UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT
MEDFORD DISTRICT OFFICE
ASHLAND RESOURCE AREA

ENVIRONMENTAL ASSESSMENT

For the
DEADWOOD GRAZING ALLOTMENT

LEASE AUTHORIZATION

(DOI-BLM-OR-M060-2010-0028-EA)

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Location: The Deadwood Allotment is located to the north and east of Howard Prairie Lake in T. 38 S., R. 3 E., in Sections 10, 11, 12, 13, 14 and 15, W.M.; T. 38 S., R. 4E., in Sections 7, 17, 18, 19, 20, 21, 25, 26, 27, 28, 29, 30, 32, 33, 34, and 35, W.M.; T. 39 S., R. 4 E., in Sections 3, 4, and 9, W.M. Approximately 32 acres of the Deadwood Allotment are within the Cascade Siskiyou National Monument (CSNM), located in the NE1/4NE1/4 of Section 9, Township 38 S., Range 4E. The entire allotment is approximately 11,890 acres and the BLM-managed portion of the allotment is 7,972 acres.

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CHAPTER 1: PURPOSE AND NEED

INTRODUCTION

The Bureau of Land Management (BLM), Ashland Resource Area, proposes to renew the 10-year grazing lease on the Deadwood Allotment. This Environmental Assessment (EA) documents the environmental analysis conducted to estimate the site-specific effects on the human environment that may result from the renewal of this lease. The Bureau of Land Management is working cooperatively with the U.S. Forest Service to manage a deferred rotation grazing system in accordance with the 1972 Deadwood Coordinated Range Management Plan (CRMP). The analysis documented in this EA will provide the BLM authorized officer, the Ashland Resource Area Field Manager, with current information to aid in the decision-making process. This EA complies with the Council on Environmental Quality's (CEQ) Regulations for Implementing the Procedural Provisions of the National Environmental Policy Act (NEPA; 40 CFR Parts 1500-1508) and the Department of the Interior's regulations on Implementation of the National Environmental Policy Act of 1969 (43 CFR part 46).

WHAT IS BLM PROPOSING & WHY

The Medford BLM authorizes livestock grazing as a component of its multiple-use program under the Federal Lands Policy and Management Act of 1976 (FLPMA) (43 U.S.C. § 1701 et seq.). The objectives of the regulations set forth under 43 CFR 4100, Grazing Administration, are to "establish efficient and effective administration of public rangelands" so as to "provide for the sustainability of the western livestock industry and communities dependent upon productive, healthy, public rangelands." *Standards for Rangeland Health and Guidelines for Livestock Grazing Management for Public Lands in Oregon and Washington* meets the requirements and intent of 43 CFR, Subpart 4180 (Fundamentals of Rangeland Health) and provide a basis for assessing the rangeland condition and trend.

A Rangeland Health Assessment was completed for the Deadwood Allotment in April of 2008 assessing the conditions and trends of the Deadwood Grazing Allotment against the Standards for Rangeland Health. A determination on the results of the assessment was made July 8, 2008, and is summarized below under Relevant Assessments & Plans. These documents are available on BLM's Website: <http://www.blm.gov/or/districts/medford/plans/inventas.php>. The BLM determined that one of the five standards, Upland Watershed Function, was being met. The Standards for Riparian/Wetland Watershed Function, Ecological Processes, Water Quality, and Native, T & E, and Locally Important Species were not being met due in part to current livestock grazing management practices. There is a need to develop grazing management for the Deadwood Grazing Allotment that is operationally and administratively feasible and addresses the requirements of 43 CFR 4180.1, which is to make progress towards meeting the Standards for Rangeland Health in the Deadwood Grazing Allotment.

The **project area** is defined as BLM-administered lands within the Deadwood Grazing Allotment. The **analysis area** is the area used to assess the effects to resources affected by the project proposal. The analysis area varies by resource.

SCOPING AND ISSUES

Scoping is the name for the process used to determine the scope of the environmental analysis to be conducted. It is used early in the NEPA process to identify (1) the issues to be addressed, (2) the depth of the analysis, and (3) potential environmental impacts of the action.

Scoping has occurred for the Deadwood grazing lease authorization. A notice for the Deadwood Grazing Lease Renewal appeared in the Ashland Resource Area's Schedule of Proposed Actions published in Medford's Messenger (BLM's quarterly newsletter) beginning in the fall 2008 edition. Scoping letters were sent on June 9, 2009 to adjacent landowners and interested organizations and individuals.

An interdisciplinary (ID) team of resource specialists reviewed the proposal and all pertinent information, including public input received, and identified relevant issues to be addressed during the environmental analysis. The following questions frame the issues determined to be relevant to the Deadwood Grazing Lease Renewal proposal. These issues will be used to identify required terms and conditions and to focus the analysis of environmental effects that may result from the implementation of BLM's alternatives.

- What is the potential for effects to riparian and wetland areas and associated aquatic habitat?
- What is the potential for effects to water resources?
- What it the potential for effects to fish?
- What is the potential for effects to botanical resources?
- What is the potential for effects to wildlife?
- What is the potential for effects to soils and site productivity?

DECISION FRAMEWORK

This Environmental Assessment will provide the information needed for the authorized officer, the Ashland Resource Area Field Manager, to select an alternative for managing grazing in the Deadwood Grazing Allotment. The Ashland Resource Area Field Manager must decide which Alternative to implement, including the no-action alternative. In choosing an alternative, the Field Manager will consider how well the alternative responds to the identified project needs, along with the relative merits and consequences of each alternative related to the relevant issues.

The forthcoming grazing decision will document the authorized officer's rationale for selecting a course of action based on the effects documented in this EA. The decision will also include a determination whether or not the impacts of the proposed action are significant to the human environment. If the impacts are determined not to result in significant effects beyond those disclosed in the 1995 Final EIS, or otherwise determined to not be significant, a Finding of No Significant Impact (FONSI) can be issued and a decision implemented. If this EA determines that the impacts are significant or not within the level of effects identified in the EISs, then a project specific Environmental Impact Statement (EIS) must be prepared.

CONFORMANCE WITH LAND USE PLANS & LEGAL REQUIREMENTS

The actions proposed and analyzed in this EA were developed to be consistent with, and/or tier to the following documents:

1. *Final EIS/ROD for the Medford District Resource Management Plan* (RMP) (1995)
2. *Final Supplemental Environmental Impact Statement and Record of Decision for Amendments to Forest Service and Bureau of Land Management Planning Documents Within the Range of the Northern Spotted Owl* (Northwest Forest Plan FSEIS 1994 and ROD 1994)
3. *Final SEIS for Amendment to the Survey & Manage, Protection Buffer, and other Mitigation Measures Standards and Guidelines* (2000), and the ROD and *Standards and Guidelines for*

Amendment to the Survey & Manage, Protection Buffer, and other Mitigation Measures Standards and Guidelines (2001)

4. *Medford District Integrated Weed Management Plan Environmental Assessment (1998*) and tiered to the *Northwest Area Noxious Weed Control Program* (EIS 1985).

The alternatives are compliant with the direction given for the management of public lands in the Medford District by the Oregon and California Lands Act of 1937 (O&C Act), Federal Land Policy and Management Act of 1976 (FLPMA), Endangered Species Act (ESA) of 1973, Clean Water Act (as amended 1972, 1981, 1987 and 2002), Safe Drinking Water Act of 1974 (as amended 1986 and 1996), Clean Air Act (as amended 1990), Archaeological Resources Protection Act of 1979, Taylor Grazing Act (TGA) of 1934, Public Rangelands Improvement Act of 1978, and National Environmental Policy Act (NEPA) of 1969.

RELEVANT ASSESSMENTS & PLANS

Deadwood Allotment Rangeland Health Assessment

The Standards for Rangeland Health provide a basis for assessing and monitoring ecological and rangeland conditions and trends. The five standards and associated criteria, listed below, were used to assess the conditions and trends in the Deadwood Grazing Allotment. Findings documented in the resulting Deadwood Allotment Rangeland Health Determination provided a basis for formulating the BLM's action alternatives for renewing the Deadwood Grazing Leases. The following is a brief summary of the Deadwood Rangeland Health Determination.

Standard 1: Watershed Function- Uplands

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

> *Summary of finding*: Recovery from past fire and associated management activities together with the limited influence of livestock at a landscape scale result in meeting the rangeland health standard for upland watershed functions in the Deadwood Allotment.

Standard 2: Watershed Function – Riparian/Wetland Areas

Riparian/Wetland areas are in properly functioning physical condition appropriate to soil, climate, and landform.

> *Summary of finding*: Several factors influence the functionality of riparian and wetland areas. Management practices including livestock grazing, timber harvest, road construction, and water withdrawals contribute to elevated fine sediment levels. Lack of riparian shade, elevated water temperatures, loss of connectivity, aquatic habitat degradation, and excessively low summer flows prevent the attainment of the rangeland health standard for riparian/wetland areas in the Deadwood Allotment.
>
> Factors directly related to grazing include the degree of consumption of riparian vegetation, the degree of streambank trampling, and the degree of disturbance in wet areas which all influence water quality and temperature.

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 hydrologic cycle.

> *Summary of finding*: Repeat fires of the early 20th century, reservoirs, salvage logging, the difficult reestablishment of conifer canopy, and influence of livestock on meadow successional

and hydrological processes prevent the attainment of the rangeland health standard for ecological processes.

The lack of improvement in hydrological process indicated by cut-banks and deteriorating rills across dry and wet meadows prevents meeting this standard.

Standard 4: Water Quality

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

Summary of finding: Several factors influence water quality in this allotment. Management practices including livestock grazing, timber harvest, road construction, and water withdrawals contribute to elevated fine sediment levels, lack of riparian shade, elevated water temperatures, loss of connectivity, aquatic habitat degradation, and excessively low summer flows.

This allotment is not meeting this standard because livestock are negatively affecting; stream temperature, establishment of riparian vegetation, stabilization of streambanks, sediment regimes and water quality.

Standard 5: Native, Threatened and Endangered, 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.

Summary of finding: The distribution of noxious weeds within the allotment is primarily limited to roadsides. There are no threatened and endangered (T&E) plant species and two species of District Sensitive plants within the Deadwood allotment. Existing data (although limited) indicates that livestock are not significantly influencing vegetation as it pertains to the "Native, T&E, and Locally Important Species" rangeland health standard of the Deadwood Allotment.

For aquatic species, grazing negatively effects aquatic mollusks and their habitat by disturbing the soil, removing vegetation that provides shade and habitat for the mollusks, and by trampling the mollusks themselves.

Several BLM Special Status terrestrial wildlife species are negatively affected by the grazing in the Deadwood allotment. The moderate to severe average utilization (RHA p.3) in the riparian areas and "wet meadows" produces the greatest negative impacts to native wildlife species. The foothill yellow-legged frog and northwestern pond turtle (BLM sensitive species) are dependent on riparian and aquatic habitat and are negatively affected when these habitats are degraded by cattle. Habitat degradation occurs through streambank trampling and wading in shallow ponds, springs, and streams.

A complex of wet meadows in the allotment is occupied by the Mardon skipper, a federal candidate species. These meadows are heavily grazed in most years which reduces the height and potentially (depending on the species) percent cover of plants used by this species for nectaring and ovipositing. The impact of grazing to these habitat components likely reduces reproduction for this species. The primary threat listed for each of these sites is grazing (Xerces 2007, 2010; Hosten 2007c).

Watershed Analysis (USDI/USDA 1997)

Watershed Analysis is a procedure used to characterize conditions, processes and functions related to human, aquatic, riparian and terrestrial features within a watershed. Watershed analysis is issue driven. Analysis teams of resource specialists identify and describe ecological processes of greatest concern in a particular "fifth field" watershed, and recommend restoration activities and conditions under which other

management activities should occur. Watershed analysis is not a decision making process. Rather, watershed analysis provides information and non-binding recommendations for agencies to establish the context for subsequent planning, project development, regulatory compliance and agency decisions (See Federal Guide for Watershed Analysis 1995 p. 1).

The Deadwood Grazing Allotment falls within the Jenny Creek and South Fork Little Butte Creek Watershed Analysis Areas. Watershed analysis focused on the use of existing information available at the time the analysis was conducted, and provides baseline information. Additional information determined to be necessary for completing an analysis of this grazing lease proposal, has been collected and is considered along with existing information provided by the 1995 Jenny Creek and 1997 Little Butte Creek Watershed Analyses. Management Objectives and Recommendations provided by watershed analysis were considered and addressed as they applied to the Deadwood Grazing Lease Renewal.

Water Quality Restoration Plan

"The BLM is recognized by Oregon Department of Environmental (DEQ) as a Designated Management Agency for implementing the Clean Water Act on BLM-administered lands in Oregon. The BLM has signed a Memorandum of Agreement (MOA) with the DEQ that defines the process by which the BLM will cooperatively meet State and Federal water quality rules and regulations.

To comply with the BLM-DEQ Memorandum of Agreement, the BLM completed Water Quality Restoration Plans (WQRPs) for the Jenny Creek Key Watershed and the North and South Forks Little Butte Key Watershed. These documents describe how the Bureau of Land Management (BLM) will meet Oregon water quality standards for 303(d) listed streams on BLM-administered lands within the above referenced watersheds. The Water Quality Restoration Plans are designed to be consistent with the DEQ's Water Quality Management Plans. Proposed recovery goals in the WQRPs focus on protecting areas where water quality meets standards and avoiding future impairments of these areas, and restoring areas that do not currently meet water quality standards.

The water quality restoration plan (WQRP) for BLM-administered lands in the Jenny Creek Watershed (USDI 2008) was submitted to the DEQ in May 2008, prior to the release by DEQ of the Upper Klamath and Lost River subbasins total maximum daily load (TMDL) and water quality management plan (WQMP). After the final TMDL was released in December 2010, BLM re-submitted the WQRP with edits for review by DEQ. A TMDL defines the amount of pollution that can be present in the waterbody without causing water quality standards to be violated. BLM's Water Quality Restoration Plan for the North and South Forks Little Butte Key Watershed was submitted to the DEQ and finalized in May of 2006. The Rogue Basin Water Quality Management Plan and TMDLs are posted on DEQs website: http://www.deq.state.or.us/WQ/TMDLs/rogue.htm.

CHAPTER 2. ALTERNATIVES

INTRODUCTION

This chapter describes the No Action Alternative, which would continue the existing lease; two Action Alternatives developed by the Interdisciplinary (ID) Team to achieve objectives identified in the Purpose and Need statement in Chapter 1; and an alternative that defers grazing for 10 years. A No Action alternative, which assumes a continuance of the existing lease, is presented to form a base line for analysis.

Lease Terms and Conditions, included as required features of Alternatives 1, 2, and 3, are important for reducing impacts of grazing and considered in the analysis of anticipated environmental impacts.

Common to All Grazing Alternatives

GRAZING MANAGEMENT

It is mandatory under all alternatives that Terms and Conditions would be met by the lessees. If it is determined by the BLM at any time that a lessee is not meeting their required Terms and Conditions, corrective measures would be implemented. Corrective measures would include consulting with the responsible lessee and may include withholding the annual use authorization, temporary or permanent reductions in AUMs or lease cancellation. Failure to maintain range improvements to BLM standards could result in an evaluation for damages and compensation to cover maintenance deficiencies based on non-compliance with lease Terms and Conditions, and other penalties defined in 43 CFR 4170 *Penalties*.

Allotment Lands within the Boundary of the Cascade Siskiyou National Monument (CSNM)
The 32 acres that are part of the CSNM would be removed from the Deadwood grazing allotment by adjusting the allotment boundary to the section line along the northern edge of T. 38S. R.4E Section 9. The boundary adjustment would be done to keep management considerations associated with the monument from impinging on the greater area of the Deadwood Allotment. At this time, review of livestock movement and utilization data indicates the parcel receives no use by livestock due to low quantities of palatable forage, no available drinking water and most of all, steep, heavily timbered slopes that livestock rarely travel through.

Protective Exclosure
Under all alternatives exclusion of grazing would occur at two exclosures to protect areas known to be inhabited by the mardon skipper, a species that is a federal candidate for listing under the Endangered Species Act. Under the Bureau Special Status Species Policy (BLM Handbook 6840, 2008) candidate species are to be managed as Sensitive Species. Both exclosures are located in T. 39S R. 4E Section 17. One exclosure is approximately 1 acre in size and the second is approximately 6 acres in size around an existing water development (project 750355) which would prevent access by livestock. Livestock would be allowed to access the water development portion of the exclosure in years when the allotment is grazed late season (August 16 to October 15).

Noxious Weed Management
Documented Noxious weed populations would continue to be treated as prescribed in the 1995 RMP and *Medford District Integrated Weed Management Plan Environmental Assessment (1998*).

Education and Outreach Measures:
The BLM is striving to more fully integrate all BLM programs and activities into actions which will improve the quality and ecological conditions of lands under the BLM management. To aid in meeting the objective set forth in the *BLM Manual 9015: Integrated Weed Management* (9015.06), it is recommended by the Ashland Resource Area Noxious Weed Specialist that lessees feed livestock certified, weed-free feed for no fewer than 3 days prior to the livestock turnout date, provided livestock are being moved from privately-owned land to lands within the Deadwood allotment area.

To provide for cooperative weed management opportunities, the Medford BLM Range program would include noxious weed information with the annual grazing application to ensure lessee's receipt of current information regarding noxious weed species of concern.

MONITORING

As funding and priorities allow, periodic monitoring would be conducted to ensure management objectives are met or moving toward meeting the *Standards for Rangeland Health and Guidelines for Livestock Grazing Management for Public Lands Administered by the Bureau of Land Management in the States of Oregon and Washington*. The following monitoring strategy would apply to Alternatives 1-3. The BLM currently conducts periodic inventories and observations to measure long-term resource condition changes.

Trend

Trend monitoring using BLM protocol (TR 4400-4, 1985) consists of data collection at 2 established Nested Plot Frequency Transect study sites on an approximately 5-year interval. BLM has evaluated current monitoring data and determined trend sites are appropriately located and additional monitoring location(s) would be valuable if funding allows.

Upland Utilization

Areas have been selected for conducting key upland forage species utilization studies. Methods currently used on the Deadwood allotment are the Key Species Method, and Mapping Use Zones using BLM technical reference *Utilization Studies and Residual Measurements* (Cooperative Extension Service et al. 1999).

Hydrologic/Riparian, and Photo Point Surveys

These surveys are conducted using the Ashland Resource Area Stream Survey Protocol. Location, flow duration, channel classification/morphology data is gathered for streams, wetlands, and other hydrologic features. In addition data is collected in regards to; instream large wood; impact descriptions and restoration opportunities, especially as it relates to livestock, transportation, and vegetation. Properly functioning condition (PFC) is assessed during the surveys. On BLM lands within the allotment, data was collected in the Upper Jenny Creek and South Fork Little Butte-Dead Indian Creeks Subwatersheds in 1996 and 2002. Some of the reaches around Howard Prairie Lake were revisited and updated in 2006. Riparian photo monitoring sites have been installed at ten locations within the allotment to document changes in riparian areas (BLM Ashland Fisheries and Range Photo Monitoring 1988-2007).

Baseline Stream Temperature Monitoring

Seasonal 30-minute interval stream temperature data is collected within the allotment using USGS and Oregon DEQ-established methodologies. Temperature monitoring data assists in assessment of Aquatic Conservation Strategy (ACS) Objectives 2, 4, and 9 (USDA/USDI 1994b); for assessment of compliance with state water quality standards; and assists in development of State of Oregon/EPA-required Water Quality Management Plans for the area.

Stream Channel Cross Sections:

Stream cross-section measurements occur within the allotment. Measurement methodologies include standard cadastral survey techniques and those outlined in Rosgen (1996). Sites are measured at approximately five-year intervals and after major flood events. Cross-sections provide a reference point from which to document changes in channel morphology, conduct flow measurements, and estimate flood flows. Documentation of changes in channel morphology provides an indication of stability and functioning of the upstream surface hydrologic system.

Rain Gages

Rainfall data is collected at 15-minute intervals at one site in lower Jenny Creek using a tipping bucket rain gage. Daily precipitation is collected at Howard Prairie Dam (NOAA), Parker Mountain (RAWS), and Buckhorn Springs (RAWS). Daily snowfall and snow-on-the-ground is collected at Howard Prairie Dam

(NOAA). Assessment of hydrologic response and water quality parameters, as well as many other aspects of ecosystem function, can only be analyzed accurately in the context of recent precipitation. Although year-to-year trends in precipitation tend to be uniform over an area the size of the Deadwood Allotment, there is substantial variability in precipitation between locations based on terrain, elevation, etc. Precipitation data from a number of sites at varying elevations and locations in and around the allotment is needed for interpretation of related data including hydrologic and vegetation conditions.

Special Status Species Wildlife

Mardon Skipper Butterfly:
As funding permits, continue cooperative surveys with Xerces Society using day-count monitoring techniques at known Mardon Skipper habitat in Section 17, Township 39 S., Range 4 E., and throughout the allotment to establish trend information. In Section 17, at two high-population sites, two exclosure fences would protect Mardon skipper habitat by excluding grazing activities at those locations. Day-counts would be conducted by the Xerces Society to determine if the exclosures enhance population numbers in ungrazed habitat areas. BLMs objective is to reduce impacts that may harm the Mardon skipper or its habitat, to prevent the need to be listed as a Threatened or Endangered species.

Aquatic Macroinvertebrate Monitoring:
Macroinvertebrate monitoring is conducted at one site in this allotment using methods that meet or exceed state or EPA protocols for the sampling of benthic macroinvertebrates. Taxa abundance, taxa richness, and other metrics are measured at 5-6 year intervals. These surveys were conducted at Jenny Creek Spring in 1991, 1995, and 2000 (Aquatic Biology Associates). Pebblesnail surveys were conducted at seven sites in the allotment (BLM 1999-2005). Two springs were sampled for aquatic mollusk presence, species data, and livestock impacts (Frest and Johannes 2005, BLM 1999-2006). Livestock grazing was measured by a combination of factors (stubble height, trampling, feces, bank destabilization, and bare ground) and was rated on a scale with the same range, as follows: 1- nil or nearly so; 2- light; 3- moderate; 4-heavy; 5-severe. These are not quantitative measures but attempts to divide a complex range continuum, often multi-faceted in cause, into more or less proportionate segments (Frest and Johannes 2005).

Additional Monitoring
The following monitoring strategy would apply to Alternatives 2 and 3. Monitoring would occur at riparian areas of concern; currently evaluated as *Functioning at Risk with a Downward Trend* or *Not Functioning* as well as other riparian areas that are currently evaluated as *Functioning at Risk with an Upward Trend* or *Properly Functioning*. Monitoring sites will be chosen in the field in cooperation with the lessees.

Riparian Utilization
Stubble heights would be measured for conformance with Terms and Conditions at key riparian areas representative of use, in accordance with BLM protocol. The key species for each of these sites would be selected at the same time. BLM specialists will select areas representative of use as an indication of potential concerns/improvements, not an average for the stream within the allotment (Cowley and Burton 2004).

Riparian Functionality
Streambank alteration would be measured for conformance with Terms and Conditions at key riparian areas in accordance with BLM protocol.

ALTERNATIVE 1- No Action Alternative (no change)

The No-Action Alternative describes a baseline against which the effects of the action alternatives can be compared. This alternative describes the existing conditions and the continuing trends, given the effects of other present actions and reasonably foreseeable actions identified for the time periods relevant to the resource issues of concern. The analysis of this No-Action Alternative answers the question: What would occur to the resources of concern, if none of the action alternatives take place?

Grazing Management

Under the No-Action Alternative, two grazing leases would be renewed authorizing the same animal unit month (AUM) levels, seasons-of-use, and terms and conditions currently in effect (See Table 2-1). The existing grazing leases for the Deadwood Allotment authorize a total of 788 active AUMs during the grazing season. One AUM is the amount of forage necessary for the sustenance of one cow or its equivalent for a period of one month. Total AUMs represent the number of cow/calf pairs multiplied by the number of months included in the season of use. The allotment would continue to be managed under a deferred rotation grazing system in accordance with the 1972 Deadwood Coordinated Range Management Plan (CRMP) with the U.S. Forest Service (Deadwood Complex Allotment Management Plan Update, 2004).

Table 2-1. No Action Alternative – Deadwood Allotment

Allotment	Total BLM Acres	Number of Livestock	Season of Use		AUMs
			Year 1	Year 2	
Deadwood	7,972	393 cattle	06/16-08/15	08/16-10/15	788

Terms and Conditions

These terms and conditions are specified by the authorized officer (shown on page 1 of each lease) and are intended to assist in achieving management objectives, provide for proper range management, or assist in the orderly administration of the public rangelands.

- The Deadwood CRMP is incorporated as a term and condition of the lease. Grazing use is rotated such that grazing begins on BLM lands in even numbered years and begins on USFS lands in odd numbered years.
- Turn-out will be based upon range readiness as determined by BLM
- Actual use reports are to be returned within 15 days of the off-date
- Maintenance of assigned range improvements is a requirement of the lease
- Billings are due upon receipt and must be paid prior to turn-out
- Late payment may result in unauthorized use, late fees and/or interest penalty
- BLM approved ear tags are required

Range Improvements & Maintenance

There are currently 25 rangeland improvement projects in the Deadwood Allotment. Under the No-Action Alternative, the BLM would continue to maintain 20 projects and the lessees would continue to maintain 5 of these projects (See Table 2-5 Range Improvement Projects and Map 2-1).

Maintenance consists of the timely repair through the input of sufficient labor and materials to keep improvements in usable condition for the purposes intended over the normal expected and extended life span (based on required inputs of new materials or updates to design over time). In the event that repairs would no longer be effective in maintaining the proper function of range improvements, the lessees would notify the BLM to determine replacement needs.

Fence maintenance includes: annual inspection by the lessee to meet BLM standards for functionality (including design and materials), keeping wire properly attached to posts, keeping stays functional, repairing structures, gates, drainage crossings, splicing broken wire, replacing segments of wire when worn out, and any other work necessary to keep fences functional.

