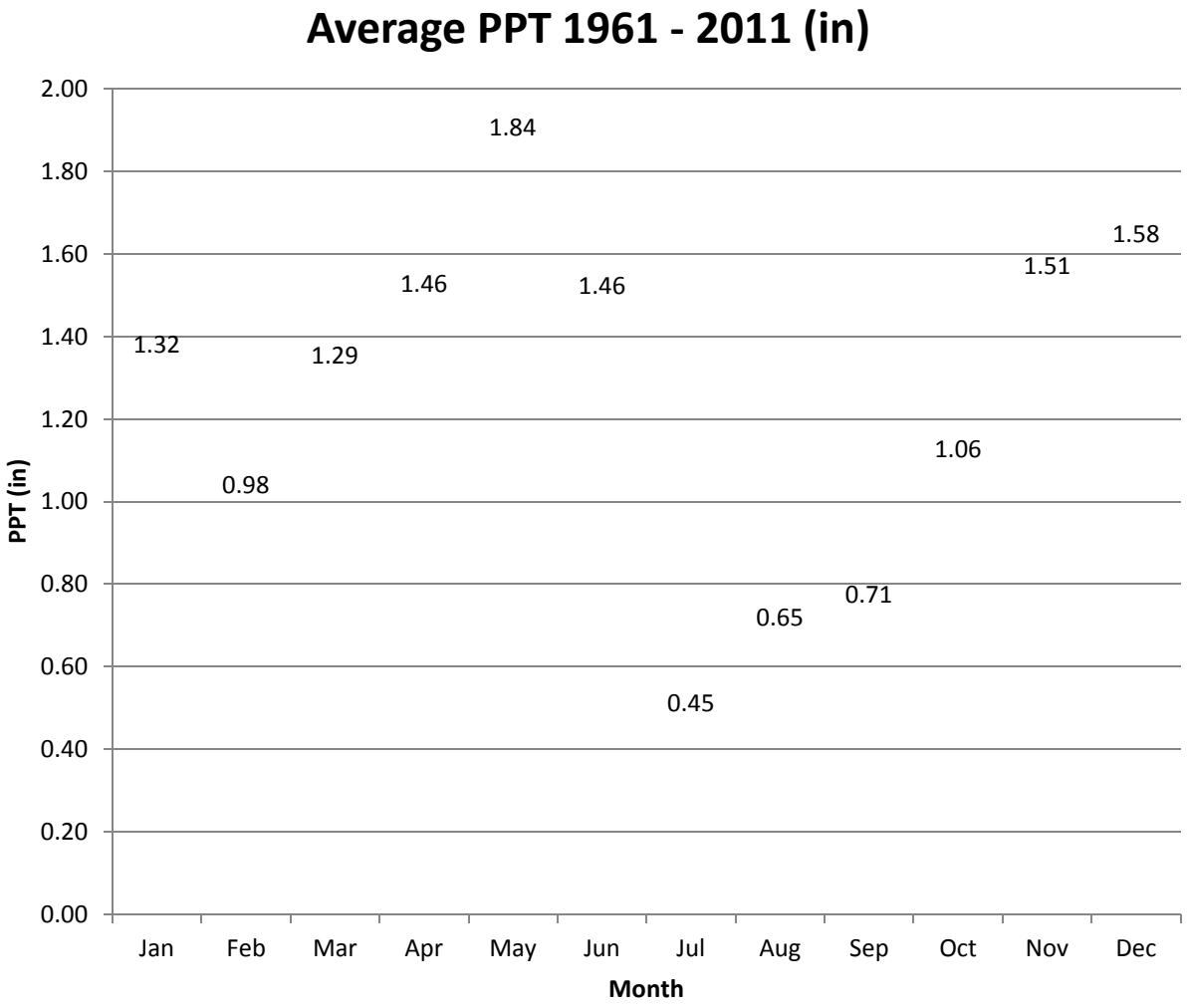
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0.40
0.20
0.00
1.32
0.98
1.29
1.46
1.84
1.46
0.45
0.65
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1.58
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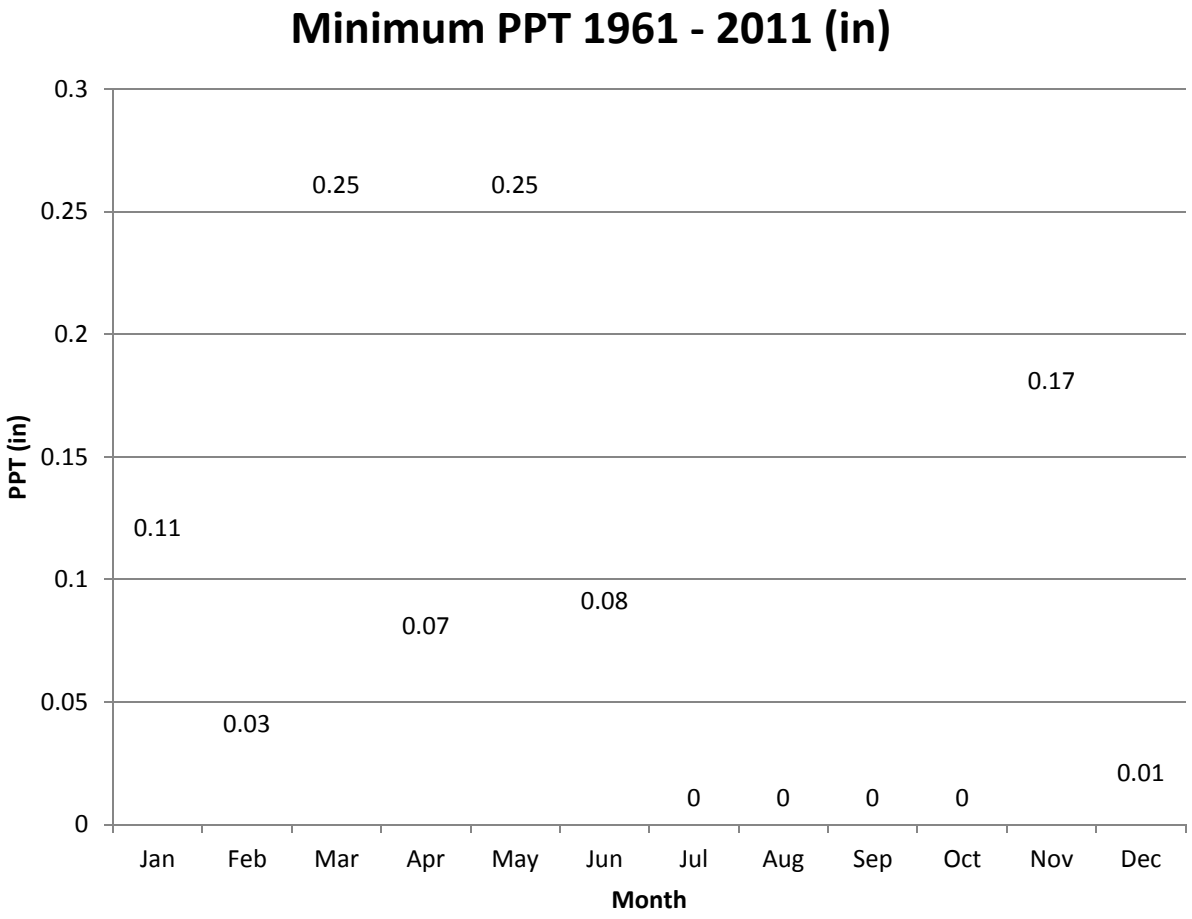
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PPT (in)
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0.07
0.25
0.08
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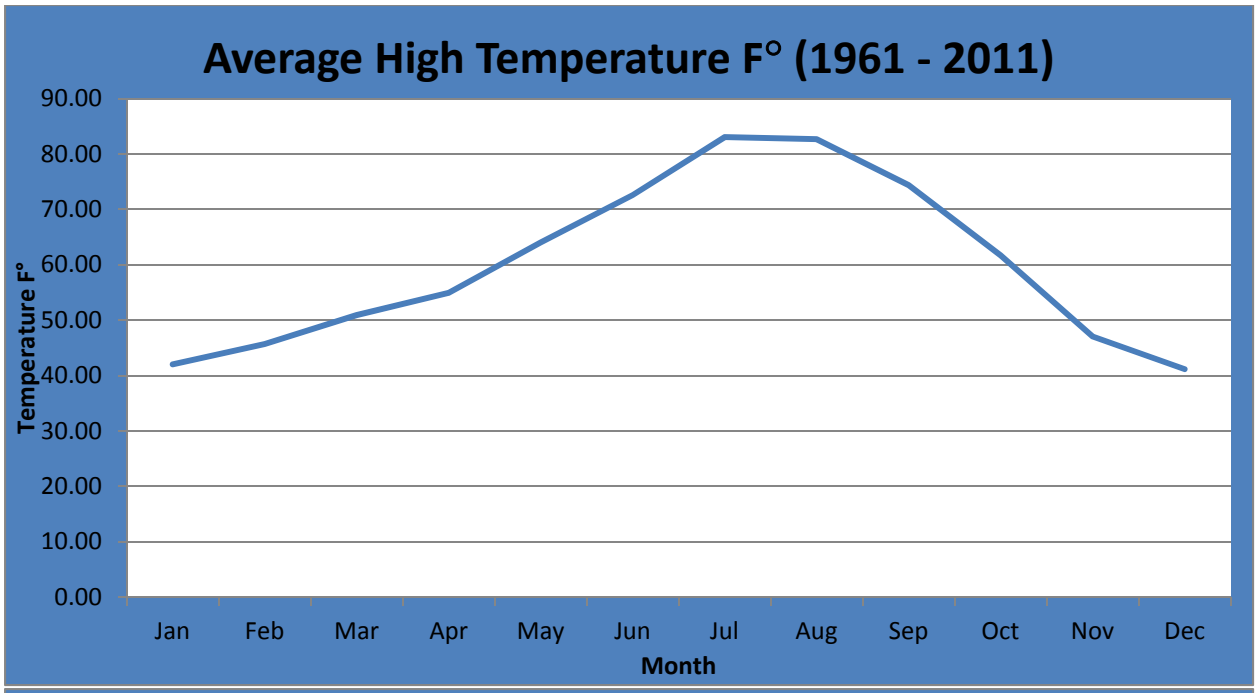
