

Medford Bureau of Land Management  
3040 Biddle Road  
Medford, Oregon 97501

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**Heppsie Mountain Allotment –**  
STANDARDS OF RANGELAND HEALTH ANALYSIS



# Table of Contents

## Introduction

Overview of the Evaluation area and principle findings

## Assessment

The Existing Environment and an overview of Assessment findings

## Figures & Tables

**Figure 1** - Upland Trend Data

**Figure 2** - Utilization Transect Data

**Table A** - *Special Status Species (Terrestrial Wildlife)*

**Table B** - *Special Status Species (Aquatic Wildlife)*

**Table C** - *Special Status Species (Vascular Plants)*

**Photo 1** - Photo of Loamy Shrub scabland ecological site

**Table D** - RHA Location 1 Indicator Summary **D1**- Soil stability, **D2**- Species composition, **D3**- Cover

**Photo 2** – Photo of Douglas fir forest ecological site

**Table E** - RHA Location 2 Indicator Summary

**Photo 3** – Photo of Pine fescue ecological site

**Table F** - RHA Location 3 Indicator Summary **F1**- Soil stability, **F2**- Species composition, **F3**- Cover

## Maps

**Map 1** – Land status and Rangeland Health Assessment locations

**Map 2**– Aerial photo

**Map 3** – Stream Network, steelhead and coho salmon habitat

**Date(s) of Assessment:** August 17, 2006/September 15, 2002

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## **Introduction**

This is an Oregon/Washington Bureau of Land Management (BLM) Standards of Rangeland Health Assessment that addresses the Heppsie Mountain Allotment (100126). The analysis area is 4,076 acres with permitted use from May 1-October 15 with 53 cows for a total of 294 AUMs (Animal Unit Months). Administration occurs within the Ashland Resource Area, Medford District. Herein, BLM summarizes resource condition findings derived from long-term monitoring studies and rangeland field assessments in relation to Oregon and Washington Standards and Guidelines (S&Gs). The findings and alternatives will be considered and analyzed in an Environmental Assessment (EA) and be used as the basis for a grazing lease renewal decision.

Public lands within this region of southwestern Oregon are topographically diverse; elevation varies from about 1,960 feet to slightly over 4,400 feet at the Heppsie Mountain summit. Plant communities present are very diverse. Forest and oak woodland plant communities in particular support high quality natural values including intact and resilient native plant communities, special status plants and animals, productive wildlife habitat, fisheries, visual resources, and recreational opportunities. Riparian habitat and fisheries management issues have been the centerpiece of most management actions and ongoing grazing adjustments. The North Fork Little Butte Creek supports steelhead (*Oncorhynchus mykiss*) and coho salmon (*O. kisutch*) which are native salmonid fish. Coho salmon have been listed as Threatened by the National Marine Fishery Service (NMFS) since 1997. Aside from coho no other federal listed or candidate species are present. The Heppsie Mountain allotment has received a substantial infusion of federal dollars for rangeland development projects including fences, spring developments, livestock water pipelines, and reservoirs.

## **Assessment**

This allotment was visited in September of 2002 but the rangeland health assessment was not completed due to other priorities. The assessment has been updated to include data collected between 2002 and 2006.

There are five Oregon/Washington BLM Standards considered in the process of determining Rangeland Health status that BLM assesses in the field with an Interdisciplinary Team (IDT) of resource professionals. The field assessment consisted of evaluating the key ecological site(s) found within the allotment. An allotment summary of the data obtained from the field assessment for applicable rangeland health standards follows.

This qualitative assessment along with quantitative monitoring data is an attempt to look at how well ecological processes are functioning. The product of this qualitative assessment is not a single rating of rangeland health, but an assessment of three interrelated attributes: Soil/site stability, Hydrologic function, and Biotic integrity. Attributes are rated based on what would be expected for the site or a “reference state” based on soils, climate and topography compared to the current state. The attributes are split into seventeen indicators that are rated as none to slight, slight to moderate, moderate, moderate to extreme, and extreme to total departures from the reference state. (see table E-G)

### **Standard 1: Watershed Function - Uplands**

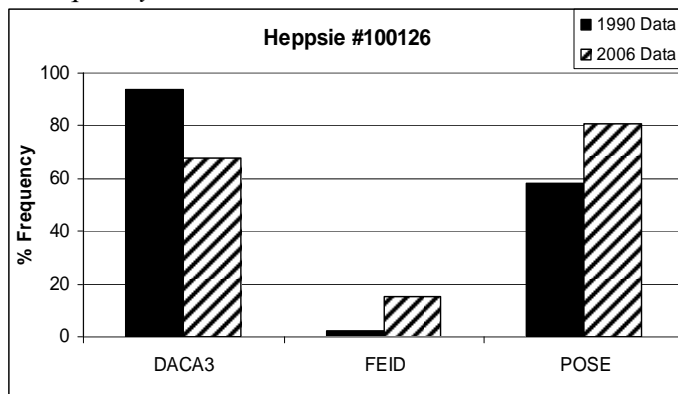
*Upland Soils exhibit infiltration and permeability rates, moisture storage, and stability that are appropriate to soil, climate, and landform.*

This grazing system does not significantly diminish the health and function of the watershed by maintaining adequate vegetative cover, healthy root systems, and soil moisture content that prevents soil compaction. These factors aid in maintaining existing infiltration, percolation, runoff and erosion rates.

