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

January 2012

Lower Big Applegate Allotment –

STANDARDS OF RANGELAND HEALTH ANALYSIS

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Rangeland Health Field Assessment Summary of Findings

Assessment Participants (Name and Discipline):

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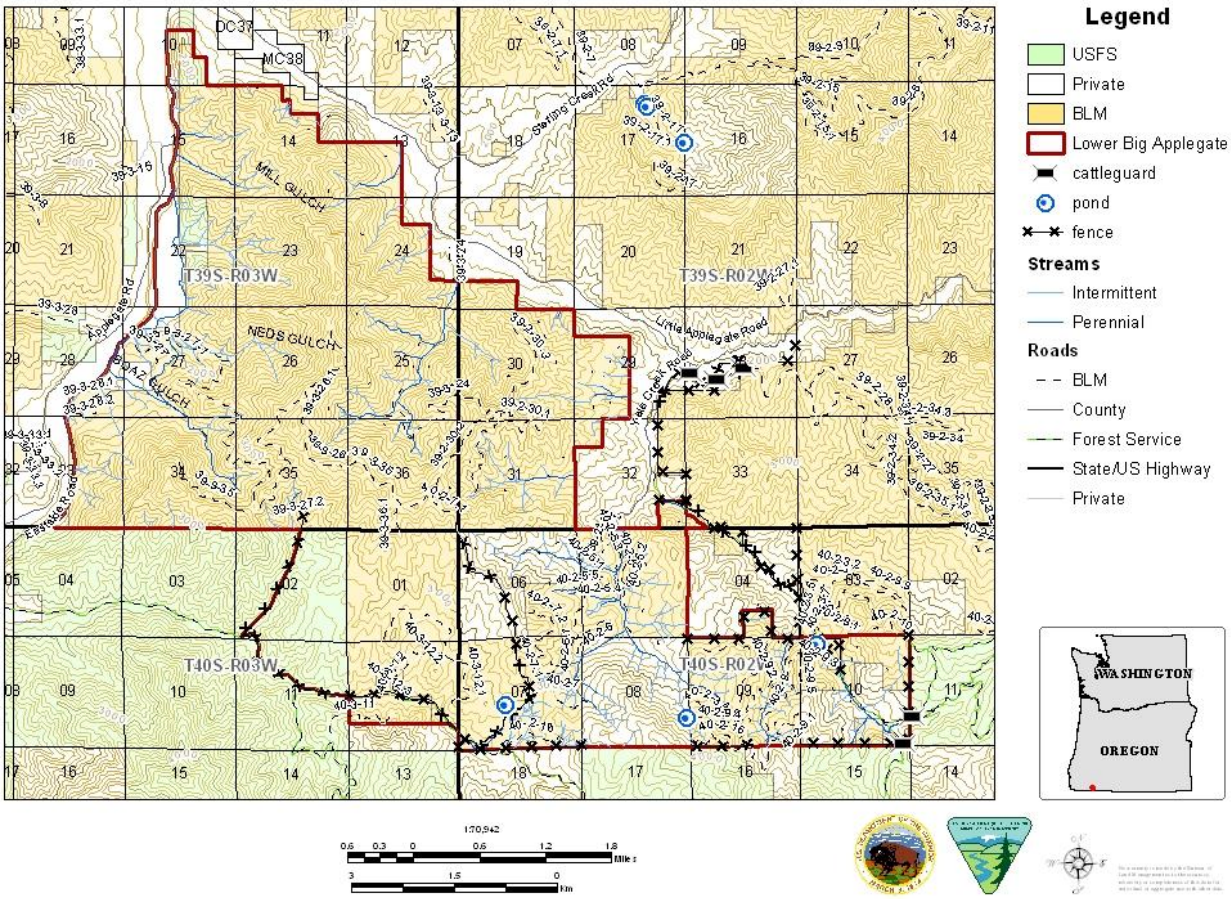
Jen Smith	- Aquatic Wildlife/Fisheries
Tim Montfort	- Hydrology
Ted Hass	-Soils
Dulcey Schuster	- Botany

INTRODUCTION

This is an Oregon/Washington Bureau of Land Management (BLM) Standards of Rangeland Health Evaluation that addresses the Lower Big Applegate Allotment (20206). The analysis area is 11,712 acres with 78 cows permitted from April 16-June 15 and 41 cows permitted from April 16-June 30, totaling 258 Animal Unit Months (AUMs).

Map 1. Lower Big Applegate Allotment map



Vegetation

The vegetation in this allotment is predominately a mosaic of chaparral (*Ceanothus cuneatus*), Douglas fir (*Pseudotsuga menziesii)*, prairie, and Oregon white oak (*Quercus garryana*) woodland with Pacific madrone (*Arbutus menziesii*) on the northern slopes. Ponderosa pine (*Pinus ponderosa*), and Pacific poison oak (*Toxicodendron diversilobum*) are also components of the plant community. Native grasses, including Secund's bluegrass (*Poa secunda*), Roemer's fescue (*Festuca roemerii*), needlegrass (*Achnatherum sp.*), tall fescue (*Festuca arundinacea*), blue wildrye (*Elymus glaucus*), and California brome (*Bromus* carinatus), and oatgrass (*Danthonia*) grow across the elevational range, depending on local conditions of soil, topography, and shade. Annual and short-

lived perennial weedy grasses, including medusahead (*Taeniatherum caput-medusae*), smooth brome (*Bromus hordeaceous*), dogstail (*Cynosurus echinatus*), and bulbous bluegrass (*Poa bulbosa*) grow throughout the allotment.

Soils

Soils series identified in the area are Caris, Offenbacher, Vannoy, Voorhies, Shefflein, and Tallowbox. The slopes range from 20 to 65 percent. Most of the soils are well drained except for the Tallowbox series which is somewhat excessively well drained. Runoff for these soils is high on soils with topography over 35 percent and moderate on those below 35 percent. Caris, Offenbacher and Voorhies usually have a gravelly surface with a potential to ravel downhill on slopes greater than 50 percent. The Shefflein and Tallowbox soils were formed from granitic parent material and are highly erodible, particularly on slopes over 35 percent. The effects of cattle grazing on the soils in this allotment are not very apparent at the current level of use.

