

BURNED AREA EMERGENCY STABILIZATION PLAN

MURPHY FIRE COMPLEX: WILDHORSE ZONE

VEGETATION/RANGE RESOURCE ASSESSMENT

I. OBJECTIVES

- Evaluate and assess fire and suppression impacts to vegetative resources.
- Determine emergency stabilization and monitoring needs supported by specifications to aid in vegetation recovery and soil stabilization efforts.
- Evaluate the potential for non-native invasive plant species encroachment into native plant communities within the fire area and determine stabilization and monitoring needs to mitigate encroachment.

II. ISSUES

- Short and long-term effects of the fire and suppression activities on plant communities and vegetative resources.
- Re-establishment of vegetation on areas disturbed by suppression activities.
- Potential for cheatgrass invasion in Trail Gulch area, Rattlesnake Canyon, and lower Bruneau River drainage.
- Potential for invasion of impacted lands by noxious weeds.
- Natural recovery and revegetation of burned areas, including cottonwood and aspen stands.
- Resting of grazing allotments to aid in vegetation recovery.
- Protection and enhancement of other resource values including site productivity, Forest Sensitive species, and Prescriptive Use Area.

III. OBSERVATIONS

This report addresses known and potential impacts to vegetative resources on US Department of Agriculture, Forest Service (FS), Humboldt-Toiyabe National Forest administered lands within the fire area. Findings and recommendations contained in this assessment are based upon information obtained from personal interviews and meetings with staff from the Forest Service- Elko, Nevada Department of Wildlife (NDOW), Nevada Division of Forestry (NDF), Burned Area Emergency Response (BAER) team specialists, literature reviews, previous emergency stabilization plans and field reconnaissance of the fire area.

A. Background

Initial ignition of the fire was on July 16, 2007 at 1912 hours due to lightning. On July 19 the California Interagency Incident Management (CIIMT) # 1 assumed command of the Murphy Fire Complex, which was composed of the Rowland and Elk Mountain Fires in Idaho. On July 20 the fires merged into a single 511,000 acre fire. From July 23 to 25 the Murphy Fire Complex burned into the State of Nevada and onto Forest Service lands administered by the Mountain City Ranger District (RD) of the Humboldt-Toiyabe National Forest. The Murphy Fire Complex was divided into two zones, the Castleford (north) zone and the Wildhorse (south) zone. The CIIMT #1 assumed command of the Castleford Zone and CIIMT #2 assumed command of the Wildhorse Zone. The National Interagency BAER Team (Gasser) arrived on July 29 and was tasked to assess the Murphy Fire Complex, Wildhorse Zone Forest Service lands.

VEGETATION

Pre-Fire Vegetation

A variety of vegetation communities occur within the boundary of the Murphy Fire Complex: Wildhorse Zone, including sagebrush dominated communities (both mountain big sagebrush and low sagebrush), montane deciduous shrublands, riparian woodlands and meadows, aspen communities, coniferous forests, curlleaf mountain mahogany woodlands, juniper woodlands, perennial forb, agriculture and pasture lands, and invasive annual grasslands. Table 1 displays the existing vegetation type groups within the fire perimeter. Listed below are descriptions of the vegetation cover types on FS lands found within the fire perimeter. The map layer created for this assessment was derived from the LANDFIRE Existing Vegetation Layer (USDA Forest Service, 2006), and the National Map LANDFIRE: LANDFIRE National Existing Vegetation Type Layer (USGS, 2006). The vegetation cover descriptions are based partly on the Southwest ReGap Vegetation Classification (NatureServe, 2004). The vegetation classification is based on the National Vegetation Classification System (NVCS).

Table 1: Vegetation types impacted by the Murphy Fire Complex: Wildhorse Zone

Vegetation Community	Total Acres	Percent
Big Sagebrush Shrubland	63,805	67
Low Sagebrush Steppe	8,885	9
Mixed Montane Deciduous Shrubland	6,716	7
Curlleaf Mountain Mahogany Woodland	686	0.7
Juniper Woodlands	502	0.5
Perennial Forb – Sparsely Vegetated	11	<0.1
Coniferous Forest	429	0.4
Aspen Woodland	8,054	9
Riparian Woodlands and Meadows	5,615	6
Agricultural Pastureland	312	0.3
Introduced Annuals	124	0.1
Barren/Rock	24	<0.1
Grand Total	95,163	100

The LANDFIRE map layer of existing vegetation types showed 37 different vegetation types within the Murphy Fire Complex: Wildhorse Zone. Due to scale of mapping, accuracies of satellite imagery, simulation models and lack of total ground truthing on the Humboldt-Toiyabe NF, some of the cover types did not exist within the burn area and other types that comprise small acreages were merged with other vegetation types. To better reflect local management needs, the vegetation types were grouped into 11 vegetation cover types. These are listed below.

Aspen Woodland

Aspen woodlands are found in riparian drainages and on hill slopes from about 6000 to 9000 feet elevation. Stands average in size from about five acres to several hundred acres and are comprised of one to several clones. These woodlands are multi-layered, consisting of a tree layer, shrub layer and herbaceous layer. Vegetative cover usually exceeds 150%.

The tree layer consists primarily of aspen (*Populus tremuloides*), sometimes with conifers such as subalpine fir (*Abies lasiocarpa*), limber pine (*Pinus flexilis*) or Rocky Mountain juniper (*Juniperus scopulorum*). The shrub layer consists of snowberry (*Symphoricarpos oreophilus*), serviceberry (*Amelanchier alnifolia*), currant or gooseberry (*Ribes* spp.), chokecherry (*Prunus virginiana*), grey alder (*Alnus incana*) and Oregon grape (*Mahonia repens*).

The understory herbaceous layer is primarily shade tolerant, tall forbs and grasses. The most common herbaceous species are sweet anise (*Osmorhiza occidentalis*), meadowrue (*Thalictrum fendleri*), columbine (*Aquilegia formosa*), monkshood (*Aconitum columbianum*), False Solomon's seal

(*Maianthemum stellatum*), mountain bluebells (*Mertensia oblongifolia*), showy stickseed (*Hackelia floribunda*), wild geranium (*Geranium viscosissimum*), nettleleaf horsemint (*Agastache urticifolia*), larkspur (*Delphinium nuttallianum*), checker mallow (*Sidalcea oregana*), mountain brome (*Bromus marginatus*), Columbia needlegrass (*Achnatherum nelsonii*) and slender wheatgrass (*Elymus trachycaulus*).

Riparian Woodlands and Meadows

The riparian areas are mostly found in narrow canyons next to streams or adjacent to springs on side or perched drainages. Sites with high rock content and rapid flowing water tend to be dominated by wooded species and areas with low water flow gradients tend to be herbaceous dominated. Vegetative cover typically exceeds 150%.

Common wooded species include Pacific willow (*Salix lasiandra*), Booth's willow (*Salix boothii*), yellow willow (*Salix lutea*), grey alder (*Alnus incana*), dogwood (*Cornus sericea*), thimbleberry (*Rubus parviflora*), wax currant (*Ribes cereum*), golden currant (*Ribes aureum*) and prickly current (*Ribes lacustre*).

Common herbaceous species include Nebraska sedge (*Carex nebrascensis*), small-wing sedge (*Carex microptera*), field sedge (*Carex praegracilis*), slender beaked sedge (*Carex athrostachya*), Baltic rush (*Juncus balticus*), sword-leaf rush (*Juncus ensifolius*), tufted hairgrass (*Deschampsia caespitosa*), mannagrass (*Glyceria striata*) and Nevada bluegrass (*Poa secunda* ssp. *juncifolia*).

Coniferous Forest

Coniferous forest community types are most common on north facing hill slopes above 7500 feet. These areas are commonly snow covered into late spring or early summer. While overstory cover is typically greater than 60%, the understory cover tends to be below 30%.

Throughout much of the burn area the dominant tree is subalpine fir (*Abies lasiocarpa*) with some limber pine (*Pinus flexilis*) and aspen (*Populus tremuloides*). Understory species include snow currant (*Ribes niveum*), whitestem gooseberry (*Ribes inerme*), snowberry (*Symphoricarpos oreophilus*), Ross' sedge (*Carex rossii*), Sandberg's bluegrass (*Poa secunda*), Idaho fescue (*Festuca idahoensis*), Chamisso arnica (*Arnica chamissonis*) and subalpine daisy (*Erigeron peregrinus*).

Mixed Montane - Deciduous Shrubland

These plant communities generally have colder, deeper soils and slightly more moisture availability than the adjacent big sagebrush shrublands, and tend to occur between big sagebrush and aspen plant communities. Vegetative cover tends to be slightly more than 100%.