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80.00
70.00
60.00
50.00
40.00
30.00
20.00
10.00
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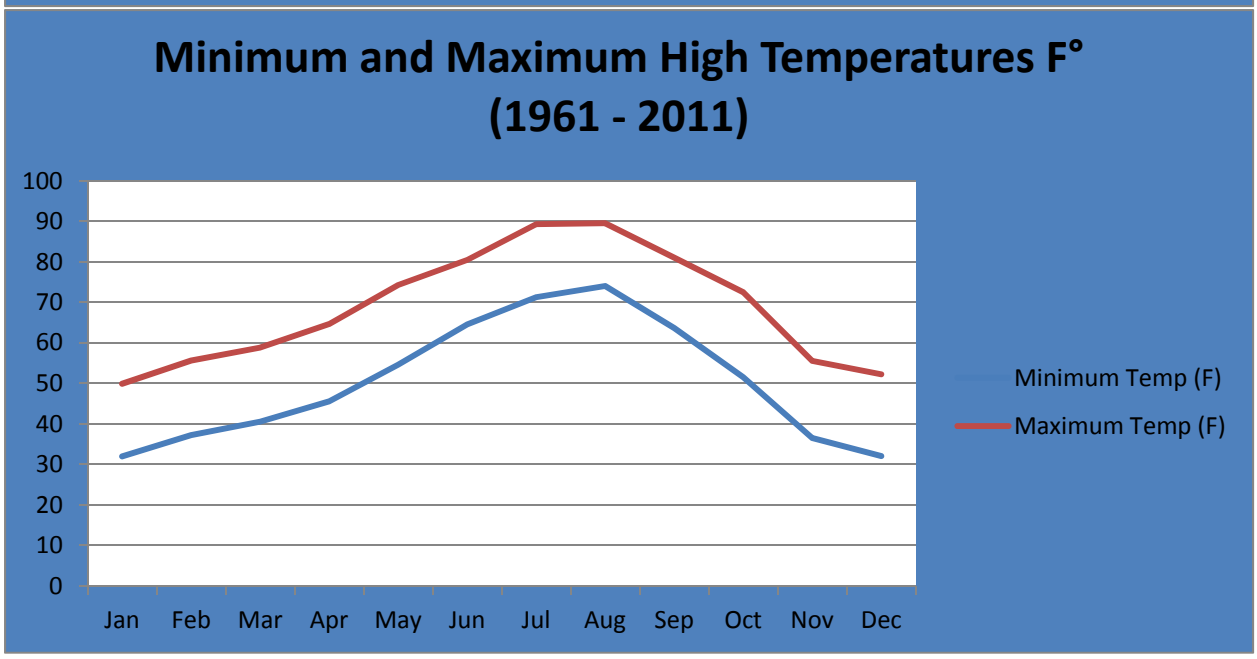
Oct
Nov
Dec
Month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90
80
70
60
50
40
30
20
10
0
Jan
Feb
Mar
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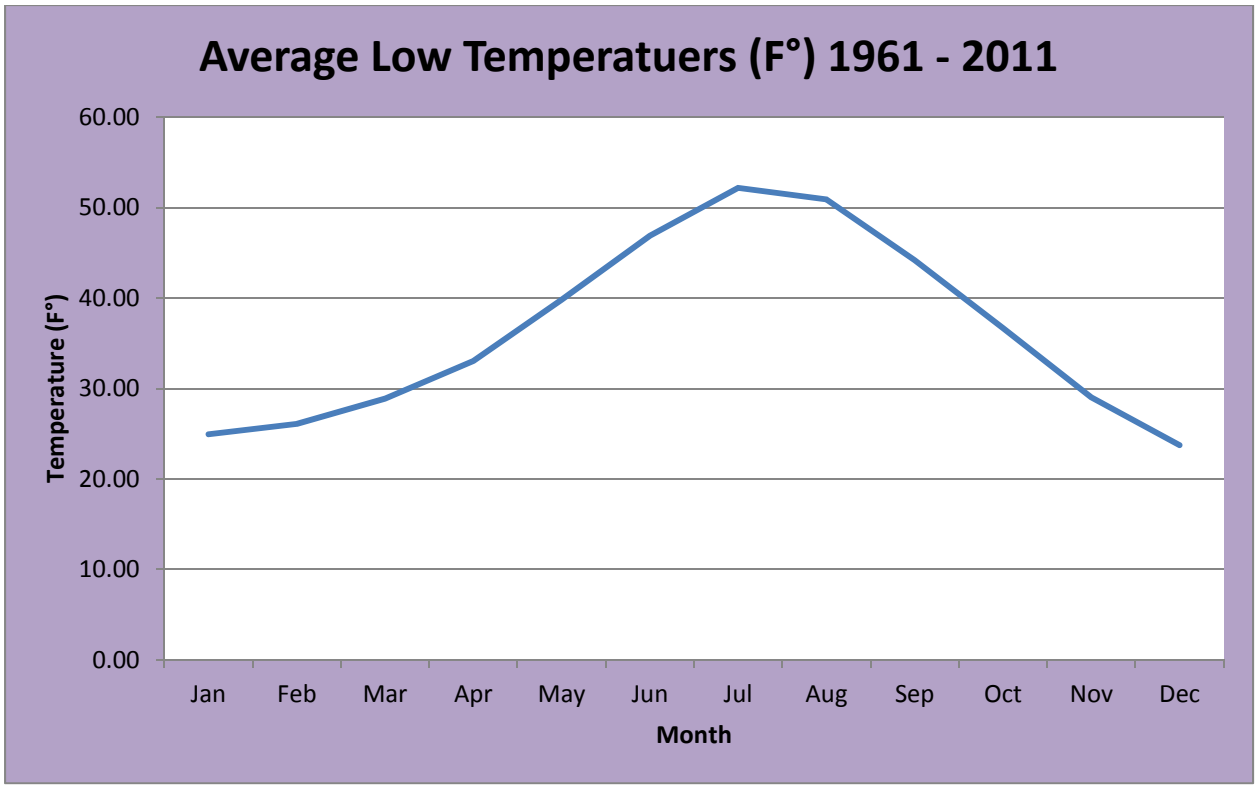
Oct
Nov
Dec
Minimum Temp (F)
Maximum Temp (F)