Hydrology

This allotment lies within the Applegate Subbasin which is located in southwestern Oregon, approximately 3 miles south of Grants Pass, Oregon and 3 miles southwest of Medford, Oregon. The Applegate River starts in California and flows 60 miles to join the Rogue River. The subbasin covers portions of three counties: Josephine and Jackson in Oregon and Siskiyou in California. Elevations within the subbasin range between approximately 880 feet at the confluence with the Rogue River, to just over 7,400 feet at Dutchman Peak. The Little Applegate River and the mainstem Applegate River comprise the allotments west and east boundaries but are not within the allotment itself. Major drainages within the allotment are Beaver, Grouse and Yale Creeks along with Boaz, Ned's and Waters Gulch. Elevation within the allotment ranges from 1640 feet to 3960 feet. The Applegate Subbasin experiences a Mediterranean climate, with a prolonged cold wet period from late October through May, followed by a hot dry season from June into October. Annual rainfall amounts vary widely across the subbasin as the rugged terrain exerts a strong rain shadow and rain-producing effect. High elevations receive up to 65 inches of annual precipitation (rainfall equivalent) and lower elevations receive 20 to 35 inches of rainfall annually. Winter precipitation at elevations above 5,000 feet generally falls as snow. Between 3,500 and 5,000 feet a mixture of rain and snow occurs and this elevation band is called the transient snow zone or rain-on-snow dominated zone. The snow level in this zone fluctuates throughout the winter in response to alternating warm and cold fronts. Rain-on-snow events in this elevation range can cause very high peak flows resulting in flooding and severe erosion. Streamflows in the Applegate River have been regulated by the Applegate Reservoir since its completion in December 1980.

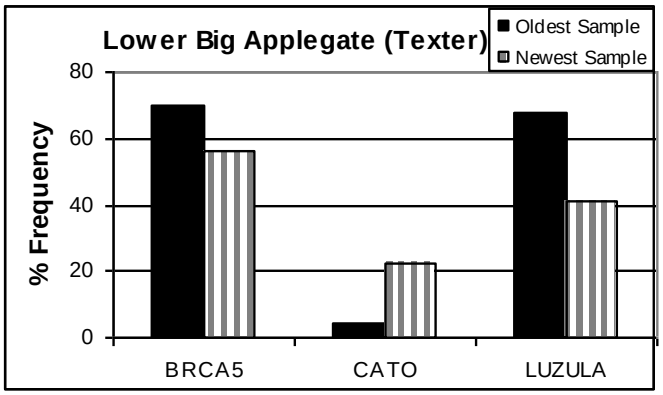
Major land uses in the Applegate Subbasin include agriculture, timber, mining, and recreation. Many of the private landowners operate "hobby farms" and small woodlots. The majority of the individual ranches and residences are located along the Applegate River and Williams Creek. Due to the close proximity to Grants Pass and Medford, Oregon, and the range of recreation opportunities available in the Applegate Subbasin, the area receives a high degree of use for fishing, hunting, swimming, hiking, mountain biking, horseback riding, off-highway vehicle (OHV) use, and pleasure driving. Roads distributed throughout the watershed provide vehicle access to managed forestlands, residences, and recreational areas.

BLM-administered lands within the allotment boundary are relatively continuous and can be characterized as generally steep and dissected uplands. Vegetation is primarily mixed conifer with scattered areas of oak woodland and brushfields. As opposed to other areas utilized for grazing, there are few low gradient meadow systems within the allotment.

Nested Frequency Data

The BLM collected trend data using the Nested Frequency Method beginning at this location in 1997, with subsequent data collection in 2002 and 2006.

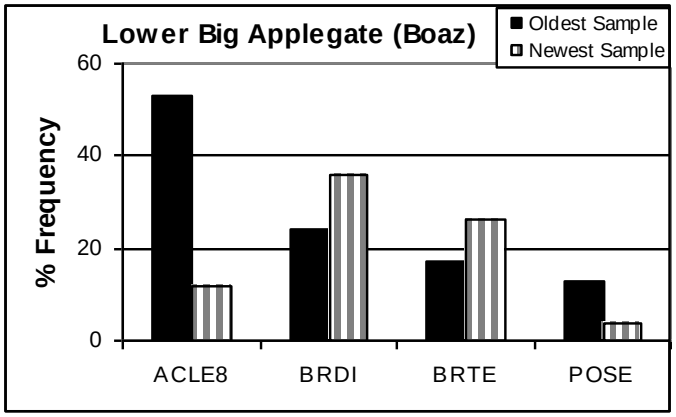
Figure 1. Nested Frequency Data



Species showing significant change in frequency include two native, perennial grass/grass-like species. *Bromus carinatus* (California brome) decreased 36% and a *Luzula comosa* (Pacific woodrush) decreased 27%. A native, perennial, lily *Calochortus tolmiei* increased 18%. The overall trend at this site is decreasing or negative due to the decrease of native perennial grasses.

The collection of trend data using the Nested Frequency Method began at this location in 1990. Data was subsequently collected in 1995 and 2006.

Figure 2. Boaz Plot-Nested Frequency Data



Species showing significant change include two non-native, invasive, annual grasses. *Bromus diandrus* (ripgut brome) increased 12% and *Bromus tectorum* (cheatgrass) increased 9%, however it decreased 36% from the data collected in 1995. Two native, perennial, bunchgrasses decreased. *Achnatherum lemmonii* (Lemmon's needlegrass) decreased 41% and *Poa secunda* (sandberg bluegrass) decreased 9%. The overall trend at this site is decreasing or negative due to the decrease of native perennial grasses and increase of undesirable annual grasses.

<u>Utilization Data</u>

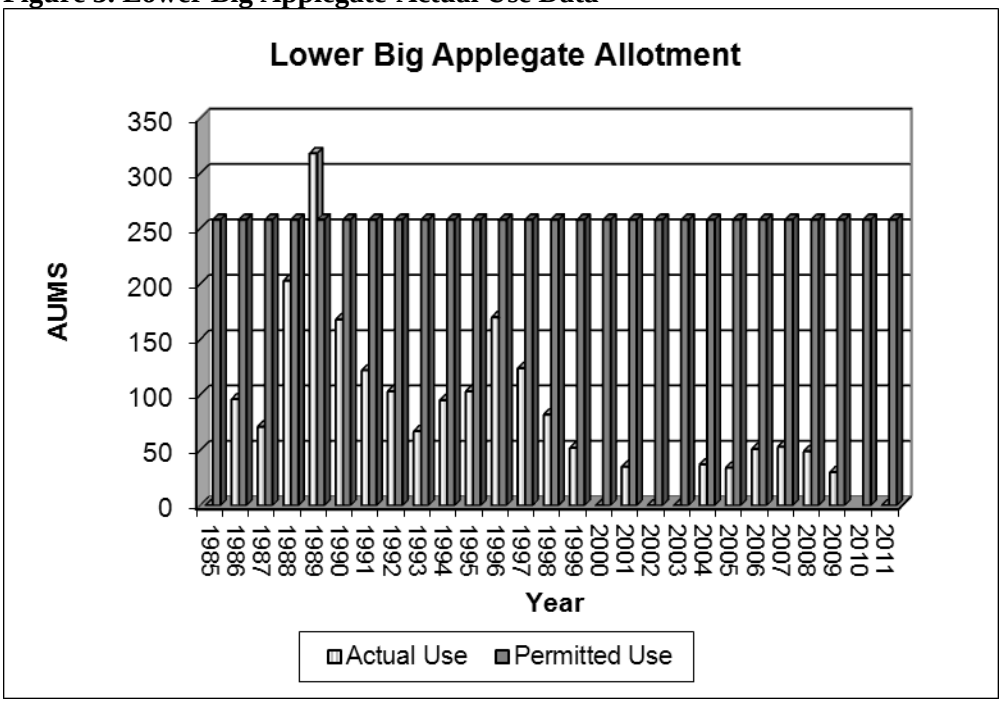
Utilization data is collected using the key species method (using ocular estimates of forage removed by weight) and mapping use zones (TR 4400-3, 1996). A six class delineation is used (No Use: 0-5 percent, Slight Use: 6-20 percent, Light Use: 21-40 percent, Moderate Use: 41-60 percent, Heavy Use: 61-80 percent, Severe Use: 81-100 percent).

