

**Decision Notice
and
Finding of No Significant Impact**

House Creek, West Malheur and Wolf Mountain Allotments

USDA Forest Service
Pacific Northwest Region
Malheur National Forest
Emigrant Creek Ranger District
265 Hwy 20 S.
Hines, Oregon 97738
Harney and Grant Counties, Oregon

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Introduction

The House Creek, West Malheur and Wolf Mountain Allotments Environmental Assessment (EA), released for 30-day public comment on August 11, 2005, documents the analysis of a proposed action and two alternatives considered in detail. This EA proposes to continue authorization of livestock grazing in a manner that is consistent with the Malheur Forest Plan as amended. Based on the analysis in the EA and public comments received, I have reached decisions, documented in this Decision Notice, on management within the House Creek, West Malheur and Wolf Mountain Allotments.

Planning for this project was initiated in 2004. Based on needs identified for each allotment, a specific proposed action was developed and the NEPA (National Environmental Policy Act) process was initiated. Through scoping of officials, agencies, tribes, organizations, and individuals, key issues involving potential conflicts between impacts of the proposed action and the protection of the human environment were identified. Alternatives responding to these issues were developed for analysis.

The project area is comprised of three livestock grazing allotments, located on the Malheur National Forest, Emigrant Creek Ranger District and is approximately 30 miles northeast of Burns, Oregon. The three allotments, House Creek, West Malheur and Wolf Mountain, encompass approximately 57,800 acres of National Forest Lands. The allotments are primarily contained in the Wolf Creek Watershed with a lesser amount in Bear Creek and Trout Creek Watersheds.

Decision

Based on the analysis in the EA and the associated Planning Record, I have decided to implement the Proposed Action Alternative (Alt. 2). This alternative follows all applicable laws and regulations such as: State Water and Air Quality Standards, the National Environmental Policy Act (NEPA), and the National Forest Management Act (NFMA). This alternative is also consistent with, and implements, the Forest Plan, as amended. This Decision Notice documents the specific components and rationale for my decision.

During the decision process for this project, I realized I would not be able to fully satisfy all public concerns, as many of them are mutually exclusive. I have selected an alternative that is ecologically sound, both for the short and long term. It includes a practical management approach that reflects sensitivity to conflicting public concerns. In making my decision, I considered and balanced numerous factors.

Specific Laws, Regulations and Policies I Considered

Based on the analysis in the EA I considered the specific laws, regulations and policies (pages 22-26):

- The Preservation of American Antiquities Act of 1906
- The National Historic Preservation Act
- The Endangered Species Act of 1973, as amended
- The Migratory Bird Treaty Act of 1918
- The National Environmental Policy Act (NEPA) of 1969, as amended
- The National Forest Management Act (NFMA) of 1976
- The Clean Water Act, as amended in 1977, 1982, and 1987
- The Clean Air Act, as amended in 1990
- Multiple-Use Sustained-Yield Act of 1960
- Migratory Bird E.O. 13186
- Natural or Depletable Resource Requirements and Conservation Potential
- Prime Farmland, Rangeland, and Forestland
- Floodplains and Wetlands (E.O. 11988 and 11990)
- Forest and Rangeland Renewable Resources Planning Act (RPA) of 1974, as amended
- Executive Order 12962 (Aquatic Systems and Recreational Fisheries)
- Executive Order 13112 (Invasive Species)

Elements of the Decision

My decision consists of a number of separate actions for each Allotment designed to meet the Purpose and Need for the project as described in the House Creek, West Malheur and Wolf Mountain Allotments EA, on pages 6-9. Specifically, these actions are as follows:

I have decided to continue authorization of domestic livestock grazing on the House Creek, West Malheur and Wolf Mountain Allotments. This action will authorize grazing and update 3 Allotment Management Plans (AMP). Implementation of the allotment management plans that emerge from this analysis is anticipated to begin in the spring of 2006.

The following tables list specific proposed actions by allotment. Cattle would be the permitted livestock on all allotments. Maps showing the proposed activities are attached to this document.

House Creek Allotment

FS Acres	Potential Season of Use	Permit/Average Number	Maximum AUMs
3,250	5/15 – 9/30	60	318 AUMs
- Allotment utilization for forage would not exceed 45% except where otherwise noted. - Regenerate aspen stands in Bridge Creek, 17 road, House Creek and CHE springs drainages by conifer removal, prescribed burning and protection by fencing and excluding livestock grazing. - Fence in spring (about 1-2 acres) on category 2 portion of House Creek and exclude grazing. - Utilization would not exceed 35% in two riparian pastures. - Stabilize existing head cut with rocks, wood and filter cloth. - Construct a drift fence in the south pasture.			

West Malheur Allotment

FS Acres	Potential Season of Use	Permit/Average Number	Maximum AUMs
22,310	5/1 – 9/30	225	1040 AUMs
- Allotment utilization for forage would not exceed 45% except where otherwise noted. - Reroute pasture boundary fence between Pierpont and Cougar pastures. - Reduce the size of Squaw Springs Cow Camp pasture. - Shift part of livestock grazing allocation from Rock Springs to Pierpont pasture to reduce impacts to upland shrubs. - Regenerate aspen stands in Squaw Creek, Van Gulch and Magpie Creek drainages by conifer removal, prescribed burning and protect by fencing and excluding livestock grazing. - Prescribe burn Cougar Flat and rest from livestock grazing for 1 year prior to the burn and for up to 2 growing seasons after the burn. - Utilization would not exceed a 6-inch stubble height in the floodplains of identified <i>Botrychium</i> habitat in Pierpont pasture. - Fell timber around Dead Horse Spring to create “jackstraw” barrier to livestock to protect <i>Botrychium</i> habitat. - Enclose and stabilize headcuts on Squaw Creek, East Fork Wolf Creek and Van Gulch and exclude livestock grazing. - Install rock structures and/or LWD placement in Squaw Creek, East Fork Wolf Creek and Van Gulch.			

Wolf Mountain Allotment

FS Acres	Potential Season of Use	Permit/Average Number	Maximum AUMs
31,650	5/1 – 10/12	286	1651 AUMs
- Allotment utilization for forage would not exceed 45% except where otherwise noted. - Enlarge Beaverdam Meadow pasture to include a headcut area and use only as a gathering pasture (overnight use only). - Fence existing population of <i>Botrychium crenulatum</i> and exclude from livestock grazing. - Regenerate aspen stands in West Fork Bridge Creek, Beaverdam Creek, Dry Gulch and Schurtz Creek drainages by conifer removal, prescribed burning and protect by fencing and excluding livestock grazing. - Fell timber along main-stem of Bridge Creek to create “jackstraw” barrier to livestock trailing. - Utilization would not exceed a 6 inch stubble height in the floodplain of identified <i>Botrychium</i> habitat in Antelope and Wolf Creek pastures. - Plant and protect willows in Beaverdam Creek in Beaverdam Meadow Pasture. - Stabilize headcuts on Beaverdam Creek and Bridge Creek with rocks, wood or filter cloth. - Install rock structures and LWD placement in Beaverdam Creek and Bridge Creek. - Decommission Forest Road 1619805			

The AMPs will describe how domestic livestock grazing, at proper use levels, would be conducted and will include the following additional terms and conditions:

- Structural range improvement standards and maintenance assignments
- Requirements for livestock distribution, including herding and salting
- Monitoring protocols

Monitoring and Mitigation Measures

I will implement the following management requirements, constraints, and mitigation measures to minimize, reduce, or eliminate environmental harm (EA on pages 40-44). These measures are in addition to standard management direction in the Forest Plan and include measures to protect unique and sensitive habitats, soil and water quality, wildlife, vegetation, range, threatened, endangered, and sensitive animals and plants, cultural resources, and to deal with noxious weeds.

Range

Management Requirement/Mitigation Measure	Objective	Responsible Person
Alternative 2		
New water developments would be constructed by digging a hole approximately 2-6 feet deep, which would allow for the placement of a springbox for water collection. A buried pipe would extend to a water trough, preferably equipped with a limiter switch to conserve water. Water troughs would be placed well away from the spring source to protect the headworks from possible trampling. If the spring rests in a wet area, an enclosure would be constructed to provide additional protection to the spring source. All headworks and spring sources would be protected by fencing.	To maintain and improve spring conditions.	Range Management Specialist

Silviculture

Management Requirement/Mitigation Measure	Objective	Responsible Person
Alternatives 1 & 2		
Place salt blocks outside of conifer or aspen plantations where the trees are less than 6' high.	To avoid damaging regeneration.	Range Management Specialist and Silviculturist

Watershed

Management Requirement/Mitigation Measure	Objective	Responsible Person
Alternative 2		
For fence construction along riparian areas, no repeated use (going back and forth over the same path) of ATVs or other motorized vehicles would occur within riparian areas.	To avoid damaging soil and riparian conditions	Range Management Specialist, Hydrologist, or Fish Biologist

Fisheries

Management Requirement/Mitigation Measure	Objective	Responsible Person
Alternatives 1 & 2		
Place salt blocks outside of RHCAs.	Reduce impacts to riparian areas	Range Management Specialist
Alternative 2		
Emphasize placing new water gaps in portions of channels where fine spawning gravels are not present	Eliminate damage to redds	Range Management Specialist
Construction of rock structures, addition of large woody debris and head cut stabilization would be performed during the instream work period with hand equipment.	Stabilize streambanks and reconnect the flood plain with the stream channel.	Fisheries Biologist and Hydrologist

Terrestrial Wildlife

Management Requirement/Mitigation Measure	Objective	Responsible Person
Alternatives 1 & 2		
Known raptor nests and new raptor nests discovered in or immediately adjacent to the Planning Area will have nest protection and disturbance standards adhered to during fence/water development construction and reconstruction. To conduct these activities during a prohibited date a waiver must be obtained from the District Biologist.	Protect raptor nests from alteration and disturbance	Range Specialist, District Wildlife Biologist
Riparian shrub standards (related to livestock grazing) would also apply to hardwood tree species of black cottonwood and quaking aspen.	Improve this “featured” habitat	Range Specialist
Aspen restoration by thinning and burning would be accomplished by hand methods.	Restore aspen	District Wildlife Biologist
All livestock water troughs would have wildlife escape ramps permanently installed.	Reduce drowning impacts to birds, small mammals and bats.	Range Specialist

Fuels

Management Requirement/Mitigation Measure	Objective	Responsible Person
Alternative 2		
Prescribed burning of Cougar Flat and aspen stands would occur during the spring or fall burning window by hand methods and/or ATVs.	Restore vegetation to an early seral stage. Stimulate aspen regeneration.	Fuels Specialist

Heritage

Management Requirement/Mitigation Measure	Objective	Responsible Person
Alternatives 1 & 2		
If site inspection indicates a need for mitigation measures at any archaeological or historic sites these would be developed in consultation with the Oregon State Historic Preservation Office and would be tailored to the specific conditions at each site. Past experience demonstrates that one or more of the following mitigation measures will normally suffice: -The erection of permanent or temporary fence around site perimeters -Altering livestock on/off dates within the allotment in order to lessen disturbance at sites with subsurface components located in areas vulnerable during wet or moist seasons -Data recovery for small lithic scatters with no subsurface component -Streambank stabilization in riparian areas where erosion is threatening a site -Providing alternative water sources for livestock in cases where troughs or stock ponds are within site perimeters. Other mitigation measures may be considered.	Protect NRHP eligible and potentially eligible sites from significant grazing related impacts	District Archaeologist, Range Specialist
Any newly discovered sites located during new survey will be evaluated for NRHP eligibility and submitted to SHPO for concurrence, along with all potential mitigation recommendations (for examples, see above).	Protect NRHP eligible and potentially eligible sites from significant grazing related impacts	District Archaeologist, Range Specialist
Salt blocks would not be located on archeological and historic sites.	Protect NRHP eligible and potentially eligible sites from significant grazing related impacts	District Archaeologist, Range Specialist
Alternative 2		
For proposed range improvement projects, clearances under Section 106 of the National Historic Preservation Act would be completed and concurred with as needed by the Oregon State Historic Preservation Office before the projects are implemented.	Protect NRHP eligible and potentially eligible sites from significant grazing related impacts	District Archaeologist, Range Specialist

Noxious Weeds

Executive Order 13112 requires Federal agency whose actions may affect the status of invasive species to identify those actions and within budgetary limits, “(i) prevent the introduction of invasive species; (ii) detect and respond rapidly to and control populations of such species...(iii) monitor invasive species populations...(iv) provide for restoration of native species and habitat conditions in ecosystems that have been invaded;...(vi) promote public education on invasive species...and (3) not authorize, fund, or carry out actions that it believes are likely to cause or promote the introduction or spread of invasive species...unless, pursuant to guidelines that it has pre-scribed, the agency has determined and made public...that the benefits of such actions clearly outweigh the

potential harm caused by invasive species; and that all feasible and prudent measures to minimize risk of harm will be taken in conjunction with the actions.”

The following management requirements and mitigation measures meet the intent of Executive Order 13112.

Management Requirement/Mitigation Measure	Objective	Responsible Person
Alternatives 1 & 2		
Permittees would be provided with a current list of noxious weeds identification material. A map showing known noxious weed infestations sites within each allotment would be reviewed at each annual operating meeting. Permittees would be asked to add known noxious weed locations not shown on the map.	To reduce the risk of spreading noxious weeds	Range Specialist
All equipment used to construct, reconstruct, or maintain water developments and fences would be cleaned in a manner sufficient to prevent noxious weeds from being carried onto the Planning Area. This requirement does not apply to passenger vehicles or other equipment used exclusively on roads. Cleaning will occur off of National Forest System lands. Cleaned equipment would be inspected and approved by the Forest Officer in charge of administering the project prior to the equipment being moved into the project area.	To reduce the risk of introducing noxious weeds	Range Specialist, District Botanist
Any seed used in the construction, reconstruction, or maintenance of water developments or in restoration projects will be certified weed free.	To reduce the risk of introducing noxious weeds	Range Specialist, District Botanist

I will also implement the following monitoring as described in the EA on pages 45-46. These monitoring items are in addition to standard monitoring direction in the Forest Plan. The objectives of monitoring are to determine if management activities are moving resources towards desired conditions.

Noxious Weed Monitoring

Noxious weeds would be monitored for changes in populations. (Range Specialist)

Aspen Treatment Monitoring

Aspen stand treatment and protection measures would be monitored for effectiveness. When aspen protection measures are deemed no longer needed (aspen shoots are at least 8 feet high), they would be removed. (Wildlife Biologist and Silviculturist)

Sensitive Plant Monitoring

The known sensitive plant site would be monitored for changes in populations and effectiveness of excluding from livestock grazing. The areas identified as potential sensitive plant habitat would be monitored for sensitive plants and effectiveness of requiring at least a 6-inch stubble height on the floodplains. (Botanist)

Aquatic/Hydrology Monitoring

Stream temperatures (303 (d)), sediment/substrate, LWD, pools, bank stability, lower bank angle, width/depth ratio, PFC survey and fish survey monitoring would continue at established sites. Headcut treatments would be monitored for effectiveness. (Fish Biologist and/or Hydrologist)

Heritage Resource Monitoring

Monitor sites that have exhibited evidence of grazing impacts after the implementation of appropriate mitigation measures (as discussed in Chapter 2 under Management Requirements, Constraints, and Mitigation Measures-Heritage) on a regular basis to be determined in consultation with Oregon SHPO. This monitoring will evaluate the effectiveness of implemented mitigations. (Archeologist)

Monitor other NRHP sites or potentially eligible sites in areas of frequent, heavy cattle congregation in order to determine if mitigation measures need to be implemented. (Archeologist)

Range Resource Monitoring

A combination of 1) The Malheur National Forest Draft Range Monitoring Guidelines (June 2005) (Appendix A), 2) The Malheur National Forest Riparian Monitoring (Condition and Trend) Strategy (2005) (Appendix B), and 3) the monitoring protocol developed by the Interagency Implementation Team (IIT), as amended in 2004 (IIT 2004), would be used to determine if grazing is allowing movement towards desired conditions and Forest Plan Standards, as amended. Based on these monitoring results, the Forest Service may adjust grazing management using a variety of management tools to adjust timing, intensity, duration, and season of use. Methods may be used singly or in combination with each other. These methods could include (but are not limited to):

- Changing livestock numbers;
- Changing the time livestock are in a pasture (length of use);
- Changing the time of year a pasture is used (season of use);
- Riding/herding/salting (i.e. more intensive management);
- Fencing areas to limit access and use (fences may be permanent or temporary);
- Temporarily curtailing/suspending use (resting pastures); and/or
- Cancellation of grazing permits in whole or part.

(Range Specialist, Botanist, Wildlife Biologist, Fish Biologist and/or Hydrologist)

Rationale for the Decision

I have reviewed the interdisciplinary analysis for this project area, the alternatives, the issues and comments from the public and the interdisciplinary teams, the Forest Plan, and conditions in the project area. After this review, I have concluded that Alternative 2 – Proposed Action best meets the purpose and need and is a responsible course of action for the House Creek, West Malheur and Wolf Mountain Allotment Management Plans.

The purpose of this proposed action is to continue authorization of livestock grazing in a manner that is consistent with the Malheur Forest Plan as amended (EA pages 6-7).

Alternative 2 meets the purpose and need of this proposal, to evaluate grazing management with the House Creek, West Malheur and Wolf Mountain Allotments and review the issues and concerns associated with management regarding the range and other resources. It also evaluates management on the affected allotments as provided in the Forest Plan, in such a manner as to ensure compliance with applicable laws, regulations, policies, and direction.

Alternative 2 meets the purpose to provide forage for the local livestock industry and to determine the appropriate flexibility in grazing, including kind, class, number, and season of use to be permitted (if any). It also identifies the appropriate management practices to implement on the allotments associated with this decision (EA pages 6-7).

Alternative 2 addresses the need to implement the direction and objectives of the Malheur National Forest Land and Resource Management Plan, by developing Allotment Management Plans (AMP) for the listed allotments. The goal of these AMP will be to maintain or improve vegetative conditions through the use of livestock management while providing for other uses (EA pages 6-7).

Congressional intent to allow grazing on suitable lands (Multiple Use Sustained Yield Act of 1960, Wilderness Act of 1964, Forest and Rangeland Renewable Resources Planning Act of 1974, Federal Land Policy and Management Act of 1976, National Forest Management Act of 1976), where consistent with other multiple use goals and objectives, is met with this alternative (EA pages 6-7).

It is Forest Service policy to make forage available to qualified livestock operators from lands suitable for grazing consistent with land management plans, Alternative 2 addresses this need. (FSM 2203.1) (EA pages 6-7)

Alternative 2 meets Forest Service policy to continue contributing to the economic and social well being of people by providing opportunities for economic diversity and by promoting stability for communities that depend on range resources for their livelihood (Forest Service Manual 2202.1) (EA pages 6-7).

Alternative 2 identifies that forage producing lands will be managed for livestock grazing where consistent with land management plans (36 CFR 222.2 (c)) (EA pages 6-7).

Alternative 2 will ensure compliance with the 1995 Rescissions Bill, Public Law 104-19. A portion of this bill, Section 504, pertains to grazing on National Forest System lands, specifically allotment analysis, grazing permit issuance, and compliance with NEPA. This bill requires the Forest Service to complete an analysis and update allotment management plans on all Forest allotments over the next 15 years (EA pages 6-7).

Within the House Creek, West Malheur and Wolf Mountain Allotments resource needs have been identified where vegetation and other resource conditions are not always consistent with the Malheur Forest Plan as amended, and livestock distribution and utilization can be modified to better contribute to desired conditions (EA pages 7-9). Adjustments from current management are proposed where existing conditions are not moving or are not moving at an acceptable rate towards desired conditions.

Alternative 2 best meets the need to enhance and restore aspen stands within the three allotments. Alternative 2 will regenerate and protect from browsing all known aspen stands. Alternatives 1 and 3 do not regenerate or protect any aspen stands from ungulate browsing (EA pages 32-40).

Alternative 2 will best enhance and restore riparian conditions in all three allotments by implementing the following activities in identified areas: excluding livestock, reducing utilization, fencing and stabilizing headcuts, felling timber to create jackstraw barriers, installing rock structures and large wood placement, planting and protecting willow, and decommissioning Forest Road 1619805. Alternative 1 would only use adaptive management practices to exclude and reduce utilization. Alternative 3 would not permit livestock grazing (EA pages 32-40).

Alternative 2 will best improve livestock grazing distribution patterns because improvements as well as adaptive management practices will be utilized. Alternative 1 only uses adaptive management practices and Alternative 3 would not permit livestock grazing (EA pages 32-40).

Alternative 2 will utilize a combination of fencing, reducing utilization and adaptive management practices to best enhance and restore upland shrubs and bunchgrasses. Alternative 1 only uses adaptive management practices and Alternative 3 would not permit livestock grazing (EA pages 32-40).

Alternative 2 will best enhance and restore *Botrychium* species (moonwarts) and its habitat because utilization will be reduced in identified habitat and an existing population will be fenced to protect it from livestock grazing. Alternative 1 would only use adaptive management practices and Alternative 3 would not permit livestock grazing (EA pages 32-40).

Alternative 2 will best restore upland and riparian vegetation in Cougar Flat because it will prescribe burn the area and reconnect the stream channel to the floodplain in order to promote riparian species capable of stabilizing stream banks. Alternatives 1 and 3 would not restore upland and riparian vegetation in Cougar Flat (EA pages 32-40).

These actions respond to the goals and objectives outlined in the Malheur National Forest Plan as amended, and helps move the project area towards desired conditions described in that plan. These actions also initiate many of the recommendations made in the Lower Malheur Watershed Assessment (December 1996) (EA pages 32-40).

Other Alternatives

In addition to the selected alternative, I considered two other alternatives in detail, the Current Management Alternative (Alt. 1) and the No Grazing Alternative (Alt. 3).

Current Management Alternative (Alternative 1)

Under the Current Management Alternative, resource areas of concern would be dealt with through adaptive management and administrative changes. Adaptive management allows the Forest Service to adjust grazing management using a variety of management tools to adjust timing, intensity, duration, and season of use. Adaptive management and administrative changes are designed to provide flexibility for continued grazing and to help move towards meeting INFISH and other Forest direction with no changes to the range management infrastructure such as fences and water developments. Moving towards meeting INFISH and other Forest direction is not expected to occur overnight or even within the life of the environmental assessment. Current Management Alternative is designed to move towards meeting INFISH and other Forest direction mainly through intensive range management. This alternative uses existing fences, existing water developments and other existing range improvements to control livestock distribution and use. It does not add new improvements, which are included in the selected Alternative. I did not select this alternative because:

- It does not regenerate or protect any aspen stands from ungulate browsing (EA pages 185 and 194).
- It would not restore upland and riparian vegetation in Cougar Flat (EA page 63).
- It would not adequately protect *Botrychium* species (moonwarts) and its habitat (EA page 77).
- It only uses adaptive management practices and limits management tools to improve livestock management (EA pages 32-34).
- It would take the longest, 50+ years (EA page 47) to meet INFISH and other Forest direction.

No Grazing Alternative (Alternative 3)

Under the No Grazing Alternative, all Term Grazing Permits for the three affected allotments would be cancelled upon implementation of the decision and resolution of the appeals process. I did not select this alternative because:

- It does not adequately regenerate or protect any aspen stands from ungulate browsing (EA pages 187 and 195-196).
- No permits would be issued to graze livestock on the House Creek, Wolf Mountain, West Malheur and Van allotments unless there was a subsequent NEPA analysis and a decision to re-stock any or all of the allotments (EA pages 93-94).
- No grazing fees would be collected on these allotments and no range betterment dollars from these 3 allotments would be returned to the Malheur National Forest (EA pages 93-94).
- Operational costs would dramatically increase for the permittees with the loss of summer pasture, increased feed costs, transportation costs, potential impacts to private land and disruption of current marketing strategies. These changes

translate to a significant negative economic impact on the permittees (EA pages 93-94).

- Alternative 3 does not meet the purpose of continuing authorization of livestock grazing in a manner that is consistent with the Malheur Forest Plan as amended (EA pages 6-7).
- Alternative 3 does not meet the purpose of providing forage for the local livestock industry (EA pages 6-7).
- Alternative 3 does not meet the purpose of Congressional intent to allow grazing on suitable lands (Multiple Use Sustained Yield Act of 1960, Wilderness Act of 1964, Forest and Rangeland Renewable Resources Planning Act of 1974, Federal Land Policy and Management Act of 1976, National Forest Management Act of 1976), where consistent with other multiple use goals and objectives (EA pages 6-7).
- Alternative 3 does not meet the intent of Forest Service policy to make forage available to qualified livestock operators from lands suitable for grazing consistent with land management plans. (FSM 2203.1) (EA pages 6-7)
- Alternative 3 does not meet the intent of Forest Service policy to continue contributing to the economic and social well being of people by providing opportunities for economic diversity and by promoting stability for communities that depend on range resources for their livelihood (Forest Service Manual 2202.1) (EA pages 6-7).
- Alternative 3 does not meet the intent of identifying that forage producing lands will be managed for livestock grazing where consistent with land management plans (36 CFR 222.2 (c)) (EA pages 6-7).

Alternatives Considered but not Fully Developed

Only alternatives or specific design elements that were responsive to purpose and need were fully developed and analyzed. Alternatives are, by definition, other strategies or ways to meet purpose and need. Additional alternatives were considered during the analysis, but not fully developed. Alternatives that were considered but not fully developed are discussed in the EA (pages 30-31).

Public Involvement

The proposal was listed in the Schedule of Proposed Actions as two separate projects. The Wolf/Van Grazing AMP project was listed in the Schedule of Proposed Actions in the summer/fall 2002 issue. This project included the Van, Wolf Mountain and West Malheur Allotments. The House Creek Grazing AMP project was listed in the Schedule of Proposed Actions in the Winter/Spring 2004 issue. The proposals were combined and provided to the public and other agencies for comment during the scoping period from August 13 to September 13, 2004. Separate scoping letters were sent to the permittees using the allotments in August, 2004. Through the environmental analysis process it was determined that the Van Allotment may have effects not supported by a Finding of No Significant Impact (FONSI). Since the Van Allotment is not a connected action (40 CFR

1508.25(1)) to the other allotments a separate Environmental Impact Statement (EIS) will be prepared.

Agency personnel also met with all permittees in May 2005. Every effort was made to address permittee concerns. The permittees provided input on alternatives and site specific development proposals for their respective allotments.

I received comments on the Preliminary EA from a total of 6 individuals, permittees and organizations. All comments received were reviewed. Substantive comments received the focus during this review. Substantive comments are defined by 36 CFR part 215, 215.2 (Definitions) as “Comments that are within the scope of the proposed action, have a direct relationship to the proposed action and include supporting reasons for the Responsible Official to consider”. Substantive comments were analyzed by the ID team, read by other District staff, and considered by myself. Where appropriate, comments were incorporated into the Final Environmental Assessment. The complete record of the public involvement process, including documentation of substantive comment consideration, is available for review in the project file.

Tribal Consultation

Tribal scoping letters were sent for comment during the scoping period from August 13 to September 13, 2004. Letters were sent to the Burns Paiute Tribe, the Confederated Tribes of the Umatilla Indian Reservation, the Confederated Tribes of Warm Springs Reservation of Oregon and the Nez Perce Tribe. No responses were received.

On March 15, 2005 District Ranger Margaret David Bailey, NEPA Coordinator Lori Bailey and Vegetation Manager George Wynn met with members of the Burns Paiute Tribe as per the process of the existing Memorandum of Understanding (MOU). Topics included an overview of the project, potential alternatives and timelines. Verbal comments were in agreement with the proposed action.

I sent the Preliminary EA to the tribes listed above; I received no comments.

Finding of No Significant Impact

I have reviewed the Council on Environmental Quality Regulations for Significance (40 CFR 1508.27) and I have determined that the decision is not a major federal action that would significantly affect the quality of the human environment either individually or cumulatively; nor would this decision affect the quality of the human environment in either context or intensity. Therefore, an environmental impact statement will not be prepared. This conclusion and finding is based on the following factors found in the documentation:

Context

The actions described in Alternative 2 are limited in scope and geographic application (40 CFR 1508.27(a)). The location of the actions is described in the EA (pages 3-4) and on maps (EA, figures 1 and 2). The physical and biological effects are limited. No significant effects are expected to extend beyond the project area or the Wolf Creek, Bear Creek and Trout Creek Watersheds because livestock grazing would be managed so that

effects from livestock grazing would not carry over to the following grazing season, thus allowing a “near natural” rate of recovery of riparian areas as defined by PACFISH Enclosure B (Appendix J) (EA page 68).

Intensity

Based on the site-specific analysis summarized in the Environmental Assessment for the House Creek, West Malheur and Wolf Mountain Allotments and on previous experience with similar proposals, I have determined that implementation of the actions described in Alternative 2 are not a major Federal action, individually or cumulatively, and will not have a significant effect on the quality of the human environment, considering the context and intensity of impacts (40 CFR 1508.27). This determination is based on the context factors stated above, project design including mitigation and resource protection measures (EA pages 40 to 44), and consideration of the following intensity factors:

1. *Impacts that may be both beneficial and adverse.* Both beneficial and adverse impacts (40 CFR 1508.27(b)(1)) of implementing Alternative 2 have been fully considered within the EA. Beneficial and adverse direct, indirect, and cumulative environmental impacts discussed in the EA have been disclosed within the appropriate context and intensity. There will be no significant direct, indirect, or cumulative effects to the various resources of the area or other components of the environment. I base this finding on the following:

Non-Significant Impacts From Alternative 2

Resource	Impact	Size or Scope of the Impact	Reason an Impact of this Size or Scope is not Significant
Sensitive Plants: <i>Botrychium</i> species	Within the West Malheur and Wolf Mountain Allotments, the Proposed Action Alternative would have direct and indirect effects to <i>Botrychium</i> habitat by trampling and could be injurious to unknown populations.	Limited to areas described in the EA as potential habitat.	Because the six <i>Botrychium</i> species considered here have a broad distribution on the continent, and because more of them are being found each year as intensive surveys are conducted in appropriate habitats, any possible impacts on individuals from this alternative would not jeopardize the survival of the species as a whole. Livestock grazing at a level that results in retaining at least a 6-inch stubble height of grasses, sedges, and rushes in the riparian zone (floodplain) in identified habitat, may impact <i>Botrychium</i> habitat, not individuals (MIIH), but would not cause a loss of viability or trend toward federal listing. No impacts (NI) to the <i>Botrychium crenulatum</i> population (in the Wolf Mountain Allotment) would occur because it would be fenced and livestock grazing would be excluded. (EA page 78)

Resource	Impact	Size or Scope of the Impact	Reason an Impact of this Size or Scope is not Significant
Noxious Weeds	Permitted livestock can introduce noxious weeds by transporting seeds in their hair or in digestive systems. Proposed ground disturbing activities may also increase the chance of noxious weed introduction and spread.	Limited to allotment boundaries.	The probability of domestic livestock transporting seeds in their digestive system is low because cattle do not generally consume the noxious weeds found on the three allotments. Livestock grazing or associated permittee actions are not a major factor in the establishment and spread of noxious weeds in the project area (EA page 84). Management requirements, constraints and mitigation measures identified in Chapter 2 would help lessen the potential for spread. Specifically, cleaning of equipment and seeding disturbed ground with certified weed free seed would reduce the chances of spread of noxious weeds (EA page 86).
Economics	The proposed action requires an increased level of livestock management. Emphasis in this alternative involves changing cattle use and distribution near aspen stands, riparian areas, <i>Botrychium</i> habitat and other areas of concern.	Limited to allotment boundaries.	As part of the public involvement process, the agency met with all permittees in May 2005. Every effort was made to address permittee concerns. The permittees provided input on alternatives and site specific development proposals for their respective allotments. The permittees and the Forest Service will be cooperatively involved in the implementation of these activities. Implementation will occur over several years (EA page 17 and 93).

Resource	Impact	Size or Scope of the Impact	Reason an Impact of this Size or Scope is not Significant
Soil - Erosion	Concentrated livestock grazing may cause localized soil compaction which in turn may cause erosion.	Limited to areas where livestock congregate in the three allotments (meadows, watering areas, and grassy riparian areas)	Because livestock in these allotments tend to concentrate in small areas near watering points, springs, and riparian zones, the total area of soil compaction is less than or equal to 5% of the total allotment acreage (EA pages 98, 99 and 101). Under Alternative 2, existing detrimental soil disturbance may continue at sites where livestock gather (EA pages 114, 116-117). However, soil compaction did not induce or exacerbate erosion on the sites that were assessed (EA pages 98-99 and 102). Erosion is the detrimental impact that would cause permanent impairment of land productivity; impairment from compaction is reversible (EA page 97). Additionally, under the selected alternative, soil quality indicators in fenced and managed areas for compaction, riparian trampling, and upland trampling are expected to improve and trend upward due to less grazing pressure. Soil nutrients are likely to trend upward due to lower forage utilization rates. For areas where forage utilization is decreased by fencing and adaptive management procedures, recover of desired conditions is likely, while grazing continues (EA pages 114-115).

Resource	Impact	Size or Scope of the Impact	Reason an Impact of this Size or Scope is not Significant
Fisheries (RMOs)	Grazing can affect bank stability with the removal of riparian vegetation. Livestock may cause mechanical damage of stream banks from hoof shear. Undercut banks that reduce stream exposure to sunlight to maintain water temperatures and provide hiding cover for fish can be destroyed under the weight of cattle; this is exacerbated where deep-rooted, late seral vegetation has been replaced with more shallow-rooted, early seral species. This increase in bank instability can lead to changes in channel profile by increasing width and decreasing depth, modifying bank angle as well as increasing sediment input to the stream.	Wolf Creek, Bear Creek and Trout Creek Watersheds.	Overall decreased utilization levels, improved livestock distribution, riparian livestock enclosures, riparian pastures, headcut stabilization, spring protection and channel restoration activities would improve stream conditions and fisheries habitat on all allotments and move these aquatic systems towards a desired future condition (DFC) through a near natural rate of recovery process, as described in INFISH/PACFISH (EA page 164). The selected alternative is consistent with Forest Plan direction and none of the potential combined effects are expected to adversely affect INFISH/PACFISH RMOs or population viability (EA page 155). It is expected that most Forest RMOs may be met in 30-40 years, depending on the current condition, site potential, fires, and precipitation (EA page 164). Continued application of INFISH/PACFISH direction is expected to improve fish habitat conditions and move aquatic habitat towards the DFC within the project area. Stream channel conditions are expected to improve with activities and actions completed under this alternative. The Proposed Action Alternative includes aquatic conservation and restoration actions that would improve the quality, quantity, function, sustainable productivity, and distribution of recreational fisheries as directed under Executive Order 12962, Recreational Fisheries (Appendix K) (EA page 155).

Resource	Impact	Size or Scope of the Impact	Reason an Impact of this Size or Scope is not Significant
Wolverine – Sensitive species	Human disturbance related to proposed management activities of herding, salting, fence maintenance, and watering livestock might displace transient dispersing wolverine from potential foraging habitat during the duration of the project.	Limited to wolverine habitat in the three allotments.	The high road densities and human disturbance in the planning area would limit wolverine use. Wolverine occurrence in the project area would be rare. Due to this possible short-term indirect effect from disturbance and potential negative impacts on big game winter range, a may impact individuals or habitat, but will not likely contribute to a trend towards federal listing or cause a loss of viability to the population (MIIH) is given (EA, Appendix H pages 13-17).
Western Sage Grouse – Sensitive species	Reduced grazing pressure in identified pastures would reduce the potential for livestock to utilize forbs which would improve forb production.	Limited to sage grouse habitat in the three allotments.	Activities proposed under the Proposed Action Alternative may improve late season brood rearing habitat by applying light grazing on the Rock Spring pasture. A MIIH (may impact individuals or habitat, but will not likely contribute to a trend towards federal listing or cause a loss of viability to the population)/ BI (Beneficial Impact) is given (EA, Appendix H pages 21-24).

Resource	Impact	Size or Scope of the Impact	Reason an Impact of this Size or Scope is not Significant
Gray Fly Catcher – Sensitive species	Grazing management may be impeding the reproduction of shrubs in the Rock Springs pasture of the West Malheur Allotment. It can be surmised that reduction in recruitment of shrubs would degrade habitat for gray flycatchers and other birds requiring shrubs for nesting and/or foraging.	Limited to gray fly catcher habitat mainly in the Rock Springs pasture of the West Malheur allotment	Since the ecological condition of the shrub-steppe habitats would improve under the Proposed Action alternative, activities may impact individuals or habitat, but will not likely contribute to a trend towards federal listing or cause a loss of viability to the population (MIIH)/Beneficial Impact (BI) is given (EA, Appendix H pages 24-26).

2. *The degree to which the action affects public health or safety.* Alternative 2 would not significantly affect public health or safety (40 CFR 1508.27(b)(2)). This finding is supported by knowledge of past similar projects in which no effects to public health or safety have occurred.
3. *Unique characteristics of the geographic Area.* There will be no significant effects on unique characteristics of the area (40 CFR 1508.27(b)(3)) such as historic or cultural resources, parklands, prime farmlands, wetlands, wild and scenic rivers, or ecologically critical areas. With the design criteria (EA, page 43) Alternative 2 conforms to those federal laws and guidelines for the protection of NRHP-eligible sites (EA, page 205). The area does not contain parklands, prime farmlands, or wild and scenic rivers.
4. *The degree to which the effects on the quality of the human environment are likely to be highly controversial* (40 CFR 1508.27(b)(4)). These types of activities have taken place on the Emigrant Creek Ranger District in similar areas and the resulting effects are well known. In that sense, there is no known scientific controversy over the impacts of the project. CEQ guidelines on controversy refer not to the amount of public opposition, but to a substantial dispute as to the size, nature, or effect of the action.

My decision falls within the scope of the analysis for the Malheur National Forest Land and Resource Management Plan, as amended, and it's supporting Final Environmental Impact Statement. The desired future condition, standards and guidelines and the analysis for the Forest Plan support the

management of livestock grazing on lands allocated for such use. Effects on the quality of the human environment are not considered highly controversial because management of livestock grazing has taken place in this area and in similar areas across the Forest for many years and the resulting effects are well known and understood. My decision does not include activities that were not already addressed in the Forest planning process.

Given the site-specific conditions and impacts disclosed in the EA chapter 3, the effects of implementation of this decision on the quality of the human environment are not likely to rise to the level of scientific controversy as defined by the Council of Environmental Quality.

5. *The degree to which the possible effects on the human environment are highly uncertain or involve unique or unknown risks.* The selected alternative would not impose highly uncertain, or involve unique or unknown, risks (40 CFR 1508.27(b)(5)). We have considerable experience with the types of activities to be implemented. The activities proposed in this decision are well-established land management practices. The risks are well known and understood. Based on previous similar actions the probable effects of this decision on the human environment, as described in the Environmental Assessment, do not involve effects that are highly uncertain or involve unique or unknown risks.
6. *The degree to which the action may establish a precedent for future actions with significant effects or represents a decision in principle about a future consideration.* Alternative 2 does not set a precedent for other projects that may be implemented to meet the goals and objectives of the Forest Plan, nor does it represent a decision in principle about a future consideration (40 CFR 1508.27(b)(6)). The actions described in Alternative 2 are limited in scope and geographic application (40 CFR 1508.27(a)).
7. *Whether the action is related to other actions with individually insignificant but cumulatively significant impacts.* Alternative 2 is not related to other actions with individually insignificant but cumulative significant impacts (40 CFR 1508.27(b)(7)). The EA, Appendix C provides a tabular display of all activities and natural events that already have occurred, are currently occurring, or are likely to occur in the area of potential cumulative effect. The information in Appendix C is then incorporated into cumulative effects discussions in the environmental consequences sections of Chapter 3. Past, present, and reasonably foreseeable future activities were analyzed, along with proposed activities, to determine cumulative effects. This was done in a manner consistent with CEQ guidance contained in a June 24, 2005 Memorandum. Specifically, that cumulative effects analysis consider relevant past actions to the extent needed to determine if the effects from the proposed alternatives would add to, modify, or mitigate the currently existing effects from such past actions. Relevant past, present, and reasonably foreseeable future activities are displayed in Appendix C. There will be no significant cumulative effects to vegetation and rangeland resources pages 68-69, 64-65, forested vegetation pages 72-73, biological soil crusts page 75, sensitive

plants pages 79-80, noxious weeds pages 85-86, Social and Economics pages 93-94, watershed and soil pages 111-117, water quality pages 118-125, fisheries pages 158-166, terrestrial wildlife pages 175, 181-182, 187-188, 191, 192, 196-197, recreation page 200, and heritage resources pages 205-206.

8. *The degree to which the action may adversely affect districts, sites, highways, structures, or objects listed on the national register of historic places or may cause loss or destruction of significant scientific, cultural, or historic resources.* Cultural resource surveys and reconnaissance have occurred and are ongoing. With the design criteria (EA, page 43) Alternative 2 conforms to those federal laws and guidelines for the protection of NRHP-eligible sites (EA, page 205). Alternative 2 would not adversely affect districts, sites, highways, structures, or objects listed in, or eligible for, listing in the NRHP or cause loss or destruction of significant scientific, cultural, or historical resources (40 CFR 1508.27(b)(8)). For proposed range improvement projects, clearances under Section 106 of the National Historic Preservation Act will be completed and concurred with as needed by the Oregon State Historic Preservation Office before the projects are implemented.
9. *The degree to which the action may adversely affect an endangered or threatened species or its habitat.* The actions are not likely to significantly adversely affect any endangered, threatened, or sensitive terrestrial wildlife species, aquatic species, plant species, or designated critical habitat (40 CFR 1508.27(b)(9)) under the Endangered Species act of 1973. Specifically, the proposed action will have No Effect (NE) on endangered gray wolf and threatened bald eagle and lynx (EA, Appendix H). Additionally, no other threatened or endangered species are present within the three allotments (EA, Biological Evaluations in Appendices F, G and H).
10. *Whether the action threatens a violation of Federal, State, or local law or requirements imposed for the protection of the environment.* I find this decision is compliant with relevant Federal, State, and local laws, regulations, and requirements designed for the protection of the environment (40 CFR 1508.27(b)(10)). Applicable laws and regulations were considered in the EA (see EA pages 22-26).

My decision to implement the projects as described in Alternative 2 is consistent with the intent of Forest Plan management direction (goals, desired conditions, standards, guidelines).

Findings Required by Other Laws _____

Forest Plan Consistency

Federal regulations (36 CFR 219.10(e)) require me to insure that permits, contracts, cooperative agreements, and other activities carried out on the Malheur National Forest are consistent with the Forest Plan. Accordingly, I have reviewed my decisions against Forest Plan direction, and I have determined my decisions are consistent with forest

management direction established in the *Malheur National Forest Land and Resource Management Plan FEIS* (approved May 25, 1990), as amended by:

- The Interim Strategies for Managing Anadromous Fish-producing Watershed in Eastern Oregon and Washington, Idaho, and Portions of California (PACFISH), dated August 18, 1994.
- Regional Forester's Amendment #2 for the Revised Continuation of Interim Management Direction Establishing Riparian, Ecosystem and Wildlife Standards for Timber Sales, dated June 5, 1995.

National Forest Management Act

I find this decision to be consistent with the requirements of the National Forest Management Act implementing regulations.

INFISH

Alternative 2 is fully compliant with the *Inland Native Fish Strategy EA, Decision Notice and FONSI*, dated July 28, 1995.

Public Law 92-488

This law recognizes the Burns Paiute Tribe and their reservation. As a Federally recognized tribe, the Burns Paiute Tribe retains rights of inherent sovereignty. The planning area is within the traditional and current use area of the Burns Paiute Tribe. The planning area is within the aboriginal use area of the Burns Paiute Tribe. All actions to be taken must fully consider and comply with Native American treaty rights. Alternative 2 is not expected to have an adverse effect on the Burns Paiute Tribe and would not prevent continuation of traditional practices (EA, page 205).

Environmental Justice

On February 11, 1994, President Clinton signed Executive Order 12898. This order directs each Federal agency to make achieving environmental justice part of its mission by identifying and addressing, as appropriate, disproportionately high and adverse human health or environmental effects of its programs, policies, and activities on minority populations and low-income populations. On the same day, the President also signed a memorandum emphasizing the need to consider these types of effects during NEPA analysis. On March 24, 1995, the Department of Agriculture completed an implementation strategy for the E.O. Where Forest Service proposals have the potential to disproportionately and adversely affect minority or low-income populations, these effects must be considered and disclosed (and mitigated to the degree possible) through the NEPA analysis and documentation. There is no indication in the EA that there is disproportionately high and adverse human health or environmental effects of its programs, policies, and activities on minority populations and low-income populations (EA, pages 87-94, 207).

Consumers, Civil Rights, Minorities, and Women

All Forest Service actions have potential to produce some form of impacts, positive or negative, on the civil rights of individuals or groups, including minorities and women. An analysis of this potential impact is required by Forest Service Manual and Forest Service Handbook direction (see Socio-Economic, Chapter 3). There is no indication in the EA that Alternative 2 will have impacts, positive or negative, on the civil rights of individuals or groups, including minorities and women (EA, pages 87-94, 207).

Implementation

When no appeal is filed within the 45-day time period, implementation of the decision may begin on, but not before, the 5th business day following the close of the appeal-filing period (36 CFR 215.15).

Except for emergency situations (36 CFR 215.10(c)), when an appeal is filed, implementation may occur on, but not before, the 15th business day following the date of appeal disposition (36 CFR 215.2). In the event of multiple appeals of the same decision, the implementation date is controlled by the date of the last appeal disposition.

Right to Appeal or Administrative Review

My decision is subject to administrative appeal. Organizations or members of the general public may appeal my decision according to Title 36 CFR Part 215. This decision is subject to appeal by a permittee under either 36 CFR 251 Subpart C or 36 CFR 215, but not under both (as per 36 CFR 215.11 (d)). Appeals under 36 CFR 251 by a permittee must be consistent with 36 CFR 251.90 (content of notice of appeal), and must be made in writing, postmarked, and sent to the Appeal Deciding Officer within 45 days of the date on the written notice to the permittee of this decision. The 45-day appeal period begins the day following the date the legal notice of this decision is published in the Burns Times Herald, Burns, Oregon, the Emigrant Creek Ranger District's official newspaper of record. The Notice of Appeal must be filed with the Appeal Deciding Officer:

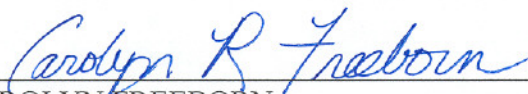
Appeal Deciding Officer
Pacific Northwest Region
USDA Forest Service
Attn. 1570 Appeals
P.O. Box 3623
Portland, OR 97208-3623

Appeals may also be filed electronically at: appeals-pacificnorthwest-regional-office@fs.fed.us, or hand delivered to the above address between 8:00 AM and 4:30 PM, Monday through Friday except legal holidays. It is the responsibility of those who appeal a decision to provide the Appeal Deciding Officer sufficient written evidence and rationale to show why my decision should be changed or reversed. The appeal must be filed with the Appeal Deciding Officer (36 CFR 215.8) in writing. At a minimum, an appeal must include the following:

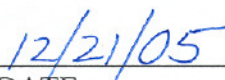
1. Appellant's name and address (§ 215.2), with a telephone number, if available;
2. Signature or other verification of authorship upon request (a scanned signature for electronic mail may be filed with the appeal);
3. When multiple names are listed on an appeal, identification of the lead appellant (§ 215.2) and verification of the identity of the lead appellant upon request;
4. The name of the project or activity for which the decision was made, the name and title of the Responsible Official, and the date of the decision;
5. The regulation under which the appeal is being filed (36 CFR Part 215 or 36 CFR 251 subpart C (§ 215.11(d))).
6. Any specific change(s) in the decision that the appellant seeks and rationale for those changes;
7. Any portion(s) of the decision with which the appellant disagrees, and explanation for the disagreement;
8. Why the appellant believes the Responsible Official's decision failed to consider the substantive comments; and
9. How the appellant believes the decision specifically violates law, regulation, or policy.

For additional information concerning the specific activities authorized with my decision, you may contact:

Lori Bailey
IDT Leader
Emigrant Creek Ranger District
265 Hwy. 20 S.
Hines, OR 97738
(541) 573-4300



CAROLYN FREEBORN
District Ranger



DATE

Comment Analysis for the House Creek, West Malheur and Wolf Mountain Allotments Preliminary Environmental Assessment

The 30-day comment period for the House Creek, West Malheur and Wolf Mountain Allotments Preliminary Environmental Assessment was initiated on August 11, 2005 and concluded on September 9, 2005. A total of 6 comment letters or e-mails were received.

Comments Received

1. Letter, dated August 24, 2005, Jim Bentz (Permittee)
2. Letter, dated September 1, 2005, Linda Driskill (Grant County Conservationists)
3. Letter, dated September 8, 2005, Kay Tiesl (Oregon Cattlemen's Association)
4. Letter, dated September 6, 2005, Pat Larson (Van Grazing Cooperative)
5. Letter, dated September 10, 2005, Kristin Ruether (Oregon Natural Desert Association)
6. E-Mail, dated September 9, 2005, Doug Heiken (Oregon Natural Resources Council)

Comment Analysis

Comment Letter #1

8-24-2005

SEP-24-2005

Emigrant Creek Ranger District Carolyn R. Freeborn, District Ranger
265 Highway 20 South
Hines, OR 97738

Jim Bentz
Actin Ranch
P.O. Box 108 Drewsey, OR 97904

Dear Carolyn R. Freeborn, District Ranger:

Please consider this my official comments and formal appeal to Preliminary Environmental Assessment for House Creek, West Malheur and Wolf Mountain Allotments: Emigrant Creek Ranger District, Malheur National Forest, Grant and Harney Counties, Oregon.

In Chapter 2- Alternatives pg. 34 paragraph 3 it is stated " The designated monitoring areas (DNA's) represent use in the most sensitive portion of the pasture, and generally when standards are met at the DNA, standards will be met elsewhere in that pasture (IIT 2004). To provide monitoring results representative of grazing use, small areas where livestock use is affected by range developments (such as water gaps or areas directly next to fences) or where human use would be expected to be high (such as campsites) would not be chosen for DNA's.

The stipulation that small areas where livestock use is affected by range developments (such as water gaps or areas directly next to fences) or where human use would be expected to be high would not be chosen for DNA's is well thought out and in line with standard range monitoring protocol. It provides a good starting point for a monitoring plan. However, basing the assessment of management on the entire allotment on area's of the allotment that are determined to be the most sensitive would be biased. Decisions based on these "select areas" which may constitute a vegetative anomaly may be arbitrary and capricious. Since this species is listed as a sensitive species rather than a legally listed Threatened and Endangered species, and the documents states that "any possible impacts on individuals from this alternative (Alternative - 2) would not jeopardize the survival of this species as a whole" I do not see where more restrictive standards that would negatively impact the feasibility of livestock operation within this allotment are in line with the Purpose and Need of the Environmental Assessment.

1-1

1-2

1-3

I would like to see the monitoring protocol further refined to state that the DNA's would be selected by use of stratified random sampling. Stratification should be based on community types within the allotment with sampling for individual community types

1

being independent of each other. All points within a community type should be randomly selected to give an accurate and un-biased picture of vegetative attributes. Changes in management should be based on long-term trend rather than point in time assessments. This would give an un-biased and statistically valid monitoring protocol that would assess management activity on the allotment on a community-by-community basis. Using adaptive management it would then be feasible to adjust vegetation management, such as prescribed burns and livestock grazing management to benefit the various plant communities. If small areas of concern are identified to be negatively affected by livestock grazing they could be protected with an enclosure rather than impacting livestock management on the entire pasture. Enough DNA's should be established within each community type to allow statistical viability in the analysis as outlined in the Interagency Technical Reference BLM/RS/ST - 96/004 + 1730 "Utilization Studies and Residual Measurements" (1996).

Chapter 2 - Alternatives pg 35 paragraph 1 Grazing Would be Based on ADM's: Permits Would be Based on Average Animal Use and Cow-Calf Pairs states: "The actual livestock numbers and periods of use may be adjusted in response to with resource specialists and in response to resource needs and range readiness (the number of livestock using the allotment may be increased while reducing the season of use, or may increase the season of use while reducing the number of livestock). For example, running livestock for a full season would require the permittee to reduce the number of livestock (below permitted number) to meet allowed ADM's.

1-4

This only allows for the reduction in stocking rate. It does not allow stocking rate to be increased if rangeland monitoring on the allotment indicates that an increased stocking rate would have a positive or non-detrimental effect. This allows little economic incentive for more labor-intensive livestock management, which improves range conditions and alleviates potential problems. In addition with the proposed prescribed burns and periods of rest on the allotment carrying capacity is likely to be increased. I would like the option to increase stocking rates included in the adaptive management outlined in this Environmental Assessment. This could be accomplished either by amending Alternative 2 or the development of a new alternative.

1-5

I would like to request that as a stated adaptive management option the following be included: "Animal numbers may be increased or season of use extended if the monitoring on the allotment shows a stable or upward trend, and/or if a change in stocking rate, timing or duration is desirable to meet resource management objectives as stated in the Purpose and Need of the Environmental Assessment for House Creek, West Malheur and Wolf Mountain Allotments.

1-6

As stated" Flexibility that allows for annual adjustments provides a management tool to assure that riparian and rangeland objectives are met under the adaptive management process, animal numbers and season of use may be adjusted annually to protect resources, to meet objectives, or to meet permittee operational needs. Changes to numbers or seasons of use would be in the Annual Operating Instructions."

1-7

With this in mind I would like to request that my allotment be designated under experimental range stewardship status and that I be included in a collaborative group that guides the management decisions on this allotment.

1-8

I would also like to request that the adaptive management plan for West Malheur Allotment as outlined in the Preliminary Environmental Assessment for House Creek, West Malheur and Wolf Mountain Allotments Chapter 2 – Alternatives include provisions to conduct prescribed burns on the south end of West Malheur Allotment for the purpose of reduction in juniper encroachment and vegetation manipulation. I am willing to move my livestock off of this portion of the allotment for the necessary period of rest.

1-9

I would also like to see more flexibility in the *Botrychium spp.* habitat standards. It is my understanding that it only grows 3 inches tall yet the proposed standard is a six-inch stubble height for all floodplains that may constitute potential habitat. The affects of shading and increased competition to *Botrychium spp.* by grasses and other vegetation is apparently unknown.

1-10

I am willing to adapt livestock management to meet the needs of known populations or to use livestock management techniques to avoid habitat if it is found that livestock grazing negatively affects the existing populations. However, these standards for potential habitat are overly restrictive and may be impossible or at least extremely difficult to meet.

Chapter 3- Environmental Consequences, pg. 152, Direct and Indirect Effects of Alternative 2- Proposed Action paragraph 2 states: " Fencing existing populations of the sensitive plant *Botrychium crenu/atum* and limiting livestock utilization to 35% on Known habitat for the species in Antelope and Wolf Creek pastures would improve riparian conditions and stream bank for aquatic species."

1-11

The proposed standards of a 6-inch stubble height on floodplains that may be potential *Botrychium spp.* habitat and limiting livestock utilization to 35% on known habitat seems arbitrary and capricious. There is no literature cited in the Environmental Assessment that would give substantiation to the benefits of these standards to *Botrychium spp* or the indicated aquatic species.

1-12

The current standards of a 4-inch stubble height on the greenline would seem to be adequate with a six-inch stubble height for the flood plain. A 4-inch stubble height would essentially make grazing by livestock unfeasible in areas where Kentucky bluegrass is the preferred species. A one time through grazing may result in a less than 4-inch stubble height on this species. Depending upon when stubble height monitoring is conducted on these sites regrowth may not be adequate to meet the standard, even though no detrimental affects to residual vegetation, shrubby species or streambank stability occurs. Additionally, during many growing seasons this species may not reach a six-inch stubble height even under ungrazed conditions.

1-13

Fencing of existing populations, or creating a jack-straw barrier around existing populations as recommended for some spring sites in the EA, and establishing paired plots, along with establishing grazed and ungrazed paired plots in potential habitat would be a better method of ascertaining both the positive and negative effects of grazing on *Botrychium spp.* Grazing may reduce competition for resources such as sunlight, nutrients and available soil moisture thus allowing *Botrychium spp.* to establish and maintain a competitive advantage. Nothing was mentioned or any literature cited that indicates what seral stage *Botrychium spp.* is most adapted to or whether perturbations such as fire or grazing can help to maintain this seral state. The establishment of paired plots would help to determine what effects if any grazing and prescribed fire has on *Botrychium spp.* The proposed standards would greatly limit the use of these tools if desired.

1-14

1-15

In addition the established 4-inch stubble height standards on the greenline, along with the bank stability standards already in place, combined with the proposed restoration activities including headcut stabilization, spring protection, and stream restoration activities should be adequate for the protection of aquatic and riparian resources. More restrictive standards that would impede the economic feasibility of livestock operations and render livestock grazing impossible hardly seem desirable.

Thank you for the opportunity to comment on this Environmental Assessment. Please feel free to contact me to discuss alternatives or proposed changes. Please keep me informed on the progress of this document and additional opportunities to review the final draft or appeal decisions.

Sincerely,

Jim Bentz

Responses to Comment Letter #1

Response to Comment 1-1: Designated Monitoring Areas (DMA's) are the locations in riparian areas and along streambanks where quantitative monitoring takes place. They are monitored to provide information concerning the management of critical areas. Essentially DMA selection relies on the theory that if proper management occurs in that location, proper management will be occurring throughout the rest of the management unit. DMAs are not "key areas," under the classic range management definition used for upland monitoring; but are areas representative of grazing use specific to riparian areas used by livestock. (See also EA, Appendix B, page 2)

DMAs should not reflect an average amount of use in all riparian areas of the stream reaches in the pasture. Instead, they should reflect typical livestock use where they enter and use vegetation in riparian areas immediately adjacent to the stream. DMAs may be selected where livestock use exceeds the apparent average use of riparian areas in the pasture if, for example, the assumption is made that condition at the monitoring site reflects higher use on than other stream segments within the pasture and the DMA meets objectives, then the rest of the pasture is also meeting the objectives. (See also EA, Appendix A, page 7)

Small livestock concentration areas, such as trail crossings and water gaps, usually less than 30 meters (100 feet) in length should not be considered as a DMA. If these sites cause resource problems, they should be treated as a site and not as part of the overall livestock management (See also EA, Appendix A, page 7).

DMA Monitoring or Multiple Indicator Monitoring as described by E.R. Cowley and T.A. Burton in Technical Bulletin No. 2005-2, represents only one tool among many used by the Forest Service Range personnel to determine the impact of livestock grazing and the effectiveness of the management strategy. Information collected using this method will be used in conjunction with other information and expertise provided by the Forest Service and the permittee to adjust livestock grazing strategies.

Response to Comment 1-2: The EA, page 78 states "*Within the West Malheur and Wolf Mountain Allotments, the Proposed Action Alternative would have direct and indirect effects to Botrychium habitat; however impacts would be less than the Current Management Alternative. Proposed management at identified springs, bogs and seeps, which would allow livestock utilization levels to not exceed a 6-inch stubble height on the floodplain, would have fewer impacts than Current Management. Grazing at this level would be less injurious to populations because small moonworts may not be eaten or trampled; plants would then have the opportunity to sporulate, a critical reproductive step, and would not be weakened by the inability to store food reserves.*" The alternatives propose varying levels of livestock utilization levels in identified Botrychium habitat (EA, pages 32-40).

Response to Comment 1-3: DMA selection and use would be according to established procedures. See also response to comment 1-1.

Response to Comment 1-4: The EA, (pages 32-40) display the maximum AUMs proposed by alternative. An alternative that increased grazing on all three allotments was brought forward in response to scoping. This proposal was considered by the IDT but eliminated from detailed analysis because range analysis data does not support an increase in AUMs, increased grazing

would not move us toward desired conditions and does not fully meet the purpose and need for action (EA, page 30).

Response to Comment 1-5: One objective of the prescribed burn in the Cougar Flat Pasture is to improve the vegetative component and perhaps increase forage production. Livestock production is an important activity on this allotment; however, it is carried out in conjunction with many other uses. Therefore, an increase in forage production may also provide for increased wildlife usage. As a result, the prescribed burning proposed under Alternative 2 of about 60 acres is not expected to increase carrying capacity dramatically enough to increase AUMs. The proposed prescribed burn would be implemented in conjunction with stream improvement work. Small rock structures would be strategically placed in Squaw Creek to catch sediment. Overtime these structures would vertically stabilize the stream channel thus allowing the water table to once again interact with the associated flood plain and adjacent meadow. Raising the water table would promote the re-establishment of wet meadow plant communities (EA, page 67). The combination of rock structures and prescribed burning in the Cougar Flat Pasture in West Malheur Allotment would start the process of rebuilding the stream channel, improving the composition of grasses and forbs. This would allow the stream channel to interact with the meadow and restore soil moisture to this once productive site (EA, page 164).

Response to Comment 1-6: Refer to response to comment 1-4.

Response to Comment 1-7: Experimental range status is outside the scope of this analysis, however the process is something that can be considered separately in the future.

Response to Comment 1-8: Currently, a project that would remove juniper on about 120 acres within the West Malheur allotment has been proposed (Coyote Creek Flow Enhancement Project) and may be analyzed in the near future (Refer to the EA, Appendix C). Prescribe burning the southern portion of the West Malheur allotment would be difficult because fuels are not contiguous; however this is something that can be considered separately in the future. The Eastern Oregon Agricultural Research Center in Burns, Oregon is currently conducting a detailed study under conditions similar to those on the West Malheur Allotment. If you would like more information on this topic visit <http://oregonstate.edu/dept/EOARC/>.

Response to Comment 1-9: The alternatives propose varying levels of livestock utilization levels in identified *Botrychium* habitat (EA, pages 32-40). Under Alternative 2, timber would be felled around Dead Horse Spring to create “jackstraw” barrier to livestock to protect *Botrychium* habitat and utilization would not exceed a 6-inch stubble height in the floodplains of identified *Botrychium* habitat in Pierpont pasture. A 6-inch stubble height in the floodplains was chosen to best protect *Botrychium* species. The EA identified only the best potential habitat for *Botrychium*.

Response to Comment 1-10: Refer to response to comment 1-9.

Response to Comment 1-11: The literature cited section for *Botrychium* recommendations has been updated in the Final EA.

Response to Comment 1-12: Kentucky bluegrass is not a dominant species in *Botrychium* habitat.

Response to Comment 1-13: Alternative 2 proposes fencing the documented population of *Botrychium crenulatum* in the Wolf Mountain Allotment (EA, pages 35-36) and creating jack-straw barrier around identified *Botrychium* habitat in the West Malheur Allotment (EA, page 35). Monitoring of *Botrychium* populations will occur as identified in the EA (page 45).

Response to Comment 1-14: The *Botrychium* section of the Plant Biological Evaluation (EA, Appendix F) has been updated in the Final EA. Monitoring of *Botrychium* populations will occur as identified in the EA (page 45).

Response to Comment 1-15: The alternatives propose varying levels of livestock utilization levels in identified *Botrychium* habitat (EA, pages 32-40).

Comment Letter #2



Grant County Conservationists
62327 Haggard Loop
John Day, Oregon 97845
keystone@ortelco.net

Carolyn Freeborn, District Ranger
Emigrant Creek Ranger District
265 Highway 20 South
Hines, Oregon 97738

Sept. 1, 2005

Dear District Ranger Freeborn,

The Grant County Conservationists are interested in the degree to which restoration of aquatic habitat is dependent upon the management of commercial livestock grazing. In addition to providing the Agency with comments on NEPA grazing documents, we make them also available to our “beaver habitat email list” of 55 people (biologists, environmentalists and others specifically interested in grazing reform on the Malheur National Forest.)

The Preliminary EA for House Creek, West Malheur and Wolf Mountain Allotments appears to be moving the district towards managing for the recovery of ecosystems badly damaged by livestock grazing. You are to be commended for the decision to treat the Van Allotment separately with an EIS. We appreciate the challenges with which you are faced, including the double bind of intent to manage for recovery and then having your hands tied by heavy weight political pressure¹. The following comments are submitted regarding the Preliminary EA.

2-1

You acknowledge the mandate of INFISH to achieve a **near natural rate of recovery** of aquatic habitat. This would be a hopeful sign but INFISH has been in place eight years, Malheur Forest Plan Amendment 29 and the Watershed Assessment for the planning area over ten years. The latter two detailed the same problems you still face today. You belie a commitment to a serious attempt at “near-natural” recovery with your projection of 15-20 year for recovery of RMOs under the No Grazing Alternative and 50 years under the Preferred Alternative. This sounds a lot like the Forest’s time worn commitment to an “upward trend” (forever). Your near-natural rate should logically be much closer to “no grazing” and would be a more believable commitment if there were a well protected, monitored and documented “control” area, either in each of the two large allotments or nearby. The Van allotment appears to have serious problems and it’s recovery without grazing could conceivably serve in this capacity.

2-1

It is indeed discouraging to see that some Forest RMOs are still not being met after many years in exclosures such as Schurtz Creek.² This is all the more reason to argue that grazing shouldn’t occur “at any cost”, that maybe under current stocking levels a “near natural rate” of recovery is impossible and, in such cases, grazing privileges need to be suspended in order to comply with national environmental laws. Other EA projections are more optimistic³ stating that riparian banks could be stabilized in 3-5 years and shade in 10-20 years. This is why a control in the same allotment, or a nearby area, is a necessity. Can grazing occur at stocking

¹ Political pressure such as occurred recently with efforts to improve management on the Myrtle Allotment.

² Appendix G page 14

³ Ibid page 17

levels necessitated by the base ranch without continued damage or not? We need to know and it is your obligation to provide convincing proof.

We commend you on the honesty and clarity of the environmental assessment. You have some serious problems to account for. Of the 25 reaches representing the perennial fish bearing creeks in the area we learn of the following **failure rates** at achieving the management objectives (p 119): temperature 100% failure, large woody [or beaver dams] 70%, pool frequency 83%, bank stability 32%, width/depth ratio 70%, shade 52%. Sediment was not included in this list but the discussion of Beaverdam Creek alone indicated a quantity of fine materials of 76%. (This was directly attributed to very intensive livestock grazing plus the proximity of a road.)

2-2

The enumeration of serious problems went on to include unstable banks and headcuts (page 119). **You plan to continue to try to restore headcuts by artificial means, already demonstrated in Photo 7⁴ (page 134) to be of questionable value.** This is going after the symptom instead of the cause of the problem which is needed recovery of the late seral plants such as sedges and rushes that have “strong cord-like rhizomes, deep, fibrous roots, coarse leaves and strong crowns which buffer streambanks against erosion, enhance streambank stability, filter sediments and rebuild eroded banks” [glossary]. “Protection” of these fragile areas is simply not the answer and we doubt that you can seriously defend the efficacy of this type of mitigation. Other problems common to the inability to management livestock successfully noted in the EA are bank stability, too intensive use, high degree of trampling and pressure, stubble heights of grasses and sedges <2” in height, hardwood species with hedging and low rates of establishment at young age classes due to grazing (121), thermal and high-energy refugia not available to fish, stream temperatures exceeding standard (122), culverts which isolate fish populations (123), riffle lengths exceeding 100 and even 200’ with no pools (124), the presence of warm water fish⁵ (125), high potential for cobble embeddedness (126, 128), degraded riparian floodplain meadows (129), the decrease of water infiltration and related increase of channelization and isolation of the floodplain (140), redband trout observed even though there was little running water (141), grasses grazed so low that it was nearly impossible to identify them (142), stream dry, upper reach heavily grazed (142), soil exposed due to livestock use in the riparian area and lack of regeneration of vegetation (145), 42% of stream flow diverted to private use (147), motorized vehicles and livestock grazing providing opportunities for the spread of noxious weeds (149), drought experienced during the past four years (149), and heavy browsing on shrubs (156).

2-2

Credibility – In order for the Agency and range management to regain credibility, we suggest that the appearance of any new headcuts automatically entail suspension of grazing privileges until such time as the reach has regained Property Functioning Condition status.

2-3

Compliance – Lack of compliance by permittees resulting in unauthorized/trespass use is mentioned fairly frequently in the EA. If administrative remedies (the charging of commercial grazing rates) are ineffective, then something should be found which is. If the USFS can’t manage credibly and successfully and demonstrate recovery then there is no end in sight to continued conflict over this particular use of public lands that is associated with violations of Clean Water and Endangered Species laws.

2-4

Utilization standards – Photos 5 and 9 (page 131,136) taken in April 2004 are highly disturbing. The captions state that the stream (Beaverdam) met the utilization standard of 4”.

⁴ We appreciate the excellent photos; they add much to our hope that you indeed do serious monitoring and also enable much easier visualization of the stream reach.

⁵ The presence of warm water fish are directly related to streams throughout the Malheur National Forest where livestock grazing has been a disturbance mechanism by the research of Bayley and Li “Final Report research/evaluate restoration of NE Oregon streams: effects of livestock exclosures on riparian vegetation, stream geomorphic features, and fish populations”. Bonneville Power Administration. Project Nos. 2000-051-00 and 2000-051-01.

This is the recommendation in the widely circulated paper by Clary and Leininger.⁶ However these researchers go on to say that this is a “starting point” and 6-8” may be required to limit streambank trampling and reduce willow browsing. This seems to be the case here. The EA itself (page 133) states, “grazing trigger points may have to be set at 35% utilization or lower to allow a natural rate of recovery.” If these fail, the FISH documents recommend “complete rest.”

2-5

Native ungulates - Moderate to heavy grazing can reduce bunchgrass populations and we presume this is exactly what is happening. The EA states that the Squaw Creek subwatershed does not meet Forest standards for forage quantity based on results from available data (157). The district proclaims that big game needs on winter range are taken into account through the AOIs but it is apparently not happening in at least this subwatershed.

Of concern is the statement on page 165 that in winter range “nearly all bitterbrush sampled were utilized beyond desired levels and above the threshold for seed production.

2-6

Forage and Native Plants - The P-EA defines forage as “browse and herbage that is available” but this definition neglects the highly important issue of palatability. I remember performing an “ocular macroplot⁷” in a unit in the Van Allotment where a FS monitoring report showed 6” end-of-season stubble height and wondering if lupine, larkspur, rabbitbrush, iris and other species unpalatable and even noxious [although native] were being counted. Large, pregnant and lactating animals don’t just take “browse and herbage” but search out and over-utilize green, nourishing plants. These used to be called “decreasers” since they would decrease or disappear with over use and range managers were on the alert to reverse this trend with administrative actions. Such knowledge and professional responsibility seems to have declined or disappeared due to a presumed political inability to take such actions.

2-7

Shrub populations (especially those palatable to ungulates) are apparently in serious decline. Recent research⁸ on shrub biomass demonstrates that herbivores can modify the abundance of several key taxa to the point of influencing the stability of the climax associations. These range scientists call the phenomenon “herbivore disclimax” and lament that forest managers seem unaware of the impact this might have on their attempts to influence succession [through timber cutting, prescribed fire, etc.]. We assume too readily that grazing does not have serious effects and that evidence of aquatic collapse such as headcuts can be easily remedied by dumping a pile of rock on the cut for stabilization.

2-2

Other shrub research recently published by Brookshire and Kauffman (2003) questions if willow populations can survive even when the current strict standards of 30% allowable shrub leader use are met without preventing declines in flower and seed production.

2-7

Research shows that under a No Grazing strategy a conversion from Kentucky bluegrass sites, which highly unsuited for the recovery of healthy stream geomorphic conditions, is possible. Kauffman et al⁹ found that when grazing was halted in moist meadows taken over by Kentucky bluegrass, succession towards a more mesic/hydric native plant community occurred. Exotic grasses more attuned to drier environments were decreasing and being replaced by native sedges and mesic forbs. A control area near the large allotments would demonstrate whether this type of mesic habitat recovery is possible and should be a management goal.

2-8

⁶ Clary, W.P. and W.C. Leininger “Stubble height as a tool for management of riparian areas.” 2000 J. of Range Man. 53:562-573.

⁷ This was left out of the glossary. Can we assume it is fancy new jargon for eyeballing it? Also missing are sympatric and allopatric and EOARC from the acronym list. In the interests of a more professional document, I think “loafing” could be eliminated in favor of livestock concentration.

⁸ Riggs, Tiedemann, Cook, Ballard, Edgerton, Vara, Krueger, Hall, Bryant, Irwin and Delcurto- “Modification of Mixed-Conifer Forests by Ruminant Herbivores in the Blue Mtn. Ecological Province” PNW-RP-527 [2000?]

⁹ Kauffman, J.B. et al 1983 “Impacts of cattle grazing on riparian plant communities.” J. Range Manage. 36:683-685.

Socio-economic and scientific beliefs – These are highly value-laden fields. Thus it is only fair that the opposing values be honestly recognized in the EA. Economic reports such as by Kohrman are political documents that are concerned with the primary economic users of the national forest (versus the citizen owners of the forest and the new direction of the USFS to managing for the “Common Good”). Economic trend analysis such as provided by The Wilderness Society for Harney County¹⁰ presents a much different view of resilient communities which are depending less and less upon traditional resource industries such as timber processing and livestock grazing. For example in spite of mill closures Harney County had a record number of jobs created in 2000 and then a slight decline in 2001-2002 reflecting the downturn of the national economy.

ICBEMP research shows that even in Harney County where the livestock industry is an important component of the local economy, the number of ranches using public lands is only 20%.

Globalization and “free-trade” capitalism are unfair to millions of people. Many of us oppose these strategies. However, is it realistic to argue that concerns over “mad cow disease,” the volatile beef market combined with the influx of foreign beef are problems which fall within the purview of the Malheur National Forest to remedy? The Forest Service now acknowledges a commitment to the “Common Good” of all people (and future generations) and the obligation to protect values such as clean and abundant water, wildlife, recreation and the existence of unroaded spaces,¹¹ etc. The Agency is also under increasing pressure to demonstrate compliance with environmental laws such as the Clean Water and Endangered Species Acts.

With all due respect to Chief Bosworth and his comments about the threat of “ranchettes,” we think this might be a problem more relative to Bend and Prineville than Burns and John Day. Oregon still has land use laws although they are threatened in some instances by measure 39. People seek out subdivisions that are near cultural and economic centers. Our ranches are more likely passing into the hands of outside millionaires.

The socio-economic analysis touts the contribution of ranches to wildlife habitat and biodiversity. The latter argument is seriously contested, especially in areas of low rainfall [the planning area is borderline], by law profession and wildlife biologist Debra Donahue in her book **The Western Range Revisited: Removing Livestock from Public Lands to Conserve Biodiversity** 1999.

The research presenting the argument that cattle grazing can improve winter forage and that “wolfy” grasses will be bad for wildlife is another case in point. We doubt that managers have the botanical expertise, management leisure/skills or the mandate to fulfill the first promise and contest the “wolfy” grass issue as bogus. While research may show that wildlife will not eat dead plant material, other research demonstrates the value of this dead material in providing protection to the plants from weather events, the contribution of organic material to nutrient-deficient soils, the holding of water and moisture through a mulching function, etc. Range scientists say the dead material is a plant anti-herbivore mechanism to protect from excessive grazing except in natural pulses such as provided by wildfire.¹² Plants which have dead material removed were found in one study to produce less green material and have shorter leaves than plants that entered spring growth with dead material intact¹³

¹⁰ Available on The Wilderness Society website.

¹¹ The existence of unroaded spaces was the first values chosen by the ICBEMP survey whereas grazing finished last in a category that included mushroom picking and firewood gathering.

¹² Painter, Elizabeth PhD Range Management, Unpublished Review: Herbivory in the Intermountain West. University of Cal. Berkeley.

¹³ Sauer, R.H. 1978 “Effect of removal of standing dead material on growth of *Agropyron spicatum*” J. of Range Management 31:121-122. Quoted by Elizabeth Painter, PhD Range Management, University of California Berkeley, Comments on Pueblo-Lone Mtn. Allotment Management Plan EA 8 Oct. 1995. Paintere@west.net

2-10

You present research that argues that the nutritional quality of grasses increases with grazing providing superior forage for fall and winter use. Others argue that there is no unequivocal evidence that large-animal herbivory increases plant fitness.¹⁴ Apparently specific research has been impossible to replicate. We would like to examine more closely the quoted research by Ganskopp, Svejcar and Vavara (2004) if you could make this available to us.

2-11

Other science warns that as Bluebunch Wheatgrass decreases Cheatgrass increases.¹⁵ This is a serious problem yet the EA does not include cheatgrass as a major threat. Ideally “noxious weeds” should be in a section on Native Plant Community health. Aggressive non-palatable native plants that threaten biodiversity (such as lupine, rabbitbrush, larkspur, wild iris mentioned above) are a major concern of those dedicated to the restoration of ecological integrity and biodiversity.

2-13

We are pleased that you cite a paper co-edited by Lloyd Reed. The range workshop held in John Day in May was impressive with by a vision of range management that we have yet to seen evidence of on the Malheur National Forest. One of the key items was Reed’s opposition to **barbed wire fences**. When Malheur National Forest grazing management fails, the solution is always more barbed wire, or cages and exclosures around anything precious [such as the sensitive *Botrychium*¹⁶]. It is our opinion that we should be removing these fences¹⁷ and requiring more management on the part of the permittees as per Reed’s plea. Among his other points were:

- Prevent grazing on regrowth. Malheur permittees count on regrowth to meet standards (and this strategy often fails). Reed’s message is to vacate the unit before utilization standards are met and leave the regrowth for “the common good” – recovery of ecosystems, wildlife, endangered species, etc. (Not to mention the credibility of range management)
- Remove no more than 50% of leaf volume.
- Never graze in the same place at the same time each year.
- “Clean” your pastures – Trespass and unauthorized use by commercial livestock is so prevalent on the Malheur Forest (since there are no serious administrative actions¹⁸ to stop it) that it almost appears as a highly successful management strategy on the part of the permittees.
- Believe that the riparian area starts at the top of the ridge and manage livestock accordingly.

This type of workshop and this kind of advise makes us hopeful that at last the Malheur National Forest is turning the corner on range management and issues of credibility and trust.

Sincerely,

Linda Driskill
cc Roger Williams, Beaver Habitat Mailing List

2-12

¹⁴ Painter, Elizabeth, see above

¹⁵ Franklin and Dyrness Natural Vegetation of Oregon and Washington (USDA FS GTR PNW-8, 1973) quoted in January 1992 Native Plant Society of Oregon Bulletin.

¹⁶ You state in the EA that you will require 6” stubble height on suspected *Botrychium* habitat. Without barbed wire? If you can achieve this why not also the surveyed sites and the aspen and other species that are in serious decline.

¹⁷ Reed urges the abandoning of this crutch and the use of portable electric tape and constant moving of the cattle. A larger, supervised herd would have much less impact on the land.

¹⁸ Permittees may be very willing to pay commercial rates to continue grazing their cattle and gain more rest for the base property. However this is not acceptable.

Responses to Comment Letter #2

Response to Comment 2-1: Control areas do exist in the project area or adjacent areas (Schurtz Creek enclosure in the Van Allotment, Calamity Creek enclosure in the Calamity Allotment, Wolf Creek enclosures on West Malheur Allotment, numerous aspen enclosures across the forest and most recently Gribble Springs on the Myrtle Creek headwaters) that would allow some comparisons between grazed and ungrazed areas to determine the actual rate of recovery. Significant stream bank damage should not occur from livestock grazing and there should not be any significant carry over effects from the previous years grazing that would affect the natural rate of recovery. This would be monitored and determined by annual allotment range monitoring of DMAs that represent the characteristics of specific stream reach (EA pages 45-46).

Grazing levels are determined by the amount of forage available to livestock, not on stocking levels necessitated by the base ranch.

Response to Comment 2-2: Not all reaches have the potential to reach Proper Functioning Condition as defined in Technical Reference 1737-15 1998. Headcuts along streams can be attributed to many natural and human related activities. Your suggestion to suspend grazing privileges when headcuts occur may not address the specific resource problem. Every stream reach is unique. Techniques deemed appropriate to stabilize one headcut might be detrimental or ineffective on another headcut. Therefore, it is more credible for the management agency to treat each headcut individually instead of applying a universal approach such as your suggestion suspend all grazing privileges. Depending on the severity of the headcut, stabilization may be supplemented with a livestock enclosure to increase the natural rate of recovery with late seral plants and no ground disturbance. Most headcut stabilization projects in the project area would use enclosure fences to control livestock. New headcuts would be dealt with in a timely manner with state of the art techniques, but not by suspending livestock grazing in the entire pasture. Depending on the severity of the headcut it may be fenced off from livestock use in the pasture (EA pages 35-36).

Response to Comment 2-3: Chapter 10 FSM Chapter 2238.4 requires that unauthorized use and permittee excess use be billed at higher rates based upon the full commercial value of leased forage. These concerns would be resolved through permit administration using the direction given in FSH 2209.13 Law enforcement may be notified when livestock are discovered that are not authorized to be on Forest Service land (EA, page 22).

Appropriate administrative actions will be taken when the permittee's management is not in compliance with the Annual Operating Instructions (AOI). Consequences would occur as described in Forest Service Handbook (FSH) 2209.13 Sec. 16.21. Under the Terms and Conditions of the Forest Service Term Grazing Permit (Part 2, number 8(b)) the Forest Officer in charge may modify the permitted number to protect resources. This is consistent with Forest Service Manual (FSM) (EA, page 39).

Response to Comment 2-4: Photos 5 and 9 document past grazing effects on streambanks on Beaverdam Creek. Due to the condition of the stream channel and riparian area, under Alternative 2, sections of this stream are proposed for exclusion from grazing by expanding the Beaverdam Meadow Enclosure and allowing only a few cattle in the enclosure for holding purposes only, 1-2 days (EA, page 36). Other sections of the stream may use trigger points of 6

inches or more as part of an adaptive management strategy to allow a natural rate of recovery for a degraded system.

Response to Comment 2-5 page 2: Livestock grazing and other factors such as drought and juniper encroachment affect bunchgrass reproduction (EA pg 168, 170). In Alternative 2, the reduction in livestock use in the Rock Springs pasture will improve big game winter range (EA pg. 172). As stated in the EA (pgs 177, 178) other factors than livestock can reduce bitterbrush production including big game browsing. Reducing grazing intensity in the Rock Springs pasture should decrease livestock browsing on bitterbrush.

Response to Comment 2-6: Ocular macroplots and end of year riparian stubble height monitoring are two separate processes. End of year riparian stubble height monitoring documents the stubble of sedges/rushes, and grasses (when sedges/rushes are not present). Lupine, larkspur, rabbit brush, iris and other unpalatable species are not measured during the end of year riparian stubble height monitoring.

Response to Comment 2-7: Measures were taken in Alternative 2 to protect riparian shrubs, primarily aspen. Riparian shrubs would also benefit from other riparian enhancement projects including headcut stabilization, creating jackstraw barriers from conifer felling, riparian fence construction, large woody debris placement, and sensitive plant habitat protection. Aspen protection addressed under each allotment in the big game section, MIS, and neo-tropical migratory birds in the EA. The affects of maintaining the current management on riparian shrubs is also addressed in the EA (for elk, pgs 170-171, mule deer pg. 178).

Malheur LRMP has standards for shrub utilization in riparian areas (LRMP IV-58). Allowable shrub utilization can vary from 25 to 40% depending on the range conditions and range resource management levels. The 30% researcher quoted is within this range.

Response to Comment 2-8: We agree, under a no grazing strategy, if environmental conditions allow and native seed sources are present, some moist meadows systems could succeed from Kentucky bluegrass dominated sites towards more mesic/hydric native plant communities.

Response to Comment 2-9: Thank you for the information you provided about the number of jobs created in Harney County. We believe that the 20% of ranches using public land is significantly contributing to the economy of Harney County. Several of the ranches with permits to graze cattle on the Malheur National Forest are part of locally owned co-ops such as Oregon Country Natural Beef and Strawberry Mountain Beef. These co-ops provide beef that can be traced back to the producer. Oregon Country Natural Beef saw a significant increase in product demand as fears of mad cow disease spread. Therefore, it may be argued that the grazing program on the Malheur does relate to concerns over mad cow disease, the volatile beef market and the influx of foreign beef.

Debra Donahue does a fine job of expressing her views on livestock grazing in arid environments. We agree with your statement that these are “highly value-laden fields.” The Western Range Revisited is one of several fundamental books outlining the controversial issues of livestock grazing. However, the recommendations provided by Donahue are not always in accordance with the mission, policies and directives of the USDA Forest Service.

Response to Comment 2-10: The description of wolfy plants was discussed in the EA (pg 173) under the No Grazing Alternative. The quantity and quality of elk forage were the point of

discussion, not the plant condition or plant physiology. Research by Ganskopp, Svejcar and Vavara (2004) indicated plants were more nutritious for big game use when grazed.

Response to Comment 2-11: Cheatgrass is mentioned in the Preliminary EA, pages 49, 149, 157, and 185 and has been augmented in the Final EA.

Response to Comment 2-12: *Botrychium* are not a preferred browse species like aspen. Impacts to *Botrychium* are described in the EA (pages 77-78) and generally include being eaten or trampled and would be injurious to populations; plants would not have the opportunity to sporulate, a critical reproductive step, and would be weakened by the inability to store food reserves, or they might be killed outright.

Response to Comment 2-13: We were delighted that you were able to attend the workshop hosted by Oregon State Extension Service at the Malheur National Forest Supervisor's Office with Floyd Reed and Michael Borman. We are very glad that you found the information useful. The Malheur National Forest is at a crossroads with our grazing program and we feel it is very important to consider and apply the management techniques that were presented. We hope to conduct a follow-up grazing workshop in the spring of 2006 and will invite the Grant County Conservationists to participate.

Comment Letter #3

Oregon Cattlemen's Association

3415 Commercial St. SE, Ste. 217
Salem, Oregon 97302
Phone: (503) 361-8941 Fax: (503) 361-8947

September 8, 2005

Emigrant Creek Ranger District Malheur National Forest
265 Highway 20 South
Hines OR 97738

ATTN: Lori Bailey

Ms. Bailey:

Oregon Cattlemen's Association would like these comments made a part of the record regarding the House Creek, West Malheur and Wolf Mountain Allotments Environmental Assessment (EA).

We have reviewed the letter prepared and submitted by the Van Grazing Co-Operative and concur fully with their comments (Attached). We have participated in many activities with the US Forest Service and our members, who graze livestock on federal lands throughout Oregon on matters that affect the livestock industry. We stand by and support the Van Grazing Co-Operative's and want to emphasize ourselves that good monitoring and grazing practices are important in protecting both the vegetation and aquatic habitats.

We request that you carefully review these and the attached comments as well as the scientific articles submitted with the Van Grazing Co-Operative letter. Several years ago Oregon Cattlemen conducted a literature review of the "best scientific information" available for livestock grazing and vegetation management, as well as many other natural resource topics. Our library of current literature is updated each year and we know the value of the articles provided to you. We are very familiar with these important manuscripts and rely on them to guide our members and develop our policies. Absent your thorough review and consideration of these comments, it is our position that the Forest will have failed in its duty to give thorough consideration to all of the environmental impacts from the proposed EA action.

3-1

As the attachments point out, the Emigrant District and Malheur National Forest have not balanced the assessment with the benefits of the grazing management currently used on the House, Wolf Mountain, and West Malheur Allotments. The proposed Alternative 2 is preferred by the Emigrant Ranger District and we support the range improvements, water development and fencing projects, but agree with the Van Grazing Co-Operative that the fencing projects should not be implemented as stream corridor fences nor situated to exclude livestock on a permanent basis. We suggest that you consider temporary exclusions and consider relocating water where possible to facilitate adapting the frequency, duration, or intensity of grazing in sensitive areas. We encourage the Forest to work with the permittees so they can offer alternatives and make adaptive changes as necessary.

We agree with the attached comments as stated: *"Without inclusion of a narrative that reflects some of the positive attributes of managed grazing systems, and the promotion of adaptive management techniques both in and outside of the fencing project, we prefer to leave well enough alone."*

3-2

Alternative 3, no grazing, is unacceptable to us. If anything, your analysis of the negative impacts from this choice would be more than you have stated. The economic harm that would be placed on the local economies, our members and the livestock industry in Oregon is the major limiting factor, but given the benefits gained through livestock grazing on the public lands, Alternative 3 makes little or no sense environmentally.

3-3

A very serious concern we have with the EA is the lack of data reporting contained in the document. As pointed out so well by the Van Grazing Co-Operative, the use of casual ocular estimates regarding fish habitat and livestock utilization is unacceptable documentation for the permittee records. The Forest must improve this aspect of your monitoring program in order to prevent bias and subjectivity from creating a false claim about livestock grazing impacts. We have quite a number of our members who have worked with researchers while collecting data, and we do know that the studies have to be designed and planned so that enough data is taken enough times to account for human errors (bias) as well as the natural variations encountered over time and different areas. Oregon Cattlemen understand and agree with the principles of science and employ the standard method of collecting samples whether for water quality or rangeland assessments. We encourage the Forest to consider this point and provide some means to rectify the problem.

3-4

The Van Grazing Co-Operative commented about the vegetation conditions. We concur and wish to repeat their statement to provide emphasis on an issue that has come before our leadership and committees many times. "To the extent that the Forest has not done so, the EA must address the fact that many plant species in the Wolf Mt., West Malheur, and House Allotments do not grow to the 3-6 inch stubble height. It is inappropriate to require the permittees to adhere to a standard where the un grazed forage, even at its climax, will never or would barely achieve a 4 or 6-inch total height during a growing season. A lack of diligence to address this issue deprives permittees of valuable forage when their grazing management is providing for ecological stability and near natural rate of recovery. Rather than punishing permittees for their efforts (which is what happens when the Forest does not do site-specific analyses), the Forest should make every effort to recognize the outstanding efforts to properly manage these grazing allotments. To the extent the Forest is not able to do this on it's own, it should find the financial resources to contract for these analyses."

3-5

Likewise, their points about the Water Quality section of the EA your reliance on the shade standard as a substitute for water temperatures is out of place. Oregon Cattlemen have collected water temperature data on their private properties since 1994. We found summations of maximum daily temperatures to be meaningless for land management decisions. Instead of taking a complacent and passive position, we developed an educational program for our members and worked diligently with researchers in Montana, California, Washington, and Oregon to develop a body of literature that was scientifically correct and based on fundamental principles. We urge the Forest to reconsider the erroneous statements in the water quality and fisheries discussions that may have relied on unproven and untested theories. Without a statistical analysis of water temperature data, the natural background conditions cannot be realized and the expectations for successful projects will endure many failures.

3-5

We cannot say it better than the Van Grazing Co-Operative and would like the record to reflect that we completely agree "to the extent that streams are not meeting temperature standards, further analysis needs to be completed as to the reasons, including natural background conditions. To the extent that these streams could never reach the temperature standards, even under pristine conditions, the Forest should be involved in removing the streams from the Oregon 303(d) list. The Forest cannot presume that streams will reach certain

temperatures without analysis of the background conditions. Further, we note that the Forest does not collect water temperature data and has not inserted their analysis of any of the state records. The statements about meeting the temperature standards for Oregon require some demonstration of experience in collecting data and analyzing the data for application to these types of activities."

We appreciate having the opportunity to review your Environmental Assessment document, but feel it needs to be edited to include more balance, better data, and data analysis. We encourage you to give full consideration to our comments and the Van Grazing Co-Operative.

Sincerely, Kay Teisl
Executive
Director

Enclosure: Van Grazing Co-Operative Comments

cc: Sharon Livingston, Oregon Cattlemen's Association President-elect

Van Grazing Co-Operative
Rodger Williams, Malheur National Forest Supervisor

Responses to Comment Letter #3

Response to Comment 3-1: Fencing is expensive for the Forest Service and the permittees. It is usually chosen only if water hauling, herding, riding and other adaptive management techniques are not successful in obtaining the natural rate of recovery without any carry over effects from the previous grazing season. The Malheur NF will work with the permittees to design the new improvements in such a way to meet the needs of the resource and the people using the land. Experience on the Malheur NF has shown that fencing can be an effective tool in restoring riparian and stream habitat as demonstrated on Schurtz Creek in the Van Allotment, Calamity Creek in the Calamity Allotment, numerous aspen exclosures across the forest and most recently Gribble Springs on the Myrtle Creek headwaters.

Response to Comment 3-2: The effects of the No grazing alternative are displayed in the EA, pages 67, 68-69, 72, 75, 78-80, 85, 93-94, 117-118, 125, 158-162, 165-166, 173-175, 179-181, 182, 186-187, 191, 192, 195-196, 200, 205, and 206 as required by NEPA.

Response to Comment 3-3: Quantifiable data was collected by private consulting firms, and fisheries biologists from USFS, USFWS, BLM, BPT and ODFW following USFS Region 6 protocol for Aquatic Systems Inventories using a peer reviewed methodology process described by Hankin and Reeves (1988). Estimating total fish abundance and total habitat area in small streams based on visual estimation methods. Can. J. Fish. Aquat. Sci. 45:834-844.

Response to Comment 3-4: The key plants monitored obtain heights of at least 4 or 6 inches depending on the condition of the allotment. The one exception may be during a drought year in which livestock would normally be removed before the end of the grazing period.

Response to Comment 3-5: The Forest Service does not use shade as a substitute for water temperatures. Shade and water temperature are collected by separate surveys. These surveys are coordinated between BLM and ODFW. Water data is collected continuously on a daily basis between June and September, following Oregon State protocol. The data are in the process of being submitted to the state for their data base.

Comment Letter #4

Van Grazing Co-Operative, Inc.
P.O. Box 115
Drewsey, OR 97904
September 6, 2005

Lori Bailey
Emigrant Creek Ranger District Malheur National Forest
265 Highway 20 South
Hines OR 97738

RE: House Creek, West Malheur and Wolf Mountain Allotments Environmental Assessment (EA).

Ms. Bailey:

The following comments have been written in a cooperative effort with our consultant, Pat Larson and are submitted for consideration as you prepare the House Creek, West Malheur and Wolf Mountain Allotments Environmental Assessment (EA).

4-1

Our understanding is that the proposed Alternative 2 is preferred by the Emigrant Ranger District and that the range improvements of water development and fencing are projects that will be incorporated into the Allotment management schedules over the next decade. We do not disagree with Alternative 2 or the suggested projects in general, but we are not certain if the fencing proposed is permanent riparian and corridor fencing only, or if such projects are meant that attention will be given to further use of fencing techniques to continue movement in an upward trend that meets the Forest plan standards. There are many kinds of fencing that are beneficial and substantial to meet the Forest plan goals, but such techniques have not been discussed in the EA. We hope to see this addressed and incorporated so that fencing does not become synonymous with livestock exclusions on a permanent basis. Too often we see areas fenced to exclude livestock use in order to promote some aspect of the stream riparian environment, but the final results are never defined and the achievement is never recognized. The fences remain permanent structures which often create new problems that cannot be resolved due to bottle-necks, constricted trailing areas, and unique sites for photo opportunities to compare grazed and ungrazed plots. If the fencing projects are not intended to be permanent structures on the landscape, we cannot support Alternative 2. If you can clarify these concerns by addressing the adaptive techniques that could be used on such projects, then we can agree with Alternative 2.

4-2

In respect to fencing more areas for the sake of fencing out livestock use where no clear goal post will be set, we prefer Alternative 1. Without inclusion of a narrative that reflects some of the positive attributes of managed grazing systems, and the promotion of adaptive management techniques both in and outside of the fencing project, we prefer to leave well enough alone. The Environmental Assessment should apply some restraints in the discussions that "point a finger" at livestock grazing as the cause of every effect the Forest casually observes and deems inappropriate via the Forest plan. These discussions in the EA are very subjective

and without more data and better sampling techniques the preferred Alternative 2 will not result in better riparian management. The Forest will merely continue to focus on ways to place more blame on the livestock and fail to consider its own inadequate investigations and interpretations of scientific information.

We see no benefits to the Malheur National Forest and Eastern Oregon ecosystems with Alternative 3. We agree it should not be chosen as a way to manage.

Other areas of concern follow:

Comments

Key Issues (p 18-22)

A number of statements throughout the Preliminary Environmental Assessment (EA), have been made, which are not based on a good database or scientific foundation of information obtained for specific use on the House Creek, West Malheur and Wolf Mountain Allotments where they are a part of the Eastern Oregon ecosystem. These Allotments may be in excellent condition across many acres, but the inventory of information and quality of sampling and analyses raises a number of issues regarding the decision and the kind of confidence that can be placed on the proposed direction.

4-3

The issues raised have not considered the positive and desirable aspects of livestock grazing on the allotments. The term "livestock grazing impacts" is overused and should be balanced with consideration of how the plant communities benefit from grazing activities throughout the growing season. The projects described (p 18) for fencing, conducting prescribed burns, and

4-4

treating aspen stands cannot be used to estimate the future condition of the planning area without also including "designed studies" aimed at capturing the planning area conditions prior to fencing, burn, or aspen treatments. Thus, the concerns about Monitoring and Credibility (p 19) loom large. The established monitoring protocols on the Malheur National Forest are useful for certain types of assessments, but are inappropriate for utilization estimates and permit administration. See more detail observations and comments below for Appendix B.

Chapter 2 Alternatives

4-5

P. 29---The isolated areas discussed in Chapter 1 and 3 where vegetation and other resource conditions have not always been consistent with the Malheur Forest Plan may be due to a misinterpretation by the Forest of the site-specific plant communities. Also, the broad goals and objectives stated in the plan should not be used to assess pasture and unit conditions where monitoring is conducted on a single 100 or 300 feet transect. Changing the timing, duration, frequency or intensity of grazing on the allotments requires planning that is linked to a database of information that has been put together from sampling and analyses beyond that described in this document. It also requires careful planning and considerable discussion with the permittees, which should be stated. In many cases, their information will be needed to explain how livestock use the areas and what is reasonable in terms of range improvements such as fences, riding, and water development.

Site Potential

4-6

Throughout the EA, the Forest makes many assumptions about past management and the possible ultimate potential of the Allotments (P45 -47). The Forest does not appear to recognize that nature is dynamic, and that each step in the process toward climax is important. It does not make sense to manage a forest in a way where the goal is that all sites be at their climax at the same time. This in essence would be managing for a monoculture. This goal would not be "natural" and the discussion provided is unreasonable. Much of the forest has been managed in the past at a highly productive state to sustain multiple uses. The most natural sites are at a variety of stages across the landscape. Managing for only climax species is as much a mistake as managing for the absence of fire in forests. The results are the same-ultimate deterioration of natural systems. The Forest would do well to adjust its approach so that it recognizes that along with many other things (i.e. fire), cattle are tools that can be used to manage so as to provide for a natural and dynamic landscape within the forest.

Pasture Monitoring

4-7

The current conditions in Wade Corner Pasture were reported to be in satisfactory condition after 1 monitoring visit in 6 years. How is this consistent with the response provided on page 19 under Monitoring and Credibility? How credible is the data obtained using ocular estimates for utilization on 1225 acres when the sampling was conducted on a single transect, one time? One sample is inadequate to represent any part of any pasture during a 6-year period. Due to the frequency and intensity of the monitoring and baseline inventory on the grazing allotments, it is difficult to place a great deal of trust in the proposals outlined for fencing, aspen stand treatments, and improved riparian conditions.

4-8

Under Alternative 2 (p. 65) the House Creek Allotment proposal, to change the use level from 45% to 35% along the greenline of riparian areas, does not appear to be supported by the data provided in the assessment.

4-9

The Forest does not have a proper height-weight relationship developed for assessing utilization on these allotments of the Emigrant Ranger District. A variety of plant communities exist in the riparian areas and not all can meet a 4 and 6-inch residual stubble height described by the Malheur Forest Plan utilization requirements. Height weight relationships of the different plant communities should be added with some level of detail added to explain the work that must be conducted in 2006.

4-10

Under Alternative 3, no grazing (p. 67) the alternative suggests that bunchgrass forage would result in "wolfy" plants which are non palatable to wild ungulates and that wildlife foraging behavior and plant preference may be altered in absence of livestock grazing. This concept has not been incorporated into Alternative 2 where fencing is proposed or rest and/or frequency of grazing may be altered. The statement is inconsistent and this is common between the two. In Alternative 1, where fencing and exclosures exist, this should be discussed as well.

4-11

On page 92, the narrative describing the Riparian Proper' Functioning Condition (PFC) should be placed in the Appendix section. It is out of place in the Watershed/Soil section, which provides a broad view of the allotment landscapes. PFC is a survey process that qualitatively assesses the stream channel and is not describing an entire riparian area that can be as little 10 feet wide to several hundred feet wide. PFC is not intended to reflect watershed conditions as the qualitative nature of the survey is restricted to stream segments and reaches and does not

incorporate upland evaluations. PFCs are intended as a planning tool for resource allocations when projects are being planned. There are other components that must be considered and evaluated after the preliminary survey is completed in order to have a useful product. The second part of the process has not been completed and the EA should refrain from using the early results as an end product when it is merely an initial step taken as part of a larger evaluation program.

Effects on Watershed/Soils (p. 95)

4-12

Reliance on a study conducted in Nebraska on a warm season grass species to support a 60% leaf volume removal resulting in a 50% die back of roots is appropriate for some warm season grass stands, but insufficient to represent a basis for cool season grass species. The grass communities in the Pacific Northwest forests are generally cool season species. While the work cited in Dietz (1989) and Weaver (1950) are useful to understand the principle of grass leaf and root interactions, the Forest should read and incorporate citations or discussion relative to the cool season species. Little information exists in the literature that covers all species and therefore it may be better to limit any implications that the 60% leaf loss on a plant on the forest is equal to a 50% reduction in root growth during a grazing season.

4-12a

Likewise Cole (1988) published a speculative statement that soil conditions may take decades or longer to reach a desired level, but in no way studied the amount of neither time nor how to determine soil condition over decades. This appeal to the literature provides little support for the proposed action.

4-12b

Page 101 the House Creek Allotment narrative regarding soil quality indicators for compaction, riparian trampling and upland trampling are included in the cumulative effects under the proposed action alternative. The Forest implies there will be an upward trend with less grazing pressure and since the Forest does not sample soils on the District as part of the monitoring program, the narrative should be revised to reflect the lack of information and that soil compaction by livestock use has not been supported in the scientific literature. The statements contained in the EA should reflect the resolutions provided on page 19 under Monitoring and Creditability concerns.

4-13

On page 110-112 the narrative does not reflect scientific literature regarding water temperature decreases with increased shade. Nor does it reflect what science accepts as a correlation between stream peak flows and timing and intensity of livestock grazing. There are no studies cited that also link urine and fecal material production in a riparian pasture, which results in an increase in bacteria and nutrient levels. Some studies have been conducted in dairy herd pastures and/or at known concentrated feeding areas, but they have not tested rangeland sites or forested riparian areas where 1-20 head travel, water, or rest for short periods during the dry summer months. There are too many differences between studied, concentrated animal pastures and the open range on the Malheur National Forest to link livestock and fecal material to bacteria and nutrient concerns in the streams. The EA statements imply a link that has not been establish in scientific, data intensive studies. The Forest may have misinterpreted the literature and assumed a position "free thinking" without identifying the premise of the research.

These statements should be rewritten to reflect what is known and reduce the statement to a nutrient input concern if one exists (no data has indicated there is one on the allotments). Otherwise, the statement should be removed entirely.

4-14

Ballard and Krueger (2005) (Attached) conducted a 2-year study in Eastern Oregon and found that livestock spent 94% of their time outside the riparian area. They also found that livestock interactions with fish was 0.01 % which provided little to no opportunity to step on known salmon redds.

4-15

Parson et al (2002) conducted research in Eastern Oregon to study the effects of season of use on livestock distribution. During early season grazing, cattle were further from the stream late season grazing and grazing distribution also displayed a diurnal response with increasing diurnal response resulting in decreased cattle distance from the stream. Fecal deposits within 1 meter of the stream tended to be greater following late season than early season grazing. Forage quality varied between seasons and livestock activity (grazing, ruminating or drinking) and grazing times, min/day were not affected by season of use. However forage utilization was influenced by season of use with early season grazing vegetation use as compared to late season grazing ($p < .05$). In summary the grazing season affected cattle distribution relative to the riparian area, with late season having more concentrated use of riparian vegetation.

4-16

Ballard and Krueger (2005) found that livestock spent 94% of their time outside the riparian areas during a 2-year study in Eastern Oregon. Which allotments are expected to show a measurable decrease in water temperature and increases in dissolved oxygen? Which stream segments have low oxygen levels? Insert tables to clarify areas of concern and identify the streams or stream reaches that will benefit from the proposed actions.

A study conducted in Eastern Oregon compared grazed and ungrazed areas using aerial photos taken over a 20 year time period. Laliberte et al. 2000 (Attached). In the study, exclosures and grazed areas responded similarly, and it was concluded that the topography and stream dynamics had a greater impact than the grazing regime in this study. This leads the body of range science in a forward direction where some may have assumed grazing affected not only small, grazed units, but also interfered with the natural channel dynamics. It is important to recognize all the factors within a watershed that can influence streams and provide a reasonable discussion about the dynamics of each before arbitrarily pointing to livestock grazing as having a significant impact over and above all others.

4-17

Fisheries (p. 115)

Livestock grazing effects on fisheries and riparian vegetation was not proved and incorporated into the body of science as the current accepted theory by Platts (1991). The author merely wrote an opinion about the interaction. Studies conducted since have questioned both the scope of the investigations and the intensity of the data collection used to create the manuscript.

4-18

There are many studies that should be considered in this section of the EA that express results where data was controlled and the questions about grazing effects were focused. On a site specific basis, the concepts expressed in the EA are generally inappropriate and the degradation referred to has not been supported through data collections and/or studies. The quality of fish

habitat within a stream channel has not been linked to "degradation" brought on by livestock grazing and riparian vegetation use.

4-19 Cattle impacts to redds have been examined in Eastern Oregon (Ballard and Krueger I and II, 2005) and the results of that study should be considered for the narrative on page 115 and 116. Redd trampling by livestock occurred 0.01 % of the time when livestock were in a pasture where salmon redds had been located and observed in a stream.

4-20 The Forest has made broad-based assumptions about the condition of the stream in these allotments and implies that all streams in all places must meet the parameters described as "high quality" fish habitat. Understanding the soil texture and type within a drainage the variability inherent to such sites is critical to understanding the potential of a stream and riparian area. Not all geomorphic surfaces can support a monoculture of wet meadow sedges and rushes and all do not support shrubs in the species mix suggested by this EA.

4-21 Further, (p. 116, par. 4) there is no file or project referenced from the Forest's archives to support such bold statements regarding past seeding on riparian areas with Kentucky bluegrass and *Agrostis stolonifera* on the Emigrant Ranger District or across the Malheur National Forest. To imply that the seeding projects were successful and the species so resilient (Heath et al 1973, Attached) that a monoculture developed is contrary to the results of many projects where seeding failed and native species continue to dominate sites. Native redtop and many native bluegrass species (Heath et al, 1973, Boivin and Love 1960: Attached) have been identified in the riparian areas, but the species mentioned in this EA have not.

4-22 Our consultant identified grasses and other plant species using references by Hitchcock and Cronquist (1981), Weber (1976), and Hall (1973), which are appropriate for the Blue Mountains of eastern Oregon. Based on this review, which could be duplicated by the Forest with little effort (but has not been to date that we are aware of), it is apparent native plant communities have been maintained or become established and are dominating the riparian meadows. Kentucky bluegrass communities no longer dominate and may be entirely absent from the grazing units. Tufted hairgrass, as well as *Deschampsia elongata*, occur on many streams of the Malheur National Forest where soils maintain sufficient moisture throughout the growing season. Other species common throughout the Allotments are: threadleaved sedge, bulrush, *Carex microptera*, thin bent grass, *Luzula*, one-spike oatgrass, California oatgrass, sandberg bluegrass, *Poa agassizensis*, *Poa nervosa*, and *Poa palustris*.

4-23 The variability in soil depth and type within a riparian zone creates a mosaic of areas where species dominance changes between wet meadow and mountain meadow communities and on some terraces to a dry site community. The processes are highly dependent on geologic structure and past climatic events. For example, some meadow soils are 2-3 feet of loam over clay/volcanic ash and or sand/gravel deposits while other areas are interspersed with large rock fragments throughout the floodplains and terraces have less than 1 foot of loam in some profiles.

4-24 The monoculture described in the EA (p. 116) is erroneous and should be deleted until a very thorough assessment is made.

The wet meadow potential plant communities are comprised of thin bentgrass (native), tufted hairgrass, bulrush, baltic rush, *Carex* spp., Timothy, and *Poa palustris*. Moist meadow community types occupy the terraces within the floodplain directly above the wet meadows and are dominated by tufted hairgrass, sedges, *Poa palustris*, Timothy, meadowfoxtail, and *Festuca rubra*. Mountain meadow terraces are drier (higher on the riparian plain) and exhibit a change in species where bentgrass, hairgrass, sedges, and *Juncus* are co-dominate or suppressed. Typical dominant grasses on the dry terraces include green fescue, *Stipas*, *Bromes*, and *Poa agassizensis*. The uplands on the Allotments under a forest canopy and dominated by elk sedge or elk sedge and pine grass. Some areas in the Allotment are comprised of low sagebrush and *Poa sandbergii*, Idaho fescue, Junegrass, and *Carex filifolia*.

4-25

The analysis methods described on page 117, paragraph 2 were not discussed and reference to the testing of variances is also missing. There should be some evidence in the EA that the quantifications produced can be associated with a level of confidence. Considering the survey methods employed during fish and wildlife investigations some quantification may have been made through categorizations of ocular estimates. In these cases rudimentary statistics rather than rigorous testing is performed which limits the interpretations. Where stream channels have been measured for width to depth ratios, pool frequency, and LWD occurrence the statistical analyses for Table 21-23 is missing. If the data is repeatable, then what is the probability that it can be repeated? Was an analysis of variance performed? Was a Chi square test used? How was this data tested and what are the results? The variation between streams and stream reaches should be described. A practical application of a structured experimental plot design and/or methodology should be cited that best describes the sampling methods used on the forest to obtain this information.

4-26

The Forest has made broad-based assumptions about the condition of Reach 1 of Shurtz Creek in the Van Allotment (p. 121-123). The reach is mostly intermittent and to suggest that the potential of the site and all geomorphic surfaces can support a monoculture of wet meadow sedges is outside the boundaries of the plant associations described by Crowe and Causnitzer 1997 and the habitats found along the creek. It is not appropriate to take a one-size-fits-all approach to these sites and expect performance where the potential doesn't exist due to a stream's intermittent flow. The soil depths have never formed to support a wet meadow environment, and the climatic events are not conducive to complement such a site even with the passage of a great deal of time. Rather than disregard the influence of geologic time and climate events, which have impacted drainages and established the riparian systems found today in the Allotments, the Forest must recognize the significant role that these forces play on local plant communities within the Forest.

4-27

It is also not appropriate to take a one-size-fit-all approach and suggest that the fenced area in the upper segment of Reach 1, Shurtz Creek in the Van Allotment has been protected and with such protection the rest of the stream will take on the same appearances and characteristics. The fenced area was created to isolate it from livestock use (p. 121), because it has characteristics that the Forest chose to set aside. It should not be used as a distraction to compare grazing responses. Such a comparison requires a systematic design of grazed and ungrazed areas in order to replicate both the exclosures and unexclosed areas. Such a project requires similar

grazed wet or moist meadow communities to compare to ungrazed wet or moist meadow communities sections. Likewise, reaches without shrubs and intermittent water flow must be set up in a similar fashion. Without stratifying the testing sites, the comparisons and results will be erroneous.

4-28

The statements regarding the "impassible" culvert on Rd. 17 (p. 123) speculates that it may be the cause of isolationism for some fish in the Shurtz Ck. segment above and below the culvert. Such isolationism is highly possible due to the intermittent status of the stream. This should be noted in the narrative as well.

4-29

Overall, the Fisheries section from pages 123-143 has too many misleading statements and poor literature citations. The section should be reviewed and scrutinized to remove subjective data interpretations and misleading statements. It should be edited to focus on the types of streams and characteristics of the riparian areas in the southern part of the Malheur National Forest without inferences that livestock grazing has impacted the entire area while referring to riparian areas and streams typical of regions with different soils, geologic structure, and precipitation patterns. Generally, the approach taken in the EA regarding fish habitat and fish numbers presents habitat descriptions applied to salmon species, which are inappropriate for redband trout. Such narrative is also inappropriate for many of the intermittent and ephemeral streams found in the Allotments. The fish have been observed using many different survey techniques, but nothing has been included to define the objectives and goals for the total number of redband trout desired. The population information should be summarized and made a part of the EA. Also, the habitat parameters depict stream components found on perennial streams and the Forest must adjust such expectations to reflect the local conditions.

4-30

Also, the water temperature data is insufficient as presented in Table 29 (p. 137) and since the data may or may not have been collected by the Forest, the deletion of the chart should be considered. Of what value is it to know the maximum water temperature measured on a single day out of a year?

4-31

There are a number of studies available to describe methods of analysis that have successfully applied the thermodynamic principles of heating and cooling (Bohren, 2004 (Attached); Larson and Larson 2001 and 2003(Attached); Stoneman and Jones 1996(Attached).) Without analysis it is not possible to separate the natural background conditions (daily thermal cycles) from thermal inputs that can be controlled through land management techniques. This EA may be relying on speculations about mechanistic temperature models that were published without field verification, and opinion articles about stream heating processes but fail to consider that these types of materials were printed without data and analysis that validated their discussions. Some contain assumptions about stream water conditions but papers that do not recite the results of their hypothesis testing using statistical methods cannot be used as support for scientific theory. Many papers assume a cause and effect that shade can cool water, but most failed to provide data supporting their theory and ignored providing a demonstration about how and where such an event could be observed.

4-32

The literature citations are insufficient in the Fisheries and Effects on Fisheries sections to support statements that appear to inflate the impacts of livestock grazing on riparian areas and thus fish and their instream habitat. To reduce the "double speak" (in a meadow beaver dams caused a headcut and in another area beaver are desirable for the positive attributes they bring) and to reduce the inconsistencies in the EA by clarifying the support citations and identifying the similarities of the places where studies have been conducted.

4-33

For example, studies of similar Eastern Oregon ecosystems are obviously better indicators of possible outcomes under the grazing and no grazing alternative than the studies conducted in other locations and ecosystem types. Comparison between enclosed, fenced areas with areas that are unfenced as shown in Photo 14 on page 153 (also see Bayley and Li, 2002) should be taken out of the EA, because the purpose of the enclosures used in the cited study and that shown in the photo were not intended for such comparisons. Livestock enclosures that can be used for comparison of vegetative changes are not the same as resource protection enclosures such as aspen protection. Likewise, the fenced project on the upper segment of Reach 1 on Shurtz Creek was not selected to be a paired plot where both grazed and ungrazed portions are studied. Photo 14 appears to be an intentional attempt to suggest that livestock grazing is negative, and rest is positive because tall vegetation is indicative of better vegetation and short plants are indicative of damaged areas.

4-34

The Forest has a duty to present the "best science" available and while many of the citations are convenient to read and insert, they do not represent data intensive studies designed to address the issues contained in the Fisheries and Effects on Fisheries narrative. Overall the citations appear to be an attempt to support subjective assessments with manuscripts that are not classified as rigorous scientific investigations (Larsen et al 1998). Larsen et al (1998) reported that of 2300 stream ecology papers reviewed by the authors, only 1/3rd were scientifically based; 2/3rds were the "opinions" of the authors.

It is important that man's ability to manipulate a system be viewed with a realistic understanding of scale and the interactions that occur in a natural system. Unreliable knowledge is the set of false ideas that are mistaken for knowledge (Romsberg 1981). If we let unreliable knowledge in, then others accepting these false laws will build new knowledge on a false foundation. Literature used for support and appeals to authority should be "selected" for their unique examination of specific questions and insightful results.

4-35

Suggestions to rest pastures in the Wolf Mt, West Malheur, or House Allotments are not supported by a scientifically valid data collection. The management prescription may result in an increase in biomass accumulation within the riparian meadows. The grass plants require stimulation in order to be able to increase vegetative tillers to attain a high reproductive state. The voids left by the existing grass plants (static vegetative reproduction) will be in jeopardy of being filled with undesirable plant species where thatch increases. Suspending livestock grazing will likely introduce problems related to ecological status. Larson, L., M. McInnis, and G. Kiemnec 1997 (Attached). It is important to examine these consequences of the proposed actions.

4-36

Due to the low level of intensive investigations within these allotments there is little evidence that a "no use" management strategy is warranted in the areas described. Instead, management is needed to invigorate the grass stand and maintain a high level of production on the site. Suspending livestock grazing rather than using the grazing as a tool to attain the level of productivity desired by the Forest, will likely introduce a variety of niches in the community structure that are conducive to noxious weed and other undesirable plant invasions. Sheley et al 1994 (Attached); Sheley and Petroff 1999 (Attached); Larson, L. et al 1997 (Attached); Larson and Kiemnec 2004 (Attached). Continued rest may be detrimental to the development of a functioning channel or later seral stage plants. Any utilization is better than none given our understanding of rangeland grasses and weeds and the current condition of this area. The Forest has not provided the necessary level of investigation required to obtain a management prescription provided in the EA.

Appendix B

No amount of professional judgment can substitute for empirical data obtained under site-specific conditions. Under some circumstances, ocular estimates of stubble height can be used to collect data, but the decision to use such methods requires a daily exercise of "making estimates" that are compared to actual measurements. There is no evidence that the Forest implements this activity prior to monitoring events.

4-37

The lack of a sound data collection method demonstrates a bias and willingness of the Forest to arbitrarily determine positive and negative grazing impacts. To remedy the situation a statistically valid design and randomization of plots is necessary in order to establish a levels of confidence in the assessments. As it is, there is a very high probability that determinations have been made about negative impacts when there are none, and determinations have been made that no impacts are present when in fact there are impacts (Snedecor and Cochran, 1997).

4-38

A scientifically sound data collection is needed to establish the proper height-weight relationship of grass species throughout the allotment pastures. Utilization estimates from stubble-heights (without a height-weight curve) results in erroneous estimates of the forage removed by livestock grazing. Random plots must be located throughout a grazing area; plant communities must be clipped, weighed, dried and weighed again to obtain an accurate production value for a pasture. It is necessary to obtain an average vegetation height for each plant community of interest, so that heights can be correlated with the plant production during a growing season. A good monitoring program is essential to good management. The Forest has maintained a monitoring program that focuses attention on sites after livestock grazing occurs. The work is not a one-time project. Monitoring must take place before livestock enter a pasture in order to obtain an average plant height across the pasture to help account for wildlife use, climate variations, or other factors. Clipping and weighing must also be repeated during dry and wet years in order to capture the variability inherent when climate variations occur.

4-39

4-40

The data collected at the DMA sites contain a significant data bias (observer error) where an observer along a designated transect length, has estimated grazing levels and subjectively placed his/her observations into broad utilization, bank alteration, and shrub use categories. Many errors (human and statistical) exist in this type of data collection and the problems are

compounded when the baseline inventory and appropriate height-weight relationships have not been established for each pasture and plant community type. Other issues include an inadequate sample size, accountability for the annual variations in plant growth due to climate, and the inherent changes in soil types across the acres represented by the data. We have already pointed out the serious issues of identifying plant communities and stratifying sites so that site potential can be considered.

This part of the EA should be edited and more thought given to designing the data collections and allotment monitoring activities so that site-specific characteristics can be accounted for each year. We also note that livestock grazing takes place across the stream riparian areas as well as uplands outside of the riparian

Vegetation Narrative

Without further intensive investigations (which the Preliminary EA does not contain), no association with a specific use or non-use can be made to account for the condition of the vegetation on these Allotments. To the best of our knowledge, the Forest has not created height weight curves for the plant communities in these Allotments and has not assessed the grazing units based on soil depth and plant communities at the site-specific level. The elimination of native plant associations and conversion to early seral vegetation through the seeding of Kentucky bluegrass and redtop that adapted to the sites to such an extent the have become resilient to all else, is difficult to imagine and should be verified using citations of USFS records. Other records on the forest where seeding of grasses has taken place were not successful and the native species dominate the sites today.

4-41

Not only does the Forest not have good data for this Allotment, but it is trying to rely on opinions and beliefs that are not supported by and are often contrary to the data collected by those who have been on the Allotment, the forest's own researchers, and basic range management science. This creates a prime situation for legal challenges, which neither the permittee nor the Forest desires. We request that the Forest address this concern by utilizing the highly reliable data and information and extract only the most objective information as support for this EA.

4-42

The vegetation discussion and narrative needs to clarify that removing livestock grazing will not result in rapid recovery when systems are already "recovered" or moving rapidly toward recovery. When speaking in general, the Forest needs to note that it is doing so and that those generalities may not be true about specific areas or practices in the area at issue. The EA should accurately note when statements are intended to only reflect data and a significant fact about specific conditions found in a locale and how it is different and is influencing the surrounding environment. This may help reduce the inaccuracies and inconsistencies in the EA.

4-43

To the extent that the Forest has not done so, the EA must address the fact that many plant species in the Wolf Mt., West Malheur, and House Allotments do not grow to the 3-6 inch stubble height. It is inappropriate to require the permittees to adhere to a standard where the ungrazed forage, even at its climax, will never or would barely achieve a 4 or 6-inch total height during a growing season. A lack of diligence to address this issue deprives permittees of valuable forage when their grazing management is providing for ecological stability and near

natural rate of recovery. Rather than punishing permittees for their efforts (which is what happens when the Forest does not do site-specific analyses), the Forest should make every effort to recognize the outstanding efforts to properly manage these grazing allotments. To the extent the Forest is not able to do this on its own, it should find the financial resources to contract for these analyses.

Water Quality

4-44

The science literature does not support the Forest's efforts to use a shade standard as a surrogate for water temperatures. In fact, the theory that shade can influence water temperatures has never been measured, analyzed and published. There are no published studies that demonstrate through empirical data that where shade is a factor that influences stream temperatures over other factors such as elevation, stream velocity, and air temperature changes. To the contrary, up-to-date, published literature shows that shading on stream water does not have an impact on temperatures, because air temperatures drive the thermal environment. The differences observed between streams and monitoring sites can be associated with orographic stratifications and stream velocities which are a part of the natural thermal cycles found in a watershed. Bohren, 2004 (Attached); Larson and Larson 2001 and 2003(Attached); Stoneman and Jones 1996(Attached). Watershed science must rely on Physics and properly designed temperature studies that are based on the Laws of Thermodynamics (developed in the mid 1600s by Rudolph Clausius), which today are the accepted theory of heat exchange. von Bayer, 1999 (Attached); Bohren, 2004 (Attached). Thus, the Forest must stop relying on an old, outdated theory that imposes unrealistic expectations on itself and the permittees.

4-45

To the extent that streams are not meeting temperature standards, further analysis needs to be completed as to the reasons, including natural background conditions. To the extent that these streams could never reach the temperature standards, even under pristine conditions, the Forest should be involved in removing the streams from the Oregon 303(d) list. The Forest cannot presume that streams will reach certain temperatures without analysis of the background conditions. Further, we note that the Forest does not collect water temperature data and has not inserted their analysis of any of the state records. The statements about meeting the temperature standards for Oregon require some demonstration of experience in collecting data and analyzing the data for application to these types of activities.

4-46

Finally, discussions about cause and effects throughout this EA have a number of issues that must be addressed to provide sufficient fortitude to withstand legal challenges. Rather than stating that the absence of grazing in riparian zones will increase vigor and amount of vegetation, it is more accurate to state that the studies show that it MAY increase vigor and amount of vegetation. This would be more consistent with other studies and professional journal manuscripts, and with the Forest's knowledge about the many factors that influence riparian vegetation and systems. The Forest would also then be consistent with studies that have shown that grazing can help maintain healthy rangelands.

Sincerely,

Van Grazing Co-Operative, Inc

John Sword, President
Actin Ranch, Inc.
Sword Ranch LLC
Sitz Ranch Partnership
Alfred & Carol
Dunten Howard
Ranch

Copy: Pat Larson
Oregon Cattlemen's Association

Attachments: 11 studies (paper copies)
CD with all studies noted in the comments as (Attached)

References:

Ballard, Teena M., and William C. Krueger. 2005. Cattle and Salmon I: Cattle Distribution and Behavior in a Northeastern Oregon Riparian Ecosystem. *Rangeland Ecology & Management*, 58:267-273

Ballard, Teena M., and William C. Krueger. 2005. Cattle and Salmon II: Interactions Between Cattle and Spawning Spring Chinook Salmon (*Oncorhynchus tshawytscha*) in a Northeastern Oregon Riparian Ecosystem. *Rangeland Ecology & Management*, 58:274-278

Bayley, P.B. and H. Li. 2002. Analyses offish responses to exclosures. Final report research/evaluate restoration ofNE Oregon streams: effects of livestock exclosures (corridor fencing) on riparian vegetation, stream geomorphic features, and fish populations. BP A Proj. Nos: 2000-051-00 and 2000-051-01. 87 p.

Bohren, C. F. 2004. The freezing of stream sand ponds: a simple - but uncomfortable--experiment. *The Physics Teacher*. Vol 42, December 2004, p 522-525

Boivin, B. and D. Love. 1960. *Poa Agassizensis*, A new prairie bluegrass. *Le Naturaliste Canadien*. Vol LXXXVII, Nos 6-7,juin-juillet. P. 173-180.

Crowe, E. and R. Clausnitzer. 1997. Mid-montane wetland plant associations of the Malheur, Umatilla and Wallowa-Whitman national Forests. USDA. Technical PaperR6-NR-ECOL-TP-22-97. 299p.

Hall, F. C. 1973. Plant communities of the Blue Mountains in eastern Oregon and southeastern Washington. USDA. Forest Service. R6 Area Guide 3-1.

Heath, M.E., D.S. Metcalfe, and R.F. Barnes. 1975. Forages: the science of grassland agriculture. Iowa State University Press. Ames, Iowa. p.243-245.