The dominant shrub species are chokecherry (*Prunus virginiana*), serviceberry (*Amelanchier alnifolia*), snowberry (*Symphoricarpos oreophilus*), wax currant (*Ribes cereum*), gooseberry currant (*Ribes montigenum*) and elderberry (*Sambucus nigra*).

Understory species include Great Basin wildrye (*Leymus cinereus*), Idaho fescue (*Festuca idahoensis*), bluebunch wheatgrass (*Pseudoroegneria spicata*), slender wheatgrass (*Elymus trachycaulus*), Letterman's needlegrass (*Achnatherum lettermanii*), Sandberg's bluegrass (*Poa secunda*), mountain brome (*Bromus marginatus*), nettleleaf horsemint (*Agastache urticifolia*), wild geranium (*Geranium viscosissimum*), sweet anise (*Osmorhiza berteroi*), arrowleaf balsamroot (*Balsamorhiza sagittata*), dwarf waterleaf (*Hydrophyllum capitatum*), wild forget-me-not (*Hackelia floribunda*), Indian paintbrush (*Castilleja angustifolia*), bluebells (*Mertensia ciliata*), Rydberg's penstemon (*Penstemon rydbergii*), one-flowered sunflower (*Helianthella uniflora*) and hawkbeard (*Crepis acuminata*).

Agricultural Pastureland

These areas are primarily Nevada State lands that were purchased about 20 years ago for wildlife habitat enhancement. At the time of purchase, the pastures were irrigated native and seeded hay meadows, but are currently converting back to more natural functioning systems. Vegetative cover generally exceeds 100%, most of which are graminoids. Due to inherent errors in satellite imagery used to create the LANDFIRE map, ground truthing revealed that approximately 80 acres mapped as agricultural land was actually introduced annuals.

Common species are meadow barley (*Hordeum brachyantherum*), Nevada bluegrass (*Poa secunda* ssp. *juncifolia*), slender beaked sedge (*Carex athrostachya*), field sedge (*Carex praegracilis*), smallwing sedge (*Carex microptera*), Nebraska sedge (*Carex nebrascensis*), timothy (*Phleum pratense*), meadow foxtail (*Alopecurus pratensis*), Kentucky bluegrass (*Poa pratensis*), bulrush (*Scirpus microcarpus*), Baltic rush (*Juncus balticus*), water ragwort (*Senecio hydrophilus*), yellow pea (*Thermopsis rhombifolia*), Western aster (*Symphyotrichum spathulatum*) and rosy pussytoes (*Antennaria microphylla*).

Juniper Woodlands

The juniper woodlands are situated on dry, rocky slopes and ridges scattered within the burned area. The species is Utah juniper (*Juniperus osteosperma*) possibly with some Western juniper (*Juniperus occidentalis*) hybridization. Vegetative cover is typically less than 75%. Surface pavement and rock is common.

Common understory species include early sagebrush (*Artemisia arbuscula* ssp. *longiloba*), mountain big sagebrush (*Artemisia tridentata* ssp. *vaseyana*), bitterbrush (*Purshia tridentata*), serviceberry (*Amelanchier alnifolia*), Sandberg's bluegrass (*Poa secunda*), bluebunch wheatgrass (*Pseudoroegneria spicata*), Idaho fescue (*Festuca idahoensis*), Letterman's needlegrass (*Achnatherum lettermanii*), lava aster (*Ionactis alpina*), dusty maiden (*Chaenactis douglasii*) and threadleaf fleabane (*Erigeron filiformis*).

Big Sagebrush Shrubland

The big sagebrush cover type is located on hill slopes throughout the burned area. It is generally found on fairly deep, well-drained soils. The dominant species of big sagebrush is mountain big sagebrush (*Artemisia tridentata* ssp. *vaseyana*). Vegetative cover is generally less than 90%.

Associated shrub species include bitterbrush (*Purshia tridentata*), serviceberry (*Amelanchier alnifolia*), snowberry (*Symphoricarpos oreophilus*), snowbrush (*Ceanothus velutinus*), low sagebrush (*Artemisia arbuscula*), whorled buckwheat (*Eriogonum heracleoides*), sulfur buckwheat (*Eriogonum umbellatum*) and, wax current (*Ribes cereum*).

Herbaceous species include Sandberg's bluegrass (*Poa secunda*), bluebunch wheatgrass (*Pseudoroegneria spicata*), Idaho fescue (*Festuca idahoensis*), Letterman's needlegrass (*Achnatherum lettermanii*), arrowleaf balsamroot (*Balsamorhiza sagittata*), spotted stickseed (*Hackelia patens*), longleaf phlox (*Phlox longifolia*), stoneseed (*Lithospermum ruderale*), cinquefoil (*Potentilla gracilis*), yarrow (*Achillea millefolium*), silver lupine (*Lupinus argenteus*), milkvetch or locoweed (*Astragalus* spp.), biscuitroot (*Lomatium* spp.), sego lily (*Calochortus nuttallii*), Indian paintbrush (*Castilleja angustifolia*), , Rydberg's penstemon (*Penstemon rydbergii*), hawksbeard (*Crepis acuminata*), Columbia ragwort (*Senecio integerrimus*), Geyer's onion (*Allium geyeri*), and threadleaf fleabane (*Erigeron filiformis*).

Low Sagebrush Steppe

The low sagebrush steppe occurs on ridgelines and hill slopes in the burned area. These sites tend to have shallow soils and a significant amount of surface rock and pavement. The dominant species of sagebrush is early sagebrush (*Artemisia arbuscula* ssp. *longiloba*). Vegetative cover is typically less than 70%.

Common understory species include Sandberg's bluegrass (*Poa secunda*), bluebunch wheatgrass (*Pseudoroegneria spicata*), Idaho fescue (*Festuca idahoensis*), Letterman's needlegrass (*Achnatherum lettermanii*), squirreltail (*Elymus elymoides*), silver lupine (*Lupinus argenteus*), slender buckwheat

(*Eriogonum microthecum*), sulfur buckwheat (*Eriogonum umbellatum*), matted buckwheat (*Eriogonum caespitosum*), dwarf paintbrush (*Castilleja nana*), woolly sunflower (*Eriophyllum lanatum*), dusty maiden (*Chaenactis douglasii*) and threadleaf fleabane (*Erigeron filiformis*). At higher elevations such as in the Hicks Summit area, Hood's phlox (*Phlox hoodii*) was a common associate of low sagebrush.

Curleaf Mountain Mahogany Woodland

The curleaf mountain mahogany cover type occupies rocky ridges and moderate hill slopes in areas with shallow soils and exposed, fractured bedrock. The dominant cover species is mountain mahogany (*Cercocarpus ledifolius*). Total plant cover is usually less than 70%.

Common associated species include mountain big sagebrush (*Artemisia tridentata* ssp. *vaseyana*), low sagebrush (*Artemisia arbuscula*), bitterbrush (*Purshia tridentata*), serviceberry (*Amelanchier alnifolia*), and snowberry (*Symphoricarpos oreophilus*), Utah juniper (*Juniperus osteosperma*), bluebunch wheatgrass (*Pseudoroegneria spicata*), Idaho fescue (*Festuca idahoensis*), Columbia needlegrass (*Achnatherum nelsonii*), milkvetch or locoweed (*Astragalus* spp.), rockcress (*Boechera* spp.), rock spirea (*Petrophyton caespitosum*), jewelflower (*Streptanthus cordatus*), Oregon grape (*Mahonia repens*), matted buckwheat (*Eriogonum caespitosum*), Rydberg's penstemon (*Penstemon rydbergii*), toadflax (*Comandra umbellata*), scarlet gilia (*Ipomopsis aggregata*), prickly sandwort (*Arenaria aculeata*) and western aster (*Symphyotrichum spathulatum*).

Perennial Forb – Sparsely Vegetated

This vegetative cover type is dominated by low growing shrubs and forbs and is often found at high elevations on rocky ridges and areas with poor soil development. Vegetative cover is often less than 50%. Due to sparse plant life, these areas usually burn very lightly, if at all.

Dominant species include low sagebrush (*Artemisia arbuscula* ssp. *longiloba*), matted buckwheat (*Eriogonum caespitosum*), Lewis buckwheat (*Eriogonum lewisii*), bitterroot (*Lewisia rediviva*), pygmy bitterroot (*Lewisia pygmaea*), ballhead gilia (*Ipomopsis congesta*), woolly sunflower (*Eriophyllum lanatum*), stemless mock goldenweed (*Stenotus acaulis*), narrowleaf mock goldenweed (*Stenotus stenophyllum*), woolly groundsel (*Packera cana*), scorpion milkvetch (*Astragalus lentiginosus* ssp. *scorpionis*), egg milkvetch (*Astragalus oophorus*), rock spirea (*Petrophyton caespitosum*) and Chambers' twinpod (*Physaria chambersii*).