Average Low Temperatuers (F°) 1961 - 2011
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50.00
40.00
30.00
20.00
10.00
0.00
Temperature (F°)
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Mar
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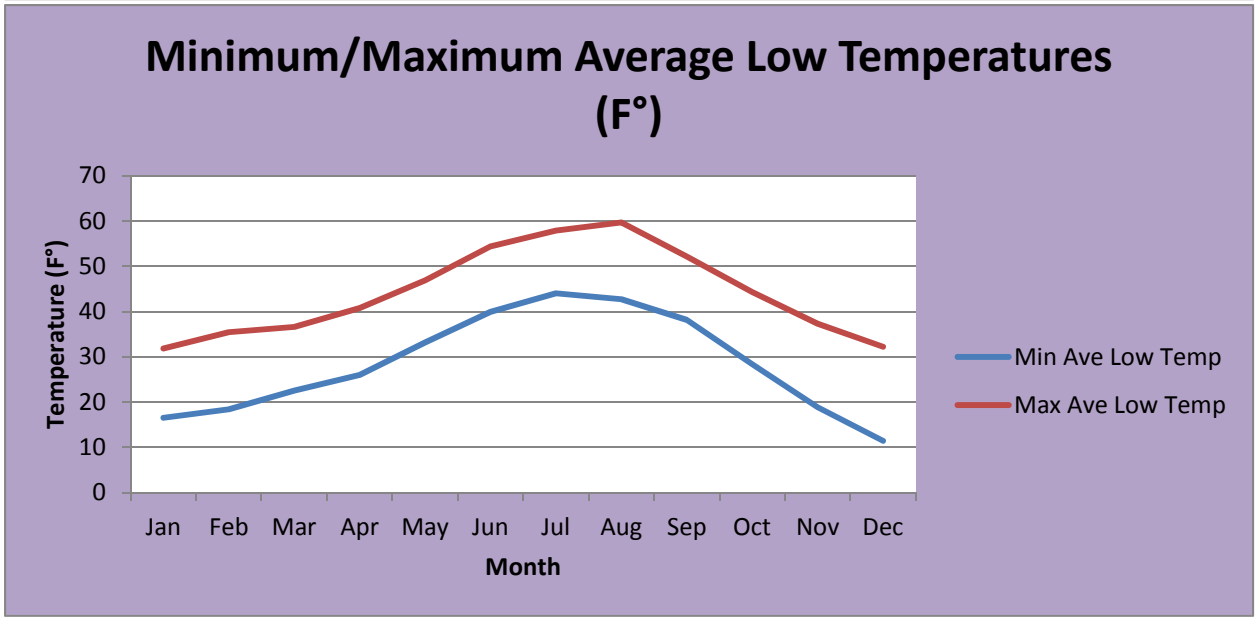
Aug
Sep
Oct
Nov
Dec
Month