Soils found on this allotment are primarily Carney clay, Carney cobbly clay, and Heppsie-McMullin Complex. The main limitations affecting livestock grazing on the Carney clay and Carney cobbly clay are compaction when the soils are wet, erosion, the surface clay/cobbly clay layer, and droughtiness. The main limitations affecting livestock grazing on the Heppsie-McMullin soils are erosion, compaction, the slope, and droughtiness. Permeability is slow in the Heppsie soil. Permeability is moderate in the McMullin soil. In both the Heppsie and McMullin soils, runoff is rapid and the hazard of water erosion is high. The McMullin soil also is limited by the depth to bedrock (<20”). Some of the soils that remain wet later in the season exhibit a weak compaction layer and in drainages where the surrounding areas are dominated by annual grasses the soils surface resistance to erosion is lower than would be expected for the area (p.13-14, Table D, Indicators 8 & 11).

Rangeland Health Assessments were conducted on three different ecological sites (Loamy shrub scabland, Douglas fir forest, and Pine fescue) in August of 2006. Looking only at indicators pertaining to Watershed function in the uplands revealed that 21 indicators (70%) were rated none to slight, 7 indicators (23%) were rated slight to moderate, 2 indicators (7%) were rated moderate, and zero were rated moderate to extreme, or an extreme to total departure. Line point intercept and soil stability data was collected at the Loamy shrub scabland and Pine fescue sites. Both transects showed levels of ground cover, canopy cover, and species composition that would be expected with the exception of one invasive annual grass (bristly dogstail) with 14% cover in the loamy shrub scabland transect location (Table D2 p.14). Soil stability data was collected at several locations; under perennial grasses was the most stable (did not disintegrate) followed by in the interspaces of plants which in some cases (disintegrated after swirling), the soil that was collected in areas dominated by annual grasses in some cases (disintegrated with no swirling) (Table D1 and Table F1 pp.13 & 17).

Figure 1 The collection of trend data using the Nested Frequency Method began in 1990, data was subsequently collected in 1995, 2002 and in 2006.

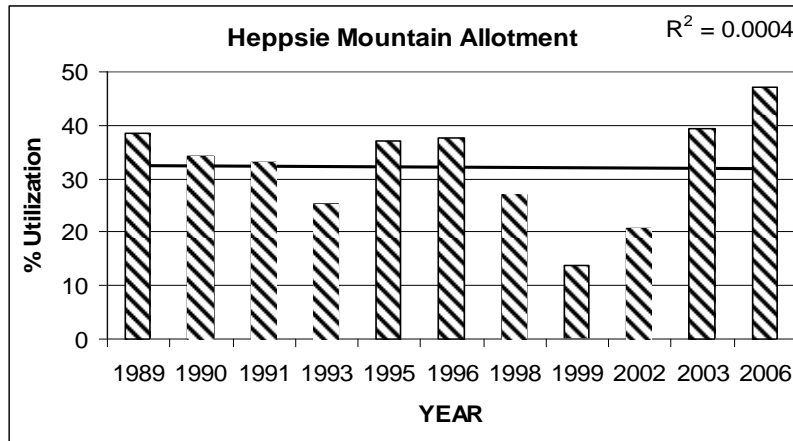


Species showing significant change include California oatgrass (*Danthonia californica*), Idaho fescue (*Festuca idahoensis*), and Sandberg bluegrass (*Poa secunda*) these species are native, perennial bunchgrasses. Other species showing change that were not significant include a slight decrease in soft brome (*Bromus hordeaceus*) (4%) and bristly dogstail (*Cynosurus echinatus*) (7%) these species are non-native, invasive, annual grasses. Species showing a slight increase include blue wildrye (*Elymus glaucus*) (3%) a native, perennial, grass and medusa head (*Taeniatherum caput-medusae*) (5%) a non-native, invasive, annual grass. These changes could be natural fluctuation within the plant community or they could be part of a shift in species that will manifest itself further in time. The condition of this site is representative of other oak woodlands in the allotment and is showing a static to slightly upward trend.

Utilization data is collected annually if time and budget constraints allow using the key species method

(KSM) and mapping use zones protocol. Utilization measures the percentage of the current year's forage production that has been consumed or destroyed by animals. This requires a comparison of the amount of herbage left compared with the amount of herbage produced during the year. The data is used to determine if the pattern of livestock use is consistent with management objectives and is also essential for tracking the progress and impacts of range improvements and management changes. A seven class delineation is used (No use 0-5%, Slight use 6-20%, Light use 21-40%, Moderate use 41-60%, Heavy use 61-80%, Severe use 81-100%).

Figure 2 (3) The average % utilization of three (KSM) transect locations are summarized below.



Utilization mapping and transect data collected in 2006 show similar use patterns to historic utilization data. Utilization in the coniferous portion of the allotment can be categorized as no use in the heavily forested areas, and slight to light use in the lightly forested areas. Use in the oak woodland portion of the allotment can be categorized as light to moderate with some areas of heavy use. In the dry meadows there are some patches of heavy use however; most of the dry meadows receive no to slight use because the annual grasses that dominate these areas are only palatable for a short period of time in early spring.