The utilization patterns in the allotment can be categorized as most of the grazing use is occurring along roads, in Texter/Armstrong Gulch, and in the vicinity of the constructed 3-4 ponds (includes ponds located on USFS land). Utilization mapping data collected in 2008 shows Slight Use in Boaz Gulch (from unauthorized horses) and in the south and east portions of the Texter Gulch Pasture (Sec. 12, 7). The remainder of the allotment was mapped as No Use. Utilization mapping and transect data collected in 1998 and1999 show similar use patterns. Utilization mapping data collected in 1998 and 1999 shows Moderate Use in Boaz Gulch and Light Use in the Armstrong and Texter Gulch drainages. The utilization in 1996 showed that most of the allotment (approximately 80%) had utilization less than 20% with approximately 10% in the Moderate Use category, and 20% in the Light Use category. Utilization mapping data collected in 2008 shows Slight Use in Boaz Gulch and in the south and east portions of the Texter Gulch Pasture (Sec. 12, 7).

Actual Use Data

Actual use data has been collected since 1985. A review of the actual use data shows that the allotment has not been grazed for 5 out of the last 10 years. The average actual use in the years that the allotment has been grazed or where actual use data is available is 102 AUMs. The average actual use for the last ten years is 44 AUMS in the years that the allotment has been grazed.

Figure 3. Lower Big Applegate-Actual Use Data



ASSESSMENT

Rangeland Health Assessments are being completed on each allotment prior to consideration of grazing lease renewal. These assessments are conducted by an interdisciplinary team of resource specialists who assess ecological processes, watershed functioning condition, water quality conditions, special status species, and wildlife habitat conditions on an allotment. Assessments include field visits to the allotments and evaluation of all available data. All available data will be used to make an overall assessment of rangeland health as described in the *Standards for Rangeland Health and Guidelines and Livestock Grazing Management for Public Lands Administered by the*

Bureau of Land Management in the States of Oregon and Washington (Standards and Guidelines) (USDI 1997), in light of the Fundamentals of Rangeland Health at 43 CFR § 4180.1.

The Standards and Guidelines identify five specific standards that are used to determine the degree to which "ecological function and process exist within each ecosystem." Standards address the health, productivity, and sustainability of the BLM-administered public rangelands and represent the minimum acceptable conditions for the public rangelands. The guidelines are management practices that will either maintain existing desirable conditions or move rangelands toward statewide standards within reasonable timeframes.

This assessment summarizes existing resource conditions on the Lower Big Applegate Allotment using information derived from rangeland field assessments; BLM monitoring data; and all other available data in relation to the five specific standards described in the Standards and Guidelines (USDI 1997).

Primary Supporting Data

Data used by the BLM to support this assessment includes, but is not limited to, the following studies and monitoring projects.

Rangeland Health Field Assessment: A field assessment using the protocol described in *Technical Reference 1734-6: Interpreting the Indicators of Rangeland Health* (USDI and USDA 2005) was conducted July 2, 2008 at a mixed pine-Douglas fir-fescue forest, granitic ecological site on the Lower Big Applegate Allotment.

Botany Surveys: Special Status vascular plant surveys were conducted in the Lower Big Applegate Allotment in 2007 and 2011 using the Intuitive Controlled Survey. In the intuitive controlled survey method, the surveyor traverses through the project area enough to see a representative cross section of all the major habitats and topographic features, looking for the target species while en route between different areas. Most of the project unit will have been surveyed. When the surveyor arrives at an area of high potential habitat (that was defined in the pre-field review or encountered during the field visit), a complete survey for the target species was made.

Proper Functioning Condition (PFC): These surveys are conducted using the Ashland Resource Area Stream Survey Protocol. Location, flow duration, channel classification/morphology data for streams, wetlands, and other hydrologic features; instream large wood; impact descriptions and restoration opportunities, especially related to livestock, transportation, and vegetation throughout the allotment is collected. Proper functioning condition (PFC) is assessed during the surveys

Water Quality: The BLM collected summertime stream temperature data at eight locations within or adjacent to the allotment.

Standard 1 Watershed Function - Uplands

To meet this standard, upland soils exhibit infiltration and permeability rates, moisture storage, and stability that are appropriate to soil, climate, and landform.

This standard focuses on the basic physical functions of upland soils that support plant growth, the maintenance or development of plant populations and communities, and promote dependable flows of quality water from the watershed.

To achieve and sustain rangeland health, watersheds must function properly. Watersheds consist of three principle components: the uplands, riparian/wetland areas and the aquatic zone. This standard addresses the upland

component of the watershed. When functioning properly, within its potential, a watershed captures, stores and safely releases the moisture associated with normal precipitation events (equal to or less than the 25 year, 5 hour event) that falls within its boundaries. Uplands make up the largest part of the watershed and are where most of the moisture received during precipitation events is captured and stored.

While all watersheds consist of similar components and processes, each is unique in its individual makeup. Each watershed displays its own pattern of landform and soil, its unique climate and weather patterns, and its own history of use and current condition. In directing management toward achieving this standard, it is essential to treat each unit of the landscape (soil, ecological site, and watershed) according to its own capability and how it fits with both smaller and larger units of the landscape.

A Rangeland Health Assessment was conducted on the allotment at a mixed pine-Douglas fir-fescue forest, granitic ecological site in July of 2008. Looking only at indicators pertaining to Soil/Site Stability revealed that all 10 indicators (100%) were rated none to slight and zero were rated; slight to moderate, moderate, moderate to extreme, or an extreme to total departure. Looking at the indicators in the Rangeland Health Assessment pertaining to Hydrologic Function revealed that all 51 indicators (100%) were rated none to slight and zero were rated slight to moderate, moderate, moderate to extreme, or extreme to total departures (Appendix A, Table A).