Maintenance for springs, pipelines, and troughs, includes: annual inspection, repair or replacement of worn or damaged parts, repair of leaks, removing trash or silt, winterizing the facility, and maintaining wildlife escape ramps.

In the event maintenance performance is not done to meet the BLM standard, the BLM may opt to seek damages for repairs from the lessee responsible and take further punitive actions according to 43 CFR 4170 *Penalties*, which may include withholding the annual use authorization, temporary or permanent reductions in AUMs, or lease cancellation.

ALTERNATIVE 2

Alternative 2 was developed to make progress towards meeting Standard 2: Watershed Function - Riparian/Wetland Areas, Standard 3: Ecological Processes, Standard 4: Water Quality and Standard 5: Native, Threatened and Endangered, and locally important species, as required by 43 CFR 4180.1. Terms and conditions would be added to the leases to reduce grazing pressure on riparian and wet areas, and reduce or eliminate the amount of heavy to severe utilization.

Grazing Management

Under Alternative 2, AUM levels and seasons-of-use would not be modified. The allotment would continue to be managed under a deferred rotation grazing system in accordance with the 1972 Deadwood Coordinated Range Management Plan (CRMP) with the U.S. Forest Service. The allotment boundary would be adjusted to exclude 32 acres that are within the CSNM boundary.

Table 2-2. Alternative 2 – Deadwood Allotment* Use Summary

Allotment	Acres	Number of Livestock	Season of Use		AUMs
			Year 1	Year 2	
Deadwood	7,972	393 cattle	06/16-8/15	08/16-10/15	788

Potential Mitigation Measures

- The Guard Station Pasture; an area that is fenced separately from the rest of the allotment in T. 38S R.4E Section 17 and the NE portion of Section 20 would be used during gathering on years where late season use is on BLM (year 2) for a maximum of seven days. To compensate for the late season concentration the previous fall, cattle will not be allowed in the Guard Station pasture until July 1 the following year to allow for recovery. Under the No Action alternative this area is used season long and has had unauthorized use because of poor fence maintenance and gates being left open.

- Two cattleguards would be installed cooperatively with the BLM and the lessee. A cattleguard would be installed on road 38-4E-7.1 in T 38S R. 4E Section 17 NW ¼ SW ¼ and on road 38-4E-7 in T 38S R. 4E Section 20 NE ¼ at the intersection of road 38-4E-8. These cattleguards would prevent livestock from drifting back into partially or completely fenced areas (that have been

grazed) at locations where gates are often left opened during the grazing season. Installing cattleguards would improve the distribution within the allotment and reduce or eliminate unauthorized use.

Terms and Conditions

This alternative would include the following Terms and Conditions. Modifications of the current Terms and Conditions are proposed to ensure progress toward meeting the Standards for Rangeland Health.

- The Deadwood CRMP is incorporated as a term and condition of the lease. Grazing use is rotated such that grazing begins on BLM lands in even numbered years and begins on USFS lands in odd numbered years.
- Turn-out would be based upon range readiness.
- Actual use reports are to be returned within 15 days of off-date.
- Billings are due upon receipt and must be paid prior to turn-out.
- Late payment may result in unauthorized use, late fees and/or interest penalty.
- Lessees are expected to commit continuous, day-long riding and gathering efforts necessary to effectively locate and remove all livestock by the annual authorization period. In even numbered years 75% of livestock must be rotated to the USFS Deadwood Allotment by 8/16 and the remaining 25% would be rotated by 8/23. Any livestock not rotated or returning to the early season (BLM) allotment would be removed within 3 days of notification.
- Lessees are expected to remove 95% of their cows by the late season take-off date. Grazing use (greater than 5% of the cows) after the take-off date will result in unauthorized use fees for forage consumed, a 20% reduction in AUMs, and termination of the late season grazing period until such time as progress toward meeting standards is achieved in accordance with the provisions of 43 CFR, part 4180.
- An average stubble height of 5 inches with no more than 20% livestock caused bank alteration will be maintained in riparian areas of concern and would be seeded by BLM using native seed mixtures when native seed and workforce are available.
- BLM approved ear tags may be a requirement of the lease.
- Lessees will conduct active management practices such as herding to promote livestock distribution to reduce grazing use in riparian areas.
- Salt/mineral blocks will be placed at hardened locations at least ¼ mile from streams, springs, seeps or other wetlands with riparian vegetation, special status species, and recreation areas and will be rotated to promote livestock distribution and movements into areas where utilization levels are low.
- Lessees are expected to annually commit labor, materials and/or funds necessary to keep improvements fully functional prior to livestock turn-out for the duration of the lease, including during periods of approved nonuse.
- To prevent the further spread of nonnative species in the allotment vehicles used for livestock transport and herding (trailers, trucks, all-terrain vehicles [ATVs]), and all motorized vehicles intended for use off of established roadways, must be power-washed prior to entry onto BLM-administered lands. Washing must remove all mud, dirt, excrement, and vegetative debris from vehicles.

Range Improvements & Maintenance

Under Alternative 2, maintenance responsibilities for 9 range improvement projects would be transferred to the lessees, with responsibilities divided amongst the lessees (Table 2-5, Alternative 2). A new maintenance agreement will be developed after lease renewal has taken place formalizing maintenance responsibilities for each lessee. The requirements for maintenance and associated penalties would be the

same as described under Alternative 1.

ALTERNATIVE 3

Alternative 3 was developed to eliminate the impacts to riparian areas occurring as a result of late-season grazing use. This reduction in use would be proposed to ensure progress towards meeting Standard 2: Watershed Function - Riparian/Wetland Areas and Standard 4: Water Quality, within one year. Similarly to Alternative 2, terms and conditions would be added to the lease to reduce grazing pressure on riparian and wet areas, and reduce the amount of heavy to severe utilization to make progress towards meeting Standard 3: Ecological Processes and Standard 5: Native, Threatened and Endangered, and locally important species, as required by 43 CFR 4180.1.

Grazing Management

Under Alternative 3, the Deadwood Allotment would be grazed for 61 days every year. Grazing leases would be modified to authorize grazing from June 16 to August 15 annually. The grazing lease would be issued at a 50 percent reduction in AUMs, from 788 AUMs to 394 AUMs. The Deadwood CRMP would be modified for the BLM portion where grazing would be rotated with the USFS. The alternate rotation of spring season (06/15-08/15) use in even years and late season use (08/16-10/15) in odd years would be eliminated. The allotment boundary would be adjusted to exclude 32 acres that are within the CSNM boundary.

Table 2-3. Alternative 3 – Deadwood Allotment Use Summary

Allotment	Acres	Number of Livestock	Season of Use	AUMs
Deadwood	7,972	197	06/16-08/15	394

*****Individual authorizations would be expressed in percentage values consistent with existing individual grazing leases.

Terms and Conditions for the Deadwood Allotment

This alternative would include the following Terms and Conditions. Modifications of the current Terms and Conditions are proposed to ensure progress toward meeting the Standards for Rangeland Health.

- Turn-out would be based upon range readiness.
- Actual use reports are to be returned within 15 days of off-date.
- Billings are due upon receipt and must be paid prior to turn-out.
- Late payment may result in unauthorized use, late fees and/or interest penalty.
- Lessees are expected to commit continuous, day-long riding and gathering efforts necessary to effectively locate and remove all livestock by the annual authorization period.
- An average stubble height of 5 inches with no more than 20% livestock caused bank alteration will be maintained in riparian areas of concern and would be seeded by BLM using native seed mixtures. Seeding would be limited by native seed supply and workforce availability.
- BLM approved ear tags may be a requirement of the lease.
- Lessees would conduct active management practices such as herding to promote livestock distribution to reduce grazing use in riparian areas.
- Salt/mineral blocks will be placed at hardened locations at least ¼ mile from streams, springs, seeps or other wetlands with riparian vegetation, special status species, and recreation areas and would be rotated to promote livestock distribution and movements into areas where utilization levels are low.

- Lessees are expected to annually commit labor, materials and/or funds necessary to keep improvements fully functional prior to livestock turn-out for the duration of the lease, including during periods of approved nonuse.
- To prevent the further spread of nonnative species in the allotment vehicles used for livestock transport and herding (trailers, trucks, all-terrain vehicles [ATVs]), and all motorized vehicles intended for use off of established roadways, must be power-washed prior to entry onto BLM-administered lands. Washing must remove all mud, dirt, excrement, and vegetative debris from vehicles.

Range Improvements & Maintenance
Under Alternative 3, maintenance responsibilities for 9 range improvement projects would be transferred to the lessees, with responsibilities divided amongst the lessees (Table 2-5). A new maintenance agreement will be developed after leases renewal has taken place formalizing maintenance responsibilities for each lessee and will be addressed as part of the maintenance of range improvements term and condition in each alternative. The requirements for maintenance and associated penalties would be the same as described under Alternative 1.

ALTERNATIVE 4

This alternative would rest the Deadwood allotment for a period of 10 years. This alternative serves to speed up the recovery of ecological conditions on BLM-administered lands impacted by past grazing where the potential for recovery exists.

Grazing Management
In accordance with 43 CFR 4110.3-3, active use of the allotment would terminate at the close of the 2011 grazing season. The Deadwood CRMP would be modified for the BLM portion where grazing would not be rotated with the U.S. Forest Service Deadwood Allotment. At the end of the 10 years the allotment would be available for grazing and rangeland health conditions would be reevaluated at that time.

Table 2-4. Alternative 4 Deadwood Allotment Use Summary

Allotment	Acres	Number of Livestock	Season of Use	AUMs
Deadwood	7,972	0 cattle	Rest	0

Terms and Conditions
No Terms or Conditions would be required as no lease authorizations to graze would be issued.

ALTERNATIVES CONSIDERED BUT ELIMINATED FROM FURTHER ANALYSIS

This section describes actions and/or alternatives that were considered during analysis but were eliminated from detailed analysis.

Riparian Fencing: Riparian fencing to protect springs, seeps, and riparian areas or develop riparian pastures was considered as part of Alternatives 2 and Alternative 3.

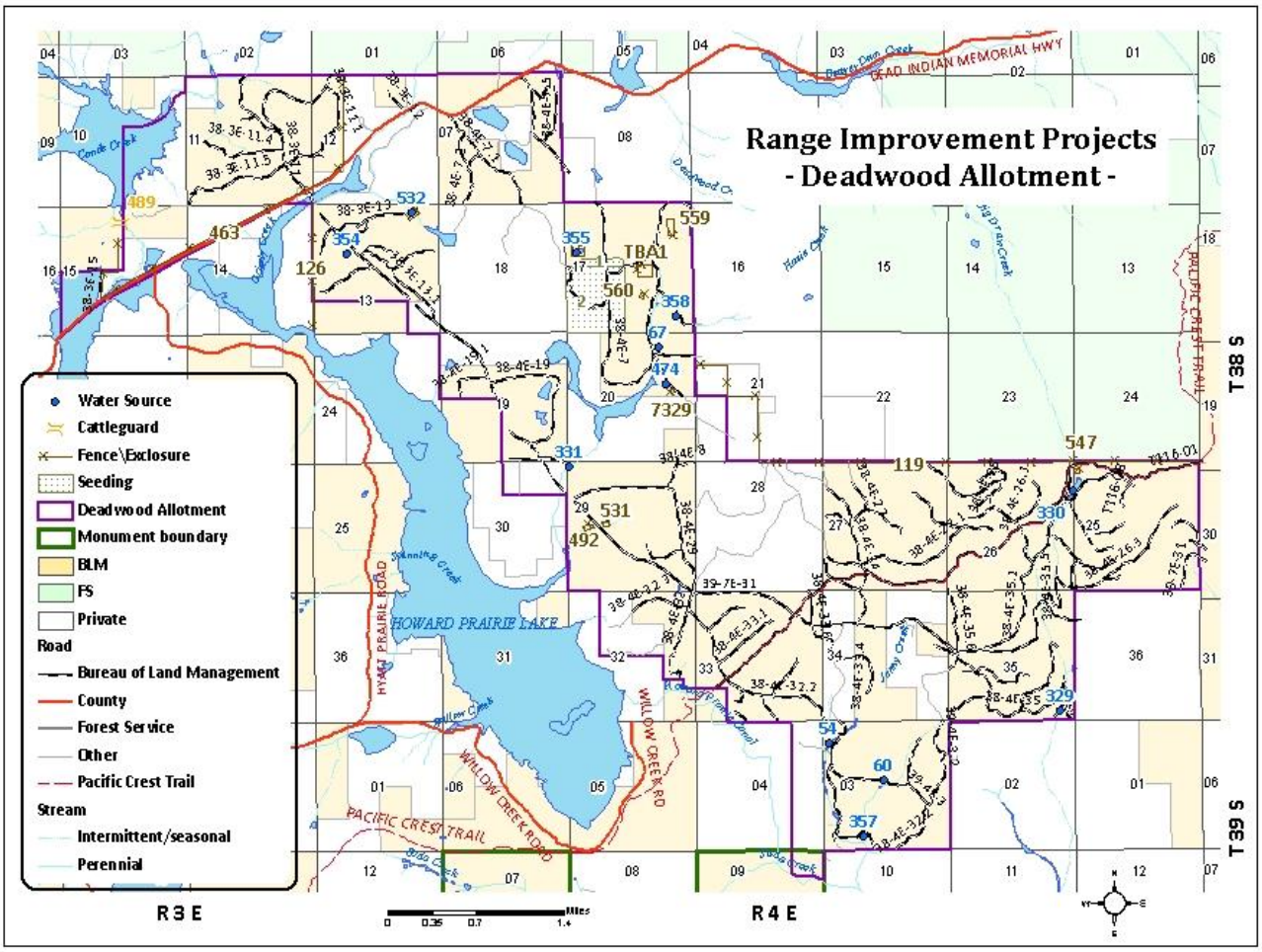
Rationale for Elimination: BLM installed (approximately 2.5 miles of) improved fenceline (project 750119) which improved grazing control. Monitoring of grazing conditions during recent field visits (9/2/09, 10/13/09, and 10/27/09) showed vegetative recovery in riparian areas after improvements to

existing fenceline (in T. 38S R 4E Section 20) and strict adherence to grazing seasons. In previous years stubble heights less than four inches were observed in the Deadwood Allotment primarily in the Grizzly Creek, Moon Prairie, and Hoxie Creek areas. Riparian grazing recommendations suggest that four to six inches of forage stubble height should remain on streamside areas at the end of the growing season, after fall frost, to limit potential impacts to the herbaceous plant community, the woody plant community, and streambank stability (Clary 1999). When terms and conditions are followed and use occurs during authorized periods, riparian vegetation consumption and associated bank disturbance is limited, even in the late season when water availability is limited. The high cost of constructing and maintaining additional fences around *all* riparian areas is not a reasonable alternative when areas of concern for vegetative recovery, streambank recovery, sedimentation, and rangeland health conditions, are limited to a few areas, and were primarily a result of use that was occurring outside of the authorized grazing season.

Table 2-5. Range Improvement Projects by Maintenance Responsibility by Alternative:

Project Name:	Project Number	Project Type:	Action:	Alt 1:	Alt 2:	Alt 3:	Alt 4:
Griffin Pass Spring Fence	750547	PCT Drinking Water	Maintain	BLM	Lessees	Lessees	Inactive
Moon Prairie (Aspen 1)	750559	Species Protection	Maintain	BLM	Lessees	Lessees	Inactive
Moon Prairie (Aspen 2)	750560	Species Protection	Maintain	BLM	Lessees	Lessees	Inactive
Owens Spring & trough	750532	Riparian Exclosure & Trough	Maintain	BLM	Lessees	Lessees	eval. for wildlife
Guard Station fence & trough	7329	Riparian Exclosure & Trough	Maintain	BLM	Lessees	Lessees	eval. for wildlife
Hoxie Meadow Fence (West)	750492	Riparian Exclosure	Maintain	BLM	Lessees	Lessees	Inactive
Hoxie Meadow Spring (East)	750531	Riparian Exclosure & Trough	Maintain	BLM	Lessees	Lessees	eval. for wildlife
Hoxie Creek Spring	750067	Trough/Water Development	Maintain	Lessees	Lessees	Lessees	eval. for wildlife
Moon Prairie Seeding #1	750001	Seeding	Maintain	BLM	BLM	BLM	BLM
Moon Prairie Seeding #2	750002	Seeding	Maintain	BLM	BLM	BLM	BLM
Dead Indian Creek Guard	750489	Cattleguard	Maintain	Lessees	Lessees	Lessees	Inactive
Shell Peak Pasture Fence	750463	Fence	Maintain	Lessees	Lessees	Lessees	Transfer to HP
Howard Prairie Fence	750126	Fence	Maintain	Lessees	Lessees	Lessees	Transfer to HP
Moon Prairie Fence	750119	Fence	Maintain	Lessees	Lessees	Lessees	Transfer to USFS
Hoxie Tributary Rock Dams	750474	Riparian Improvement	Maintain	BLM	BLM	BLM	BLM
Jenny Crk. Detention Dam	750054	Water Development	Maintain	BLM	BLM	BLM	Inactive
Brush Mtn. Detention Dam	750060	Water Development	Maintain	BLM	BLM	BLM	Inactive
Brush Mtn. Res	750357	Water Development	Maintain	BLM	BLM	BLM	Inactive
Guard Station Road Reservoir	750355	Water Development & mardon skipper study exclosure	Maintain	BLM	Lessee (exclosure only)	Lessee (exclosure only)	Inactive
Big Fir Reservoir	750358	Water Development	Maintain	BLM	BLM	BLM	Inactive
Johnson Crk. #1 Pump Chance	750329	Pump Chance	Maintain	BLM	BLM	BLM	Inactive
Big Spring Pump Chance	750330	Pump Chance	Maintain	BLM	BLM	BLM	Inactive
Hoxie Creek Pump Chance	750331	Pump Chance	Maintain	BLM	BLM	BLM	Inactive
Quarry Pump Chance	750354	Pump Chance	Maintain	BLM	BLM	BLM	Inactive
Moon Prairie Meadow	To be assigned (TBA1)	Mardon skipper study exclosure	Maintain	BLM	Lessee	Lessee	Inactive

Map 2-1. Range Improvement Projects



ALTERNATIVE COMPARISON

Table 2-6. Comparison of Alternatives

Comparison Factor	Alternative 1 (No Action)	Alternative 2	Alternative 3	Alternative 4
Number of Cattle	393	393	197	0
Season-of-Use	06/16-08/15 or 08/16-10/15	06/16-08/15 or 08/16-10/15	06/16-08/15	No grazing for 10-years
Total AUMs	788	788	394 50% reduction	0
Days on the Allotment	61	61	61	0
Grazing Rotation	Deferred grazing-rotated with USFS	Deferred grazing-rotated with USFS	Early Season only	None
Rangeland Improvement Responsibility **BLM:** **Lessee:**	 20 5	 11 14	 11 14	3 transfer to USFS 3 0
Terms & Conditions	Same 7 Terms and Conditions as previous lease	7 Additional Terms & Conditions including: • 75% of livestock must be rotated by the rotation date, 100% within 2 weeks • Reduce AUMs by 20% for late livestock removal • Retain average 5" stubble height in key riparian areas • Wash vehicles to prevent weed dispersal	5 Additional Terms & Conditions including: • Retain average 5" stubble height in key riparian areas • Wash vehicles to prevent weed dispersal	None

CHAPTER 3. AFFECTED ENVIRONMENT & ENVIRONMENTAL IMPACTS

INTRODUCTION

This chapter forms the scientific and analytical comparison of alternatives and answers the question:

What are the effects of BLM's Alternative(s)?

The Affected Environment section describes the existing conditions of the project planning area and associated analysis areas, and it sets the environmental baseline for comparing the effects of the alternatives, including the No Action Alternative. The affected environment is described to the level of detail needed to determine the significance of impacts to the environment of implementing Alternatives.

The impact analysis addresses direct, indirect, and cumulative effects on all identified affected resources of the physical, biological, and human environment. The analysis areas for actions proposed under this EA vary by resource. For all resources it includes the project area, which encompasses the areas where actions

are proposed for the Deadwood Lease Renewal.

CONSIDERATION OF CUMULATIVE EFFECTS

The Council on Environmental Quality (CEQ), in guidance issued on June 24, 2005, points out, the "environmental analysis required under NEPA is forward-looking," and review of past actions is required only "to the extent that this review informs agency decision-making regarding the alternatives." The CEQ stated in this guidance that "[g]enerally, agencies can conduct an adequate cumulative effects analysis by focusing on the current aggregate effects of past actions without delving into the historical details of individual past actions." This is because a description of the current state of the environment inherently includes the effects of past actions. The CEQ guidance specifies that the "CEQ regulations do not require the consideration of the individual effects of all past actions to determine the present effects of past actions." The importance of "past actions" is to set the context for understanding the incremental effects of the action alternatives. This context is determined by combining the current conditions with available information on the expected effects of other present and reasonably foreseeable future actions.

The analysis of the effects of other present and reasonably foreseeable actions relevant to the effects of the alternatives is necessary. How each resource analysis uses the information concerning other present and reasonably foreseeable actions is dependent on the geographic scale of concern and attributes considered during each resource analysis. Reasonably foreseeable actions are considered and analyzed as appropriate specific to each affected resource.

Past Silviculture Treatments

The reforestation areas located in the Deadwood grazing allotment were harvested by commercial timber removal from 1960 through early 1980. These harvested areas have been manually conifer seeded and planted with seedlings along with other vegetation management treatments including: paper mulching or radius scalping and vegetation cutting. The planted conifer seedlings also had protective treatments such as; gopher baiting and trapping and vexar tube or netting installation. These silviculture treatments were used to protect the seedlings from rodents, big game animals (browse) and grazing cattle in the allotment. There are 123 reforestation units and several slashbuster treated areas (for fuels reduction) located in the allotment. The reforestation units have been monitored for seedling survival and growth over time by using the Bureau Stocking Survey Guidelines.

Future Silviculture Treatments

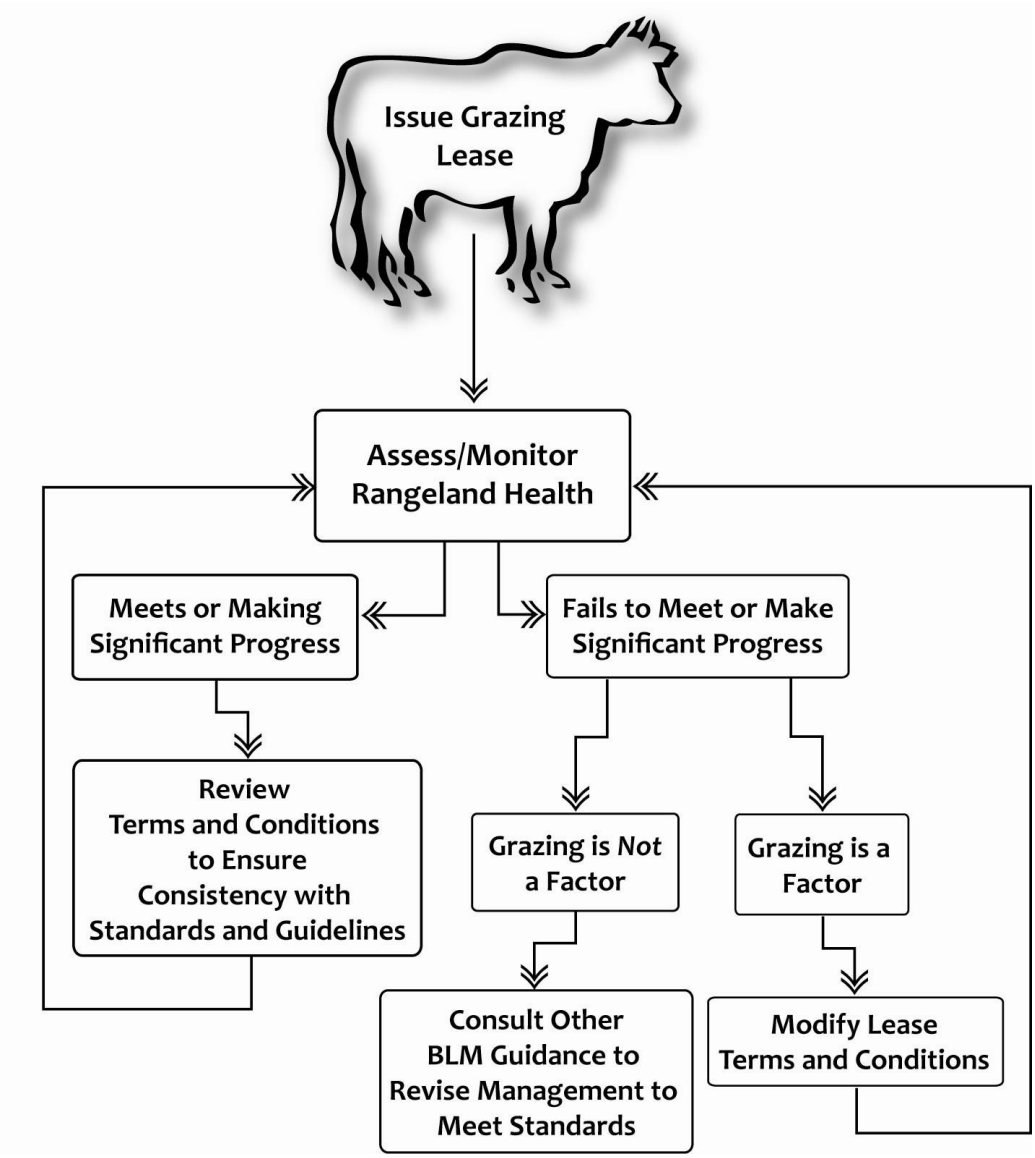
The majority of the reforestation units have developed into sapling or small pole size stands. The age and stocking level distribution are at minimum tree per acres to overstocked stand condition. Some units will need a release treatment using precommercial thinning methods. Most of the reforestation units have been thinned over the past 15 years.