Minimum/Maximum Average Low Temperatures (F°)
70
60
50
40
30
20
10
0
Temperature (F°)
Jan
Feb
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Apr
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Month
Min Ave Low Temp
Max Ave Low Temp

APPENDIX D
Monitoring Protocol

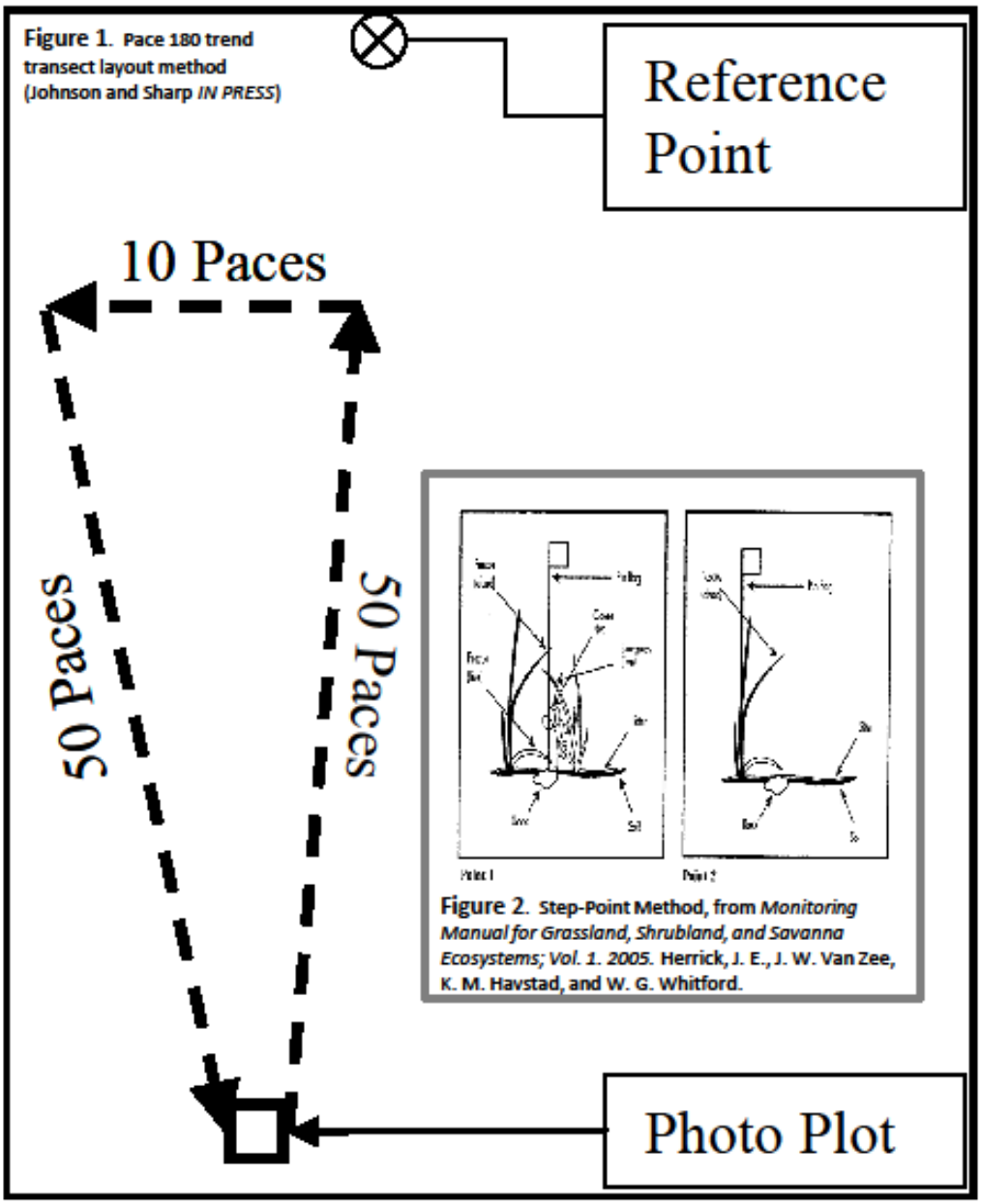

Figure 1. Pace 180 trend transect layout method (Johnson and Sharp *IN PRESS*)

Figure 2. Step-Point Method, from *Monitoring Manual for Grassland, Shrubland, and Savanna Ecosystems; Vol. 1. 2005.* Herrick, J. E., J. W. Van Zee, K. M. Havstad, and W. G. Whitford.

Fire Rehab Monitoring Protocol: Pace 180, supplemented with Step-Point, and Density (0.25m² frame) Methodologies. 100 paces read = 100 point measures taken. Density frame read every 5th pace = 20 frame measurements (perennial plants by species). Photo Plot 3'x3' established at start point of transect. Landscape Photo taken at starting point towards established reference point, along with cardinal direction photos (total of 4 Landscape Photos).

APPENDIX E

Standard Operating Procedures and Mitigation Measures

Excerpted from the Vegetation Treatments Using Herbicides on BLM Lands in Oregon FEIS/ROD (2010) (pp. 457-467)

Introduction

The following Standard Operating Procedures and Mitigation Measures have been adopted from the Record of Decision for the PEIS. Minor edits have been made to some Standard Operating Procedures and Mitigation Measures to clarify intent.

Standard Operating Procedures (identified below with SOP) have been identified to reduce adverse effects to environmental and human resources from vegetation treatment activities based on guidance in BLM manuals and handbooks, regulations, and standard BLM and industry practices.1 The list is not all encompassing, but is designed to give an overview of practices that would be considered when designing and implementing a vegetation treatment project on public lands (PER:2-29)2. Effects described in the EIS are predicated on application of the Standard Operating Procedures, that a site-specific determination is made that their application is unnecessary to achieve their intended purpose or protection, or that if the parent handbook or policy direction evolves, the new direction would continue to provide the appropriate environmental protections.
For example, the Standard Operating Procedure to "complete vegetation treatments seasonally before pollinator foraging plants bloom" would not be applied to treatments not likely to have a significant effect on pollinators.

PEIS Mitigation Measures (identified below with MM) were identified for all potential adverse effects identified in the PEIS. They are included in, and adopted by, the Record of Decision for the PEIS. Like the SOPs, application of the mitigation measures is assumed in this EIS. However, for PEIS Mitigation Measures, site-specific analysis and/or the use of Individual Risk Assessments Tools (see Chapter 3), or evolution of the PEIS Mitigation Measures into handbook direction at the national level, would be permitted to identify alternative ways to achieve the expected protections (PEIS:4-4).
Although not displayed here, Standard Operating Procedures for non-herbicide treatments (from regulation, BLM policy, and BLM Handbook direction) also apply (PER:2-31 to 44).

Standard Operating Procedures and Mitigation Measures for Applying Herbicides

Guidance Documents
BLM Handbook H-9011-1 (*Chemical Pest Control*); and manuals 1112 (*Safety*), 9011 (*Chemical Pest Control*), 9012 (*Expenditure of Rangeland Insect Pest Control Funds*), 9015 (*Integrated Weed Management)*, and 9220 (*Integrated Pest Management*).

1 Manual-directed standard operating procedures and other standing direction may be referred to as best management practices in resource management and other plans, particularly when they apply to water.
2 The PER includes Standard Operating Procedures for the full range of vegetation treatment methods. Only those applicable to herbicide application are included in this appendix.