The targeted level of utilization allows 40-80% of the plants to produce and retain seed each year, replenish carbohydrate reserves that were used for spring growth and seed head production, and allow for fall regrowth later in the season if conditions permit. In areas of heavy use this is not occurring. Some areas that receive heavy use contain species such as Tall fescue (*Festuca arundinaceae*) which is a non-native, perennial grass and California oatgrass (*Danthonia californica*) a native perennial grass neither of these species decrease with heavy grazing. Other species such as Lemmon's needle grass (*Achnatherum lemmonii*) and Idaho Fescue are not tolerant to heavy grazing and will decrease if overutilized.

### Standard 2 Watershed Function - Riparian/Wetland Areas

*Riparian-wetland areas are in properly functioning physical condition appropriate to soil, climate, and landform.*

The majority of the riparian-wetland areas are improving in condition. Springs in this grazing allotment are commonly stratigraphically and/or structurally controlled (fault controlled). Both types of springs emerge in a linear fashion either along faults or as a line of springs at the interface between strata, i.e., an upper rock layer and an underlying clay layer. This linear arrangement of springs occurs as isolated springs commonly connected by slightly damp zones. Animals walking between springs or spring boxes walk through these damp zones leaving hoof imprints. Two springs were identified as being impacted during the initial assessment period in 2002 and were fenced prior to livestock turnout in 2003. However, the spring in 36S 2E Section 1 was not fully enclosed and livestock hoof impacts are occurring below the enclosure.

The Heppsie Mountain Allotment includes streams and wetlands that drain into both the North and South Forks of Little Butte Creek. The forks are subwatersheds in the larger Little Butte Creek watershed. Two short segments of the North Fork of Little Butte Creek are contained within the allotment, of which ~ 0.2 miles are on BLM administered lands. A very short segment of the mainstem channel of the South Fork (private land) is within the allotment as well.

Proper Functioning Condition (PFC) Assessments were conducted in the riparian areas of the allotment on BLM lands in 1998. The PFC Assessment refers to a consistent approach for considering hydrology, vegetation, and erosion/deposition (soils) attributes and processes to assess the condition of riparian areas. Within the Heppsie Mountain Allotment there are an estimated 43 miles (from GIS) of stream channels displaying scour and deposition, 28 of which are on BLM managed lands. Of these BLM stream miles, 6.9 miles (16% of all streams) have been assessed for PFC, of which 2.7 are within the North Fork of Little Butte Creek subwatershed, and 4.2 within the South Fork Little Butte Creek subwatershed. The reach of the North Fork Little Butte Creek (fish habitat) within the allotment was found to be Functioning at Risk with no apparent trend. The remaining surveyed stream miles in the North Fork subwatershed are comprised of: 0.8 miles Proper Functioning Condition (PFC), 1.5 miles Functioning at Risk (FAR), and 0.2 miles of Non Functioning (NF). Within the South Fork subwatershed, 2.2 miles were found to be PFC, 2 miles FAR, and less than .01 mile NF. This equates to ~ 42% of all surveyed reaches being PFC, 55% FAR, and 3% NF within the allotment boundary (USDI 1998).

Within the allotment, 8.8 of a total of 24.3 BLM surveyed stream miles were found to have greater than 30% actively eroding banks, and ~ 20 miles (82% of all surveyed stream reaches) were reported to have greater than 30% fines, above the Oregon Dept. of Fish and Wildlife “desirable” benchmark. The percentage of actively eroding banks and fines are high in surveyed reaches in the Heppsie Mountain allotment.

Stream surveys conducted by BLM in 1998 identified numerous locations of livestock overutilization and excessive hoof/soil impacts in multiple locations throughout the allotment, primarily located in upper reaches of headwater tributaries and springs. Surveyors noted that while overutilization by cattle may be contributing to instream sedimentation and stream ratings other than PFC, generally the majority of assessed stream reaches in the allotment that are Functioning at Risk or Non-functional were found to be primarily impacted by other land management activities.

The mainstem channel of the North Fork of Little Butte Creek has been impacted by augmented summer water releases from Fish Lake Reservoir. BLM surveyors have noted that increased flow has likely enabled some channel erosion, as evident by eroding banks. Likely also due to the high flow velocities in the North Fork of Little Butte, there is little stored sediment apparent in the mainstem channel.

On an adjacent BLM segment of South Fork Little Butte Creek, located just downstream of the private segment that flows across the northern boundary of the allotment, it is rocky with stable stream banks and vigorous willow growth since the 1997 Flood. A monitoring sight was established along this stretch of South Fork Little Butte Creek in an area accessible to cattle. Yearly site visits (2000, 2002, 2003, 2005, and 2006) found no indication that cattle used this area. A riparian photo-point was established in 2001 along the South Fork of Little Butte Creek in T37S R3E, Section 17 to monitor riparian conditions. Photos were taken at this location in 2001 and again in 2006. The condition of the riparian area is showing improvement with a noted increase in willows and other shrubby vegetation (USDI 2006).