Introduced Annuals

This is a disturbance induced plant community that has been altered to an extent that it is functioning outside of its natural parameters. Soil types and slopes are variable, but the soil surface is often depleted of organic matter and moisture holding capacity. Vegetative cover is typically less than 60%. Due to inherent errors in satellite imagery used to create the LANDFIRE map, ground truthing revealed that approximately 80 acres mapped as agricultural land was actually introduced annuals.

Common species associated with this cover type are cheatgrass (*Bromus tectorum*), tumbled mustard (*Sisymbrium altissimum*), pale alyssum (*Alyssum alyssoides*), false flax (*Camelina microcarpa*), Basin blue eyes (*Nemophila brevifolia*), and white-stem blazing star (*Mentzelia albicaulis*).

Barren

These are cliffs, rock outcrops, areas subjected to mining activities, and generally poor quality soils devoid of vegetation. The vegetation that is found on barren lands is reflective of the adjacent dominant plant community. Many of these sites are also habitats for sensitive and other rare plant species.

Minor plant communities

Other minor plant alliances that comprise a small component within the burn area include Great Basin big sagebrush (*Artemisia tridentata* ssp. *tridentata*), Wyoming big sagebrush (*A. tridentata* ssp. *wyomingensis*), and cottonwood (*Populus balsamifera* ssp. *trichocarpa*). These communities were not mapped and are not represented on the pre-fire vegetation map. The Great Basin Big sagebrush alliance is a part of the Inter-Mountain Basins Big Sagebrush Shrubland vegetative type and can be found in the

lower reaches of Bruneau Canyon on relatively flat floodplains of the river. Common associates include basin wildrye (*Leymus cinereus*), western wheatgrass (*Pascopyrum smithii*), and field sedge (*Carex praegracilis*). On the more disturbed sites, especially those associated with agriculture and pasturelands, the understory is comprised primarily of cheatgrass.

The Wyoming big sagebrush alliance is a part of the Great Basin Xeric Mixed Sagebrush Shrubland type and is found on the more arid and gentle slopes above the lower reaches of the Bruneau River and towards the Rowland area. Dominant species include Sandberg's bluegrass (*Poa secunda*), squirreltail (*Elymus elymoides*), and Thurber's needlegrass (*Achnatherum therberiana*). More disturbed sites have an understory dominated by cheatgrass.

A third community is the black cottonwood alliance. This community is small (5 to 10 acres in the burn area) but is of local concern. Stands are located along Meadow creek and Bruneau River. Common associates include dogwood (*Cornus sericea*), alder (*Alnus incana*), yellow willow (*Salix lutea*), mountain brome (*Bromus marginatus*), and slender wheatgrass (*Elymus trachycaulus*). All of these plant alliances are important for wildlife habitat and NDOW has expressed concerns for this loss in the basin big and Wyoming big sagebrush communities. The local staff of the FS Mountain City Ranger District is concerned about the regeneration of cottonwoods in the burn area.

The map layer underestimated or did not map open water. There is approximately 28 acres of open water; this is mapped with mostly the riparian woodlands and meadows cover group.

Native vegetation was disturbed by suppression activities and an issue by local FS staff was the regeneration on these disturbed areas. Approximately 30 miles of dozerline and almost ½ mile of hand line was known to be constructed in the Murphy Fire Complex: Wildhorse Zone. Safety zones and other staging areas were also constructed in the fire area and revegetation and weed invasion on these sites is a concern.

Threatened, Endangered and Sensitive Species

There are no known threatened or endangered plants in or near the Murphy Fire Complex: Wildhorse Zone. There are 8 species of concern present in, within 1 mile, or suspected to occur in the burn area; 7 of these are Region 4 (R4) Forest Sensitive species (S) and 1 is a watch (W) species. Table 2 shows the species of concern, their status (R4/global/state), and habitat where found. All of the species are actively inventoried for and considered At-Risk by the Nevada Natural Heritage Program (NNHP). A species is considered at-risk if it has federal or Nevada agency status and a Global or State ranking of 1-3, indicating some level of imperilment. (NNHP, 2007).

Table 2: Sensitive and Rare Plant Species

Species	Status (R4/G/S) ¹	Community/Habitat
<i>Antennaria arcuata</i> Meadow pussytoes	S/G2/S1	Moist meadows/seasonally moist alkaline meadows, seeps & springs in silver sagebrush & grassland associations.
<i>Botrychium ascendens</i> Upswept moonwort	S/G2-3/ S1	Seeps & springs/alpine & avalanche meadows, & grassy roadsides. Affinity for limestone and calcareous soils. Suspected.
<i>Botrychium crenulatum</i> Dainty moonwort	S/G3/S1	Seeps & springs/very moist sites with saturated soil and dense vegetation. Higher elevations. Affinity for limestone and calcareous soils. Suspected.
<i>Eriogonum douglasii</i> var. <i>elkoense</i> Sunflower Flat buckwheat	W/G5T1/ S1	Sagebrush/gentle slopes with rocky clay soils. In patches of less dense vegetation. Newly described.
<i>Eriogonum lewisii</i> Lewis' buckwheat	S/G2-3/ S2-3 3Q	Mountain big or low sagebrush/dry, exposed, shallow, relatively barren, undisturbed rocky residual soils on convex ridge lines & crests underlain by siliceous carbonate rocks, on flat to moderately steep slopes. Clay hills at lower elevations. Taxonomy in question.
<i>Lathyrus grimesii</i> Grimes' vetchling	S/G2/S2	Sagebrush, mountain shrub/dry, open, shallow, silty clay soils overlain by a thin scree of reddish to yellowish brown gravel, stone, and clay that form relatively barren patches on mostly steep slopes of all aspects with sparse to moderately sparse vegetation.
<i>Phacelia minutissima</i> Least phacelia	S/G3/S2	Riparian/ Vernal saturated, summer drying, sparsely vegetated, partially shaded to fully exposed areas of bare soil and mud banks in meadows at perimeters of mules ear, corn lily, and aspen.
<i>Trifolium leibergii</i> Leiberg's clover	S/G2/S2	Sagebrush to pinyon-juniper/dry, shallow, relatively barren gravel soils of crumbling volcanic outcrops, bare shale crests, talus slopes, and reddish ash flow tuft.

¹ Nevada Natural Heritage Program Global (Grank) and State (Srank) Ranks for Threats and/or Vulnerability:

- G Global rank indicator, based on worldwide distribution at the species level
- T Global trinomial rank indicator, based on worldwide distribution at the infraspecific level
- S State rank indicator, based on distribution within Nevada at the lowest taxonomic level
 - 1 Critically imperiled and especially vulnerable to extinction or extirpation due to extreme rarity, imminent threats, or other factors
 - 2 Imperiled due to rarity or other demonstrable factors
 - 3 Vulnerable to decline because rare and local throughout its range, or with very restricted range
 - 4 Long-term concern, though now apparently secure; usually rare in parts of its range, especially at its periphery
 - _Q Taxonomic status uncertain

There is very little fire effects information on rare plants and none on the species listed above. There is a Conservation Status Report for Lewis' buckwheat (Morefield, 1996).

Invasive Species and Noxious Weeds

Noxious weeds and non-native invasive species are present in the burn area. Noxious weeds are now recognized worldwide as posing threats to biological diversity—second only to direct habitat loss and fragmentation. Noxious weeds are known to alter ecosystem functions such as nutrient cycles, hydrology, and wildfire frequency; to outcompete and exclude native plants and animals; and to hybridize with native species. The presence and abundance of noxious weeds in an ecosystem are highly dynamic, subject to changes in the local environment. (Whitson, T.D., et al. 1992, Cal-Ipc, 2007). Commonly, sagebrush and

other shrub communities become infested with noxious weeds (typically cheatgrass) following fires. Greater invasive plant dominance can increase landscape flammability, and greater fire frequency can increase vulnerability to invasion (Brooks and Pyke, 2001.) All natural communities are susceptible to invasion by noxious weeds.