Ashland Resource Area Micro*Storms database records as of 5/20/10, which is based on the Bureau Stocking Survey Guidelines indicates approximately 350 acres are in need of final precommercial thinning treatment. These areas will be treated over the next four years within budget constraints. In addition, some of these units may have tree pruning on the lower branches for improved wood quality. These precommercial thinning and tree pruning treatments will occur after these areas have been surveyed for botanical species.

Swinning and Plateau Thin Timber Sale

Swinning and Plateau Thin are timber sales which fall partially within the Deadwood grazing allotment and are planned to occur in 2011 on approximately 1,160 acres.

RANGE RESOURCES



AFFECTED ENVIRONMENT

Conifer communities with grass species such as blue wild rye (*Elymus glaucus*), and Alaska oniongrass (*Melica subulata*) and forb species such as insideout flower (*Vancouveria hexandra*), broadleaf starflower (*Trientalis latifolia*), and prince's pine (*Chimaphila menziesii*) create a landscape matrix within which the riparian areas and meadows grazed by livestock are embedded. Riparian areas include willow thickets hosting beaver, as well as more open wetland areas incorporating sedges such as (*Carex eucarex sp.*) and (*Carex vignea sp.*) and grasses such as meadow barley (*Hordeum brachyantherum*), colonial bentgrass (*Agrostis capillaris*), and tufted hairgrass (*Deschampsia caespitosa*). Shallow soils define open meadows

that may be dominated by California oatgrass (*Danthonia* californica) on clayey sites or Idaho fescue (*Festuca idahoensis*), Secund's bluegrass (*Poa secunda*) and Lemmon's needlegrass (*Achnatherum lemmonii*) on soils with more sand or silt. Seasonally inundated soils may host California false hellebore (*veratrum californicum*), cone flower (*Rudbeckia sp.*), and other forbs. Other open meadows may be dominated by shrubs such as common snowberry (*Symphoricarpus albus)*.

ENVIRONMENTAL CONSEQUENCES

Field inspections in 2007 and 2008 indicated fence maintenance on the line between the Forest Service and BLM portions of the allotment was not being performed. The fence was non-functional and apparently had been that way for a number of years. The lack of a functional fence negated the benefits from alternating seasons of use, as well as increased AUMs on BLM lands. After repairs to this fence in 2008, field observations indicated the effects on riparian, wetlands, meadows were reduced, and the amount of heavy to severe utilization was less.

Methane Emissions - Greenhouse Gas Production Resulting from Livestock Grazing on the Deadwood Allotment

Livestock grazing results in methane emissions as a result of ruminant digestion. Methane emission rates from cattle vary widely and depend on many variables (Johnson and Johnson 1995; DeRamus et al. 2003). Estimates for grazing cattle typically range from 80 – 101 kilograms of methane per year per animal (EPA, 2009) or 6.7 -9.2 kilograms of methane per month. This analysis will assume a methane emission rate of 8 kilograms of methane per animal unit month (AUM). Assuming that methane has a global warming potential 21 times carbon dioxide (EPA 2009, p. ES-3), each AUM results in 0.168 metric tons of carbon dioxide equivalent. Continuing to lease this area (in this example) for grazing use at the authorized level of 1,000 AUMs would result in methane emissions of 168 metric tons of carbon dioxide equivalent per year. Current U.S. emissions of methane from livestock total approximately 139 million metric tons of carbon dioxide equivalent per year (EPA 2009, p. 6-2); current U.S. emissions of all greenhouse gases total approximately 7 billion metric tons of carbon dioxide equivalent (EPA 2009, p. 2-4); current global emissions of all greenhouse gases total 25 billion metric tons of carbon dioxide equivalent (Denman et al. 2007, p. 513). This emission would represent 0.0001% of the annual U.S. methane emissions from livestock, and 0.000002% of the annual U.S. emissions of all greenhouse gases, and 0.0000007% of the global emissions of all greenhouse gases. Carbon storage as a result of changes in grazing practices is likely to be small and difficult to predict, especially where a rangeland health assessment has determined that the Standards for Rangeland Health Standards and Guidelines for Livestock Grazing Management are being met. Therefore, this analysis will assume that changes in grazing practices on allotments would not result in any change in total carbon storage. Livestock grazing can affect rangeland carbon levels, through changes in plant community and changes in ecosystem processes, but the effects have been variable and inconsistent among the ecosystems studied (Schuman et al. 2009). Some studies have found that grazing can result in increased carbon storage compared to no grazing, because of increased plant turnover and changes in plant species composition (Follett et al. 2001). Many changes in rangeland carbon from different grazing practices do not result in substantial changes in total ecosystem carbon, but are redistributions of carbon, for example, from above-ground vegetation to root biomass (Derner and Schuman 2007). Overall, changes in rangeland carbon storage as a result of changes in grazing practices are likely to be small and difficult to predict. Therefore, this analysis will assume that changes in grazing practices on this allotment would not result in any change in total carbon storage.

Livestock grazing currently authorized in the Deadwood grazing lease represents the highest potential methane production of all the alternatives being analyzed in this EA. As the EPA, working in conjunction with the Oregon DEQ, have set project area limits of 25,000 metric tons of Methane production for projects within the Medford District project area, the Deadwood Allotment falls well below the production

limit to be in compliance with the Council for Environmental Quality's directions for Methane production.

Table 3-1. Methane Production (GHGs) From Grazing on the Deadwood Allotment

Authorization	Use Type	Number of Livestock	AUMs	Tons CO2 Equiv./AUM	Methane Production (metric tons)
Lessee 1	Active Lease	282 cattle	566	0.168	95.088
Lessee 2	Active Lease	111 cattle	223	0.168	37.464
Total		393 Cattle	789*		132.552

Economic Analysis by Alternative

Costs associated with AUM reductions, AUM replacement and Maintenance of Improvements

The cost tables below estimate some of the costs that the lessees would likely experience from implementation of each alternative. This cost analysis assumes that the lessees would lease private pasture land and does not account for costs associated with feeding hay, cost of transporting animals, or cost of additional herding that may be required to be in compliance with additional terms and conditions.

The fees for Active AUMs are calculated at the 2010 Annual Grazing Fee of $1.35 per AUM and replacement AUMs are calculated at the Average Private Grazing Land Lease Rate per AUM for Oregon of $14.60 per AUM (BLM Instruction Memorandum No. 2010-67).

Table 3-2. Cost Comparison of Alternatives

Comparison Factor	Alternative 1 (No-Action)	Alternative 2	Alternative 3	Alternative 4
Number of Cattle	393	393	197	0
Season-of-Use	06/16-08/15 or 08/16-10/15	06/16-08/15 or 08/16-10/15	06/16-08/15	No grazing for 10-years
Total AUMs	788	788	394 50% reduction	0
Active AUM Costs	$1063.80	$1063.80	$531.90	$0.00
Replacement AUM Costs	$0	$0	$5,752.40	$11,504.80
Total Annual AUM Cost	$1063.80	$1063.80	$6,284.30	$11,504.80

The cost analysis associated with maintenance of range improvements accounts for transfer of improvement maintenance to lessees. Maintenance is considered a cost of doing business associated with grazing authorizations and is reflected in the discounted AUM rate as defined in 43 CFR 4130.8, *Fees*. Table 3-3 illustrates an estimate of the average number of hours necessary to complete the annual maintenance on the Deadwood Allotment by alternative. Annual maintenance costs are calculated at $8.40 per hour.

Table 3-3. Cost of Maintaining Range Improvements by Alternative

Description	Alternative 1		Alternative 2		Alternative 3		Alternative 4	
Maintenance Responsibility	**BLM**	**Lessee**	**BLM**	**Lessee**	**BLM**	**Lessee**	**BLM**	**Lessee**
Number of Improvements	20	5	11	14	11	14	3	0
Annual Maintenance Time (in hours)	-	18.5	-	32	-	32	-	0
Annual Maintenance Costs	-	$155.40	-	$268.80	-	$268.80	-	0

WATER RESOURCES

Characterization

The *Jenny Creek Watershed Analysis* (USDI 1995) provides general water resources background information for the Deadwood Allotment. The Draft *Water Quality Restoration Plan for the Jenny Creek Watershed* (USDI 2008c) provides additional water quality information about the area.

Climate

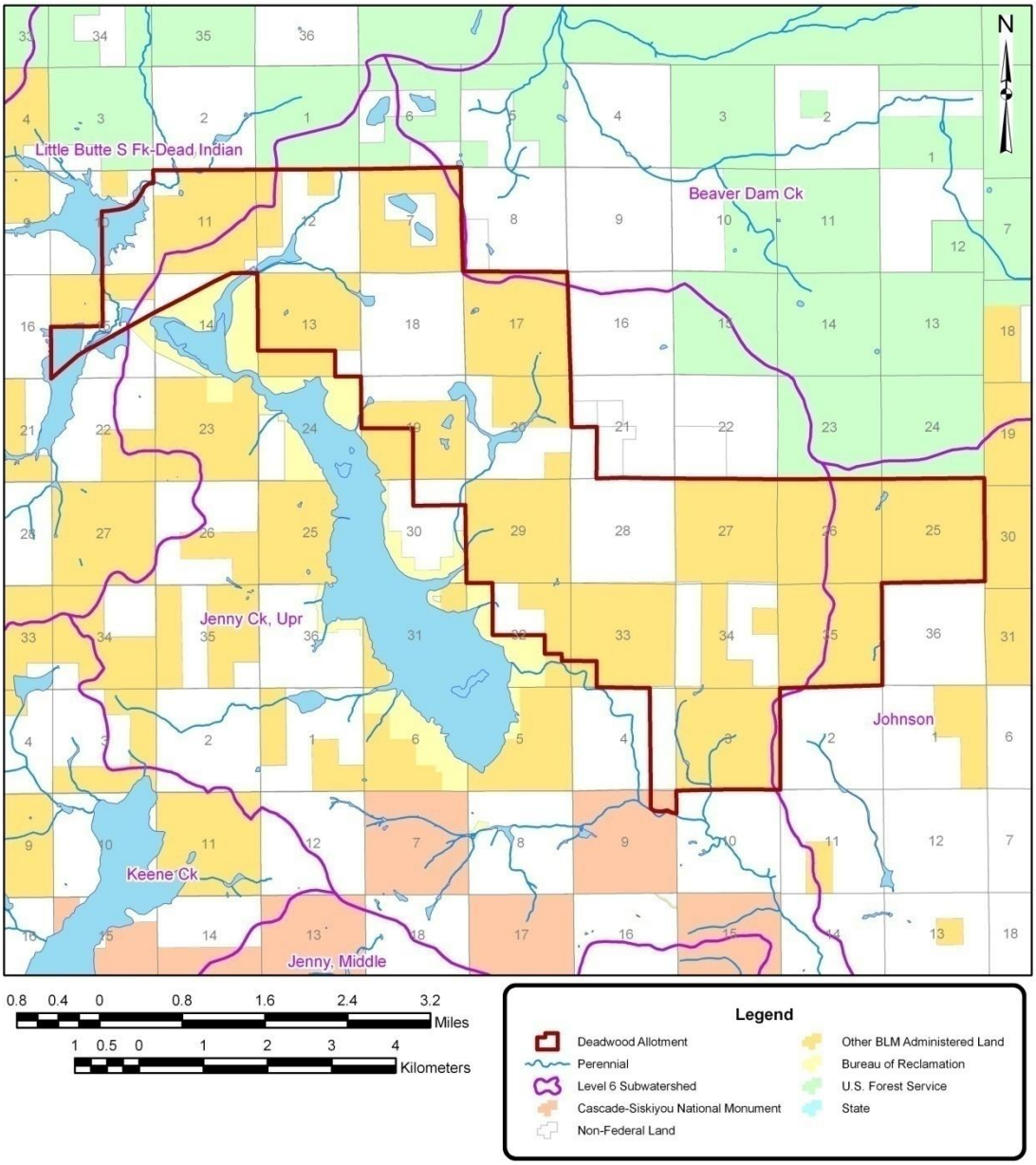
Mild, wet winters and hot, dry summers characterize the allotment area. During the winter, the moist, westerly flow of air from the Pacific Ocean results in frequent storms of varied intensities. The analysis area is located entirely within the snow zone; transient snow zone is not an issue. Winter precipitation usually occurs as snow, which ordinarily melts during the spring runoff season from March through June. Precipitation falls predominately from November through March and summer months are typically dry. The precipitation patterns in the winter months are wide based with relatively low intensity and long duration in contrast to localized, short duration, and high intensity summer storms that occasionally occur. Average annual precipitation in the Deadwood Allotment is about 38 inches.

During the summer months, the allotment area is dominated by the Pacific high pressure system, which results in hot, dry summers. Summer rainstorms occur occasionally and are usually of short duration and limited area coverage. Air temperatures can display wide variations daily, seasonally, and by elevation. The nearest NOAA weather stations with air temperature data are located at Howard Prairie Dam (located south of the allotment area) and the Medford Weather Station (west of the allotment area). The highest average maximum monthly temperatures occur in July and August, where they reach 79.2°F and 79.7°F at the Howard Prairie Dam Station and 90.5°F and 90.8°F at the Medford Station (USDI and USDA 1997).

Analysis Area Description

The Deadwood Allotment includes 8,004 acres of federal land administered by the Bureau of Land Management (BLM) and 3,886 acres of interspersed privately owned land. This allotment lies in two Tier One watersheds. The allotment lies mostly within the Jenny Creek Watershed (91 percent) and includes portions of the Upper Jenny Creek and Johnson Creek Subwatersheds. The remainder of the allotment (nine percent) falls within the Little Butte Creek Watershed and includes portions of the South Fork Little Butte-Dead Indian Creeks and Beaver Dam Creek Subwatersheds. Map 3-1 illustrates the subwatersheds in the Deadwood Allotment. The major creeks within the allotment include Hoxie, Grizzly, Jenny, Green, Dead Indian, and Conde Creeks. There are approximately 11 miles of perennial streams, 19 miles of intermittent streams, 19 miles of dry draws, and one mile of ditch within the allotment.

Map 3-1. Subwatersheds in the Deadwood Allotment



Past Actions

Removal of riparian vegetation, and the shade it provides, contributes to elevated stream temperatures. Past human-caused activities in riparian areas such as timber harvest, road construction, residential and agricultural clearing, and livestock grazing, have reduced the amount of riparian vegetation in the analysis area (USDI 2006 and USDI 2008c). Water withdrawals during the summer also contribute to elevated stream temperatures. Augmentation and diversion of flows in Jenny Creek Watershed for purposes of irrigation and hydroelectric production in the Bear Creek Watershed greatly complicate the instream flow regime for Jenny Creek.

Past ground-disturbing activities such as road building, logging, land clearing, agriculture, and livestock grazing contributed sediment to streams in the analysis areas (USDI 2006). Agricultural and residential development along the South Fork Little Butte Creek contributed sediment through channel modification, grazing, and land clearing. Livestock grazing has occurred throughout the analysis areas since the mid-1800s (USDI and USDA 1997). Large numbers of cattle and sheep were driven from lower valley pastures to high plateau meadows each summer during the mid-1800s to early 1900s. These large numbers of livestock had an adverse impact on watershed conditions, especially along stream courses and near springs and meadows (USDI and USDA 1997). After 1930, cattle became the primary livestock in the South Fork Little Butte Creek area. By the early 1960s, livestock grazing on public lands had been reduced by 50 percent and there has been an additional 50 percent reduction since then (USDI and USDA 1997). BLM stream surveys conducted in riparian areas of this allotment between 1996 and 2006 identify numerous locations where streambanks have been trampled and damaged by cattle (USDI 1995-2007).

AFFECTED ENVIRONMENT

Water Quality

The Oregon Environmental Quality Commission has adopted numeric and narrative water quality standards to protect designated beneficial uses. 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 in the Rogue Basin and redband trout in the Jenny Creek watershed are the most sensitive beneficial uses (USDI 2006 and USDI 2008c). 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. DEQ's 2004/2006 303(d) list is the most recent listing of these streams (ODEQ 2006).

The BLM is recognized by Oregon DEQ as a Designated Management Agency for implementing the Clean Water Act on BLM-administered lands in Oregon. The BLM and DEQ have a Memorandum of Agreement (MOA) that defines the process by which the BLM will cooperatively meet State and Federal water quality rules and regulations. In accordance with the MOA, the BLM in cooperation with the Forest Service, DEQ, and the Environmental Protection Agency is implementing the *Forest Service and Bureau of Land Management Protocol for Addressing Clean Water Act Section 303(d) Listed Waters* (USDI and USDA 1999). Under the Protocol, the BLM will protect and maintain water quality where standards are met or surpassed, and restore water quality limited waterbodies within their jurisdiction to conditions that meet or surpass standards for designated beneficial uses. The BLM would also adhere to the State Antidegradation Policy (OAR 2006b; 340-041-0004) under any proposed actions.

In December 2008, the ODEQ issued the *Rogue River Basin Total Maximum Daily Load (TMDL)*. The TMDL addresses temperature and bacteria (*E. coli*) impairments for an area that includes the North and South Forks Little Butte Creek. In December 2010, the ODEQ issued the *Upper Klamath and Lost River Subbasins TMDL* for review. TMDLs are numerical loadings that are set to limit pollutant levels such that instream water quality standards are met.

Both TMDLs target system potential effective shade as the surrogate measure to meet the TMDL load allocation for nonpoint sources. Effective shade is defined as the percent reduction of potential daily solar radiation load delivered to the water surface (ODEQ 2008 and ODEQ 2010). It can be measured in the field and relates directly to solar loading.

There are five streams in or adjacent to the Deadwood Allotment on the Oregon DEQ's 2004/2006 Environmental Protection Agency approved 303(d) list. Three streams are listed for summer temperature (salmonid fish rearing) and two streams for year around temperature (core cold water habitat) (ODEQ 2006) (Table 3-4).

Table 3-4. Water Quality Limited Streams within or adjacent to the Deadwood Allotment (ODEQ 2006).

Level 5 Watershed	Stream	River Miles	Parameter	Status	Miles in the Allotment
Jenny Creek	Jenny Creek	0 to 17.8	Temperature-Summer	303(d)	none
	Grizzly Creek	0 to 3.0	Temperature-Summer	303(d)	none
	Hoxie Creek	0.8 to 4.4	Temperature-Summer	303(d)	2.2
Little Butte Creek	Dead Indian Creek	0 to 9.6	Temperature-Year Around	303(d)	2.6
	Conde Creek	0 to 4.4	Temperature-Year Around	303(d)	0.4

a. Temperature

There are a total of 5.2 stream miles listed for temperature (2.2 miles for summer temperature and 3.0 miles for year around temperature) in the allotment of which 1.7 miles (1.4 miles on Hoxie Creek, 0.3 miles on Dead Indian Creek, 0.0 miles on Conde Creek) are on BLM-administered lands.
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, livestock grazing, and OHV use are the primary impacts specific to federally managed lands that have the potential to affect water quality conditions in the allotment. Both *Rogue River Basin TMDL* and *Upper Klamath and Lost River Subbasins TMDL* identify four nonpoint source factors that may result in increased thermal loads: stream shade, stream channel morphology, flow, and natural sources (ODEQ 2008 and ODEQ 2010).

The BLM collected summertime stream temperature data at locations within the South Fork Little Butte Creek and Jenny Creek watersheds between 1994 and 2005 (Table 3). The 7-day statistics for all sites listed in Table 3 exceed the established 2004 temperature criteria. In the South Fork Little Butte Creek, 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. In the Jenny Creek Watershed, the seven-day-average maximum temperature may not exceed 20.0°C (68.0°F) for streams in Jenny Creek Watershed designated as redband trout use. Prior to the 2004 list, the Oregon DEQ 7-day maximum listing criteria was 17.8°C (64.0°F) for both watersheds.

Table 3-5. Temperature summary for selected streams within the allotment

Watershed	Stream Name	Period of Record[1]	7-day Statistic	Range of 7-day Statistic	
				Minimum	Maximum

			(ave. for all years)		
South Fork Little Butte Creek	Dead Indian Creek (above Conde Creek)	94-01, 03-05	74.9	72.5	77.6
	Conde Creek (above TID diversion)	94-97, 99-03, 05	72.1	69.2	74.0
	Conde Creek @ lower BLM line, Sec. 9 NE1/4 SW1/4	98-01	73.6	73.1	74.8
Jenny Creek	Grizzly Creek (abv. Soda Creek)	2001, 03-05	69.9	69.0	71.3
	Hoxie Creek (abv. Keno access rd.)	1997-1998	72.2	70.2	74.2
	Jenny Creek (abv. Johnson Creek)	1996-2001	73.0	71.0	74.2

1/ Temperature measured from June to September

System potential shade targets (percent-effective shade) along with current shade were calculated for two streams on BLM-administered lands in the Deadwood allotment that are within the North and South Forks Little Butte Creek Key Watershed: Conde and Dead Indian. The Shadow model (Park 1993) was used for the shade assessment. The Shadow model determines the system potential targets and number of years needed to obtain shade recovery using forest growth curves for various tree species within southwestern Oregon. The growth curves project growth rates and maximum heights for the dominant riparian tree species. Target shade values represent the maximum potential stream shade based on the system potential tree height. The BLM administered lands along the assessed reaches of lower Conde and Dead Indian Creek meet the target shade.

The RAPID effective shade model (Park and Hawkins 2007) was used to analyze the existing shade conditions and potential future shade along perennial streams on BLM-administered lands within the Jenny Creek portion of the Deadwood Allotment. The target shade values represent the maximum potential stream shade based on the system potential tree height. The analysis is based on regional shade curves (Park 1993) which provide effective shade values based on stream width, tree height, channel orientation, and stream adjacent slope. The projection of years to recovery uses forest growth estimates for Douglas-fir in southwest Oregon. A total of 3.9 miles of field verified perennial streams on BLM land were analyzed. Thirty-six percent of the reaches met the target shade. The average additional shade needed across the allotment for all reaches was 13%. The average years to maximum stream shade recovery was 77. Stream temperatures are on an upward trend (decreasing) on federal land as previously harvested riparian vegetation recovers. However, roads built in riparian areas and livestock grazing that damages shade-producing vegetation in riparian areas will continue to contribute to temperature increases. On non-federal lands, near-stream vegetation disturbance/removal and water withdrawals continue to adversely affect stream temperatures (ODEQ 2004). Water withdrawals have the potential to greatly impact surface water temperatures within the Little Butte Creek and Jenny Creek Watersheds. Talent Irrigation District (TID) diverts water from Conde and Dead Indian Creeks into Howard Prairie Reservoir. Dead Indian is a tributary to South Fork Little Butte Creek, a tributary to Little Butte Creek, a tributary to the Rogue River.

Streams in the Deadwood Allotment drain into Howard Prairie Reservoir, Jenny Creek, and Dead Indian Creek. Howard Prairie Reservoir is actually in the Jenny Creek subbasin; however, water from the Howard Prairie Reservoir is transported to Keene Creek Reservoir and then into the Bear Creek Watershed (a tributary of the Rogue River) through tunnels and a pipeline down to Green Springs Power Plant. Water from the power plant flows to Emigrant Creek for storage in Emigrant Reservoir and dispersal through the Talent Irrigation District canal system. The transbasin conveyance of water from Keene Creek Reservoir to Emigrant Creek normally captures 100 percent of the flow of Keene Creek. Input to the downstream Jenny Creek system via Keene Creek occurs rarely during flood events or instances where the transport system into Emigrant is shut down. Jenny Creek flows into the Irongate Reservoir in northern California in the Klamath basin.

There are numerous small water developments within the allotment including pump chances and small reservoirs. BLM has water rights to store water at ten locations in the allotment for livestock, wildlife, fire suppression, and road operations. The functionality of most of the developments in the allotment is reliant upon seasonal precipitation. The management of water withdrawals is within the jurisdiction of the Oregon Water Resources Department and as such the BLM has no authority in this area.

b. 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 bed load 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.

The Oregon statewide narrative criteria found in OAR 340-041-0007(1) (ODEQ 2006b) is the water quality criteria that applies to BLM management.

> *(1) Notwithstanding the water quality standards contained in this Division, the highest and best practicable treatment and/or control of wastes, activities, and flows must in every case be provided so as to maintain dissolved oxygen and overall water quality at the highest possible levels, and water temperatures, coliform bacteria concentrations, dissolved chemical substances, toxic materials, radioactivity, turbidities, color, odor, and other deleterious factors at the lowest possible levels.*

Improper livestock management contributes to sedimentation through bank trampling and the reduction or elimination of riparian vegetation. BLM stream surveys from 1996 to 2006 noted many reaches with these types of grazing impacts.

Current conditions resulting from past and present actions are summarized as follows. Surface erosion from existing roads on all lands contributes to low levels of sediment input primarily at road-stream crossings and where fill slopes closely parallel streams. Streambank trampling from livestock grazing continues to contribute sediment to streams.

c. Coliform

Fecal coliform bacteria are produced in the guts of warm-blooded vertebrate animals, and indicate the presence of pathogens that cause illness in humans. *E. coli* is a species of fecal coliform bacteria. A variety of everyday activities cause bacterial contamination in surface waters (ODEQ 2004). The largest sources of contamination include runoff from agricultural, industrial, rural and urban residential activities (ODEQ 2004). Sources of bacteria from BLM-administered lands include animal feces (wild and domestic, including livestock such as cattle) and inadequate waste disposal by recreational users. The

BLM does not monitor fecal coliform and it is often difficult, as it is with the other parameters, to attribute livestock impacts to the monitoring results.

The *Rogue River Basin TMDL* (ODEQ 2008) addresses bacteria (*E. coli*) and acknowledges that the management of federal forest lands does not typically contribute to elevated levels of *E. coli* that are the basis for the listings in the Rogue Basin (ODEQ 2008). The *Water Quality Restoration Plan for BLM-Administered Lands in the North and South Forks Little Butte Creek Key Watershed* (USDI 2006) includes the following recovery goal for *E. coli*: manage livestock to prevent concentrations in streams or riparian zones. There are currently no *E. coli*-listed streams on BLM-administered lands within the Deadwood Allotment; however, livestock access and concentration in streams or riparian zones continues to allow site-level bacterial contamination in surface water from BLM-managed lands in some locations within the allotment.