Necessary maintenance of assigned range improvements (specified in the Maintenance and Cooperative Agreement) are completed prior to cattle turn out to control livestock distribution, and protect upland,

riparian and water quality conditions. When forage conditions and utilization monitoring indicate, cattle are moved through the allotment. The Lessee salts at least 1/4 mile from riparian areas and other watering sources in selected areas at different times during the grazing season to facilitate proper distribution. This combination of herding and salting simulates a rotational grazing system which promotes increased health and function of the watershed by maintaining enough ground cover and healthy root systems to facilitate percolation, reduce erosion and runoff, and retain water on the site for infiltration (see indicator 10 pp.11-16 Table D, E, and F). Off stream water sources (BLM and private lands) provide cattle and wildlife with an alternative to utilizing riparian areas for water. These also aid in preventing livestock concentration in the riparian areas and improve distribution throughout the allotment.

Looking at the indicators in the Rangeland Health Assessment pertaining to Hydrologic Function revealed that 26 indicators (72%) were rated none to slight, 8 indicators (22%) were rated slight to moderate, 2 indicators (6%) were rated moderate, and zero were rated moderate to extreme, or extreme to total departure. Indicators of particular concern include indicator 3 Pedestals and Terracettes and indicator 5 Gullies both of which had a moderate departure in drainages in the Loamy shrub scabland ecological site (pp.13-17)

### **Standard 3: Ecological Processes**

*Healthy, productive, and diverse plant and animal populations and communities appropriate to soil, climate, and landform are supported by ecological processes of nutrient cycling, energy flow and the hydrologic cycle.*

There is a healthy mix of live and dead/decaying matter on the rangeland (Indicators 13 and 14 pp. 13-17 Table D, E, and F). These conditions provide soil cover which helps to prevent erosion and holds water on site reducing runoff and increasing percolation into the soil (Indicators 8, 9, and 11 pp. 13-17 Table D, D1, D3, E, F and F3). These conditions also support an intact nutrient and energy cycle (see indicators 13, 14, 15, and 17 pp. 13-17 Table D, E, and F). The plant communities on this allotment are diverse and support a variety of animal species (see indicator 12 pp. 13-17 Table D, D2, E, F and F2).

The forested portion (54%) of this allotment supports a diverse mix of forest plant communities and invasive plant species are generally confined to some road-sides or localized disturbed areas (pp. 15 & 16 Assessment locations 2 and 3). The remaining 46% of the allotment consists of dry meadows and oak woodland plant communities. The oak woodlands in this allotment also support a diverse mix of plant species. However, invasive plant species are scattered through out the majority of the oak woodlands particularly bristly dogstail and other exotic annual grasses. The Nested Frequency data (p.5 Figure 1) indicates that there is a static to slightly upward trend in this plant community within the last 16 years. The dry meadows are generally less productive and vulnerable to invasive plant influences from species including medusahead rye, annual bromes, bristly dogstail, yellow starthistle, and a variety of other weedy species (p.13 Assessment location 1). In addition to reducing habitat quality for wildlife, annual grasses have shallower root systems and shorter life cycles than native perennial grasses, and thus have reduced capacity to hold the soil and retain water and nutrients. Annual grassland furthermore often accumulates a layer of thatch where decomposition and nutrient cycling are different than in native plant communities (Ehrenfeld 2003; D'Antonio and Vitousek 1992). Current livestock grazing is not considered a significant contributing factor in the rangeland health decline on these dry meadows. It is apparent from the Bureau's upland assessment that the dry meadows have suffered declines in plant productivity, distribution, and vigor. The demand for livestock forage in some dry meadow areas appears to be in excess of what can be produced given the conversion to non-native unpalatable species.

Looking at the indicators in the Rangeland Health Assessment pertaining to Biotic Integrity revealed that 10 indicators (40%) were rated none to slight, 12 indicators (48%) were rated slight to moderate, 1

indicator (4%) was rated moderate, 2 indicators (8%) were rated moderate to extreme, and zero were rated extreme to total departure (pp. 13-17 Table E, D, and F).

**Standard 4: Water Quality**

*Surface water and groundwater quality, influenced by agency actions, complies with State water quality standards.*

The allotment falls within the state delineated source water areas for the Medford Water Commission and the cities of Gold Hill, Rogue River, and Grants Pass. The surface water source for these four public water systems is the Rogue River. Little Butte Creek is a tributary to the Rogue River. The allotment is located over 25 miles upstream from the closest public water system intake.

A source water assessment is in progress for the Medford Water Commission and assessments have been completed by the DEQ and the Oregon Department of Human Services for the cities of Gold Hill, Rogue River, and Grants Pass. The completed assessments include an inventory of potential contaminant sources within the source water areas. Grazing animals were identified as a potential contaminant source for the Gold Hill, Rogue River, and Grants Pass drinking water protection areas.

The Oregon Department of Environmental Quality (DEQ) is required by the federal Clean Water Act (CWA) to maintain a list of stream segments that do not meet water quality standards for one or more beneficial uses. This list is called the 303(d) list because of the section of the CWA that makes the requirement. DEQs 2004/2006 303(d) list is the most recent listing of these streams (ODEQ 2006a). Within the Heppsie Mountain Allotment, North Fork Little Butte Creek is the only stream listed on DEQs 2004/2006 303(d) list. Several smaller streams within the southern portion of the allotment drain into South Fork Little Butte Creek which is also on DEQs 2004/2006 303(d) list (Table 1). Both streams are listed for exceeding the summer temperature and *E. coli* criteria; North Fork Little Butte Creek also exceeds the pH criterion; and South Fork Little Butte Creek also exceeds the sedimentation criterion.