General
- Prepare an operational and spill contingency plan in advance of treatment. *(SOP)*
- Conduct a pretreatment survey before applying herbicides. *(SOP)*
- Select the herbicide that is least damaging to the environment while providing the desired results. *(SOP)*

- Select herbicide products carefully to minimize additional impacts from degradates, adjuvants, other ingredients, and tank mixtures. *(SOP)*
- Apply the least amount of herbicide needed to achieve the desired result. *(SOP)*
- Follow herbicide product label for use and storage. *(SOP)*
- Have licensed or certified applicators or State-licensed "trainees" apply herbicides, or they can be applied by BLM employees under the direct supervision of a BLM-certified applicator. *(SOP)*
- Use only USEPA-approved herbicides and follow product label directions and "advisory" statements. *(SOP)*
- Review, understand, and conform to the "Environmental Hazards" section on the herbicide product label. This section warns of known herbicide risks to the environment and provides practical ways to avoid harm to organisms or to the environment. *(SOP)*
- Consider surrounding land use before assigning aerial spraying as a treatment method and avoid aerial spraying near agricultural or densely populated areas. *(SOP)*
- Minimize the size of application area, when feasible. *(SOP)*
- Comply with herbicide-free buffer zones to ensure that drift will not affect crops or nearby residents/ landowners. *(SOP)*
- Post treated areas and specify reentry or rest times, if appropriate. *(SOP)*
- Notify adjacent landowners prior to treatment, if appropriate. *(SOP)*
- Keep a copy of Material Safety Data Sheets (MSDSs) at work sites. MSDSs are available for review at http:// www.cdms.net/. *(SOP)*
- Keep records of each application, including the active ingredient, formulation, application rate, date, time, and location. *(SOP)*
- Avoid accidental direct spray and spill conditions to minimize risks to resources. *(SOP)*
- Avoid aerial spraying during periods of adverse weather conditions (snow or rain imminent, fog, or air turbulence). *(SOP)*
- Make helicopter applications at a target airspeed of 40 to 50 miles per hour (mph), and at about 30 to 45 feet above ground. *(SOP)*
- Take precautions to minimize drift by not applying herbicides when winds exceed >10 mph (>6 mph for aerial applications), or a serious rainfall event is imminent. *(SOP)*
- Use drift control agents and low volatile formulations. *(SOP)*
- Conduct pre-treatment surveys for sensitive habitat and SSS within or adjacent to proposed treatment areas. *(SOP)*
- Consider site characteristics, environmental conditions, and application equipment in order to minimize damage to non-target vegetation. *(SOP)*
- Use drift reduction agents, as appropriate, to reduce the drift hazard to non-target species. *(SOP)*
- Turn off application equipment at the completion of spray runs and during turns to start another spray run. *(SOP)*
- Refer to the herbicide product label when planning revegetation to ensure that subsequent vegetation would not be injured following application of the herbicide. *(SOP)*
- Clean OHVs to remove plant material. *(SOP)*

The BLM has suspended the use of the adjuvant R-11.

<u>Air Quality</u>

See Manual 7000 (*Soil, Water, and Air Management*)

- Consider the effects of wind, humidity, temperature inversions, and heavy rainfall on herbicide effectiveness and risks. *(SOP)*
- Apply herbicides in favorable weather conditions to minimize drift. For example, do not treat when winds exceed 10 mph (>6 mph for aerial applications) or rainfall is imminent. *(SOP)*
- Use drift reduction agents, as appropriate, to reduce the drift hazard. *(SOP)*
- Select proper application equipment (e.g., spray equipment that produces 200- to 800-micron diameter droplets [spray droplets of 100 microns and less are most prone to drift]). *(SOP)*

- Select proper application methods (e.g., set maximum spray heights, use appropriate buffer distances between spray sites and non-target resources). *(SOP)*

Soil

See Manual 7000 (*Soil, Water, and Air Management*)

- Minimize treatments in areas where herbicide runoff is likely, such as steep slopes when heavy rainfall is expected. *(SOP)*
- Minimize use of herbicides that have high soil mobility, particularly in areas where soil properties increase the potential for mobility. *(SOP)*
- Do not apply granular herbicides on slopes of more than 15 percent where there is the possibility of runoff carrying the granules into non-target areas. *(SOP)*

Water Resources

See Manual 7000 (*Soil, Water, and Air Management*)

- Consider climate, soil type, slope, and vegetation type when developing herbicide treatment programs. *(SOP)*
- Select herbicide products to minimize impacts to water. This is especially important for application scenarios that involve risk from active ingredients in a particular herbicide, as predicted by risk assessments. *(SOP)*
- Use local historical weather data to choose the month of treatment. (*SOP*)
- Considering the phenology of target aquatic species, schedule treatments based on the condition of the water body and existing water quality conditions. *(SOP)*
- Plan to treat between weather fronts (calms) and at appropriate time of day to avoid high winds that increase water movements, and to avoid potential stormwater runoff and water turbidity. *(SOP)*
- Review hydrogeologic maps of proposed treatment areas. Note depths to groundwater and areas of shallow groundwater and areas of surface water and groundwater interaction. Minimize treating areas with high risk for groundwater contamination. *(SOP)*
- Conduct mixing and loading operations in an area where an accidental spill would not contaminate an aquatic body. *(SOP)*
- Do not rinse spray tanks in or near water bodies. (*SOP*)
- Do not broadcast pellets where there is danger of contaminating water supplies. *(SOP)*
- Minimize the potential effects to surface water quality and quantity by stabilizing terrestrial areas as quickly as possible following treatment. *(SOP)*
- Establish appropriate (herbicide-specific) buffer zones for species/populations (Tables A2-1 and A2-2). (*MM*)
- Areas with potential for groundwater for domestic or municipal use shall be evaluated through the appropriate, validated model(s) to estimate vulnerability to potential groundwater contamination, and appropriate mitigation measures shall be developed if such an area requires the application of herbicides and cannot otherwise be treated with non-herbicide methods. (*MM*)
- Use appropriate herbicide-free buffer zones for herbicides not labeled for aquatic use based on risk assessment guidance, with minimum widths from water of 100 feet for aerial, 25 feet for vehicle, and 10 feet for hand spray applications. *(SOP)*
- Maintain buffers between treatment areas and water bodies. Buffer widths should be developed based on herbicide and site-specific conditions to minimize impacts to water bodies. *(SOP)*

Wetlands and Riparian Areas

- Use a selective herbicide and a wick or backpack sprayer. *(SOP)*
- Use appropriate herbicide-free buffer zones for herbicides not labeled for aquatic use based on risk assessment guidance, with minimum widths from water of 100 feet for aerial, 25 feet for vehicle, and 10 feet for hand spray applications. *(SOP)*
- See mitigation for Water Resources and Vegetation. (*MM*)