Livestock grazing is managed in accordance with the *Standards and Guidelines for Livestock Grazing Management for Public Lands Administered by the Bureau of Land Management in the States of Oregon and Washington* (USDI 1997) and the BLM grazing regulations. These documents provide guidance for grazing management activities to ensure water quality will be maintained, protected and/or restored. Management measures used to limit the presence of livestock in stream channels or riparian zones in order to reduce sedimentation (USDI 2006) will also minimize the amount of bacterial contamination in surface water from BLM-managed lands.

The Preliminary Determination and Evaluation found that the allotment was "Not Meeting the Standard, current livestock grazing management practices are significant factors" and "Does not conform with Guidelines for Livestock Grazing Management" for Standard 4 Water Quality (USDI 2008b).

The Guidelines for Livestock Grazing Management (USDI 1997) that are not being achieved for Standard 4 include:

- Adequate cover and plant community structure to promote streambank stability, debris and sediment capture, and floodwater energy dissipation in riparian areas.
- Promote livestock distribution.
- Avoid unwanted or damaging concentrations of livestock on streambanks, in riparian areas and other sensitive areas such as highly erodible soils, unique wildlife habitats and plant communities.
- Protect water quality.
- Animal introductions in riparian and wetland areas must be compatible with the capability of the site, including the system's hydrologic regime, and contribute to the maintenance and restoration of properly functioning condition.

Watershed Analysis Recommendations

The Deadwood Allotment falls within the source water areas for the cities of Gold Hill, Rogue River, and Grants Pass in Oregon and Yreka in California. The surface water source for the three cities in Oregon is the Rogue River downstream from Bear Creek. The Bear Creek and Little Butte Creek Watersheds are included in the source water area and 1,012 acres of the allotment are in the South Fork Little Butte-Dead Indian Creeks and Beaver Dam Creek Subwatersheds of Little Butte Creek (Map 3-1). The allotment lands within the Little Butte Creek Watershed are approximately 25 miles upstream from the closest public water system intake. The water source for Yreka is Fall Creek. The Fall Creek Subwatershed lies within the Jenny Creek Watershed. Approximately 10,877 acres of the allotment are within the Upper Jenny Creek and Johnson Creek Subwatersheds of the Jenny Creek Watershed (Map 3). Fall Creek is outside the Deadwood Allotment.

Source water 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 and by the California Department of Health Services for the City of Yreka. The assessments include an inventory of potential contaminant sources within the source water areas. Grazing animals (greater than five large animals or equivalent per acre) were identified as a potential contaminant source for the Gold Hill, Rogue River, and Grants Pass drinking water protection areas. The assessments recognized that concentrated livestock may contribute to erosion and sedimentation of surface water bodies. Grazing in the Little Butte Creek portion of the allotment consists of open range grazing with an average of approximately 48 cows across the 1,012 acres of the allotment. The City of Yreka source water assessment identified open range cattle as a potential contaminating activity. No other potential contaminant sources that could occur on BLM lands were identified in the state source water assessments.

The *Water Quality Restoration Plan for the North and South Forks of Little Butte Creek Key Watershed* and the *Draft Water Quality Restoration Plan for the Jenny Creek Watershed* (USDI 2006 and USDI 2008c) identified several nonpoint source factors that may result in increased thermal loads including: near-stream vegetation disturbance/removal, channel modifications and widening, dams, diversions, and irrigation districts, and hydromodification–water rights.

The *Water Quality Restoration Plan for the North and South Forks of Little Butte Creek Key Watershed* (USDI 2006) identifies percent-effective shade targets for major perennial and fish-bearing streams on BLM-administered lands. Streams are considered recovered where current shade achieves the target shade or is 80 percent or greater. Lower Conde and Dead Indian Creeks are considered recovered.

Current shade is less than the target on BLM-administered lands for Hoxie Creek and the headwaters of Grizzly Creek. The majority of the field verified portions of the Jenny Creek Spring tributary system on BLM are at or near recovery for shade.

Both WQRPs (USDI 2006 and USDI 2008c) identify the effect of channel morphology on stream temperature. Wide channels tend to have lower levels of shade due to simple geometric relationships between shade producing vegetation and the angle of the sun. Channel widening is often related to degraded riparian conditions that allow increased streambank erosion and sedimentation of the streambed. Sediment sources resulting from human activities include roads; logging (tractor skid trails, yarding corridors, and landings); concentrated livestock grazing in riparian zones; residential clearing of riparian zones; irrigation ditch blowouts; and poor irrigation practices (USDI and USDA 1997).

Riparian Condition

Riparian areas (streams, wetlands, springs, and seeps) within the allotment were inventoried using BLM's *Process for Assessing Proper Functioning Condition*, Technical Reference 1737-9 (USDI 1993). On BLM lands within the allotment, data was collected in the Upper Jenny Creek and South Fork Little Butte-Dead Indian Creeks Subwatersheds in 1996 and 2002. Some of the reaches around Howard Prairie Lake were revisited and updated in 2006. The process used an interdisciplinary evaluation to rate riparian areas as either "Proper Functioning Condition", "Functioning at Risk", or "Nonfunctional". The ratings are defined as:

Proper Functioning Condition (PFC) – Riparian-wetland areas are functioning properly when adequate vegetation, landform, or large woody debris is present to dissipate stream energy associated with high waterflows, thereby reducing erosion and improving water quality; filter sediment, capture bedload, and aid floodplain development; improve flood-water retention and ground-water recharge; develop ponding and channel characteristics to provide the habitat and the water depth, duration, and temperature necessary for fish production, waterfowl breeding, and other uses; and support greater biodiversity. The functioning

condition of riparian-wetland areas is a result of interaction among geology, soil, water, and vegetation.

Functional-At Risk (FAR) – Riparian-wetland areas that are in functional condition but an existing soil, water, or vegetation attribute makes them susceptible to degradation.

Nonfunctional – Riparian-wetland areas that clearly are not providing adequate vegetation, landform, or large woody debris to dissipate stream energy associated with high flows and thus are not reducing erosion, improving water quality, etc., as listed above. The absence of certain physical attributes, such as a floodplain where one should exist, is an indicator of nonfunctioning conditions.

Stream surveys and PFC Assessments were conducted in riparian areas on BLM land in this allotment between 1996 and 2006. 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. Only perennial and intermittent streams are assessed for PFC. Stream survey data in this allotment identifies numerous locations where streambanks have been trampled and damaged by cattle. . In the Hoxie Creek drainage, PFC surveys conducted on BLM land found approximately 2.5 miles of the 3.0 miles surveyed (82%) in non-functional or functioning-at-risk with a downward trend. The Hoxie Creek system has more stream segments that are non-functional (approximately one mile) or functioning-at-risk with a downward trend (approximately 4,000 feet) than other streams in the allotment. As a perennial stream, Hoxie Creek receives heavier grazing pressure late in the season when water and palatable vegetation are limited to perennial riparian areas (BLM 2003 and 2004). An 800 foot section of an unnamed perennial tributary to Grizzly Creek in Section 13 was also identified as nonfunctional due in part to trampling of banks and substrate resulting in an increased width to depth ratio. In section 19 and 29, unnamed intermittent tributaries to Howard Prairie reservoir with a total length of approximately one mile were identified as nonfunctional or functioning-at-risk with a downward trend. On these stream reaches and Dead Indian Creek in Section 15, surveyors noted that overutilization by cattle is contributing to destabilization of streambanks and instream sedimentation. A survey conducted along Jenny Creek (T39S R4E Section 3) found altered streambanks along 36 percent of the 200 meters surveyed (Ashland Exclosure Monitoring 2005). This protocol describes the linear length of streambank alteration that can be directly attributed to large herbivores. Grazing impacts from moderate to severe were observed in three of the four springs surveyed for aquatic mollusks (Frest and Johannes 2005).

The BLM livestock impact study by Hosten and Whitridge found stream channel riparian areas show considerable improvement in vegetation composition expressed as the establishment of vegetation on bare ground, replacement of grass by sedge, and replacement of herbaceous vegetation by riparian shrubs depending on the site. While change is slow relative to ungrazed areas, streamside riparian areas are generally improving throughout the Deadwood Allotment (Hosten and Whitridge 2007) in areas accessible to livestock. However, stubble heights less than four inches were observed in the Deadwood Allotment primarily in the Grizzly Creek, Moon Prairie, and Hoxie Creek areas. Riparian grazing recommendations suggest that four to six inches of forage stubble height should remain on streamside areas at the end of the growing season, after fall frost, to limit potential impacts to the herbaceous plant community, the woody plant community, and streambank stability (Clary 1999).

Physical Habitat Surveys conducted by ODFW (2002) on Grizzly Creek, just downstream of the Howard Prairie Reservoir spillway found actively eroding stream banks (34 percent of the 3,370 feet surveyed) and high levels of fine sediment (39 percent) in the stream substrate. This report listed grazing as the primary contributor to degraded conditions. Cows have repeatedly been observed on this allotment past the removal date, increasing the pressure on perennial seeps, springs, and streams.

In both the even and odd-numbered years cattle tend to linger and congregate in riparian areas throughout

the entire grazing season because of convenience of forage, water, and shade. In the odd-numbered years cattle have access to riparian areas in the late fall, allowing no time for plant regrowth or bank stabilization prior to winter rains. Grazing beyond approximately August 15th leads to increased bank disturbance, bare ground, fine sediment, and heavy use of riparian vegetation because the cattle are attracted to riparian areas for the lush vegetation, cool water, and cooler temperatures

Six riparian exclosures, 13 developed water sources, and 2 pasture fences (table 2-5, EA p.19) help reduce concentrated use in riparian areas and facilitate even distribution, particularly if used with herding and salt placement. The composite map of utilization and transect data collected between the years of (1984-2004) shows an overall decrease in utilization over the past decade within the Deadwood allotment (RHA p.3). The major variables defining utilization include proximity to water, roads, and elevation. Patterns in utilization with elevation are associated with the transition in grazing from summer to fall when uplands are drier and grazing becomes concentrated in riparian areas (Hosten et al. 2007a).

The Preliminary Determination and Evaluation found that the allotment was "Not Meeting the Standard, current livestock grazing management practices are significant factors" and "Does not conform with Guidelines for Livestock Grazing Management" for Standard 2 Watershed Function—Riparian/Wetland Areas (USDI 2008b).

The Guidelines for Livestock Grazing Management (USDI 1997) that are **not** being achieved for Standard 2 include:

- Adequate cover and plant community structure to promote streambank stability, debris and sediment capture, and floodwater energy dissipation in riparian areas.
- Promote livestock distribution.
- Avoid unwanted or damaging concentrations of livestock on streambanks, in riparian areas and other sensitive areas such as highly erodible soils, unique wildlife habitats and plant communities.
- Protect water quality.
- Animal introductions in riparian and wetland areas must be compatible with the capability of the site, including the system's hydrologic regime, and contribute to the maintenance and restoration of properly functioning condition.

ENVIRONMENTAL CONSEQUENCES

As identified in the WQRP (USDI 2006), stream temperature is affected by both shade and channel modification. For achievement of shade targets, the WQRP recommends allowing riparian vegetation to grow up to reach target values.

Stream flow also influences stream temperature. The temperature change produced by a given amount of heat is inversely proportional to the volume of water heated (USDA and USDI 2005). A stream with less flow will heat up faster than a stream with more flow given all other channel and riparian characteristics are equal. Trampling by cattle reduces the porosity in wetlands, springs, and seeps and thus reduces the volume of water that can be contained in the macropores. The indirect effect of this compaction is less water storage capabilities and reduced contribution to late-season streamflows.

Stream temperature is driven by the interaction of many variables. The principal source of heat energy for streams is solar energy striking the stream surface (USDA and USDI 2005). Stream surface shade is dependent on riparian vegetation height, location, and density. The ability of riparian vegetation to shade

the stream throughout the day depends on vegetation height and the vegetation position relative to the stream. The woody riparian vegetation and groundcover provide a necessary component of shade for the riparian areas in this allotment, especially in the meadow and wetland areas.

Table 3-6 and Table 3-7 show the potential changes to hydrologic processes and water quality from livestock grazing. The effects to streamflow and water quality will be assessed by alternative.

Table 3-6. Changes to Hydrologic Processes due to Grazing

Changes to Hydrologic Processes that Affect Streamflow	Changes to Streamflow
Peak Flows	
• *Reduced infiltration due to compaction: increases surface run off, decreases groundwater, and reduces time to reach peak.*	• *Reduced time to hydrograph peak.* • *Increased frequency of peak flows.* • *Increased magnitude of peak flows.*
Low Flows	
• *Decreased summer streamflow due to water withdrawals for livestock.* • *Lowered water table due to riparian vegetation removal.*	• *Decreased magnitude of low flows*

Table 3-7. Affects to Water Quality due to Grazing

Changes to Processes that Affect Water Quality	Changes to Water Quality
• *Riparian vegetation removal: reduced stream shade, increased erosion, and increased channel width-depth ratio.* • *Streambank disturbance: increased erosion and increased channel width-depth ratio.* • *Water quality contamination due to livestock in streams.*	• *Increased temperature.* • *Decreased dissolved oxygen.* • *Increased turbidity/sediment.* • *Increased bacteria/pathogens.*

This allotment is within the source water areas for the cities of Gold Hill, Rogue River, Grants Pass, and Yreka; however, given the numbers of AUMs authorized on this allotment is somewhat low, it is unlikely that this allotment grazed as authorized under the No Action or the three action alternatives is a significant contributor to the identification of grazing as a potential contaminant source.

ALTERNATIVE 1- No Action Alternative (no change)

Under the No Action Alternative, the grazing lease on the Deadwood Allotment would be issued at the same animal unit month (AUM) level, the same season of use and with the same terms and conditions currently in effect. The existing grazing leases for the Deadwood Allotment authorize a total of 788 active AUMs during the grazing season. The grazing season would continue to be 6/16 - 8/15 in even years and 8/16 - 10/15 in odd years.

Direct and Indirect Effects

Grazing under this alternative would continue to impact water quantity by contributing to altered peak and

low flow regimes at the site level, continued compaction and reduction of plant cover/litter in the seeps, springs, streams and uplands within the allotment. Impacts to the riparian areas and wetlands from cattle grazing reduce the resiliency of the watershed to high flow events.

This alternative also affects summer low flows at the site scale through decreased discharge from soil water storage and cattle use of riparian areas and wetlands late into the season.

Grazing under this alternative would continue to impact water quality at the site scale through the trampling of streambanks and the reduction of riparian vegetation contributing to elevated sedimentation and water temperatures. Livestock access and concentration in streams would continue to allow bacterial contamination in surface water from BLM-managed lands in some locations within the allotment. Under this alternative, grazing would continue to contribute sediment to streams. Tributaries in the allotment flow directly into Dead Indian Creek, Howard Prairie Reservoir, and Jenny Creek.

The physical integrity of the seeps, springs, and streams is compromised under this alternative by grazing of riparian vegetation and the shearing and sloughing of streambanks, increasing stream width and decreasing stream depth, resulting in higher stream temperatures. Removal of riparian vegetation allows higher levels of solar radiation to reach the water surface in seeps/springs/streams resulting in increased water temperatures.

September and October is the most critical time of the year in terms of protecting the plant cover, plant litter, and organic matter that are necessary to protect banks from erosion, reduce water velocity along the stream edges, and filter out sediments during high water. In alternating years, late season grazing (through October 15) in this alternative exacerbates the effects to the stream system because as the season progress, the cattle tend to congregate in the riparian areas and wetlands where there is still palatable vegetation, water and shade.

Long-term consequences of continued grazing at current levels would mean the impacted areas identified in the BLM stream surveys (1996-2006) and BLM photo documentation (2003-2008) would continue to have compaction, eroding banks, and reduced productivity of riparian vegetation. Soil disturbance, post-holing, churning and compaction from cattle loitering in these areas would continue, threatening the water holding capacity of these areas. The intermittent and perennial streams and associated springs would continue to be grazed at the current level of use. Some downcutting would continue in the sections of the channel that are unarmored by bedrock and cobble. The stability of the low gradient areas where sediment is being retained by pieces of large wood, woody riparian species, and riparian groundcover would continue to be compromised. Under this alternative, impacts to riparian soils would continue to reduce the soil's ability to retain moisture.

This alternative does not address the findings in the Preliminary Determination and Evaluation that grazing practices in the Deadwood Allotment are not conforming to the Guidelines for Livestock Grazing Management (USDI 1997) for Standard 2, Watershed Function or Standard 4, Water Quality. This alternative does not alter any of the terms and conditions of the lease to make progress toward: 1) improving plant cover and community structure to promote streambank stability, debris and sediment capture, and floodwater energy dissipation in riparian areas; improving livestock distribution; 2) improving water quality; and 3) avoiding unwanted or damaging concentrations of livestock on streambanks and wetland areas.

Alternative 1 fails to meet Standard 2 (Riparian/Wetlands) and Standard 4 (Water Quality) because:

- Trampling of streambanks and the reduction of riparian vegetation continues to remain a factor in sedimentation levels and water temperatures that do not meet the water quality standards for the

303(d) listed streams in the North and South Forks Little Butte and Jenny Creek Key Watersheds. There are 5.2 miles of 303(d) listed streams on the allotment, 1.7 miles are on BLM-administered lands.

- Late-season grazing results in vegetation that does not adequately regrow before dormancy sets and therefore does not function to filter sediments as water flows in and around streambanks.
- Stubble heights of less than 4 inches are occurring along perennial waterways.

Grazing is a factor because:

- Current grazing levels mean the impacted areas identified in the BLM stream surveys (1996-2006) and BLM photo documentation (2003-2008) would continue to have compaction, eroding banks, and reduced productivity of riparian vegetation.
- Late season grazing in Hoxie Creek, Dead Indian Creek, and unnamed tributaries to Grizzly Creek and Howard Prairie reservoir have contributed to 3.1 stream miles of non-functional or functioning-at-risk with a downward trend. Surveyors noted that overutilization by cattle is contributing to destabilization of streambanks, channel widening, and instream sedimentation.
- Until maximum shade recovery occurs, in areas with an absence of an established forest canopy and in meadows and wetlands, woody riparian shrubs and grasses provide essential riparian shade. Continued grazing pressure on these woody shrubs and grasses reduces stream shading.
- A survey along Jenny Creek found altered streambanks along 36% of the 200 meters surveyed. Livestock use was identified as the primary cause for the altered streambanks.
- Grazing impacts from moderate to severe were observed in three of the four springs surveyed for aquatic mollusks (Frest and Johannes 2005).
- Cattle tend to linger and congregate in riparian areas throughout the entire grazing season. Cattle tend to avoid hot, dry environments and congregate in wet areas for water and forage, which is more succulent and abundant than in the forested uplands (Belsky, Matzke, and Uselman 1999). Impacts are not widespread throughout the entire allotment rather they are focused along perennial and intermittent stream sections.

Animal introductions in riparian and wetland areas must be compatible with the capability of the site, including the system's hydrologic regime, and contribute to the maintenance and restoration of properly functioning condition. While there is some recovery from past management (logging, historic grazing, road construction), impacts from late season grazing and focused use along perennial riparian areas prevent attainment of the ACS objectives at the site level.

ALTERNATIVE 2

Under this alternative the existing cattle grazing lease authorization would continue at the same AUMs and season of use as Alternative 1. This alternative would include seven additional terms and conditions listed on EA page 15-16 including; stubble height and bank alteration criteria, stricter management requirements with penalties for non-compliance, and two potential mitigation measures.

Terms and Conditions

The addition of the term and condition requiring removal of livestock when a 5" stubble height and/or 20% bank alteration threshold is met will slightly improve streambank stability and improve the ability of vegetation to trap sediment during higher streamflows. Maintaining adequate riparian vegetation reduces the solar radiation and heating of the water surface in seeps/springs/streams. The success of this alternative will rely on close monitoring of riparian stubble heights and altered banks in the latter half of each grazing season.

The addition of the term and condition requiring removal of livestock within the authorization periods will allow for some recovery of riparian vegetation before fall rain events in years with the early grazing season. In the odd years (late season) enforcement of the take-off date will help reduce impacts to vegetative cover critical to trapping fine sediment and stabilizing banks. Seeding of native vegetation on bare riparian ground will also benefit water resources.

Many of the stream segments in this allotment are intermittent and do not have flowing water late in the summer. Most of the water developments in the allotment rely on annual precipitation. In dry years and in odd-numbered years when late season grazing is authorized many of the small ponds and reservoirs are not reliable sources of water. In drought years, Howard Prairie reservoir can be the only reliable source of water. In both even and odd- numbered year grazing seasons, as vegetation dries out and water becomes scarce, cattle will continue to congregate and linger in the riparian areas that have any moisture and forage. It will be the lessee's responsibility to herd and salt the livestock away from riparian areas as mandated in the terms and conditions.

Potential Mitigation Measures

If the potential mitigation measures are elected in this alternative, there will be an additional benefit to water resources in the allotment. In odd years with late season grazing, the Guard Station Pasture will be used to gather livestock. Excluding cows from this area until July 1 the following year (two weeks later than the rest of the allotment) will be a benefit to riparian vegetation in this area. The installation of the two cattleguards in section 17 and Section 20 would improve the distribution within portions of the allotment and provide some benefit to riparian vegetation in Hoxie Creek.

This alternative addresses the findings in the Preliminary Determination and Evaluation that grazing practices in the Deadwood Allotment were not conforming to the Guidelines for Livestock Grazing Management (USDI 1997). This alternative alters the terms and conditions of the lease to make slight progress toward: 1) improving plant cover and community structure to promote streambank stability, debris and sediment capture, and floodwater energy dissipation in riparian areas; 2) improving livestock distribution; 3) improving water quality; and 4) avoiding unwanted or damaging concentrations of livestock on streambanks and wetland areas.

The 7 additional terms and conditions under this alternative, especially maintaining 5" stubble heights and less than 20% active, livestock caused bank alteration and active herd management would have some local benefits to water resources. Late season use would continue to focus impacts on riparian areas making attainment of ACS difficult although not impossible. The 7 additional terms and conditions and active herd management will be vital for this alternative to meet ACS objectives at the site level and HUC 7 level.

ALTERNATIVE 3

Under this alternative the existing cattle grazing lease authorization would continue but there would be 5 additional terms and conditions, a 50% reduction in AUMs, and elimination of late season grazing.

Terms and Conditions

The addition of terms and conditions requiring removal of livestock when a 5" stubble height and/or 20% bank alteration threshold is met will slightly improve streambank stability and improve the ability of vegetation to trap sediment during higher streamflows. Maintaining adequate riparian vegetation will also reduce the solar radiation and heating of the water surface in seeps/springs/streams. These terms will help ensure that in years of low vegetative productivity adequate stubble heights are maintained to protect banks

from erosion, reduce water velocity along the stream edges, and filter out sediments during high water flows.

This alternative would improve the physical integrity of the seeps, springs, and streams in the allotment. Eliminating the late season of use will decrease the concentrated grazing of riparian vegetation and the shearing and sloughing of streambanks, thus improving riparian-wetland functions (Hosten et al 2007a).

This alternative addresses the findings in the Preliminary Determination and Evaluation that grazing practices in the Deadwood Allotment were not conforming to the Guidelines for Livestock Grazing Management (USDI 1997). This alternative alters the terms and conditions of the lease and reduces the authorized AUMs by 50% to make progress toward: 1) improving plant cover and community structure to promote streambank stability, debris and sediment capture, and floodwater energy dissipation in riparian areas; 2) improving livestock distribution; 3) improving water quality; and 4) avoiding unwanted or damaging concentrations of livestock on streambanks and wetland areas.

This alternative would reduce site level impacts to water resources. Hydrologic function and aquatic habitat would improve at the site level and likely at the HUC Level 7 level thus meeting ACS objectives.

ALTERNATIVE 4

Under this alternative, lands within the Deadwood Allotment would not be available for livestock grazing for a period of ten years. This alternative serves to provide for the recovery of ecological conditions that have been impacted by grazing within the allotment boundary. In accordance with 43 CFR 4110.3-3, permitted use of the allotment would terminate at the close of the 2011 grazing season.

The singular action of eliminating grazing in this allotment is not likely to change the water quality listings for Conde, Dead Indian, and Hoxie Creeks. Past timber harvest on federal and non-federal lands and roads built in riparian areas will continue to contribute to temperature increases. On non-federal lands, near-stream vegetation disturbance/removal and water withdrawals continue to adversely affect stream temperatures. On federal forested lands, the long-term recovery of shade in the riparian reserves will decrease water temperatures. Under this alternative, with the removal of grazing, over time slight progress would be made toward meeting the water quality standards for temperature.

The elimination of grazing on this allotment would allow riparian vegetation to thrive in the perennial and intermittent streams, and the springs and wet meadow areas associated with these systems. Over time, hoof impacts along the streams and at the springs would heal. Soil disturbance and churning associated with cattle use in these areas would heal, protecting the water holding capacity of these ecosystems. Increases in riparian vegetation where there is sufficient water to support these species would be expected. Improved riparian vegetation will contribute to rooting strength and floodplain/streambank roughness that dissipates erosive energies associated with flowing water. Removing grazing from the allotment would allow historic streambank failures to revegetate. In the absence of grazing, the storage capacity of the trampled wetlands, seeps, and springs would improve and could improve late-season streamflows and decrease stream temperature.

This alternative would eliminate site level impacts to water resources from grazing. Hydrologic function and aquatic habitat would improve at the site level and likely at the HUC Level 7 level thus meeting ACS objectives.