Areas preferred by livestock, especially the habitats with little or no canopy cover, have grass and forb layers often dominated by nonnative plant species. These nonnative species include invasive and/or noxious weeds. The initial establishment of nonnative plants was the result of past management activities; such as logging, historic grazing, and road construction. The current grazing authorization does not diminish the restoration of the plant community. However, in areas dominated by nonnative species plant communities would not restore themselves to native species without costly restoration efforts such as seeding or weed treatments regardless of the grazing regime because there is no longer a native seed source. A healthy, properly functioning ecosystem relies on the interactions of native and naturally occurring species.

Standard 2 Watershed Function - Riparian/Wetland Areas

To meet this standard, riparian-wetland areas are in properly functioning physical condition appropriate to soil, climate, and landform.

Riparian-wetland areas are grouped into two major categories: 1) lentic, or standing water systems such as lakes, ponds, seeps, bogs, and meadows; and 2) lotic, or moving water systems such as rivers, streams, and springs. Wetlands are areas that are inundated or saturated by surface or ground water at a frequency and duration to support, and which under normal circumstances do support, a prevalence of vegetation typically adapted to life in saturated soil conditions. Riparian areas commonly occupy the transition zone between the uplands and surface water bodies (the aquatic zone) or permanently saturated wetlands.

Properly functioning condition of riparian and wetland areas describes the degree of physical function of these components of the watershed. Their functionality is important to water quality in the capture and retention of sediment and debris, the detention and detoxification of pollutants, and in moderating seasonal extremes of water temperature. Properly functioning riparian areas and wetlands enhance the timing and duration of stream flow through dissipation of flood energy, improved bank storage, and ground water recharge. Properly functioning condition should not be confused with the Desired Plant Community (DPC) or the Desired Future Condition (DFC) since, in most cases, it is the precursor to these levels of resource condition and is required for their attainment.

The Lower Big Applegate Allotment encompasses portions of two fifth field watersheds, the Upper Applegate and Little Applegate River Watersheds, both of which drain into the Applegate River subbasin. Larger, fish bearing streams contained within the allotment include portions of Beaver, Yale, and Grouse Creeks, and Waters Gulch, a Yale Creek tributary.

Proper Functioning Condition (PFC) Assessments were conducted in the riparian areas of the allotment in 1998/99 by BLM hydrology staff (BLM Stream Surveys). 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 Lower Big Applegate Allotment there are 92 miles (estimated from GIS) of active stream channels (perennial or intermittent streams) on private and federal lands. 73 miles are on BLM administered lands, all of which have been surveyed. PFC assessments were made of all long duration and perennial streams, which total 50 miles. Assessments documented 30.5 miles as Proper Functioning Condition, 18 miles as Functioning at Risk (FAR), and 1.5 miles as Non Functional (NF). This equates to ~ 61% of all assessed reaches being PFC, 36% FAR, and 3% NF within the allotment boundary (USDI 1999). Surveyors noted moderate to light cattle related impacts occurring along 2.5 miles (or 3%) of all surveyed reaches. This includes short duration intermittent streams for which PFC assessments were not made. Of PFC assessed streams, cattle related impacts were found to be contributing to FAR ratings on less than one mile (2%) of the streams.

Of the stream reaches with identified cattle impacts, only one (.3 miles in length) was reported to have a moderate percentage (35%) of actively eroding banks. However, in most of the reaches it was observed that substrate composition was composed of greater than 30% fines (silt and sand), which is the Oregon Dept. of Fish and Wildlife "desirable" benchmark. This was largely driven by high amounts of decomposed granitic sand present, particularly in the Beaver Creek subwatershed. Surveyors did not note that cattle impacts were a major contributor of fines, and they are likely primarily a byproduct of other land management activities, such as the building and use of extensive road networks.

Given the large size of the allotment and the limited number of animals authorized (and even less which are actually turned out) which equates to light use distributed over a large spatial scale; that most streams are steep, forested, and armored by rocky and well vegetated banks; and the overall lack of observed cattle impacts to any aquatic habitats, it is not likely that cattle use in the Lower Big Applegate allotment is contributing adverse impacts to riparian resources.

Standard 3 Ecological Processes

To meet this standard, 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.

This standard addresses the ecological processes of energy flow and nutrient cycling as influenced by existing plant and animal communities. While emphasis may be on native species, an ecological site may be capable of supporting a number of different native and introduced plant and animal populations and communities while meeting this standard. This standard also addresses the hydrologic cycle which is essential for plant growth and appropriate levels of energy flow and nutrient cycling.

The ability of plants to capture sunlight energy, to grow and develop, plays a role in soil development and watershed function. Nutrients necessary for plant growth are made available to plants through the decomposition and metabolization of organic matter by insects, bacteria and fungi, the weathering of rocks and extraction from the

atmosphere. Nutrients are transported through the soil by plant uptake, leaching and by rodent, insect and microbial activity. They follow cyclical patterns as they are used and reused by living organisms.

The ability of rangelands to provide habitat for wildlife and satisfy social and economic needs depends on the buildup and cycling of nutrients over time. Interrupting or slowing nutrient cycling can lead to site degradation, as these lands become increasingly deficient in the nutrients plants require.

Some plant communities, because of past livestock use, fire frequency, or other past extreme or continued disturbances, are incapable of meeting this standard. For example, shallow-rooted winter-annual grasses that completely dominate some sites do not fully occupy the potential rooting depth of some soils, thereby reducing nutrient cycling well below optimum levels. In addition, these plants have a relatively short growth period and thus capture less sunlight than more diverse plant communities. Plant communities like those cited in this example are considered to have crossed the threshold of recovery and often require great expense to be recovered. The cost of recovery must be weighed against the site's potential ecological/economic value in establishing treatment priorities.

The allotment supports a diverse mix of plant communities, where invasive plant species are generally confined to some road-sides or localized disturbed areas the energy, nutrient, and hydrologic cycles are balanced and utilization is low enough to not disrupt these cycles.

Areas preferred by livestock, especially the habitats with little or no canopy cover, have grass and forb layers often dominated by nonnative plant species. These nonnative species include invasive and/or noxious weeds. The initial establishment of nonnative plants was the result of past management activities; such as logging, historic grazing, and road construction. The current grazing authorization does not diminish the restoration of the plant community. However, in areas dominated by nonnative species plant communities would not restore themselves to native species without costly restoration efforts such as seeding or weed treatments regardless of the grazing regime because there is no longer a native seed source. A healthy, properly functioning ecosystem relies on the interactions of native and naturally occurring species. In consideration of healthy, properly functioning ecosystems, it is important to recognize the aggressive colonization characteristics of many nonnative species and their ability to out-compete native species. This ability will allow them to continue to increase, even in the absence of grazing activities.

The potential plant community for this site is dominated by ponderosa pine and Douglas fir. Sugar pine, although important, is less common on the site, and incense cedar grows only sporadically. Common hardwood trees in the overstory include Pacific madrone and California black oak. Understory shrubs include deer brush, Brewers lupine, poison oak, common snowberry, tall Oregongrape, whiteleaf Manzanita, and hairy honeysuckle. Grasses include Idaho fescue, western fescue, blue wildrye, mountain brome, prairie junegrass, tall trisetum, and California fescue. Forbs, which are of a minor extent, include white hawkweed, lupine, tarweed, iris, brackenfern, mountain sweetroot, and California bellflower.