Vegetation

See Handbook H-4410-1 (*National Range Handbook*), and manuals 5000 (*Forest Management*) and 9015 (*Integrated Weed Management*)

- Refer to the herbicide label when planning revegetation to ensure that subsequent vegetation would not be injured following application of the herbicide. *(SOP)*
- Use native or sterile plants for revegetation and restoration projects to compete with invasive plants until desired vegetation establishes. *(SOP)*
- Use weed-free feed for horses and pack animals. Use weed-free straw and mulch for revegetation and other activities. *(SOP)*
- Identify and implement any temporary domestic livestock grazing and/or supplemental feeding restrictions needed to enhance desirable vegetation recovery following treatment. Consider adjustments in the existing grazing permit, to maintain desirable vegetation on the treatment site. *(SOP)*
- Minimize the use of terrestrial herbicides (especially bromacil, diuron, and sulfometuron methyl) in watersheds with downgradient ponds and streams if potential impacts to aquatic plants are identified. (*MM*)
- Establish appropriate (herbicide-specific) buffer zones (Tables A2-1 and 2) around downstream water bodies, habitats, and species/populations of interest. Consult the ecological risk assessments (ERAs) prepared for the PEIS for more specific information on appropriate buffer distances under different soil, moisture, vegetation, and application scenarios. (*MM*)
- Limit the aerial application of chlorsulfuron and metsulfuron methyl to areas with difficult land access, where no other means of application are possible. (*MM*)
- Do not apply sulfometuron methyl aerially. (*MM*)
- When necessary to protect Special Status plant species, implement all conservation measures for plants presented in the *Vegetation Treatments on Bureau of Land Management Lands in 17 Western States Programmatic Biological Assessment* (see Appendix 5). (*MM*)

Pollinators

- Complete vegetation treatments seasonally before pollinator foraging plants bloom. *(SOP)*
- Time vegetation treatments to take place when foraging pollinators are least active both seasonally and daily. *(SOP)*
- Design vegetation treatment projects so that nectar and pollen sources for important pollinators and resources are treated in patches rather than in one single treatment. *(SOP)*
- Minimize herbicide application rates. Use typical rather than maximum rates where there are important pollinator resources. *(SOP)*
- Maintain herbicide free buffer zones around patches of important pollinator nectar and pollen sources. *(SOP)*
- Maintain herbicide free buffer zones around patches of important pollinator nesting habitat and hibernacula. *(SOP)*
- Make special note of pollinators that have single host plant species, and minimize herbicide spraying on those plants and in their habitats. *(SOP)*

Fish and Other Aquatic Organisms

See manuals 6500 (*Wildlife and Fisheries Management*) and 6780 (*Habitat Management Plans*)

- Use appropriate buffer zones based on label and risk assessment guidance. *(SOP)*
- Minimize treatments near fish-bearing water bodies during periods when fish are in life stages most sensitive to the herbicide(s) used, and use spot rather than broadcast or aerial treatments. *(SOP)*
- Use appropriate application equipment/method near water bodies if the potential for off-site drift exists. *(SOP)*
- For treatment of aquatic vegetation, 1) treat only that portion of the aquatic system necessary to meet vegetation management objectives, 2) use the appropriate application method to minimize the potential for injury to desirable vegetation and aquatic organisms, and 3) follow water use restrictions presented on the herbicide label. *(SOP)*

- Limit the use of diquat in water bodies that have native fish and aquatic resources. (*MM*)
- Limit the use of terrestrial herbicides (especially diuron) in watersheds with characteristics suitable for potential surface runoff that have fish-bearing streams during periods when fish are in life stages most sensitive to the herbicide(s) used. (*MM*)
- To protect Special Status fish and other aquatic organisms, implement all conservation measures for aquatic animals presented in the *Vegetation Treatments on Bureau of Land Management Lands in 17 Western States Programmatic Biological Assessment* (see Appendix 5). (*MM*)
- Establish appropriate herbicide-specific buffer zones for water bodies, habitats, or fish or other aquatic species of interest (Tables A2-3 and A2-4, and recommendations in individual ERAs). (*MM*)
- Consider the proximity of application areas to salmonid habitat and the possible effects of herbicides on riparian and aquatic vegetation. Maintain appropriate buffer zones around salmonid-bearing streams. (*MM*)
- At the local level, consider effects to Special Status fish and other aquatic organisms when designing treatment programs. (*MM*)

<u>Wildlife</u>

See manuals 6500 (*Wildlife and Fisheries Management*) and 6780 (*Habitat Management Plans*)

- Use herbicides of low toxicity to wildlife, where feasible. *(SOP)*
- Use spot applications or low-boom broadcast operations where possible to limit the probability of contaminating non-target food and water sources, especially non-target vegetation over areas larger than the treatment area. *(SOP)*
- Use timing restrictions (e.g., do not treat during critical wildlife breeding or staging periods) to minimize impacts to wildlife. *(SOP)*
- To minimize risks to terrestrial wildlife, do not exceed the typical application rate for applications of dicamba, diuron, glyphosate, hexazinone, tebuthiuron, or triclopyr, where feasible. (*MM*)
- Minimize the size of application areas, where practical, when applying 2,4-D, bromacil, diuron, and Overdrive® to limit impacts to wildlife, particularly through contamination of food items. (*MM*)
- Where practical, limit glyphosate and hexazinone to spot applications in grazing land and wildlife habitat areas to avoid contamination of wildlife food items. (*MM*)
- Do not use the adjuvant R-11 (*MM*)
- Either avoid using glyphosate formulations containing POEA, or seek to use formulations with the least amount of POEA, to reduce risks to amphibians. (*MM*)
- Do not apply bromacil or diuron in rangelands, and use appropriate buffer zones (Tables A2-1 and 2) to limit contamination of off-site vegetation, which may serve as forage for wildlife. (*MM*)
- Do not aerially apply diquat directly to wetlands or riparian areas. (*MM*)
- To protect Special Status wildlife species, implement conservation measures for terrestrial animals presented in the *Vegetation Treatments on Bureau of Land Management Lands in 17 Western States Programmatic Biological Assessment* (See Appendix 5) (*MM*)

<u>Threatened, Endangered, and Sensitive Species</u>

See Manual 6840 (*SSS*)

- Provide clearances for SSS before treating an area as required by SSS Program policy. Consider effects to SSS when designing herbicide treatment programs. *(SOP)*
- Use a selective herbicide and a wick or backpack sprayer to minimize risks to Special Status plants. *(SOP)*
- Avoid treating vegetation during time-sensitive periods (e.g., nesting and migration, sensitive life stages) for SSS in area to be treated. *(SOP)*