Cumulative Effects

The Plateau Thin EA (EA M060-2010-0034) addressed other federal timber sales planned within the larger Jenny Creek Watershed. These include the Swinning Timber sale, which is proposed in areas upstream of Howard Prairie Reservoir, and the Cold Onion Timber Sale, proposed in upper portions of the Johnson Creek catchment on the Klamath Falls Resource area of the Lakeview BLM. Environmental analyses have been conducted for both of these sales; the Swinning timber sale was analyzed under the Plateau Thin EA, while Cold Onion Forest Health Treatments EA (EA OR 014-08-11) was prepared for the Cold Onion Timber sale. It was determined that the Plateau Thin Forest Management project would not contribute to significant cumulative effects due to increased risk in peak flow. Both analyses determined that potential adverse effects to aquatic environments from proposed activities would be limited to small site level, short term inputs of sediment and/or turbidity. These inputs were determined to have no potential to adversely impact water quality, and therefore no potential for these projects to contribute to significant adverse cumulative effects to water quality or aquatic habitat in the Jenny Creek Watershed.

As analyzed in the Plateau Thin EA, up to 350 acres of silviculture treatments including pruning and pre-commercial thinning could occur over the next four years. No-treatment buffers would protect stream systems from instream effects and the proposed silvicultural prescriptions would maintain canopy cover, providing shade along stream corridors.

The Plateau Thin EA also included analysis of private timber harvest. Future timber harvest on private lands would likely occur within the analysis area. The water resources analysis of this EA addresses future timber harvest on private lands, and assumes that it will continue to occur at a similar rate as has occurred in the past, with similar affects to aquatic habitats. Private lands are governed under state forestry regulations, and as such receive a different level of protection than federal lands. Analysis of effects from private timber harvest generally considers the worst case scenario (i.e. all suitable forested lands would be logged at ~ 60 year tree-growing rotations). At this time, it is not known when or where private timber harvest will occur in the area. This analysis will assume that all suitable private lands will continue to be subject to timber harvest, and that the amount of disturbance to aquatic systems as a result of this harvest will continue similar to present rates, helping to maintain degraded aquatic habitats.

Outside of the Plateau Thin analysis area, the Sampson Cove Timber sale proposed on BLM lands includes 6 acres of units which slop over the drainage divide from the Bear Creek Watershed into the Keene Creek subwatershed. These units are located near the ridge top, do not include any stream channels or Riparian Reserves, and would leave a minimum of between 40 to 60% canopy cover following harvest. Because they do not have any hydrological connectivity with aquatic habitat in the Keene Creek subwatershed, and because they would retain sufficient canopy cover to negate the possibility of altering peak or base flows, these units would have no causal mechanism to affect aquatic habitat in Keene Creek. As such, harvest of these units would not have any direct or indirect effects, and hence would not add a cumulative effect to aquatic habitat.

Comparison of Cumulative Effects between Alternatives

Table 3-8 shows a comparison between alternatives of the potential for cumulative effects on stream flows, water quality, and riparian functioning condition.

Table 3-8. Comparison of Alternatives for Cumulative Effects on Streamflows, Water Quality and Riparian Condition

Resource Value	Potential for Cumulative effects on Hydrology by Alternative

Affected	ALT 1. (No Action)	ALT 2. (ALT 1 plus add'l terms & conds.)	ALT3. (reduced AUM, no late season grazing)	ALT 4. (No Grazing)
Peak Flows	Low Negative	Low Negative	Low Negative	Slight Positive
Low Flows	Low Negative	Low Negative	Low Negative	Slight Positive
Bacteria/ Pathogens	Low Negative	Low Negative	Low Negative	None
Temperature	Mod. Negative	Low-Mod. Neg.	Low Negative	Slight Positive
Turbidity/ Sediment	Mod. Negative	Low-Mod. Neg.	Low Negative	Slight Positive
Riparian Condition	Mod. Negative	Low-Mod. Neg.	Low Negative	Slight Positive

This table is meant to present a continuum of cumulative effects across the alternatives. Alternative 1, 2, and 3 all present a similar low potential for negative effects to peak flows, low flows, bacteria and pathogens. Alternatives 2 and 3 have less potential for negative effects to temperature, turbidity, and riparian condition than alternative 1. Alternative 2 will slightly improve conditions at the site level and the HUC 7. Alternative 3 will improve conditions more rapidly at the site level and the HUC 7 than alternative 2.

FISHERIES RESOURCES

Issues and Concerns

- Jenny, Grizzly, and Hoxie Creeks are listed by ODEQ as water quality limited for exceeding summer high temperature standards while Dead Indian and Conde Creeks exceed the temperature standards year-round. Grazing riparian vegetation on perennial channels contributes to high summer water temperatures.
- Although not listed by ODEQ for sediment many of the streams in the allotment have elevated fine sediment levels as a result of concentrated livestock use.
- Concentrated livestock use in seeps, springs, wet meadows, and along streams.

Discussion of Issues/Concerns (Potential Effects) and Related Research

The effects of sediment on aquatic species

Turbidity and suspended sediment can affect salmonid physiology, behavior and habitat (Bash et al 2001). Physiological effects include but are not limited to reduced reproduction and growth, gill trauma, and osmoregulation. Sigler et al. (1984) found a significant difference between steelhead and coho growth rates in clear versus turbid water. Turbidities in the 25-50 nephelometric turbidity units (NTU) range caused a reduction in growth. Behavioral affects include avoidance, territoriality, foraging and predation, and abundance and diversity of prey. Juvenile coho salmon that were acclimated to clear water did not exhibit significant sediment avoidance until the turbidity reached 70 NTUs (Bisson an Bilby 1982); however, Sigler et al (1984) found that turbidities in the 25-50 NTU range caused more young coho and steelhead to emigrate from laboratory streams than did clear water. Increases in sediment and turbidity affect salmonid habitat by reducing permeability of spawning gravels, reducing or eliminating habitat for aquatic insects, filling in pools, and blocking the interchange of subsurface and surface waters (Meehan 1991). When high, fine sediment levels occur in spawning gravels, less spawning occurs, eggs tend to suffocate, and emerging fry become trapped resulting in mortality and reduced production (Philips et al. 1975; Tappel and Bjornn 1983; Chapman 1988; Meehan 1991). Hausle and Coble (1976) reviewed studies on coho salmon and steelhead fry emergence in gravels with concentrations of sand exceeding 20 percent. When concentrations of sand exceed 20 percent in spawning beds, emergence success declined.

Cedarholm (1981) found increased fine sediment in spawning gravels when more than 2.5% of a basin area was roaded. Roads and associated culverts can cause erosion and sedimentation if not properly

maintained or installed. Improperly installed culverts are also migration barriers for fish and other aquatic organisms.

The effects of stream temperature on fish

Five streams within the planning area are included on DEQ's 303(d) list for exceeding temperature criterion (see Water Resources section). Summer maximum temperature standards were generated for fish, specifically salmonids, because of their narrow thermal temperature tolerance. Elevated water temperatures can affect feeding, growth, and survival of salmonids (Meehan 1991). The preferred temperature range for coho salmon is between 53.6 and 57.2 degrees F (Meehan 1991). Temperatures outside of the preferred range affect the metabolic performance of fish, altering the balance between energy inputs and outputs (growth). This does not mean that a fish cannot grow at higher or lower temperatures, but that growth is not as efficient outside of the optimum temperature range. As temperature increases so do the metabolic needs of the fish, with decreases in growth, and increases in stress becoming more apparent as temperatures continue to rise, until a point termed the upper lethal limit, 78.9^0 F, where death of the individual is imminent (Meehan 1991).

The effects of late and hot season grazing on perennial riparian areas

Hot season (midsummer) grazing exacerbates physical effects to streams as cattle focus on riparian areas because the riparian vegetation is still palatable (upland vegetation has cured and is less palatable), water is available, and there is more shade (Chaney et al 1993). Next to season-long grazing, which is universally recognized as detrimental to riparian areas, repeated or extended grazing during the hot summer season is generally considered most injurious to riparian zones (USDI BLM 1998). Reduced soil moisture and declining temperatures are the norm during late season (fall) grazing; these conditions are not conducive to vegetative regrowth once the cattle are removed (USDI BLM 1998). Altered stream banks and excessively grazed riparian vegetation leave streams vulnerable to fall and winter high stream flows and spring snow melt.

Stubble height recommendations

Riparian grazing recommendations suggest that four to six inches of forage stubble height should remain on streamside areas at the end of the growing season, after fall frost, to limit potential impacts to the herbaceous plant community, the woody plant community, and streambank stability (Clary 1999). For recovery of depleted meadow riparian systems, ten to fifteen centimeters (4-6 inches) of forage stubble height should remain on streamside areas at the end of the growing season, or at the end of the grazing season after fall frost, to limit impacts to the herbaceous plant community, the woody plant community, and streambank stability (Clary 1999). In other situations, fifteen to twenty centimeters (6-8 inches) of stubble height may be required to reduce browsing of willows or limit trampling impact to vulnerable streambanks (Clary and Leininger 2000). According to Hall and Bryant (1995), cattle preference will shift to woody vegetation as stubble height for the most palatable species (Kentucky bluegrass) approaches three inches but in sedge and rush communities the shift will happen earlier, and six to nine inch stubble heights may be more suitable (Marlow comm. 2003).

The effects of disturbance on aquatic mollusks

Studies in seeps and springs found that high diversity and species indicative of clean water were compatible with low to moderate ungulate use (Dinger et al. 2007). Higher use resulted in a loss of intolerant species. Locally there were no statistically significant associations of aquatic mollusk richness with livestock utilization; however, aquatic communities of larger and minimally altered springs are more diverse than are those of small and more disturbed springs (Barr and Frest In prep.). Sada & Vinyard (2002) concluded that spring degradation and biotic population decline and loss were primarily due to anthropogenic factors, including livestock grazing in mollusk-occupied spring habitats. A study examining patterns of aquatic macroinvertebrates in streamside riparian influence found that the combined influence

of road density, logging, and livestock reduced aquatic macroinvertebrate richness (Barr et al. In review). Disturbance-intolerant taxa decline with increased average livestock utilization across the Cascade Siskiyou National Monument located within and south of the Deadwood Allotment.

The effects of increased nutrient loading on fish

Increased inputs of organic nutrients (such as cattle feces) can lead to decreased dissolved oxygen content in aquatic habitats. Increased nutrients may promote increased algal growth, increasing respiration rates and hence oxygen demands by plant material. Additionally, as the additional nutrients and/or algae decompose (an aerobic process), oxygen is depleted from the water at an accelerated rate (Meehan 1991). Elevated water temperatures would exacerbate this situation as warmer water does not allow for as much oxygen saturation as colder water. Dissolved oxygen is a critical habitat element that allows aquatic organisms to respire. As dissolved oxygen levels fall below optimum ranges for particular species of fish, metabolic processes become stressed, growth and development may be hampered, and death ensues if levels fall below critical thresholds, or remain low for long durations. It has been suggested that DO concentrations below 5 mg/L limits growth rates of salmonids (Meehan 1991).

Coho Critical and Essential Fish Habitat

In 1997 the Southern Oregon/Northern California (SONC) Evolutionary Significant Unit (ESU) of coho salmon (*Oncorhynchus kisutch)* was listed as "threatened" with the possibility of extinction under the Endangered Species Act (ESA) by the National Marine Fisheries Service (NMFS). On May 5, 1999, the National Marine Fisheries Service (NMFS) designated Coho Critical Habitat (CCH) for SONC coho salmon. Critical Habitat includes "all waterways, substrate, and adjacent riparian zones below longstanding, naturally impassable barriers." It further includes "those physical or biological features essential to the conservation of the species and which may require special management considerations or protection...", including all historically accessible waters (F.R. vol. 64, no. 86, 24049). In the Klamath River system, Southern Oregon/Northern California (SONC) coho salmon (*Oncorhynchus kisutch*), a "threatened" species under the Endangered Species Act (ESA) are restricted to habitat below Irongate Reservoir located approximately 18 miles downstream of the Deadwood Allotment. South Fork Little Butte Subwatershed supports populations of coho salmon, approximately four miles downstream of the allotment boundary.

Essential Fish Habitat (EFH) has been defined by NOAA fisheries as "those waters and substrate necessary to fish for spawning, breeding, feeding, or growth to maturity." This definition includes all waters historically used by anadromous salmonids of commercial value (including coho salmon). In the South Fork Little Butte project area, EFH is identical to CCH. More information regarding EFH may be found at: **http://www.nmfs.noaa.gov/habitat/habitatprotection/efh/index.htm**

Aquatic Conservation Strategy (ACS) Objectives:

The Aquatic Conservation Strategy (USDI BLM 1995) was developed to restore and maintain the ecological health of watersheds and aquatic ecosystems contained within them on public lands. Under the ACS, Riparian Reserves are used to maintain and restore riparian structures and functions of intermittent streams, confer benefits to riparian-dependent and associated species other than fish, enhance habitat conservation for organisms that are dependent on the transition zone between upslope and riparian areas, improve travel and dispersal corridors for many terrestrial animals and plants, and provide for greater connectivity of the watershed. Guidance for grazing management requires BLM to "adjust grazing practices to eliminate impacts that retard or prevent attainment of Aquatic Conservation Strategy objectives. If adjusting practices is not effective, eliminate grazing.

Riparian Reserves:

Riparian Reserves are an important component of the Aquatic Conservation Strategy and the Northwest

Forest Plan. Under the ACS, Riparian Reserves are used to maintain and restore riparian structures and functions for the benefit of riparian dependent and associated species and to provide connectivity. These reserves provide a buffer of protection from many proposed management actions and most often actions approved for Riparian Reserves are much less impacting than actions outside reserves. Livestock grazing is just the opposite and in many cases, the impacts to riparian reserves are greater than in any other part of the watershed. Riparian Reserves provide livestock with clear water, palatable vegetation, and shade from the hot summer sun and as such effects occur along many of the perennial reaches including bank and channel disturbance that leads to fine sediment increases and channel widening. Riparian vegetation is grazed along these perennial waterways, negatively impacting vegetative species composition, bank stability, and cover.

Tier 1 Key Watersheds:
The South Fork Little Butte and Jenny Creek drainages and their tributaries are a Tier 1 Key Watershed as identified in the 1995 Record of Decision. "Key watersheds serve as refugia critical to maintaining and recovering habitat for at risk stocks of anadromous salmonids and resident fish species. This system of watersheds provides refugia in areas of high quality habitat and areas of degraded habitat. Key watersheds with high quality conditions serve as anchors for the potential recovery of depressed stocks. Those of lower quality habitat have high potential for restoration and will become future sources of high quality habitat with the implementation of a comprehensive restoration program. Tier 1 watersheds specifically contribute directly to conservation of at-risk anadromous salmonids, bull trout, and resident fish species. Key watersheds overlay portions of all land use allocations in the BLMs Medford District and place additional management requirements or emphasis on activities in those areas.

Past Actions:
Removal of riparian vegetation, and the shade it provides, contributes to elevated stream temperatures. Past human-caused activities in riparian areas such as timber harvest, road construction, residential and agricultural clearing, and livestock grazing, have reduced the amount of riparian vegetation in the analysis area (USDI 2006 and USDI 2008c). Water withdrawals during the summer also contribute to elevated stream temperatures. Augmentation and diversion of flows in Jenny Creek Watershed for purposes of irrigation and hydroelectric production in the Bear Creek Watershed greatly complicate the instream flow regime for Jenny Creek.

Past ground-disturbing activities such as road building, logging, land clearing, agriculture, and livestock grazing contributed sediment to streams in the analysis areas (USDI 2006). Agricultural and residential development along the South Fork Little Butte Creek contributed sediment through channel modification, grazing, and land clearing. Livestock grazing has occurred throughout the analysis areas since the mid-1800s (USDI and USDA 1997). Large numbers of cattle and sheep were driven from lower valley pastures to high plateau meadows each summer during the mid-1800s to early 1900s. These large numbers of livestock had an adverse impact on watershed conditions, especially along stream courses and near springs and meadows (USDI and USDA 1997). After 1930, cattle became the primary livestock in the South Fork Little Butte Creek area. By the early 1960s, livestock grazing on public lands had been reduced by 50 percent and there has been an additional 50 percent reduction since then (USDI and USDA 1997). BLM stream surveys conducted in riparian areas of this allotment between 1996 and 2006 identify numerous locations where streambanks have been trampled and damaged by cattle (USDI 1995-2007).

Foreseeable Future Actions:
This section will present projects proposed in the foreseeable future that may add cumulative impacts to fisheries resources on top of anticipated impacts resulting from the Deadwood Allotment Lease Renewal project, within the analysis area. Anticipated direct and indirect affects to fisheries resources will be described from each action. For any foreseeable future action determined to have any anticipated effects to

aquatic habitat, the cumulative effect of the action coupled with effects from the Deadwood Allotment Lease Renewal will be discussed at the end of this analysis.

Federal Timber Harvest: The Sampson Cove Timber sale proposed on BLM lands includes 6 acres of units which slop over the drainage divide from the Bear Creek Watershed into the Keene Creek subwatershed. These units are located near the ridge top, do not include any stream channels or Riparian Reserves, and would leave a minimum of between 40 to 60% canopy cover following harvest. Because they do not have any hydrological connectivity with aquatic habitat in the Keene Creek subwatershed, and because they would retain sufficient canopy cover to negate the possibility of altering peak or base flows, these units would have no causal mechanism to affect aquatic habitat in Keene Creek. As such, harvest of these units would not have any direct or indirect effects, and hence would not add a cumulative effect to aquatic habitat.

Other federal timber sales are planned within the larger Jenny Creek Watershed. These include the Swinning Timber sale, which is proposed in areas upstream of Howard Prairie Reservoir, and the Cold Onion Timber Sale, proposed in upper potions of the Johnson Creek catchment on the Klamath Falls Resource area of the Lakeview BLM. Environmental analyses have been conducted for both of these sales; the Swinning timber sale was analyzed under the Plateau Thin EA (EA M060-2010-0034), while Cold Onion Forest Health Treatments EA (EA OR 014-08-11) was prepared for the Cold Onion Timber sale. Both analyses determined that potential adverse effects to aquatic environments from proposed activities would be limited to small site level, short term inputs of sediment and/or turbidity. These inputs were determined to have no potential to adversely impact water quality, and therefore no potential for these projects to contribute to significant adverse cumulative effects to water quality or aquatic habitat in the Jenny Creek Watershed.

Private Timber Harvest: Future timber harvest on private lands would likely occur within the analysis area. The water resources analysis of this EA addresses future timber harvest on private lands, and assumes that it will continue to occur at a similar rate as has occurred in the past, with similar affects to aquatic habitats. Private lands are governed under state forestry regulations, and as such receive a different level of protection than federal lands. Analysis of effects from private timber harvest generally considers the worst case scenario (i.e. all suitable forested lands would be logged at ~ 60 year tree-growing rotations). At this time, it is not known when or where private timber harvest will occur in the area. This analysis will assume that all suitable private lands will continue to be subject to timber harvest, and that the amount of disturbance to aquatic systems as a result of this harvest will continue similar to present rates, helping to maintain degraded aquatic habitats.

Little Hyatt Dam: Little Hyatt Dam has weathered to the point that its integrity has been compromised. Recent emergency stabilization measures undertaken by the BLM have alleviated short term concerns of a dam failure, but its long term future remains in doubt. The BLM is considering several alternatives for dealing with the dam, including restoration, full removal, and partial removal. At this time, no decision has been made as to the fate of the dam. If the dam is restored, existing conditions would remain; no additional impacts to aquatic habitat would occur as a result of this decision. If it is decided to fully remove the dam, it is anticipated that effects to fish and fish habitat would occur. The primary impact would likely be a large input of sediment and turbidity to Keene Creek immediately following dam removal. The sediment would migrate downstream overtime to Keene Creek reservoir, where it would settle out and be stored. Turbidity pulses would periodically occur as high water events flushed deposited fine sediment downstream, potentially resulting in short term impacts to feeding behavior. Removal of the dam would restore upstream passage to migratory fish, though this would be of limited benefit to aquatic species, as other large dams exist both up and downstream of Little Hyatt dam. Should the BLM choose to partially decommission the dam, fish passage facilities could be a requirement of the action, again restoring

access to the limited amount of stream between Little Hyatt and Hyatt Lake Dam. This alternative would not release the volume of sediment associated with full dam removal, as the majority of deposited sediment behind Little Hyatt Dam would remain behind the partial structure left. It is probable that as Keene Creek carved through newly exposed mud flats as the reservoir level was dropped that turbidity levels would spike for short periods, impacting downstream habitats for a short durations.

The turbidity pulses could potentially disrupt feeding behavior of aquatic organisms in downstream reaches of Keene Creek for short periods. The native fauna of the Jenny Creek Watershed have evolved in a dynamic system that historically was naturally subject to periods of increased turbidity, such as would occur during a rain on snow event, or a particularly rapid snow melt. As such, short periods of increased turbidity resulting in either a full or partial dam removal would not be expected to have long term detrimental impacts to aquatic species. A significant release of fine sediment (in the case of the full removal option) on the other hand, could potentially have more severe impacts; these include reduction in spawning habitat, reduced substrate availability for macroinvertebrates and hence reduced food source for other aquatic organisms, both of which could lead to decreased growth, survival, and reproduction rates of fish and other aquatic fauna. Impacts of this nature would persist for some time, as the mobilized sediment made its way ~ 2.1 downstream to Keene Creek reservoir, but would be limited to this reach, as the reservoir would effectively capture and hold the sediment.

Silviculture treatments: Up to 350 acres of silviculture treatments including pruning and pre-commercial thinning could occur over the next four years. No-treatment buffers would protect stream systems from instream effects and the proposed silvicultural prescriptions would maintain canopy cover, providing shade along stream corridors.

AFFECTED ENVIRONMENT

Aquatic Organisms and Designated Habitat

The allotment supports populations of Jenny Creek redband trout (*Oncorhynchus mykiss*), rainbow trout (*O. mykiss*), speckled dace (*Rhinichthys osculus*), Keene Creek pebblesnails and Emigrant Creek pebblesnails. Downstream of the allotment boundary, Jenny Creek suckers (*Catostomus rimiculus*) and other endemic pebblesnails (13 known species) are distributed throughout the Jenny Creek drainage. Jenny Creek redband trout are considered "sensitive" on the Final Interagency Special Status/Sensitive Species List (January 2008) and the Jenny Creek sucker are considered a "strategic" species. Within the Jenny Creek Watershed, downstream of the allotment boundary, there is one "sensitive" pebblsnail species (nerite pebblesnail) and three "strategic" species (toothed, Fall Creek, and Keene Creek pebblesnails). In the Klamath River system, Southern Oregon/Northern California (SONC) coho salmon (*O.kisutch*), a "threatened" species under the Endangered Species Act (ESA) and Klamath Mountain Province steelhead (*Oncorhynchus mykiss*), a "sensitive" species on the Final Interagency Special Status/Sensitive Species List (January 2008), and chinook salmon (*O. tshawytscha*) are restricted to habitat below Irongate Reservoir located approximately 18 miles downstream of the Deadwood Allotment.

Dead Indian Creek, a tributary to South Fork Little Butte Creek in the Rogue basin, supports populations of Klamath small scale suckers, speckled dace, Emigrant Creek pebblesnail and Keene Creek pebblesnails. In addition, the South Fork Little Butte Creek drainage supports populations of steelhead, listed as "sensitive" on the Final Interagency Special Status/Sensitive Species List (January 2008) and coho salmon, approximately 4.0 miles downstream of the allotment boundary. Chinook salmon have been confirmed in the lower mile of South Fork Little Butte Creek, approximately 17 miles downstream of the allotment. Very little information exists on the abundance or distribution of the Special Status species caddisflies.

Riparian and Aquatic Habitat Condition

As described previously in the Water Resources section, impaired stream function (high fine sediment levels and actively eroding stream banks) has been reported in the Grizzly Creek, Hoxie Creek, and Keno Springs systems. Sand and silt were the dominant substrates on all surveyed fish bearing streams draining into Howard Prairie Reservoir. Spawning gravel is low, both in volume and appropriate size, and pool frequency was low (BLM Riparian Surveys, USDI 2002; BLM Presence/Absence Surveys 2007). Hoxie Creek had the highest percentages of fine sediment, with ninety percent of the stream dominated by sand and silt. The high sediment levels observed in the riparian surveys are consistent with the BLM fish presence/absence survey habitat observations (2007). Existing levels of sediment likely reduce incubation and emergence success in most streams. According to the PFC Assessments, ODFW, DOI, and BLM surveys, these conditions are attributable, in large part, to grazing and past timber harvest.

Within the allotment, photo point, exclusion cage, and associated vegetation plot monitoring (USDI BLM 1995-2007) occurred on Hoxie Creek, a Hoxie Creek tributary, and Jenny Creek. Photo point monitoring designed to track seasonal changes and year to year trends were established at two sites on upper Hoxie Creek (Moon Prairie) and one site on Jenny Creek. These photo points generally demonstrate the transition from little to no livestock use early in the season to increased use late in the season. Overall trends in riparian condition can also be discerned from this type of monitoring. Exclusion cages were set up on upper Hoxie Creek and a Hoxie Creek tributary to show vegetation site potential and to compare ungrazed vegetation inside the exclosure cage to grazed conditions outside the cage. These two types of monitoring show increased late season use along perennial stream channels with associated bank disturbance, bare ground, and grazed streamside vegetation.

As a perennial stream, Hoxie Creek receives heavier grazing pressure late in the season when water and palatable vegetation are limited to perennial riparian areas (BLM 2003 and 2004). Stream survey data in this allotment identifies numerous locations where streambanks have been trampled and damaged by cattle. A survey conducted along Jenny Creek (T39S R4E Section 3) found altered streambanks along 36 percent of the 200 meters surveyed (Ashland Exclosure Monitoring 2005). This protocol describes the linear length of streambank alteration that can be directly attributed to large herbivores.

Grazing impacts from moderate to severe were observed in three of the four springs surveyed for aquatic mollusks and reported by Frest and Johannes (2005). Livestock grazing was measured by a combination of factors (stubble height, trampling, feces, bank destabilization, and bare ground) and was rated on a scale with the same range, as follows: 1- nil or nearly so; 2- light; 3- moderate; 4-heavy; 5- severe. These are not claimed to be quantitative measures but merely attempts to divide a complex range continuum, often multi-faceted in cause, into more or less proportionate segments (Frest and Johannes 2005). Stubble heights less than four inches were observed in the Deadwood Allotment primarily in the Grizzly Creek, Moon Prairie, and Hoxie Creek areas.