**Table 1. 2004/2006 303(d) Listings in the Heppsie Mountain Allotment (ODEQ 2006a)**

303(d) List Date	Stream Segment	Listed Parameter	Season	Applicable Rule (at time of listing)	Total Miles Affected	BLM Miles Affected <sup>1</sup>
2004	North Fork Little Butte Creek	<i>E. coli</i>	Fall/Winter/Spring	OAR 340-041-0009 (1)(a)(A, B)	6.5	0.4
2002		<i>E. coli</i>		OAR 340-041-0365(2)(b)(e, f)	6.5	0.4
2004		pH	Summer	OAR 340-041-0021(1)(a)	17.8	0.8
1998		Temperature	Summer Summer Summer	OAR 340-041-0365(2)(b)(A)	6.5	0.4
2004	South Fork Little Butte Creek	<i>E. coli</i>	Summer	OAR 340-041-0009(1)(a)(A,B)	16.4	1.4
1998		Sedimentation Temperature	Summer	OAR 340-041-0365(2)(j)	16.4	1.4
1998				OAR 340-041-0365(2)(b)(A)	16.4	1.4

1/ USDI 2006a

BLM stream surveys conducted from 1998 in the allotment (USDI 2006b) identify multiple locations of livestock overutilization and excessive hoof/soil impacts that are contributing to stream sedimentation and bacterial contamination of surface water. Some of these areas were visited in August 2006 and livestock impacts are still present. The season of use on this allotment (May-October) allows cattle to access riparian areas from late spring to early fall. Cattle tend to linger and congregate in riparian areas throughout the entire grazing season because of convenience of forage, water, and shade.

In the Rangeland Health Assessments indicators 5.Gullies, and 3.Pedestals were rated moderate departures at the Loamy shrub scabland ecological site. These indicators have the potential to reduce water quality by increasing sedimentation. Other indicators that could increase sedimentation that were rated slight to moderate departures include 1.Rills 2.Water Flow Patterns 8.Soil surface resistance to erosion and 9.Soil surface loss or degradation. Indicators that were also rated slight to moderate departures that could increase temperature and sedimentation include 4.Bareground 10.Plant community composition and distribution relative to infiltration and 11.Compaction. For further information refer to pp.11-16.

**Standard 5: Native, T&E, and Locally Important Species**

*Habitats support healthy, productive, and diverse populations and communities of native plants and animals (including special status species and species of local importance) appropriate to soil, climate, and landform.*

The plant communities on this allotment are floristically and synecologically diverse and support a variety of animal species consistent with the surrounding soil, landscape and climate. The allotment provides summer and winter forage in addition to thermal cover for elk, deer, and other wildlife

**Terrestrial Wildlife:**

Several wildlife species within the allotment are classified either as special status, Survey and Manage, or locally important. Species are recognized as "special status" if they are federally listed as threatened or endangered, proposed or a candidate for federal listing as threatened or endangered, or if they are a BLM sensitive or assessment species. BLM policy is to manage for the conservation of these species and their habitat so as not to contribute to the need to list and to recover these species. Survey and Manage species are designated for special management in the Standards and Guidelines of the Northwest Forest Plan. Deer and elk are considered locally important species because the allotment is in big game winter range as designated in the Medford District RMP.

The following is a list of the special status and Survey and Manage species known to be present in the allotment.

**Federally listed, Special Status and NWFP Survey and Manage Wildlife Species:**

<b>Species</b>	<b>Status</b>
Great gray owl ( <i>Strix nebulosa</i> )	S&M
Northern spotted owl ( <i>Strix occidentalis</i> )	FT
Lewis’s woodpecker ( <i>Melanerpes lewis</i> )	BSO

S&M - Northwest Forest Plan Survey and Manage

FT - Federal Threatened

BSO - Bureau Sensitive Oregon

Livestock grazing primarily impacts wildlife by changing vegetation composition, structure, and function. Livestock operations result in a reduction of forage available to native herbivores (e.g. deer and elk), as well as reductions in vegetative ground cover for ground nesting birds, burrowing rodents, and other wildlife species dependent on ground cover for protection, food, and breeding sites. The mere presence of livestock can also change local distribution and habitat use by native species.

Except for some riparian areas that are heavily grazed in the oak-woodland and meadow plant communities (see Standard 1), it appears, subjectively, that the allotment is moderately grazed in most years. Northern spotted owls are unlikely to be affected by the grazing operation because their preferred habitat is dense forest, and grazing is light to non-existent in these areas (see Standard 1). Great gray owl foraging opportunity,

however, is likely to be adversely affected in the areas that are heavily grazed. Gophers and voles are the primary prey species of great gray owls. Both of these species are herbivores, and overgrazing reduces their food supply. Also, trampling in the heavily grazed areas can collapse tunnel systems. Lewis’s woodpecker would not likely be affected by the grazing operation since their primary food sources are insects, acorns and fruit.

**Big Game Winter Range Area**

Essentially the entire allotment is within an area designated by the Medford RMP as Big Game Winter Range for deer and elk. This designation is meant to identify areas to promote forage, and hiding and thermal cover for deer and elk. (USDI BLM, 1994). Grazing has little influence on hiding and thermal cover conditions, but it can have a profound effect on forage conditions.