<u>Livestock</u>

See Handbook H-4120-1 (*Grazing Management*)

- Whenever possible and whenever needed, schedule treatments when livestock are not present in the treatment area. Design treatments to take advantage of normal livestock grazing rest periods, when possible. *(SOP)*
- As directed by the herbicide product label, remove livestock from treatment sites prior to herbicide application, where applicable. *(SOP)*
- Use herbicides of low toxicity to livestock, where feasible. *(SOP)*
- Take into account the different types of application equipment and methods, where possible, to reduce the probability of contamination of non-target food and water sources. *(SOP)*
- Avoid use of diquat in riparian pasture while pasture is being used by livestock. *(SOP)*
- Notify permittees of the herbicide treatment project to improve coordination and avoid potential conflicts and safety concerns during implementation of the treatment. *(SOP)*
- Notify permittees of livestock grazing, feeding, or slaughter restrictions, if necessary. *(SOP)*
- Provide alternative forage sites for livestock, if possible. *(SOP)*
- Minimize potential risks to livestock by applying diuron, glyphosate, hexazinone, tebuthiuron, or triclopyr at the typical application rate where feasible. (*MM*)
- Do not apply 2,4-D, bromacil, dicamba, diuron, Overdrive®, picloram, or triclopyr across large application areas, where feasible, to limit impacts to livestock, particularly through contamination of food items. (*MM*)
- Where feasible, limit glyphosate and hexazinone to spot applications in rangeland. (*MM*)
- Do not apply bromacil or diuron in rangelands, and use appropriate buffer zones (Tables A2-1 and 2) to limit contamination of off-site vegetation, which may serve as forage for wildlife. (*MM*)

<u>Wild Horses and Burros</u>

- Minimize using herbicides in areas grazed by wild horses and burros. *(SOP)*
- Use herbicides of low toxicity to wild horses and burros, where feasible. *(SOP)*
- Remove wild horses and burros from identified treatment areas prior to herbicide application, in accordance with herbicide product label directions for livestock. *(SOP)*
- Take into account the different types of application equipment and methods, where possible, to reduce the probability of contaminating non-target food and water sources. *(SOP)*
- Minimize potential risks to wild horses and burros by applying diuron, glyphosate, hexazinone, tebuthiuron, and triclopyr at the typical application rate, where feasible, in areas associated with wild horse and burro use. (*MM*)
- Consider the size of the application area when making applications of 2,4-D, bromacil, dicamba, diuron, Overdrive®, picloram, and triclopyr in order to reduce potential impacts to wild horses and burros. (*MM*)
- Apply herbicide label grazing restrictions for livestock to herbicide treatment areas that support populations of wild horses and burros. (*MM*)
- Where practical, limit glyphosate and hexazinone to spot applications in rangeland. (*MM*)
- Do not apply bromacil or diuron in grazing lands within HMAs, and use appropriate buffer zones identified in Tables A2-1 and 2 to limit contamination of vegetation in off-site foraging areas. (*MM*)
- Do not apply 2,4-D, bromacil, or diuron in HMAs during the peak foaling season (March through June, and especially in May and June), and do not exceed the typical application rate of Overdrive® or hexazinone in HMAs during the peak foaling season in areas where foaling is known to take place. (*MM*)

<u>Cultural Resources and Paleontological Resources</u>

See handbooks H-8120-1 (*Guidelines for Conducting Tribal Consultation*) and H- 8270-1 (*General Procedural Guidance for Paleontological Resource Management*), and manuals 8100 (*The Foundations for Managing Cultural Resources*), 8120 (*Tribal Consultation Under Cultural Resource Authorities*). See also: *Programmatic Agreement among the Bureau of Land Management, the Advisory Council on Historic Preservation, and the National Conference of State Historic Preservation Officers Regarding the Manner in Which BLM Will Meet Its Responsibilities Under the National Historic Preservation Act.*

- Follow standard procedures for compliance with Section 106 of the National Historic Preservation Act as implemented through the *Programmatic Agreement among the Bureau of Land Management, the Advisory Council on Historic Preservation, and the National Conference of State Historic Preservation Officers Regarding the Manner in Which BLM Will Meet Its Responsibilities Under the National Historic Preservation Act* and State protocols or 36 Code of Federal Regulations Part 800, including necessary consultations with State Historic Preservation Officers and interested tribes. *(SOP)*
- Consult with tribes to locate any areas of vegetation that are of significance to the tribe and that might be affected by herbicide treatments; work with tribes to minimize impacts to these resources. *(SOP)*
- Follow guidance under Human Health and Safety in the PEIS in areas that may be visited by Native peoples after treatments. *(SOP)*
- Do not exceed the typical application rate when applying 2,4-D, bromacil, diquat, diuron, fluridone, hexazinone, tebuthiuron, and triclopyr in known traditional use areas. (*MM*)
- Avoid applying bromacil or tebuthiuron aerially in known traditional use areas. (*MM*)
- Limit diquat applications to areas away from high residential and traditional use areas to reduce risks to Native Americans. (*MM*)

Visual Resources

See handbooks H-8410-1 (*Visual Resource Inventory*) and H-8431-1 (*Visual Resource Contrast Rating*), and manual 8400 (*Visual Resource Management*)

- Minimize the use of broadcast foliar applications in sensitive watersheds to avoid creating large areas of browned vegetation. *(SOP)*
- Consider the surrounding land use before assigning aerial spraying as an application method. *(SOP)*
- Minimize off-site drift and mobility of herbicides (e.g., do not treat when winds exceed 10 mph; minimize treatment in areas where herbicide runoff is likely; establish appropriate buffer widths between treatment areas and residences) to contain visual changes to the intended treatment area. *(SOP)*
- If the area is a Class I or II visual resource, ensure that the change to the characteristic landscape is low and does not attract attention (Class I), or if seen, does not attract the attention of the casual viewer (Class II). *(SOP)*
- Lessen visual impacts by: 1) designing projects to blend in with topographic forms; 2) leaving some low-growing trees or planting some low-growing tree seedlings adjacent to the treatment area to screen short-term effects; and 3) revegetating the site following treatment. *(SOP)*
- When restoring treated areas, design activities to repeat the form, line, color, and texture of the natural landscape character conditions to meet established Visual Resource Management (VRM) objectives. *(SOP)*

Wilderness and Other Special Areas

See handbooks H-8550-1 (*Management of Wilderness Study Areas (WSAs)*), and H-8560-1 (*Management of Designated Wilderness Study Areas*), and Manual 8351 (*Wild and Scenic Rivers*)