- Larsen, R.E., W.e. Krueger, M.R George, M.R Barrington, J.e. Buckhouse and D.E. Johnson. 1998. Livestock influences on riparian zones and fish habitat. Literature classification. 1. Range. Manage. 51:661-664
- Larson, L. and G. Kiemnec. 2004. Germination of Russian knapweed and Perennial Pepperweed under water and salt stress with variable light regimes. Weed Technol. In print.
- Larson, P.A. and L.L. Larson. 2003. Landowner monitoring of stream temperature and bottom sediments. Journal of Soil and Water Conservation. 58:3:152-157.
- Larson, L. and P.A. Larson. 2001. Influence of thermal gradients on the rates of heating and cooling of streams. Journal of Soil and Water Conservation. 56: 1 :38-43
- Larson, L., M. Mcinnis, and G. Kiemnec. 1997. Rangeland weed invasion. Rangelands. 19:30-32.
- Laliberte, Andrea S., Douglas E. Johnson, Norman R. Harris, and Grant M. Casady. 2001. Stream change analysis using remote sensing and geographic information systems (GIS). J. Range Manage. 54: A22-A50.
- Romesburg, H.C. 1981. Wildlife science: gaining reliable knowledge. J. Wildl. Manage. 45(2):293-313.
- Rosgen, D. 1996. Applied river morphology. Wildland Hydrology. Pagosa Springs, CO. 300p.
- Sheley, R., T. Svejcar and B. Maxwell. 1996. A theoretical framework for developing successional weed management strategies on rangelands. Weed Technol. 10:766-773.
- Sheley, Rand J. Petroff. 1999. Biology and management of noxious rangeland weeds. Oregon State University Press. Corvallis. 438 p.
- Stoneman, C.L. and Michael L. Jones. 1996. A simple method to classify stream thermal stability with single observations of daily maximum water and air temperatures. North American Journal of Fisheries Management 16:128-131.
- von Baeyer, Hans C. 1999. Warmth disperses and time passes: the history of heat. The Modern Library. NY
- Weaver, J. E. 1950. Effects of different intensities of grazing on depth and quantity of roots and grasses. JRM 3: 100-113.

Responses to Comment Letter #4

Response to Comment 4-1: All proposed fencing projects under Alternative 2 are permanent structures. Fences placed around aspen stand and headcuts are considered permanent structures and would be maintained until the objective is met (aspen stands are restored or headcuts are stabilized). At that time, the fences around aspen stand and headcuts would be removed. The proposed fence to enlarge Beaverdam meadow pasture to include a headcut would also be considered a permanent structure and not removed. The permittees will be included in the design and construction of the fences.

Response to Comment 4-2: Livestock grazing was addressed as *one of many reasons* for the degradation of stream conditions on the allotments. See page 113, 126, 146-150 and photos 9, 12 and 13. Since the majority of actions analyzed with this project deal with livestock grazing, our in depth discussions consider the effects of livestock grazing on aquatic systems. These were determined through site specific field observations, analytically derived site-specific habitat inventories and professional judgment.

Response to Comment 4-3: An issue is an effect on a physical, biological, social, or economic resource. An issue is not an activity; instead, the projected effects of the activity create the issue. Key issues are defined as those directly or indirectly caused by implementing the proposed action (EA, page 17).

Response to Comment 4-4: The measures described in the EA (pages 18-19) are the indicators used to measure the environmental consequences of each alternative.

Response to Comment 4-5: The need for action is described in the EA (pages 7-9) and indicate the isolated areas where resource conditions have not always been consistent with the Malheur Forest Plan.

Response to Comment 4-6: The Preliminary EA pages 45-47 describe vegetation patterns, principal human impacts, and potential vegetation groups in this area. The EA never made statements that imply the forest should be managed in a way where the goal is that all sites be at their climax at the same time.

Response to Comment 4-7: Because of budget constraints, the Forest Service cannot formally monitor every pasture on the Forest every year. Areas where resource conditions are problematic are monitored more often than areas where resource conditions are meeting or moving towards desired conditions. The Wade Corner pasture has no perennial streams and monitoring is conducted near Jungle/Holdout spring. The monitoring site in the Wade Corner pasture is an area where if proper management occurs in that location, proper management will be occurring throughout the rest of the management unit. Changes made to livestock management during the 2000 grazing season have been satisfactory in meeting resource objectives in this pasture. This site was only formally monitored once between 1999 and 2004 because current management in that pasture is meeting or moving towards desired resource conditions. However, undocumented observations by district range personnel and permittees and professional judgment indicate the same, hence the pasture is not listed in the needs section of the EA (pages 7-9).

Response to Comment 4-8: The EA (page 65) states “*Current livestock management on the House Creek Allotment has been successful in maintaining desired riparian conditions. Nevertheless, it is proposed to change the acceptable use level from 45% to 35% along the greenline of the riparian areas on the House Creek Allotment to more rapidly restore the riparian area. This change would not affect the current permittee or livestock operation as stubble-height measurements are consistently well above the required standard.*”

Response to Comment 4-9: The EA, Appendix A states, “The methods and tools chosen (for implementation monitoring) are dependent on the specific monitoring objectives as well as constraints such as timing, available funding and personnel, other priorities, and the geographical area to be monitored. Due to these reasons, the Forest Service has not developed height/weight curves for each individual allotment. Any new height/weight curves, forage production or other data important to livestock management can be collected by the permittees independently or cooperatively with Forest Service personnel. The results of this data should be summarized and discussed during the annual operating meeting. Where appropriate, new information can be included in the annual operating instructions to help identify appropriate move triggers.

Response to Comment 4-10: The EA (pg 69) states “*The No Grazing Alternative would allow bunchgrass forage to develop residual growth resulting in “wolfy” plants, which are not palatable to wild ungulates. The establishment of older non-palatable plants would occur over time, unless some type of disturbance such as fire occurred.*” The quantity and quality of elk forage were the point of discussion, not the plant condition or plant physiology. Research by Ganskopp, Svejcar and Vavara (2004) indicated plants were more nutritious for big game use when grazed. This was not incorporated into Alternatives 1 and 2 because it would not occur in any significant amount.

Response to Comment 4-11: The U.S. Forest Service and Malheur National Forest use PFC as a minimum standard for evaluating riparian areas. The Riparian Proper Functioning Conditions (PFC) assessments are located in Appendix I of the DEIS. The PFC and riparian discussion was included in the watershed section because stream and riparian resources are a dynamic and significant part of the watershed.

Response to Comment 4-12: The discussion in the EA (pages 105-107) focused primarily on plant roots’ interaction with soils. The leaf and root aspect of this discussion was secondary. The intention of using material from Dietz (1989) and Weaver (1950) was to illustrate the interaction of plants, especially plant roots, with soils. The fundamental principle and purpose of this discussion can be summarized in the excerpts below:

“If below ground root mass is maintained, the derived soil benefits (stability, structure, fertility, water holding capacity) will also be maintained” (EA, page 105).

“Plant roots help to break up compacted layers by forcing their way between soil particles. Plants with large taproots are more effective at penetrating and loosening deep compacted layers, and fibrous root systems can break up surface compacted layers. Roots also reduce compaction by providing a food source that increases the number and activity of soil organisms” (EA, page 107).

These fundamental principles will remain the same whether the plant is cool season, warm season, woody, or herbaceous.

Response to Comment 4-12a: Soil genesis and morphology takes place on geologic time scales. Furthermore, parent material, climate, topography, biology, and time are all variable factors in soil genesis. Processes include physical weathering, chemical decomposition, particle transport, sedimentation, organic deposition, and eluviation. A soil's change rate can be described by the equation $dS = T \times (I - C)$ where dS = the rate of change for a particular soil property, I = the intensity of a particular process to change that soil property, and C = the capacity of the soil to resist change. Because of these multiple and variable factors, there is no constant soil recovery/formation rate. Soil change rates have a broad range:

“Natural A horizons, or “topsoil”, are reported to form at rates of 1yr cm⁻¹ to 38 yr cm⁻¹, while it is estimated that several tens to hundreds of years are required to form a centimeter in entire profiles.” (See Buol, S.W., R.J Southard, R.C. Graham, and P.A. McDaniel. 2003. Soil Genesis and Classification, Fifth Edition. Iowa State Press, Ames IA, p. 153, 159-61, and 167.)

Because soil change occurs below the ground surface, it is difficult to observe soil change under natural conditions. Also, soil processes occur at a geologic time scale, outlasting research funding and researcher's lifespans. Therefore, when all the multiple and variable factors, processes, and existing soil properties are taken into account, it is reasonable to assume a soil recovery rate on the order of decades.

Response to Comment 4-12b: From September 20 to September 27, 2005, the District hydrologist conducted rapid assessments of soils believed to be representative of soil conditions in areas of obvious livestock use. However, the exclosures have not existed for the entire time that grazing has occurred on the Forest. Past soil damage may take decades to recover, and exclosures may not accurately represent pre-grazing soil conditions that can be used as a reference or control for monitoring. Baseline pre-grazing data was not collected in the nineteenth century. Additionally, exclosures are currently grazed under special provision or by trespass livestock. This invalidates said exclosures as “no-grazing” controls for monitoring or otherwise measuring ecological changes. Details and results are included in the EA pages 97-102.

Response to Comment 4-13: Water temperature data is collected on the Forest as per Oregon Watershed Enhancement Board, Water Quality Monitoring Technical Guide Book, July 1999, Version 2.0, Chapter 6.

The U.S. Forest Service is required to comply with the Clean Water Act. “The Forest Service and 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.” (Forest Service and Bureau of Land Management Protocol for Addressing Clean Water Act Section 303(d) Listed Waters. May 1999, Version 2.0, p. 1)

The water quality standards associated with a particular water body is determined by that water body's beneficial uses. Beneficial use examples include drinking water, cold water fisheries, industrial water supply, recreation, and agricultural uses. The Oregon Department of Environmental Quality (DEQ) has the responsibility for determining beneficial uses and developing water quality standards that protect beneficial uses of rivers, streams, lakes and estuaries. Once standards that protect beneficial uses are established, the state monitors water quality and reviews available data and information to determine if these standards are being met and water is protected. Section 303(d) of the federal Clean Water Act requires each state to develop a list of water bodies that do not meet standards. The “303(d) list” provides a way for

DEQ to identify and prioritize water quality problems. The list also serves as a guide for developing and implementing watershed pollution reduction plans to protect beneficial uses by achieving water quality standards.

Beneficial uses in the Malheur River Basin and the Malheur Lake Basin include public and private domestic water supply (when properly treated and filtered), industrial water supply, irrigation, livestock watering, fish and aquatic life, wildlife and hunting, fishing, boating, water contact recreation, and aesthetic quality (Oregon DEQ Administrative Rules). On the Malheur National Forest, most streams are capable of supporting redband trout and water temperature is a concern. Water temperature is influenced by solar radiation, stream shade, ambient air temperatures, channel morphology, groundwater inflows, and stream velocity, volume, and flow.

The temperature standard set by Oregon DEQ for the seven-day-average maximum allowable temperature in streams identified as having redband trout, is not to exceed 20.0 degrees Celsius, ~ 68.0 degrees Fahrenheit. Most streams on the Emigrant Creek RD are capable of supporting redband trout. The seven-day-average maximum temperature of a stream identified as having bull trout spawning and juvenile rearing use may not exceed 12.0 degrees Celsius, ~53.6 degrees Fahrenheit. The Malheur River, identified as suitable bull trout habitat, receives the Wolf Creek watershed waters and will be impacted by the Wolf Creek inflow. The Wolf Mountain and West Malheur allotments all are part of the Wolf Creek watershed (Oregon DEQ Administrative Rules).

The livestock urine and fecal discussion included in the Preliminary EA was a result of direct observation of livestock urinating and defecating near, or in, the stream channel and not due to a literature review. The following statement describes possible outcomes of livestock directly urinating and defecating into the stream channel. “water quality can be directly impacted in the following ways:

- Livestock urine and fecal wastes increase bacteria levels that cause adverse health effects for wildlife, livestock, and humans;
- Livestock urine and fecal wastes increase nutrients that lead to excessive algae and other aquatic plant growth, which can be adverse to wildlife, livestock, and human health;” (p. 105, emphasis added).

The Forest did not explicitly state that bacteria and excess nutrients in the streams are current concerns. However, the discussion in the EA and the quote from page 118 (above) concerning bacteria and nutrients was included because it is well known that urine and fecal wastes are associated with bacterial health hazards, particularly *Escherichia coli*, and water eutrophication. The Forest is obliged to recognize and acknowledge the potential problems associated with livestock urine and fecal wastes in streams and other surface waters.

Response to Comment 4-14: You have misinterpreted the study conducted by Teena M. Ballard and William C. Krueger. From their article published in *Rangeland Ecology and Management* in May of 2005 it states: “Cattle spent approximately 94% of their time in the terrestrial habitats...the remaining time was spent in stream habitats which consisted of gravel bar (5%) and in aquatic (<1%). Riparian areas were considered terrestrial habitats and were included in the 94% measurement. “This grouping was made by mapping the vegetation within a 50-m strip on each side of the stream (Ballard and Krueger 2005).” The Ballard/Krueger study represents a documented case history. They used scientifically sound methods to describe the interactions that were taking place between cattle and Spring Chinook Salmon in a specifically designated area.

The information they collected will help land managers better understand these interactions. However, the results of this study might be very different if conducted on another piece of land under a different grazing strategy.

Response to Comment 4-15: The discussion on redds on page 128 and 150 of the EA state that impacts from livestock are unlikely and direct impacts would be minimal. In reference to the Ballard/Krueger study they state that the applicability of their results from their study to other riparian areas is unknown.

Response to Comment 4-16: The cumulative effects section of the EA (pages 158-162, 163, 164 and 166) describes the expected changes in RMOs (water temperature) by alternative. Dissolved oxygen is not a part of RMOs and is not monitored on a routine basis. When water temperatures decrease, it is expected to see an increase in dissolved oxygen. See also response to comment 4-14 for Ballard/Krueger comment.

Response to Comment 4-17: The EA, (pages 127) cited Platts 1991 in reference to bank stability and the removal of riparian vegetation by livestock. These activities have been documented in the EA with stream surveys and photos, see response to comment #4-18. Also, Platts 1991 (page 393) states “*Livestock grazing can affect the riparian environment by changing, reducing, or eliminating vegetation*” and (page 398) “*When animals graze directly on streambanks, mass erosion from trampling, hoof slide, and streambank collapse causes soil to move directly into the stream*”.

Response to Comment 4-18: Photos 5, 7, 8 and 9 support stream survey data (EA, pages 132-155) indicating that 32% of stream reaches fail to meet bank stability standards and that embeddedness of substrates is a concern on some streams.

Response to Comment 4-19: Refer to response to comment 4-15.

Response to Comment 4-20: The EA never made statements that imply all streams in all places meet high quality fish habitat. On page 13, high quality habitat and complexity are defined by meeting Forest Riparian Management Objectives, where the potential to meet those standards exists.

Response to Comment 4-21: It is common knowledge among range specialists that seeding of these and other species likely occurred on the Forest or private in-holdings and spread across the landscape, especially after the intense grazing in the early 1900’s. Therefore the statement on page 129 was modified to reflect the fact that they are introduced species altering the natural plant community. The EA makes no reference that “seeding projects” were successful resulting in a monoculture. Both of these species have been documented on the forest and in the project area.

Response to Comment 4-22: We are confident that Kentucky bluegrass communities are not entirely absent from the grazing units. We agree that “tufted hairgrass, as well as *Deschampsia elongata*, occur on many streams of the Malheur National Forest where soils maintain sufficient moisture throughout the growing season. Other species common throughout the Allotments are: threadleaved sedge, bulrush, *Carex microptera*, thin bent grass, *Luzula*, one-spike oatgrass, California oatgrass, sandberg bluegrass, *Poa agassizensis*, *Poa nervosa*, and *Poa palustris*.”

Response to Comment 4-23: We agree.

Response to Comment 4-24: No monoculture was described in the Preliminary EA, page 116.

Response to Comment 4-25: Testing of variances was not conducted since the majority of the data consisted of actual field measurements, not samples, to insure repeatability. Tables 21-23 (EA, pages 130-131) do not require a statistical analysis since these tables display Forest objectives and a summary of habitat criteria and areas of concern. Data were collected following Region 6 Forest Service protocol using a peer reviewed methodology process described by Hankin and Reeves 1988. Hankin, D.G., and G.H. Reeves. 1988. Estimating total fish abundance and total habitat area in small streams based on visual estimation methods. Can. J. Fish. Aquat. Sci. 45:834-844.

Response to Comment 4-26: The condition of Schurtz Creek was determined by data (not assumptions) collected from a Level II stream survey following Region 6 Forest Service protocol using a peer reviewed methodology process described by Hankin, D.G., and G.H. Reeves. 1988. Estimating total fish abundance and total habitat area in small streams based on visual estimation methods. Can. J. Fish. Aquat. Sci. 45:834-844. The data does not state that the potential of the site and all geomorphic surfaces support a monoculture of wet meadow sedges. Although the lower parts of the stream may be intermittent, it still provides seasonal fisheries habitat and the condition of this reach effects downstream habitat on Calamity Creek.

Response to Comment 4-27: Those characteristics that the Forest chose to set aside almost vanished before the exclosure was constructed due to over utilization of riparian vegetation by livestock. The exclosure demonstrates the potential for further restoration opportunities in similar sites within the 3 allotments.

Response to Comment 4-28: The 17 road culvert is a year round permanent barrier to fish resulting in isolationism. An intermittent stream like Schurtz Creek allows fish passage for several months during the spring when redband trout tend to migrate naturally thus not creating isolationism.

Response to Comment 4-29: The methodologies that were used are based on the most recent applicable science. The EA focuses on the types of streams, their characteristics and conditions as they primarily relate to livestock grazing since this is the purpose of the document. Other factors affecting aquatic systems are discussed in the cumulative effects section of the EA, pages 158-164, and 166. Literature citations are sufficient representing the best science supporting the mission of the Forest Service in the proper management of aquatic ecosystems. Additionally the methodologies used (level II stream surveys, PFC) are peer reviewed and consulted over 100 scientific references, agencies , tribes and individuals in preparing the EA.

Response to Comment 4-30: Refer to response to comment 4-13.

Response to Comment 4-31: Refer to response to comment 4-13.

Response to Comment 4-32: Refer to response to comment 4-29.

Response to Comment 4-33: Photo 14 demonstrates the potential difference in vegetation response that could result from the implementation of different alternatives.

Response to Comment 4-34: Refer to response to comment 4-29.

Response to Comment 4-35: To the contrary, resting pastures as demonstrated on upper Schurtz Creek does not result in biomass accumulation, voids or problems with ecological status. They resulted in greater abundance of native vegetation supporting a wide diversity of wildlife, insects, worms, nematodes and mites, that aid in the breakdown of vegetation biomass, contributing to uncompacted soils allowing better water infiltration and water retention in the floodplain, based on personal professional observations. The enclosure on Schurtz Creek also resulted in improved stream structure and function which resulted in a rating of Proper Functioning Condition instead of Functioning at Risk as was determined outside the enclosure in the grazed portion of the pasture.

Response to Comment 4-36: The EA (page 67) displays the effects of the No Grazing Alternative on rangeland vegetation, as required by NEPA.

Response to Comment 4-37: The EA (page 45) states, “A combination of 1) *The Malheur National Forest Draft Range Monitoring Guidelines (June 2005) (Appendix A)*, 2) *The Malheur National Forest Riparian Monitoring (Condition and Trend) Strategy (2005) (Appendix B)*, and 3) *the monitoring protocol developed by the Interagency Implementation Team (IIT), as amended in 2004 (IIT 2004)*, would be used to determine if grazing is allowing movement towards desired conditions and Forest Plan Standards”. Forest Service range personnel encourage participation of the permittees and/or their consultants in the collection and interpretation of monitoring data on the grazing allotments.

Response to Comment 4-38: Refer to response to comment 4-9.

Response to Comment 4-39: Refer to response to comment 4-9.

Response to Comment 4-40: Monitoring will be conducted using established methods. The EA, Appendix A (page 1) states, “*Following is a sample of publications that describe many of the monitoring methods available for use on the Malheur National Forest.*”

- “*Utilization Studies and Residual Measurements*”, *Interagency Technical Reference* 1734-3;
- “*Sampling Vegetation Attributes*”, *Interagency Technical Reference* 1734-4.
- “*Monitoring the Vegetation Resources in Riparian Areas*”, *RMRS-GTR-47*.
- “*Riparian Area Management*”, *TR 1737-15; A User Guide to Assessing Proper Functioning Condition and the Supporting Science for Lotic Areas*:
- “*Guidelines for Establishing Allowable Levels of Streambank Alteration*”, by Ervin R. Cowley (March, 2002).
- *Program Manual for “Implementation Monitoring Program for PACFISH, INFISH and the 1998 Biological Opinions for Salmon, Steelhead, and Bull Trout”*, July, 2003.
- “*Monitoring Streambanks and Riparian Vegetation – Multiple Indicators*”, *Technical Bulletin No. 2005-001*; March, 2005.

Response to Comment 4-41: We are not sure what allotment you are referring to. However, the data used in this analysis is the best available.

Response to Comment 4-42: The vegetation section of the EA does not state that removing livestock grazing would result in rapid recovery of stream systems.

Response to Comment 4-43: Refer to response to comment 3-4.

Response to Comment 4-44: The Forest Service does not use shade as a substitute for water temperatures. Shade and water temperature are collected by separate surveys. These surveys are coordinated between BLM and ODFW. Water temperature data is collected continuously on a daily basis between June and September, following Oregon State protocol. The data are in the process of being submitted to the state for their data base.

Response to Comment 4-45: Refer to response to comment 4-44.

Response to Comment 4-46: The EA, (page 105) states, *“Increased water availability will improve plant vigor and overall biomass.”* We believe this statement to be true.

Comment Letter #5

Carolyn Freeborn, District Ranger
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Hines, OR 97738

September 10, 2005

Re: Comments on Preliminary Environmental Assessment for House Creek, West Malheur and Wolf Mountain Allotments—VIA EMAIL (signed hard copy to follow via postal mail)

Dear Ms. Freeborn:

Please accept these comments from the Oregon Natural Desert Association (ONDA) on the Preliminary Environmental Assessment for House Creek, West Malheur and Wolf Mountain Allotments. ONDA is a non-profit public interest organization whose mission is to protect, defend, and restore forever, the health of Oregon's native deserts. ONDA has a long history of interest and involvement in Forest Service activities with respect to wilderness, grazing, riparian areas, water quality, and fish and wildlife. The members and staff of ONDA use and enjoy the public lands and natural resources on the Malheur National Forest, including areas within and adjacent to the planning area, for recreational, scientific, spiritual, educational, aesthetic, and other purposes. ONDA and its members also participate in information gathering and dissemination, education and public outreach, agency land use planning, and other activities relating to the Forest Service's management and administration of the public lands of eastern Oregon.

5-1

I. **The EA Does Not Analyze a Reasonable Range of Alternatives.**

The EA presents only three alternatives, two of which propose no change to current grazing levels. EA at 28-33. The only distinction between Alternative 1 (current management) and Alternative 2 (proposed action) is that the latter would add "physical changes (such as water developments or fence construction) to improve allotment management." EA at 31. The inclusion of Alternative 3 (No Grazing/No Action) seems to constitute little more than a pretext for satisfying the "No Action" alternative requirement under NEPA, rather than demonstrating the Forest Service "rigorously explored" and "objectively evaluated" this option (as discussed in greater detail below). See 40 C.F.R. §§ 1502.14 (EISs must "[r]igorously explore and objectively evaluate all reasonable alternatives").

The Forest Service must study, develop, and analyze a reasonable range of alternatives to the proposed action. 42 U.S.C. § 4332(2)(C)(iii); (2)(E). Consideration of a reasonable range of alternatives is "the heart of the environmental impact statement." 40 C.F.R. §§ 1502.14; see also id. § 1502.1 (an EIS "shall provide full and fair discussion of significant environmental impacts and shall inform decisionmakers and the public of the reasonable alternatives which would avoid or minimize adverse impacts or enhance the quality of the human environment"). The range of alternatives requirement is critical

to serving NEPA's primary purposes of insuring fully informed decision-making and providing for meaningful public participation in environmental analyses and decision-making. See id. § 1500.1(b), (c).

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Although the EA purports to present three alternatives, in actuality, it only presents two alternatives representing two diametrically opposed courses of action. The EA is completely devoid of *any* mid-range alternative. For instance, the EA should at least consider eliminating or reducing grazing in sensitive areas, such as riparian areas adjacent to streams exceeding water quality standards or failing to attain RMOs, as well as other similarly sensitive areas within the planning area. Without this type of alternative and the accompanying detailed analysis and objective evaluation that should accompany it, the EA falls short of statutory requirements. See Muckleshoot Indian Tribe v. U.S. Forest Serv., 177 F.3d 800, 813 (9th Cir. 1999) (Forest Service violated NEPA by failing to consider range of appropriate alternatives, where Service considered only a no action alternative along with two virtually identical alternatives).

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While almost complete reliance on structural "range improvements" may be appropriate to analyze as one alternative for this project, it is arbitrary and capricious to refuse to also look at other alternatives that reduce or eliminate the actual problem: unsustainable livestock grazing practices in already depleted and damaged areas. Without doing so, this EA appears simply to attempt to justify a decision already made. The Ninth Circuit has soundly rejected such an approach: "[T]he comprehensive 'hard look' mandated by Congress and required by [NEPA] must be timely, and it must be taken objectively and in good faith, not as an exercise in form over substance, and not as a subterfuge designed to rationalize a decision already made." Metcalf v. Daley, 214 F.3d 1135, 1142 (9th Cir. 2000). "The existence of a viable but unexamined alternative renders an environmental impact statement inadequate." Alaska Wilderness Recreation & Tourism v. Morrison, 67 F.3d 723, 729 (9th Cir. 1995)

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Because the Forest Plan provides that riparian-dependent resources will receive "primary emphasis" in the RHCAs established in Management Area 3B throughout the planning area, it is arbitrary not to analyze in detail an alternative that provides such emphasis via reduced or partially eliminated grazing in allotments or units that contain RHCAs—particularly RHCAs with identified special designations or management problems (e.g., 303(d)-listed streams, consistent failures to meet grazing standards and/or RMOs). Moreover, the decision to rely almost exclusively on range improvements is inconsistent with PACFISH/INFISH standard GM-1, which requires that the Forest Service modify or suspend grazing practices where RMOs are not being met. This is the document and planning process in which the Forest Service must make those changes and suspensions. It is arbitrary to rely so heavily on these types of structural range improvements, and not even consider reduced numbers or eliminating grazing from certain areas, based on the data and observations currently in existence and without any actual RMO baseline data to support that decision.

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Moreover, the Service's rationale for eliminating viable alternatives from detailed consideration is flawed. EA at 28. For instance, the EA eliminated the alternative to implement "a reduction in grazing access" because "it would not meet the purpose and

need for action.” Id. The Forest Service does not explain how reducing grazing would not meet objectives such as satisfying PACFISH/ INFISH, and other Forest Plan ecological goals and standards. Nor is there any authority identified in the EA that requires the agency to provide a certain amount of forage to permittees regardless of the environmental consequences of that decision. However, even if reducing the numbers alone would in fact be inconsistent with meeting management objectives, this does not support completely eliminating the option altogether from the planning discussion. The Service fails to consider the possibility of incorporating reductions into a broader grazing strategy. The Service’s flawed rationale for eliminating viable alternatives from detailed consideration demonstrates that the agency failed to “[r]igorously explore and objectively evaluate all reasonable alternatives” as required under NEPA. See also Citizens for a Better Henderson v. Hodel, 768 F.2d 1051, 1057 (9th Cir. 1985) (a “viable but unexamined alternative renders [the] environmental impact statement inadequate”).

Simply listing off and then discarding various alternatives does not satisfy NEPA’s requirements. The Forest Service must consider all reasonable alternatives, and reduction or elimination of grazing in certain areas represents a reasonable alternative. Thus, the Forest Service has unreasonably constrained the range of alternatives considered in the EIS. The agency must “[r]igorously explore and objectively evaluate all reasonable alternatives” in order “to restore and enhance the quality of the human environment and avoid or minimize any possible adverse effects of [the agency’s] actions upon the quality of the human environment.” 40 C.F.R. §§ 1502.14(a), 1500.2(f). Analysis of alternatives must be “sufficiently detailed to reveal the agency’s comparative evaluation of the environmental benefits, costs and risks of the proposed action and each reasonable alternative.” Id. (emphasis added); see id. § 1502.14(a); Bob Marshall Alliance v. Hodel, 852 F.2d 1223 (9th Cir. 1988), cert. denied, 489 U.S. 1066 (1988). That type of sufficient detail is not present for the reasonable, but eliminated, alternatives.

This is arbitrary and capricious, particularly in light of the fact that ONDA noted in its scoping comments why reducing or suspending grazing is indeed reasonable. The purpose of the “rigorous” analysis required by NEPA is to “provid[e] a clear basis for choice among options by the decisionmaker and the public.” 40 C.F.R. § 1502.14; see also 42 U.S.C. § 4332(2)(E); 40 C.F.R. §§ 1507.2(d), 1508.9(b). In this EA, all that is present are “conclusory statements [T]he [EA] offers precious little to show that the [government] ever paused to test its foundational assumption.” Simmons v. U.S. Army Corps of Eng’rs, 120 F.3d 664, 670 (7th Cir. 1997). Without baseline information, the Forest Service’s assertions amount to little more than conclusory statements and the public is denied an opportunity to meaningfully participate in this aspect of the decision-making process.

Furthermore, the EA’s statement of purpose and need necessarily precludes implementation of Alternative 3 (no grazing), leaving only Alternative 2 (proposed action) as a means for accomplishing the goals of the proposal. Because the EA states that “[t]he purpose of this proposal is to continue authorization of livestock grazing in a manner that is consistent with the Malheur Forest Plan,” Alternative 3 only serves to satisfy NEPA’s no action alternative requirement. EA at 6. The EA additionally states that current management “has not always been consistent with the Malheur National Forest Plan and/or moved toward meeting aquatic and other resource Forest Plan standards... including INFISH Riparian Management Objectives (RMO) at a near natural rate of recovery...” EA at 29. This necessarily precludes Alternative 1 (current management) as a viable option. Thus, two of the three “alternatives” presented, are in fact not alternatives at all, since neither is capable of accomplishing the agency’s goals. By only presenting a single viable alternative that is capable of meeting the stated purpose and need, the

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Service has essentially rendered the EIS a mere formality. This eviscerates Congress's intent in enacting NEPA.

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II. The EA Proposes Grazing Activities that are Inconsistent with the Forest Plan and INFISH.

Regulatory background

The Malheur National Forest's Land and Resource Management Plan ("LRMP") Rangeland Standards require the Forest Service to conduct grazing management "to promote objectives of [MIS]" and "[m]anage allotments to ensure that resource values other than forage are maintained at or above minimum requirements." See LRMP at IV-53. In addition, the Forest Plan set a goal of providing "preferential consideration to anadromous fish" in areas suitable for grazing. *Id.* at IV-62. The standards created for anadromous riparian areas to meet these goals include: providing necessary habitat to "maintain or increase management indicator species with special emphasis on steelhead"; managing "the composition and productivity of key riparian vegetation to protect or enhance riparian-dependent resources" with an emphasis on "reestablishment of remnant hardwood shrub and tree communities"; designing and implementing "riparian habitat improvement activities"; improving the recovery rate in riparian areas "by eliminating or reducing the impacts of management activities that may slow riparian recovery"; managing allotments to "protect or enhance riparian-dependent resources"; and managing grazing "so that water quality meets Oregon State standards and fish populations are maintained at an acceptable condition or in an upward trend." *Id.* at IV-63 to IV-65.

Despite these requirements, habitat degradation and decline continued on the Malheur National Forest, such that the Forest Plan subsequently was amended by PACFISH to protect anadromous fish species. PACFISH was "designed to halt the degradation and begin the restoration of anadromous fish habitat and see that future opportunities are not foregone by management decisions" during the preparation of long-term regional management strategies. In 1995, the Forest Service developed the Inland Native Fish Strategy ("INFISH"), an aquatic conservation strategy that set management objectives and standards for twenty-two national forests within the range of (non-anadromous) bull trout habitat.

The Forest Service amended the affected forest plans, including the Malheur LRMP, and PACFISH and INFISH standards thus apply to the Middle Fork John Day River and its tributary streams. Because the grazing standards in the Forest Plan were amended by the PACFISH and INFISH standards, the PACFISH/INFISH standards therefore became the applicable grazing standards within the planning area. Importantly, though, any original Forest Plan standard not superseded by a new PACFISH/INFISH standard remains in force.

Grazing standard GM-1 states that the Forest Service must:

Modify grazing practices (e.g., accessibility of riparian areas to livestock, length of grazing season, stocking levels, timing of grazing, etc.) that retard or prevent attainment of Riparian Management Objectives or are likely to adversely affect listed anadromous fish. Suspend grazing if adjusting practices is not effective in meeting Riparian Management Objectives or avoiding adverse effects on listed anadromous fish.

EA at 144. Modifications may include reducing numbers of livestock or "season of use, changes in handling practices or the complete removal of livestock from [Riparian Habitat Conservation

Areas].”¹⁹ Riparian Management Objectives (“RMOs”) are “[q]uantifiable measures of stream and streamside conditions that define good fish habitat, and serve as indicators against which attainment or progress toward attainment of goals will be measured.” See PACFISH EA at App. C-4 to C-6.

PACFISH establishes RMOs for measurable stream attributes such as bank stability, bank angle, stream width-to-depth ratio, pool frequency, and water temperature. See *id.* Both the PACFISH and Amendment 29 water temperature RMOs are superseded by the more stringent 2002 and 2004 revisions to the Oregon water quality standard for temperature, established under the Clean Water Act.

The Forest Service defines “retard attainment of RMOs” as the “measurably slow recovery of any identified RMO feature (e.g., pool frequency, water temperature, etc.) that is worse than the objective level.” PACFISH Glossary at 6. Degradation of the physical and biological processes or conditions that determine RMOs is also considered to retard attainment of RMOs. *Id.* This standard therefore requires the Forest Service to move toward attainment of RMOs at a specified rate and either modify or suspend grazing when necessary to satisfy that duty. In particular, the “do not retard” standard does not permit status quo grazing practices because this language goes beyond simply preventing attainment and imposes an affirmative duty on the Forest Service to move toward achievement of RMOs and riparian recovery. Indeed, according to NOAA Fisheries, the GM-1 grazing standard sets an “expectation of habitat improvement at natural rates or faster” and the fisheries agency “assume[d] that the requirement . . . that actions not retard attainment of the RMOs is equivalent to a requirement that actions should not impede natural habitat recovery rates, nor should they reduce the quality of the key or supporting features [RMOs].”

Current and proposed grazing practices continue, and will continue, to degrade habitat and result in failure to achieve or progress toward meeting RMOs.

Here, the EA’s summary of RMO attributes for the planning area shows an troubling failure rate for every category, conceding that at least 73% of surveyed reaches in the project area failed to meet Amendment 29/ INFISH RMOs in 2002. EA at 118-119. Also many streams failed to meet OR DEQ 303(d) standards. *E.g.* EA at 122. The Service concedes that the two action alternatives will not allow recovery for decades: over 50 years to meet RMOs under Alt. 1 and 30-40 years under Alt. 2. EA at 151-2. The EA predicts that under Alt. 3, RMOs would be met in 15-20 years. *Id.* at 154. The BE further states that “the majority of surveyed reaches are not meeting Forest Plan [RMOs] for pool habitat, LWD, and fine sediment.” EA Appendix G at 9.

The EA, as well as countless other documents, explains that it is grazing that is impeding the achievement of stream goals. The EA explains that grazing degrades bank stability through removal of riparian vegetation, mechanical damage of stream banks, the collapse of undercut banks, downcutting, direct trampling of redds, reduction of woody plants for stream shading, and more. EA at 115-116. Despite all this evidence, the EA baldly asserts that all alternatives are consistent with Forest Plan direction. EA at 143. The Service insists that maintaining existing levels of grazing and utilizing “adaptive management” will result in “near natural rates” of

¹⁹ Riparian Habitat Conservation Areas (“RHCAs”) are “portions of watersheds where riparian-dependant resources receive primary emphasis, and management activities are subject to specific standards and guidelines.”

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recovery. These assumptions not only are unsupported, but completely contradict the Service's own monitoring and assessment data demonstrating that current grazing management simply has not, and is not, resulting in progress toward attainment of RMOs, let alone "near natural rates" of recovery. For example, the Aquatic BE for this project states that "[t]he reduction of bank stabilizing vegetation and stream shade is retarding the near natural rate of recovery and the obtainment of Forest RMO's." EA Appendix G at 17.

PACFISH and INFISH are now in their tenth year of implementation, meaning the Malheur National Forest has had a *decade* to make modifications that would result in achievement of RMOs. Yet the Forest Service admits that the preferred alternative will not achieve recovery for 30-40 years. The fact that these strategies originally were designed as interim, 18-month strategies to begin restoration of native fish habitat shows that its authors envisioned suspension of grazing within a few years if modifications were unsuccessful. See, e.g., INFISH EA at 1. Moreover, suspension is required "if adjusting practices is not effective in meeting [RMOs]." Id. at A-9. In many cases within the planning area, only multi-year suspension of grazing can allow these highly degraded systems to move toward attainment of RMOs and satisfy the GM-1 standard and purposes. In short, because the Service's grazing strategy here has failed to move the ecological condition toward RMOs at a near natural rate, the requirement to suspend grazing has plainly been triggered. Moreover, the plain language of GM-1 does not permit an agency to continually make modifications that are unsuccessful in achieving RMOs.

Hot-season concerns

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Of particular concern is that ongoing grazing is, and under the proposed action will continue, during the hot summer season, the time during which fragile desert riparian areas are most susceptible to impacts from grazing. The proposed action proposes grazing from June 1—Sept. 30. EA at 32-33. The Forest Service has long understood that hot season grazing can cause significant damage to riparian and aquatic conditions:

During the hot season, livestock concentrate in or near the riparian area when upland forage becomes rank or dry, water distribution is more limited, and the desire for shade is more intense. Where free-choice grazing is allowed, summer use usually results in greater utilization of riparian vegetation. Summer is also when grazing causes the greatest stress in most plant communities. There is less time for regrowth and replenishment of carbohydrate reserves than with spring use, and more need for leaf area than later in the growing season. Annually repeated grazing throughout the hot season is nearly always detrimental to riparian vegetation (essentially the same as season-long use), especially in large pastures with small riparian areas that are not managed as riparian pastures.

U.S. Forest Serv. & U.S. BLM, "Grazing Management for Riparian-Wetland Areas," Tech. Ref. 1737-14, at 30 (1997), available at www-a.blm.gov/riparian/tech.htm. The alternatives should discuss an alteration of this scheme.

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III. The DEIS Lacks Relevant and Required PACFISH/INFISH Monitoring Information to Support the Proposed Action.

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In order to ensure the standards established by PACFISH/ INFISH are being implemented and that RMOs are sufficiently protective of fish, the Forest Service must monitor the on-the-ground impacts of its authorized grazing. See PACFISH App. C-22 to C-23.

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However, it does not regularly do so. The EA notes 1995 and 2003 stream surveys, and ONDA appreciates this. However, there is no evidence of the occurrence of stream surveys on a regular basis so as to provide a baseline for comparison and evaluation of the rate of recovery. ONDA therefore questions how the agency can assert that its proposed changes will achieve a “near natural rate” of recovery when the agency may have no idea what that rate is or at what rate (positive or negative) change currently is occurring.

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The proposed action should include an improved comprehensive monitoring program designed to produce more on-the-ground surveys to comply with PACFISH/ INFISH. Instead, judging from Appendices A and B, the EA apparently relies on its Grazing Implementation Monitoring Module (“Module”) in an attempt to meet its monitoring responsibility. While the PACFISH RMOs consist of physical features of non-anadromous fish habitat, monitoring under the Module essentially consists of approximating vegetative components rather than measuring actual RMOs. These proxies include mean residual stubble height (the height of grasses at the end of the grazing season), forage utilization, and shrub utilization (the amount of new season’s growth on woody species consumed by livestock); plus one physical component, bank damage. For example:

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➤ Proper Functioning Condition Assessments: PFC is a qualitative method widely acknowledged to be highly subjective and lacking in scientific rigor. See Second Rhodes Decl. at ¶¶ 18–21 (citing National Research Council findings, as well as those of Forest Service and BLM aquatic experts and independent reviewers).²⁰ The PFC method involves no measurement of any stream or riparian attribute and even the National Riparian Service Team (NRST), which developed the method, stated in a publication co-authored by Borman that PFC is a “checklist” method that is “an appropriate starting point for determining and prioritizing the type and location of quantitative inventory or monitoring necessary.” Id. at ¶¶ 19–20. The Forest Service must recognize that there is no “PFC standard” under the aquatic conservation strategies, and the agency can provide no support for the argument that PFC is a valid proxy for measurement of actual RMOs. In fact, one federal court has discredited the Forest Service’s primary pre-2004 grazing season evidence proffered to support the agency’s 2004 AOI decisions:

The Trip Report, as well as the intervenors’ expert reports, rely on PFC methodology to support the conclusions that grazing is not causing ecological harm to the river corridors. As explained by the second declaration of plaintiffs’ expert Rhodes, the PFC method is a *qualitative* method. Rhodes cites to numerous sources which question the usefulness of the methodology because it is considered highly subjective. See also Ore. Natural Desert Ass’n v. Singleton, 47 F. Supp. 2d 1182, 1189 (D. Or. 1998) (noting that PFC analysis does not equate to finding that the WSRA requirements are being met).

²⁰ The Rhodes and other ONDA declarations are available at Appendix I of the MNF 2004 End-of-Year Grazing Report. The declarations cited in this section refer to those from Ore. Natural Desert Ass’n v. U.S. Forest Serv., No. 03-213-JO.

ONDA v. USFS, No. 03-213-KI, slip op. at 14–15 (D. Or. June 10, 2004) (emphasis in original). The method simply cannot, as the Forest Service asserts, be used to determine whether grazing is retarding the rate of recovery.

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The Forest Service has failed to accurately determine whether recovery has been successful in its first decade of implementing PACFISH and INFISH and appears poised to continue this failure in this plan. In short, PFC assessments are not a good substitute for measuring RMOs to determine whether the riparian areas are progressing toward attainment of RMOs.

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- “Multiple Indicator Monitoring”: This monitoring consists of four components: designated monitoring areas, end-point monitoring, effectiveness monitoring, and channel cross-section/streambed/reach measurements. EA at App. B-2 to B-3. If the example from the Malheur National Forest’s 2004 End-of-Year Grazing Report (“EOY Report”) is accurate, this monitoring method will be of little use. The 2004 EOY Report contained a 230-page section that consisted of only twelve data sheets accompanied by photos with no captions other than locations. The data sheets are difficult to decipher and most of the data lack units. Neither do the data appear to be measurements of RMOs, with the exception of bank stability. The fact that the Forest Service could only produce twelve MIM data sheets for its entire 2004 grazing season casts doubt on the effectiveness of the method.

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At the core of PACFISH and INFISH is the requirement to maintain a *trend toward attainment* of RMOs at a *near natural rate* of recovery. Stubble height, the quantitative measurement the Forest Service most frequently records in its Allotment Inspection Reports, and the measure the agency uses to predict whether grazing will ultimately degrade or prevent the attainment of RMOs, is by the agency’s own admission completely inappropriate as a performance standard and is not a substitute for long-term monitoring of vegetative composition, streambank stability and regeneration of woody species. See Univ. of Idaho Stubble Height Study Report in 2004 EOY.²¹

The primary quantitative component of the Forest Service’s riparian monitoring strategy consists of monitoring “endpoint indicators” and the effectiveness of “riparian objectives” at designated monitoring areas. EA at App. B-2 to B-3. The “endpoint indicators” include modified extensive browse utilization, modified stubble height, and streambank alteration. *Id.* at B-2. Monitoring the effectiveness of “riparian objectives” includes monitoring the following characteristics “every three to five years”: modified greenline, modified woody species regeneration, and streambank stability.” *Id.* at B-3. This strategy raises several concerns.

²¹ Moreover, the U.S. Fish & Wildlife Service and NOAA Fisheries complained to the Malheur National Forest Supervisor in 2002 that the Forest’s monitoring data and methods were at times poorly documented, inconsistent, non-existent or incorrectly implemented. In February 2004, the wildlife agencies again criticized the Forest Service’s 2003 EOY Report on thirteen points, including chastising the Forest Service for determinations that several allotments were in compliance, but without any monitoring data. Other deficiencies in the 2003 EOY Report include missing monitoring data, failures to report unauthorized use, and locating “designated monitoring areas” (DMAs) on private lands, outside allotment boundaries and/or not on streams. Insufficient monitoring in 2003 means the Forest Service had insufficient support for its 2004 AOI decisions. This trend of lacking data to support decisions appears to continue with this decision.

First, nowhere in PACFISH is stubble height mentioned as an indicator of functioning aquatic habitat. The height of riparian grasses at the end of the grazing season is not an adequate surrogate for monitoring pool frequency, temperature, width/depth ratio, and lower bank angle, all of which the Forest Service has deemed strong indicators of healthy fish habitat. Thus, the reliance on stubble height as a primary indicator of aquatic habitat health is not consistent with PACFISH and is arbitrary and capricious. Burlington Truck Lines v. United States, 371 U.S. 156, 168 (1962) (the agency must consider the “relevant factors” and articulate “a rational connection between the facts found and the choices made”).

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Another concern is the Forest Service’s extremely poor track-record on actually implementing its multiple indicator monitoring strategy. This is particularly problematic in light of the fact that the agency so heavily relies on future monitoring to ensure that current grazing will result in “near natural rates” of recovery.

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According to the Forest Service, “Without the benchmark provided by measurable RMOs, habitat suffers a continual erosion.” PACFISH EA at App. C-5. RMOs were chosen because they are “indicative of ecosystem health” and “establish habitat parameters that together define good anadromous fish habitat.” *Id.* at 16. Monitoring RMO features is imperative to determine whether standards and guidelines are being applied and met. The definition of “retard” under PACFISH (“measurably slow the rate of recovery”) requires, at a minimum, that the rate of recovery be capable of being measured. This requires the existence of baseline data and measurement and monitoring of post-grazing conditions in order to show that progress is being made toward recovery and that such progress is not “measurably slow.” According to NOAA Fisheries, “to determine if [Standard GM-1] is being met, it is necessary to understand environmental baseline conditions in watersheds and combined effects of actions on various watershed functions.” Nevertheless, the Forest Service has thoroughly failed to adequately collect quantitative baseline aquatic information and assess the RMOs. The sporadic on-the-ground surveys and proxies will not provide for compliance with PACFISH and INFISH.

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IV. **The Forest Service Has Not Adequately Analyzed the Cumulative Impacts from the Proposed Action.**

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In relying exclusively on “adaptive management” to produce “near natural rates” of recovery as a proxy for an actual cumulative impacts analysis, the DEIS fails to satisfy NEPA’s requirement to assess cumulative impacts. NEPA requires an analysis of the cumulative impacts of the proposed action. See 40 C.F.R. §§ 1508.7, 1508.25(a)(2). Cumulative impact is

the impact on the environment which results from the incremental impact of the action when added to other past, present, and *reasonably foreseeable future actions* regardless of what agency . . . or person undertakes such other actions. Cumulative impacts can result from *individually minor but collectively significant actions* taking place over a period of time.

Ocean Advocates v. U.S. Army Corps of Eng’rs, 361 F.3d 1108, 1128 (9th Cir. 2004) (quoting Kern v. U.S. Bureau of Land Mgmt., 284 F.3d 1062, 1075 (9th Cir. 2002)); see also 40 C.F.R. § 1508.7 (CEQ definition). Thus, the Forest Service must actually assess the cumulative effects of the proposed action, in particular with respect to protected fish populations and habitat. See, e.g., Klamath-Siskiyou Wildlands Ctr. v. Bureau of Land Mgmt., 387 F.3d 989, 9979 (9th Cir. 2004) (EAs did not sufficiently identify or discuss incremental impacts).

The EA does not truly assess the cumulative impacts on the environment of the grazing alternatives. The EA contains one paragraph of cumulative effects discussion for each alternative, which simply estimates the length of time it will take to meet RMOs and DFCs. EA at 151-2. The discussion for alternative 2 states, without support, that it would allow for a near natural rate of recovery. *Id.*

As a result, the Forest Service has failed to take the requisite “hard look” at the potential environmental impacts of the proposed action. See *Blue Mtns. Biodiversity Project v. Blackwood*, 161 F.3d 1208, 1211 (9th Cir. 1998); *Neighbors of Cuddy Mtn. v. U.S. Forest Serv.*, 137 F.3d 1372, 1380 (9th Cir. 1998) (general statements about “possible” effects and “some risk” do not satisfy NEPA, nor is it appropriate to defer consideration of cumulative impacts to a future date). Far more analysis and detail is required to satisfy these statutory requirements.

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V. The Forest Service Must Ensure its Authorized Grazing Complies with State Water Quality Standards.

Section 313 of the Clean Water Act requires the Forest Service to adhere to state water quality standards. 33 U.S.C. § 1323(a). See also LRMP at IV-62 (manage riparian areas within anadromous fish habitat to protect water quality); IV-65 (“[m]anage livestock grazing so that water quality meets Oregon State standards and fish populations are maintained at an acceptable condition or in an upward trend”). Adoption of allotment management plans and authorization of grazing practices fall within the gambit of “any activity resulting, or which may result, in the discharge or runoff of pollutants.” 33 U.S.C. § 1323(a).

However, the EA states that at least five streams in the project area do not meet the Oregon temperature standard. EA at 94. In order to comply with its water quality mandates, the Forest Service must provide for more concrete compliance with water quality standards until such time as TMDLs and WQRPs are prepared throughout the planning area.

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It is well-documented that stream temperatures are influenced by streamside shade, base flow conditions and channel dimensions. These stream and riparian attributes are in turn influenced negatively by livestock grazing. See Belsky (1999). Only rest from grazing along these streams can reverse this damage. It is ONDA’s position that, given the underlying chronic failures to meet RMOs and water quality standards on critical fish-bearing streams throughout the planning area, the Forest Service cannot authorize grazing on units containing these streams until TMDLs are established.

VI. The Forest Service Must Actually Assess the Suitability of Continued Grazing on these Allotments.

The NFMA grazing regulations require the Forest Service to determine the suitability and capability of national forest lands for forage production and for providing habitat for management indicator species. 36 C.F.R. § 219.20. “Capability” means:

The potential of an area of land to produce resources, supply goods and services, and allow resource uses under an assumed set of management practices and at a given level of management intensity. Capability depends upon current conditions and site conditions such as climate, slope, landform, soils, and geology, as well as the application of management practices, such as silviculture or protection from fire, insects, and disease.

Id. § 219.3. “Suitability” is defined as:

The appropriateness of applying certain resource management practices to a particular area of land, as determined by an analysis of the economic and environmental consequences and the alternative uses foregone. A unit of land may be suitable for a variety of individual or combined management practices.

Id.

The EA indicates that the allotments are identified as suitable for livestock grazing. EA at 6. But because the Forest Service’s capability and suitability determinations were flawed or exceedingly insufficient in the 1990 Forest Plan, and because significant changes have occurred that have altered grazing management in the planning area since the Forest Plan was adopted fifteen years ago, the agency must satisfy this NFMA requirement during this planning process. In *Wilderness Society v. Thomas*, 188 F.3d 1130 (9th Cir. 1999), the Ninth Circuit court of appeals held that a challenge to a forest plan grazing suitability determination was not ripe for challenge, but that claims that the Forest Service violated NFMA at the site-specific level were in fact justiciable. 188 F.3d at 1134. Thus, the plaintiff’s claims that the Forest Service violated NFMA by adopting two AMPs without identifying lands suitable for grazing were ripe for review. Id. If the agency feels it can only revisit its “suitability” determination in the land use planning context, this EA should include a potential Forest Plan amendment to account for the several ESA listings, rangeland management projects, and over a decade of failed standards and failure to meet or progress toward RMOs, that have occurred since 1990. In any event, the 1990 Forest Plan includes no indication that the Forest Service performed a grazing suitability analysis as required by law. See, e.g., Malheur National Forest LRMP FEIS at V-20.

VII. The Proposed Action Will Violate NFMA by Allowing for Authorization of Grazing on these Allotments Without Acquiring and Analyzing Actual and Trend Data for Relevant Management Indicator Species.

NFMA requires the Forest Service to provide animal and plant diversity in the national forests. 16 U.S.C. § 1604(g)(3)(B). The Forest Service has a duty to manage fish and wildlife habitat “to maintain viable populations of existing native . . . vertebrate species in the planning area.” 36 C.F.R. § 219.19. To achieve this goal, NFMA requires the Forest Service to designate “management indicator species” (“MIS”) in its Forest Plan. MIS are proxies used to measure the

effects of Forest Service management strategies on the forest, species diversity and species population viability.

Species selected as MIS are selected because their population changes are believed to indicate the effects of management activities. See 36 C.F.R. § 219.19(a)(1). By monitoring and analyzing impacts to MIS, the Forest Service is able to gauge the overall health and trends of other species within the forest, without incurring the time and expense of studying each species individually. 36 C.F.R. § 219.19(a)(1); see Inland Empire Pub. Lands Council v. U.S. Forest Serv., 88 F.3d 754, 762 n.11 (9th Cir. 1996); The Lands Council v. Powell, 379 F.3d 738, 753–54 (9th Cir. 2004). NFMA regulations require that “[p]opulation trends of the management indicator species . . . be monitored and relationships to habitat changes determined.” 36 C.F.R. § 219.19(a)(6).

MIS on the forest include redband trout, elk, steelhead, and bull trout are designated MIS on the Malheur National Forest. LRMP at IV-32. The Forest Plan requires the Forest Service to “[p]rovide the necessary habitat to maintain or increase populations of [MIS] with special emphasis on steelhead.” Id. at IV-63. In order to provide this habitat, the Forest Plan states that the Malheur National Forest will “monitor habitat capability in all subwatersheds that have existing or potential anadromous fish habitat.” Id. at V-13. Thus, the Forest Plan sets up a proxy-on-proxy approach to MIS viability analysis (i.e. the MIS is an indicator for other species, the first level of proxy, and habitat capability is an indicator for viability of the MIS, the second level of proxy.) See Idaho Sporting Cong. v. Rittenhouse, 305 F.3d 957, 962–63 (9th Cir. 2002).

The Ninth Circuit has upheld the use of the proxy-on-proxy approach to MIS monitoring in very limited circumstances. Inland Empire, 88 F.3d at 763; Idaho Sporting Cong. v. Thomas, 137 F.3d 1146, 1153–54 (9th Cir. 1998) (proxy-on-proxy method upheld where the Forest Service “demonstrates no appreciable habitat disturbance” from the management activity); The Lands Council, 379 F.3d at 754 (habitat proxy methodology must be sound; where habitat trend data flawed, “proxy on proxy result” will be equally flawed). In Inland Empire, the Forest Service’s methodology essentially consisted of three steps: (1) consider the amount of suitable habitat needed by an MIS, (2) determine the management activity’s impact on that habitat, and (3) analyze whether remaining suitable habitat, post-management, is sufficient to maintain a viable population and what effects the loss of habitat will have on population trends. Inland Empire, 88 F.3d at 762–63. The court also held that where population monitoring was not “technically reliable and cost-effective” due to the reclusive nature of the MIS, and where the court was convinced that the Forest Service’s alternative methodology for extrapolating population data based on suitable habitat for MIS was sound, the Forest Service could be excused from its duty and could rely instead on habitat condition to infer population status. See Inland Empire, 88 F.3d at 763 n. 12; but see Idaho Sporting Cong. v. Rittenhouse, 305 F.3d 957 (9th Cir. 2002) (distinguishing and limiting Inland Empire to its particular facts).

In Idaho Sporting Congress, the Ninth Circuit distinguished Inland Empire, and held that “the Forest Service’s use of habitat as a proxy for population monitoring of the management indicator species was arbitrary and capricious.” Id. at 972–973. Inland Empire is similarly distinguishable from this situation. Here, the Forest Service has made no determinations that monitoring steelhead populations is unreliable or not cost-effective based on the reclusive nature of the species or on any other basis. Moreover, the Forest Service has failed to consider the amount of suitable habitat needed by steelhead, to determine the effects of grazing on that habitat, analyze whether remaining suitable habitat, post-grazing, is sufficient to maintain a viable population, or analyze what effects the loss of habitat will have on steelhead population

trends. Thus, the Forest Service's reliance on the proxy-on-proxy approach to MIS monitoring is not consistent with its viability duty. The Forest Service' authorization of grazing without acquiring and analyzing the relevant factors of the effect of grazing on MIS populations will be arbitrary and capricious.

5-29

Neither has the Malheur National Forest acted consistently with its Forest Plan MIS requirements. The Forest Plan requires the Forest Service to “[p]rovide the necessary habitat to maintain or increase populations of [MIS] with special emphasis on steelhead.” LRMP at IV-63. In order to provide this habitat, the Forest Plan states that the Malheur National Forest will “monitor habitat capability in all subwatersheds that have existing or potential anadromous fish habitat.” Id. at V-13. The streams in this project area qualify, since they are former (and potential) anadromous fish habitat. The Forest Plan also sets a “variability threshold” on steelhead habitat of “more than 10% decrease in habitat capability in a subwatershed” and “[f]orest-wide habitat capability +/- 10% from the projected level.” Id. The Forest Plan fails to define what the “projected level” of forest-wide habitat is for anadromous fish. As evidenced by the agency's own annual Monitoring and Evaluation Reports, the Forest Service has failed to monitor habitat in such a way as to determine whether management activities, including grazing, are causing habitat to decline below the variability threshold set out in the Forest Plan. The M&E Reports evidence the Forest Service's complete failure to monitor population or habitat trends of steelhead and to determine the effects of grazing on the species viability as required by NFMA. The Lands Council, 379 F.3d at 754 (where habitat trend data flawed, proxy on proxy result equally flawed).

5-30

Neither does the EA present any evidence of anything other than sporadic stream surveys in the planning area over the past decade or more. E.g. EA at 121 (citing stream survey data from 1995 and 2003). The Forest Service cannot rely upon stale habitat data. The Lands Council, 379 F.3d at 748 (Forest Service cannot use 13-year-old fish habitat survey, even where updated by 6-year-old fish count surveys, because “[e]vidence of the current habitat conditions, and any degradation or improvement in the last thirteen years, is relevant evidence”). Without current data and a healthy baseline, the Forest Service has no means to determine the impacts of grazing on the viability of MIS. In the absence of any systematic effort to collect data and determine population trends, the Forest Service's grazing decisions under this decision will be inconsistent with the Forest Plan MIS requirements and therefore arbitrary and capricious.

CONCLUSION

Thank you for the opportunity to participate in this important planning process and for your careful consideration of ONDA's comments. Please note that I have sent a hard copy of these comments to you via regular U.S. Mail. If you have any questions regarding these comments, please feel free to contact me at the address below or Bill Marlett at 541-330-2638.

Sincerely,

/s/

Kristin Ruether
Oregon Natural Desert Association
917 SW Oak Street, Suite 408
Portland, OR 97205

Comment Analysis

503-525-0193
kristinruether@yahoo.com

Cc: Bill Marlett, Executive Director
Oregon Natural Desert Association

Responses to Comment Letter #5

Response to Comment 5-1: The Responsible Official felt the alternatives to be analyzed in detail represented a range of reasonable alternatives (40 CFR 1502.14(a)) and that they address the Purpose and Need (EA, page 29). The EA displays three alternatives considered in detail (EA, pages 31-40) and five alternatives considered but eliminated from detailed analysis (EA pages 30-31). All alternatives considered in detail except the No Grazing Alternative (Alt. 3), meet the purpose and need for action (EA, pages 6-9). Range analysis data summaries (EA, pages 52-53, 54-56 and 58-59) for the three allotments state that key resource concerns associated with livestock grazing stem from current grazing distribution patterns (on the Wolf Mountain allotment are limited to small areas within the Beaver Dam pasture), adjustments in livestock management should focus on shifting grazing intensity and duration away from areas where transect data indicate that ecologic succession is inhibited, or where range condition is poor with a static or downward trend.

Response to Comment 5-2: The Proposed Action Alternative (Alt. 2) proposes to eliminate or reduce grazing in sensitive areas such as riparian areas in the House Creek Allotment and the West Malheur Allotment (EA, page 35), and the Wolf Mountain Allotment (EA, page 36).

Response to Comment 5-3: Under the Current Management Alternative, areas of concern would be dealt with through adaptive management and administrative changes (EA, pages 32-33). Under the Proposed Action Alternative (Alt. 2), areas of concern would be dealt with through adaptive management, administrative changes and management tools in the form of new improvements and other specific actions to increase management flexibility and achieve better distribution of livestock (EA, pages 34-36). Under the No Grazing Alternative (Alt. 3), no grazing would eliminate impacts from livestock (EA, page 40).

Response to Comment 5-4: Refer to response to comment 5-2.

Response to Comment 5-5: The rationale for eliminating alternatives from detailed analysis has been enhanced in the Final EA (pages 30-31).

Response to Comment 5-6: The “No Action” alternative is required by NEPA. Consideration of the No Grazing Alternative (Alternative 3) meets the intent of the “No Action” alternative as required by NEPA (EA, pages 29-30).

Response to Comment 5-7: The EA (page 32) states *“The Current Management Alternative, as based on the current management actions implemented over the last 3 to 5 years, has not always been consistent with the Malheur National Forest Plan and/or moved toward meeting aquatic and other resource Forest Plan standards, as amended, including INFISH Riparian Management Objectives (RMO) at a near natural rate of recovery. There are isolated areas (these areas are displayed in Chapters 1 and 3), where vegetation and other resource conditions have not always been consistent with the Malheur Forest Plan as amended and livestock distribution and utilization can be modified to better contribute to desired conditions.”*

“Under the Current Management Alternative, these areas of concern would be dealt with through adaptive management and administrative changes. Adaptive management allows the Forest Service to adjust grazing management using a variety of management tools to adjust

timing, intensity, duration, and season of use.” Therefore, the Current Management Alternative would meet the purpose and need through adaptive management.

Response to Comment 5-8: Under Alternative 1 – Current Management the EA (page 33) states *“Selection of this alternative may not be consistent with the Forest Plan, as amended (36 CFR 219.10(c) within the life of this environmental assessment (about 5 years). Through the use of adaptive management and administrative changes that deal with areas of concern discussed in Chapters 1 and 3 this alternative is expected to move towards meeting INFISH and other Forest direction and have an improving cumulative trend over the next 15-20 years, but would not reach riparian management objectives for at least 50 years.”* Under Alternative 2 – Proposed Action the EA (page 36) states *“No Forest Plan amendments would be required to implement this alternative. Selection of this alternative would be consistent with the Forest Plan, as amended (36 CFR 219.10(c), through the use of adaptive management and administrative changes that deal with areas of concern discussed in Chapters 1 and 3.”* Under Alternative 3 – No Grazing the EA (page 40) states *“No Forest Plan amendments would be required to implement this alternative. Selection of this alternative would be consistent with the Forest Plan, as amended (36 CFR 219.10(c).”*

Response to Comment 5-9: Livestock grazing was addressed as *one of many reasons* for the degradation of stream conditions on the allotments. See pages 113, 126, 146-150 and photos 9, 12 and 13. Since the majority of actions analyzed with this project deal with livestock grazing, our in depth discussions consider the effects of livestock grazing on aquatic systems. These were determined through site specific field observations, analytically derived site-specific habitat inventories and professional judgment.

Response to Comment 5-10: This statement describes the current condition of bank stabilizing vegetation on some stream reaches (Photo 5 pg. 143) within the project area and the fact that these conditions may require years to recover. However, depending on the alternative selected these conditions would recover at different rates. This statement is part of the Reasonable Foreseeable Activities in the BE Cumulative effects section and is qualified in the next paragraph on the same page, as noted below.

This cumulative component and future recovery of riparian areas depends on the level of livestock use and achievement of grazing standards within the RHCAs. The outcome would influence and may offset some of the positive benefits for water quality and aquatic species gained from this project. This analysis assumes that Forest Service grazing standards would be achieved in the future.

Response to Comment 5-11: The EA (page 63) states *“hot season grazing could be reduced or modified to limit cattle loafing and shrub utilization in riparian areas later in the year when temperatures are warm and the protein content of upland forage grasses has declined. This adaptive management strategy could reduce livestock impacts on streambanks, riparian vegetation and water quality.”*

Response to Comment 5-12: Resource monitoring would be implemented with the action alternatives. A combination of 1) The Malheur National Forest Draft Range Monitoring Guidelines (June 2005) (Appendix A), 2) The Malheur National Forest Riparian Monitoring (Condition and Trend) Strategy (2005) (Appendix B), and 3) the monitoring protocol developed by the Interagency Implementation Team (IIT), as amended in 2004 and again in 2005 (IIT

2004), would be used to determine if grazing is allowing movement towards desired conditions and Forest Plan Standards, as amended (EA, pages 45-46).

Response to Comment 5-13: Stream surveys will be conducted at intervals of 10-20 years depending on the resource condition and changes. Other range monitoring as described in Appendix A (pg. 1-11) and riparian monitoring in Appendix B (pg 1-18) will monitor the effects of livestock grazing at different time intervals. The combination of several different monitoring methods should allow a determination recovery rates and if there are any carry over effects from the previous years grazing.

Response to Comment 5-14: While the natural rate of recovery is often difficult to determine, the fact that we are managing for no significant carry over effects from the previous livestock grazing season should allow for a positive recovery (EA page 13 and 143).

Response to Comment 5-15: In addition to implementation monitoring the Riparian Monitoring Strategy also includes effectiveness monitoring. RMO's are measured during stream surveys which would occur on a future basis of 10-20 years cycle, due to recent budget reductions. EA Appendix B. After the decision is signed, the Emigrant Creek Ranger District will develop comprehensive Allotment Management Plan (AMP). A key component of the AMP is a monitoring program tailored specifically to the resource conditions on the individual allotment.

Response to Comment 5-16: PFC was never used as a stand alone survey method, since it does not measure RMOs. It was used in conjunction with Level II stream surveys for parts of the project area when dollars and time permitted. In the case of Schurtz Creek, reach 1 was determined to be FAR and 5 out of 6 measurements for RMO failed to meet Forest RMOs. Please note that a table on page 9 in appendix B does demonstrate how PFC attributes relate to Forest RMOs (EA pages 103-104, 132, and 134).

Response to Comment 5-17: Level II stream surveys were conducted in 1995 and 2003 on most fish bearing streams and their baseline data will be used to determine rates of recovery using RMOs. Additional riparian and stream channel monitoring as described in appendix A and B will also be used to determine whether recovery has been successful. EA pages 129-155 and Appendices A and B.

Response to Comment 5-18: Multiple Indicator Monitoring is included as part of the Riparian Monitoring Strategy and will produce a clear concise data analysis as described in appendix B. Appendix B pages 1-18. The 2004 End of Year grazing report was compiled by the Blue Mountain and Prairie City Ranger Districts, it did not include information from the Emigrant Creek Ranger District. Therefore comment 5-18 is outside of the scope of this document.

Response to Comment 5-19: Stubble height along with stream bank alteration and shrub utilization are used as triggers to determine when livestock should be removed from the allotment. Removing livestock when one of these triggers has been met usually allows for adequate recovery of the resource. Monitoring methods described in appendices A and B will also be used to insure there are no significant carry over effects from the previous grazing season that would retard the natural rate of recovery. EA, Appendix A.

Response to Comment 5-20: Resource monitoring would be implemented with the action alternatives. A combination of 1) The Malheur National Forest Draft Range Monitoring Guidelines (June 2005) (Appendix A), 2) The Malheur National Forest Riparian Monitoring

(Condition and Trend) Strategy (2005) (Appendix B), and 3) the monitoring protocol developed by the Interagency Implementation Team (IIT), as amended in 2004 (IIT 2004), would be used to determine if grazing is allowing movement towards desired conditions and Forest Plan Standards, as amended (EA, pages 45-46).

Response to Comment 5-21: The Forest collected recent level II stream data on most streams in the project area in 2003 measuring RMOs. All monitoring information is analyzed collectively to determine if we are obtaining near natural rate of recovery. EA page 129-155

Response to Comment 5-22: The cumulative effects of each resource is displayed in the EA, non-forested vegetation pages 68-69, 64-65, forested vegetation pages 72-73, biological soil crusts page 75, sensitive plants pages 79-80, noxious weeds pages 85-86, Social and Economics pages 93-94, watershed and soil pages 111-117, water quality pages 118-125, fisheries pages 158-166, terrestrial wildlife pages 175, 181-182, 187-188, 191, 192, 196-197, recreation page 200, and heritage resources pages 205-206.

Response to Comment 5-23: Refer to response to comment 5-14 and 5-15.

Response to Comment 5-24: Refer to response to comment 4-13.

Response to Comment 5-25: Refer to response to comment 4-13, 4-16 and 4-44.

Response to Comment 5-26: The Forest Plan has determined the capability and suitability of the plan area and established programmatic direction including goals, objectives, standards, guidelines, and monitoring requirements. Range specialist reports collected in the 1960's examined the site-specific capability and capacity of these allotments. This information was used during development of the Forest Plan. NFMA does not require that a suitability analysis be conducted at the project level. On August 24, 1999, the U.S. Court of Appeals for the Ninth Circuit concluded the Forest Service had complied with NFMA by adopting the Forest Plan, including its allocation of acreage suitable for grazing. This analysis is to determine whether or not to authorize livestock grazing in the project area (*Wilderness Society v. Thomas* 188 F.3d 11(9th Cir. 1999)) (EA, page 19).

Response to Comment 5-27: Refer to response to comment 5-26.

Response to Comment 5-28: Redband trout are the only aquatic MIS species found on these allotments within the project area and their habitat will be managed in a manner to maintain or increase their populations through range monitoring as described in appendices A and B and level II stream surveys (EA pages 126-127).

Terrestrial MIS are addressed in the Rocky Mountain elk portion and under Management Indicator Species (EA pgs. 167-175; 183-188).in the Terrestrial Wildlife section. The affects to MIS habitat were discussed. Alternative 2 was developed to protect MIS habitat in aspen stands and other riparian habitat. Measures would be taken under Alternative 2 to protect the recruitment of future snag habitat in aspen stands. Effects to MIS habitat from other alternatives were also discussed in the EA along with cumulative effects. Forest Plan consistency is stated in the Wolf Mountain allotment (EA pg. 173) in regards to key riparian shrubs.

Response to Comment 5-29: There is no anadromous habitat within the project area due to the Hells Canyon dam on the Snake River that blocks upstream migration affecting anadromous fish passage on the south end of the Malheur NF (EA Page 126).

Response to Comment 5-30: Most stream data used in this analysis is 3 years old and most fish bearing streams in the project area were surveyed about this time in preparation for this analysis. This data will provide a healthy baseline. Depending on the budget, fish population surveys are planned in 2006 that may determine population trends. EA page 126-155

Comment Letter #6

Doug Heiken <onrcdoug@efn.org>

09/09/2005 02:45 PM

Please respond to Doug Heiken

To: comments-pacificnorthwest-malheur-emigrantcreek@fs.fed.us

cc:

Subject: ONRC comments on the House Creek, West Malheur, and Wolf Mountain Allotments Preliminary EA

Dear FS:

Please accept the following comments from Oregon Natural Resources Council on the Preliminary EA for the House Creek, West Malheur, and Wolf Mountain Allotments on the Emigrant Creek Ranger District of the Malheur NF.

In the rush to auction timber sales before the end of the fiscal year, ONRC has been unable to devote much time to reviewing this PEA. We would like to express our interest in healthy ecosystems and urge you to make the necessary changes in livestock management to achieve that objective. If the FS would have been following the PACFISH/INFISH mandate to attain natural rates of recovery since PACFISH/INFISH was first instituted, then we would be a lot further along in the restoration process. Further delay is unacceptable.

6-1

We also wish to point out that these grazing allotments overlap several unroaded areas larger than 1,000 acres. These areas have significant ecological value in terms of water quality, wildlife habitat, recreation, etc. Historically, most wildlife habitat occurred in large blocks, but now these large blocks are rare and under-represented across the landscape. Please manage these unroaded areas with restoration in mind, so that these areas can provide higher quality water, wildlife habitat, and recreation in the future.

6-2

Grazing suitability should be identified based on consideration economic and ecological factors.

6-3

Be sure to fully disclose the impacts of grazing, including the adverse effect of grazing on fuel profiles and "forest health." Please disclose the cumulative effects of all the past and foreseeable logging and thinning in the area. How has grazing contributed to those problems.

We incorporate by reference the Sept 1, 2005 comments of the Grant County Conservationists.

Sincerely,

/s/

Doug

--

Doug Heiken
Oregon Natural Resources Council
PO Box 11648, Eugene OR 97440
541-344-0675, onrcdoug@efn.org
<http://www.onrc.org>

Responses to Comment Letter #6

Response to Comment 6-1: Livestock grazing would have no impact on whether an area would or would not be considered unroaded (EA, page 21). The Malheur Forest Plan divided National Forest System Lands into Management Areas, each with different management goals, resource potential, and limitations (EA, page 14). Any areas considered unroaded would be managed as per the Management Area it falls under.

Response to Comment 6-2: The Forest Plan has determined the capability and suitability of the plan area and established programmatic direction including goals, objectives, standards, guidelines, and monitoring requirements. Range specialist reports collected in the 1960's examined the site-specific capability and capacity of these allotments. This information was used during development of the Forest Plan. NFMA does not require that a suitability analysis be conducted at the project level. On August 24, 1999, the U.S. Court of Appeals for the Ninth Circuit concluded the Forest Service had complied with NFMA by adopting the Forest Plan, including its allocation of acreage suitable for grazing. This analysis is to determine whether or not to authorize livestock grazing in the project area (*Wilderness Society v. Thomas* 188 F.3d 11(9th Cir. 1999)) (Preliminary EA, page 19).

Response to Comment 6-3: The Preliminary EA, chapter 3, disclosed the impacts of grazing on resources. The Final EA, chapter 3 also discloses the impacts of grazing on resources.



United States
Department of
Agriculture

Forest
Service

Emigrant Creek
Ranger District,
Malheur National
Forest

265 Highway 20 South
Hines, OR 97738
(541)573-4300
Fax (541)573-4398

File Code: 1950

Date: December 21, 2005

Dear Reader:

Enclosed, please find the Final Environmental Assessment, Decision Notice and Comment Analysis for the House Creek, West Malheur and Wolf Mountain Allotments. The Decision Notice documents my decision to select the Proposed Action Alternative and the factors I considered in reaching my decision. My decision consists of a number of separate actions for each Allotment designed to meet the Purpose and Need for the project as described in the House Creek, West Malheur and Wolf Mountain Allotments EA, on pages 6-9. Specifically, I have decided to continue authorization of domestic livestock grazing on the House Creek, West Malheur and Wolf Mountain Allotments. This action will authorize grazing and update 3 Allotment Management Plans (AMP). Implementation of the allotment management plans that emerge from this analysis is anticipated to begin in the spring of 2006.

My decision is subject to administrative appeal. Organizations or members of the general public may appeal my decision according to Title 36 CFR Part 215. This decision is subject to appeal by a permittee under either 36 CFR 251 Subpart C or 36 CFR 215, but not under both (as per 36 CFR 215.11 (d)). Appeals under 36 CFR 251 by a permittee must be consistent with 36 CFR 251.90 (content of notice of appeal), and must be made in writing, postmarked, and sent to the Appeal Deciding Officer within 45 days of the date on the written notice to the permittee of this decision. The 45-day appeal period begins the day following the date the legal notice of this decision is published in the Burns Times Herald, Burns, Oregon, the Emigrant Creek Ranger District's official newspaper of record. The Notice of Appeal must be filed with the Appeal Deciding Officer:

Appeal Deciding Officer
Pacific Northwest Region
USDA Forest Service
Attn. 1570 Appeals
P.O. Box 3623
Portland, OR 97208-3623

Appeals may also be filed electronically at: appeals-pacificnorthwest-regional-office@fs.fed.us, or hand delivered to the above address between 8:00 AM and 4:30 PM, Monday through Friday except legal holidays. It is the responsibility of those who appeal a decision to provide the Appeal Deciding Officer sufficient written evidence and rationale to show why my decision should be changed or reversed. The appeal must be filed with the Appeal Deciding Officer (36 CFR 215.8) in writing. At a minimum, an appeal must include the following:

1. Appellant's name and address (§ 215.2), with a telephone number, if available;
2. Signature or other verification of authorship upon request (a scanned signature for electronic mail may be filed with the appeal);



3. When multiple names are listed on an appeal, identification of the lead appellant (§ 215.2) and verification of the identity of the lead appellant upon request;
4. The name of the project or activity for which the decision was made, the name and title of the Responsible Official, and the date of the decision;
5. The regulation under which the appeal is being filed (36 CFR Part 215 or 36 CFR 251 subpart C (§ 215.11(d))).
6. Any specific change(s) in the decision that the appellant seeks and rationale for those changes;
7. Any portion(s) of the decision with which the appellant disagrees, and explanation for the disagreement;
8. Why the appellant believes the Responsible Official's decision failed to consider the substantive comments; and
9. How the appellant believes the decision specifically violates law, regulation, or policy.

For additional information concerning the specific activities authorized with my decision, you may contact:

Lori Bailey
IDT Leader
Emigrant Creek Ranger District
265 Hwy. 20 S.
Hines, OR 97738
(541) 573-4300

When no appeal is filed within the 45-day time period, implementation of the decision may begin on, but not before, the 5th business day following the close of the appeal-filing period (36 CFR 215.15).

Except for emergency situations (36 CFR 215.10(c)), when an appeal is filed, implementation may occur on, but not before, the 15th business day following the date of appeal disposition (36 CFR 215.2). In the event of multiple appeals of the same decision, the implementation date is controlled by the date of the last appeal disposition.

I want to thank those of you who took the time review and comment on the Preliminary Environmental Assessment. Your interest in the management of the Malheur National Forest is appreciated.



CAROLYN FREEBORN
District Ranger



United States
Department of
Agriculture

Forest
Service

December 2005



Final Environmental Assessment for House Creek, West Malheur and Wolf Mountain Allotments

Emigrant Creek Ranger District, Malheur National Forest

Grant and Harney Counties, Oregon

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Table of Contents

Summary	i
Chapter 1 - Introduction	1
Document Structure	1
Background	1
Purpose and Need for Action	6
Proposed Action	9
Decision Framework	11
Desired Conditions	11
Management Areas	14
Public Involvement	16
Issues	17
Laws and Regulations	22
Project Record	27
Chapter 2 - Alternatives	29
Introduction	29
Alternative Development Process	29
Alternatives Considered but Eliminated from Detailed Analysis	30
Alternatives Considered in Detail	31
Management Requirements, Constraints, and Mitigation Measures	40
Monitoring Plans	45
Comparison of Alternatives	47
Implementation Schedule	48
Chapter 3 - Environmental Consequences	49
Specialist Reports	49
Vegetation and Rangeland Resources	50
Effects on Rangeland Resources	61
Forested Vegetation/Condition	62
Effects on Forested Vegetation	72
Biological Soil Crusts	74
Effects on Biological Soil Crusts	74
Sensitive plants	76
Effects on Sensitive Plants	76
Noxious weeds	81
Effects on Noxious Weeds	83
Social and Economics	87
Effects on Economics	92
Watershed/Soil	95
Effects on Watershed/Soils	104
Fisheries	95
Effects on Fisheries	155
Terrestrial Wildlife	126
Heritage	199
Effects on Heritage	203
Other Required Disclosures	207

Chapter 4 – Acroynms, Glossary, List of Preparers, Distribution list, and Literature Cited	209
Commonly used Acroynms	209
Glossary	210
List of Preparers	230
Consultation and Distribution List	231
Literature Cited	232

Appendices

Appendix A – Draft Range Monitoring Guidelines, Malheur National Forest.	A-1
Appendix B - Riparian Monitoring Strategy, Malheur National Forest.	B-1
Appendix C - Past, Present, and Future Activities in the Cumulative Effects Area of the House Creek, West Malheur and Wolf Mountain Allotments. . .	C-1
Appendix D - Post-Fire Grazing Interim Guidelines, Malheur National Forest.	D-1
Appendix E – Range Improvements	E-1
Appendix F – Plant Biological Evaluation.	F-1
Appendix G – Aquatic Biological Evaluation.	G-1
Appendix H – Wildlife Biological Evaluation.	H-1
Appendix I – Proper Functioning Condition Surveys.	I-1
Appendix J – PACFISH Enclosure B.	J-1
Appendix K – Recreational Fisheries	K-1

SUMMARY

The Malheur National Forest proposes to continue authorization of grazing on the House, West Malheur and Wolf Mountain Allotments. The project area is located in the Wolf Creek, Bear Creek and Trout Creek Watersheds and is within the boundary of the Emigrant Creek Ranger District, Malheur National Forest, Oregon. This action is needed, because: Within the House Creek, West Malheur and Wolf Mountain Allotments management is generally adequate, except for isolated areas that are problematic. In these isolated areas, vegetation and other resource conditions are not always consistent with the Malheur Forest Plan as amended, and livestock distribution and utilization can be modified to better contribute to desired conditions. Because, management is not always consistent with forest plan standards, guidelines, goals, and objectives, minor adjustments from current management are needed. Adjustments from current management are proposed where existing conditions are not moving or are not moving at an acceptable rate towards desired conditions.

The proposed action is expected to maintain and improve desired resource conditions on key management sites within the House, West Malheur and Wolf Mountain Allotments. These sites are:

- Aspen stands throughout the three allotments
- Riparian conditions in House Creek, Squaw Creek, Van Gulch, East Fork Wolf Creek, Middle Fork Wolf Creek, West Fork Wolf Creek, Bridge Creek, and Beaverdam Creek
- Improve unsatisfactory range conditions at identified sites
- Enhance and maintain *Botrychium* species (moonwarts) and its habitat in Pierpont, Antelope and Wolf Creek pastures.

In addition to the Proposed Action (Alternative 2), the Forest Service also evaluated the following alternatives:

- Alternative 1 - Current Management
- Alternative 3 - No Grazing

Based upon the effects of the alternatives, the responsible official will decide whether or not to authorize grazing on the House Creek, West Malheur and Wolf Mountain Allotments and if the decision is to continue authorization of grazing, then to decide any specific standards and guidelines that would be used with this action.

CHAPTER 1 - INTRODUCTION

Document Structure

The Forest Service has prepared this Environmental Assessment in compliance with the National Environmental Policy Act (NEPA) and other relevant Federal and State laws and regulations. This Environmental Assessment discloses the direct, indirect, and cumulative environmental impacts that would result from the proposed action and alternatives. The document is organized into four parts:

- *Chapter 1: Introduction:* The section includes information on the history of the project proposal, the purpose of and need for the project, and the agency's proposal for achieving that purpose and need. This section also details how the Forest Service informed the public of the proposal and how the public responded.
- *Chapter 2: Comparison of Alternatives, including the Proposed Action:* This section provides a more detailed description of the agency's proposed action as well as alternative methods for achieving the stated purpose. These alternatives were developed based on significant issues raised by the public and other agencies. This discussion also includes mitigation measures. Finally, this section provides a summary table of the environmental consequences associated with each alternative.
- *Chapter 3: Environmental Consequences:* This section describes the environmental effects of implementing the proposed action and other alternatives. This analysis is organized by resource. Within each section, the affected environment is described first, followed by the effects of the No Action Alternative that provides a baseline for evaluation and comparison of the other alternatives that follow.
- *Chapter 4: Agencies and Persons Consulted:* This section provides a list of preparers and agencies consulted during the development of the environmental assessment.
- *Appendices:* The appendices provide more detailed information to support the analyses presented in the environmental assessment.

Additional documentation, including more detailed analyses of project-area resources, may be found in the project planning record located at the Emigrant Creek Ranger District Office in Hines, Oregon.

Background

National Direction

Prior to 1995, controversy existed over whether there was any need to consider a grazing permit a Federal action requiring review under the National Environmental Policy Act as well as the adequacy of the progress toward getting allotment NEPA decisions completed. To resolve the issue, Congress included language in the Rescission Act (Public Law 104-19, Section 504) which requires the Forest Service to identify all allotments on which NEPA analysis is needed, and to prepare and adhere to a schedule for conducting an assessment of grazing actions under NEPA. Section 504(b) and (c) allows the Forest Service to issue expired and waived permits on allotments listed on the

schedule, but have not gone through a NEPA analysis as long as the terms and conditions of the permit are not changed. In a reply to Congress, the Forest Service established a fifteen year schedule for completion of this work.

Grazing actions on public land must be viewed as an on-going action. In order to understand the context of grazing activity today, one must have an appreciation of the history of grazing in the West. Prior to the 1930s, extensive unregulated grazing on public land was a major problem until Congress enacted laws which required grazers to own a local home ranch to qualify for a permit to graze. The Granger-Thye Act of 1950: P.L. 81-478 (April 24, 1950) established the direction for National Forest System allotment management, including the authorization to issue grazing permits for terms up to 10 years; authorization to use grazing fee receipts for rangeland improvement; and the establishment of grazing advisory boards. Requirements including base property and commensurability were also designated by statute to ensure economic stability to local communities and to foster stewardship toward the public land resources and to manage rangelands for sustainability. The period of unregulated grazing resulted in adverse environmental consequences such as soil loss and watershed modifications that created many of the permanent and semi-permanent impacts seen today. Borman (2005) states that “Today livestock numbers on public lands are substantially lower and grazing is generally managed. Grazing then and grazing now are not the same.” Some of these impacts, such as the capability for sites to restore native vegetation communities, must be clearly recognized and understood to ensure that unrealistic expectations for management are not part of the action alternatives.

This environmental assessment of vegetation and watershed conditions takes into account the historic level of use that occurred on these allotments prior to the establishment of management and control of livestock numbers with the enactment of the Granger-Thye Act of 1950. The purpose of both the Granger -Thye Act for USFS managed lands and Taylor Grazing Act for BLM lands was to establish controls and stewardship activities to improve the public land grazing resource. The core of that stewardship created a linkage of the use of public land to an established private landowner who would bring stability to the community and bring these lands into a sustainable level of production for both forage and wildlife habitat.

Forest Direction

The Malheur National Forest Land and Resource Management Plan (Forest Plan) (USDA Forest Service 1990) directs the Forest Service to update or develop new Allotment Management Plans (AMP). AMPs are updated by conducting an environmental analysis of the impacts of grazing and associated activities. The Forest Plan originally scheduled AMPs for these allotments to be completed between 1991 and 1998 (USDA Forest Service 1990).

This environmental assessment is tiered to the Malheur National Forest Land and Resource Management Plan FEIS (herein referred to as the Forest Plan) approved May 25, 1990 as amended by:

- Forest Plan Amendment #29 for *Incorporation of the Columbia River Basin Anadromous Fish Habitat Management Policy and Implementation Guide* (The

Interim Strategies for Managing Fish Producing Watersheds in Eastern Oregon and Washington, Idaho, and Portions of California (PACFISH), (herein referred to as Forest Plan Amendment #29 or PACFISH) dated August 18, 1994.

- The Regional Forester's Amendment #2 for the *Revised Continuation of Interim Management Direction Establishing Riparian, Ecosystem and Wildlife Standards for Timber Sales*, (herein referred to as Regional Forester's Amendment #2) dated June 5, 1995.
- *The Inland Native Fish Strategy EA, Decision Notice and Finding of No Significant Impact*, (herein referred to as INFISH) dated July 28, 1995.

Watershed Assessment

A Watershed Assessment (WA) for the Lower Malheur Watershed was completed in December 1996. The intent of watershed assessment is to develop and document a scientifically based understanding of the processes and interactions occurring within a watershed. This environmental assessment (EA) incorporates by reference the Lower Malheur Watershed Assessment, dated December 1996. The Lower Malheur Watershed Assessment (December 1996) followed a six-step process that characterized the watershed (Step 1), identified issues and key questions (Step 2), described current resource conditions (Step 3), described reference conditions (Step 4), synthesized and interpreted information (Step 5), and made recommendations (Step 6). The Lower Malheur Watershed Assessment (December 1996) described opportunities from which to develop site-specific projects designed to meet enhancement or management opportunities that would cause positive trends towards the desired future conditions, as described in the Forest Plan. Existing conditions were determined from field data. The differences between existing condition and desired future condition represent selected resource opportunities. The Lower Malheur Watershed Assessment (December 1996) identified Beaverdam Creek and Squaw Creek as riparian areas of concern. This EA incorporates many of the recommendations made in the Lower Malheur Watershed Assessment (December 1996).

Planning Area

The House, West Malheur and Wolf Mountain Range Planning Area is comprised of three livestock grazing allotments, and is located on the Malheur National Forest, Emigrant Creek Ranger District and is approximately 30 miles northeast of Burns, Oregon (see Figures 1 and 2). The three allotments, House Creek, West Malheur and Wolf Mountain, encompass approximately 57,800 acres of National Forest Lands. The allotments are primarily contained in the Wolf Creek Watershed with a lesser amount in Bear Creek and Trout Creek Watersheds. There are no anadromous fish in the project area; therefore INFISH applies to this analysis area, not PACFISH. Elevations range from 4300 to 6500. Annual precipitation ranges from 20 inches in the higher elevations to 15 inches at lower elevations and falls mostly in the form of snow.

Livestock grazing has been a part of the landscape of the Malheur National Forest since the 1860's when the first miners and homesteaders entered this area. Although livestock grazing on National Forest Lands has decreased since the early 1900s, the ranching industry remains an important part of Harney and Grant County culture and economy.

The allotments within the planning area, like many areas in the Western United States, have a reputation of livestock overuse that started in the late 1800's and continued into the mid 1930's. Early maps dated back to 1912 show that cattle range extended northward to the Harney County line and the remainder of the present three allotments was used as sheep range. No fences were present and the cattle roamed at-will. This dual use over most of the range from the time the snow melted in the spring until late fall was responsible for the erosion and poor range conditions of the past, some of which are still observable today in areas such as Beaverdam and Squaw creeks. By about the 1930's sheep had been eliminated from this range. By the 1950's all permits were converted to cattle and allotments were formed to relieve heavy grazing pressures. However, season-long grazing continued until division fences were constructed in the 1960's and 1970's. Replacing season-long use with a multi-pasture deferred-rotation system has promoted improved grazing practices on the allotments in general.

Improved grazing systems and pasture designs were implemented to accelerate riparian area recovery in the late 1970's and throughout the 1980's with a reduction in allowable use in the 1970's. Implementation of the Malheur National Forest Land and Resource Management Plan in the early 1990's, again reduced the amount of allowable use by livestock grazing to accelerate the rate of recovery in riparian areas, and to limit utilization on shrubs. In the mid to late 1990's other mitigations associated with the Endangered Species Act and the INFISH amendments to the Forest Plan were implemented to further protect riparian areas and associated aquatic species. The overall allotment conditions are mainly in an improving trend. A few areas are in a static or downward trend, and are attributed to past and current livestock grazing as well as other past management actions such as timber harvest, roads and effective fire suppression.

This Environmental Assessment focuses on resolving current areas of resource concern that may be contributing to undesirable conditions in specific locations and situations. This EA documents the environmental analysis of effects of livestock grazing in the House Creek, West Malheur and Wolf Mountain Allotments and will be used to develop new Allotment Management Plans (AMP) for each allotment.

The project was initially scoped on August 13, 2004 with four similar actions including the House Creek, West Malheur, Wolf Mountain, and Van Allotments. Through the environmental analysis process it was determined that the Van Allotment may have effects not supported by a Finding of No Significant Impact (FONSI). Since the Van Allotment is not a connected action (40 CFR 1508.25(1)) to the other allotments a separate Environmental Impact Statement (EIS) will be prepared.

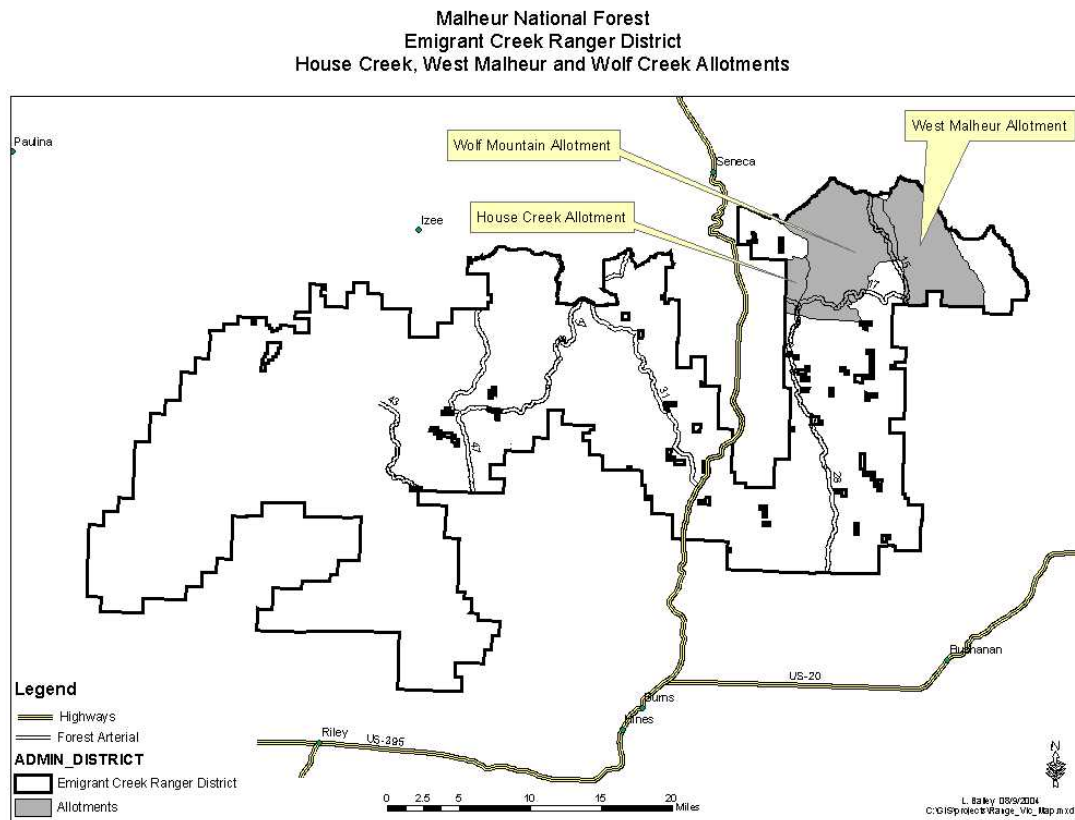


Figure 2: Allotment Vicinity Map. Location of the House Creek, West Malheur and Wolf Mountain Allotments.

Purpose and Need for Action

Purpose

The purpose of this proposed action is to continue authorization of livestock grazing in a manner that is consistent with the Malheur Forest Plan as amended. Authorization is needed on these allotments because:

- Where consistent with other multiple use goals and objectives there is Congressional intent to allow grazing on suitable lands. (*Multiple Use Sustained Yield Act of 1960, Wilderness Act of 1964, Forest and Rangeland Renewable Resources Planning Act of 1974, Federal Land Policy and Management Act of 1976, National Forest Management Act of 1976*).
- The allotments contain lands identified as suitable for domestic livestock grazing in the Malheur Forest Plan and continued domestic livestock grazing is consistent with the goals, objectives, standards, and guidelines of the forest plan (Forest Plan pages IV-2, IV-7, IV-10, IV-18, IV-34, IV-50, IV-53, IV-57, IV-58, IV-64, IV-65, IV-71, IV-77, IV-82, IV-83, IV-86, IV-88, IV-89, IV-91, IV-93, IV-95, IV-97, IV-100, IV-106, IV-108, IV-109, IV-113, IV-119, IV-123, IV-128, IV-132, IV-133, IV-136, and IV-137).

- The Malheur National Forest Plan permits livestock use on suitable range when the permittee manages livestock using prescribed practices (Forest Plan IV-2).
- It is Forest Service policy to make forage available to qualified livestock operators from lands suitable for grazing consistent with land management plans. **(FSM 2203.1)**
- It is Forest Service policy to continue contributions to the economic and social well being of people by providing opportunities for economic diversity and by promoting stability for communities that depend on range resources for their livelihood. **(FSM 2202.1)**
- By regulation, forage producing lands will be managed for livestock grazing where consistent with land management plans. **(36 CFR 222.2 (c))**

Need

Within the House Creek, West Malheur and Wolf Mountain Allotments current management is producing adequate results, except for the following isolated areas that are problematic. In these isolated areas, vegetation and other resource conditions are not always consistent with the Malheur Forest Plan as amended, and livestock distribution and utilization can be modified to better contribute to desired conditions. Because, resource conditions are not always consistent with forest plan standards, guidelines, goals, and objectives, minor adjustments from current management are needed. Adjustments from current management are proposed where existing conditions are not moving or are not moving at an acceptable rate towards desired conditions. The following paragraphs identify where adjustments in management are needed.

House Creek Allotment (3250 acres)

There is a need to

- Enhance and restore aspen stands in Bridge Creek, 17 road, House Creek and CHE springs drainages because most are small and appear as a few old decadent stems with little or no viable regeneration. This has occurred because they are being overgrown by conifers; disturbances that could regenerate the clones are lacking; ungulates browse the few new sprouts that do occur, and lowered water tables from stream down-cutting. Without protection from ungulates, aspen sprouts often are prevented from maturing by browsing.
- Enhance and restore riparian conditions in House Creek drainage because the spring itself is being impacted by livestock trampling, there is a headcut within the lower riparian pasture, and historic heavy grazing has reduced or eliminated many native riparian species.
- Improve livestock grazing distribution patterns in the south pasture because better utilization of upland forage would reduce use on riparian forage.

West Malheur Allotment (22,900acres)

There is a need to

- Enhance and restore aspen stands in Squaw Creek, Van Gulch and Magpie Creek drainages because most are small and appear as a few old decadent stems with little or no viable regeneration. This has occurred because they are being overgrown by conifers; disturbances that could regenerate the clones are lacking; ungulates browse the few new sprouts that do occur, and lowered water tables from stream down-cutting. Without protection from ungulates, aspen sprouts often are prevented from maturing by browsing.
- Enhance and restore riparian conditions in Squaw Creek, Van Gulch and East Fork Wolf Creek drainages to stabilize and reconnect stream channels to the floodplain in order to promote riparian species capable of stabilizing stream banks.
- Enhance and restore upland shrubs and bunchgrasses in Rock Springs pasture because shrub browsing was estimated as heavy in the Rock Springs pasture.
- Improve livestock grazing distribution patterns across the Allotment because better utilization of upland forage would reduce use on riparian forage.
- Enhance and restore *Botrychium* species (moonworts) habitat in Pierpont pasture because current livestock management at springs, bogs and seeps, allows utilization levels to reach a 4-inch stubble height on the green line. This usually results in less than 4-inch stubble heights on the floodplain. Grazing at this level permits small moonworts to be eaten or trampled and could be injurious to populations; plants would not have the opportunity to sporulate, a critical reproductive step, and would be weakened by the inability to store food reserves, or they might be killed outright.
- Restore upland and riparian vegetation in Cougar Flat because the density and cover of big sagebrush is dominating the plant composition and reducing the amounts of productive forage grasses.

Wolf Mountain Allotment (31,650acres)

There is a need to

- Enhance and restore aspen stands in West Fork Bridge Creek, Beaverdam Creek, Dry Gulch and Schurtz Creek drainages because most are small and appear as a few old decadent stems with little or no viable regeneration. This has occurred because they are being overgrown by conifers; disturbances that could regenerate the clones are lacking; ungulates browse the few new sprouts that do occur, and lowered water tables from stream down-cutting. Without protection from ungulates, aspen sprouts often are prevented from maturing by browsing.
- Enhance and restore riparian conditions in Beaver Dam Creek, Bridge Creek, and Antelope Creek drainages to stabilize and reconnect stream channels to the floodplain in order to promote riparian species capable of stabilizing stream banks. Additionally, current livestock utilization levels are impacting riparian shrubs in Beaver Dam Meadow, livestock trailing along Bridge Creek is impacting the riparian area, and Forest Road 1619805 is impacting the Antelope Creek drainage riparian area.

- Improve livestock grazing distribution patterns in Beaverdam Meadow and Bridge Creek drainage because better utilization of upland forage would reduce use on riparian forage.
- Enhance and restore *Botrychium* species (moonworts) and its habitat in Antelope and Wolf Creek pasture because current livestock management at springs, bogs and seeps, allows utilization levels to reach a 4-inch stubble height on the green line. This usually results in less than 4-inch stubble heights on the floodplain. Grazing at this level permits small moonworts to be eaten or trampled and could be injurious to populations; plants would not have the opportunity to sporulate, a critical reproductive step, and would be weakened by the inability to store food reserves, or they might be killed outright.

These actions respond to the goals and objectives outlined in the Malheur National Forest Plan as amended, and helps move the project area towards desired conditions described in that plan. These actions also initiate many of the recommendations made in the Lower Malheur Watershed Assessment (December 1996).

Proposed Action

A proposed action is defined early in the project-level planning process. This serves as a starting point for the interdisciplinary NEPA planning team, and gives the public and other agencies specific information on which to focus comments. Using these comments, and information from preliminary analysis, the interdisciplinary team then develops alternatives as needed to the proposed action. Alternative 2 is the Proposed Action Alternative (reference Maps #1, #2 and #3) and is briefly described below and described in further detail in Chapter 2.

The Emigrant Creek Ranger District, Malheur National Forest proposes to continue authorization of livestock grazing on the House Creek, West Malheur, and Wolf Mountain Allotments under the following terms and conditions:

House Creek Allotment

FS Acres	Potential Season of Use	Permit/Average Number	Maximum AUMs
3,250	5/15 – 9/30	60	318 AUMs
• Allotment utilization for forage would not exceed 45% except where otherwise noted. • Regenerate aspen stands in Bridge Creek, 17 road, House Creek and CHE springs drainages by conifer removal, prescribed burning and protection by fencing and excluding livestock grazing. • Fence in spring (about 1-2 acres) on category 2 portion of House Creek and exclude grazing. • Utilization would not exceed 35% in two riparian pastures. • Stabilize existing head cut with rocks, wood and filter cloth. • Construct a drift fence in the south pasture.			

See map #1.

West Malheur Allotment

FS Acres	Potential Season of Use	Permit/Average Number	Maximum AUMs
22,310	5/1 – 9/30	225	1040 AUMs
• Allotment utilization for forage would not exceed 45% except where otherwise noted. • Reroute pasture boundary fence between Pierpont and Cougar pastures. • Reduce the size of Squaw Springs Cow Camp pasture. • Shift part of livestock grazing allocation from Rock Springs to Pierpont pasture to reduce impacts to upland shrubs. • Regenerate aspen stands in Squaw Creek, Van Gulch and Magpie Creek drainages by conifer removal, prescribed burning and protect by fencing and excluding livestock grazing. • Prescribe burn Cougar Flat and rest for up to 2 growing seasons. • Utilization would not exceed a 6 inch stubble height in the floodplain of identified <i>Botrychium</i> habitat in Pierpont pasture. • Fell timber around Dead Horse Spring to create “jackstraw” barrier to livestock to protect <i>Botrychium</i> habitat. • Enclose and stabilize headcuts on Squaw Creek, East Fork Wolf Creek and Van Gulch and exclude livestock grazing. • Install rock structures and/or LWD placement in Squaw Creek, East Fork Wolf Creek and Van Gulch.			

See map #2.

Wolf Mountain Allotment

FS Acres	Potential Season of Use	Permit/Average Number	Maximum AUMs
31,650	5/1 – 10/12	286	1651 AUMs
• Allotment utilization for forage would not exceed 45% except where otherwise noted. • Enlarge Beaverdam Meadow pasture to include a headcut area and use only as a gathering pasture (overnight use only). • Fence existing population of <i>Botrychium crenulatum</i> and exclude from livestock grazing. • Regenerate aspen stands in West Fork Bridge Creek, Beaverdam Creek, Dry Gulch and Schurtz Creek drainages by conifer removal, prescribed burning and protect by fencing and excluding livestock grazing. • Fell timber along main-stem of Bridge Creek to create “jackstraw” barrier to livestock trailing. • Utilization would not exceed a 6 inch stubble height in the floodplain of identified <i>Botrychium</i> habitat in Antelope and Wolf Creek pastures. • Plant and protect willows in Beaverdam creek in Beaverdam Meadow Pasture. • Stabilize headcuts on Beaverdam Creek and Bridge Creek with rocks, wood or filter cloth. • Install rock structures and LWD placement in Beaverdam Creek and Bridge Creek. • Decommission Forest Road 1619805			

See map #3.

Decision Framework

Based on the interdisciplinary analysis presented in the environmental assessment, The District Ranger is the responsible official who will decide whether or not to continue authorization of grazing on the House Creek, West Malheur, and Wolf Mountain Allotments. If the decision is to continue to authorize grazing, it will also include deciding the kind and number of livestock, approximate season of use, and measures (terms and conditions) intended to mitigate any environmental effects.

Desired Future Conditions

The desired future conditions for the House Creek, West Malheur and Wolf Mountain Allotments are described in the Forest Plan (USDA Forest Service 1990), as amended. The Forest Plan provides the parameters for identifying and defining project-specific desired future conditions. The purpose and need for an action is driven by the difference between the existing and desired condition. The proposed actions for each allotment were developed with the purpose of beginning movement or to continue moving riparian areas and other plant communities towards desired conditions.

Using the Forest Plan, as amended, the following site specific desired conditions were developed to address the areas of concern where vegetation and other resource conditions are not always consistent with the Malheur Forest Plan as amended. General desired conditions described in the Forest Plan as amended still apply but are not listed below.

Rangeland Resources

- Modified grazing strategies in the House Creek, Squaw Creek, Van Gulch, East Fork Wolf Creek, Beaverdam Creek and Bridge Creek drainages will increase the rate of improvement in riparian vegetation; riparian areas within these drainages will show improvements due to reduced utilization of grasses and shrubs.
- Woody shrubs will be more prevalent in the House Creek, Squaw Creek, Van Gulch, East Fork Wolf Creek, Beaverdam Creek and Bridge Creek drainages (Forest Plan IV-7).
- Modified grazing strategies in the Rock Springs pasture will increase the rate of improvement in upland vegetation; upland areas within this pasture will show improvements due to reduced utilization of bunchgrasses and shrubs.
- Modified grazing strategies as well as other management strategies in the Cougar Flat area will increase the rate of improvement in upland and riparian vegetation.
- Grazing management adjustments will improve distribution patterns on the South, Rock Springs, Cougar, Pierpont, Antelope and Beaverdam pastures.

Riparian Vegetation

- Aspen stands in Bridge Creek, 17 road, House Creek, CHE springs, Squaw Creek, Van Gulch, Magpie Creek, West Fork Bridge Creek, Beaverdam Creek, Dry Gulch and Schurtz Creek drainages will be more abundant, diverse, naturally regenerating, and in uninterrupted or released architecture.

- *Botrychium* species (moonwarts) habitat in Pierpont, Antelope and Wolf Creek Pastures will be less impacted by livestock grazing. Stubble height within the floodplain of identified habitat would be maintained at least a 6-inch stubble.
- *Botrychium* species (moonwarts) population in Antelope pasture will be protected from livestock grazing impacts.
- Species indicative of maintenance of riparian soil moisture (late seral riparian vegetation such as sedges and rushes) are present (PACFISH Enclosure B).
- Diverse age structure for woody species is present where such species are a part of the natural system (PACFISH Enclosure B).
- Plants exhibit high vigor (PACFISH Enclosure B).
- Influences of livestock grazing result in riparian restoration at a minimum of “near natural” rates. “Near natural” rates of recovery can occur by limiting environmental effects to those that do not carry through to the next year, thereby avoiding cumulative, negative effects (PACFISH Enclosure B).
- “Manage the composition and productivity of key riparian vegetation to protect or enhance riparian-dependent resources. Emphasis...on...remnant hardwood shrub...” (Forest Plan IV-63). ...meet or move toward standard for shade provided by the shrub component based on the site potential as outlined in Malheur Forest Plan Amendment #29 for Management Area 3B. To meet or move towards those riparian management objectives, riparian shrubs need to be abundant, diverse, naturally regenerating (from seed, sprouts, etc.), and in uninterrupted or released architecture where site potential exists.

Watershed and Fisheries

The desired conditions for watershed and fisheries builds on the desired conditions described for riparian vegetation discussed in the previous section.

- Headcuts on House, Squaw, East Fork Wolf, Van Gulch, Beaverdam and Bridge Creeks have become stable or are no longer evident, and riparian species present are indicative of maintenance of riparian soil moisture (late seral riparian vegetation such as sedges and rushes).
- Stream channels in Squaw, Van Gulch, Beaver Dam, Bridge and East Fork Wolf Creeks are interacting with floodplains. Riparian species present indicate maintenance of riparian-wetland soil moisture characteristics. Down cutting is not evident.
- Stream bank vegetation protects stream banks and dissipates energy during high flows (i.e., consider community type composition, rooting characteristics, and plant density).
- Steambanks are building at near natural rates of recovery and carryover effects do not impact stream channel geomorphology including profile, bank angle.

The Forest Service recognizes the Riparian Management Objectives (RMO) from INFISH are important for high quality fish habitat. However, RMO's are not expected to show measurable change during the life of this NEPA document. Because RMO's are long term objectives, PACFISH (Enclosure B), which was incorporated into INFISH, gives direction to use changes in vegetative condition rather than changes in RMOs as a predictor of riparian condition and trend – “Since the condition of the riparian vegetative community directly affects these RMOs and changes in riparian vegetation are generally

detectable within shorter time periods, the recovery of the vegetation component of the riparian system will be used to predict whether grazing will ultimately degrade, retard, or prevent the attainment of the RMOs". The following are long term Watershed and Fisheries desired conditions but will not likely occur during the life of the document:

- Riparian areas will meet or move toward Riparian Management Objectives (Forest Plan Amendment #29) where potential to meet those standards exists, at a near natural rate of recovery. The stream habitat elements of sediment/substrate, water quality (temperature), channel morphology (pool frequency, bank stability/bank angle, and width:depth ratios) and riparian vegetation (ground cover, % of stream bank vegetated, and shade/canopy closure), all of which can be impacted by livestock and livestock management, are managed within their historical range of variability (HRV) (Forest Plan Amendment #29). This will ensure that streams contain high habitat complexity and quality to support all life histories of native fish throughout the year; this includes winter and summer rearing as well as spawning habitat.
- Stream channels will exhibit stream channel attributes typical of their geomorphology and position on the landscape.
- Native and desired non-native plant communities in riparian areas will be diverse, productive, and will provide shade and cover, large woody debris (LWD), and sediment/erosion reduction characteristic of natural aquatic and riparian ecosystems.
- Schurtz Creek, Wolf Creek, West Fork Wolf Creek, East Fork Wolf Creek, and South Fork Antelope Creek will meet Oregon State Water Quality Standards for temperature, or not be listed on the State 303(d) list where temperature is not influenced by land management practices.

Heritage

- All archaeological and historic sites that are eligible or potentially eligible for listing on the National Register of Historic Places (NRHP) are protected from significant impacts caused by grazing and range management actions.

Economics/Social

- Long-term economic and social stability is maintained by sustaining healthy rangelands and watersheds while providing sustainable domestic livestock grazing.
- The proposed activities contribute toward the production of a wide range of social and economic benefits and opportunities and provides a mix of goods and services to meet public needs while protecting other resource needs.

Management Areas

The Forest Plan (1990) divided National Forest System Lands into Management Areas (MA), each with different management goals, resource potential, and limitations. Forest Plan Amendment #29 amended MA 3A and 3B (Riparian Areas) and provided desired future conditions for each of these MAs. Additionally, this amendment provided more specific numeric standards for these MAs. Standards are now based on the same scientific information used in PACFISH (March 25, 1994) and INFISH (July 28, 1995). Riparian Habitat Conservation Areas (RHCA) were created with incorporation of PACFISH and INFISH into the Forest Plan. In this manner, RHCAs are not management areas; however, they amend the Forest Plan and incorporate new goals, objectives, standards, guidelines, and management direction. These new standards take the place of direction described in the Forest Plan. The following MAs and RHCAs are located within the three allotments.

Table 1 – Management Areas by Allotment

Management Area (MA)	Acres per Allotment			MA Total Acres	Percent of Planning Area
	House Creek	West Malheur	Wolf Mountain		
1-2 Forest and Rangeland	1,467	15,098	25,085	41,650	72
4A Big Game Winter Range	0	5,690	1,222	6,913	12
13 Old Growth	195	624	2,870	3,690	6
14 Visual Corridor	1,450	63	45	1,558	3
RHCA	139	1,423	2,427	3,990	7
Totals	3,250	22,900	31,650	57,800	100
Private Land	0	0	0	0	0

Management Area 1 - General Forest

This management area primarily consists of forested lands and is designed to emphasize timber production on a sustained yield basis while providing for other resource values. Generally, acres for MA 1 and MA 2 (see below) are combined. There are about 41,650 acres of MA 1/2 general forest/rangeland in the planning area.

Standards for MA1

- Manage allotments to utilize available forage while maintaining vegetation (including trees) and site productivity.
- Create and utilize transitory forage resulting from past timber harvest if restocking of cutover areas within regeneration period is assured.
- Design structures which facilitate livestock distribution to protect tree regeneration.
- Plan and implement range forage seedings that are not detrimental to tree restocking of harvested areas within planned regeneration periods.

Management Area -2 – General Rangeland

This management area primarily consists of nonforested grasslands and low-site ponderosa pine lands that are unsuitable for timber production. Forage production is emphasized on nonforested areas on a sustained yield basis while providing for other resource values. This management area is usually included as non-forested lands within other MAs, primarily MA 1 – General Forest. See MA 1 for acres.

Standards for MA2

- Design and administer range management activities to promote objectives of management indicator species.
- Manage allotments to ensure that resource values other than forage are maintained at or above minimum requirements.

Management Area 4A – Big Game Winter Range Maintenance

This management area consists of non-forested grasslands, bitterbrush and mountain mahogany brush fields, and forested lands. The goal of MA 4A is to maintain or enhance the quality of the winter range habitat for deer and elk through timber harvesting, prescribed burning, and other management activities, including access management and restricted activities during winter months. There are about 6,910 acres of big-game winter range in the planning area.

Standards for MA4A

- Prioritize forage utilization to provide for big game species at levels derived in consultation with the Oregon Department of Fish and Wildlife for each area.
- Include the forage needs of big game in late fall when preparing or updating allotment management plans and when considering seasonal extensions of livestock grazing.

Management Area 13 – Old Growth

Management Area 13 is composed of mature and overmature trees (150 years or older), which provide: habitat for wildlife species dependent on mature and overmature forest conditions, ecosystem diversity, and preservation of aesthetic qualities. These areas are distributed across the Forest, providing an old growth network. Wildlife species dependent on these lands include the pileated woodpecker and pine marten. These acres reflect both designated and replacement old growth and include only those areas outside wilderness, research natural areas, semi-primitive areas, and wild and scenic rivers. There are about 3,690 acres of old growth in the planning area.

Standards for MA13

- Permit livestock grazing in accordance with Forest-wide standards.

Management Area 14 – Visual Corridors

Management Area 14 consists of visible and potentially visible landscapes along major travel routes, and state scenic waterways where the traveling public has a high to medium sensitivity to scenery. About 1,560 acres of the planning area are within a scenic viewshed. The goal of MA 14 is to manage corridors within scenic viewsheds with primary consideration given to scenic quality and growth of large diameter trees.

Standards for MA14

- Permit livestock grazing in accordance with Forest-wide standards.

Riparian Habitat Conservation Area (RHCA)

Riparian habitat conservation areas are portions of watersheds where riparian-dependent resources receive primary emphasis, and management activities are subject to specific standards and guidelines. The planning area contains about 3,990 acres of RHCAs. These areas include traditional riparian corridors, wetlands, intermittent headwater streams (MA3A), and other areas where proper ecological functioning is crucial to maintenance of the streams water, sediment, large woody material, and nutrient delivery systems.

Standards for RHCA

- Grazing Management 1 - Modify grazing practices (e.g., accessibility of riparian areas to livestock, length of grazing season, stocking levels, timing of grazing, etc.) that retard or prevent attainment of Riparian Management Objectives or are likely to adversely affect inland native fish. Suspend grazing if adjusting practices is not effective in meeting Riparian Management Objectives.
- Grazing Management 2 – Locate new livestock handling and/or management facilities outside Riparian Habitat Conservation Areas. For existing livestock handling facilities inside the Riparian Habitat Conservation Areas, assure that facilities do not prevent attainment of Riparian Management Objectives. Relocate or close facilities where these objectives cannot be met.
- Grazing Management 3 – Limit livestock trailing, bedding, watering, salting, loading, and other handling efforts to those areas and times that would not retard or prevent attainment of Riparian Management Objectives or adversely affect inland native fish.

Public Involvement

Information provided as a result of the scoping process is located in the House, West Malheur and Wolf Mountain Range Planning Area Project Record. Using the comments from the permittees, public, other agencies, and tribes, (see Issues section), the interdisciplinary team developed a list of issues to address.

Scoping

The proposal was listed in the Schedule of Proposed Actions as two separate projects. The Wolf/Van Grazing AMP project was listed in the Schedule of Proposed Actions in the summer/fall 2002 issue. This project included the Van, Wolf Mountain and West

Malheur Allotments. The House Creek Grazing AMP project was listed in the Schedule of Proposed Actions in the Winter/Spring 2004 issue. The proposals were combined and provided to the public and other agencies for comment during scoping period from August 13 to September 13, 2004.

A separate scoping letter was sent to the permittees using the allotments in August, 2004. Agency personnel also met with permittee Jim Bentz out in the field to discuss specific issues the permittee brought up. NEPA coordinator Lori Bailey also spoke with permittee Izzy Oren to discuss specific issues the permittee brought up. In addition, as part of the public involvement process, the agency met with all permittees in May 2005. Every effort was made to address permittee concerns. The permittees provided input on alternatives and site specific development proposals for their respective allotments.

On September 8, 2005 NEPA Coordinator Lori Bailey spoke with Harney County Judge Steven Grasty to discuss specific concerns of the County Court.

The project was initially scoped on August 13, 2004 with four similar actions including the House Creek, West Malheur, Wolf Mountain, and Van Allotments. Through the environmental analysis process it was determined that the Van Allotment may have effects not supported by a Finding of No Significant Impact (FONSI). Since the Van Allotment is not a connected action (40 CFR 1508.25(1)) to the other allotments a separate Environmental Impact Statement (EIS) will be prepared.

Tribal Consultation

Tribal scoping letters were sent for comment during the scoping period from August 13 to September 13, 2004. Letters were sent to the Burns Paiute Tribe, the Confederated Tribes of the Umatilla Indian Reservation, the Confederated Tribes of Warm Springs Reservation of Oregon and the Nez Perce Tribe. No responses were received.

On March 15, 2005 District Ranger Margaret David Bailey, NEPA Coordinator Lori Bailey and Vegetation Manager George Wynn met with members of the Burns Paiute Tribe as per the process of the existing Memorandum of Understanding (MOU). Topics included an overview of the project, potential alternatives and timelines. Verbal comments were in agreement with the proposed action.

Issues

The Forest Service separates the issues into two groups: key and other issues. Key issues are defined as those directly or indirectly caused by implementing the proposed action. Other issues are identified as those: 1) outside the scope of the proposed action; 2) already decided by law, regulation, Forest Plan, or other higher level decision; 3) not clearly relevant to the decision to be made; or 4) conjectural and not supported by good scientific or factual evidence. The Council on Environmental Quality (CEQ) NEPA regulations require this delineation in Sec. 1501.7, "...identify and eliminate from detailed study the issues which are not significant or which have been covered by prior environmental review (Sec. 1506.3)..."

Key Issues

The Forest Service identified three categories of key issues raised during the scoping process. These key issues include:

Issue 1 – Water Quality/Fish and Aquatic Habitat

Concern: How will water quality/fish and aquatic habitat be affected by the continuation of livestock grazing? Streams in the planning area contain habitat for native aquatic and sensitive species. Livestock grazing may affect streams in the project area by increasing the time it takes to reach RMO's.

Resolution: The alternatives authorize varying levels of livestock forage use and require varying levels of fence and water developments in an effort to enhance and maintain water quality/fish and aquatic habitat. Decommissioning Forest Road 1619805 would enhance and restore riparian conditions in the Antelope Creek drainage. The addition of rock structures, woody debris and riparian planting would allow stream channels to interact with floodplains and restore riparian vegetation communities thus allowing water quality/fish and aquatic habitat to improve. Under the No Grazing Alternative, no livestock grazing would occur and water quality/fish and aquatic habitat would be influenced only by wild ungulates.

Measures: Estimated years to reach RMO's, number of headcuts stabilized, number of streams improved by adding rock structures, large woody debris, and road decommissioning, and effects to sensitive aquatic species.

Issue 2 – Upland and Riparian Vegetation

Concern: Will continued livestock grazing impact non-forested upland and riparian vegetation composition by altering plant community composition, and structure? The composition of non-forested upland and riparian vegetation within the planning area is the result of interactions among many factors including historical and current livestock use, tree canopy cover, big game use, management activities, and the presence or absence of fire in the ecosystem.

Resolution: The alternatives authorize varying levels of livestock forage use and require varying levels of fence and water developments in an effort to enhance and maintain non-forested upland and riparian vegetation. The addition of rock structures, woody debris and riparian planting would allow stream channels to interact with floodplains and restore riparian vegetation communities. Prescribed burning would reduce the density and cover of big sagebrush and encourage the production of forage grasses at Cougar Flat. Livestock utilization levels in identified *Botrychium* habitat would be reduced. Under the No Grazing Alternative, no livestock grazing would occur and non-forested upland and riparian vegetation would be influenced only by wild ungulates.

Measure: A combination of aspen stand treatments, hardwood plantings, prescribed burning, vegetation trend, and rate of change related to applied grazing strategies would be used to estimate the future condition of planning area non-forested upland and riparian vegetation types. Number of *Botrychium* habitat sites where livestock utilization would be reduced.

Issue 3 – Social/Economic

Concern: How will the proposed action and the alternatives affect the quality of life in the area? Forage production on the Forest is an important output and ranching and livestock grazing are primary sources of income in the affected counties. Some publics prefer to have livestock grazing removed or significantly reduced on public lands.

Resolution: The alternatives evaluate and authorize varying levels of livestock forage use and require varying levels of fence and water developments. Under the No Grazing Alternative, no livestock grazing would occur and no fence and water developments would be required. The economic and social effects of these alternatives including quality of life were evaluated in this environmental assessment.

Measure: Permitted numbers, and effect to permittees and the Forest Service in terms of implementation and operations costs.

Other Issues

Besides the key issues, other concerns were identified by the responsible official as non-significant issues and were resolved without developing separate alternatives.

Suitability and Capability Determinations

Concern: Address the suitability of areas for livestock grazing.

Resolution: The Forest Plan has determined the capability and suitability of the plan area and established programmatic direction including goals, objectives, standards, guidelines, and monitoring requirements. Range specialist reports collected in the 1960's examined the site-specific capability and capacity of these allotments. This information was used during development of the Forest Plan. NFMA does not require that a suitability analysis be conducted at the project level. On August 24, 1999, the U.S. Court of Appeals for the Ninth Circuit concluded the Forest Service had complied with NFMA by adopting the Forest Plan, including its allocation of acreage suitable for grazing. This analysis is to determine whether or not to authorize livestock grazing in the project area (*Wilderness Society v. Thomas* 188 F.3d 11(9th Cir. 1999)).

Monitoring and Credibility

Concern: There is concern that the Forest Service does not adequately monitor all parameters (utilization on grasses and grasslikes and shrubs and bank stability) listed in the Forest Plan.

Resolution: FSH 2209.13 Chapter 90 Rangeland Management Decision Making Section 97-Monitoring states: "Monitoring and evaluation shall be identified as part of the project decision. Conduct planned monitoring only to the extent needed to determine if planned actions have been implemented and whether they are effective in achieving objectives. The significant issues or effects should dictate monitoring requirements".

Monitoring would be conducted using established protocols for the Malheur National Forest which are listed in the monitoring section in Chapter 2. When monitoring indicates that resource problems are occurring, these concerns are resolved through permit administration using the direction given in FSH 2209.13 Chapter 10.

Reliability and Verifiability of Current Utilization Standards

Concern: There is concern that the current utilization standards are not reliable and verifiable.

Resolution: The Forest Plan as amended identifies appropriate utilization standards. These standards will be monitored using established protocols for the Malheur National Forest which are listed in the monitoring section in Chapter 2. Monitoring locations are further specified by allotment in the annual operating instructions (AOI).

Soils

Concern: Does continued livestock grazing have impacts on soils?

Resolution: Livestock grazing may affect long-term soil productivity by causing detrimental soil compaction by trampling, detrimental soil puddling by trampling and trailing, detrimental soil erosion by reducing ground cover, and nutrient loss. The Forest Plan standards and guidelines to manage soil and water resources to maintain or enhance the long-term productivity of the Forest will be met. The alternatives will be analyzed and the effects on soils will be compared to the Forest Plan standards and guidelines.

Threatened, Endangered, Proposed and Sensitive Species

Concern: Does continued livestock grazing have impacts on threatened, endangered, proposed and sensitive species?

Resolution: The Forest Service is required to analyze the effects of proposed projects on threatened, endangered, proposed and sensitive species. To meet this requirement, biological assessments (BA) and/or biological evaluations (BE) for species known to occur or which may occur in the planning area have been prepared by Forest Service biologists.

Appendix H determined No Effect to the two terrestrial wildlife species whose status is considered threatened and one terrestrial wildlife species whose status is considered endangered from the proposed action. Because there would be no impacts to threatened and endangered species expected from the action alternatives, a BA and consultation with the United States Fish and Wildlife Service (USFWS) is not required.

A Regional Sensitive Species list was provided to the Forest by the Pacific Northwest Region (Region 6) of the Forest Service. This list identifies sensitive species that may occur on the Malheur National Forest. IDT members have prepared Biological Evaluations (BE) (Appendices F, G and H) for sensitive species that analyze the effects of the proposed actions on these species. In summary, effects of the proposed action on sensitive plant, aquatic and terrestrial wildlife species range from no impact to may impact individuals or habitat, but will not likely contribute to a trend towards federal listing or cause a loss of viability to the population or species, to beneficial impacts.

Management Indicator Species

Concern: Does continued livestock grazing have impacts on management indicator species?

Resolution: Indicator species for the Emigrant Creek Ranger District are identified in the Malheur Forest Plan (IV-32). Chapter 3 discloses the effects to MIS by alternative. The

wildlife specialist report for the House, West Malheur and Wolf Mountain Allotments discloses more information regarding MIS.

Inventoried Roadless Areas

Concern: Should timber harvest be avoided in roadless areas?

Resolution: There are no inventoried roadless areas in the planning area and no timber harvest is proposed.

Unroaded Areas

Concern: Should uninventoried roadless areas (unroaded areas) be considered for their potential roadless and wilderness values?

Resolution: Livestock grazing would have no impact on whether an area would or would not be considered unroaded.

Biological Soil Crusts

Concern: How will the EA address biological soil crusts? The EA should discuss the importance of biological soil crusts and include an inventory and evaluation of their current status over the entire planning area, the causes of their degradation, concomitant losses of ecosystem function, and how they will be recovered.

Resolution: Chapter 3 discloses the effects to biological soil crusts by alternative. The botany specialist report for the House, West Malheur and Wolf Mountain Allotments discloses more information regarding biological soil crusts.

Total Maximum Daily Loads (TMDL)

Concern: How and when will scheduled TMDLs be integrated into allotment planning?