Standard 4 Water Quality

To meet this standard, surface water and groundwater quality, influenced by agency actions, complies with State water quality standards.

The quality of the water yielded by a watershed is determined by the physical and chemical properties of the geology and soils unique to the watershed, the prevailing climate and weather patterns, current resource conditions, the uses to which the land is put and the quality of the management of those uses. Standards 1, 2 and 3 contribute to attaining this standard.

States are legally required to establish water quality standards and Federal land management agencies are to comply with those standards. In mixed ownership watersheds, agencies, like any other land owners, have limited influence on the quality of the water yielded by the watershed. The actions taken by the agency will contribute to meeting State water quality standards during the period that water crosses agency administered holdings.

The Northwest Forest Plan (ROD) (1995), which incorporates the Aquatic Conservation Strategy and the Medford District Resource Management Plan (RMP) (1995) are designed to meet the objectives of water quality and proper riparian function and health. Grazing specific Best Management Practices (BMP's) (RMP/ROD, Appendix D) are currently being implemented on the allotments as the primary method to achieve Oregon water quality standards.

The Oregon Environmental Quality Commission has adopted numeric and narrative water quality standards to protect designated beneficial uses (Table 3). In practice, water quality standards have been set at a level to protect the most sensitive uses. Cold-water aquatic life such as salmon and trout are the most sensitive beneficial uses in the Applegate Subbasin.

Table 1. Beneficial Uses in the Applegate Subbasin (OAR 340-41-362)

Beneficial Use	***Occurring***	***Beneficial Use***	***Occurring***
Public Domestic Water Supply	✓	Anadromous Fish Passage	✓
Private Domestic Water Supply	✓	Salmonid Fish Spawning	✓
Industrial Water Supply	✓	Salmonid Fish Rearing	✓
Irrigation	✓	Resident Fish and Aquatic Life	✓
Livestock Watering	✓	Wildlife and Hunting	✓
Boating	✓	Fishing	✓
Aesthetic Quality	✓	Water Contact Recreation	✓
Commercial Navigation & Trans.		Hydro Power	✓

Section 303 of the Clean Water Act of 1972, as amended by the Water Quality Act of 1987, provides direction for designation of beneficial uses and limiting discharge of pollutants to waters of the state. The DEQ is responsible for designating streams that do not meet established water quality criteria for one or more beneficial uses. These streams are included on the state's 303(d) list, which is revised every two years, and submitted to the Environmental Protection Agency (EPA) for approval. Section 303 of the Clean Water Act further requires that total maximum daily loads (TMDLs) be developed for waters included on the 303(d) list. A TMDL defines the amount of pollution that can be present in the waterbody without causing water quality standards to be violated. A water quality management plan (WQMP) is developed to describe a strategy for reducing water pollution to the level of the load allocations and waste load allocations prescribed in the TMDL. The approach is designed to restore water quality and result in compliance with water quality standards. The approach is intended to protect the designated beneficial uses of waters of the state. A WQMP addressing 303(d) listed water bodies on federal lands within the Applegate Sub-basin was jointly prepared by the BLM and Forest Service in January of 2005 (USDI and USDA 2005) and outlines a strategy to achieve water quality standards..

As of the 2006 Oregon 303(d) (ODEQ 2006a) list, there is one water quality listed stream that runs through the allotment boundary, Grouse Creek. Grouse Creek is listed as impaired for dissolved oxygen (DO). Pending additional information, DO was deferred in the most recent TMDL and will be addressed by DEQ as part of the five-year review. Other streams that are adjacent or within the allotment boundary include: Applegate River, Little Applegate River, Yale Creek, Beaver Creek, Boaz Gulch, Ned's Gulch, and Waters Gulch. Some of these streams were evaluated with the most recent TMDL and their status is depicted in Table 4. Although many were delisted in 2004/2006 with

implementation of the TMDL, they still warrant concern until recovery occurs. In particular, recovery goals for temperature and sediment on federal land as outlined in the WQRP (USDI and USFS 2005) state: manage livestock to maintain or improve riparian vegetation and implement prescriptions that increase growth rate and survival of riparian vegetation.

Table 2. 2004/2006 303(d) Listing Status in the Lower Big Applegate Allotment (ODEQ 2006a)

Stream Segment	Listed Parameter	Status
Applegate River	Temperature	2004 Delisted (TMDL)
	Dissolved Oxygen	2004 303(d)
Beaver Creek	Temperature	2004 Delisted (TMDL)
	Sediment	2004 Delisted (TMDL)
Grouse Creek	Dissolved Oxygen	2002 303(d)
Little Applegate River	Temperature	2004 Delisted (TMDL)
Yale Creek	Temperature	2004 Delisted (TMDL)

Temperature:
The BLM collected summertime stream temperature data at locations within or adjacent to the allotment (Table 3). The 7-day statistics for all sites listed in Table 5 exceed the established 2004 temperature criteria. Perennial streams are designated as core cold-water habitat, therefore the seven-day-average maximum for these streams may not exceed 16.0°C (60.8°F) outside the salmon and steelhead period of spawning use.

Table 3. Temperature summary for selected streams within the Lower Big Applegate Allotment

Stream Name	Period of Record	Avg. 7-day statistic	Range of 7 Day for all years
Yale Creek above Box Canyon Creek	1996-2001, 2003-2004	62.3	61.9 – 65.6
Box Canyon Creek above confluence with Yale Creek	1996, 1997	61.0	59.8 - 62.2
Yale Creek above Waters Gulch, Sec. 32 SE 1/4 SE 1/4 on BLM	1996-2005	64.2	61.9 – 65.6
Waters Gulch (Yale Creek) @ 40-2-5 Road crossing	1996,1997, 2005	62.1	60.7 - 63.4
Grouse Creek in Section 24, above irrigation ditch return	2002,2003,2005	64.1	63.0 – 65.8
Texter Gulch above confluence with Beaver Creek	2002,2003	63.8	63.6 - 64.0
Beaver Creek @ Section 11/12 boundary	1999,2002,2003	64.2	61.7 - 65.5
Beaver Creek below confluence with Pete's Camp Ck., @ Sec. 7/18 line	1999,2002,2003	64.5	61.6 - 66.0

Stream temperature is influenced by riparian vegetation, channel morphology, hydrology, climate, and geographic location. While climate and geographic location are outside of human control, the condition of the riparian area, channel morphology and hydrology can be altered by land use. Human activities that contribute to degraded thermal water quality conditions include: agricultural activity; rural residential developments; water withdrawals; timber harvests; local and forest access roads (USDI and USDA 1997). Timber harvest, roads, and livestock grazing are the primary impacts specific to federally managed lands that have the potential to affect water quality conditions in the allotment area.