High quality forage is important to both deer and elk, especially on winter ranges. Several areas in the allotment have been identified as being heavily grazed. Most of these areas are associated with water/riparian zones where the grasses and forbs are more palatable and nutritious. The heavy utilization late into the grazing season (mid October) could result in inadequate regrowth by grasses and forbs. This regrowth (fall green-up) is important to deer and elk in building fat reserves that help sustain them during the winter season.

The potential lack of regrowth is exacerbated by the declining forage conditions throughout the allotment. Winter range forage conditions are deteriorating due to the encroachment of noxious grasses and forbs and the exclusion of fire from the mountain shrubland/chaparral plant community. Bristly dogstail and medusahead rye are common introduced species that are displacing native grasses and forbs. Compared to native species, these species are much less palatable and nutritious. Wedgeleaf ceanothus is the primary browse species for deer on the winter range. This shrub is generally regenerated by fire, but due to fire suppression, wedgeleaf has become decadent and forage quality has decreased.

Grazing has no discernible influence on the condition of shrubs/browse in the allotment. Achieving and maintaining targeted livestock utilization levels, however, would help ensure that there is adequate grass and herbaceous forage for deer and elk on the winter range.

**Aquatic Wildlife:**

**TABLE B:** *Special Status Species (Aquatic Wildlife)*

Species	Species Status
coho salmon ( <i>Oncorhynchus. kisutch</i> )	<b>FT</b>

FT - Federal Threatened

Portions of the mainstem channels of both the North and South Forks of Little Butte Creeks are contained within the allotment. Less than a quarter of a mile of the North Fork and none of the South Fork are on BLM managed lands within the allotment. Both streams support populations of “threatened” (as listed under the Endangered Species Act) coho salmon as well as steelhead, rainbow, and cutthroat trout. Coho Critical Habitat (CCH) has been designated by the National Marine Fisheries Service for the Southern Oregon/Northern California (SONC) Evolutionary Significant Unit of coho, and includes the North and South Forks of Little Butte Creek. This same habitat is also considered Essential Fish Habitat (EFH) under the Magnuson Stevenson Fisheries Act.

BLM fisheries staff have not observed utilization occurring along either the North or South Forks of Little Butte Creeks in the small segments of fish bearing stream on Federal land either within (N Fork) or

adjacent to (S Fork) the allotment. Conditions along the mainstem channels on private lands within the allotment have not been assessed.

Although no direct effect to designated fish habitat from grazing has been observed within this allotment, several monitoring sites established by fisheries and hydrology staff have documented areas of post holing and bank erosion in upstream tributary reaches. Most of the observed “hot spots” are located well upstream from fish habitat, but one area of concern is located within approximately ¼ of a mile from the North Fork of Little Butte Creek and includes several small stream channels that are subject to trampling and bank erosion. No studies have been conducted in the mainstem channels to determine if and how much sediment may be being contributed to CCH as a result of grazing, but it is inevitable that displaced and mobilized sediment from these hot spots eventually finds its way into CCH. The majority of sediment generated and stored in upland and tributary reaches would likely only be transported and released into CCH as pulses of elevated turbidity during periods of high stream flow, and as the mainstem channels would be experiencing high turbidities during these same periods from other (including natural) sources, it would not be detectable to CCH beyond background levels occurring to habitat from all other sources. The likelihood of grazing to noticeably affect SONC coho salmon or CCH increases as proximity of the impacts to CCH decreases, hence the hot spot located only ¼ of a mile from CCH in the North Fork of Little Butte is a concern.

**Survey and Manage and Bureau Special Status fungi, lichens, and bryophytes:**

Approximately 7% of the allotment area has been surveyed for Survey and Manage and Bureau Special Status fungi, lichens, and bryophytes. Currently there are no known occurrences of Bureau Special Status or Survey and Manage fungi, lichens, or bryophytes within the allotment area.

**Federally Listed, Survey and Manage, and Bureau Special Status Vascular Plants**

84% of the allotment area has been surveyed for Survey and Manage and Bureau Special Status vascular plants and 100% of the allotment area has been surveyed for the Federally listed *Fritillaria gentneri*. No occurrences of *Fritillaria gentneri* or any other federally listed plant species are known on federal lands within the allotment. The allotment is outside of the range of other federally listed plants recognized by the U.S. Fish and Wildlife Service *Limnanthes floccosa & Lomatium cookii* (USDI Fish and Wildlife Service, 2003).

The following special status vascular plant species have known populations within the allotment:

**TABLE C: Special Status Species (Vascular Plants)**

Species	Species Status	Occurrences
<i>Carex serratodens</i>	BAO	1
<i>Cheilanthes intertexta</i>	BAO	12
<i>Cirsium ciliolatum</i>	BSO	4
<i>Cypripedium montanum</i>	BTO, S&M (C)	1
<i>Plagiobothrys glyptocarpus</i>	BAO	1
<i>Ribes inerme var. klamathense</i>	BTO	3
<i>Scribneria bolanderi</i>	BTO	2

**Status:**

- BSO - Bureau sensitive Oregon
- BAO- Bureau Assessment Oregon
- BTO- Bureau Tracking Oregon
- S&M- Survey and Manage

Livestock generally seek out grasses and grass-like plants (graminoids) to form the bulk of their diet (Holechek et al. 1982). Of the special status species sites listed above, the only graminoids are *Carex serratodens*, a sedge, and *Scribneria bolanderi*, an annual grass. The *Carex serratodens* population occurs in an area seldom visited by livestock, and thus remains generally unaffected by grazing. The two known *Scribneria bolanderi* sites occur in areas receiving light grazing. As an annual grass, *Scribneria bolanderi* matures and sets seed quickly, leaving it fibrous and low in nutritive value by the time livestock are turned out, and so this species is able to reproduce and in some cases increase under livestock grazing. In the event of heavy or repeated disturbance, invasive exotic annuals such as medusahead could colonize and displace *Scribneria bolanderi*.