Resolution: The House, West Malheur, and Wolf Mountain Allotment EA is consistent with the “Forest Service and Bureau of Land Management Protocol for Addressing Clean Water Act Section 303(d) Listed Waters.” In addition to the Protocol, the May 2002 Memorandum of Understanding Between USDA Forest Service and Oregon Department of Environmental Quality to Meet State and Federal Water Quality Rules and Regulations states “WQRP’s (Water Quality Restoration Plans) should be completed where management activities have the potential to affect impaired waters 303(d) listed and a TMDL is not yet in place” (p. 6). For this project the protocol and decision framework were not initiated because the project would not measurably affect the parameter (summer temperature) for which streams within the analysis area (Wolf Creek and East Fork Wolf Creek were previously listed, but dropped) were listed and, therefore, a WQRP is not needed for this project. This determination is also based on the application of LMRP (including INFISH and Amendment 29 amendments) standards, RHCAs buffers, and site specific BMPs (see Chapter 2 – Mitigation). Also the implementation of the Protocol requires a collaborative approach with the State and Tribes with the Forest Service assisting in the development of a TMDL. The TMDL for the Malheur sub-basin is scheduled for 2007 (<http://www.deq.state.or.us/WQ/TMDLs/MalheurRiverBasin.htm>). Following this timeline and using a collaborative approach, the Forest will undertake the development and implementation of a WQRP for the Malheur sub-basin in order to provide the specific actions needed for the Forest to meet TMDL requirements. Thus, the

House, West Malheur, and Wolf Mountain Allotment EA is consistent with the direction and regulations of the Clean Water Act and 303(d) listed streams.

Trespass Livestock

Concern: How will the EA address trespass livestock?

Resolution: Chapter 10 FSM Chapter 2238.4 requires that unauthorized use and permittee excess use be billed at higher rates based upon the full commercial value of leased forage. These concerns would be resolved through permit administration using the direction given in FSH 2209.13 Law enforcement may be notified when livestock are discovered that are not authorized to be on Forest Service land.

Forested Vegetation

Concern: What are the potential effects of livestock grazing on the health and density of ponderosa pine forests? Has grazing helped move away from the historic range of variability (HRV)?

Resolution: Chapter 3 discloses the effects to forested vegetation by alternative. The silviculturist specialist report for the House, West Malheur and Wolf Mountain Allotments discloses more information regarding forested vegetation and HRV.

Heritage Resources

Concern: How will the EA address potential impacts to heritage resources?

Resolution: Chapter 3 discloses the effects to heritage resources by alternative. All alternatives include management requirements, constraints and mitigation measures to protect heritage resources. The heritage specialist report for the House, West Malheur and Wolf Mountain Allotments discloses more information regarding heritage resources.

Laws and Regulations

This EA adheres to the following legal requirements and coordination, and regulations:

The Preservation of American Antiquities Act of 1906

This Act makes it illegal to “appropriate, excavate, injure, or destroy any historic or prehistoric ruin or monument, or any object of antiquity, situated on lands owned by the Government of the United States, without the permission of the Secretary of the Department of the Government having jurisdiction over the lands on which said antiquities are situated.”

The National Historic Preservation Act

This Act requires Federal agencies to consult with State and local groups before nonrenewable cultural resources, such as archaeological sites and historic structures, are damaged or destroyed. Section 106 of this Act requires Federal agencies to review the effects project proposals may have on the cultural resources in the Planning Area.

The Endangered Species Act of 1973, as amended

The purposes of this Act are to “provide a means whereby the ecosystems upon which endangered species and threatened species depend may be conserved, to provide a program for the conservation of such endangered species and threatened species, and to take such steps as may be appropriate to achieve the purposes of the treaties and conventions set forth in subsection (a).” The Act also states “It is further declared to be the policy of Congress that all Federal departments and agencies shall seek to conserve endangered species and threatened species and shall utilize their authorities in furtherance of the purposes of this Act.” A biological assessment is being prepared to document effects of proposed activities on endangered and threatened species in the project area. Appropriate coordination, conferencing, and consultation with USFWS and NOAA-Fisheries will be completed if appropriate.

The Migratory Bird Treaty Act of 1918

The purposes of this Act are to establish an international framework for the protection and conservation of migratory birds. The Act makes it illegal, unless permitted by regulations, to “pursue, hunt, take, capture, purchase, deliver for shipment, ship, cause to be carried by any means whatever, receive for shipment, transportation or carriage, or export, at any time, or in any manner, any migratory bird, included in this Convention...for the protection of migratory birds...or any part, nest, or egg of such bird” (16 USC 703). The original 1918 statute implemented the 1916 Convention between the United States and Great Britain (for Canada). Later amendments implemented treaties between the United States and Mexico, Japan, and the Soviet Union (now Russia).

The National Environmental Policy Act (NEPA) of 1969, as amended

The purposes of this Act are “To declare a national policy which will encourage productive and enjoyable harmony between man and his environment, to promote efforts which will prevent or eliminate damage to the environment and biosphere and stimulate the health and welfare of man; to enrich the understanding of the ecological systems and natural resources important to the Nation; and to establish a Council on Environmental Quality” (42 USC Sec. 4321). The law further states “it is the continuing policy of the Federal Government, in cooperation with State and local governments, and other concerned public and private organizations, to use all practicable means and measures, including financial and technical assistance, in a manner calculated to foster and promote the general welfare, to create and maintain conditions under which man and nature can exist in productive harmony, and fulfill the social, economic, and other requirements of present and future generations of Americans” [42 U.S.C. Sec. 4331(a)]. NEPA establishes the format and content requirements of environmental analysis and documentation for projects such as this. The entire process of preparing an environmental assessment was undertaken to comply with NEPA.

The National Forest Management Act (NFMA) of 1976

This Act guides development and revision of National Forest Land Management Plans and has several sections ranging from required reporting the Secretary must submit

annually to Congress to preparation requirements for timber sale contracts. There are several important sections within the act, including Section 1 (purpose and principles), Section 19 (fish and wildlife resource), Section 23 (water and soil resource), and Section 27 (management requirements). All alternatives in this document were developed to be in full compliance with NFMA.

The Clean Water Act, as amended in 1977, 1982, and 1987

The primary objective of this Act is to restore and maintain the integrity of the nation's waters. This objective translates into two fundamental national goals: 1) Eliminate the discharge of pollutants into the nation's waters; and 2) Achieve water quality levels that are fishable and swimmable. This Act establishes a non-degradation policy for all federally proposed projects. The proposed action meets anti-degradation standards agreed to by the State of Oregon and the Forest Service, Region 6, in a Memorandum of Understanding (Forest Service Manual 1561.5). This will be accomplished through planning, application, and monitoring of Best Management Practices (BMPs). Site specific BMPs have been designed to protect beneficial uses.

The Clean Air Act, as amended in 1990

The purposes of this Act are "to protect and enhance the quality of the Nation's air resources so as to promote the public health and welfare and the productive capacity of its population; to initiate and accelerate a national research and development program to achieve the prevention and control of air pollution; to provide technical and financial assistance to State and local governments in connection with the development and execution of their air pollution prevention and control programs; and to encourage and assist the development and operation of regional air pollution prevention and control programs."

Multiple-Use Sustained-Yield Act of 1960

The Multiple-Use Sustained-Yield Act of 1960 requires the Forest Service to manage National Forest System lands for multiple uses (including timber, recreation, fish and wildlife, range and watershed). All renewable resources are to be managed in such a way that they are available for future generations. The harvesting and use of standing timber can be considered a short-term use of a renewable resource. As a renewable resource, trees can be re-established and grown in again if the productivity of the land is not impaired.

Public Law 92-488

This law recognizes the Burns Paiute Tribe and their reservation. As a Federally recognized tribe, the Burns Paiute Tribe retains rights of inherent sovereignty. The planning area is within the traditional and current use area of the Burns Paiute Tribe. The planning area is within the aboriginal use area of the Burns Paiute Tribe. All actions to be taken must fully consider and comply with Native American treaty rights.

Migratory Bird E.O. 13186

On January 10, 2001, President Clinton signed an Executive Order (E.O. 13186) titled “Responsibilities of Federal Agencies to Protect Migratory Birds.” This E.O. requires that “environmental analysis of Federal actions, required by NEPA or other established environmental review processes, evaluate the effects of actions and agency plans on migratory birds, with emphasis on species of concern.”

Natural or Depletable Resource Requirements and Conservation Potential

The House, West Malheur and Wolf Mountain Range Planning project has been designed to conform to applicable laws and regulations pertaining to natural or Depletable resources, including minerals and energy resources. Regulations of mineral and energy activities on the National Forest, under the U.S. Mining Laws act of 1872 and the Mineral Leasing Act of 1920, are shared with the Bureau of Land Management. The demand for access to National Forest System lands for the purpose of mineral and energy exploration and development is expected to increase over time.

Environmental Justice

On February 11, 1994, President Clinton signed Executive Order 12898. This order directs each Federal agency to make achieving environmental justice part of its mission by identifying and addressing, as appropriate, disproportionately high and adverse human health or environmental effects of its programs, policies, and activities on minority populations and low-income populations. On the same day, the President also signed a memorandum emphasizing the need to consider these types of effects during NEPA analysis. On March 24, 1995, the Department of Agriculture completed an implementation strategy for the E.O. Where Forest Service proposals have the potential to disproportionately and adversely affect minority or low-income populations, these effects must be considered and disclosed (and mitigated to the degree possible) through the NEPA analysis and documentation (see Environmental Justice, Chapter 3).

Prime Farmland, Rangeland, and Forestland

All alternatives are in accordance with the Secretary of Agriculture Memorandum 1827 for prime farmland, rangeland, and forestland. “Prime” forestland is a term used only for non-Federal land, which would not be affected by proposed alternatives in this project. Regardless of the alternative selected, National Forest System lands would be managed with sensitivity to adjacent private and public lands.

Floodplains and Wetlands (E.O. 11988 and 11990)

The purpose of these 1977 orders are to “...avoid to the extent possible the long and short term adverse impacts associated with the occupancy and modification of floodplains and to avoid direct and indirect support of floodplain development...” and similarly “...avoid to the extent possible the long and short term adverse impacts associated with the destruction or modification of wetlands...”

Forest and Rangeland Renewable Resources Planning Act (RPA) of 1974, as amended

This Act directed the Secretary of Agriculture to prepare a Renewable Resources Assessment and updates. These assessments include “an analysis of present and anticipated uses, demand for, and supply of the renewable resources, with consideration of the international resource situation, and an emphasis of pertinent supply, demand and price relationships trends.” The USDA Forest Service Inventory and Analysis unit provides updates for this assessment.

Executive Order 12962 (Aquatic Systems and Recreational Fisheries)

This 1995 order’s purpose is to conserve, restore, and enhance aquatic systems to provide for increased recreational fishing opportunities nationwide. It requires federal agencies to evaluate the effects of federally funded actions on aquatic systems and document those effects relative to the purpose of this order.

Executive Order 13112 (Invasive Species)

This 1999 order requires Federal agency whose actions may affect the status of invasive species to identify those actions and within budgetary limits, “(i) prevent the introduction of invasive species; (ii) detect and respond rapidly to and control populations of such species...(iii) monitor invasive species populations...(iv) provide for restoration of native species and habitat conditions in ecosystems that have been invaded;...(vi) promote public education on invasive species...and (3) not authorize, fund, or carry out actions that it believes are likely to cause or promote the introduction or spread of invasive species...unless, pursuant to guidelines that it has pre-scribed, the agency has determined and made public...that the benefits of such actions clearly outweigh the potential harm caused by invasive species; and that all feasible and prudent measures to minimize risk of harm will be taken in conjunction with the actions.”

Effects to invasive species from the Proposed Action are described in Chapter 3, and management requirements, constraints and mitigation measures are described in Chapter 2. Effects are not expected to be significant because livestock grazing or associated permittee actions have not been identified as a major factor in the establishment and spread of noxious weeds in the project area, cattle do not generally consume the noxious weeds found on the three allotments, Permittees would be provided with a current list of noxious weeds identification material and asked to add known noxious weed locations not shown on the map, all equipment used to construct, reconstruct, or maintain water developments and fences would be cleaned in a manner sufficient to prevent noxious weeds from being carried onto the project area, and seed used in the construction, reconstruction, or maintenance of water developments or in restoration projects would be certified weed free.

Consumers, Civil Rights, Minorities, and Women

All Forest Service actions have potential to produce some form of impacts, positive or negative, on the civil rights of individuals or groups, including minorities and women. An analysis of this potential impact is required by Forest Service Manual and Forest Service Handbook direction (see Socio-Economic, Chapter 3).

Project Record

This EA hereby incorporates by reference the Project Record (40 CFR 1502.21). However, Chapter 3 provides a summary of Specialist Reports in adequate detail to support the rationale for the decisions and the appendices provide supporting documentation. The Project Record contains Specialist Reports and other technical documentation used to support the analysis and conclusions in the EA. These Specialist Reports are for Forest Vegetation, Wildlife, Soil, Water, Fisheries, Range, Botany, Heritage, and Socio-Economics. The Project Record is available for review at the Emigrant Creek Ranger District Office, 265 Highway 20 South, Hines, Oregon, Monday through Friday during normal business hours.

CHAPTER 2 - ALTERNATIVES

Introduction

Chapter 2 describes the proposed action and alternatives to the proposed action, including a no grazing alternative. This chapter also describes the measures necessary to mitigate environmental effects, identifies management requirements, develops monitoring plans, and shows a summary comparison of the alternatives as they relate to key issues and the purpose and need for action. This chapter is divided into seven sections:

- Alternative Development Process
- Alternatives Considered but Eliminated from Detailed Study
- Alternatives Considered in Detail
- Management Requirements, Constraints, and Mitigation Measures
- Monitoring Plans
- Comparison of Alternatives
- Implementation Schedule

Affected environment and environmental consequences of implementing alternatives for the House, West Malheur and Wolf Mountain Planning Area can be found in Chapter 3. The analysis file is referenced throughout this document and contains additional documentation and analysis.

Alternative Development Process

This chapter describes in detail three alternative ways to manage livestock grazing practices on lands and resources in the House, West Malheur and Wolf Mountain Allotments, Alternative 1 (Current Management), Alternative 2 (Proposed Action) and Alternative 3 (No Grazing). The Proposed Action was developed using the District Ranger's specific direction in the Project Initiation Letter. Public participation to review and comment on proposed activities in the House, West Malheur and Wolf Mountain Planning Area began in summer/fall 2002. Forest Service resource specialists were part of an interdisciplinary team (IDT) that worked on development of action alternatives. Based on comments received from the public and other agencies, direction given by Forest leadership, and through incorporating Forest Plan amendments, existing State and Federal laws, and Forest Service interim direction, the range of alternatives considered in detail is limited. The alternatives were designed to stay within a framework of ecological stewardship and the Malheur Forest Plan.

Each action alternative analyzed in detail discloses environmental effects associated with its implementation, thereby facilitating a comparison of alternatives. This comparison of effects along with projected environmental consequences detailed in Chapter 3 provides the Responsible Official with information needed to make an informed choice between alternatives.

The IDT and Responsible Official felt the alternatives to be analyzed in detail represented a range of reasonable alternatives (40 CFR 1502.14(a)) and that they address the Purpose and Need. The "No Action" alternative is required by NEPA. Consideration of the No

Grazing Alternative (Alternative 3) meets the intent of the “No Action” alternative as required by NEPA.

Alternatives Considered but Eliminated from Detailed Analysis

Federal agencies are required by NEPA to rigorously explore and objectively evaluate all reasonable alternatives and to briefly discuss the reasons for eliminating any alternatives that were not developed in detail (40 CFR 1502.14). The following alternatives or components of alternatives were considered, but eliminated from detailed consideration for reasons summarized below.

Alternative A

An alternative that increased grazing on all three allotments was brought forward in response to scoping. This proposal was considered by the IDT but eliminated from detailed analysis because range analysis data does not support an increase in AUMs, increased grazing would not move us toward desired conditions and does not fully meet the purpose and need for action.

Range analysis data do not support an increase in AUMs. Upland clusters and macroplots indicate an array of condition, trend, and seral status ranging from poor with downward trend to excellent with upward trend. This pattern is typical of allotments where current livestock grazing distribution patterns constitute a greater influence on ecologic trends in primary range than does the total livestock forage allocation for the allotment. Riparian macroplots indicated impacts typically related to grazing such as inadequate bank stability and stream shading in several drainages. Forage production estimates for the allotments indicate that the current total livestock forage allocation does not exceed available production in a near normal growing season.

Alternative B

An alternative that included wildlife enhancement, increase forage for big game, eliminate or reduce the impact on old growth, and a reduction in grazing access was brought forward in response to scoping. This alternative was considered by the IDT but eliminated from detailed analysis because of the following reasons: (1) portions of this alternative (wildlife enhancement) are incorporated into the Proposed Action alternative. Aspen stand enhancement, reduction or elimination of livestock utilization in specified areas, prescribed burning, headcut stabilization, installation of rock structures and large wood, road decommissioning, and planting and protecting willow are all activities that would enhance wildlife habitat and increase forage for big game; (2) aspen enclosures, spring enclosures, and overnight use by livestock are also incorporated into the Proposed Action Alternative and would reduce grazing access in identified areas; and (3) livestock grazing is not expected to have impacts on old growth.

Alternative C

An alternative that included a reduction in non-motorized recreation and reduce conflicts between different users including hikers, fishermen, hunters and cattle was brought

forward in response to scoping. This proposal was considered by the IDT but eliminated from detailed analysis because it is outside the scope of this analysis.

Alternative D

An alternative that proposed management of vegetation to increase forage, control fire, reduce noxious weeds and bugs was brought forward in response to scoping. This proposal was considered by the IDT but eliminated from detailed analysis because it would not meet the purpose and need for action. Additionally, parts of this alternative are being considered in future projects such as the Van Vegetation Management Project.

Alternative E

An alternative that proposed a decrease in grazing on all three allotments was brought forward during the 30-day public comment period on the Preliminary EA. This proposal was considered by the IDT but eliminated from detailed analysis because range analysis data does not support a needed decrease in AUMs.

Range analysis data do not support a need for a decrease in AUMs. Upland clusters and macroplots indicate an array of condition, trend, and seral status ranging from poor with downward trend to excellent with upward trend. This pattern is typical of allotments where current livestock grazing distribution patterns constitute a greater influence on ecologic trends in primary range than does the total livestock forage allocation for the allotment. Riparian macroplots indicated impacts typically related to grazing such as inadequate bank stability and stream shading in several drainages. Forage production estimates for the allotments indicate that the current total livestock forage allocation does not exceed available production in a near normal growing season.

Alternatives Considered in Detail

As described in the Alternative Development section, the No Grazing and two grazing alternatives were analyzed to predict their effect on the environment. The Elements Common to all Grazing Alternatives within the Planning Area section displays assumptions, background information, and design elements common to action Alternatives 1 and 2. The basic purpose and design of each alternative is detailed in this section. The Forest Service development the management requirements, constraints, and mitigation measures to be used as part of the action alternatives. These methods to avoid or mitigate possible undesired consequences of alternatives are described in the next section, Management Requirements, Constraints, and Mitigation Measures, of this chapter.

The “No Action” alternative is required by NEPA. Consideration of the no grazing alternative (Alternative 3) meets the intent of the “No Action” alternative as required by NEPA.

Alternative 1 – Current Management

Purpose and Design

The purpose of this alternative (Alternative 1) is two-fold.

- 1) Provide continued grazing and
- 2) Provide the responsible official with a way to compare continued grazing at current levels to the proposed action.

The Current Management Alternative, as based on the current management actions implemented over the last 3 to 5 years, has not always been consistent with the Malheur National Forest Plan and/or moved toward meeting aquatic and other resource Forest Plan standards, as amended, including INFISH Riparian Management Objectives (RMO) at a near natural rate of recovery. There are isolated areas (these areas are displayed in Chapters 1 and 3), where vegetation and other resource conditions have not always been consistent with the Malheur Forest Plan as amended and livestock distribution and utilization can be modified to better contribute to desired conditions.

Under the Current Management Alternative, these areas of concern would be dealt with through adaptive management and administrative changes. Adaptive management allows the Forest Service to adjust grazing management using a variety of management tools to adjust timing, intensity, duration, and season of use. Methods may be used singly or in combination with each other. These methods could include (but is not limited to):

- Changing livestock numbers;
- Changing the time livestock are in a pasture (length of use);
- Changing the time of year a pasture is used (season of use);
- Riding/herding/salting (i.e. more intensive management);
- Fencing areas to limit access and use (fences may be permanent or temporary and may require additional NEPA);
- Temporarily curtailing/suspending use (resting pastures); and/or
- Cancellation of grazing permits in whole or part.

Adaptive management and administrative changes are designed to provide flexibility for continued grazing and to help move towards meeting INFISH and other Forest direction with no changes to the range management infrastructure such as fences and water developments. Moving towards meeting INFISH and other Forest direction are not expected to occur overnight or even within the life of this environmental assessment (about 5 years).

Alternative 1 is designed to move towards meeting INFISH and other Forest direction mainly through intensive range management. This alternative uses existing fences, existing water developments and other existing range improvements to control livestock distribution and use. It does not add new improvements, which are included in Alternative 2. The effects of using the existing improvements are included in Chapter 3 of this document, and it is expected that intensive management (by both the permittees and Forest Service) would be required to meet INFISH and Forest direction.

Alternative 1 is designed to achieve the near natural rate of recovery which would be similar to the rate of recovery that would occur without livestock grazing. The near natural rate of recovery is intended to not have carryover effects from one year to the next. However, due to the nature of grazing and complexities and uncertainties of having livestock move throughout an allotment, some effects would occur, which would be allowable under INFISH. The Malheur National Forest Riparian Monitoring Strategy (Appendix B) provides a starting point for acceptable level of effects or condition thresholds (endpoint indicators). The intent of INFISH is that no negative cumulative effects that would retard attainment of riparian management objectives would occur as a result of the project. Alternative 1 would have an improving cumulative trend over the next 15-20 years.

Description of Specific Features

Alternative 1 proposes no physical changes to current management of the three allotments. This alternative would manage the allotments as they are currently described in their permits (see Table 2). Areas of concern would be dealt with through adaptive management and administrative changes (such as change or reduction in timing, intensity, frequency, and duration of use); and would provide for no physical changes (such as water developments or fence construction). This alternative proposes current livestock management strategies. Alternative 1 would include the “Elements Common to all Grazing Alternatives within the Planning Area”, described later. Implementation of the allotment management plans that emerge from this analysis would be anticipated to begin in the spring of 2006. Cattle would be the permitted livestock on all allotments.

Table 2. Alternative 1 – Current Management

FS Acres	Season of Use	Permit/Average Number	Maximum AUMs
House Creek Allotment			
3,250	6/1 – 9/30	60	318 AUMs
West Malheur Allotment			
22,310	6/1 – 9/15	225	1040 AUMs
Wolf Mountain Allotment			
31,650	6/2 – 10/12	286	1651 AUMs
Modify grazing practices (e.g., accessibility of riparian areas to livestock, length of grazing season, stocking levels, timing of grazing, etc.) that retard or prevent attainment of Riparian Management Objectives or are likely to adversely affect inland native fish. Suspend grazing if adjusting practices is not effective in meeting Riparian Management Objectives (GM-1).			

Consistency with Forest Plan Standards and Guidelines, as amended

Selection of this alternative may not be consistent with the Forest Plan, as amended (36 CFR 219.10(c) within the life of this environmental assessment (about 5 years). Through the use of adaptive management and administrative changes that deal with areas of concern discussed in Chapters 1 and 3 this alternative is expected to move towards meeting INFISH and other Forest direction and have an improving cumulative trend over

the next 15-20 years, but would not reach riparian management objectives for at least 50 years.

Adaptive management and administrative changes would modify grazing practices (e.g., accessibility of riparian areas to livestock, length of grazing season, stocking levels, timing of grazing, etc.) that retard or prevent attainment of Riparian Management Objectives or are likely to adversely affect inland native fish. Grazing would be suspended if adjusting practices is not effective in meeting Riparian Management Objectives (GM-1).

Alternative 2 – Proposed Action

Purpose and Design

The purpose of this alternative is to provide continued grazing while assuring that livestock management is consistent with the Malheur National Forest Plan and/or moves toward meeting aquatic and other resource Forest Plan standards, as amended, including INFISH Riparian Management Objectives (RMO) at a near natural rate of recovery. As in Alternative 1, areas of concern would be dealt with through adaptive management and administrative changes; however, Alternative 2 also utilizes physical changes (such as water developments or fence construction) to improve allotment management.

The Proposed Action is designed to achieve the near natural rate of recovery which would be similar to the rate of recovery that would occur without livestock grazing. The near natural rate of recovery is intended to not have carryover effects from one year to the next. However, due to the nature of grazing and complexities and uncertainties of having livestock move throughout an allotment, some effects would occur, which would be allowable under INFISH. The Malheur National Forest Riparian Monitoring Strategy (Appendix B) provides a starting point for acceptable level of effects or condition thresholds (endpoint indicators). The intent of INFISH is that no negative cumulative effects that would retard attainment of riparian management objectives (RMOs) would occur as a result of the project. The Proposed Action would have an improving cumulative trend over the life of the EA.

The Proposed Action uses adaptive management to help achieve INFISH and other Forest direction and provides the same AUMs as Alternative 1. The primary difference between the action alternatives is that the Proposed Action Alternative provides management tools in the form of new improvements and other specific actions to increase management flexibility and achieve better distribution of livestock. Generally, less intensive management (by both the permittees and Forest Service) would be required to meet INFISH and Forest direction with the use of these tools.

Description of Specific Features

The District Ranger of the Emigrant Creek Ranger District, Malheur National Forest proposes to continue authorized domestic livestock grazing on the House Creek, West Malheur and Wolf Mountain Allotments. Alternative 2 would include the “Elements Common to all Grazing Alternatives within the Planning Area,” described below, plus additional proposed actions specific to this alternative. Implementation of the allotment management plans that emerge from this analysis would be anticipated to begin in the spring of 2006.

The following tables list specific proposed actions by allotment. Cattle would be the permitted livestock on all allotments. Maps showing the proposed changes are located in the map section at the end of this chapter.

House Creek Allotment

FS Acres	Potential Season of Use	Permit/Average Number	Maximum AUMs
3,250	5/15 – 9/30	60	318 AUMs
- Allotment utilization for forage would not exceed 45% except where otherwise noted. - Regenerate aspen stands in Bridge Creek, 17 road, House Creek and CHE springs drainages by conifer removal, prescribed burning and protection by fencing¹ and excluding livestock grazing. - Fence² in spring (about 1-2 acres) on category 2 portion of House Creek and exclude grazing. - Utilization would not exceed 35% in two riparian pastures. - Stabilize existing head cut with rocks, wood and filter cloth. - Construct a drift fence³ in the south pasture. See map #1.			

¹ Materials and labor to construct the aspen exclosures would be provided by the Forest Service. Maintenance of these exclosures would be the responsibility of the Forest Service.

² Materials and labor to construct the spring exclosure would be provided by the Forest Service. Maintenance of this exclosure would be the responsibility of the Forest Service.

³ Materials to construct the drift fence would be provided by the Forest Service. Labor to construct and maintenance of this fence would be the responsibility of the Permittee.

West Malheur Allotment

FS Acres	Potential Season of Use	Permit/Average Number	Maximum AUMs
22,310	5/1 – 9/30	225	1040 AUMs
- Allotment utilization for forage would not exceed 45% except where otherwise noted. - Reroute pasture boundary fence³ between Pierpont and Cougar pastures. - Reduce the size³ of Squaw Springs Cow Camp pasture. - Shift part of livestock grazing allocation from Rock Springs to Pierpont pasture to reduce impacts to upland shrubs. - Regenerate aspen stands in Squaw Creek, Van Gulch and Magpie Creek drainages by conifer removal, prescribed burning and protect by fencing¹ and excluding livestock grazing. - Prescribe burn Cougar Flat² and rest from livestock grazing for 1 year prior to the burn and for up to 2 growing seasons after the burn. - Utilization would not exceed a 6-inch stubble height in the floodplains of identified <i>Botrychium</i> habitat in Pierpont pasture. - Fell timber⁴ around Dead Horse Spring to create “jackstraw” barrier to livestock to protect <i>Botrychium</i> habitat. - Enclose⁵ and stabilize headcuts on Squaw Creek, East Fork Wolf Creek and Van Gulch and exclude livestock grazing. - Install rock structures and/or LWD placement in Squaw Creek, East Fork Wolf Creek and Van Gulch. See map #2.			

¹ Materials and labor to construct the aspen exclosures would be provided by the Forest Service. Maintenance of these exclosures would be the responsibility of the Forest Service.

² The Forest Service would conduct all prescribed burning activities either internally or through contract.

³ Materials to construct the fence would be provided by the Forest Service. Labor to construct and maintenance of this fence would be the responsibility of the Permittee.

⁴ The Forest Service would conduct all timber felling activities either internally or through contract.

⁵ Materials and labor to construct the fences as well as maintenance would be provided by the Forest Service.

Wolf Mountain Allotment

FS Acres	Potential Season of Use	Permit/Average Number	Maximum AUMs
31,650	5/1 – 10/12	286	1651 AUMs
- Allotment utilization for forage would not exceed 45% except where otherwise noted. - Enlarge Beaverdam Meadow pasture² to include a headcut area and use only as a gathering pasture (overnight use only). - Fence³ existing population of <i>Botrychium crenulatum</i> and exclude from livestock grazing. - Regenerate aspen stands in West Fork Bridge Creek, Beaverdam Creek, Dry Gulch and Schurtz Creek drainages by conifer removal, prescribed burning and protect by fencing¹ and excluding livestock grazing. - Fell timber⁴ along main-stem of Bridge Creek to create “jackstraw” barrier to livestock trailing. - Utilization would not exceed a 6 inch stubble height in the floodplain of identified <i>Botrychium</i> habitat in Antelope and Wolf Creek pastures. - Plant⁴ and protect willows in Beaverdam Creek in Beaverdam Meadow Pasture. - Stabilize headcuts⁴ on Beaverdam Creek and Bridge Creek with rocks, wood or filter cloth. - Install rock structures⁴ and LWD placement⁴ in Beaverdam Creek and Bridge Creek. - Decommission⁴ Forest Road 1619805 See map #3.			

¹¹ Materials and labor to construct the aspen exclosures would be provided by the Forest Service. Maintenance of these exclosures would be the responsibility of the Forest Service.

² Materials and labor to construct the fence would be provided by the Forest Service. Maintenance of this fence would be the responsibility of the Permittee.

³ Materials and labor to construct the fence as well as maintenance would be provided by the Forest Service.

⁴ The Forest Service would conduct all activities either internally or through contract.

Consistency with Forest Plan Standards and Guidelines, as amended

No Forest Plan amendments would be required to implement this alternative. Selection of this alternative would be consistent with the Forest Plan, as amended (36 CFR 219.10(c), through the use of adaptive management and administrative changes that deal with areas of concern discussed in Chapters 1 and 3. Adaptive management and administrative changes would modify grazing practices (e.g., accessibility of riparian areas to livestock, length of grazing season, stocking levels, timing of grazing, etc.) that retard or prevent attainment of Riparian Management Objectives or are likely to adversely affect inland native fish. Suspend grazing if adjusting practices is not effective in meeting Riparian Management Objectives (GM-1).

Elements Common to all Grazing Alternatives within the Planning Area

This section displays assumptions, background information, and design elements common to the grazing alternatives, Alternatives 1 and 2. The IDT assumed that, if the following elements are followed, then effects from livestock use will be acceptable.

- **Forest Plan Standards and Guidelines as Amended by INFISH Would be Met or Moving Towards**

Rangeland management strategies and methods that are based on range and other resource science are incorporated into the Allotment Management specific to each allotment/pasture and are commensurate with resource needs. The objectives behind these strategies is to manage rangeland and riparian resource conditions to meet or move toward attainment of desired conditions through an ongoing monitoring and adjustment process (adaptive management). They also specifically define the monitoring and protocols (IIT 2004). Monitoring includes identification of designated monitoring areas (DMA) on sensitive stream reaches (in terms of fish habitat) and establishment of site specific, appropriate thresholds and end-point indicators (including values for residual stubble height, bank alteration, or shrub utilization or shrub architecture). Thresholds and end-point indicators may change during the life of this EA based on adjustments made in response to monitoring results, timing, or climatic conditions. For riparian resources, recovery to desired conditions must occur at a near natural rate – INFISH implies that if appropriate end-point indicators are not exceeded and Standards and Guidelines for forage and browse utilization are not exceeded, then effects from livestock use will be acceptable and limited to those that do not carry through to the next year, thereby avoiding cumulative negative effects, carryover effects of grazing will be minimized so that “near natural” rates of riparian recovery can occur (PACFISH Enclosure B).

The DMAs represent use in the most sensitive portion of the pasture, and generally when standards are met at the DMA, standards will be met elsewhere in that pasture (IIT 2004). To provide monitoring results representative of grazing use, small areas where livestock use is affected by range developments (such as water gaps or areas directly next to fences) or where human use would be expected to be high (such as camp sites) would not be chosen for DMAs.

Annual Operating Instructions (AOI) give an approximate schedule for rotation and duration of time in pastures. Actual move dates depend on meeting triggers and end-point indicators. Necessary changes to livestock management (including move dates) will be made through permit administration to ensure thresholds are not exceeded. Management strategies and methods are subject to change in response to various resource conditions, climate, and natural events such as debris torrents or floods.

The Malheur National Forest Draft Range Monitoring Guidelines (June 2005) (Appendix A), the Malheur National Forest Riparian Monitoring (Condition and Trend) Strategy (2005) (Appendix B), and/or the monitoring protocol developed by the Interagency Implementation Team (IIT), as amended in 2004 (IIT 2004), may be used to determine if grazing is meeting or moving towards desired conditions. Based on these monitoring results, the Forest Service may adjust grazing management using a variety of management tools to adjust timing, intensity, duration, and season of use. Methods may be used singly or in combination with each other. These methods could include (but is not limited to):

- o Changing livestock numbers;
- o Changing the time livestock are in a pasture (length of use);
- o Changing the time of year a pasture is used (season of use);

- o Riding/herding/salting (i.e. more intensive management);
- o Fencing areas to limit access and use (fences may be permanent or temporary);
- o Temporarily curtailing/suspending use (resting pastures); and/or
- o Cancellation of grazing permits in whole or part.

- **Grazing Would be Based on AUMs; Permits Would be Based on Average Animal Use and Cow/Calf Pairs**

Alternatives 1 and 2 establish a maximum number of Animal Unit Months (AUM) which allows for a range of permitted animal numbers and season of use for each allotment. AUMs allow flexibility for annual adjustment of both numbers and/or season within the permitted use level. AUMs listed above in Alternatives 1 and 2 tables by allotment are the maximum number that will be permitted in the allotment-number of animals and season of use would be adjusted so as not to exceed the total AUMs. The tables in Alternatives 1 and 2 identify the permit livestock numbers (an average number of livestock) and the average season of use which includes the earliest possible “on” dates related to range readiness and the latest dates that livestock are permitted to be on the allotment. The actual livestock numbers and period of use may be adjusted in response to discussions with resource specialists and in response to resource needs and range readiness (the number of livestock using the allotment may be increased while reducing the season of use, or may increase the season of use while reducing the number of livestock). For example, running livestock for the full season would require the permittee to reduce the number of livestock (below permitted number) to meet allowed AUMs. Flexibility that allows for annual adjustments provides a management tool to assure that riparian and rangeland objectives are met. Under the adaptive management process, animal numbers and season of use may be adjusted annually to protect resources, to meet objectives, or meet permittee operational needs. Changes to numbers and season of use would be displayed in the Annual Operating Instructions.

The permits will display the “average” number of livestock for the “average” season of use (Grazing Permit Administration Handbook 2209.13, Section 15.13; these dates and numbers may vary year by year in Allotment Operating Instructions, but when combined, will be equal to or less than the permitted AUMs). This EA would permit cow/calf pairs, but the responsible official may decide to allow other classes of livestock on any or all the allotments.

- **Endangered Species Act Consultation Requirements Would be Followed**

All grazing alternatives would implement actions required by the Section 7 ESA consultation process, when applicable. Changes in livestock management to meet Terms and Conditions of Biological Opinions (for fish, wildlife, or plant species) could occur. Continued implementation of such actions that are or could become required through the ESA consultation process would be followed.

- **Allotment Facilities are Maintained**

Permittees are required to perform all annual maintenance of range improvements (i.e. fences and water developments) assigned in permits. All fences would be functional before animals are turned out into the pasture to be used. Range improvements would be reconstructed as the need arises (i.e. end of life span).

- **Appropriate Administrative Actions Would Occur**

Appropriate administrative actions will be taken when the permittee's management is not in compliance with the Annual Operating Instructions (AOI). Consequences would occur as described in Forest Service Handbook (FSH) 2209.13 Sec. 16.21. Under the Terms and Conditions of the Forest Service Term Grazing Permit (Part 2, number 8(b)) the Forest Officer in charge may modify the permitted number to protect resources. This is consistent with Forest Service Manual (FSM).

- **Current Management Activities Unrelated to Livestock Management Would Continue**

Current management activities taking place in the area that are unrelated to livestock management would continue if any alternative were selected. Activities including motorized access travel management, road maintenance, recreation, noxious weed management, fire protection, and other management actions would still occur in the Planning Area (Appendix C, Cumulative Effects). However, resumption of livestock grazing after prescribed burning or wildfire would be subject to the Forest's post burn grazing guidelines (USDA Forest Service 2003-Appendix D).

- **Noxious weed strategy**

The prevention of the spread or invasion of noxious weeds is an objective common to all alternatives. No treatments of weeds are proposed within this EA, but the prevention strategy in the mitigation section is incorporated into Alternatives 1 and 2.

- **Heritage Resources**

Archeological and Historic sites that are determined to be negatively impacted by grazing activities would be protected through mitigation developed in consultation with the Oregon State Historic Preservation Office.

Alternative 3 – No Grazing

Purpose and Design

Alternative 3 represents the ‘no grazing’ alternative. Under this alternative, all Term Grazing Permits would be cancelled. No permits would be issued for the three affected allotments until and unless a subsequent NEPA decision to re-authorize grazing on any or all of the allotments is made. The purpose of the no grazing alternative is to describe the effects of cancellation of grazing permits.

Other management activities taking place in the area would continue if Alternative 1 were selected, but no livestock management activities would take place. Activities such as motorized access travel management, road maintenance, dispersed recreation, noxious weed management, and fire protection would be allowed to continue as the currently take place in the Planning Area.

Description of Specific Features

In all three allotments, Permittees would be given two years written advance notice of the cancellation of their permits as provided under 36 CFR 222.4(a)(1).

All range developments currently in existence on the allotments (such as fences and water developments) would be left in place but not maintained. If removal or maintenance of any developments for other resource needs is desired, a subsequent decision would need to be made regarding those developments. Permittees would be reimbursed for their depreciated share of cooperative range improvements where they participated in the development (FSH 1109.13 Chapter 70).

Allotment exterior boundary fences would be assigned to any adjacent permittees for continued maintenance. Private land boundary fences would remain intact with maintenance shifting to the private landowner.

Consistency with Forest Plan Standards and Guidelines, as amended

No Forest Plan amendments would be required to implement this alternative. Selection of this alternative would be consistent with the Forest Plan, as amended (36 CFR 219.10(c)).

Management Requirements, Constraints, and Mitigation Measures

In response to public comments on the proposal, mitigation measures were developed to ease some of the potential impacts the alternatives may cause. The Forest Service developed the following additional mitigation measures to be used as part of the action alternatives. Throughout the project, all applicable Watershed Management, and Vegetative Management Best Management Practices (BMPs) (General Water Quality Best Management Practices, Pacific Northwest Region 1988) will be used to enable the achievement of water quality standards:

- RM-1: Range Analysis, Allotment Management Plan, Grazing Permit System, and Permittee Operating Plan
- RM-2: Controlling Livestock Numbers and Season of Use
- RM-3: Controlling Livestock Distribution Within Allotments

- RM-4: Rangeland Improvements

Headings in the tables indicate which alternatives a mitigation measure relates to. Unless noted otherwise in the decision document, these management requirements, constraints, and mitigation measures are mandatory if the Responsible Official selects an action alternative for implementation.

Range

Management Requirement/Mitigation Measure	Objective	Responsible Person
Alternative 2		
New water developments would be constructed by digging a hole approximately 2-6 feet deep, which would allow for the placement of a springbox for water collection. A buried pipe would extend to a water trough, preferably equipped with a limiter switch to conserve water. Water troughs would be placed well away from the spring source to protect the headworks from possible trampling. If the spring rests in a wet area, an enclosure would be constructed to provide additional protection to the spring source. All headworks and spring sources would be protected by fencing.	To maintain and improve spring conditions.	Range Management Specialist

Silviculture

Management Requirement/Mitigation Measure	Objective	Responsible Person
Alternatives 1 & 2		
Place salt blocks outside of conifer or aspen plantations where the trees are less than 6' high.	To avoid damaging regeneration.	Range Management Specialist and Silviculturist

Watershed

Management Requirement/Mitigation Measure	Objective	Responsible Person
Alternative 2		
For fence construction along riparian areas, no repeated use (going back and forth over the same path) of ATVs or other motorized vehicles would occur within riparian areas.	To avoid damaging soil and riparian conditions	Range Management Specialist, Hydrologist, or Fish Biologist

Fisheries

Management Requirement/Mitigation Measure	Objective	Responsible Person
Alternatives 1 & 2		
Place salt blocks outside of RHCAs.	Reduce impacts to riparian areas	Range Management Specialist
Alternative 2		
Emphasize placing new water gaps in portions of channels where fine spawning gravels are not present	Eliminate damage to redds	Range Management Specialist
Construction of rock structures, addition of large woody debris and head cut stabilization would be performed during the instream work period with hand equipment.	Stabilize streambanks and reconnect the flood plain with the stream channel.	Fisheries Biologist and Hydrologist

Terrestrial Wildlife

Management Requirement/Mitigation Measure	Objective	Responsible Person
Alternatives 1 & 2		
Known raptor nests and new raptor nests discovered in or immediately adjacent to the Planning Area will have nest protection and disturbance standards adhered to during fence/water development construction and reconstruction. To conduct these activities during a prohibited date a waiver must be obtained from the District Biologist.	Protect raptor nests from alteration and disturbance	Range Specialist, District Wildlife Biologist
Riparian shrub standards (related to livestock grazing) would also apply to hardwood tree species of black cottonwood and quaking aspen.	Improve this “featured” habitat	Range Specialist
Aspen restoration by thinning and burning would be accomplished by hand methods.	Restore aspen	District Wildlife Biologist
All livestock water troughs would have wildlife escape ramps permanently installed.	Reduce drowning impacts to birds, small mammals and bats.	Range Specialist

Fuels

Management Requirement/Mitigation Measure	Objective	Responsible Person
Alternative 2		
Prescribed burning of Cougar Flat and aspen stands would occur during the spring or fall burning window by hand methods and/or ATVs.	Restore vegetation to an early seral stage. Stimulate aspen regeneration.	Fuels Specialist

Heritage

Management Requirement/Mitigation Measure	Objective	Responsible Person
Alternatives 1 & 2		
If site inspection indicates a need for mitigation measures at any archaeological or historic sites these would be developed in consultation with the Oregon State Historic Preservation Office and would be tailored to the specific conditions at each site. Past experience demonstrates that one or more of the following mitigation measures will normally suffice: -The erection of permanent or temporary fence around site perimeters -Altering livestock on/off dates within the allotment in order to lessen disturbance at sites with subsurface components located in areas vulnerable during wet or moist seasons -Data recovery for small lithic scatters with no subsurface component -Streambank stabilization in riparian areas where erosion is threatening a site -Providing alternative water sources for livestock in cases where troughs or stock ponds are within site perimeters. Other mitigation measures may be considered.	Protect NRHP eligible and potentially eligible sites from significant grazing related impacts	District Archaeologist, Range Specialist
Any newly discovered sites located during new survey will be evaluated for NRHP eligibility and submitted to SHPO for concurrence, along with all potential mitigation recommendations (for examples, see above).	Protect NRHP eligible and potentially eligible sites from significant grazing related impacts	District Archaeologist, Range Specialist
Salt blocks would not be located on archeological and historic sites.	Protect NRHP eligible and potentially eligible sites from significant grazing related impacts	District Archaeologist, Range Specialist
Alternative 2		
For proposed range improvement projects, clearances under Section 106 of the National Historic Preservation Act would be completed and concurred with as needed by the Oregon State Historic Preservation Office before the projects are implemented.	Protect NRHP eligible and potentially eligible sites from significant grazing related impacts	District Archaeologist, Range Specialist

Noxious Weeds

Executive Order 13112 requires Federal agency whose actions may affect the status of invasive species to identify those actions and within budgetary limits, “(i) prevent the introduction of invasive species; (ii) detect and respond rapidly to and control populations of such species...(iii) monitor invasive species populations...(iv) provide for restoration of native species and habitat conditions in ecosystems that have been invaded;...(vi) promote public education on invasive species...and (3) not authorize, fund, or carry out actions that it believes are likely to cause or promote the introduction or spread of invasive species...unless, pursuant to guidelines that it has pre-scribed, the agency has determined and made public...that the benefits of such actions clearly outweigh the potential harm caused by invasive species; and that all feasible and prudent measures to minimize risk of harm will be taken in conjunction with the actions.”

The following management requirements and mitigation measures meet the intent of Executive Order 13112.

Management Requirement/Mitigation Measure	Objective	Responsible Person
Alternatives 1 & 2		
Permittees would be provided with a current list of noxious weeds identification material. A map showing known noxious weed infestations sites within each allotment would be reviewed at each annual operating meeting. Permittees would be asked to add known noxious weed locations not shown on the map.	To reduce the risk of spreading noxious weeds	Range Specialist
All equipment used to construct, reconstruct, or maintain water developments and fences would be cleaned in a manner sufficient to prevent noxious weeds from being carried onto the Planning Area. This requirement does not apply to passenger vehicles or other equipment used exclusively on roads. Cleaning will occur off of National Forest System lands. Cleaned equipment would be inspected and approved by the Forest Officer in charge of administering the project prior to the equipment being moved into the project area.	To reduce the risk of introducing noxious weeds	Range Specialist, District Botanist
Any seed used in the construction, reconstruction, or maintenance of water developments or in restoration projects will be certified weed free.	To reduce the risk of introducing noxious weeds	Range Specialist, District Botanist

Monitoring Plans

Resource monitoring would be implemented with the action alternatives. The objectives are to determine if management activities are moving resources towards desired conditions. In addition to any monitoring requirements that may apply from the Malheur National Forest Monitoring Plan, monitoring activities would include the following:

Noxious Weed Monitoring

Noxious weeds would be monitored for changes in populations. (Range Specialist)

Aspen Treatment Monitoring

Aspen stand treatment and protection measures would be monitored for effectiveness. When aspen protection measures are deemed no longer needed (aspen shoots are at least 8 feet high), they would be removed. (Wildlife Biologist and Silviculturist)

Sensitive Plant Monitoring

The known sensitive plant site would be monitored for changes in populations and effectiveness of excluding from livestock grazing. The areas identified as potential sensitive plant habitat would be monitored for sensitive plants and effectiveness of requiring at least a 6-inch stubble height on the floodplains. (Botanist)

Aquatic/Hydrology Monitoring

Stream temperatures (303 (d)), sediment/substrate, LWD, pools, bank stability, lower bank angle, width/depth ratio, PFC survey and fish survey monitoring would continue at established sites. Headcut treatments would be monitored for effectiveness. (Fish Biologist and/or Hydrologist)

Heritage Resource Monitoring

Monitor sites that have exhibited evidence of grazing impacts after the implementation of appropriate mitigation measures (as discussed in Chapter 2 under Management Requirements, Constraints, and Mitigation Measures-Heritage) on a regular basis to be determined in consultation with Oregon SHPO. This monitoring will evaluate the effectiveness of implemented mitigations. (Archeologist)

Monitor other NRHP sites or potentially eligible sites in areas of frequent, heavy cattle congregation in order to determine if mitigation measures need to be implemented. (Archeologist)

Range Resource Monitoring

A combination of 1) The Malheur National Forest Draft Range Monitoring Guidelines (June 2005) (Appendix A), 2) The Malheur National Forest Riparian Monitoring (Condition and Trend) Strategy (2005) (Appendix B), and 3) the monitoring protocol developed by the Interagency Implementation Team (IIT), as amended in 2004 (IIT 2004), would be used to determine if grazing is allowing movement towards desired conditions and Forest Plan Standards, as amended. Based on these monitoring results, the

Forest Service may adjust grazing management using a variety of management tools to adjust timing, intensity, duration, and season of use. Methods may be used singly or in combination with each other. These methods could include (but is not limited to):

- Changing livestock numbers;
- Changing the time livestock are in a pasture (length of use);
- Changing the time of year a pasture is used (season of use);
- Riding/herding/salting (i.e. more intensive management);
- Fencing areas to limit access and use (fences may be permanent or temporary);
- Temporarily curtailing/suspending use (resting pastures); and/or
- Cancellation of grazing permits in whole or part.

(Range Specialist, Botanist, Wildlife Biologist, Fish Biologist and/or Hydrologist)

Comparison of Alternatives

This section provides a summary of the effects of implementing each alternative. Information in the table is focused on activities and effects where different levels of effects or outputs can be distinguished quantitatively or qualitatively among alternatives.

Table 3. Alternative Comparison

Issue	Allotment	Unit of Measure	Alt. 1 Current Management	Alt. 2 Proposed Action	Alt. 3 No Grazing
ISSUE 1 Water Quality/Fish and Aquatic Habitat	Estimated Years to Reach RMO's				
	All Allotments	Years	50+	30-40	15-20
	Number of Headcuts Stabilized				
	House Creek	Total #	0	1	0
	West Malheur	Total #	0	4	0
	Wolf Mountain	Total #	0	2	0
	Number of Streams Improved by Adding Rock Structures and LWD				
	House Creek	Total #	0	0	0
	West Malheur	Total #	0	3	0
	Wolf Mountain	Total #	0	2	0
	Number of Streams Improved by Road Decommissioning				
	House Creek	Total #	0	0	0
	West Malheur	Total #	0	0	0
	Wolf Mountain	Total #	0	1	0
ISSUE 2 Upland and Riparian Vegetation	Number of Drainages Where Aspen Stands are Treated and Protected				
	House Creek	Total #	0	4	0
	West Malheur	Total #	0	3	0
	Wolf Mountain	Total #	0	4	0
	Number of Drainages Where Willow are Planted and Protected				
	House Creek	Total #	0	0	0
	West Malheur	Total #	0	0	0
	Wolf Mountain	Total #	0	1	0
	Botrychium Habitat Protected				
	All Allotments		No	Yes	No
	Acres of Prescribed Burning				
	All Allotments	Acres	0	60	0

Table 3 continued. Alternative Comparison

Issue	Allotment	Unit of Measure	Alt. 1 Current Management	Alt. 2 Proposed Action	Alt. 3 No Grazing
ISSUE 3 Social/Economic	Permitted Numbers				
	House Creek	AUMs	318	318	0
	West Malheur	AUMs	1040	1040	0
	Wolf Mountain	AUMs	1651	1651	0
	Operational Costs to Permittees				
	All Allotments	Effect	0	-	--
	Operational Costs to Forest Service				
	All Allotments	Effect	0	0	+
	Implementation Costs to Permittees				
	All Allotments	Effect	0	-	--
	Implementation Costs to Forest Service				
	All Allotments	Effect	0	-	+

The table uses 0 as the baseline, - (minus) to reflect a decrease or negative impact, -- (double minus) to reflect a greater decrease, and +(plus) to reflect an increase or positive impact to the permittee and Forest Service.

Implementation Schedule

Depending on which alternative is selected by the Responsible Official, activities included in the decision would occur in approximately the following timescale.

Table 4. Implementation Schedule

Activity	2006	2007	2008	2009	2010
Complete AMP for each Allotment	X				
Pasture/Allotment Fence Reconstruction (West Malheur and Wolf Mountain)	X	X			
Spring Protection (House Creek)	X	X			
Aspen Restoration/Protection (All Allotments)	X	X	X	X	X
Headcut Stabilization (House, West Malheur, and Wolf Mountain)	X				
Drift Fence Construction (House)		X			
Prescribe Burn Cougar Flat (West Malheur)			X	X	
Fell Timber for Jackstraw Barrier (West Malheur and Wolf Mountain)	X	X			
Install Rock structures (West Malheur and Wolf Mountain)	X	X	X	X	X
<i>Botrychium</i> Protection (West Malheur and Wolf Mountain)	X	X	X		
Plant and Protect Willows (Wolf Mountain)		X	X		

CHAPTER 3 - ENVIRONMENTAL CONSEQUENCES

This chapter summarizes the physical, biological, social and economic environments of the affected project area and the potential changes to those environments due to implementation of the alternatives. It also presents the scientific and analytical basis for comparison of alternatives presented in Chapter 2.

This analysis is organized by resource area. Within each section, the affected environment is described first, followed by the effects of the No Grazing Alternative and the two grazing alternatives. Past, present, and reasonably foreseeable future activities were analyzed, along with proposed activities, to determine cumulative effects. This was done in a manner consistent with CEQ guidance contained in a June 24, 2005 Memorandum. Specifically, that cumulative effects analysis consider relevant past actions to the extent needed to determine if the effects from the proposed alternatives would add to, modify, or mitigate the currently existing effects from such past actions. Relevant past, present, and reasonably foreseeable future activities are displayed in Appendix C.

Specialist Reports

This EA hereby incorporates by reference the Forest Vegetation, Wildlife, Soil, Water, Fisheries, Range, Botany, Heritage, and Socio-Economics Specialist Reports in the Project Record (40 CFR 1502.21). These Specialist Reports are located in the Project Record and contain the detailed data, methodologies, analyses, conclusions, maps, references, and technical documentation that the resource specialist relied upon to reach the conclusions in this EA.

Forested Vegetation/Condition

The current conditions are the result of past fire suppression policies, grazing practices, past harvesting practices, past fuel practices, and past road building practices. Borman (2005) states that dense ponderosa pine forests and less-than-desirable forest conditions of today originated primarily in the early 1900s, with the convergence of factors that no longer apply. Those factors include (1) especially favorable climate years for tree reproduction; (2) exceptionally heavy, unregulated, unmanaged grazing by very large numbers of horses, cattle, and sheep during the late nineteenth and early twentieth centuries in most of the West; and (3) substantially reduced return intervals for low-intensity ground fires that served to thin dense stands of younger trees. These factors are no longer occurring in the project area. Today, livestock grazing is regulated and monitored, and fire is being reintroduced to thin dense stands of younger trees.

Regardless of the type of forested stands, most are generally overstocked. Most of the area has been partially harvested sometime in the last 50 years, refer to Appendix C for more information on past harvesting. Most of this harvesting was in the form of salvaging, sanitation, regeneration cutting or high-grading. There is still a large old growth component in many of these stands, which is generally declining. Many of these stands are susceptible to disease and insects.

Dry Upland Forest PVG

The Dry Upland Forest PVG has been further subdivided into Hot Dry, Hot Moist, and Warm Dry Plant Association Groups (PAG). There is no Hot Moist PAG in the planning area.

In these forested stands there are a variety of understory shrubs, forbs and grasses that grow in conjunction with trees. With increased stocking of trees there has been a decrease in the stocking of shrubs, forbs, and grasses in these stands, and also a decrease in the plant species diversity with a corresponding decrease or change in the wildlife species that used the area. With the invasion of trees into non-forested areas there has been a decrease in the total number and the diversity of plant species that inhabited the former non-forested site. Finally with increased diversity and stocking of trees (stands that were once dominated by ponderosa pine that have now converted to mix conifer stands) there has been a decreased diversity and total number of plants and animals that use these stands.

Hot Dry PAG

This association is composed of three types of stands: 1) ponderosa pine and juniper, 2) predominantly even aged ponderosa pine stands, and 3) two storied stands. The predominant tree species in this group is ponderosa pine with less amounts of juniper. Occasionally Douglas-fir may be growing in some stands but are small inclusions of other plant associations. These PAGs are commonly intermixed with the Non-forested PVGs.

Most of the stands in this PAG are heavily overstocked and growth has declined in recent years making them susceptible to mountain pine beetle, and western pine beetle. There are scattered pockets of annosus and black stain root disease.

Warm Dry PAG

In this PAG although ponderosa pine historically was the dominant tree species in this potential vegetation group, Douglas-fir or white fir are the climax species. Dominance of ponderosa pine was historically maintained by periodic fire. Survival of the seedlings was low because of the frequent fire interval which usually killed most of the seedlings.

Lodgepole pine probably occurred quite frequently as well as stands of both pure lodgepole pine and stands where lodgepole grew in conjunction with ponderosa pine and Western larch. White fir and Douglas-fir occurred throughout this planning area but was generally maintained by fire on the cooler northern and eastern aspects. Western larch has decreased in frequency and distribution from historical conditions.

Juniper historically occurred mainly on rocky ridges, scab flats, and southern aspects. Juniper is now more common throughout the watershed, including riparian areas. Lack of periodic fire has enabled the invasion of juniper into mix conifer stands.

With the advent of fire suppression, and past timber harvesting practices, the composition of these stands have radically changed and moved towards climax species. The stocking has increased two to four fold (basal area) and up to 10 times (trees per acre). These changes in composition and stocking have changed the continuity, arrangement and loading of fuels, which has resulted in changing the fire regime of this area. With this increased density and increased shading the composition and abundance of shrubs, forbs, and grasses have decreased

Aspen within the Warm Dry PAG

Quaking aspen (*Populus tremuloides*) was once quite common and occurred generally in the riparian areas as unevenly stringer stands in riparian areas. Aspen occurs mainly as clumps or small stringer stands and has decreased in frequency. Cadastral surveys conducted in the mid-1800's recorded "jungles of aspen" in some meadows on the Malheur National Forest. The present aspen stands are the remnants of these much larger stands and were the young regeneration that was present when this fire suppression began.

Today, most aspen stands found within the watershed are small and appear as a few old decadent stems with little or no viable regeneration. This has occurred because they are being overgrown by conifers; disturbances that could regenerate the clones are lacking; ungulates browse the few new sprouts that do occur, and lowered water tables from stream down-cutting. Without protection from ungulates, aspen sprouts often are prevented from maturing by browsing.

In most cases, succession of these aspen stands to conifers has led to diminished patch size, loss of vertical structural diversity, and loss of this species from most riparian corridors. The lack of stand regeneration has resulted in a decline of aspen acreage in the planning area and the competitive capabilities of aspen to regenerate and maintain vigor.

Aspen can produce viable seed but usually regenerate vegetatively through root suckers (adventitious shoots that sprout from the shallow lateral roots of the parent tree if apical dominance does not inhibit suckering). This process is accelerated when the parent tree is stressed or killed. The result is a clump (clone) of trees identical in genetic

composition, which can cover many acres under the right conditions. Although the physiological age of individual mature trees varies from 60 to 120+ years, the clone itself may be hundred or thousands of years old. Research suggests that some clones in the Great Basin are at least 8,000 years old.

Disturbances such as prescribed fire and vegetation treatments, as well as protection from browsing are necessary to perpetuate aspen. Where aspen stands have been treated, either with fire (natural or prescribed) or by removal of overstory vegetation, and protected to exclude or restrict browsing, regeneration has been successful and vigorous.

The present source of most of the perennial water sources in this area originates in our present aspen stands. This could be due to there being more moisture available and aspen being able to out compete conifers at these sites. Aspen roots also alter the ground water holding capacity by creating a “fibrous sponge” that is more effective in holding soil moisture during early spring and slowly releasing the moisture over a longer period of time through the summer period.

Effects on Forested Vegetation

Direct and Indirect Effects Common to all Alternatives

The direct and indirect effect on forested vegetation is negligible because domestic livestock do not normally consume forested vegetation. Effects to aspen are displayed in the terrestrial wildlife section of this chapter.

Cumulative Effects Common to all Alternatives

Heavy ungulate grazing in the early part of the last century removed competing grasses, allowing conifer seedlings to become established. Coupled with fire suppression activities, which did not allow fire to periodically burn through these stands and kill many of these new seedling have allowed the forest stands to become overstocked (trees per acre), and allowed tolerant species (white fir, and Douglas-fir) to increase in stand composition. With time and growth the basal area now occupied by the forest vegetation is often two to three times the historical basal area on these sites. With this increase in forest vegetation, the understory grazing and browsing plants have decreased. Also this forest vegetation colonized former nonforested vegetation lands. In the last half of the past century, there was numerous timber harvesting activities in this area. Appendix C describes this past harvesting by allotment. This harvesting has generally removed many of the fire resistance ponderosa pines from most of the area. In addition there have been numerous clear cutting of forest stands. This clear cutting has increased the number of grasses, forbs, and shrubs. Over time (approximately 10 to 20 years) as the clear cuts are re-vegetated and trees begin to fully occupy the site, there will be a decrease in the amount of grasses, forbs and shrubs.

In the future it is foreseeable that there could be other timber sales that could affect the forested vegetation in this area. At this time, future clear cutting is unlikely. Commercial and pre-commercial thinning (like the proposed Van Vegetation Management Project) of overstocked stands to reduce stocking levels and move stand compositions toward early seral species is highly likely. With this thinning there should be an increase in ground

vegetation beginning the next growing season and increasing for 3 to 5 years. This increase should then peak and hold steady for 10 to 20 years, before beginning a gradual decrease over time as the residual trees from the last treatment increase in size and begin to use the available moisture and light. The amount of increase in ground vegetation and the length of time of the release of this ground vegetation are directly proportional to the degree of harvest that occurs. The greater the decrease in density of the forest vegetation, the greater will be the increase in ground vegetation and the greater the length of time before the residual trees once again cause a decrease in ground vegetation.

Vegetation and Rangeland Resources

The vegetation pattern in this area varies from forested stands composed of ponderosa pine, Douglas-fir, white fir, lodgepole pine, western larch, aspen, and juniper to non-forested areas of grass, forbs, brush, and scattered ponderosa pine and/or juniper.

The principal human impacts have been to alter the natural succession of this area through past management practices in fire suppression, grazing, timber harvesting, fuel management, and road building.

This planning area was historically maintained by fire, either caused by lightning or by the Native Americans (Corman 1911; Colville 1898) or insects (Evans 1912, Keen 1950). Although different researchers give different fire frequencies they are very close for this type of site. Fire frequency probably varied from a 3 - 25 year fire cycle on the drier sites (Maruoka and Agee, 1994; Agee and Maruoka, 1994) to a 25 - 150 years fire cycle on the wetter sites (Agee and Maruoka, 1994; Arno, Steve et.al 1991).

With the advent of the European descendent settlers (1860's to 1900's) (Barnes, 1926) grazing of cattle (Erickson, M.L. 1906) and sheep (Langille, 1906; Colville, 1898) began along with fire control (Colville, 1898; Bartrum, 1910). Large amounts of fuels have built up in some areas due to 100+ years of fire suppression. With the lack of fire, late seral tree species began invading areas dominated by early seral tree species, and early seral tree species began invading areas that were formerly non-forested. Stocking levels have greatly increased, in many places up to 10 times historical stocking. Now, fire cannot be easily restored to the ecosystem (Agee, 1993), during the historical burning period (Arno, Steve et.al 1991), without the high risk of a large high intensity wildfire occurring.

Beginning in the 1930's or early 1940's (Guthrie, 1924; Cox, Thomas R. 1993) large amounts of timber began to be harvested. In some areas inadequate slash treatment has also contributed to the buildup of fuel. More importantly the large pine over-story (Bright, 1912) was often harvested with inadequate treatment of the under-story increasing stand conversion, stocking, and drastically changing the stand structure.

These changes in structure, stocking and species composition have in recent years been shown to be unsustainable and are beginning to cause drastic changes in the processes that function in this ecosystem.

Potential Vegetation Groups

Specific plant species tend to be found together in a characteristic set of ecological conditions. The unit of classification based on the probable, or projected, climax plant community type is defined as the "plant association" (USFS R-6 Ecology Glossary committee, 1989) or potential vegetation type (Interior Columbia Basin Supplemental Draft Environmental Impact Statement, 2000) and may be used to describe and classify sets of ecological conditions.

Plant associations and plant community types in this area have been identified using Plant Associations of the Blue and Ochoco Mountains (Johnson and Clausnitzer, 1992) and Plant Communities of the Blue Mountains in Eastern Oregon and Southeastern

Washington (Hall, 1973) and Mid-Montane Wetlands Classification of the Malheur, Umatilla, and Wallowa-Whitman National Forest (Crowe and Clausnitzer, 1997). For purposes of classification and analysis, plant associations may be grouped into areas with like temperature/moisture and fire disturbance regimes called Potential Vegetation Groups (PVG) (Interior Columbia Basin Supplemental Draft Environmental Impact Statement, 2000).

Rangeland Resources

Most of the woodlands PVG are juniper climax plant associations that were historically dominated by a low stocking of either juniper or scattered ponderosa pine with grasses, forbs, and shrubs. The trees in these plant associations were kept at a low stocking in this early seral stage by frequent low intensity fires. Juniper was more prominent on scab flats and rocky ridges where there was not enough vegetation to support fires. With the advent of fire control and grazing, stocking of tree species have increased on these sites and areas that were formerly non-forested have been converted to woodlands (Skovlin and Thomas, 1995). With the increase in juniper there is usually a decrease in other vegetation and an increase in fire interval. Prior to the effective control of fire, juniper levels in the watershed were dominated by seedlings and saplings stages with very few pole and larger sizes, except for small pockets of mature trees or isolated individuals. The mature juniper trees were generally confined to areas not prone to frequent fire, such as rock-dominated areas or isolated individuals. Once established, juniper utilizes the majority of the available soil moisture causing sagebrush and other shrub species to decline. Eventually juniper root systems will utilize nearly all of the available soil moisture such that shrublands can become pure juniper stands and reduce total ground cover leaving bare ground that is susceptible to erosion and the invasion of non-native plant species (Loewen and Schwenke, 2002).

Non-forested PVG sites are composed of plant associations where trees are generally absent. Vegetation on these sites was dominated by a variety of perennial grasses, forbs, and shrubs. Due to past grazing practices, the exclusion of fire, and the invasion of introduced species there has been an increase in annual species and a decrease in perennial species. These areas include wet and moist meadows, dry meadows, and rocky scablands.

The natural fire regime is one of frequent (5-25) low intensity fires except for the scab flats and rocky ridges where large old growth juniper was predominantly located. Most historical perennial species were adapted to these fire regimes. Some introduced annual species such as cheatgrass are also well adapted to fires. Cheatgrass (*Bromus tectorum*) is present in scattered patches across all three allotments but at this time is not considered a significant problem. Depending upon the frequency and timing of burning these species could either be favored or selected against.

Starting approximately 130 years there has been a dramatic decrease in riparian vegetation shrub species (alder, willow, dogwood, maple, etc) over historical conditions due to increased browsing by ungulates and increased competition from conifers. These past changes in vegetation, along with increased trampling of banks, and changes in hydrological conditions due to roads have changed the stream structure, resulted in downcutting, which has lowered the water table in many areas. This has caused a further

decrease in other riparian vegetation such as forbs and shrubs, and a decrease in the width of the riparian vegetation along the streams in this area.

With the encroachment of ponderosa pine and juniper into non-forested areas (meadows, riparian areas, etc), more moisture has been used by these dominant species which has caused a decline in other plant species.

House Creek Allotment

Range analysis was conducted on the House Creek Allotment in 2002 and 2004. Analysis data consists of vegetation typing on capable acres, condition assessments in key grazing areas, and a review of actual use monitoring records for the past five years. No trend transects were ever established in this allotment. Actual use monitoring records for the past five years indicate grazing use levels are at Forest Plan and Term Grazing Permit Standards and Guidelines. The data was augmented with proper functioning condition survey on House Creek; which was rated as "Proper Functioning Condition" for riparian vegetation and stream bank stability.

Range Analysis Summary

Range analysis data were collected in 2002 and 2004 for vegetation typing on capable acres, condition assessments in key grazing areas, and a review of actual use monitoring records for the past five years. Data were collected from an ocular macroplot to determine plant association / community type. No condition and trend (Parker) transects were ever established in this allotment however field observations can provide a basis for general interpretation of trend by a journey level Range Management Specialist. Results are as follows:

Uplands: Field observations by district range technicians and range management specialists have determined condition, trend, and seral status to be ranging from poor to excellent with a static or upward trend. This pattern is typical of allotments where current livestock grazing distribution patterns constitute a greater influence on ecologic trends in primary range than does the total livestock forage allocation for the allotment. Forage production estimates for the House Creek allotment indicate that the current total livestock forage allocation does not exceed available production in a near normal growing season.

Riparian: There is only one perennial stream system within the House Creek Allotment. Riparian conditions were assessed within a riparian pasture created in 1996 along House creek by an ocular macroplot (plot 2075). Vegetation consists mainly of the Ponderosa pine/Kentucky bluegrass plant community type (CPM112) with a little Baltic rush plant community type (MW3912) along the creek. In 2002 this plot was covered by lush growth of introduced, grazing-resistant grasses (wheatgrass and bluegrass). Historic heavy grazing reduced or eliminated many native species, and reduction of grazing pressure in the riparian pasture has allowed the surviving plants to flourish. The introduced grasses are strong competitors and will inhibit recovery of native species, but meanwhile the dense cover of these sod-forming grasses should provide good soil protection. Past degradation is not attributable to current management practices because the riparian pasture is showing signs of improvement and future monitoring will

document the rate of recovery. This plot does not provide information on current range condition outside of the riparian pasture.

A proper functioning condition survey was conducted on House Creek in 2004. House Creek was rated as “Proper Functioning Condition” for riparian vegetation and stream bank stability. There was good establishment of woody shrubs and grasses along the stream bank.

General Conclusions

Given that the key resource concerns associated with livestock grazing on the House Creek allotment stem from current grazing distribution patterns, adjustments in livestock management should focus on shifting grazing intensity and duration away from areas where ecologic succession is inhibited, or where range condition is poor. Such adjustments would contribute to an evolutionary management process that has already yielded substantial site specific resource improvement on this allotment.

Monitoring conducted during the last 5 years indicates that overall forage utilization levels have not exceeded Forest Plan and Term Grazing Permit Standards and Guidelines, thus the current livestock forage allocation can be met.

Range Improvements

Several range improvements exist within the House Creek Allotment. It is the responsibility of the permittee to maintain these range improvements as outlined in the term grazing permit. Appendix E lists each improvement.

Pasture Management Summaries

The allotment is managed on a deferred rotation using two units, North and South pastures. The units are rotated and used first on alternative years.

North Pasture

North Pasture is on the north end of the House Creek Allotment. The pasture is about 1,920 acres of which 720 acres (38%) have been determined to be not capable for livestock management due to steep slopes or dense timber types. Ponderosa pine/elk sedge, grand fir/elk sedge and Douglas-fir/elk sedge plant associations make up the majority of the acres in the pasture. Overall the pasture is determined to be in satisfactory condition based on the Forest Plan definition.

Key area summary for North Pasture

The Malheur Forest Plan allowable use grazing utilization standard for this pasture is 45%. A key area was established in this pasture within the category 2 riparian area of House creek. In 1996, two small riparian pastures were established for a total of about 6 acres. The two small riparian pastures are rotated and used on alternative years. These small pastures were developed to regulate use on the riparian area. In compliance with the monitoring protocol developed by the Interagency Implementation Team (IIT) a four-inch residual stubble height for riparian grass and grass-like species was established and monitored along the green line. Table 5 summarizes monitoring data collected from 1999

through 2004 at the House creek monitoring site in the North Pasture which occurs in the two small riparian pastures.

Table 5: North Pasture, Monitoring parameters from 1999-2004

KEY AREA: House Creek Riparian Area	1999	2000	2001	2002	2003	2004
North Pasture - STUBBLE HEIGHT (")	5.5	2.5				Non-use
North Pasture - STUBBLE HEIGHT (")	6.5	7	5	10		Non-use

South Pasture

South Pasture is on the south end of the House Creek Allotment. The pasture is about 1,325 acres of which 45% have been determined to be not capable for livestock management due to steep slopes or dense timber types. Douglas-fir/elk sedge, ponderosa pine/elk sedge, and ponderosa pine/mountain-mahogany/Idaho fescue-bluebunch wheatgrass plant associations make up the majority of the acres in the pasture. Overall the pasture is determined to be in satisfactory condition based on the Forest Plan definition.

Key area summary for South Pasture

The Malheur Forest Plan allowable use grazing utilization standard for this pasture is 45%. In compliance with the monitoring protocol developed by the Interagency Implementation Team (IIT) a four-inch residual stubble height for riparian grass and grass-like species was established and monitored along the green line. Table 6 summarizes monitoring data collected from 1999 through 2004 at the House creek monitoring site in the South Pasture.

Table 6: South Pasture, Monitoring parameters from 1999-2004

KEY AREA: House Creek and Riparian A	1999	2000	2001	2002	2003	2004
South Pasture - STUBBLE HEIGHT (")					10	Non-use
South Pasture - STUBBLE HEIGHT (")					6	Non-use

West Malheur Allotment

Range analyses were conducted on the West Malheur Allotment in 1994, 1995, 1997, 1998, 2002 and 2004. Analysis data include vegetation typing, rangeland condition and trend assessments, ecologic phase determination for selected vegetation communities in primary range, forage production estimates and a review of forage utilization monitoring records for the past five years. Ten condition and trend transects, previously read in 1959 were located and reread. Twelve ocular macroplots (used in determining ecologic phase and trend) were established and read in 1994 or 1997, and reread in 2002 or 2004.

Range Analysis Summary

Range analysis data were collected in 1994, 1995, 1997, 1998, 2002 and 2004 for plant associations / communities in key livestock use areas. Data were collected from ocular macroplots to determine plant association / community type and phase within applicable ecologic state and transitions models. All but one of the 1994, 1995, 1997 and 1998

macroplots were re-read in 2002 (and one again in 2004) to provide an indication of ecologic trend. Condition and trend (Parker) transects were re-read in 1995, 1997, and 2002, and the results compared with readings taken in 1959 to establish long term apparent trend in range forage condition. Some ocular macroplots were located close enough to condition and trend transects to allow for site-specific contrasts of results from both techniques. Though data from condition and trend transects do not directly relate to ecologic state and transition models, the premise for this planning effort will be that significant differences in species composition (even when measured using different techniques) combined with technician field observations can provide a basis for general interpretation of trend by a journey level Range Management Specialist. Results are as follows:

Uplands: C&T clusters B1, B4, and B5 could not be relocated during the 2002 analysis project. Other upland clusters and macroplots indicate an array of condition, trend, and seral status ranging from poor with downward trend to excellent with upward trend. This pattern is typical of allotments where current livestock grazing distribution patterns constitute a greater influence on ecologic trends in primary range than does the total livestock forage allocation for the allotment. Forage production estimates for the West Malheur allotment indicate that the current total livestock forage allocation does not exceed available production in a near normal growing season.

Riparian: Riparian conditions were assessed adjacent to reaches of Squaw Creek where impacts typically related to grazing caused concern. Specific criteria of concern include inadequate bank stability and stream shading. An ocular macroplot (MW1662) located inside Cougar Flat showed a downward ecologic trend in riparian vegetation between 1994 and 2002. Squaw Creek was also listed as a “stream of concern” in a watershed analysis conducted in 1995. Ocular macroplots located in riparian areas other than those adjacent to Squaw Creek indicate good conditions with static trend.

Cougar Flat: Cougar Flat is a small pasture, approximately 60 acres, within the West Malheur Allotment. This area was fenced and treated with herbicide in the mid 1960’s to reduce the density and cover of big sagebrush, *Artemisia tridentate*. After forty years, big sagebrush once again dominates the plant composition within the Cougar Flat pasture. Current vegetation conditions lack productive forage grasses. As a result, this area is only grazed by livestock for a limited amount of time every few years.

Evaluation of Squaw creek that flows through Cougar Flat pasture indicates that many years ago the channel was vertically unstable. As the channel incised, the water table dropped below the flood plain. It is believed that this drop in the water table led to a shift in vegetation communities away from those associated with a wet meadow to the plant community that is now present and dominated by upland shrubs and mid seral grasses.

Cougar Flat is surrounded by pine forests and is too small of an area to provide habitat for sage grouse.

General Conclusions

Given that the key resource concerns associated with livestock grazing on the West Malheur allotment stem from current grazing distribution patterns, adjustments in livestock management should focus on shifting grazing intensity and duration away from

areas where transect data indicate that ecologic succession is inhibited, or where range condition is poor with a static or downward trend. Such adjustments would contribute to an evolutionary management process that has already yielded substantial site specific resource improvement on this allotment.

Forage production has been estimated for capable/suitable range within the Rock Springs, Cougar, and Pierpont pastures. Results indicate that under management conditions where primary range is fully utilized (not exceeding Forest Plan Standards), the current livestock forage allocation can be met. This is supported by monitoring conducted during the last 5 years which indicates that overall forage utilization levels have not exceeded Forest Plan and Term Grazing Permit Standards and Guidelines.

Range Improvements

Several range improvements exist within the West Malheur Allotment. It is the responsibility of the permittee to maintain these range improvements as outlined in the term grazing permit. Appendix E lists each improvement.

Pasture Management Summaries

The allotment is managed on a rotation using three units, Rock Springs, Cougar, and Pierpont pastures. This grazing strategy was initiated in 1962 when the allotment was created. Prior to 1962 a season long grazing strategy was followed.

Rock Springs Pasture

Rock Springs pasture is on the southeast end of the West Malheur Allotment. The pasture is about 2,210 acres. Low sagebrush/Idaho fescue-bluebunch wheatgrass and mountain big sagebrush/Idaho fescue-bluebunch wheatgrass plant associations are the dominant associations in the pasture.

Key area utilization summary for Rock Springs Pasture

No permanent key area monitoring locations have been established in the Rock Springs pasture.

Permanent Vegetation Monitoring

Four condition and trend transects (E1, B2, E3, and B8), and two ecologic status transects (8141 and 8142) are located in the Rock Springs pasture. Data collected from these transects have been compiled and interpreted, and are summarized in the Range Analysis Summary section. Transect data (not interpreted) are available in the project file.

Cougar Pasture

Cougar Pasture is on the south central end of the West Malheur Allotment. The pasture is about 7,900 acres. Ponderosa pine/Idaho fescue, Douglas-fir/elk sedge, Mountain big sagebrush/Idaho fescue-bluebunch wheatgrass, Stiff sagebrush/Sandberg's bluegrass, and ponderosa pine/bluebunch wheatgrass plant associations make up the majority of the acres in the pasture.

Key area utilization summary for Cougar Pasture

The Malheur Forest Plan allowable use grazing utilization standard for this pasture is 45%. In compliance with the monitoring protocol developed by the Interagency Implementation Team (IIT) a four-inch residual stubble height for riparian grass and grass-like species was established and monitored along the green line. Table 7 summarizes monitoring data collected from 1999 through 2004 in the Cougar Pasture.

Table 7: Cougar Pasture, Monitoring parameters from 1999-2004

KEY AREA:	1999	2000	2001	2002	2003	2004
Below Cougar Flat - STUBBLE HEIGHT (")		6	5		6	
Cougar - STUBBLE HEIGHT (")		6				
T3 - STUBBLE HEIGHT (")		9	5	8	12	7
Van Gulch - STUBBLE HEIGHT (")		5				
Horse Pasture - STUBBLE HEIGHT (")		7				
East Fork Wolf Creek (1/4 mile east) - STUBBLE HEIGHT (")		5.5				

Permanent Vegetation Monitoring

Three condition and trend transects (C1, E2 and C5), and three ecologic status transects (8053, 8120 and MW1662) are located in the Cougar. Data collected from these transects have been compiled and interpreted, and are summarized in the Range Analysis Summary section. Transect data (not interpreted) are available in the project file.

Pierpont Pasture

Pierpont Pasture is on the north end of the West Malheur Allotment. The pasture is about 12,750 acres. Grand fir/heartleaf arnica, Grand fir/elk sedge, and Douglas-fir/elk sedge plant associations make up the majority of the acres in the pasture.

Key area utilization summary for Pierpont Pasture

The Malheur Forest Plan allowable use grazing utilization standard for this pasture is 45%. In compliance with the monitoring protocol developed by the Interagency Implementation Team (IIT) a four-inch residual stubble height for riparian grass and grass-like species was established and monitored along the green line. Table 8 summarizes monitoring data collected from 1999 through 2004 in the Pierpont Pasture.

Table 8: Pierpont Pasture, Monitoring parameters from 1999-2004

KEY AREA:	1999	2000	2001	2002	2003	2004
N of 1540 Rd - STUBBLE HEIGHT (")		5	5	5	5	5
Just N of CG		6	7	5	4	4
E. Fork of Wolf		5.5				
Wolf Creek Rd 1540 north	6.7					
Wolf Creek County line and up	4.5	4.5				

Permanent Vegetation Monitoring

Three condition and trend transects (C4, C6 and B6), and five ecologic status transects (2070, 8060, 8061, MW1672 and MW 1681) are located in the Pierpont Pasture. Data collected from these transects have been compiled and interpreted, and are summarized in the Range Analysis Summary section. Transect data (not interpreted) are available in the project file.

Wolf Mountain Allotment

Range analyses were conducted on the Wolf Mountain Allotment in 1959, 1990, 1994, 1997, and 2002. Analysis data include vegetation typing, rangeland condition and trend assessments, ecologic phase determination for selected vegetation communities in primary range, and a review of forage utilization monitoring records for the past five years. One condition and trend transect, previously read in 1959 was located and reread in 1997 and again in 2002. Ten ocular macroplots (used in determining ecologic phase and trend) were established and read in 1990, and re-read in 2002. Eight additional macroplots were established and read in 1994, and re-read in 2002. Nine additional macroplots were established and read in 2002. Analysis results and preliminary issues used to develop the proposed action are disclosed in the “Range Analysis Summary” section below.

Range Analysis Summary

Range analysis data were collected in 1994, 1995, 1997, 1998, 2002 and 2004 for plant associations / communities in key livestock use areas. Data were collected from ocular macroplots to determine plant association / community type and phase within applicable ecologic state and transitions models. All but one of the 1994, 1995, 1997 and 1998 macroplots were re-read in 2002 (and one again in 2004) to provide an indication of ecologic trend. Condition and trend (Parker) transects were re-read in 1995, 1997, and 2002, and the results compared with readings taken in 1959 to establish long term apparent trend in range forage condition. Some ocular macroplots were located close enough to condition and trend transects to allow for site-specific contrasts of results from both techniques. Though data from condition and trend transects do not directly relate to ecologic state and transition models, the premise for this planning effort will be that significant differences in species composition (even when measured using different techniques) combined with technician field observations can provide a basis for general interpretation of trend by a journey level Range Management Specialist. Results are as follows:

Uplands: Only one C&T transect could be re-located in 1997 and 2002. This transect was located in a floodplain known as Lower Beaver Dam Meadows. This area is a favored loafing spot for livestock and is near a riparian concern area.

Of 19 macroplots on upland sites, only one showed substantial (qualitative judgment) disturbance. Further, the disturbances seen could not be primarily attributed to livestock since logging effects were also prevalent. Overall, transect data for upland range sites indicate light to negligible grazing impacts along with satisfactory range condition.

Riparian: Riparian conditions were assessed adjacent to reaches of Bridge Creek and Beaver Dam Creek where impacts typically related to grazing caused concern. Specific criteria of concern include inadequate bank stability and stream shading. Eight ocular macroplots located in riparian zones indicated excellent to fair conditions (qualitative judgment) in riparian vegetation with static trend between 1994 and 2002.

General Conclusions

Given that the key resource concerns associated with livestock grazing on the Wolf Mountain allotment stem from current grazing distribution patterns, and are limited to small areas within the Beaver Dam pasture, adjustments in livestock management should focus on shifting grazing intensity and duration away from areas where transect data indicate that ecologic succession or riparian function is inhibited.

Forage production has been estimated for capable / suitable range within the Beaver Dam pasture. Results indicate that under management conditions where primary range is fully utilized (not exceeding Forest Plan Standards); the current livestock forage allocation can be met. This is supported by monitoring conducted during the last 5 years which indicates that overall forage utilization levels have not exceeded Forest Plan and Term Grazing Permit Standards and Guidelines

Range Improvements

Several range improvements exist within the Wolf Mountain Allotment. It is the responsibility of the permittee to maintain these range improvements as outlined in the term grazing permit. Appendix E lists each improvement.

Pasture Management Summaries

The allotment is managed on a modified deferred rotation using five units, Antelope, Wolf Creek, Beaverdam, Schurtz Creek and Wade Corner pastures. Prior to the 1969 the grazing strategy was season long until an east-west division fence was constructed during the 1969 grazing season.

Antelope Pasture

Antelope pasture is on the northwest end of the Wolf Mountain Allotment. The pasture is about 8,900 acres. Grand fir/elk sedge and Grand fir/heartleaf arnica plant associations make up the majority of the acres in the pasture. Overall the pasture is determined to be in satisfactory condition based on the Forest Plan definition.

Key area summary for Antelope Pasture

The Malheur Forest Plan allowable use grazing utilization standard for this pasture is 45%. In compliance with the monitoring protocol developed by the Interagency Implementation Team (IIT) a four-inch residual stubble height for riparian grass and grass-like species was established and monitored along the green line. Grazing in this pasture has not always met the monitoring protocol developed by the Interagency Implementation Team (IIT). Table 9 summarizes monitoring data collected from 1999 through 2004 in the Antelope Pasture.

Table 9: Antelope Pasture, Monitoring parameters from 1999-2004

KEY AREAS:	1999	2000	2001	2002	2003	2004
Antelope Creek - STUBBLE HEIGHT (")			3		2	4
SF Antelope Creek - STUBBLE HEIGHT (")				2		
WF Bridge Creek - STUBBLE HEIGHT (")		4		1.5		
1710 Road - STUBBLE HEIGHT (")						

Beaverdam Pasture

Beaverdam Pasture is on the southwest end of the Wolf Mountain Allotment. The pasture is about 6,300 acres. Grand fir/elk sedge and Douglas-fir/elk sedge plant associations make up the majority of the acres in the pasture. Overall the pasture is determined to be in satisfactory condition based on the Forest Plan definition.

Key area summary for Beaverdam Pasture

The Malheur Forest Plan allowable use grazing utilization standard for this pasture is 45%. In compliance with the monitoring protocol developed by the Interagency Implementation Team (IIT) a four-inch residual stubble height for riparian grass and grass-like species was established and monitored along the green line. Table 10 summarizes monitoring data collected from 1999 through 2004 in the Beaver Dam Pasture.

Table 10: Beaverdam Pasture, Monitoring parameters from 1999-2004

KEY AREA:	1999	2000	2001	2002	2003	2004
Beaverdam Creek - STUBBLE HEIGHT (")	3.8	5	4	4	4	11

Schurtz Creek Pasture

Schurtz Creek Pasture is on the east central portion of the Wolf Mountain Allotment. The pasture is about 5,585 acres. Grand fir/elk sedge and grand fir/heartleaf arnica plant associations make up the majority of the acres in the pasture. Overall the pasture is determined to be in satisfactory condition based on the Forest Plan definition.

Key area summary for Schurtz Creek Pasture

The Malheur Forest Plan allowable use grazing utilization standard for this pasture is 45%. In compliance with the monitoring protocol developed by the Interagency Implementation Team (IIT) a four-inch residual stubble height for riparian grass and grass-like species was established and monitored along the green line. Grazing in this pasture has not always met the monitoring protocol developed by the Interagency Implementation Team (IIT). Table 11 summarizes monitoring data collected from 1999 through 2004 in the Schurtz Creek Pasture.

Table 11: Schurtz Creek Pasture, Monitoring parameters for Wolf Mountain Allotment from 1999-2004

KEY AREA:	1999	2000	2001	2002	2003	2004
Schurtz Creek - STUBBLE HEIGHT (")		3				Non-use
Wolf Creek - STUBBLE HEIGHT (")			4			Non-use

Wade Corner Pasture

Wade Corner pasture is on the southeast end of the Wolf Mountain Allotment. The pasture is about 1,225 acres. Douglas-fir/elk sedge, Ponderosa pine/Idaho fescue, and Mountain big sagebrush/Idaho fescue-bluebunch wheatgrass plant associations make up the majority of the acres in the pasture. Overall the pasture is determined to be in satisfactory condition based on the Forest Plan definition.

Key area summary for Wade Corner Pasture

The Malheur Forest Plan allowable use grazing utilization standard for this pasture is 45%. In compliance with the monitoring protocol developed by the Interagency Implementation Team (IIT) a four-inch residual stubble height for riparian grass and grass-like species was established and monitored along the green line. The Wade Corner pasture has no perennial streams and monitoring is conducted near Jungle/Holdout spring. Changes made to livestock management during the 2000 grazing season have been satisfactory in meeting resource objectives as documented in formal monitoring. In addition, undocumented observations by district range personnel and permittees and professional judgment indicate the same. Table 12 summarizes monitoring data collected from 1999 through 2004 in the Wade Corner Pasture.

Table 12: Wade Corner Pasture, Monitoring parameters from 1999-2004

KEY AREA: Dry Creek Pasture	1999	2000	2001	2002	2003	2004
Jungle/Holdout Spring - STUBBLE HEIGHT (")		8				

Wolf Creek Pasture

Wolf Creek pasture is on the northeast end of the Wolf Mountain Allotment. The pasture is about 9,600 acres. Grand fir/elk sedge and grand fir/heartleaf arnica plant associations make up the majority of the acres in the pasture. Overall the pasture is determined to be in satisfactory condition based on the Forest Plan definition.

Key area summary for Wolf Creek Pasture

The Malheur Forest Plan allowable use grazing utilization standard for this pasture is 45%. In compliance with the monitoring protocol developed by the Interagency Implementation Team (IIT) a four-inch residual stubble height for riparian grass and grass-like species was established and monitored along the green line. Grazing in this pasture has not always met the monitoring protocol developed by the Interagency Implementation Team (IIT). Table 13 summarizes monitoring data collected from 1999 through 2004 in the Wolf Creek Pasture.

Table 13: Wolf Creek Pasture, Monitoring parameters from 1999-2004

KEY AREA:	1999	2000	2001	2002	2003	2004
Wolf Creek (Glass Mtn. 13) - STUBBLE HEIGHT (")					2	Non-Use 6.5
MF Wolf Creek - STUBBLE HEIGHT (")		4				Non-use

Effects on Rangeland Resources

The vegetation and rangeland resources section, as well as information in Appendix C, describe past allotment use records and vegetation management activities. The reported current conditions are in essence the cumulative effects of past activities. Expected conditions and trends that would result from combining the effects from these past activities with the direct and indirect effects of each alternative are described below for each of the allotments.

Direct and Indirect Effects Common to Alternatives 1 and 2

In all three allotments, adaptive management strategies would be employed in the combination best suited to meeting riparian and upland objectives. Adaptive management strategies could include (but would not be limited to): changes in timing duration and frequency of grazing; distribution of livestock; and stocking rates. A shorter, earlier timing of grazing with a higher stocking rate could be used to provide for riparian stubble height and shrub objectives by giving time for riparian species re-growth and preventing late season shrub utilization. This strategy could be incorporated with a rest-rotation system to speed riparian recovery. Attainment of upland management objectives could be facilitated through a later season grazing treatment which would provide for seed set in perennial grasses. Invasive annuals could be grazed in a high intensity, short duration grazing treatment to reduce competition with desirable native perennials. Adaptive management strategies can be modified and adjusted based on monitoring data, livestock operations and seasonal fluctuations. Activities that improve upland vegetative conditions would take grazing pressure off of the riparian areas and provide for better livestock distribution.

Many examples of adaptive management effectiveness are available, such as Technical Reference 1734-14 (1997) which evaluated and rated grazing strategies for stream riparian habitats. Continuous season-long grazing was rated as poorly compatible (rating of 1), compared with deferred-rotation which is rated (rating of 4) as more compatible with stream riparian habitats. New strategies, such as low impact herding and protein supplementation may be incorporated with adaptive management strategies.

Direct and Indirect Effects of Alternative 1 - Current Management

House Creek Allotment

Under this alternative, the two riparian pastures on House Creek would continue to improve. Livestock would continue to be managed to provide adequate stubble height on herbaceous riparian vegetation to filter sediment, dissipate the energy of flowing water and limit the movement of soil into the stream channel. Although much of the herbaceous riparian vegetation on this allotment consists of non-native introduced species, the root systems are effectively stabilizing streambanks.

Utilization on shrubs would continue to be within acceptable levels dictated by the Forest Plan. Incidence of bank alteration due to livestock hoof action would continue to be within acceptable levels leading to near natural rates of recovery.

The upland vegetation would continue to be managed in such a way to support the ecological integrity of the allotment. Upland vegetation would continue to be adequate to meet livestock forage requirements. Maintenance of good upland conditions would continue to reduce grazing pressure and livestock impacts on the riparian areas.

The current management alternative on the House Creek Allotment utilizes a grazing rotation that incorporates certain years and seasons of complete rest from livestock grazing. This rest allows the vegetation to complete phonological stages without being impacted by livestock.

Monitoring would continue to be conducted to determine if the management activities are meeting or moving toward resource objectives and desirable conditions.

West Malheur Allotment

Upland clusters and macroplots indicate an array of condition, trend, and seral status ranging from poor with downward trend to excellent with upward trend. This pattern is typical of allotments where current livestock grazing distribution patterns constitute a greater influence on ecologic trends in primary range than does the total livestock forage allocation for the allotment. Overall, current grazing distribution patterns would be adjusted through adaptive management and would focus on shifting grazing intensity and duration away from areas where transect data indicate that ecologic succession is inhibited, or where range condition is poor with a static or downward trend. Such adjustments would contribute to resource improvement on this allotment. Monitoring would continue to be conducted to determine if the management activities are meeting or moving toward resource objectives and desirable conditions.

Ocular macroplots located in riparian areas other than those adjacent to Squaw Creek indicate good conditions with static trend. These riparian areas would be expected to continue to improve through the use of adaptive management. For example, hot season grazing could be reduced or modified to limit cattle loafing and shrub utilization in riparian areas later in the year when temperatures are warm and the protein content of upland forage grasses has declined. This adaptive management strategy could reduce livestock impacts on streambanks, riparian vegetation and water quality.

Livestock would continue to be managed to provide adequate stubble height on herbaceous riparian vegetation to filter sediment, dissipate the energy of flowing water and limit the movement to soil into the stream channel. Utilization on shrubs would continue to be within acceptable levels dictated by the Forest Plan. Incidence of bank alteration due to livestock hoof action would continue to be within acceptable levels leading to near natural rates of recovery.

Streambank stability and stream shading on Squaw Creek would also be expected to improve through adaptive management although not as quickly as Alternatives 2 and 3.

Cougar Flat would continue to be dominated by a dense cover of big sagebrush, *Artemisia tridentate*. Forage grasses would continue to decline. The water table would continue to be below the floodplain. Thus perpetuating the shift away from wet meadow vegetation to plant communities associated with drier upland sites.

Wolf Mountain Allotment

Overall, transect data for upland range sites indicate light to negligible grazing impacts along with satisfactory range condition. Upland vegetation would be expected to improve through the use of adaptive management. For example, if a dry year leads to reduced forage production, livestock would be removed from the allotment earlier in the grazing season or fewer animals would be allowed to graze; thus ensuring that utilization standards are not exceeded. Monitoring indicates that there is adequate forage to meet livestock nutritional requirements without exceeding allowable use levels.

Overall, transect data for riparian sites indicate excellent to fair conditions (qualitative judgment) in riparian vegetation with static trend between 1994 and 2002. Riparian vegetation would be expected to improve through the use of adaptive management. Livestock would continue to be managed to provide adequate stubble height on herbaceous riparian vegetation to filter sediment, dissipate the energy of flowing water and limit the movement to soil into the stream channel. Utilization on shrubs would continue to be within acceptable levels dictated by the Forest Plan. Incidence of bank alteration due to livestock hoof action would continue to be within acceptable levels leading to near natural rates of recovery.

Streambank stability and stream shading on Bridge Creek and Beaver Dam Creek would also be expected to improve through adaptive management although not as quickly as Alternatives 2 and 3.

Monitoring would continue to be conducted to determine if the management activities are meeting or moving toward resource objectives and desirable conditions.

Direct and Indirect Effects of Alternative 2 - Proposed Action

House Creek Allotment

Installation of the proposed drift fences would aid livestock management and distribution in the South Pasture. Cattle would drift away from House Creek and be distributed in the uplands of the South Pasture, thereby reducing the utilization in House Creek and increasing utilization in the uplands.

Cattle would be excluded from aspen stands in Bridge Creek, 17 road, House Creek and CHE spring drainages. Forage within the exclosures of these aspen stands would not be available for livestock consumption until the fences are removed (about 10 years) and is not expected to be a significant decrease in livestock forage because of the limited acres being fenced (less than 50 acres per allotment). If by fencing an aspen stand a water source is also fenced, alternative sources of livestock water would need to be developed outside of the exclosures. Little impact to livestock movement patterns is expected from fencing because permittees would be involved in the placement of the fences or natural barriers to ensure that livestock travel routes are not blocked and to avoid the creation of livestock congregation areas.

Proposed fence construction on the spring source at the upper end of House Creek would protect the spring source and riparian vegetation from livestock trampling. Livestock would be excluded from the spring source. An alternative source of water would not be needed because a water gap exists within 1/8 of a mile. Cattle traveling routes would not

be impacted due to fence design and permittees would be involved in the placement of the fence.

Current livestock management on the House Creek Allotment has been successful in maintaining desired riparian conditions. Nevertheless, it is proposed to change the acceptable use level from 45% to 35% along the greenline of the riparian areas on the House Creek Allotment to more rapidly restore the riparian area. This change would not affect the current permittee or livestock operation as stubble-height measurements are consistently well above what is required.

Wolf Mountain Allotment

Beaverdam Meadow would be enlarged to encompass the active headcut. Livestock grazing management in the Beaverdam Meadow would be designed to support riparian objectives. Livestock grazing would take place in the Beaverdam Meadow on a limited basis as a gathering pasture for overnight use. Light use would allow for improvement in the riparian plant composition, community structure, and streambank stability along Beaverdam creek.

The existing population of *Botrychium crenulatum* would be fenced to eliminate disturbance associated with livestock grazing. The area being enclosed is approximately 1-2 acres and therefore would have little impact on available livestock forage. The fence would be designed to provide water for livestock use outside of the enclosure. This enclosure would improve *Botrychium crenulatum* habitat and have positive impacts to the existing population.

Allowable use for livestock grazing would be modified to approximately a six inch stubble height on the floodplains on all other areas identified as potential *Botrychium crenulatum* habitat. These areas would be mapped and visited by the permittee and Forest Service personnel. Existing range improvements would be maintained or upgraded to protect developed springs within potential *Botrychium crenulatum* habitat. Modifying utilization standards on *Botrychium species* habitat would have beneficial impacts to its habitat.

Cattle would be excluded from aspen stands in West Fork Bridge Creek, Beaverdam Creek, Dry Gulch and Schurtz Creek. Forage within the enclosures of these aspen stands would not be available for livestock consumption until the fences are removed (about 10 years) and is not expected to be a significant decrease in livestock forage because of the limited acres being fenced (less than 50 acres per allotment). If by fencing an aspen stand a water source is also fenced, alternative sources of livestock water would need to be developed outside of the enclosures. Little impact to livestock movement patterns is expected from fencing because permittees would be involved in the placement of the fences or natural barriers to ensure that livestock travel routes are not blocked and to avoid the creation of livestock congregation areas.

Decommissioning of Forest Road 1619805 may provide additional forage, when the road is revegetated. It is unknown if the permittee uses this road to manage the allotment. Impacts to the permittee would be limited because there are other roads nearby.

West Malheur Allotment

Cattle would be excluded from aspen stands in Squaw Creek, Van Gulch and Magpie Creek. Forage within the exclosures of these aspen stands would not be available for livestock consumption until the fences are removed (about 10 years) and is not expected to be a significant decrease in livestock forage because of the limited acres being fenced (less than 50 acres per allotment). If by fencing an aspen stand a water source is also fenced, alternative sources of livestock water would need to be developed outside of the exclosures. Little impact to livestock movement patterns is expected from fencing because permittees would be involved in the placement of the fences or natural barriers to ensure that livestock travel routes are not blocked and to avoid the creation of livestock congregation areas.

Allowable use for livestock grazing would be modified to a six-inch stubble height on the floodplain on all areas identified as potential *Botrychium* species habitat. These areas would be mapped and visited by the permittee and Forest Service personnel. Existing range improvements would be maintained or upgraded to protect developed springs within potential *Botrychium* species habitat. Modifying utilization standards on *Botrychium* species habitat would have beneficial impacts to its habitat.

Livestock would be excluded from headcuts on Squaw Creek and Van Gulch. Rock structures and large wood would be installed to help stabilize the headcuts and speed the recovery process.

The timing, intensity and frequency of livestock grazing would be adjusted in the Rock Springs pasture to reduce cattle impacts on upland shrubs. The pasture boundary fence between Pierpont and Cougar pastures would be re-routed to improve livestock movement and distribution near Squaw Creek thus reducing livestock utilization in this area. The amount and distribution of upland plant communities would increase under this alternative.

Proposed prescribe burning of Cougar Flat would move vegetation conditions to an earlier seral stage. A reduction in sagebrush would occur and overtime an increase in grasses and forbs would occur. Cougar Flat would be rested from livestock grazing for one year prior to the burn. The purpose of resting this small defined area is to allow fine fuels to build up in sufficient abundance to carry a low intensity fire. After the fire, Cougar Flat would be rested from livestock grazing for a minimum of 2 growing seasons (as per the Post-Fire Grazing Interim Guidelines for the Malheur National Forest, December 2, 2003 (Appendix D)). During this time, vegetation will be evaluated to determine the success of plant establishment and seed production. Soil and watershed conditions will also be evaluated prior to re-initiation of livestock grazing. Resting Cougar Flat from livestock grazing will not be difficult because the entire area is already fenced. The West Malheur permittee has not been using the area in a regular grazing system due to low forage productivity and high sagebrush density. Cougar Flat is surrounded by pine forests and is too small of an area to provide habitat for sage grouse.

The proposed prescribed burn would be implemented in conjunction with stream improvement work. Small rock structures would be strategically placed in Squaw Creek to catch sediment. Overtime these structures would vertically stabilize the stream channel thus allowing the water table to once again interact with the associated flood plain and

adjacent meadow. Raising the water table would promote the re-establishment of wet meadow plant communities.

Direct and Indirect Effects from Alternative 3 - No Grazing

This alternative provides the no grazing alternative. Under this alternative, all Term Grazing Permits would be cancelled upon implementation of the decision and resolution of the appeals process. No permits would be issued to graze livestock on the House Creek, Wolf Mountain, and West Malheur allotments unless there was a subsequent NEPA analysis and a decision to re-stock any or all of the allotments.

Range improvements including: fences, water systems and corrals would remain on the allotments but would no longer be the responsibility of the permittees to maintain. Permittees would be reimbursed for their amortized share of cooperative range improvements where they participated in the development (Forest Service Handbook 1109.13 Chapter 70).

Subsequent decisions would be needed regarding retention of any improvements for other resource needs such as wildlife or recreational use. Alternative funding sources for maintenance would need to be secured. Allotment boundary fence maintenance would be re-assigned to adjacent permittees. If private landowners wished to continue grazing the associated private lands, it would be necessary for them to fence the boundaries to insure their livestock would not trespass on Forest Service lands. Fences in common with other state and federal lands would remain intact with ownership assumed to belong to the private land owner, state or federal agency.

Under the no grazing alternative, there would be no mitigation measures related to livestock management.

The absence of domestic livestock in riparian zones would increase the amount of riparian grasses and sedges and increase willow canopy cover where willows currently exist. Stream banks would eventually become lined with tall sedges in those locations where the potential exists.

The absence of domestic livestock in the uplands would increase the amount of upland vegetation. Upland vegetation compositions would slowly change to being dominated by late seral species. On vegetation types where conifers are a component, understory shrubs and grasses would continue to decline as canopies close, except where fire is prescribed or a wildfire occurs.

Cumulative Effects Common to All Alternatives

Past domestic grazing is described by allotment in Appendix C. This past domestic grazing has reduced plant species that have low tolerance to grazing and are preferred by livestock; and has increased plant species that are tolerant to grazing. Past timber is also described by allotment in Appendix C. This past timber management has opened up conifer canopies and allowed understory shrubs and grasses to increase in those areas for a short term increase in forage. Over time, the conifer canopies have closed and understory shrubs and grasses have declined.

Future vegetation projects are also described in Appendix C. Future vegetation projects such as the Van, Parasol, and 2005 Plantation PCT Projects, would open up conifer canopies and allow understory shrubs and grasses to increase in those areas for a short term increase in forage. Eventually, the conifer canopies would close up and understory shrubs and grasses would start to decline.

The Coyote Creek Flow Enhancement Project would reduce the amount of juniper in the Rock Springs Pasture of the West Malheur Allotment. This would allow the increase of uplands shrubs, grasses and forbs in that pasture.

Future activities that improve upland vegetative conditions would take grazing pressure off the riparian areas and provide for better livestock distribution.

Cumulative Effects of Alternative 1 - Current Management

Under Current Management, upland and riparian vegetation would slowly increase as adaptive management strategies are utilized. Resource conditions at House Creek, Squaw Creek, Beaverdam Creek and Bridge Creek would be expected to improve through adaptive management although not as quickly as Alternatives 2 and 3. Cougar Flat would continue to be dominated by a dense cover of big sagebrush, *Artemisia tridentate*. Forage grasses would continue to decline unless a wildfire occurred.

The diminished vegetation conditions from past actions would not be further diminished under Alternative 1 because livestock grazing would be managed so that effects from livestock grazing would not carry over to the following grazing season, thus allowing a “near natural” rate of recovery of riparian areas as defined by PACFISH Enclosure B (Appendix J).

Cumulative Effects of Alternative 2 - Proposed Action

Under the Proposed Action Alternative, upland and riparian vegetation would increase as adaptive management strategies are utilized. Resource conditions at House Creek, Squaw Creek, Beaverdam Creek and Bridge Creek would be expected to improve through adaptive management and proposed range improvements although not as quickly as Alternative 3. Cougar Flat would no longer be dominated by a dense cover of big sagebrush, *Artemisia tridentate*; upland and riparian grasses and sedges would have increased due to proposed activities.

The diminished vegetation conditions from past actions would not be further diminished under Alternative 2 because livestock grazing would be managed so that effects from livestock grazing would not carry over to the following grazing season, thus allowing a “near natural” rate of recovery of riparian areas as defined by PACFISH Enclosure B (Appendix J).

Cumulative Effects from Alternative 3 - No Grazing

Under the no grazing alternative, herbaceous plants and shrubs would no longer be utilized by livestock. Plant productivity, diversity and species composition may change over time in absence of livestock grazing. Preferred plants with low tolerance to grazing may increase in abundance. Plants that are grazing tolerant may become decadent and overgrown. Upland vegetation compositions would slowly change to being dominated by

late seral species. Ground cover parameters would stabilize over time, with bare ground at a minimum for the plant association.

In all three allotments, the no grazing alternative would allow an increase in bunchgrass production for bluebunch wheatgrass, Idaho fescue, and other bunchgrasses within the allotments. Research by Ganskopp, Svejcar and Vavara (2004) near Burns, Oregon found that light grazing decreased fall standing crop by 32%, while heavy grazing reduced standing crop by about 67% when compared to ungrazed stands. However, the nutritional quality of the grasses increased with grazing, which provided superior forage for fall and winter use. The No Grazing Alternative would allow bunchgrass forage to develop residual growth resulting in “woffy” plants, which are not palatable to wild ungulates. The establishment of older non-palatable plants would occur over time, unless some type of disturbance such as fire occurred. Wildlife foraging behavior and plant preference may be altered in absence of livestock grazing.

Shrub communities without fire or other disturbance regimes would gradually move towards the predominance of shrubs over grasses and forbs. Improvement would occur at a rate faster than those predicted in the action alternatives.

Stream banks would eventually become lined with tall sedges in those locations where the potential exists. Riparian vegetation conditions would be maintained or would improve meeting or moving towards the Inland Native Fish Strategy (USDA Forest Service, 1995).

The diminished vegetation conditions from past actions would not be further diminished under Alternative 3 because effects from livestock grazing would not occur and a “near natural” rate of recovery of riparian areas as defined by PACFISH Enclosure B (Appendix J) would occur.

Biological Soil Crusts

Rangeland lichens grow as a part of the complex interrelationship between lichens, bryophytes, and cyanobacteria that make up the microbiotic crust (biological soil crusts). Many microbiotic lichens found in the Basin are widespread globally, yet the area they now cover in the United States has been greatly reduced compared to historic times. The major threats to survival of microbiotic crusts in the Basin include: invasion of exotic annual grasses and associated increases in fire frequency; conversion of rangelands to agriculture and suburban developments; and livestock trampling. Areas that contain shrubs and microbiotic crusts can be grazed by livestock when the soil is moist with little harm to the crusts (Quigley, et al., 1997).

Quigley, et al., (1997) determined that dense, closed forest stands, resulting from the past 100 years of fire suppression, have fewer lichens than historic, open forest stands. In the rangeland ecosystem, Quigley, et al., (1997) describes how the seeding of exotic grasses for erosion control and livestock forage has resulted in increased fire frequency. Fire, along with livestock trampling, has reduced the microbiotic crust coverage, and as a result, the fire-adapted, annual exotics can completely saturate the ground, creating a dense, closed stand of annual grasses that out competes the crust communities.

The Northwest Forest Plan addressed the topic of lichen conservation for the forests west of the Cascades, but there have been no such scientific studies on this topic in the Interior Columbia Basin (Quigley, et. al. 1997). Formal lichen surveys have not been conducted in the project area, although biological soil crusts are known to exist. It is unknown how much biological soil crust was present before the unregulated grazing in the early 1900's. The unregulated grazing most likely decreased the amount of biological soil crusts we see today. The invasion of trees into non-forested areas has also enabled a decrease in the total number and the diversity of plant species that inhabited the former non-forested sites; this may include a decrease in the amount of biological soil crusts.

Several ecology plots were established within the project area to determine range condition and trend. Three plots within the West Malheur Allotment have noted the condition of soil crusts. All three plots were subjectively determined to have too little cover by soil crusts.

Based on this limited information, crust communities are known to exist within the project area and appear to have been impacted by past management actions. Crust communities are most likely on a slight upward trend because unregulated grazing has ceased and invasion of trees into traditional non-forested areas has also slowed.

Effects on Biological Soil Crusts

Direct and Indirect Effects of Alternative 1 – Current Management

Under Current Management, biological soil crusts would continue their slow recovery since unregulated grazing has ceased and invasion of trees into traditional non-forested areas has slowed.

Direct and Indirect Effects of Alternative 2 – Proposed Action

Under the Proposed Action, effects would be similar to Alternative 1. Additionally, shifting part of the livestock grazing allocation from Rock Springs to Pierpont pasture would reduce impacts to biological soil crusts in Rock Springs pasture. Prescribed burning in Cougar Flat may impact biological soil crusts in the short term but may also be beneficial in the long term by reducing the risk of stand replacing fire.

Direct and Indirect Effects of Alternative 3 – No Grazing

Under the No Grazing alternative, effects would be similar to Alternative 1 except with no grazing biological soil crusts may continue their slow recovery at a slightly higher rate.

Cumulative Effects Common to all Alternatives

Past management actions, such as effective fire suppression, has facilitated dense forested stands, and along with livestock trampling of microbiotic crusts, has most likely reduced the densities of forest and rangeland lichens within the project area. The diminished habitat conditions for biological soil crusts attributed to past management actions would not be further diminished by any of the Alternatives because unregulated grazing no longer occurs and invasion of trees into traditional non-forested areas has slowed. Future foreseeable actions include thinning of conifers and juniper and landscape scale prescribed burning in both forested and non-forested ecotypes (see Appendix C for a list of projects). These future foreseeable activities would not be implemented on every acre of ground within the project area; rather a mosaic of eco-types would be formed. These future foreseeable vegetation treatments combined with past actions would be cumulative in nature and it is likely the diversity and densities of lichens would increase due to more open forest conditions and a mosaic of eco-types.

Social and Economics

Changes in levels of grazing use associated with the Emigrant Creek Ranger District Environmental Assessment may affect the major social and economic characteristics of the surrounding geographic area. The affected area or impact zone for the Malheur National Forest consists of Grant and Harney counties in eastern Oregon. Agriculture, manufacturing (particularly wood products), and retail trade are important sources of employment and income in this region. Grant County, for example, has a low level of economic diversity, a high dependence on federal timber and forage, and a low resiliency for change. Reliance on timber and forage from federal lands is moderate to high in counties in the impact zone (Kohrman 2003). The rate of conversion from wildland range to other uses has been less than 1% total between 1986 and 2001 (USDA Forest Service & ODF 2004).

Many communities are closely tied to the forest in both work activities and recreation. The local communities within an hour or two drive that are anticipated to be directly or indirectly affected by the proposed action, alternatives, and their associated economics include: Prairie City (population 1,080), Burns/Hines (4,565), Dayville (140), John Day/Canyon City (2,740), Long Creek (260), Mount Vernon (650), Monument (150), Seneca (230), Sumpter (175), and Unity (145). Austin, Crane, Drewsey, Fox, Greenhorn, Ritter, and Hereford are examples of other smaller communities also located in the vicinity. Larger towns and cities two or more hours away from John Day include: Baker City (10,160), LaGrande (12,795), Ontario (10,680), Bend (52,029), and Pendleton (16,915). The nearest metropolitan areas are the Tri-Cities area of Kennewick, Pasco, and Richland in Washington State, and Boise, Idaho. Most of the permittees live in the listed local communities.

Ranching has played a defining role in the establishment of the western United States. The activities associated with livestock production are often reflected in local cultures and economies. Many public land permittees consider the ranching way of life vital to maintaining traditional values and their cultural heritage. This unique lifestyle has endured and evolved throughout generations. Ranchers express a strong sense of responsibility to their families, the land, their livestock and the community (USDA Forest Service RMRS-GTR-113.2003).

Nationally, regionally, and locally, the social values and demands are changing on the national forests. A recent national survey has shown there is wide support for management of public lands to provide a diversity of uses, including grazing (Shields et al, 2002). However, the same study shows the importance to manage forest and grasslands to provide different types of recreational opportunities, including preserving the ability to have a “wilderness experience”. The Draft Current Management Situation Report for the Blue Mountains forest plan revision also discusses changing social values (Revision Team, 2004). There is also a growing dichotomy between rural and urban Oregon (Kaylor, 2003).

Economics

A grazing program on portions of the Malheur National Forest has been around since the forest was establishment as part of the Blue Mountain Forest Reserve in 1906 and as a

separate unit in 1908 (Mosgrove, 1980). Economically, the cattle ranching business has been an economic mainstay in Grant and Harney counties along with the forest products industry and government jobs.

Up to 50% of the grazing fees collected annually on the Malheur National Forest return to the Forest as range betterment dollars. A portion of these dollars are used to purchase materials for range improvements and to hire local workers to complete projects on public land.

The economics of the grazing program has evolved over time. Generally, stock animals, mainly cattle, spend the winter and early spring months on lower elevation private lands where they can be fed stored hay. The animals are moved to higher elevation private lands and public lands, mainly the Bureau of Land Management (BLM) and Forest Service (FS), as these lands become range ready in the spring. It is necessary for the cattle to be moved off their winter pastures so these private lands can be irrigated for forage production then stored for the upcoming winter.

This system of moving cattle to other pastures in the spring through fall maximizes the use of prime rangelands for forage production. It allows for a larger herd size than can be supported by keeping the stock just on private low-elevation lands. The longer the livestock are kept off these prime rangelands, the greater the opportunity to produce two or more hay crops. The more forage produced, the more cattle can be held over the winter, and the rancher/permittee is better able to time the selling of their stock to take advantage of market prices. In 2004, the sale of alfalfa hay totaled \$13,460,000 in Harney County (Burns Times-Herald, 2005).

In the current grazing system, calving is done early. Most of the calves are born between October and February. This allows the calves to be born near ranches where they can be watched and the birth assisted when necessary by the ranchers thus reducing mortality rates. The calves develop to a size by mid-spring to where they can be safely transported to new pasturage and are large enough to be protected from most predators, mainly coyotes.

The BLM uses an early on and early off strategy for utilization of forage grass. In this manner, the early grazing season allows for re-growth of the forage in the summer and fall, prior to the critical high peak flows in the spring due to snow melt. The grass recovers to a length where it retains its filtration value in trapping silt. The Forest Service also uses an early on and early off strategy for part of its administered lands. However, on the higher elevation lands another strategy is commonly used. The amount of utilization is restricted to allow for the remaining grass length to retain its filtration value over the winter into the next spring. These lands generally become ready for livestock use in mid-May or early June depending on the weather, aspect, and amount of snow pack. The cattle remain until late summer or until the end of October depending on when the amount of utilization authorized under the permit is met, or when the end of season date in the permit is reached.

Financial institutions and the Internal Revenue Service have recognized the economic value of federal grazing permits and long-term permittees have been able to capitalize this permit as part of total ranch value for loans and property sales. However, the Forest Service does not recognize the permit as having additive financial value to an

individual's property because there is no guarantee that the permit will remain with current permittee in perpetuity and that the sale of the base property will automatically give the permit to the new owner.

Annual adjustments to the permit are made in conjunction with the results of the end-of-year monitoring on forage utilization and stream bank alteration. Based upon this information, annual adjustments may be made in the timing, intensity and duration of livestock grazing. Wildfires and prescribed fires may cause portions of allotments to be rested for a period of time. Therefore, when mitigating for ecological concerns, there are both direct and indirect economic impacts to the permittees and the local economies. Economic impacts will have a social impact to rural life styles.

If either the BLM or the FS were to reduce their role in this grazing system, the permittee would need to find other private or public lands to hold their cattle while forage is being grown, or they would need to reduce their total livestock numbers. Buying and shipping forage from outside sources (a feedlot scenario) is not considered economical because of the costs. In many cases, reductions in total livestock numbers would also make some family-owned businesses uneconomical.

Economic strains intensify as operational costs increase without associated increases in the prices received for livestock products. The average 300 cow/calf operation in the western United States typically yields a two percent investment return. In other words, a million dollar ranch with investments in land, grazing permits, livestock and equipment would typically have an annual return of \$20,000.00. This return is often too low to support a ranching family. Under these conditions, many family members must seek employment outside of the ranch to make ends meet (Knight et al. 2002).

Studies have shown that services provided by local governments are significantly less to farms and ranches than the ranchettes and subdivisions that often replace them. Agricultural lands provide more in tax revenues than they demand in services. Likewise, residential lands incur greater service costs than they provide back to the county in tax revenue (Bradford et al. 2002 and Knight et al. 2002).

Contributions of public land ranching go beyond those expressed with dollar figures. The low intensity economic activity on ranches also provides open space, biodiversity, wildlife habitat scenic vistas and control of invasive and exotic species (Knight et al. 2002).

Employment

Cattle production and forest products provide a core employment for Grant and Harney counties. Most of the ranches are family run businesses and are not corporately owned. The majority of these ranches rely on public land for summer pasture. The 2004 agricultural revenue for Harney County alone totaled \$60,617,000.00. Cow and calf sales comprised 73% of the agricultural revenue in Harney County or \$44,250,410.00 (Burns Times-Herald, 2005).

Forest products industries include 3 major lumber mills and numerous logging companies. Wood products employment totaled 530 direct jobs (e.g., mill workers and loggers), which is approximately 14% of the total non-farm employment in Grant and Harney counties (average annual in 2000). In Grant County alone in 2000, there were

about 730 jobs (16% of the total employment in the county) in farm and agricultural services, with 580 in farm services (The Wilderness Society 2004). Local government, retail trade, and services employ the most people in Grant and Harney counties (Kohrman 2003, The Wilderness Society 2004).

Ranchers in Grant and Harney counties, with federal permits in the analysis area, are highly dependent on forage from federally managed lands, compared to other counties in the region. The value of cattle reared on forage from federally managed lands represents more than 10% of total agricultural sales in Grant and Harney counties (Haynes & Horne, 1997). Baker, Wheeler, and Malheur counties are rated moderately dependent (3.6% to 10% of total agricultural sales come from cattle raised on forage from federally managed lands). Union, Umatilla, Morrow, and Gilliam counties are less dependent (less than 3.6%). Shifts in permitted use of federal grazing allotments change the availability of this forage source. The impact these shifts have on the local economy varies according to the adjustments that local ranchers have to make within their ranching operation. In Grant County, total gross farm income dropped between 1970 and 2000, and the percent of gross farm income from livestock had been reduced from 80% in 1970 to 43% in 2000 (The Wilderness Society 2004).

Recreation-based industries, while prevalent elsewhere in the region, have not been a major contributor to the local economies. Recent efforts indicate that the volume of business is only enough to supplement income, rather than provide a primary source of income (Kohrman 2003). The exception is hunting season, which typically draws larger numbers of people into the area. Stores that sell sporting goods benefit during this period. Recreation-based employment is seasonal and service-oriented, with wages at the lower end of the pay scale (Kohrman 2003). Economic activity based on recreation may have limited growth potential for communities in the area (Kline, 2001). Seasonal limitations, the dispersed nature of recreation within the counties, along with a general lack of large, water-based recreational opportunities, does not create the concentrated numbers of recreationists and readily-identifiable recreation destinations necessary to support many recreation industries (Kohrman 2003). Recreation based industry had a small increase in Grant County between 1990 and 2000 (The Wilderness Society 2004).

Historically, government employment and expenditures has provided a degree of stability in rural communities (Kohrman 2003). With reduced Forest Service budgets and work force, and a switch to management emphasis that produces generally lower amounts and value of commodity products, federal workforce and program expenditures has not buffered economic downturns as in the past (Oregon Department of Employment, 2001). This situation, combined with fluctuations in the other base industries, has had a significant effect on the economy (Kohrman 2003).

The communities surrounding the project area have a disproportionately high unemployment compared with the Oregon State average of 6.5% and the National average of 5.7%. Unemployment in Baker County at 12.6%, Grant County – 14.6%, Harney County – 13.1% and Malheur County – 11.4% (Oregon Employment Department, 2003 & 2004).

Average Wages

Average annual pay per job provides an indication of the wage contribution of jobs in the analysis area. Average income for the affected counties is below the national and state averages: United States \$36,200, Oregon \$33,200, Baker County \$24,200, Grant County \$24,500, Harney County \$23,300, Malheur County \$23,200 (Kohrman 2003). Wages in Grant and Harney counties are lower, primarily due to lower wage rates per hour and a larger number of part-time jobs, compared to the state as a whole (Kohrman 2003).

Per Capita Income

Per capita income measures economic well being, taking into account both population and income changes, although it does not address income distribution. Per capita personal income is total personal income divided by the estimated population. Per capita income in Grant and Harney counties is approximately \$22,400 and \$22,700 (2003 dollars), respectively. These counties lag behind the statewide average of \$29,300 (2003 dollars).

Environmental Justice

The population of the area is predominately white, followed by Hispanics (2.2% Grant County, 4.4% Harney County), and American Indians (1.7% Grant County, 4.4% Harney County). The region is sparsely populated, and contains low populations of minorities (5.5% of the Grant County population, 5.4% of Baker County, 9.9% of Harney County, and 31.2% of Malheur County (of which about a fourth is of Hispanic origin with the majority living east of Vale) (Kohrman, 2003; United States Census Bureau 2003; Malheur National Forest, 2004). The primary American Indian tribes involved are the Burns Paiute Tribe, the Confederated Tribes of the Umatilla Indian Reservation, and the Confederated Tribes of Warm Springs Reservation of Oregon. The 1855 Umatilla and the Warm Springs treaties, which were proclaimed in 1859, allow for grazing in kind with the citizens of the United States. With the exceptions of the Burns Paiute and Hispanics east of Vale, minorities are scattered throughout the counties. Poverty rates provide some indication of the percentage of the population in surrounding communities with low-incomes. Poverty rates for both Grant and Harney counties are 13.7%. The Oregon statewide average rate of persons living below poverty is 11.6% (Kohrman 2003).

Data regarding minorities or people with disabilities employed in the region in the timber, mining, ranching, road construction, forestry services, and recreation sectors is unavailable. Some firms contracted by the Forest Service for reforestation work have traditionally hired Hispanic workers that comprise a migratory workforce in the area. Asian and Pacific Islanders uses of the area include commercial mushroom harvesting and developed camping associated with this activity. Some contracts are reserved for award to minority businesses under the USDA Office of Small and Disadvantaged Business Utilization and the Small Business Administration, although overall contract amounts to these groups has declined since 1998 (Kohrman 2003).

There is no quantifiable information on how much use the area receives from minority and low-income populations other than the information shared by the Burns Paiute Tribe.

Effects on Social and Economics

The project area is grazed seasonally by three local ranching operations. The National Forest provides the majority of the summer pasture for these operators. Total livestock numbers under permitted grazing for these three ranches at the peak of the grazing season is 571 head. As these ranches are cow/calf operations, an estimated 457 calves are grazed on National Forest Allotments. In an average summer grazing, these calves would each gain approximately 250 pounds live weight or 150 pounds of red meat production. In total, approximately 114,250 pounds of live weight production is gained. Depending on market conditions, this gain could range from \$79,975.00 based on \$0.70/lb LW to \$114,250.00 based on \$1.00/lb LW.

Reducing permitted livestock levels would affect the economic viability of the ranch operation because of cost associated with securing replacement range, fencing and establishing waters on replacement range, and increasing the frequency of cattle trucking to reach replacement range. In addition there may be an overall increase in the time required by permittees in managing ranch operations.

A special report published in 1992 by the Oregon State University Extension Service concluded that: "changes in federal grazing policies and regulations may have led to relative asset devaluation in the federal land dependent sector of the western livestock industry in Eastern Oregon" (Obermiller, 1992).

The same study found that although grazing fees on private land are significantly higher than Forest Service land, overall grazing costs are much higher on Forest Service land. The increased expense associated with grazing on public land was attributed to: the cost of taking animals on and off of federal land, livestock management, maintenance of range improvements and higher death loss (Obermiller, 1992).

A comprehensive economic analysis requires all economic benefits and costs be identified and compared. In lieu of a comprehensive analysis, an economic analysis based on identifiable and quantifiable costs is presented. Quantifiable economic information on the benefits of alternatives is not available because of the difficulty in obtaining quantifiable data of the relationship between project outputs and resource impacts. For example, the flow of benefits from maintaining or enhancing ecological status and viability of riparian areas is difficult to quantify from an economic standpoint. The main problem from an analysis standpoint is that these resources are not typically allocated through a well functioning market system. Consequently, price and quantity information is frequently not available for a particular resource. This, along with the incomplete information on the production function relationship between project activities and a quantifiable effect on a given resource, makes it difficult, to identify and measure economic benefits. The economic analysis addresses the concern that reducing permitted livestock levels would affect the economic viability of the ranch operation because of cost associated with securing replacement range, fencing and establishing waters on replacement range, and increasing the frequency of cattle trucking to reach replacement range. In addition there may be an overall increase in the time required by permittees in managing ranch operations.