- Encourage backcountry pack and saddle stock users to feed their livestock only weed-free feed for several days before entering a wilderness area, and to bring only weed-free hay and straw onto BLM lands. *(SOP)*
- Encourage stock users to tie and/or hold stock in such a way as to minimize soil disturbance and loss of native vegetation. *(SOP)*
- Revegetate disturbed sites with native species if there is no reasonable expectation of natural regeneration. *(SOP)*
- Provide educational materials at trailheads and other wilderness entry points to educate the public on the need to prevent the spread of weeds. *(SOP)*
- Use the “minimum tool” to treat noxious weeds and other invasive plants, relying primarily on the use of ground-based tools, including backpack pumps, hand sprayers, and pumps mounted on pack and saddle stock. *(SOP)*

- Use herbicides only when they are the minimum treatment method necessary to control weeds that are spreading within the wilderness or threaten lands outside the wilderness. *(SOP)*
- Give preference to herbicides that have the least impact on non-target species and the wilderness environment. *(SOP)*
- Implement herbicide treatments during periods of low human use, where feasible. *(SOP)*
- Address wilderness and special areas in management plans. *(SOP)*
- Control of weed infestations shall be carried out in a manner compatible with the intent of Wild and Scenic River management objectives. *(SOP)*
- Mitigation measures that may apply to wilderness and other special area resources are associated with human and ecological health and recreation (see mitigation measures for Vegetation, Fish and Other Aquatic Resources, Wildlife Resources, Recreation, and Human Health and Safety). (*MM*)

<u>Recreation</u>

See Handbook H-1601-1 (*Land Use Planning Handbook, Appendix C*)

- Schedule treatments to avoid peak recreational use times, while taking into account the optimum management period for the targeted species. *(SOP)*
- Notify the public of treatment methods, hazards, times, and nearby alternative recreation areas. *(SOP)*
- Adhere to entry restrictions identified on the herbicide product label for public and worker access. *(SOP)*
- Post signs noting exclusion areas and the duration of exclusion, if necessary. *(SOP)*
- Mitigation measures that may apply to recreational resources are associated with human and ecological health (see mitigation measures for Vegetation, Fish and Other Aquatic Resources, Wildlife Resources, and Human Health and Safety). (*MM*)

<u>Social and Economic Values</u>

- Consider surrounding land use before selecting aerial spraying as a treatment method, and avoid aerial spraying near agricultural or densely-populated areas. *(SOP)*
- Post treated areas and specify reentry or rest times, if appropriate. *(SOP)*
- Notify grazing permittees of livestock feeding restrictions in treated areas, if necessary, as per herbicide product label instructions. *(SOP)*
- Notify the public of the project to improve coordination and avoid potential conflicts and safety concerns during implementation of the treatment. *(SOP)*
- Control public access until potential treatment hazards no longer exist, per herbicide product label instructions. *(SOP)*
- Observe restricted entry intervals specified by the herbicide product label. *(SOP)*
- Notify local emergency personnel of proposed treatments. *(SOP)*
- Use spot applications or low-boom broadcast applications where possible to limit the probability of contaminating non-target food and water sources. *(SOP)*
- Consult with Native American tribes to locate any areas of vegetation that are of significance to the tribes and Native groups and that might be affected by herbicide treatments. *(SOP)*
- To the degree possible within the law, hire local contractors and workers to assist with herbicide application projects and purchase materials and supplies for herbicide treatment projects (including the herbicides) through local suppliers. *(SOP)*
- To minimize fears based on lack of information, provide public educational information on the need for vegetation treatments and the use of herbicides in an integrated vegetation management program for projects proposing local use of herbicides. *(SOP)*

<u>Rights-of-way</u>

- Coordinate vegetation treatment activities where joint or multiple use of a ROW exists. *(SOP)*
- Notify other public land users within or adjacent to the ROW proposed for treatment. *(SOP)*
- Use only herbicides that are approved for use in ROW areas. *(SOP)*

Human Health and Safety

- Establish a buffer between treatment areas and human residences based on guidance given in the HHRA, with a minimum buffer of ¼ mile for aerial applications and 100 feet for ground applications, unless a written waiver is granted. *(SOP)*
- Use protective equipment as directed by the herbicide product label. *(SOP)*
- Post treated areas with appropriate signs at common public access areas. *(SOP)*
- Observe restricted entry intervals specified by the herbicide product label. *(SOP)*
- Provide public notification in newspapers or other media where the potential exists for public exposure. *(SOP)*
- Store herbicides in secure, herbicide-approved storage. (*SOP*)
- Have a copy of MSDSs at work site. *(SOP)*
- Notify local emergency personnel of proposed treatments. *(SOP)*
- Contain and clean up spills and request help as needed. *(SOP)*
- Secure containers during transport. *(SOP)*
- Follow label directions for use and storage. *(SOP)*
- Dispose of unwanted herbicides promptly and correctly. *(SOP)*
- Use the typical application rate, where feasible, when applying 2,4-D, bromacil, diquat, diuron, fluridone, hexazinone, tebuthiuron, and triclopyr to reduce risk to workers and the public. (*MM*)
- Avoid applying bromacil and diuron aerially. Do not apply sulfometuron methyl aerially. (*MM*)
- Limit application of chlorsulfuron via ground broadcast applications at the maximum application rate. (*MM*)
- Limit diquat application to ATV, truck spraying, and boat applications to reduce risks to workers; limit diquat applications to areas away from high residential and subsistence use to reduce risks to the public. (*MM*)
- Evaluate diuron applications on a site-by-site basis to avoid risks to humans. There appear to be few scenarios where diuron can be applied without risk to workers. (*MM*)
- Do not apply hexazinone with an over-the-shoulder broadcast applicator (backpack sprayer). (*MM*)

Individual Herbicide Summaries

The following information about each of the 18 herbicides has been compiled for reference from information within the EIS. More information, including comparisons with other herbicides, can be found at the following locations:

- Examples of product names used on BLM lands can be found in this Appendix (Appendix 9);
- Species that an herbicide is effective on is contained in Appendix 7;
- Estimated Annual Treatment Acres is from Table 3-3 (Chapter 3);
- Selected Risk Categories includes data from Table 3-12 through 3-21 (Chapter 3), which summarizes the Risk Assessment information in (uncirculated) Appendix 8. H (High), M (Moderate), L (Low), and 0 (no risk) risk categories are defined in the Chapter 3 tables;
- Leaching, persistence and half-life information can be found in:
  - Table 3-1 (*The 18 Herbicides* section in Chapter 3)
  - Table 4-14 (*Soil Resources* section in Chapter 4)
  - Table 4-17 (*Water Resources* section in Chapter 4)
  - Table 4-20 (*Wetlands and Riparian Areas* section);
- PEIS Mitigation Measures and Standard Operating Procedures can be found in Appendix 2; and,
- All other information can be found in the *The 18 Herbicides* section in Chapter 3.