The primary reason for elevated stream temperatures on BLM managed lands in this area is an increase in solar radiation reaching the stream surface following timber harvest or road construction that removed stream shading vegetation. Pre-NWFP management activities along streams on federal lands in the subbasin have left a mosaic of vegetation age classes in the riparian areas. The amount of riparian area with late-successional forest characteristics has declined on federal lands primarily due to timber harvest and road construction within or adjacent to riparian areas. In some cases the large conifers have been replaced by young, small diameter conifer stands and in other cases, hardwoods have replaced conifers as the dominant species in riparian areas. In riparian areas where the trees are no longer tall enough to adequately shade the adjacent streams, the water flowing through these exposed areas is subject to increased solar radiation and subsequent elevated temperatures.

Although it is unknown if the following shade data was collected within the allotment boundary, currently the BLM administered lands along the assessed reaches of the Little Applegate River and Beaver and Yale Creeks meet the target shade values. Given the steep incised drainages and the forested setting, it is unlikely that grazing is affecting stream shade within the allotment boundaries for these drainages. Therefore, it is expected that temperature values will continue to improve as riparian vegetation recovers.

Table 4. Percent-Effective Shade Targets for BLM-Managed Lands within or near the Allotment Boundary

Stream	Current Shade[1] (%)	Target Shade[1] (%)	Additional Shade Needed[2] (%)	Time to Recovery[3] (years)
Beaver Creek	86	87	1	0
Little Applegate River	93	96	3	0
Yale Creek	96	98	2	0

1/ Current shade and target shade refer to percent-effective shade defined as the percent reduction of solar radiation load delivered to the water surface. Shade values are averages for all BLM stream miles assessed.

2/ Additional shade needed is the increase in percent-effective shade required to meet the target shade.

3/ If current shade is greater than or equal to the target shade, the time to recovery is listed as 0 years. If current shade is less than the target shade, the time to recovery is listed as the number of years needed to reach full system potential percent-effective shade. At a value equal to the target shade or ≥ 80 percent effective shade, a stream is considered recovered and the stream should not be a candidate for active restoration. Additional shade should come from passive management of the riparian area. Any increase over the target shade or 80 percent effective shade is considered a margin of safety. Years to recovery are a weighted average of recovery time for individual stream reaches.

Sediment:

Sediment is a natural part of a healthy stream system with equilibrium between sediment input, routing, and in-stream storage. Under natural conditions, there is generally a balance between the amount of fine sediment, coarse bedload sediment, and larger elements of instream structure (i.e. wood, boulders). Sedimentation results from either stream channel or upland erosion. Disturbances that change riparian vegetation, increase the rate or amount of overland flow, or destabilize a stream bank may increase the rates of stream bank erosion and result in sedimentation increases (ODEQ 2004). Disturbances in the uplands that remove vegetation, reduce soil stability on slopes, or channel runoff can increase sediment inputs (ODEQ 2004).

Natural erosion processes occurring in the allotment area such as landslides, surface erosion, and flood events contribute to increased sedimentation (USDI and USDA 1997). Sediment sources resulting from human activities include roads, logging (tractor skid trails, yarding corridors, and landings); off-highway vehicle (OHV) trails and concentrated livestock grazing in riparian zones.

Improper livestock management contributes to sedimentation through bank trampling and the reduction or

elimination of riparian vegetation. BLM stream surveys in 1998 and field assessments in October 2011 noted few reaches with these types of grazing impacts.

Riparian vegetation is a key factor involved in sediment sources stemming from BLM administered lands. The BLM uses a proper functioning condition (PFC) assessment to determine the condition of riparian areas. PFC is a qualitative method based on quantitative science (USDI and USDA 1998). This assessment considers hydrology, vegetation, and erosion/deposition attributes and processes to evaluate the condition of riparian areas. It can often serve as a surrogate indicator for all affected parameters. The assessment places riparian areas into one of four categories: proper functioning, functional-at risk, nonfunctional, or unknown. The functional-at risk category is further defined by a trend: upward, downward. Only perennial and intermittent streams are assessed for PFC. For all stream miles evaluated within the allotments, the majority were characterized as either functioning properly or functioning at risk with an upward trend. It should be noted that for assessing grazing impacts, PFC is more appropriate for lower gradient streams. The data presented in Table 7 may not accurately reflect impacts from grazing since the streams within the allotment are largely higher gradient. In fact, care must be exercised in definitively attributing poor PFC evaluations to other human induced impacts as well. For instance, natural processes such as floods may result in poor PFC results.

Table 5. Proper Functioning Condition Assessment for Stream Reaches on BLM-Administered Lands within the Allotment.

Allotment Name	Stream Miles Assessed	Proper Functioning Condition (% of assessed miles)	Functional-At Risk, Trend Upward (% of assessed miles)	Functional-At Risk, Trend Downward (% of assessed miles)	Nonfunctional (% of assessed miles)
Lower Big Applegate	50	61	19	17	3

Overall, stream survey data and field observations indicate that under current management practices and stocking levels, water quality is not being adversely impacted from grazing within this allotment. Little use was noted in the steep upland terrain, and where armored channels are generally not favored by cattle.

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

To meet this standard, 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.

Federal agencies are mandated to protect threatened and endangered species and will take appropriate action to avoid the listing of any species. This standard focuses on retaining and restoring native plant and animal (including fish) species, populations and communities (including threatened, endangered and other special status species and species of local importance). In meeting the standard, native plant communities and animal habitats would be spatially distributed across the landscape with a density and frequency of species suitable to ensure reproductive capability and sustainability. Plant populations and communities would exhibit a range of age classes necessary to sustain recruitment and mortality fluctuations.

The plant communities on this allotment are floristically diverse, healthy, and support a wide variety of animal species consistent with the surrounding soil, landscape and climate. Species are recognized as "special status" if they are (1) species listed or proposed for listing under the Endangered Species Act (ESA), and (2) species requiring special management consideration to promote their conservation and reduce the likelihood and need for future

listing under the ESA, which are designated as Bureau Sensitive by the State Director(s). All Federal candidate species, proposed species, and delisted species in the 5 years following delisting will be conserved as Bureau Sensitive Species.

Bureau Special Status and Emphasis Wildlife

The terrestrial wildlife species of concern in the Lower Big Applegate Allotment are classified in two categories; Special Status Species and Birds of Conservation Concern (including Game Birds Below Desired Condition). Special Status Species known or likely to be present on BLM managed land in the allotments are displayed in the following table.