Noxious weeds and non-native invasive species that have been identified to exist in and adjacent to the burn area include:

- Canada thistle – *Cirsium arvense*
- Musk thistle – *Carduus nutans*
- Plumeless thistle – *Carduus acanthoides*
- Yellowspine thistle – *Cirsium ochrocentrum*
- Bull thistle – *Cirsium vulgare*
- Scotch thistle – *Onopordum acanthium*
- Perennial pepperweed – *Lepidium latifolium*
- Whitetop (hoary cress) – *Cardaria draba*
- Cheatgrass – *Bromus tectorum*

Yellowspine thistle is a native to the mid western US but has become a weed in western states including Nevada. It is becoming more common along roads in the burn area. The northern part of the fire area--the mesa north of Road 751, Trail Gulch area, Rattlesnake Canyon, and the lower reaches of Meadow Creek and Bruneau River—has localized infestations of cheatgrass and local staff has concern for further expansion of cheatgrass into the burn area. Cheatgrass has steadily increased its hold on western rangelands over the past several decades. It frequently invades landscapes after wildfire, forming dense stands with fine fuels that shorten typical fire intervals. Thus cheatgrass and wildfire form a positive feedback mechanism that threatens native ecosystems and often impacts critical wildlife habitat. Cheatgrass dominated communities have shallow root systems that increase erosion potential, decrease watershed health and function and provide low nutritional value for wildlife and domestic livestock.

Range Resources

Consultation with staff from the FS Mountain City RD was conducted on range management issues. Rangeland management staff provided the data for allotments impacted. Many of the permitted animal (or head) months are potentially impacted due to the extent of the burns and existing rangeland projects, i.e. fencing and water sources. Impacts to the grazing allotments have occurred as a result of the loss of upland, riparian, and wetland riparian habitats. Eleven grazing allotments of the Mountain City RD were affected by the fire, which in turn affected five permittees. The Buck Creek grazing allotment is in the Jarbridge RD and the part contiguous to the main fire area (next to the Diamond A and Wickiup allotments and the Prescriptive Use Area) did not burn at all. The 129 acre burned portion on the Nevada/Idaho state line and 1 mile due east of the main fire area, Nevada portion, was not inspected by either air or ground. Table 3 shows the existing permits with season of use, numbers and kind of livestock, and grazing system.

Table 3: Grazing Allotments (Mountain City RD) in the Burn Area

Allotment	Permittee	Permitted Use	Permitted Livestock	Head (Animal) Months	Grazing System	# Pastures
Copper Cottonwood S&G	Ellison Ranching Company	7/1 to 10/10	2000 e/l; 4 horse	1677	DR	1
North Copper S&G	Ellison Ranching Company	7/1 to 10/10	4400 e/l; 4 horse	Part of Wickiup	DR	1
Tennessee Mountain S&G	Ellison Ranching Company	7/1 to 10/10	2675 e/l; 4 horse	3099	DR	1

Allotment	Permittee	Permitted Use	Permitted Livestock	Head (Animal) Months	Grazing System	# Pastures
West Bruneau River S&G	Ellison Ranching Company	7/1 to 10/10	4400 e/l; 4 horse	6931	DR	1
Wickiup S&G	Ellison Ranching Company	7/1 to 10/10	4400 e/l; 4 horse	5365	DR	1
Copper Basin S&G	Ellison Ranching Company	7/1 to 10/10	2000 e/l; 4 horse	6700	DR	1
McDonald Creek C&H	Simplot	6/20 to 9/19	485 c/c	1467	DR	4
Sunflower Flat C&H	Cal Worthington Trust	6/6 to 10/5	849 c/c	3405	RR	4
Telephone C&H	Cal Worthington Trust	6/1 to 10/1	281 c/c	1136	Modified RR	5
Diamond A C&H	Gary Stowell	6/16 to 10/15	345 c/c, 7 horses	1598	DR	2
Bruneau Summer C&H	Prunty	6/16 to 10/15	130 c/c	521	DR	2

S&G = sheep and goat, C&H = cow and horse

DR = deferred rotation

RR = rest rotation

e/l = ewe with lamb(s)

c/c = cow with calf

B. Reconnaissance Methodology and Results

When the BAER team arrived, meetings were held with local agency staff to identify issues and determine the focus for conducting resource assessment. Information on vegetation resources, Forest sensitive plant species, invasive plants, possible seeding and other vegetation treatments, range management including range improvements (fences, water developments, etc) and other resources were obtained from specialists from the FS-Elko, NDF, and NDOW.

Identification and mapping of vegetation mortality was aided by using post-fire satellite image-derived reflectance classification. A Burned Area Reflectance Classification (BARC) is a satellite image-derived map of post-fire changes in spectral reflectance. This is used in combination with field observations to develop a map of post-fire vegetation mortality. The USGS EROS Data Center in Sioux Falls, South Dakota obtains and processes the images to produce the BARC map. The BARC map was evaluated by field visits and helicopter reconnaissance, and classification break points were adjusted to produce the final vegetation mortality map.

Another map that is derived from the BARC by the BAER team is the soil burn severity map. These maps look similar, but for the Murphy Fire Complex: Wildhorse Zone, the vegetation mortality BARC classification break points were different than for the soil burn severity. The soil burn severity map is a representation of fire-caused changes to soil characteristics that affect runoff, erosion, and vegetation recovery (see discussion of soil burn severity in the Soil and Watershed Resource Assessment portion of

this document). The vegetation mortality map is a representation of immediate post-fire vegetation condition. These two conditions (soil burn severity and vegetation mortality) are not always directly correlated, since a community of sparse, or light and 'flashy' fuel such as grasses burn quickly with short heat residence time, and soils are little affected.

Ground surveys were conducted from July 31 through August 4 and a low level aerial reconnaissance was conducted on August 3 to collect data and determine fire effects to vegetation. Ground reconnaissance included driving (truck and ATV) and hiking to remote areas and recording observations on plant community types, burn mortality, non-native invasive species, damages to range improvements, and suppression damage. Coordination was done with other specialists on the team.

When conducting vegetation mortality mapping the vegetation specialists look at all the layers of vegetation—trees, shrubs, and herbaceous (forbs and grasses). We determined the immediate post-fire effects on vegetation, the top kill of vegetation. For the purposes of this assessment, mortality in sagebrush, deciduous shrublands, and riparian areas was averaged out between grasses and shrubs. This is necessitated by the need to create one vegetation mortality map. For perennial grasses we looked at not only the amount of vegetation above the root crown that was burned off but at the root crown itself. The entire top portion could be burned off but the root crown could be intact. We looked at the tissue at and below ground level to determine how deep the fire burned into the plant. On many grass fires, fire moves quickly across the landscape with little residency time; the leaves and culms are removed but the fire moves on before it burns any of the root crown. This would be determined to have low vegetation mortality. The degree of fire residency time and how deep into the root crown the fire penetrates will determine the level of mortality.

For shrubs such as sagebrush (woody species), mortality was determined by how much of the top portion was removed—the stems, branches, leaders, flowering stalks. We looked at how much living material was left which is a factor of amount of leaves remaining, if the bark was burned off, and if moisture is still in the stems. Vegetation specialists use literature reviews and professional field experience to determine the percent or amount of living tissue and material that is remaining after a fire burns over a plant. If the entire top portion of a grass is burned off, the entire root crown is intact (has viable living tissue) and the sagebrush was entirely burned to the ground, the grass would have low mortality and the shrub high mortality. The site would then have a determination of moderate vegetation mortality. This may or may not be a reflection of vegetation recovery. For a discussion of vegetation recovery and fire effects, see Findings below.

C. Findings

Fire Suppression Damage to Vegetation

Dozer lines occurred in the Murphy Fire Complex: Wildhorse Zone. Approximately 31 miles of dozer lines were established in the suppression effort. Some of the lines supported existing roads or widened road prisms. It was noted that some of the dozer lines had the berms pulled back, with pre-existing vegetation laid back on the surface. Effects to vegetation will vary depending on the size of the line and the pre-fire vegetation condition. On many of the dozer lines, vegetation is expected to recover, but they will need a longer recovery period than areas affected by fire alone. Soil and vegetation pulled back over the lines during rehabilitation should facilitate natural recovery of the lines; however, a greater opportunity exists for non-native invasive species to establish during the extended recovery period.

Analysis of the Sensitive Plant and Suppression damage maps indicates that nearly 2 1/2 miles of occupied habitat of Lewis' buckwheat (*Eriogonum lewisii*) is potentially impacted by the construction of dozer lines on Klondyke Mtn; the boundary between the Mountain City and Jarbridge RD's. The Conservation Status Report for Lewis' buckwheat (Morefield, 1996), states that the ridgeline habitat of Lewis' buckwheat is convenient for access roads, off-road vehicle use, livestock supplementation and resultant trampling, transmission facilities, and fire suppression activities. Morefield has not observed this species spreading off its habitat along disturbance corridors, and permanent loss of plants is evident where disturbance has been continuous and severe, such as road beds bisecting the habitat.