Macroinvertebrate monitoring was conducted at one site in this allotment using methods that meet or exceed state or EPA protocols for the sampling of benthic macroinvertebrates. Taxa abundance, taxa richness, and other metrics are measured at 5-6 year intervals. These surveys were conducted at Jenny Creek Spring in 1991, 1995, and 2000 (Aquatic Biology Associates). Dinger et al. (2007) found that disturbance intolerant taxa decline with increased average livestock utilization across the CSNM. Maintenance of intolerant species and species indicative of clean water (*Ephemoptera*, *Plecoptera*, and *Trichoptera*) suggest low to moderate grazing would retain macroinvertebrate species diversity (Dinger et al. 2007). Barr et al. (In review) found that road density, livestock use, and logging likely acted interdependently to increase fine sediments in first and second order streams. High levels of sand and silt (90 percent) in the Jenny Creek Spring were attributed to intensive grazing and extensive road network (Aquatic Biology Associates 1991, 1995, and 2000).

Pebblesnail surveys were conducted at seven sites in the allotment (BLM 1999-2005), four of which support local, southwest Oregon endemic pebblesnail (*Flumincola* sp.) populations. Four springs were sampled for aquatic mollusk presence, species data, and livestock impacts (Frest and Johannes 2005, BLM 1999-2006). Of the four sites evaluated for livestock impacts, moderate impacts were recorded at two sites, severe impacts at one site, and very little impacts at the fourth site.

ENVIRONMENTAL CONSEQUENCES

ALTERNATIVE 1- No Action Alternative (no change)

Grazing under this alternative compromises the physical integrity of perennial seeps, springs, and streams at the site level by increasing compaction, bank disturbance, and sedimentation at several locations throughout the allotment. Compaction of fragile, moist soils reduces the water storage capacity of these critically important habitats. Increases in bank disturbance occur where cows have direct access to streams and where heavy to severe use occurs. Bank disturbance causes increases in fine sediment. Under this alternative, grazing would continue to contribute sediment to streams. Many of these tributaries flow directly into Howard Prairie Reservoir while others flow into the Jenny Creek and Dead Indian Creek.

The physical integrity of seeps, springs, and streams is further compromised by grazing of riparian vegetation. Where minimum stubble heights are not maintained throughout the grazing season and where repeated grazing inhibits plant vigor, riparian vegetation has a reduced capacity to trap sediment during elevated flows and stream bank stability decreases. Additionally, removal of riparian vegetation allows higher levels of solar radiation to reach the water surface in seeps/springs/streams resulting in increased water temperatures.

Late season grazing exacerbates physical effects to streams as cattle focus on riparian areas because the vegetation is still palatable, water is available, and there is more shade (Chaney et al 1993). Late season grazing leads to increased bank disturbance, bare ground, and sediment because the cattle spend an inordinate amount of time “loafing” in these areas. Continuous season-long grazing riparian vegetation below the 4-6” minimum further inhibits riparian function and with late season grazing there is not enough time for vegetative regrowth, root production, and energy storage to occur before fall rains. Lack of overhanging and bank stabilizing vegetation negatively influence water quality by decreasing shade, cover, and bank stability.

Alternative 1 does not meet Standard 2 (Riparian/Wetlands), Standard 4 (Water Quality) or Standard 5 (Native and T&E Species) because:

- Focused use is occurring along perennial riparian areas causing bank erosion, fine sediment, and bare ground with no time for recovery before fall rains.
- Late season grazing is not allowing enough time for vegetative regrowth to occur, leaving banks to withstand the winter rains in a degraded condition, increasing erosion and disturbance.
- Stubble heights of less than 4 inches are occurring along perennial waterways.
- Streams in the allotment are exceeding temperature standards set by ODEQ.
- Seeps and springs surveyed were in degraded condition. This is an area of high pebblesnail endemism and pebblesnails need clean, cold water to survive.

Grazing is a factor because:

- Cattle congregate in perennial riparian areas, especially late in the season. At the current grazing levels, fragile riparian areas would continue to see heavy to severe use and associated bank disturbance, fine sediment and bare ground. These impacts are not widespread throughout the entire allotment; rather, they are focused along critical perennial stream sections.
- Stubble heights of < 4" are less effective at trapping sediment during high flows and this is critical to proper hydrologic function. Once vegetation is grazed to 4 inches, cattle preference tends to shift toward woody species like willow and these woody species are critical for shade and bank protection. Stubble heights of less than 4" do not provide adequate cover to aquatic species.
- Grazing impacts stream temperature by removing aquatic vegetation and by trampling banks and increasing the width to depth ratio.
- Surveys conducted by ODFW and BLM described grazing and timber production as dominant uses along the stream channels surveyed. In the Hoxie Creek drainage, PFC surveys conducted on BLM land found approximately 2.5 miles of the 3.0 miles surveyed (82%) as non-functional or functioning-at-risk with a downward trend. In Jenny Creek, altered streambanks were observed along 35% of the 200 meters surveyed. Both reported grazing as the primary contributor to degraded conditions.
- Grazing impacts from moderate to severe were observed in three of the four springs surveyed for aquatic mollusks as reported by Frest and Johannes (2005).
- Grazing contributes to aquatic degradation along perennial waterways in the allotment and most of this use occurs in the late-season. Spatially the area of impact is relatively small compared to the size of the allotment but many of these areas are fragile and support equally fragile ecosystems.

ALTERNATIVE 2

This alternative proposes to permit the same number of cows over the same season of use resulting in the same AUMs as Alternative 1 (No Action) and the effects to aquatic systems are similar.

Seven new terms and conditions proposed under this alternative, specifically maintenance of 5" stubble heights in riparian areas, <20% active, livestock caused bank alteration, and active herd management will provide a measure of protection for riparian areas, allowing for slightly improved condition of riparian hotspots at the end of each grazing season. There would be a slight decrease in bank trampling and disturbances near water sources due to the term and condition requiring herding of animals away from riparian areas. The proposed mitigation measures (if chosen) would help reduce hotspot impacts but due to the season of grazing would have a very slight positive effect on stream banks and riparian stubble heights.

Given the late season use every other year and the logistics of frequent and widespread monitoring, long-term site level improvement is dependent upon successful livestock management. Successful livestock management is the lessee's responsibility and is based upon the terms and conditions outlined in this document and other livestock management practices such as herding and salting livestock away from riparian areas. Monitoring by BLM employees, will determine the efficacy of the terms and conditions and will determine future management changes, if needed.

ALTERNATIVE 3

Reducing the number of cows and eliminating late season rotation with the USFS would accelerate recovery of perennial riparian areas in this allotment. Cattle tend to start congregating in riparian areas around August 15 when much of the upland vegetation has dried out, so removing cows from the allotment at this time would provide myriad benefits to the aquatic systems. Under this alternative, vegetative regrowth would occur before fall rains, increasing plants capacity to trap sediment and protect stream banks. Bank disturbance and associated sediment would decrease because cows would not have the opportunity to linger in these areas throughout the dry late summer and early fall months when they are particularly appealing for their cooler temperatures, water, and palatable vegetation. Spring habitats would see marked improvement in this alternative, improving habitat for pebblesnails and other aquatic organisms.

ALTERNATIVE 4

The condition of seeps, springs, and streams on the Deadwood Allotment would immediately improve under this alternative. Over several years, riparian vegetation would reestablish, increasing the capacity to trap sediment and protect stream banks, and decrease bank disturbance. Associated fine sediment would decrease, filling in areas of bare ground, stabilizing banks, and increasing shade. Riparian and aquatic habitat conditions in the allotment would improve as trampling and associated fine sediment would decrease while riparian vegetation density would increase. Upland seeps and springs would see marked improvement in this alternative, improving habitat for pebblesnails and other aquatic organisms.

Aquatic habitat conditions would improve in the short and long term. Shrub recovery can be dramatic following the elimination of livestock grazing (Platts and Rinne 1985, Elmore and Beschta 1987). Removing all cattle from the allotment will lead to improvement in the condition of seeps, springs, and streams on and downstream of the allotment area. Macroinvertebrate habitat would improve, including habitat for the Little Butte pebblesnail. In the short term, sedimentation would continue in areas of bare ground as it will take time for vegetation to reestablish on the stream banks. Over the long term (over 5 years), riparian vegetation would reestablish, filling in areas of bare ground, stabilizing banks, and increasing shade. Stream temperatures would eventually lower in the allotment and would eventually contribute to lower stream temperatures downstream in fish-bearing streams. Riparian and aquatic habitat conditions in the allotment would improve as trampling and associated fine sediment would decrease while riparian vegetation density would increase.

Over time, compaction in the uplands and riparian areas from livestock grazing would be reduced, improving ground water storage and recharge. Plant cover and litter would increase, filling in areas of bare ground, improving the dissipation of flood energy, and maintaining infiltration and permeability. These changes, over time would enhance the timing and duration of peak flows and improve the availability of summer low flows at the site scale.

AQUATIC CONSERVATION STRATEGY (ACS)

The Northwest Forest Plan's (NWFP) Aquatic Conservation Strategy (ACS) has four components: Riparian Reserves, Key Watersheds, Watershed Analysis, and Watershed Restoration. It is guided by nine objectives which are meant to focus agency actions to protect ecological processes at the 5th-field hydrologic scale, or watershed, at the 6th and or 7th fields (subwatershed and or drainage), and at the site level. The Deadwood Allotment includes 8,004 acres of federal land administered by the Bureau of Land

Management (BLM) and 3,886 acres of interspersed privately owned land. This allotment lies in two Tier One watersheds: 91 % of the allotment is within the Jenny Creek Watershed including portions of the Upper Jenny Creek and Johnson Creek Subwatersheds while the remainder of the allotment (9%) falls within the Little Butte Creek Watershed and includes portions of the South Fork Little Butte-Dead Indian Creeks and Beaver Dam Creek Subwatersheds. How the four components of ACS relate to the Deadwood Allotment is explained below:

Component 1. Riparian Reserves: Riparian Reserve widths for streams, springs, wetlands, and unstable soils have been determined according to the protocol outlined in the NWFPs Aquatic Conservation Strategy.
Component 2. Key Watersheds: Tier 1 Key Watersheds contribute directly to conservation of at-risk anadromous salmonids, bull trout, and resident fish species. They also have a high potential of being restored as part of a watershed restoration program. The South Fork Little Butte and Jenny Creek Watersheds are designated Tier 1 Key Watersheds, for anadromous salmonids.
Component 3. Watershed Analysis: The Deadwood Grazing Allotment falls within the Jenny Creek (1995) and South Fork Little Butte Creek (1997) Watershed Analysis Areas.
Component 4. Watershed Restoration: Most of the restoration activities in the watershed have focused on road and culvert maintenance. Range improvements put in place for the protection and restoration of riparian areas are listed in table 2-5 (EA p. 18).

Potential Mitigation Measures

- Restricted use at Guard Station Pasture
- Installation of two new cattle guards to improve distribution

Evaluation of this action's consistency with Northwest Forest Plan Aquatic Conservation Strategy Objectives

Objective 1. *Maintain and restore the distribution, diversity, and complexity of watershed and* ***landscape-scale features*** *to ensure protection of the aquatic systems to which species, populations and communities are uniquely adapted.*

Topography, slope, forest fire regime, climate, and the distribution of soil types and plant communities are some of the landscape-scale features affecting aquatic systems in the Jenny and South Fork Little Butte Creek Watershed. Biological features included in this objective include vegetation, Riparian Reserves, and fish and wildlife habitat.

Under Alternative 1 stream channel complexity is diminished where livestock use within Riparian Reserves results in bank collapse, channel widening, and reduced riparian vegetation. Localized impacts are observed at numerous perennial waterways in the allotment and as such Alternative 1 is not maintaining ACS Objective #1. Native plant communities continue to be at risk for further degradation and conversion. Late season grazing will continue to threaten the health of root systems, nutrient storage capacity and seed bank capacity of native riparian and meadow species, increasing the potential for colonization by nonnative species in those areas. Soil destabilization in areas where vegetation has been trampled or overgrazed, or where nonnative annuals are dominant species, will continue to be a threat to riparian systems' health.

Alternative 2 would see minor improvements over Alternative 1 because of the 5" stubble height and <20% bank disturbance outlined in the terms and conditions. If 5" stubble heights and <20% bank disturbance are maintained throughout the allotment and active herding is conducted effectively then improvements at the site level would occur. Late season use would continue to focus impacts on riparian areas making attainment of ACS difficult although not impossible.

Alternative 3 would restore complexity because of the shortened season of use, at a time of year when much of the rangeland is palatable, allowing for better distribution throughout the allotment and less focus on perennial waterways. Alternative 3 would increase the likelihood that native plant communities (particularly those in the riparian areas) would maintain or improve current levels of native colonization due to the elimination of late-season grazing and seeding in areas where disturbance levels reach or exceed 20%.

Alternative 4 would restore stream channel complexity by eliminating grazing as a source of disturbance. Passive restoration of plant communities would occur by eliminating grazing as a disturbance factor. However, plant community restoration would also be dependent on reducing the likelihood of nonnative species colonization in disturbed areas via seeding and active restoration practices which are not addressed in Alternative 4.

Objective 2. *Maintain and restore* ***spatial and temporal connectivity*** *within and between watersheds. Lateral, longitudinal, and drainage network connections include floodplains, wetlands, upslope areas, headwater tributaries, and intact refugia. These network connections must provide chemically and physically unobstructed routes to areas critical for fulfilling life history requirements of aquatic and riparian-dependent species.*

Spatial connectivity is compromised under Alternative 1 as access to refugia is limited by areas of poor habitat quality and because sediment and temperature impacts occurring in the headwater areas are transmitted to downstream habitats.

Alternative 2 see ACS Objective 1.

Spatial connectivity would improve under Alternative 3 by reducing the amount of time that cattle spend on the allotment so that in-channel disturbance is diminished. Removing cattle on August 15 would improve distribution throughout the allotment so that perennial waterways would recover from years of late season disturbance.

Alternative 4 would improve connectivity by eliminating grazing as a source of disturbance.

Objective 3*. Maintain and restore the* ***physical integrity*** *of the aquatic system, including shorelines, banks, and bottom configurations.*

The physical integrity of shorelines, banks, and bottom configurations would be compromised under Alternative 1 as cattle continue to trample stream banks and bottoms. Water, lush vegetation, and cooler temperatures draw cattle to these areas in effect “loving them to death”. Where perennial water is accessible to cattle, meaning the topography is not too steep or channels not densely vegetated, cattle linger for most of the grazing season with little incentive to move on. Native plant communities continue to be at risk for further degradation and conversion, affecting the long-term integrity of riparian systems. Late season grazing will continue to negatively impact root systems, nutrient storage capacity and seed bank capacity of native riparian and meadow species, increasing the potential for colonization by nonnative species. Soil destabilization in areas where vegetation has been trampled or overgrazed, or where nonnative annuals are dominant species, will continue to be a threat to riparian systems’ health.

Alternative 2, see ACS Objectives 1 and 2.

Under Alternative 3, hot spots would occur however not to the degree that would impact ACS because

cows would be moved off the allotment by August 15th, at a time when riparian areas would not have experienced concentrated use and in time for bank stabilization to occur before fall rains. Alternative 3 would increase the likelihood that native riparian plant communities would maintain or improve current levels of native colonization due to the elimination of late-season grazing and seeding in areas where disturbance levels reach or exceed 20%.

Alternative 4 would restore the physical integrity of the aquatic system by eliminating grazing as a source of disturbance. Alternative 4 would allow for passive restoration of riparian plant communities by eliminating grazing as a disturbance factor. However, riparian plant community restoration would also be dependent on reducing the likelihood of nonnative species colonization in disturbed areas via seeding and active restoration practices which are not addressed in Alternative 4.

Objective 4. *Maintain and restore* ***water quality*** *necessary to support healthy riparian, aquatic and wetland ecosystems. Water quality must remain within the range that maintains the biological, physical, and chemical integrity of the system and benefits survival, growth, reproduction, and migration of individuals composing aquatic and riparian communities.*

Water quality continues to be compromised under Alternative 1. The Rogue Basin and Draft Upper Klamath and Lost River Subbasins temperature TMDL identifies four nonpoint source factors result in increased thermal loads: stream shade, stream channel morphology, flow, and natural sources. Under Alternative 1, riparian plant community degradation would continue to negatively impact water quality and cattle continue to trample and overgraze riparian vegetation, effectively reducing the shading function of streamside vegetation. In the meadow systems of the allotment, in the absence of a forested overstory, streambank vegetation such as willows and grass species provide the primary shade for the riparian areas. Consumption of this vegetation increases the exposure of water surfaces to solar heating.

Addressing the Rogue Basin and Draft Upper Klamath and Lost River Subbasins temperature TMDL, the *Water Quality Restoration Plan for the North and South Forks of Little Butte Creek Key Watershed* and the *Draft Water Quality Restoration Plan for the Jenny Creek Watershed* (USDI 2006 and USDI 2008c) identifies the effect of channel morphology on stream temperature. Wide channels tend to have lower levels of shade due to simple geometric relationships between shade producing vegetation and the angle of the sun. Concentrated livestock grazing in riparian zones and channel widening is often related to degraded riparian conditions that allow increased streambank erosion and sedimentation of the streambed.

A stream with less flow will heat up faster than a stream with more flow given all other channel and riparian characteristics are equal. Under alternative 1, trampling by cattle reduces the porosity in wetlands, springs, and seeps and thus reduces the volume of water that can be contained in the macropores. The indirect effect of this compaction is less water storage capabilities and reduced contribution to late-season streamflows.

Under alternative 2, the seven additional terms and conditions will slightly improve the physical integrity of these sites and reduce some of the effects of grazing on riparian vegetation. Maintaining 5” stubble height and less than 20% bank disturbance throughout the allotment will improve water quality. Active herd management will be necessary to promote livestock dispersal so as to prevent the development of other hotspots and overutilization of the woody shrub species and grasses that provide stream shade in the riparian areas. Late season use would continue to focus impacts on riparian areas making attainment of ACS difficult although not impossible.

Water quality would improve under alternative 3. Reducing the season of use would decrease the concentrated grazing of riparian vegetation and the shearing and sloughing of streambanks in the late

season. Vegetative regrowth would occur before fall rains, increasing their capacity to trap sediment and protect stream banks. Bank disturbance and associated sediment would decrease, improving channel stability and reestablishment of undercut banks. Improving the riparian plant health under Alternative 3 would improve water quality by ensuring soil stabilization, root function and proper nutrient cycling.

Elimination of grazing under Alternative 4 would allow for passive restoration to the plant community, and therefore, allow for water quality improvement. However, the necessary riparian plant community restoration that would allow for water quality improvements would also be dependent on active restoration activities which are not addressed.

Objective 5. *Maintain and restore the* ***sediment regime*** *under which aquatic ecosystems evolved. Elements of the sediment regime include the timing, volume, rate, and character of sediment input, storage, and transport.*

Alternative 1 contributes sediment through bank trampling and the reduction or elimination of riparian vegetation (see ACS Objective 3).

Alternatives 2, 3 and 4, see ACS Objective 3.

Objective 6. *Maintain and restore* ***instream flows*** *sufficient to create and sustain riparian, aquatic, and wetland habitats and to retain patterns of sediment, nutrient, and wood routing. The timing, magnitude, duration, and spatial distribution of peak, high, and low flows must be protected.*

Peak and low streamflows are not expected to be influenced beyond the site scale with the implementation of any of the alternatives.

Grazing under alternative 1 would continue to impact water quantity through contributing to altered peak and low flow regimes at the site level by increasing compaction and reducing plant cover/litter in the seeps, spring, streams and uplands within the allotment. Active downcutting in riparian areas, exacerbated by season-long grazing of the streambanks will continue to lower the water table and decrease groundwater storage and yield for summer low flows. During high water, plant cover, plant litter, and organic matter are necessary to protect banks from erosion, reduce water velocity along the stream edges, and filter out sediments. Under alternative 1, summer low flows are affected at the site scale through decreased discharge from soil water storage and cattle use of riparian areas and wetlands late into the season.

Alternative 2, see ACS Objective 1-4.

Under alternative 3, removing cattle on August 15 would allow for the regrowth and maintenance of plant cover, plant litter, and organic residue in the riparian areas going into the rainy season. This, in turn, would help to prevent hydrologic degradation by protecting the banks from erosion, reducing water velocity along the stream edge, and causing sediments to settle out. In addition to the localized positive impacts to the peak flow regime in the allotment, alternative 3 would benefit low summer flows by eliminating cattle use of wetlands and riparian areas at the time of the year when instream flows are limited. Reduction in riparian disturbance will likely improve ground water and bank storage, making more water available for recharge later into the season. Additionally, if two years of rest is selected as a mitigating measure, compaction in the uplands and riparian areas from livestock grazing would begin to recover, improving ground water storage and recharge. Regrowth of riparian vegetation could help stabilize the streambanks, reduce water velocity, and dissipate energy in high water events.

Alternative 4 would result in improving localized impacts on peak and low flows. Conditions in seeps,

springs and streams in and downstream of the allotment would improve by eliminating cattle grazing on the allotment. Over time, compaction in the uplands and riparian areas from livestock grazing would be reduced, improving ground water storage and recharge. Plant cover and litter would reestablish filling in areas of bare ground improving the dissipation of flood energy and maintain infiltration and permeability. These changes, over time would enhance the timing and duration of peak flows and improve the availability of summer low flows at the site scale.

Objective 7. *Maintain and restore the timing, variability, and duration of floodplain inundation and water table elevation in* ***meadows and wetlands****.*

Wetlands would be negatively impacted under Alternative 1 because cattle congregate in these areas during hot and late season use causing chronic site-level disturbance. Chronic compaction of these areas alters the water table elevation and floodplain inundation.

Alternative 2, see ACS Objectives 1-4.

Alternative 3 would maintain wetlands in current condition as cattle will use these areas but not to the degree they would be used in Alternatives 1 and 2, allowing adequate time for recovery at the end of the grazing season and reducing overall pressure by decreasing AUMs.

Wetland conditions would improve under Alternative 4 by removing cattle from these fragile areas for the next 10 years. Over time, compaction in the uplands and riparian areas from livestock grazing would be reduced, improving ground water storage and recharge.

Objective 8. *Maintain and restore the species composition and structural diversity of* ***plant communities in riparian areas*** *and wetlands to provide adequate summer and winter thermal regulation, nutrient filtering, appropriate rates of surface erosion, bank erosion, and channel migration and to supply amounts and distributions of* ***coarse woody debris*** *sufficient to sustain physical complexity and stability.*

Livestock are attracted to Riparian Reserves for their lush vegetation, clear water, and cooler temperatures. Under Alternative 1, chronic site level disturbance in riparian areas alter species composition and structural diversity of plant communities in riparian areas and wetlands.

For Alternatives 2, 3, and 4, see ACS Objectives 1-5.

Objective 9. *Maintain and restore* ***habitat*** *to support well-distributed populations of native plant, invertebrate, and vertebrate riparian-dependent species.*

Pebblesnail populations are negatively impacted by trampling and fine sediment that occurs under Alternative 1.

For Alternatives 2, 3, and 4, see ACS Objectives 1-8.

TERRESTRIAL WILDLIFE

AFFECTED ENVIRONMENT

Terrestrial Wildlife Habitat

An array of habitat types/plant communities occur in the Deadwood allotment. This is reflected in the

diversity of terrestrial wildlife species that are present.

The many plant communities that support wildlife in this allotment are grouped into various zones based primarily on elevation. The zones found in the Deadwood allotment are the Mixed-Conifer Zone (mid-elevation), and the White Fir Zone (high elevation). Representative plant communities for each zone are presented in Table 3-8 (USDI 1995).

Table 3-9 Elevational zones within the Deadwood Allotment

Zones	Representative Plant Communities
Mixed Conifer Zone	Douglas Fir, Mixed Fir and Pine, Oak Woodland
White Fir Zone	White Fir, Shasta Red Fir

Special/unique habitats that support various wildlife species occur at multiple locations throughout the allotment. These special habitats include cliffs, seeps and springs, caves, and meadows (USDI 1995a).

Special Status Species

The terrestrial wildlife species of special concern in the allotment are grouped into two categories; Special Status Species, and Birds of Conservation Concern (including Game Birds Below Desired Condition). 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 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 additional species, and to recover listed species. Special Status Species known or likely to be present in the project area are displayed in the following table.

Table 3-10. Known or Suspected Special Status Species

Common Name	Scientific Name	Status
Northern Spotted Owl	*Strix occidentalis caurina*	FT - Suspected
Fisher	*Martes pennant*	FC - Suspected
Mardon Skipper Butterfly	*Polites mardon*	FC - Known
Bald Eagle	*Haliaeetus leucocephalus*	BS - Known
Foothill Yellow-legged Frog	*Rana boylii*	BS - Suspected
Northwestern Pond Turtle	*Actinemys marmorata marmorata*	BS - Suspected
Pallid Bat	*Antrozous pallidus*	BS - Suspected
Fringed Myotis	*Myotis thysanodes*	BS - Suspected
Chase Sideband	*Monadenia chaceana*	BS - Suspected
Travelling Sideband	*Monadenia fidelis celeuthia*	BS - Suspected
Siskiyou Hesperian	*Vespericola sierranus*	BS - Suspected
Siskiyou Short-horned Grasshopper	*Chloealtis aspasma*	BS – Known
Oregon shoulderband Snail	*Helmithoglypta hertleini*	BS - Suspected

FT = Federal threatened
FC = Federal Candidate
BS = Bureau Sensitive

Birds of Conservation Concern and Game Birds 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 Instruction Memorandum 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 (Deadwood 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 3-11. BCC and GBBDC Bird Species Known or Likely to be Present

Species	Status
Flammulated Owl (*Otus flammeolus*)	BCC
Olive-sided Flycatcher (*Contopus cooperi*)	BCC
Rufous Hummingbird (*Selasphorus rufus*)	BCC
Mourning Dove (*Zenaida macroura*)	GBBDC
Black-throated Gray Warbler (*Dendroica nigrescens*)	BCC
Lewis' Woodpecker (*Melanerpes lewis*)	BCC
Grasshopper Sparrow (*Ammodramus savannarum*)	BCC
Northern Goshawk (*Accipiter gentilis*)	BCC

BCC - Bird of Conservation Concern
GBBDC - Game Birds Below Desired Condition

Grazing occurs throughout all of the vegetative zones found in the Deadwood Allotment, i.e. Mixed-Conifer Zone, and White Fir Zone. The impacts of grazing in the Mixed-Conifer Zone and White Fir Zone are most notable in the meadows and riparian areas that are interspersed throughout the more dominant conifer matrix.