The economic analysis focuses on three key indicators of change by alternative. First, the number of permitted head months. Second, operational costs or change in management

intensity. Third, cost to implement the activities identified in the alternative. Table 15 displays the comparison of alternatives. Alternative 1 is the current management and will be used as the baseline for comparison purposes. Alternative 2 is the proposed action. Alternative 3 is the no action alternative or no grazing on Forest Service land. The table uses 0 as the baseline, - (minus) to reflect a decrease or negative impact, -- (double minus) to reflect a greater decrease, and +(plus) to reflect an increase or positive impact to the permittee and Forest Service.

Table 15 Key Economic Indicators

Indicator	Alt 1 Current Mgmt	Alt 1 Current Mgmt	Alt 2 Proposed Action	Alt 2 Proposed Action	Alt 3 No Grazing	Alt 3 No Grazing
	Permittee	USFS	Permittee	USFS	Permittee	USFS
Permitted HMs	0	0	-	0	--	--
Operational Costs	0	0	-	0	--	+
Implementation Costs	0	0	-	-	--	+

Direct, Indirect and Cumulative Effects from Alternative 1 – Current Management

Alternative 1, Current Management was used as the baseline for which the other two alternatives were compared. Alternative 1 does not change the permitted head months or the operational costs because it requires the same level of management intensity from the permittees and continues the same level of Forest Service administration and oversight. Alternative 1 does not propose any new range improvements and continues to maintain the existing infrastructure, therefore implementation costs remain the same for the permittees and the Forest Service.

Direct, Indirect and Cumulative Effects from Alternative 2 – Proposed Action

The proposed action requires an increased level of livestock management. Emphasis in this alternative involves changing cattle use and distribution near aspen stands, riparian areas, *Botrychium* habitat and other areas of concern. Due to the increased management requirements, operational costs will increase leading to a negative economic impact on the permittees. Operational costs for the Forest Service will be similar to the current management outlined by alternative 1.

The proposed action identifies several new fences, in stream restoration activities and aspen stand treatments. The permittees and the Forest Service will be cooperatively involved in the implementation of these activities. Therefore, the implementation costs associated with this alternative will have a negative impact on the permittees and the Forest Service.

Permittees were consulted through out the entire analysis process. Every effort was made to address permittee concerns. The permittees provided input on alternatives and site specific development proposals for their respective allotments. In fact, many of the

proposed developments were brought forward by the permittee's with full knowledge of the potential economic impact.

Direct, Indirect and Cumulative Effects from Alternative 3 – No Grazing

The no grazing alternative would eliminate livestock grazing on the House Creek, West Malheur, and Wolf Mountain Allotments. This alternative addresses the issues raised by individuals and groups that do not support livestock grazing on public lands. The aesthetic, recreational, environmental and other philosophical values of these groups are likely to be enhanced if the no grazing alternative is selected

The no grazing alternative would have an even greater negative impact on the permittees and the Forest Service under the permitted head month indicator. The proposed action called for a reduction of head months and the no grazing alternative requires an elimination of head months. Under alternative 3, all Term Grazing Permits would be cancelled upon implementation of the decision and resolution of the appeals process. No permits would be issued to graze livestock on the House Creek, Wolf Mountain, West Malheur and Van allotments unless there was a subsequent NEPA analysis and a decision to re-stock any or all of the allotments. No grazing fees would be collected on these allotments and no range betterment dollars would return to the Malheur National Forest.

Operational costs would dramatically increase for the permittees with the loss of summer pasture, increased feed costs, transportation costs, potential impacts to private land and disruption of current marketing strategies. These changes translate to a significant negative economic impact on the permittees. Under the no grazing alternative, operational cost to the Forest Service may decrease. Forest Service administration would not be as intense on allotments that are no longer grazed. Under the no grazing alternative, there would be no mitigation measures related to livestock management. Therefore, alternative 3 would have a positive economic impact on the Forest Service.

Implementation costs associated with alternative 3 will have a negative economic impact on the permittees similar to those associated with operational costs. Activities necessary to maintain livestock grazing on public land would no longer be necessary therefore, implementation costs of the no grazing alternative would have a positive economic effect to the Forest Service.

Range improvements including: fences, water systems and corrals would remain on the allotments but would no longer be the responsibility of the permittees to maintain. Forest Service would assume responsibility for maintenance until removal. Permittees would be reimbursed for their amortized share of cooperative range improvements where they participated in the development (Forest Service Handbook 1109.13 Chapter 70).

Subsequent decisions would be needed regarding retention of any improvements for other resource needs such as wildlife or recreational use. Alternative funding sources for maintenance would need to be secured. Allotment boundary fence maintenance would be re-assigned to adjacent permittees. If private landowners wished to continue grazing the associated private lands, it would be necessary for them to fence the boundaries to insure their livestock would not trespass on Forest Service lands. Fences in common with other state and federal lands would remain intact with ownership assumed to belong to the private land owner, state or federal agency.

Watershed/Soil

The Malheur National Forest is located in Southeast Oregon and is part of the Owyhee Uplands sub-ecoregion of the Intermountain Semi-desert Ecoregion (USDA, 1994). This region is typically sagebrush-steppe with elevations from approximately 4,000 to 9000 ft.

Topography

House Creek Allotment

The elevations at the House Creek allotment range from approximately 5000 – 5900 ft. The topography is upland flats with moderate to steep slopes leading to hilltops. Aspects are generally south, but can be variable. House Creek has two tributaries, north and south, that confluence in the Silvies Valley, then flow as House Creek into the Silvies River.

West Malheur Allotment

The West Malheur allotment is located in the East Fork Wolf Creek watershed and ranges in elevation from approximately 4300 ft to 6100 ft. The allotment is composed of upland flats with moderate to steep slopes leading up ridges and hilltops, generally in the eastern and northern areas of the allotment. Slope aspects are variable. The East Fork Wolf Creek headwaters are located in the northeast area of this allotment. Reaches of Wolf Creek, Squaw Creek, Magpie Creek, and Duck Creek flow through this allotment. Only the East Fork Wolf and Wolf Creek are perennial streams.

Wolf Mountain Allotment

The elevations at the Wolf Mountain allotment range from approximately 4500 ft. to 6500 ft. The topography is primarily rolling upland flats with moderate slopes rising to hill and ridge tops. There are some steeper slopes occurring in this allotment.

Precipitation

Annual precipitation on the Malheur N.F. ranges from 15 to 40 inches, with the higher elevations receiving the higher annual precipitation. Most precipitation is from winter snowfall and/or rain occurring between the months of October and March with the remainder coming from summertime convective thunderstorms of short duration. The House Creek area within the House Creek Allotment has an annual precipitation rate of approximately 15 inches per year. The Middle Fork Wolf Creek Watershed has an average annual precipitation of approximately 17 inches (USDA, 2004). The East Fork Wolf Creek Watershed where the West Malheur Allotment is located has an average annual precipitation of approximately 17 -20 inches. The Wolf Mountain area where the Wolf Mountain Allotment is located has an annual precipitation rate of approximately 20 inches per year.

Soils

Overgrazing by sheep and cattle in the 1800s and early 1900s caused extensive erosion of shallow soil areas, especially at higher elevations. Due to the self-reinforcing nature of erosion, accelerated erosion continues in many shallow soil areas. Erosion impacts from current grazing on shallow soils are minor, because under current management cattle generally avoid shallow soils.

In meadows, watering areas, and grassy riparian areas, current grazing compacts soil, reduces maximum infiltration rates, and reduces ground cover. However, these effects do not appear to significantly increase soil erosion.

Regulatory Framework

Malheur National Forest Plan Forest-Wide Standards state:

125. Evaluate the potential for soil displacement, compaction, puddling, mass wasting, and surface soil erosion for all ground-disturbing activities.

126. The total acreage of all detrimental soil conditions shall not exceed 20% of the total acreage within any activity area, including landing and system roads. Consider restoration treatments if detrimental conditions are present on 20% or more of the activity area. Detrimental soil conditions include compaction, puddling, displacement, and severely burned soil, and surface erosion.

127. Minimum percent effective ground cover following land management activities:

Soil Erodibility	First Year %	Second Year %
Very High	60-75	75-90
High	50-60	65-75
Between Moderate & High	45	60
Moderate	38	50
Between Low & Moderate	30	40
Low	20	30

Forest-Wide Standard 126 was developed for timber projects, and the Forest soil scientist and the Regional Soil Scientist have concluded it does not fit range projects well.

Reasons for this conclusion include the following:

- The term "activity area" is undefined for range projects.
- Standards were developed for response of trees to detrimental conditions, but response of forage may be different.
- Any decrease in plant production from grazing due to compaction and puddling is likely to be small compared to the decrease due to defoliation and other direct damage to plants (Greenwood & McKenzie 2001).
- Little scientific information is available on compaction and puddling by livestock, as managed on these allotments, and in environments similar to these allotments.
- Rangeland soil quality has commonly been described in terms of erosion (ground cover amount and distribution, rilling, pedestaling, erosion pavements, sediment deposition, trampling) rather than compaction and puddling (USDA Forest Service 1984, section 254.1)

Because of the poor fit between Forest Wide Standard 126 and rangelands, and because potential grazing effect on soil and water resources is an issue in this Environmental Assessment, this assessment will focus on representative erosion and compaction

conditions. The desired condition is that livestock compaction effects on soil erosion would be negligible, in terms of soil and water quality. Attainment of this desired condition would meet the intent of the Forest Plan, which is to manage the land without permanent impairment of land productivity and to maintain or improve soil and water quality (Forest Service Manual, R-6 Supplement 2500-98-1). Erosion is the detrimental impact that would cause permanent impairment of land productivity; impairment from compaction is reversible.

Methods

In this assessment, "soil" means soil outside stream channels. Compaction can potentially decrease infiltration capacity enough that it increases runoff and erosion from soil. In order to check how common this process is, randomly selected areas of known livestock use were examined for indications of erosion, compaction, and overland runoff between September 20 and September 27, 2005. Erosion was determined through visual indicators. Compaction was determined by using a spade and soil structure indicators. The following table lists the areas visited.

Table 16. Soil Examinations

Allotment	Pasture	General Area
House	North	CHE Springs area
	South	House Creek
Wolf Mountain	Schurtz	Upper Schurtz Creek,; Rd 859
	Wolf Creek	Wolf Creek Meadows; Jump – Off – Joe Mountain
	Beaverdam	Beaverdam Meadows
West Malheur	Cougar	Squaw Creek; Squaw Creek Spring; Lucky Reservoir
	Pierpont	Cow Spring

Existing Conditions

House Creek Allotment

The soils in the House Creek allotment are primarily young, poorly developed Andisols derived from volcanic materials such as rhyolite, andesite, basalt, and tuffaceous sediments. Soils on slopes and hilltops are gravelly and cobbly loam mixed with silt and volcanic ash. These are well-drained soils and have moderate to rapid infiltration rates and moderate permeability rates. The upland flats soils are moderate to poorly drained gravelly to cobbly loams and clay loams. The soils in both assessment areas were extremely dry due to the lateness of the season.

The surface soils in the South pasture are well drained silt loams derived from volcanic ash on the hilltop and north slope of the largest hill. The north slope subsoils are unconsolidated, variable volcanic materials. The other slopes and upland flats are excessively drained, gravelly loams and clay loams derived from basalt and andesite. With these gravelly loams, 40 to 60% of the land surface is covered with rock fragments. The soils in the assessment area are very dry, rocky, and shallow. The soils along the House Creek streambank are the same as the upland soils. Heavy livestock use is evident.

The soils in the North pasture are excessively drained, basalt and andesite derived gravelly and cobbly loams on the hilltop, transitioning to ash derived surface soils on the north and east slopes. The west and south slopes that gradually descend to upland flats with moderately drained, clay loam surface soils and gravelly to cobbly clay loam subsoils. These soils are derived from basalt and rhyolite. The area surrounding Che Springs showed heavy livestock use, with diminishing use as distance from the spring increased. The soils are dry and less rocky than those along House Creek.

The table below summarizes the soil assessment for House Creek allotment. ‘Resistance’ describes the force required for the shovel to penetrate the soil. Low resistance required arm strength only; Moderate resistance required foot pressure; High resistance required standing or jumping on the spade. Soil was compacted in 100% of all assessed areas of obvious, concentrated cattle use. However, because livestock in these allotments tended to concentrate in small areas near watering points, springs, and riparian zones, the total area of soil compaction is less than or equal to 5% of the total allotment acreage. None of the upland soils assessed were compacted. Soil compaction did not induce or exacerbate erosion on the sites that were assessed.

Table 17. House Creek Allotment Soil Assessment

Pasture	Sample	Resistance	Soil Structure	Compaction	Erosion
South	1	Moderate	Massive	YES	NO
South	2	Moderate/High	Massive	YES	NO
South	3	Moderate	Platy	YES	NO
North	1	High	Massive	YES	NO
North	2	Moderate/High	Platy	YES	NO
North	3	High	Platy	YES	NO

Natural processes are slow to restore soil productivity in this semiarid region; therefore, soil degradation prevention is an effective way to maintain soil productivity. Vegetative cover is critical for managing potential erosion and improving or maintaining soil water storage that contributes cool soil water to local, summer low flows. Low water storage capabilities in the well drained soils limit plant available water in the drier summer months, usually beginning in June. The clayey soils in the flatter terrain are resistant to erosion but susceptible to compaction when they are wet (Carlson, 1974).

West Malheur Allotment

The most common soil in this allotment, found primarily on sideslopes but also on upland flats, is a shallow, well-drained silt loam derived from volcanic ash. The underlying subsoil is a gravelly loam that increases in gravel and cobble content as soil depth increases. Parent material is derived from tuffaceous sediments, basalt, and rhyolite. Much of the land area is covered with rock and rock fragments. Lack of a suitable growing medium and low water storage capabilities limit plant growth in some areas, such as Magpie Table. Soils in stream channels, riparian zones, and floodplains are generally unconsolidated materials consisting of gravelly to very gravelly and cobbly loams and clayey loams. (Carlson, 1974).

The Cougar Flat pasture soils are very shallow, gravelly and cobbly loams and clay loams that range from 4 to 12 inches deep. Parent material is weathered basalt and andesite. The soils contain 30 to 70 percent gravel and cobble and are excessively drained. The soils on the ridge to the east consist of well to excessively drained soils that are ash-derived.

These soils are variable, poorly defined, shallow, and rocky. The soils in the low-gradient, Squaw Creek Spring assessment area are silty loams without the rock and gravel typical of downstream Squaw Creek assessment area. The Squaw Creek assessment area showed no signs of recent grazing, but past grazing was evident. The Lucky Reservoir assessment area is similar to the Squaw Creek Spring assessment area with silty loams and without large amounts of rock and gravel. The presence of soil surface rock fragments and gravel increases a short distance from the reservoir up to 90%, with 40 – 70% more typical, especially in the Rock Springs pasture.

The soil types in the Pierpont pasture are dominated by the well-drained, ash-derived silt loams of the hill/mountain. These soils are 8 to 24 inches deep, with the deeper soils occurring on the north face. In the Cow Springs assessment area, organic matter/O-horizon is 0 to 2 inches deep and consists primarily of pine duff. The soil showed increasing compactedness near the spring/trough. The subsurface soil is a gravelly loam derived from tuffaceous sediments and rhyolite. Soils found in the ridges and draws north of East Fork Wolf Creek are composed of excessively drained gravelly and cobbly loams and clay loams. These soils are derived from basalt and andesite, with recent volcanic ash inclusions. The soils along East Fork Wolf Creek are poorly defined, ash-derived soils that overlay unconsolidated and variable subsoil material. Soil surface rock fragments on the Magpie Flat and in the Rock Springs can be up to 90%, with 40 – 70% more typical.

The table below summarizes the soil assessment for West Malheur allotment.

‘Resistance’ describes the force required for the shovel to penetrate the soil. Low resistance required arm strength only; Moderate resistance required foot pressure; High resistance required standing or jumping on the spade. Soil was compacted in 75% of all assessed areas of obvious, concentrated cattle use. However, because livestock in these allotments tended to concentrate in small areas near watering points, springs, and riparian zones, the total area of soil compaction is less than or equal to 5% of the total allotment acreage. None of the upland soils assessed were compacted. Soil compaction did not induce or exacerbate erosion on the sites that were checked.

Table 18. West Malheur Allotment Soil Assessment

Pasture	Sample	Resistance	Soil Structure	Compaction	Erosion
Cougar/Squaw Creek	1	Moderate	Granular	NO	NO
Cougar/Squaw Creek	2	Moderate	Structureless, Single grain	NO	NO
Cougar/Squaw Creek	3	Moderate/High	Platy	YES	NO
Cougar/Squaw Creek Springs	1	High	Massive	YES	NO
Cougar/Squaw Creek Springs	2	Moderate/High	Platy	YES	NO
Cougar/Squaw Creek Springs	3	High	Platy	YES	NO
Cougar/Lucky Reservoir	1	High	Massive/platy	YES	NO
Cougar/Lucky Reservoir	2	High	Platy	YES	NO
Cougar/Lucky Reservoir	3	High	Massive	YES	NO
Pierpont/Cow Springs	1	High	Platy	YES	NO
Pierpont/Cow Springs	2	High	Massive/Platy	YES	NO
Pierpont/Cow Springs	3	High	Structureless, Single grain	NO	NO

Wolf Mountain Allotment

The soils in the Wolf Mountain allotment are primarily derived from volcanic materials including rhyolite, tuffaceous sediments, basalt and andesite. Surface soils on this allotment are commonly silt loams from volcanic ash that are up to 12 inches deep. Other common soils in this allotment are gravelly loams and clay loams. The subsoil is typically gravelly loam; gravels and cobbles increase with depth. These surface soils are well drained, have low bulk density, and high water storing capacity that resists water erosion. Subsurface loams and gravelly loams are more susceptible to water erosion. With low soil moisture (< 10%) or vegetative cover loss, these ash-derived soils become highly susceptible to displacement, mixing, dustiness, and wind erosion due to their low bulk density. Natural processes are slow to restore soil productivity in this semiarid region; therefore, prevention of soil degradation is necessary. Vegetative cover on these ash derived soils is critical for managing potential wind erosion of the surface soil that

can lead to sheet, rill and gully erosion of subsoil. Vegetative cover also improves or maintains soil water storage that contributes cool water to local, summer low flows.

The Antelope pasture soils at Jump - Off Joe Mountain are ash-derived silt loams that range from 12 to 24 inches deep. These soils have rapid infiltration rates and moderate permeability. The subsoil is gravelly to cobbly loams that are derived from weathered basalt, andesite, and tuffaceous material. The assessment site in this area had pine duff covered soils and no signs of recent or historic grazing. The slope was 30% to 40 %. Past timber management and logging activities were in evidence. The draws and ridges to the northeast of Jump Off Joe Mountain are mostly excessively drained silt loams that are derived from weathered basalt and andesite. These soils are gravelly to very gravelly and cobbly and gravels and cobbles increase with depth. There are also ash-derived surface soils present. There is usually 0 to 2 inches of organic litter in process of becoming an O-horizon. The stream channel soils range from silt loams to loams to clay loams and can be highly susceptible to gully and streambank erosion.

The surface soils in the Wolf Creek pasture are almost entirely ash-derived silt loams with rapid infiltration and permeability rates. The soils found on Wolf Mountain and the upland flats and are 8 to 12 inches deep. Subsurface soils are derived from tuffaceous material and rhyolite. There is 0 to 2 inches organic litter/O-horizon and less than 10% of the soil surface is covered with rock fragments. Wolf Creek Meadows is a wet sedge meadow and had a dense root mat/O-horizon for the top three inches. Below that, the soil is a silty loam. The soils along the stream channels are ash-derived surface soils, 8 to 12 inches deep, with poorly defined, unconsolidated material beneath.

The surface soils in the Beaverdam pasture are excessively drained silt loams that are derived from weathered basalt and andesite. The Beaverdam pasture assessment site adjacent to the 17 Road has a wet sedge meadow enclosure. These soils are a silty loam with a dense root mat for the first two to three inches. Soils were also assessed outside the enclosure. These soils, along Beaverdam Creek, are ash-derived silt loams with rapid infiltration and permeability rates until the creek enters the canyon at which point the soils become more clayey and unconsolidated. Evidence of past grazing was present in and around the enclosure. The soils showed soil compaction, even though there was no evidence of recent grazing.

The surface soils in the Schurtz Creek pasture are rocky, gravelly, well drained silt loams with moderate permeability. The subsoil is gravelly and cobbly clay loam with very slow permeability. There are 30 to 60% surface rock fragments, increasing towards Schurtz Creek canyon. In this pasture, it is common for these soils to be mixed with ash-derived silt loams with rapid infiltration and permeability rates.

The table below summarizes the soil assessment for the Wolf Mountain allotment. 'Resistance' describes the force required for the shovel to penetrate the soil. Low resistance required arm strength only; Moderate resistance required foot pressure; High resistance required standing or jumping on the spade. Soil was compacted in 80% of all assessed areas of obvious, concentrated cattle use. However, because livestock in these allotments tended to concentrate in small areas near watering points, springs, and riparian zones, the total area of soil compaction is less than or equal to 5% of the total allotment

acreage. None of the upland soils assessed were compacted. Soil compaction did not induce or exacerbate erosion on the sites that were checked.

Table 19. Wolf Mountain Allotment Soil Assessment

Pasture	Sample	Resistance	Soil Structure	Compaction	Erosion
Beaverdam	1	Moderate	Granular/Platy	YES	NO
Beaverdam	2	Moderate/High	Granular/Platy	YES	NO
Beaverdam	3	Moderate	Granular/Platy	YES	NO
Wolf Creek Meadows	1	Moderate	Platy	YES	NO
Wolf Creek Meadows	2	High	Platy	YES	NO
Wolf Creek Meadows	3	Moderate	Platy	YES	NO
Antelope	1	Moderate	Structureless, Single grain	NO	NO
Antelope	2	Moderate	Structureless, Single grain	NO	NO
Antelope	3	Moderate	Structureless, Single grain	NO	NO
Schurtz Creek	1	Moderate/high	Platy	YES	NO
Schurtz Creek	2	Moderate	Platy	YES	NO
Schurtz Creek	3	Moderate/high	Platy/Granular	YES	NO
Schurtz Creek	4	High	Platy	YES	NO
Schurtz Creek	5	Moderate	Platy	YES	NO
Schurtz Creek	6	Moderate	Platy/Granular	YES	YES

Riparian

A riparian area is the area immediately adjacent to water (e.g., streams and ponds) where vegetation communities are strongly influenced by the presence of water. It is a transitional area on the stream banks between the aquatic environment within the stream and the upland environment on the slopes above. Although these areas are typically a minor portion of the landscape, they serve a much larger ecological role. A properly functioning riparian area will filter sediments and nutrients from floodwaters and upland runoff and prevent erosion during flood flows by stabilizing stream banks. They also provide wildlife habitat and thermal cover for aquatic and terrestrial life. A non-functioning riparian area would lack some or all of these attributes. Vegetation types typically found in riparian habitats in the project area include, but are not limited to,

willow and alder shrubs, cottonwood trees, and graminoids, such as sedges and grass. Bluegrass has also become prevalent (Crowe and Clausnitzer, 1997).

Riparian Proper Functioning Condition (PFC)

Proper functioning condition (PFC) assessment is a qualitative method for assessing the condition of riparian-wetland areas. The PFC assessment refers to a consistent approach for considering hydrology, vegetation, and erosion/deposition attributes and processes to assess the condition of riparian-wetland areas. A checklist is used for the PFC assessment, which synthesizes information that is foundational to determining the overall health of a riparian-wetland system.

The on-the-ground condition termed PFC refers to how well the physical processes are functioning. PFC is a state of resiliency that will allow a riparian-wetland area to hold together during high-flow events with a high degree of reliability. This resiliency allows an area to then produce desired values, such as fish habitat, neotropical bird habitat, or forage, over time. Riparian-wetland areas that are not functioning properly cannot sustain these values.

House Creek Allotment

Riparian Proper Functioning condition was conducted on two reaches of House Creek, the only perennial stream on this allotment. House Creek was determined to be in Proper Functioning Condition.

West Malheur Allotment

Recent proper functioning condition (PFC) surveys were not conducted on any streams within the West Malheur Allotment because PFC efforts were prioritized to streams of concern not located in this allotment.

Wolf Mountain Allotment

Riparian Proper Functioning Condition was conducted on a segment of Shurtz Creek. Shurtz Creek segment 3 is 0.25 miles long, beginning at the allotments southern boundary and ending upstream at Forest Road 17. This segment was rated “properly functioning condition”. The hydrology and soils sections of the PFC assessment on Shurtz Creek segment 3 are summarized below:

- Floodplain above bankfull is inundated in “relatively frequent” events
- Sinuosity, width/depth ratio, and gradient are in balance with the landscape setting
- Riparian-wetland area is widening or has achieved potential extent
- Upland watershed is not contributing to riparian-wetland degradation
- Floodplain and channel characteristics are adequate to dissipate energy
- Point bars are revegetating with riparian-wetland vegetation
- Point bars are revegetating with riparian-wetland vegetation
- Point bars are revegetating with riparian-wetland vegetation
- System is vertically stable
- Stream is in balance with the water and sediment being supplied by the watershed
- No headcuts were observed

There is good stream-floodplain interaction in this segment. Establishment of woody shrubs along the stream banks improves bank stability, and the stream channel narrows and deepens. Cottonwoods were observed.

Streams

The streams that flow through the allotments originate from snow-fed springs and seeps. Livestock consume and trample riparian vegetation and streambanks, which may contribute to increased width/depth ratio and higher water temperatures due to decreased shade. Elevated water temperatures lead to lower dissolved oxygen concentrations and can be harmful to aquatic life. The Oregon Department of Environmental Quality (DEQ) has determined that the seven-day-average maximum temperature of a stream identified as having Lahontan cutthroat trout or redband trout use in the Malheur River subbasin may not exceed 20.0 degrees Celsius (68.0 degrees Fahrenheit) (Oregon DEQ, 2003). None of the water bodies on the four allotments are on the Oregon DEQ 303(d) list. However, Forest Service temperature monitoring following 303(d) standards indicate the following streams do not meet the temperature standard.

- Schurtz Creek
- Wolf Creek
- West Fork Wolf Creek
- East Fork Wolf Creek
- South Fork Antelope Creek

House Creek Allotment

The streams that flow through the House Creek allotment flow generally west into the Trout Creek watershed, then to the Silvies River. This allotment has portions of House Creek and Poison Creek flowing through it. Due to the low annual precipitation and highly drained soils, most streams and headwater sources on this allotment are intermittent. Only House Creek is perennial. The upper half of the creek lies within the Malheur National Forest. House Creek is a second order stream and a tributary to the Silvies River located in the southeast corner of Flat Creek/House Creek subwatershed within the northeastern part of the Trout Creek watershed in the Silvies sub-basin.

West Malheur Allotment

The streams that run through the West Malheur allotment flow generally southwest, and eventually reach the Upper Malheur River. East Fork Wolf Creek, Wolf Creek, Squaw Creek, Magpie Creek, and Duck Creek all have reaches that flow through the West Malheur allotment. The East Wolf Creek and Middle Fork Wolf Creek confluence is located at the boundary of this allotment. These two streams have perennial flows. Squaw Creek, Magpie Creek, and Duck Creek are intermittent. The following table summarizes the geomorphology of the streams that run through the Van allotment. The data are averages and was taken from Malheur National Forest Stream Surveys published in 2004. Some information was not available or applicable.

Wolf Mountain Allotment

The major streams that flow through the Wolf Mountain allotment are Wolf Creek, Middle Fork Wolf Creek, Shurtz Creek, and Beaverdam Creek have their sources in the

Wolf Mountain allotment and flow generally southeast into the Malheur River system. Antelope Creek and South Fork Antelope Creek also have their sources in this allotment and flow northwest into Bear Creek, which flows into the Silvies River. Headcuts have been observed on Beaverdam Creek. There are many unnamed, intermittent streams as well.

Effects on Watershed/Soils

Effects on Soils

Effects Common to all Alternatives

Soil, water, and plants are extensively interconnected in the natural environment. As plants become established in soil that is fertile enough to sustain them, the roots penetrate into the soil. The plant and root systems create channels for preferential water flow, resist soil erosion, and reduce compaction by maintaining soil structure (Brady and Weil, 1999; Sylvia et al, 1998). Increased water availability will improve plant vigor and overall biomass. Plants also contribute to soil fertility by adding organic matter to soil through litter fall and dead plant decomposition. Organic matter is well known to improve soil structure, fertility, and soil moisture capacity (Kirkham, 2005; Brady and Weil, 1999; Gleissman, 1998). Plant-derived organic matter also provides a food source to organisms that further contribute to overall soil stability, structure, fertility, and water holding capacity (Brady and Weil, 1999; Wood 1998). If plant-root mass decreases, the associated soil stability, structure, fertility, and water holding capacity will likely also decrease. Below is an illustration showing the relationship between plant above-ground vegetative mass and below ground root mass.

By maintaining above ground plant biomass, below ground root mass is also maintained. If below ground root mass is maintained, the derived soil benefits (stability, structure, fertility, water holding capacity) will also be maintained. Vigorous plant growth will mitigate the negative effects livestock can have on soil quality.

Concentrated livestock grazing may cause soil compaction. Management strategies that help minimize compaction of rangeland soils include:

- Minimize grazing and vehicular traffic when the soils are wet;
- Use only designated trails or roads, and reduce the number of trips;
- Maintain or increase the content of organic matter in the soil by improving plant cover and plant production.



Figure 3. Relationship between above ground biomass and root mass. *Photo courtesy of University of Illinois Extension Service.* (See Also: Weaver, 1950; Albertson, et al, 1953; and Dietz, 1989).

As Figure 3 shows, when above ground leaf/blade biomass is reduced to a certain threshold, root mass diminishes dramatically. Dietz (1989) identified the threshold at 60% leaf removal. Below table 20 summarizing Dietz's finding.

Table 20. How grazing affects root growth.

Percent Leaf Volume Removed	Percent Root Growth Stoppage
10%	0%
20%	0%
30%	0%
40%	0%
50%	2-4%
60%	50%
70%	78%
80%	100%
90%	100%

All root growth stops for 12 days with 80% leaf removal and for 18 days with 90% leaf removal.

Natural recovery rates for compacted soil are often slow, taking years to decades or more (Cole, 1988). Freeze/thaw cycles and annual wetting and drying can break down compacted soil, especially in soils that have high clay content. Drought conditions may slow compaction recovery processes and prolong recovery periods (Thurrow, et. al., 1999). Plant roots help to break up compacted layers by forcing their way between soil particles. Plants with large taproots are more effective at penetrating and loosening deep compacted layers, and fibrous root systems can break up surface compacted layers. Roots also reduce compaction by providing a food source that increases the number and activity of soil organisms. Soil organisms, such as earthworms and small mammals reduce compaction as they burrow and mix the soil.

Improperly managed livestock may cause accelerated water erosion. Management strategies that help minimize water erosion of rangeland soils include:

- Maintaining or increasing surface plant cover and litter through good rangeland management practices;
- Increasing water infiltration rates and improving soil aggregate stability by improving or maintaining plant community quantity and quality through livestock management;
- Minimizing grazing and traffic when the soil is wet to prevent soil compaction;
- Fencing.

Plant community recovery after fertile topsoil is eroded is restricted. Erosion of nutrient-rich topsoil can cause a shift to less desirable plants, such as from palatable or soil stabilizing species to unpalatable invasive species and weeds that do not improve soil quality.

Improperly managed livestock grazing may trample riparian areas. Management strategies that help minimize streambank trampling include (Council for Agricultural Science and Technology, 2002):

- Fencing
- Increase upland forage outside the immediate banks by rotating grazing duration, timing, and forage use;

Management strategies that help minimize trampling of upland range soils include (USDA, Natural Resources Conservation Service, 2001, Rangeland Sheet 7):

- Maintaining the optimum amount of live vegetation, and litter relative to the site in order to maintain organic matter content and soil structure to control erosion through livestock management;
- Improve soil structure and plant establishment by incorporating organic matter into the soil;
- Rotate grazing during periods when soils are most susceptible to physical disturbances.

Biological soil crust recovery can take decades to hundreds of years. Adequate organic matter, desirable species seeds, and a rest period are needed for successful establishment of plants after crusts are broken (Kaltenecker et. al., 1999). Biological crusts that are in low rainfall areas, on coarse textured soils with low stability, and are in areas with a large amount of bare ground are most susceptible to disturbance and have the longest recovery times. (USDA, Natural Resources Conservation Service, 2001, Rangeland Sheet 8)

Because the Malheur National Forest is public land managed for multiple uses, effects from uses and management practices other than livestock grazing are apparent. Timber sales and logging have occurred in grazing allotment areas as evidenced by roads, stumps and skid trails.

Timber harvest began on a small scale on the Malheur National Forest at the end of the nineteenth and beginning of the twentieth centuries, mostly to supply local ranch needs. Large-scale timber harvest began within the Forest in the late 1940s and early 1950s. Consequently, roads were constructed through the Forest to access timber. Approximately 80 percent of the Malheur National Forest is forested. Approximately 30 percent of this area has been intensively managed since the early 1970s. Prior to this time logging was selective for large overstory pine (USFS, 1996).

Landscape disturbances from the commercial harvest of trees, especially clear-cut activities and activities in floodplains have had a significant effect within the Forest's stream channels and floodplains. Over 20,165 acres have been harvested across the 3 allotments since 1978. However, since 1995 the removal of trees and associated activities in riparian areas has been restricted to the surrounding uplands unless those activities

would improve conditions in the riparian area. It would take over a hundred years to replace old growth trees removed from the floodplains, but harvest restrictions during the past 11 years have improved the rate of recovery from these historic landscape altering events.

Driving equipment and hauling or dragging logs over forest soils gouges and ruts the soil, displaces organic matter, and can cause compaction. Low bulk density soils, such as the volcanic ash soils that are common on the Malheur National forest, are more susceptible to compacting than those soils with a high baseline bulk density.

One possible consequence of soil compaction is site productivity reduction. Plant roots have difficulty penetrating compacted soil, and water infiltration rates decrease. Also, changes in soil water content from reduced infiltration due to soil compaction affect temperature flux. This alters microclimatic conditions and can further inhibit root growth and stand productivity, because compacted soils have smaller pore sizes than non-compacted or undisturbed soils. These effects from compaction can last for decades.

Timber management activities also affect soil-water processes. In the past, clearcutting has increased storm peak flows and surface runoff. The largest increases usually occur during early spring storms. Suspended sediment loads can increase significantly due to increased overland flow and landslides from reduced vegetative surface cover. Sediment loads can remain elevated more than a decade after harvest.

Road building also affects soil-water runoff processes, sediment yields, and erosion. Increased peak flows, suspended sediment loads, and erosion can occur with different harvest treatments. Responses can be variable between treatments and among project areas. Modern forest practices seem to mitigate, but not eliminate these impacts.

As post harvest vegetation grows, the flow increases diminish, returning to pre-harvest flow conditions after about 10 years. Sediment yields do recover as quickly and can persist despite vegetative recovery. Erosion and sedimentation from road building and tractor logging can remain elevated decades after harvest.

Fires have also occurred on the allotments, either naturally, as prescribed treatments, or as part of past logging activities. The severity of fire affects to soil, vegetative ground cover, and organic matter are largely determined by the intensity of temperatures and duration of the fire. With low burn severity sites, such as prescribed burning or historic wildfire, the litter is partially consumed by the fire and the soil surface layer receives little heat. Low intensity fire does not affect the soil hydrologic properties. Unburned roots and seeds that are in the surface soil would aid in revegetating the burn area. Natural re-vegetation on these sites usually occurs quickly. Low severity fires can make water-soluble nutrients immediately available for plant uptake. This may enhance vegetative re-growth immediately after a fire.

High severity burn sites, such as intensive wildfires or slash pile burning sites have modified surface soil properties. There are few viable roots and soil organic matter has been consumed, leading to soil structure breakdown, and a strong hydrophobic layer may be present. Few viable seeds remain in the upper layers of the soil. Hydrophobic soil conditions and a lack of organic litter layer or protective vegetative cover. It can take decades for soils to recover pre-fire structure, function, and productivity.

If plants immediately succeed in revegetating the burn area, pre-fire levels of most soil properties can be recovered and even enhanced.

Past timber sales in Wolf Mountain Allotment that may have impacted soils in the manner described above include Cove, Jungle Spring, Long Spring, Long Mountain, Milk Spring, Ewing II, County, Glass Mountain, Antelope, Cold Springs, Dry Springs, Northside and Dry Joe. Fuels treatments consisted of a variety of treatments including lop and scatter, hand pile and burn, grapple pile and burn, machine pile and burn, and about 116 acres of no fuel treatment.

The Van Vegetation Project, located within the Wolf Creek Watershed is in the early planning stage. This project would aid in mitigating the negative effects of prior timber and grazing management. The draft purpose of this project would be to

- Improve watershed conditions by reducing road related-impacts
- Improve riparian and overall watershed conditions through enhancement of riparian vegetation, and management of upland and riparian vegetation structure and composition
- Improve the health, vigor, and resiliency of vegetation to insects, disease, wildfire, and other disturbances, to more closely resemble historical conditions in order to promote long-term forest sustainability and wildlife species diversity
- Capture the economic value of those trees that are surplus to other resource needs on suitable lands

Past timber sales in West Malheur Allotment that have impacted soils include Vangulch, Frost, Capbox, Bedrock, East Wolf, Forks, Elk, and Boundary.). Fuels projects included of a variety of treatments including lop and scatter, hand pile and burn, grapple pile and burn, machine pile and burn, broadcast burn, and underburning.

In August 2001, the Wolf Creek fire burned approximately 661 acres within the West Malheur Allotment, creating some of the soil conditions described above.

The Coyote Creek Flow Enhancement Project proposes to thin juniper trees on about 120 acres in the West Malheur Allotment, Rock Springs Pasture. Juniper removal would increase soil water content and surface channel flow.

Past timber sales in House Allotment include CHE Spring and Otter. These were harvested mainly by overstory removal. Since the year 2000, about 60 acres have been harvested by selection and 321 acres by commercial thinning (Parasol Timber Sale). Past fuels treatments within the Allotment consisted of about 600 acres of machine piling (CHE Springs Timber Sale), 48 acres of lop and scatter (Otter Timber Sale), 72 acres of hand piling (Otter Timber Sale), and 43 acres of grapple piling (Otter Timber Sale).

The Parasol Vegetation and Watershed Management Project Decision Notice, signed 9/18/1998, authorized commercial harvest, precommercial thinning, mechanical fuels activities, aspen management, fire reintroduction, road closures and decommissions, relocation of designated old growth, designation of replacement old growth, and watershed and fisheries improvement projects. One aspect of this project that has not yet occurred is the fire reintroduction. Fuels will be burned in 7 blocks totaling about 6,700

acres. Of these acres, about 900 acres are within the House Creek Allotment and will be burned in the near future. Expected effects are described above.

Direct, Indirect and Cumulative Effects from Alternative 1 - Current Management

Allowable use levels for both upland and riparian vegetative communities would remain the same. The allotments are currently managed under the Allotment Management Plans. Current grazing systems, livestock numbers, season of use, and head months would remain the same. The Current Management alternative will require intensive livestock management and use existing fences, water developments and other physical structures. No new structures will be added. Areas of concern would be addressed with adaptive management and administrative changes.

Soil impacts such as compaction, livestock trampling, water erosion, and wind erosion due to inadequate livestock management have been well documented in scientific literature. Effects from historic, unregulated grazing include “[damage] to meadows and upland sites, many of which were compacted and eroded” and “Early sheep and cattle grazing practices have accelerated erosion over a good portion of the range and more open timber types (USDA Forest Service, 1990). This unregulated over-grazing severely reduced ground cover. Resultant plant production and ground cover probably was decreased for decades.

The parameters on the allotments that may affect soil productivity over the long term are lack of plant rooting depth, which contributes to accelerated erosion, and soil compaction. If the allotments maintain plant rooting vigor and adequate vegetative soil cover, soil capability would likely sustain or improve current soil productivity levels over the long term.

The geographic area for soil cumulative effects analysis is separated by allotment. This is because one grazing allotment or pasture’s soil productivity is not dependent on the adjacent grazing allotment or pasture’s productivity. Also, different livestock management practices may occur on different allotments. Although there are general, consistent cumulative effects to soil productivity, cumulative effects should be evaluated on a site-specific basis. Disturbances associated with current grazing management that may affect soil conditions include compaction, trampling, water erosion, and wind erosion. In the four allotments, soil conditions may be affected by man-caused disturbances not currently existing or by future natural events. Other common factors that may cumulatively affect soil conditions include:

- Roads – Considerable portions of the District have roads. Roads can have significant impacts on soil and water quality, riparian function, stream channel morphology, and floodplain function.
- Off road travel – Impacts from off road vehicle travel are increasing due to increasing use and equipment advancements.
- Terracing caused by wildlife trails – Big game species include deer, pronghorn, and elk. Their numbers are limited and the impacts from trailing are light.
- Burrowing animals contributing to bare ground.
- Fire – Fires have impacted large areas on the District. Water erosion following fires commonly occurs.

- Water diversions or spring developments in poor condition – Limited erosion and soil compaction or puddling can occur at some spring developments that are poorly designed or in disrepair.
- Flooding/High intensity storm events – These occur occasionally and can have considerable impacts on the watersheds that occur in the House allotment. The impacts are most pronounced following wildfires.
- Rain and snowmelt events - These occur occasionally and have considerable impacts on the steep and deeply incised watersheds that occur in parts of the District.
- Wind velocity
- Drought
- Juniper encroachment – In xeric environments, juniper out-competes other vegetation for soil moisture. This reduces understory vegetation, plant re-establishment, and vigor.

House Creek Allotment

While the current trend for long term soil productivity in the House allotment is not certain, the greatest potential for impairment is likely to occur in the areas that are most sensitive to adverse soil impacts such as compaction, water erosion, and in areas with biological crusts. These sensitive areas are primarily soils that have little or no vegetative cover, are found along stream channels or on steep slopes. Grass less than 4 inches tall may indicate compaction (or simply may indicate mechanical damage). The soils along House Creek and in the Che Springs area had indicators of soil compaction. The relative severity of compaction is difficult to determine because ungrazed areas are not available for comparison. Compaction could impede plant root growth, which then adversely affects above ground biomass (see above discussion, pages 94 - 96). In the areas assessed, upland soil erosion effects appeared to be negligible in terms of soil quality, water quality, and fish habitat. Under the current management alternative, ground cover, productivity, and biological soil crusts would continue to slowly recover on shallow soils that were degraded by unregulated grazing. Reaching desired soil conditions in areas of concern may take decades or longer (Cole, 1988).

West Malheur Allotment

While the current trend for long term soil productivity in the West Malheur allotment is not certain, the greatest degree of impairment is likely to occur in the areas that are most sensitive to adverse soil impacts such as compaction, trampling, water erosion, and wind erosion. These sensitive areas are primarily soils that have little or no vegetative cover, are found along stream channels, or on steep slopes. Grass less than 4 inches tall may indicate compaction (or simply may indicate mechanical damage). Soils around watering and congregating areas, such as Lucky Reservoir and Squaw Springs, were severely compacted. Compaction could impede plant root growth, which then adversely affects above ground biomass (see above discussion, pages 94 - 96). The relative severity level of compaction is difficult to determine in the grassy pastures because ungrazed areas are not available for comparison. Under the current management alternative, ground cover, productivity, and biological soil crusts should continue to slowly recover on some

shallow soils that were degraded by unregulated grazing. Reaching desired soil conditions in areas of concern may take decades or longer (Cole, 1988).

Wolf Mountain Allotment

While the current trend for long term soil productivity in the Wolf Mountain allotment is not certain, the greatest degree of impairment is likely to occur in the areas that are most sensitive to adverse soil impacts such as compaction, trampling, water erosion, wind erosion, and in the areas with biological crusts. These sensitive areas are primarily soils that have little or no vegetative cover, are found along stream channels or on steep slopes. Grass less than 4 inches tall may indicate compaction (or simply may indicate mechanical damage). Soils around watering and loafing areas, such as Wolf Creek Meadows, were severely compacted. Compaction could impede plant root growth, which then adversely affects above ground biomass (see above discussion, pages 94 - 96). The relative severity level of compaction is difficult to determine in the grassy pastures because ungrazed areas are not available for comparison. The desired condition is that soil erosion effects would be negligible in terms of soil quality, water quality, and fish habitat. Except for an open area along Road 1630-859, upland soil erosion effects in assessed areas seemed negligible in terms of soil quality, water quality, and fish habitat. Rill erosion in the aforementioned area was due to lack of vegetative cover. It will not likely have an effect on water quality or aquatic habitat because of the long distance from any stream or other water source. The erosion effect on soil quality is unclear because the soil is naturally shallow, very gravelly, and not prone to vegetative production. Under the current management alternative, ground cover, productivity, and biological soil crusts would continue to recover at slower than natural rates on soils that were degraded by unregulated grazing. Reaching desired soil conditions in areas of concern may take decades or longer (Cole, 1988).

Direct, Indirect and Cumulative Effects from Alternative 2 – Proposed Action

House Creek Allotment

The proposed actions for House allotment include stabilizing an inactive headcut on House Creek to prevent possible future erosion, fencing a riparian area on House Creek that includes a spring, maintaining 6" stubble heights in riparian areas, and a rotational grazing schedule.

The headcut would be stabilized using filter cloth, rock, and wood to slow water velocity and armor the streambanks and channel bed. Stabilizing the headcut would prevent possible future channel erosion upstream as well as associated downcutting and bank erosion. Downstream water quality would improve and riparian areas would retain streambank vegetation and stability. By fencing the riparian area with the spring enclosed and livestock excluded, the typically moist or wet soils in these areas would be at less risk for compaction, trampling, vegetative cover loss, and erosion. Combining this fence with maintaining 6" stubble height in riparian areas, soil nutrients and productivity would move toward desired conditions as vegetative organic matter remains on-site and gradually becomes incorporated into the soil matrix. Rotating grazing on alternate years will potentially reduce direct livestock impact to soils and improve plant vigor when

compared to “Current Management” impacts by periodically relieving grazing pressure. Improved plant vigor and decreased adverse soil impacts would likely enhance soil productivity.

Detrimental soil disturbance, such as the observed compaction, may continue to occur at sites where livestock gather, depending on the number of livestock and the time spent congregating in specific areas. Cumulative effects under “The Proposed Action” alternative would include soil quality indicators for compaction along House Creek, riparian trampling, and upland trampling near Che Springs improving and trending upward due to less grazing pressure. Compaction would decrease back to natural levels as root growth, animal burrowing, and soil freezing loosens the soil. Ground cover and infiltration rates would increase. Water tables and riparian soil moisture would slowly increase as improved vegetation production regulates and recharges soil moisture. Soil nutrients are likely to remain static on sites dominated by undesirable annual or invasive plant species and trend upward elsewhere due to lower forage utilization rates. Erosion attributed to riparian livestock grazing should decrease because lower forage utilization will increase vegetative ground cover.

West Malheur Allotment

The proposed action for the West Malheur allotment includes fencing around headcuts in Squaw Creek and Van Gulch. Other fencing actions would reroute the cross fence that separates Cougar and Pierpont pastures, exclude livestock from selected aspen stands, and use an existing, 2-wire fence to set apart a new pasture to increase livestock management options.

Livestock management options include shifting part of the grazing allocation or rescheduling grazing from Rock Springs pasture to Pierpont pasture to reduce grazing pressure on shrub communities. Also, a 6” stubble height would be maintained in spring areas to provide habitat for Botrychium.

Restoration activities include regenerating identified aspen stands by conifer removal and prescribed burning. Along Squaw Creek and Van Gulch install rock structures and large woody debris at selected sites. Also, to improve future forage potential, prescribe burn Cougar flat and rest from grazing for 2 years.

Cumulative effects for areas where forage utilization is decreased by fencing, and different livestock management, would likely recover desired conditions from previous grazing effects, while grazing continues. Shifting forage utilization has the potential to reduce livestock impact to soils compared to “Current Management” impacts. Improved plant vigor and decreased adverse soil impacts would likely enhance soil condition recovery on existing impacted areas due to less intense grazing. Soil moisture would slowly increase as vegetation production improves, and waters recharge soil moisture. Ground cover and infiltration rates would increase and at quicker rates than alternative 1. Compaction would decrease back to natural levels as root growth, animal burrowing, and soil freezing loosens the soil. Compacted soils that are structureless/massive would regain structure. Regardless of these overall changes, existing detrimental soil disturbance may continue at sites where livestock gather, depending on the number of livestock and time spent congregating at a particular site. Under “The Proposed Action” alternative, soil

quality indicators in fenced and managed areas for compaction, riparian trampling, and upland trampling are expected to improve and trend upward due to less grazing pressure. Soil nutrients are likely to trend upward due to lower forage utilization rates. Water erosion and wind erosion trends are likely to remain static where a site has crossed below threshold due to excessive soil loss. Otherwise the erosion trends attributed to livestock grazing should improve and trend upward because lower forage utilization will increase vegetative ground cover and biological crusts.

Other effects from placing low rock structures and large woody debris at carefully selected points along Squaw Creek and Van Gulch, water velocity will slow, sediment will drop out of suspension, and the streambed and adjacent water table will rise, reconnecting the stream to the floodplain. This will increase soil-water levels and increased available water will result in establishment or re-establishment of deep-rooted riparian vegetation. Deep rooted plants will improve soil stability and structure.

Proposed prescribed burning has the potential to affect soil quality over the burn area. The severity of fire effects to soil, ground cover, and organic nutrient conditions are determined by the intensity of temperatures occurring in the fire (Clark, 2001). On low intensity burn sites, the litter is partially consumed by the fire and very little soil surface heating occurs. The fire does not affect the soil hydrologic properties. Soil temperatures at 1 cm are less than 50 C. Lethal temperatures for soil organisms occur down to depths of about 1 cm. Unburned roots and seeds that are in the surface soil would aid in re-vegetating the burned areas. One effect of low intensity fires is to make water-soluble nutrients immediately available for plant uptake. This effect may enhance vegetative re-growth immediately after a fire. Natural re-vegetation on these sites usually occur quickly.

Moderate intensity burn sites have slightly altered surface soil structure, reduced numbers of fine roots, and less soil surface seed viability. In most places, the organic layer is reduced to a layer of charred litter. Soil temperatures at the 1 cm depth can reach 100 to 200 C. Lethal temperatures for soil organisms occur down to depths of 3 to 5 cm. Natural re-vegetation on these sites is slower than a low burn severity site. Hydrophobic soils that result from fire have slightly glazed or impermeable layers at the surface, may occur under moderate burn sites, but are usually scattered and short-lived.

High intensity burn sites have modified surface soil properties. The surface soil structure has been broken down, and a strong hydrophobic layer may be present. Soil temperatures at 1 cm are greater than 250 C. Lethal temperatures for soil organisms occur down to depths of 9 to 16 cm. There are few viable roots or seeds remaining in the upper layers of the soil. Lack of organic litter layer or protective vegetative cover allows rain-impact erosion at the surface, reduced infiltration, and increases the potential for erosion and runoff. The natural re-vegetation on these sites is slow. Immediately after the fire, these areas would usually experience accelerated water runoff and erosion, until a vegetative cover becomes reestablished and the hydrophobic conditions dissipate. The potential for erosion is highest on steep slopes that burned with a high intensity (Nevada EIS, 2004).

Wolf Mountain Allotment

The proposed actions for the Wolf Mountain allotment include building fences to enclose selected aspen stands, expand Beaverdam meadow to enclose a headcut on Beaverdam Creek, create livestock exclosures around *Botrychium* habitat, and decommissioning road 1619805.

Management options include using Beaverdam Meadow as a gathering pasture for overnight use only, felling timber along Bridge Creek to create a barrier to livestock trailing, maintaining 6" stubble height in Beaverdam meadow and *Botrychium* sites, and using rest/rotation management. Restoration activities include planting willows along Beaverdam Creek, and establishing small rock structures and large woody debris in Beaverdam and Bridge Creek.

Effects from alternative 2 include a decrease in negative soil impacts as livestock forage utilization is decreased in areas where fencing prevents livestock grazing. A decrease in livestock forage utilization would likely increase plant vigor and root mass production, increase vegetative ground cover, increase soil organic matter, break up soil compaction, and improve water infiltration and soil water holding capacity. The areas where forage utilization is decreased would likely regain a desired condition from previous grazing effects. A reduction in grazing some areas would likely lead to changes in how the allotment is managed. Light utilization grazing, as would occur in a rest/rotation management system, has fewer negative impacts on plant vigor, litter, and soil organic matter than heavy grazing (Clary et. al., 2002, Naeth et. al. 1991). Decreased forage utilization has the potential to reduce livestock impact to soils compared to "Current Management" impacts. Improved plant vigor and decreased adverse soil impacts would likely enhance soil condition recovery on existing impacted areas due to less intense grazing. Existing detrimental soil disturbance may continue at sites where livestock gather. Under "The Proposed Action" alternative, soil quality indicators for compaction, riparian trampling, and upland trampling are expected to improve and trend upward due to less grazing pressure. Water erosion and wind erosion trends are likely to remain static. Otherwise the erosion trends attributed to livestock grazing should improve and trend upward because lower forage utilization due to fencing and management will increase vegetative ground cover.

Decommissioning Road 1619805 would reduce sediment in the stream channel and allow Antelope Creek to function more naturally. Water quality and fish habitat would also be improved.

Other effects from placing low rock structures and large woody debris at carefully selected points along Beaverdam and Bridge Creeks, water velocity will slow, and the streambed and adjacent water table will rise, reconnecting the stream to the floodplain. This will increase soil-water levels and increased plant-available water will result in establishment or re-establishment of deep-rooted riparian vegetation. Deep rooted plants will improve soil stability and structure. Water tables and riparian soil moisture would slowly increase as streams build wider flood zones, and waters recharge soil moisture. Ground cover and infiltration rates would increase above current levels. Compaction would decrease back to natural levels as root growth, animal burrowing, and soil freezing loosens the soil. Because riparian areas tend to be ecologically resilient, noticeable

improvement can be expected in 3 to 5 years. Desired conditions could be met in 8 to 10 years.

Direct, Indirect and Cumulative Effects from Alternative 3 – No Grazing

Effects Common to all Allotments

Grazing termination would provide the greatest potential to restore soils to desired function and structure at or near natural recovery rates in areas that may have been previously impacted by grazing (Belsky, et. al., 1999). Overall effects would be similar to alternative 2. With livestock grazing at zero percent, improved soil and plant productivity should occur due to increased root mass, increased plant vigor, increased ground cover, increased organic nutrients, and increased water-holding capacity.

High resiliency areas such as riparian sites would probably improve more rapidly compared to upland areas with impaired soil conditions. Riparian vegetation recovery may occur as soon as three years after livestock removal (Cole, 1988). The stream channel itself would improve more slowly as it builds up around the riparian vegetation. Upland recovery areas may take longer than riparian areas due to less moisture and shallower soils. Soil recovery rates are dependent on many factors, including disturbance type, severity, extent, plant community structure, adjoining substrate condition, and climate during and after disturbance. Recovery may be slower for upland rangeland soils that are sensitive to compaction, trampling, water erosion, wind erosion, or have fragile soils, compared to less sensitive areas. Soil quality recovery for severely impacted areas may require decades. These conditions may be present where concentrated livestock use occurs within the allotment area. On sites where critical amounts of topsoil have been lost through water or wind erosion, sites where stream channel head cutting has significantly dropped the water table, or sites dominated by undesirable annual or invasive plant species, restoration to optimal condition may not be ecologically or economically feasible. Under the “No Grazing” alternative, soil quality related to compaction, riparian trampling, and upland trampling is expected to improve because of the cessation of livestock grazing. Soil nutrients are also likely to improve due to on-site organic matter retention rather than losses caused by compaction, trampling, erosion, and conversion of vegetation into livestock biomass.

This alternative would have the greatest potential to improve, conserve, and maintain soil productivity, structure, and function in the four allotments due to grazing termination. Desired conditions would be reached at a quicker rate than the other alternatives. Roads, off road travel, trails, recreation sites, mining, invasive plants, fire, and naturally occurring actions and events would continue to impact soils.

Effects on Water Quality

Livestock grazing has been and still is the greatest landscape activity in the three allotments, and has the potential to cause widespread detrimental effects to water quality. This is because livestock have been grazing in this area for decades, and grazing occurs over a greater area of the allotments than other activities. Additionally, livestock tend to congregate in riparian areas and streams where water quality can be directly impacted in the following ways:

- Livestock urine and fecal wastes increase bacteria levels that cause adverse health effects for wildlife, livestock, and humans;
- Livestock urine and fecal wastes increase nutrients that lead to excessive algae and other aquatic plant growth, which can be adverse to wildlife, livestock, and human health;
- Increased width/depth ratios and shading vegetation loss along stream banks contribute to higher water temperatures that are harmful to aquatic life;
- Lower dissolved oxygen levels resulting from increased aquatic plant growth and higher water temperatures are harmful to aquatic life as the water solubility of oxygen decreases as temperature increases.
- Sedimentation due to vegetation loss and soil disturbance along stream banks is harmful to aquatic life;

Additional information concerning water quality, stream measurements, and existing conditions is located in the 'Fisheries' section of Chapter 3.

Direct, Indirect and Cumulative Effects from Alternative 1 - Current Management

Under the Current Management alternative, current management plans would continue in all allotments until the permits expire.

House Creek Allotment

The Current Management alternative will require intensive livestock management and use existing fences, water developments and other physical structures. No new structures will be added. Under this alternative, the water quality conditions would remain unchanged or possibly improve. It could take as long as 50 years to reach most Riparian Management Objectives. Areas of concern, such as the inactive headcut and aspen stand, would be addressed with adaptive management and administrative changes. The "Current Management" alternative would show slow progress toward achieving desired conditions in areas where riparian management objectives are not met. There is potential for currently unimpaired, functional riparian and water resources to be degraded if intensive management practices are not understood or adhered to.

Actions that have or could act cumulatively with grazing to negatively impact stream/riparian and water quality include fire, recreation, and drought. It is reasonable to assume that stream/riparian and water quality would continue to be affected by these things during the life of the permit. There is also the possibility that cumulative effects could increase.

Fire has the potential to affect water quality over the greatest area. The severity of the fire impacts to water quality are determined by fire temperature intensity. On low severity burn sites, the fire does not affect the soil hydrologic properties. Many unburned roots and seeds that are in the surface soil will aid in re-vegetating the burned areas, limiting potential surface erosion. Moderate burn severity sites have slightly altered surface soil structure, reduced numbers of fine roots and less seed viability in the soil surface. Natural re-vegetation on these sites is slower than a low burn severity site increasing erosion

potential. High burn severity sites have modified surface soil properties. The surface soil structure has broken down, and a strong hydrophobic layer may be present. There are few viable roots or seeds remaining in the upper soil layers and natural re-vegetation on these sites is slow. These conditions allow for rain-impact erosion, reduced infiltration, and increased surface runoff and erosion, negatively impacting water quality. There have been no recent large fires on the House allotment.

Recreation use, such as inappropriate off-road vehicle travel, has the potential to adversely effect stream/riparian and water quality, especially if it occurs in riparian areas and the streams themselves. Activities like this have the potential to increase stream sediment by destroying soil and vegetation structure, increasing erosion rates. Overall stream morphology would be impacted more than grazing alone would impact it. The intensity and duration of the effects are dependent on the number of vehicles, rule-abiding riders, and time spent recreating.

Despite a wetter than usual spring, the Malheur National Forest is currently in drought conditions (Drought Monitor, 2003), and lower stream flows may reduce the ability of a stream to transport sediments, resulting in increased streambed sedimentation. Low water quantity in streams can also have an effect on water quality. When stream flows are low, and when riparian vegetation is removed, stream temperatures tend to increase, sometimes failing to meet water quality standards set by Oregon Department of Environmental Quality (see Table...). Livestock grazing has the potential to remove riparian vegetation that provides shade, regulates seasonal near-surface groundwater discharge, and impacts in-channel temperature. Unmanaged livestock grazing also has the potential to remove vegetative ground cover and compact soil, thereby decreasing precipitation infiltration. This increases surface runoff and erosion, contributing to channel widening and straightening, and reduces long-term base flows in streams and soil-water available to plants.

Under alternative 1, intensively managed livestock would not over-use desired riparian vegetation. It would remain in place and provide shade, streambank stability, and cool groundwater inflow, maintaining water quality. In areas of concern, riparian vegetation would eventually achieve desired conditions at slower than natural recovery rates, gradually improving water quality. In this allotment, riparian vegetation recovery in areas of concern should take three to five years, unless impacted by fire, recreation, or drought. Water quality on the House allotment is important because House Creek drains into the Silvies River, which is habitat for the sensitive Redband Trout, Malheur Mottled Sculpin, and Columbia Spotted Frog.

West Malheur Allotment

The Current Management alternative will require intensive livestock management and use existing fences, water developments and other physical structures. No new structures will be added. Areas of concern, such as headcuts, and water temperature, would be addressed with adaptive management and administrative changes.

Under this alternative, the water quality conditions in areas of concern would remain static or recover at slower than natural rates. It could take as long as 50 years to reach most Riparian Management Objectives. Water quality in other areas would remain

unchanged. The “Current Management” alternative would probably show little progress toward achieving desired conditions. There is potential for currently unimpaired, functional riparian and water resources to be degraded if intensive management practices are not understood or adhered to.

Things that have or could act cumulatively with grazing to negatively impact stream/riparian and water quality include wildfires, recreation, and drought. It is reasonable to assume that stream/riparian and water quality would continue to be affected by these things during the life of the permit. There is also the possibility that cumulative effects could increase.

Fire has the potential to affect water quality over the greatest area. The severity of the fire impacts to water quality are determined by fire temperature intensity. On low severity burn sites, the fire does not affect the soil hydrologic properties. Many unburned roots and seeds that are in the surface soil will aid in re-vegetating the burned areas, limiting potential surface erosion. Moderate burn severity sites have slightly altered surface soil structure, reduced numbers of fine roots and less seed viability in the soil surface. Natural re-vegetation on these sites is slower than a low burn severity site increasing erosion potential. High burn severity sites have modified surface soil properties. The surface soil structure has broken down, and a strong hydrophobic layer may be present. There are few viable roots or seeds remaining in the upper soil layers and natural re-vegetation on these sites is slow. These conditions allow for rain-impact erosion, reduced infiltration, and increased surface runoff and erosion, negatively impacting water quality.

Recreation use, such as inappropriate off-road vehicle travel, has the potential to adversely effect stream/riparian and water quality, especially if it occurs in riparian areas and the streams themselves. Activities like this have the potential to increase stream sediment by destroying soil and vegetation structure, increasing erosion rates. Overall stream morphology would be impacted more than grazing alone would impact it. The intensity and duration of the effects are dependent on the number of vehicles, rule-abiding riders, and time spent recreating.

The water quantity in streams can also have an effect on water quality. When stream flows are low and riparian vegetation is removed, stream temperatures tend to increase. The Malheur National Forest is currently in drought conditions (Drought Monitor, 2003), and lower stream flows may reduce the ability of a stream to transport sediments, resulting in increased streambed sedimentation. Low water quantity in streams can also have an effect on water quality. When stream flows are low, and when riparian vegetation is removed, stream temperatures tend to increase, sometimes failing to meet water quality standards set by Oregon Department of Environmental Quality (see Table...).

Unmanaged livestock grazing has the potential to remove riparian vegetation that provides shade, regulates seasonal near-surface groundwater discharge, and impacts in-channel temperature. Unmanaged livestock grazing also has the potential to remove vegetative ground cover and compact soil, thereby decreasing precipitation infiltration. This increases surface runoff and erosion, contributing to channel widening and straightening, and reduces long-term base flows in streams and soil-water available to plants.

Under alternative 1, intensively managed livestock would not over-use desired riparian vegetation. It would remain in place and provide shade, streambank stability, and cool groundwater inflow, maintaining water quality. In areas of concern, riparian vegetation would eventually achieve desired conditions at slower than natural recovery rates, gradually improving water quality. Water quality on the West Malheur allotment is important because the Wolf Creek watershed and Malheur River is habitat for the sensitive Redband Trout, Malheur Mottled Sculpin, and Columbia Spotted Frog.

Wolf Mountain Allotment

The Current Management alternative will require intensive livestock management and use existing fences, water developments and other physical structures. No new structures will be added. Areas of concern, such as headcuts and water temperature, would be addressed with adaptive management and administrative changes. Under this alternative, the water quality conditions would remain unchanged or recover at slower than natural rates. It could take as long as 50 years to reach most Riparian Management Objectives. There is potential for currently unimpaired, functional riparian and water resources to be degraded if current management practices are not understood and adhered to. The “Current Management” alternative would probably show little or no progress toward achieving desired conditions.

Things that have or could act in conjunction with grazing to negatively impact stream/riparian and water quality include wildfires, recreation, water diversions, and drought. It is reasonable to assume that stream/riparian and water quality would continue to be affected by these things during the life of the permit. There is also the possibility that cumulative effects could increase.

Fire has the potential to affect water quality over the greatest area. The severity of the fire impacts to water quality are determined by fire temperature intensity. On low severity burn sites, the fire does not affect the soil hydrologic properties. Many unburned roots and seeds that are in the surface soil will aid in re-vegetating the burned areas, limiting potential surface erosion. Moderate burn severity sites have slightly altered surface soil structure, reduced numbers of fine roots and less seed viability in the soil surface. Natural re-vegetation on these sites is slower than a low burn severity site increasing erosion potential. High burn severity sites have modified surface soil properties. The surface soil structure has broken down, and a strong hydrophobic layer may be present. There are few viable roots or seeds remaining in the upper soil layers and natural re-vegetation on these sites is slow. These conditions allow for rain-impact erosion, reduced infiltration, and increased surface runoff and erosion, negatively impacting water quality.

Recreation use, such as inappropriate off-road vehicle travel, has the potential to adversely effect stream/riparian and water quality, especially if it occurs in riparian areas and the streams themselves. Activities like this have the potential to increase stream sediment by destroying soil and vegetation structure, increasing erosion rates. Overall stream morphology would be impacted more than grazing alone would impact it. The intensity and duration of the effects are dependent on the number of vehicles, rule-abiding riders, and time spent recreating.

The water quantity in streams can also have an effect on water quality. When stream flows are low and riparian vegetation is removed, stream temperatures tend to increase. The Malheur National Forest is currently in drought conditions (Drought Monitor, 2003), and lower stream flows may reduce the ability of a stream to transport sediments, resulting in increased streambed sedimentation. Low water quantity in streams can also have an effect on water quality. When stream flows are low, and when riparian vegetation is removed, stream temperatures tend to increase, sometimes failing to meet water quality standards set by Oregon Department of Environmental Quality (see Table...).

Unmanaged livestock grazing has the potential to remove riparian vegetation that provides shade, regulates seasonal near-surface groundwater discharge, and impacts in-channel temperature. Unmanaged livestock grazing also has the potential to remove vegetative ground cover and compact soil, thereby decreasing precipitation infiltration. This increases surface runoff and erosion, contributing to channel widening and straightening, and reduces long-term base flows in streams and soil-water available to plants.

Under alternative 1, intensively managed livestock would not over-use desired riparian vegetation. It would remain in place and provide shade, streambank stability, and cool groundwater inflow, maintaining water quality. In areas of concern, riparian vegetation would eventually achieve desired conditions at slower than natural recovery rates, gradually improving water quality. In this allotment, riparian vegetation recovery in areas of concern should take three to five years. Water quality on the Wolf Mountain allotment is a concern because the Wolf Creek watershed and Malheur River is habitat for the sensitive Redband Trout, Malheur Mottled Sculpin, and Columbia Spotted Frog.

Direct, Indirect and Cumulative Effects from Alternative 2 – Proposed Action

House Creek Allotment

The “Proposed Action” alternative would implement new soil, water, vegetation, and livestock management practices based on stabilizing a headcut on House Creek, fencing a riparian area on House Creek that includes a spring, maintaining 6” stubble heights in riparian areas, and a rotational grazing schedule. Other adaptive management and administrative changes would also be used.

The headcut would be stabilized using filter cloth, rock, and wood to slow water velocity and armor the streambanks and channel bed. Stabilizing the headcut would prevent the headcut from migrating upstream and the associated stream channel downcutting and bank erosion. Downstream water quality would improve by reducing sedimentation. Riparian areas would retain streambank vegetation and stability, filtering surface runoff.

The “Proposed Action” would allow decreased grazing in wet/riparian areas and improved livestock management. If this action is taken, stream/riparian and water quality conditions would likely improve. Fencing the riparian area and maintaining 6” stubble heights in riparian areas would:

- Reduce livestock urine and fecal material production, thereby reducing bacteria and nutrient levels in streams.

- Reduce soil disturbance, compaction, and vegetation loss along streambanks, resulting in improved streambank stability, decreased sedimentation, and cooler water temperatures due to the growth of shade providing vegetation along streams.
- Increased vegetative cover would help control surface run-off, reduce soil erosion, improve stream base flows, and decrease peak stream flow timing and intensity that can potentially cause catastrophic flood damage.
- Increase dissolved oxygen levels due to water temperature decreases.
- Decrease algae-producing nutrient levels.
- Increase recovery rates due to decreased stress from grazing. Informed land management decisions that would maintain or achieve desired stream/riparian and water quality conditions could be made possible by monitoring conditions in the stream/riparian communities.

Because livestock grazing has the potential to have a greater impact compared to other uses that affect stream or riparian conditions, changes in grazing management under the Alternative 2 Proposed Action would likely result in a decrease in detrimental water quality effects. Fencing and rotational grazing would reduce grazing pressure in stream/riparian areas and better overall watershed conditions in the House allotment would improve water quality for downstream beneficial uses. Most Riparian Management Objectives could be met in 30 to 40 years with this proposed action.

West Malheur Allotment

The proposed action for the West Malheur allotment includes fencing around headcuts in Squaw Creek and Van Gulch. Other fencing actions would reroute the cross fence that separates Cougar and Pierpont pastures, exclude livestock from selected aspen stands, and use an existing, 2-wire fence to set apart a new pasture to increase livestock management options. Other adaptive management and administrative changes would also be used.

Livestock management options include shifting part of the grazing allocation or rescheduling grazing from Rock Springs pasture to Pierpont pasture to reduce grazing pressure on shrub communities. Also, a 6" stubble height would be maintained in spring areas to provide habitat for Botrychium.

Restoration activities include regenerating identified aspen stands by conifer removal and prescribed burning. Along Squaw Creek and Van Gulch install rock structures and large woody debris at selected sites. Also, to improve future forage potential, prescribe burn Cougar flat and rest from grazing for 2 years.

The "Proposed Action" would allow reduced grazing in areas that are not functioning as desired. If this action is taken, stream/riparian and water quality conditions would likely improve.

Reduced grazing would:

- Reduce livestock urine and fecal material production, thereby reducing bacteria and nutrient levels in streams.

- Reduce soil disturbance, compaction, and vegetation loss, resulting in improved streambank stability, decreased sedimentation, and cooler water temperatures due to the growth of shade providing vegetation along streams.
- Increased vegetative cover would help control surface run-off, reduce soil erosion, improve stream base flows, and decrease peak stream flow timing and intensity that can potentially cause catastrophic flood damage.
- Increase dissolved oxygen levels due to water temperature decreases.
- Decrease algae-producing nutrient levels.
- Increase headcut recovery rates due to decreased stress from grazing. Informed land management decisions that would maintain or achieve desired stream/riparian and water quality conditions would be made possible by monitoring conditions in the stream/riparian communities.

Maintaining 6" stubble heights around springs would maintain water quality in the spring area and limit sedimentation associated with vegetation loss and trampling.

By placing low rock structures and large woody debris at carefully selected points along Squaw Creek and Van Gulch, water velocity will slow, and the streambed and adjacent water table will rise, reconnecting the stream to the floodplain. This will increase soil-water levels and increased available water will result in establishment or re-establishment of deep-rooted riparian vegetation. Deep rooted plants will improve streambank stability and structure. In-stream water quality will improve as re-established riparian vegetation filters surface-runoff, decreases streambank erosion, shades the stream, and improves shallow groundwater retention. However, the long term water and vegetative improvements could take years.

Because livestock grazing has the potential to have a greater impact as compared to other uses that also affect stream or riparian conditions, changes in grazing management under the Alternative 2 Proposed Action would likely result in a decrease in detrimental cumulative effects. Additionally, better overall watershed conditions would improve water quality for downstream beneficial uses. Most Riparian Management Objectives could be met in 30 to 40 years with this proposed action.

Wolf Mountain Allotment

The "Proposed Action" would allow no or decreased grazing in areas that are fenced. If this action is taken, stream/riparian and water quality conditions would likely improve. This applies particularly to fencing and felled timber in stream and riparian areas. Other adaptive management and administrative changes would also be used.

By placing low rock structures and large woody debris at carefully selected points along Beaverdam and Bridge Creeks, water velocity will slow, and the streambed and adjacent water table will rise, reconnecting the stream to the floodplain. This will increase plant-available water result in establishment or re-establishment of deep-rooted riparian vegetation. Deep rooted plants will improve streambank stability and structure. In-stream water quality will improve as re-established riparian vegetation filters surface-runoff, decreases streambank erosion, shades the stream, and improves shallow groundwater

retention for base flows. However, the long term water and vegetative improvements could take years.

Decommissioning Road 1619805 would reduce sediment in the stream channel and allow Antelope Creek to function more naturally. Water quality and fish habitat would also be improved.

Because livestock grazing has the potential to have a greater impact as compared to other uses that also affect stream or riparian conditions, changes in fencing, grazing management, and restoration activities under the Alternative 2 Proposed Action would likely result in a decrease in detrimental water quality effects. Additionally, better overall watershed conditions on the Wolf Mountain allotment would improve water quality for downstream beneficial uses. Most Riparian Management Objectives could be met in 30 to 40 years with this proposed action.

Direct, Indirect and Cumulative Effects from Alternative 3 – No Grazing

No Grazing would likely have the most beneficial effects for riparian/stream and water quality conditions. Recovery would occur at natural or near natural rates. Without livestock grazing, there would be no adverse impacts caused by said grazing described earlier. There would not be any livestock urine and fecal material to contribute nutrients and bacteria to streams, and no extra sedimentation in streams due to livestock trampling banks and removing riparian vegetation. Dissolved oxygen levels would improve as water temperatures decrease and as aquatic plant life growth is reduced due to fewer nutrients from fecal material. The rate at which an area moves towards a desired condition would depend on its current condition. Headcuts would still need to be addressed.

Livestock grazing is the single greatest activity in the three allotments, having the greatest and most widespread impact on water resource and riparian area conditions. The cumulative impact to water resources and riparian areas would decrease substantially without livestock grazing. As with the “Proposed Action,” better watershed conditions under “No Grazing” would result in better water quality for downstream beneficial uses. Stream channel stability and most other Riparian Management Objectives could be reached in 15 to 20 years.

There may be a detrimental effect to private lands under “No Grazing.” The grazing intensity on these private lands could increase if cattle do not have access to the National Forest. This could lead to greater damage to the stream/riparian and water resources on these other lands. Damage would include soil disturbance, compaction, and vegetation loss, resulting in streambank destabilization, sedimentation, and warmer water temperatures due to the removal of shade providing vegetation along streams. Decreased vegetative cover, especially in riparian areas, would increase surface run-off, soil erosion, decrease stream base flows, and increase peak stream flow timing and intensity that can potentially cause catastrophic flood damage. Decreased dissolved oxygen levels due to water temperature increases and increased algae-producing nutrient levels.

Fisheries

This section describes the condition of the aquatic habitat and lists the associated aquatic species in the 57,800-acre project area for the House Creek, West Malheur and Wolf Mountain Allotments within the east half of the Emigrant Creek Ranger District.

There are no anadromous fish in the project area, although the Malheur River system once supported Chinook salmon steelhead on the forest, including the drainages associated with this project area. The Hells Canyon Dam Complex on the Snake River blocked all upstream migration of anadromous fish in the late 1950s with the creation of 3 dams. Resident aquatic species in the project area include redband trout, Malheur mottled sculpin, speckled and long nosed dace, red side shiners, bridgelip suckers, Columbia spotted frogs, crayfish and the western pearlshell mussel.

The major limiting factors degrading fish habitat and fish populations in the project area are low base flows, excessive summer water temperatures, widened channels, lack of high quality pools, and lack of fish habitat connectivity. Conditions are discussed in direct/indirect effects section where activities associated with this project would modify existing conditions or in cumulative effects if other projects will modify aquatic conditions.

Management activities that have impacted streams within the watershed include timber harvest with associated road construction, and livestock grazing. Water quality throughout the watershed is variable; individual reaches may not meet one or more of the minimum habitat objectives such as pools per mile, water temperature, large woody material (LWM) per mile, bank stability, and/or width-to-depth ratios. These habitat parameters are identified in the Malheur Forest Plan Amendment # 29.

Management Indicator Species, Threatened, Endangered and Sensitive Species

Management Indicator Species (MIS) are species of vertebrates and invertebrates whose population changes are believed to best indicate the effects of land management activities. Through the MIS concept, the total number of species found within a project area is reduced to a subset of species that collectively represent habitats, species and associated management concerns. The MIS are used to assess the maintenance of populations (the ability of a population to sustain itself naturally) and biological diversity (which includes genetic diversity, species diversity, and habitat diversity), and to assess effects on species in public demand. MNF LRMP Standard 61 (p. IV-32) lists species and gives direction to provide for habitat requirements of MIS species. MIS species in the project include redband trout.

A sensitive species is an animal or plant species identified by the Forest Service Regional Forester for which species viability is a concern either a) because of significant current or predicted downward trend in population numbers or density, or b) because of significant current or predicted downward trends in habitat capability that would reduce a species' existing distribution. The Forest Service assess all proposed projects that involve habitat changes or disturbance and have the potential to alter the habitat of threatened, endangered or sensitive plant and animal species. No threatened or endangered aquatic

species occur or are suspected to occur within the planning area. Sensitive species that occur or are suspected to occur within the planning area include redband trout, Malheur mottled sculpin and Columbia spotted frog. For more information about threatened, endangered and sensitive aquatic species refer to Appendix G, Aquatic BE.

Steelhead/Redband Trout

Steelhead trout (*Oncorhynchus mykiss gairdneri*) is the species identified as the anadromous native life form of "rainbow trout" by the Oregon Department of Fish and Wildlife (ODFW) on the Malheur National Forest. Behnke (1992) also classifies the rainbow trout species "east of the Cascades" as steelhead and redband trout. Redband trout (*Oncorhynchus mykiss gairdneri*) are considered the native, resident form of the rainbow trout that are on the FS Region 6 sensitive species list. All perennial fish-bearing streams identified on the Emigrant Creek Ranger District are considered to have populations of redband trout.

Malheur Mottled Sculpin

The taxonomy of the Malheur mottled sculpin supports recognition of two forms in eastern Oregon (*bendirei* and *hubbsi*), which makes up the *Cottus bairdi* complex. It is considered endemic to the Harney Basin (Silver River and its tributaries, Donner und Blitzen River, its tributaries and isolated southern creeks, Silvies River and its tributaries, and Poison Creek system), Malheur River, and Snake River Basin. Recent fish surveys found sculpin spp. in several of the streams within the project area. The Malheur mottled sculpin is on the FS Region 6 sensitive species list.

Columbia Spotted Frog

Spotted frogs (*Rana luteiventris*) are highly aquatic and are rarely found far from permanent water. Breeding habitat is usually in shallow water in ponds or other quiet waters along streams. Breeding may also occur in flooded areas adjacent to streams and ponds. Adults may disperse overland in the spring and summer after breeding. Habitat has been degraded by past management activities, such as livestock grazing, road construction along streams, and timber harvest adjacent to streams, lakes ponds, springs, and marshes.

The spotted frog is considered present in all subbasins on the Malheur National Forest and has been documented in all drainages within the project area during fish and stream surveys conducted in 2001 and 2002. The Columbia spotted frog is on the FS Region 6 Sensitive species list.

Livestock Grazing Effects

Grazing can affect bank stability with the removal of riparian vegetation. Livestock may cause mechanical damage of stream banks from hoof shear (Platts 1991). Undercut banks that reduce stream exposure to sunlight to maintain water temperatures and provide hiding cover for fish can be destroyed under the weight of cattle; this is exacerbated where deep-rooted, late seral vegetation has been replaced with more shallow-rooted, early seral species. This increase in bank instability can lead to changes in channel profile by increasing width and decreasing depth, modifying bank angle as well as increasing sediment input to the stream. Stream channel profiles (both bankfull and wetted width to depth ratios) are wider than expected in the project area. Extreme cases of overgrazing

may cause stream channels to down cut, lowering water tables and disconnecting floodplains.

Cattle commonly use Sensitive Stream Reaches because the low gradient and wide valley bottoms makes access easy, herbaceous vegetation is available in meadows and water is nearby. This easy accessibility as well as available food and water make these reaches highly desirable to domestic livestock. The sensitivity of these reaches increases the potential for degradation of the stream channel, modification of water tables and floodplains as well as associated riparian areas. The Lower Malheur WA (pp.65) noted several streams are of concern due to their current poor condition. These include Squaw Creek in the West Malheur Allotment and Beaverdam Creek in Wolf Mountain Allotment. The WA (pp. 64) also states that; “the priority reaches within these streams need adjustments in grazing strategies or in some cases complete rest”. Recent stream surveys indicate that these streams are still failing to meet Forest plan standards and remain a concern to the integrity of the watershed and support of aquatic species.

Cattle may impact fish directly by trampling redds where fish eggs/embryos are buried by adult fish. Redd trampling is less likely to occur with spring spawning species when stream flows are higher and palatable forage is abundant in riparian areas and uplands. Redd trampling is more likely to occur with fall spawning fish because stream flows are low, air temperatures are high, upland vegetation is less palatable, and cattle tend to congregate more in riparian areas. Since redband trout spawn in the spring and most livestock turnout after June 1st, direct impacts would be minimal.

Livestock management practices have produced changes to some riparian areas. Monitoring of grazing historically focused on drier upland areas while data and analysis in riparian areas was limited (Platts 1991). The Lower Malheur WA (pp. 45) stated that historically most areas in the project area were overgrazed. Some of the major livestock concerns recognized in the Lower Malheur WA (pp.64) are; 1) Inadequate ability to control livestock grazing within riparian areas especially during the dry season and or drought years, 2) Effects of vegetation browsing on water temperature and stream conditions, 3) Suitability- defining and classifying suitable riparian areas for grazing using the latest stocking rates, 4) increase in elk numbers compounded with livestock grazing and the associated impacts to riparian vegetation.

Concerns for the aquatic resources in the past 30 to 40 years have led to changes in the grazing strategy and produced dramatic improvements in most riparian areas throughout the subbasin. However, issues such as lowered water tables, disconnected flood plains and reduced riparian vegetation remain. Rates of recovery have depended on the current riparian vegetation condition/seral stage, stream condition, stream channel type, livestock grazing management, site potential and big game use.

Total exclosures that keep out deer, elk and domestic ungulates in Wolf Creek are reference areas to display site potential of similar areas. Livestock exclosures on Schurtz Creek 500 feet below Wolf Mountain Allotment and on Wolf Creek in West Malheur Allotment indicate a natural rate of recovery with and without wildlife presence respectively. This may be somewhat misleading as wildlife can use both shrubs and herbaceous vegetation more heavily in livestock exclosures in winter range areas where little forage is left after grazing by cattle outside the exclosure.

Livestock grazing has impacted fish habitat in less obvious ways. Components of native plant associations have been reduced or eliminated, allowing for the establishment of exotic plant species or conversion to early seral stage vegetation. Kentucky bluegrass and redtop are highly productive and resilient species introduced to the Malheur Forest that are adapted to grazing but alter the native plant communities of riparian areas. These species have shallow root systems that contribute little to stream bank stability compared to native, deep-rooted aquatic vegetation. They can also form mats that crowd out other species. Native grass and sedge species such as tufted hairgrass, wooly sedge, and Nebraska sedge were reduced due to their sensitivity to grazing. Riparian hardwood browsing may reduce quantity and vigor of plants that shade streams and maintain water temperatures. Browsing of hardwood seedlings and saplings can reduce or eliminate replacement of existing hardwoods, leaving only older plants which may be susceptible to blight or disease. This can indirectly reduce instream Coarse Woody Debris (CWD) quantities over the long term. Deep-rooted vegetation is essential to maintain stream bank stability, building of stream banks and creation of undercut banks. As stated in channel morphology in the fisheries section and in the hydrology section, channel evolution must have components of late seral vegetation and LWD to create high quality fish habitat.

Analysis Methods

The analysis area consists of five subwatersheds within the Wolf Creek watershed, in the Upper Malheur Subbasin; Duck Creek, Calamity Creek, Squaw Creek, Upper Wolf Creek, East Fork Wolf and two subwatersheds; Flat Creek/House Creek in the Trout Creek watershed and Antelope Creek in the Bear Creek watershed both of which are in the Silvies subbasin. Three allotments (House, Wolf Mountain, and West Malheur) within these subwatersheds are the focus of this analysis.

Information was compiled from the Lower Malheur Watershed Analysis (USDA 1996), stream survey reports and Proper Functioning Condition assessments. Region 6 Level II stream and riparian habitat surveys were conducted on most project area fish-bearing streams between 1995 and 2002. These surveys quantify fish habitat within reaches that are based on gradient, valley width, or topographic features that make the stream reach somewhat homogeneous and focus on core attributes critical to fish habitat. They generate quantitative estimates of habitat attributes that are statistically valid and repeatable across time and boundaries. They also represent an integrated approach between USFS watershed and fisheries disciplines in defining aquatic resource conditions.

Level II stream survey data is displayed at the “reach” level by subwatershed. Reaches vary in length and usually overlap allotments and pastures. This means that some detail is lost at this scale. Smaller areas, such as “Sensitive Stream Reaches,” may contain Rosgen channel type, shade, stream bed and bank substrate, bank instability, slope and entrenchment that are overall very different from the average parameters of the survey reach.

Stream survey information is compared with standards and guidelines from the Malheur National Forest Land and Resource Management Plan (1990) including amendment 29 and INFISH to determine relative “health” or condition of the riparian areas, streams and

the effects to fish and fish habitat. Existing stream channel conditions were compared to expected conditions to provide fish habitat based on geomorphology characteristics of hill slopes, valley bottom width/gradient, substrate parent materials and riparian vegetation communities.

The aquatic species section builds on analysis and conclusions from soils, vegetation and watershed sections of this EA to determine direct, indirect and cumulative effects on fish habitat and populations. Direct, indirect and cumulative effects of all alternatives are disclosed for Sensitive Species (USDA 2000) and Management Indicator Species. A Biological Evaluation (Appendix G) was prepared for Sensitive Species as directed by the Malheur National Forest Plan (USDA 1990) as amended.

Table 21. Summary of Riparian Management Objectives (RMOs) for Malheur National Forest Amendment 29 and INFISH.

Habitat Attribute	Objectives
Water Temperature	Forest wide standard is not to exceed 68° F; for redband trout
Large Woody Debris ²	Ponderosa Pine 20-70 piece per mile, Mixed-Conifer 80-120 pieces per mile; Lodgepole Pine 100 – 350 pieces per mile.
Bankfull Width	(ft)
Pool Frequency	5 10 20 25 50 75 100 125 150 200 151- 75- 38- 30- 15- 10- Pools per Mile 264 132 66 53 26 23 8-18 6-14 5-12 4-9
Bank Stability	At least 90% stable, no decrease if above 90% stable
Width/Depth Ratio	<10, mean wetted width divided by mean depth (all systems)
Shade/ Canopy Closure	Ponderosa Pine 50-55%; Mixed Conifer 50-65%; Lodgepole Pine 60-75%; Hardwood/Meadow Complex 80% shaded.

² LWD deemed as “functional wood”, see Large Wood Debris discussion for further details.

Amendment 29 of the Malheur National Forest Land and Resource Management Plan (LRMP) specifies desired future conditions (DFC) for habitat elements measured as part of Level II stream surveys (Table 21). Headwater and tributaries that are not fish bearing are important for water quality to occupied downstream reaches but are not surveyed under the Level II protocol. The section below describes project area hydrologic, riparian and stream habitat indicators most relevant to fish and fish habitat. Reaches that do not meet LRMP DFCs and RMOs standards are likely affecting fish populations. Analysis of a Level II stream survey conducted in the project area in 2002 determined at least 73% of the reaches failed to meet Malheur NF Amendment 29 standards, Table 22.

Table 22. Habitat criteria that has met (M) or failed to meet (F) the Malheur National Forest Amendment 29 DFCs on the 25 Reaches Representing the Following Perennial Fish Bearing Creeks in the analysis area; Antelope (2), Main Fork Antelope (3), South Fork Antelope (2), Beaverdam (1), Schurtz (2), East Fork Wolf (4), Middle Fork Wolf (5), West Fork Wolf (4), Bridge Creek (2). (*water temperatures were recorded as instantaneous readings on some reaches within the Antelope Creek system).

Habitat Attribute	Reaches		
	Meets	Fails	% Failed
Water Temperature*	0	16	100
Large Woody Debris	7	16	70
Pool Frequency	4	19	83
Bank Stability	17	8	32
Width/Depth Ratio	7	16	70
Shade/ Canopy Closure	11	12	52

The lower half of Beaverdam Creek (in Beaverdam pasture), segments of reaches 6 and 7 of Bridge Creek, are stream segments of concern in the project area that have a high proportion of habitat attributes that fail to meet RMOs, Table 23. Stream bank stability and high fine sediment levels are concerns on these streams. Additionally, stream headcuts on Bridge, and Beaverdam Creeks in the Wolf Allotment and on East Fork Wolf, Squaw and Van Gulch Creeks in West Malheur Allotment (Table 23) are also contributing to some degree of the degraded condition of these streams. Livestock grazing can lead to further erosion in these areas and headcuts can effect water movement into the floodplain, changing the desired plant associations.

Table 23 Streams Reaches of Concern with Unstable Streambanks, Headcuts and Springs

Allotment	Pasture	Subwatershed	Stream	Reach	Concern
West Malheur	Pierpont	East Fork Wolf	East Fork Wolf	4	headcut
West Malheur	Cougar	Squaw	Squaw Creek	5	headcuts
West Malheur	Cougar	Squaw	Van Gulch	2	headcut
Wolf Mountain	Beaverdam	Flat/House	Bridge	6 & 7	headcuts
Wolf Mountain	Beaverdam	Calamity	Beaverdam	1	headcut and streambanks
House Creek	North	Flat/House	House	2	headcut & Spring protection

Proper Functioning Condition Surveys

Proper Functioning Condition (PFC) analyses were completed on streams lacking level II stream surveys (House Creek) or streams of concern that are failing the majority of Forest RMOs (Schurtz Creek). The PFC assessment was designed to give a consistent approach for considering hydrology, vegetation, and erosion/deposition attributes and processes to assess the condition of riparian-wetland areas (Prichard, 1998). The results are listed below within Allotment Summaries.

Although Proper Functioning Condition Analyses were not conducted on all stream channels, headcuts were documented in House, Bridge, Beaverdam, East Fork Wolf Creek, Squaw and Van Gulch Creeks that would indicate these stream channels may be functioning at risk. Item 16 in the PFC Analysis states that active headcuts resulting in **rapid** vertical adjustment result in a “No” rating and indicate the stream is Functioning at Risk. Not all of these headcuts are resulting in rapid vertical adjustment, but they will be stabilized in alternative 2. A PFC analysis conducted on House Creek indicated the stream is Functioning Properly with a stabilized headcut.

Existing Conditions for Aquatic Species on Streams by Range Allotment and Pasture

Schurtz Creek

2.5 miles of reach 1 is in Van Allotment, Schurtz Creek Pasture.

0.3 miles of reach 1 and all of reach 2 (3.3 miles) is in Wolf Mountain Allotment, Schurtz Creek Pasture

Stream Characters

Schurtz Creek is divided into two reaches by a 250 foot culvert installed in 1973 at FS Road 17. The culvert acts as a fish barrier for a short section of fish bearing stream above the road. Most of reach 1 (2.5 mi.) is located in the Van Allotment and 0.3 mi. of the reach is located in the lower part of Wolf Mountain Allotment, while all of reach 2 (3.3 mi.) is located in the Wolf Mountain Allotment. The upper segment of reach 1 in the Van Allotment has one enclosure that was constructed in 1991 to control livestock and allow natural recovery of the stream channel and riparian habitat.

Habitat Survey

Although most of reach 1 is in the Van Allotment the entire reach description is included in the existing conditions report since this analysis is conducted at the subwatershed level and activities in reach 2 may be carried downstream to reach 1. Reach 1 is classified as a “C4” channel type; a slightly entrenched, low gradient, gravel dominated riffle and pool channel. Typically pools are separated in C4 channels by 5 – 7 bankfull widths (approximately 81 ft for Reach 1). Pool frequency was calculated to be 27 pools per mile, or an average separation of ~196 ft. The wetted width/depth ratio (width/depth) was considered high for Reach 1. High width/depth ratios (i.e. >20) are indicators of very

shallow conditions and poor quality rearing habitat. This condition often results in high temperature extremes and decreases in available cover for fish.

The upper section of Reach 1 contains one large riparian enclosure in the Van Allotment. The effects of this livestock exclusion in this section were pronounced; in general there were more wetland obligate species, higher above ground biomass and vegetative cover, and less widespread bank erosion. PFC surveys indicate that segment 2 and 3 of reach 1 and all of reach 2 are functioning properly (PFC report, Appendix I). The enclosure was grazed in 2004 for the first time, but not entirely by the permitted livestock. (Personal Communication Alfred Dunten Nov. 15, 2004)

The culvert on the Road 17 has substantially altered the hydrologic regime of Schurtz Creek. Evidence of this was clear in the upper section of Reach 1, in Wolf Mountain Allotment, as riffle lengths dramatically increased, sinuosity decreased, the stream became more incised, pool creators were less available, and areas having eroding banks suffered very intense erosion. Restorative measures have been taken within the enclosure, with varying degrees of success. Small pieces of juniper wood (3 – 5 inches in diameter) have been placed in the stream to slow creek flow, initiate meandering, and create more pool habitat. It is important to note that although some of these pieces of wood are currently functioning as small debris jams to create pools in Schurtz Creek, the size class of this wood is below what would be detected using the stream survey protocol (USFS 2002). During a large, 25 year event this type of woody material may readjust itself before LWD would. Regardless, this type of small wood plays a key roll in small stream systems where large wood is lacking or often lays across the stream channel instead of interacting with the active water channel. In this section of Reach 1, the limiting factor affecting fish populations is the high-energy water originating at the culvert during high flows that has altered the structure and functioning of the stream channel. It is expected the high-energy flows will eventually alter the vegetative structure and function of the floodplain as well.

Stream survey data from 1995 indicated that moderately heavy grazing caused moderate stream bank damage in reach 1, segment 1, below the enclosure, in the Van allotment. The reach passed the forest standard for bank stability in 1995 but not in 2003, which may indicate a downward trend. During the 2003 survey it was noted there was evidence of intensive livestock grazing in this same part of the reach.

Overall, data from the 2003 stream survey indicated that Reach 1, segment 2 failed to meet Amendment 29 standards (Table 24) except for stream shading (40 – 55% for ponderosa pine series). Evidence of intensive livestock grazing was prevalent in the lower section of Reach 1. In general, this section was composed of riparian floodplain meadows that have experienced high degrees of trampling and grazing pressure. Stubble heights of grasses and sedges were typically less than 2 inches in height (exceeding Forest utilization standards for this allotment) and riparian obligate species (e.g. sedges and rushes) were excluded from either entrenchment of stream banks or from excessive trampling in the interactive zone of the riparian floodplain (i.e. within 5 ft of the water edge). Hardwood species in the lower section of Reach 1 have experienced mortality at the older age class, and hedging and low rates of establishment at the younger age class due to grazing. Generally, hardwood growth and regeneration below 5 ft in height was not readily apparent; hardwoods that have achieved heights of at least 5 ft were more apt

to survival, although their structures typically favored low crown widths (contributing less shade). The combined effects of grazing in the lower section of Reach 1 appear to be the largest pressure to limiting habitat for fish, spotted frogs and other aquatic species.

A Proper Functioning Condition (PFC) Survey was conducted during the fall of 2004 on Schurtz Creek that indicates segment 1 downstream of the Van Allotment enclosure is functioning at risk (PFC report, Appendix I). The PFC survey also noted that a high number hardwood species predominantly; thinleaf alder, black hawthorn, western chokecherry and willow species, are decadent, heavily browsed and lacking the younger age class. All of these species are important streambank stabilizers that also provide cover, shade, structure and habitat for aquatic and terrestrial insects that support aquatic species.

Table 24. Habitat criteria for Schurtz Creek that has met (M) or failed to meet (F) the Malheur National Forest Amendment 29 standards.

Habitat Attribute	Stream Reach	
	1	2
	90% in Van Allot.	100% in Wolf Mt. Allot.
Water Temperature ¹	F	M
Large Woody Debris	F	F
Pool Frequency	F	M
Bank Stability	F	M
Width/Depth Ratio	F	F
Shade/ Canopy Closure	M	M

¹Continuous temperature readings did not meet OR DEQ 303(d) standards

Reach 2, in Wolf Mountain Allotment, Schurtz Creek pasture was delineated from Reach 1 primarily because of a long culvert and the narrowing of the valley width and an increase in channel gradient. Cross sectional attributes classified this reach as a “C4b” channel type, which is a slightly entrenched, low to moderate gradient, pool and riffle channel with a well-developed floodplain. However a more likely and accurate description of Reach 2 is a mosaic of “A”, “B”, and “C” type channels, distributed throughout the reach.

In Reach 2, and part of reach 1, segment 3 (.3 mi.) in the Wolf Mountain Allotment, Amendment 29 standards and PFC were mostly met. This stream reach generally had high-quality spawning gravels, adequate shade and good connectivity with the floodplain in the riparian meadow sections, and a pool frequency that did not suggest habitat is fragmented. However, there were no deep pools present (>3 ft deep), suggesting thermal and high-energy refugia were not available to fish in Reach 2. Streamside vegetation was functioning adequately as a thermal buffer (81% shade), however instantaneous stream temperatures peaked at ~66 °F. Continuous water temperature data indicates the stream temperature exceeded the state 303(d) temperature standard of 68 degrees. This, combined with few deep pools, would suggest sections of Reach 2 are at risk for providing thermal refugia for redband trout in the later summer months.

Reach 2 was minimally impacted by livestock grazing and is best characterized as a mosaic of riparian floodplain meadows and dense hardwood stands. Spawning gravels were generally clean and abundant; redband trout and macro-invertebrates were observed throughout the reach. Perhaps the greatest threat to fish populations in this reach is the increased isolationism due to the impassible culvert at Road 17 and the poor condition of the channel in the Van Allotment. Individual fish that migrate downstream do not interact with fish upstream, hence the population structure may favor older and stronger fish or fish that are able to find low-energy areas at times of high flows.

Aquatic Species

Redband trout were present throughout Schurtz Creek until river mile 7.02 (Reach 2, SO 732). Redband trout are a Malheur National Forest management indicator species and a Region 6 sensitive species. Malheur Mottled Sculpins, also a Region 6 sensitive species, were observed above the 17 road and speckled dace were observed below the culvert. In addition to fish, general observations indicated that macro-invertebrates were common throughout Schurtz Creek, suggesting food sources were not a limiting factor affecting redband populations.

Middle Fork Wolf Creek

Middle Fork Wolf Creek (Van Allotment; 1.3 mi. of reach 2 in the Wolf Creek Exclosure Pasture and .3 mi. in Dry Pasture. Wolf Mountain Allotment; upper part of reach 2, for .6 mi and 5.4 mi. in reaches 3, 4, 5, in the Wolf Creek Pasture)

However, two water diversions were present near the beginning of Reach 1. Flow volume of 4.91 cfs was measured immediately upstream of these water diversions. Both East Fork Wolf Creek and West Fork Wolf Creek are major tributaries to Middle Fork Wolf Creek and contribute to these flows. At the time of this survey (June 2002), these water diversions were at a minimum a 42% reduction of instream flows and likely trapping significant numbers of redband trout in the irrigation system, (Photo 1).

Stream Characters

Five reaches were identified in this stream survey and a total of 47 cross sections were measured for bankfull width, bankfull depth, flood prone depth, and flood prone width.

The lower 11.161 mi of the 11.761 mi of Middle Fork Wolf Creek was sampled as part of this survey, beginning at the USFS boundary. A total of 5 reaches were identified in this survey and a total of 1,545 habitat units were measured. Middle Fork Wolf Creek is best characterized as a forest/meadow transition stream. This type of system is most commonly positioned at a low-to-moderate gradient, with a narrow and interactive floodplain dominated by graminoids in the understory and hardwoods and conifers in the overstory (Brookshire and Dwire 2003). Reaches 1 and 3 were classified as “B” type channels; Reaches 2 and 4 were “C” type channels, and Reach 5 was an “E” type channel.



Photo 1

One of two water diversions on the Middle Fork Wolf Creek that divert water to private land and trap redband trout in the irrigation ditch. Both diversions accounted for a 42% reduction in stream flow at the time of the survey.

Riffle dominance was a concern in the lower ~4.1 mi of Middle Fork Wolf Creek (Reach 1 and part of Reach 2). Riffle lengths routinely exceeded 100 and even 200 ft in this section. Pools were very infrequent and poorly developed, with an average of ~11% fine materials (<6 mm in size). In Reaches 3-5, riffle lengths markedly decreased, and riffles exceeding 100 ft in length were few (8% of all riffles) compared with the section downstream (45% exceeded 100 ft in the first ~4.1 mi). Pools were generally more developed and frequent in the upstream reaches, but fine materials were a co-dominant feature. Excepting the ~4% fines in Reach 3, materials <6 mm in size comprised 25% and 45% of the substrate profile for Reaches 4 and 5, respectively.

The high sediment loads did not appear to be correlated with bank stability. Banks were generally stable ($\geq 90\%$ stable) but closer examination revealed that the few areas having active bank erosion were at the intensive level.

Malheur National Forest Amendment 29 standards were evaluated for all reaches of Middle Fork Wolf Creek (Table 25). Of the 6 evaluated standards, Reaches 1 and 2 met only the standards for bank stability and instantaneous water temperatures. Continuous stream temperature data indicates that maximum stream temperatures are observed in late July and early August. Forest Service data indicates that continuous water temperatures exceed the 68°F maximum in late summer.

Beginning at Reach 3, habitat indicators generally improved and Amendment 29 standards for pool frequency and LWD measures were met. Pool frequency was an important metric that changed. It increased markedly from 12 to 14 channel widths in Reaches 1 and 2 to ~8 channel widths in Reaches 3 and 4. This is important because increased pool frequency and decreased riffle lengths provide fish with necessary low energy refugia. Width-depth ratios were not within the desired range for Reaches 1

through 4. High width-depth ratios generally promote a condition with less thermal and visual cover for fish. Reach 5, a riparian floodplain E-type system, met five of the six habitat metrics of Amendment 29 (Table 25).

Table 25. Habitat criteria for Middle Fork Wolf Creek that has met (M) or failed to meet (F) the Malheur National Forest Amendment 29 DFCs.

Habitat Attribute	Stream Reach				
	1	2	3	4	5
Water Temperature¹	F ⁴	M	M	F	M
Large Woody Debris²	F	F	M	M	M
Pool Frequency	F	F	M	M	M
Bank Stability	M	M	M	M	M
Width/Depth Ratio	F	F	F	F	M
Shade/ Canopy Closure³	F	F	F	F/M ⁴	M

¹ Stream does not meet continuous temperature standards for OR DEQ 303(d),

² LWD thresholds are generally too large to detect hardwood and cumulative small-diameter instream wood for floodplain meadows (Reaches 2, 4, and 5). Reaches 1-4 were evaluated for ponderosa pine ecosystems; Reach 5 for lodgepole pine ecosystems.

³ Based upon hardwood/meadow complex vegetation for Reaches 1-4; lodgepole pine series was used for Reach 5.

⁴ At Amendment 29 threshold for instantaneous readings;

Aquatic Species

In 2001 the Emigrant Creek Ranger District sampled Middle Fork Wolf Creek using multiple pass depletion electro-fishing. Redband trout were observed along with mottled sculpin and speckled dace.

In Reaches 1 and 2 the presence of dace (a warm water fish) with redband trout provide indicators of the aquatic conditions of Middle Fork Wolf Creek. The presence of redband trout with warmer-water species including mottled sculpin and speckled dace provides insight into the trout habitat conditions in Middle Fork Wolf Creek. The presence of warm water fishes (particularly speckled dace) in the lower reaches suggests that long-term thermal habitat conditions are not within the desired range for the best trout habitats. These co-dominant fish have also been observed in streams throughout the Malheur National Forest where livestock grazing has been a disturbance mechanism (Bayley and Li 2002).

Upstream in Reach 3, speckled dace became less abundant and the species assemblage favored more “cool water” fish (sculpins). Further upstream into Reaches 4 and 5, the redband trout were the only fish observed, suggesting a higher abundance of cool water available. Habitat features reflect this with 33% and 56% of the habitat area as pool habitats.

In addition to fish, mussel species (likely the western pearlshell mussel, (*Margaritifera* spp.) were present throughout the survey. The large meadow unit near Road 15 (between mile post 23 and 24, SO 681, RM 6.5) contained the largest mussel beds of the survey (>50 individuals) and redband trout appeared to be abundant. One crayfish and several spotted frogs were also observed in Reach 5.

West Fork Wolf Creek

West Fork Wolf Creek (Van Allotment; 1.7 mi. of reach 1 in Dry Pasture, Wolf Mountain Allotment; 3.4 mi. of Reaches 2, 3, 4, in Wolf Creek Pasture)

Stream Characters

Four reaches were identified in this survey. Reach 1 was best characterized as a riparian floodplain meadow system (“E” type channel) within a forest/meadow transition zone (Rosgen 1996). Reaches 2 through 4 were positioned at a steep gradient with LWD (Photo 2) and were classified as “B” type channels within the forested zone.



Photo 2

LWD and steep slopes in reaches 2-4 prevent most livestock from using the narrow floodplain.

All reaches were riffle-dominated and limited in quality pool habitat. Overall pool structures were generally shallow and non-complex units with high degrees of sedimentation. Fine materials (i.e., <6 mm in size) were dominant in all four reaches, ranging from 10% in Reach 1 to ~27 to 38% in Reaches 2 through 4, suggesting the high potential for cobble embeddedness. Probable sources of sediment to the stream were attributed to the close proximity of Road 1550, especially in the upper half of the stream system. Because banks were generally very stable bank erosion was not deemed to be the source of sediment to the stream.

All four reaches of West Fork Wolf Creek met most of the habitat requirement objectives described by Amendment 29 standards (Table 26). Pool frequency and large woody debris (LWD) were two habitat attributes that did not meet Amendment 29 objectives. The steep gradient, long riffle lengths, and minimal LWD that function as pool creators have created a condition that does not favor low-energy refugia for rearing fish. Lack of low-energy refugia requires that fish have higher metabolic expenditures to maintain their position in the water column.

Table 26. Habitat criteria that has met (M) or failed to meet (F) the Malheur National Forest Amendment 29 standards for West Fork Wolf Creek.

Habitat Attribute	Stream Reach			
	1	2	3	4
Water Temperature ¹	M	M	M	M
Large Woody Debris ²	F	F	F	F
Pool Frequency	F	F	F	F
Bank Stability	M	M	M	M
Width/Depth Ratio	M	M/F ³	M	M
Shade/ Canopy Closure ²	M	M	M	M

¹ Instantaneous temperatures, Continuous temperature readings did not meet OR DEQ 303(d) standards

² LWD and stream shading based upon dominant series vegetation

³ Width-Depth ratio was 10.0, at the threshold of Amendment 29 standards

Aquatic Species

Redband trout were the only species observed in this stream. Although some of the habitat attributes discussed in this report are not meeting the RMOs of Amendment 29, this stream has the potential to provide excellent salmonid spawning and rearing habitat. Bank stability, temperature maximums, and stream shading are far more desirable than in neighboring streams within the watershed that presently contain redband trout (Schurtz, East Fork Wolf, West Fork Wolf, and Beaverdam Creeks, Reports Duck Creek Associates 2004a-d).

East Fork Wolf Creek

East Fork Wolf Creek (West Malheur Allotment; 1 mile of the lower part of reach 1 in Two Wire Pasture and 6.97 mi. of the upper part reach 1 and reaches 2, 3, and 4 in Pierpont Pasture).

Stream Characters

The lower 7.97 miles of the ~10.1-mile East Fork Wolf Creek were surveyed and four reaches were identified. Reaches 1, 3 and 4 were best characterized as riparian floodplain

meadow systems (“C” and “E” type channels) within a forest/ meadow transition zone (Rosgen 1996). Reach 2 (River Mile ~2.27 – 3.29) was best described as a more constrained reach with very little floodplain (a “B” type channel).

All reaches were riffle-dominated and limiting in quality pool habitat. Overall pool structures were generally shallow, non-complex units that resembled slow moving “glides” rather than well-developed pools with quality pool tail crests. Fine materials were co-dominant in Reaches 1, 3 and 4, ranging from 18% to 44%, suggesting the high potential for cobble embeddedness.

In general, all four reaches of East Fork Wolf Creek were not meeting many of the habitat requirements described by the Amendment 29 standards (Table 27). Bank stability and large wood debris components met the habitat criteria.

Paradoxically, the high degrees of sedimentation and the dominance of very long riffle lengths (>100) do not appear to be correlated with active bank erosion or lack of LWD in the stream system. The riffle dominance and poorly developed pool structures are likely due to other disturbances, including livestock grazing, and the close proximity of Road 1560. The Wolf Creek fire in 2001 had minimal negative effects to Wolf Creek due to sediment catchments placed on the slopes above the creek. Although the effects from the Wolf Creek fire were minimal due to the low intensity burn in the riparian area it did add LWD an important habitat feature lacking in most streams, in reach 1 (Photo 3).



Photo 3

The addition of+ LWD, an important habitat feature, in reach one of East Fork Wolf Creek, a result of the Wolf Creek fire in 2001.

In Reaches 1, 3 and 4, the stream system is showing evidence of shifting from an entrenched “E” type stream channel to a “C” type channel with generally less sinuosity that is more prone to lateral adjustment (Rosgen 1996). It is recommended that the condition of riparian floodplain meadows be improved to favor wetland obligate species (i.e., sedges and rushes). While East Fork Wolf Creek does not contain expansive riparian meadows, the importance of the floodplain in the forest/meadow transition zone is paramount to decreasing width-depth ratios, development of pool structures, and the retention of nutrients and fine sediments (Dwire et al. 2004, Brookshire and Dwire 2003, Kauffman et al. 1997). The data indicate a generally poor condition for salmonid spawning and rearing, but specific recommendations are not possible without further review. An active headcut is present in reach 4 which could lead to a rating of functioning at risk (Photo 4).

Table 27. Habitat criteria that has met (M) or failed to meet (F) the Malheur National Forest Amendment 29 standards for East Fork Wolf Creek.

Habitat Attribute	Stream Reach			
	1	2	3	4
Water Temperature ¹	M	M	F	F
Large Woody Debris ²	M	M	M	M
Pool Frequency	F	F	F	F
Bank Stability	M	M	M	M
Width/Depth Ratio	F	F	F	F
Shade/ Canopy Closure ³	F	F	F	F

¹ Instantaneous temperatures, Continuous temperature readings did not meet OR DEQ 303(d) standards

² LWD thresholds are generally too large to detect hardwood and cumulative small-diameter instream wood for floodplain meadows (Reaches 1, 3, and 4)

³ Based upon hardwood/meadow complex vegetation.



Photo 4
A small headcut in reach 4 of East Fork Wolf Creek.

All four reaches of East Fork Wolf Creek had stable banks (>90%). However, two major observations from the data prompted further analysis: (1) riffle lengths in East Fork Wolf Creek were uncharacteristically high for a stream system of its type, and (2) despite the stable banks, fine materials were co-dominant in the stream system. Closer examination and analysis of the data revealed there was a negative correlation between the riffle lengths and the percent bank erosion for riffles undergoing active erosion (Adj. $R^2 = 0.58$, $p < 0.05$). Overall, as riffle length increased, the proportion of that riffle experienced less active bank erosion, suggesting that the little bank erosion present in the system is due to localized disturbances (e.g., livestock grazing) rather than large-scale hydrologic processes (e.g., lateral adjustment from high-energy flows).

Aquatic Species

Redband trout were observed, along with mottled sculpin and speckled dace during fish surveys in 1999 and 2001. The 1999 – 2001 surveys were conducted downstream of the first culvert that posed a potential barrier to fish migration (below SO 625, RM 7.32 in Reach 4). However, redband trout were observed upstream of this culvert and two other culverts upstream at the time of this survey. Hence, the upper limit of fish is at least the upper limit of this survey (UTM 366095.9E/ 4884654.4N)

The presence of warm water fishes (e.g., speckled dace) with redband trout in Reach 1 suggests a condition where Reach 1 has lost many of the cool-water refugia that are desired for quality salmonid habitat (Bayley and Li 2002). In Reach 2, where the stream shifted to a “B4c” type channel, only redband trout were encountered. This is likely due

to the potential for higher turbulence and the proximity of the toe-slope to the stream channel (i.e., potentially more cool water seeps) that is characteristic of “B” type channels (Rosgen 1996). In Reaches 3 and 4, cool-water fishes (mottled sculpin) were found sharing habitat units with redband trout. This suggests a similar condition to Reach 1, where warmer water conditions have become prevalent in the stream system, likely causing stress to salmonids, particularly within the young of the year age class (Bayley and Li 2002).

Beaverdam Creek

Beaverdam Creek Wolf Mountain Allotment; Beaverdam Pasture about 4.6 miles of stream of which the first .75 miles are on Calamity Allotment.

Stream Characters

Rosgen E4 stream channels and associated riparian floodplain meadows are important for the retention and cycling of instream nutrients and for the regulation of hydrologic flows. Such meadows are very susceptible to anthropogenic disturbance, particularly livestock grazing (Photo 5) (Brookshire and Dwire 2003, Kauffman et al. *in press*).



Photo 5

Hardwood shrubs that have undergone intensive browsing by domestic livestock combined with unstable banks contributing to an incised channel and a change from sedges to Kentucky blue grass.

Beaverdam Creek has experienced intensive livestock grazing and changes in floodplain hydrology (Photo 6), particularly downstream of a road culvert and old abandoned beaver dams. For descriptive purposes, the single reach of Beaverdam Creek is discussed as the lower section (River Mile 0 to 1.5), middle section (RM ~1.5 to 2.5) and the upper section (~2.5 to 3.2). The first .75 miles of the lower section is the Calamity Allotment, but since this section is affected by the condition of upstream activities, stream descriptions for this lower section are included in this report. Each section has undergone different types and intensities of disturbance as well as different restoration efforts.

Although evidence of livestock grazing is present throughout the entire stream, intensive livestock grazing activity in the lower section (River Mile 0 to 1.5) of Beaverdam Creek was severe enough to prompt a large restoration effort in June 1999 by the U.S. Forest Service. The net result was the construction of a large livestock exclosure on Calamity Allotment (~1.25 miles in length, 350 acres), the selected removal and placement of western juniper from the floodplain to the stream channel, and willow plantings throughout the stream system and neighboring streams (McBride and Calamity Creeks). However the evidence of this livestock disturbance remains strong despite 4 years after the establishment of a 350-acre riparian exclosure in 1999. Livestock were actively grazing within the exclosure at the time of the survey in 2002. Exclosure success as a passive restoration treatment is only as effective as the construction and maintenance of fencing. Because livestock continue to graze within the exclosure the restoration project has had limited success and Forest riparian management objectives are not being met.

In areas that remain ungrazed there is generally better interaction with the floodplain, and habitat features, including overhanging and stable banks, hardwoods, root wads, are contributing to more pools and generally higher quality habitat. Maintenance of these floodplain meadows is important for the maintenance of a healthy riparian ecosystem: channel complexity, retention of organic nutrients, food webs, deep pools, water table elevations, and vegetative cover are all aspects that are maintained with an interactive floodplain environment (Brookshire and Dwire 2003, Dwire 2001, Kauffman et al. 1997, Kauffman et al. 2002, Bayley and Li 2002). For the long term, the maintenance of a healthy riparian floodplain ecosystem enhance fish populations, including redband trout (Region 6 Sensitive Species).



Photo 6

Expansive riparian floodplain meadow, which is functioning as a locale for sediment deposition as well as a buffer that mitigates high-energy flows originating upstream.

This wetland is proposed for livestock exclusion (alternative 2) until it is restored and a headcut below this area is stabilized.

Habitat Survey

In the mid-section of Beaverdam Creek (RM ~1.5 to 2.5), active erosion was notably lower and the stream channel was generally more stable than in the lower 1.5 miles. In general, riffle lengths decreased to an average of ~50 ft, but 12 riffles (14%) exceeded 100 ft in length. Livestock grazing and the close proximity of Road 1705 are likely mechanisms for losses of pool structure in this E-type channel system. What is most notable and important about this stream section is its expansive riparian floodplain meadow, which is functioning as a locale for sediment deposition as well as a buffer that mitigates high-energy flows originating upstream. Intensive disturbances, particularly from livestock grazing, will likely transform this functioning meadow to a less desirable condition similar to that of the lower ~1.5 mi of Beaverdam Creek (i.e. wet meadow to dry meadow). However, at present this meadow section represents quality fish habitat and is functioning to minimize water velocity and incision. Monitoring in this section should be conducted annually to ensure that plant species composition, water table elevations, and pool habitats are maintained. In addition, monitoring proper forage utilization by livestock is critical in this section to restore fisheries habitat. For these reasons and the active headcut (Photo 7) grazing trigger points may have to be set at 35% utilization or lower to allow a natural rate of recovery.



Photo 7

A previous attempt at stabilizing a head cut in a riparian meadow on Beaverdam Creek.

In the upper section of this stream (beginning at RM 2.457, SO 388), there is evidence of increasing bank erosion that is due in part to upstream influence from the culvert located at Road 17 and in part to increased velocities directly downstream of a beaver dam relic (mound in the floodplain). If the riparian pasture (Photo 8) below the 17 road excluded livestock for several years until willows and other woody species became established this section of the creek would support beaver that could play a key role in restoring the interaction of the stream channel and the floodplain and stabilizing the entire length of the channel (Naiman, R.J., C.A. Johnston and J.C. Kelley. 1988). Monitoring stations at this point up and downstream are recommended to ensure that bank erosion and losses in pool structures do not carry downstream to the relatively intact floodplain meadow system.



Photo 8

Relic beaver dam located in the semi-wet meadow on the south side of the 17 road. Restoring relic beaver dams like this one would slow water flows and improve the interaction of the stream channel with the floodplain. This area is proposed (alternative 2) for livestock exclusion until the area is restored.

The perched culvert was also observed to be a potential fish barrier. This culvert is located at the Road 17 crossing (RM 2.952, SO 432) immediately upstream of a large riparian floodplain meadow created by the relic beaver dam (wetland, SO 431). This section has experienced extensive bank erosion from a combination of trampling by livestock and the loss of meander-scours due to sustained high-energy flows (Photo 9).



Photo 9

Unstable banks partially due to livestock grazing, high energy flows and the lack of bank stabilizing sedges on the lower part of Beaverdam Creek (April 2004). The channel is becoming incised and lack of floodplain connectivity would likely result in a shift of species composition from sedges to less desirable upland grasses and sagebrush (Kauffman et al. 1997). Stubble heights from the prior year appear to be at 4 inches, however trampling of the stream bank by livestock has degraded the habitat condition for fish. This type of stream channel and vegetation has a high potential for recovery with adaptive management practices that would allow the sloughed off banks to stabilize with sedges, and form a new floodplain, with a narrower stable channel.

Overall, Beaverdam Creek did not meet the standards for pool frequency, bank stability, shade, and large wood debris (Table 28). Because the majority of Beaverdam Creek is a riparian floodplain meadow environment, the incorporation of wood material is generally composed of decadent hardwoods and root wads (Dwire 2001): wood debris deemed to be functional in these systems is generally smaller in diameter than the LWD minimum diameter sizes mandated by protocols that were developed primarily for systems west of the Cascade Crest (USFS 2002). As a result, this survey did not detect the “cumulative effects” of small diameter wood in the formation and maintenance of pools (a beaver dam is a prime example of this). However, some sections of Beaverdam Creek (smaller than the reach scale) are best described as forest/meadow transitional zones, and it is expected that some quantities of LWD would be present in the stream channel (Brookshire and Dwire 2003). This is particularly true upstream of Road 17 and in a subsection between RM 1.5 and 2.5.

Table 28. Habitat criteria that have met (M) or failed to meet (F) the Malheur National Forest Amendment 29 standards.

Habitat Attribute	Stream Reach
	1
Water Temperature ¹	P/F
Large Woody Debris ²	F
Pool Frequency	F
Bank Stability	F
Width/Depth Ratio	M
Shade/ Canopy Closure ³	F

¹ Water temperatures were evaluated using instantaneous readings in June, while continuous temperatures monitoring at a downstream site indicate Beaverdam probably failed the OR DEQ 303(d) standard in late July. See Temperature section for details.

² LWD thresholds are generally too large to detect hardwood and cumulative small-diameter instream wood for floodplain meadows.

³ Based upon hardwood/meadow complex vegetation.

Although instantaneous stream temperatures were within the maximum thresholds of those outlined in Amendment 29, continuous stream temperature data collected at the confluence of Calamity and Beaverdam Creeks indicate that maximum temperatures were typically measured in the last week of July (Table 29) and exceeded state 303(d) standards. Because this survey was conducted at least 7 weeks prior to the weeks exhibiting peak temperatures, it is very likely Beaverdam Creek would fail Amendment 29 standards during the summer months.

Table 29. Continuous stream temperature data collected at the confluence of Calamity Creek and Beaverdam Creek from 1998 through 2003. These data are not specific to Beaverdam Creek, but provide insight as to the timing and magnitude of peak temperatures within the watershed.

Year	Start Date (m/d/y)	Stop Date (m/d/y)	Date of Daily Maximum	Daily Maximum	7-Day Average Maximum	Days >50°F	Days >55°F	Days >64°F
1998	07/30/98	10/25/98	08/04/98	79.7°F	77.5°F	74	62	47
1999	07/15/99	09/16/99	07/29/99	79.3°F	77.0°F	64	64	57
2000	06/01/00	09/06/00	07/29/00	84.4°F	81.3°F	98	96	85
2002	07/23/02	12/03/02	07/29/02	79.6°F	76.8°F	82	73	51
2003	04/23/03	11/03/03	07/21/03	83.4°F	82.0°F	NA	148	110

In addition to temperature extremes, sedimentation was a limiting factor affecting fish populations in Beaverdam Creek. At the reach level, the dominant substrate has shifted from very fine gravels to fine materials. Although not directly measured, a “sand on gravel” condition leads to increased embeddedness of substrates, which results in low

oxygen flow, and loss of suitable and successful spawning redds for salmonids (Hunter 1991).

While riparian floodplain meadow systems are generally described as retention or depositional reaches (Rosgen 1996), the quantity of fine materials in Beaverdam Creek is outside what would be expected for this stream system (76% fines). Three major mechanisms were observed as the sources of the fine materials in Beaverdam Creek: very intensive livestock grazing (especially in the lower ~1.5 mi), the proximity of Road 1705, and the constrained hydrologic flows at Road 17.

Sand and very fine materials dominated the substrate profiles of Beaverdam Creek (i.e., <2 mm in size). Sediment inputs in Beaverdam Creek were most often associated with the proximity of roads and meander scours within the floodplain meadow (lateral adjustments). Livestock grazing and trampling of the stream banks was the most evident source of sediment to the stream channel; but the affected area immediately below the culvert at Road 17 also had high degrees of sedimentation resulting from increased overland flow from the road, and direct deposition via the culvert, into the downstream wetland. The wetland is beginning to display evidence of a channelized system due to the increased sedimentation, which will ultimately result in losses of connectivity and water holding capacity for the stream.

Bank stability was measured as the total linear distance of actively eroding banks along the entire primary channel and expressed as a percentage. Beaverdam Creek did not meet the Amendment 29 standards for bank stability (87% stable). Closer examination of bank stability revealed that bank erosion was most concentrated in the lower and uppermost sections of Beaverdam Creek (Figure 4).

In a marked contrast to the lower 1.5 mi of Beaverdam Creek, the middle ~1 mi between RM 1.5 and 2.5 had stable banks. This section of stream was a floodplain meadow created by an old beaver dam that at one time had many of the characteristics of a functioning riparian floodplain meadow system (E Type channel). However disturbances, especially from ongoing livestock grazing, are a significant factor in determining the integrity of this riparian system.

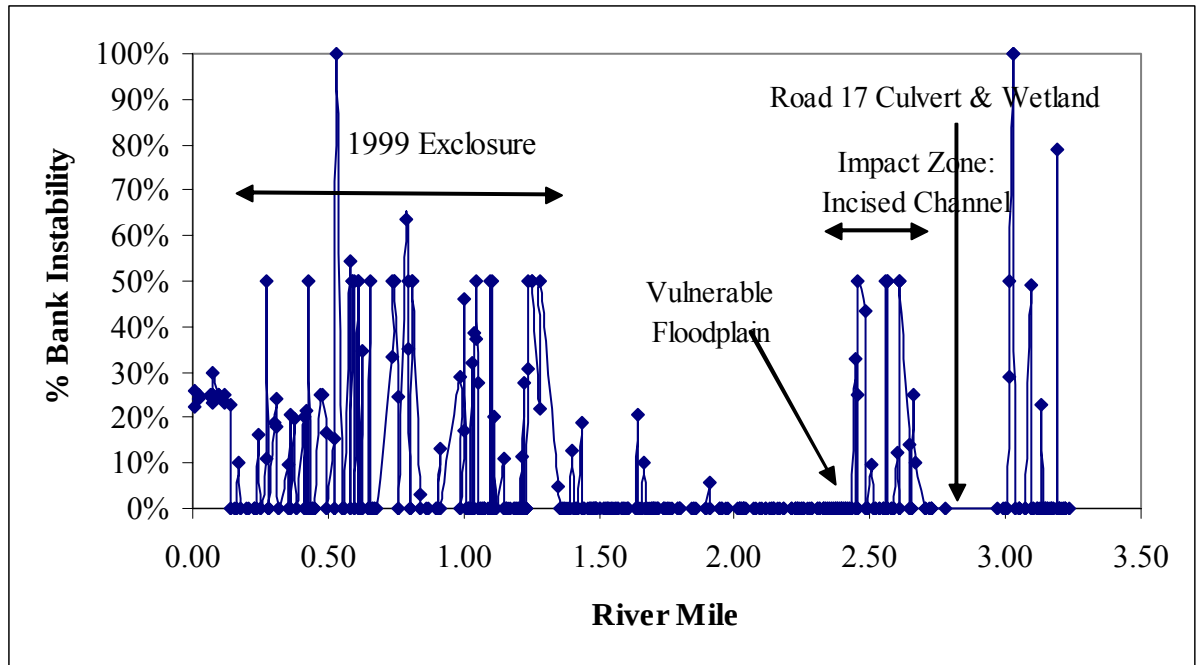


Figure 4. Bank instability expressed as a percentage of each habitat unit along the stream continuum for Beaverdam Creek.