Vegetation Mortality

The degree of fire-related vegetation mortality was determined using a combination of satellite imagery, aerial reconnaissance, and ground surveys. The BARC image was verified by aerial and ground reconnaissance observations and refined as necessary. A Vegetation Mortality Map is found in Appendix IV. Vegetation mortality was classified into the following four categories based on immediate post fire mortality of the above-soil plant parts:

- Unburned to Low mortality (0-25%)
- Low mortality (26-50%)
- Moderate mortality (51-75%)
- High mortality (76-100%)

For the purposes of this assessment, vegetation mortality refers to immediate post fire mortality of the above-soil plant parts. These classifications do not imply long term vegetation mortality or recovery potential. Resprouting and releafing from epicormic plant parts or root crowns can occur on many species based on specific plant physiological characteristics, degree of injury, climatic conditions, environmental stress such as drought, and the presence of other damaging agents, including animals and insects. Vegetation mortality classification parameters include degree of consumption of herbaceous, shrub, and forest/woodland vegetation communities, and effects of the fire on the regeneration potential of the affected vegetation species. Table 4 displays the immediate post-fire vegetation mortality by ownership, according to observations noted by the BAER Team vegetation as well as wildlife and hydrology specialists.

Table 4: Vegetation Mortality

Vegetation Mortality, Acres					
Vegetation Communities	Unburned	Low	Moderate	High	TOTAL
Big Sagebrush Shrubland	10,863	36,885	15,107	950	63,805
Low Sagebrush Steppe	1,371	6,470	1,013	31	8,885
Mixed Montane Deciduous Shrubland	1,354	2,641	2,651	70	6,716
Curlleaf Mountain Mahogany Woodland	21	487	175	3	686
Juniper Woodlands	116	232	132	22	502
Perennial Forb – Sparsely Vegetated	1	3	7	0	11
Coniferous Forest	196	107	126	0	429
Aspen Woodland	3,701	2,278	2,062	13	8,054
Riparian Woodlands and Meadows	812	3,211	1,484	108	5,615
Agricultural Pastureland	32	76	204	0	312
Introduced Annuals	80	36	8	0	124
Barren/Rock	24	0	0	0	24
Total	18,571	52,426	22,969	1,197	95,163
Percent	20	55	24	1	100

VEGETATION

As stated in Reconnaissance Methodology and Results above, the mapped vegetation mortality was averaged between the native perennial grasses and the shrubs. This was to simplify mapping and reflect that the perennial grasses throughout a majority of the burned area will resprout. This averaging was done primarily for the mountain big sagebrush, low sagebrush, and the montane deciduous shrubland cover types. To account for shrub mortality in the above communities, where a rating of moderate was determined, the shrub mortality would be high and less than half of the above shrub communities rated as low would have moderate mortality. Approximately 25% of the big sagebrush shrublands would have high mortality, and about 29% would have moderate mortality. Nearly 12% of the low sagebrush would have high mortality and 36% would have moderate mortality. In the mixed montane deciduous shrubland, over 40% would have high mortality and nearly 20% would have moderate mortality.

Vegetation recovery will occur naturally on the majority of the burned area because the majority of the fire burned in a mosaic pattern, with moderate and high mortality areas surrounded by unburned and shrub communities with low mortality. The following sections describe the dominant plant communities (and communities of concern), their distribution, typical plant species, and responses to fire. Table 5 summarizes the post fire response of some of the common shrubs, grasses and forbs found within the burn area.

Table 5: Post-fire vegetation response of dominant species in the Murphy Fire Complex: Wildhorse Zone

Species	Fire Effects/Susceptibility to Damage	Response/ Years to Recover
Mountain big sagebrush (<i>Artemisia tridentata</i> ssp. <i>vaseyana</i>)	Top killed; high-easily killed by fire	Non-sprouter; ground residual & initial off site colonizer; seed/ 3-20
Low sagebrush (<i>A. arbuscula</i> ssp. <i>arbuscula</i>)	Top killed; severely damaged;	Non-sprouter; initial off site colonizer; seed/ recovery variable/ 2-5 under favorable conditions, otherwise >10 (to 30)
Bitterbrush (<i>Purshia tridentata</i>)	Top killed	Somewhat fire tolerant; weak sprouter (variable); decumbent forms may sprout from root crown/ 3-6
Curl leaf mountain mahogany (<i>Cercocarpus ledifolius</i>)	Top and below ground killed; severe	Weak sprouter; initial off site colonizer; seed/ (1) 8-50
Mountain Snowberry (<i>Symphoricarpos oreophilus</i>)	Top killed-moderate to high severity; undamaged by low severity fire	Sprouter; initial off colonizer; sprouts from adventitious bud root crown
Sandberg's bluegrass (<i>Poa secunda</i>)	Plants with pedestals and with litter are moderately damaged, otherwise low susceptibility	Tussock graminoid; seed; tillering/ 1-4
Idaho fescue (<i>Festuca idahoensis</i>)	Top killed; survives low severity fires, damaged by moderate to high severity, long residence time can kill root crown	Tussock graminoid-bunchgrass; on site 2° colonizer; seed, tillering/ 3-12
Bluebunch wheatgrass (<i>Pseudoroegneria spicata</i>)	Top killed; undamaged by fire due to buds protected by soil and plant material	Tussock graminoid; seed (variable)/ 1-5
Tailcup lupine (<i>Lupinus argenteus</i> ssp. <i>heteranthus</i>)	Top killed; slightly to moderately damaged	Ground residual colonizer (on site initial); caudex sprouter/ up to 4
Hood's Phlox (<i>Phlox hoodii</i>)	Top killed	Caudex—sprouts from growing points in soil/ 1-4

Sagebrush dominated communities

Wildfires in the big sagebrush/grasslands of the Great Basin can be extremely detrimental or beneficial, depending on ecological condition pre-fire, management goals, presence or absence of noxious weeds or invasive species, and stabilization or rehabilitation efforts. Sagebrush plants lack specialized adaptations to survive fire or to insure rapid recolonization of burned landscapes. The majority of the Murphy Fire Complex: Wildhorse Zone burned in a mosaic pattern. It was observed by the Vegetation Specialists and other specialist on the BAER Team that there were large areas of unburned vegetation, low soil burn severity, and low to moderate vegetation mortality. The unburned islands of sagebrush should provide a

seed source for natural recovery. This is substantiated by Bushey (1987).

Nearly 67% of the burned area was dominated by mountain big sagebrush associations and 9% by low sagebrush. Another observation by the Vegetation Specialists was there were areas of unburned vegetation or a mosaic burn pattern (mixed fire severity) above areas with moderate and high mortality. Over 90% of the perennial grasses were not killed by the fire and there was greenup or sprouting from the root crowns occurring in the burn area.

Mixed montane deciduous shrublands

The plant associations found here were also mixed with mountain big sagebrush and like the sage sites there was a mix of mortality. This cover type makes up 7 % of the burned area. The snowberry and serviceberry should resprout. It was observed that burned bitterbrush plants had seeds scattered at their bases. These had fallen off as the plants burned. Random checks of various plants at different locations in the burn area revealed about 20% of the seeds were hard with uncracked capsules. It is unknown whether there is a large rodent population which aid in regeneration of bitterbrush due to their seed caching habits. The bitterbrush communities should be monitored for recovery. Fire is known to be more damaging to bitterbrush growing on fine textured soils than on coarse textured soils (Britton, et al, 1979). Within the fire area, bitterbrush tended to be mostly growing on well drained coarse textured soils.

Curleaf mountain mahogany woodlands

Mixed mortality was observed in these communities with unburned plants next to portions of stands that had full consumption of the fuels. Mahogany sprouts but it mainly produces by seed; thousands of seeds can be produced when environmental conditions are right. Hundreds of seeds were seen at the base of burned plants at most stands the Vegetation Specialists visited. The unburned plants next to dead individuals should aid in recovery. Ibenez (1999) found that the greatest numbers of seeds of mahogany are found immediately under and in the litter of mature plants. The greatest number of seedlings, however, has been found in the open interspaces and under sagebrush canopies; open canopies are necessary for seedling survival. Although intolerant of fire, seedlings will benefit from the present conditions of bare mineral soil, shade from unburned adjacent stands and mountain big sagebrush communities and the gaps in canopy cover of the adjacent communities with mortality classes from unburned to moderate.