ENVIRONMENTAL CONSEQUENCES

Wildlife studies have not been conducted in the allotment to discern the impacts of the grazing lease authorization to wildlife or wildlife habitat. However, a wealth of information in the literature exists concerning the effects of grazing on wildlife, which provided a basis for the following analysis.
Under all alternatives exclosures will protect areas known to be inhabited by the Mardon Skipper. These exclosures will aid this butterfly species through limiting trampling of eggs, larvae, or adults and through increased availability of preferred vegetation for ovaposition and nectaring.

The Deadwood Allotment is located within the proposed project area of the Plateau Thin and Swinning timber sales, with approximately 1,160 acres of the allotment included within the proposed project area. The effects of the Plateau Thin and Swinning timber sales would include soil disturbance and canopy thinning from logging activity and proposed road building. Increased roads in the area would encourage motorized travel in areas not currently experiencing disturbance. Project design features would greatly reduce this issue. These timber sales would not add to the effects of grazing as the activities take place in greatly different habitats. The species which are anticipated to have effects due to grazing do not use the habitat expected to be affected by timber sale activities. The cumulative effects of actions occurring within this allotment would not differ alternative by alternative.

ALTERNATIVE 1- No Action Alternative (no change)

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 cover for ground nesting birds, burrowing rodents, and other wildlife species dependent on ground cover for protection, food, and breeding sites (e.g.—Mardon Skipper Butterfly). Grazing also reduces water quality in seeps, springs, and streams used by native wildlife. The presence of livestock can change local distribution and habitat use by native species due to interspecific

behavioral traits. Currently, grazing occurs in all vegetation communities and condition classes in the allotment, but is most prevalent in the grassland/meadow and open forest vegetation communities. Riparian areas are favored grazing sites in all vegetation communities in the allotment.

Species of Special Concern that are Minimally Affected by Grazing

Some of the species of special concern found in the allotment are not greatly affected by grazing.

The suite of species that is not affected or affected to only a minor degree includes the following: Northern Spotted Owl, Bald Eagle, Fisher, Olive-sided Flycatcher, Black-throated Gray Warbler, Flammulated Owl, Northern Goshawk, Pallid Bat and Fringed Myotis. These species are primarily associated with the Mixed-Conifer and White Fir Zones. Grazing does not physically reduce the numbers of these species nor does it appreciably reduce feeding, breeding and sheltering opportunities.

Northern Spotted Owl – There is one known Northern Spotted Owl nest site in this allotment. Northern Spotted Owls prefer dense forest habitat and grazing is light to non-existent in these areas due to a lack of forage. Grazing does not affect this species in this allotment.

Bald Eagle nests are known to be located near Howard Prairie Lake and have been documented within this allotment. Bald Eagles are unlikely to be impacted by grazing as neither their treetop nest sites nor the fish and waterfowl upon which they feed are subject to significant impacts from grazing.

Fisher are confirmed to occupy forested habitat within the Deadwood Allotment. Fisher are unlikely to be impacted by grazing as they primarily utilize forested areas and depend upon large wood for denning sites, and small to medium sized mammals for prey. Denning sites and prey species are unlikely to be impacted by grazing.

Olive-sided Flycatcher and Black-throated Gray Warbler – Flycatchers and warblers feed primarily on insects, and nests are generally located relatively high in conifers (Marshall et al. 2003, 2006) where they are not disturbed by cattle. There could be a minor impact to this species if an occasional nest is placed near the ground where nesting could be disrupted by cattle.

Flammulated Owl and Northern Goshawk - Both of these species have been documented within the Deadwood allotment. These species are associated with mature forest stands. Grazing impact to these stands is minimal. Thus these species are not affected by grazing in this allotment.

Pacific Pallid Bat and Fringed Myotis – These bats are associated with a variety of habitats including conifer forests and oak-woodlands. They forage primarily on flying insects, and roost in mines, caves, abandoned buildings, and crevices and cavities in large trees. Due to their foraging and roosting habits, impacts from grazing are undetectable.

Travelling Sideband, Chase Sideband, and Siskiyou Hesperian– These mollusks are commonly associated with rocky, moist, forest dominated areas. Due to the concentrated grazing in riparian areas, habitat quality may be degraded. There also is potential for individuals of these species to be trampled. Impacts to these species would be limited by the tendency of cattle to avoid rocky ground.

Species of Special Concern that are Physically Affected by Grazing

Some species of special concern are susceptible to the physical aspects of grazing, e.g., trampling, rubbing, and water quality degradation. These include Foothill Yellow-legged Frog, Northwestern Pond Turtle, Travelling Sideband, Chase Sideband, Siskiyou Hesperian, Rufous Hummingbird, and Mourning Dove. Large amounts of habitat for these species exist in areas adjacent to this grazing allotment. Much of this habitat is not subject to grazing and will continue to provide for the persistence of this species in this area.

Foothill Yellow-legged Frog and Northwestern Pond Turtle – These species are dependent on riparian and aquatic habitat; therefore, they can be adversely affected when these habitats are degraded by grazing. Habitat degradation occurs through streambank trampling; wading in shallow ponds, springs, and streams; and defecation/urination in springs and seeps. Pond turtles also use upland habitat for nesting and nests can be trampled by cattle.

Species of Special Concern that are Adversely Affected by Vegetation Removal

Rufous Hummingbird, Mourning Dove, Siskiyou Short-horned Grasshopper, Franklin's Bumblebee, Grasshopper Sparrow, and Mardon Skipper Butterfly can be adversely affected by the reduction in grasses, forbs and shrubs due to grazing.

Rufous Hummingbird and Mourning Dove – These species are common shrub nesters. Browsing and rubbing can disturb nesting activities, and in some cases nests can be destroyed. Doves also occasionally nest on the ground and these nests are susceptible to trampling. Doves are seedeaters and grazing reduces the seed available to this species. Some graminoids because of drought, immaturity, or other stressors such as repeated heavy grazing do not set seed and others may be grazed after seed set. Hummingbirds depend on flowering plants for nectar, and grazing reduces the number of nectar-producing plants that reach the flowering stage, through both utilization and trampling.

Siskiyou Short-horned Grasshopper - This species is documented within two miles of the boundary of this allotment. It is often associated with blue elderberry for the egg-laying phase of its life cycle. Siskiyou short-horned grasshoppers are actively feeding and reproducing from July through September and are likely to be impacted by reduction of grass and forb resources upon which they depend for food and protective cover. Suitable habitat occurs at many locations within the Deadwood Allotment. Cattle have been documented to impact elderberry through use as rubbing objects.

Franklin's Bumblebee (a Bureau Sensitive Species) was once locally common throughout the Rogue Basin in southern Oregon, and is now known to only one site confirmed active in 2006 (Robbin Thorp Pers. comm.); the species is in steep decline. The likely cause of this decline is the introduction of a parasitic fungus from Europe and not habitat loss or degradation (Robbin Thorp Pers. comm.).This bee species favors open areas with abundant flowering shrub and forb species and rodent burrows used for nesting. Consumption of such shrubs and forbs, and trampling of suitable nesting sites may limit the ability of this species to successfully maintain a population at formerly suitable sites.

Grasshopper Sparrow –A ground nesting bird, the grasshopper sparrow depends on forbs, grasses and shrubs for protection. Its diet consists of insects and seeds, both of which are negatively impacted by consumption of the vegetation in the open grassland habitat that this bird requires.

Mardon Skipper Butterfly -- The Mardon Skipper Butterfly is a Bureau Sensitive Species and is listed as a Federal Candidate species under the U.S. Endangered Species Act. Two reproductive sites are known within this allotment. Twelve known sites occur in the Ashland Resource Area. The "primary threat" listed for each of these sites is "grazing." Mechanisms through which livestock may impact this species include trampling, eating food sources, and facilitating invasion of non-native plants (Xerces, 2007, 2010). With the construction of two protective exclosures at the reproductive sites, impacts to the Mardon Skipper are greatly reduced.

There is little diet overlap between livestock and deer with greater overlap of preferred forage between livestock and elk. There is a tendency of both deer and elk to avoid areas being grazed by cattle (Hosten, P. E. et al. 2007b).

ALTERNATIVE 2

Impacts to wildlife under Alternative 2 would be similar as under Alternative 1. AUMs would be the same in both Alternatives. Grazing use would be eliminated on the 32 acres of this allotment which are located within the bounds of the Cascade Siskiyou National Monument. Since little use was occurring on this steep ground and very little forage exists due to the heavy tree canopy, little change to wildlife impacts are expected. Potential mitigation measures include; installation of two cattleguards and pasture rotation. Additional terms and conditions include; herding, salt block location and rotation, and removal of livestock when stubble height and/or bank alteration benchmarks are reached. Measures noted above which facilitate distribution of livestock will result in improved forage conditions for wildlife. Disturbance and potential nest trampling of nesting birds would not differ measurably from those under Alternative 1.

ALTERNATIVE 3

Impacts to wildlife under Alternative 3 will be lessened by a reduced season of use, and reduced AUMs, which results in reduced areas of moderate to heavy grazing utilization, which in turn lessens the impacts associated with removal of plants and trampling of ground nest sites. Additional terms and conditions include; herding, salt block rotation, and removal of livestock when stubble height and/or bank alteration benchmarks are reached. These reductions in livestock use on the allotment and terms and conditions noted above which facilitate distribution of livestock would result in more forage and cover available for wildlife species.

ALTERNATIVE 4

This alternative would benefit wildlife by eliminating the direct adverse impacts (e.g., nest trampling and trampling of individual mollusks) described in Alternative 1. In the long term, the removal of cattle from the allotment for a 10 year rest period would improve both riparian and upland habitat condition which would benefit native wildlife species.

SOIL RESOURCES

AFFECTED ENVIRONMENT

The main effects that livestock grazing has on the soil resource is disturbance leading to increased erosion and increase in bulk density when cattle grazing occurs during wet soil conditions. Cattle can exert both beneficial and detrimental effects on a grazed field. The greatest detrimental concerns, perhaps, are the physical effects of treading. The interaction of several factors will determine the amount of potential damage that may result. Soil moisture content, soil physical properties, type of forage, stocking rate, and number of days grazed all interact greatly in managing to minimize treading damage. The most basic concept is that the application of weight (cattle) to soil which is wet, will compress more soil into smaller volumes, thereby increasing bulk density of soil (weight per unit volume). The effect of compaction is a diminished volume of soil pore space in the plant rooting zone that can store oxygen and water. Because the effect of treading is greatest at the soil surface, this can lead to decreased soil permeability of both air and water. Lowered rates of water infiltration may lead to higher rates of surface runoff during heavy rains and to greater soil erosion, a problem often related to overgrazing (Wells, 1997).

The nature of the forage can also affect the rate at which treading damage occurs. Established forages that

have a prolific rooting system in the top 6 to 10 inches of soil (form a good sod), can absorb more treading energy than those forages that do not form a dense rooting mass, thereby slowing the rate at which soil damage can occur. 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).

Large quantities of dung and urine are deposited across the allotment as a result of cattle grazing. In addition to nutrient recycling, organic matter in the dung will increase the rate of organic matter buildup in the soil, which also leads to improved soil physical properties. One of the obvious consequences of using cattle to harvest forages is that nutrient content of ingested forages may be transported from some parts of a field to other parts and re-deposited in urine and feces. Most estimates indicate that about 25%, 20%, and 15%, respectively, of nitrogen (N), phosphorus (P), and potassium (K) contained in forages consumed by grazing cattle is retained in their bodies for support of their various metabolic processes. This means that about 75%, 80%, and 85%, respectively, of N, P, and K passes through the animal and are excreted in urine and feces. Most of the nutrients ingested are, thereby, recycled by the animals, perhaps many times. On grazed fields, these recycled animal nutrients are, or can become, available as plant nutrients. One point of concern, though, is that urination and defecation patterns of grazing cattle do not result in recycling of nutrients uniformly over the field. Grazing practices affect the distribution of recycled nutrients (Wells 1997).

The Deadwood Allotment is located within the proposed project area of the Plateau Thin and Swinning timber sales, with approximately 1,160 acres of the allotment included within the proposed project area. The effects of the Plateau Thin and Swinning timber sales would include soil disturbance from logging activity and proposed road building. Increased roads in the area would encourage motorized travel in areas not currently experiencing disturbance, and thus, increase the likelihood that these areas would be susceptible to soil damages from unauthorized off-highway vehicle (OHV) activity. However, project design features would greatly reduce this issue. The cumulative effects of actions occurring within this allotment would not differ alternative by alternative.

ENVIRONMENTAL CONSEQUENCES

ALTERNATIVE 1- No Action Alternative (no change)

Under this alternative the existing cattle grazing lease authorization would be renewed at the current AUMs and season of use. The topography of this allotment is fairly gentle so erosion rates on most of the landscape in this area are moderate. There is a potential for higher than normal erosion rates along stream banks and near water sources. Field observations revealed that impacts to the soil resource such as trampling and an increase in soil erosion are occurring near the watering areas where the cattle congregate. In these areas, forage is reduced at a higher level than across the general landscape and soil disturbance and compaction near the water sources would continue.

There is one rangeland health standard related to the soils resources that was assessed for environmental consequences.

Alternative 1 fails to meet Standard 3 (Ecological Processes) because:

- There is a potential for higher than normal erosion rates along stream banks and near water sources.

Grazing is a factor because:

- Field observations revealed that impacts to the soil resource such as trampling and an increase in soil erosion are occurring near the watering areas where cattle congregate. The amount of area affected in this allotment would be small (about 2 acres total), but it's the location of these disturbed areas in relationship to water that remains the concern. However, in the Deadwood allotment, the disturbance near the watering areas is a minor issue because the main watering area is Howard Prairie Lake.

ALTERNATIVE 2

This alternative is similar to the existing conditions (No Action Alternative) and affects to the soil resource are anticipated to be the similar as Alternative 1. There would be a slight decrease in bank trampling and disturbances near water source due to the additional monitoring and possible herding of animals away from streambanks. Overall the erosion rates in this allotment would remain moderately above natural levels in the areas where cattle water. The proposed mitigation will help to insure cattle will remain in the allotted grazing area but due to the season of grazing would have only a very slight positive effect on soil erosion and/or productivity rates. The 7 additional terms and conditions will slightly reduce trampling and soil compaction in riparian areas.

ALTERNATIVE 3

Under this alternative the proposed release date would be consistent yearly for 61 days with a fifty percent reduction in the number of cattle grazing the allotment. Reducing the number of cattle grazing by one-half would most likely reduce the negative effects of cattle grazing by fifty percent particularly in the area where the cattle congregate (water sources). Removing the cattle every year on August 15 would allow for vegetative "green-up" in the fall which would increase vegetative cover before the winter rains and reduce erosion potential.

ALTERNATIVE 4

Eliminating cattle grazing from the BLM-administered land in this allotment for 10 years would have moderate positive benefits to the soil resource. Trampling and erosion currently associated with the grazing lease authorization, particularly in the riparian areas and water sources, would gradually recover to near natural conditions.

BOTANY RESOURCES

AFFECTED ENVIRONMENT

The forested portion (94%) of this allotment supports a diverse mix of forest plant communities. Plant series found within the Deadwood Allotment uplands and forested areas include Douglas fir, Ponderosa Pine and White Fir. Dominant shrubs and forbs vary within these areas, depending on canopy cover, soil type, slope, aspect and elevation. Dominant shrubs include thimbleberry (*Rubus parviflorus*), snowberry (*Symphoricarpus albus*), wild currants (*Ribes sp.*) and rose species (*Rosa sp*). Common forbs and

graminoid species include white inside-out flower (*Vancouveria hexandra*), anemone (*Anemone* sp), Pacific woodrush (*Luzula comosa*), wakerobin species (*Trillium sp.*) and sweetcicely (*Osmorhiza chilensis*), wild strawberry (*Fragaria vesca*), broadleaf starflower (*Trientalis latifolia*), prince's pine (*Chimaphila menziesii*), blue wild rye (*Elymus glaucus*), and Alaska oniongrass (*Melica subulata*).

Meadows comprise 6% of the allotment area. Riparian areas include willow (*Salix sp.*) thickets hosting beaver, as well as open wetland areas incorporating sedges such as; water sedge (*Carex aquatalis* var *dives*), panicled bulrush (*Scirpus microcarpus*), swordleaved rush (*Juncus ensifolius*) and common rush (*Juncus effusus*) and grasses such as meadow barley (*Hordeum brachyantherum*), colonial bentgrass (*Agrostis capillaris*), meadow foxtail (*Alopecurus pratensis*), and tufted hairgrass (*Deschampsia caespitosa*). Seasonally inundated soils may host California false hellebore (*veratrum californicum*), cone flower (*Rudbeckia sp.*), yampah (*Perideridia* species), small camas (*Camassia quamash*), straightbeak buttercup (*Ranunculus orthorhyncus*), checker lily (*Fritillaria affinis*) and bigleaf lupine (*Lupinus polyphyllus*). Shallow soils define open meadows that may be dominated by California oatgrass (*Danthonia* californica) on clayey sites or Idaho fescue (*Festuca idahoensis*), Secund's bluegrass (*Poa secunda*), silver hairgrass (*Aira caryophyllea*), and Lemmon's needlegrass (*Achnatherum lemmonii*) on soils with more sand or silt. Forbs associated with drier sites include larkspur (*Delphinium* sp), slender cinquefoil (*Potentilla gracilis*), narrow-leaf blue-eyed Mary (*Collinsia linearis*), Oregon sunshine (*Eriophyllum lanatum*), rose spiraea (*Spiraea douglassii*), and horsemint (*Agastache urtricifolia*). There are also populations of quaking aspens (*Populus tremuloides*) in portions of the allotment's meadows, although populations are small and the species is not considered to be abundant within the Deadwood allotment area.

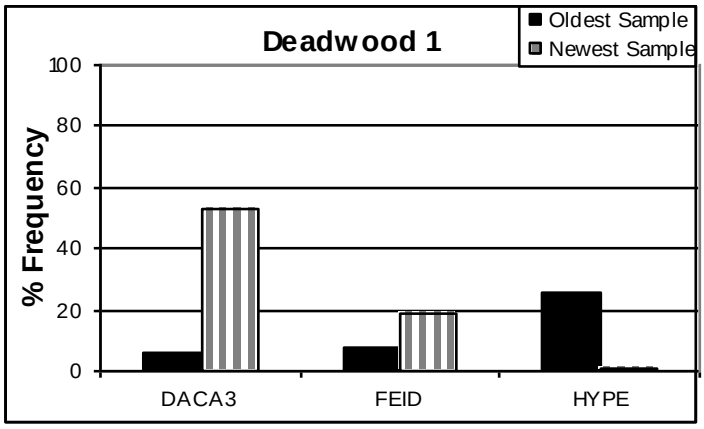
The Rangeland Health Assessment completed in 2008 showed that there are varied departures in Biotic Integrity within this allotment, depending on the ecological site being evaluated. Three ecological sites were evaluated: Mixed Fir-Yew Forest (None to Slight departure), Wet Meadow (Slight departure), and Dry Meadow (Moderate departure).

Known populations of noxious weeds are present throughout the allotment, but are primarily confined to roadsides or rock quarries. Introduced plants not necessarily recognized by Oregon Department of Agriculture (ODA) as "noxious weeds" are present throughout the allotment, with high concentrations in open, meadow areas.

Dry meadows are generally less productive and more vulnerable to invasive plant influences from non-native species including bulbous bluegrass (*Poa bulbosa*), cheatgrass (*Bromus tectorum*), and a variety of other non-native species. 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.

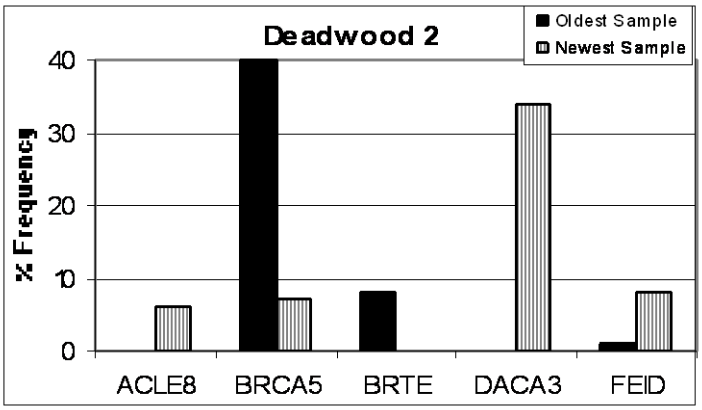
There are two Nested Frequency plots within the Deadwood Allotment, representing both the dry meadow ecotype and the perennially wet/semi-wet meadow ecotype (Figure 3-1 and 3-2).

Figure 3-1. The collection of trend data using the Nested Frequency Method occurred at a perennially wet/semi-wet meadow ecotype in 1988, 1994, 1999, and 2004.



Species showing significant change include an increase in native, perennial bunchgrasses California oatgrass (DACA3) and Idaho fescue (FEID) and a decrease in St. Johnswort (HYPE) a perennial non-native forb listed on the ODAs noxious weed list . The condition of this site is showing an upward trend because of the increase of native perennial grasses and the decrease of a noxious weed species.

Figure 3-2. The collection of trend data using the Nested Frequency Method occurred at the dry meadow ecotype in 1996, 2001, and 2006.



Species showing significant change include a decrease in California brome (BRCA5) and an increase in Lemmon's needlegrass (ACLE8), California oatgrass (DACA3), and Idaho fescue (FEID) these are native, perennial bunchgrasses. Other species showing change include a decrease in cheatgrass (BRTE) a non-native annual grass. The condition of this site is showing an upward trend because of the increase of native perennial grasses and a decrease in an invasive, annual, grass species.

Threatened, Endangered and Bureau Special Status Species

No occurrences of any federally listed plant species are known or expected on federal lands within the Deadwood allotment. The allotment is outside the range of federally listed plants known to occur on the Medford District of the BLM *(Fritillaria gentneri* , *Limnanthes floccosa ssp. grandiflora, Arabis macdonaldiana,* and *Lomatium cookii)* as defined by the U.S. Fish and Wildlife Service (USDI Fish and Wildlife Service, 2003).

Survey and Manage

There are four Survey and Manage fungi species and no lichen or bryophyte species known to occur within

the Deadwood allotment. These species have status which has been determined that pre-disturbance surveys were impractical and not required or have unknown practicality (Table 3-12). Oregon State Office Information Bulletin No. OR-2004-145 reaffirmed that these surveys were impractical and further stated that Bureau policy (Manual Section 6840) would be met by known site protection and large-scale inventory work (strategic surveys) through fiscal year 2004.

The two species occurring within the Deadwood allotment that require management of known sites and manage high priority sites (Table 3-12.) respectively are *Cortinarius olympianus* and *Pithya vulgaris*. *Cortinarius olympianus* is a pale lilac mushroom with pink-lilac gills and a viscid cap. The one site within the Deadwood Allotment is located in a forested area that is mapped as slight (6-20%) utilization. The fruiting period for this species is September to December. *Pithya vulgaris* is located at five locations within the allotment with utilization ranging from slight to moderate (6-40%) utilization. The fruiting period for this species is early March and November which is outside the lease authorization period. Management of these species is primarily related to maintaining an overstory of trees.

Sensitive Vascular Plants

Approximately 53% of the allotment has had vascular plant surveys within 10 years of the project initiation date of July 6, 2007. Surveys have been conducted in timber stands proposed for timber harvest or silvilcultural treatment as well as in meadows and other areas of light-severe livestock utilization (21-100%). One vascular special status species is known to occur within the Deadwood Allotment (Table 3-12).

Cimicifuga elata is a perennial broadleaved forb that has reproductive limitations that make colonization into new sites difficult, including its lack of effective seed dispersal and attraction for pollinators when in competition with other flowering plants, due to lack of nectar (Penny and Douglas 2001). Monitoring at three sites on the Medford District for four years has shown that *Cimicifuga elata* is able to persist even with annual herbivory by deer and insects (Kaye 2002). Populations typically occur in coniferous forests on north facing slopes where departure from the ecological site description is rated none to slight. Both of the known populations are located in an area that has an average utilization of “light” (21-40%).

Sensitive Fungi, lichens, and bryophytes:

Approximately 53% of the allotment area has been surveyed for Bureau Special Status fungi, lichens, and bryophytes. Currently there are no known occurrences of Bureau Sensitive lichens or bryophytes and one population of fungus within the allotment.

Boletus pulcherrimus is a species of fungi known as the red-pored bolete mushroom. Plant community data for this area shows this species occurring in White fir/Douglas-fir early mature forests, Douglas-fir/White fir/Ponderosa pine young forest, White fir/chinquapin communities, and Shasta red fir/chinquapin communities with elevation ranges from 4620’ to 5640’. The species is a mycorrhizal fungus dependent on the health of its symbiotic partnership with mixed conifers (Castellano et al 1999).