Populations of the other known vascular plant species either occupy habitats that receive very little livestock use, or have life history characteristics that prevent them from being significantly affected by livestock. *Cheilanthes intertexta* is a fern found in crevasses in cliffs and rocks. *Cirsium ciliolatum* is a thistle protected by spines and thorns. *Cypripedium montanum* grows in coniferous forests where little livestock forage is available. The *Plagiobothrys glyptocarpus* population occurs in an area receiving light grazing, but is unlikely to be impacted by livestock since it is an annual forb that can complete its reproductive cycle before livestock are turned out. *Ribes inerme* var. *klamathense* is a shrub found in coniferous riparian zones seldom visited by livestock, and is protected by thorns.

#### **Noxious Weeds:**

Field surveys have located a number of noxious weed species within the allotment, including yellow star thistle (*Centaurea solstitialis*), bull thistle (*Cirsium vulgare*), Canada thistle (*Cirsium arvense*), and medusahead rye (*Taeniatherum caput-medusae*). Many of the weed populations occur along roads or in areas historically disturbed by forestry operations. In the non-conifer habitats preferred by livestock, medusahead and other exotic annual grasses are present in most meadows, and dominant in some areas. The Rangeland Health Assessments indicate that there is a slight to moderate departure in the forested areas of the allotment and a moderate to extreme departure in the meadows (see indicator 16 p.14,16,and 17). Disturbance from historic livestock grazing practices contributed to the invasion and conversion of native perennial grasslands throughout Southern Oregon and California in the past (D'Antonio and Vitousek, 1992). Exotic annual grass infestations are of concern because they alter the ecological functioning of native plant communities, reduce the value of wildlife habitat, and provide inferior forage for wildlife and livestock (D'Antonio and Vitousek, 1992). The areas most likely to experience conversion from native perennial grasslands to exotic annual grasslands have already undergone conversion, and current stocking rates are unlikely to convert additional areas of remnant native grassland. Due to their invasive nature, noxious weeds present on the allotment can continue to spread when left untreated. Field visits to the allotment and BLM monitoring data suggests exotic annual grasses are not spreading rapidly under current grazing regimes. However, areas of moderate to heavy livestock utilization, congregation areas (salt blocks, water sources, shade) and loading areas that experience soil and vegetation disturbance within the allotment are at risk for weed colonization. Although no weed treatments have been done in this allotment in recent years, the BLM weed control program uses herbicides, biological control agents, and hand pulling to treat infestations across the landscape as time, budget, and personnel constraints allow.

#### **SUMMARY OF RANGELAND HEALTH FIELD ASSESMENTS**

Rangeland Health is defined as the degree in which the integrity of the soil, vegetation, water, and air as well as the ecological processes of the rangeland ecosystem are balanced and sustained (USDA 1997).

Rangeland health assessments were completed at three ecological sites on the Heppsie Mountain allotment; Loamy Shrub Scabland, Douglas Fir Forest, and Pine Fescue Forest. These ecological sites were chosen

by using GIS (Global Information Systems) mapping that defined vegetative communities and soils followed by field surveys to determine a representative location to complete the assessment. The assessments were completed with an IDT (Interdisciplinary team).

**Location 1: Loamy Shrub Scabland Summary**

The overall rating for this location is a Slight to Moderate departure from what would be expected for this site. Four indicators (24%) were rated None to Slight, eight indicators (47%) were rated Slight to Moderate, three indicators (18%) were rated Moderate, two indicators (11%) were rated Moderate to Extreme, and zero were rated Extreme to Total.

**Photo 1.** Photo taken at the Loamy Shrub scabland ecological site.



**Table D: RHA location 1 indicator summary**

Location 1: Loamy shrub scabland					
Indicator	Degree of Departure from Ecological Site Description				
	Extreme	Moderate to Extreme	Moderate	Slight to Moderate	None to Slight
1. Rills				✓	
2. Water Flow Patterns				✓	
3. Pedestals and/or Terracettes			✓		
4. Bareground				✓	
5. Gullies			✓		
6. Windscooured Blowouts					✓
7. Litter movement					✓
8. Soil surface resistance to erosion				✓	
9. Soil surface loss or degradation				✓	
10. Plant community composition and distribution relative to infiltration				✓	
11. Compaction Layer				✓	
12. Functional/Structural groups			✓		
13. Plant mortality/ decadence					✓
14. Litter amount					✓
15. Annual Production				✓	
16. Invasive Plants		✓			

17. Reproductive capability of Perennial plants		✓			
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### Soil Stability

Soil stability data was collected at 3 locations in the Loamy Shrub scabland ecological site using the Bottle Cap Test. This test is completed by placing a small soil fragment in a bottle cap filled with water.