Table 6. Known or Suspected Special Status Species (Terrestrial Wildlife)

Common Name	Scientific Name	Status
Northern Spotted Owl	*Strix occidentalis caurina*	FT - Known
Lewis's Woodpecker	*Melanerpes lewis*	BS - Known
Foothill Yellow-legged Frog	*Rana boylii*	BS - Suspected
Pacific Pallid Bat	*Antrozous pallidus*	BS - Suspected
Fringed Myotis Bat	*Myotis thysanodes*	BS - Suspected
Northwestern Pond Turtle	*Actinemys marmorata marmorata*	BS - Suspected
Siskiyou Mountains Salamander	*Plethodon stormi*	BS - Known

FT = Federal threatened; BS = Bureau Sensitive

Birds of Conservation Concern and Gamebirds Below Desired Condition

BLM has interim guidance for meeting federal responsibilities under the Migratory Bird Treaty Act and Executive Order 13186 (EO). Both the Act and the EO promote the conservation of migratory bird populations. The interim guidance was transmitted through Instruction Memorandum No. 2008-050. The I.M. relies on two lists prepared by the U.S. Fish and Wildlife Service in determining which species are to receive special attention in land management activities; the lists are *Bird Species of Conservation Concern* (BCC) found in various Bird Conservation Regions (Lower Big Applegate Allotment is in BCR 5) and *Game Birds Below Desired Condition* (GBBDC). The following table displays those species that are known or likely to be present in the project area.

Table 7. Bird Species of Conservation Concern

Species	Status
Purple Finch (*Carpodacus purpureus*)	BCC
Olive-sided Flycatcher (*Contopus cooperi*)	BCC
Rufous Hummingbird (*Selasphorus rufus*)	BCC
Mourning Dove (*Zenaida macroura*)	GBBDC
Band-tailed Pigeon (*Columba fasciata*)	GBBDC

Livestock grazing impacts wildlife in several ways. Grazing reduces forage available to native herbivores (e.g. black-tailed deer), and it reduces vegetative ground cover for ground nesting birds, rodents, and other wildlife species dependent on ground cover for protection, food, and breeding sites. Grazing can reduce water quality in seeps, springs, and streams used by native wildlife by means of trampling, urination and defecation. The presence of livestock can also change local distribution and habitat use by native wildlife species due to wildlife-livestock interactions.

The existing data for the allotment and a cursory check of several areas in the allotment indicate that the Texter Gulch pasture, which is fenced, is the primary area of cattle use in the allotment. It appears that use is primarily confined to the areas adjacent to the roads in the lower portion of the pasture. At the current stocking rate, which is below what is authorized, the impact the grazing operation has to the wildlife species of special concern in the allotment is negligible. There does not appear to be a lack of forage or ground cover for wildlife, water quality and riparian vegetation condition is acceptable, and there likely is not a lot of wildlife-livestock interaction considering the low current stocking rate.

Big Game Winter Range Area

The Lower Big Applegate allotment is within an area designated by the Medford RMP as Big Game Winter Range Area for deer and elk. The intent of this designation is meant to identify areas to promote forage, hiding, and thermal cover for deer and elk. General dates for the use of the area for deer and elk winter range is Oct. 1st - April 30th (ODFW 2002). In addition to the winter months, the allotments are within important deer and elk habitat areas used throughout the year.

Hiding and thermal cover for summer and winter seasonal conditions are currently met through existing late-successional forest stands, oak woodlands, and brush fields present in the allotment areas. Both winter and summer thermal cover generally has canopy closure values in excess of 60 percent. The high canopy closure moderates microclimatic extremes, and can benefit deer and elk by reducing the energy required to maintain body temperatures.

Hiding cover is also important to deer and elk because it provides areas for escaping predators and avoiding disturbances caused by other mechanisms, such as vehicular traffic. Paradoxically, fire suppression has reduced forage condition (vigor) and to a minor extent, quantity due to brush replacement, but this has generally improved hiding cover conditions in the watershed. In the absence of fire, shrubs and trees that provide hiding cover have become denser.

High quality forage is very important to both deer and elk, especially on winter ranges. Forage conditions are declining in the watershed due to noxious weed proliferation, and fire suppression. Introduced noxious herbaceous species, such as yellow starthistle and medusa, are displacing native grasses and herbs which generally provide high quality, more nutritious forage. Also, due primarily to fire suppression, large acreage of important browse species such as wedgeleaf ceanothus have become decadent and are not providing the quality forage that younger plants provide.

Special Status Species (Aquatic Wildlife)

Southern Oregon/Northern California (SONC) coho salmon are listed as “threatened” under the Endangered Species Act. There are populations of this species in lower reaches of Beaver Creek, the Little Applegate River, and in the Applegate River upstream to Applegate Dam. The allotment boundary itself does not include these coho reaches, which are designated Coho Critical and Essential Fish Habitat (CCH, EFH). Natural barriers on the tributary streams preclude coho from accessing habitats within the allotment. However, the allotment boundary closely parallels, and includes streams that drain directly into, coho bearing reaches on the Little Applegate and Applegate Rivers, and corners less than 500’ from coho in Beaver Creek. Reaches that support coho in both the Applegate and Little Applegate also support chinook salmon. Steelhead trout are present as well in these reaches, and continue well upstream in the tributaries. Within the allotment boundary, Grouse Creek, Yale Creek (Little Applegate tributaries) and Beaver Creek support populations of steelhead trout. Both chinook and steelhead are special status species, listed as “sensitive”. All species mentioned above are anadromous, migrating to the rivers and streams to spawn and rear their young.

BLM fisheries personnel have noticed the most prominent cattle use within allotment area streams to be occurring in the Texter Gulch area, in the southern portion of the allotment, located roughly 2 miles upstream from Coho Critical and Essential Fish Habitat (CCH, EFH) in Beaver Creek. Concentrated number of animals, hoof prints, droppings, and trails have been observed in/near several perennial and intermittent stream channels in this area, particularly in T 40S R 4W, sec 12. Impacts to aquatic habitat, though moderate in several locales, appear to be limited only to small areas immediately upstream of the road crossing, which are the only spots easily accessible to cattle. Stream banks up and downstream of the road crossings, particularly in the perennial channels, appear steep enough to discourage cattle from attempting to access what little suitable forage exists in these areas.

Of the fish bearing streams within the allotment, cattle use has only been observed to occur adjacent to Beaver Creek, in the vicinity of the Texter Gulch confluence. Cattle trails and some moderate grazing and trampling of riparian vegetation were observed in May 2009, but it was limited to small (< ¼ acre in size) flat areas that were easily accessible from the Beaver Creek road. Impacts were limited to areas outside of the active stream channel, which is dominated and protected by bedrock and large boulders. As of May 2009, there was no evidence that the other fish reaches (including Yale & Grouse Creeks, and Waters Gulch) of the allotment streams are being impacted by cattle. The stream banks are relatively steep, armored by rocks and vegetation, and it does not appear as if cattle access these areas frequently, if at all.