Aquatic Species

Redband trout were the only fish observed in Beaverdam Creek as part of the 2002 stream survey. The upper limit for redband trout in Beaverdam Creek was at a natural bedrock waterfall approximately 0.5 mi upstream of Road 17 (SO 483, RM 3.197, UTM 0354019E/ 4874833N). Because of the high proportion of fine material found throughout the stream channel, the relatively low amounts of stream shade, and the high degrees of bank instability in localized areas (Figure 1), it is likely that the habitat of Beaverdam Creek is functioning at risk for redband trout populations.

Columbia spotted frogs and Pacific tree frogs (*Hyla regilla*) were also observed in Beaverdam Creek in a follow-up visit in April 2004 by USFS fisheries biologists. Both adults and egg masses were observed in a wetland stretch immediately upstream of the culvert at Road 17 (SO 433, RM 2.967) on the west side of the stream along the road fill.



Photos 10 and 11

A functioning floodplain illustrates the connectivity of sedges (*Carex aquatilis*) with the stream channel, providing nesting and rearing habitat for Columbia spotted frogs and Pacific tree frogs.

It is important to maintain the integrity of wetland environments for sensitive species. Photos 10 and 11 illustrate the connectivity of floodplain sedges (*Carex aquatilis*) with the stream channel and nesting and rearing habitat of spotted frogs. This is important because these wetlands perform many critical functions within the Beaverdam Creek ecosystem, including providing habitat for sensitive animal species, slowing water flow, and creating retention “sinks” of sediments and organic nutrients (Brookshire and Dwire 2003). The physical disturbance of livestock presence in this type of system has been shown to decrease water infiltration rates and thus increase channelization and isolation of the floodplain. It is also likely the presence of livestock would have a negative impact upon spotted frog nesting habitat should the floodplain become disconnected.

Bridge Creek

Bridge Creek (Wolf Mountain Allotment; Beaverdam Pasture, Reach 6 (2600 feet) and Reach 7 (2600 feet))

Reach 6 (follows the 1601-919 Rd.) The riparian plant association was described as Ponderosa Pine/lodgepole. Ground cover averaged 89% grass/forbs, 3% shrubs (currents), and 29% tree crown cover. Stream banks averaged 56% stable and stream shade averaged 34%. The streambed was described in poor condition and the stream gradient was 8.2%. Redband trout were present in this reach.

Reach 7 (follows the 1601-802 Rd.) The riparian plant association was described as Douglas fir/Ponderosa Pine/juniper. Ground cover averaged 84% grass/forbs, 6% shrubs (currents/snowberry), and 29% tree crown cover. Stream banks averaged 82% stable and stream shade averaged 65%. One segment was described in poor condition with several large headcuts (4 feet) and the potential for high sediment flows and unstable banks. The second segment had a higher percentage of stable stream banks but still failed to meet forest plan standards. Redband trout were present up to the headcut.

Antelope Creek System

The North, South and Middle Forks are in the Wolf Mountain Allotment, Antelope Pasture. All three streams are category 1 perennial fish bearing streams. Stream surveys were conducted in 1996 and indicated concerns with bank stability that was as low as 60% on some reaches. However, field observations in 2005 indicated that these reaches have improved, and now range between 80 and 90 % stable, except for one segment of Antelope Creek that is flowing down the 1619-805 road.

Squaw Creek Drainage

Squaw Creek Drainage System West Malheur Allotment; 1 mi. in East Fork Wolf Creek Pasture, 3 mi. in Cougar Flat Pasture and 2 mi. in Pierpont Pasture.

Squaw Creek

Riparian characterization Reach 1, Category 1 fish bearing stream (3 transects, approximately 3920 feet)

The riparian plant association was classified as psme/syal (Douglas fir/snowberry) with abgr (grand fir), alin (alder) and undefined associations also present. Ground cover averaged 98% grass/forbs, 21% shrubs, and 42% tree crown cover. Trees were primarily Douglas fir and ponderosa pine with some grand fir. Stream banks averaged 90 to 100% stable. Stream shade averaged 51% and the channel gradient averaged 3.5%. A few redband trout were observed near the end of the reach, .5 miles upstream of FS 15 Road, even though there was little running water. Cattle were not present at the time of the survey.

Riparian characterization Reach 2, Category 1 fish bearing stream (5 transects, approximately 6600 feet)

The riparian plant association was classified as undefined and psme (Douglas fir)/mesic forb. The ground cover averaged 96% grass/forbs, 29% shrubs, and 23% tree crown

cover. Indicator trees were primarily Douglas fir with some ponderosa pine, quaking aspen and lodgepole pine. Stream banks averaged 90-100% stable. Stream shade averaged 41% and the gradient averaged 6%. A few fish were observed in this reach 1.5 miles upstream of FS 15 Road. No fish were observed above this reach. Cattle were not present at the time of the survey, but the riparian area showed signs of grazing.

Riparian characterization Reach 3 (6 transects, approximately 7920 feet)

The riparian plant association was classified as undefined, with psme (Douglas fir), pipo (ponderosa pine) and syal (common snowberry) associations also were present. Ground cover averaged 99% grass/forbs, 15% shrubs, and 26% tree crown cover. Trees consisted primarily of ponderosa pine, Douglas fir and quaking aspen. The stream banks averaged 90-100% stable on the left and 75-89% stable on the right. Stream shade averaged 32% and the gradient averaged 2.5%. No fish were observed in this reach. Vegetation was utilized at levels that were preventing the attainment of Forest RMOs.

Riparian characterization Reach 4 (2 transects, approximately 2640 feet).

The riparian plant association was classified as popr (Kentucky bluegrass) and juncos (rushes). Ground cover averaged 100% grass/forbs, 16% shrubs, and 0% tree crown cover. This reach was in a meadow (Cougar Flat), therefore there were no trees. Stream banks averaged 90-100% stable. Stream shade averaged 5% and the channel gradient averaged 1.5%. The stream was dry in this reach. Vegetation was utilized at levels that were preventing the attainment of Forest RMOs.

Riparian characterization Reach 5 (7 transects, approximately 9240 feet)

The riparian plant association was classified as pipo/syal (ponderosa pine/snowberry) with salix/juncos (willows/rushes) and popr (Kentucky bluegrass) associations also present. The ground cover averaged 98% grass/forbs, 9% shrubs, and 20% tree crown cover. Trees consisted primarily of ponderosa pine, and quaking aspen with some Douglas fir and lodgepole pine. Stream banks averaged 75-89% stable. Two headcuts are present in this reach; in section 33 below the junction of the 1630 and 428 roads and in section 4 near the junction of the 1630 and 197 roads. Stream shade averaged 37%. The channel gradient averaged 2.5% and no fish were observed in this reach. Vegetation was utilized at levels that were preventing the attainment of Forest RMOs.

Riparian characterization Reach 6 (8 transects, approximately 10560 feet)

The riparian plant association was classified as psme/syal (Douglas fir/snowberry) with pipo (ponderosa pine) and undefined associations also present. Ground cover averaged 97% grass/forbs, 13% shrubs, and 27% tree crown cover. The trees consisted primarily of Douglas fir and ponderosa pine with some grand fir and quaking aspen. Stream banks averaged 75-89% stable and stream shade averaged 42%. The gradient averaged 7%. No fish were observed in this reach. Grazing had occurred in this reach, but not to the extent of previous ones.

Van Gulch Creek

Van Gulch Creek, West Malheur Allotment; Cougar Flat Pasture

Riparian characterization Reach 1 (8 transects, approximately 10560 feet).

The riparian plant association was classified as pipo/undefined (ponderosa pine) with psme/syal (Douglas fir/common snowberry) associations also present. The ground cover averaged 100 % grass/forbs, 5% shrubs, and 36% tree crown cover. The indicator trees were primarily ponderosa pine, and Douglas fir. The stream banks averaged 75-89% stable. The reach was dry until the last transect. Stream shade averaged 51%. The gradient averaged 2.4%. No fish were observed in the reach. Vegetation was utilized at levels that were preventing the attainment of Forest RMOs.

Riparian characterization Reach 2 (5 transects, approximately 5940 feet)

The riparian plant association was classified as pipo/undefined (ponderosa pine) with psme (Douglas fir) and syal (common snowberry) associations also present. Ground cover averaged 93% grass/forbs, 3% shrubs, and 40% tree crown cover. Trees were primarily ponderosa pine, with some Douglas fir, quaking aspen and grand fir. Stream banks averaged 90-100% stable. A headcut is present in this reach, near Van Gulch Spring. Stream shade averaged 48%. The gradient averaged 6.2%. No fish were observed in this reach.

Effects on Fisheries

All alternatives are consistent with Forest Plan direction and none of the potential combined effects associated with the alternatives are expected to adversely affect INFISH/PACFISH RMOs or population viability. However the rate of natural recovery to achieve the DFCs varies by alternative. Continued application of INFISH/PACFISH direction is expected to improve fish habitat conditions and move aquatic habitat towards the DFC within the project area. Stream channel conditions are expected to improve with activities and actions completed under these alternatives. The Proposed Action Alternative and the No Grazing Alternative include aquatic conservation and restoration actions that would improve the quality, quantity, function, sustainable productivity, and distribution of recreational fisheries as directed under Executive Order 12962, Recreational Fisheries (Appendix K).

Potential effects to aquatic species including redband trout, Malheur mottled sculpin and Columbia spotted frog, all of which are forest sensitive species are addressed in the biological evaluation (Appendix G). The Malheur National Land and Resource Management Plan (Forest Plan) directs the Forest to improve and increase habitat for these species by ensuring that effects from livestock grazing do not carry over to the following grazing season, thus allowing a “near natural” rate of recovery of riparian areas as defined by PACFISH Enclosure B (Appendix J).

Summary of Effects to Aquatic TES

Species	Current Management	Proposed Action	No Grazing
redband trout (S)	MIH	MIH	BI
Malheur mottled sculpin (S)	MIH	MIH	BI
Columbia spotted frog (S)	MIH	MIH	BI

P = Proposed, E = Endangered, T = Threatened, S = Sensitive

Refer to the Biological Evaluation for Aquatic Species (Appendix G) for more details on effects to Aquatic TES.

The Forest Plan classifies all allotments as either unsatisfactory or satisfactory with appropriate vegetation utilization standards of 35% and 45% use, respectively. The goals of these Forest Plan standards are to improve streams and fisheries habitat, to reach a desired future condition (DFC) through a near natural rate of recovery process, as described in INFISH/PACFISH. This classification system combined with the two different levels of utilization should improve stream conditions and allow aquatic habitats to reach the DFC through the natural rate of recovery process. Depending on the specific subwatershed and associated site potential, utilization standards may have be adjusted to meet the goals of GM-1, which states, the Forest will, “Modify grazing practices (e.g, accessibility of riparian areas to livestock, length of grazing season, stocking levels, timing of grazing, etc.) that retard or prevent attainment of Riparian Management Objectives or are likely to adversely affect inland fish. Suspend grazing if adjusting practices is not effective in meeting Riparian Management Objectives”. The rates of recovery and utilization levels are addressed by each alternative.

Aside from the allotment classification system and associated utilization standards, adaptive management techniques and specific restoration practices are proposed in alternative 1 and 2 respectively, based on current conditions and management practices that would allow the forest to achieve the DFCs in different time frames. The existing condition section describes in detail the current stream condition by allotment and pasture.

Direct and Indirect Effects Common to Alternative 1 - Current Management and Alternative 2 - Proposed Action

Impacts to fisheries and stream habitats associated with improperly grazed livestock have been well documented in scientific literature and by state and federal agencies (Kauffman and Krueger 1984; Clary and Webster, 1989; Overton, et. al., 1994; Platts, 1991; Platts and Nelson, 1985; Platts, 1979). Grazing can affect all components of the aquatic system - riparian vegetation, channel morphology, quality and shape of water column, and structure of the soil portion of the streambanks (Platts 1979). Chapter 3, Existing Conditions, provides data for each allotment that indicates that specific reaches of streams in the project area are not meeting RMOs and not functioning at desired conditions. Channel morphology and sedimentation are two of the most common and important stream characters in these allotments not meeting DFCs. Specific segments of Beaverdam Creek and Bridge Creek in the Wolf Creek Allotment, are two streams of

concern in the project area that fail to meet several RMOs. Additional impacts from livestock grazing in these areas include, but are not limited to:

- Manipulation of channel morphology (bank shearing, increased width/depth ratio, channel incision, unstable streambanks due to loss of riparian vegetation and erosion, loss of undercut banks)
- Changes in riparian vegetation types and overall loss of riparian vegetation;
- Increased water temperatures
- Increased fine sediment levels
- Loss of riparian areas from channel degradation, channel incision, and loss of water-table

Manipulation of channel morphology results in the direct loss of habitat features that are important to trout (especially young-of-the-year) and sculpin, such as undercut banks, shore water depth, and quality pool habitat (Platts 1987). The ability of the stream to transport sediment, withstand flood events, and maintain local water table is reduced by the alteration of morphology (Rosgen 1996). Changes in channel morphology caused by bank shearing and bank instability would increase the width/depth ratio of the channel, creating a wide and shallow stream and a corresponding increase in water temperature during the summer. A wide, shallow channel can also act as a barrier to fish movement.

With a wide and shallow stream, fish are also impacted during the winter months from lack of thermal protection and freezing and the formation of anchor ice. Anchor ice, which forms in shallow channels, prevents fish movement between rocks on the bottom of the stream and inhibits fish from feeding on aquatic invertebrates (Montana Fish, Wildlife, and Parks 2003). Streams that are deeper and narrower, having healthy riparian vegetation and a subsequent decrease in width/depth ratio are less likely to have anchor ice than shallow, exposed streams.

Sediment and Substrate Embeddedness

Fine sediment levels in excess of 20% were found in stream surveys conducted in 2002 and 2003, and substrates embedded with fine sediment over 30% were observed within specific stream reaches in the project area (Chapter 3). Most of these stream segments are associated with bare soils located in and adjacent to riparian zones. These conditions are often related to the level of livestock use in the riparian area and lack of regeneration of deep rooted plant species. Fine sediment in streams is a normal component of salmonid habitat; however, major disruption of the system occurs when sediment levels substantially exceed natural levels. Deposition of fine sediment can eliminate habitat for aquatic insects; reduce density, biomass, and diversity of aquatic insects; reduce permeability of spawning gravels; and reduce emergence of fry from redds. (Nelson et. al. in Meehan 1991). Studies have shown that an increase in 1-3mm size sand from 20% to 30% can decrease emergent survival of salmonid species from 65% down to 40% (Phillips et. al. 1975). Fine sediments are known to impact fry emergence and survival, and fine sediment (<6.5mm in size) levels above 40% can effectively eliminate a trout fishery and many macro invertebrate species (Everest and Harr 1982).

The lower half of Beaverdam Creek (in Beaverdam pasture), and segments of reaches 6 and 7 of Bridge Creek, are stream segments of concern in the project area that have a high proportion of habitat attributes that fail to meet RMOs, (Table 22). Stream bank

stability and high fine sediment levels are issues on these streams. Additionally, stream headcuts (Table 23) on Bridge, and Beaverdam Creeks in the Wolf Allotment and on East Fork Wolf, Squaw and Van Gulch Creeks in West Malheur Allotment are also contributing to some degree of the degraded condition of these streams. Livestock grazing can lead to further erosion in these areas and headcuts can effect water movement into the floodplain, changing the desired plant associations.

These stream segments of concern would be dealt with by adaptive management and administrative changes in grazing (such as a change or reduction in timing, intensity, frequency, distribution, and duration of use) to control livestock use in these riparian areas, and allowing the near natural rate of recovery to occur with no carry over effects from grazing to the next year. Livestock would be allowed to utilize riparian vegetation at 35 % levels.

Cumulative Effects common to all Alternatives

Activities that have cumulatively affected stream habitats, fisheries, and particularly redband trout and sculpin habitat within the project area and at the watershed scale outside of the project area include: long term grazing on public and private land, logging, recreation, road construction and maintenance, recreational fishing, mining, water diversions, stocking of non-native fish, and the spread of noxious weeds (refer to Appendix C for a list of specific activities). Cumulatively, livestock grazing and logging are the most widespread activity with the longest duration in the project area, starting in the late 1800's. Impacts to the landscape, as noted previously, have been extensive, and impacts to streams and riparian areas are particularly well documented.

Domestic livestock use within the watershed began in the mid- to late-1800s. High numbers of cattle and sheep grazed within the watershed. Grazing usually occurred in the winter at low elevations and moved upslope in summer to higher elevation meadows and ridges. A pre-1900 report indicated rangelands were dominated by "bunchgrass over the whole territory as high as a horse's knee and very little sagebrush" (USFS, 1996). By the late 1870s, tens of thousands of sheep and approximately 18,000 cattle resided in the area. This area was still officially part of the Blue Mountain Paiute/Snake Indian Reserve until the late 1870s. However, encroachment into the area was common and intensive. After the reserve was forfeited to the federal government in 1879, livestock numbers rapidly increased. Excessive grazing and browsing contributed to an increase in less palatable plant species such as sagebrush, and a decrease in more palatable species such as bitterbrush. Bunchgrass plant associations, which thrived prior to introduced grazing, were rapidly overgrazed within a half-century. Within the last 60 years, improvements have occurred to control the distribution of domestic livestock and their use of vegetation. Fencing, developing upland water sources, controlling numbers and changing the season of use, have all been used by range managers (USFS, 1996).

Agricultural diversions occur on two streams; Wolf Creek (on USFS, Photo 12) and House Creek (on private). The diversions depend on a reliable water supply from upstream sources on the Forest and effects to these water sources such as alterations in channel morphology leading to channel incision can cause changes to water retention along the riparian zone and less water being available during low flow periods. In some cases, water removal would result in reduced quantity and quality of downstream habitat

for trout. The channel of House Creek does not exist beyond the (downstream) point of the diversion due to the diversion of all the water for flood irrigation on private pastures. Since the stream is no longer connected to the Silvies River, this may account for the absence of fish above the diversion. However unscreened diversions on the Middle Fork Wolf Creek on the Malheur NF trap fish in the irrigation system, leading to eventual mortality as the water spreads out across private downstream pastures.



Photo 12

One of two water diversions on the Middle Fork of Wolf Creek, constructed of boulders and rock, that alter natural hydrologic stream behavior and trap redband trout in irrigation systems that provide water to private agricultural land. Both diversions diverted 42 percent of the stream flow, at the time of the survey, in June 2002.

Historically this watershed was once part of an anadromous fishery. Steelhead trout (*Oncorhynchus mykiss*) and Chinook salmon (*O. tshawytscha*) migrated up the Columbia River to the Snake River then up the Malheur River and into the Upper Malheur Watershed (USFS, 1996). The installation of Hell's Canyon Dams on the Snake River effectively eliminated salmon and steelhead runs in the Malheur River. Historic importance of the habitat within the Upper Malheur Watershed is unknown for salmon and steelhead spawning and rearing (USFS, 1996).

Fish stocking can also have negative effects to the native fish population and the first known stocking of non-native fish into streams on USFS and BLM occurred about 1935. Since that time rainbow trout, brook trout and other warm water species were stocked into Malheur River subbasin streams. Not all stocking activities have been documented; however, it is assumed that perennial streams with adequate access were stocked with non-native fish. Oregon Department of Fish and Wildlife stopped stocking streams in the entire basin about 1992 due to concerns of hybridization between native redband and

hatchery rainbow trout. However, natural environmental conditions favor native redband trout over hatchery fish and over the course of 14 years the rainbow hatchery influence is probably no longer a threat to the native redband population.

Existing roads on public and private, particularly those within RHCAs and riparian areas would continue to impact watersheds in several ways including: alteration of channel morphology, alteration of runoff regimes, increase of fine sediment levels in streams, reduced riparian vegetation and cover, and confinement of channel (particularly when roads are placed directly next to streams on adjacent floodplains). Implementation of regular road maintenance activities is designed to reduce sediment delivery to streams by clearing blocked culverts and blading road surfaces to reduce erosion, sedimentation and road failure. Recreation (ATVs) and dispersed camping alongside roads have also contributed to stream impacts. Where roads intersect streams in the wolf creek and Schurtz creek drainage, culverts create migration barriers or completely block fish movement. Several miles of roads in the project area have been closed or decommissioned under past timber harvest projects to reduce impacts to fisheries habitat.

Timber harvest began on a small scale within the watershed around the turn of the century, mostly to supply local ranch needs. Large-scale timber harvest began within the watershed in the late 1940s and 1950s. Roads were consequently constructed within the watershed to access timber. Approximately 80 percent of the USFS lands within the watershed are forested. Approximately 30 percent of this area has been intensively managed since the early 1970s. Prior to this time logging was selective for large overstory pine (USFS, 1996).

Landscape disturbances from the commercial harvest of trees, especially clear-cut activities and tree removal activities in the floodplain have had a negative affect within the stream channel and floodplain (Photo 13). Over 20,165 acres have been harvested by 9 different treatments across the 3 allotments just since 1978. However, since 1995 the removal of trees and associated activities in riparian areas has been restricted to the surrounding uplands unless those activities would improve conditions in the riparian area. It would take over a hundred years to replace old growth trees removed from the floodplain, but harvest restrictions during the past 11 years have improved the rate of recovery from these historic landscape altering events.

Past timber sales that have led to these existing conditions described above on these allotments include; Cove, Jungle Spring, Long Spring, Long Mountain, Milk Spring, Ewing II, County, Glass Mountain, Antelope, Cold Springs, Dry Springs, Northside and Dry Joe (Wolf Mountain Allotment); Vangulch, Frost, Capbox, Bedrock, East Wolf, Forks, Elk, and Boundary (West Malheur Allotment); and CHE Spring and Otter (House Creek Allotment).

**Photo 13****West Fork Wolf Creek**

Landscape disturbances from the commercial harvest of trees in the floodplain have had a negative affect within the stream channel and floodplain of most streams in the three allotments.

The use of motorized vehicles and livestock grazing provide opportunities for the spread of noxious weeds, which can invade riparian areas, replace native deep-rooted species and ultimately impact stream habitat. The control of noxious weeds is discussed further in the vegetation portion of the document.

Some natural processes outside the control of the Forest have contributed to cumulative effects to aquatic resources. These processes include wildfire and drought. The Malheur NF is particularly susceptible to wildfire due to existing moisture regimes and changes in forest vegetation structure. Fires tend to spread quickly and burn hotter under these conditions. Historically, fire played a significant role in the ecosystem of the Upper Malheur Watershed. Ponderosa pine ecosystems historically had a natural fire disturbance interval consisting of low intensity frequent fires. Since the early 1900s, management practices have suppressed natural wildfires in the watershed. Fire suppression has had a significant impact on composition, health, and distribution of range plant communities. Some rangeland ecosystems, such as bitterbrush or bunchgrass types, are maintained by low intensity, frequent fires. Without such disturbance these plant communities are at risk from invasion of other plant species (USFS, 1996).

The Malheur NF has also experienced periods of drought during the past 4 years, which exacerbate these conditions.

Adaptive management (Alternative 1), a combination of riparian fencing, adaptive management strategies, headcut stabilization and stream channel restoration activities (alternative 2) or no grazing as described in 3, would reduce (Alternatives 1 and 2) or eliminate negative impacts (Alternative 3) from livestock on the three allotments allowing the near natural rate of recovery process, to move aquatic habitats towards the desired future condition, as described in INFISH/PACFISH. This would occur in a shorter time frame with Alternatives 2 and 3 than just the adaptive management process associated with Alternative 1, which would require the longest period of time. Alternative 3, No Grazing would have the fastest rate of recovery due to no impacts from livestock.

Direct and Indirect Effects of Alternative 1 - Current Management

Alternative 1 would maintain current permitted livestock numbers, under adaptive management strategies on the 3 allotments. Under this alternative, improvement in existing stream and fisheries habitat conditions would take the longest to occur because features such as water developments, fence construction, rock structures, large wood debris, headcut stabilization and aspen restoration would not be implemented.

Most impacts to fish are indirect unless grazing occurs during fish spawning and egg development associated with redds. If redds are present during the grazing period, the possibility exists for fish mortality by livestock trampling of redds and the early life stage embryos and alevins that have not emerged from the stream substrates. This is unlikely in these allotments since most of the young redband trout have completed their life cycle in the gravel by the time livestock are turned out. However a change in the livestock season (earlier) could have direct negative effects on forest sensitive fish species that may be in the gravel stage. This would require a study on the timing of fish emergence from the gravel stage in combination with earlier livestock grazing in June to determine any possible affects. See also Appendix G for more information on effects to sensitive species.

Indirect impacts would include: increased sedimentation, vertical instability related to changes in channel morphology upstream, increased water temperature, and decreased water quality. The majority of impacts to fisheries occurs indirectly from the alteration of stream habitat and result in reduced populations, growth, and recruitment. Indirect effects occur in a cause and effect manner when livestock trample streambanks and reduce crucial bank vegetation, and channel morphology is altered. With unstable streambanks, undercut banks collapse, erosion occurs, fine sediment enters the stream channel, the channel is widened, and water temperatures rise with shallow water and decreased riparian vegetation. In some cases, the stream forms a headcut, and the channel becomes incised resulting in lowered water tables and loss of entire riparian floodplains. Headcuts are present on several fish bearing streams including Beaverdam, Bridge, East Fork Wolf, and Squaw Creeks.

In areas where impacts from livestock are measurable (Beaverdam Creek) specific stream reaches contain elevated levels of fine sediment, streambanks are less stable, undercut banks are lacking, and water temperatures are generally higher. Populations of salmonids and other aquatic life that are sensitive to these changes like redband trout would continue to have reduced reproduction and survival rates (Platts 1991). These stream reaches are expected to slowly improve under adaptive management strategies and a

change in riparian forage utilization that would allow a more natural rate of recovery to achieve DFCs.

Currently most streams within the project area are not functioning at DFCs levels partially due to livestock grazing. Specific reaches of Beaverdam, and Bridge Creeks in the Wolf Mountain allotment, and Squaw Creek, and Van Gulch Creek in the West Malheur allotment are below desired conditions with the most common issue being a combination of unstable banks, excessive fine substrates and high width/depth ratios. Past management contributed to these issues and water temperatures above 303(d) standards on Beaverdam and Schurtz Creeks. With the implementation adaptive management strategies, a change in riparian forage utilization, and habitat monitoring these conditions would slowly improve under this alternative. A complete description of existing conditions by stream and allotment pasture is in Chapter 3. Aquatic habitat conditions within the House allotment recently improved due to two riparian exclosures and periods of non-use by the permittee. Non-use on selected pastures on the Wolf Mountain Allotment would also speed the recovery rate in certain pastures. Riparian areas associated with these pastures are expected to improve at a faster rate than other perennial streams.

Cumulative Effects of Alternative 1 - Current Management

Under current management most streams in these allotments may require more than 50 years to meet RMOs except in riparian areas with controlled grazing using fenced exclosures. These time periods also depend on the current condition, site potential, fires, and precipitation. Even these areas may require 20-25 years to meet most DFCs. Combined with the effects from roads, past timber harvesting and undersized culverts, improvements with existing riparian and fisheries habitat conditions would take the longest to occur in this alternative.

Direct and Indirect Effects of Alternative 2 - Proposed Action

Improvement in stream conditions under the Proposed Action would occur more rapidly than the Current Management alternative but slower than the no grazing alternative. The proposed action allows for streams of concern to be grazed at lower utilization levels through adaptive management or in some cases not at all through fenced riparian pastures, in order to achieve DFCs. Fine sediment levels are expected to be lower under proposed action due to improved streambank condition and riparian vegetation. With improved aquatic habitat conditions, improvement in fisheries reproduction and survivability are expected to occur.

The combination of reduced forage utilization in two riparian pastures, and fencing a spring on House Creek in the House Creek Allotment would improve livestock management in those areas and reduce direct and indirect affects to fisheries habitat.

Enlarging the Beaverdam riparian pasture, excluding grazing, stabilizing the headcut and planting willows (with protection from big game) would allow this area to recover at a near natural rate of recovery and eventually meet most RMOs. Falling timber along Bridge Creek to create a jackstraw barrier to livestock trailing along the creek and stabilizing the headcut would reduce livestock impacts and allow streambanks to stabilize.

Adjusting the size of Pierpont and Cougar Pastures, reducing the size of the Squaw Springs Cow Camp Pasture and shifting livestock use from Rock Springs to Pierpont Pasture, all on West Malheur Allotment, would improve livestock distribution in those areas and reduce direct and indirect effects to fisheries and Columbia spotted frog habitat. Falling timber around Dead Horse Spring on the same allotment to protect the sensitive plant *Botrychium crenulatum* would improve habitat for the Columbia spotted frog.

Fencing existing populations of the sensitive plant *Botrychium crenulatum* and limiting livestock forage utilization to a six inch stubble on the floodplain of known habitat for the species in Antelope and Wolf Creek pastures would improve riparian conditions and stream banks for aquatic species.

Stabilizing headcuts, installing rock structures and LWD and constructing livestock enclosures on, Squaw, Van Gulch and East Fork Wolf Creek on the West Malheur Allotment (at the headcut sites) would decrease water energy, stabilize the stream channels and eventually reconnect the stream channel with the floodplain.

Restoration of aspen stands, including livestock fencing, on all allotments would protect riparian areas from livestock increasing stream shade and water retention in the stream floodplain or isolated riparian areas.

Decommissioning the 1619805 road along Antelope Creek on the Wolf Mountain Allotment would speed the recovery of that aquatic system and eliminate one of the most significant sources of sediment to that stream. It would also reduce livestock use in the stream channel and provide more forage on the restored riparian floodplain on the old road base.

Prescribed burning, conifer thinning and fencing of aspen stands would increase forage production and ground cover, trapping sediment and preventing possible input into stream channels. The combination of rock structures and prescribed burning in the Cougar Flat Pasture in West Malheur Allotment would start the process of rebuilding the stream channel, improving the composition of grasses and forbs. This would allow the stream channel to interact with the meadow and restore soil moisture to this once productive site.

See also Appendix G for more information on effects to sensitive species.

Cumulative Effects of Alternative 2 - Proposed Action

The cumulative effects of the proposed actions for all allotments would be positive and improve current aquatic habitat conditions. Overall decreased utilization levels, improved livestock distribution, riparian livestock enclosures, riparian pastures, headcut stabilization, spring protection and channel restoration activities would improve stream conditions and fisheries habitat at a faster rate on all allotments than the current management alternative and move these aquatic systems towards a desired future condition (DFC) through a near natural rate of recovery process, as described in INFISH/PACFISH. It is expected that most Forest RMOs will be met in 30-40 years, depending on the current condition, site potential, fires, and precipitation.

Direct and Indirect Effects of Alternative 3 – No Grazing

No grazing would likely see the most immediate and long term improvement in stream and fisheries habitat conditions, as all direct and indirect effects of livestock would be removed from the project area. With the removal of livestock grazing (passive restoration), stream and riparian areas would be restored more quickly than with Alternatives 1 or 2. Many studies have shown stream habitats degraded by livestock grazing would improve when grazing is eliminated. Investigations have also shown that fish production increased after grazing was removed (Platts 1991). The rate of recovery of any given stream would vary depending on its current level of interaction with the floodplain, substrate size, stream flows, condition of riparian vegetation, and upstream supply of sediment (Rosgen 1996). Deer and elk would still have some effect on riparian shrub communities but are expected to be negligible in most areas. Many streambanks would be covered with grasses and sedges over 20 inches high, overhanging streams providing shade for cooler water temperatures and cover for aquatic species. Vegetation use would only occur by native ungulates.

Livestock enclosures on Schurtz Creek, 500 feet below Wolf Mountain Allotment demonstrate the rate of recovery and changes in the stream channel and riparian area in this subwatershed over 14 years of no grazing. In this enclosure there is a higher rate of bank stability, vegetation cover, stream shade and interaction between the stream channel and the floodplain. Plants in the enclosure also exhibit higher vigor compared to plants grazed by livestock outside the enclosure. Sedges form dense mats instead of broken clumps or individual plants. This alternative would allow for the fastest opportunity for water temperatures to decrease, with increased stream shade and narrower channels.

See also Appendix G for more information on effects to sensitive species.



Photo 14

An example of grazed and ungrazed landscape in the Wolf Creek watershed demonstrating the expected vegetation response between alternatives 1, 2 and 3. The

right side of the photo reflects annual summer long grazing as proposed in Alternatives 1 and 2 while the left side reflects no grazing as describe in alternative 3. The long term difference would be more remarkable since this represents one season of rest and under Alternative 3 no grazing would continue for many years into the foreseeable future.

Cumulative Effects of Alternative 3 – No Grazing

Because grazing would be eliminated, this alternative would have the highest reduction in cumulative effects, as compared to the “Proposed or Current Management Alternatives.” All disturbances from livestock grazing would be eliminated including the combined negative effects from feces and urine affecting water quality, hoof damage affecting bank stability, width /depth ratios, pools and cobble embeddedness, and the removal of riparian vegetation affecting stream shade, stream bank stability, and water temperature. Springs would be restored to their natural flow patterns and disconnected from water troughs, benefiting amphibians.

Herbaceous hydrophytic vegetation such as sedges and rushes would increase in abundance and vigor, moving riparian areas towards a late seral stage at a near natural rate of recovery. Due to natural wild ungulate use some of these affects would continue but at a lower level of disturbance, and closer to the near natural levels. Photo 14 documents what the expected vegetation would look like on a stream system similar to Schurtz Creek with no grazing. It is expected that most RMOs on all allotments may be met in 15- 20 years under this type of management, depending on the current condition, site potential, fires, and precipitation.

Noxious weeds

There is about 10 acres of known noxious weed sites located in the three allotments and Table 14 below lists the weeds presently within the planning area. Weeds may be categorized as noxious because of the potential economic consequences of a weed invasion, or because of the threat to native vegetation communities and wildlife. Characteristics of noxious weeds include: a wide range of adaptability, rapid growth rates, abundant seed production, ability to re-sprout, ability to spread from vegetative or root fragments, and long seed viability in the soil. These attributes give noxious weeds a competitive edge over other plants. They are also difficult or impossible to eradicate once established.

Cheatgrass (*Bromus tectorum*) has not been designated as noxious by the Oregon State Department of Agriculture (ODA) or Local Weed Districts. Nevertheless, in general, cheatgrass has the potential to be detrimental or destructive to agricultural production, is difficult to control or eradicate, and is a threat to native vegetation communities. Currently, cheatgrass is present in small scattered patches in all three allotments. Cheatgrass is not as prevalent on the three allotments as it is on lower elevation rangelands because at these elevations, native perennial vegetation can sufficiently compete with it. Therefore, in the three allotments, cheatgrass is not considered to be a significant threat to native vegetation communities.

The primary mechanism for spread and establishment of noxious weeds are equipment, vehicles, and road work moving reproductive plant parts from infested areas and depositing them in non-infested areas. Animals, which include livestock, terrestrial wildlife, birds, wind, and water are minor mechanisms for spread. Most activities that spread weeds occur during the period of mid June through October. Most infestations occur along travel routes in the planning area and would be possible to eradicate if enabling planning documents and funding were available. Current strategy emphasizes preventing the establishment of new weeds and slowing the spread of existing infestations. Decreasing the amount of ground disturbance, promoting establishment and proliferation of more desirable vegetation, and reducing the production and spread of reproductive plant parts, are some of the means to implement the current strategy.

Executive Order 13112 requires Federal agency whose actions may affect the status of invasive species to identify those actions and within budgetary limits, “(i) prevent the introduction of invasive species; (ii) detect and respond rapidly to and control populations of such species... (iii) monitor invasive species populations... (iv) provide for restoration of native species and habitat conditions in ecosystems that have been invaded;... (vi) promote public education on invasive species... and (3) not authorize, fund, or carry out actions that it believes are likely to cause or promote the introduction or spread of invasive species... unless, pursuant to guidelines that it has pre-scribed, the agency has determined and made public... that the benefits of such actions clearly outweigh the potential harm caused by invasive species; and that all feasible and prudent measures to minimize risk of harm will be taken in conjunction with the actions.”

Management requirements and mitigation measures listed in Chapter 2 meet the intent of Executive Order 13112.

Canada Thistle (*Cirsium arvense*)

Canada thistle is a relatively long-lived creeping perennial. Reproduction occurs from seed and root buds will sprout to form new plants if the weed is disturbed. Canada thistle seed moves readily with vehicles. Presently, Canada thistle is the most prevalent noxious weed inventoried within the planning area. It has become very common across the forest. The majority of sites are along roads, but are increasing in riparian areas. Current treatment includes pulling plants and/or cutting plants at late bud or early bloom to prevent seed dispersal.

Russian knapweed (*C. repens*/*Acroptilon repens*)

Russian knapweed is a perennial that can form dense colonies by adventitious shoots from widely spreading roots. These roots can grow to eight feet deep. Reproduction occurs from seed and new plants will grow from roots left in the ground.

Dalmatian Toadflax (*Linaria dalmatica*)

Dalmatian toadflax is a perennial that can reproduce from seed and root rhizomes. New plants will also grow from root segments left in the ground. Dalmatian Toadflax is often found in rock pits, but mainly along roads. Dalmatian Toadflax is prevalent along Forest Road 17.

White Top (*Cardaria spp*)

White top is a perennial that can reproduce from seed and root rhizomes. New plants will also grow from root segments left in the ground. White top it is extremely difficult to control and is found in disturbed areas (road junctions) and along roads.

Houndstongue (*Cynoglossum officinale*)

Houndstongue is a biennial, growing 1 to 4 feet tall and reproducing by seed. It forms a rosette the first year and sends up a flowering stalk the second year. The nutlets (group of seeds) break apart at maturity and cling to clothing, vehicles or animals. Houndstongue is toxic, containing pyrrolizidine alkaloids, causing liver cells to stop reproducing. Animals can live up to six months after ingesting a lethal amount of plant material. Houndstongue is found along Hwy 395, and Forest Roads 1705, 1601 and 1601876.

Scotch broom (*Cytisus scoparius*)

Scotch broom is a perennial, woody shrub, up to 10 feet tall, with showy yellow flowers. It is an aggressive shrub and seeds remain viable in the soil for years.

Table 14. Acres of Noxious Weeds by Allotment

Allotment	Canada Thistle	Russian Knapweed	Dalmatian Toadflax	White Top	Houndstongue	Scotch Broom	Total
House Creek	0.9	0	0.1	0	0.2	0	1.2
West Malheur	3.6	0	0.1	1.1	0	0	4.8
Wolf Mountain	3.0	0.3	0.4	0.1	0.2	0.2	4.2
Total Acres	7.5	0.3	0.6	1.2	0.4	0.2	10.2

Risk factors

1. The project area has been altered, providing enhanced conditions for establishment of noxious weeds. These conditions include more sunlight to the soil surface, less organic material covering the soil surface, more exposed mineral soil, and increased soil disturbance. These conditions are located in areas such as roads/cut slopes, rock pits, landings, skid trails, and dispersed campsites.
2. There are known noxious weed populations in and adjacent to the project area which constitutes a source of reproductive material for establishment on the Forest.
3. Forest Road 17 and the entire road system have a fair amount of vehicle traffic, especially during big game hunting season.
4. Herbicide use for the control and eradication of noxious weeds on the Malheur N.F. was stopped by a court decision. The decision did not preclude manual treatment of noxious weeds which is more labor intensive and not as effective on some weed species.

New sites should be treated at least manually, even though it is not as economical or as effective as integrated pest management. Treating the sites would help prevent the spread of noxious weeds from these sites and it is anticipated in ten years there will be a slight reduction in the number of plants and the acres they cover.

Effects on Noxious Weeds**Direct and Indirect Effects Common to all Allotments**

Permitted livestock can introduce noxious weeds by transporting seeds in their hair or in digestive systems if coming from or trailing through an area already infested with weeds. Similarly, they can start new populations by ingesting plants and moving seeds to new areas through fecal deposits; this more often occurs with horses and sheep who will

consume several species, like thistles, after seed heads are already produced. The probability of domestic livestock transporting seeds in their digestive system is low because cattle do not generally consume the noxious weeds found on the three allotments. Cheatgrass would continue to be present in the uplands.

Effects of Alternative One – Current Management

Livestock grazing or associated permittee actions are not a major factor in the establishment and spread of noxious weeds in the project area.

There would not be any direct effect (change) in the number of noxious weed species or rate of spread of existing infestations because the amount of disturbance would remain constant. Existing weed species are not preferred forage and therefore, existing weed propagules, are not likely to be ingested or transported by livestock. Other weed increasing activities would remain constant or may increase with an increasing recreating public.

Permittees and Forest Service Range Management Personnel presence on allotments assists in detection and control of noxious weeds. In addition, grazing fee funds would be available for noxious weed treatment under this alternative.

The Forest would continue to conduct a noxious weed management program that would minimize the spread of state-listed species (with the tools available) that implements an integrated program focusing on prevention, early detection, and timely treatment of priority species.

District personnel and permittees would continue to work together to develop an accurate and up to date inventory of the noxious weeds present on allotments within the project area. Once inventoried, each site would be treated.

Effects of Alternative Two – Proposed Action

Livestock grazing or associated permittee actions are not a major factor in the establishment and spread of noxious weeds in the project area. Reduction of livestock use in identified areas will not change the amount and type of noxious weeds within the allotments.

Alternative 2 may increase the chance of noxious weed spread within the project area because of the potential of ground disturbance with the proposed activities such as improvement of existing and construction of new water developments, construction of new fences, prescribed burning, stabilizing headcuts, felling timber, installing rock structures and large wood and decommissioning of Forest Road 1619805. Management requirements, constraints and mitigation measures identified in Chapter 2 would help lessen the potential for spread. Specifically, cleaning of equipment and seeding disturbed ground with certified weed free seed would reduce the chances of spread of noxious weeds.

Cheatgrass would continue to be present in the uplands and proposed activities would not cause it to increase in any measurable amounts because of management requirements, constraints, and mitigation listed in Chapter 2. Specifically, cleaning of equipment and seeding disturbed ground with certified weed free seed would reduce the chances of spread of cheatgrass.

Permittees and Forest Service Range Management Personnel presence on allotments assists in detection and control of noxious weeds. In addition, grazing fee funds would be available for noxious weed treatment under this alternative.

The Forest would continue to conduct a noxious weed management program that would minimize the spread of state-listed species (with the tools available) that implements an integrated program focusing on prevention, early detection, and timely treatment of priority species.

District personnel and permittees would continue to work together to develop an accurate and up to date inventory of the noxious weeds present on allotments within the project area. Once inventoried, each site would be treated.

Effects of Alternative Three – No Grazing

Under the no-grazing alternative, the permittees would no longer play a role in the detection and management of noxious weeds potentially allowing weed populations to become well established prior to detection. Forest Service funds derived from grazing fees would not be available for noxious weed treatment. Without disturbance and with plant communities moving towards potential natural conditions, there would be fewer opportunities for noxious weed establishment. In the long term (about 15 years) established noxious weed sites would be at a competitive disadvantage from native plants. Roads would continue to be the major conduit and site for weeds, and terrestrial wildlife would be the only ungulate transporter of seed. Cheatgrass would continue to be present in the uplands.

Direct and Indirect Effects Common to House Creek and Wolf Mountain Allotments

Hound's tongue is the only noxious weed present on the House Creek and Wolf Mountain allotments that has the ability to be spread by livestock transporting seeds in their hair. Under Alternatives 1 and 2, domestic livestock would continue to have the potential to spread hound's tongue because they would be present in the allotment. Currently, there is about 0.4 acres of hound's tongue present in three separate locations in both allotments and under these alternatives, because cattle are present, hound's tongue may increase slightly. Permittees and Forest Service Range Management Personnel presence would assist in immediate detection and control of the potential spread of hound's tongue.

Under Alternative Three, terrestrial wildlife and people would be the only potential vectors to spread hound's tongue. Domestic livestock would no longer be present in the allotments and therefore would not contribute to the potential spread of Hound's tongue. Permittees would no longer assist in the immediate detection and control of the potential spread of hound's tongue.

Cumulative Effects Common to all Alternatives

Past management actions have contributed to the establishment and spread of noxious weeds in the project area. Past timber sales that have likely aided in the establishment and/or spread of noxious weeds include Bedrock, Boundary, Capbox, CHE Springs,

Cove, Ewing², Glass Mtn., Long Mtn., Long Spring, Milk Spring, Otter and Van Gulch because noxious weeds are located within unit boundaries.

Past livestock grazing has likely aided in the establishment and/or spread of noxious weeds in the area because prior to the 1930s, extensive unregulated grazing on public land was a major problem. The period of unregulated grazing resulted in adverse environmental consequences such as soil and vegetation loss that most likely created an environment that favored noxious weeds. To some varying degrees, wild ungulates, birds and rodents have also spread weeds through ingestion and deposition of seeds.

Certain noxious weed populations would almost certainly continue to expand, regardless of the alternative chosen, due to natural increase of existing populations from all the complex ways these species are spread. However, other species that occupy limited area (plus other species that are not yet here) would be managed to the extent possible to stop the spread.

Other on going and future activities in the planning area, may contribute to the establishment and expansion of noxious weeds. Roads provide the perfect habitat for establishment from vehicles which transport seed and plant segments. Propagules are transported into the forest and within the Forest by weed contaminated equipment. After establishment, the regular traffic flow enhances the opportunity and ability to spread to other equally good sites. Log landing sites, skid trails, and rock pits provide excellent weed establishment habitat. Future vegetation management projects like Van Vegetation, Plantation PCT, Coyote Creek and Parasol would most likely have cumulative effects on noxious weeds because they propose ground disturbing activities in areas where weeds exist. Rates of spread depend on the amount and duration of disturbance and the frequency of vectors.

Existing noxious weed populations would continue to spread onto adjacent or intermingled private and other agency lands; similarly, populations from other-ownership lands would continue to spread onto the Forest. Both conditions require coordination with county weed and pest offices to manage populations and their effects regardless of land ownership and property boundaries. Cheatgrass would continue to be present in the uplands.

Activities proposed in this project would be cumulative in nature with past and future actions but is not expected to be significant because proposed livestock levels are extremely lower than what existed prior to the 1930's and subsequent ground disturbance is also lower, and management requirements, constraints and mitigation measures identified in Chapter 2 would help lessen the potential for spread. Specifically, cleaning of equipment and seeding disturbed ground with certified weed free seed would reduce the chances of spread of noxious weeds. Additionally, permittees and Forest Service Range Management Personnel presence on allotments assists in detection and control of noxious weeds.

Sensitive plants

Sensitive plants suspected to occur on the district are derived from the Region 6 Sensitive Plant List. Sensitive plant surveys for past projects were conducted in portions of the project area in the 1970's thru the 1990's. These past surveys reviewed areas by floristic walk-through survey (Nelson 1985) during specific times of the year for peak plant identification periods.

A prefield review was performed to identify all sensitive species that could be encountered within the proposed project area. One existing population of *Botrychium crenulatum* was documented in the Wolf Mountain Allotment, Antelope pasture. The prefield review also identified potential habitat for nine species listed as Sensitive by Region 6 within the four allotments: *Botrychium ascendens*, *B. crenulatum*, *B. lanceolatum*, *B. minganense*, *B. montanum*, *B. pinnatum*, *Carex backii*, *C. interior*, and *C. parryana*. For more specific information on sensitive plant species, refer to the Plant Biological Evaluation (BE) located in Appendix F.

Sensitive plant surveys for this project were conducted in 2003 and 2004. Field surveys in 2003 and 2004 were focused on areas identified as potential habitat, mainly springs and riparian areas. No new sensitive plant populations were located.

Sensitive Lichens

Two sensitive lichens, *Leptogium burnetiae* var. *hirsutum* (Hairy Skin Lichen) and *Dermatocarpon luridum* (Silver Skin Lichen) are suspected to occur on the Malheur National Forest. The Emigrant Creek Ranger District is not considered suitable habitat for Hairy Skin Lichen because the district does not contain the wettest of the wet coniferous plant associations (e.g. one's with pacific yew) where this sensitive lichen grows. Silver Skin Lichen is semi-aquatic and grows on bedrock or immovable boulders at or near the water level in larger streams like the Malheur River (which is not within the planning area). No suitable habitat for Silver Skin Lichen occurs within the three allotments. If suitable habitat did occur, livestock grazing would not affect this lichen. In-stream work (rock structures and woody debris placement) would not affect this lichen, because these proposed activities are on smaller streams that are not considered habitat.

Effects on Sensitive Plants

This section summarizes the effects of the alternatives on sensitive plant species. For a detailed analysis of the effects of the proposed alternatives on sensitive plant species in the planning area, refer to the Biological Evaluation for Sensitive Plant Species (Appendix F).

Direct and Indirect Effects from Alternative 1 – Current Management

House Creek Allotment

No impact (NI) to sensitive *Botrychium* and *Carex* species is expected because none were found within this allotment.

West Malheur Allotment

No impact (NI) to sensitive *Carex* species is expected because none were found within the West Malheur Allotment. Activities proposed (see chapter 2) under this alternative would therefore have no impacts to sensitive *Carex* species.

Within the West Malheur Allotment, the Current Management Alternative would have direct and indirect effects to *Botrychium* habitat. Current management at springs, bogs and seeps, allows livestock utilization levels to reach a 4-inch stubble height on the green line. This usually results in less than 4-inch stubble heights on the floodplain. Grazing at this level (less than 6-inch stubble height on the floodplain) would permit small moonworts to be eaten or trampled and would be injurious to populations; plants would not have the opportunity to sporulate, a critical reproductive step, and would be weakened by the inability to store food reserves, or they might be killed outright.

Determination: Because the six *Botrychium* species considered here have a broad distribution on the continent, and because more of them are being found each year as intensive surveys are conducted in appropriate habitats, any possible impacts on individuals from this alternative would not jeopardize the survival of the species as a whole. Livestock grazing at a utilization level that results in retaining a 4-inch stubble height of grasses, sedges, and rushes on the greenline, may impact *Botrychium* habitat, not individuals (MIIH), but would not cause a loss of viability or trend toward federal listing.

Wolf Mountain Allotment

No impact (NI) to sensitive *Carex* species is expected because none were found within the Wolf Mountain Allotment. Activities proposed (see chapter 2) under this alternative would therefore have no impacts to sensitive *Carex* species.

Within the Wolf Mountain, the Current Management Alternative would have direct and indirect effects to *Botrychium crenulatum* and its habitat. Current management at springs, bogs and seeps, allows livestock utilization levels to reach a 4-inch stubble height on the green line. This usually results in less than 4-inch stubble heights on the floodplain. Grazing at this level (less than 6-inch stubble height on the flood plain) would permit small moonworts to be eaten or trampled and would be injurious to populations; plants would not have the opportunity to sporulate, a critical reproductive step, and would be weakened by the inability to store food reserves, or they might be killed outright.

Determination: Because the six *Botrychium* species considered here have a broad distribution on the continent, and because more of them are being found each year as intensive surveys are conducted in appropriate habitats, any possible impacts on individuals from this alternative would not jeopardize the survival of the species as a whole. Livestock grazing at a utilization level that results in retaining a 4 inch stubble height of grasses, sedges, and rushes on the green line, may impact *Botrychium crenulatum* individuals and habitat (MIIH), but would not cause a loss of viability or trend toward federal listing.

Direct and Indirect Effects from Alternative 2 – Proposed Action

House Creek Allotment

No impact (NI) to sensitive *Botrychium* and *Carex* species is expected because none were found within this allotment. Activities proposed (see chapter 2) under this alternative would therefore have no impacts to sensitive *Botrychium* and *Carex* species.

West Malheur and Wolf Mountain Allotment

No impact (NI) to sensitive *Carex* species is expected because none were found within these allotments. Activities proposed (see chapter 2) under this alternative would therefore have no impacts to sensitive *Carex* species.

Within the West Malheur and Wolf Mountain Allotments, the Proposed Action Alternative would have direct and indirect effects to *Botrychium* habitat; however impacts would be less than the Current Management Alternative. Proposed management at identified springs, bogs and seeps, which would allow livestock utilization levels to not exceed a 6-inch stubble height on the floodplain, would have fewer impacts than Current Management. Grazing at this level would be less injurious to populations because small moonworts may not be eaten or trampled; plants would then have the opportunity to sporulate, a critical reproductive step, and would not be weakened by the inability to store food reserves. Other activities proposed under this alternative (see chapter 2) would have no impacts on *Botrychium crenulatum* and its habitat because none of the activities are proposed in *Botrychium* habitat.

No impacts (NI) to the *Botrychium crenulatum* population (in the Wolf Mountain Allotment) would occur because it would be fenced and livestock grazing would be excluded. The existing population, if it still exists, would most likely increase. Fencing would occur outside *Botrychium crenulatum* habitat and therefore implementation of fencing would not impact this sensitive species.

Determination: Because the six *Botrychium* species considered here have a broad distribution on the continent, and because more of them are being found each year as intensive surveys are conducted in appropriate habitats, any possible impacts on individuals from this alternative would not jeopardize the survival of the species as a whole. Livestock grazing at a level that results in retaining at least a 6-inch stubble height of grasses, sedges, and rushes in the riparian zone (floodplain), may impact *Botrychium* habitat, not individuals (MIIH), but would not cause a loss of viability or trend toward federal listing.

Direct and Indirect Effects from Alternative 3 – No Grazing

House Creek Allotment

No impact (NI) to sensitive *Botrychium* and *Carex* species because none were found within these allotments.

West Malheur Allotment

No impact (NI) to sensitive *Carex* species is expected because none were found within this allotment.

Within the West Malheur Allotment, the No Grazing Alternative would most likely have a beneficial impact (BI) to *Botrychium* habitat. No livestock grazing would allow springs, bogs and seeps to recover from past affects. Habitat for *Botrychium* species would improve, but whether these species could re-occupy this habitat is unknown.

Wolf Mountain Allotment

No impact (NI) to sensitive *Carex* species is expected because none were found within this allotment.

Within the Wolf Mountain Allotment, the No Grazing Alternative would most likely have a beneficial impact (BI) to *Botrychium crenulatum* and its habitat. No livestock grazing would allow springs, bogs and seeps to recover from past affects. Habitat for *Botrychium* species would improve, and the existing population, if it still exists, would most likely increase. Whether this species could re-occupy other potential habitat is unknown.

Cumulative Effects Common to All Alternatives

Past domestic grazing, timber harvesting and fire suppression have contributed to changes in riparian habitats and the plant communities they support. The distribution and vitality of sensitive *Botrychium* and *Carex* species, before these management activities began are unknown.

Historic livestock grazing and timber harvesting have resulted in loss of potential habitat for these species through stream downcutting and accelerated erosion processes that alter local surface hydrology. Historic logging practices included skidding logs through riparian areas, which could have destroyed existing plants but could have also provided soil openings for new plants to establish. Fire suppression may have caused a decline in populations through increased competition for soil moisture and nutrients by shade-tolerant plant species.

Past timber sales in the Wolf Mountain Allotment that have likely impacted *Botrychium* habitat are Northside, Antelope, Cold Springs and Dry Joe timber sales. Past timber sales in the West Malheur Allotment that have likely impacted *Botrychium* habitat are Capbox and Elk timber sales. These sales have impacted riparian areas because logging and associated activities occurred within the riparian habitat conservation areas (RHCA). Impacts to *Botrychium* species habitat under Alternatives 1 and 2 would be cumulative with these past actions because grazing would permit small moonworts to be eaten or trampled and would be injurious to populations; plants would not have the opportunity to sporulate, a critical reproductive step, and would be weakened by the inability to store food reserves, or they might be killed outright. Impacts are cumulative but are not expected to further diminish habitat conditions for *Botrychium* under Alternative 2. The diminished habitat conditions for *Botrychium* may be further diminished under Alternative 1 but would not be expected to cause a loss of viability or trend toward federal listing because only one population has been documented.

The 2001 Wolf Creek Fire has altered riparian habitats and the plant communities they support within the West Malheur Allotment. This fire may have altered the habitat conditions for these species most likely leading to insufficient moisture levels due to

decreased shading and/or greater competition by other plant species due to increased light availability.

Future foreseeable activities such as vegetation management in the Wolf Creek Watershed (Van Vegetation Management Project), Coyote Creek Project and the Plantation PCT project would not have cumulative impacts on *Botrychium* and *Carex* species because activities would most likely not be proposed within riparian areas.

Cumulative Effects Specific to No Grazing Alternative

No livestock grazing would have long-term beneficial effects on *Botrychium* species habitat. The diminished habitat conditions for *Botrychium* species are not expected to be further diminished under Alternative 3 because livestock would no longer be impacting habitat. Additionally, future foreseeable activities such as vegetation management in the Wolf Creek Watershed (Van Vegetation Management Project), Coyote Creek Project and the Plantation PCT project would not have cumulative impacts on *Botrychium* and *Carex* species because activities would most likely not be proposed within riparian areas.

Recreation

Recreational opportunities within the three allotments are limited because there is only one developed recreation facility. Recreational use consists primarily of dispersed activities of viewing scenery or wildlife, camping, hiking, fishing and hunting. Other activities such as snowmobiling, cross-county skiing, OHV use, horseback riding, and horn hunting are also popular pursuits. Although not commonly considered recreation activities elsewhere, many local people use firewood gathering and Christmas tree cutting as a low cost family outing. Driving for pleasure to look at scenery and wildlife, and picnicking are also popular low-cost activities practiced within the three allotments.

The Malheur Recreation Strategy defines the “Niche” for the Malheur National Forest as “A Traditional Way of Life”. Domestic livestock on the Forest is a traditional way of life.

Recreation Opportunity Spectrum (ROS)

The Forest Service developed the Recreation Opportunity Spectrum (ROS) system to help identify, quantify, and describe the variety of recreational settings available on National Forest system lands. The ROS system provides a framework for planning and managing recreation resources. The ROS settings are classified on a scale ranging from primitive to urban. The National Forest System lands encompassed within the House Creek, West Malheur and Wolf Mountain Allotments have been inventoried using the ROS system to determine what recreation opportunities and settings are available to visitors. Currently, the area meets semi-primitive non-motorized, roaded natural, and roaded modified. Management direction for recreation as outlined in the Forest Plan is to continue to maintain existing ROS settings.

- **Roaded Modified** – a natural environment that has been substantially modified by development of structures and vegetative manipulation characterizes. Sights and sounds of humans are readily evident, and the interaction between users is often moderate to high. Facilities are often provided for special activities. Moderate user densities are present away from developed sites.
- **Roaded Natural** – A predominantly natural-appearing environment with moderate evidence of the sights and sounds of humans. Such evidence usually harmonizes with the natural environment. Interaction between users may be moderate to high with evidence of other users prevalent. Resource modification and utilization practices are evident but harmonize with the natural environment. Conventional motorized use is allowed.
- **Semi-primitive Non-Motorized** - A predominately natural or natural-appearing environment of moderate to large size. Interaction between users is low, but there is often evidence of other users. The area is managed in such a way that minimum onsite controls and restrictions may be present but would be subtle. Motorized recreation use is not permitted, but local roads used for other resource management activities may be present on a limited basis. Use of such roads is restricted to minimize impacts on recreational experience opportunities.

The ROS setting of a Recreation place largely determines its attractiveness and utility. Many recreation opportunities, such as viewing scenery, require a natural ROS setting; other activities, such as hunting, may not directly depend on the setting.

Developed Campgrounds

Rock Springs Campground is the only developed campground within the three allotments and is located in the Wolf Mountain Allotment.

Dispersed Campsites

Dispersed campsites are rustic in nature with common features such as meat poles and rock fire rings. Dispersed campsites are easily accessed by roads and are concentrated in flat areas off main transportation systems where water is readily available. Therefore majority of dispersed camp site are near springs or creeks. There is a wide range in size and amount of disturbance for all dispersed campsites. Use of these sites varies throughout the year, with the majority of sites showing heaviest use during the fall hunting season.

Trails

Frazier snowmobile loop trail is the only developed trail within the three allotments and is located in the West Malheur Allotment.

Effects on Recreation

Direct, Indirect and Cumulative Effects From Alternatives 1 and 2

With the continuation of grazing the presence and sign of domestic livestock near dispersed campsites would continue to affect some visitors. There would be no affect to visitors in developed campgrounds because they are fenced and livestock do not have access. There would be no affect to visitors on the Frazier snowmobile loop trail because cattle are not present when the trail is being used. Alternatives 1 and 2 would not measurably effect the ROS classification. Future vegetation activities described in Appendix C would affect the ROS classification of some areas, possibly changing them from roaded natural to roaded modified.

Direct, Indirect and Cumulative Effects From Alternative 2 – Proposed Action

Proposed improvements such as fence construction, aspen regeneration and protection, head cut stabilization, felling timber, prescribed burning, installing rock structures, large wood placement, planting willows, and decommissioning forest road 1619805 would affect some visitors if they are present when activities are taking place. Decommissioning forest road 1619805 would affect some visitors that utilize the road however other roads are available for use.

Direct, Indirect and Cumulative Effects From Alternative 3 – No Grazing

Under the No Grazing alternative, conflicts between grazing and recreation uses would be eliminated. Alternative 3 would not measurably effect the ROS classification.

Terrestrial Wildlife

Rocky Mountain elk, mule deer and pronghorn antelope are the three wild ungulate species that occur within the project area. Rocky Mountain elk were selected as a Management Indicator Species (MIS) due to their economic and social value, and their response to changes in forest cover, forage quality and open road density.

Rocky Mountain Elk (*Cervus elaphus*)- MIS

Rocky Mountain elk are widely distributed across the District, Forest and the Blue Mountain Region. Historic elk populations at the beginning of the 20th century were low due to market hunting for meat, hides, teeth, and antlers (Mace et al. 1995). Elk numbers were also naturally low in the more arid regions of Oregon.

Population Numbers

The project area is part of the North Malheur River Management Unit (NMRMU) with population numbers managed by Oregon Department of Fish and Wildlife (ODF&W). The elk population in the NMRMU is currently at desired and sustainable levels. A new revised elk management plan is pending and population management objectives are expected to be similar to the existing plan. The population objectives for elk would likely be maintained around 1500 animals in the NMRMU.

Habitat

Rocky Mountain elk habitat consists of a combination of forage, cover, water, and specialized areas such as calving areas. Optimal cover-forage ratios are 40/60 (Thomas et al. 1979).

Cover

Elk utilize cover primarily during the autumn months for security and escapement of hunters (Irwin and Peck, 1983). Thomas et al (1979) has defined cover as either hiding cover or thermal cover. Malheur Land Resource Management Plan (LRMP) describes thermal cover as either satisfactory or marginal with forest standards listed by watersheds and management areas.

Thermal Cover- Thermal cover in the project area has increased compared to historic times due to decades of effective fire suppression, which has accelerated succession. Ponderosa pine, Douglas fir and white fir have expanded their range or composition in most watersheds, increasing thermal cover. Even so, past logging practices have reduced thermal cover in some areas. Past sales that occurred in the late 1980's and early 1990's that reduced thermal cover include the following: Capbox, Elk, and East Wolf timber sales in the West Malheur Allotment; Antelope, Dry Joe and Long Springs timber sales in the Wolf Mountain Allotment; and Otter, CHE Springs and Mountain Springs timber sales in the House Creek Allotment. Other past timber sales and treatments are described in Appendix C, Cumulative Effects.

When thermal cover is over abundant, forage potential for elk is decreased. Grasses and other forage become shaded from the conifer canopy closure reducing forage for elk.

In 2001, the 660-acre Wolf Creek wildfire occurred in the Wolf Creek drainage, and reduced elk thermal cover where the fire burned at high intensity. However, thermal cover in the Wolf Creek drainage is currently above desired levels.

Cover for elk is limited in the Duck Creek subwatershed because this area is on the transitional zone between forest and sagebrush ecosystems and ecologically can not provide trees for elk cover. Duck Creek subwatershed is in the West Malheur allotment.

Hiding Cover- Elk use dense stands of young conifers for hiding cover as security to escape predators and human disturbance. Elk use hiding cover during migration and within corridors between feeding and bedding areas. The quality of hiding cover increases with an increase in the distance from open roads (Rowland et al 2000). Many past harvest units such as Seldom Seen, Capbox, Antelope, and Elk timber sale units were planted with conifers, which have grown to heights and densities provide hiding cover for elk. Hiding cover is above optimal levels in most subwatersheds, with the exception of Duck Creek.

Forage

Forage habitat is defined as areas where canopy closure is less than 40 percent. Clear cuts, open timbered stands, natural openings, scablands, burned areas, and non-forested ecosystems such as meadows are classified as foraging habitat for elk. Elk are primarily grazers, foraging on grasses, forbs, and sedges. The diet of elk usually shifts to forbs and shrubs during the later summer months when grasses cure. The primary grasses in the project area include elk sedge (*Carex geyeri*), Idaho fescue (*Festuca idahoensis*) and bluebunch wheatgrass (*Agropyron spicatum*). Riparian shrubs such as red osier dogwood (*Cornus stolonifera*) and willow (*Salix sp*) are important elk browse in the project area.

Limited forage for elk is more prevalent on winter ranges where concentrated elk use occurs. If snow depths are deep, elk move down into private land and compete for forage with livestock on agricultural lands. The Forest Plan developed big game winter range management areas (MA-4A) for the forest. Approximately 6,900 acres of big game winter range are designated in the project area within the West Malheur, and Wolf Mountain allotments. The highest potential for forage competition between elk and cattle occur on winter ranges or spring-fall ranges where animals are compressed into smaller areas (Wisdom and Thomas, 1996). Changes in bunchgrass composition can occur from over utilization of winter range, reducing forage for elk and other ungulates.

Forage for elk was reduced near isolated watering areas because livestock concentrate there. Utilization by livestock is heavy around most water holes. Riparian areas along Squaw Creek demonstrate heavy browsing on shrubs, primarily aspen, and lack shrub regeneration based on the results from shrub utilization monitoring and personal observations. Further shrub conditions are described in the mule deer section, since mule deer are primarily browsers. Heavy ponderosa pine densities are shading out the floodplain of Squaw Creek reducing forage for elk. Roads constructed in nearly all the tributaries also affected riparian forage for elk.

Sagebrush and ponderosa pine encroachment is occurring in meadows such as Cougar Flat, due to lack of fire. Juniper expansion has occurred due to lack of fire, further reducing the production of bunchgrasses. Juniper expansion is more prevalent on the

southern allotments in big game winter range and in riparian areas along Squaw Creek within aspen stands.

In the summer of 2001, a wildfire burned approximately 660 acres in the Wolf Creek drainage, opening timber stands for grasses and forbs to grow. Though there was no formal vegetation surveys conducted, it can be assumed that the Wolf Creek fire improved forage quality and quantity in the East Fork and Upper Wolf Creek subwatersheds.

Water Distribution

Water distribution is a key resource in elk utilization of a range. Research by Nelson and Burnell (1975) and others have indicated elk use is reduced at distances greater than 0.5 miles from water during summer months. The amount of annual precipitation, timing and duration of precipitation, and forage determine the dependence on water use by elk.

Water is not a limiting factor in the project area. Stock ponds, reservoirs, and spring developments have been constructed to provide water for livestock. There are over 70 ponds and reservoirs constructed throughout the three allotments providing seasonal and yearlong water. These range improvement projects have benefited wildlife by providing water in arid areas. However, development of isolated springs for livestock use can displace elk from the area, since elk tend to avoid areas that are heavily used by livestock (Neff, 1980; Mackie, 1970).

Roads

There are about 460 miles of roads in summer range and 45 miles of road in winter range that are open to traffic in the planning area. About half of the subwatersheds within the planning area have road densities above forest standards. Wisdom et al. (1999) stated the negative impacts roads and associated activities have on elk and other wildlife. Roads provide human access into elk security areas increasing displacement of elk. Vehicle traffic increases disturbance, harassment, and vulnerability to elk during the hunting seasons (late August to December). Off road vehicle use and winter snowmobile traffic also increase harassment to elk. ODF&W is concerned with the high road densities in the project area.

HEI (Habitat Effective Index)

The Habitat-Effectiveness Index (HEI) model developed by Thomas et al (1988) is used to evaluate Rocky Mountain elk habitat. Malheur Forest LRMP set standards and minimum values for cover requirements, spatial arrangements, forage quality and quantity, and road density. The primary implications of the model is to illustrate changes in Habitat-Effectiveness Index resulting in changes in vegetation from various treatments to cover or reductions in road densities from access management plans.

For the planning area, road density coefficients were not met in five subwatersheds. A roads analysis was not conducted in the project area for this project because only one road is proposed for decommissioning. A roads analysis will be completed in the future

(within three years) for the Van Vegetation Management Project. Additionally, reductions in cover are not proposed under any of the action alternatives.

Livestock grazing can affect the forage index variable on the big game winter range. Moderate to heavy grazing pressure can reduce bunchgrass populations. The quantity of forage available for elk can be limited with a reduction in bunchgrass populations. Parker transect data and Ocular Macroplot data was used to determine forage values for the HEI assessment. The Squaw Creek subwatershed does not meet Forest standards for forage quantity based on the results from the available data.

Environmental factors such as drought, lack of fire, and an increase in juniper and ponderosa pine can also reduce grass production. Noxious weeds such as cheatgrass can also compete with native bunchgrasses and reduce the forage values for big game.

Special Behavior Requirements

Calving and fawning areas- Forest Plan emphasizes protection of elk calving sites and prevents harassment from off-road use of ATV's and other motorized vehicles during the calving season from May 1 to June 30 (Forest Standards, IV-29; #'s36, 58). There have been no calving areas identified in the planning area that would require protection. Proper management of riparian areas would meet these special needs for elk.

Wallows- Mature bull elk use wallows during the rutting season for territorial display. Forest Plan requires protection of known wallows and seasonal restrictions during the rutting season. No specific wallowing areas were identified in the planning area that would warrant protection.

Effects on Rocky Mountain Elk (MIS)

Direct and Indirect Effects from Alternative 1 – Current Management

All Allotments

No measurable changes in HEI are expected with current management; however, concentrated use by livestock in the Rock Springs pasture might continue to cause a reduction in forage quantity from extended use. HEI values are not expected to affect elk populations in the Malheur River hunting unit. Other factors govern elk populations, which are managed by Oregon Department of Fish and Wildlife (ODF&W). However, the distribution of elk can be affected by HEI values such as forage values and road densities, when habitat indexes are too low.

Other than displacement from more favorable range, the impact to elk during the rutting season and disturbance to wallows is similar with all grazing alternatives. The highest potential for competition for water may occur on the West Malheur allotment during drought years where water may be limiting on the eastern portion of the allotment and the House allotment, where few water sources are available.

House Creek

There were no concerns in this allotment for forage production. Elk probably use this allotment at different times of the year than livestock. The condition of House Creek riparian area was favorable for calving. It is suspected this allotment receives elk use

during winter months. Alternative 1 would be similar to the No Grazing Alternative, since only approximately 60 head of livestock are grazed on this allotment.

West Malheur

Current livestock grazing is altering elk distribution primarily in the Squaw Creek drainage. Concentrated use around water sources within Squaw Creek and associated tributaries displaces elk from possibly more favorable habitat during summer months. Elk forage such as sedges and aspen is reduced in these riparian areas where livestock use is heavy. In some areas, upland shrub utilization is above desired levels, which can reduce elk winter range. However, forage availability is not limited from livestock use and may be impacted by other management activities such as fire suppression and subsequent plant succession. The concern is the distribution of livestock in specific areas, not the numbers of livestock.

Wolf Mountain

There were no elk forage concerns on this allotment based on shrub utilization monitoring and field observations. Other than disturbance and displacement from standard livestock operations, the impacts to elk with this alternative would be minimal.

Direct and Indirect Effects from Alternative 2 – Proposed Action

All Allotments

As overall range conditions improve, the index increases, therefore an increase in HEI is anticipated with Alternatives 2. The quality of forage may decline within a 5-10 year period, but the quantity of forage would increase with the change in cattle use practices with Alternative 2. There would be a slight increase in HEI in the Antelope Creek subwatershed from decommissioning the 1619805 road. Reducing road densities improves elk security reducing disturbance from motorized vehicles. The other attributes in the HEI model (cover, spatial arrangements of cover and forage) would remain constant.

Other than displacement from more favorable range, the impact to elk during the rutting season and disturbance to wallows is similar with all grazing alternatives. The highest potential for competition for water may occur on the West Malheur allotment during drought years where water may be limiting on the eastern portion of the allotment and the House allotment, where few water sources are available.

House Creek

Reducing livestock utilization in the two riparian pastures along House Creek would assure recovery of shrubs. It is unlikely livestock would forage on riparian shrubs and residual sedges would be available for elk. In the long term, aspen regeneration would provide forage for elk, especially in late winter. Cattle stocking rates are at levels compatible with elk on this allotment.

Fencing a spring in House Creek drainage could improve specialized habitat such as wallows, especially if livestock are absent from the area during the rutting season. Disturbance from humans may limit wallowing of this area during archery hunting seasons. An improvement in riparian forage for elk cows during calving might occur, but the excluded area is so small only minor elk use is expected.

The aspen regeneration project effects are similar to West Malheur allotment. It is highly probably a big game fence might be installed near CHE Springs to allow aspen regeneration to occur. No benefits to elk or deer are expected in the short term, since big game would be excluded from browsing on aspen in the exclosures.

West Malheur

Forage in big game winter range should improve in the Rock Springs pasture with a reduction in livestock use. Less livestock use reduces browsing potential on bitterbrush and other shrubs in Rock Springs. With minimal grazing, some grass conditioning can occur for late season big game use.

Establishment of a minimum of 6-inch stubble height in floodplains of identified areas to protect sensitive plant habitat would improve forbs and riparian shrub production in East Fork Wolf Creek drainage. An increase in elk use in these plant protection areas would be minimal due to roads along the drainage. Some seasonal elk use is expected and improvements in forage during the calving season may occur. In these areas, forage availability for elk is comparable to the No Grazing Alternative. Alternative 1 potentially could affect these sensitive sites and reduce forage available for elk during the summer months, however, impacts on forage availability are of low concern during this time period, except possibly during drought years when forage may be limiting.

Protection and regeneration of aspen with this alternative would improve future foraging habitat for elk. With the use of felled conifers as a barrier to livestock, the availability of aspen for elk is also reduced, allowing for natural aspen regeneration. However, there would be short-term forage available from moss and lichens from some of the felled conifers. The small acreage treated would most likely benefit deer instead of elk and the benefits would be short term (one year) until large stands of aspen develop (at least 10 years).

Prescribed burning in Cougar Flat, with a rest from grazing, would enhance forage quality and quantity for elk and deer in the meadow. Prescribed fire would reduce sagebrush and an increase in forb production is expected. Because of the secondary 1630 road and spur roads adjacent to Cougar Flat meadow, roads limit the improvement to elk habitat. Prescribed burning in aspen stands to stimulate suckering may occur in small areas along Squaw Creek. Big game fencing, a 10 foot tall fence, would be installed after the prescribed fire to prevent big game and livestock browsing on aspen. Therefore, there is no short term benefit to big game forage. There may be long term benefits of forage production once the fences are removed.

Stream restoration projects to install rock structures and large woody debris may improve long -term forage habitat for elk and deer in Squaw Creek, once floodplain vegetation is restored. Once the water table is replenished, plants that are more favorable to big game would be enhanced. The indirect forage improvement would take at least five years to develop.

Wolf Mountain

Establishment of a minimum of 6-inch stubble height in floodplains of identified areas to protect sensitive plant habitat would improve late season forage availability for elk in the Antelope and Wolf Creek pastures. However, the habitat is adjacent to roads so elk use

would be seasonal and minimal in these areas. Compared to current management, this alternative assures good forage in the pastures where *Botrychium* habitats are protected, since livestock use would be minimal in these riparian areas. Conditioned forage would be more palatable to elk. Protection of plant habitat improves elk calving and rearing habitat in the spring and summer, and potential wallows during the rutting season in the autumn.

As shrubs become established in the Beaverdam pasture, an improvement in late winter elk forage may occur. Treatment of aspen stands and riparian planting would help accomplish this winter range improvement. This alternative meets the Malheur LRMP standards for non-anadromous riparian areas (MA-3A - #8, IV-56) to “manage composition and productivity of key riparian vegetation with emphasis on riparian hardwood shrubs”. Even though last year riparian shrub utilization was acceptable with the current management in this allotment, the potential for shrub and sedge over utilization by livestock exists. Limited livestock use in the Beaverdam meadow would improve forage diversity for winter and spring big game use.

Decommissioning of approximately one mile of the 1619805 road would improve elk habitat by reducing disturbance. Improvement in forage would occur once native grasses and forbs became established in the old road corridor.

The effects on aspen stands and riparian improvement projects would be similar to West Malheur allotment.

Direct and Indirect Effects from Alternative 3 - No Grazing

All Allotments

In all allotments, the No Grazing Alternative would allow an increase in bunchgrass production for bluebunch wheatgrass, Idaho fescue, and other bunchgrasses within the allotments. Research by Ganskopp, Svejcar and Vavara (2004) near Burns, Oregon found that light grazing decreased fall standing crop by 32%, while heavy grazing reduced standing crop by about 67% when compared to ungrazed stands. However, the nutritional quality of the grasses increased with grazing, which provided superior forage for fall and winter use. The No Grazing Alternative would allow bunchgrass forage to develop residual growth resulting in “wooly” plants, which are not palatable to wild ungulates. The establishment of older non-palatable plants would occur over time, unless some type of disturbance such as fire occurred.

Competitive displacement would not occur under the No Grazing Alternative. Stewart et al (2002) found elk used lower elevations when cattle were absent and moved to higher elevations when cattle were present, indicating competitive displacement. Elk would not be displaced into higher elevations or steeper slopes prematurely due to livestock introductions on the allotments. With the absence of livestock, elk and mule deer would forage in possibly higher productive areas. Displacement of elk from disturbance during livestock operations would not occur. Salting, herding, fence and range structure improvement maintenance would not occur, reducing disturbance to wild ungulates.

Regeneration of riparian shrubs would improve in streams where livestock no longer concentrate. Late summer and early fall forage would be more available for elk and mule deer in riparian areas with the absence of livestock on the allotments. A better

distribution of wild ungulates may occur around the various water sources with the absence of livestock, since livestock concentrate near water sources during the hotter part of summer. An improvement in calving/fawning areas would occur over time as riparian shrubs become established.

The HEI may improve slightly in the Squaw Creek subwatershed, because of forage increase with the No Grazing Alternative. The composition of bunchgrasses would improve over time, primarily in the West Malheur Rock Springs pasture. As overall range conditions improve, the index increases, therefore an increase in HEI is anticipated. The quality of forage may decline within a 5-10 year period, but the quantity of forage would increase with the absence of cattle.

Elk would use water and specialized habitats: ponds, reservoirs and spring developments more, since no livestock grazing would occur. Displacement of cow/calf elk from water sources would not occur with the absence of livestock. Disturbance to elk during the calving and calf-rearing period would be reduced, since there would not be any livestock operations occurring under the no grazing alternative. The vegetation around the springs would improve, compared to current conditions, enhancing these areas for calf-rearing. Succulent vegetation would be more available for elk around isolated water sources.

House Creek

There would be no displacement of elk from livestock operations. The quality of grass forage may decline over time as grasses become mature and unpalatable. Vegetation around isolated water sources would improve in the short term, since concentrated livestock use would not occur. Aspen regeneration would most likely improve without livestock use.

West Malheur

Forage production for big game would improve with the absence of livestock in certain areas that have received moderate to heavy use in the past. Rock Springs pasture would show the most improvement in the short term, since more poor to fair range condition plots were sampled in this pasture. The uplands within this allotment appear to receive little livestock use, where some riparian areas receive concentrated use. The No Grazing Alternative is similar to Alternative 1 on most of this allotment, with the exception of the Squaw Creek drainage and surrounding area, the southern portion of the Cougar pasture and Rock Springs pasture. The meadow in Cougar Flat should improve over time with livestock exclusion, enhancing forage for elk in the short term. However, sagebrush expansion is inevitable and decline in elk forage is expected in the long term, unless natural disturbance or prescribed fire occurs.

Riparian forage would improve in the Squaw Creek drainage once riparian shrubs became established. Improvement in forage quality would occur over time as native species replace other species such as Kentucky bluegrass. Because of the high road densities, the improvement for riparian forage in the Squaw Creek drainage would receive seasonal use by elk, due to human disturbances associated with roads.

Wolf Mountain

There would be minimal differences in forage availability for elk between the No Grazing Alternative and Alternative 1. In the past, lower Beaverdam Creek has received

heavy grazing pressure, which impacted riparian vegetation. However, livestock management changes have improved these conditions. High road densities in the lower Beaverdam Creek reduce foraging potential for elk. Seasonal and nocturnal use by elk would occur in Beaverdam Creek.

The forage in Wolf Creek meadow would improve for elk in the short term until plants became too woody and unpalatable. With the absence of livestock grazing, vegetation in the meadow may be unpalatable for elk forage due to plant maturity and residual grasses.

Without livestock grazing, a slightly faster recovery rate of riparian vegetation in some streams is expected. Livestock would not forage on riparian vegetation in streams such as Antelope, Wolf Creek, and Bridge Creek. Stream bank and riparian vegetation establishment would occur at a faster rate than with the Current Management Alternative allowing recovery of riparian forbs and shrubs.

Cumulative Effects Common to All Alternatives

Decades of fire suppression, past timber harvesting and associated road construction have altered elk habitat in all three allotments. Fire suppression has allowed the expansion of juniper and other woody stemmed plants reducing the forage for elk and increasing the probability of forage competition with livestock. Past timber harvest (timber sales harvested in the 1970's and 1980's) created foraging habitat for elk, but regeneration has occurred in most units reducing forage quality for elk. Thinning within old pine plantations scheduled for 2005 in the Wolf Mountain allotment may enhance some foraging habitat for elk. Approximately 1300 to 1500 acres are planned to be treated overall in the project. Vegetation management treatment may occur in the Wolf Mountain allotment, which would enhance forage for elk and possibly cattle. Road closures are highly probable in the future in Wolf Creek drainage to bring road densities to more desired levels and meet forest plan directions. Road closures would alleviate elk displacement from cattle and human disturbances, if the areas closed provided forage/cover needs for elk.

Range improvement projects such as water developments have helped in distributing elk through out the project area. Placement of salt for livestock also benefits elk during the summer months.

HEI index would not be further diminished by Alternatives 2 and 3 because there is no impact on cover and no measurable changes in road densities. Under Alternative 1, HEI index could be further diminished due to a slight decrease in forage quantity and quality in Squaw Creek subwatershed.

Mule deer (Odocoileus hemionus)

Mule deer are considered widely distributed across the District, Forest and the Blue Mountain Region and have similar habitat requirements as elk.

Population Numbers

Current mule deer populations estimate are at 10,700 deer for the Malheur River Unit (MRU). Mule deer populations are approximately 30 to 35% below management objectives. The current downward trend could be attributed to several factors, but low recruitment rates are considered a primary concern by ODF&W biologists. High cougar

and coyote populations can limit fawn production. Long periods of drought can also affect recruitment. The planning area occupies about 15% of the MRU.

Habitat

Mule deer habitat consists of a combination of forage, cover, and specialized areas such as fawning areas. Optimal habitat contains 55 percent forage, 20 percent hiding cover, 10 percent thermal cover, 10 percent fawn-rearing and 5 percent fawning habitat.

Cover

Thermal Cover - Thermal cover for deer is defined as canopy cover of at least 75 percent provided by shrubs or trees at least 1.5 meters (5 feet) high. If thermal cover requirements are met for elk, it can be assumed thermal requirements for deer are met. Thermal cover for deer is abundant throughout most of the allotments and would not be limited with any of the action alternatives.

Hiding Cover- Currently, hiding cover in the planning area is considerably higher than the recommended 20 percent. While abundance of hiding cover improves probability of escapement during hunting season, cover shades out shrubs and other vegetation providing forage. An excessive amount of hiding cover may limit forage production for mule deer in some areas.

With recent understory thinning and selective harvesting in the Parasol Planning Area in the House Creek Allotment, conversion of hiding cover to forage has occurred. About 380 acres of understory fir and pine have been thinned since 2000. Historically fire maintained a balance between cover and forage.

Forage- Mule deer forage consists of a variety of forbs, shrubs, and, bunchgrasses such as Sandberg's bluegrass depending on the time of year and the condition of the forage. Shrubs and forbs are the primary forage for mule deer. Absence of timber management coupled with fire suppression has resulted in dense stands of ponderosa pine and juniper throughout the project area. This has reduced the forage for mule deer with the exception of the Wolf Creek wildfire area where forage has increased.

Some of the key shrub deer forage in the project area include: antelope bitterbrush (*Purshia tridentata*), Curl-leaf mountain mahogany (*Cercocarpus ledifolius*), common serviceberry (*Amelanchier alnifolia*), and chokecherry (*Prunus virginiana*). Quaking aspen (*Populus tremuloides*) is valuable forage for mule deer found primarily in the Squaw Creek drainage. The most prominent shrub is common snowberry (*Symphoricarpos albus*). Bitterbrush and mountain mahogany, in most areas in the project area are in poor condition. Decadent and heavily browsed bitterbrush is common where the plants occur (See photo 15). Bitterbrush utilization in the project area is most likely higher than 40% in most areas, which is above desired levels.

Mountain mahogany stands occur throughout the southern allotments and are lacking reproduction. Decadent stands of mahogany are common with little to no regeneration. Fire suppression allows establishment of ponderosa pine and juniper, which compete with mountain mahogany. Juniper and ponderosa pine have shaded some the mountain mahogany areas. Natural fires created soil beds for mountain mahogany propagation.

With the lack of shrub production in the uplands, and concentrated livestock use in some riparian areas, forage for mule deer can be limited in some areas.

Dietary overlap between cattle and mule deer primarily occurs on grazing Sandberg's bluegrass and various shrubs consumed by livestock during the drier summer months. Sandberg's bluegrass is a preferred grass grazed on by mule deer during spring green up. Aspen is a preferred browse favored by cattle and deer.

Estimation of use on different habitat types occurred at randomly selected sites throughout the various allotments using the Intensive Browse Method. Shrub browsing was heavy in some of the pastures such as Rock Springs. Riparian areas outside of the Wolf Creek drainage appeared to receive concentrated use by livestock and browsing of shrubs was common. Squaw Creek drainage received the heaviest browsing on riparian shrubs. The adjacent uplands received little grazing pressure compared to riparian areas. Livestock use was concentrated in riparian areas with minimal foraging occurring on adjacent slopes. Aspen stands received concentrated use by livestock and most aspen suckers received heavy browsing.



Photo 15

An example of decadent bitterbrush common in the Rock Springs pasture.

Nearly all bitterbrush sampled were utilized beyond desired levels and above the threshold for seed production. On the big game winter range(s), such as the one sampled in the Rock Springs pasture, there was evidence of three species of wild ungulates as well as livestock browsing on bitterbrush. There was no evidence of any young bitterbrush occurring in the sampled area at the southern portion of the allotment. Recruitment of

bitterbrush in most areas is limited due to ungulate browsing, competition from conifers and juniper, and environmental conditions such as drought.

Fawning and fawn-rearing habitat - Compact areas containing a diversity of cover, succulent forbs, and water are needed by does during the fawning and fawn-rearing period (Sheehy, 1978). Riparian areas are key for fawn production, because of variety of succulent plants, including shrubs. In rangeland areas hiding and thermal cover for fawn production is limited. In dense timber areas in the project area, lack of succulent forage is common. The Wolf Creek drainage and upper Shurtz Creek provide healthy riparian areas that may be good fawn rearing areas. Lack of timber management, road construction in RHCA's and concentrated livestock grazing in riparian areas has degraded the potential for optimal fawning and fawn rearing habitat in some areas in the project area. To optimize forage habitat for mule deer, livestock use should emulate natural grazing disturbance to stimulate grass production.

Effects on Mule Deer

Direct and Indirect Effects from Alternative 1 – Current Management

House Creek

Other than aspen stands near CHE Springs, there were no other areas of concern observed where livestock could impact mule deer habitat. There was no obvious browsing on riparian shrubs in the two riparian pastures along House Creek. The use of few livestock in this allotment could improve grass forage quality and enhance fall green up, which improves transition range for mule deer.

West Malheur

Riparian forage for mule deer would continue to be reduced with current management in the Squaw Creek RHCA. While the lower section of Squaw Creek receives very little grazing pressure, the upper reaches were grazed to levels unfavorable for aspen, other riparian shrubs and forbs. Mule deer foraging and fawn rearing habitat was adversely impacted in Squaw Creek from concentrated livestock use. The current management is not affecting riparian shrub conditions in East Fork of Wolf Creek; therefore this drainage is favorable for fawn production.

Upland shrubs, primarily bitterbrush, in the Rock Springs pasture were in poor condition due to all ungulate browsing. There was also long term monitoring plots in Rock Springs pasture indicating a declining trend in vegetation. Even though deer use may be migratory through this pasture, the current shrub conditions for bitterbrush and mountain mahogany are less than desired. Where livestock could be contributing to heavy shrub browsing, wild ungulate use is also a factor.

Wolf Mountain

Current livestock grazing practices have had minimal impacts on mule deer habitat based on observations and shrub data. However, last years livestock use was limited to yearlings and not cow/calf pairs. The potential for concentrated use exists and the primary areas of concern are in the Beaverdam pasture. Reduction in riparian shrubs, primarily willow and aspen can occur with concentrated livestock use.

Direct and Indirect Effects from Alternative 2 – Proposed Action***House Creek***

The affects on mule deer are similar to elk for this allotment. Riparian shrubs would most likely increase given a 35% utilization requirement in riparian pastures in House Creek. Aspen protection may exclude deer use, therefore short -term foraging improvements would be limited to moss and lichens on felled conifers. Long-term aspen productivity would benefit mule deer near CHE Springs. Fencing a spring would provide an undisturbed water source for does and fawns.

West Malheur

The impacts to mule deer habitat from this alternative are similar to elk. Because the Cougar pasture is impacted the most by concentrated livestock use, riparian and aspen restoration would improve habitat for mule deer more than No Grazing Alternative. Alternative 2 would alleviate livestock impacts and enhance aspen and riparian shrub production by restoring Squaw Creek and removing competing conifers. Improved fawning and fawn-rearing is anticipated with this alternative.

All stream restoration and prescribed fire in Cougar Flat would improve mule deer habitat in the short and long term. As floodplains become restored and vegetation established, mule deer forage and hiding cover will be enhanced. Aspen stands will respond quickly, in less than five years, with protection and conifer removal. Aspen regeneration provides ideal fawning and fawn rearing habitat.

Wolf Mountain

Excluding or limiting livestock utilization on riparian vegetation for other resource objectives would improve foraging and fawn -rearing habitat in this allotment. Enhancement of aspen would improve small foraging areas for mule deer. Planting of riparian shrubs would provide future browse for mule deer. Based on past riparian data and a one-year shrub analysis, the impacts from current management on mule deer habitat would be similar to no grazing, with the exception of a few aspen stands and a meadow in the Beaverdam pasture. Decommissioning of the 1619805 road would improve fawning and fawn rearing habitat in the future once riparian plants became established. Stream stabilization projects would improve riparian vegetation and improve habitat for mule deer in the long term (10 plus years).

Direct and Indirect Effects from Alternative 3 - No Grazing

In all allotments, the No Grazing Alternative would have both negative and positive affects on mule deer forage. Likewise with elk, competition for forage occurs on winter or transitional ranges where animals are concentrated due to weather conditions. Competition for forage between livestock and mule deer occurs primarily on shrubs in riparian areas. Mid to late summer livestock grazing attributes to competition for shrubs, where livestock concentrate in riparian areas. Past livestock practices have attributed to decline of riparian shrubs in several streams. The No Grazing Alternative would improve the recovery of riparian shrubs faster than the action alternatives.

Livestock reduce the riparian vegetation utilized by mule deer during fawn rearing. Kie et al. (1991) found female mule deer feed at significantly higher rates during moderate to

heavy livestock use in riparian and meadow areas compared to ungrazed areas. As forage for mule deer is limited, the home range increases. Reduction in fawn survivability can occur as habitat for fawning becomes limited. Predation on fawns can occur at a higher rate as fawning and fawn rearing is limited. By reducing the recruitment of riparian shrubs, livestock can negatively affect fawning habitat for mule deer. The fawn rearing habitat would improve best with the No Grazing Alternative, because competition in riparian areas would be limited to native ungulates.

Controlled livestock grazing can improve foraging habitat for mule deer. Anderson and Scherzinger (1975) were the first to assess forage quality after seasonal grazing. Nutritional quality and palatability of grass forage is enhanced with proper grazing intensities. Early season grazing can be a tool employed to improve mule deer winter range.

House Creek

Forage competition concerns are minimal on this allotment since approximately 60 animals are grazed. There would be minimal differences between the no grazing and other alternatives. However, the forage near the water sources would improve with absence of livestock. The quantity of forage would improve but the quality of forage may decline over time, unless other disturbances such as fire or understory thinning were initiated. Aspen regeneration would improve near CHE Springs with the absence of livestock. An increase in forb production may occur where concentrated livestock exists around springs. There may be improvement in the ponderosa pine- Kentucky bluegrass plant community with the absence of livestock. The reestablishment of snowberry and other shrubs would enhance fawn rearing habitat in these areas.

The 1968 Range Management Plan noted severe browsing on bitterbrush and mountain mahogany. The No Grazing Alternative would reduce potential for livestock browsing on shrubs during the hotter months of summer. The competition for browse would depend on the distribution of bitterbrush and mahogany from the water sources.

West Malheur

Shrub component in the Squaw Creek drainage would improve considerably with the No Grazing Alternative. Aspen, chokecherry, and snowberry in the drier riparian areas would not receive browsing pressure from livestock. Dispersal of does and fawns throughout the Squaw Creek drainage would be more common with the absence of livestock concentrating near intermittent water sources in Squaw Creek. Forage availability for forbs may increase over time as riparian conditions improve.

Browse in the big game winter range is another concern for this allotment. In the Rock Springs pasture, browse surveys indicated heavy to moderate use on bitterbrush, a key mule deer browse. Research by Ganskopp et al (1999) found cattle shifted their diet to bitterbrush once grass seed ripens. The No Grazing Alternative may lessen the browsing impact on bitterbrush, but with current big game densities, the length of the recovery period for bitterbrush would be at least ten years or more.

Wolf Mountain

Primary concern of grazing to mule deer habitat in this allotment is the regeneration of aspen in the Beaverdam and Bridge Creek streams. The No Grazing Alternative would

allow faster recovery of aspen and provide fawning habitat compared to current management (Alternative 1). The establishment of riparian shrubs, such as willow, would occur at a faster rate with the No Grazing Alternative. However, last years livestock operations did not affect riparian shrubs, since yearling cattle were grazed. Yearlings usually do not concentrate in riparian areas during the summer as often as lactating cows.

Cumulative Effects to Mule Deer Habitat

In all allotments, past timber harvest of approximately 19,000 acres has improved mule deer forage by creating openings for shrubs and forbs. Fire suppression has reduced mule deer habitat by reducing foraging habitat. Fire return intervals have been changed in the transitional ponderosa pine/shrub steppe ecosystems from historic intervals of 12-25 years to more than 100 years since settlement (Miller and Rose, 1999). Lack of fire reduces forage opportunities for mule deer. Future prescribed fire is planned in the House Creek Allotment with approximately 900 acres planned for burning in the next five years. An additional 6,000 acres of prescribed fire are planned in an adjacent allotment to House Creek. These future resource projects would enhance mule deer habitat.

Past logging practices and associated road construction have altered riparian vegetation. Riparian shrubs utilized by mule deer have decreased because of degraded riparian areas. Riparian shrubs have also been impacted by over-grazing from livestock.

Historic grazing practices, where season long grazing occurred, impacted riparian vegetation. There were no regulations to govern use in riparian areas. Historic grazing along with logging and road construction has changed the plant communities in riparian areas from favorable mesic communities to more xeric. The loss of mesic forbs and shrubs is apparent in all of the allotments.

Alternative 1 would further lessen fawning habitat and forage in Squaw Creek and Beaverdam Creek and upland shrubs in the Rock Springs pasture. Alternative 2 would not further diminish fawning habitat and forage in Squaw Creek and Beaverdam Creek and upland shrubs in the Rock Springs pasture. Riparian enhancement proposals would improve fawning habitat, forage and upland shrubs. Alternative 3 would not further diminish fawning habitat and forage in Squaw Creek and Beaverdam Creek and upland shrubs in the Rock Springs pasture because livestock grazing would not occur.

Pronghorn antelope (*Antilocapra americana*)

Habitat for pronghorn antelope consists of short or mixed grasslands or sagebrush grasslands with average vegetation heights of 15 inches. Vegetation cover is at least 50% with a mix of grasses, forbs, and shrubs such as bitterbrush, sagebrush, and rabbit brush. Tree densities are usually very low on open rolling hills with gentle slopes. Forbs and shrubs are the primary diet for pronghorns.

Pronghorn habitat is limited in the project area. Juniper and ponderosa pine encroachment from fire suppression has degraded habitat in the southern portion of the West Malheur Allotment. Pronghorn pellets were found in the vegetation analysis indicating some foraging occurs in the Rock Springs pasture of the West Malheur Allotment. Antelope migrate through the West Malheur allotment to Logan Valley located approximately three to four miles north of a Pierpont pasture.

Effects on Pronghorn antelope

Direct, Indirect and Cumulative Effects Common to All Allotments

The habitat within the project area is limited for pronghorns except for the southern most portion of the West Malheur Allotment, Rock Springs pasture. Because there is limited habitat for pronghorn in Wolf Mountain and House Creek allotments, impacts to pronghorn habitat would be negligible. There is very little dietary overlap between cattle and pronghorns. Domestic sheep have the greatest potential to affect pronghorn forage due to diet similarity however there are no sheep on these allotments at the present time. There is potential for competition on shrub species such as bitterbrush. Antelope consume bitterbrush when forbs are cured or unavailable.

A concern with pronghorn is fences and fence repair. It can be assumed that fence maintenance would not occur with a No Grazing Alternative; therefore, the potential for pronghorn to become entrapped in barb-wire may be higher unless fences were removed. Livestock permittees maintain most of the pasture and allotment boundary fences. The existing fences, when maintained, are not antelope barriers.

West Malheur

There is approximately 900 to 1,000 acres of marginal pronghorn antelope habitat in the Rock Springs pasture. Habitat concerns on this pasture are similar for antelope as the other wild ungulates. The lack of reproduction on bitterbrush is utmost importance. The No Grazing Alternative would eliminate livestock competition on bitterbrush and forbs that may be consumed by cattle. Yoakum (1975) and Salwasser (1980) maintained that forage competition between antelope and cattle was not a serious problem on rangelands in good ecological condition. Based on vegetation plots, Rock Springs pasture is not in good ecological condition.

There is low potential for competitive displacement during the late fawning period. Livestock enter the pasture during the second half of the fawning period. Fawning period for antelope is mid- May to mid-June. McNay and O’Gara (1982) reported displacement forced antelope does to unfavorable fawning areas, which can reduce survival of fawns. There have been no surveys to confirm any antelope or other ungulates fawn or calve in this pasture, but the possibility of fawning exists. Most of the antelope fawning would occur prior to livestock use on the pasture.

Direct, Indirect and Cumulative Effects from Alternative 2 – Proposed Action

The Proposed Action to shift grazing allocation from Rock Springs pasture to Pierpont may reduce browsing on bitterbrush and forbs that produce forage for pronghorns. Since moderate to high shrub utilization occurred on this pasture last year, this alternative is more favorable than Alternative 1 for pronghorn forage.

Fire suppression, which has allowed the expansion of juniper and ponderosa pine is the primary concern affecting pronghorn habitat in the West Malheur allotment. Livestock grazing had minimal impact on marginal pronghorn habitat. However, with continued expansion of juniper, the habitat potential for antelope in West Malheur could decline. Drought can impact forage production of shrubs and forbs utilized by antelope. Adjusting livestock use to reduce grazing pressure on forbs and shrubs would reduce competition.

Competition for forbs and shrubs, primarily bitterbrush, can occur during drought years when livestock shift their diet from grasses at a earlier time. Heavy concentrations of elk during the winter can reduce bitterbrush production, therefore reducing habitat for other ungulates like antelope.

Management Indicator Species (MIS)

The Malheur Forest Plan, as amended, identifies 15 Management Indicator Species and their associated habitat requirements. MIS habitat requirements are presumed to represent those of a larger group of wildlife species, and act as a barometer for the health of their various habitats. Rocky Mountain elk represent big game species, primary cavity excavators (mostly woodpecker species) represent dead wood habitats, and pine marten, pileated woodpecker, and northern three-toed woodpecker represent old growth habitats.

Table 30 lists the Management Indicator Species for the Malheur National Forest and associated habitats and reason for selection. Primary cavity excavator needs (dead and dying habitat) would not be changed by this grazing proposal, therefore snag and downed wood will not be evaluated at this time. Vegetation management plans are planned for the near future (Van Vegetation Management) and habitat potential for all MIS bird species will be assessed during that analysis. However, the following species can be impacted by riparian vegetation and assessments on habitat are addressed.

Downy woodpecker (Picoides pubescens)

This smallest North American woodpecker is found in deciduous stands of alder, cottonwood and aspen. While this species is more common on the west slopes of the Cascades, they do occur in riparian areas in eastern Oregon. Downy woodpeckers are common around dwellings in orchards and hardwood shrubs. Downy woodpeckers are less common in conifer forests. Medin and Cary (1991) found woodpecker densities four times higher in ungrazed willow and aspen communities than in grazed areas. The competition from conifers shading riparian hardwoods is a conservation concern that may be affecting downy woodpecker populations. One pasture with the highest concern for hardwood recruitment for Downy woodpeckers is Cougar, in the West Malheur allotment.

Williamson's, Red-Breasted, Yellow-Bellied and Red Naped Sapsuckers (Sphyrapicus thyroids, S. rubber, S. varius and S. nuchalis)

Sapsuckers are associated with riparian hardwood communities and open ponderosa pines. Aspen, willow, and cottonwoods are the primary riparian species sapsuckers utilize for breeding in eastern Oregon. Dobkin et al. (1995) found 72% of the red-naped sapsuckers nests in aspen trees on their study in south-central Oregon. No formal snag surveys were conducted in the riparian areas to assess habitat for cavity nesting birds. However, the recruitment potential for future snags was assessed in aspen stands. Heavy utilization of aspen suckers was noted in over 90% of the aspen stands. Poor recruitment will limit mature aspen trees in the future. The Wolf Creek and upper Schurtz Creek drainages contain diverse riparian plant communities and should provide habitat for sapsuckers. Sapsucker foraging sign (sap wells) was noted along the East Fork of Wolf Creek (Sutcliffe pers. Obs.) in alder.

To provide long term sustainability for cavity nesting birds in riparian areas and subsequent secondary cavity nesters, recruitment of hardwood species would need to occur. Aspen restoration would need to occur to regenerate the aspen communities in the project area. Fewer conifers in riparian habitat conservation areas (RHCA's) in the project area would reduce competition on hardwood species. Periodic fires in aspen stands would promote suckering and would improve health of aspen communities. Establishment of cottonwoods in the Wolf Creek drainage would provide nesting and foraging habitat for sapsuckers and other cavity excavators. Streams maintained in functional condition assure establishment of cottonwood and other riparian hardwoods.

Table 30. Terrestrial Management Indicator Species, Malheur National Forest

Species	Reason for Selection	Spec. Habitat Needs
Rocky Mountain elk	Species commonly hunted	Forage, cover, spatial arrangements of cover, road densities.
pileated woodpecker	Old growth	Snags, downed logs in OG mixed conifers
pine marten	Old growth	Snags, downed logs in mature forests
three-toed woodpecker	Old growth	Lodgepole pine plant associations
Lewis woodpecker	Primary cavity excavator; dead and defective habitat	Open habitat near water in oak, ponderosa pine and cottonwood
yellow-bellied woodpecker	Primary cavity excavator; dead and defective habitat	Riparian habitat, primarily aspen, cottonwood, pine
red-breasted woodpecker	Primary cavity excavator; dead and defective habitat	Aspen-ponderosa pine
Williamson's woodpecker	Primary cavity excavator; dead and defective habitat	Ponderosa pine aspen
downy woodpecker	Primary cavity excavator; dead and defective habitat	Riparian hardwoods, aspen
hairy woodpecker	Primary cavity excavator; dead and defective habitat	Ponderosa pine, mixed conifer snag habitat
white-headed woodpecker	Primary cavity excavator; dead and defective habitat	Open ponderosa pine, mixed conifer
three-toed woodpecker	Primary cavity excavator; dead and defective habitat	Lodgepole pine plant associations
black-backed woodpecker	Primary cavity excavator; dead and defective habitat	Conifer forests w/ high snag densities from bark beetles & fire kill
northern flicker	Primary cavity excavator; dead and defective habitat	Open forest edges, juniper OG
pileated woodpecker	Primary cavity excavator; dead and defective habitat	Snags, downed logs in OG mixed conifers

Old Growth Dependent MIS, Old Growth and LOS Habitat

Pileated woodpecker, pine marten, and three-toed woodpecker are species that are dependent on habitat characteristics of old growth forests. White-headed woodpecker and Lewis woodpecker are associated with open ponderosa pine and are focal species for managing ponderosa pine. Black-backed woodpecker is associated with burned forests and bark beetle infestations. Because grazing does not affect snag densities or the potential recruitment of conifer snags, none of the proposed alternatives would have an affect on habitat for these woodpeckers, therefore no further analysis is necessary for the above mentioned MIS.

Designated old growth exists in all allotments. Approximately 3700 acres have been designated old growth habitat in the planning area. Minimal forage for livestock and big game is present under the canopy of old growth and LOS (late old structure) conifers due to the high canopy cover. Because little grazing occurs in old growth habitat due to the limited herbaceous production and steep slopes proposed grazing alternatives would not affect old growth habitat and its associated species.

Effects on MIS - Downy Woodpeckers and Sapsuckers

Direct and Indirect Effects from Alternative 1 – Current Management

House Creek

CHE Springs is the primary area of concern for sapsucker and downy woodpecker nesting habitat within this allotment because of poor condition of aspen stands. Domestic and wild ungulate browsing on aspen suckers and high density of conifers reduced aspen regeneration in CHE Spring area. Current management practices were not impacting the House Creek drainage, however, aspen was scarce in the lower House Creek. High density of downed wood, dense trees, and very little livestock forage production prevent livestock from browsing on the few aspen in House Creek.

West Malheur

Aspen inventories and field observations indicated heavy browsing on aspen. Continued concentrated livestock use in Squaw Creek and Van Gulch would reduce aspen regeneration and future nesting habitat for MIS. The short term increase in aspen stands would improve nesting habitat, however, the long term recruitment of aspen is questionable with continued browsing pressure in aspen stands.

Wolf Mountain

The primary concern in this allotment for MIS habitat is the impacts livestock pose on aspen recruitment. Bridge Creek and Beaverdam Creek are two areas aspen stands negatively impacted from livestock browsing on aspen suckers. Depending on the type of livestock used, browsing of aspen and other shrubs can be severe, impacting future recruitment of nesting and foraging habitat for MIS woodpeckers.

Direct and Indirect Effects from Alternative 2– Proposed Action

House Creek

This alternative enhances aspen habitat, with the absence of livestock grazing in aspen stands. Conifer treatment and fences would protect aspen suckers allowing future regeneration of aspen. As in other pastures, maintaining a 35% utilization objective, sufficient herbaceous grasses and sedges are left, and the shift to browsing of riparian shrubs is unlikely. The long term recruitment of riparian shrubs is expected in the two pastures in House Creek creating potential nesting and foraging habitat for downy woodpeckers and red-naped sapsuckers in the long term.

West Malheur

There are no short term direct and indirect affects to MIS with the Proposed Action. However, the long-term recruitment of hardwood snags is the highest with this alternative due to the treatment of aspen and restoration projects associated with Squaw Creek and its tributaries. While there would be no immediate MIS habitat changes, hardwood snags would increase over time as aspen stands develop. It is expected that higher density of riparian hardwoods increases woodpecker nesting habitat, based on Medin and Clary (1991) and others research, probably due to the cover from deciduous vegetation and snag availability.

Prescribed fire project in Cougar Flat might improve foraging habitat for woodpeckers if mortality occurs on some of the ponderosa pines within the meadow fringes. Because of the small scale burn and the close proximity to the old Wolf Creek fire, no measurable benefits are anticipated. Similar affects are anticipated if aspen stands are burned. The scale of the prescribed fire would be less than 10 acres per aspen stand. Small scale burns may provide a few foraging trees, but there would be no measurable increase in foraging habitat for MIS woodpeckers. The prescribed fire would occur outside the nesting season, in the early fall/late summer, therefore no loss of young birds is expected.

Wolf Mountain

This alternative enhances riparian shrubs by protecting aspen stands and planting willows in Beaverdam Creek. Riparian shrub recruitment would provide future habitat for MIS species. The felling and leaving of conifers in Bridge Creek to protect aspen provides foraging habitat for woodpeckers as insects invade the downed woody material. Treatment of the 1619805 road would improve snag habitat for MIS in the future by reducing the potential for fire wood cutting. It would improve approximately 40 acres of habitat for MIS.

Direct and Indirect Effects from Alternative 3 - No Grazing

The No Grazing Alternative would not directly affect habitat for MIS species that occupy aspen and riparian shrub habitat. Livestock grazing does not affect dead and dying habitat, which is primarily snag habitat. However, livestock browsing can negatively affect the recruitment of hardwoods. Most aspen stands and riparian areas have limited recruitment due to browsing and conifer shading. Some stands of aspen would respond favorably to no livestock browsing, but others may remain suppressed until further disturbance occurs. Trampling of young aspen by livestock can negatively impact aspen suckers. Other indirect effects livestock pose on riparian vegetation is reduction in bank

stability and hoof shearing of stream banks, which widens stream channel and prevents establishment of riparian shrubs. Riparian shrubs are used for foraging and nesting habitat for some MIS species.

House Creek

Both pastures contain aspen with long term productivity concerns. The no grazing option would reduce impacts on aspen recruitment. Wild ungulate browsing most likely would limit some recruitment of aspen in the North Pasture. Improvement of future woodpecker habitat would be minimal in the South Pasture due to small aspen stand and potential for expanding the aspen is limited by the Forest Service 17 road.

West Malheur

Aspen within the Cougar pasture would improve with livestock exclusion. Long-term aspen habitat for cavity nesters would be improved with the regeneration of aspen in the Squaw Creek drainage. The degraded stream channel in Squaw Creek would limit expansion of aspen in some stands. The western portion of this allotment in the East Fork Wolf Creek would not have measurable changes with no grazing compared to current conditions (Alternative 1). Riparian shrubs appear to receive little browsing by livestock in East Fork Wolf Creek.

Wolf Mountain

Riparian shrub and aspen regeneration concerns on this allotment are limited to Beaverdam and Bridge Creek. The poor riparian conditions on this allotment are due to cumulative effects of past management and not of current practices employed recently. In 2004, yearling cattle grazed in the allotment and browsing of riparian shrubs met acceptable levels where shrub sampling occurred. The No Grazing Alternative would improve long-term productivity of riparian shrubs where livestock use is occurring. The absence of livestock in the Bridge Creek aspen stands would reduce trampling and aspen sucker damage from concentrated livestock travel. However, the long-term productivity for hardwood snags for cavity nesting birds is not jeopardized with current livestock management practices (Alternative 1).

Cumulative Effects on MIS Habitat for All Allotments

Road construction and subsequent logging in the past have altered habitat for cavity nesting birds. Highly degraded streams have reduced the ability of streams to retain water for important hardwoods used as nesting and foraging habitat for specific MIS woodpeckers. Present firewood cutting has further contributed to the decline in nesting habitat in some areas. Concentrated livestock use on intermittent and perennial streams has reduced the recruitment of hardwoods.

Fire suppression has allowed conifer densities to exceed levels that displace riparian hardwoods. Historically, fire would maintain most of the aspen and some riparian areas reducing conifer and juniper competition. Currently, shading produced by conifers is reducing recruitment of aspen, alder, and willow in some areas.

Alternative 1 would further diminish the potential for snag recruitment within the hardwood species, primarily aspen. Alternatives 2 and 3 would not further diminish the potential for snag recruitment within the hardwood species, primarily aspen. This is due

to the absence of livestock browsing in aspen stands. Alternative 2 would also increase the recruitment of aspen due to restoration projects.

Featured Species

The Forest Plan defines featured species as “species of high public interest and demand” (Chapter IV-30, 31). Featured species include sage grouse, antelope, blue grouse, upland sandpipers, bighorn sheep, and osprey. Two species, sage grouse and antelope are addressed in the TES section and big game section, respectively.

Mistletoe infected fir providing blue grouse habitat would not be altered by any of the action alternatives, therefore livestock use would not impact blue grouse habitat.

There is no habitat available for upland sandpipers in the project area. The closest habitat for sandpipers is in Logan Valley north of the planning area. Since there are no meadows large enough to provide potential nesting for upland sandpipers in the project area, there would be no effects to upland sandpipers.

There is no habitat for bighorn sheep in or near project area, therefore there would be no effects to bighorn sheep.

There would be no impact to osprey nesting habitat (snags or green tree replacement) from any of the alternatives because livestock grazing does not impact snags or green tree replacement.

Since featured species would not be impacted by any of the alternatives or habitat is not suitable in the project area, no further analysis is necessary for featured species.

Unique and Sensitive Habitats

Unique and sensitive habitats include meadows, rimrock, talus slopes, cliffs, animal dens, wallows, bogs, seeps, springs, and quaking aspen. Rimrock, talus slopes, and cliffs would not be impacted by any of the action alternatives and would not require further analysis. No animal dens were found that would need protection.

Quaking aspen (*Populus tremuloides*) - Quaking aspen habitat supports one of the most diverse wildlife communities in the western United States, yet covers less than 1% of the landmass in the Blue Mountain and Great Basin physiographic provinces. Aspen is one of the most important deciduous tree communities on the Malheur National Forest. Aspen provides aesthetic enjoyment to humans, is a culturally important native plant, adds diversity to the living landscape, and is second only to riparian habitat in importance to wildlife. Aspen provides high quality forage, cover, resting, and breeding habitat for over 50 species of mammals, 150 species of birds, and many amphibians, reptiles, insects and other invertebrates. Leaves, catkins, and buds of aspen, and associated understory grasses, forbs and shrubs provide nutritious forage for elk, deer, grouse, snowshoe hare, and small mammals. Herbaceous cover provides nesting habitat for ground nesters like dark eyed juncos, shrub nesters including *Empidonax* flycatchers and canopy nesters including robin, yellow-rumped warblers and western tanager and others. Insects that feed on aspen provide a rich bounty of food for many species of songbirds. Aspen snags and live aspen trees provide excellent habitat for some species of cavity excavating birds.

Aspen is very susceptible to heart rot, which makes the trees more favorable to some of the primary cavity excavators such as sapsuckers.

Aspen has decreased by least 80 to 90% of its original range prior to European influences in the Blue Mountains of Oregon. The main factors that contributed to the decrease in aspen are:

- Lack of periodic fire
- Past overgrazing by domestic livestock
- Increase in conifers and junipers as a result of a lack of periodic fire
- Road construction has disrupted ground water flows
- Loss of water table from degraded stream channels

There are approximately 30 aspen stands scattered through out the planning area ranging in size from one-tenth of an acre to approximately five acres. Aspen grow in nearly all drainages, but the highest concentrations of aspen are in the Squaw Creek drainage.

Most of the aspen stands in Squaw Creek are composed of mature aspen with no mid story recruitment and heavy browsing on aspen suckers primarily from concentrated livestock use. Some stands had as few as two mature trees remaining with nearly all suckers browsed. Livestock browsing of aspen suckers is suppressing regeneration of aspen. In addition to receiving browsing pressure, most aspen stands contained high densities of conifers that shade out and compete with water and nutrients.

Aspen stands in the House Creek Allotment were identified in the Parasol Timber Sale in 1996. Similar condition exists with an over abundance of conifers and moderate browsing of aspen suckers. Livestock use at CHE Springs would affect aspen without protect for aspen suckers. Because this area is isolated from human pressure, elk use in this area may also limit aspen regeneration. Some elk wintering use in the House Creek Allotment may hinder aspen regeneration due to concentrated browsing.

At least 90% of the aspen stands have roads adjacent to the stand. Past road construction and logging operations have impacted streams and lowered water tables. In floodplains where the water table has receded, other shallow rooted plants have become established. Continuous livestock grazing occurs in these areas primarily during late season. Plant communities such as ponderosa pine-Kentucky bluegrass become established and loss of aspen and other shrubs occur.

In summary, the existing aspen in the project area are in poor condition due to competition from conifers, primarily ponderosa pine and western juniper, over browsing of aspen suckers from wild and domestic ungulates, and impacts from past road construction affecting water infiltration and run off. Lack of natural disturbances such as fire has enabled an accelerated succession displacing aspen with conifers. Concentrated livestock use in certain areas, like portions of Squaw Creek, has reduced recruitment of young aspen by heavy browsing of suckers. Without treatment of conifers and protection of aspen suckers from browsing, aspen will continue to decline in the project area.

Effects to aspen are displayed in MIS and Neotropical bird sections.

Threatened, Endangered and Sensitive Species (TES)

Terrestrial mammals on the Regional Forest Sensitive Species list with potential habitat in the project area include wolverine, gray flycatcher, western sage grouse and pygmy rabbits. The threatened and endangered species that could occur in the project area include gray wolf and bald eagle. There is no critical habitat for any threatened or endangered species in the project area. Refer to Appendix H. for more details on TES in the Biological Evaluation for Wildlife. The following is a summary of the habitat conditions and effects of potential TES species that may occur in the project area.

Gray wolf (*Canus lupus*)

Prior to European settlement, wolves occupied most habitats in Oregon that contained adequate ungulate populations as food source. The southern portions of the Blue Mountains were no exception for gray wolf occupancy. Potential dispersing wolves from Idaho could reoccupy historic ranges in Oregon, with time and acceptance. However, road densities in the project area, which increase human disturbance, are not favorable for wolves. Wild ungulate populations in eastern Oregon may be higher than pre-settlement times for some species such as mule deer.

Bald eagle (*Haliaeetus leucocephalus*)

An occupied bald eagle nest occurs within eight miles of the project area. The Silvies River, which is a primary foraging area for bald eagles, is approximately 2.5 miles west of the House Creek Allotment. The probability of bald eagles nesting in the project area is low.

Wolverine (*Gulo gulo*)

Wolverines were long thought to be extirpated from Oregon (Bailey, 1936) but recent sightings have confirmed the presence of wolverine. In 1992, skeleton and tufts of hair remains were found in Grant County approximately 15 air miles from the House Creek Allotment on the west side of Silvies valley. The nearest suitable source habitat for wolverines is the Strawberry Mountain wilderness located approximately 10 to 12 miles north of Wolf Mountain Allotment. The high road densities and human disturbance in the planning area would limit wolverine use. Wolverine occurrence in the project area would be rare.

Sage grouse (*Centrocercus urophasianus*)

There are no known leks (breeding areas) for sage grouse on any of the allotments. The closest known lek is approximately four miles south of the West Malheur Allotment. There have been no known sightings of sage grouse in the project area. Brood rearing habitat within the project area is marginal. Expansion of ponderosa pine and juniper in the last eight to ten decades has decreased the potential for sage grouse rearing habitat. Sage grouse rear young near agriculture fields south of the National Forest boundary. There have been sightings of sage grouse in the Logan Valley area, approximately four to five miles north of the northern boundary of West Malheur Allotment (pers. con. Gonzalez, ODF&W). Sage grouse hens may move their broods through the project area to favorable brooding areas north of the project area.

Pygmy rabbit (*Brachylagus idahoensis*)

Pygmy rabbits occupy habitat dominated by big sagebrush (*Artemisia tridentata*) on deep friable soils for digging burrows (Green and Flinders, 1980). In an Oregon study, sagebrush cover and soil depth were two primary parameters determining presence of pygmy rabbits. Average soil depths were 51 centimeters (20 inch) and shrub cover averaged 28.8 percent (Weiss and Verts, 1984). Soil conditions and sagebrush densities would not be favorable for pygmy rabbits in the project area. The probability is low of pygmy rabbits occurring in the project area.

Gray flycatcher (*Empidonax wrightii*)

The gray flycatcher breeds in arid woodlands and shrublands in big sagebrush, bitterbrush, mountain mahogany, and juniper. Gray flycatchers are also found in open ponderosa pine with shrub understory (Sterling, 1999,). Potential breeding habitat exists in the transitional zone at the southern boundary of the Malheur National forest. There is approximately 6,400 acres of gray flycatcher habitat within the project area with over half of the habitat occurring in the West Malheur Allotment. However, the condition and recruitment of upland shrubs such as bitterbrush is poor in the West Malheur Allotments reducing nesting habitat for gray flycatchers. There has been no bird monitoring in the project area to determine presence or abundance of gray flycatchers. Gray flycatchers are susceptible to nest parasitism by brown-headed cowbirds, which are associated with livestock and agriculture.

Summary of Effects to Terrestrial TES

Table 31. Summary of Effects to Terrestrial TES

Species	No Action Alternative	Current Management	Proposed Action
gray wolf (E)	NE	NE	NE
bald eagle (T)	NE	NE	NE
lynx (T)	NE	NE	NE
wolverine (S)	NI	MIH	MIH/BI
pygmy rabbit (S)	NI	NI	NI
peregrine falcon (S)	NI	NI	NI
western sage grouse (S)	NI	MIH	MIH/BI
gray flycatcher (S)	NI	MIH	MIH/BI

P = Proposed, E = Endangered, T = Threatened, S = Sensitive

Refer to the Biological Evaluation for Wildlife (Appendix H) for more details on effects to terrestrial TES.

Species of concern – Northern Goshawk (*Accipiter gentiles*)

Regional Foresters Amendment #2 (1995) interim management directions set standards to protect goshawk habitat to insure species viability. Goshawk reproductive habitat is comprised of three habitat components: nesting, post-fledging, and foraging. The entire home range is approximately 5,000 to 6,000 acres.

Goshawks, like other forest accipiters, prefer to nest in stands with high basal area of large trees in close approximation to water. The fledging, or rearing habitat consists of a diversity of habitats, but LOS comprises at least 60% of the habitat.

Formal surveys for goshawks were conducted in the Wolf Creek watershed in 1995. One goshawk nest was found and other observations of birds were noted. Goshawks were found in the Wolf Mountain Allotment at the northern end of the planning area. There have been no recent surveys conducted; however surveys would be planned in the future prior to vegetation management. Nearly the entire planning has potential for goshawk foraging habitat. Due to the high canopy density in aspen stands and the potential for bird nesting, the regeneration of aspen is of primary concern for goshawks in the planning area. Degraded riparian areas are of concern also, since goshawk prey species can be more abundant in riparian areas.

Effects on Northern Goshawk (*Accipiter gentiles*)

Direct, Indirect and Cumulative Effects Common to All Allotments

There would be no direct effects to goshawk from any alternative. Indirect affects however, may result from habitat modifications for goshawk prey species. Studies have compared small mammal densities on grazed and ungrazed areas and found higher densities of small mammals in ungrazed areas (Medin and Clary, 1989; Bock et.al. 1992). Similar results have been presented for avian prey species (Kreuper et al. 2003). Goshawk foraging areas are at least 5,400 acres with a diverse prey selection. No removal of conifer nesting habitat would occur under all alternatives, therefore no affects to goshawks are anticipated from current management or any other alternatives. However, the enhancement of potential goshawk habitat increases with proper management of riparian areas and aspen stands. Higher density of riparian shrubs increases bird diversity and small mammals, improving goshawk prey sources. Multi-layered aspen stands could provide nesting habitat for goshawks. The areas within each allotment that would enhance goshawk habitat are addressed in the above sections on migratory birds and MIS. Migratory birds and MIS species are prey for goshawk.

The Proposed Action Alternative provides the best long-term productivity for goshawk prey species in all of the allotments due to protection and restoration of riparian areas. Because of the amount of aspen in the West Malheur allotment, the proposed action would enhance breeding bird habitat, small mammals, and potential future nesting habitat in aspen, once a multi-story stand is developed.

Cumulative effects on goshawk prey species under all alternatives would be negligible due to large home range and variety of goshawk prey.

Neo-Tropical Migratory Landbirds

Neo-tropical-migratory landbirds are those that breed in the U.S or Canada and winter south of the Tropic of Cancer, latitude 23 ½ degrees North (Sharp, 1992). Many of our well-known passerine songbirds, hawks, and shorebirds fall in this category. Many migratory landbirds populations are indicating a declining trend. In Oregon 26 species of neo-tropical migratory birds (NTMB) have experienced declining population trends based on breeding bird survey data from 1968 to 1991.

No surveys were conducted to assess neo-tropical birds within the planning area. Table 32 lists the NTMB that potentially could be found in the project area that are indicating a decline in population with associated habitat. In the project area, 50% of the bird species

with declining population trends are associated with riparian habitat and in Oregon 56% of the birds with declining population trends nest in riparian habitat.

Nest parasitism by cowbirds can be a factor influencing NTMB in areas where habitat alteration by human activities and livestock operations are frequent. Yellow warbler and song sparrows were the top two host species for cowbird nests in Oregon and both species are indicating a downward trend.

The lack of riparian shrubs in streams that are degraded from past management activities is the primary concern for nesting neo-tropical birds in the project area. Table 32 lists the allotments and pastures that may provide habitat for specific species and may have a potential concern from livestock management. The areas of concern for riparian conditions described in the aspen, MIS, and big game sections of this report apply to most species of neo-tropical birds.

In summary, riparian areas that are not functioning properly or not producing riparian shrubs are of concern due to reduction in nesting and foraging habitat. These streams include Squaw Creek and a small section of Beaverdam Creek.

There is concern for recruitment of shrubs in the shrub-steppe ecosystems at the transitional zones on the southern forest boundary. Heavy browsing of bitterbrush and other shrubs by wild and domestic ungulates has reduced recruitment. Livestock can affect shrub nesters such as sage thrashers and brewers sparrows. Reduction in bunchgrasses can reduce nesting cover for ground nesting neo-tropical birds, since minimal residual grass would be available for nesting. The potential reduction of nesting habitat may be occurring in the allotments where condition and trend data or macro plots are indicating a poor or fair condition. However, habitat for ground nesting birds does not appear to be limiting in any of the pastures. Bunchgrasses were observed during shrub utilization monitoring. The only limited nesting habitat would be near isolated water sources occur where livestock use is concentrated.