Watching it for 30 seconds, gently swirling the water for five seconds and then assigning one of the three ratings; M=Melts in first 30 seconds (without swirling) D= Disintegrates when swirled (but does not melt), and S = Stable (even after swirling).

**Table D1**

Site description	Sample 1	Sample 2	Sample 3
Site 1 Perennial grasses	S	S	S
Site 2 Annual grasses	S	M	S
Site 3 Annual grasses on 20% slope.	S	S	M

### Line Point Intercept

Line point intercept data indicates 96% canopy cover by vascular plants and 0% bare ground, which is defined as soil with nothing above it.

**Table D2 – Species composition**

Common name	Scientific name	Life Form	Origin	% Frequency
Tall fescue	<i>Festuca arundinaceae</i>	PG	I	46
Sandberg bluegrass	<i>Poa secunda</i>	PG	N	28
Bristly dogtail	<i>Cynosurus echinatus</i>	AG	I	14
California oatgrass	<i>Danthonia californica</i>	PG	N	12
meadow barley	<i>Hordeum brachyantherum</i>	PG	N	28
lotus	<i>Lotus sp.</i>	PF	N	14
carex	<i>Carex sp.</i>	PGL	N	8

PG= Perennial grass, AG=Annual grass, PF= Perennial forb, PGL= Perennial grass-like N= Native  
I= Introduced

**Table D3- Ground cover**

Ground Cover	# Of Hits	% Frequency
Litter	26	52
Moss	29	58
Soil	19	38
Rock	2	4

### Location 2: Douglas Fir Forest Summary

The overall rating for this location is a None to Slight departure from what would be expected for this site. Thirteen indicators (76%) were rated None to Slight, four indicators (24%) were rated Slight to Moderate departure, and zero indicators were rated Moderate, Moderate to Extreme or Extreme to Total.

**Photo 2.** Photo taken at the Douglas fir forest ecological site.



**Table E: RHA location 2 Indicator summary**

<b>Location 2: Douglas Fir Forest</b>					
<b>Indicator</b>	<b>Degree of Departure from Ecological Site Description</b>				
	Extreme	Moderate to Extreme	Moderate	Slight to Moderate	None to Slight
1. Rills					✓
2. Water Flow Patterns					✓
3. Pedestals and/or Terracettes					✓
4. Bareground					✓
5. Gullies					✓
6. Windscored Blowouts					✓
7. Litter movement					✓
8. Soil surface resistance to erosion					✓
9. Soil surface loss or degradation					✓
10. Plant community composition and distribution relative to infiltration					✓
11. Compaction Layer					✓
12. Functional/Structural groups				✓	
13. Plant mortality/ decadence				✓	
14. Litter amount					✓
15. Annual Production				✓	
16. Invasive Plants				✓	
17. Reproductive capability of Perennial plants					✓

**Location 3: Pine/Fescue Summary**

The overall rating for this location is a None to Slight departure from what would be expected for this site. Twelve (71%) were rated None to Slight, five (29%) were rated Slight to Moderate, and zero were rated Moderate, Moderate to Extreme, or Extreme to Total departures.

**Photo 3.** Photo taken at the Pine/Fescue ecological site



**Table F: RHA location 3 indicator summary**

Indicator	Location 3: Pine/Fescue				
	Degree of Departure from Ecological Site Description				
	Extreme	Moderate to Extreme	Moderate	Slight to Moderate	None to Slight
1. Rills					✓
2. Water Flow Patterns					✓
3. Pedestals and/or Terracettes					✓
4. Bareground				✓	
5. Gullies					✓
6. Windscooured Blowouts					✓
7. Litter movement					✓
8. Soil surface resistance to erosion					✓
9. Soil surface loss or degradation					✓
10. Plant community composition and distribution relative to infiltration					✓
11. Compaction Layer					✓
12. Functional/Structural groups				✓	
13. Plant mortality/ decadence				✓	
14. Litter amount					✓
15. Annual Production					✓
16. Invasive Plants				✓	
17. Reproductive capability of Perennial plants				✓	

### Soil Stability

Soil stability data was collected at 2 locations in the Pine/Fescue ecological site using the Bottle Cap Test. This test is completed by placing a small soil fragment in a bottle cap filled with water. Watching it for 30 seconds, gently swirling the water for five seconds and then assigning one of the three ratings; M=Melts in first 30 seconds (without swirling) D= Disintegrates when swirled (but does not melt), and S = Stable (even after swirling).

**Table F1**

Site description	Sample 1	Sample 2	Sample 3
Site 1 Under tree canopy	S	S	S
Site 2 Between tree canopy and plant base	S	D	D

### Line Point Intercept

Line point intercept data indicates 54% canopy cover by vascular, herbaceous plants and 0% bare ground, which is defined as soil with nothing above it.

**Table F2 – Species composition**

Common name	Scientific name	Life Form	Origin	% Frequency
California fescue	<i>Festuca californica</i>	PG	N	46
Oregon grape	<i>Berberis aquifolium</i>	PS	N	6
Alaskan onion grass	<i>Melica subulata</i>	PG	N	6

PG= Perennial grass, PS= Perennial shrub, N= Native

**Table F3 – Ground Cover**

Ground Cover	# Of Hits	% Frequency
Litter	47	94
Wood	4	8
Soil	50	100

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