Juniper Woodlands

Over 69% of the juniper woodlands were either unburned or had low mortality. This level of mortality was evident of all the layers, including the shrub species of mountain big sagebrush, low sagebrush, bitterbrush, and snowberry. Perennial grasses will probably resprout and shrubs will have a local seed source to aid in recovery.

Aspen Woodland

There was mixed mortality and soil burn severity in the aspen stands on the Murphy Fire Complex:Wildhorse Zone. About 10% of the stands had full consumption of vegetation. Most of these were adjacent to or within 1,000 feet of unburned aspens or stands with mixed mortality. Disturbance or dieback is necessary for aspen regeneration. Loss can be attributed to a combination of successional processes, reduction (or elimination) of fire, and long-term overuse by ungulates (Bartos, 1998). Vegetation in springs and seeps associated with a number of aspen stands was seen sprouting. The majority of the clones in the burned area appear to be intact and sprouting should occur. Mapping and monitoring should be conducted according to the Aspen Delineation protocols.

Riparian Woodlands and Meadows

There was mixed mortality of riparian areas. Most communities burned in a mosaic pattern. Willows, forbs, grasses, and sedges were seen resprouting in burned riparian areas. Unburned vegetation adjacent to and upstream of burned riparian areas will aid in recovery. The main concern in the riparian areas is sprouting and invasion by noxious weeds, primarily Canada thistle (along both Meadow Creek and Bruneau River) and perennial pepperweed. Canada thistle was found sprouting in riparian areas. These areas will be a priority for monitoring (See Recommendations).

Perennial Forb and Barren

Both of these communities were lightly impacted from the fire. The perennial forb community is associated with high elevation sites and is ecotonal with low sagebrush. There are potential impacts from suppression activities. The Barren/Rock communities were most not affected by the fire. The Vegetation Specialists did observe vegetation that was growing on cliff faces were burned. Affects on these cliff side communities are unknown.

Coniferous Forest

No impacts were observed. Local staff stated that the subalpine fir that was burned was a positive impact. Other conifers and shrub species associated with this community should replace burned and dead subalpine fir.

Range Resources

Approximately 31,899 animal months are directly affected from the Murphy Fire Complex: Wildhorse Zone. Resting entire pastures or allotments, or portions of allotments will be needed for vegetative recovery. The Range staff will coordinate and consult with the permittees to decide what allotments or portions of allotments, will be rested. For example, if most of allotment or pasture is burned, it may be more cost effective to rest the area rather than expend funds to install and then remove the fence at a later time. New temporary fencing to exclude livestock grazing to protect vegetation recovery might also be necessary.

The burned portions of the allotments will be rested to livestock grazing for a minimum of two years. Proposed protection fences, riding, herding, and controlling water sources will be implemented to ensure that livestock will not graze on the burned portions of the grazing allotments. Table 5 lists the grazing allotments and the acres burned and the percent of the total allotment that burned.

Table 5: Grazing Allotment Acres Burned

Allotment	Total Acres in Allotment	Acres Burned	Percent of Allotment Burned
Bruneau Summer C&H	6,818	1,532	23
Buck Creek C&H	4,945	511	10
Copper Basin S&G	825	825	100
Copper Cottonwood S&G	4,955	557	11
Diamond A C&H	10,006	9,056	91
McDonald Creek C&H	22,505	6,808	30
North Copper S&G	5,535	2,455	44
Prescriptive Use ¹	24,666	19,574	79
Sunflower Flat C&H	21,452	1,866	9
Telephone C&H	16,476	8,055	49
Tennessee Mountain S&G	9,965	5,578	56
West Bruneau S&G	22,484	12,850	57
Wickiup S&G	7,519	6,460	86
TOTAL	158,151	76,127	

¹ The Prescriptive Use Area is managed for wildlife habitat (elk and mule deer) and for riparian, aquatic, and recreational values. There is no livestock grazing in the Prescriptive Use Area, except for sheep trailing.

Recovery of burned areas would involve a natural vegetation response from plant species not damaged by wildfire or re-growth of grasses and forbs within the burned area. In some areas, seeding would be necessary to meet resource objectives and provide for watershed stabilization. In either case, livestock grazing would need to be deferred to allow for plant re-growth and re-establishment.

Livestock grazing on allotments that are within the burned area will be closed for at least 2 years. Specific vegetative objectives will be completed for the areas impacted by fires. Grazing allotment agreements or decisions will be handled on an allotment basis in order to meet vegetative objectives. Grazing may be permitted in order to meet objectives primarily to control and decrease the spread of invasive plant species during the “green up” period. Due to the extent of the fires and the vast variety of vegetative communities, ecological sites and resource concerns, burned area objectives may vary by allotment.

Sensitive Plants

There are potential negative impacts to the Region 4 Sensitive plant Lewis’ buckwheat (*Eriogonum lewisii*). Investigation of map layers after field assessments were completed revealed that a dozer line went through occupied habitat. Monitoring for recovery will be recommended. See Fire Suppression Damage above. There is occupied habitat of other R4 sensitive plant species that will need to be protected from livestock grazing. Leiberg’s clover (*Trifolium leibergii*) is found in the Telephone Creek and Little Telephone Creek areas, within both moderate and low vegetation mortality. The temporary fence (See Specification # 11) will help to keep livestock off of occupied habitat of this species.

Invasive Species and Noxious Weeds

The Vegetation Specialists located known locations of noxious weeds and found new populations of noxious weeds. Two undocumented weeds, black henbane (*Hyoscyamus niger*) and wild licorice (*Glycyrrhiza lepidota*) were located. Black henbane was located on the roadsides of Meadow Creek and Bruneau River. The local Weed Coordinator said it is only confined to the roadsides. The plant was in seed and vehicles had run over numerous plants; the tiny seeds were probably spread up and down the roads. Wild licorice was found along the Bruneau River.

Canada thistle was common along the Meadow Creek and Bruneau River. It was seen in riparian communities that had mortality from unburned to high. New sprouts were seen in the burn area. A new population of perennial pepperweed was located along the Bruneau River. This very aggressive weed has roots that extend more than 6 feet down with lateral roots that can extend to over 20 feet. This plant was in an unburned part of the riparian area. Bull thistle was located in both burned and unburned parts of the fire.

Most noxious weeds are favored by fire and all the weeds in the burned area are expected to spread beyond their current locations. Burned areas contain high nutrient levels, exposed ground surfaces and reduced shade. These conditions favor weed colonization and exponential weed growth, which can prevent reestablishment of desired vegetation and displace already established native plants (Goodwin, K & Sheley, R. 2001). The burned areas are now considered to have increased invasibility and combined with the invasiveness of the weeds present in the burned area, there is a high potential for weed spread.

IV. RECOMMENDATIONS

A. Emergency Stabilization – Fire Suppression Repair

As stated under findings, some of the dozer lines had the berms pulled back, with pre-existing vegetation laid back on the surface. All lines should be treated in this manner. Seeding of dozer lines, safety zones and staging areas is recommended to reduce potential soil erosion from water and wind, limit noxious weed invasion, prevent establishment of non-native invasive plants and provide dust abatement once plants are established.

An impact to a Region 4 Sensitive Plant Species may have occurred from dozer line construction in Sections 32, 33, 34, and 35, T47N, R57E, MDM. The dozer line was constructed along 2 ½ miles of documented locations of Lewis’ buckwheat (*Eriogonum lewisii*). An emergency stabilization specification is proposed to fund the Forest Ecologist to look at the potential impacts from this dozer line. Any funding needed to repair the site or to initiate and promote recovery must come from fire suppression funds.

The dozer line that may have impacted Lewis' buckwheat (*Eriogonum lewisii*) should be blocked on both ends to prevent any access from the public to adjacent FS lands. It is recommended that blocking be permanent and that closure signs be used to inform the public.

B. Emergency Stabilization

Specifications

Specification 8 Noxious Weed Treatment

A specification has been prepared to control the spread of known infestations of Nevada listed noxious weeds along with newly discovered noxious weeds within the fire perimeter of the Murphy Fire Complex: Wildhorse Zone. Direct treatment of non-native invasive plant species introduced or aggravated by the fire or fire suppression activities is appropriate. Weed infestations consist of Canada thistle (*Cirsium arvense*), bull thistle (*Cirsium vulgare*), Scotch thistle (*Onopordum acanthium*), hoary cress (*Cardaria draba*), perennial pepperweed (*Lepidium latidolium*), wild licorice (*Glycyrrhiza lepidota*), black henbane (*Hyoscyamus niger*), and yellowspine thistle (*Cirsium ochrocentrum*). Control will be by herbicides approved in the approved Environmental Assessment for the Humboldt-Toiyabe National Forest Noxious Weed Control Program. Proposed herbicides are as follows: (2,4-D amine®, Escort®, Transline® and Tordon®). Biological agents (insects) are also prescribed for control, primarily on Canada thistle communities. Approximately 704 acres will be treated by truck mounted, backpack, or ATV mounted sprayers, hand grubbed in accessible spots, or by insect release.