Effects to Neo-Tropical Migratory Landbirds

Riparian areas are the most productive habitat for NTMB. Because of water, succulent forage, cooler temperatures, gentle slopes, and shade, riparian areas are high use areas for livestock. Concentrated livestock use in riparian areas can reduce favorable vegetation for nesting birds. Livestock grazing can change vegetative communities in many ways, including reducing plant density, changing species composition, decreasing plant vigor, decreasing seed and insect production, and eliminating vegetative recruitment (Belsky, et. al. 1999; Platts 1991). Additionally, trampling of soil by livestock may increase wind and water erosion, compact soils, and prevent seedling establishment. These impacts are similar in most of the aspen stands in the project area growing in riparian areas. Loss of riparian vegetation affects ground and shrub nesting birds. Birds nesting in canopy are least impacted by lack of hardwood vegetation. Saab et al. (1995) and Tewksbury et al. (2002) reviewed the effects of cattle on birds in western North America. Among 68 species of Neo-tropical migrants, 46% decreased in abundance with cattle grazing, 29% increased, and 25% showed no clear response.

Species of birds responding positively to grazing include riparian generalists such as aerial foragers associated with open habitat (Lewis woodpecker), ground foragers

preferring areas with little cover (American robin), or species directly attracted to livestock (brown-headed cowbirds). Brown-headed cowbirds pose a problem to NTMB where favorable habitat conditions exist from forest fragmentation and livestock grazing. Cowbird brood parasitism has potential to negatively affect nesting NTMB in the allotments where riparian vegetation is limiting.

Direct and Indirect Effects from Alternative 1 – Current Management

House Creek

Livestock use around CHE Springs is reducing recruitment of aspen, therefore nesting habitat for birds is affected. Since CHE Springs is a primary watering area for livestock, livestock heavily browse young aspen. Without protecting aspens from browsing, future nesting habitat would continue to decline near CHE Springs. Similar results are expected on the aspen stands within this allotment, even though only 60 head of livestock are grazed on this allotment.

West Malheur

Concentrated livestock use under current conditions (Alternative 1) and high densities of conifers reduces herbaceous vegetation, limiting nesting habitat for ground and shrub nesting birds in the upper reaches of Squaw Creek and Van Gulch tributaries. The lack of aspen and other riparian shrub regeneration can be partially attributed to livestock use. The absence of aspen regeneration affects long term nesting habitat for NTMB.

In the Wolf Creek drainage, the abundance of alder and dogwood provide excellent nesting habitat. The impacts livestock are having on NTMB habitat in Wolf Creek are minimal.

Wolf Mountain

It is suspected the current management practices are having little impacts on NTMB habitat with the exception of the few aspen stands in Beaverdam and Antelope pastures. The few shrub utilization monitoring plots taken in 2004 did not indicate any concentrated livestock use. High road densities and lack of natural disturbance are more of a concern to riparian nesting habitat in this allotment than the livestock use.

Direct and Indirect Effects from Alternative 2 – Proposed Action

House Creek

The utilization modification in the riparian pastures in House Creek would improve nesting habitat for ground nesting birds and enhance recovery of shrubs for nesting and foraging birds. Livestock exclusion around a spring in House Creek would provide similar nesting habitat improvements. Depending on the time of year livestock enter the riparian pasture, the potential for nest trampling may occur. The riparian habitat conditions for nesting NTMB would be similar between current management and Proposed Action.

West Malheur

In addition to riparian and aspen affects addressed in the MIS section, the primary concern on NTMB with this allotment are the shrubs in the shrub-steppe ecosystem. The primary area of concern is in Rock Springs pasture. This alternative may enhance shrub

component in Rock Springs due to livestock reduction. However, the short-term increase would be immeasurable due to wild ungulate browsing. The residual grasses would improve habitat for ground and low vegetation cup nesting bird. Brewer's and vesper sparrows, Western meadowlark, and Ferruginous hawk habitat would improve with less livestock utilization. Less livestock use on this pasture would reduce potential for nest trampling and disturbance during nesting season, compared to current management (Alternative 1).

All the stream restoration projects and prescribed burning would occur outside the nesting season for NTMB to assure nest protection and disturbance during the breeding season. This seasonal restriction applies to Wolf Mountain and House Allotments also. Therefore, no direct effects from prescribed burning and stream restoration projects is anticipated. No indirect effects on nesting or foraging habitat is expected due to small acres treated. If restoration projects are successful, long term benefits of nesting habitat might occur once riparian shrubs become established along RHCA's.

Wolf Mountain

This alternative would restore riparian vegetation in Beaverdam Creek at a faster rate than Alternatives 1 and 3. While current management is compatible with establishment of riparian shrubs, primarily willow, the proposed action of extending riparian fencing, a 35% utilization instead of 45% in Beaverdam meadow, and planting shrubs would accelerate restoration of Beaverdam Creek and may provide nesting opportunities for warblers and other NTMB within 7-10 years. Decommissioning of the 1619805 road would reduce disturbance potential for nesting birds and allow the recovery of riparian shrubs, primarily alder. Nesting habitat would be enhanced in the long term.

Direct and Indirect Effects from Alternative 3 - No Grazing

House Creek

Since the riparian area in House Creek is functioning properly with a diversity of riparian shrubs and Bridge Creek appears to have a good recruitment of riparian shrubs, the only concern in this allotment for NTMB is recruitment of aspen. The No Grazing Alternative would reduce livestock browsing on aspen suckers, but regeneration of aspen may be limited by wild ungulates and high density of conifers. Nest trampling and disturbance to ground and shrub nesting birds is eliminated with no grazing.

West Malheur

No Grazing Alternative would improve the recruitment of aspen in 8-10 stands in the Cougar pasture for approximately three miles of Squaw Creek and Van Gulch tributaries. Reduced browsing on aspen enhances regeneration of aspen. Multi-layered aspen provide ideal nesting habitat for NTMB. The herbaceous cover beneath the aspen would provide nesting habitat for ground nesting birds such as dark eyed juncos. Herbaceous vegetation in riparian areas would not be reduced with this alternative. In some areas, ground nesting habitat would be affected by conifer densities. Pine trees have shaded out potential habitat for ground and shrub nesting birds.

There would be a minor increase in other shrubs such as serviceberry and chokecherry. These shrubs provide nesting and foraging habitat for NTMB when the berries ripen.

Depending on the location of these shrubs, wild ungulate browsing on berry producing shrubs may be higher than livestock use.

The potential for nest trampling would not occur with no grazing. Impacts such as nest trampling vary depending on the livestock timing and use in the riparian areas and bird nesting chronology. Most livestock use in riparian areas is after young birds have fledged.

Wolf Mountain

The section of Beaverdam Creek in the Beaverdam pasture south of the 17 road has potential to provide willow, alder, and aspen, which may become habitat for yellow and Wilson's warblers, if the hardwoods become dense enough for nesting cover. The No Grazing Alternative would be a slight advantage over current conditions due to reduced potential livestock browsing on young hardwoods. Other aspen in Beaverdam Creek might regenerate at a slightly faster rate with the absence of livestock. Riparian shrubs along Beaverdam Creek would provide future nesting and foraging habitat once established.

Cumulative Effects on NTMB for All Allotments

Riparian habitat is the primary concern affecting neo-tropical birds. Riparian areas have been altered by past timber harvest, the construction of roads, high recreational use, effective fire suppression, and concentrated livestock use. The lack of fire to suppress conifer densities has reduced nesting potential for several NTMB. The absence of beaver in some of the watersheds has changed water-holding capacities. Most streams do not have the riparian shrub component to support beaver in the current condition.

Riparian pastures and exclosures have proven beneficial to riparian nesting habitat for NTMB. Range improvements for water development have provided water sources for nesting birds during the summer month's possibly expanding nesting habitat for some birds.

Roads in riparian areas can impact nesting birds due to recreational activities. Camping and fishing during the nesting period can disturb nesting birds. Off road vehicle use may disturb nesting birds and can reduce shrubs by soil displacement. Within the allotments, recreational disturbance is minimal during nesting season compared to hunting seasons in the fall months. Negative impacts from road construction in RHCA's have changed the hydrology of streams consequently affecting riparian vegetation. Approximately 65 miles of roads have been constructed in the RHCA's within the project area. Associated activities with road may have detrimental affects to nesting songbirds due to disturbance during nesting and hydrologic affects to aspen and other riparian shrubs.

Another concern associated with livestock grazing that affects birds is mortality caused from livestock drinking troughs. Several observations of dead birds have been found in drinking troughs. Most of the troughs in the planning area do not have escape ramps installed to allow birds, small mammals, and bats to escape from the troughs. Mitigation measures to install escape ramps will prevent future mortalities to NTMB.

Alternative 1 would continue to reduce nesting and foraging habitat for NTMB in riparian areas in the Squaw, Van Gulch, CHE springs, and Beaverdam Creek drainages.

Refer to Table 32 for species showing a decline in populations due to livestock impacts. Alternatives 2 and 3 would not further diminish nesting and foraging for NTMB. This is due to a reduction in livestock browsing and trampling in riparian areas.

Table 32. Neotropical birds potentially found in planning area that are indicating a declining population trend.

Species	Nest layer	Habitat association	10 yr	26+ yrs.	Potential factors for declining populations	Areas of concern within the planning area Allot./past.
Killdeer	Ground	Scab flats, roadsides	10.5	4.3	Nest destruction from graders, livestock, & off-road vehicles. Pesticides spraying	Stock ponds in early season use/ all allot.
Mourning dove	Shrub	Juniper-steppe, open Ponderosa pine		3.0	Sagebrush conversion to agriculture. Domestic pets, primarily cats	NA
Calliope hummingbird	Canopy	Open forest/edges, Mountain meadows, Riparian shrubs	13.4	10.9	Lack of forest openings for flowering plants Overgrazing riparian areas	Wolf Mnt./ Beaverdam
Olive-sided Flycatcher	Canopy	Forest burns w/snags Riparian, & edge	4.2	5.1	Logging OG timber, fire suppression, nest predation	NA
Willow flycatcher	Shrubs	Riparian	4.3	2.5	Loss of riparian shrubs to hydrologic processes & overgrazing. Cowbird parasitism.	Wolf Crk Encl.
American robin	Canopy	Riparian, open forest	1.5		Unknown. Population decline insignificant	NA
Yellow warbler	Shrub	Riparian shrubs willow, cottonwood, aspen and alder	2.1	1.7	Loss of shrubs from grazing & herbicide spraying. Cowbird parasitism.	W. Mal/all pastures House/all pastures Wolf Mnt./ Beaverdam
Chipping sparrow	Shrub	Open conifer forests with grassy openings		3.9	Cowbird parasitism & competition with house sparrows	NA
Brewers sparrow	Shrub	Big sagebrush	4.3	2.6	Sagebrush conversion to agriculture. Invasion of exotics like cheatgrass.	W. Mal/Rock Spr. & Cougar
Song sparrow	Shrub	Willow and riparian thickets		2.7	Overgrazing of riparian shrubs.	W. Mal/all pastures House/all pastures Wolf Mnt./ Beaverdam
Western meadowlark	Ground	Shrub-steppe outside forested areas	3.7	0.8	Shrub steppe conversion to agriculture. Livestock trampling. Pesticides.	W. Mal./Rock Spr & Cougar House/South.
Pine siskin	Canopy	Conifer forest	8.8		Low conifer cone production	NA

Numbers indicate percent decline based on breeding bird surveys.

Heritage

The National Historic Preservation Act (NHPA) of 1966, as amended through 2000, states in Section 110, 2b:

that such properties under the jurisdiction or control of the agency as are listed in or may be eligible for the National Register are managed and maintained in a way that considers the preservation of their historic, archaeological, architectural, and cultural values in compliance with section 106 of this Act and gives special consideration to the preservation of such values in the case of properties designated as having National significance.

In addition, the 1990 Malheur National Forest Land and Resource Management Plan (currently being revised) for Cultural Resource Standards states:

The Forest will protect National Register and eligible properties from human impacts and natural degradation. Protection plans may include physical protection such as fences and barriers...

Under the NHPA the Area of Potential Effect (APE) for this undertaking is the following grazing allotments on the Emigrant Creek Ranger District: House Creek, Wolf Mountain, and West Malheur.

This project area lies within the south-central margin of the Blue Mountains Physiographic Province and less than fifty miles from the Harney Lake region and Basin and Range Physiographic Province. Obsidian, an important raw material for American Indian tool manufacturing, is locally abundant over much of the project area. Food plants, game animals, and a variety of fish were among the resources available that were used by American Indian groups. Due to the elevation and associated cold winter temperatures and heavy snow pack, prehistoric use of the area probably was most intense during the warmer seasons. Archaeological sites and isolated artifacts within the project area are predominately associated with indigenous obsidian localities and available water. During the historic period the lower foothills were an entrance into the forest for grazing, hunting, homesteading and logging. Except for the steep side slopes of stream channels, the majority of this project area can be considered high probability for the cultural remains of prehistoric and historic use.

The existing condition of archaeological sites within the project area varies. Many Euro-American sites, such as wooden structures and log troughs, are generally better protected against logging, livestock grazing, and road building but weathering and wild fires affect their integrity. Many of the prehistoric sites within the project area have experienced disturbance to their ground surface cultural materials from historical livestock grazing, logging, road building, and artifact collecting. Typical impacts associated with livestock grazing mentioned in site records include the trampling of surface artifacts, displacement of artifacts from trailing and degradation of sites adjacent to streams, springs, developed ponds and salt licks.

The three livestock grazing allotments comprising the project area were analyzed for past Heritage survey coverage, and all archaeological sites were identified and analyzed for their eligibility to the National Register of Historic Places (NRHP) and specific impacts listed in their site records from livestock grazing. The following data was compiled:

- Project Area /Allotments acreage: 57,800
- Total number of past Heritage surveys within the Project Area: 38
- Number of past Heritage surveys adequate for present SHPO standards: 7
- Acreage of SHPO-adequate past inventories: 19,150
- Additional adequate inventory not yet submitted to SHPO: 26,950
- Acreage with no SHPO-adequate past inventories: 11,700
- Total number of archaeological sites within Project Area: 130
- Total number of newly recorded sites within project area: 80
- Number of sites with recorded potential livestock impacts: 52

Of the approximate 11,700 acres without SHPO-adequate past inventory, less than 1,000 acres of this land is in locations where cattle are known or suspected to congregate (the area of focus for this Heritage analysis).

Table 33 gives, by Allotment, numbers of previously known sites and their eligibility to the National Register of Historic Places.

Table 33 Previously Known Archaeological Sites Within the Allotments

Allotment Name	Number of known sites	Number of sites with suspected livestock impacts	Number of sites evaluated as NRHP-Eligible	Number of sites not evaluated for NRHP
House Creek	7	1	5	1
Wolf Mountain	75	13	63	6
West Malheur	48	12	6	42
TOTAL	130	26	74	49

Table 34 gives, by Allotment, numbers of newly recorded sites and their eligibility to the National Register of Historic Places.

Table 34 Newly Recorded Archaeological Sites Within the Allotments

Allotment Name	Number of known sites	Number of sites with suspected livestock impacts	Number of sites evaluated as NRHP-Eligible	Number of sites not evaluated for NRHP
House Creek	0	0	0	0
Wolf Mountain	65	10	0	65
West Malheur	15	16	0	15
TOTAL	80	26	0	80

Tribal Uses

Archaeological evidence, earlier ethnographic work, and historic accounts support the information passed on by elders regarding the traditional and continuing importance of the Planning Area to the Burns Paiute Tribe. Much of the Planning Area lies within the boundaries of the original Malheur Reservation, which continued north to the summit of the Strawberry Mountains, and east to Monument Rock. The lands included within the Planning Area, the health of the vegetation, wildlife, water, geology, and soils, are

integral to the lifeways of members of the Burns Paiute Tribe. Tribal members use these lands for traditional religious ceremonies, hunting, fishing, and the gathering of plants for subsistence, medicinal, utility crafting, artistic, and ceremonial purposes. Though members of the Burns Paiute Tribe have become members of the greater Burns and Harney County communities, they have also kept alive traditional liveways, and continue to pass on knowledge, beliefs and practices to younger generations.

The lands within this project area provide important natural resources for Native Americans. Plants such as camas, biscuit-root, bitterroot, onion, wax current, chokecherry and seeds from ponderosa pine trees provide important sources of food. Other plants such as yarrow, wormwood, big sagebrush and juniper are used for medicinal purposes. Many Native American crafts and tools are also made using materials gathered within the project area including willow and red-osier dogwood for basket weaving (USDA Forest Service, December 1996).

Effects on Heritage

The evaluation criteria to be used in analyzing the effects of the alternatives on Heritage Resources is the assessment of the disturbance, from livestock and livestock grazing related activities, to those qualities of an archaeological site that contribute to its eligibility for listing on the National Register of Historic Places (NRHP). The affected resources to be measured are those archaeological sites known to exist within areas where livestock congregate within the project area. For most sites within the Malheur National Forest the qualities that make them potentially eligible for inclusion on the NRHP are the artifacts contained within the sites and the spatial relationships between the artifacts.

Effects to the artifacts themselves are fairly obvious and include direct crushing and breakage of artifacts through trampling and the increased potential for looting of artifacts through removal of vegetation. Debitage, the waste flakes generated during stone tool manufacture, are the most common artifact type at prehistoric sites on the forest. Although quite fragile, most of their information value can survive through all but the most complete crushing. This would generally be restricted to sites with rocky soils. Patterned stone tools, such as projectile points, knives, drills and scrapers, contain more information regarding the age of the site, the activities that took place there, and in some cases, the culturally affinity of the people who used the site. Damage or loss of these artifacts has a more profound effect on the qualities that make the site potentially eligible for inclusion on the NRHP.

Effects on the spatial relationship between artifacts are more difficult to identify and cause a more significant effect on the quality of the site when it occurs. These spatial relationships occur both vertically and horizontally. The vertical relationships are those in which the artifacts are situated within the soil matrix of the site. In the ideal case this creates a layer cake effect with the oldest artifacts at the bottom and the newest at the top. Unfortunately, in the real world many factors cause the artifacts to get mixed up within the matrix. These include periodic erosion events, animal burrowing, freeze/thaw effects, the growth of trees (pushing artifacts down in the roots) and the falling of trees (pulling artifacts up in their root balls). Over a period of many centuries the cumulative effects of these actions can be extreme. In fact, it is difficult to find intact vertical relationships at archaeological sites on the forest. Sites with intact buried components are rare and

extremely important to understanding the prehistoric record of the region. The identification of intact buried deposits generally requires limited test excavation and analysis of soils and artifacts. Where intact buried sites are identified the potential for cattle to impact the deposits can generally be recognized through an understanding the potential effect grazing cattle have on the soil.

Horizontal relationships between artifacts can indicate where various activities took place across the site. For instance, different types of artifacts are associated with stone tool manufacturing, wood working, butchering, plant processing and cooking. These horizontal relationships sometimes also reveal changes in use over time as people in different time periods use different locations on the landscape in response to environmental or cultural changes. For instance, people may have used the same site at a meadow over many centuries but the specific use locations may change as the tree line fluctuates or a creek meanders. On relatively level ground the horizontal relationships between artifacts can remain intact even in areas with very shallow soils. On steeper ground artifacts tend to drift down slope over time. In areas where cattle congregate or trail the horizontal patterning of artifacts can become diffused as animals transport artifacts adhering to their hooves or through water transport along well used trails.

Ground surface historic artifacts (cans, bottles, and other campsite items) can be crushed and broken by trailing and congregating livestock. Standing wooden structures can be damaged and sometimes toppled by livestock rubbing or pushing on them as they congregate for cover from sun, wind, or rain. Buried sites may be close to the surface of the ground, and susceptible to trampling, especially when soils are soft during the early summer. Rock cairns can be toppled by livestock as they rub against the rock.

Direct and Indirect Effects from Alternative 1 – Current Management

With this alternative, current management of the grazing allotments would continue with adaptive management. Direct effects to archaeological sites would be the continued trampling and dislocation of artifacts at sites surrounding springs, along streams, at salt licks, and at places where cattle congregate in the shade. Direct effects to historic features and structures would be the possibility of livestock toppling standing walls of structures as they congregate close to buildings to avoid the wind and rain, or as they scratch themselves on wooden structure components. Indirect effects would be the breakdown of the soil crust, facilitating erosion and the displacement of artifacts. Livestock trailing keeps the surface soils loose and vulnerable to wind and water erosion, jeopardizing subsurface site components. The removal of vegetation in areas of site artifacts contributes to the surface collecting of those artifacts.

With the implementation of design criteria included for this alternative (see Chapter 2); this alternative conforms to those federal laws and guidelines for the protection of NRHP-eligible sites.

Impacts to tribal uses would continue at existing levels. Livestock would continue to have direct impacts (browsing) to riparian plants such as chokecherry, willow and red-osier dogwood that are used by local tribes. Other plants, such as camas, biscuit-root, bitterroot, onion, wax current, ponderosa pine, yarrow, wormwood, big sagebrush and juniper would not be impacted directly by livestock grazing. This alternative would not prevent continuation of traditional practices.

Direct and Indirect Effects from Alternative 2 – Proposed Action

With this alternative, grazing in all three allotments would continue using an adaptive management approach as well as physical changes to range improvements and other restoration activities. The same effects discussed under alternative 1 could take place. However, with this strategy monitoring would aid in the identification and assessment of livestock damage to archaeological sites. Specific damage from livestock would be documented and mitigation measures would be implemented to protect those qualities of a site that make it eligible to the NRHP. The design criteria proposed with this alternative would reduce the damage currently affecting sites from livestock grazing. With adaptive management, archaeological sites would be protected from further erosion along streams where erosion has already taken place due to livestock congregating. With this alternative, terraces along streams, where archaeological sites are often found and where livestock prefer to congregate, would revegetate faster, helping to conceal surface artifacts.

With the proposed design criteria this alternative conforms to those federal laws and guidelines for the protection of NRHP-eligible sites.

Impacts to tribal uses would be similar to those described in the Current Management Alternative. Local tribal members are reluctant to divulge where they collect plant materials. Therefore it is unknown if activities proposed under this alternative would directly impact collection sites. If proposed activities overlap with collection areas, the effects would be beneficial to riparian vegetation and therefore beneficial to tribal uses. This alternative would not prevent continuation of traditional practices.

Direct and Indirect Effects from Alternative 3 – No Grazing

With this alternative, those sites presently incurring impacts from livestock would no longer be adversely affected by the trailing of livestock to water sources, however, large wildlife ungulates would continue to use these same trails. Livestock, and large ungulates, would no longer be attracted to salting areas where the surface of the ground is substantially affected. Archaeological sites, in areas along streams where erosion has already taken place due to livestock congregating, may continue to erode unless rehabilitative measures were taken. Terraces along streams, where archaeological sites are often found and where livestock prefer to congregate, would revegetate over a number of years, helping to conceal surface artifacts.

This alternative conforms to those federal laws and guidelines for the protection of NRHP-eligible sites.

Impacts to tribal uses would be beneficial. No grazing would be beneficial to riparian vegetation and therefore beneficial to tribal uses. This alternative would not prevent the continuation of traditional practices.

Cumulative Effects from Alternatives 1 and 2

Implementation of the mitigation measures with this alternative should prevent, or at least reduce, impacts that are currently affecting archaeological sites within these allotments. However, the cumulative effects of natural elements, logging, road building, grazing, surface collecting and/or illegal digging, and natural fuels reduction projects could still be reflected in these sites.

Impacts to tribal uses would be cumulative with past and future management of vegetation. Future vegetation projects such as the Van Vegetation Management Project would have beneficial impacts to tribal uses because proposed activities would have beneficial impacts to vegetation in the long term.

Cumulative Effects from Alternative 3

Under this alternative grazing would not contribute to the cumulative effects to cultural resources taking place in this project area. It is possible that additional effects from wild fire could occur when cattle do not annually reduce fine fuels but if this contributed to a return to historic fire regimes it may actually reduce the long term effects on sites.

Impacts to tribal uses would be cumulative with past and future management of vegetation. Future vegetation projects such as the Van Vegetation Management Project would have beneficial impacts to tribal uses because proposed activities would have beneficial impacts to vegetation in the long term.

Other Required Disclosures

Floodplains and Wetlands

No effects on wetlands and floodplains are expected from implementing the proposed action or any of the alternatives.

Prime Rangeland, Farm Land and Forest Land

All alternatives are in accordance with the Secretary of Agriculture Memorandum 1827 for prime farmland, rangeland, and forestland. “Prime” forestland is a term used only for non-Federal land, which would not be affected by proposed alternatives in this project. Regardless of the alternative selected, National Forest System lands would be managed with sensitivity to adjacent private and public lands.

Environmental Justice

Executive Order 12898 requires all Federal Agencies to make environmental justice part of each agency’s mission, by identifying and addressing, as appropriate, disproportionately high and adverse human health or environmental effects on minority populations or low-income populations. The alternatives do not differ from one another in their effects on minorities, Native Americans, women, or the civil liberties of any American citizen. There would be no disproportionate effects on minority or low-income populations by any of the alternatives for this project.

Energy Requirements and Conservation Potential of Alternatives

The energy consumption associated with the alternatives, as well as the differences between alternatives, is insignificant.

Effects on Public Health and Safety

There would be no adverse or unusual effects on public health and safety from implementing the Proposed Action or any of the alternatives.

Irreversible and Irretrievable Resource Commitments

Irreversible resource commitments involve nonrenewable resources. Irretrievable resource commitments involve renewable resources. There would be no significant irreversible or irretrievable commitment of resources from implementing the Proposed Action or any of the alternatives.

Adverse Environmental Effects Which Cannot be Avoided

The implementation of the Proposed Action or other alternatives would not result in any significant adverse environmental effects and would not affect long-term productivity.

Relationship Between Short-Term Uses and Long-Term Productivity

Due to the use of BMP's (specific mitigation measures, management requirements and constraints, and Forest Plan (as amended) standards and guidelines), there would be no effects to long-term productivity.

Cumulatively Significant Effects

There would be no cumulatively significant effects from implementing the Proposed Action or any of the alternatives on the human environment within the scope of the Proposed Action.

CHAPTER 4 – ACROYNMS, GLOSSARY, LIST OF PREPARERS, DISTRIBUTION LIST, AND LITERATURE CITED

Commonly used Acroynms

AMP - Allotment Management Plans
AOI - Annual Operating Instructions
AUM – Animal Unit Month
BA – Biological Assessment
BE - Biological Evaluation
BMP – Best Management Practices
BLM - Bureau of Land Management
CEQ – Council on Environmental Quality
DMA - Designated Monitoring Areas
EA - Environmental Assessment
EIS – Environmental Impact Statement
FONSI – Finding of No Significant Impact
FS - Forest Service
FSH - Forest Service Handbook
FSM - Forest Service Manual
HEI - Habitat-Effectiveness Index
HRV - historical range of variability
IDT – Interdisciplinary Team
IIT - Interagency Implementation Team
LOS - late and old structural stands
LRMP - Malheur Land Resource Management Plan
LWD - large woody debris
MA - Management Areas
MIS - Management Indicator Species
MO - management objective

MOU – Memorandum of Understanding
NEPA - National Environmental Policy Act
NRHP – National Register for Historic Places
NFMA - National Forest Management Act
NTMB - neo-tropical migratory birds
ODA - Oregon Department of Agriculture
PACFISH and INFISH
PAG - Plant Association Groups
PFC - Proper functioning condition
PFA - Post Fledging Area
PVG - Potential Vegetation Groups
RHCA - Riparian Habitat Conservation Areas
RMO - Riparian Management Objectives
TES - Threatened, Endangered and Sensitive Species
USDA – United States Department of Agriculture
USFWS – United States Fish and Wildlife Service
WA - Watershed Assessment

Glossary

A

Abundance - The total number of individuals of a species in an area, population, or community.

Affected Environment – The biological, social, economic, and physical aspects of the environment that will or may be changed by proposed actions.

Allotment - A rangeland and/or forestland area designated for the use of a prescribed number and kind of livestock under one plan of management.

Allotment Management Plan (AMP) - A long-term operating plan for a grazing allotment on public land prepared and agreed to by the permittee and appropriate agency.

Allowable Use - (1) The degree of utilization considered desirable and attainable on various parts of a ranch or allotment considering the present nature and condition of the resource, management objectives and levels of management. (2) The amount of forage planned to be used to accelerate range improvement.

Alternative – A combination of management prescriptions applied in specific amount and locations to achieve a desired management emphasis as expressed in goals and objectives. One of several policies, plans, or projects proposed for decision making. An alternative need not substitute for another in all respects.

Anadromous fish – Those species of fish that mature in the sea and migrate into streams to spawn (e.g., salmon and steelhead trout).

Animal-Month (AM) - A month's tenure upon range by one animal. Must specify kind of class of animal. Not synonymous with animal-unit month.

Animal-Unit (AU) - Considered to be one mature cow of approximately 1,000 pounds, either dry or with calf up to six months of age, or their equivalent, based on a standardized amount of forage consumed.

Animal-Unit-Month (AUM) - The amount of dry forage required by one animal unit for one month based on a forage allowance of 26 pounds per day. Not synonymous with animal-month. The term AUM is commonly used in three ways: (a) Stocking rate, as in "X acres per AUM", (b) forage allocations, as in "X AUMs in Allotment A", (c) utilization, as in "X AUMs taken from Unit B."

Annual Plant - A plant that completes its life cycle and dies in one year or less.

Architecture (shrub) - Uninterrupted Growth—type Shrub: Stem segments were annually added to each shoot to produce an uninterrupted, sequence of height growth. Diverse stem heights. Arrested-Growth-type shrub: Shoots are browsed at a uniform height above ground level; the uniform height of browsing indicates that the shrub has experienced intense herbivory since establishment. Shrubs are generally considered to transition into this class with greater than 30% use. Retrogressed Growth-type Shrub: An uninterrupted growth-type shrub that has been grazed intensely at whatever height shoots were available -- resulting in death from browsing of a complete set of annual shoots and/or some growth taller than arrest height. Released Growth-type Shrub: A formerly arrested or retrogressed shrub with a terminal leader(s) that has (have) grown through and beyond the browse zone. From Kegley and Frisina 1998.

Apparent Trend - An interpretation of trend based on a single observation. Apparent trend is described in the same terms as measured trend except that when no trend is apparent it shall be described as "none." Note: Some agencies utilize the following

definition: "An assessment, using professional judgment, based on a one-time observation. It includes consideration of such factors as plant vigor, abundance of seedlings and young plants, accumulation or lack of plant residues on the soil surface, soil surface characteristics, i.e., crusting, gravel pavement, pedicled plants, and sheet or rill erosion."

Aquatic (and riparian) health — Aquatic and riparian habitats that support animal and plant communities that can adapt to environmental changes and follow natural evolutionary and biogeographic processes. Healthy aquatic and riparian systems are resilient and recover rapidly from natural and human disturbance. They are stable and sustainable, in that they maintain their organization and autonomy over time and are resilient to stress. In a healthy aquatic/riparian system there is a high degree of connectivity from headwaters to downstream reaches, from streams to floodplains, and from subsurface to surface. Floods can spread into floodplains, and fish and wildlife populations can move freely throughout the watershed. Healthy aquatic and riparian ecosystems also maintain long-term soil productivity. Mineral and energy cycles continue without loss of efficiency.

Available Forage - That portion of the forage production that is accessible for use by a specified kind or class of grazing animal.

B

Bare Ground - All land surface not covered by vegetation, rock or litter.

Benchmark - (1) A permanent reference point. (2) In range inventory, it is used as a point where changes in vegetation through time are measured.

Best Management Practice (BMP) - A practice or a combination of practices, that is determined by a State (or designated area-wide planning agency) after problem assessment, examination of alternative practices and appropriate public participation to be the most effective, practicable (including technological, economic, and institutional considerations) means of preventing or reducing the amount of pollution generated by non-point sources to a level compatible with water quality goals.

Biennial - A plant that lives for two years, producing vegetative growth the first year and usually blooming and fruiting in the second year and then dying.

Biological Crust/Biological Soil Crust – Mosses, lichens, fungi, algae, or bacteria (including cyanobacteria and actinomycetes) that bind a thin layer of surface soil into a crust that resists erosion.

Biological Diversity – (1) The distribution and abundance of plant and animal communities. (2) The variety of life forms and processes, including a complexity of species, communities, gene pools, and ecological functions.

Biomass - That total amount of living plants and animals above and below ground in an area at a given time.

Biophysical Environment or Bioenvironment – The interaction of climatic factors (moisture and temperature) and soil conditions on the expression of vegetation types and associated habitats. Climatic and soil conditions that result in similar successional pathways, disturbance processes and associated vegetative/habitat characteristics are referred to as a biophysical environment.

Browse - That part of leaf and twig growth of shrubs, woody vines and trees available for animal consumption. (v.) Act of consuming browse.

Brush - A term encompassing various species of shrubs or small trees usually considered undesirable for livestock or timber management.

Bunchgrass - A grass having the characteristic growth habit of forming a bunch; lacking stolons or rhizomes.

C

Canopy - (1) The vertical projection downward of the aerial portion of vegetation, usually expressed as a percent of the ground so occupied. (2) The aerial portion of the overstory vegetation. See also: Canopy Cover.

Canopy Cover - The percentage of ground covered by a vertical projection of the outermost perimeter of the natural spread of foliage of plants. Small openings within the canopy are included. It may exceed 100%.

Categorical Exclusion (CE) – ...a category of actions which do not individually or cumulatively have a significant effect on the human environment and which have been found to have no such effect in procedures adopted by a Federal agency in implementation of these regulations {1507.3) and for which, therefore, neither an environmental assessment nor an environmental impact statement is required. (40 CFR 1508.4)

Channel (stream) — The deepest part of a stream or riverbed through which the main current of water flows.

Climax - (1) The final or stable biotic community in a successional series that is self-perpetuating and in dynamic equilibrium with the physical habitat; (2) the assumed end point in succession.

Closure – A road management term indicating the road cannot be used by motorized traffic. This limitation can be accomplished by regulation, barricade, or blockage devices. The road can be available for emergency use; limited administrative use may be permitted.

Community (Plant Community) - An assemblage of plants occurring together at any point in time, while denoting no particular ecological status. A unit of vegetation.

Compaction, Soil - Compaction increases bulk density and soil strength, and decreases porosity and infiltration rate. Soil compaction is due to forces such as weight and vibration.

Competition - The interaction between organisms as a result of the removal or reduction of a common, required resource from the environment. Resources may include water, nutrients, light, oxygen, carbon dioxide, food and shelter.

Composition - Syn. species composition.

Condition and Trend Studies (C/T) - Monitoring sites with permanent transect lines which can be analyzed and compared to previous years to detect changes in range condition over time. C/T plot data is collected over time and “scored” (to provide comparable current data to historic data), and used to provide a current condition/status of range vegetation, as well as a comparative condition to past range vegetation.

Condition Threshold — Three components currently being monitored to determine riparian condition – mean stubble height, mean bank alteration, and mean shrub use. Stubble height, bank alteration, and shrub use relate to riparian function and are the disturbances expected from livestock use of riparian areas.

Connectivity — The arrangement of habitats that allows organisms and ecological processes to move across the landscape; patches of similar habitats are either close together or linked by corridors of appropriate vegetation. The opposite of a fragmented condition.

Corridor (landscape) — Landscape elements that connect similar patches of habitat through an area with different characteristics. For example, streamside vegetation may create a corridor of willows and hardwoods between meadows or through a forest.

Cover - (1) The plants or plant parts, living or dead, on the surface of the ground. Vegetative cover or herbage cover is composed of living plants and litter cover of dead parts of plants. (2) The area of ground cover by plants of one or more species. The four levels of cover as defined for elk are: satisfactory cover; marginal cover; hiding cover; and thermal cover.

Cover type — A vegetation classification depicting a genus, species, group of species, or life form of tree, shrub, grass, or sedge. In effect the present vegetation of an area.

Crust — See Biological Crust.

Cultural Resources - The physical remains (artifacts, ruins, burial mounds, petroglyphs, etc.) and/or conceptual content or context (as a setting for legendary, historic, or prehistoric events, as a sacred area of native peoples, etc.) of an area associated with human use capable of providing scientific or humanistic understanding of past human behavior, cultural adaptation and related topics through the application of scientific or scholarly techniques of investigation, or has spiritual value for members of the affiliated culture.

D

Decommissioned Road —a road permanently removed from the transportation system, i.e. the road is no longer drivable. The management objective of decommissioning is to restore the hydrologic function. Decommissioning includes, as needed: the removal of drainage structures such as culverts, re-contouring cut and fill slopes, subsoiling, and revegetating the old road beds and may include methods described in Chapter 2, Management Requirements, Constraints, and Mitigation Measures under Watershed for decommissioning temporary roads.

Defer - Delay of livestock grazing on an area for an adequate period of time to provide for plant reproduction, establishment of new plants, or restoration of vigor of existing plants. See also: Deferred Grazing, Deferred Rotation, Rest.

Deferred Grazing - The use of deferment in grazing management of a management unit, but not in a systematic rotation including other units.

Deferred Rotation - Any grazing system, which provides for a systematic rotation of the deferment among pastures.

Density (stand) — The number of trees growing in a given area, usually expressed in terms of trees per acre or basal area per acre.

Designated Monitoring Area (DMA) - A relatively small portion of a pasture or management unit selected because of its location, use or grazing value as a monitoring point for grazing use. It is assumed that key areas, if properly selected, will reflect the overall riparian condition and the acceptability of current grazing management in riparian areas.

Designated Old Growth (DOG) – A management area composed of mature/overmature trees (150 years or older) which provides for preservation of natural genetic pools, habitat for plants and wildlife species, contributions to the ecosystem diversity, aesthetic quality, and Native American cultural values.

Desirable Plant Species - Species that contribute positively to the management objectives. A plant may be desirable for one resource and not desirable for another.

Desired Condition – (1) A portrayal of the land or resource conditions that are expected to result if goals and objectives are fully achieved. (2) A description of the landscape as it could reasonably be expected to appear at the end of the planning period if the plan goals, objectives, standards, and guidelines for that landscape are fully achieved.

Detrimental soil impacts – Soil erosion, displacement, compaction, puddling, or burning that exceeds certain thresholds. For instance, displacement is a detrimental soil impact only if more than 50% of the topsoil or humus-enriched A-horizon is removed from an area of 100 square feet or more, which is at least 5 feet in width. A Forest Plan standard limits the amount of detrimental soil impacts to 20% of an activity area.

Diameter at Breast Height (DBH) – The diameter of a tree measured 4-1/2 feet above the ground.

Dispersed Recreation - Recreation use that occurs outside of developed sites and requires few, if any, facilities other than roads and trails. Dispersed recreation activities include hiking, backpacking, cross-country skiing, hunting, snowmobiling, viewing scenery, and driving for pleasure.

Disturbance — Refers to events that alter the structure, composition, or function of terrestrial or aquatic habitats. Natural disturbances include, among others, drought, floods, wind, fires, wildlife grazing, and insects and diseases. Human-caused disturbances include, among others, actions such as timber harvest, livestock grazing, roads, and the introduction of exotic species

Diversity — The distribution and abundance of animal and plant associations and species within an area. In this document we are referring to native and locally adapted species.

Dominant - Plant species or species groups, which by means of their number, coverage, or size, have considerable influence or control upon the conditions of existence of associated species.

Downed wood — A tree or part of a tree that is dead and lying on the ground.

Drought - (1) A prolonged chronic shortage of water, as compared to the norm, often associated with high temperatures and winds during spring, summer, and fall. (2) A period without precipitation during which the soil water content is reduced to such an extent that plants suffer from lack of water.

Duff — The partially decomposed organic material of the forest floor that lies beneath freshly fallen leaves, needles, twigs, stems, bark, and fruit.

E

Ecological Site - A kind of land with a specific potential natural community and specific physical site characteristics, differing from other kinds of land in its ability to produce vegetation and to respond to management.

Ecological Status (seral status) - The present state of vegetation and soil protection of an ecological site in relation to the potential natural community for the site. Vegetation status is the expression of the relative degree of which the kinds, proportions, and

amounts of plants in a community resemble that of the potential natural community. If classes or ratings are used, they should be described in ecological rather than utilization terms. For example, some agencies are utilizing four classes of ecological status ratings (early seral, mid-seral, late seral, potential natural community) of vegetation corresponding to 0-25%, 26-50%, 51-75% and 76-100% of the potential natural community standard. Soil status is a measure of present vegetation and litter cover relative to the amount of cover needed on the site to prevent accelerated erosion. This term is not used by all agencies.

Ecosystem — A complete, interacting system of living organisms and the land and water that make up their environment; the home places of all living things, including humans.

Effects – Environmental changes resulting from a proposed action. Included are direct effects, which are caused by the action and occur at the same time and place, and indirect effects, which are caused by the action and are later in time or further removed in distance, but which are still reasonably foreseeable. Indirect effects may include growth-inducing effects and other effects related to induced changes in the pattern of land use, population density, or growth rate, and related effects on air and water and other natural systems, including ecosystems.

Enclosure - An area fenced to regulate animal use.

Encroach - to advance beyond natural limits, make inroads.

Endangered Species – Any species, plant, or animal that is in danger of extinction throughout all or a significant portion of its range. Endangered species are identified by the Secretary of the Interior in accordance with the 1973 Endangered Species Act.

End-point Indicator – Physical features that can be measured as a group to assess cause and effect relationships and determine condition and trend. The timing of measurements is based on the objective – bank disturbance features (such as hoof prints) are best measured at the end of the grazing season, vegetation monitoring is generally conducted at the end of the growing season (or the end of the grazing season-whichever is later).

Environment — The combination of external physical, biological, social, and cultural conditions affecting the growth and development of organisms and the nature of an individual or community.

Environmental Assessment (EA) - A document of an environmental analysis which provides a basis for determining whether to prepare an environmental impact statement or a finding of no significant impact, and includes a discussion of alternatives and their impacts adequate to allow an alternative to be chosen.

Environmental Impact Statement (EIS) – A document prepared by a Federal agency that provides a statement of environmental effects required for major Federal actions under Section 102 of the National Environmental Policy Act (NEPA) and released to the public and other agencies for comment and review.

Ephemeral Draw – Draw bottoms that carry streamflow only as a direct response to rainfall or snowmelt events. They generally have no baseflow or defined channel with evidence of annual scour or deposition.

Erosion — The wearing away of the land surface (i.e., soil/rock fragments) or stream channel by running water, wind, ice, gravity, or other geological activities. Channel erosion-Removal of stream bed material and/or stream bank material by the stream,

resulting in down cutting and/or bank cutting. Soil erosion-Removal of some soil from a site by surface runoff. Erosion leaves rills and/or pedestals

Exclosure - An area fenced to exclude animals.

F

Featured Species — A wildlife species in the Malheur Forest Plan identified to have high public interest or demand.

Fire regime — The characteristics of fire in a given ecosystem, such as the frequency, predictability, intensity, and seasonality of fire.

Fire return interval — The average time between fires in a given area.

Floodplain — The portion of river valley or level lowland next to streams, which is covered with water when the river or stream overflows its banks at flood stage.

Forage - (n) Browse and herbage which is available and may provide food for grazing animals or be harvested for feeding. (v) To search for or consume forage.

Forage Production - The weight of forage that is produced within a designated period of time on a given area. The weight may be expressed as either green, air-dry, or oven-dry. The term may also be modified as to time of production such as annual, current year's or seasonal forage production.

Forb - Any broad-leafed herbaceous plant other than true grasses, sedges, and rushes (those in the Gramineae or Poaceae, Cyperaceae and Juncaceae).

Forest Plan (Malheur National Forest Land and Resource Management Plan) — A document that guides natural resource management and establishes standards and guidelines for a national forest; required by the National Forest Management Act.

Forest-Wide Standards – An indication of policy or conduct dealing with the basic management of the Forest. Forest-wide management standards apply to all areas of the Forest regardless of the other management prescriptions applied.

Fuel (fire) — Dry, dead parts of trees, shrubs, and other vegetation that can burn readily.

Fuel Treatment – The rearrangement or disposal of natural or activity fuels to reduce the fire hazard.

Full Capacity Range - Terrain that is stable and may be grazed by domestic livestock under any management scheme.

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

G

Graminoid — Grass-like plants such as grasses and sedges.

Grass - A member of the family Gramineae (Poaceae).

Grassland - Land on which the vegetation is dominated by grasses, grasslike plants, and/or forbs. Non-forest land shall be classified as grassland if herbaceous vegetation provides at least 80% of the canopy cover excluding trees. Lands not presently grassland that were originally or could become grassland through natural succession may be classified as potential natural grassland. See also: Rangeland.

Graze - (1) (vi.) The consumption of standing forage by livestock or wildlife. (2) (vt.) To put livestock to feed on standing forage.

Grazing - (vt.) To graze.

Grazing Distribution - Dispersion of livestock grazing within a management unit or area.

Grazing Permit - Official written permission to graze a specific number, kind, and class of livestock for a specified period on a defined allotment or management area. See also: Term Permit.

Grazing Management - The manipulation of grazing and browsing animals to accomplish a desired result.

Grazing Permittee - An individual or other legal entity who has been granted a term grazing permit to graze a specified number of livestock for a specific period on a range allotment.

Grazing Season - (1) On public lands, an established period for which grazing permits are issued. May be established on private land in a grazing management plan. (2) The time interval when animals are allowed to utilize a certain area.

Greenline - The first perennial vegetation from the water's edge. Riparian areas that are in high seral status with stable stream banks will exhibit a continuous line of vegetation at the bankfull discharge level. Rocky stream types may have a significant amount of rock causing breaks in the vegetation. This rock is considered part of the green line. Other breaks may occur in the first perennial bank of vegetation (watercourses or bare ground). The amounts of these (perennial vegetation, rock, and bare ground) should be recorded.

H

Habitat — The natural environment of a plant or animal that provides seasonal or year-round food, water, shelter, and other environmental conditions for an organism, community, or population of plants or animals.

Habitat Effectiveness Index (HEI) – index for estimating elk habitat effectiveness on the landscape. Overall habitat effectiveness (HEscr) incorporates three variables or indices for summer range: cover quality (HEc), size and spacing of cover (HEs) and open road density (HEr).

Habitat type — A group of plant communities having similar habitat relationships.

Harvest — (1) Felling and removal of trees from the forest; (2) removal of game animals or fish from a population, typically by hunting or fishing.

Headwaters — Beginning of a watershed; un-branched tributaries of a stream.

Herbaceous - Vegetative growth with little or no woody component. Non-woody vegetation, such as graminoids and forbs.

Herbicide - A phytotoxic chemical used for killing or inhibiting the growth of plants.

Hiding Cover — Vegetation capable of hiding 90% of a standing adult deer or elk from human view at 200 feet.

Historic Range of Variability (HRV) — The natural fluctuation of ecological and physical processes and functions that would have occurred during a specified period of time. Refers to the range of conditions that are likely to have occurred prior to settlement of the Planning Area by Euro-Americans (approximately the mid 1800s), which would have varied within certain limits over time. HRV is discussed in this document only as a reference point, to establish a baseline set of conditions for which sufficient scientific or historical information is available to enable comparison to current conditions.

Humus - The organic fraction of soil in which decomposition is so far advanced that its original form is not distinguishable.

I

Indicator – See End-point Indicator

Indicator species — A species that is presumed to be sensitive to habitat changes; population changes of indicator species are believed to best indicate the effects of land management activities.

Interdisciplinary Team (IDT) – A group of individuals with different training assembled to solve a problem or perform a task. The team is assembled out of recognition that no one scientific discipline is sufficiently broad to adequately solve the problem. Through interaction, participants bring different points of view to bear on the problem.

Intermittent stream — A stream that flows only at certain times of the year when it receives water from other streams or from surface sources such as melting snow.

Invader - Plant species that were absent in undisturbed portions of the original vegetation of a specific range site and will invade or increase following disturbance or continued heavy grazing.

Invasion - The migration of organisms from one area to another area and their establishment in the latter. **Inventory (Rangeland)** - (1) The systematic acquisition and analysis of resource information needed for planning and for management of rangeland. (2) The information acquired through rangeland inventory.

Inventory (Rangeland) - (1) The systematic acquisition and analysis of resource information needed for planning and for management of rangeland. (2) The information acquired through rangeland inventory.

Irretrievable – Applies primarily to the use of nonrenewable resources. For example, some or all of the timber production from an area is irretrievably lost during the time an area is used as a winter sports site. If the use is changed, timber production can be resumed. The production lost is irretrievable, but the action is not irreversible.

Irreversible – Applies primarily to the use of nonrenewable resources, such as minerals or cultural resources, or to those factors such as soil productivity that are renewable only over long time periods. Irreversible also includes loss of future options.

Issue – A subject or question of widespread public interest identified through public participation relating to management of National Forest System lands.

K

Key Area - A relatively small portion of a pasture or management unit selected because of its location, use or grazing value as a monitoring point for grazing use. It is assumed that key areas, if properly selected, will reflect the overall acceptability of current grazing management over the pasture or unit as a whole.

L

Landscape — All the natural features such as grass-lands, hills, forest, and water, which distinguish one part of the earth's surface from another part; usually that portion of land which the eye can comprehend in a single view, including all its natural characteristics.

Large downed wood — Logs on the forest floor with a large end diameter of at least 21 inches.

Large woody debris — Pieces of wood that are of a large enough size to affect stream channel morphology.

Late and Old Structural (LOS) Forest — Refers to mature forest characterized by a single or multiple canopy layer consisting of large or old trees. Other characteristics of old forests include: variability in tree size; increasing numbers of snags and coarse woody debris; increasing appearance of decadence, such as broken tops, sparse crowns, and decay in roots and stems; canopy gaps and understory patchiness; and old trees relative to the site and species.

Litter — The uppermost layer of organic debris on the soil surface, which is essentially the freshly fallen or slightly decomposed vegetation material such as stems, leaves, twigs, and fruits.

Local Road — Roads constructed and maintained for, and frequented by, the activities of a given resource element. These roads connect terminal facilities with Forest collector or Forest arterial roads or public highways. The location and standard usually are determined by the requirement of a specific resource activity rather than by travel efficiency.

M

Maintenance Burning - The use of prescribed burning to maintain vegetation in a desired condition.

Management Area — An area with similar management objectives and a common management prescription.

Management direction — A statement of goals and objectives, management prescriptions, and associated standards and guidelines for attaining them.

Management Indicator Species — Species identified in the a planning process that are used to monitor the effects of planned management activities on viable populations of wildlife and fish, including those that are socially or economically important.

Management Plan - A program of action designed to reach a given set of objectives.

Marginal Cover — For elk, a stand of coniferous trees 10 or more feet tall with an average canopy closure equal to or more than 40 percent.

Mature — For aspen/cottonwood, trees that are past peak growth.

Meadow - (1) An area of perennial herbaceous vegetation, usually grass or grasslike, (2) Openings in forests and grasslands of exceptional productivity in arid regions, usually resulting from high water content of the soil, as in streamside situations and areas having a perched water table.

Mitigation — Avoiding or minimizing impacts by limiting the degree or magnitude of the action and its implementation; rectifying the impact by repairing, rehabilitating, or restoring the affected environment; reducing or eliminating the impact by preservation and maintenance operations during the life of the action.

Monitoring - The orderly collection, analysis, and interpretation of resource data to evaluate progress toward meeting management objectives.

Multiple Use - Use of range for more than one purpose, i.e., grazing of livestock, wildlife production, recreation, watershed, and timber production. Not necessarily the combination of uses that will yield the highest economic return or greatest unit output.

N

National Environmental Policy Act (NEPA) – An act which encourages productive and enjoyable harmony between humans and their environment; promotes efforts to prevent or eliminate damage to the environment and biosphere and stimulate the health and welfare of humanity; enriches the understanding of the ecological systems and natural resources to the nation, and establishes a Council on Environmental Quality (CEQ).

Native Species - A species that is a part of the original fauna or flora of the area in question.

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 be are indicators of nonfunctioning conditions. (Bureau of Land Management Technical Report 1737-9)

Non-use - (1) Absence of grazing use on current year's forage production. (2) Lack of exercise, temporarily, of a grazing privilege on grazing lands. (3) An authorization to refrain, temporarily, from placing livestock on public ranges without loss of preference for future consideration.

Noxious Weed - A plant species that is undesirable because it conflicts, restricts, or otherwise causes problems under management objectives. Not to be confused with species declared noxious by laws concerned with plants that are weedy in cultivated crops and on range.

O

Objective - A specific statement of measurable results to be achieved within a stated time period. Objectives reflect alternative mixes of all outputs or achievements which can be attained at a given budget level. Objectives may be expressed as a range of outputs.

Ongoing actions — Those actions that have been implemented, or have contracts awarded or permits issued.

Open Road – A road, or segment thereof, that is open to use.

Overmature – For aspen/cottonwood, trees that are nearing the end of their life.

Overgrazing - Continued heavy grazing that exceeds the recovery capacity of the community and creates a deteriorated range. See also: Overuse.

Overstory – The uppermost canopy of the forest when there is more than one level of vegetation.

Overuse - Utilizing an excessive amount of the current year's growth, which, if continued, will result in range deterioration.

P

PACFISH – An amendment to the Forest Plan that prescribes goals, standards, and guidelines, meant to restore and protect native fish habitat. It provides an interagency ecosystem management approach for maintaining and restoring healthy, functioning watersheds, riparian areas, and aquatic habitats within the range of Pacific anadromous fish on Federal lands managed by the USDI Bureau of Land Management and the USDA Forest Service.

Partial Retention – See Visual Quality Objectives.

Pasture - A grazing area enclosed and separated from other areas by fencing or other barriers; the management unit for grazing land.

Pedestaling - An evidence of soil erosion, where soil has been eroded from around a piece of ground cover (such as a clump of grass, or a piece of gravel), leaving the ground cover on a pedestal of uneroded soil.

Percent Use - Grazing use of current growth, usually expressed as a percent of the current growth (by weight) that has been removed.

Perennial Plant - A plant that has a life span of three or more years.

Permittee - One who holds a permit to graze livestock on state, federal, or certain privately owned lands.

Phenology - The study of periodic biological phenomena that are recurrent such as flowering, seeding, etc., especially as related to climate.

Pioneer Species - The first species or community to colonize or recolonize a barren or disturbed area in primary or secondary succession.

Planning Area - The area covered by the grazing allotment; a delineated area of land subject to analysis of (1) responses to proposed management practices in the production, enhancement, or maintenance of forest and rangeland outputs and environmental quality objectives; and (2) economic and social impacts.

Planning or Project Record - A system that records decision and activities that result from the process of developing a plan, revision, or significant amendment.

Plant Association Group (PAG) - Broad potential vegetation classes with similar temperature and moisture conditions, and similar structure. For example, the "Hot Dry Upland Forest" PAG includes a variety of ponderosa pine forests with sagebrush or bunchgrass understory.

Plant Vigor - Plant health.

Potential Natural Community (PNC) - The biotic community that would become established on an ecological site if all successional sequences were completed without interferences by man under the present environmental conditions. Natural disturbances are inherent in its development. The PNC may include acclimatized or naturalized non-native species.

Prescribed burning/fire - Intentional use of fire under specified conditions to achieve specific management objectives for burning a predetermined area.

Prescription - A management pathway to achieve a desired objective(s).

Preservation - Allows only ecological changes. Management activities, except for very low visual impact recreation facilities, are prohibited. This objective applies to specially classified areas, including wilderness.

Partial Retention - Management activities may be evident to the viewer but must remain visually subordinate to the surrounding landscape.

Modification - Management activities may visually dominate the natural surrounding landscape but must borrow from naturally established form, line, color, and texture.

Productivity - (1) Soil productivity: the capacity of a soil to produce plant growth, due to the soil's chemical, physical, and biological properties (such as depth, temperature, water-holding capacity, and mineral, nutrient, and organic matter content). (2) Vegetative productivity: the rate of production of vegetation within a given period. (3) General: the innate capacity of an environment to support plant and animal life over time.

Proper Functioning Condition – Riparian wetland areas are functioning properly when adequate vegetation, landform, or large woody debris is present to dissipate stream energy associated with high water flows, thereby reducing erosion and improving water quality; filter sediment, capture bedload, and aid floodplain development; improve flood-water retention and ground-water recharge; develop root masses and stabilize stream banks against cutting action; develop diverse 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.

Proper Use - A degree of utilization of current year's growth that, if continued, will achieve management objectives and maintain or improve the long-term productivity of the site. Proper use varies with time and systems of grazing.

Proposed action — In terms of the National Environmental Policy Act, a proposal by a federal agency to authorize, recommend, or implement an action which is the subject of an environmental impact statement or environment assessment.

Puddling, Soil — A decrease in macro-pore abundance and/or a decrease in connections among macro-pores, due to shearing forces. Soil puddling decreases infiltration rates. Soil puddling is usually accompanied by soil compaction, but not always.

R

Range - (n.) Any land supporting vegetation suitable for grazing including rangeland, grazable woodland and shrubland. Range is not a use. (adj.) Modifies resources, products, activities, practices and phenomena pertaining to rangeland.

Range Improvement - Any structure or nonstructural improvement to facilitate management of rangelands or livestock.

Range Readiness - The defined stage of plant growth at which grazing may begin under a specific management plan without permanent damage to vegetation or soil. Usually applied to seasonal range. To be determined by Range Management Specialist with input from IDT.

Rangeland - Land where the vegetation is predominantly grasses, grass-like plants, forbs, or shrubs suitable for grazing and browsing.

Reconnaissance - A general examination or survey of a region with reference to its main features, usually as a preliminary act to a more detailed survey or as a follow-up to a survey.

Record of Decision – A document separate from but associated with an Environmental Impact Statement that states the decision, identifies all alternatives, specifying which were environmentally preferable, and states whether all practicable means to avoid environmental harm from the alternative have been adopted, and if not, why not (40 CFR 1505.2).

Recreation Opportunity Spectrum (ROS) – A system for planning and managing recreation resources. Land delineations that identify a variety of recreation experience opportunities categorized into classes on a continuum from primitive to urban. Each class is defined in terms of the degree to which it satisfies certain recreation experience needs, based on the extent to which the natural environment has been modified, the type of facilities provided, the degree of outdoor skills needed to enjoy the area, and the relative

density of recreation use. The settings, activities, and opportunities for obtaining experiences have been arranged along a continuum or spectrum divided into seven classes: Primitive, Semiprimitive Nonmotorized, Semiprimitive Motorized, Roaded Modified, Roaded Natural, Rural, Urban.

Reforestation — Treatments or activities that help to regenerate stands of trees after disturbances such as harvest or wildfire. Typically, reforestation activities include preparing soil, controlling competition, controlling pests, and planting seeds or seedlings.

Regeneration — The process of establishing new plant seedlings, whether by natural means or artificial measures (planting).

Rehabilitate — To repair and protect certain aspects of a system so that essential structures and functions are recovered, even though the overall system may not be exactly as it was before.

Replacement Old Growth (ROG) – Stands that will replace Dedicated Old Growth management areas when they no longer meet old growth requirements

Residual Vegetation/Stubble Height - Residual vegetation/stubble height is that stubble height remaining at the end of the growing season just prior to winter dormancy. A protocol that describes where and how to collect data on residual vegetation/stubble height to ensure consistency across the PACFISH, INFISH area is included with IIT monitoring protocol.

Resilient, resilience, resiliency — (1) The ability of a system to respond to disturbances. Resiliency is one of the properties that enable the system to persist in many different states or successional stages. (2) In human communities, refers to the ability of a community to respond to externally induced changes such as larger economic or social forces.

Rest - Leaving an area ungrazed thereby foregoing grazing of one forage crop. Normally rest implies absence of grazing for a full growing season or during a critical portion of plant development; i.e., seed production.

Rest Period - A time period of no grazing included as part of a grazing system.

Rest Rotation - An intensive system of range management whereby grazing is deferred on various parts of the range during succeeding years, allowing the deferred part complete rest for one year.

Restoration — Holistic actions taken to modify an ecosystem to achieve desired, healthy, and functioning conditions and processes. Generally refers to the process of enabling the system to resume acting or continue to act following disturbance as if the disturbances were absent. Restoration management activities can be either active (such as control of noxious weeds, thinning of over-dense stands of trees, or redistributing roads) or more passive (more restrictive, hands-off management direction that is primarily conservation oriented).

Retention—Provides for management activities that are not visually evident. Management activities are permitted, but the results of those activities on the natural landscape must not be evident to the average viewer.

Riparian area — Area with distinctive soil and vegetation between a stream or other body of water and the adjacent upland; includes wetlands and those portions of floodplains and valley bottoms that support riparian vegetation.

Riparian Habitat Conservation Areas (RHCAs) – Portions of watersheds where riparian-dependent resources receive primary emphasis, and management activities are

subject to specific standards and guidelines. Riparian Habitat Conservation Areas include traditional riparian corridors, wetlands, intermittent streams, and other areas that help maintain the integrity of aquatic ecosystems by (1) influencing the delivery of coarse sediment, organic matter, and woody debris to streams, (2) providing root strength for channel stability, (3) shading for stream, and (4) protecting water quality.

Riparian Species - Plant species occurring within the riparian zone. Obligate species require the environmental conditions within the riparian zone; facultative species tolerate the environmental conditions, and may occur away from the riparian zone.

Riparian Zone - The banks and adjacent areas of water bodies, watercourses, seeps and springs whose waters provide soil moisture sufficiently in excess of that otherwise available locally so as to provide a more moist habitat than that of contiguous flood plains and uplands.

Road - A motor vehicle travel way over 50 inches wide, unless designated and managed as a trail. A road may be classified, unclassified, or temporary (36 CFR 212.1). See also Classified, Unclassified and Temporary Road.

Road Density - The measure of the degree to which the length of road miles occupies a given land area (usually expressed as mile/sq. mile).

Roadless Area - A National Forest area that (1) is larger than 5,000 acres or, if smaller than 5,000 acres, is contiguous to a designated wilderness or primitive area; (2) contains no roads; and (3) has been inventoried by the Forest Service for possible inclusion in the Wilderness Preservation System.

Rotation Grazing - A grazing scheme where animals are moved from one grazing unit (paddock) in the same group of grazing units to another without regard to specific graze:rest periods or levels of plant defoliation.

Runoff - The total stream discharge of water, including both surface and subsurface flow, usually expressed in acre-feet of water yield.

S

Salting - Placing salt blocks in specific areas for use by livestock or game; often relocated periodically to achieve improved animal distribution.

Satisfactory Cover - For elk, a stand of coniferous trees 40 or more feet tall with an average canopy closure equal to or more than 50 percent for ponderosa pine, and 60 percent for mixed conifer. Satisfactory cover typically exist as a multi-storied stand and will meet elk hiding cover criteria.

Scenery Management System - Management guidelines based on the premise that land management activities (including construction of facilities) should not contrast with the existing natural appearing landscape. Within a framework of regional landscape, character types, form, line, color, and texture should be used to make activities and structures "fit" within landscapes.

Scenic Integrity Objectives (SIOs) - The degree of direct human-caused deviations in the landscape, such as road construction, timber harvesting, or activity debris. Indirect deviations, such as landscape created by human suppression of the natural role of fire, are not included. The level to which an area meets its SIOs is indicated by the ratings Very High, High, Moderate, Low, Very Low, or Unacceptably Low.

Scoping - An early and open process for determining the scope of issues to be addressed and for identifying the significant issues related to the proposed action.

Identifying the significant environmental issues deserving of study and de-emphasizing insignificant issues, narrowing the scope of the environmental impact statement accordingly (CEQ regulations, 40 CFR 1501.7).

Season of Use - The time during which livestock grazing is permitted on a given range area, as specified in the grazing permit.

Seasonal Grazing - Grazing restricted to a specific season.

Sediment — Solid materials, both mineral and organic, in suspension or transported by water, gravity, ice, or air; may be moved and deposited away from their original position and eventually will settle out.

Sensitive Species – Those species which (1) have appeared in the Federal Register as proposals for classification and are under consideration for official listing as Endangered or Threatened; (2) are on an official State list; or (3) are recognized by the Regional Forester to need special management in order to prevent the need for their placement on Federal or State lists.

Sensitive Stream Reach – Generally, stretches of stream that are fairly flat, found in a wide valley bottom, with stream banks or beds composed of dirt/silt/sand - Sensitive stream reaches are often key habitat areas for fish and are those areas most sensitive to change due to management of domestic livestock. These areas are also more likely to be influenced by livestock management. Sensitive stream reaches would likely be used as Designated Monitoring Areas (DMAs) because of these characteristics. See Figure 10, Map Section, for an estimation of sensitive stream reach location in the MFJD Range Planning Area.

Seral — 1) Refers to the stages that plant communities go through during succession. Developmental stages have characteristic structure and plant species composition. Early seral refers to plants that are present soon after a disturbance or at the beginning of a new successional process (in riparian areas-usually shallow-rooted, weak-stemmed colonizing plants that grow quickly and filter very fine sediment-often grasses); mid seral is often a mix of early and late seral plants; late or old seral refers to plants present during a later stage of plant community succession (in riparian areas-commonly stabilizing plants such as sedges and rushes that have strong cord-like rhizomes, deep, fibrous roots, coarse leaves and strong crowns that buffer streambanks against erosion, enhance streambank strength, filter sediments, and with water build/rebuild eroded banks-Winward 2000). 2) Refers to species or communities that are eventually replaced by other species or communities within a sere.

Seral stage — The developmental phase of rangeland with characteristic structure and plant species composition (see SERAL). Seral stage is a measure of vegetative condition which varies from very early to late seral with potential natural community (PNC) being the latest seral stage. Generally, an area falls into a later seral stage if it has a high percentage of “stabilizers” (usually native, deep-rooted sedges and grasses, and in some places rocks and down wood) and a shrub component. Areas with a higher percentage of “colonizers” (usually short-lived, shallow-rooted plants that respond quickly to change, including non-native plants) and with fewer shrubs are in earlier seral stages (adopted from Winward, 2000). PACFISH (USDA Forest Service 1995) defines seral stage by percent similarity of riparian vegetation to PNC or stream condition: under 25% similarity to PNC or “poor” stream condition equals early seral, over 50% similarity to PNC or “good” or better stream condition equals late seral. In terms of riparian function,

later stages provide better stability and function, but in terms of forage, mid- and early seral stages tend to provide more production.

Shade-intolerant — Species of plants that do not grow well in or die from the effects of too much shade. Generally these are fire-tolerant species.

Shade-tolerant — Species of plants that can develop and grow in the shade of other plants. Generally these are fire-intolerant species.

Shallow soils – Highly and very highly erodible, unforested, shallow, rocky soils supporting low amounts of ground cover: also known locally as “scab soils.”

Shrub - A plant that has persistent, woody stems and a relatively low growth habit, and that generally produces several basal shoots instead of a single bole. It differs from a tree by its low stature (generally less than 16 feet) and non-aborescent form.

Silviculture — The practice of manipulating the establishment, composition, structure, growth, and rate of succession of forests to accomplish specific objectives.

Site — A specific location of an activity or project, such as a campground, a lake, or a stand of trees to be harvested.

Slash – The residue left on the ground after felling and other silvicultural operations and/or accumulating there as a result of storm, fire, girdling, or poisoning of trees.

Snag — A standing dead tree, usually larger than five feet tall and six inches in diameter at breast height. Snags are important as habitat for a variety of wildlife species and their prey.

Soil — The earth material that has been so modified and acted upon by physical, chemical, and biological agents that it will support rooted plants.

Soil Compaction – An increase in soil bulk density of 20 percent or more from the undisturbed level of volcanic ash soils. For other soils, it is an increase in soil bulk density of 15 percent or more from the undisturbed level.

Soil Disturbance — Disturbance, such as displacement or compaction, which may or may not be intense enough to be detrimental soil impact.

Species Composition - The proportions of various plant species in relation to the total on a given area. It may be expressed in terms of cover, density, weight, etc.

Stable - The condition of little or no perceived change in plant communities that are in relative equilibrium with existing environmental conditions; describes persistent but not necessarily culminating stages (climax) in plant succession. Implies a high degree of resilience to minor perturbations.

Stand — A group of trees in a specific area that is sufficiently alike in composition, age, arrangement, and condition so as to be distinguishable from the forest in adjoining areas.

Stock Pond - A water impoundment made by constructing a dam or by excavating a dugout or both, to provide water for livestock and wildlife.

Stocking Rate - The number of specific kinds and classes of animals grazing or utilizing a unit of land for a specified time period. May be expressed as animal unit months or animal unit days per acre, hectare, or section, or the reciprocal (area of land/animal unit month or day). When dual use is practiced (i.e. cattle and horse), stocking rate is often expressed as animal unit months/unit of land or the reciprocal.

Stockwater Development - Development of a new or improved source of stockwater supply, such as well, spring, pond, together with storage and delivery system.

Structural stage — A stage of development of a vegetation community that is classified on the dominant processes of growth, development, competition, and mortality.

Structure — The size and arrangement, both vertically and horizontally, of vegetation.

Stubble - The basal portion of herbaceous plants remaining after the top portion has been harvested either artificially or by grazing animals.

Subwatershed — A drainage area, equivalent to a 6th-field Hydrologic Unit Code (HUC). Hierarchically, subwatersheds (6th-field HUC) are contained within watershed (5th-field HUC), which in turn contained within a subbasin (4th-field HUC).

Subwatersheds are shown graphically in Figure 10, Map Section.

Succession - The progressive replacement of plant communities on a site which leads to the potential natural plant community; i.e., attaining stability. Primary succession entails simultaneous successions of soil from parent material and vegetation. Secondary succession occurs following disturbances on sites that previously supported vegetation, and entails plant succession on a more mature soil.

Suitable Range - Land which produces or has the inherent capability to produce 50 pounds or more of palatable forage per acre, can be grazed on a sustained-yield basis, and is or can be feasibly made accessible for use.

Suitability – a determination of the appropriateness of applying certain resource management practices to a particular area of land, as determined by an analysis of the economic and environmental consequences and the alternative uses foregone.

Surface Erosion – The detachment and transport of individual soil particles by wind, water, or gravity.

Sustained Yield - Production of specified resources or commodities at a given rate for a designated unit of time.

T

Temporary Permit - A document authorizing grazing of a certain number of livestock on public lands during an emergency or for a certain period, terminable at the end of such period and with no guarantee of renewal in whole or in part. See also: Grazing Permit.

Term Permit - A document that authorizes grazing on public lands for a stated number of years as contrasted with an annual or temporary permit. See also: Grazing Permit.

Terrestrial — Pertaining to the land.

Thermal cover — Cover used by animals for protection against weather.

Thinning — An operation to remove stems from a forest for the purpose of reducing fuel, maintaining stand vigor, regulating stand density/composition, or for other resource benefits. Although thinning can result in commercial products, thinning generally refers to non-commercial operations.

Threatened and Endangered Species (T&E) — A species or subspecies of animal or plant whose prospects of survival and reproduction are in immediate jeopardy or likely to become so within the foreseeable future. Threatened species are identified by the Secretary of Interior in accordance with the 1973 Endangered Species Act.

Threshold – See Condition Threshold.

Trampling - Treading underfoot; the damage to plants or soil brought about by movements or congestion of animals.

Trend - The direction of change in ecological status or resource value rating observed over time. Trend in ecological status should be described as toward or away from the potential natural community, or as not apparent. Trend in a resource value rating for a specific use should be described as up, down or not apparent. Trends in resource value

ratings for several uses on the same site at a given time may be in different directions, and there is no necessary correlation between trends in resource value ratings and trend in ecological status. Some agencies use trend only in the context of ecological status.

U

Unauthorized Use - The grazing of livestock on a range area without proper authority.

Understory — The trees and other woody species that grow beneath the canopy of other plants. Usually refers to grasses, forbs, and low shrubs under a tree or shrub canopy.

Undesirable Species - Species that conflict with or do not contribute to the management

Uneven-aged stand — Stand of trees in which there are considerable differences in the ages of individual trees.

Ungulates - Hoofed animals, including cattle, deer, and elk.

Upland — Ground elevated above the lowlands along rivers or between hills. The portion of the landscape above the valley floor or stream.

Use - (1) The proportion of current year's forage production that is consumed or destroyed by grazing animals. May refer either to a single species or to the vegetation as a whole. (2) Utilization of range for a purpose such as grazing, bedding, shelter, trailing, watering, watershed, recreation, forestry, etc.

Utilization - Syn. Use.

Utilization Standards - The prescribed level of grazing by livestock which will achieve specific objectives including maintenance of vegetation and soil condition. Expressed as the percent of the annual herbaceous production removed by grazing.

V

Vegetation condition rating-A rating for range vegetation from Condition and Trend (C/T) plot data that is calculated by using a model that uses four successional stages (climax, late seral, mid seral, and early seral) mainly determined by percentage of climax vegetation on site. The C/T plots on the Malheur National Forest used ratings of excellent, good, fair, and poor which correlate to climax, late seral, mid seral and early seral and can be substituted in the vocabulary if necessary. With heavy grazing and subsequent defoliation of decreasers (palatable productive plants and perennial grasses associated with climax seral stages) comes retrogression to an earlier seral stage resulting in an increase of increasers (plants usually of lower productivity and/or palatability associated with early seral stages).

Vegetative - Relating to nutritive and growth functions of plant life in contrast to sexual reproductive functions. Of or relating to vegetation.

Viability — In general, viability means the ability of a population of a plant or animal species to persist for some specified time into the future. For planning purposes, a viable population is one that has the estimated numbers and distribution of reproductive individuals to ensure that its continued existence will be well distributed in the planning area.

Vigor - Relates to the relative robustness of a plant in comparison to other individuals of the same species. It is reflected primarily by the size of a plant and its parts in relation to its age and the environment in which it is growing. Syn. plant vigor.

Visual Quality Objectives (VQOs) — A desired level of management based on physical and sociological characteristics of an area. Refers to the degree of acceptable alteration of the characteristic landscape:

W

Warm-season Plant - A plant which makes most or all its growth during the spring, summer or fall and is usually dormant in winter.

Water Gap - A small part of a unit where the fence crosses a stream for a relatively short segment then recrosses the stream, giving livestock access to the short segment of stream for watering; often a specially constructed fence across a drainage. The fence is easily moved by the forces of a flood, thus preventing damage to the permanent fence.

Watershed — A land area that collects and discharges excess surface water through a single outlet; (1) The region draining into a river, river system, or body of water. (2) a watershed also refers specifically to a drainage area of approximately 50,000 to 100,000 acres, which is equivalent to a 5th-field Hydrologic Unit Code (HUC). Hierarchically, subwatersheds (6th-field HUC) are contained within a watershed (5th-field HUC), which in turn is contained within a subbasin (4th-field HUC).

Weed - (1) Any plant growing where unwanted. (2) A plant having a negative value within a given management system.

Wetland — In general, an area soaked by surface or groundwater frequently enough to support vegetation that requires saturated soil conditions for growth and reproduction; generally includes swamps, marshes, springs, seeps, bogs, wet meadows, mudflats, natural ponds, and other similar areas. Legally, federal agencies define wetlands as possessing three essential characteristics: (1) hydrophytic vegetation, (2) hydric soils, and (3) wetland hydrology. The three technical characteristics specified are mandatory and must all be met for an area to be identified as a wetland. Hydrophytic vegetation is defined as plant life growing in water, soil, or on a substrate that is at least periodically deficient in oxygen as a result of excessive water content. Hydric soils are defined as soils that are saturated, flooded, or ponded long enough during the growing season to develop anaerobic (without oxygen) conditions in the upper part of the soil profile. Generally, to be considered a hydric soil, there must be saturation at temperatures above freezing for at least seven days. Wetland hydrology is defined as permanent or periodic inundation, or soil saturation to the surface, at least seasonally.

Wildfire — A human or naturally caused fire that does not meet land management objectives.

Y

Yearlong Grazing - Continuous grazing for a calendar year.

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Consultation and Distribution List

The Forest Service consulted with the following individuals, Federal, State, and local agencies, tribes and non-Forest Service persons during the scoping process of this environmental assessment. Those denoted with a ¹ are on the Preliminary EA distribution list. Those denoted with a ² are on the Final EA distribution list.

Agencies

BLM, Burns District
¹County Court for Harney County
 County Court for Grant County
 Malheur County SWCD
 Oregon Dept. of Fish and Wildlife
 Oregon Water Resources Dept.
 US Fish & Wildlife Service
 US EPA Region 10 NEPA Review

Tribes

¹Burns Paiute Tribe
 Confederated Tribes of Warm Springs
 Confederated Tribes of Umatilla
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Organizations and Businesses

3J Cattle Co.
 ACW Inc.
^{1, 2}Actin Ranch Inc.
 Anchor Cross Ranch
¹Blue Mountain Biodiversity Project
 Boise Cascade Corporation
 Drinkwater Ranch
^{1, 2}Grant County Conservationists
 Harney Rock and Paving Co.
 Hi Desert Snow Drifters
 H_Ranch
 Harney County Gypsum LLC
 Hell-N-Gone Ranch
 High Desert Fur Takers
^{1, 2}Jack and Merilee Young Land Co.
 KZZR-AM/KQHC-FM
 L. S. & D. Logging
 Malheur Timber Operators
 Northwest Environmental Defense Center
^{1, 2}Oregon Natural Resource Council
^{1, 2}Oregon Natural Desert Association
 Oregon Sheep Growers Association
²Oregon Cattlemen's Association
^{1, 2}Ponderosa Ranch
 Prairie Wood Products
 Rutter Cedar Products
 Rocky Mountain Elk Foundation
 Silver Creek Ranches of Oregon LLC
 Southworth Brothers
 Upper South Fork John Day Watershed Council
^{1, 2}Van Grazing Cooperative

Literature Cited

- Albertson, F. W., A. Riegel, and J. L. Launchbaugh, Jr. 1953. Effects of different intensities of clipping on short grasses in West-central Kansas. *Ecology* 34: 1-20.
- Agee, James K. 1993. *Fire Ecology of Pacific Northwest Forests*. Island Press, Washington D.C.
- Agee, James K. and Kathleen R. Maruoka, March 1994. *Historical Fire Regimes of the Blue Mountains*. Technical Notes from the Blue Mountains Natural Resources Institute. BMNRI-TN-1. 4 pages.
- Arno, Steve, Jim Brown, Clint Carlson, Bob Mutch, Roger Ottmar, Janice Peterson, and Art Tiedmann. 12/6/91. *Maintaining Forest Health in the Blue Mountains: A Strategy for Fire's Future Role*.
- Bailey, V. 1936. The mammals and life zones of Oregon. *North American Fauna*, 55:1-416 in Verts, B.J. and Leslie N. Carraway.1998. *Land Mammals of Oregon*.
- Bright, George A. 1912. *A study of the growth of yellow pine in Oregon*. Unpublished typescript report obtained from the National Archives, College Park, Maryland, record group 95. 106p.
- Bartrum, S.C. 1910. *Fire Protection on the National Forest Cooperation with States, counties, and Organizations*. Paper read by Supervisor bartrum at the Supervisor's Meeting, Portland, Oregon, March 21-26, 1910.
- Barnes, Will C. 1926. *The Story of the Range*. USDA, Forest Service. Government Printing Office.
- Belsky, A.J., Matzke, A. and Uselman, S. 1999. Survey of livestock influences on stream and riparian ecosystems in the western United States. *Journal of Soil and Water Conservation* 54(1): 419-431.
- Brady, Nyle C. and Ray R. Weil. 1999. *The Nature and Properties of Soils*, 12th Edition. Prentice-Hall, Upper Saddle River, NJ, p. 146, 150-2, 204-5, 423, 404-435, 468-9.
- Blue Mountain Forest Plan Revision Team. 2004. *Draft current management situation report: Glue Mountains Forest Plan Revision*. October. 110 p.
- Bradford, D., F. Reed, R. Baird LeValley, C. Cambell, S. Kossler. 2002. *Livestock Grazing on the National Forests-Why continue to do it?* *Rangelands* V. 24, No.2. Pp 2-11.
- Burns Times-Herald. 2005. *Destination Harney County, 2005-2006 Visitor Relocation Information Guide*. A Supplement to the Burns Times-Herald, April 27, 2005. Pp 28-30.
- Bayley, P.B. and H. Li.. 2002. *Analyses of fish responses to exclosures*. IN: Kauffman, J.B., P. Bayley, H. Li, P. McDowell, and R.L. Beschta. 2002. *Final report research/evaluate restoration of NE Oregon streams: effects of livestock exclosures (corridor fencing) on riparian vegetation, stream geomorphic features, and fish populations*. Bonneville Power Administration. Project Nos: 2000-051-00 and 2000-051-01. 87 p.

- Behnke, Robert J., Native Trout of Western North America. American Fisheries Society Monograph 6, 1992.
- Borman, Michael M. 2005. *Forest Stand Dynamics and Livestock Grazing in Historical Context*. *Conservation Biology*, Volume 19, No. 5, October 2005.
- Brookshire, E.N.J. and K.A. Dwire. 2003. Controls on patterns of coarse organic particle retention in headwater streams. *J. N. Am. Benthol. Soc.* 22(1):17-34.
- Carlson, Garwin. 1974. Soil Resource Inventory, Malheur National Forest.
- Clark, Bob. 2001. Chapter V – Soils, Water, and Watershed. In: National Interagency Fire Center, Fire Effects Guide (NFES 2394).
- Clary, Warren P. and Kinney, John W. 2002. Streambank and Vegetation Response to Simulated Cattle Grazing. *Wetlands*. Vol. 22, no. 1 (Mar. 2002) p 139-148.
- Crowe, Elizabeth A. and Roderick R. Clausnitzer. 1997. Mid-Montane plant associations of the Malheur, Umatilla, and Wallowa-Whitman National Forests. USDA Forest Service, Pacific Northwest Region, Technical Paper R6-NR-ECOL-TP-22-97.
- Cole, David N. 1988. Disturbance and Recovery of Trampled Montane Grassland and Forests in Montana. Research paper INT-389. U.S. Department of Agriculture, Forest Service, Intermountain Research Station.
- Council for Agricultural Science and Technology. 2002. Environmental Impacts of Livestock on U.S. Grazing Lands. Issue paper number 22. http://www.cast-science.org/cast-science.lh/pubs/grazinglands_ip.pdf.
- Corman, Warren E. 1911. Did the Indian protect the forest? *Pacific Monthly*. 26 (3 Sept: 300-306.
- Colville, Frederick V. 1898. Forest Growth and Sheep Grazing in the Cascade Mountains of Oregon. USDA Division of Forestry. Bulletin No. 15. Government Printing Office.
- Cox, Thomas R. January 1993. Frontier Enterprise versus the Modern Age, Fred Herrick and the Closing of the Lumberman's Frontier, Herrick-Barnes-Hines. *Pacific Northwest quarterly* 84, no. 1. pp 19-29.
- DEQ's 1994/1996 303(d) List of Water Quality Limited Waterbodies, Oregon Dept. of Environmental Quality, July 1996.
- Duck Creek Associates, Inc. 2003a. Schurtz Creek Stream Survey Report. Submitted to Richard Vetter and Vincent Hunter, Emigrant Creek Ranger District, Hines, OR.
- Duck Creek Associates, Inc. 2003b. Calamtiy Creek Stream Survey Report. Submitted to Richard Vetter and Vincent Hunter, Emigrant Creek Ranger District, Hines, OR.
- Duck Creek Associates, Inc. 2003c. Vegetation and Fire and Fuels sections IN: Canyon Creek Watershed Analysis. Malheur National Forest, John Day, OR. Available on the Internet at: <http://www.fs.fed.us/r6/malheur/canyon-cr/canyon-cr-list.htm>.
- Dwire, K.A., J.B. Kauffman, E.N.J. Brookshire, J.E. Baham. 2004. Plant biomass and species composition along an environmental gradient in montane floodplain meadows. *Oecologia*. 139(2): 309-317.

- Dwire, K.A. 2001. Relations among hydrology, soils, and vegetation in riparian meadows: influence on organic matter distribution and storage. 168p. Ph.D. Dissertation. Oregon State University, Corvallis, Oregon.
- Dietz, Harland E. 1989. Grass: The stockman's crop – how to harvest more of it. Lindsborg, KS: Sunshine Unlimited, Inc.
- Erickson, M.L. December 1906. Report on Blue Mountains (West) Reserve Oregon.
- Evans, R.M. 1912. General silvical report: Wallowa and Minam Forest. Unpublished Typescript Report. USDA. Forest Service.
- Gleissman, Stephen R. 1998. Agroecology: Ecological Processes in Sustainable Agriculture. Ann Arbor Press, Chelsea, MI, p. 100.
- Ganskopp, D., Svejcar, T., and Vavra, M. 2004. Livestock forage conditioning: Bluebunch wheatgrass, Idaho fescue, and bottlebrush squirreltail. USDA-ARS Eastern Ore. Agr. Res. Ctr. 67826-A Hwy 205, Burns, Ore. 97720. J. Range Management. 57:384-392.
- Garner, Ron. 2005. Personal Communication. Oregon Dept. Fish and Wildlife District Wildlife Biologist. Hines, OR
- Gonzales, Dan. 2005. Personal Communication. Oregon Dept. Fish and Wildlife District Habitat Biologist. Hines, OR
- Green, J.S., and J.T. Flinders. 1980. Habitat and dietary relationships of the pygmy rabbit. J. Range Management 33:136-142. in Verts, B.J. and Leslie N. Carraway. 1998. Land Mammals of Oregon
- Guthrie, J. D. 1924. Development of New Oregon Pine Section Completion of Railroad from Crane to Burns Marks First Step. Published in the October 1924, The Timberman.
- Hall, Frederick C. 1973. Plant Communities of the Blue Mountains in Eastern Oregon and Southeastern Washington. USDA Forest Service, Pacific Northwest Region, R6 Area Guide 3-1.
- Johnson, Charles G. and Roderick R. Clausnitzer. 1992. Plant Associations of the Blue and Ochoco Mountains. USDA Forest Service, Pacific Northwest Region, R6-ERW-TP-036-92.
- Kaltenecker, J.H., Wicklow-Howard, M.C. and Rosentreter, R. 1999. Biological Soil Crusts in Three Sagebrush Communities Recovering from a Century of Livestock Trampling. In: McArthur, E. Durant; Ostler, W. Kent; Wambolt, Carl L., comps 1999 Proceedings: shrubland ecosystems; 1998 August 12-14; Ephraim, UT. Proc RMRS-P-11. p 222-226 Ogden, UT; U.S. Department of Agriculture, Forest Service, Rocky Mountain Research Station.
- Kaylor, Christian. 2003. "Urban and rural: the economy of the two Oregons". Oregon Labor Trends. October. <http://www.qualityinfo.org/pubs/olt/03/olt-1003.pdf>. 4 p.
- Kauffman, J.B., R.L. Beschta, N. Otting, and D. Lytjen. 1997. An ecological perspective of riparian and stream restoration in the western United States. Fisheries 22(5):12-24.

- Kauffman, J.B., P. Bayley, H. Li, P. McDowell, and R.L. Beschta. 2002. Final report research/evaluate restoration of NE Oregon streams: effects of livestock exclosures (corridor fencing) on riparian vegetation, stream geomorphic features, and fish populations. Bonneville Power Administration. Project Nos: 2000-051-00 and 2000-051-01. 87 p.
- Keen, F.P. 1950. The influence of Insects on Ponderosa Pine Silviculture. *Journal of Forestry*. 48:186-188.
- Kie, John G., Evans, Charles J., Loft, Eric R., Menke, John W. 1991. Foraging Behavior by Mule Deer: The Influence of Cattle Grazing. U.S. Forest Service Southwest Research Station., 2081 E. Sierra Ave.. Fresno CA. *Journal Wildlife Management* 55(4): 665-674.
- Kirkham, M.B. 2005. *Principles of Soil and Plant Water Relations*. Elsevier Academic Press, Burlington, MA, p. 103.
- Knight, R.L., W.C. Gilgert, E. Marston, eds. 2002. *Ranching West of the 100th Meridian. Culture, Ecology, and Economics*. Island Press
- Korman, Elaine. 2003. Recovery efforts 2002 fires: Social and economic conditions, Malheur National Forest. 1 June. 40 p.
- Langille, H.D. 1906. Report on the Proposed Blue Mountains Forest Reserve. Department of the Interior General Land Office.
- Loewen and Schwenke, 2002. Vegetative Management Analysis of Juniper.
- Mackie, R.J. 1970. Range Ecology and relations of mule deer, other game animals and livestock in the Missouri River breaks. *Montana Wildl. Monogr. The Wildlife Soc.*, Washington, D.C. 20: 1-79.
- Maruoka, Kathleen R and James K. Agee. March 1994. Fire Histories: Overview of Methods and Applications. Technical Notes from the Blue Mountains Natural Resources Institute. BMNRI-TN-2. 5 pages.
- Miller, R.F., and J. A. Rose. 1999 Fire history and western juniper encroachment in sagebrush steppe. *Journal of Range Management* 52:550-559.
- Medin, D. E., and W. P. Clary. 1989. Small Mammal Populations in a Grazed and Ungrazed Riparian Habitat in Nevada. US. Dept. Agr. For Serv. Intermountain Res. Sta. Res. Paper INT-413
- _____. 1991. Breeding bird populations in a grazed and ungrazed riparian habitat in Nevada. US. Dept. Agr. For Serv. Intermountain Res. Sta. Res. Paper INT-441.
- Mosgrove, Jerry L. 1980. The Malheur National Forest: an ethnographic history. 253 p.
- Meehan, W.R., editor. 1991. Influences of forest and rangeland management on salmonid fishes and their habitats. American Fisheries Society Special Publication 19.
- Naiman, R.J., C.A. Johnston and J.C. Kelley. 1988. Alteration of North American streams by beaver, *BioScience* 38: 753-762
- Naeth, M.A., Bailey, A.W., Pluth, D.J., Chanasyk, D.D.S., and Hardin, R.T. 1991. Grazing impacts on litter and soil organic matter in mixed prairie and fescue grassland ecosystems of Alberta. *Journal of Range Management* 44(1): 7-13.

- Neff, D. J. 1980. Effects of watershed treatment on deer and elk range use. Job Proj. Rept. W-78 R4/5, Arizona Game and Fish Dept. Tucson, AZ 28pp. in Toweill and Thomas. North American Elk Management and Ecology 962pp.
- Nelson, J.R., and D.G. Burnell. 1975. Elk-cattle competition in central Washington in Toweill and Thomas. North American Elk Management and Ecology 962pp.
- Nelson, J.R. 1985. Rare plant surveys: techniques for impact assessment. Natural Areas Journal, Vol. 5., No. 3, pp 18-30.
- Nevada EIS, 2004. United States Department of Agriculture Forest Service. March 2004. Draft Environmental Impact Statement, Martin Basin Rangeland Project. Santa Rosa Ranger District Humboldt-Toiyabe National Forest Humboldt County, Nevada.
- Obermiller, F.W. 1992. Special Report 903. Costs Incurred by Permittees in Grazing Cattle on Public and Private Rangelands and Pastures in Eastern Oregon. Oregon State University Extension Service. Pp.9-17.
- Oregon Employment Department 2003. Eastern Oregon labor trends. April. <http://www.qualityinfo.org/pubs/olt/03/olt-0403.pdf>. 14 p.
- Oregon Employment Department 2004. Eastern Oregon labor trends. October. <http://www.qualityinfo.org/pubs/olt/04/olt-1004.pdf>. 13 p.
- Prichard, Don. 1999. A User Guide to Assessing Proper Functioning Condition and the Supporting Science for Lotic Areas. Technical Reference 1737-16. Denver, Colorado.
- Platts, W. S. 1991. Livestock grazing. Pages 389-423 In W. R. Meehan, editor. Influences of forestland rangeland management on salmonid fishes and their habitats. American Fisheries Society, Special Publication 19, Bethesda, Maryland
- Quigley, Thomas M.; Arbelbide, Sylvia J., tech. eds. 1997. An assessment of ecosystem components in the interior Columbia basin and portions of the Klamath and Great Basins: volume 3. Gen. Tech. Rep. PNW-GTR-405. Portland, OR: U.S. Department of Agriculture, Forest Service, Pacific Northwest Research Station.
- Rosgen D. 1996. Applied River Morphology. Wildland Hydrology, Pagosa Springs, Colorado.
- Stewart, Kelley M., Bowyer, Terry R., Kie, John G., Cimon, Norman J., and Johnson, Bruce K., 2002. Temporospatial Distributions of Elk, Mule Deer, and Cattle: Resource Partitioning and Competitive Displacement. Journal of Mammalogy: 83 (1): 239-244.
- Skovlin, Jon M. and Jack Ward Thomas. June 1995. Interpreting long-Term Trends in Blue Mountain Ecosystems from Repeat Photography. USDA Forest Service, Pacific Northwest Research Station, PNW-GTR-315.
- Sharp, Brian E. 1992. Neotropical Migrants on National Forests in the Pacific Northwest: A compilation of existing information. Ecological Perspectives, Portland, OR.
- Sheehy, D.P. 1978. Characteristics of shrubland habitat associated with mule deer fawns at birth and during early life in southeastern Oregon. Ore. Dept. Fish and Wldl. Inf. Rep. Ser. , Wldl. 78-1, 31p. Corvallis

- Shields, Deborah J., Martin, Ingrid M., Martin, Wade E., and Haefele, Michelle A. 2002. Survey results of the American public's values, objectives, beliefs, and attitudes regarding forest and grasslands: A technical document supporting the 2000 USDA Forest Service RPA Assessment. Gen. Tech. Rep. RMRS-GTR-95. Fort Collins, CO: U.S. Department of Agriculture, Forest Service, Rocky Mountain Research Station. 111 p.
- Stewart, Kelley M., Bowyer, Terry R., Kie, John G., Cimon, Norman J., and Johnson, Bruce K., 2002. Temporospatial Distributions of Elk, Mule Deer, and Cattle: Resource Partitioning and Competitive Displacement. *Journal of Mammalogy*: 83 (1): 239-244.
- Sterling, J.C. 1999. Gray Flycatcher (*Empidonax wrightii*). In *The Birds of North America*, No. 458 (A. Poole and F. Gill, eds.)
- Thomas, J.W. et. al. 1988. Habitat- Effectiveness Index for Elk on Blue Mountain Winter Ranges. Gen. Tech. Rpt. PNW-Gtr-218. 28pp
- Thurow, Thomas L. and Taylor, Jr., Charles A. 1999. Viewpoint: The Role of Drought in Range Management. *Journal of Range Management* 52(5): 413-419.
- USDA, Natural Resources Conservation Service. 2001. Soil Quality Information Sheet Rangeland Soil Quality-Physical and Biological Soil Crusts, Rangeland Sheet 7. Available Online: <http://soils.usda.gov/sqi/files/RSQIS6.pdf>
- USDA, Natural Resources Conservation Service. 2001. Soil Quality Information Sheet Rangeland Soil Quality-Soil Biota, Rangeland Sheet 8. Available Online: <http://soils.usda.gov/sqi/files/RSQIS8.pdf>
- USDA, 1994. Ecological Subregions of the United States: Section Descriptions WO-WSA-5. Compiled by W. Henry McNab and Peter E. Avers, Washington D.C., July 1994.
- USDA, 2004. Middle Fork Stream Survey, Malheur National Forest, August 2004.
- U.S. Drought Monitor. August 2003. U.S. Drought Monitor Map. Available: <http://www.drought.unl.edu/dm/monitor.html>.]
- USDA Forest Service, Pacific Northwest Region. 1990. Final Environmental Impact Statement and Record of Decision, Land and Resource Management Plan, Malheur National Forest.
- USDA Forest Service. 1994. "Regional Foresters Amendment No 1". Notice for the Continuation of Interim Management Direction Establishing Riparian, Ecosystem and Wildlife Standards for Timber Sales. Including Appendices. Signed May 20, 1994 by John Lowe.
- USDA Forest Service. 1995. "Regional Foresters Amendment No 2". Decision Notice for the Revised Continuation of Interim Management Direction Establishing Riparian, Ecosystem and Wildlife Standards for Timber Sales. Including Appendices. Signed June 5, 1995 by John Lowe.
- USDA Forest Service, Pacific Northwest Region. 1996. Lower Malheur Watershed Assessment.

USDA Forest Service, Malheur National Forest. 2004. "Malheur contributions to special emphasis programs". August 25. 1 p.

USDA Forest Service, Malheur National Forest. 2004/2005 Proper Functioning Condition Surveys of House and Schurtz Creeks

USDA Forest Service, Washington D.C. 2003. "Changing the debate on managing national forests and grasslands," basis for Forest Service Chief Dale Bosworth's remarks during the "Breakfast Roundtable," Annual Conference Society of Environmental Journalists. Sept. 12, 2003. <http://www.fs.fed.us/news/2003/speeches/09/change-debate.shtml>. 5 p.

USDA Forest Service and Oregon Department of Forestry. 2004. Forests, farms and people: Land use change on non-federal land in Eastern Oregon 1975-2001. 42 p.

USDA Forest Service. 2005. Regional Forester's Sensitive Plant List, Pacific Northwest Region.

U.S. Forest Service (USFS). 1994. Amendment 29, Management Area 3A. IN: USFS 1990. Land and resource management plan (LRMP), appendices, and amendments: Malheur National Forest, John Day, Oregon.

U.S. Forest Service (USFS). 1995. Inland Native Fish Strategy (INFISH), Decision Notice/Finding of No Significant Impact, Environmental Assessment, Inland Native Fish Strategy, Interim Strategies for Managing Fish-Producing Watershed in Eastern Oregon and Washington, Idaho, Western Montana, and Portions of Nevada. United States Department of Agriculture, U.S. Forest Service.

U.S. Forest Service (USFS). 2002. Stream Inventory Handbook, Level I & II. PNW-R6. Version 2.2.

USDA. 1995a. Interim strategies for managing anadromous fish-producing watersheds in eastern Oregon and Washington, Idaho and portions of California. [PACFISH]. Decision Notice February 24, 1995.

USDA. 1995b. Interim strategies for managing fish-producing watersheds in eastern Oregon and Washington, Idaho and portions of California. [INFISH]. Decision Notice July 28, 1995

USDA. 1995c. PACFISH Enclosure B; Grazing Guidelines Revision. July 31, 1995.

USDI, 1997. Technical Reference 1737-14. Riparian Area Management, Grazing Management for Riparian-Wetland Areas. TR 1737-14. BLM

Weaver, J. E. 1950. Effects of different intensities of grazing on depth and quantity of roots of grasses. *Journal of Range Management* 3: 100-113.

Wilderness Society, The. 2004. Population, employment, earnings and personal income trends: Grant County, OR. Report. Pacific Northwest Office. 27 p.

Wisdom, J. M., B. C. Wales, R. S. Holthausen, C. D. Hargis, V. A. Saab, W. J. Hann, T. D. Rich, D. C. Lee, and M. M. Rowland. 1999. Wildlife Habitats in Forests of the Interior Northwest: History, Status, Trends, and Critical Issues Confronting Land Managers. In

Trans. 64th North America Wildlife and Natural Resources Conference, Section 1:
Wildlife Habitats in Forest of the Interior Northwest

Weiss, N.T. and B.J. Verts, 1984. Habitat and distribution of pygmy rabbits in Oregon.
The Great Basin Naturalist. 44:563-571. in Verts, B.J. and Leslie N. Carraway.1998.
Land Mammals of Oregon.

APPENDIX A

Draft Range Monitoring Guidelines Malheur National Forest

Malheur National Forest
Range Monitoring Guidelines
June 9, 2005

INTRODUCTION

This document provides clarification and a common understanding of monitoring methods and strategies available for use on the Malheur National Forest.

There are many accepted methodologies and analytical tools available to monitor rangeland and forest health, both in the short term and long term. The methods and tools chosen are dependent on the specific monitoring objectives as well as constraints such as timing, available funding and personnel, other priorities, and the geographical area to be monitored. Therefore no one monitoring method can always be applied across the Forest. The monitoring used and associated assessments are intended to be an important part of the adaptive management process and are subject to changes or modifications based on new scientific findings and improvements in methodologies as well as changes in definitions and policy.

Following is a sample of publications that describe many of the monitoring methods available for use on the Malheur National Forest.

- “*Utilization Studies and Residual Measurements*”, Interagency Technical Reference 1734-3;
- “*Sampling Vegetation Attributes*”, Interagency Technical Reference 1734-4.
- “*Monitoring the Vegetation Resources in Riparian Areas*”, RMRS-GTR-47.
- “*Riparian Area Management*”, TR 1737-15; A User Guide to Assessing Proper Functioning Condition and the Supporting Science for Lotic Areas;
- “*Guidelines for Establishing Allowable Levels of Streambank Alteration*”, by Ervin R. Cowley (March, 2002).
- Program Manual for “*Implementation Monitoring Program for PACFISH, INFISH and the 1998 Biological Opinions for Salmon, Steelhead, and Bull Trout*”, July, 2003.
- “*Monitoring Streambanks and Riparian Vegetation – Multiple Indicators*”, Technical Bulletin No. 2005-001; March, 2005.

Resource monitoring usually takes two forms; 1) Implementation Monitoring and 2) Effectiveness Monitoring (commonly referred to as trend monitoring):

- 1) Implementation monitoring of grazing activities (usually short term) looks at resource indicators to determine if the affects of projects or management actions are within the established parameters set to accomplish resource objectives.

Implementation monitoring usually looks at utilization of herbaceous (grass and sedges) and browse (shrubs) vegetation plus the impacts of livestock to soils and streambanks to determine if the affects of livestock grazing are within established parameters.

- 2) Effectiveness (also referred to as trend) monitoring looks at resource indicators over time to determine if we are moving towards, away from, or have met the desired resource objectives.

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Effectiveness monitoring usually looks at changes in vegetation types and density and physical characteristics of streams and uplands over a long period of time. This monitoring also may look at species populations and distribution as well as other indicators. Cumulative impacts due to all types of projects or management activities, as well as natural processes such as fire, insect infestations, etc. that have taken place on the area being monitored must be considered when reviewing the monitoring results. The present potential of the area or feature being looked at is also considered.

Because of changes in constraints and priorities over the years, the type and amount of range monitoring used on the Forest has been limited mostly to implementation monitoring. Some effectiveness (long term trend) monitoring has been conducted on the Forest, but mostly on the uplands.

FOREST PLAN STANDARDS & GUIDELINES

The Land and Resource Management Plan for the Malheur National Forest as amended (Forest Plan), provides the direction, goals, objectives, and standards by which this National Forest is to be managed.

Standards for grazing are listed in Chapter IV of the Forest Plan. It established quantifiable utilization standards for grazing Forest Wide and in riparian areas (see Forest Wide standard 87 and Management Areas 3A/3B standard #18). These standards are utilization levels of grass and grass-like species, and shrubs (see Tables IV-2, IV-4, and IV-5).

Two amendments to the Forest Plan (Amendment 29 in 1994 & PACFISH/INFISH in 1995) supplemented existing management direction and standards in the Forest plan by replacing existing conflicting direction that provided less protection for aquatic habitat. PACFISH/INFISH amendment did not replace existing Forest Plan direction where the Forest Plan provided more protection for aquatic habitat (See Attachment A).

PACFISH/INFISH identified six interim Riparian Management Objectives (RMOs).

The RMOs have numeric values for (see Glossary):

- RMO 1. Pool Frequency
- RMO 2. Water Temperature
- RMO 3. Large Woody Debris
- RMO 4. Bank Stability
- RMO 5. Lower Bank Angle
- RMO 6. Width/Depth Ratio

The RMOs were developed for the entire interior Columbia Basin. They were considered interim, anticipating that site-specific objectives would be developed as new data, monitoring, and experience led to understanding of site-specific values and variability. Local RMOs have not been developed for the Malheur National Forest. Some of the RMOs, especially 1, 2, and 3, respond very slowly to changes in management. For example, it can take 80 to 100 years to meet the large woody debris RMO east of the Cascades where trees have been removed. Pool frequency changes mainly occur in response to 10 to 20 year flood events. RMOs 4, 5, and 6 can be more responsive to livestock

management practices. Although still not amenable to annual monitoring, changes in these RMOs are generally measurable in 3 to 5 years.

PACFISH/INFISH standards and guidelines GM-1 to GM-4 state that grazing activities will not retard or prevent the attainment of (RMOs). Retard is defined in PACFISH/INFISH as slowing the rate of recovery below the near natural rate of recovery

Additional guidelines for grazing activities were provided in Enclosure B “*Recommended Livestock Grazing Guidelines*” (Revised 7/31/95) of the PACFISH implementation direction letter (August 14, 1995) from Gordon Haugen, Columbia River Basin/PACFISH Coordinator (See Attachment B).

MONITORING GUIDELINES

As previously mentioned implementation monitoring has been the main emphasis on the Forest. This monitoring will continue but it has become evident that effectiveness/trend monitoring is needed to determine the success of current management strategies, particularly in riparian areas (in meeting GM-1). Because of limited funding and personnel, emphasis will generally be placed on monitoring riparian areas. However, the uplands are also important and should not be ignored. The general assumption is that if the riparian areas are managed appropriately and meet, or are moving towards the desired condition (objectives) the uplands, are managed appropriately as well.

When monitoring, invite participation from the permittee and/or their representative where feasible.

Move Indicators/Move Triggers

Move Indicators/Move Triggers will be used to define when livestock should be moved. The livestock should be moved before these indicators are exceeded. They are most often indicators of allowable use in a given riparian area and are designed to maintain livestock effects to stream channels and riparian vegetation at acceptable levels. Common indicators/triggers currently in use are forage utilization, stubble height, streambank alteration, woody browse, and move date. Although they frequently use similar types of parameters as “endpoint indicators,” move indicators/move triggers have different purposes and need to be considered separately from endpoint indicators.

An example of move indicators/triggers might be:

<u>Plant Species</u>	<u>% Max Allowable Use</u>	<u>Locations</u>
Riparian spp. If Available or	35% or 6 inch stubble height, 10% bank alteration	All greenlines of streams
Riparian Shrubs	Un-used or lightly used	Riparian Zones
Grass and Grasslike	35% of available	Area outside of the greenline

Although these may be checked by a Forest Service employee it is the responsibility of the permittee to move their livestock off and keep them off the unit so as not to exceed the move indicators/triggers. These indicators are established so that if they are not exceeded there is a high degree of confidence that the endpoint indicators will be met.

Move Indicators/Move Triggers are set by the land management agency responsible for the allotment and may be changed if the standards or objectives are not being achieved.

Uplands

Effectiveness/Trend Monitoring

In the 1950s and early 1960s Parker Three-Step C&T (Condition & Trend) Transects were installed throughout the Forest. The majority of these were established in the uplands. Over the last five years many of these transects have been re-examined. The procedure has been to read the transect using the original Three-Step method and then reread the transect using a modified Daubenmire cover/frequency method (see Attachment D & Technical Reference 1734-4). This allows comparisons between old and new information to determine trend and establishes a baseline using the more accurate cover/frequency method for gathering future data. The re-examining of these established transects will continue. If new trend transects are established the modified Daubenmire cover/frequency will be used.

Implementation Monitoring

As previously mentioned there are a variety of monitoring methods available for use (refer to previously listed documents). The method or methods to be used will depend on the questions needing to be answered and considering other priorities. In some cases ocular observation (qualitative) will be sufficient, but when specific concerns are identified you may need quantitative methods such as Paired Clipped plots or height weight. Some of the more commonly used methods can be found in “*Utilization Studies and Residual Measurements*”, Technical Reference 1434-4.

Riparian Areas

To attain more information that would better help us determine if riparian resources are moving towards meeting the (RMOs) set forth in the Forest Land Management Plan as Amended, Forest personnel designed a monitoring strategy which combines accepted methods of both implementation and effectiveness/trend monitoring. It includes protocols to qualitatively and quantitatively evaluate the effects of the grazing activities on riparian habitats and stream channels. It uses both multiple indicator monitoring assessments (MIM), which are largely quantitative in nature, and proper functioning condition assessments (PFC), which are largely qualitative. MIM is used on specific monitoring sites, while PFC applies to larger stream reaches. Both are based on sound scientific principles and can be used to establish riparian condition and trend. Refer to **Attachment E** for a detailed description of the “**Malheur National Forest Riparian Monitoring (Condition & Trend) Strategy**”.

This monitoring strategy is very adaptive. The information collected can be used not only to assist in determining what changes may be needed to grazing management but also for NEPA analysis of other Forest management and restoration activities and projects. Also, as new scientific findings or improvements in methodologies occur, the monitoring methods used can be changed or modified.

MIM is applied at (DMAs) that have been established on a stream where usually, but not always, a PFC has been completed. In 2004 a total of 37 miles of PFC assessments were completed and 18

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Designated Monitoring Areas (DMAs) were established and assessed with MIM on the Malheur National Forest. Under this monitoring strategy it is planned to reanalyze the DMAs every five years. During years between full MIM monitoring it is planned to do the implementation monitoring annually or semi-annually.

This strategy is planned to be implemented Forest wide. It will be applied on a priority basis and be consistent with available funding and personnel. It is hoped that this strategy can be implemented in about 30 locations per year.

What to do when assessment information is not available?:

Use professional judgment based on knowledge/visual observations of the area and follow IIT procedures for implementation monitoring (PACFISH/INFISH (Forest Plan) direction. Consensus of **an interdisciplinary team is necessary** to determine compliance with PACFISH/INFISH (Forest Plan) – the “**near natural rate of recovery**” call. In addition, the Malheur Forest Plan provides standards for upland utilization levels, which may be used in conjunction with IIT procedures.

Implementation Monitoring

For those riparian areas where the MIM has not been implemented (baseline established) the following implementation monitoring will be used.

Endpoint indicators are used to determine if the stream and associated riparian areas that were actually used by livestock in the current year’s grazing season are in a condition that can be expected to result in a desired trend in aquatic habitat quality.

The monitoring procedure is described in “*Monitoring Streambanks and Riparian Vegetation – Multiple Indicators*”, Technical Bulletin No. 2005-001 (Attachment C). Additional information on the purpose for monitoring endpoint indicators is available in the “*Program Manual, July 1, 2003*”, for the Implementation Monitoring Program for PACFISH, INFISH and the 1998 Biological Opinions for Salmon, Steelhead, and Bull Trout.

DMAs will need to be established for this implementation monitoring. The criteria for selecting DMAs is in Technical Bulletin No. 2005-001 (Attachment C).

Setting endpoint indicators and values being monitored for must be determined and **documented though the interdisciplinary team effort**. This includes the Level one Team where appropriate.

General starting points for establishing Desired Riparian Values and End-Point Indicators (see Attachment E)

The following ranges of values are generally accepted starting points for setting desired riparian values and end-point indicator values that will allow for near natural rates of recovery. These values should be, and are expected to be, adjusted as more site-specific information is gathered. End-point indicators should be adjusted for timing, intensity, frequency, and duration.

Desired Riparian Objectives

- Mean bank stability: >80% (Kershner et al. 2004)

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- Mean bank cover: >80-95% (varies by greenline capability group – see Winward 2000)
- Percent saplings (shrubs): >25% (Winward 2000, UI Stubble Height Study Report 2004)
- Percent mature (shrubs): >25% (Winward 2000, UI Stubble Height Study Report 2004)
- Percent decadent and dead (shrubs): <10% (Winward 2000, UI Stubble Height Study Report 2004)
- Percent hydrophytic vegetation: >64-78 (varies by greenline capability group – Winward 2000; 80% of values shown on page 34 is the general desired target value)
- Greenline stability rank: >7 (Winward 2000)

EndPoint Indicators (Condition Thresholds)

Stubble Height: >3-6 inches (UI Stubble Height Study Report 2004, Hall and Bryant 1995)

Bank Alteration: <5-20% (Cowley 2002, Bengueyfield and Svoboda 1998)

Mean incidence of use on woody species: <50% (Winward 2000)

Desired Channel Morphology Objectives (In Development)

Bankfull width/depth ratio:

Percent fines <6mm:

Using the methods described above does not preclude using other methods also as needed.

GLOSSARY

Move Indicators/Move Triggers - define when livestock should be moved. The livestock should be moved before these indicators are exceeded. They are most often indicators of allowable use in a given riparian area and are designed to maintain livestock effects to stream channels and riparian vegetation at acceptable levels. Common indicators/triggers currently in use are forage utilization, stubble height, streambank alteration, woody browse, and move date. Although they frequently use similar types of parameters as “endpoint indicators,” move indicators/move triggers have different purposes and need to be considered separately from endpoint indicators.

Move Indicators/Move Triggers are set by the land management agency responsible for the allotment and may be changed if the standards or objectives are not being achieved.

DMAs – A “designated monitoring area” is the location in riparian areas and along streambanks of a livestock grazing unit (pasture), where monitoring takes place. DMAs are not “key areas,” under the classic range management definition used for upland monitoring; but are areas representative of grazing use specific to riparian areas used by livestock.

DMAs should not reflect an average amount of use in all riparian areas of the stream reaches in the pasture. Instead, they should reflect typical livestock use where they enter and use vegetation in riparian areas immediately adjacent to the stream. DMAs may be selected where livestock use exceeds the apparent average use of riparian areas in the pasture if, for example, the assumption is made that condition at the monitoring site reflects higher use on than other stream segments within the pasture and the DMA meets objectives, then the rest of the pasture is also meeting the objectives (see Attachment C for further information about DMA selection and use).

Small livestock concentration areas, such as trail crossings and water gaps, usually less than 30 meters (100 feet) in length should not be considered as a DMA. If these sites cause resource problems, they should be treated as a site and not as part of the overall livestock management.

Endpoint indicators – are monitoring parameters that can be linked directly to effects of livestock grazing as well as riparian or channel processes. They are used to determine if the stream and associated riparian areas that were actually used by livestock in the current year’s grazing season are in a condition that can be expected to result in a desired trend in aquatic habitat quality.

Endpoint indicators relate the condition of the stream or riparian area, after livestock use, by the typical time of the next flow event that reaches or exceeds bank-full; therefore, the appropriate time to measure and evaluate endpoint indicators is after the end of all grazing use in the pasture and after it is in the condition that it will be in by the time of the next high flow event that reaches or exceeds bank-full.

Although parameters for endpoint indicators may be similar to those for annual move indicators/move triggers, the two are not the same.

To meet the purpose, endpoint indicators should meet the following criteria:

- Relate directly to livestock grazing
- Be relatively easy to monitor
- Provide consistent results

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- Provide relatively quick information on likely trend in aquatic habitat conditions
- Be useful across a wide variety of grazing strategies.

Most if not all appropriate indicators for stream/riparian areas will center on (1) vegetation (herbaceous and/or woody riparian species) for protection and building of streambanks and (2) mechanical damage that leaves streambanks vulnerable to increased energies experienced during high flows. For example, residual stubble height is an endpoint indicator that has been correlated with a number of parameters that are beneficial to salmonids on stream types that are dependent on herbaceous vegetation for streambank stability (Clary, 1999). However, in other situations, where streambanks depend on both herbaceous and woody vegetation for stability, streambank alteration or streamside vegetation utilization (woody and herbaceous) may be more appropriate as the endpoint indicator.

GM-1 Standard states:

PACFISH

“Modify grazing practices (e.g. accessibility of riparian areas to livestock, length of grazing season, stocking levels, timing of grazing, etc.) that retard or prevent attainment of Riparian Management Objectives (RMO) or are likely to adversely affect listed anadromous fish. Suspend grazing if adjusting practices is not effective in meeting RMOs and avoiding adverse effects on listed anadromous fish.”

INFISH

“Modify grazing practices (e.g. accessibility of riparian areas to livestock, length of grazing season, stocking levels, timing of grazing, etc.) that retard or prevent attainment of Riparian Management Objectives or are likely to adversely affect inland native fish. Suspend grazing if adjusting practices is not effective in meeting Riparian Management Objectives.”

GM-2 Standard - PACFISH & INFISH states: “Locate new livestock handling and/or management facilities outside of Riparian Habitat Conservation Areas. For existing livestock handling facilities inside the Riparian Habitat Conservation Areas, assure that facilities do not prevent attainment of Riparian Management Objectives. Relocate or close facilities where these objectives cannot be met.”

GM-3 Standard - PACFISH & INFISH states: “Limit livestock trailing, bedding, watering, salting, loading, and other handling efforts to those areas and times that would not retard or prevent attainment of Riparian Management Objectives or adversely affect inland native fish.”

GM-4 Standard - PACFISH & INFISH states: “Adjust wild horse and burro management to avoid impacts that prevent attainment of Riparian Management Objectives or adversely affect inland native fish.”

Greenline Vegetation - is the first perennial vegetation closest to the water line at the time of measurement. The greenline is generally composed of rushes, sedges, and riparian grasses, such as bluejoint reedgrass or creeping bentgrass.

Implementation Monitoring Task Team – This team reports to the Deputy Team and provides direction to the field units for implementation monitoring protocols and upward reporting.

Interagency Implementation Team – Sometimes referred to as the IIT (PACFISH/INFISH, PIBO) this oversight team was made up of State Deputies for USFS, BLM, USFWS, NOAA, and EPA. It was dissolved and replaced by the “Implementation Monitoring Task Team.”

Key areas – are portions of the range that because of its location and available forage receives more use by livestock than the rest of the range. **It does not reflect an average amount of use.** It serves as a monitoring and evaluation focal point for range condition, trend, and degree of grazing use. Properly selected key areas give an indication of the overall ability of current grazing management to meet all resource management objectives. A key area guides the general management of the entire area of which it is a part.

Key Management Species - Those species, which must, because of their importance within the plant community, be specifically identified and considered in the management program. These species are known to respond to grazing pressure in certain ways and are therefore valuable for determining when it is time to remove the livestock so that long-term objectives can be met. They are normally native species, are palatable to livestock and /or wildlife, and are an important part of the plant community. In other words they are the herbaceous and or shrub species we want or should be there.

PIBO - Is the PACFISH/INFISH Biological Opinion signed and approved in 1998 by the Regional Foresters (R1, R4, R6), Regional Director of the Fish and Wildlife Service, and BLM State Directors (OR/WA, ID, MT, NV).

Riparian - refers to land adjacent to perennial streams, lakes, and reservoirs and including other well developed riparian vegetation (primarily intermittent streams). This land is specifically delineated as the transition between the aquatic ecosystem and the adjacent upland terrestrial ecosystem and is defined by soil characteristics and distinctive vegetation communities that require free and unbound water (water influence zone). This encompasses the flood prone area, which is a zone adjacent to the stream bank that is subject to frequent flooding, i.e. every 1-3 years. "Green line" and riparian area are not identical.

RMOs – Riparian Management Objectives developed in the interim for landscape scale assessment used for describing optimum habitat for anadromous fish. Applied at the watershed scale for streams of moderate to large size (3rd to 6th order streams). The indicators are:

1) **Pool Frequency** (all systems; **PACFISH & INFISH**) – varies by channel width,

Wetted width in feet:	10	20	25	50	75	100	125	150	200
Number of pools per mile:	96	56	47	26	23	18	14	12	9

2) **Water Temperature PACFISH** – No measurable increase in maximum water temperature (7 day moving of daily maximum temperature measured as the average of the maximum daily temperature of the warmest consecutive 7 day period). **Maximum water temperature below 64°F within migration and rearing habitats and below 60°F within spawning habitats.**

INFISH - No measurable increase in maximum water temperature (7 day moving of daily maximum temperature measured as the average of the maximum daily temperature of the warmest consecutive 7-day period). **Maximum water temperature below 59°F within adult holding habitat and below 48°F within spawning and rearing habitats.**

3) Large Woody Debris (forested systems; *PACFISH*) – East of Cascade Crest in **OR, WA, ID**: > 20 pieces/Mile; > 12 inches diameter; > 35 ft. length.

INFISH – East of Cascade Crest in **OR, WA, ID, NV, and western MT**: > 20 pieces per mile; > 12 inch diameter; > 35 foot length.

4) Bank Stability (non-forested systems *PACFISH* & *INFISH*) - > 80 percent stable.

5) Lower Bank Angle (non-forested systems *PACFISH* & *INFISH*) - > 75 percent of banks with < 90 degree angle (i.e., undercut)

6) Width/Depth Ratio (all systems *PACFISH* & *INFISH*) - < 10 (mean wetted width divided by mean depth)

RHCAs – Riparian Habitat Conservation Areas are portions of watersheds where riparian dependent resources receive primary emphasis, and management activities are subject to specific standards and guidelines. RHCAs include traditional riparian corridors, wetlands, intermittent streams, and other areas that help maintain the integrity of aquatic ecosystems by (1) influencing the delivery of coarse sediment, organic matter, and woody debris to streams, (2) providing root strength for channel stability, (3) shading the stream, and (4) protecting water quality (Naiman et. al. 1992)

University of Idaho Stubble Height Study Report (2004) – A team of scientists, land management agency specialists, ranchers, and consultants was formed in 2003 to review and make recommendations for the use of stubble height monitoring to the Regional Forester, Region 4 Forest Service and the State Director, Idaho BLM.

LITERATURE CITED

- Cowley, E.R. and T.A. Burton. 2005. Monitoring Streambanks and Riparian Vegetation – Multiple Indicators. Tech. Bull. No. 2005-002. USDI, BLM, Idaho State Office. Boise, ID.
- Hall, Frederick C. & Bryant, Larry. 1995. Herbaceous Stubble Height as a Warning of Impending Cattle Grazing Damage to Riparian Areas. General Technical Report. PNW-GTR-362
- Interagency Technical Reference. 1999. Utilization Studies and Residual Measurements. Interagency Technical Reference. BLM/RS/ST-96/004+1730
- Interagency Technical Reference. 1999. Sampling Vegetation Attributes. Interagency Technical Reference. BLM/RS/ST-96/002+1730
- Prichard, D. 2003. Riparian Area Management: A User Guide to Assessing Proper Functioning Condition and the Supporting Science for Lentic Areas. Tech. Ref. 1737-16. 1999, revised 2003. USDI, BLM. Denver, CO.
- Prichard, D. 1998. Riparian Area Management: A User Guide to Assessing Proper Functioning Condition and the Supporting Science for Lotic Areas. Tech. Ref. 1737-15. USDI, BLM. Denver, CO.
- Technical Report. 1998. RIPARIAN AREA MANAGEMENT. A User Guid to Assessing Proper Functioning Condition and the Supporting Science for Lotic Areas. TR 1737-15
- University of Idaho Stubble Height Review Team. 2004. University of Idaho Stubble Height Study Report. U. of I. Forest, Wildlife and Range Experiment Station, Contribution No. 986.
- Winward, Alma H. 2000. Monitoring the Vegetation Resources in Riparian Areas. General Technical Report RMRS-GTR-47.

ATTACHMENTS

- Attachment A..... Forest Plan Standards Relating to Range Activities
- Attachment B..... PACFISH Enclosure B, 7-31-95
- Attachment C..... Monitoring Streambanks and Riparian Streambank
Vegetation
- Attachment D..... Protocol Comparison, Tri-Forest Cover/Frequency &
Daubenmire Method
- Attachment E..... Malheur National Forest Riparian Monitoring (Condition
& Trend) Strategy

APPENDIX B

Draft Riparian Monitoring Strategy Malheur National Forest

Draft 5/16/2005

Malheur National Forest

Riparian Monitoring (Condition & Trend) Strategy



Photo by Tom Friedrichsen

Middle Fork John Day River

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Malheur National Forest Riparian Monitoring (Condition & Trend) Strategy

¹Tom Friedrichsen, Brian Hoefling and Alan Miller

There are many accepted methodologies and analytical tools available to monitor rangeland and forest health, both in the short term and long term. The methods and tools chosen are dependent on the specific monitoring objectives as well as constraints such as timing, available funding and personnel, other priorities, and the geographical area to be monitored. Described below are the overall monitoring strategy, as well as methods and analytical tools, which the Malheur National Forest is currently using for determining condition and trend of riparian ecosystems as they relate to grazing activities. The assessments and monitoring used are intended to be an important part of the adaptive management process and are subject to changes or modifications based on new scientific findings and improvements in methodologies as well as changes in definitions and policy. Moreover, risk analyses and prioritization should be completed in all areas prior to initiating monitoring in order to determine the level and intensity of quantitative data collection. PFC assessments serve as the risk analyses/prioritization step.

Below are the key components of the Malheur National Forest Riparian Monitoring Strategy:

1. Information Gathering and Interpretation
 - Proper Functioning Condition (PFC) Assessment – qualitative over a stream reach (geomorphic or unit specific)
 - Multiple Indicator Monitoring (MIM) – quantitative assessment of a site specific location
 - Analysis – interpretation and evaluation of information to assess current riparian condition and trend)
 - Channel cross-section, streambed particle size distribution, and reach description measurements (i.e. Rosgen Channel Type)
2. Determinations – demonstrate compliance with Forest Plan, including PACFISH & INFISH amendments. See Appendix A for further discussion of Forest Plan standards and objectives related to riparian areas, water quality and fish habitat.
 - Standards are GM 1-4 in PACFISH & INFISH; standards 15-21 in Forest Plan (see Chpt. IV).
 - Management Objectives for stream and riparian areas are described in PACFISH & INFISH amendments (RMO's) and in Amendment 29 of Forest Plan for MA3A/B (DFC's).
3. Recommendations
 - Shows linkage between condition, trend, and past/current management activities
 - o A process that provides support for decisions
 - Allows annual adjustment of management strategies, as needed, to achieve desired riparian objectives

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1. Information Gathering and Interpretation

PROPER FUNCTIONING CONDITION ASSESSMENTS

Proper functioning condition (PFC) assessments are a qualitative method for determining the condition of riparian areas. The term PFC is used to describe both the assessment process, and a defined, on the-ground condition of a riparian area. PFC assessments can be an appropriate starting point for determining and prioritizing the type and location of quantitative inventory or monitoring necessities, and has been proven to be an excellent communication tool for bringing a wide diversity of publics to agreement. All PFC assessments are to be conducted with a journey level interdisciplinary team. One purpose of these assessments is to help correlate the findings with the trend towards attainment of the Malheur Forest Plan Riparian Management Objectives (RMOs), more specifically, to determine whether grazing practices are retarding attainment of Near Natural Rates of Recovery of RMOs. See Appendix B for the PFC protocol.

MULTIPLE INDICATOR MONITORING

The July 1, 2003 PACFISH/INFISH Implementation Monitoring Program Manual provides the background and direction for monitoring. The Multiple Indicator Monitoring supplement by Cowley/Burton, dated May 2005 with addendums, provides the procedures in use by the Malheur National Forest to monitor streambanks and riparian vegetation. The above documents were created by the Interagency Implementation Team; see Appendix C for these documents. Multiple Indicator Monitoring for grazing activities is designed to determine whether or not livestock grazing management is resulting in “Near Natural Rates of Recovery” as defined by PACFISH/INFISH. Below are the four components, which comprise multiple indicator monitoring. Monitoring is to be conducted by an interdisciplinary professional team trained in riparian plant identification and channel classification. Multiple indicator monitoring consists of implementation (endpoint indicator) monitoring and effectiveness (riparian objective) monitoring at designated locations (i.e. designated monitoring areas).