Table 3-12. Bureau Special Status Species Located Within the Deadwood Allotment

Scientific Name	Common Name	2010 Status	Total # of Populations
Cimicifuga elata	tall bugbane	SEN	2
Boletus pulcherrimus	red-pored bolete mushroom	SEN	1
Gyrometra montana	snow mushroom	S&M (F)	1
Sarcosoma mexicana	Mexican Gel-cup	S&M (F)	1
Cortinarius olympianus	-	S&M (B)	1
Pithya vulgaris	-	S&M (D)	5

SEN-Bureau Sensitive (USDI Oregon State Director's List)
S&M- Survey and Manage
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
Category F; No site management, Practicality of pre-disturbance surveys undetermined

Noxious Weeds and Introduced Plant Species

"Noxious Weed" describes any plant classified by the Oregon State Weed Board that is injurious to public health, agriculture, recreation, wildlife, or any public or private property. The definition of a B-Designated weed is one "of economic importance which is regionally abundant, but which may have limited distribution in some counties" and treatment methods are determined on a case-by-case basis (ODA Noxious Weed Program).

Field surveys have located populations of 9 species of B-Designated noxious weeds within or adjacent to the allotment: Canada thistle (*Circium arvense*), meadow knapweed (*Centaurea nigrescens*), diffuse knapweed (*Centaurea diffusa*), spotted knapweed (*Centaurea maculosa*), Dyer's woad (*Isatis tinctoria*), bull thistle (*Circium vulgare*), St. John's Wort (*Hypericum perforatum*), houndstongue (*Cynoglossum officinale*) and Dalmatian toadflax (*Linaria dalmatica*) (Table 3-13).

Table 3-13. Noxious Weed Species Located Within or Adjacent to the Deadwood Allotment Boundary

Scientific Name	Common Name	Number of Occurrences
Centaurea nigrescens	Meadow knapweed	1
Centaurea diffusa	Diffuse knapweed	1
Centaurea stoebe	Spotted knapweed	1
Circium arvense	Canada thistle	8
Cynoglossum officinale	Houndstongue	1
Isatis tinctoria	Dyer's woad	1
Linaria dalmatica	Dalmatian toadflax	9
Circium vulgare	Bull thistle	Unknown
Hypericum perforatum	St. Johnswort	Unknown

Meadow knapweed (*Centaurea nigrescens)* is a perennial forb native to Europe that favors moist roadsides, sand or gravel bars, river banks, irrigated pastures, moist meadows and forest openings. Its foliage is coarse and tough and not generally palatable to livestock. Meadow knapweed out-competes grasses and other pasture species, threatens wildlife habitat and is difficult to control. Meadow knapweed seeds are carried in rivers, streams, or irrigation water, in hay or by vehicles along roadsides. It is susceptible to herbicide treatments, but control efforts must persist for the long-term. There is some evidence that knapweeds release chemical substances that can inhibit the growth and reproductive cycles of surrounding vegetation. There are 459 sites reported for the Medford District and 1 site in the project area. One roadside population of this species is found within the allotment, in an area that averages 41-60% (Moderate) grazing use.

Diffuse knapweed (*Centaurea diffusa*) is a biennial or short-lived perennial that is a native of Eurasia that infests roadsides, waste areas and dry rangelands. It is considered to be a highly competitive plant that threatens to exclude native species once it is established. This species has limited forage value, increases ranching and haying costs, displaces native plants, and decreases plant diversity. Diffuse knapweed contains an allelopathic chemical that can suppress the growth of other species which allows the formation of dense single-species stands. Lasting control will require a combination of various methods of land management, biological control, physical control, chemical control, and suppression by desirable vegetation. There are 22 sites reported for the Medford District and one population located within the allotment, in an area that averages 41-60% (Moderate) grazing use.

Spotted knapweed (*Centaurea stoebe*) is a biennial or short-lived perennial that is a native of Eurasia that easily invades areas with disturbance and causes a reduction in desirable plant communities. It can easily outcompete native plants for soil moisture and nutrients, and as the other knapweeds may release chemical substances that can inhibit the growth and reproductive cycles of surrounding vegetation. There are 74 known sites of spotted knapweed on the Medford District, and 1 roadside population is found within the allotment in an area that averages 41-60% (Moderate) grazing use.

Canada thistle (*Circium arvense*) is a colony-forming (primarily by asexual reproduction) perennial that is a native of Eurasia. This prickly rose-purple flowered plant can produce up to 1500 wind transported seed per flowering shoot with seed that can remain viable in the soil for 20 years. Detrimental effects attributed to the establishment of Canada thistle include displacement of native species, decrease of plant diversity, reduced forage, and it serves as an alternate host for insects and pathogenic microorganisms that attack various crops. Successful control methods include biological, chemical, cultural, and some limited success with mechanical methods. There are 1141 sites reported for the Medford District, with 8 populations within the allotment boundary, in areas ranging from Slight (6-20%) to Moderate (41-60%) grazing use.

Houndstongue (*Cynoglossum officinale*) is a biennial that was introduced to the United States from Eurasia in the late 1800s as a contaminant of cereal seed. Plants form rosettes the first year, and produce flowers and seed the second year. Individual plants can produce up to 2000 seeds in a season. It is considered to be unpalatable and toxic to livestock, and is generally avoided. The species can establish rapidly and will easily form dense monocultures in areas of disturbance, displacing native species. Because it produces barbed seeds, it is easily transported on animal hair, clothing, shoes and vehicles. Successful control of this species is usually obtained using a multi management approach, including chemical treatments and seeding with competitive vegetation. There are 4 sites on the Medford District, and 1 reported site that occurs roadside within the Deadwood allotment in an area averaging Slight (6-20%) grazing use.

Dyers woad (*Isatis tinctoria*) is a native of Europe, and can grow as a winter annual, a biennial or short-lived perennial, and is a member of the mustard family. Dyers woad produces thousands of seeds in a flowering season. Seeds can remain viable in the soil for years. Considered to be an aggressive invader,

Dyers woad forms dense stands in rangelands and crowds out native vegetation. It reduces forage availability by suppressing annual grasses and is not palatable (though not toxic) to livestock. The decomposing seed pods are considered to have allelopathic properties that inhibit the growth of other plants around it (ODA 2009b). Successful control methods include manual (before seed maturation) and chemical (before bolting occurs). There are 64 reported and current sites of dyers woad on the Medford District and 1 known occurrence within the allotment boundary in an area with an average utilization of Slight (6-20%).

Dalmatian toadflax (*Linaria dalmatica*) is a native of Europe, and typically colonizes roadsides and rangelands. A short-lived perennial, it reproduces both by seed and roots, and is considered to be an aggressive invader and will easily crowd out native vegetation. Because it has an extensive and deep root system, it is an extremely difficult plant to control. Successful control methods include chemical, biological and using native species to out-compete. There are 18 known sites on the Medford District, with 7 occurrences within the allotment boundary occurring in areas with average utilization of Slight to light (6-40%).

Bull thistle (*Cirsium vulgare*) is a taprooted biennial with spiny stems, leaves, and inflorescences native to Eurasia. Each flower head can produce up to 250 seeds. Most seed falls within six feet of the parent plant but is capable of long distance transport by wind and animals. Seed survival is very low, as is seedling and rosette survival. It is estimated to take 200 seeds to produce one flowering plant. Bull thistle seedlings are poor competitors and require bare mineral soil to survive. There are 1548 sites reported on the Medford District; however, this weed is under-reported on the Medford District as active control methods are not usually employed. Personal knowledge of the Botanist and recent records verify sites within the allotment area. Detrimental effects include displacement of native species, decrease of plant diversity, limits wildlife movement, and reduced forage. Bull thistle is eventually outcompeted by other vegetation for light, moisture, and nutrients.

Common St. Johnswort (*Hypericum perforatum*) is a perennial forb with extensive creeping rhizomes introduced from Eurasia as an ornamental plant. It is both a toxic and invasive weed. It can form dense stands in meadows, pastures, rangelands, disturbed sites, and along roads. This weed is under-reported on the Medford District and active control methods, other than the release and monitoring of biological control agents, are not usually employed. Personal knowledge of the Botanist and recent records verify numerous sites within the Deadwood allotment area, including dense monocultures along roadways. Detrimental effects include displacement of native species, decrease of plant diversity, and reduced forage. Successful control methods include biological and chemical.

Most of the noxious weed populations occur along roads or in areas with historical disturbance regimes. Due to their invasive nature, noxious weeds present on the allotment can continue to spread when left untreated. Areas of moderate-to-heavy livestock utilization, and congregation areas (salt blocks, water sources, shade) that experience soil and vegetation disturbance within the allotment are at risk for weed colonization. To control known populations and prevent future spread of noxious and invasive species, the BLM weed control program uses herbicides, biological control agents, and hand pulling to treat infestations across the landscape. Chemical treatments in the Deadwood Allotment have occurred at three separate locations totaling 21 acres, treating several species (knapweed, houndstongue and Canada thistle). Treatments will be ongoing, assuming time, budget and personnel permit.

Introduced plants are species that are nonnative to the ecosystem under consideration. Introduced plants may adversely affect the proper functioning condition of the ecosystem. Although not listed on the ODA Noxious Weed list, many introduced species pose a threat to natural plant communities in the Deadwood Allotment; some areas once dominated by native species have been converted to those species considered

to be non-native and/or invasive. Recorded surveys and range monitoring plots indicate that there are many non-native species located within the Deadwood allotment.

ENVIRONMENTAL CONSEQUENCES

Effects to Botanical Resources Common to all Grazing Alternatives (Alternatives 1-3)

This section of the EA will discuss the effects of implementing all of the alternatives and the impacts it would have on botanical resources. This section will also discuss any cumulative effects considering our range of alternatives plus the effects of other actions that are currently happening or will be happening in the foreseeable future.

The Deadwood Allotment is located within the proposed project area of the Plateau Thin and Swinning timber sales, with approximately 1,160 acres of the allotment included within the proposed project area. The effects of the Plateau Thin and Swinning timber sales would include soil disturbance, canopy thinning and proposed road building. Native plant seeding in the area post-disturbance would not only decrease the likelihood of increases in non-native species but would also increase the amount of native forage available for ungulates. This would increase the area considered to be preferred for use in the grazing season which would improve livestock distribution. Thinning of the canopy would allow more light to hit the forest floor providing for the introduction and spread of more herbaceous species. Increased roads in the area would encourage motorized travel in areas not currently experiencing disturbance, and thus, increase the likelihood that these areas would be susceptible to weed invasions and unauthorized off-highway vehicle (OHV) activity. However, project design features would greatly reduce this issue. The cumulative effects of actions occurring within this allotment would not differ alternative by alternative.

Survey and Manage

The persistence of S&M species would not be affected **because** livestock use in forested areas where much of the habitat that can support S&M species occurs, has none to slight utilization (0-20%). Where use does occur in forested areas it is generally restricted to the edge of meadows where cattle go to ruminate and rest in the shade. In some forested areas a wildlife/livestock trail will be used as a movement corridor from one high forage area (meadow) to another, which creates a small area of soil compaction and bare ground where most species would not be able to survive. In some instances livestock will go into forested areas seeking water however, because the Deadwood allotment has numerous developed sites (troughs and ponds) this is not occurring. Review of our Special Status plant database (Geobob) and species lists included in survey reports from 2001 to 2009 included no incidental sightings of other S&M species in the allotment. Many of the Survey and Manage lichens and bryophytes are arboreal species (occur in trees) and would not be effected by grazing.

There are no known vascular or non-vascular lichens and bryophyte S&M species and no damage to known sites of fungi is expected from the levels of grazing analyzed in this EA **because** livestock do not graze any of these species and **because** the fruiting period for *Cortinarius olympianus* and *Pithya vulgaris* is outside or close to outside of the authorized grazing period. These species are not expected to have negative impacts from the grazing on the Deadwood Allotment therefore no protection/mitigation measures will be recommended for these populations.

Sensitive Vascular Plants

The populations of *Cimicifuga elata* occur in coniferous forests on north facing slopes where departure from the ecological site description is rated none to slight. Known sites of the plant occur in an area with an average utilization of light (21-40%). It is not expected that grazing poses a threat to the persistence of the Bureau Sensitive plant *Cimicifuga elata* and loss of some individuals would not contribute to the need to list this species.

Sensitive Fungi, lichens, and bryophytes
Boletus pulcherrimus is not palatable to livestock, and because it occurs in coniferous forests where livestock seldom forage, it is unlikely that livestock have any impact from trampling or herbivory on its population.

Weeds
Localized site disturbance would continue to produce conditions favoring noxious weeds and invasive introduced species. These introduced species are superior competitors for available resources, thereby displacing and excluding native plants. Livestock would continue to contribute to the spread of introduced seed via ingestion and involuntary transport. The level at which livestock grazing on this allotment occurs would not significantly change the structure or rate of noxious weed spread. These species would continue to spread or maintain their current levels, particularly in roadsides and open areas.

Recreational use and other land management activities (both private and federal) will continue to contribute to the conversion of native landscapes to non-native dominated landscapes. Introduced species will continue to present management challenges.

Areas within this allotment that are overly dense due to fire suppression would be susceptible to intense stand replacement fires. This, in turn, would create more susceptibility to non-native species introduction in these areas. Native plant communities would continue to be threatened by conversion to a landscape dominated by non-native plant species. Rare plant populations and grassland meadow communities could be lost.

ALTERNATIVE 1- No Action Alternative (no change)

Grazing would occur from June 16-August 15 in Year 1 (even years), and from August 16-October 15 in Year 2 (odd years). The Deadwood CRMP is incorporated as a term and condition of the lease, and grazing is rotated with the US Forest Service portion of the Deadwood Allotment every year. Stocking rates would allow up to 393 cattle (788 AUMs) within the allotment.

Some of the perennial plants have not produced seed by June 16 in this area. Due to high elevation (ranging from approximately 4,400 to 6,040 feet) within the allotment, the growing season often begins much later than low elevation sites. However, because livestock disperse and are not grazing the entire allotment before seed set, 40-80% of the plants within the allotment are able to produce seed annually.

The early season of use that occurs on this allotment allows livestock the opportunity to graze invasive species such as non-native grasses and palatable noxious weeds before they bloom and become unpalatable. One of the Nested Frequency Transects (EA p. 55) did have a decrease in a noxious weed however; it is unknown whether or not the current grazing regime is having a definitive negative or positive impact on the invasive species population. There is little doubt that livestock strongly influenced vegetation at the end of the 19th and early 20th centuries when stocking rates were ten times higher than the current (Hosten et al. 2007a). Studies indicate that many plant communities are still recovering from past livestock-induced annual grass domination (Hosten et al. 2007d). Past conversion of seeps and springs to stockponds and the restricted area of wetland systems result in livestock concentrations and consequent soil and vegetation impacts preventing recovery of seeps and springs. However, repeat riparian photos show an increase in vegetative cover throughout the CSNM (Hosten and Whitridge 2007). Therefore, with no change in grazing or disturbance regimes within the allotment area, plant community health would persist

in its current state or show slight improvement.

There are two standards related to the botany resources that were assessed for environmental consequences.

Alternative 1 meets Standard 1 (Watershed Function-Uplands) and Standard 5 (Native, T&E Species) because:

- The plant community health persists in its current state or shows a slight improvement.
- Only localized site disturbance would continue to produce conditions favoring noxious weeds and invasive introduced species. Noxious weed populations/sites in the allotment are sparse with most species occupying a single, small location.
- The Rangeland Health Assessment completed in 2008 showed that there are varied departures in Biotic Integrity within this allotment, depending on the ecological site being evaluated. Three ecological sites were evaluated: Mixed Fir-Yew Forest (None to Slight departure), Wet Meadow (Slight departure), and Dry Meadow (Moderate departure). Current livestock grazing is not considered a significant contributing factor in the rangeland health decline on these dry meadows.
- Both Deadwood Nested Frequency sites show an upward trend in vegetation health because of the increase of native perennial grasses and a decrease in an invasive species.
- No federally listed plant species are known to occur on the allotment.
- The four species of Survey and Manage fungi species and one Bureau sensitive fungi are mostly impacted by the maintenance of overstory trees, and not by grazing.
- Monitoring on the Medford District of *Cimicifuga elata* indicates it is able to persist despite herbivory. Both of the known populations are located in an area that has an average utilization of "light" (21-40%).
- The level at which livestock grazing on this allotment occurs would not significantly change the structure or rate of noxious weed spread.

ALTERNATIVE 2

Under Alternative 2, grazing would occur from June 16-August 15 in Year 1 (even years), and from August 16-October 15 in Year 2 (odd years). The Deadwood CRMP would continue to be incorporated as a term and condition of the lease, and grazing would be rotated with the US Forest Service portion of the Deadwood Allotment every year. There would be seven additional terms and conditions and two potential mitigation measures to make progress toward meeting the Rangeland Health Standards that are currently not being met. Stocking rates would allow up to 393 cattle totaling 788 AUMs within the allotment, and turnout would continue to be based on range readiness.

Ensuring that use dates are complied with and if they are not implementing a 20% reduction in AUMs the following grazing season would allow plants to restore carbohydrate reserves for winter dormancy and spring growth in years with the early season of use (June 16-August 15). In years with the late season of use (August 16-October 15) a higher percentage of plants will be able to complete their growth cycles, from early season sprouting and blooming to setting seed successfully (if this is their primary means of reproduction).

Soil and vegetation trampling of wet or semi-wet areas would continue to a lesser extent than in Alternative 1. The repair to a fence separating the BLM from the US Forest Service and additional terms and conditions of the lease (particularly stubble height requirements in key riparian areas) would reduce the amount of time that livestock spend in riparian areas. This, in turn, would benefit native riparian

species, as well as those that grow in the semi-wet to dry areas adjacent to perennial sources of water. Seed set would remain in adequate condition for successful germination the following season. Native species could begin to outcompete the short-lived, and highly successful, exotic species which thrive in disturbed soils and contributed to a conversion from native to non-native dominance in some open areas within the Deadwood allotment. The ability of a site to increase in native species will depend on the species characteristics (native and non-native) that are present, and the ecological site.

A term and condition has been added to reduce the further spread of nonnative species by requiring washing of vehicles used for livestock transport and herding off of established roadways. The level at which livestock grazing on this allotment occurs would not significantly change the structure or rate of noxious weed spread.

ALTERNATIVE 3

Under Alternative 3, the allotment would be leased with permitted grazing reduced by 50 percent, achieved by reducing the allowable grazing season and the permitted AUMs. Grazing would occur from June 16-August 15 (elimination of late-season grazing), and allowable AUMs would be limited to 394 (197 cattle). The initial turnout date is not altered, and is based on range readiness.

Elimination of late-season grazing would better allow perennial plants to restore carbohydrate reserves for winter dormancy and spring growth which could increase plant vigor slightly.

Soil trampling, erosion and compaction of wet or semi-wet areas would continue to a lesser extent than in Alternative 1 and 2 as the need for water later in the season (when temperatures increase and make riparian areas more appealing for cattle) would be reduced. This, in turn, would benefit native riparian species, as well as those that grow in the semi- wet to dry areas adjacent to perennial sources of water. Seed set earlier in the growing season would remain in adequate conditions for successful germination the following season. Native species could begin to outcompete the short-lived, and highly successful, exotic species which thrive in disturbed soils and contributed to a conversion from native to non-native dominance in some open areas within the Deadwood allotment. The ability of a site to increase in native species will depend on the species characteristics (native and non-native) that are present, and the ecological site.

It is unknown whether or not reduced grazing poses a threat to the persistence of the Bureau Sensitive plant *Cimicifuga elata.*

A term and condition has been added to reduce the further spread of nonnative species by requiring washing of vehicles used for livestock transport and herding off of established roadways. The reduced level of livestock grazing on this allotment is not expected to change the structure or rate of noxious weed spread.

ALTERNATIVE 4

This alternative would not have any direct effects on botanical resources within the allotment. However, eliminating grazing on the allotment would allow plant community restoration to occur at a slightly faster rate than would occur with the current grazing allocation. Riparian vegetation would expand in some cases without the annual herbivory, while in other cases the water may stay sub-surface and decrease the amount of riparian vegetation. In areas where there is a slight to moderate departure from the

ecological reference condition it is expected that positive effects to the plant community composition and structure would be visible within 3-10 years, depending on climate conditions. Slow displacement of annual grasses (and other introduced invasive species) by native perennial grasses would improve the condition of the natural plant communities, especially the open meadows. In areas with an extreme departure from the ecological reference condition, there would be no visible benefits from removing livestock grazing because livestock do not use these areas as there is no suitable forage. Furthermore, in expansive areas of non-native grasses there would be little to no seed source for the establishment of native perennial grasses.

Resting the Deadwood allotment for ten years would slightly increase the effectiveness of noxious weed treatments due to: reduced soil disturbance in areas actively utilized for grazing management; desirable and palatable species would be able to produce more seed and some species would grow more vigorously without annual defoliation; and the transport of weed seed by livestock in their hair, hooves, or feces would be eliminated. There is no indication that cattle have utilized (as a primary forage source) the existing noxious weed populations although, one nested frequency did show a decrease in a noxious weed species. Without active management of noxious weed species in the Deadwood allotment, weed populations would continue to increase in size, and the potential for introduction of new species due to continued human activity remains.

CULTURAL RESOURCES

This project would not result in restricting access to, and ceremonial use of, Indian sacred sites by Indian religious practitioners or adversely affect the physical integrity of such sacred sites. No sites have been identified in the project area. Executive Order 13007 (Indian Sacred Sites).

This project would have no effect on Indian Trust Resources as none exist in the project area.

This project was determined to have no adverse effects on properties listed or eligible for listing on the National Register of Historic Places. This includes Native American religious or cultural sites, archaeological sites, or historic properties. The proposed project would have no adverse effects on known cultural resources.

RECREATIONAL AND VISUAL RESOURCES

The grazing allotment is near several established and developed recreation areas within the Hyatt-Howard Prairie Special Recreation Management Area. The allotment is adjacent to Lily Glenn horse camp and surrounds Dick R. Lake. Lily Glenn horse camp is fully fenced, while Dick R. Lake is in a forested area that receives little to no livestock grazing use causing little negative effect to the recreation experience at these sites. Additional recreation which may occur in the project area would be of a limited and dispersed nature such as equestrian and foot traffic on the Lilly Glen Trail, hunters on foot and ATV, and by those exploring the area for wild flowers, mushroom collection, sunbathing, and activities of this nature. The allotment is within a Visual Resource Management Area, with a Class 2 management objective. The objective for this class is to retain the existing character of the landscape. The level of change to the characteristic landscape should be low. Management activities may be seen, but should not attract the attention of the casual observer. Any changes must repeat the basic elements of form, line, color, and texture found in the predominant natural features of the characteristic landscape. Cattle grazing activities in the Deadwood Allotment would have little to no effect on the basic elements of form, line, color, and texture for the area and the basic character of the landscape would be unchanged by this activity.

SPECIAL DESIGNATION AREAS; Areas of Critical Environmental Concern (ACECs) and Research Natural Areas (RNAs)

The Hoxie Creek ACEC is located in the SE corner of 38S 4E Section 29 and is a 255 acre area designated in the Medford District RMP for the areas natural systems, wildlife and botanical values. The ACEC is within the SE corner of the Deadwood allotment boundary. Utilization within the Hoxie Creek ACEC has generally been light.

The Moon Prairie ACEC is located in 38 4E in the NE corner of section 17 and SE corner of section 20 and was formed for the natural systems that exist in the area. There are 91 acres of the ACEC within the Deadwood Allotment boundary. Utilization within the Moon Prairie ACEC is heavy along Hoxie Creek, near livestock watering ponds, and in meadows. A heavy level of use on a consistent basis (year after year) will cause harm to the natural systems that the ACEC was set aside to protect. Fires and subsequent salvage operations of the early 1900s increased forage available to livestock (Minore 1978) in the Moon Prairie area of the Deadwood Allotment. Competition with herbs and grasses, frost, and gopher problems slowed down the regeneration of conifer for many decades. The slow establishment of plantations has likely resulted in concomitant declines in forage. Repeat photos in the Moon Prairie area show a general improvement in range condition over the past two decades.

The Old Baldy RNA is located in the NE corner of 38S 4E section 25 and occupies 166 acres that lie partially within the Deadwood Allotment boundary. The RNA has white fir at high elevation with Shasta fir, Red fir/Mountain hemlock, Pacific Silver fir/ White pine and chaparral plant communities. It was formed for scientific research and as a baseline study area. According to Utilization mapping livestock do not use this area; therefore, livestock have no effect on the Old Baldy RNA.

CHAPTER 4 - PUBLIC PARTICIPATION

Letters were mailed to interested organizations, community groups, individuals, and other agencies and tribes announcing the proposed action to renew grazing leases in June 2009. A description of the proposed action, expected activities and maps were included in the mailing, along with a request for public input regarding BLM's proposed management activities. Meetings and a field trip were held with the allotment lessee to gather and share information as required by part 4130.2 (b) of the BLM grazing regulations, "…before issuing or renewing grazing permits or leases."

Announcement of EA availability was mailed to interested individuals and to the following agencies, organizations, and tribes:

Association of O&C Counties
Audubon Society
Dead Indian Stockman's Association
Hannon Library, Southern Oregon University
Jackson County Commissioners and Courthouse
Jackson Co. Soil and Water Conservation District
Jackson Co. Stockman's Association
Klamath Siskiyou Wildlands Center
Little Butte Watershed Council
Medford Water Commission
National Center for Conservation Science and Policy
Northwest Environmental Defense Center
Oregon Department of Environmental Quality – Medford
Oregon Department of Environmental Quality – Portland
Oregon Department of Fish and Wildlife
Oregon Wild

Pacific Legal Foundation
Rogue River – Siskiyou National Forest
Siskiyou Project – Grants Pass
Southern Oregon Timber Industries Association

Federally Recognized Tribes
Cow Creek Band of Umpqua Indians
Confederated Tribes of Grand Ronde
Confederated Tribes of Siletz
Klamath Tribe
Quartz Valley Indian Reservation (Shasta Tribe)
Shasta Nation

Other Tribes
Confederated Bands [Shasta], Shasta Upper Klamath Indians
Confederated Tribes of the Rogue-table Rock and Associated Tribes

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