Specification 9 Noxious Weed/Invasive Detection

A specification has been prepared for detection of noxious weeds/non-native invasive plant species within the fire perimeter of the Murphy Fire Complex: Wildhorse Zone. This will consist of monitoring known infestations of noxious weeds that were present before the fire and survey disturbed areas within the fire perimeter to determine spread of weeds. Areas to be inventoried will be along roads, disturbed areas from suppression attempts and riparian areas. New infestations that are found will be documented with photos and the location will be captured using Global Positioning System technology. This treatment will determine the post-fire presence of invasive species when there is a likelihood of introduction or expansion. The specification will also provide monitoring effectiveness to Specification 8, Noxious Weed Treatment.

When monitoring for cheatgrass (See Noxious Weed Treatment map, Appendix IV) a determination will be made in the fall of 2007, by the first rains, if cheatgrass is growing within its existing occurrences (in situ) or is expanding into burned native plant communities having no or less than 3% cheatgrass by density. If cheatgrass is present submit a supplemental funding request to treat the invaded plant communities with pre-emergent, annual grass selective herbicides followed by a late fall or early spring seeding. Herbicides such as Plateau® (imazapic) or Oust® XP (sulfometuron methyl) or Roundup UltraMax® (glyphosate), are the recommended herbicides. Any seeding proposed will follow established seed mixes and rates used by the local Ranger District and as approved by the Forest Ecologist.

Glyphosate should be applied in the early spring before desirable forbs or perennial grasses break dormancy. Because glyphosate has no soil residual activity, seeding or other revegetation practices can be carried out immediately. An herbicide spraying project utilizing glyphosate should be tied directly with seeding so both can occur at the same time (Bussan and Dyer, 1999). If using Roundup® Ultra the rates should be in the range of 10-20 ounces/acre (oz/ac). It is important that glyphosate be applied before seed formation.

Plateau® can be applied in the fall or early spring and the range of rates is 2-12 oz/ac. For release of remnant vegetation (within unburned communities that have a high potential for cheatgrass invasion in the burn perimeter) apply a fall application of Plateau® at 2-8 oz/ac, adjusted for rainfall and soil texture. If

cheatgrass is beyond the four leaf stage then the rate will be at least 6 oz/ac plus a surfactant. On burned sites with no litter or vegetation in the interspaces of perennial grass root crowns, apply at a rate of 6-8 oz/ac. If cheatgrass is beyond the four leaf stage or beginning to tiller (on burned sites) add glyphosate at 12 oz/ac to Plateau® plus a non-ionic surfactant. Apply prior to planting or seeding. If drill seeding apply Plateau® prior to seeding; if broadcast seeding with no seed incorporation, apply prior to seeding; if broadcast seeding with incorporation, apply after incorporation.

Oust® XP is to be applied to non-cropland at a rate of ¾- 1½ oz/ac when cheatgrass is not beyond 6-12 inches in height. Whatever herbicide is used the labels must be followed or rates must be approved by a University Extension agent. If treatments occur in sensitive plant or wildlife habitat, the RD Weed Coordinator and Forest Ecologist must be present to ensure there are no impacts sensitive species.

Specification 10 Monitoring Critical Habitat

A specification has been prepared to monitor the Critical Habitat of habitat critical to the persistence of R4 sensitive species within the fire perimeter of the Murphy Fire Complex: Wildhorse Zone. Vegetation transects will be established throughout the fire, in the seven vegetation types described in this assessment that are within critical habitat, to determine whether vegetation necessary to meet sensitive species habitat needs has occurred. Critical Habitat monitoring will utilize either line transects or plots. Point intercept is recommended on grass dominated communities and line intercept for shrub dominated communities. Forest Service Ecologists will develop criteria demonstrating recovery, such as plants per square meter, biomass, or trees per acre. Cover sampling methodologies shall represent dominant plant community types, aspect, and slope variations within the seeded areas. Photo documentation shall accompany written documentation, along with referencing the sites using Global Positioning System (GPS) technology. Monitoring is also required to ascertain native recovery success and recovery of critical Habitat. This critical habitat monitoring will evaluate if subsequent treatments are warranted where values at risk were identified, but no treatment measures were implemented due to concerns regarding effectiveness.

A possible impact from dozer line construction to a Region 4 Sensitive Plant Species may have occurred in Sections 32, 33, 34, and 35, T47N, R57E, MDM. The species possibly impacted is Lewis' buckwheat (*Eriogonum lewisii*). The monitoring of potential impacts should receive high priority within this specification. A long-term recovery plan may be needed to rehabilitate the habitat of Lewis' buckwheat, as according to Morefield (1996) severely damaged sites may not recover at all. Any treatments resulting from this monitoring will be charged to the fire suppression funding account.

Specification 11 Protective Fencing

A specification has been prepared to construct temporary protective fencing within the Murphy Fire Complex: Wildhorse Zone. This temporary fencing is required to protect critical natural resource habitat, to reduce unacceptable erosion, to minimize unacceptable degradation of water quality, and to stabilize critical or significant natural resources, and to protect recovering areas from uses that could interfere with recovery. The areas being protected for recovery are also critical habitat for Region 4 sensitive species such as sage grouse, goshawk, pygmy rabbit, and Columbia spotted frog. Three of the grazing allotments are upslope from the Bruneau River, which is probable Bull trout over-wintering habitat. The Telephone Flat cattle and horse allotment is Critical Habitat for the R4 sensitive plant species Leiberg's clover. The temporary fences (4-strand barbed wire) will be built to USFS range fencing standards. An electric fence was rejected due to the remoteness of the fence locations (3 to 4 hours away from the RD office), the terrain, the distance between each fence segment, and the fact that elk graze in the vicinity of the proposed temporary fences. Elk are known to break electric fences and the maintenance required to keep the electric fence hot will outweigh any savings realized by constructing an electric fence. A 3-strand fence was also rejected because cattle will actively try to access the new re-growth of perennial grasses; the local Rangeland Management Specialist said a 3 wire fence will not keep livestock out of the recovering areas. Approximately 13 miles of temporary fence will be constructed, protecting burned vegetation within

5 grazing allotments. This specification also promotes cooperation between the USFS and grazing permittees by providing grazing on the unburned allotment portions while protecting recovery in the burned portions of the allotments.

C. Rehabilitation Recommendations (no specification)

The vegetation group was primarily focused on emergency stabilization issues although long-term rehabilitation projects were considered, such as reseeding and fencing.

Repair or Replacement of Minor Facilities

The vegetation group, in discussion with range specialists, recognized the need to repair or replace range improvements damaged or destroyed by the fire but that cannot be funded by emergency stabilization. These improvements, such as boundary fencing (approximately 17 miles), or interior pasture fences (approximately 41 miles), water delivery systems (above and below ground water piping), and water tanks can be funded for repair or replacement under the minor facilities portion of rehabilitation. Most of these improvements are documented in the agencies Geographic Information System (GIS) and in Resource Management Plans so development of a rehabilitation specification for minor facilities is applicable and allowed.

D. Management Recommendations (non-specification related)

Work with the Nevada Department of Wildlife (NDOW) to develop a fencing strategy for the Prescriptive Use Area along the Bruneau River and Meadow Creek. Working together to replace the existing fence in a more logical place, not dependent upon agency ownership, would allow better management and maintenance of the resource.

The USFS should establish permanent fire effects plots in each vegetation type within the burn. Long term monitoring can develop recovery trends that are useful for developing stabilization and rehabilitation specifications for fires in the future. Plots should also be established at locations of known Region 4 Sensitive Plant Species to monitor their effects from the fire and potential recovery.

Work with the Bureau of Land Management in cost sharing the reconstruction of the boundary fence between the agencies near the Idaho/Nevada border.