Table 8. Special Status Species (Aquatic Wildlife)

Species	Status
Coho Salmon *(Onchorynchus kisutch)*	FT
Chinook Salmon *(Onchorynchus tshawytscha)*	SSS-s
Steelhead Trout (*Onchorynchus mykiss*)	SSS-s

SSS- Special Status Species
s-sensitive
FT-federally threatened

Federally Listed and Bureau Special Status Vascular Plants

The entire Lower Big Applegate allotment is within the range of federally endangered *Fritillaria gentneri* (Gentner's fritillary). The allotment is outside the range of federally listed *(Limnanthes floccosa* ssp. *grandiflora, Lomatium cookii,* and *Arabis macdonaldiana*) as defined by the U.S. Fish and Wildlife Service (USDI Fish and Wildlife Service, 2003).

Surveys for Special Status vascular plants and 2nd year surveys for *Fritillaria gentneri* were conducted in suitable habitat in the allotment. Seven Bureau Sensitive vascular plant species were found within the allotment.

Survey and Manage and Bureau Special Status fungi, lichens, liverworts and bryophytes

Surveys for Special Status nonvascular plants have been conducted in the allotment for fuels reduction and other land management projects. Currently, there are two known occurrences of Survey and Manage fungi within the allotment.

Table 9. *Special Status Species (Vascular and Nonvascular Plants, and Fungi)*

Scientific Name	Common Name	Life Form	Status	Occurrences
Camissonia graciliflora	slender-flowered evening-primrose	Vascular Plant	BS	1
Cypripedium fasciculatum	clustered lady's slipper	Vascular Plant	BS,S&M(C)	31
Eucephalus vialis	wayside aster	Vascular Plant	BS,S&M(A)	44
Fritillaria gentneri	Gentner's Fritillaria	Vascular Plant	BS, FE	6

Mimulus bolanderi	Bolander's monkeyflower	Vascular Plant	BS	1
Rafinesquia californica	California chicory	Vascular Plant	BS	1
Solanum parishii	Parish's nightshade	Vascular Plant	BS	1
Tremiscus helvelloides		Fungi	S&M(D)	1
Gelantinodiscus flavidus		Fungi	S&M(B)	2

BS - Bureau sensitive
FE - Federally Endangered
S&M - Survey and Manage
Category A & C; Manage all known sites**,** Complete pre-disturbance surveys
Category B; Manage all known sites**,** No pre-disturbance surveys required
Category D; Manage "high-priority "sites, Pre-disturbance surveys not practical OR not required to provide a reasonable assurance of species persistence

A total of 85 populations of special status vascular plants occur within the allotment. Each of the seven species that comprise the 85 populations is listed as "Sensitive" per the State Director's list finalized in February 2008. There are a total of three populations of two S&M fungi species in the Lower Big Applegate Allotment.

The six known occurrences of *Fritillaria gentneri* occur in areas that receive no to slight (0-20%) use by livestock. Two sites were visited on May 21, 2009 and one site was visited on May 20, 2011 to evaluate site impacts from grazing, these sites showed no use by livestock.

Camissonia graciliflora is an annual forb found in grasslands, shrublands, and woodlands. These habitats are favored by livestock. The site is below a road in an opening in an area that has received light (6-20%) use in some past years.

Cypripedium fasciculatum is a perennial forb and a member of the orchid family. Habitat includes moist areas, dry slopes and mixed-evergreen or coniferous forest (Hickman 1993). The known populations within the allotments occur in coniferous upland areas that receive no to slight (0-20%) use.

In the Klamath Physiographic Province, *Eucephalus vialis* is found in open, dry sites with Douglas-fir, Ponderosa pine, Pacific madrone, and Oregon white oak. Threats to this species include livestock grazing, fire exclusion, logging, weeds, inbreeding depression, human use development, roads, and recreation. Areas in this allotment with *Eucephalus vialis* populations have historically seen slight to moderate livestock use (6-60%). One population is located in the Texter pasture in an area of recent moderate use. This population was discovered in 2007 and effects from livestock grazing were not reported.

There is one *Mimulus bolanderi* site in the allotment that is located in an opening of a *ceanothus* hillside. The site is near the ridgetop and has received no livestock use in the past.

Rafinesquia californica is a species of flowering plant in the sunflower family that is a known nitrate accumulator. This plant may cause nitrate poisoning and is avoided by livestock. The population is located in an area that has received no use by livestock in the past. The habitat is Douglas-fir/dry shrub plant association.

Solanum parishii is a perennial herb or subshrub that is very toxic if ingested and would be avoided by livestock. The site occurs on a steep slope where there is no use by livestock.

Tremiscus helvelloides is a fungus that fruits on moss and well rotted woody debris in conifer forests. Fruit bodies are rubbery, pink to orange (Season: Aug.-Oct.). *Gelantinodiscus flavidus* is a cup fungus endemic to Oregon and

Washington that grows on cones, twigs and foliage of *Chamaecyparis nootkatensis* (Alaska cedar). It fruits very early in the spring, just after snow melt.

Noxious Weeds:

There are 51 noxious weed populations, 41 of *Centaurea solstitalis* (yellow starthistle), eight of *Rubus armeniacus* (Himalayan blackberry), one of *Senecio jacobaea* (tansy ragwort), and one of *Centaurea nigrescens* (meadow knapweed) within the Lower Big Applegate Allotment. In the non-conifer habitats, medusahead and other exotic annual grasses are present in most meadows, and dominant in some areas. 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 continue to spread when left untreated. Areas that experience soil and vegetation disturbance within the allotment are at risk for weed colonization. The BLM weed control program uses herbicides, biological control agents, and hand pulling to treat infestations across the landscape. Treatment areas are selected based on the potential of the weed population to cause economic or environmental harm or harm to human health and as funding is available.

Appendix A. RANGELAND HEALTH FIELD ASSESMENT SUMMARY OF FINDINGS

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). This qualitative assessment along with quantitative monitoring data is an attempt to look at how well ecological processes such as the water cycle (capture, storage, and safe release of precipitation), energy flow (conversion of sunlight to plant and then animal matter), and nutrient cycle (the cycle of nutrients through the physical and biotic components of the environment) 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 A).

Rangeland health field assessments were completed at a mixed pine-Douglas fir-fescue forest, granitic ecological site on the Lower Big Applegate allotment. This ecological site was 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 assessment was completed with an IDT (Interdisciplinary team).

***Location 1*: Mixed pine-Douglas fir-fescue forest, granitic**

The overall rating for this location is a None to Slight departure from what would be expected for this site. Sixteen indicators (94%) were rated None to Slight, one indicator (6%) was rated Slight to Moderate, and none of the indicators were rated Moderate, Moderate to Extreme, or Extreme to Total.

Photo 1. Photo taken at the Mixed pine-Douglas fir-fescue, granitic ecological site.

Table A. Rangeland Health Field Assessment Indicator Summary

Mixed pine-Douglas fir-fescue forest, granitic					
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. Windscoured 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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