DESIGNATED MONITORING AREAS

Designated Monitoring Areas (DMA's) are the locations in riparian areas and along streambanks where quantitative monitoring takes place. They are monitored to provide information concerning the management of critical areas. Essentially DMA selection relies on the theory that if proper management occurs in that location, proper management will be occurring throughout the rest of the management unit. See Appendix C for the procedures used to collaboratively establish DMA's. The goal is to establish twenty or more DMA's each grazing season in order to establish a 5-year re-monitoring schedule and have coverage across the Forest's allotments.

IMPLEMENTATION MONITORING - ENDPOINT INDICATORS

Implementation (endpoint indicator) monitoring measures indicators to determine if livestock management is being applied, as prescribed, and that effects of management do not carry through to the next year. It provides information to assist with making decisions under adaptive management. Presently, implementation monitoring includes: modified extensive browse utilization (Interagency Technical References, 1996), modified stubble height (Interagency Technical Reference, 1996 and Challis Resource Area, 1999), and streambank alteration (Cowley, 2004). These procedures provide information to refine and make annual adjustments

to livestock grazing management practices necessary to meet long-term management objectives (adaptive management). See Appendix C for sampling procedures used.

EFFECTIVENESS MONITORING - RIPARIAN OBJECTIVES

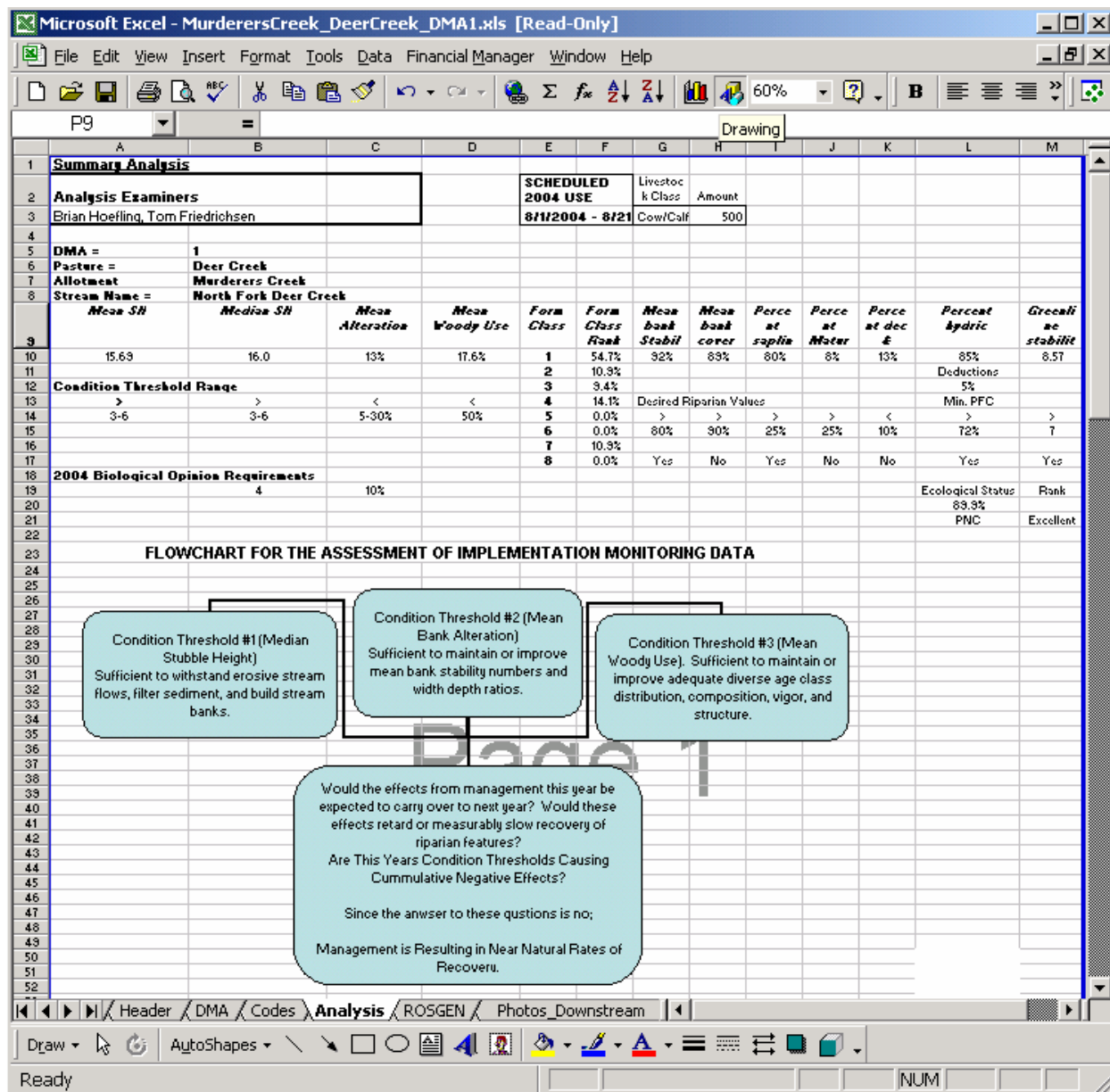
Effectiveness (riparian objective) monitoring is designed to address the question of whether or not management practices currently applied to the area are achieving the desired results. These procedures are designed to measure changes in vegetation and streambank stability over time, i.e., trend. The goal is to conduct effectiveness monitoring every three to five years on riparian areas and streambanks. This period of time is considered to be the minimum necessary to detect changes, although unusually wet years and/or flood events may result in short-term changes that validate the need to monitor more frequently, or at least at the time of the event. Budget and personal constraints may limit the extent in which monitoring of this type will be conducted. Presently, effectiveness monitoring includes: modified greenline, modified woody species regeneration, and streambank stability. These provide data and information concerning the present conditions and trend of riparian vegetation and streambanks. Monitoring procedures for vegetation include modifications of methods described by Winward (2000) and Coles-Ritchie *et al.* (2003). Streambank stability is a modification of the method described by Henderson *et al.* (2003). See Appendix C for sampling procedures used.

In 2005, additional information collected will include: **CHANNEL MORPHOLOGY OBJECTIVES (CHANNEL CROSS-SECTION, STREAMBED PARTICLE SIZE DISTRIBUTION), & REACH DESCRIPTION MEASUREMENTS**. The objective of the channel cross-section measurements is to be able to quantifiably determine bankfull and wetted widths, width-to-depth ratios and the entrenchment ratio; the objective of the streambed particle size distribution measurement is to be able to determine the percent fines less than 6 mm in diameter (D), D16, D50 (median particle size), and D84; the objective of the reach description measurements is to be able to determine sinuosity and stream gradient (see Appendix D for sampling protocols). This information is essential in determining Rosgen channel type and Winward greenline capability group, both of which are needed in the riparian analysis process as well as interpreting site sensitivity to disturbance for the decision flowchart process. This information is used to determine the direction and rate of change in these physical attributes (primarily channel morphology) over time as a function of management activities (primarily related to livestock management), and to help determine if aquatic systems are being degraded, maintained, or restored across the Malheur National Forest. The Forest is currently working on developing appropriate numerical values for these physical attributes, by Rosgen stream type.

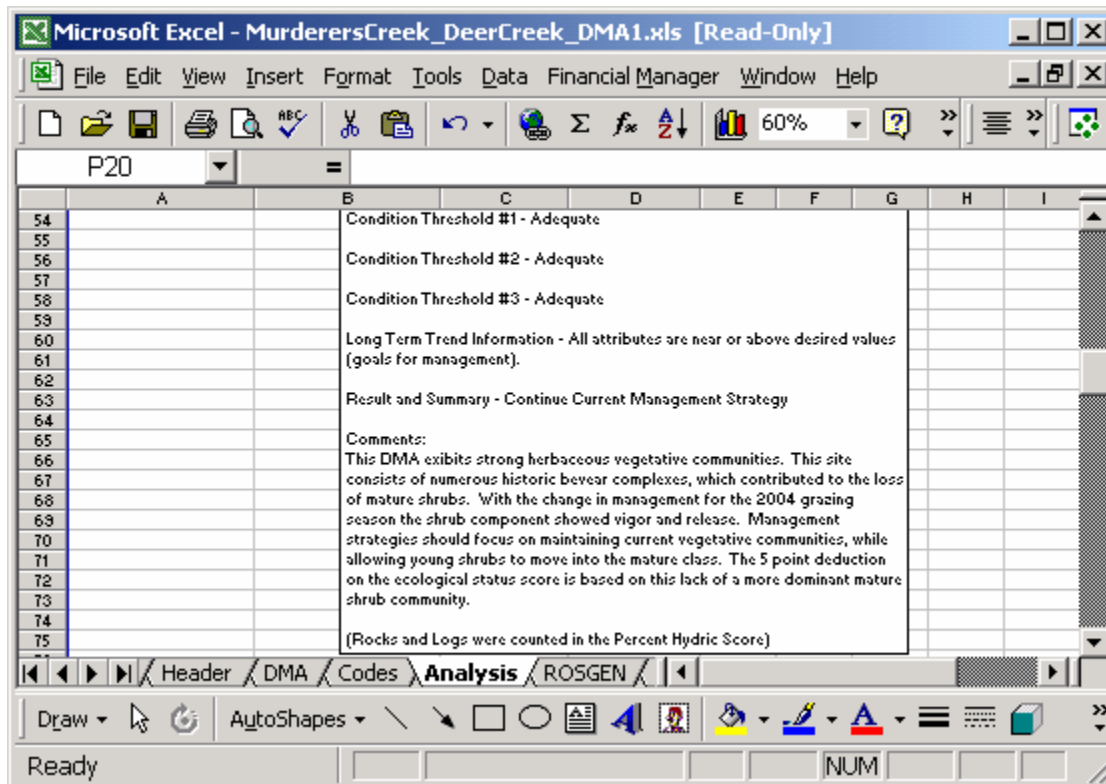
DATA AND ANALYSIS TOOLS

Data collected at each DMA includes six long-term indicators for stream/riparian areas, Rosgen stream classification information and reach description measurements, photographs, universal transverse mercator (UTM) coordinates, and decision flowcharts/summaries. A spreadsheet was developed to analyze implementation (endpoint indicator) and effectiveness (riparian and channel morphology objectives) monitoring data in order to determine riparian and channel conditions and compare them over time. The primary purpose of the decision flowchart is to assess implementation and effectiveness monitoring data and to determine if current grazing management is resulting in “Near Natural Rates of Recovery”, as described in PACFISH Enclosure B. See the following two pages for an example of the decision flowchart.

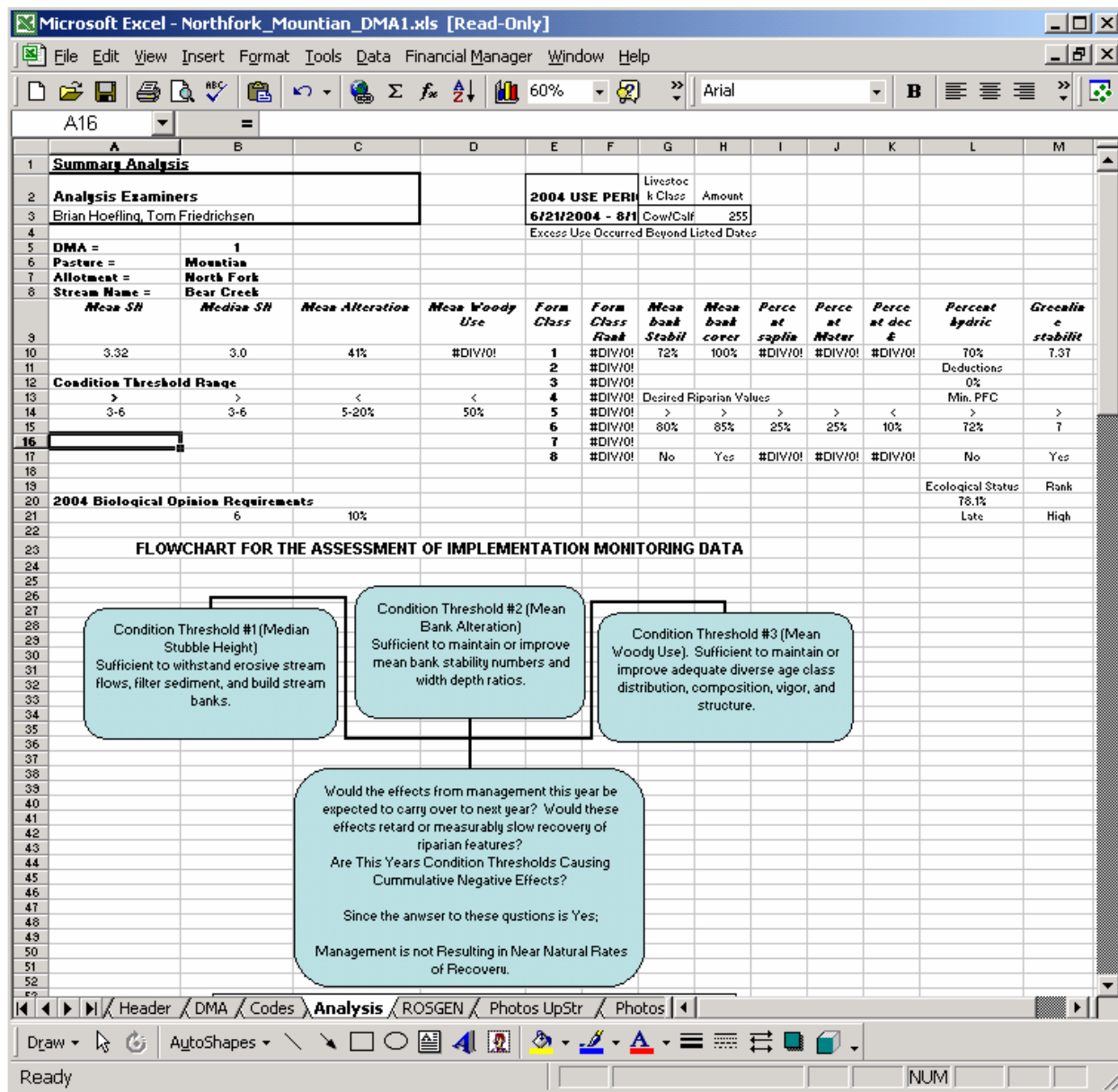
DECISION FLOWCHART EXAMPLE



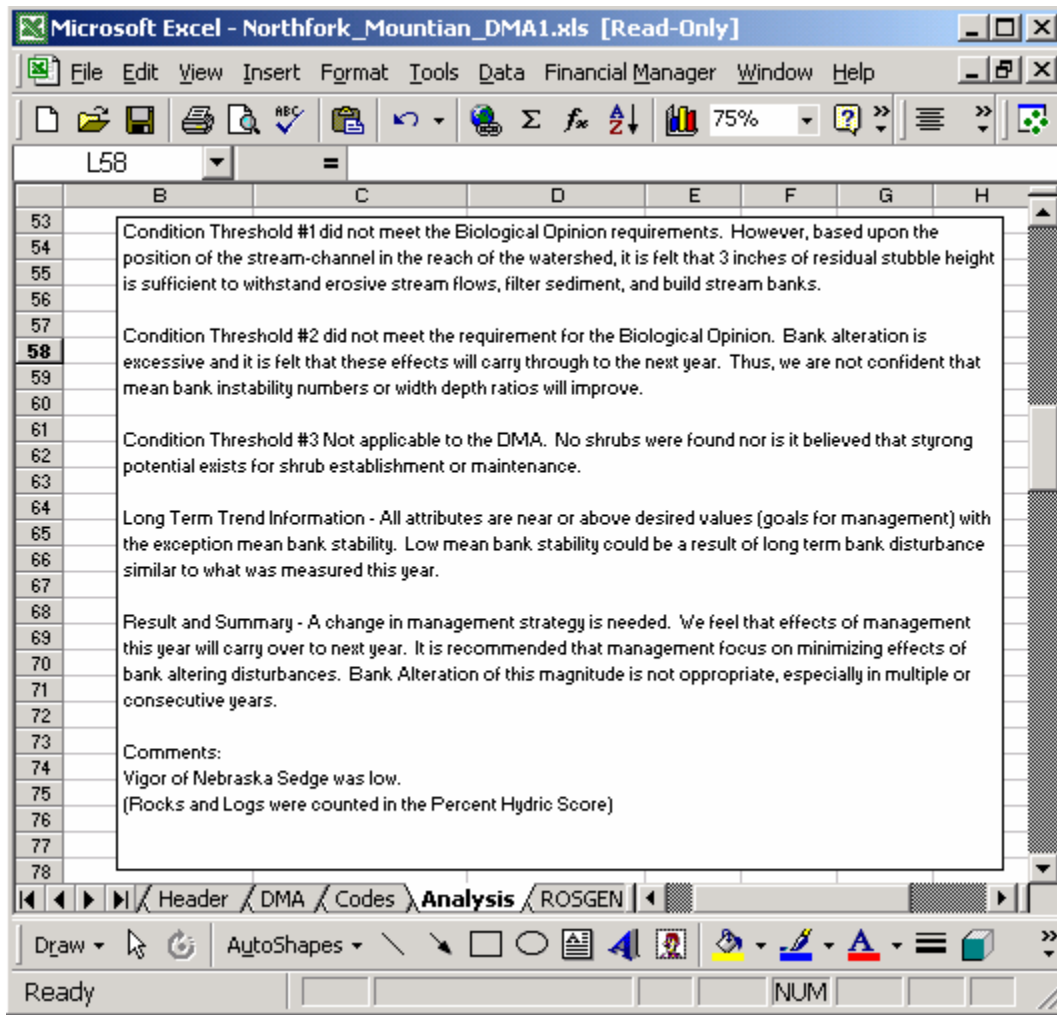
DECISION FLOWCHART EXAMPLE



DECISION FLOWCHART EXAMPLE



DECISION FLOWCHART EXAMPLE



2. Determinations (demonstrate compliance with PACFISH and INFISH)

Assessments/Monitoring as they relate to RMO's

There is a correlation between the PFC assessment attributes and processes and the Forest RMO elements. The RMO elements are represented by quantitative values established by the Malheur National Forest Plan as amended by PACFISH and INFISH. While the RMOs are largely quantitative and rely on physical measurements taken using appropriate scientific methods (such as Level II Stream Survey), the PFC approach for determining stream/riparian condition is qualitative; relying on highly trained and experienced surveyors to evaluate the PFC assessment elements. Both, however, are designed to evaluate similar attributes and processes. The general areas of comparability are presented in Table 1.

The PFC assessments do not measure individual RMO parameters in the field nor do the teams performing them claim to be conducting a quantitative inventory. During a PFC assessment, the interdisciplinary team examines the structure and function of riparian areas and stream channels to determine if grazing management is retarding attainment of RMOs. Many factors and land management practices other than grazing affect stream function and the related RMOs. However, this assessment focuses primarily on the role of grazing management on trend toward or away from attainment of RMOs. The assessment methodology requires evaluating reaches of streams, in all cases more than ¼ mile, using professional knowledge and experience. As noted in the methodology section of the PFC assessment protocol, the determination of trend involves a variety of factors. Vegetation is likely the predominant indicator of trend in most of the reaches surveyed and includes factors, both recent and legacy, in terms of condition. Vegetation trend depends on the kind of species present as well as their vigor, abundance, and age class. Therefore, trends typically represent a longer-term look at the effects of management and response of plants.

Those reaches that have achieved PFC, or are functioning at risk (FAR) with an upward trend, indicate that current management practices are allowing the stream/riparian zone to be maintained at or move toward full ecological potential or the new capability imposed by socio-economic constraints. The natural rate of recovery will depend on the annual variation in climatic conditions that influence moisture regimes and plant growth. Catastrophic events, such as 100-year floods and fire, can also modify recovery rates by setting back ecological conditions to an earlier seral state. Streams having riparian vegetative communities exhibiting presence and abundance of late-seral communities will recover quicker following major disturbance events as compared to those dominated with early-seral communities.

Quantitative measurements such as stream temperature, pool frequency, bank angle and other parameters are used to describe desired characteristics in the RMO's. However, at any given point in time, the measurements may provide very little information to the manager in terms of whether or not current grazing management practices are being successful in meeting a "Near Natural Rate of Recovery" as required by standard GM-1. By definition, streams that are not at PFC may not be able to sustain their dimension, pattern and profile in a moderately high flow event. Quantitative measurements on several of the parameters are not positively sustainable below PFC, thus lessening their significance (if the dimension, pattern and profile of a stream is

a major reason for a stream reach being below PFC, then a RMO measure such as pools/mile is of less importance until the dimension, pattern and profile are in equilibrium at a functional desired state). It is not unusual for streams below PFC to make a series of recovery/degradation progressions that alter important channel characteristics. Some of these may be positive, others negative, in terms of desired characteristics. They are often a necessary part of recovery processes, but nonetheless, they affect the reliability and significance of quantitative measurements over time. They also often fail to take into account the differing pathways streams take towards recovery, even those that may be on similar ecological sites. Upward trend, such as from early to late-seral vegetative communities, as determined during the PFC assessment process, can be a reliable indicator of successful management towards a “Near Natural Rate of Recovery”. While it is qualitative, experienced interdisciplinary teams use processes and principles based in science for the determination.

Table 1. Comparison of PFC Checklist Items with RMO Categories

Malheur Forest RMO/DFC Categories	Comparable Attributes & Processes Addressed by PFC Assessment	Relation
Pool Frequency/Mile	3, 9, 11, 13	When properly functioning riparian areas and stream channels are adequately processing streamflows and sediment yields, the streams physical potential can be expressed.
Water Quality (Temperature)	3, 4, 6, 7, 8, 11, 15	Properly functioning riparian vegetation, channel condition, and channel sinuosity contribute to maintenance or improvement of water temperature
Large Woody Debris (LWD)	6, 12, 13	For riparian areas with the potential for large woody debris, the indicators compare existing to potential
Bank Stability	3, 4, 9, 11, 13, 15, 17	As the vegetation composition of a riparian areas moves towards plants with large dense root structures and physical and biological factors are able to keep streamflow energy and sediment yields in balance, bank structure and geometry can approach site potential
Lower Bank Angle	3, 9, 11, 15, 17	
Channel Width/Depth Ratio	3, 4, 8, 9, 11, 13, 15, 17,	
Sediment/Substrate	1, 3, 5, 15, 16, 17	
Riparian Vegetation (% of bank cover)	11	

PACFISH/INFISH grazing guidelines (Enclosure B Rev. 8/14/95) state that the “Influences of grazing must result in riparian restoration at a minimum of near natural rates.” This same

reference, page 7, describes achieving a “near natural rate of recovery”, in general, as avoiding effects that “carry over to the next year” so as to prevent the likelihood of cumulative, negative effects (see PACFISH Enclosure B, page 7, for definition of “near natural rate of recovery”). In this light, a primary focus of the Malheur National Forest Riparian Monitoring Strategy in evaluating the effects of current grazing activities/strategies and recommending any modifications for future grazing is on avoiding negative effects, the influence of which, is likely to still be existent at the beginning of the next grazing season to a degree that would meaningfully impede recovery (additionally, riparian ecological condition and site potential are considered when making management recommendations). This should allow for attainment of a “near natural rate of recovery” for riparian systems, as defined by PACFISH/INFISH. In correlating PFC assessment findings with the trend towards attainment of RMOs, for the specific purpose of determining whether grazing practices are retarding RMO attainment and “near natural rates of recovery”, the relevant assumptions and guidelines from Enclosure B, “Recommended Livestock Grazing Guidelines for Use Within the Range of Anadromy – PACFISH” were considered. These assumptions are shown below:

Key Assumptions

- Influences of livestock grazing must result in riparian restoration at a minimum of “near natural” rates. We recognize that some environmental effects are inherent with the presence of livestock. However, we believe that “near natural” rates of recovery can be provided if we limit environmental effects to those that do not carry through to the next year, thereby avoiding cumulative, negative effects.
- Adverse affects to aquatic habitat associated with livestock grazing can be avoided and riparian restoration provided by controlling:
 - Season of use (tied to plant phenology and soil characteristics rather than calendar dates) and
 - Amount of use.
- Providing for the health, form and function of riparian systems should remain the focus of grazing management efforts.
- Stream gradient, inherent stability characteristics, potential vegetative communities, and type of degradation (i.e., vegetation vs. bank/channel characteristics) are important factors in determining restoration potential and guidelines that will lead to restoration.
- Guidelines for developing allotment specific prescriptions can be identified at the programmatic level. However, in general, the prescriptions themselves must be developed to fit “on-the-ground” conditions within the context of those guidelines.
- In some definable cases, avoiding adverse effects can only be accomplished by suspending livestock grazing. These cases include problems related to ecological status.
- Effective monitoring using specific measurement approaches, as well as administration are essential.

Quantifiable techniques like those in Multiple Indicator Monitoring are encouraged in conjunction with the PFC assessment for individual calibration and/or where answers are uncertain. It is rather easy to determine condition of riparian ecosystems at extreme ends of ecological status (e.g. Late and Early Seral); however, it may be desirable to collect quantitative information where ecological status is not as easily defined.

Multiple Indicator Monitoring is divided into two primary parts. First, is implementation (endpoint indicator) monitoring which measures indicators to help determine if livestock management is being applied as prescribed and that effects of management do not carry through to the next year. Second, effectiveness (riparian and channel morphology objectives) monitoring which is designed to address the question of “whether or not management practices currently applied to the area are achieving the desired objectives or values”. Together these help determine appropriate condition thresholds over time. A condition threshold (endpoint indicator) is the quantitative measure of selected indicators of impending impacts that could carry over to the next year. The selection of indicators used (e.g. stubble height, bank alteration, incidence of hardwood riparian shrubs) is based on the potential of the site. Determinations made on whether effects of management will carry over to the next year are based on Multiple Indicator Monitoring and PFC assessment results, as well as, assessing potential sensitivity and inherent stability of the riparian area through the ID Team process.

When Multiple Indicator Monitoring is included to address if management practices related to livestock grazing are meeting near natural rates or recovery (i.e. not retarding attainment of RMO's), a discussion of the three condition thresholds is included. These are: Condition Threshold #1 - Median Stubble Height and its ability to withstand erosive stream flows, filter sediment, and build stream banks; Condition Threshold #2 - Mean Bank Alteration and its influence on maintaining or improving mean bank stability values and width depth ratios; Condition Threshold #3 - Mean Riparian Hardwood Incidence of Use and its importance for improving adequate diverse age class distribution, composition, vigor, and structure of shrubs.

Management of rangelands is both a science and an art. With this in mind, land managers should base decisions on both “quantitative science” and “qualitative experience”. This combination of science and art is necessary due to the intricacies and variability of disturbances. There is an inherent link between this science, art, and the methodologies used for determining condition and trend of riparian ecosystems (e.g. Multiple Indicator Monitoring and Proper Function and Condition Assessments). While Multiple Indicator Monitoring is largely quantitative in nature and Proper Function and Condition Assessments are largely qualitative, both are based on sound scientific principles; and when used together, they complement each other extremely well. In 2004, where overlap occurred in the same stream reach, there was a strong correlation (identical results) between the two methods. Based on these results, the Malheur National Forest utilized the strong correlation to make highly supported determinations of riparian condition and trend, even on reaches where only a PFC assessment was conducted. Additionally, since a PFC reach is considerably longer than a DMA site, the correlation between them allows for the extrapolation of the quantitative data to the qualitative determinations, providing for quality results. Individually, each method can be used to establish riparian condition and trend, and make determinations of near natural rates of recovery, so long as the limitations of each method are understood. Both methodologies are described in Appendices B and C, respectively.

The following guidelines for livestock grazing were considered when recommendations were developed. Additionally, an interdisciplinary team considered measured attributes (when available) these are listed below.

Recommended Programmatic Grazing Guidelines

As noted in the Key Assumptions above, the goals, or desired outcomes of management efforts provide the foundation for the recommended programmatic livestock grazing guidelines. The guidelines and resulting site-specific prescriptions are of value only to the extent they contribute to meeting these goals. The Environmental Assessment for PACFISH interim direction provides suitable riparian goals for the land management activities (See PACFISH EA, APPENDIX C, pages C-3 and C-4). All management activities implemented, including non-livestock related activities, should contribute to accomplishment of these goals where they can be achieved.

Where these goals are met, the following on-the-ground attributes will be evident (See BLM Technical Reference 1737-9 and 15, Process for Assessing Proper Functioning Condition):

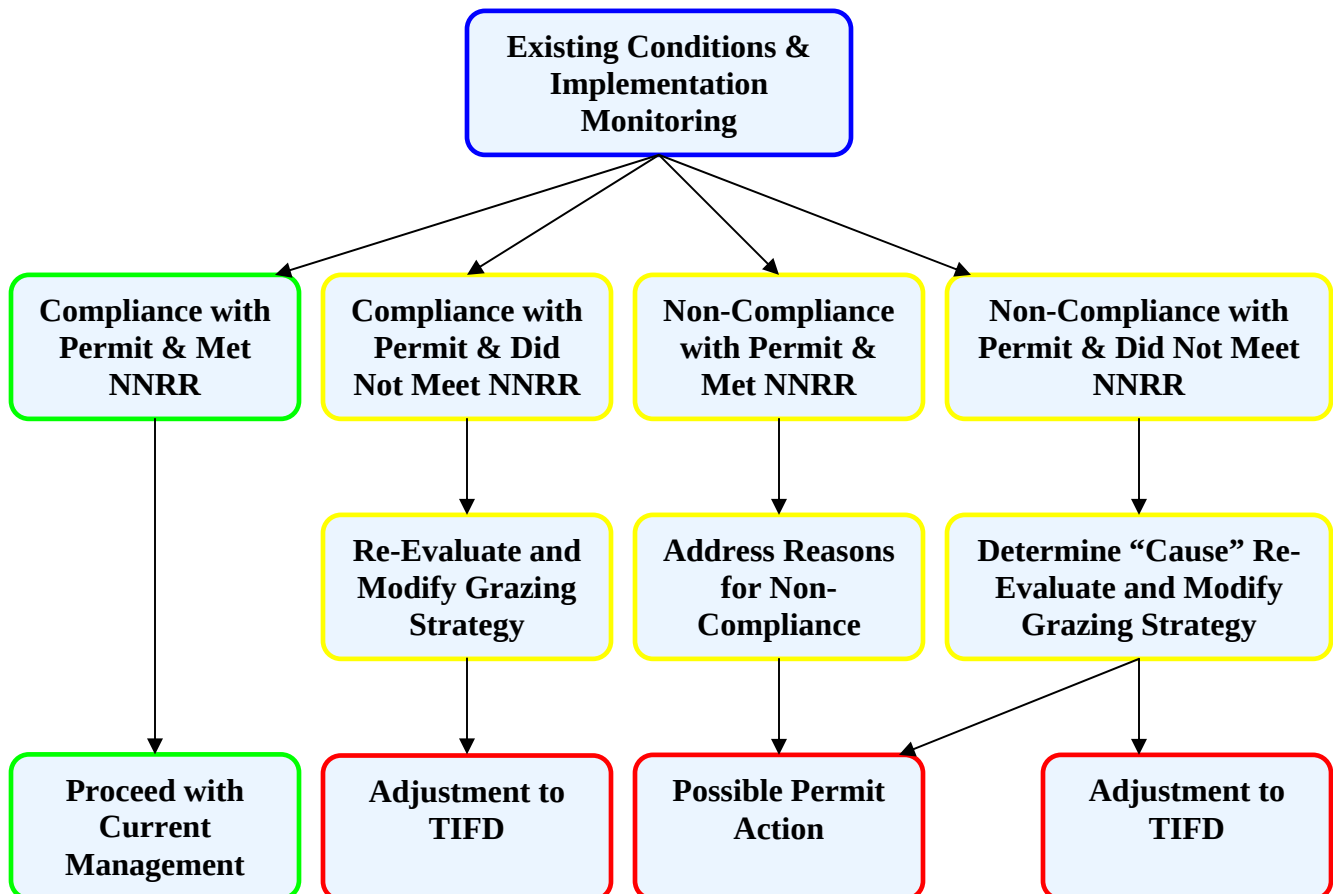
1. Floodplains are inundated by relatively frequent events (i.e., 1-3 years).
2. Stream sinuosity, width/depth ratio, and pool frequency reflect the capabilities of the setting (i.e., landform, geology, and bioclimatic region).
3. Lateral stream movement is associated with natural sinuosity, (i.e., streambank stability reflects the inherent capabilities of the setting).
4. The overall system is vertically stable.
5. Streambank morphology reflects the inherent capabilities of the ecological setting.
6. Upland watershed conditions within the allotment are not contributing to degradation of riparian habitat conservation areas.
7. Riparian vegetation characteristics:
 - a. Diverse age structure for woody species (where such species are part of the natural system);
 - b. Plants exhibit high vigor;
 - c. Species present indicate maintenance of riparian soil moisture;
 - d. Streambank vegetation protects stream banks and dissipates energy during high flows (i.e., consider community type composition, rooting characteristics, and plant density); and
 - e. Provide an adequate source of coarse and/or large woody debris (where such debris is a part of the natural system)."

All of the available information is to be synthesized in an interdisciplinary team environment to determine recommendations for use in development of Annual Operating Instructions (AOI's) with permittees, in order to provide a high degree of assurance that the Forests goals for riparian and stream channel conditions will be met. Line officers are given the opportunity to review all recommendations and use them to help guide the development of future proposed actions. If proposed actions do not incorporate recommendations, then a rationale should be provided detailing the reasons for the decision.

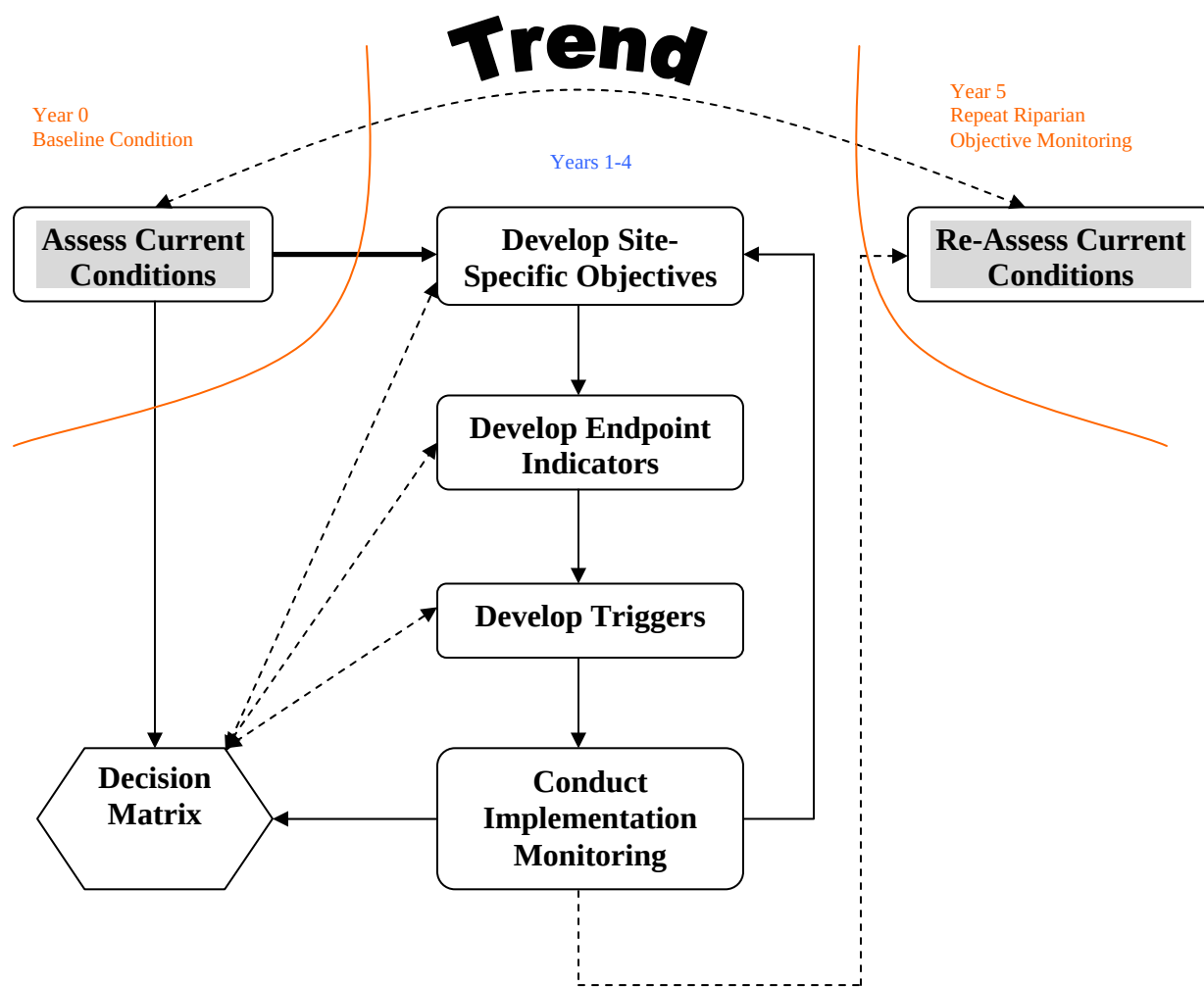
3. Recommendations

Interdisciplinary team recommendations to rangeland administrators rely heavily on quantitative and qualitative information (such as PFC assessments and MIM) that assess characteristics/attributes of riparian function, which indicate riparian condition and trend. Rangeland Management Specialists use these recommendations in combination with range administration to develop a decision matrix (see below); the end product of which is a roadmap displaying the current ecological condition, a determination of whether or not livestock grazing management is resulting in “Near Natural Rates of Recovery” (NNRR) as defined by PACFISH/INFISH, determining if adjustments to Timing, Intensity, Frequency, and Duration (TIFD) are necessary, and whether or not the Permit was satisfactorily implemented. All of these components are considered together when developing strategies that would move riparian and stream characteristics towards desired values, without negative effects the influence of which is likely to still be existent at the beginning of the next grazing season to a degree that would meaningfully impede recovery.

Decision Matrix



FLOWCHART FOR RIPARIAN MONITORING STRATEGY



Supporting Description of Flowchart

1. Assess Current Conditions

What?

Determine condition of riparian vegetative community

Determine condition of stream channel (physical attributes) and stream banks

Develop desired riparian vegetation and channel morphology objectives for the area based on potential riparian vegetation and channel type.

Determine if a near natural rate of recovery is being achieved under current management scheme.

How?

Use multiple indicator monitoring and/or proper functioning condition assessments, along with stream channel physical attribute measurements to construct an analysis of current conditions at designated monitoring areas. Where possible, overlay multiple indicator monitoring with proper functioning condition assessments.

Who?

The Forest Monitoring Team will conduct quantitative and qualitative surveys with assistance from District range personal. (Years 0 or baseline and Year 5.....)

District ID Teams will conduct annual or semi-annual quantitative implementation (endpoint indicator) monitoring to evaluate and determine if near natural rates of recovery are occurring. (Years 1 through 4)

2. Develop Site-Specific Objectives

What?

Develop quantitative management objectives based on desired goals for the area.

How?

During the baseline year, the Forest Monitoring Team will provide individual desired riparian values (riparian vegetation and stream channel attributes) that may be adjusted as more information is gathered. Additionally, this team will display where and when these resource values are at upper and lower limits. (Have desired conditions been met already? Since vegetative and hydrologic interactions are complex, is it possible to improve certain parameters when certain conditions exist). Districts will use this information as a compass for development of attainable site-specific desired objectives.

Who?

District ID Teams

3. Develop End-Point Indicators

What?

Based on the goals and objectives, develop quantitative end-point indicator values (condition thresholds). This will generally be a variable range to begin with and accuracy should improve as annual or semi-annual re-evaluation of the End-Point Indicators occurs.

How?

The Forest Monitoring Team will provide an initial range of desired End-Point Indicator values (condition thresholds) during the baseline year. Districts will

Draft 5/16/2005

adjust these desired End-Point Indicator values (condition thresholds) based on reassessments of site-specific information and annual or semi-annual determinations of Near Natural Rates of Recovery.

Who?

District ID Teams

4. Develop triggers that will meet End-Point Indicators resulting in Near Natural Rates of Recovery towards desired riparian objectives.

What?

Develop triggers to ensure end-point indicators are met.

How?

Develop triggers based on timing, intensity, frequency, and duration of use and site-specific conditions. (Keep them simple. The goal is a Near Natural Rate of Recovery towards desired objectives, not simply meeting a trigger. The assumption is that if a trigger is set appropriately and met, Endpoint Indicators will be achieved resulting in a Near Natural Rate of Recovery.)

Who?

District ID Teams

5. Conduct Implementation Monitoring

What?

Conduct Annual or Semi-Annual Implementation Monitoring to determine if Near Natural Rates of Recovery are occurring.

How?

Prioritize by needs

Who?

District ID Teams

6. Decision Matrix

What and How?

Interdisciplinary team recommendations to rangeland administrators rely heavily on quantitative and qualitative information (such as PFC and MIM) that assess characteristics/attributes of riparian function, which indicate riparian condition and trend. Range Management Specialists use these recommendations in combination with range administration to develop a decision matrix; the end product of which is a roadmap displaying the current ecological condition, a determination of whether or not livestock grazing management is resulting in "Near Natural Rates of Recovery" as defined by PACFISH/INFISH, and whether or not the AOI were satisfactorily implemented. All of these components are considered together when developing strategies that would move riparian and stream characteristics towards desired values without negative cumulative effects.

Who?

District Rangers and Interdisciplinary Teams with support from the Forest Monitoring Team.

7. Re-Assess Current Conditions

What?

All assessments that occurred during the baseline assessment will be repeated (goal is to repeat the measurements every 5 years). The caveat is that additional analysis will be conducted to determine “trend”.

How?

The Forest Monitoring Team will analyze the information from the baseline line year and compare to the new information in order to quantifiably determine if management is resulting in attaining desired riparian objectives (if management practices related to livestock grazing are maintaining or restoring riparian vegetative structure and function).

Who?

The Forest Monitoring Team

Additional Information

What to do when assessment information is not available?:

Use professional judgment based on knowledge/visual observations of the area and follow IIT procedures for implementation monitoring (PACFISH/INFISH (Forest Plan) direction.

Consensus of an interdisciplinary team is necessary to determine compliance with PACFISH/INFISH (Forest Plan) – the “near natural rate of recovery” call. In addition, the Malheur Forest Plan provides standards for upland utilization levels, which may be used in conjunction with IIT procedures.

General starting points for establishing Desired Riparian Values and End-Point Indicators

The following ranges of values are generally accepted starting points for setting desired riparian values and end-point indicator values that will allow for near natural rates of recovery. These values should be, and are expected to be, adjusted as more site-specific information is gathered. End-point indicators should be adjusted for timing, intensity, frequency, and duration.

Desired Riparian Objectives

Mean bank stability: >80% (Kershner et al. 2004)

Mean bank cover: >80-95% (varies by greenline capability group – see Winward 2000)

Percent saplings (shrubs): >25% (Winward 2000, UI Stubble Height Study Report 2004)

Percent mature (shrubs): >25% (Winward 2000, UI Stubble Height Study Report 2004)

Percent decadent and dead (shrubs): <10% (Winward 2000, UI Stubble Height Study Report 2004)

Percent hydrophytic vegetation: >64-78 (varies by greenline capability group – Winward 2000; 80% of values shown on page 34 is the general desired target value)

Greenline stability rank: >7 (Winward 2000)

End-Point Indicators (Condition Thresholds)

Stubble Height: >3-6 inches (UI Stubble Height Study Report 2004, Hall and Bryant 1995)

Bank Alteration: <5-20% (Cowley 2002, Bengueyfield and Svoboda 1998)

Mean incidence of use on woody species: <50% (Winward 2000)

Desired Channel Morphology Objectives (In Development)

Bankfull width/depth ratio:

Percent fines <6mm:

APPENDIX C

Past, Present and Future Activities
in the Cumulative Effects Area

Appendix C

Past, Present, and Future Activities in the Cumulative Effects Area of the House Creek, Van, West Malheur and Wolf Mountain Allotments

Past Activities

House Creek Allotment

Background

The last Range Environmental Analysis (REA) completed on the House Creek Allotment was 1961. This work formed the basis for management changes associated with Range Management Plans developed and signed in 1968.

Grazing records for this area date back to 1926. The House Creek Allotment was created in 1964 and 1965. This allotment was taken from the extreme southwestern corner of the Wolf Mountain C&H Allotment, which was a sheep allotment prior to 1950. This allotment was formed to relieve heavy grazing pressures on the Silvies C&H Allotment. The east allotment boundary was fenced in the fall of 1964 and the spring of 1965. The east-west division fence was completed in the spring of 1966, creating two pastures, North and South pastures. The allotment is managed on a deferred rotation using two units. The units are rotated and used first on alternative years. A complete history of this allotment can be found in the Emigrant Creek Ranger District 2210 files. Field data records and allotment maps are also filed at the District.

Range Management Plan

A Range Management Plan for the House Creek Allotment was completed in 1968. This plan was based on data obtained from a 1961 range analysis. At that time, it was estimated the allotment contained 3,168 acres of National Forest Lands and 1,285 acres (41%) were considered unsuitable for grazing. Of the suitable acres (1,883 acres), 100% were considered primary range.

Allotment Use Records

The allotment is managed on a deferred rotation using two units. The units are rotated and used first on alternative years. This grazing strategy was initiated in 1967 and in 1993 the permit was transferred. In 1993 and 2004 non-use was taken by the new permittee. Table 1 displays actual use records for the House Creek Allotment from 1964 to present.

Table 1: Actual Use, House Creek Allotment 1964-Present

Year	Season of Use	Number Grazed
1964	N/A	0
1965-1969	6/1 – 9/30	49
1970-1992	6/1 – 9/30	60
1993	N/A	0
1994-2003	6/1 – 9/30	60
2004	N/A	0

Past Vegetation Activities

Since 1984, about 765 acres were harvested mainly by overstory removal in the House Creek Allotment (CHE Springs, Mountain Spring and Otter Timber Sales). Since the year 2000, about 60 acres have been harvested by selection and 321 acres by commercial thinning (Parasol Timber Sale).

Past fuels treatments within the Allotment consisted of about 600 acres of machine piling (CHE Springs Timber Sale), 48 acres of lop and scatter (Otter Timber Sale), 72 acres of hand piling (Otter Timber Sale), and 43 acres of grapple piling (Otter Timber Sale). For the most part, these acres occurred on the same acres as the timber harvest mentioned above.

West Malheur Allotment

Background

The last Range Environmental Analysis (REA) completed on the West Malheur Allotment was completed in 1964. The area that is now the West Malheur Allotment was used by both sheep and cattle for a great many years. Early maps dated back to 1912 show that cattle range extended northward to the Harney County line and the remainder of the present allotment was sheep range. However, no fences were present and the cattle roamed at will. This dual use over most of the range from the time the snow went off in the spring until late fall was responsible for the erosion and poor range conditions of the past.

By 1922, domestic sheep were no longer permitted on this range. In March of 1962, the Forest Service decided to split the area into two separate allotments. The Central Malheur and West Malheur Allotments were formed by splitting the old West Malheur down Black Ridge.

Range Management Plan

A Range Management Plan for the West Malheur Allotment was completed in 1964 and was based on data obtained from a 1957 range analysis. At that time, it was estimated the allotment contained 22,053 acres of National Forest Lands and 5,450 acres (25%) were considered unsuitable for grazing. Of the suitable acres (16,603), 35% (5,782 acres) were considered primary range and 65% (10,821 acres) were considered secondary range. Much of the suitable range (83%) was considered to be in poor condition.

The 1957 range analysis estimated grazing capacity for the allotment to be 407 AUM on primary range and 727 AUM on secondary range for a total of 1134 AUM. It was also noted at that time that AUMs would increase to 1,364 following completion of a proposed development plan.

Allotment Use Records

The allotment is currently managed using a multi-pasture rotation with four primary pastures and one special management (gathering) pasture. Livestock are rotated through the four primary pastures from south to north each year. This grazing strategy was initiated in 1962. Season of use during the early history of the allotment was nearly year long. By 1935 the season of use was shortened to June 1 to October 15. Table 2 displays actual use records for the Old West Malheur Allotment from 1926 to 1961 and Table 3 displays actual use records for the West Malheur Allotment from 1962-present.

Table 2: Actual Use, Old West Malheur Allotment 1926-1961

Year	Season of Use	Number Grazed
1926-1931	5/16-10/15	801
1932-1934	5/16-10/15	992
1935-1937	6/1 – 10/15	1037
1938-1942	6/1 – 10/15	993
1943-1944	6/1 – 10/15	725
1945-1948	6/1 – 10/15	625
1949	6/1 – 10/15	625
1950-1951	6/1 – 10/15	625
1952	6/1 – 10/15	493
1953	6/1 – 10/15	493
1954-1956	6/1 – 10/15	432
1957	6/1 – 10/15	425
1958	6/1 – 10/15	412
1959	6/1 – 10/15	395
1960	6/1 – 10/15	375
1961	6/1 – 10/15	375

Table 3: Actual Use, West Malheur Allotment 1962-Present

Year	Season of Use	Number Grazed
1962	6/1 – 10/15	200
1963	6/3-10/12	190
1964-1966	6/16-9/25	200
1967	6/5-10/15	200
1968	6/3-9/30	195
1969-1970	6/14-9/20	246
1971	6/7-9/20	270
1972	6/12-9/13	270
1973	6/16-9/13	297
1974	6/16-9/18	298
1975	6/11-9/25	282
1976	6/8-9/22	298
1977	6/8-9/15	298
1978	6/8-9/19	255
1979-1987	6/1-9/15	255
1988-1993		230
1994	6/10-8/10	325
1995	6/25-8/20	350
1996-1997	5/15-8/25	375
1998-present	5/15-5/31	75
	6/20-9/1	325

Past Vegetation Management Activities

Since 1981, almost 6,315 acres have been treated by commercial harvesting. Past fuels treatments within the Allotment occurred on about 3295 acres. Fuels projects included a variety of treatments including lop and scatter, hand pile and burn, grapple pile and burn, machine pile and burn, broadcast burn, underburning, and about 200 acres of no fuel treatment. For the most part, these activities occurred within the project boundaries of the timber sales listed above. Table 4 describes the acres by treatment.

Table 4, Past Commercial Activities

Treatment	Acres	Sales
Unknown	740	Capbox, Forks, Elkslop
Clear Cut	115	Capbox
Clear Cut with Reserves	437	Hogflat, ELK
Final Removal	670	Capbox
Overstory Removal	3672	Van Gulch, Frost, Bedrock, Eastwolf, Capbox, Twin Spring, Elk, Glass Mtn., Boundary
Partial Removal	508	Van Gulch, Forks, Frost
Shelterwood	120	Frost, Capbox
Salvage	50	Capbox,
Total	6312	

Past fuels treatments within the Allotment consisted of about 3295 acres. Fuels treatments consisted of a variety of treatments including lop and scatter, hand pile and burn, grapple pile and burn, machine pile and burn, broadcast burn, underburning, and about 200 acres of no fuel treatment. For the most part, these acres occurred on the same acres as the timber harvest mentioned above.

Past Large Wildfires

In August 2001, the Wolf Creek fire burned approximately 661 acres within the West Malheur Allotment, Cougar and Pierpont pastures, and the Van Allotment, Wolf Creek Pasture. A June 24, 2002 Decision Notice authorized about 45 acres of harvest, 25 acres of planting, riparian hardwood planting and fencing at Bedrock Spring, riparian spot hardwood planting and caging on East Fork Wolf Creek, mountain mahogany planting and caging, large woody development on East Fork Wolf Creek and contour falling.

Salvage harvesting in the Wolf Creek fire was never implemented because it was not economically feasible. Riparian hardwood planting and fencing at Bedrock Spring, riparian spot hardwood planting and caging on East Fork Wolf Creek, and large woody development on East Fork Wolf Creek and contour falling have all been implemented.

Wolf Mountain Allotment

Background

The last Range Environmental Analysis (REA) completed on the Wolf Mountain Allotment was 1966. Prior to 1939 the area encompassed by the Wolf Mountain Allotment consisted of two sheep allotments and one cattle allotment; Wolf Creek S&G on the north, Schurtz Creek S&G in the middle, and East Silvies C&H on the southwest. Total acreage of these three allotments was about 40,000 acres. In 1939 the Schurtz Creek Allotment was divided and the west portion called the Beaverdam Allotment. The area of Wolf Creek Allotment was reduced by about 5,000 acres when District boundaries were rearranged in 1949. By 1950 the allotment encompassed about 35,000

acres and all permits were converted to cattle and the allotment was named Wolf Mountain. In 1962 the allotment was reduced by 2,200 acres due to District boundary changes. Then in 1964, the House Creek Allotment was established excluding about 3,165 acres from Wolf Mountain Allotment bringing it to about 30,100 acres. Since 1950, the conversion to cattle, the allotment was under a season-long system of management until an east-west division fence was constructed during the 1969 grazing season.

A complete history of this allotment can be found in the Emigrant Creek Ranger District 2210 files. Field data records and allotment maps are also filed at the District.

Range Management Plan

A Range Management Plan for the Wolf Mountain Allotment was completed in 1966 and was based on a 1961 range analysis. At that time, it was estimated the allotment contained 30,141 acres of National Forest Lands and 22,470 acres were considered unsuitable for grazing. Of the suitable acres, 98% (22,055 acres) were considered primary range and 2% (415 acres) were considered secondary range. Of the primary range, 18,000 acres were considered to be in poor condition. The 1961 range analysis estimated grazing capacity for the allotment to be 2,355 AUM on National Forest Lands

Allotment Use Records

The allotment is managed on a modified deferred rotation using five units. Table 5 displays actual use records for the West Malheur Allotment from 1949 to present.

Table 5: Actual Use, Wolf Mountain Allotment 1950-Present

Year	Season of Use	Number Grazed
1950-1951	6/1-9/30	301
1952-1961	6/1-9/30	288
1962-1963	6/1-9/30	250
1964	6/1-9/30	302
1965-1973	6/1-9/30	300
1974	6/1-10/15	300
1975	7/1-9/30	250
1976	6/15-10/15	300
1977	6/1-9/30	300
1978-1980	6/15-10/15	270
1981	6/15-10/15	250
1982	6/1-10/11	295
1983	6/1-9/30	300
1984-1985	6/1-9/30	295
1986-1990	6/2-10/12	286
1991		300
1992	5/20-9/20	400
1993	6/3-10/11	315
1994	6/3-9/1	340
1995	6/2-10/12	260

1996	6/8-9/30	275
1997	6/2-6/18	160
	6/19-9/25	325
1999	6/5-9/10	325
2000	6/28-10/1	325
2001	6/2-10/12	300
2002	6/5-10/12	275
2003	5/14-8/19	200
2004	5/18-6/30	400 yearlings

Past Vegetation Activities

Since 1978, almost 12,500 acres have been treated by commercial harvesting. Past fuels treatments within the Allotment consisted of about 6,890 acres. Fuels treatments consisted of a variety of treatments including lop and scatter, hand pile and burn, grapple pile and burn, machine pile and burn, and about 116 acres of no fuel treatment. For the most part, these acres occurred on the same acres as the timber harvest. Table 6 describes the acres by treatment.

Table 6, Past Commercial Activities

Treatment	Acres	Sales
Unknown	260	Cove, Long Mtn., Milk Spg., Forks, Northside, Kent Spg.
Clear Cut	820	CHE Spg., Milk Spg., Ewing 2, Glass Mtn., Seldom Seen, Cold Spg., Dry Joe, Antelope
Clear Cut with Reserves	650	Otter, Cove, Northside
Final Removal	230	Long Spg., Dry Joe
Overstory Removal	7,500	Jungle Spg., Mtn. Spg., Otter, Long Mtn., Long Spg., CHE Spg., Farley, Dry Creek, County, Milk Spg., East Wolf, Ewing 2, Davidson, Dry Joe, Glass Mtn., Cold Spg., Dry Spg., Antelope,
Partial Removal	1860	Jungle Spg., Long Spg., Milk Spg., JJ, Kirkwood, Antelope, Kent Spg.
Shelterwood	435	Cove, County, Ewing 2, Northside, Dry Joe
Selection	360	Cove
Commercial Thin	236	Cove
HPL	65	Cove, Long Spg.
Total	12,470	

Past fuels treatments within the Allotment consisted of about 6,890 acres. Fuels treatments consisted of a variety of treatments including lop and scatter, hand pile and burn, grapple pile and burn, machine pile and burn, and about 116 acres of no fuel treatment. For the most part, these acres occurred on the same acres as the timber harvest mentioned above.

Future Vegetation Activities

Van Vegetation Project

The Van Vegetation Project, located within the Wolf Creek Watershed is in the early planning stage. The draft purpose of this project would be to

- Improve watershed conditions by reducing road related-impacts
- Improve riparian and overall watershed conditions through enhancement of riparian vegetation, and management of upland and riparian vegetation structure and composition
- Improve the health, vigor, and resiliency of vegetation to insects, disease, wildfire, and other disturbances, to more closely resemble historical conditions in order to promote long-term forest sustainability and wildlife species diversity
- Capture the economic value of those trees that are surplus to other resource needs on suitable lands

To meet the draft purpose, the following types of projects are being considered for action alternatives:

- Access and Travel Management Activities, such as road closures and decommissions
- Vegetation Activities, such as prescribed burning, commercial and precommercial thinning, aspen restoration, juniper reduction, and noxious weed treatments

2005 Plantation PCT Project

The 2005 Plantation PCT Project (CE signed 6/3/2005) will pre-commercially thin seedlings and saplings within up to 1600 acres of 10 to 20 year old pine plantations established in clearcuts, shelterwoods, and reforested wildfire locations on the old Burns portion of the Emigrant Creek Ranger District.

Units that overlap the 3 allotments include Antelope, Capbox, CHE springs, Dry Joe, Ewing 2, Glass Mtn, Kent Springs, Milk Springs, and Seldom Seen.

Coyote Creek Flow Enhancement Project

Coyote Creek Flow Enhancement Project proposes to thin juniper trees on about 120 acres in the West Malheur Allotment, Rock Springs Pasture. Juniper is currently distributed far beyond sites historically occupied, and the density far exceeds what the site can sustain. Encroachment of juniper has reduced native vegetation of perennial grasses and mountain mahogany.

Parasol Vegetation and Watershed Management Project

The Parasol Vegetation and Watershed Management Project Decision Notice, signed 9/18/1998, authorized commercial harvest, precommercial thinning, mechanical fuels activities, aspen management, fire reintroduction, road closures and decommissions, relocation of designated old growth, designation of replacement old growth, and

watershed and fisheries improvement projects. One aspect of this project that has not yet occurred is the fire reintroduction. Fuels will be burned in 7 blocks totaling about 6,700 acres. Of these acres, about 900 acres are within the House Creek Allotment and will be burned in the near future.

APPENDIX D

Post-Fire Grazing Interim Guidelines Malheur National Forest



**United States
Department of
Agriculture**

**Forest
Service**

**Malheur
National
Forest**

**P.O. Box 909
John Day, OR 97845
(541) 575-3000
Fax (541) 575-3001
TDD (541) 575-3089**

File Code: 2200-3

Date: December 2, 2003

Route To:

Subject: Post-Fire Grazing Interim Guidelines

To: District Rangers

Enclosed is the Post-Fire Grazing Interim Guidelines. These guidelines will be used for all project analysis involving grazing in areas that have been burned by wildfire, and do not currently have a signed decision document. This document will replace the letter issued by me on June 16, 2003 regarding post-fire grazing.

ROGER W. WILLIAMS
Forest Supervisor

Enclosure

cc: Nancy Phelps, R6



POST-FIRE GRAZING INTERIM GUIDELINES
MALHEUR NATIONAL FOREST
December 2, 2003

The Authorized Officer, Forest Supervisor and or District Ranger (this authority can not be delegated), has the responsibility of determining when to resume grazing on areas burned during wildfire or prescribed fire. These guidelines establish the minimum timeframes that an area will be rested from grazing following fire. Other resource concerns may require resting the burned area from grazing for longer periods to allow the area to recover sufficiently.

When making that decision to resume grazing after fire, some factors that should be considered are (list not all inclusive):

- Amount of acres burned (suitable for grazing and non-suitable).
- Amount and spatial arrangement of moderate and high intensity burned areas in relation to the whole burn and surrounding non-burned area.
- History of past grazing use.
- Vegetation community type and its condition prior to the burn. The vegetation community and its condition will influence the amount of time necessary for it to recover from the affects of fire.
- How much effective ground cover is available and are needed to resume grazing.
- Aquatic resource values.
- Condition of range improvements, have they been damaged and, if so, have they been reconstructed.

Resumption of grazing following prescribed fire or wildfire is dependent upon the length of time it takes the vegetation to recover sufficiently to withstand grazing (Sanders 2000). Some vegetation types, such as elk sedge (*Carex geyeri*)/pine grass (*Calamagrostis rubescens*); require little or no recovery time after a light burn. Because elk sedge sprouts from underground rhizomes, it has a high degree of resistance to fire, often increasing after a fire; however, severe fire may cause a decrease in elk sedge cover. Burning can improve elk sedge production. Pine grass has rhizomes buried in the top inches of mineral soil, allowing plant survival when the duff is not completely consumed. Low to moderate severity fires are best for pine grass enhancement in Douglas-fir/pine grass associations of the Blue Mountains (information obtained from the Fire Effects Information System).

Other vegetation types, such as bunch grasses, require long recovery periods even after a light burn (prescribed or wildfire) (Brown and Smith 2000, p. 151-152). Carbohydrates manufactured by the plants provide the energy for metabolism and growth (Trlica 1977: in Brown and Smith 2000 p. 28). The underground plant parts that remain after fire usually provide carbohydrates until sufficient growth occurs to allow photosynthesis. Grazing and browsing can delay recovery if the demand on the plant reserves is excessive. Heavy post fire grazing is most likely to cause harm during the first year post fire (Trlica 1977: in Brown and Smith 2000 p. 28). After a light burn by either prescribed fire or wildfire, plant recovery is usually rapid with ground cover returning to pre-burn status in one or two growing seasons (Johnson 1998), but seed production usually doesn't resume until the second growing season. Because seed production might not

occur the first season after a prescribed fire or light intensity wildfire, grazing generally would not resume until after the first year seed was produced, probably the second growing season. Recovery after moderate to severe burning can take three or more years (Johnson, pers. comm. February 2003; Johnson 1998). Therefore, grazing generally would not resume until ground cover had recovered and was near or at its pre-fire condition.

In areas where elk sedge and pine grass are the dominant ground cover and 10% or less of the burned area is occupied by native bunchgrasses, grazing may occur in the same year as a light-intensity (intensity as described in Johnson 1998 or as mapped by the Burned Area Emergency Recovery [BAER] Team) fire if:

- Burning occurs before vegetative green-up, then grazing may occur in the area of the burn without any timing restriction; or
- The burn occurs after vegetative green-up, grazing may occur after range has been determined to be ready and the percent ground cover of elk sedge and pine grass is the same as prior to the burn, or grazing may occur in the fall (Sept./Oct.) without a range-readiness determination.

For a light (or low) intensity fire in areas where bunchgrass occupies more than 10% of the burned area, grazing may occur the second growing season after the burn, but only after seed has set. If the bunchgrass areas can be adequately protected from grazing, such as by electric fencing, then grazing may resume in the remainder of the burned area during the first growing season post burn.

For moderate to high intensity (intensity as described in Johnson 1998 or as mapped by the BAER Team) fire in all areas suitable for grazing, as defined by the Forest Plan, grazing may resume after the vegetation has recovered to the percent ground cover that existed prior to the fire as described for the appropriate plant association type in Plant Association of the Blue and Ochoco Mountains (Johnson and Clausnitzer 1992). A team consisting of at least two resource specialists, such as a range conservationist, botanist, ecologist, silviculturist, or hydrologist, will conduct the monitoring to determine if the percent ground cover has been reestablished. The method and results will be documented and submitted to the authorized official who will decide when to resume grazing. If monitoring is not done, grazing may resume after three full grazing seasons after the fire occurred, because research indicates that vegetation usually recovers within this timeframe (C. G. Johnson, pers. Comm., February 2003). However, grazing would not resume prior to two growing seasons after the fire, even if monitoring verified that the percent ground cover was the same as the pre-fire condition, to allow for plants to set seed.

Brown, J. K. and J. K. Smith, Eds. 2000. Wildland fire in ecosystems: effects of fire on flora. Gen. Tech Rep. RMRS-GTR-42-vol. 2. Ogden, UT: S. S. Dept. of Agric., Forest Service, Rocky Mountain Research Station. 257 p.

Johnson, C. G., Jr. 1998. Vegetation response after wildfires in national forests of Northeastern Oregon. R6-NR-ECOL-TP-06-98. US. Dept. Agric., Forest Service, Pac. Northwest Region.

Johnson, C. G., Jr. and R. R. Clausnitzer. 1992. Plant Association of the Blue and Ochoco Mountains. US Dept. Agric., Forest Serv., Pacific Northwest Region, Wallowa-Whitman National Forest, R6-ERW-TP-036-92

Sanders, K. D. 2000. How long should rangelands be rested fro livestock grazing following fire: a viewpoint. Unpubl. Rep. Rangeland Ecology and Management, University of Idaho.

APPENDIX E

Range Improvements
House Creek, West Malheur and
Wolf Mountain Allotments

Appendix E

Range Improvements

Range Improvements, House Creek Allotment

Improvement #	Type	Description
14401-1	Boundary Fence	House Ck N. Fence 1
14402	Interior Fence	House Ck Division Fence
14403-1	Boundary Fence	House Ck SE Wolf 1
14404-1	Boundary Fence	House Ck Calamity 1
14406	Developed Spring	CHE Spring
14407	Developed Spring	JH Spring
14408	Developed Spring	House Creek Spring
14409	Water System	Little Lake Reservoir
14410	Water System	Section 14 Pond
14411	Water System	Always Empty Work
14412	Water System	Section 11 NE Pond
14413	Water System	Section 11 W Pond
14414	Water System	Section 2 Pond
14415	Water System	Big Hole Pond
14416	Water System	Past End of Rd Reservoir
14417-1	Boundary Fence	House Ck Forest Boundary Fence 1
14941	Pond	Dry

Range Improvements, Wolf Mountain Allotment

Improvement #	Type	Description
99 TK 426		
100 TK 426		
UNK CG 611		
298 PD 413		
294 TK 426		
500 TK 426		
14414		
14418	Spring Development	Tamarack Spg.
14501	Boundary Fence	N. Wolf Mtn Bear Valley Fence
14502	Boundary Fence	Wolf Mtn West Malheur Fence
14503	Interior Fence	Wolf Mtn N. Unit Division Fence
14504	Interior Fence	Middle Division Fence
14505	Interior Fence	Wolf Mtn N/S Division Fence
14506	Boundary Fence	W. Wolf Mtn House Creek Fence
14507	Boundary Fence	Wolf Mtn Calamity Fence
14509	Interior Fence	Holdout Sp Fence
14512	Spring Development	Kirkwood Spg.
14514		
14517		
14519	Spring Development	Long Spg.
14520	Spring Development	John S. Spg
14521	Water System	Three Ponds
14522	Spring Development	Rock Springs
14523	Interior Fence	Beaverdam Area
14525	Spring Development	
14526	Water System	Two Ponds
14527	Water System	Natural Pond
14529	Spring Development	
14531		
14532	Water System	Pond
14534		
14538		
14540		
14541	Interior Fence	Wolf Cr. Meadows
14542		
14543a	Water System	Pond
14543b	Water System	Pond
14543c	Water System	Pond
14543		
14544		
14546	Spring Development	Ewing Spring
14546		

14547	Water System	Pond
14548	Water System	Undeveloped spring
14549a	Water System	Pond
14549b	Water System	Pond
14549c	Water System	Pond
14549d	Water System	Reservoir
14550a	Water System	Pond
14550b	Water System	Pond
14550c	Water System	Pond
14551a	Water System	Pond
14552		
14553	Water System	Reservoir
14554	Spring Development	
14555	Water System	Pond
14555		
14556	Water System	Seep
14557	Water System	Bonde spring
14558a	Water System	Pond
14558b	Water System	Pond
14559		
14559		
14560		
14561		
14563	Water System	Reservoir
14564	Water System	Rock Spring CG Trough
14565	Water System	Pond
14566		
14567	Water System	Spring
14568		
14569	Water System	Spring Development
14570		
14572		
14582		

Range Improvements, West Malheur Allotment

Improvement #	Type	Description
297 TK 426		
501 TK 426		
633 TK 426		
17101	Boundary Fence	Northeast Fence
17102	Boundary Fence	Middle West Fence
17103	Boundary Fence	Middle East Fence
17104	Interior Fence	Magpie Division Fence
17105	Interior Fence	South Division Fence
17106	Interior Fence	Horse Pasture Fence
17107	Interior Fence	Cougar Flat Fence
17108	Spring Development	Cow Spring
17109	Water System	Annie's Reservoir
17110	Water System	Diesel Reservoir
17111	Water System	Tittering Rock Res.
17112	Water System	Dead Log Res.
17113	Water System	Debbie Flat Reservoir
17114	Water System	Fence Line Res.
17115	Water System	Magpie Rock Res.
17116	Water System	Double M Res.
17117	Water System	Reservoir I
17118	Water System	Section 9 Res.
17119	Water System	Van Gulch Res.
17120	Water System	Lucky Reservoir
17121	Water System	Dunten Reservoir
17122	Water System	Scab Flat Reservoir
17123	Water System	Stock Water Res.
17124	Water System	Cathy's Reservoir
17125	Water System	Duck Reservoir
17126	Spring Development	Cap Box Spring
17127	Spring Development & Water System	Pierpont Water development
17128	Water System	Rock Spring Reservoir
17130	Water System	Section 14 NE Res.
17131	Spring Development	Bedrock Spring
17132	Spring Development	Mahogany Spring
17133	Spring Development	Van Gulch
17134	Water System	Sweat Point Pond
17135	Water System	T17S, R33.5E, Sec. 27 Reservoir
17135	Spring Development	Section Line Pond T17S, R33.5E, Sec. 28
17136	Water System	Section 13 Reservoir
17137	Spring Development	Rock Springs

17138	Water System	Section 13 Res. II
17139	Water System	Section 12 SESW Trough
17140	Water System	Section 35 Trough
17141	Spring Development	L. Bear Spring
17142	Water System	Section 12 Pond
17143	Water System	Section 17 SE Pond
17144	Water System	Section 4 Reservoir
17145	Spring Development	McMullen Spg.
17146	Spring Development	Magpie Spring
17147	Spring Development	Buck Spg.
17148	Water System	Section 35 Reservoir
17149	Spring Development	Squaw Spring
17150	Cabin	Squaw Spring Cow Camp Cabin
17151	Spring Development	Little Bear Spring
17152	Interior Fence	Bedrock Sp Drift Fence
17153	Water System	Thistle Down Pond
17154	Water System	Thistle Down Trough
17155	Water System	Brown Trough by culvert
17156	Water System	Section 9 NE Pond
17157	Water System	Section 22 SE Pond
17158	Spring Development	Section 9 Trough/Spring
17159	Water System	Pond Near Rock Pit
17160	Water System	JB Pond
17161	Water System	Section 13 Res. NE
17162	Water System	Frost Mill Pond
17163	Water System	Dash A Trough
17164	Spring Development	
17167		
17168	Water System	Reservoir
17170	Interior Fence	17 Rd Van Drift Fence
17171	Water System	Reservoir
17172		
17173		
17174		

APPENDIX F

Plant Biological Evaluation



United States
Department of
Agriculture

Forest Service

Malheur National
Forest,
Emigrant Creek
Ranger District

October 2005



Forest Service House Creek, West Malheur, and Wolf Mountain Range Allotments

Plant Biological Evaluation

Prepared by: /S/ Lori Bailey
Lori Bailey
NEPA Coordinator

Date: October 12, 2005

Reviewed by: _____
Robert D. Curtis
Forest Range/Botany Staff

Date: _____

Approved by: _____
Carolyn Freeborn
Acting District Ranger

Date: _____

Summary

Table 1--Threatened, endangered and sensitive (TES) plant species considered in the analysis of the House Creek, West Malheur, and Wolf Mountain Range Allotment project.

Species (Status ²)	Scientific Name	Presence on the Malheur National Forest	Occurrence ³	Effects ⁴		
				Alt. 1	Alt. 2	Alt. 3
Silver Skin Lichen (S)	<i>Dermatocarpon luridum</i>	Suspected	HN	NI	NI	NI
Hairy Skin Lichen (S)	<i>Leptogium burnetiae</i> var. <i>hirsutum</i>	Suspected	HN	NI	NI	NI
Henderson's Ricegrass (S)	<i>Achnatherum hendersonii</i> ¹	Suspected	HN	NI	NI	NI
Wallowa Ricegrass (S)	<i>Achnatherum wallowaensis</i> ¹	Suspected	HN	NI	NI	NI
Transparent Milkvetch (S)	<i>Astragalus diaphanus</i> var. <i>diurnus</i>	Suspected	HN	NI	NI	NI
Deschutes Milkvetch (S)	<i>Astragalus tegetarioides</i>	Documented	HN	NI	NI	NI
Upswept Moonwort (S)	<i>Botrychium ascendens</i>	Suspected	HD	NI/MIH	NI/MIH	NI/BI
Dainty Moonwort (S)	<i>Botrychium crenulatum</i>	Documented	D	NI/MIH	NI/MIH	NI/BI
Triangle Moonwort (S)	<i>Botrychium lanceolatum</i>	Documented	HD	NI/MIH	NI/MIH	NI/BI
Mingan Moonwort (S)	<i>Botrychium minganense</i>	Documented	HD	NI/MIH	NI/MIH	NI/BI
Mountain moonwort (S)	<i>Botrychium montanum</i>	Documented	HD	NI/MIH	NI/MIH	NI/BI
Northwestern Moonwort (S)	<i>Botrychium pinnatum</i>	Documented	HD	NI/MIH	NI/MIH	NI/BI
Peck's Long-Bearded Mariposa (S)	<i>Calochortus longebarbatus</i> var. <i>peckii</i>	Documented	HN	NI	NI	NI
Dwarft Suncup (S)	<i>Camissonia pygmaea</i>	Suspected	HN	NI	NI	NI
Back's Sedge (S)	<i>Carex backii</i>	Documented	HD	NI	NI	NI
Inland Sedge (S)	<i>Carex interior</i>	Documented	HD	NI	NI	NI
Parry's Sedge (S)	<i>Carex parryana</i>	Documented	HD	NI	NI	NI
Clustered Lady Slipper (S)	<i>Cypripedium fasciculatum</i>	Suspected	HN	NI	NI	NI
Northern Twayblade (S)	<i>Listera borealis</i>	Documented	HN	NI	NI	NI
Red-Fruited Lomatium (S)	<i>Lomatium erythrocarpum</i>	Suspected	HN	NI	NI	NI
Raven's Desert Parsley (S)	<i>Lomatium ravenii</i>	Documented	HN	NI	NI	NI
Colonial Luina (S)	<i>Luina serpentina</i>	Documented	HN	NI	NI	NI
Fleeting Monkeyflower (S)	<i>Mimulus evanescens</i>	Documented	HN	NI	NI	NI
Bridge's Cliff-Brake (S)	<i>Pellaea bridgesii</i>	Suspected	HN	NI	NI	NI
Least Phacelia (S)	<i>Phacelia minutissima</i>	Documented	HN	NI	NI	NI
Oregon Semaphore Grass (S)	<i>Pleuropogon oregonus</i>	Suspected	HN	NI	NI	NI
Arrow-Leaved Thelypody (S)	<i>Thelypodium eucosmum</i>	Documented	HN	NI	NI	NI

¹*Achnatherum hendersonii* and *Achnatherum wallowensis* = *Oryzopsis hendersonii* (Vasey).

²Sensitive species from Regional Forester's List

³Occurrence: **HD - Habitat Documented** or suspected within the project area or near enough to be impacted by project activities

HN - Habitat Not within the project area or affected by its activities

D - Species **Documented** in general vicinity of project activities

S - Species **Suspected** in general vicinity of project activities

N - Species **Not documented** and not suspected in general vicinity of project activities

⁴Effect Determinations for Sensitive Species:

NI - No Impact

MIH - May Impact Individuals or Habitat, but Will Not Likely Contribute to a Trend Towards Federal Listing or Cause a Loss of Viability to the Population or Species

WIFV - Will Impact Individuals or Habitat with a Consequence that the Action May Contribute to a Trend Towards Federal Listing or Cause a Loss of Viability to the Population or Species

BI - Beneficial Impact

Introduction

This Biological Evaluation (BE) analyzes the potential effects of the proposed action for the House Creek, West Malheur, and Wolf Mountain Range Allotment Project, Malheur National Forest. This BE satisfies the requirements of Forest Service Manual 2672.4 that requires the Forest Service to review all planned, funded, executed or permitted programs and activities for possible effects on proposed, endangered, threatened or sensitive species.

The following sources of information have been reviewed to determine which TES species, or their habitats, occur in the project area:

- 1999 Region 6 Regional Forester's Sensitive Species List
- Forest or district sensitive species database(s) and the GIS mapping layer(s)
- Oregon Natural Heritage Program, Rare, Threatened and Endangered Plants and Animals of Oregon
- Sensitive Plants of the Malheur, Ochoco, Umatilla, and Wallowa-Whitman National Forests (1991)
- Forest or district sensitive species database(s) and the GIS mapping layer(s)
- Project area maps (topographic maps and aerial photographs).

Project Description

The House, West Malheur and Wolf Mountain Range Planning Area is comprised of three livestock grazing allotments, and is located on the Malheur National Forest, Emigrant Creek Ranger District, approximately 30 miles northeast of Burns, Oregon (see Figures 1 and 2). The three allotments, House Creek, West Malheur and Wolf Mountain, encompass approximately 57,800 acres of mainly National Forest Lands. The allotments are primarily contained in the Wolf Creek Watershed with a lesser amount in Bear Creek and Trout Creek Watersheds.

The Emigrant Creek Ranger District, Malheur National Forest proposes to continue authorization of livestock grazing on the House Creek, West Malheur, and Wolf Mountain Allotments.

For more information on the proposed activities, refer to the Environmental Assessment for the House Creek, West Malheur, and Wolf Mountain Range Allotment Project, Chapters 1 and 2.

Prefield Review

The following sources of information were consulted during the prefield review to determine the presence/absence of TES species, or their habitats, within the Project Area:

- Regional Forester's Sensitive Species List
- Malheur National Forest Sensitive Species Plant List
- Sensitive Plants of the Malheur, Ochoco, Umatilla, and Wallowa-Whitman National Forests (1991)
- Forest or district sensitive species database(s) and the GIS mapping layer(s)
- Oregon Natural Heritage Program, Rare, Threatened and Endangered Plants and Animals of Oregon (2001)
- Project area maps (topographic maps and aerial photographs)
- Pertinent Literature (On file or borrowed from other sources)

The prefield review was performed to identify all sensitive species that could be encountered within the proposed project area. One existing population of *Botrychium crenulatum* was documented in the Wolf Mountain Allotment. The prefield review also identified potential habitat for ten species listed as Sensitive by Region 6: *Botrychium ascendens*, *B. crenulatum*, *B. lanceolatum*, *B. minganense*, *B. montanum*, *B. pinnatum*, *Carex backii*, *C. interior*, and *C. parryana*.

Field Survey

To identify habitats that may harbor sensitive plants, the physical and biological features in the project area are correlated with those in which sensitive plants are known or suspected to occur (Nelson 1985). Habitats suspected of harboring sensitive plant populations are identified based on aspect, elevation, and ecoclass (plant association). Brooks et al. (1991) describes specific habitat features for Malheur National Forest sensitive species. Forest botanists have compiled habitat data from field surveys for the remainder of species with potential occurrence, listed since the above book was written.

Sensitive plant surveys for past projects were conducted in portions of the project area in the 1970's thru the 1990's. These past surveys reviewed areas by floristic walk-through survey (Nelson 1985) during specific times of the year for peak plant identification periods. Past surveys identified one population of *Botrychium crenulatum* in the Wolf Mountain Allotment.

Sensitive plant surveys for this specific project were conducted in 2003 and 2004. Field surveys in 2003 and 2004 were focused on areas identified as potential habitat, mainly springs and riparian areas. No new sensitive plant populations were located. The existing population of *Botrychium crenulatum* in the Wolf Mountain Allotment was also not relocated. Table 1 lists the species considered in this analysis.

Species Considered In Analysis

The following sensitive species were considered in this analysis.

***Botrychium* Species**

Botrychiums, also known as moonworts or as grapeferns, are small primitive plants closely related to ferns. They reproduce by spores, and are known to be mycorrhizal, though many details of their life history and growth requirements are still unknown. Although green and apparently photosynthetic, the species considered here are all capable of surviving for years with only sporadic above-ground growth, apparently drawing reserves from the host plants with which they have mycorrhizal connections. As a result, populations of moonworts appear to fluctuate from year to year, depending on how many plants produce visible leaves and/or fruiting bodies. The factors determining yearly growth are not yet understood.

The six *Botrychium* species listed in Table 1 are strongly associated with one another due to their common habitat requirements: seepy, perennially moist areas along streams and within shaded meadows. These six *Botrychium* species are found sporadically throughout the mountains of the Pacific Northwest and the Rockies, and *B. minganense* is known across Canada to the eastern part of the continent. In the Blue Mountains they have primarily been found between 5000 and 7500 feet in elevation.

Preferred habitat of these species is perennially moist ground at the edges of small streams, wet meadows, springs, and seepy openings in forest. The plants often favor shade from an overstory of conifers and/or riparian shrubs such as alder and red-osier dogwood, but also occur in openings or meadows with only grasses and forbs providing shade. Wet meadow edges with encroaching lodgepole pine are prime grapefern sites, as are the mossy openings around springs in mixed conifer forest that includes subalpine fir and Engelmann spruce. Since most of the plants are quite small and are difficult to find, they may be easily overlooked except in intensive surveys. Their habitat, on the other hand, is readily identified and protected or avoided during management activities.

Reproduction of these fern allies is accomplished by the dispersal of spores by wind and water, and pollinators are not required.

Potential habitat for *Botrychium ascendens*, *B. crenulatum*, *B. lanceolatum*, *B. minganense*, *B. montanum*, *B. pinnatum*, and *Carex interior* is present within the Wolf Mountain and West Malheur Allotments. On the Emigrant Creek Ranger District, wet meadow edges with encroaching lodgepole pine are prime grapefern sites, as are the mossy openings around springs. Almost all springs north of and including Squaw Spring (in the West Malheur allotment) and Milk Spring (in the Wolf Mountain allotment) would be considered potential habitat for these species.

An existing population of *Botrychium crenulatum* in the Wolf Mountain Allotment was originally located in 1997 and consisted of one individual. This site is described as a small unnamed spring or seep along the 1710 road. Associated plants are *Pinus contorta*, and *Fragaria virginiana*. This site was revisited in 2000, 2003 and 2004 and the one

individual has never been relocated. However, because the plants are quite small (10 cm or less) and are difficult to find, they may be easily overlooked except in intensive surveys. The original site record states that cattle browsing at the site may have been the reason no additional plants were observed. During each revisit, it was noted that grazing by livestock in excess of 4-6 inch stubble height has most likely hindered the ability to relocate this species.

***Carex backii* (C. cordillerana)**

Carex backii is a tufted sedge that grows in lowlands to mid-montane elevation. Its range extends across southern Canada to British Columbia and south to Utah and Colorado. In Oregon it grows in dry forests and riparian woods at mid elevations, occurring in the Wallowa, Blue, and Steens Mountains and adjacent ranges. It is superficially grass-like in appearance and the inflorescence tends to be hidden in the foliage. Therefore, it is likely that this species is often overlooked when searching for sensitive sedges, and may be much more common in our area than believed.

Carex backii is found in a variety of habitats from north to southeastern Oregon. In the Wallowa uplands, it is most common on steep southerly aspects in open ponderosa pine savannahs near thickets of *Symphoricarpos albus*. In the northern Blues, it has commonly been found closely associated with streambanks and gravel bars. In the southern Blues, it is also found in ponderosa pine forests on rocky ridgetops, or growing in the proximity of basaltic rock outcrops with Great Basin wildrye, chokecherry, and snowberry. In the Steens, it is found in quaking aspen/grass associations adjacent to the major streams on steep slopes. These sites all show evidence of disturbance from substrate movement on steep slopes or in streambeds, or are closely associated with rock outcrops. They also are always in dappled to deep shade and have a shrub component. These sites are between 4900-6400' in elevation. Associated species include: *Juniperus occidentalis*, *Alnus incana*, *Cornus stolonifera*, *Ribes aureum*, *R. hudsonianum*, *Carex praticola*, *C. geyeri*, and *Poa pratensis*.

Carex backii does not have creeping rhizomes, therefore, only reproduces by seed production.

Carex interior

Carex interior is a densely tufted sedge that grows in lowland to mid-montane elevations. It is a widespread N. American species found throughout the range of the Pacific Northwest, as defined by Hitchcock and Cronquist (1969); however, it is apparently uncommon in Oregon.

Carex interior inhabits very wet riparian areas, such as swamps and wet meadows associated with seeps, springs, or streams. On the Malheur National Forest associated species include *Carex aurea*, *C. echinata*, *C. luzulina*, *C. stipata*, *Fragaria virginiana*, *Glyceria elata*, *Deschampsia cespitosa*, *Juncus balticus*, and *Mimulus guttatus*.

Carex interior is not rhizomatous, therefore, most likely reproduces by seed only.

Carex parryana

Carex parryana is a loosely tufted sedge that grows from lowlands to moderate elevation. Its range is chiefly east of the continental divide, but it extends onto the Pacific slope in central and east Idaho and northern Utah; it is also known from northeast Oregon and central Nevada.

Carex parryana grows in the driest communities of moist meadows, swales, and moist, low ground around streams and lakes, and on prairies and high plains as well. Associated plants found on a wetland classification plot on the Emigrant Creek RD were *Poa pratensis*, *Agrostis stolonifera*, *Juncus balticus*, and *Carex praegracilis*.

Carex parryana can reproduce via creeping rhizomes, and by seed production.

Carex species

Potential habitat for *Carex backii*, *C. parryana* and *C. interior*, is present within all three allotments, however no individuals have been located. Potential habitat for these species would include many of the springs listed above as well as the lower elevation springs.

Design Measures for the Proposed Action **Alternative**

Project design measures are established to ensure that sensitive plant populations are not inadvertently impacted from proposed activities.

- Fence and monitor the existing *Botrychium crenulatum* population on the 1710 road.
- Where appropriate habitat exists, graze at levels that would retain at least a 6 inch stubble height of grasses, sedges, and rushes on the floodplain.
- Survey appropriate habitat for at least one season. Where moonworts are found monitor their response to livestock grazing for the life of the permit or at least 5 years.

Effects and Determinations of Effects for Sensitive Species

The three possible types of effects to TEPS (Threatened, Endangered, Proposed, or Sensitive) species that a Biological Evaluation or Biological Assessment can identify, and the corresponding "determinations of effect" to use, are given for TEP species in the 1986 Endangered Species Act regulations (50 CFR Part 402) and the March 1998 FWS/NMFS Endangered Species Consultation Handbook; and for sensitive species in FSM 2670 and in the May 15 and June 11, 1992 Associate Chief/RF 2670 letters on this topic.

Effects Analysis

In understanding the effects of grazing on moonworts it is important to understand their biology and life history. Moonworts are relatives of ferns; they possess vascular tissue (veins to transport water, nutrients, and photosynthate) and reproduce by using an alternation of generations. A small, subterranean sexual stage, the gametophyte, produces motile, water-borne gametes which unite, then grow and develop into the fernlike sporophyte, the stage collected and described by botanists. Like ferns, the asexual sporophyte produces air-borne spores which germinate and, to complete the cycle, develop into gametophytes.

Moonwort spores require a medium of soil or humus to germinate in. Thus, to maintain a viable population of moonworts, some level of ground disturbance is necessary (Muller 1991, 1993; Wagner & Wagner 1993). Zika (1992) noted that the nature of disturbance was important in providing a medium suitable for moonwort recruitment – modest flooding along headwater creek floodplains, frost heaving, and soil creep. The author also found many moonworts colonizing small patches of ground less than 10 cm², so to this list one might add the mounds of gophers and other small, burrowing animals. Moonworts have also been observed colonizing more disturbed ground where logging machinery has exposed soil in riparian areas and floodplains. These disturbances appear to be solitary events occurring about twenty or more years ago; hence, larger disturbances permitting moonwort colonization have not been ongoing or otherwise chronic.

Disturbance created by livestock grazing could be detrimental to moonworts or could provide for their viability depending perhaps on the level or timing of grazing. Although some observations of grazed and ungrazed habitats show livestock grazing to be deleterious to moonworts (Farrar and Johnson-Groh 1991), no studies have yet been completed that compare levels of grazing with effects to moonwort populations. Wagner (pers. Comm.) has stated that livestock grazing is compatible with the maintenance of moonwort populations, but he does not indicate utilization levels or timing preferences. Conversely, others report that grazing may have an adverse effect on moonworts (Zika 1992, Zika et al. 1995) and recommend protection of middle and upper montane habitat from livestock grazing.

The disturbance created by livestock grazing, namely trampling and herbivory could create soil openings in which spores may germinate. However, grazing at levels to the point that small moonworts would be eaten or trampled would be injurious to populations; plants would not have the opportunity to sporulate, a critical reproductive

step, and would be weakened by the inability to store food reserves, or they might be killed outright. Grazing at levels that retain a 6 inch stubble height would prevent excess trampling and herbivory of moonworts as well as provide for the overall maintenance and possible improvement of the riparian vegetation since these moonworts average under 6 inches height above ground. (Region 6 Implementation of PACFISH Guidelines).

Management recommendations for *Botrychium montanum* from Potash (1998) include:

- Maintain current hydrologic regime
- Maintain conditions which enhance fungal diversity
- Maintain deep shade
- Maintain microclimatic conditions in old growth stands
- Avoid excessive siltation or deposition of soil
- Avoid disturbance of duff layer where the species occurs
- Avoid actions that would contribute towards establishment of competing exotic vegetation, and manually remove noxious weeds
- Avoid impacts caused by livestock such as trampling or grazing
- Restrict collection of moss from known sites

Direct and Indirect Effects from Alternative 1 – Current Management

House Creek Allotment

No impact (NI) to sensitive *Botrychium* and *Carex* species is expected because none were found within this allotment.

West Malheur Allotment

No impact (NI) to sensitive *Carex* species is expected because none were found within the West Malheur Allotment.

Within the West Malheur Allotment, the Current Management Alternative would have direct and indirect effects to *Botrychium* habitat. Current management at springs, bogs and seeps, allows livestock utilization levels to reach a 4-inch stubble height on the green line. This usually results in a stubble height less than 4-inch on the floodplain. Grazing at this level (less than 6-inch stubble height on the floodplain) would permit small moonworts to be eaten or trampled and would be injurious to populations; plants would not have the opportunity to sporulate, a critical reproductive step, and would be weakened by the inability to store food reserves, or they might be killed outright.

Determination: Because the six *Botrychium* species considered here have a broad distribution on the continent, and because more of them are being found each year as intensive surveys are conducted in appropriate habitats, any possible impacts on individuals from this alternative would not jeopardize the survival of the species as a whole. Livestock grazing at a utilization level that results in retaining a 4 inch stubble height of grasses, sedges, and rushes on the green line, may impact *Botrychium* habitat, not individuals (MIIH), but would not cause a loss of viability or trend toward federal listing.

Wolf Mountain Allotment

No impact (NI) to sensitive *Carex* species is expected because none were found within the Wolf Mountain Allotment.

Within the Wolf Mountain, the Current Management Alternative would have direct and indirect effects to *Botrychium crenulatum* and its habitat. Current management at springs, bogs and seeps, allows livestock utilization levels to reach a 4-inch stubble height on the green line. This usually results in a stubble height less than 4-inch on the floodplain.. Grazing at this level (less than 6-inch stubble height on the green line) would permit small moonworts to be eaten or trampled and would be injurious to populations; plants would not have the opportunity to sporulate, a critical reproductive step, and would be weakened by the inability to store food reserves, or they might be killed outright.

Determination: Because the six *Botrychium* species considered here have a broad distribution on the continent, and because more of them are being found each year as intensive surveys are conducted in appropriate habitats, any possible impacts on individuals from this alternative would not jeopardize the survival of the species as a whole. Livestock grazing at a utilization level that results in retaining a 4 inch stubble height of grasses, sedges, and rushes on the green line, may impact *Botrychium crenulatum* individuals and habitat (MIIH), but would not cause a loss of viability or trend toward federal listing.

Direct and Indirect Effects from Alternative 2 – Proposed Action

House Creek Allotment

No impact (NI) to sensitive *Botrychium* and *Carex* species is expected because none were found within this allotment. Activities proposed (see chapter 2) under this alternative would therefore have no impacts to sensitive *Botrychium* and *Carex* species.

West Malheur and Wolf Mountain Allotment

No impact (NI) to sensitive *Carex* species is expected because none were found within these allotments. Activities proposed (see chapter 2) under this alternative would therefore have no impacts to sensitive *Carex* species.

Within the West Malheur and Wolf Mountain Allotments, the Proposed Action Alternative would have direct and indirect effects to *Botrychium* habitat; however impacts would be less than the Current Management Alternative. Proposed management at identified springs, bogs and seeps, which would allow livestock utilization levels to not exceed a 6-inch stubble height on the floodplain, would have fewer impacts than Current Management. Grazing at this level would be less injurious to populations because small moonworts may not be eaten or trampled; plants would then have the opportunity to sporulate, a critical reproductive step, and would not be weakened by the inability to store food reserves.

No impacts (NI) to the *Botrychium crenulatum* population (in the Wolf Mountain Allotment) would occur because it would be fenced and livestock grazing would be excluded. The existing population, if it still exists, would most likely increase. Fencing

would occur outside *Botrychium crenulatum* habitat and therefore implementation of fencing would not impact this sensitive species. Other activities proposed under this alternative (see chapter 2) would have no impacts on *Botrychium crenulatum* and its habitat because none of the activities are proposed in *Botrychium* habitat.

Determination: Because the six *Botrychium* species considered here have a broad distribution on the continent, and because more of them are being found each year as intensive surveys are conducted in appropriate habitats, any possible impacts on individuals from this alternative would not jeopardize the survival of the species as a whole. Livestock grazing at a level that results in retaining at least a 6-inch stubble height of grasses, sedges, and rushes in the riparian zone (floodplain), may impact *Botrychium* habitat, not individuals (MIIH), but would not cause a loss of viability or trend toward federal listing.

Direct and Indirect Effects from Alternative 3 – No Grazing

House Creek Allotment

No impact (NI) to sensitive *Botrychium* and *Carex* species because none were found within these allotments.

West Malheur Allotment

No impact (NI) to sensitive *Carex* species is expected because none were found within this allotment.

Within the West Malheur Allotment, the No Grazing Alternative would most likely have a beneficial impact (BI) to *Botrychium* habitat. No livestock grazing would allow springs, bogs and seeps to recover from past affects. Habitat for *Botrychium* species would improve, but whether these species could re-occupy this habitat is unknown.

Wolf Mountain Allotment

No impact (NI) to sensitive *Carex* species is expected because none were found within this allotment.

Within the Wolf Mountain Allotment, the No Grazing Alternative would most likely have a beneficial impact (BI) to *Botrychium crenulatum* and its habitat. No livestock grazing would allow springs, bogs and seeps to recover from past affects. Habitat for *Botrychium* species would improve, and the existing population, if it still exists, would most likely increase. Whether this species could re-occupy other potential habitat is unknown.

Cumulative Effects Common to All Alternatives

Past domestic grazing, timber harvesting and fire suppression have contributed to changes in riparian habitats and the plant communities they support. The distribution and vitality of sensitive *Botrychium* and *Carex* species, before these management activities began are unknown.

Historic grazing has resulted in loss of potential habitat for these species through stream downcutting and accelerated erosion processes that alter local surface hydrology. Past timber harvesting has also increased erosion and altered hydrologic relationships. Historic logging practices included skidding logs through riparian areas, which could have destroyed existing plants but could have also provided soil openings for new plants to establish. Fire suppression may have caused a decline in populations through increased competition for soil moisture and nutrients by shade-tolerant plant species.

The Wolf Creek Fire (2001) has altered riparian habitats and the plant communities they support within the West Malheur Allotment. This fire may have altered the habitat conditions for these species most likely leading to insufficient moisture levels due to decreased shading and/or greater competition by other plant species due to increased light availability.

Future foreseeable activities such as vegetation management in the Wolf Creek Watershed (Van Vegetation Management Project) would not have cumulative impacts on *Botrychium* and *Carex* species because activities would most likely not be proposed within riparian areas.

Cumulative Effects Specific to No Grazing Alternative

No livestock grazing would have long-term beneficial effects on *Botrychium* species habitat.

References

- Brady, N. C., 1974. *The Nature and Properties of Soils*. Macmillan Publishing Co., Inc. New York:. pp. 341.
- Brooks, P., K. Urban, and G. Yates. 1991. *Sensitive Plants of the Malheur, Ochoco, Umatilla, and Wallowa-Whitman National Forest*, R6-WAW-TP-040-92, USDA Forest Service, Pacific Northwest Region.
- Hitchcock, C.L., A. Cronquist, M. Ownbey, and J.W. Thompson. *Vascular Plants of the Pacific Northwest*, Parts 1-5. University of Washington Press, Seattle, WA. 1969.
- Murphey, E.V.A. 1959. Indian uses of native plants. Mendocino County Historical Society, Fort Bragg, CA.
- Nelson, J.R. 1985. *Rare plant surveys: techniques for impact assessment*. Natural Areas Journal, Vol. 5., No. 3, pp 18-30.
- Oregon Natural Heritage Program. 2001. *Rare, Threatened and Endangered Plants and Animals of Oregon*. Oregon Natural Heritage Program, Portland, Oregon. 94 pp.
- Potash, Laura L. 1998. *Management Recommendations for Mountain grape-fern (Botrychium montanum W.H. Wagner) v. 2.0*
- USDA Forest Service. 1999. *Regional Forester's Sensitive Plant List*, Pacific Northwest Region.

APPENDIX G

Aquatic Biological Evaluation

Biological Evaluation/Assessment for PETS Species
that may occur in or would be affected by the

HOUSE, WEST MALHEUR, WOLF MOUNTAIN
ALLOTMENTS GRAZING EA

Malheur National Forest
Emigrant Creek Ranger District

Table 1. Summary of Conclusion of Effects for all Allotments (unless noted)
(Rationale for conclusion of effects is contained in the body of this document)

Species	No Action Current Management (Alternative 1)	Proposed Action (Alternative 2)	No Grazing (Alternative 3)
redband trout (S)	MIIH	MIIH	BI
Malheur mottled sculpin (S)	MIIH	MIIH	BI
Columbia spotted frog (S)	MIIH	MIIH	BI

Table 2. Sensitive Species Impact Definitions (Appendix A)

NI	No Impact
MIIH	May Impact Individuals or Habitat, but Will Not Likely Contribute to a Trend Towards Federal Listing or Cause a Loss of Viability to the Population or Species
WIFV	Will Impact Individuals or Habitat with a Consequence that the Action May Contribute to a Trend Towards Federal Listing or Cause a Loss of Viability to the Population or Species
BI	Beneficial Impact

Prepared By: /S/ Rick Vetter, Fisheries Biologist

Date 12/15/05

Approved By: _____
Carolyn Freeborn, District Ranger

Date

I. Introduction

This combined BE (Biological Evaluation)/BA (Biological Assessment) analyzes the potential effects of the proposed action and alternatives developed for the EA, which are fully described in the EA Chapter 2. Effects on PET (Proposed, Endangered, or Threatened) species listed under ESA (Endangered Species Act, as amended) and those species identified as sensitive by the FS (United States Department of Agriculture-Forest Service) that do or may occur in the project area would be considered (Appendix B) as required by FSM (Forest Service Manual) 2672.42.

PET species considered include:

those known to occur within the planning area,
those likely to occur within the planning area, based on the distribution of the species, the habitat conditions required or used by the species, and the current habitat conditions of the planning area,

- those that could be affected by management actions, due to known species occurrence adjacent to, or immediately downstream from the planning area.

The BE includes documentation of how PETS (proposed, endangered, threatened, or sensitive) species were identified for, or excluded from, the effects analysis.

The following sources were reviewed during a prefield data base review to gather evidence of or potential for PETS and/or their habitats to occur within the area of the proposed project or action:

Current Regional Forester's (R6) Sensitive Plant and Animal Lists
Malheur National Forest and Burns Ranger District PETS Species Database
Burns District WildObs Database
Oregon Department of Fish and Wildlife
Oregon State University, Department of Fish and Wildlife
ORNHP (Oregon National Heritage Program) Database records
District Stream Surveys
Current and historical species distribution maps

In addition, field reconnaissance was conducted to:

Assess the project area to identify potential PETS habitat
Search suitable habitat for PETS species occurrence (if present)
Confirm known habitat is suitable (if present)
Refine knowledge of how habitat exists on the landscape and how species use their habitat

Field reconnaissance to determine the presence of PETS was conducted from 2000-2004.

This combined BE/BA is prepared to satisfy the requirements of FSM 2672.42. This requires the Forest Service to review all its planned, funded, executed, or permitted programs and activities for possible effects (beneficial, adverse, or lack of effects) on PETS species.

The BE process is intended to review proposed Forest Service programs or activities in sufficient detail to determine how an action or proposed action may affect PETS species and to ensure that proposed management actions would not:

jeopardize the continued existence, or cause adverse modification of habitat, for species listed or proposed to be listed as endangered or threatened by the FWS (United States Department of the Interior-Fish and Wildlife Service) (FSM 2672.41) or;
contribute to the loss of viability for species listed as sensitive by FS-Region 6, or any native or desired non-native species; nor cause any species to move toward federal listing (FSM 2672.41).

This process is conducted to provide a standard by which to ensure that threatened, endangered, proposed, and sensitive species receive full consideration in the decision making process.

II. Summary of Alternatives

The project area is located on the east side of the Emigrant Creek Ranger District and is comprised of Antelope Creek and Trout Creek subwatersheds (6th level HUC) which make up the Bear Creek and Trout Creek Watersheds (5th level HUC) in the Silvies Subbasin and Upper Wolf Creek, East Fork Wolf Creek, Squaw Creek, Calamity Creek, Duck Creek, Coyote creek and Cliff Creek subwatersheds (6th level HUC) which make up the Wolf Creek, Upper Malheur River Watersheds (5th level HUC) in the Upper Malheur subbasin.

The project area contains about 57,800 acres of National Forest lands. Some private land occurs within project area boundary.

All acres listed herein are approximate. In most cases, pastures or allotments have been delineated using the most up to date information available and acreages have been determined through computer analysis. Acreages are considered approximate until actually verified on the ground.

The alternatives described in this EA were developed by the interdisciplinary team in response to the issues that were brought up during project scoping. Three alternatives are considered in detail: Current Management (Alternative 1), Proposed Action (Alternative 2), and No Grazing alternative 3.

See Chapter 2 of the EA for a complete description of alternatives. Project area maps, and foldout maps of all alternatives considered in detail are provided in the EA. Large-scale maps are also available in the project planning record. Appropriate mitigation measures have been

developed as needed for the action alternatives.

Table 4. Federally listed and proposed endangered and threatened fish species that may occur within the Malheur National Forest but are NOT present in the project area

Species	DPS/ESU (fish)
bull trout (T)	Columbia River DPS
summer steelhead (T)/critical habitat	mid-Columbia ESU

Table 5. Sensitive species (documented or suspected to occur in the project area, or otherwise impacted by actions taken) considered. I

Animals	Fish	Invertebrates	Plants
Columbia spotted frog	redband trout Malheur mottled sculpin		

IV. Potential Effects on Sensitive Species

Sensitive Amphibians

Columbia Spotted Frog

Population 3-Great Basin
(*Rana luteiventris*) Thompson, 1913

Status

Federal Status: N/A The Great Basin population (Idaho, Nevada) is a candidate for listing under the U.S. Endangered Species Act (Federal Register, 7 May 1993, 2 April 1998).

USDA-Forest Service (Region 6) Status: Sensitive (USFS 2000)

Oregon State Status: Undetermined Status (ORNHP 2000)

Oregon Natural Heritage Program Status: List 3 (ORNHP 2000)

Conservation Status Ranking
(NatureServe 2000)

Global Rank= G4T?Q
Oregon State Rank=S2?

Major Threats

Great Basin population has been adversely affected by habitat degradation resulting from

mining, livestock grazing, road construction, agriculture, and direct predation by bullfrogs and non-native fishes (NatureServe 2000).

Degree of Threat

Moderately threatened range-wide, habitat or community lends itself to alternate use

Population Status and Trend

Recent intensive surveys indicate declines in the Great Basin populations.

Fragility

Fairly resistant and tolerant of nondestructive intrusion.

Habitat

Spotted frogs are highly aquatic; and are rarely found far from permanent water. They are usually found along the grassy margins of streams, lakes, ponds, springs, and marshes. Breeding habitat is usually in shallow water in ponds or other quiet waters along streams. Breeding may also occur in flooded areas adjacent to streams and ponds. Adults may disperse overland in the spring and summer after breeding.

Distribution

Green et al. (1997) determined that frogs from the vicinity of the type locality of *Rana pretiosa* (Oregon spotted frog) are conspecific with the species residing in south-central Washington and the Cascade Mountains of Oregon. They concluded that populations from southwestern British Columbia, western Washington, western and central Oregon, and northeastern California are Oregon spotted frog whereas spotted frogs from the remainder of the range are Columbia spotted frogs (NatureServe 2000).

This species occurs in extreme southeastern Alaska, southwestern Yukon, northern British Columbia, and western Alberta south through Washington east of the Cascades, eastern Oregon, Idaho, and western Montana to Nevada (disjunct, Mary's, Reese, and Owyhee river systems), southwestern Idaho (disjunct), Utah (disjunct, Wasatch Mountains and west desert), and western and north-central (disjunct) Wyoming. Disjunct populations occur on isolated mountains and in arid-land springs.

In Oregon, the Columbia spotted frog appears to be widely distributed east of the Cascade Mountains.

This frog is present in all subbasins on the Malheur National Forest. It is assumed widely distributed in the project area. Confirmed sightings occur in all watersheds within the project area.

Existing Condition

No habitat surveys have been conducted specifically for spotted frogs. However, habitat for spotted frogs has been degraded due to past management activities such as livestock grazing, road construction along streams, and timber harvest adjacent to streams, lakes ponds, springs, and marshes. Many of these activities have resulted in incised stream channels that reduce the interaction with the floodplain and result in the loss of riparian plants and wetlands.

Sensitive Fish

Great Basin redband trout

Population 18

(*Oncorhynchus mykiss* spp.) Walbaum
1792

Status

Federal Status: Species of Concern (list 1-7-00-SP-588).

Forest Service (Region 6) Status: Sensitive (USFS 2003)

Malheur National Forest Status: management indicator species

State Status: Vulnerable-Listing of Species is not believed to be imminent and can be avoided (ODFW 1997).

Oregon Natural Heritage Program Status: List 3 (ORNHP 2000)

Conservation Status Ranking

The Association for Biodiversity Information 2000)

Global Rank=G5T2Q (Sept. 02, 1998)

National Rank=N

Oregon State Rank=S3

Major Threats

In the Great Basin, agricultural development has resulted in extensive diking, channeling, draining, and loss of marshlands. Irrigation diversions have been constructed on most streams, causing habitat dewatering and physical blockage for both upstream and downstream migration trout. Because of these developments, lake and marsh trout rearing habitat has been lost and population productivity has been compromised. Timber harvest, livestock grazing, and road building have adversely affected aquatic habitats in forested areas and rangelands throughout the range of Great Basin redband trout (USFWS 2000).

The introduction of nonnative fish species such as brook trout and smallmouth bass, and the stocking of hatchery rainbow trout have also negatively impacted this species (USFWS 2000).

Habitat

There are four different populations of redband trout in the Blue Mountains. These are: 1) sympatric populations with steelhead, 2) isolated allopatric populations in anadromous watersheds, 3) allopatric populations in the Great Basin portion of the Blue Mountains, and 4) allopatric populations in watersheds that formally supported anadromous populations (N.F. Malheur and Upper Malheur Rivers). There is little data on current population trends of the redband trout, however, the four population types do not face the same level of threats from management activities. Subpopulations of the Great Basin redband trout are probably at the greatest threat of being listed as threatened under the ESA. Redband trout in the project area are of the Great Basin population. Overall, the Interior redband trout have the most extensive area of all game fishes in the Blue Mountains. They are in the smallest headwater areas as well as in the largest rivers of the Blue Mountains.

Native trout found in the internal basins of Oregon are redband trout derived from the Columbia River system. Malheur Lake Basin is the largest of the Oregon desert basins and contains the greatest amount of trout habitat associated with the Great Basin population. The Silvies River is one of six sub-basins feeding into the lake. Basin fish fauna show little difference from the Columbia River fauna, suggesting a rather broad and geologically recent connection between Malheur Lake and Malheur River; which flows east into the Snake River system. Berg (1987) found a relatively high frequency in genetic likeness between the Silvies River and the Columbia River sub-groups. J.O. Snyder was the first researcher to sample Malheur redband trout in 1904, taking them from the Silvies River and Silver Creek.

It is not known if pure native trout populations exist in the Malheur basin (Behnke 1992). The last specimen collected that was thought to be pure native came from Smyth Creek in 1968. Hatchery introduction has occurred across the basin in years past and native redband trout face constant hazards in the high desert environment. The project Area's climatic extremes of high summer temperatures and low flow conditions frequently produce oxygen depletion in the water. Malheur redband trout are a genotypic sub-species adapted to these unstable, harsh, environments and because they are more adapted to variable water conditions, they probably have resisted hybridization with hatchery fish or native cutthroat. Observations in the Silvies and Upper Malheur watersheds have verified this adaptive nature by finding redband trout in some very marginal waters late in the summer. They tend to be small in size and are better suited for the microhabitats being maintained by base flows of less than 0.3 cfs. Hatchery rainbows would not be able to tolerate the harsh water conditions.

Interior redband trout (sensitive) are assumed to be the resident form of the anadromous steelhead. Most redband trout spawning and rearing occurs in the second to fourth order streams in the forested environment. Even when small streams are not accessible to migrating fish because of barriers or steep gradients, they are vitally important to the quality of downstream habitats.

Redband trout of the interior Oregon basins inhabit isolated desert watersheds that vary widely in size. Populations residing in small isolated streams are vulnerable to climatic fluctuations

and habitat disturbance due to their isolation from neighboring streams. During wet years, marshes and lakes can provide connections between populations of adjacent streams.

Redband trout are sensitive to changes in water quality and habitat. Redband trout of interior Oregon basins are believed to be best adapted to cold ($<21^{\circ}\text{C}$), clean water, but possess a hereditary basis to function at high temperatures (Behnke 1992). Adult redband trout are generally associated with pool habitats, although various life stages require a wide array of habitats for rearing, hiding, feeding, and resting. Pool habitat is important refugia during low water periods. An increase in sediment lowers spawning success and reduces the quantity and quality of pool and interstitial habitat. Other important habitat features include healthy riparian vegetation, undercut banks and LWD (large woody debris).

Spawning occurs during the spring, generally from March to June. Redds tend to be located where velocity, depth and bottom configuration induce water flow through the stream substrate, generally in gravels at the tailouts of pools. Water temperatures influence emergence of fry, which is typically from June through July.

Distribution

Interior redband trout are widely distributed across Oregon east of the Cascade Mountains and in the Klamath Basin (Behnke 1992). The U.S. Fish and Wildlife Service has classified the populations of redband trout inhabiting the Great Basin as a single distinct population segment (DPS) (USFWS 2000). This DPS is referred to as the “Great Basin redband trout DPS”. The range of Great Basin redband trout in Oregon includes the Warner, Catlow, Goose Lake, Fort Rock, Chewaucan, and Harney basins.

Great Basin redband trout are widely distributed in the Silvies, Upper Malheur and Harney-Malheur Lakes subbasins on the Emigrant Creek and Blue Mountain Ranger Districts of the Malheur National Forest.

This species is widely distributed in the project area, occupying the majority of perennial streams found within the watershed. They also move seasonally in the spring into many of the intermittent streams.

Existing Conditions

Stream surveys have been completed in all fish bearing streams in the project area. The majority of surveyed reaches are not meeting Forest Plan riparian management objectives (RMOs) for pool habitat, LWD, and fine sediment (Fisheries Specialist Report). Most streams do not meet Oregon water temperature standards and the lower reach of Schurtz Creek, downstream of the Wolf Mountain Allotment is functioning at risk.

Malheur mottled sculpin

(*Cottus bendirei*) Girard 1850

Status

Federal Status: Species of Concern (list 1-7-00-SP-588).

Forest Service (Region 6) Status: Sensitive (USFS 2000)

Malheur National Forest Status: management indicator species

State Status: Critical (ODFW 1998).

Oregon Natural Heritage Program Status: List 3 (ORNHP 2000)

Conservation Status Ranking

(The Association for Biodiversity Information 2000)

Global Rank=G5T3Q (Aug. 28, 1996)

National Rank=N3 (Dec 05, 1996)

Oregon State Rank=S3

Major Threats

Major threats to the Malheur mottled sculpin include destruction, modification and contraction of habitat from livestock grazing, timber harvest, and water withdrawals.

Habitat and Life History

Mottled sculpin require water temperatures below 26°C with high dissolved oxygen and low turbidity. They are found in streams with moderate to rapid current and are associated with rubble, gravel, or rocky bottoms. They seldom are found in silted areas. Malheur mottled sculpins are sensitive to changes in water quality including increases in water temperature and sediment. Spawning occurs in the spring generally from February through May. Females deposit adhesive eggs in a crevice or under rocks in clusters of 20 to 150. The male guides her to the nest area and guards the nest after she leaves the area. The female produces from about 50 to 300 eggs, depending on her size. Eggs hatch in about 4 weeks. They feed on a variety of aquatic invertebrates, mostly insects, but also shrimp, snails, fish eggs and fish fry. They were thought to be serious predators of trout eggs and fry, but results of studies on their food habits have revealed that few trout eggs or fry are actually eaten. Mottled sculpins are much more important as forage for trout.

Sculpin are a bottom dwelling fish that generally favor streams dominated by riffles or glides with cool water and clean, silt free, gravels, although the "bairdi" complex can tolerate temperatures up to 70 degrees F. Many of the streams within the project area do not meet the preferred habitat conditions; therefore, water temperature is more likely a key factor in structuring and controlling seasonal distribution patterns.

Distribution

The taxonomy of mottled sculpin (*Cottus bairdi* complex) in Harney County, Oregon was recently reviewed by Markle and Hill (2000). Based on available literature and current data, Markle and Hill support recognition of two species, Malheur mottled sculpin (*C. bendirei*) and Columbia mottled sculpin (*C. hubbsi*). The regional foresters sensitive species list recognizes the Malheur mottled sculpin as *Cottus bairdi* but recent literature recognizes the species as *Cottus bendirei*, which will be used in this report. Both species occur in northern Harney Basin and hybrids were found at contact zones in the Silver and Silvies Rivers. The Columbia mottled sculpin appears dominant in the mainstem of the Silvies River with the Malheur mottled sculpin found upstream and in isolated creeks. The Malheur mottled sculpin was the only species found in southern Harney Basin. Both species also occur in Harney Basin in the Malheur and Snake Rivers, lower Columbia Basin, and probably the upper Columbia Basin.

The Malheur mottled sculpin was first reported in Rattlesnake Creek near Camp Harney but, apparently disappeared from that locality about 1960 (Bond 1983). Malheur mottled sculpin populations are currently reported to be present in Smyth Creek, Riddell Creek, Poison Creek, Devine Creek, upper Silver Creek, Donner und Blitzen River, Silvies River, and in the Malheur River system. The composition of fish from the Silvies River system has changed dramatically from predominantly *hubbsi* forms in 1955-68 to predominantly *bendirei* and intergrades more recently.

There is a possibility that these sculpin represent a single polymorphic species or ecotype. Markle and Hill (2000) reject this hypothesis because the congruence of morphology and distribution was consistent with two species meeting in a narrow hybrid zone. A better understanding of reproduction, development and the dynamics of sculpin hybrid contact zones is needed to resolve this question.

Existing Conditions

Stream surveys have been completed on all fish bearing streams in the project area. The majority of surveyed reaches are not meeting Forest Plan riparian management objectives (RMOs) for pool habitat, LWD, width/depth ratios and fine sediment (Fisheries Specialist Report). Most streams do not meet Oregon water temperature standards and the lower reach of Schurtz Creek, downstream of the Wolf Mountain Allotment is functioning at risk.

Combined Effects and Determination by Alternative for Activities on House, Wolf, and West Malheur Allotments for the Columbia Spotted Frog, Redband Trout and Malheur Mottled Sculpin

Because of the similarity of habitat requirements for the Columbia spotted frog, redband trout, and Malheur sculpin, the effects and determination analysis for these species are combined for each alternative.

Alternative 1 (Current Management)

Direct and Indirect Effects:

The current management of the past 3-5 years combined with adaptive management would have localized negative effects on populations of the three aquatic species in all allotments except House Creek, where only the spotted frog occurs. Past management of specific riparian areas on streams and springs associated with the Wolf, and West Malheur allotments have retarded the near natural rate of recovery of these systems. These include Bridge Creek, the lower reach of Beaverdam Creek on Wolf Mountain Allotment and shorter intermittent sections of East Fork Wolf, Squaw and Van Gulch Creeks on West Malheur Allotment. The existing condition section describes the specific reaches of these streams that are not meeting Forest RMO's. Under current management stream banks would continue to erode at a higher rate than alternatives 2 or 3, creating high width/depth ratios and filling in pools with fine substrates. Stream temperatures would remain high for a longer time period due to the lack of ungrazed riparian vegetation. Additional riparian habitat associated with isolated springs, like Buck Springs on the West Malheur allotment, would also be negatively affected and impact spotted frog habitat. This alternative may have long-term adverse effects to all three sensitive aquatic species until most RMOs are met in about 50 years. This time period could vary depending on the current condition, site potential, fires, and precipitation.

Cumulative Effects:

The cumulative effects of degraded stream channels and riparian areas combined with active headcuts, unstable banks, high stream temperatures and stream channels that are not interacting with floodplains would retard the near natural rate of recovery of these aquatic systems and result in a loss of habitat for the Columbia spotted frog, redband trout and Malheur mottled sculpin. The timing and extent of these effects will vary depending on droughts, and high water events.

Determination:

Due to the minimal number of restoration projects and adaptive management proposals of the no action alternative, there would be a determination of; **May Impact Individuals or Habitat, but Will Not Likely Contribute to a Trend Towards Federal Listing or Cause a Loss of Viability to the Population or Species (MIIH)** for all three species on the West Malheur and Wolf Mountain Allotments and for Columbia spotted frog on the House Allotment.

**Alternative 2
Proposed Action
Riparian Restoration and Adaptive Management**

Direct and Indirect Effects

Management activities including; aspen and cottonwood restoration, spring and riparian fencing, headcut stabilization, prescribed burning, road treatment, addition of large woody debris to stream channels, and a change of livestock season of use in the West Malheur Allotment would have beneficial effects to Columbia spotted frogs, redband trout and the Malheur mottled sculpin.

Felling of trees in RHCAs during aspen and stream restoration activities may result in direct mortality to spotted frogs and fish, although this is unlikely. These activities would occur during the instream work period to avoid disturbances to spawning sites and young fish.

Decommissioning the 1619-805 road along Antelope Creek will speed the recovery of that aquatic system and eliminate one of the most significant sources of sediment to that creek. Closing the road to traffic will also provide additional forage for livestock.

Prescribed burning in aspen stands will increase forage production and ground cover, trapping sediment and preventing possible input into stream channels. The combination of rock structures and prescribed burning in the Cougar Flat Pasture will improve the composition of grasses and forbs and start the process of rebuilding the stream channel. This will eventually allow the stream channel to interact with the meadow and restore soil moisture to this once productive site.

Spring development can dewater portions of the ground surrounding springs. Since frogs may be using wet soil as hibernation habitat, dewatering (drying up) the habitat could reduce the amount of hibernation habitat that is available (J. Wood, USFWS, pers. com. 2003). Any water developments for livestock would be designed so they do not dewater spring sites and therefore would not affect frog hibernation habitat.

Fencing and thinned jack-strawed trees would reduce livestock and possibly big game impacts at spring and aspen/cottonwood restoration sites, which would protect spotted frog habitat. Reducing coniferous tree density around springs could increase surface water flows, which may result in greater water availability throughout the summer months for fish and spotted frogs.

Cumulative Effects

All restoration activities described above and the change in livestock numbers, season of use and riparian fencing would improve water quality and riparian habitat in watersheds within the project area and downstream areas on other allotments and private land. Spring developments would be designed in a manner as to not dewater springs, therefore no effect to frog hibernation habitat is expected. The timing and extent of these effects would vary due to

droughts, high water events and the repeated unauthorized grazing by livestock in Van and West Malheur allotments.

Determination:

Positive impacts from the restoration activities on all allotments, a reduction of livestock numbers and water hauling on the Van Allotment, and a change of livestock season of use in the West Malheur Allotment will improve the near natural rate of recovery process and move stream attributes towards Forest RMO's. However this process may require between 10 and 50 years before most Forest RMO's are met. This time period may vary depending on the current condition, site potential, fires, and precipitation. During this time livestock grazing would continue along streams, unfenced riparian areas and springs across the 3 allotments. Riparian vegetation in these areas would be grazed to 45% and 35% inch stubble heights compared to natural heights of 12-16 plus inches as documented in the Schurtz Creek livestock exclosure. Although this exclosure demonstrates the improvements that can occur with a change in livestock grazing management, it also demonstrates that after 14 years of no livestock grazing that some Forest RMO's are still not being met.

Due to the time period required for the recovery process, and continued livestock grazing in most riparian areas there would be a determination of; **May Impact Individuals or Habitat, but Will Not Likely Contribute to a Trend Towards Federal Listing or Cause a Loss of Viability to the Population or Species (MIIH)** of Columbia spotted frogs, redband trout and the Malheur mottled sculpin. Although this determination is the same as alternative one, the rate of recovery would be faster due to the restoration activities and the impact to aquatic species would be less due to riparian fencing of specific stream segments.

Alternatives 3 No Grazing

Direct and Indirect Effects

"No Grazing" would likely have the most beneficial effects for water quality and provide a more rapid and long term recovery. If there were no livestock grazing, there would be none of the adverse effects caused by grazing as described in alternatives 1 and 2. Livestock urine and fecal material would no longer contribute additional amounts of nutrients and bacteria to streams affecting water quality. Sedimentation in streams from livestock trampling banks and grazing riparian vegetation would decrease. With less sediment, spawning sites would improve and the quality of pools would improve. Dissolved oxygen levels would also improve as water temperatures decrease and as aquatic plant life growth is reduced due to fewer nutrients from fecal material. Vegetation vigor and abundance would increase and provide microhabitats for insects above the water column providing a food source for aquatic species. Riparian shrubs would increase and shade stream courses reducing water temperatures. With no livestock grazing, it is also likely that stream and riparian areas would move towards the

desired condition faster than the other 2 alternatives. The rate, however, at which a riparian area or stream moved towards the desired condition, would depend on its current condition and level of cumulative effects from other management activities.

Cumulative Effects

Livestock grazing is probably the single greatest activity in the project area, having the greatest and most widespread effect on water resources and riparian area conditions. Without livestock grazing, the cumulative negative impact to water resources and riparian areas would likely decrease substantially. Watershed conditions under “No Grazing” would likely result in better water quality for downstream beneficial uses. There may, however, be a detrimental effect to private or BLM lands under “No Grazing.” If cattle do not have access to the National Forest, the grazing intensity on these other lands may increase. This would likely lead to greater damage to the water resources and riparian areas on these lands.

Determination

Due to the positive impacts on aquatic and riparian habitats in the shortest time period (15-20 years) from no livestock grazing there would be a **Beneficial Impact (BI)** to Columbia spotted frogs, redband trout and the Malheur mottled sculpin.

Cumulative Effects common to all alternatives:

Past Effects

During the past 100 years timber harvesting, livestock grazing, noxious weeds, stream dewatering, fire suppression, road construction on erosive soils, road density, lack of road maintenance, and general road use on public and private lands have contributed to landscape changes in overland and stream flows affecting riparian and aquatic habitat. These changes are having negative effects on water quality, and aquatic species. Fire exclusion in the 20th century resulted in dense understories that may be detrimentally affecting late season flow in streams. Extensive road construction and timber harvest activities often occurred in stream channels resulting in unstable streambanks and high amounts of sediment. The cumulative affects of riparian grazing and timber harvest contributed to a reduction of LWD, wider stream channels, and loss of stream shade, resulting in higher stream temperatures and a reduction of high quality pools. The existing condition section describes stream reaches that are not meeting Forest RMO's for sediment, bank stability, temperature, large woody debris, width/depth ratios and pools in site specific areas within the project area. Past commercial tree harvest within the project area has had negative effects on bank stability, width/depth ratios, stream shade and temperatures, substrate embeddedness. Timber harvesting across the landscape both on public and private lands have altered natural habitat-forming processes degrading the condition of stream channels and riparian areas, slowing the recovery process.

The Wolf wildfire in 2001 burned about 600 acres near the confluence of the East, West and Middle Forks of Wolf Creek in the West Malheur and Van Allotment. Small amounts of sediment from this fire entered the Middle Fork of Wolf Creek and the effects were negligible. The fire also resulted in the addition of large woody debris to the East Fork of Wolf Creek, which helped move the lower reach of this stream closer to the Forest RMO's for LWD and pools.

As streams became channelized, riparian floodplains lost their ability to retain ground water and floodplain vegetation changed from grasses, sedges and forbs to sagebrush and rabbitbrush. During the past 20 years efforts have been made to limit resource degradation within the allotments by conducting small scale restoration projects. These projects included; riparian meadow restoration, headcut stabilization, streambank stabilization, aspen restoration, road treatments, livestock exclosures and drift fences. As individual roads are closed and decommissioned in the upper part of the watershed, sediment input would be reduced and eventually the entire watershed and downstream areas would receive less sediment, resulting in long term positive cumulative effects for water quality and aquatic species.

INFISH guidelines established riparian stream buffers and now exclude specific activities from these areas that may have negative affects on aquatic ecosystem. However, the restoration process will require decades to fully restore natural drainage systems and meet INFISH/FOREST RMOs (USDI 1995), including pool frequency, water temperature, large woody debris, bank stability, lower bank angle, and width depth ratios.