V. CONSULTATIONS

Resource Advisors that Assisted in Vegetation/Range Resource Assessment for the BAER Team

NAME	AFFILIATION	FUNCTION	CONTACT #
Mike Balen	Humboldt-Toiyabe NF-Mtn City R.D.	Engineer	775-778-6140
Greg Beasley	NDF-Elko	Forester	775-237-5608
Steve Foree	NDOW-Elko	Supervisory Habitat Biologist	775-777-2306
Brett Glover	H-T NF-Mtn City R.D.	Rangeland Management Specialist/ Noxious Weed Coordinator	775-738-5121
Cheri Howell	H-T NF- Mtn City R.D.	Ecologist	775-752-1713
Ron Hudson	H-T NF- Mtn City R.D.	Hydrologist/BAER Coordinator.	775-778-6122
Nancy Prall	H-T NF- Mtn City R.D.	Rangeland Management Specialist	775-778-6113
Tom Warren	BLM-Elko Field Office	ESR Manager	775-753-0349

VEGETATION

VI. REFERENCES

- Britton, Carlton M.; Ralphs, Michael H. 1979. Use of fire as a management tool in sagebrush ecosystems. In: The sagebrush ecosystem: a symposium: Proceedings; 1978 April; Logan, UT. Logan, UT: Utah State University, College of Natural Resources. 101-109.
- Brooks, M.L., Pyke, D., 2001. Invasive Plants and Fire in the Deserts in North America. In: Galley, K., Wilson, T. (eds). Proceedings of the Invasive Species Workshop. The Role of Fire in the Control and Spread of Invasive Species. Tall Timber Research Station, Tallahassee, FL. Pp.1-14. (Misc Publ. No. 11).
- Brown, James K.; Smith, Jane Kapler, eds. 2000. Wildland Fire in Ecosystems: Effects of Fire on Flora. Gen. Tech. Rep. RMRS-GTR-42, Vol. 2, Ogden, UT. U.S.D.A., Forest Service, Rocky Mountain Research Station, 257p.
- Bushey, Charles L. 1987. Short-term vegetative response to prescribed burning in the sagebrush/grass ecosystem of the northern Great Basin; three years of postburn data from the demonstration of prescribed burning on selected Bureau of Land Management districts. Final Report. Cooperative Agreement 22-C-4-INT-33. Missoula, MT: Systems for Environmental Management. 77 p.
- Bussan, Alvin J. & Dyer, William E. 1999. Herbicides and Rangeland. In: Biology and Management of Noxious Rangeland Weeds. Sheley, R & Pteffoff, J (eds). 1999. Oregon State University Press.
- California Invasive Plant Council, Cal-IPC. 2007. Online: <http://www.caleppc.org/>.
- Cronquist, A et al. 1977-2005. Intermountain Flora, vascular Plants of the Intermountain West. New York Botanical Garden.
- D'Antonio, C.M. and P.M. Vitousek. 1992. Biological invasions by exotic grasses, the grass/fire cycle, and global change. Annu. Rev. Ecol. Syst. 23:63-67.
- FEIS (Fire Effects Information System). 2007. <http://www.fs.fed.us/database/feis/index.html>
- Goodwin, Kim & Roger Sheley. 2001. Managing Weeds After Wildfire. Montana State University. <http://www.montana.edu/wwwpb/ag/weedfire.html>.
- Morefield, James D. 1996. Current Knowledge and Conservation Status of *Eriogonum lewisii* Reveal (Polygonaceae), the Lewis buckwheat. Nevada Natural Heritage Program. http://heritage.nv.gov/reports/erle_txt.pdf
- Natureserve. 2004. Landcover descriptions for the Southwest Regional Gap Analysis Project.
- Nevada Natural Heritage Program. 2007. Nevada native Plant Society (NNPS) Status Lists. <http://heritage.nv.gov/lists/nnpstat.htm>.
- Ryan, K.C. 1990. Predicting Prescribed Fire Effects on Trees in the Interior West. In: M.E. Alexander And G.F. Bisgrove, tech. coord., The Art and Science of Fire Management: Proceedings of the First Interior West Fire Council Annual Meeting and Workshop, Kanaskis Village, Alberta, October 24-27, 1988. pp 148-162
- Sargent, Charles S. 1905. Manual of the Trees of North America. Riverside Press, Cambridge.

Selected Noxious Weeds of Northeastern California. 1999. Cooperative publication between California Dept of Food and Agriculture, county, and federal agencies, and Tuscarora Gas Transmission Company.

USDA Forest Service. 2006. LANDFIRE: Existing Vegetation Type. Available online:

US Department of the Interior, Geologic Survey. 2006. National Map, LANDFIRE: LANDFIRE National Existing Vegetation Type Layer. Available online: <http://gisdata.usgs.net/website/landfire/>

Whitson, T.D., L.C. Burrill, S.A. Dewey, D.W. Cudney, B.E. Nelson, R.D. Richard, and R. Parker. 1992. Weeds of the West. University of Wyoming, Jackson Wyoming.

Wyoming Weed and Pest Council. 2000. Weed Handbook, Series 1-55.

Vegetation Assessment prepared by:

Michael Dolan, BAER Botanist; Botanist BLM-Alturas Field Office, California, (530) 233-7903
Bruce Card, BAER Forester; Forester BIA-Rocky Mountain Regional Office, (406) 247-7949
Cheri Howell, Forest Ecologist, USFS Humboldt-Toiyabe NF, (775) 752-1713

Key to Symbols used by Nevada Natural Heritage Program

U. S. Fish and Wildlife Service (Usfws) Categories for Listing under the Endangered Species Act:

LE	Listed Endangered - in danger of extinction in all or a significant portion of its range
LT	Listed Threatened - likely to be classified as Endangered in the foreseeable future if present trends continue
LENL/LTNL	Listed Endangered or Threatened in portions of its range, not listed in other portions of its range
PE	Proposed Endangered
PT	Proposed Threatened
C	Candidate
RI	Former Category 1 Candidate/proposed species, now species of concern for which there is insufficient evidence of vulnerability and threats
<	Other former status as indicated, now species of concern
<CI	Former Category 1 Candidate, now species of concern
<C2	Former Category 2 Candidate, now species of concern
_SA	Similarity of appearance species

Bureau of Land Management (Blm) Species Classification:

S	Nevada Special Status Species - USFWS listed, proposed or candidate for listing, or protected by Nevada state law
N	Nevada Special Status Species - designated Sensitive by State Office
P	Proposed Nevada Special Status Species - designated proposed Sensitive by State Office
C	California Special Status Species (see definition S and N)

United States Forest Service (Usfs) Species Classification:

S	Region 4 (Humboldt-Toiyabe NF) sensitive species
I	Region 5 (Inyo NF) sensitive species
W	Region 5 (Inyo NF) watch species
L	Region 5 (Lake Tahoe Basin Management Unit) sensitive species
C	Region 5 sensitive species, not yet known from Inyo NF or Lake Tahoe Basin Management Unit
E	Region 4 and/or Region 5 Endangered species
T	Region 4 and/or Region 5 Threatened species

Nevada Natural Heritage Program Global (Grank) and State (Srank) Ranks for Threats and/or Vulnerability:

G	Global rank indicator, based on worldwide distribution at the species level
T	Global trinomial rank indicator, based on worldwide distribution at the infraspecific level
S	State rank indicator, based on distribution within Nevada at the lowest taxonomic level
1	Critically imperiled and especially vulnerable to extinction or extirpation due to extreme rarity, imminent threats, or other factors
2	Imperiled due to rarity or other demonstrable factors
3	Vulnerable to decline because rare and local throughout its range, or with very restricted range
4	Long-term concern, though now apparently secure; usually rare in parts of its range, especially at its periphery
5	Demonstrably secure, widespread, and abundant
_H	Historical; could be rediscovered
_P	Potential within Nevada
_Q	Taxonomic status uncertain
_NR	Taxon is not yet ranked
_NA	Rank is not applicable; Taxa is not a suitable target for conservation (usually due to accidental or exotic status)
_U	Unrankable
_X	Presumed extirpated or extinct
?	Assigned rank uncertain

For populations of migratory species, additional qualifiers added to rank include:

B_	Breeding status within Nevada
M_	Transient or migratory population
N_	Non-breeding status within Nevada

Nevada State Protected (State) Species Classification:

Fauna:	
YES	Species protected under NRS 501.
Flora:	
CE	Critically endangered - species whose survival requires assistance because of overexploitation, disease or other factors or because their habitat is threatened with destruction, drastic modification or severe curtailment (NRS 527.260-.300)
CE#	Recommended for listing as critically endangered
CY	Protected as a cactus, yucca, or Christmas tree (NRS 527.060-.120)

Endemic (End) Status:

Y	Found only in Nevada
P	Probable endemic of Nevada

Eors: The number of occurrences currently in the database.