Cumulative Effects at the Project Level

Management activities and natural processes over space and time create cumulative watershed effects. These include but are not limited to: changes in timing and magnitude of flows, sediment supply to channels, sediment storage, structure in channels, and water temperature, snowmelt and freezing. Cumulative watershed effects can affect aquatic species directly by increasing sedimentation of spawning/rearing habitat associated with bank erosion, loss of riparian vegetation or indirectly by changes in habitat, water quality, or impacts to macroinvertebrates/aquatic organisms.

All restoration activities and adaptive management strategies described in alternative 2 would improve water quality and riparian habitat over all the subwatersheds in the project area and downstream on other allotments and private land. Passive restoration from the elimination of livestock in alternative 3 and the stabilization of headcuts and addition of LWD would also improve water quality and riparian habitat over the same landscape, but a faster rate.

Based on the analysis of proposed activities, alternatives 2 and 3 are not likely to exacerbate cumulative watershed effects; few adverse impacts from livestock grazing activities are expected due to proposed changes in grazing management, restoration activities and annual monitoring.

Reasonable Foreseeable Activities

Potential effects from alternatives 2 and 3 would be cumulative with additional effects from non-federal activities within the project area and all activities outside the project area on federal, state and private lands but within the Malheur and Silvies River drainage. Aside from this project, other activities that may contribute to cumulative effects include; timber harvest activities, wildfires, livestock grazing, road use, non functional roads acting as streams, flood irrigation, and vegetation alteration. These activities occur on an annual basis with the exception of timber harvest and wildfire, and are known contributors of stream dewatering and sediment, affecting water quality and aquatic species.

Water diversions for flood irrigation occur in Wolf Creek near Squaw Creek, on the forest. A channel spanning rock dam blocks the stream flow and diverts it into the private floodplain for livestock grazing or hay production. These diversions restrict seasonal fish movement during the spring and summer and trap fish in the unscreened irrigation ditch, resulting in the death redband trout.

The reduction of bank stabilizing vegetation and stream shade is retarding the near natural rate of recovery and the obtainment of Forest RMO's. Shading of streams has been documented as a key component in maintaining proper stream temperatures (Beschta et al., 2003).

This cumulative component and future recovery of riparian areas depends on the level of livestock use and achievement of grazing standards within the RHCAs. The outcome would influence and may offset some of the positive benefits for water quality and aquatic species gained from this project. This analysis assumes that Forest Service grazing standards would be achieved in the future. Under these conditions riparian vegetation would stabilize stream banks in about 3-5 years, and produce additional stream shade in 10-20 years. Narrowing of stream channels requires the longest recovery period, between 10 to 50 years, depending on the current condition, site potential, fires and precipitation.

Summary of Effects

Alternatives two and three, allow for the most improvement within the project area with the least potential for negative impacts to aquatic habitat and water quality. Benefits common to both alternatives would prevent further decline in watershed health, reduce risks affecting ecosystem sustainability, begin vegetation and watershed restoration activities, lower the risk of stand-replacement fires, protect and improve riparian, aquatic and terrestrial habitat, and address road management concerns. Environmental changes resulting from these actions include the enhancement of riparian areas and improved watershed health and ecosystem sustainability that would be consistent with the Clean Water Act, INFISH and Forest standards. Minimal watershed and aquatic impacts from harvesting activities are likely to occur due to the implementation of design features, BMPs, INFISH RHCA buffers and monitoring strategies associated with these action alternatives. Negligible direct, indirect, and cumulative effects on water quality (sediment and temperature) and quantity (magnitude, timing, and duration) are anticipated if these alternatives are implemented. A reduction in stream sediment would

improve aquatic habitat, especially pool quality, and allow redband trout and other aquatic species to increase. Activities associated with the alternatives two and three would improve water quality (temperature and sediment) in the long term on creeks listed for high temperatures.

Alternative 1 allows for the continuation of current grazing management with adaptive management, but no restoration activities, prescribed burning or road treatment. This alternative would provide the least amount of improvements and allow aquatic habitat conditions to improve at the slowest rate (50+ years). Livestock would be allowed to utilize riparian vegetation at 35 to 45 % levels and upland vegetation by 55%.

Alternative 2 Alternative two includes active restoration projects, road treatment, prescribed burning and adaptive management techniques to improve the current condition. Most Forest RMOs may be met in 30-40 years. Livestock would be allowed to utilize riparian vegetation at 35 to 45 % levels and upland vegetation by 55%.

Alternative 3 allows for the best possible improvement in aquatic habitat and species expansion by eliminating livestock grazing, allowing for a more natural passive restoration process. Many streambanks would be covered with grasses and sedges over 20 inches high, overhanging streams providing shade for cooler water temperatures and cover for aquatic species. Vegetation use would only occur by native ungulates. The near natural rate of recovery would not be retarded by livestock and RMOs would be obtained faster, (possibly 15-20 years) then alternatives 1 or 2.

References

- Beschta, Robert L., Bruce A. McIntosh, and Christian E. Torgersen, 2003. Perspectives on water flow and the interpretation of FLIR images. *J. Range Management* 56:97-99, January 2003.
- Behnke, R. J. 1992. Native Trout of Western North America. American Fisheries Society. Monograph 6, pp. 175-185.
- Bond, C. E. 1983. General reports on Oregon Lakes. *in* E. P. Peister, (ed.). Proceedings of the desert fishes council. Vol. III-IV.
- Green, D.M., H. Kaiser, T.F. Sharbel, J. Kearsley, and K.R. McAllister. 1997. Cryptic Species of Spotted Frogs *Rana pretiosa* Complex, in Western North America. *Copeia* 1997(1):1-8.
- American Fisheries Society Special Publication 19:483-518.
- Markle, D. F., and D. H. Hill, Jr. (2000). Taxonomy and Distribution of the Malheur Mottled Sculpin, *Cottus bairdi*. *Northwest Science*, Vol. 74, No. 3.
- NatureServe: An online encyclopedia of life [web application]. 2000. Version 1.1. Arlington, Virginia, USA: Association for Biodiversity Information. <http://www.natureserve.org>
- Oregon Department of Fish and Wildlife. 1997. Sensitive Species List.
- USDA Forest Service. 2000. Region 6 Sensitive Animal List. Revised November 2000.
- USDA Forest Service, USDI Fish and Wildlife Service 1995. Decision Notice/Decision Record, FONSI, EA, Appendices for Inland Native Fish Strategy (INFISH).
- USDA Forest Service and USDI Bureau of Land Management. 1995. Decision Notice and Decision Record for the Interim Strategies for Managing Inland Native Fish (INFISH) in Eastern Oregon and Washington, Idaho, and Portions of California. USDA Forest Service and USDI Bureau of Land Management. 13pp.
- USDI Bureau of Land Management (BLM). 1998. Riparian Area Management: Process for Assessing Proper Functioning Condition. Technical Reference 1737-15. USDI Bureau of Land Management Service Center, Denver, CO.
- USDI-Fish and Wildlife Service. Federal Register. Volume 68, Number 62, pages 15804-115875.

Appendix A

Status Definitions

Federal Status Definitions

Endangered Species, which are in danger of becoming extinct within the near future throughout all or a significant portion of their range

Threatened Species those likely to become endangered within the foreseeable future.

Species of Concern Former USFWS C2 candidate that have sufficient information to support a proposal to list under the ESA or by ODFW under the OEAS.

Oregon's Threatened and Endangered Species Program Definitions
(under the authority of ORS 496.172, the Oregon Endangered Species Act, 1987)

Sensitive species are broken into four categories defined as follows:

Critical Species for which listing as threatened or endangered is pending; or those for which listing as threatened or endangered may be appropriate if immediate conservation actions are not taken. Also considered critical are some peripheral species that are at risk throughout their range, and some disjunct populations.

Vulnerable Species for which listing as threatened or endangered is not believed to be imminent and can be avoided through continued or expanded use of adequate protective measures and monitoring. In some cases, the population is sustainable, and protective measures are being implemented; in others, the population may be declining and improved protective measures are needed to maintain sustainable populations over time.

Peripheral or Naturally Rare Peripheral species refer to those whose Oregon populations that are on the edge of their range, Naturally rare species are those which had low population numbers historically in Oregon because of naturally limiting factors. Maintaining the status quo for the habitat and population of these species is a minimum requirement. Disjunct populations of several species that occur in Oregon should not be confused with peripheral.

Undetermined Status Animals in this category are species for which status is unclear. They may be susceptible to population decline of sufficient magnitude that they could qualify for endangered, threatened, critical or vulnerable status, but scientific study will be required before a classification can be made.

Conservation Status Ranking

- 5** Secure-Common, demonstrably widespread and abundant. Typically with considerably more than 1000 occurrences and more than 10,000 individuals.

Secure in Oregon, and essentially ineradicable under present conditions.

- 4** Apparently Secure-Uncommon but not rare, and usually widespread. Possibly, cause for long-term concern. Typically more than 1000 occurrences and more than 10,000 individuals.

Not rare, and usually widespread in Oregon. Usually more than 100 occurrences.

- 3** Vulnerable-Vulnerable globally because very rare and local throughout its range, found only in a restricted range (even if abundant at some locations), or because of other factors making it vulnerable to extinction. Typically 21 to 100 occurrences or between 3,000 and 10,000 individuals.

Vulnerable in Oregon either because rare and uncommon, or found only in a restricted range (even if abundant at some locations), or because of other factors making it vulnerable to extirpation. Typically 21 to 1000 occurrences.

- 2** Imperiled-Imperiled globally because of rarity or because of some factor(s) making it very vulnerable to extinction. Typically 6 to 20 occurrences or few remaining individuals (1,000 to 3,000) or acres (2,000 to 10,000) or stream miles (10 to 50).

Imperiled in Oregon because of rarity or because of some factor(s) making it very vulnerable to extirpation from the state. Typically 21 to 100 occurrences.

- 1** Critically Imperiled-Critically imperiled globally because of extreme rarity or because of some factor(s) making it especially vulnerable to extinction. Typically 5 or fewer occurrences or very few remaining individuals (<1,000) or acres (<2,000) or stream miles (<10).

Critically Imperiled in Oregon because of extreme rarity or because of some factor(s) making it especially vulnerable to extirpation for the state. Typically 5 or fewer occurrences or very few remaining individuals or acres.

Oregon Natural Heritage Program List (ONHP 2000)

List 1 contains taxa that are threatened with extinction or presumed to be extinct throughout their entire range.

List 2 contains taxa that are threatened with extirpation or presumed extirpated from the state of Oregon. These often peripheral or disjunct species are of concern when considering species diversity within Oregon's borders. They can be very significant when protecting the genetic diversity of a taxon. ORNHP regards extreme rarity as a significant threat and has included species that are very rare in Oregon on this list.

List 3 contains species for which more information is needed before status can be determined, but which may be threatened or endangered in Oregon or throughout their range.

List 4 contains taxa that are of conservation concern but are not currently threatened or endangered. This includes taxa that are very rare but are currently secure, as well as taxa that are declining in numbers or habitat but are still too common to be proposed as threatened or endangered. While these taxa currently may not need the same active management attention as threatened or endangered taxa, they do require continued monitoring.

DETERMINATION OF CONCLUSION DEFINITIONS FOR BIOLOGICAL EVALUATIONS.

Sensitive Species

NO IMPACT (NI)

Applied when an activity would have no effect on habitat, individuals, a population or a species.

MAY IMPACT INDIVIDUALS OR HABITAT, BUT WILL NOT LIKELY CONTRIBUTE TO A TREND TOWARD FEDERAL LISTING OR CAUSE A LOSS OF VIABILITY TO THE POPULATION OR SPECIES (MIIH)

Activities or actions that have effects that are immeasurable or minor, or that are consistent with Conservation Strategies or conservation of the species would receive this conclusion.

For populations that are very small, or vulnerable, each individual may be important for the short and long term viability.

Because sensitive species have been designated based on concerns for their viability, impacts on either individuals or populations are best managed under the umbrella of a Conservation Strategy. Without a Conservation Strategy, the best hierarchical level to base effects of management activities or activities is usually the population, metapopulation or fish stock level.

WILL IMPACT INDIVIDUALS OR HABITAT WITH A CONSEQUENCE THAT THE ACTION WILL CONTRIBUTE TO A TREND TOWARD FEDERAL LISTING OR CAUSE A LOSS OF VIABILITY TO THE POPULATION OR SPECIES (WIFV)

Loss of individuals or habitat can be considered significant when the potential effect may be:

1. contributing to a trend towards federal listing,
2. results in a significantly increased risk of loss of viability to a species,

3. or results in a significantly increased loss of viability to a population (stock).

Activities that adversely affect many individuals, or even a few individuals in vulnerable populations, should probably receive this determination unless there is a Conservation Strategy. Activities that are in conflict with the Conservation Strategy or Conservation Agreement would receive this determination.

Significant adverse impacts to sensitive species must not occur until a Conservation Strategy, or similar plan for species conservation, is prepared (FSH 2672.1) The purpose of a Conservation Strategy is to ensure cumulative effects do not result in reduced viability or conditions that result in the need for federal listing.

BENEFICIAL IMPACT (BI)

Applied when an activity would benefit a sensitive species.

APPENDIX H

Wildlife Biological Evaluation

Biological Evaluation for Terrestrial Wildlife PETS Species

that may occur in or will be affected by the

West Malheur, Wolf Mountain, House

Malheur National Forest
Emigrant Creek Ranger District

Table 1. Summary of Conclusion of Effects

(Rationale for conclusion of effects is contained in the body of this document)

Species	No Action Alternative	Current Management	Proposed Action
gray wolf (E)	NE	NE	NE
bald eagle (T)	NE	NE	NE
lynx (T)	NE	NE	NE
wolverine (S)	NI	MIH	MIH/BI
pygmy rabbit (S)	NI	NI	NI
peregrine falcon (S)	NI	NI	NI
western sage grouse (S)	NI	MIH	MIH/BI
gray flycatcher (S)	NI	MIH	MIH/BI

P = Proposed, **E** = Endangered, **T** = Threatened, **S** = Sensitive

(Definitions of effects determinations provided in Appendix A)

Prepared By: _____

Roy Sutcliffe
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Date

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Richard Vetter
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Date

Margaret D. Bailey
District Ranger

Date

I. Introduction

This combined BE (Biological Evaluation)/BA (Biological Assessment) analyzes the potential effects of the proposed action and alternatives developed for to the House, West Malheur and Wolf Mountain Range Analysis, which are described below. Effects on PET (Proposed, Endangered, or Threatened) species listed under ESA (Endangered Species Act, as amended) and those species identified as sensitive by the FS (United States Department of Agriculture-Forest Service) that do or may occur in the project area would be considered (Appendix B) as required by FSM (Forest Service Manual) 2672.42.

PET species considered include:

- those that are known to occur within the planning area,
- those that are likely to occur within the planning area, based on the distribution of the species, the habitat conditions required or used by the species, and the current habitat conditions of the planning area,
- those that could be affected by management actions, due to known species occurrence adjacent to, or immediately downstream from the planning area.

The BE includes documentation of how PETS (proposed, endangered, threatened, or sensitive) species were identified for, or excluded from, the effects analysis.

The following sources were reviewed during a prefield data base review to gather evidence of or potential for PETS and/or their habitats to occur within the area of the proposed project or action:

- Current Regional Forester's (R6) Sensitive Plant and Animal Lists
- Malheur National Forest and Burns Ranger District PETS Species Database
- Burns District WildObs Database
- Oregon Department of Fish and Wildlife
- Oregon State University, Department of Fish and Wildlife
- ORNHP (Oregon National Heritage Program) Database records

- Current and historic species distribution maps
- Site-specific habitat present within the analysis area that is suitable or may be potential habitat

In addition, field reconnaissance was conducted to:

- Assess the project area to identify potential PETS habitat
- Search suitable habitat for PETS species occurrence (if present)
- Confirm known habitat is suitable (if present)
- Refine knowledge of how habitat exists on the landscape and how species use their habitat

Field reconnaissance to determine the presence of PETS was conducted in 2004.

This combined BE/BA is prepared to satisfy the requirements of FSM 2672.42. This requires the Forest Service to review all its planned, funded, executed, or permitted programs and activities for possible effects (beneficial, adverse, or lack of effects) on PETS species.

The BE/BA process is intended to review proposed Forest Service programs or activities in sufficient detail to determine how an action or proposed action may affect PETS species and to ensure that proposed management actions would not:

- jeopardize the continued existence, or cause adverse modification of habitat, for species listed or proposed to be listed as endangered or threatened by the FWS (United States Department of the Interior-Fish and Wildlife Service) (FSM 2672.41) or;
- Contribute to the loss of viability for species listed as sensitive by FS-Region 6, or any native or desired non-native species; nor cause any species to move toward federal listing (FSM 2672.41).

This process is conducted to provide a standard by which to ensure that threatened, endangered, proposed, and sensitive species receive full consideration in the decision making process.

II. Summary of Alternatives

The project area is located on the north side of the Burns Ranger District and is comprised of Duck Creek, Calamity Creek, East Fork Wolf Creek, Upper Wolf Creek, Squaw Creek, Mountain Creek, House Creek, and Antelope Creek subwatersheds (6th level HUC). Two watersheds occur in the project area which include Trout Creek and Wolf Creek Watershed (5th level HUC). Table 2 provide the legal description of the project area.

Table 2 Project Area in the three allotments by Location by Township/Range/Section.

Allotment	Township	Range	Section
Wolf Mnt.	18S	32E	1,12-14,23,24
Wolf Mnt	17S	32E	1,12-14,22-26,36
Wolf Mnt.	17S	33E	5-11,14-23,25-36
Wolf Mnt.	18S	33E	3-10,16-21,28,29
W.Mal.	18S	331/2E	1-15,17,18
W.Mal.	17S	331/2E	5-9,15-22,30-35
W.Mal	17S	33E	1,2,11-14,23-25,36
House	18S	32E	3,10-12,14-5,22-3
House	17S	32E	35

The project area contains about 55,350 acres of Forest Service managed land. The three allotments are divided as follows: House- 3,170 acres, Wolf Mountain- 30,140 acres, and West Malheur- 22,050 acres. All acres listed herein are approximate. In most cases, pastures and allotments have been delineated using the most up to date information available and acreages have been determined through computer analysis. Acreages are considered approximate until actually verified on the ground.

The alternatives described in the Range Analysis were developed by the interdisciplinary team in response to the issues that were brought up during project scoping. Three alternatives are considered in detail: the No Action, Current Management and the Proposed Action

See Chapter 2 of the EA for a complete description of alternatives. Project area maps and foldout maps of all alternatives considered in detail are provided in the EA. Large-scale maps are also available in the project planning record.

III. Species Considered

Table 3. Federally listed species (documented or suspected to occur in the project area, or otherwise impacted by actions taken) considered.

Species	Effects Determination	Informal Consultation	Biological Assessment
gray wolf (E)	No Effect	NO	NO
bald eagle (T)	No Effect	NO	NO
lynx (T)	No Effect	NO	NO

Table 4. Sensitive Terrestrial species (documented or suspected to occur in the project area, or otherwise impacted by actions taken) considered.

Animals
wolverine
pygmy rabbit
peregrine falcon
western sage grouse
gray flycatcher

See Appendix B for full list of PETS found or suspected to occur on the Burns Ranger District.

IV. Potential Effects on Listed and Proposed Species and Critical Habitat

Gray wolf (*Canis lupus*) Linnaeus 1758

Status

Federal Status: Endangered (list 1-7-00-SP-588). The northern Rocky Mountain gray wolf was listed as endangered on June 4, 1973, and a recovery plan was released in 1987. Service down listed gray wolf in April 2003 to threaten and adopted a special "4(d) rules" allowing the take of wolves under certain circumstances. January, 31, 2005, the U.S. District Court vacated a U.S. Fish and Wildlife Service rule on gray wolves. Therefore, gray wolves are currently listed as endangered.

Forest Service (Region 6) Status: Endangered

State Status: Endangered (last revised 12/1998)
Conservation Plan accepted, February 11, 2005.

Oregon Natural Heritage Program Status: List 2-extirpated (ORNHP 2000)

Conservation Status Ranking

(The Association for Biodiversity Information 2000)

- **Global Rank= G4** (November 15, 1996)
- **National Rank=N4** (September 05, 1996)
- **Oregon State Rank= SX** (resumed extirpated)

(See Appendix C for definitions)

Major Threats

Human-caused mortality is the major factor limiting the recovery of wolves with the majority of losses due to shooting, trapping and vehicle accidents. In addition, wolves, particularly juveniles, are susceptible to canine parvovirus and distemper.

Roads negatively affect this species. Roads increase human presence in wolf habitat and increase the likelihood of negative contacts. A disproportionate number of human-caused mortalities occur near roads. These mortalities are mostly legal and illegal shooting resulting from

human access provided by roads. Vehicle collisions account for additional wolf mortalities.

"Thurber and others (1994) cite three studies (Jensen and others 1986, Mech and others 1988, Thiel 1985) indicating wolf packs would not persist where road densities exceeded about 1.0 mi/mi²." (Wisdom et al. 2000)

Population Status and Trend

Currently there are experimental populations of gray wolves established in Idaho and Montana. There are no known wolf packs in Oregon but dispersing wolves could establish in remote areas within the state.

Before wolves would be down listed in Oregon, four breeding pairs need to exist for three consecutive years in eastern Oregon. A breeding pair is defined as an adult male and female with at least two pups surviving to the end of December. The number of wolves associated with a breeding pair can vary from 6-14 wolves (USFWS 2002-3). Based on data from Idaho, four breeding pairs is 6-7 packs of wolves, which is a population of 40-50 animals. It is estimated it would take decades to reach this population objective in Oregon.

Source Habitat Trend

Source habitats span a broad elevational range and include all terrestrial community groups except exotic herblands and agriculture (Wisdom et al. 2000).

Source habitats for gray wolf likely occurred throughout the basin historically. The current extent of habitat, albeit largely unoccupied, is similar to the historic distribution except for the Columbia Plateau, Lower Clark Fork, and Upper Clark Forks ERUs, (Ecological Reporting Unit) where habitat is more patchily distributed than it was historically. The overall trend in source habitats across the basin was neutral.

Existing Condition

Historically, wolves occupied all habitats on this Forest (Wisdom et al. 2000), but are currently considered extirpated.

In 1999, a collared wolf (B-45-F) from the experimental, non-essential Idaho population traveled to the three Blue Mountain National Forests and stayed until it was captured and returned to Idaho. Another wolf was found dead near Baker City in the spring of 2000.

This indicates that the three Blue Mountain Forests are probably suitable habitat for wolves. Over time, wolves dispersing from the growing experimental, non-essential central Idaho wolf population could return to the Blue Mountains and establish packs.

Effects and Determination

Common to All Alternatives

Wolves are limited by prey availability and are threatened by negative interactions with humans. Generally, land management activities are compatible with wolf protection and recovery, especially actions that manage ungulate populations. Habitat and disturbance effects are of concern in denning and rendezvous areas.

No such habitat is currently occupied in Oregon.

At this time, the determination for almost all project activities on the Malheur National Forest is **NO EFFECT (NE)** for the following reasons:

- No populations currently occupy the Malheur National Forest.
- No denning or rendezvous sites have been identified on the Malheur national Forest.
- There is an abundance of prey on the forest, therefore prey availability is not a limiting factor.
- Most management activities for non-breeding populations are compatible with wolf protection and recovery.

bald eagle
(*Haliaeetus leucocephalus*)
Linnaeus 1766

Federal Status: Threatened

On February 14, 1978 the bald eagle was federally listed as endangered in all of the conterminous United States except Minnesota, Wisconsin, Michigan, Oregon and Washington, where it was

classified as threatened. No critical habitat was designated at the time of listing. On August 11, 1995, it was downlisted to threatened in all of the conterminous United States.

Conservation Status Ranking

(Csuti et al. 1997)

- **Global Rank=G4**
- **Oregon State Rank=S3**

Major Threats: Lethal and non-lethal exposure to organochlorides pesticides, predator control (shooting and poisoning), habitat degradation, loss of nest sites and winter roost habitat, and human disturbance.

Habitat

In Oregon, breeding habitat is associated with large bodies of water which support fish populations and have large trees for nesting nearby (Marshall 1992). Nesting bald eagles are rare on the Malheur National Forest. As of 2004, only two documented active nest site has been found on the Emigrant Creek District

These birds are more common in the area during the winter. Wintering habitat is not nearly as specific as nesting habitat. It is located wherever there is an adequate supply of carrion or dying animals and has protected sites for roosting. Roost sites can be 20 miles or more from feeding areas and are most commonly in stands of mature or old-growth conifers. Roost sites contain trees which are larger in diameter than those generally found in the area. Roost sites provide thermal cover and wind protection and may be used by many birds. Major roost sites are still being discovered and vary as to location and use, according to food supply and availability of roost trees (Marshall 1992). Several communal winter roost and potential winter roost sites have been identified on the Emigrant Creek District.

Distribution

The bald eagle is the only North American representative of the fish and sea eagles (Grossman and Hamlet 1964, Brown and Amadon 1968), and is endemic to North America. Other sea and fish eagles occur as vagrants to the Bering Strait Islands and along the coast of Alaska, or occur in Greenland. The breeding range of bald eagles formerly included most of the continent, but now nest mainly in Alaska, Canada, the Pacific Northwest

states, the Great Lakes states, Florida, Chesapeake Bay and rarely in the Desert Southwest.

Pacific Population

Bald eagle populations in the 7-state recover area (California, Idaho, Montana, Nevada, Oregon, Washington and Wyoming) are less than what would be expected from historical perspectives. Breeding populations in Oregon and Washington are still widely distributed, but historic information suggests significant declines and changes in distribution. (USFWS 1986).

Bald eagles occur throughout the 7-state recover area, but nesting distribution is more restricted than wintering distribution. In 1985, 527 of 635 nesting territories surveyed were occupied by breeding pairs, for an occupancy rate of 83%. More than 25% of all the wintering bald eagles in the lower 48 states occur in the Pacific recovery area. As many as 4,588 birds have been counted during midwinter surveys conducted between 1979 and 1984 (USFWS 1986).

Breeding populations of bald eagles in Oregon and Washington are still widely distributed, but historical information suggests significant declines and changes in distribution. Oregon has the second highest population of nesting bald eagles in the Pacific Northwest recover area. Breeding pairs occupied 132 of 149 traditional nesting territories surveyed in 1985. At that time, approximately 60% of eagle pairs nested on public land. The Klamath Basin contained the highest concentration in the state (60 pair), but significant numbers (24 pair) nest near high Cascade lakes (USFWS 1986). The Oregon coastline and lower Columbia River Basin have the most of the remaining pairs in the state (Isaacs et al. 1983).

The Pacific Bald Eagle Recover Plan (USFWS 1986) defines the minimum number of nesting territories and breeding pairs needed for a recovered bald eagle population. The Pacific Recovery area has been divided into 47 recovery zones. Each of the zones has a corresponding "habitat management goal" (number of nesting territories) and a "population goal" (number of breeding pairs) expected to occur if the population were considered recovered. These numbers were determined for each zone by considering the current eagle population and the amount of potentially suitable eagle habitat available within the zone.

The Silvies River nesting territory falls within the Harney Basin/Warner Mountains recovery zone (RZ21) which has a habitat management goal of 16

nesting territories and a population goal of 10 breeding pairs of bald eagles. The Silvies River site is the third documented nesting territory and breeding pair in RZ21. Another bald eagle nest was discovered on the former Snow Mountain District in 2001. Two other existing territories identified in the Pacific Bald Eagle Recover Plan occur in the Modoc Plateau, California.

The Silvies River nest was located in July of 1991. Over the last 13 years of nest monitoring the nest has been occupied each year, except in 2001-2003. It has produced young 8 out of 13 years and has averaged 0.85 young fledged per year since discovery. The eagle nest on former Snow Mountain District has produced six young in the past four years with 1.5 young per year fledging average.

Existing Condition

An active bald eagle nest is located approximately eight air miles southwest of the House allotment. The BEMA (Bald Eagle Management Area) primary use (foraging, loafing and roosting) area for this nest site is centered on the main channel of the Silvies River.

The nearest consistently occupied bald eagle winter roosts (MA-5) on the forest is the Rattlesnake Creek roosts located approximately 18 miles south of the West Malheur allotment. Bald eagle foraging occurs along the Silvies River located approximately 2.5 miles from the House allotment. There is no observations of bald eagles foraging, roosting, loafing, or nesting within the planning area.

Effects and Determination

.Based on a preliminary assessment of alternatives, implementation of the no action alternative would have **NO EFFECT (NE)** on bald eagles or bald eagle nesting habitat and foraging habitat.

Proposed Action and Current Management Alternatives

Direct and Indirect Effect

There would be no direct effects on bald eagles from livestock operations in all the allotments due to rarity of bald eagle use in the area. There has not been any documented evidence of bald eagles foraging, roosting or nesting in the allotments. There would be no indirect effects on foraging habitat since there are no large rivers, lakes or reservoirs providing foraging habitat for eagles. Any bald eagle foraging in the

allotments would be incidental and would be short term.

There would be no removal of roosting or nesting trees in the project area. The nesting habitat is limited in the project area and the likelihood of bald eagles nesting in the area is very low.

Determination

Based on the following a NO EFFECT determination is given for bald eagles for all the allotments

- Livestock would not affect nesting, roosting, loafing and foraging habitat
- There is no nesting or winter roosting areas in the project area.
- There have been no sightings of bald eagles in any of the allotments.

lynx
(*Lynx canadensis*) Kerr 1792

Status

Federal Status: Threatened (list 1-7-00-SP-588). On March 24, 2000, the USDI Fish and Wildlife Service published a final rule (50 CFR Part 17, RIN 1018-AF03) to list the contiguous U.S. distinct population segment of the Canada lynx, as threatened, pursuant to the Endangered Species Act of 1973, as amended. The listing became effective 30 days after publication of the final rule in the Federal Register. (USDI-Fish and Wildlife Service 2000a)

Forest Service (Region 6) Status: Threatened

State Status: N/A

Oregon Natural Heritage Program Status: List 2

Conservation Status Ranking (NatureServe 2000)

- **Global Rank= G5** (Nov 19, 1996)
- **National Rank=N4?** (Jan. 15, 1997)
- **Oregon State Rank=S1**

Major Threats

This species has a large range in northern North America, Alaska and most of Canada. Declines have occurred in some populations, but apparently still

widespread and relatively abundant in most of historic range, though population data are lacking for many areas. Habitat loss, fragmentation and susceptibility to overharvest (trapping) are major concerns across its range (TNC 1999).

Factors thought to be of concern include; forest management activities that drastically alter habitat, fire suppression, landscape level catastrophic wildfire, roads, developments that destroy habitat, grazing, predator control and trapping, competition with other predators, and human disturbances (winter recreation off-highway travel and highways) that displace lynx from their habitat (Wisdom et al. 2000, TNC 1999, and Witmer et al. 1998).

Population Status and Trend

"Empirical data for distribution of lynx within the basin are scarce, and data on abundance of lynx populations are not available. McKelvey and others (1999) recently summarized all known lynx locations in the United States, which provides a framework for designing and conducting future surveys and demographic studies of lynx populations." (Wisdom et al. 2000)

Source Habitat Trend

Basin-wide, source habitat was projected to have increased moderately or strongly in 47 percent of the watersheds. The Blue Mountains ERU has undergone a positive absolute (+26.93%) and relative (>100.00%) change in source habitat availability (moderate or strong increases in more than 50 percent of the watersheds). An increase in Blue Mountains source (denning) habitat was most influenced by an increase in mid and late-seral montane forests and mid-seral subalpine forests (Wisdom et al. 2000).

Habitat

General Description

Lynx are typically associated with large tracts of higher elevation boreal and coniferous forests that are often interspersed with rock outcrops, bogs and thickets. Key components of lynx habitat include denning, foraging, and travel corridors provided by a mosaic of forest habitats.

Home range size varies considerably and is usually dependent upon prey availability. Typical home range territories are 45-155 mi². Lynx habitat landtype typically occur where low topographic relief

creates continuous forest communities of varying ages (Ruggiero et al. 1994). This species requires early successional forests that contain high numbers of prey for foraging, and late-successional forest that contain cover for kittens (especially deadfalls) and for denning. Intermediate successional stages may serve as travel cover, but function primarily to provide connectivity within a forested landscape. Lynx avoid large openings (>330 feet from cover) that have the potential to disrupt movement between isolated populations (Ruggiero et al. 1994).

Snowshoe hare (*Lepus americanus*) is a primary prey species (Quinn and Parker 1987). Other prey items used include small rodents, red squirrels (*Tamiasciurus hudsonicus*), grouse (*Bonasa umbellus* and *Dendrogapus* spp.) and ptarmigan (*Lagopus* spp.) (Hatler 1989, McCord and Cordoza 1982).

Lynx prefer early to mid-successional, densely stocked, mixed conifer forests created by natural or human-caused disturbances that support plentiful populations of hare for hunting (Ruggiero et al. 1994). In general, these conditions are often preferred by snowshoe hare (*Lepus americanus*) for cover. In Washington, hares were 4-5 times more abundant in 20-25 year old lodgepole pine (*Pinus contorta*) stands than older stands. In Montana, dense stand of early to mid-successional Douglas-fir (*Pseudotsuga mesziesii*) were most commonly used and in Colorado and Utah, dense stands of early to mid-successional subalpine fir (*Abies lasiocarpa*) and Engelmann spruce (*Picea engelmannii*) were preferentially selected.

Snowshoe hares also need large numbers of downed logs within these habitats for hiding cover and warren sites.

Lynx denning habitat is characterized as having large woody debris that provides security and thermal cover and mature overstory canopies. These combine to provide both vertical and horizontal structural diversity (Ruggiero et al. 1994). Habitat quality, as measured by the availability of alternate den sites, appears to be an important factor in kitten survival when disturbance occurs. Den sites occur primarily on north to northeast aspect slopes (Ruggiero et al. 1994). Primary denning sites are often in large hollow logs, beneath windfall or upturned roots, or in brush piles in dense thickets (Brittall et al. 1989).

Deep snow and cold temperatures are often associated with lynx habitat. Other predators, such

as the wolverine, may need to migrate to lower elevations under these conditions in order to follow their food source. Lynx, however, remain and thrive under these conditions due to their physical adaptations to low temperatures, deep snow and ability to successfully hunt the snowshoe hare.

The third key component of lynx habitat is travel corridors that provide security during movement from denning areas to foraging areas and during dispersal. Travel corridors are characterized as having minimum stem density of at least 180 stems per acre that are over eight feet tall.

Local Description (central Idaho, eastern Oregon and western Utah)

The Blue Mountains of Oregon, Idaho Batholith of central Idaho, Bitterroot Mountains of Montana and eastern Idaho, and mountains of Wyoming are included in this ecoprovince.

Landforms are primarily of volcanic and sedimentary origin. Dominant plant communities are big sagebrush and bluebunch wheatgrass at lower elevations; Douglas-fir, grand fir, and ponderosa pine forests at middle elevations; Engelmann spruce, lodgepole pine and subalpine fir on upper mountain slopes; and alpine communities on the highest mountains within the eastern portion of the ecoprovince.

In central Idaho, lodgepole pine community types and habitat types are not widespread but do commonly appear on more gentle terrain, toe-slopes and valley bottoms wherever the species can dominate the site. Such stands usually grade into subalpine fir or Douglas-fir habitat types on adjacent steeper or higher slopes. After disturbances such as fire, these lodgepole pine communities often provide good quality lynx foraging habitat for several decades.

The subalpine fir series occurs at upper elevations throughout most of central Idaho. Large stands of fire-induced lodgepole pine commonly dominate much of this series and, especially when interspersed with unburned islands of subalpine fir, often provide very good quality lynx habitat. Undergrowth is variable and ranges from tall shrub layers of blue huckleberry and menziesia to low, depauperate layers of grouse whortleberry or heartleaf arnica. Thus, the quality of lynx foraging habitat (i.e., snowshoe hare habitat) often varies greatly by habitat type. Engelmann spruce stands commonly occur along streams and valley bottoms

where cool air drainage allows them to extend into the adjacent, lower elevation Douglas-fir communities. Habitat types within the series often occur on very wet sites and on steep northerly aspects where snow accumulates. Though a minor series, Engelmann spruce habitat types commonly provide good lynx travel corridors and denning habitat.

Douglas-fir habitat types occur over the broadest range of environmental conditions of any conifer in central Idaho. Douglas-fir communities often extend from lower to upper timberline, especially in the drier mountain ranges. The types of most importance to lynx include those where lodgepole pine is a seral species and those, which abut shrub-steppe communities. Within central Idaho, many habitat types within the Douglas-fir series are too dry and/or depauperate to provide good lynx foraging habitat.

Atypical lynx habitats in central and southern Idaho, Wyoming, southeast Montana, and eastern Oregon occur in the shrub-steppe communities where populations of alternate prey such as whitetail jackrabbits are found. These atypical habitats often provide connectivity between adjacent mountains ranges. Along the Continental Divide, they may also provide an important north/south link between large areas of typical habitats.

Portions of the Ochoco and Malheur National Forests may provide connectivity/dispersal habitat for movement between the Northern Rocky Mountains and the Oregon Cascades.

Distribution

The geographic range of lynx includes all of Alaska and Canada (except the northeastern parts of Northwest Territories) and the United States south to a line from southern Oregon to southern Colorado, southern Iowa, southern Indiana and southern Maryland (Verts and Carraway 1998). Lynx are considered to have historically resided in 16 of the contiguous United States (Maine, New Hampshire, Vermont, New York, Massachusetts, Pennsylvania, Michigan, Wisconsin, Minnesota, Washington, Oregon, Idaho, Montana, Wyoming, Utah, and Colorado) based on historical observations, trapping records, and other documented evidence. The occurrence of the lynx in most of the contiguous United States is likely the result of transient dispersal during declines in population density of their primary prey, snowshoe hares (Quinn and Parks 1987).

Existing Condition

In Oregon, there are 12 verified records of lynx documented between 1897-1993 (Ruggiero et al 1999, Verts and Carraway 1998). Locations for these specimens include:

- One from the Willamette Valley (taken in atypical habitat-suburban residential area, near Corvallis, Oregon)
- Two from the Cascade Range
- One from Steens Mountain
- One from the Stinkingwater Mountains
- Five from the northern and central Blue Mountains
- One from the Wallowa Mountains (taken in atypical habitat-bunchgrass-rimrock habitat, near Imnaha, Oregon)
- One from the southern Blue Mountains (near Drewsey, Oregon)

Of these 12 known specimens, one each was collected in 1897, 1964, 1974, and 1993; 2 in 1920; and 3 each in 1916 and 1927.

Peaks in density of lynx populations in Alaska reportedly occurred in 1916-1918, 1926-1928, 1963-1966, and 1974-1975 (Quinn and Parks 1987). Collection dates in populations farther north; even the collection of lynx in Oregon in 1920 may be related to an exceptionally high peak in 1914-1916 (Quinn and Parks 1987). Verts and Carraway (1998) concludes from this that lynx occurrence in Oregon likely are of dispersers from within currently occupied areas farther north that immigrate into the area and persist for a short time. Thus, self-maintaining populations of lynx likely have not existed in historic times in Oregon.

The Fish and Wildlife Service (2000) states, "...many of the lynx records in the contiguous United States, including Oregon, are of transient animals that disperse during cyclic population increases". Animals that are considered "dispersing": and found in unsuitable habitat is considered lost from the metapopulations; therefore, they are unlikely to survive unless they return to the boreal forest (USF&WS 2000).

In addition to verified records, there are 72 spatially referenced occurrences in Oregon (Ruggiero et al. 1999). This includes 20 records of physical evidence (15-reliable, 5-unknown reliability), 1 report of tracks

(unknown reliability), 36 visual reports (9-reliable, 27-unknown reliability), and 15 unknowns.

(Table 6.). Reliability varies for unreliable to very good but are not considered confirmed/verified.

In Harney and Grant Counties, there are nine “spatially referenced” unconfirmed occurrences

Table 6. “Unconfirmed” Occurrences of Lynx in Harney and Grant County

County	Location	Date
Grant	Umatilla National Forest	1980
Grant	Wallowa-Whitman NF	1990
Grant	Malheur National Forest	1991
*Harney	Private Land	1993
Grant	Malheur National Forest	1996
**Harney	Ochoco National Forest	1997
Grant	Umatilla National Forest	1997
Grant	Malheur National Forest	2000
Grant	Malheur National Forest	2000

*1993-occurrence near Drewsey, Oregon. Occurrence was positively identified from physical remains (portion of skull and pelt).

**1997-occurrence on the former Snow Mountain Ranger District. Occurrence was a visual observation considered to have very good reliability. Observation lacked independent collaboration by additional trained observers or physical evidence to verify occurrence.

The Emigrant Creek Ranger District defines an “**unconfirmed**” sighting as:

- An uncollaborated sighting of an animal by an observer lacking the necessary skills to properly identify and differentiate the animal in question from similar species (i. e. bobcat).
- A sighting of an animal by a trained observer that lacks any physical evidence.

For sightings to be considered as “confirmed”:

- Observation must be independently collaborated by additional trained observers or
- An observer must be clearly familiar with the species in question, and physical evidence such as photos of the animal or its tracks, physical remains, track castings, hair samples should be collected to positively confirm the sighting.

Because of the uncertainty of unconfirmed sightings, it would be dubious to infer that lynx are present in a given area.

Current Pacific Northwest Distribution Assessment

In 1998, regional surveys conducted by the Wildlife Conservation Society and coordinated with the USDA Forest Service and USDI Fish and Wildlife Service identified lynx presence on the Deschutes, Willamette and Mount Hood National Forests (Weaver and Amato 1999). All locations were in the Oregon Cascades. Four of the occurrences occurred in areas modeled as “suitable” lynx habitat, and the remaining occurrence was in atypical habitat. Based on the distribution of the survey results, Weaver and Amato speculated that perhaps four individual lynx might be represented.

In Washington, lynx occurred historically along the Cascade Range down to Mount Adams (Dalquest 1948) and lynx occurred historically as far south as the southern end of the Cascade Range near Crater Lake (Weaver and Amato 1999). Based on the 1998 surveys, Weaver and Amato (1999) suggest that lynx occur further south in the Cascade Range of Washington and Oregon than current range maps depict. Results suggest that current distribution in the Cascade Range is similar to documented historical ranges.

In 1999, region-wide assessment of the current distribution of lynx was conducted on the Mount Baker-Snoqualmie, Okanogan, Wenatchee, Gifford Pinchot Forest in Washington, and the Mount Hood, Willamette, Deschutes, Umpqua, Winema, Rogue River, Wallowa-Whitman, Ochoco, Malheur and

Umatilla National Forests in Oregon, and Crater Lake National Park.

In Oregon and Washington, the Forest Service set up 452 transects across numerous National Forests, each with five hair snag rub stations. Surveyors visited each station twice, resulting in 4,520 sample sites. The US Fish and Wildlife Service placed an additional 700 rubbing stations in potential lynx habitat, which were also visited twice, resulting in 1,400 sample sites. DNA analysis of collected hair determined that lynx are present in Washington (Okanogan National Forest) but was unable to document presence in Oregon and other forests in Washington.

Based on the limited available information, the Fish and Wildlife Service cannot substantiate the historic or current presence of a resident lynx population in Oregon (USF&WS 2000). Based on records and available collections, Verts and Carraway (1998) conclude that there is no evidence of self-maintaining populations in Oregon and USDI (1997) considered lynx "extirpated" from Oregon. New findings indicate that there may be lynx in the Oregon Cascades (Weaver and Amato 1999). Additional surveys and research are warranted before lynx are considered as having self-maintaining populations in Oregon.

Local Surveys

Hair-Snag Pad Surveys-In 1999, the Forest Service and Fish and Wildlife Service conducted hair capture surveys on the former Snow Mountain Ranger District. Survey protocol followed that developed as a part of the Interagency Lynx Conservation Assessment Strategy and Agreement and by Dr. John Weaver. This was part of a region-wide three years survey to be conducted in Oregon and Washington.

No lynx hair was captured during these surveys. DNA analysis of hair captured from survey sites confirmed bobcat and other animal presence. There were no surveys conducted on the former Burns Ranger District during the 1999 effort.

Habitat Model

Lynx habitat was modeled for the former Burns Ranger District and Snow Mountain District using plant associations considered as primary and secondary vegetation

Subalpine fir, cedar, and lodgepole pine are considered primary lynx habitat on the Ranger Districts. There are no subalpine fir, cedar or Engelmann spruce plant associations on the districts. The closest stands occur in the Strawberry Mountains approximately 16 miles north of the project area. There are small, scattered lodgepole blocks present on the districts, mostly in the northern portions. There are also small, scattered, non-continuous secondary vegetation blocks in portions of the Districts. This includes, some grand fir, aspen and alder plant associations.

Additional reviews of grand fir plant associations indicate that most these dry grand fir (ABGR/VASC) sites do not qualify as secondary lynx habitat.

Within the Wolf Creek and West Malheur Allotments, there is about 500 acres of primary vegetation (lodgepole pine)). There are an additional 2125 acres of fragmented secondary habitat consisting of grand fir/grouse huckleberry, birchleaf spirea, and twinflower plant associations.

Lynx Analysis Unit

LAUs are areas delineated for management of habitat characteristics and implementation of Project Design Criteria (PDCs) necessary for the lynx to complete its life cycle. An LAU contains lands capable of producing the necessary lynx components; denning and foraging habitat comprising the majority of the areas contained within the boundary. LAUs would likely encompass both lynx habitat (may or may not be currently in suitable conditions for denning or foraging habitat) and unsuitable areas. LAUs are not designed to represent the actual home range of a lynx. The Malheur developed LAUs based on an analysis of potential lynx habitat.

LAUs are intended to provide the fundamental or smallest scale which to begin evaluation and monitoring of the effects of management actions on lynx habitat. Conservation measures listed in the Canada Lynx Conservation Assessment and Strategy (January 2000) would generally apply only to lynx habitat on federal lands within LAUs.

Results

Emigrant Creek Ranger District

There are no LAU's on the Emigrant Creek Ranger District. The district has stringers of lodgepole pine

plant associations, but does not contain enough habitat to support lynx.

Conclusion on Status and Distribution in Oregon

Based on the limited available information, the Fish and Wildlife Service cannot substantiate the historic or current presence of a resident lynx population in Oregon (USF&WS 2000). The Fish and Wildlife Service (USF&WS 2000) goes on to state that "...many of the lynx records in the contiguous United States, including Oregon, are of transient animals that disperse during cyclic population increases".

Based on records and available collections, Verts and Carraway (1998) conclude that there is no evidence of self-maintaining populations in Oregon and USDI (1997) considered lynx "extirpated" from Oregon. New findings indicate that there may be lynx in the Oregon Cascades. This information is currently under review for accuracy.

Effects and Determination

Alternative 3 (No Action Alternative)

Direct and Indirect Effect

Under the No Action Alternative, there would be no management activities; therefore, there should be direct or indirect effects to transient lynx or the limited lynx habitat present in the watershed.

Proposed Action and Current Management Alternatives

Direct and Indirect Effect

Although there are several unconfirmed sightings in Grant and Harney Counties, there is no indication of this species occurring in the project area. The likelihood of lynx using or frequenting the area is expected to be very low due to the lack of lynx habitat.

There is no lynx LAUs in or adjacent to the project area, and, in the project area. The project area does not provide connectivity from the LAU in the Strawberry Mountains to other LAU's. There is not sufficient habitat (only a minor amount of fragmented primary and secondary habitat) in this watershed to consider this area as contributing significantly to lynx viability.

Research indicates that lynx needs approximately 15 square miles (9600 acres) of primary vegetation to support a functional home range. Primary vegetation is key to lynx habitat and secondary vegetation is used where it is "intermingled and intermixed" with primary vegetation. There is approximately 500 acres of primary habitat intermixed in the project area. The amount and distribution of primary and secondary vegetation in the Wolf and Trout Creek watersheds does not provide adequate habitat capable of supporting resident lynx.

From a review currently available research, lynx habitat was always found in association with spruce and subalpine fir habitats. This watershed lacks any association with spruce or subalpine fir, is too dry and the site potential is limited to provide anything more than poor lynx foraging habitat or marginal connectivity/dispersal habitat. The closest significant area of possible lynx habitat is located over 16 miles to the north in the Strawberry Mountain wilderness.

Livestock may directly compete with snowshoe hare for forage, and in turn reduce lynx prey availability. Forage utilization at Forest Plan standards would remove vegetation on an annual basis but should allow for a continual long-term improvement in overall habitat condition. Aspen stands that livestock are affecting are not large enough to support any snowshoe hare densities for lynx. Aspen and lodgepole pine in the project area are confined to riparian stringers and would not provide habitat for lynx.

Determination

Many of the lynx records in the contiguous United States, including Oregon, are of transient animals that dispersed during cyclic population increases. Animals considered "dispersing" and found in unsuitable habitat are considered lost from the metapopulations; therefore, they are unlikely to survive unless they return to the boreal forest (USF&WS 2000).

Dispersing individuals were not considered in the March 24, 2000 listing. The Fish and Wildlife Service determined that the contiguous United States population of lynx is a DPS under the ESA and warrants listing as a threatened species. This determination, therefore, includes all lynx within the continuous United States, whether they are transient or part of a resident population (USF&WS 2000).

Due to extremely limited potential for indirect effects, and lack of habitat, a determination of **NO EFFECT**

(NE) is made.

V. Potential Effects of the Proposed Action on Sensitive Species

The two criteria for evaluating potential effects to sensitive species are:

1. would implementation contribute to the loss of viability for species listed as sensitive (**S**) by USDA-Forest Service Region 6, or any native or desired non-native species, or
2. would implementation cause any species to move toward federal listing (FSM 2672.4) under the Endangered Species Act.

Sensitive Animals

California wolverine (*Gulo gulo luteus*) Elliot 1904

Taxonomic Comments: "Some authors (e.g., Hall 1981) have regarded the North American wolverine as a species (*Gulo luscus*) distinct from the Eurasian wolverine (*Gulo gulo*)." (NatureServe 2000)

Authorities who recently have provided systematic treatments of the order Carnivora recognize only one species (*Gulo gulo*) (Verts and Caraway 1998). Verts and Caraway (1998) suggests that all North American wolverine should be regarded as *Gulo gulo luscus*.

Status

Federal Status: Species of Concern (list 1-7-00-SP-588). On April 19, 1995 (50 CFR part 17), the USDI Fish and Wildlife Service published a 90-day finding for a petition to add the contiguous United States population of the wolverine (*Gulo gulo luscus*) to the List of Threatened and Endangered Species. The Service found the petition did not present substantial information indicating that listing the wolverine in the contiguous United States may be warranted.

Forest Service (Region 6) Status: Sensitive (USDA 2000)

State Status: Threatened (ODFW 2000)

Oregon Natural Heritage Program Status: List 2 (ORNHP 2000)

Conservation Status Ranking (NatureServe 2000)

- **Global Rank=G4T3** (Nov 18, 1996)
- **National=N3** (Jan 15, 1997)
- **Oregon State Rank=S2**

Major Threats

Wolverine populations are suspected to be small, especially sensitive to disturbance and vulnerable to local extinction. Past decline in population may have been due primarily from fur trapping, but habitat alteration (e.g. agriculture, oil exploration, cattle grazing, rural settlement, timber harvest, road construction, and ski area development) and general human disturbance (snowmobiling) are contributing factors (TNC 1999, Witmer et al. 1998).

Population Status and Trend

"Hash (1987) described a contraction in the North American range of the wolverine beginning around 1840 with the onset of extensive exploration, fur trade, and settlement. State records suggest very low wolverine numbers in Montana, Idaho, Oregon, and Washington from the 1920s through 1950s, with increases in wolverine sightings since the 1960s (Banci 1994)." (Wisdom et al. 2000). Through the mid-1970s, numbers appeared to be increasing in California, Oregon, and Washington (NatureServe 2000).

Current population status is not well known in many portions of the range and it may be extirpated from most of its historic range in the contiguous 48 states. Verts and Caraway (1998) believe that while there is a possibility of self-maintaining population of wolverine in the Oregon, most animals seen or collected are likely dispersers from Washington and Idaho populations.

Source Habitat Trend

Basin-wide, source habitat was projected to have increased moderately or strongly in 56 percent of the watersheds. The Blue Mountains ERU has undergone a positive absolute (+27.46%) and relative (>100.00%) change in source habitat availability (moderate or strong increases in more than 50 percent of the watersheds). An increase in Blue Mountains source habitat was most influenced by an increase in mid- and late-seral montane community types (Wisdom et al. 2000).

Habitat

The wolverine occurs in a broad range of wilderness habitats (Verts and Carraway 1998). Source habitats for wolverines include alpine tundra and all subalpine and montane forests. Within the forest type, all structural stages except the closed stem exclusion stage provide source habitat (Wisdom et al. 2000). The impression that wolverines require high elevation habitat may be a result of remaining wolverine populations retreating to inaccessible, undeveloped areas, which are often at high elevations (Witmer et al. 1998).

They are solitary predators that range over vast and remote territories; consequently, they are difficult to study and to survey (Rausch and Pearson 1972). Most available research indicated that wolverines were strictly associated with secluded wilderness areas and that distribution is probably limited to upper montane and sub-alpine forest types. Some recent work suggests that although wolverines may frequent upper montane and sub-alpine habitat during most of the year, they may follow migrating big game herds to lower elevation winter range.

Wolverines are typically opportunistic predators and use a wide variety of foods including roots, berries, small and medium size rodents, birds, bird eggs, fish, and carrion (especially ungulate carcasses) (Wisdom et al. 2000, NatureServe 2000). They are known to attack moose, caribou, and deer hampered by deep snow.

Carrion often makes up a large percentage of the diet ((Wisdom et al. 2000, NatureServe 2000). Copeland (1996) found that carrion related food supplied 46 percent of wolverine diets in Idaho during both summer and winter. Banci (1994) suggests that diversity of habitats and foods is important to wolverines.

Several special habitat features have been identified for wolverines. Natal dens in the western United States is generally located in subalpine basins in isolated talus fields surrounded by trees (Copeland

1996). There is also evidence that wolverine use down logs and hollow trees for denning and cavities in live trees may be used (Wisdom et al. 2000). Both talus and areas associated with large, fallen trees were used as maternal dens sites in Idaho (Copeland 1996).

Regardless of habitat type used, the critical component to suitable source habitat seems to be the absence of human activity or development (Hash 1987). High elevation wilderness and undisturbed backcountry refugia are still considered critical to the current welfare and viability of existing wolverine populations (Hornocker and Hash 1981).

Denning Habitat

A denning habitat model developed primarily by Jeff Copeland, Idaho Department of Fish and Game, was used to identify potential wolverine denning habitat on the Malheur National Forest. Utilizing PMR (Pacific Meridian Resources Company) data and ArchInfo base coverage, key habitat components were queried to produce a forest level coverage of potential denning habitat. Key elements included topographic relief with flat to concave curvature, slopes with north to northeast aspects, areas above 5,000-foot elevation, and rock or snow cover types.

Results: Large areas of potential denning habitat were identified in the Strawberry Wilderness, Monument Rock Wilderness, and in some northern portions of the Malheur National Forest. Isolated potential denning habitat areas were identified on the Emigrant Creek Ranger District. Most of these areas are not suitable denning habitat because of size or position on the landscape in relationship to developments, roads or natural landscape conditions.

Distribution

The California wolverine (geographic subspecies) appears to occur in California, Oregon, Washington, and part of southern British Columbia (NatureSource 2000).

Wolverines were always rare in Oregon, although recent sightings, tracks, and collected remains document their continued presence at low densities in the state (Csuti et al. 1997). Current distribution appears to be restricted to isolated wilderness areas. A query of the Oregon Natural Heritage Program database reveals that there are about 150 observations of wolverines in Oregon, with most

occurring in the mountainous northeast (Baker, Grant, Umatilla, Union and Wallowa Counties) region (Edelmann and Copeland 1997).

Records of wolverine occurrence on the Malheur National Forest are very limited. Confirmed and high confidence observations on Malheur National Forest and adjacent areas include:

- Collection of an animal from Steens Mountain, Harney County, (1973)
- Hair and track collection on the former Snow Mountain Ranger District, Ochoco National Forest (1992)
- A partial skeleton and tufts of fir found near Canyon Mountain, Grant County (1992)
- Tracks and a probable denning site found in the Strawberry (1997)

Observers located probable wolverine tracks leading to and from a potential wolverine natal or maternal den in the northwest corner (T.14S., R.32E.) of the Strawberry Wilderness. Additional aerial reconnaissance of the area located additional tracks leading to and from the potential denning site.

Tracks observed showed the correct gait pattern and size for wolverine but physical evidence (track casts or detailed photos) could not be collected to confirm the sighting. Reliability of this observation is considered high.

- Tracks in Monument Rock Wilderness (1997).

A set of tracks was observed in the Monument Rock Wilderness (T.14S., R.36E.) near the crest of Table Rock. No obvious denning or feeding locations were found associated with these tracks.

- A set of probable wolverine tracks were found in the Pine Creek drainage near the Lost Fork of Pine Creek (1997). No obvious denning or feeding locations were found associated with these tracks.

There are 6 "unconfirmed" sightings of wolverines on the Emigrant Creek Ranger District; Hall Creek (1983), Gilbert Ridge (1990), Crooked Creek (1991), Paine Creek (1991), Gold Hill (1993), and Silvies River (1994). One additional unconfirmed sighting was made on the former Snow Mountain Ranger District, along Burnt Cabin Creek (1987).

Existing Condition

Source habitat is very limited on the district. There are no subalpine forest types with or without talus surrounded by trees in or adjacent to this area. The nearest area that approximates this habitat type is located in the Strawberry and Aldrich Mountains, over 16 miles north of the Wolf Mountain allotment.

Montane forest types within the northern portion of the district may provide marginal or poor (winter) foraging habitat for wolverines. High levels of human disturbance (recreational use, firewood cutting, and management activities) and development make most of this area unsuitable for wolverine.

Effects and Determination

(No Action Alternative)

Direct and Indirect Effect:

Under the No Action Alternative, there would be no management activities; therefore, there should be direct or indirect effects to wolverine or potential habitat. Long term reduction in big game habitat may occur as forage for big game is reduced by overstory vegetation and unpalatable grasses.

Determination

Due to the nature of the no action alternative, there would be **NO IMPACT (NI)**.

Proposed Action,

Direct Effect

There are no confirmed records of this species occurring in the project area; therefore, there would be no direct effect to this species. The probability of any livestock grazing actions influencing wolverine is anticipated to be extremely low. There is no denning habitat in the project area, therefore no indirect effects to reproductive habitat for wolverine is expected.

Indirect effects on potential foraging habitat

Under these alternatives, there are no proposals to drastically modify existing stand cover or reduce connective habitat to a point of excluding possible wolverine use. However, human disturbance related to proposed management activities herding, salting, fence maintenance, and watering livestock might displace transient dispersing wolverine from

potential foraging habitat during the duration of the project.

Areas of high ungulate density and especially winter range are key to identifying suitable wolverine foraging habitat (Witmer et al. 1998). Management recommendations by Banci in Scientific Basis for Conserving Forest Carnivores: American Marten, Fisher, Lynx, and Wolverine in the Western United States (USDA 1994) suggest that management activities should incorporate strategies that improve the ungulate forage base for wolverine, without significantly changing vegetation structure. Under the Proposed Action Alternative, grazing strategies would improve forage for ungulates without drastically changing vegetation structure, thereby improving the potential forage base for wolverines. The current management in the Rock Springs pasture of the West Malheur allotment may be reducing habitat for wild ungulates based on long-term vegetation monitoring plots and shrub conditions. However, the probability of wolverine foraging in the winter range within the allotments is extremely low.

Because of competition with other carnivores (coyotes and bear), scavengers (corvids), the probability of carrion being available for wolverines is low.

Wisdom et al. (2000) suggests several management practices that could be used to reverse broad-scale declines or accelerate improvements in source habitat within the Interior Columbia Basin. While developed primarily for the northern portion of the basin they can be used in the southern portion with beneficial results. They include:

- Retain existing old forests (LOS) and identify mid successional forests where attainment of old-forest conditions can be accelerated.
- Actively recruit snags and logs in mid-seral and old forests where these old-forest structures are uncommon or absent.
- Maintain current wilderness areas and other reserves as refugia for wolverines.
- Minimize new construction of secondary roads and close unneeded roads after timber harvest.

LOS Management

All alternatives would not affect LOS habitat for wolverine or any other species requiring mature timber. Livestock grazing at the levels used would not alter LOS and old growth management.

Therefore no impacts to dispersal habitat for wolverine is expected.

Determination

Due to this possible short-term indirect effect from disturbance and potential negative impacts on big game winter range, a **may impact individuals or habitat, but will not likely contribute to a trend towards federal listing or cause a loss of viability to the population (MIIH)** is given for the current management. However, the probability of impacting wolverines from grazing big game habitat is extremely low. It can be assumed that declining range conditions are not favorable habitat for wintering big game, therefore not favorable habitat for predators or scavengers that would prey upon big game. Because the potential adverse impact is non-significant, these alternatives would not result in reduced viability or conditions that result in the need for federal listing. Because of the expected improvements in big game winter range habitat, a **IIH/Beneficial Impact (BI)** determination is given for the Proposed Action. As big game winter is improved over time, it can be surmised that prey for wolverine could improve in both small mammal densities and possibly large mammals.

pygmy rabbit

(*Brachylagus idahoensis*) Merriam 1891

Status

Federal Status: Species of Concern (list 1-7-00-SP-588).

Forest Service (Region 6) Status: Sensitive (USDA 2000)

State Status: Vulnerable (ORNHP 2000)

Oregon Natural Heritage Program Status: List 2 (ORNHP 2000)

Conservation Status Ranking

(The Association for Biodiversity Information 2000)

- **Global Rank=G4** (November 2, 1998)
- **National=N4** (December 05, 1996)
- **Oregon State Rank=S2?**

Major Threats

Threats include range wildfire, sagebrush eradication to improve range conditions for livestock grazing, invasion of exotic annuals, conversion of shrub-steppe to cropland, and fragmentation of remaining suitable and occupied habitat (WDFW 1995).

Population Status and Trend

Moderately threatened range-wide, habitat or community lends itself to alternate use

Washington Department of Wildlife reports that the pygmy rabbit had declined greatly in eastern Washington. Washington Department of Fish and Wildlife (1995) estimated that the state's population is less than 250 rabbits in five areas.

Little information is available on population trend in other states.

Source Habitat Trend

The trend for Great Basin shrubsteppe habitats is generally downward due to fire, grazing, invasion of exotic annuals, and agricultural conversion, which likely correlate with downward trends for sagebrush obligate species such as the pygmy rabbit (Whisenant 1990; Knick and Rotenberry 1995, 1997).

Degree of Fragility

Fairly resistant and tolerant of nondestructive intrusion.

Habitat

Pygmy rabbits are closely tied to habitats dominated by big sagebrush (*Artemisia tridentata*) growing on deep, loose, friable soil types (Verts and Carraway 1998, WDFW 1995). Sagebrush is a key habitat element for this species because it provides both forage and cover. When 10 habitat variables were submitted to discriminant analysis, shrub cover was the most important variable distinguishing site occupancy by pygmy rabbits from adjacent sites. Soil depth was the second most important variable of importance (WDFW 1995).

The principal food of this species is big sagebrush, even where other tall shrubs such as bitterbrush (*Purshia tridentata*) are common. On an annual basis, sagebrush composes 67% of the diet, grasses 26% and forbs only 6% (Verts and Carraway 1998).

Sagebrush present on occupied sites characteristically forms tall and very dense stands. Occupied sites have an average shrub height of 33 ± 2 inches and an average overall shrub cover of $28.8 \pm 1.4\%$, with sagebrush making up almost 24% of the total (Verts and Carraway 1998).

In southwestern Wyoming, pygmy rabbits selectively used dense and structurally diverse stands of sagebrush that accumulated a relatively large amount of snow; the subnivean environment provided access to a relatively constant supply of food and provided protection from predators and thermal extremes (Katzner and Parker 1997).

Soil type is also a major factor in habitat suitability. Soils need to be of the proper depth and texture to excavate for burrows. Burrows are most commonly found in loose coarse-silty and fine-loamy soil types derived from loess or glacial parent material. Burrows usually extend to no more than 3 feet in depth (WDFW 1995).

Occupancy of potential habitats is likely related to a combination of availability of forage, security from predators, and ease of burrow construction.

Distribution

This species can be found in the southeastern third of Oregon to east-central California, east to western Utah and southwestern Montana. Isolated populations occur in east-central Washington (WDFW 1995). Within its range the distribution is not continuous but patchy, primarily in areas of Great Basin big sagebrush dominated plains and alluvial fans where plants occur in tall and dense clumps, and the soil relatively deep and friable (NatureServe 2000).

In Oregon, pygmy rabbits have been documented at 37 sites east and south of a line connecting Klamath Falls, Klamath County; Fremont, Lake County; Redmond, Deschutes County; and Baker City, Baker County (Verts and Carraway 1998). Sighting within Harney County indicate that this species occurs mainly in the sagebrush basin south of Burns, Oregon. An isolated locality record documents a historic occurrence in Silvies Valley (near Seneca, Oregon).

Existing Condition

Confirmation of the presence of pygmy rabbits has not been done but an analysis of potential habitat

was conducted using current data. GIS analysis indicates that there is about 2,000 acres of mountain big sagebrush in the project area. The bulk of the acres were in the West Malheur allotment. However, about 40 acres in the Duck Creek subwatershed have soil depths that may be deep enough for pygmy rabbits. The remaining sagebrush area contains shallow rocky soil not conducive for burrowing rabbits.

Effects and Determination

Alternative 3 (No Action Alternative)

Direct and Indirect Effect

Under the No Action Alternative, there would be no new management activities; therefore, there should be direct or indirect effects to limited potential pygmy rabbit habitat present in the watershed.

Pygmy rabbits have evolved in the presence of native ungulate grazing. Historic heavy livestock grazing has apparently lowered the resilience of sagebrush plant communities across much of this species range.

The influence of ongoing cattle grazing on pygmy rabbit habitat is not well understood. In general, grazing is known to affect the characteristics of sagebrush communities. The effects depend on a variety of factors including timing and intensity of grazing, stocking densities, location of water sources and salting areas, and other factors that would concentrate cattle use in suitable habitat (WDFW 1995).

It is speculated that livestock grazing may result in forage competition during the spring and summer when pygmy rabbits preferentially select grasses, and heavy grazing can cause breakage of sagebrush plants because of trampling. On the other hand, grazing can increase sagebrush densities and vigor when grazing animals selectively graze on perennial forbs and grasses and reduce competition for limited resources.

Common to All Action Alternatives

Direct and Indirect Effects

Based on the scattered distribution of mountain big sagebrush habitat, its small size and lack of suitable linkage corridors, the likelihood of pygmy rabbit occupying these habitat blocks is very low.

Because these sites are already considered “very low in potential”, any activities that alter vegetation structure or availability would not likely further reduce its very limited potential. Because of this low habitat potential and the low likelihood of pygmy rabbit occurrence in these areas there would be **NO IMPACT (NI)** from implementation of any action alternatives.

American peregrine falcon
(*Falco peregrinus anatum*) Tunstall 1771

Status

Federal Status: N/A

On August 25, 1999 the Department of Interior, Fish and Wildlife Service determined that the American peregrine falcon is no longer an endangered or threatened species pursuant to the Endangered Species Act of 1973, as amended (50 CFR Part 17, RIN 1018-AF04). This action removes the American peregrine falcon throughout its range as an endangered species from the Federal List of Endangered and Threatened Wildlife, thereby removing all protections provided by the Act. It also removed the designation of “endangered due to similarity of appearance” or any free-flying peregrine falcons within the 48 conterminous United States.

This designation does not affect protection provided to this species by the Migratory Bird Treaty Act, the Convention on International Trade in Endangered Species of Wild Fauna and Flora, or state laws and regulations, nor does it affect the endangered listing status of the Eurasian peregrine falcon (*Falco peregrinus peregrinus*) under the Act. (USDI-Fish and Wildlife Service 1999)

USDA-Forest Service (Region 6) Status: Sensitive (USDA 2000)

State Status: Endangered (last revised 12/1998)

Oregon Natural Heritage Program Status: List 1 (ORNHP 2000)

Conservation Status Ranking

(The Association for Biodiversity Information 2000)

- **Global Rank= G4T3** (July 04, 1997)
- **National Rank=N3B, N3N** (July 04, 1997)
- **Oregon State Rank=S1B**

Major Threats

In the 1970's, peregrine falcon populations were greatly impacted by organochlorine pesticide accumulation that caused eggshell thinning. Peregrine falcons in Oregon and Washington are still adversely affected by organochlorine contaminants, which contribute to nesting failure due to eggshell thinning. During the 1998 nesting season, 24 of 51 active nest sites found in Oregon failed due to eggshell thinning and subsequent breakage and/or embryo mortality.

Data suggest that the DDE may be residual and could continue to affect Pacific Northwest peregrine falcons for decades. Additional monitoring is needed to investigate this hypothesis and identify possible sources of contamination.

Illegal collecting of nestlings for use in falconry and incidental shooting are other major threats to recovery efforts (The Nature Conservancy 1999).

Habitat

Peregrine falcon habitat consists of nesting, perching, roosting and foraging areas. The most critical habitat component for peregrine falcons appears to be suitable nesting sites (Csuti et al 1997). Nesting occurs almost exclusively on sheer cliffs with small caves or overhangs large enough to contain three to four full-grown nestlings and is usually near water. Nesting on substitute human-made sites include ledges on tall buildings, bridges, rock quarries, and raised platforms occurs. Tree nesting is virtually unknown.

The peregrine falcon nests along the seacoast, near marshes and even in cities, but are not well suited to life in forest interiors (Csuti et al 1997).

Associated with the nest territory is a foraging area. This generally includes wooded areas, marshes, open grasslands and bodies of water within a short flying distance from the nesting area (Marshall 1992).

When not breeding, peregrine falcons can occur in areas where preys concentrate. This includes farmlands, marshes, lakeshores, river mouths, tidal flats, dunes and beaches, broad river valleys, cities and airports (The Nature Conservancy 1999).

Distribution

Henny and Nelson (1981) reported that there are at least 42 historic peregrine nest sites in Oregon. Other sources indicate that there were as many as 70 historic nest sites within the state. Of these reports, one referred to a location in the Strawberry Mountain Wilderness (unverified).

Sighting of peregrine falcons are uncommon. They are often noted in the fall and spring when migrating through the forest (Pagel 1992).

Existing Condition

In 1992, surveys to identify probable nest sites were conducted on the Malheur National Forest (Pagel 1992). The potential for nests at various locations were identified and rated from no to high potential of use according to specific habitat criteria. The closest potential nest site is located within Silvies Canyon. Pagel (1992) classified this site as having a "medium" potential.

Medium potential is defined as: cliffs with an acceptable level of potential occupancy, or were otherwise low potential cliffs with a possibility of a nesting ledge that was not visible or may be suspected. Certain rock types (conglomerate, granite, sandstone, limestone) have distinct possibilities of having ledges that are not normally visible, and were usually categorized as medium, if they had the "proper" or acceptable height (Pagel 1992).

To date, there have been no recorded observations of peregrine falcon use in this area. In July 2000, a pair of peregrine falcons with an immature was sighted near Yellowjacket Lake. House allotment is approximately 20 miles south-west of Yellowjacket Lake. The presence of an apparently successful breeding pair suggest that peregrine falcons may be breeding somewhere on the Malheur National Forest.

Effects and Determination

From a review of available records, it was determined that there is no known occupied nesting, perching or roosting peregrine falcon habitat within the planning area. There is no nesting habitat within Trout Creek and Wolf Creek watersheds.

There are no records of peregrine foraging in or migrating through the area. While a transient peregrine falcon could fly over or migrate through the project area, the potential of the activity having a

measurable effect on this species is very low. There are no cumulative effects.

There would be **NO IMPACT (NI)** to peregrine falcons or occupied habitat by the implementation of any alternative.

western sage grouse
(*Centrocercus urophasianus phaios*)
southeast populations
Bonaparte 1827

Status

Federal Status: Species of Concern (list 1-7-00-SP-588).

Forest Service (Region 6) Status: Sensitive (USFS 2000)

Malheur National Forest Status: Featured Species

State Status: N/A

Oregon Natural Heritage Program Status: List 3 (ORNHP 2000)

Conservation Status Ranking

(The Association for Biodiversity Information 2000)

- **Global Rank=G5T3Q** (Nov 25, 1996)
- **National Rank=N3** (Jan 05, 1997)
- **Oregon State Rank=S3**

Major Threats

Conversion of sagebrush cover types to agricultural lands and conversion of shrubsteppe vegetation to exotic forbs and annual grasses (Wisdom et al. 2000) have drastically reduced or altered the availability of this species habitat. In southeastern Oregon, over 2,760 square miles of federally administered lands have been modified to the detriment of sage grouse (Willis et al. 1993).

Predation and livestock grazing contribute to the decline of sage grouse numbers.

Juniper encroachment due to fire suppression decreases sage grouse habitat.

Population Status and Trend

Prior to the 1950s, estimates of abundance were anecdotal, and historical population levels are unknown (Braun 1998). Early accounts, however, suggest that this species was once widespread and abundant in many areas of the West. There are reports of sage grouse at times blackening the sky and being shot by the wagon-load (Braun 1999). Declines began with livestock overgrazing of western rangelands aggravated by over harvesting and periods of drought. By the 1920s and 1930s, sage grouse were thought to be declining throughout their range (Braun 1998). Population declines have continued to present day with accumulating loss and degradation of sagebrush habitats.

Distribution has contracted by approximately 50 percent since European settlement, and these species has been extirpated from five states and one province (Kansas, Nebraska, Oklahoma, Arizona, New Mexico, and British Columbia) (Braun 1998).

Wisdom et al. (2000) reports that sage grouse populations have shown significant, steep declines since the 1940s in Idaho, Oregon and Washington. The rates of decline in Idaho, Oregon, and Washington are not significantly different, suggesting common, widespread factors affecting these populations. In eastern Oregon, long-term population declines have averaged 30 percent since 1950. (Interagency Interdisciplinary Sage Grouse Planning Team 2000 "draft")

Braun (1998) estimates a current total of fewer than 142,000 grouse rangewide, and population levels for each state and province as follows:

- Estimated 500 in Alberta and Saskatchewan.
- Fewer than 2,000 in North Dakota, South Dakota, and Washington.
- Fewer than 5,000 in California.
- Fewer than 15,000 in Colorado and Utah.
- Fewer than 20,000 in Idaho and Nevada.
- Fewer than 20,000 in Montana, Oregon and Wyoming.

A complicating factor is that sage grouse in this geographic area may exhibit population cycles with a periodicity of around 10 years. Apparent trends over short periods should be regarded with caution. Nonetheless, trends for populations in Colorado, for example, reveal that each population peak has been lower than the last (Braun 1999). There have been

no sustained population increases in any part of the range (Braun 1998).

Source Habitat Trend

The current extent of habitat is similar to the historic distribution, although the abundance of habitat has changed in some areas. Basin-wide, nearly 48 percent of the watersheds showed a moderate or strongly declining trend in habitat, and declines exceeded increases in every ERU. The Blue Mountains ERU has undergone a negative absolute (-11.73% and -12.70%) and relative (-30.14% and -32.78%) change in winter and summer source habitat availability. (Wisdom et al. 2000)

Habitat

Sage grouse are obligate residents of sagebrush habitat, usually inhabiting sagebrush-grassland or juniper-sagebrush grassland communities. Throughout their range habitats used includes a wide variety of sagebrush mosaic habitats, including: (Schroeder et al. 1999)

- tall sagebrush types such as big sagebrush, three-tip sagebrush (*A. tripartita*), and silver sagebrush (*A. cana*);
- low sagebrush types, such as low sagebrush (*Artemisia arbuscula*) and black sagebrush (*A. nova*);
- mixes of low and tall sagebrush with abundant forbs;
- riparian and wet meadows;
- steppe dominated by native forbs and bunchgrasses;
- scrub-willow (*Salix* spp.)
- sagebrush/woodland mixes with juniper (*Juniperus* spp.), ponderosa pine (*Pinus ponderosa*), or quaking aspen (*Populus tremuloides*).

In southeastern Oregon, the most widely used vegetation type throughout the year is forb-rich sagebrush association with low stature sagebrush, and mosaics of low and high stature sagebrush (Willis et al. 1993). Vegetation types of low stature primarily include low sagebrush (*A. longiloba*), although black sagebrush, stiff sagebrush (*A. rigida*), and three-tipped sagebrush may be used. Wyoming big sagebrush (*A. t. var wyomingensis*) and mountain big sagebrush (*A. t. var vaseyana*) are the primary species of high stature used in mosaic form with low sagebrush in Oregon. Neither expansive

dense sagebrush nor expansive open areas constitute optimal sage grouse habitat.

Sage grouse use sagebrush of different age classes and stand structures for lek (courtship display), nesting, brood rearing, and wintering.

During the mating season (February-May), leks may be on bare areas, such as swales, irrigated fields, meadows, burns, and roadsides (Klebenow 1973), or areas of low cover and stature of sagebrush and are more often within vegetation types of low sagebrush or low/big sagebrush mosaics. When not on the lek, sage grouse disperse to the surrounding areas (Wallestad 1975).

After mating, hens usually nest near lek grounds, but some fly as far as 12 to 20 miles to favorable nesting sites. They prefer sagebrush 14 to 25 inches tall with an open canopy, 10-50%, for nesting (Klebenow 1973). During the nesting season, cocks and hens without nests use relatively open areas for feeding, and roost in dense sagebrush patches (Klebenow 1969).

Early brood rearing occurs near the nest site depending on the availability of forbs and insects, which are the main food source for the chicks. Young broods use areas of low plant height (9 to 15 inches) and density, while older broods and adults use areas with taller plants (7 to 25 inches) (Martin 1970). Sage grouse apparently do not require open water for day-to-day survival if succulent vegetation is available, but they utilize free water if available.

Habitat used by summering groups generally takes three forms: mid-elevation playas and waterholes, high mountain areas, and alfalfa developments. After early brood rearing, hens with broods leave early brooding areas when forbs have desiccated and move to areas that still have green vegetation. There they spend the mid- and late summer period with other hens and brood groups. Hens without broods group up with other unsuccessful hens in meadow habitats. By August, most birds cluster near permanent watering sites.

In Oregon, sage grouse movements in mid-elevational summering areas are more random.

The Interagency Sage Grouse Planning Team (2000) identify important late brood rearing habitats as sagebrush, meadows and riparian areas, dry lake beds, and agricultural lands. The optimum habitat contains a mosaic of these lands types that include at least;

- 40 percent of the area in sagebrush stands that are 16 to 32 inches tall with a canopy cover of 10 to 20 percent (less than 25 percent total shrub cover), and
- an herbaceous understory of 15 percent grass canopy cover, and
- 10 percent forb canopy cover.

Habitat loss, predation, drought, and poor weather conditions during hatching and brooding have been cited as factors leading to poor recruitment. Sage grouse hunting is closely regulated in states where it is allowed, and is not generally cited as a factor in sage grouse decline (NatureServe 2000).

Sagebrush is used for hiding cover year-round and provides thermal cover during summer and winter. Vegetation types used for wintering include primarily low sagebrush, big sagebrush, and mosaics of low and big sagebrush, where the often prefer wind swept areas free of snow.

Sagebrush, used year-round, is the most important component in the diet of adult sage grouse (Interagency Sage Grouse Planning Team 2000). Sagebrush constituted less than 60 percent of the diet only between June and September (Wallestad 1975). Other forage consists largely of herbaceous leaves of dandelion (*Taraxacum* spp.), legumes (*Fabaceae*), yarrow (*Achillea* spp.) and wild lettuce (*Lactuca* spp.), which is used primarily in late spring and summer (NatureServe 2000). Insects are a minor diet item for adult sage grouse. Chicks consume primarily insects, especially ants and beetles, in their first week of life (Interagency Sage Grouse Planning Team 2000). Their diet then switches to forbs, with sagebrush gradually assuming primary importance.

Distribution

Sage grouse occur from central Washington, southern Idaho, Montana, southeastern Alberta, southwestern Saskatchewan, southwestern North Dakota, and western South Dakota south to eastern California, south-central Nevada, southern Utah, and western Colorado (NatureServe 2000).

Western sage grouse (*B. u. phaios*), if indeed *phaios* is a taxonomically valid subspecies, occur from central and eastern Washington (Ellensburg, and Columbia County) south to southeastern Oregon; formerly to southern British Columbia (Osoyoos Lake). Populations in most of California and western Nevada are intergrades between subspecies, *phaios* and *urophasianus*. (NatureServe 2000)

Taxonomic validity questionable due to introduction of nominate subspecies into range of *phaios*, Validity may be impossible to determine. (NatureServe 2000)

Existing Conditions

There are no known leks in any of the allotments in Trout Creek and Wolf Creek watersheds on U. S. National Forest lands. Active grouse leks have been found south of the West Malheur Allotment approximately four miles on BLM lands (ODF&W). The potential for leks to occur in the project area is highly unlikely due to tree densities and elevation.

Potential marginal early season brood rearing summer habitat exists in the south end of the Duck Creek subwatershed. Hens with broods may use low sagebrush-steppe when lower elevation sagebrush types dry up. Seasonal sage grouse use would occur primarily on the West Malheur allotment.

There is no documented occurrence of sage grouse in the project area. It is likely that adult sage grouse with young occasionally use the non-forested portions of the watershed. There is no key late brood-rearing habitat identified in the watershed.

Effects and Determination

(No Action Alternative)

Direct and Indirect Effect

Under the No Action Alternative, there would be no grazing activities; therefore, there should be direct or indirect effects to sage grouse or their habitat.

Determination

Due to the nature of a no action alternative, there would be **NO IMPACT (NI)**.

Proposed Action Alternative

Direct and Indirect Effect:

Grazing Management

The Proposed Action Alternative would reduce grazing pressure in the Rock Springs pasture. Shorter grazing period would reduce the potential for livestock to forage on forbs particularly in riparian areas along Coyote and Duck Creeks. This alternative may benefit sage grouse by providing

light grazing by cattle, which would improve forb production.

The prescribed fire proposed in Cougar Flat would not impact sage grouse habitat since the flat is so small, it is surrounded by ponderosa pine, and is isolated from other natural feeding areas. It is doubtful that sage grouse use Cougar Flat for brood rearing habitat.

Other restoration projects are not within sage grouse habitat and would not directly or indirectly impact sage grouse or grouse habitat.

Current Management Alternative

Direct and Indirect Effect:

The Current management practices may be impacting sage grouse habitat in the riparian areas along Duck and Coyote Creek. However, the habitat has been encroached by juniper and pine and is marginal brood rearing habitat. Some sites in the upland sagebrush habitat have indicated excessive livestock use based on long term trend counts. Since there were no plant composition measurements taken to determine forb densities, the assessment is based on the increase on bare ground counts from past trend plots and personal observations along Duck Creek.

Determination

Activities proposed under the Proposed Action Alternative may improve late season brood rearing habitat by applying light grazing on the Rock Spring pasture. A **MIIH (may impact individuals or habitat, but will not likely contribute to a trend towards federal listing or cause a loss of viability to the population)/ BI (Beneficial Impact)** is given for the Proposed Action. A **MIIH** is given for the Current Management Alternative due to the excessive grazing on the Duck Creek drainage. A No Impact is given for the other pastures on the West Malheur allotment and other allotments due to absence of habitat.

gray flycatcher
(*Empidonax wrightii*) Baird 1858

Status

Federal Status: N/A

Forest Service (Region 6) Status: Sensitive (USDA 2000)

State Status: N/A

Oregon Natural Heritage Program Status: N/A

Conservation Status Ranking (NatureServe 2000)

- **Global Rank= G5** (December 2, 1996)
- **National Rank=N5B, NZN** (March 19, 1997)
- **Oregon State Rank=S4**

Focal Species for Mature Juniper Woodland with Regeneration. (Landbird Conservation Plans-Columbia Plateau (Altman, Holmes 2000)

Major Threats

This species is vulnerable to land clearing, but is generally found in very arid environments not usually converted to agriculture (USDA Forest Service 1994). Clearing of pinyon-juniper in favor of grassland for livestock grazing or widespread harvesting of pinyon-juniper could be detrimental. Other conservation issues include pesticide use for insect control and cowbird parasitism.

Population Status and Trend

North American BBS (Breeding Bird Survey) shows a survey-wide significantly increasing trend of 10.2 percent average per year (n = 89) during the 1966-1996 sample period; a nonsignificant decline of -1.0 percent average per year (n = 22) during 1966-1979; and a significant increase from 1980 to 1996 of 10.0 percent average per year (n = 84) (Sauer et al. 1997).

Data for Oregon reflects a strong long-term increase of 5.0 percent average per year (n = 29) during the 1966-1996 period (Sauer et al. 1999). A dramatic annual population increase of 37% in National Forests between 1980 and 1994 has been contributed to thinning of forests (Sharp, 1996).

Habitat

The gray flycatcher prefers relatively treeless areas with tall sagebrush, bitterbrush, or mountain mahogany communities, but is also associated with pinyon-juniper woodland with understory sagebrush, and open ponderosa pine forests (Csuti et al. 1997).

This species is most abundant in extensive tracts of big sagebrush, often selecting areas along washes where the sagebrush is especially tall. In the western Great Basin, this species nests in tall big sagebrush shrublands (Ryser 1985).

During the nonbreeding season, this species commonly winters in arid scrublands, riparian woodlands, and mesquite groves in the southwest (USGS 2000).

Distribution

Breeding range covers extreme southern British Columbia and south-central Idaho south to southern California, southern Nevada, central Arizona, south-central New Mexico, and locally western Texas (NatureServe 2000). In Oregon, this species is typically found east of the Cascade Mountains (Csuti et al. 1997).

Birds winter in southern California, central Arizona, south to Baja California and south-central mainland of Mexico (NatureServe 2000).

Existing Condition

Confirmation of the presence and general abundance (0.01 birds/route-very low abundance) (USGS 2000) of gray flycatchers was done for the Silvies Valley during roadside abundance surveys on BBS route Ore-248: Silvies. Presence and density information is not available for the Trout and Wolf Creek Watersheds.

An analysis of potential habitat was conducted using current data to determine the potential for presence. GIS analysis indicates that there are about 6,400 acres of shrublands and ponderosa pine/shrub habitat in the project area. Most of this acreage occurs in the West Malheur allotment.

Effects and Determination

Alternative 3 (No Action Alternative)

Effect

Under the No Action Alternative, there would be no grazing activities; therefore, there should be no direct or indirect effects resulting from management on gray flycatchers or their habitat.

. Determination

Due to the nature of a no action alternative, there would be NO IMPACT (NI).

Current grazing management

Preliminary analysis by Miller et al. (1999) shows avian diversity among different communities types is greatest in mid-successional shrub-steppe woodland communities and open old growth juniper. The current grazing management may be impeding the reproduction of shrubs in the Rock Springs pasture of the West Malheur Allotment. It can be surmised that reduction in recruitment of shrubs would degrade habitat for gray flycatchers and other birds requiring shrubs for nesting and/or foraging. The landbird conservation plan cited that grazing in big sagebrush/bluebunch wheatgrass communities could have negative effects on gray flycatchers.

Based on long-term condition and trend plots and shrub utilization surveys, livestock in the Rock Springs pasture may be impacting habitat for gray flycatchers. There is also potential for livestock to disturb nesting birds on the southern West Malheur allotment. Without present surveys, it can not be determined if livestock are disturbing nesting birds, and shrub browsing appears to be excessive; therefore a conservative determination of **may impact individuals or habitat, but will not likely contribute to a trend towards federal listing or cause a loss of viability to the population (MIIH)** is given for the current management.

Proposed Action

Direct and Indirect Effects

The Proposed Action Alternative addresses the upland shrub concerns and should reverse the declining shrub trends in the West Malheur allotment. However, big game browsing may inhibit the growth of shrubs favorable for gray flycatchers. Since the ecological condition of the shrub-steppe habitats would improve a **may impact individuals or habitat, but will not likely contribute to a trend towards federal listing or cause a loss of viability to the population (MIIH)/Beneficial Impact (BI)** is given.

Beneficial Impacts from shrub recovery would not occur in the short-term, but may occur after 10 years. The change in range management practices should increase shrub production and improve habitat for flycatchers. However, concentrated use

by wild ungulates during winter and transitional use by wild ungulates in the spring and fall will retard

natural regeneration of shrubs by continual browsing.

References

- Bailey, V. 1936. The Mammals and Life Zones of Oregon. North American Fauna, No 55. USDA, Bureau of Biological Survey, Washington DC.
- Braun, C.E. 1998. Sage Grouse Declines in Western North America: What are the Problems? Proc. Western Association of Fish and Wildlife Agencies. 78:139-156.
- Braun, C.E. 1999. Conservation plans. Western Sage Grouse Status Conference, Jan. 14-15, 1999, Boise, ID
<http://www.rangenet.org/projects/grouse.html>.
- Brittall, J. D., R. J. Poelker, S. J. Sweeny and G. M. Koehler. 1989. Native Cats of Washington. Washington Department of Wildlife, Olympia, WA. 169 pp.
- Belsky, A. J. 1996. Viewpoint: Western Juniper Expansion: Is It a Threat to Arid Northwestern Ecosystems? Journal of Range Management 49:53-59.
- Brown, L. and D. Amandon. 1968. Eagles, Hawks, and Falcons of the World. McGraw Hill Book Co., NY.
- Csuti B., A. J. Kimerling, T. A. O'Neil, M. M. Shaughnessy, E. P. Gaines, and M. M. P. Huso. 1997. Atlas of Oregon Wildlife, Distribution, Habitat and Natural History. Oregon State University Press, Corvallis, Oregon.
- Dalquest, W. W. 1948. Mammals of Washington. University of Kansas Publication, Museum of Natural History, 2:1-444.
- Dellasala, D. A., R. G. Anthony, T. A. Spies, K. A. Engel. 1998. Management of Bald Eagle Communal Roosts in Fire-adapted Mixed-conifer Forests. Journal of Wildlife Management 62(1):1998.
- Edelmann, F. B. and J. Copeland. 1997. Wolverine Survey in the Seven Devils Mountains of Idaho, as part of the ODFW/IDFDG/USFS/IPCo Cooperative Wolverine Survey (CCS 6-16-97-392). Unpubl.
- Forest Service Manual 2672.42 (USDA 1991)
- Gilligan j., M. Smith, D. Rogers, and A. Contreras. Grossman, M. L. and J. Hamlet. 1964. Birds of Prey of the World. Clark N. Potter, Inc. New York, NY. 496 pp.
- Hash, H. S. 1987. Wolverine. in Novak, M., J. A. Baker, J. A. Obbard, (eds.). Wild Furbearer Management and Conservation in North America. Toronto: Ontario Ministry of Natural Resources.
- Hatler, D. F. 1988. A Lynx Management Strategy for British Columbia. Ministry of Environment. 115 pp.
- Henny, C. J. and M. Nelson. 1981. Decline and Present Status of Breeding Peregrine Falcons in Oregon. Murrelet 62:43-53.
- Hornocker, M. G. and H. S. Hash. 1981. Ecology of the Wolverine in Northwestern Montana. Canadian Journal of Zoology. 59:1286-1301.
- Isaacs, F. B., R. G. Anthony and R. J. Anderson. 1983. Distribution and Productivity of Nesting Bald Eagles in Oregon, 1978-1982. Murrelet 64:33-38.
- Interagency Interdisciplinary Sage Grouse Planning Team. 2000. Draft Interim Management Guidelines for Sage Grouse and Sagebrush-steppe Ecosystems.
- Johnson, C. G. and R. R. Clausnitzer. 1992. Plant Associations of the Blue and Ochoco Mountains. Tech. Report R6-ERW-TO-036-92. USDA, Forest Service, Pacific Northwest Region, Wallowa-Whitman National Forest. 164 pp.
- Katzner, T. E., and K. L. Parker. 1997. Vegetative Characteristics and Size of Home Ranges Used by Pygmy Rabbits (*Brachylagus idahoensis*) During Winter. Journal of Mammalogy 78:1063-1072.
- Klebenow, D. A. 1969. Sage Grouse Nesting and Brood Habitat in Idaho. Journal of Wildlife Management. 33(3):649-62.

- _____. 1973. The Habitat Requirements of Sage Grouse and the Role of Fire in Management *in* Proceedings from Annual Tall Timbers Fire Ecology Conference. Tall Timbers Research Station, Tallahassee, FL.
- Knick, S. T., and J. T. Rotenberry. 1995. Landscape Characteristics of Fragmented Shrubsteppe Habitats and Breeding Passerine Birds. *Conservation Biology* 9:1059-1071.
- Knick, S. T., and J. T. Rotenberry. 1997. Landscape characteristics of disturbed shrubsteppe habitats in southwestern Idaho (U.S.A.). *Landscape Ecology* 12:287-297.
- Martin, N. S. 1970. Sagebrush Control Related to Habitat and Sage Grouse Occurrence. *Journal of Wildlife Management*. 34(2):313-320.
- Marshall, D. B. 1992. Threatened and Sensitive Wildlife of Oregon's Forests and Woodlands. Audubon Society of Portland. Draft monograph.
- Marshall, D.B. et. al. 2003. Birds of Oregon. Oregon State University Press. Corvallis OR 752pp.
- McCord, C. M. and J. E. Cardoza. 1982. Bobcat and Lynx: *Felis rufus* and *F. lynx*. Pp. 728-766, *in* Wild Mammals of North America: Biology, Management and Economics. (J. A. Chapman and G.A. Feldhamer, eds.). The John Hopkins University Press, Baltimore. 1147 pp.
- Miller, R. F., 1999. Managing Western Juniper for Wildlife Pp. 98-97 *in* Range Field Day 1999 Progress Report, Juniper Woodlands: History, Ecology, and Management. Department of Rangeland Resources, Eastern Oregon Agricultural Research Center, Oregon State University and US Department of Agriculture, Agricultural Research Service.
- Miller, R. F., T. Svejcar, and J. Rose. 1999. The Impacts of Juniper Encroachment on Understory Cover and Diversity *in* Range Field Day 1999 Progress Report, Juniper Woodlands: History, Ecology, and Management. Department of Rangeland Resources, Eastern Oregon Agricultural Research Center, Oregon State University and US Department of Agriculture, Agricultural Research Service.
- NatureServe: An online encyclopedia of life [web application]. 2000. Version 1.1. Arlington, Virginia, USA: Association for Biodiversity Information. <http://www.natureserve.org>
- Oregon Department of Fish and Wildlife. 2000. Oregon List of Threatened and Endangered Fish and Wildlife Species.
- Oregon Department of Fish and Wildlife. 1997. Sensitive Species List.
- Oregon Natural Heritage Program (ORNHP). 2000. Rare, Threatened, and Endangered Plants and Animals of Oregon. Portland, OR.
- Pagel, J. 1992. Analysis of Potential Peregrine Falcon Reintroduction Sites on the Malheur National Forest. USDA-Forest Service. Unpubl.
- Quinn, N. W. S., and G. Parker. 1987. Lynx. Pp. 683-694, *in* Wild Furbearer Management and Conservation in North America (M. Novak, J. A. Baker, M. E. Obbard, and B. Malloch, eds.). Ontario Ministry of Natural Resources, Toronto. 1150 pp.
- Sauer, J.R., J.E. Hines, G. Gough, I. Thomas, and B.G. Peterjohn. 1997. The North American Breeding Bird Survey Results and Analysis. Version 96.3. Online. Patuxent Wildlife Research Center, Laurel, MD. <http://www.mbr.nbs.gov/bbs/bbs.html>.
- Schroeder, M. A., J. R. Young, and C. E. Braun. 1999. Sage Grouse (*Centrocercus urophasianus*). *In* A. Poole and F. Gill, editors, The Birds of North America, No. 425. The Birds of North America, Inc., Philadelphia, PA.
- Rausch, R. L. and A. M. Pearson. 1972. Notes on the Wolverine in Alaska and the Yukon Territory. *Journal of Wildlife Management*. 36:249-268.
- Ruggiero, L. F., K. B. Audry, S. W. Buskirk, G. M. Koehler, C. J. Krebs, K. S. McKelvey, and J. R. Squires. 1999. Ecology and Conservation of Lynx in the United States. Gen. Tech. Report RRMRS-GTR-30WWW. USDA, Forest Service, Rocky Mountain Forest and Range Experiment Station, Fort Collins, CO. 480 pp
- Ruggiero, L. F., K. B. Aubry, S. W. Buskirk, L. J. Lyon, and W. J. Zielinski tech eds. 1994. The Scientific Basis for Conserving Forest Carnivores: American Marten, Fisher, Lynx, and Wolverine in the Western United States. Gen. Tech. Report RM-254. USDA, Forest Service,

- Rocky Mountain Forest and Range Experiment Station, Fort Collins, CO. 184 pp.
- Ryser, F.A. 1985. Birds of the Great Basin: a natural history. University of Nevada Press, Reno, NV.
- The Nature Conservancy (TNC). 1999. Natural Heritage Conservation (BioSource) Database. Accessed by USDA Forest Service under Grant No. 97-CC2-230.
- The Association of Biodiversity Information. 2000. NatureServe, Natural Heritage Central Databases. The Association for Biodiversity Information, Arlington, VA (August 06, 2000).
- Wallestad, R. 1975. Male Sage Grouse Responses to Sagebrush Treatment. *Journal of Wildlife Management* 39:482-484.
- Weaver J. L. and G. Aamato. 1999. Lynx Surveys in the Cascade Range: Washington and Oregon. Wildlife Conservation Society. Bronx, New York. 16 pp.
- USDA Forest Service. 2000. Region 6 Sensitive Animal List. Revised November 2000.
- USDA Forest Service. 1994. Neotropical Migratory Bird Reference Book. USDA Forest Service, Pacific Southwest Region. 832 pp.
- USDI Bureau of Land Management (BLM). 1998. Riparian Area Management: Process for Assessing Proper Functioning Condition. Technical Reference 1737-9. USDI Bureau of Land Management Service Center, Denver, CO.
- USDI-Fish and Wildlife Service. 2000a. Final Rule on Listing of Canada Lynx (50 CFR Part 17, RIN 1018-AF03). USDI Fish and Wildlife Service, Helena, MT. 77 pp.
- _____. 1997. Federal Register: May 27, 1997, Volume 62, Number 101.
- USGS-Patuxent Wildlife Research Center. 2000. Oregon Trend Results: North American Breeding Bird Survey Trend Comparative Results. www.mbr-pwrc.usgs.gov
- Verts, B. J. and L. N. Carraway. 1998. Land Mammals of Oregon. University of California Press, Berkeley and Los Angeles, CA. Pp. 455-458.
- Washington Department of Fish and Wildlife. 1995. Washington State recovery Plan for Pygmy Rabbit. Wildlife Management Program. Olympia. 73pp.
- Whisenant, S. G. 1990. Changing Fire Frequencies on Idaho's Snake River Plains: Ecological and Management Implications. pages 4-10 in E. D. McArthur, E. M. Romney, S. D. Smith, and P. T. Fuller, editors. *Proceedings of a Symposium on Cheatgrass Invasion, Shrub Die-off, and Other Aspects of Shrub Biology and Management*. USDA Forest Service, Intermountain Research Station, Ogden, Utah.
- Wisdom, M. J., R. S. Holthausen, B. C. Wales, C. D. Hargis, V. A. Saab, D. C. Lee, W. Hann, T. D. Rich, M. M. Rolland, W. J. Murphy, and M. R. Eames. 2000. Source Habitats for Terrestrial Vertebrates of Focus in the Interior Columbia Basin: Broad-scale Trends and Management Implications. Gen. Tech. Rep. PNW-GTR-485 (CD-ROM, Draft Version, March 2000). USDA Forest Service, Pacific Northwest Research Station, Portland, OR.
- Willis, J. M., G. P. Keister, Jr., D. A. Immell, D. M. Jones, R. M. Powell, and K. R. Durbin. 1993. Sage grouse in Oregon. Wildlife Research Report Number 15. Oregon Department of Fish and Wildlife, Wildlife Research Section, Portland, OR. 54pp.
- Witmer G. W., S. K. Martin, and R. D. Saylor. 1998. Forest Carnivore Conservation and Management in the Interior Columbia Basin: Issues and Environmental Correlates. Gen. Tech. Report PNW-GTR-420. USDA Forest Service, Pacific Northwest Research Station, Portland, OR. 51 pp.
- Yocum C. F. 1973. Wolverine records in the Pacific Coastal States and New Records for Northern California. in *The Scientific Basis for Conserving Forest Carnivores: American Marten, Fisher, Lynx, and Wolverine in the Western United States*. Gen. Tech. Report RM-254. USDA, Forest Service, Rocky Mountain Forest and Range Experiment Station, Fort Collins, CO. 184 pp.
- Zielinski W. J. and T. E. Kucera, (tech. eds.). 1995. American Marten, Fisher, Lynx, and Wolverine: Methods for Their Detection. Gen. Tech. Rep. PSW-GTR-157. Pacific Southwest Research Station, USDA Forest Service. 163 pp.

Appendix C Status Definitions

Federal Status Definitions

Endangered Species, which are in danger of becoming extinct within the near future throughout all or a significant portion of their range

Threatened Species those likely to become endangered within the foreseeable future.

Species of Concern Former USFWS C2 candidate that have sufficient information to support a proposal to list under the ESA or by ODFW under the OEAS.

Oregon's Threatened and Endangered Species Program Definitions

(under the authority of ORS 496.172, the Oregon Endangered Species Act, 1987)

Sensitive species are broken into four categories defined as follows:

Critical Species for which listing as threatened or endangered is pending; or those for which listing as threatened or endangered may be appropriate if immediate conservation actions are not taken. Also considered critical are some peripheral species that are at risk throughout their range, and some disjunct populations.

Vulnerable Species for which listing as threatened or endangered is not believed to be imminent and can be avoided through continued or expanded use of adequate protective measures and monitoring. In some cases, the population is sustainable, and protective measures are being implemented; in others, the population may be declining and improved protective measures are needed to maintain sustainable populations over time.

Peripheral or Naturally Rare Peripheral species refer to those whose Oregon populations that are on the edge of their range, Naturally rare species are those which had low population numbers historically in Oregon because of naturally limiting

factors. Maintaining the status quo for the habitat and population of these species is a minimum requirement. Disjunct populations of several species that occur in Oregon should not be confused with peripheral.

Undetermined Status Animals in this category are species for which status is unclear. They may be susceptible to population decline of sufficient magnitude that they could qualify for endangered, threatened, critical or vulnerable status, but scientific study will be required before a classification can be made.

Conservation Status Ranking

5 Secure-Common, demonstrably widespread and abundant. Typically with considerably more than 1000 occurrences and more than 10,000 individuals.

Secure in Oregon, and essentially ineradicable under present conditions.

4 Apparently Secure-Uncommon but not rare, and usually widespread. Possibly, cause for long-term concern. Typically more than 1000 occurrences and more than 10,000 individuals.

Not rare, and usually widespread in Oregon. Usually more than 100 occurrences.

3 Vulnerable-Vulnerable globally because very rare and local throughout its range, found only in a restricted range (even if abundant at some locations), or because of other factors making it vulnerable to extinction. Typically 21 to 100 occurrences or between 3,000 and 10,000 individuals.

Vulnerable in Oregon either because rare and uncommon, or found only in a restricted range (even if abundant at some locations), or because of other factors making it vulnerable to extirpation. Typically 21 to 1000 occurrences.

2 Imperiled-Imperiled globally because of rarity or because of some factor(s) making it very

vulnerable to extinction. Typically 6 to 20 occurrences or few remaining individuals (1,000 to 3,000) or acres (2,000 to 10,000) or stream miles (10 to 50).

endangered taxa, they do require continued monitoring.

Imperiled in Oregon because of rarity or because of some factor(s) making it very vulnerable to extirpation from the state. Typically 21 to 100 occurrences.

- 1** Critically Imperiled-Critically imperiled globally because of extreme rarity or because of some factor(s) making it especially vulnerable to extinction. Typically 5 or fewer occurrences or very few remaining individuals (<1,000) or acres (<2,000) or stream miles (<10).

Critically Imperiled in Oregon because of extreme rarity or because of some factor(s) making it especially vulnerable to extirpation for the state. Typically 5 or fewer occurrences or very few remaining individuals or acres.

Oregon Natural Heritage Program List (ONHP 2000)

- List 1** contains taxa that are threatened with extinction or presumed to be extinct throughout their entire range.
- List 2** contains taxa that are threatened with extirpation or presumed extirpated from the state of Oregon. These often peripheral or disjunct species are of concern when considering species diversity within Oregon's borders. They can be very significant when protecting the genetic diversity of a taxon. ORNHP regards extreme rarity as a significant threat and has included species that are very rare in Oregon on this list.
- List 3** contains species for which more information is needed before status can be determined, but which may be threatened or endangered in Oregon or throughout their range.
- List 4** contains taxa that are of conservation concern but are not currently threatened or endangered. This includes taxa that are very rare but are currently secure, as well as taxa that are declining in numbers or habitat but are still too common to be proposed as threatened or endangered. While these taxa currently may not need the same active management attention as threatened or

Appendix A

Determination of Conclusion Definitions for Biological Assessments and Biological Evaluations.

Listed Species

NO EFFECT (NE)

Applied when a project or activity will not have any "effect" on a listed species, or critical habitat.

Conferencing with the US Fish and Wildlife Service or National Marine Fisheries Service is not required.

MAY EFFECT-LIKELY TO ADVERSELY AFFECT (LAA)

If all Forest Plan standards and guidelines, interim direction and Recovery Plan conservation recommendations to protect threatened or endangered species cannot be implemented, a "May Effect-Likely to Adversely Affect" situation likely exists. Informal consultation should be begun to determine if this determination can be avoided.

If this determination is made, formal consultation must be initiated (50 CFR 402.12). Formal consultation must be requested in writing through the forest supervisor (FSM 2670.44) to the appropriate US Fish and Wildlife Service state or field supervisor, or National Marine Fisheries Service office.

MAY EFFECT-NOT LIKELY TO ADVERSELY AFFECT (NLAA)

A situation where a "May Effect-Not Likely to Adversely Affect" conclusion could be made if there are possible effects such as displacement or habitat modification, but those effects are insignificant or discountable.

If this determination is made, then written concurrence by the US Fish and Wildlife Service or National Marine Fisheries Service is required (50 CFR 402.13). Requests for concurrence must be initiated in writing from the forest supervisor to the state or field supervisor.

BENEFICIAL EFFECT (BE)

A situation where an activity or project is determined to substantially improve the habitat or status of a threatened or endangered species, or its habitat.

Written concurrence from the US Fish and Wildlife Service or National Marine Fisheries Service is required. Requests for concurrence must be initiated in writing from the forest supervisor to the state or field supervisor.

Proposed Species

NO EFFECT (NE)

Applied when a project or activity will not have any "effect" on a proposed species, or proposed critical habitat.

Conferencing with the US Fish and Wildlife Service or National Marine Fisheries Service is not required.

NOT LIKELY TO JEOPARDIZE THE CONTINUED EXISTENCE OF THE SPECIES OR RESULT IN DESTRUCTION OR ADVERSE MODIFICATION OF PROPOSED CRITICAL HABITAT (NLJR)

This determination is used when there are effects or cumulative effects, but where such effects would not have the consequence of losing key populations (stocks), would not adversely modify proposed critical habitat, or would not irreversible or irretrievable commit resources that might foreclose options to recovery, should the species be listed.

Conferencing with the US Fish and Wildlife Service or National Marine Fisheries Service is not required but may be initiated.

LIKELY TO JEOPARDIZE THE CONTINUED EXISTENCE OF THE SPECIES OR RESULT IN DESTRUCTION OR ADVERSE MODIFICATION OF PROPOSED CRITICAL HABITAT (LJR)

This determination is used when there are significant effects that could jeopardize the continued existence of the species, result in adverse modification or destruction of proposed critical habitat, and/or result

in irreversible or irretrievable commitments of resources that could foreclose options to avoid jeopardy, should the species be listed.

Conferencing with the US Fish and Wildlife Service or National Marine Fisheries Service is required if this determination is made.

Sensitive Species

NO IMPACT (NI)

Applied when an activity would have no effect on habitat, individuals, a population or a species.

MAY IMPACT INDIVIDUALS OR HABITAT, BUT WILL NOT LIKELY CONTRIBUTE TO A TREND TOWARD FEDERAL LISTING OR CAUSE A LOSS OF VIABILITY TO THE POPULATION OR SPECIES (MIIH)

Activities or actions that have effects that are immeasurable or minor, or that are consistent with Conservation Strategies or conservation of the species would receive this conclusion.

For populations that are very small, or vulnerable, each individual may be important for the short and long term viability.

Because sensitive species have been designated based on concerns for their viability, impacts on either individuals or populations are best managed under the umbrella of a Conservation Strategy. Without a Conservation Strategy, the best hierarchical level to base effects of management activities or activities is usually the population, metapopulation or fish stock level.

WILL IMPACT INDIVIDUALS OR HABITAT WITH A CONSEQUENCE THAT THE ACTION WILL CONTRIBUTE TO A TREND TOWARD FEDERAL LISTING OR CAUSE A LOSS OF VIABILITY TO THE POPULATION OR SPECIES (WIFV)

Loss of individuals or habitat can be considered significant when the potential effect may be:

1. contributing to a trend towards federal listing,
2. results in a significantly increased risk of loss of viability to a species,
3. or results in a significantly increased loss of viability to a population (stock).

Activities that adversely affect many individuals, or even a few individuals in vulnerable populations, should probably receive this determination unless there is a Conservation Strategy. Activities that are in conflict with the Conservation Strategy or Conservation Agreement would receive this determination.

Significant adverse impacts to sensitive species must not occur until a Conservation Strategy, or similar plan for species conservation, is prepared (FSH 2672.1) The purpose of a Conservation Strategy is to ensure cumulative effects do not result in reduced viability or conditions that result in the need for federal listing.

BENEFICIAL IMPACT (BI)

Applied when an activity would benefit a sensitive species.

Appendix B

Terrestrial Mammalian TEPS Species List for the Emigrant Creek Ranger District and Occurrence in the Trout and Wolf Creek Watersheds

common name	scientific name	status	occurrence in project area
gray wolf	<i>Canis lupus</i>	Endangered	historic
northern bald eagle	<i>Haliaeetus leucocephalus</i>	Threatened	suspected
lynx	<i>lynx canadensis</i>	Threatened	suspected
American peregrine falcon	<i>Falco peregrinus anatum</i>	R-6 Sensitive	suspected
western sage grouse	<i>Centrocercus urophasianus phaios</i>	R-6 Sensitive	suspected
gray flycatcher	<i>Empidonas wrightii</i>	R-6 Sensitive	suspected
bobolink	<i>Dolichonyx oryzivorus</i>	R-6 Sensitive	N/A
bufflehead	<i>Bucephala albeola</i>	R-6 Sensitive	N/A
wolverine	<i>Gulo gulo luseus</i>	R-6 Sensitive	suspected
pygmy rabbit	<i>Brachylagus idahoensis</i>	R-6 Sensitive	suspected
Pacific fisher	<i>Martes pennanti</i>	R-6 Sensitive	N/A

Documented=in project area, or adjoining lands Suspected=potential habitat present N/A=Not Applicable

APPENDIX I

Proper Functioning Condition Surveys

Proper Functioning Condition Assessment Standard Checklist and Evaluation

Name of Riparian-Wetland Area: House Creek, House Creek Allotment, Reach 1

Date: 11/12/04

Miles: Reach 1= .5 mi.

ID Team Observers: Rick Vetter- Fisheries Biologist, Lori Bailey-Planner/Botanist, and Chad Boyd (EOARC)

Acres: 23,000 acres Flat Creek/House Creek subwatershed

Stream Overview:

House Creek is a second order stream and a tributary to the Silvies River located in the southeast corner of **Flat Creek/House Creek subwatershed** within the northeastern part of the Trout Creek watershed in the Silvies sub-basin. The upper half of the creek lies within the Malheur National Forest and contains 2 reaches for PFC. The lower half is on private and is entirely diverted into two irrigation ditches at the forest boundary. Reach 1, represents that portion of the creek starting at the forest service boundary, and running upstream to an enclosure in a meadow. Most of this reach is in a confined narrow canyon with no floodplains (or very narrow when they do exist), except for the last few hundred feet before private, where the floodplain widens. No fish were observed and it is unlikely that there are any fish since the stream channel disappears at the irrigation diversions on private land.

Yes	No	N/A	HYDROLOGY
☐	☐	☒	1)Floodplain above bankfull is inundated in “relatively frequent” events
☐	☒	☐	2)Where beaver dams are present they are active and stable
There is evidence of an old beaver dam across the channel and aspen cuttings			
☒	☐		3)Sinuosity, width/depth ratio, and gradient are in balance with the landscape setting (i.e., landform, geology, and bioclimatic region)
☒	☐	☐	4)Riparian-wetland area is widening or has achieved potential extent
Widening but has not reached potential			
☒	☐		5)Upland watershed is not contributing to riparian-wetland degradation

Yes	No	N/A	VEGETATION
☒	☐	☐	6)There is diverse age-class distribution of riparian-wetland vegetation (recruitment for maintenance/recovery)
Alder is highlined			
☒	☐	☐	7)There is diverse composition of riparian-wetland vegetation (for maintenance/recovery)
Sedges are lacking near the forest service boundary section of the stream, a few hundred feet, and willow is limited possibly by shade from encroaching conifers. red osier dogwood			
☒	☐	☐	8)Species present indicate maintenance of riparian-wetland soil moisture characteristics
brookgrass			

☒	☐	☐	9)Streambank vegetation is comprised of those plants or plant communities that have root masses capable of withstanding high-streamflow events
☒	☐	☐	10)Riparian-wetland plants exhibit high vigor
☒	☐	☐	11)Adequate riparian-wetland vegetative cover is present to protect banks and dissipate energy during high flows
☒	☐	☐	12)Plant communities are an adequate source of coarse and/or large woody material (for maintenance/recovery)

Yes	No	N/A	EROSION/DEPOSITION
☒	☐		13)Floodplain and channel characteristics (i.e., rocks, overflow channels, coarse and/or large woody material) are adequate to dissipate energy
☒	☐	☐	14)Point bars are revegetating with riparian-wetland vegetation
☒	☐		15)Lateral stream movement is associated with natural sinuosity
☒	☐		16)System is vertically stable
No headcuts were observed			
☒	☐		17)Stream is in balance with the water and sediment being supplied by the watershed (i.e., no excessive erosion or deposition)

Remarks

This allotment was rested in 2004, although there was evidence of livestock on the allotment. Good establishment of woody shrubs (mountain snowberry) and grasses along the stream bank. Two age classes of alder, young and decadent with browsing on the young. Potential for aspen with remnant trees being overgrown by alder. Juniper is invading the riparian area. Beaver sign on the old aspen and there is evidence of an old beaver dam. There is also evidence of an old railroad grade or road along the stream channel, mostly overgrown now. Small area of Canada thistle invading along the stream channel. (9 photos, Reach 1, USFS boundary to lower enclosure fence, Photoset A, misc. photos #s 9886 thru #9903)

Summary Determination

Functional Rating:

Proper Functioning Condition **X**
 Functional-At Risk
 Nonfunctional
 Unknown

Trend for Functional-At Risk:

Upward
 Downward
 Not Apparent **X**

Are factors contributing to unacceptable conditions outside the control for the manager?

Yes
No **X**

If yes, what are those factors?

_____ **Flow regulations**
_____ **Channelization**
_____ **Augmented flows**

_____ **Mining activities**
_____ **Road encroachment**
_____ **Other (specify) _____**

_____ **Upstream channel conditions**
_____ **Oil field water discharge**

Proper Functioning Condition Assessment Standard Checklist and Evaluation

Name of Riparian-Wetland Area: House Creek, House Creek Allotment, Reach 2

Date: 11/12/04

Miles: Reach 2= .5 mi.

ID Team Observers: Rick Vetter- Fisheries Biologist, Lori Bailey-Planner/Botanist, and Chad Boyd (EOARC)

Acres: 23,000 acres Flat Creek/House Creek subwatershed

Stream Overview:

House Creek is a second order stream and a tributary to the Silvies River located in the southeast corner of **Flat Creek/House Creek subwatershed** within the northeastern part of the Trout Creek watershed in the Silvies sub-basin. The upper half of the creek lies within the Malheur National Forest and the lower half is on private and diverted into two irrigation ditches at the forest boundary. Reach 2, represents that portion of the creek starting at the first enclosure, running through the water gap, the second enclosure and ending at a spring on the right side of the channel. The gradient decreased to less than 2% on this reach, with a wide floodplain.

Yes	No	N/A	HYDROLOGY
☒	☐	☐	1)Floodplain above bankfull is inundated in “relatively frequent” events
More evident above the single headcut that appears to be stabilized			
☐	☐	☒	2)Where beaver dams are present they are active and stable
☒	☐		3)Sinuosity, width/depth ratio, and gradient are in balance with the landscape setting (i.e., landform, geology, and bioclimatic region)
☒	☐	☐	4)Riparian-wetland area is widening or has achieved potential extent
More evident above the single headcut that appears to be stabilized			
☒	☐		5)Upland watershed is not contributing to riparian-wetland degradation
The landing (bare ground) could affect the stream during large events but there is an adequate vegetation buffer on the floodplain			

Yes	No	N/A	VEGETATION
☒	☐	☐	6)There is diverse age-class distribution of riparian-wetland vegetation (recruitment for maintenance/recovery)
☒	☐	☐	7)There is diverse composition of riparian-wetland vegetation (for maintenance/recovery)
Few willow and shrubs in lower enclosure, more alder in upper enclosure			
☒	☐	☐	8)Species present indicate maintenance of riparian-wetland soil moisture characteristics
☒	☐	☐	9)Streambank vegetation is comprised of those plants or plant communities that have root masses capable of withstanding high-streamflow events

☒	☐	☐	10)Riparian-wetland plants exhibit high vigor
☒	☐	☐	11)Adequate riparian-wetland vegetative cover is present to protect banks and dissipate energy during high flows
☒	☐	☐	12)Plant communities are an adequate source of coarse and/or large woody material (for maintenance/recovery)
but are less than reach 1			

Yes	No	N/A	EROSION/DEPOSITION
☒	☐		13)Floodplain and channel characteristics (i.e., rocks, overflow channels, coarse and/or large woody material) are adequate to dissipate energy
☐	☐	☒	14)Point bars are revegetating with riparian-wetland vegetation
☒	☐		15)Lateral stream movement is associated with natural sinuosity
☒	☐		16)System is vertically stable
One headcut was observed in the lower enclosure that was becoming stabilized with vegetation. There was minimal down cutting but the stream channel did drop about 2-3 feet at this point.			
☒	☐		17)Stream is in balance with the water and sediment being supplied by the watershed (i.e., no excessive erosion or deposition)

Remarks

This allotment was rested in 2004, although there was evidence of livestock in the allotment. There is a small area of Canada thistle in lower enclosure. Several springs and seeps are along the south side of the channel. The flowing part of the stream starts at one of these springs (fenced). The riparian wetland area is wider in the upper enclosure and contains more shrubs. The water gap between the enclosures should be armored with rock. Fence at spring stream source should be redesigned larger. (9 photos, Reach 2, lower and upper enclosures, photoset B, misc. photos #9904 thru 9915)

Summary Determination

Functional Rating:

Proper Functioning Condition **X**
 Functional-At Risk
 Nonfunctional
 Unknown

Trend for Functional-At Risk:

Upward
 Downward
 Not Apparent **X**

Are factors contributing to unacceptable conditions outside the control for the manager?

Yes

No

X

If yes, what are those factors?

☐ Flow regulations

☐ Channelization

☐ Augmented flows

☐ Mining activities

☐ Road encroachment

☐ Other (specify) _____

☐ Upstream channel conditions

☐ Oil field water discharge

Proper Functioning Condition Assessment Standard Checklist and Evaluation

Name of Riparian-Wetland Area: Schurtz Creek, Van and Story-Fry Allotments, Reach 1, Segment 1

Date: 11/15/04

Miles: Segment 1=2.24 mi. of Reach 1= 3.79 mi. (from confluence with Calamity Creek to the enclosure on Schurtz Creek)

ID Team Observers: Zolley-Range specialist, Rick Vetter- Fisheries Biologist, Lori Bailey- Planner/Botanist, and Barbara Howard and Alfred Dunten, permittees for the Van Allotment.

Acres: 7,834 acres Schurtz Creek Subwatershed

Stream Overview:

Schurtz Creek is a third order stream and a tributary to Calamity Creek located in the Calamity Creek subwatershed within the Wolf Creek watershed of the Upper Malheur sub-basin and lies entirely within the Malheur National Forest. (In 2003 the Schurtz Creek watershed was incorporated into the Calamity Creek watershed) Segment 1 represents that part of Reach 1, which is below the Schurtz Creek enclosure. This segment also includes the portion of Schurtz Creek that is fenced into the Story-Fry allotment, as a water gap.

Yes	No	N/A	HYDROLOGY
☐	☒	☐	1) Floodplain above bankfull is inundated in "relatively frequent" events
This reach has a combination of short segments consisting of rocky steep gradients with narrow channels and short wide areas with less gradient and wider floodplains. Overall the gradient was about 2%. This answer pertains mostly to the unconfined channels with relatively wide floodplains since parts of the floodplain in the steep narrow segments are limited in size and function due to the natural character of the narrow rocky confined channel and steep valley slopes. Large infrequent events may enter the floodplain, but frequent events appear to be restricted to the channel. The amount of channel deposition, bank erosion and debris jams, indicates a lack of energy dissipation across the floodplain. There is a lack of interaction between the channel and the floodplain. The lack of surface flow in the lower segment of this reach may also indicate a lack of frequent flooding of the floodplain. Frequent flooding of the floodplain allows riparian areas to be recharged, maintaining obligate riparian species with dense root systems that retain soil moisture and slowly dissipate the water during the summer into the channel. Down cutting and widening of the channel is limiting flood flows onto the floodplain, reducing the interaction of the stream with the adjacent floodplain and limiting the natural beneficial hydrologic functions that should be occurring in these areas.			
☐	☐	☒	2) Where beaver dams are present they are active and stable
☐	☒	☐	3) Sinuosity, width/depth ratio, and gradient are in balance with the landscape setting (i.e., landform, geology, and bio-climatic region)
Sinuosity and gradient are closer in balance with the natural landscape, but overhanging banks are lacking. Width depth ratios are greater than 10.			
☐	☒	☐	4) Riparian-wetland area is widening or has achieved potential extent
There is an increase in shallow rooted grasses (bluegrass) and in some cases sagebrush, on the			

floodplain which indicates the riparian wetland is narrowing and the water table is falling. This usually occurs with the lack of floodplain development as described in question # 1. Parts of the lower segment in the confined channel would be a NA since the landform dictates the functionality, and there is no potential for wetland vegetation.			
☐	☒		5) Upland watershed is not contributing to riparian-wetland degradation
There is evidence of cementing of the streams substrate and overloading of point bars which indicate a no answer. However without further studies it is unclear what amounts of sediment, and overland flows are being contributed from uplands or altered streambanks. The uplands are overstocked with timber, and encroached with western juniper resulting in a degraded understory of shrubs, forbs and grasses. Soils may be compacted beyond the normal range of variability which would also affect runoff. Bulk density evaluations of soils and water infiltration rates may also help determine if the uplands and or riparian floodplains are contributing to the wetland degradation. It should be noted that this item pertains to whether uplands are contributing to the degradation of riparian wetland areas, and not the condition of the uplands.			

Yes	No	N/A	VEGETATION
☐	☒	☐	6) There is diverse age-class distribution of riparian-wetland vegetation (recruitment for maintenance/recovery)
There is a non-continuous pattern of sedges scattered along the banks and the mid age class of shrubs is lacking. There are more old decadent alder and willow, and few young .			
☐	☒	☐	7) There is diverse composition of riparian-wetland vegetation (for maintenance/recovery)
Due to the condition of the vegetation it was difficult to identify all plant species, but it was evident that there were not sufficient numbers of the existing riparian plants for timely recovery.			
☐	☒	☐	8) Species present indicate maintenance of riparian-wetland soil moisture characteristics
The water table is not being maintained due to the lack of wetland species (sedges) and the abundance of upland species (sagebrush, bluegrass) on the floodplain.			
☐	☒	☐	9) Streambank vegetation is comprised of those plants or plant communities that have root masses capable of withstanding high-streamflow events
Narrow steep reaches have older willows, alders and hawthorns that are providing some stabilization (subsurface flow segments) but the majority of the streambanks associated with surface flow are lacking plants that have root masses capable of withstanding high stream flows thus the reason for the amount of altered banks observed along this reach segment. Bank stability standards are not met in this reach.			
☐	☒	☐	10) Riparian-wetland plants exhibit high vigor
The size and shape of the riparian plants indicate that plants are not vigorous. There are more high-lined and mushroom shaped plants than robust well rounded plants. Sedges tend to occur in broken clumps rather than dense continuous mats, except at several small seeps associated with springs.			
☐	☒	☐	11) Adequate riparian-wetland vegetative cover is present to protect banks and dissipate energy during high flows
Streambanks associated with surface flows are dominated by upland plant species that do not dissipate energy from high flows.			
☒	☐	☐	12) Plant communities are an adequate source of coarse and/or large woody material (for maintenance/recovery)
There is an adequate source of LWD but it is not in the stream channel interacting with the water flow and forming pools.			

Yes	No	N/A	EROSION/DEPOSITION
☐	☒		13) Floodplain and channel characteristics (i.e., rocks, overflow channels, coarse and/or large woody material) are adequate to dissipate energy
Overall there is a lack of large woody debris that would help dissipate energy and create pools.			

Where wood is interacting with the water flow, pools are being created and stream energy is being dissipated. Rocks were stabilizing parts of the channel in the steeper gradients.			
☐	☒	☐	14) Point bars are re-vegetating with riparian-wetland vegetation
The majority of the point bars do not contain riparian wetland species with root masses capable of withstanding high flow events. Some areas of vegetation may be limited by lack of sunlight, due to the encroaching forest canopy.			
☐	☒	☐	15) Lateral stream movement is associated with natural sinuosity
Although there is some natural lateral movement the majority of the stream banks are eroded and unstable. This reach does not meet bank stability standards.			
☒	☐	☐	16) System is vertically stable
No head cuts were observed			
☐	☒	☐	17) Stream is in balance with the water and sediment being supplied by the watershed (i.e., no excessive erosion or deposition)
Unstable banks and excessive erosion indicate that this segment of the stream is out of balance. This is partially due to the lack of riparian plants with deep root masses.			

Remarks

This evaluation is for the entire length of Schurtz Creek, in reach 1, Segment 1, from Calamity Creek to the downstream end of the enclosure at the upper end of the Van allotment. This includes a small fenced portion of the Story-Fry allotment, in the center of the Van allotment on Schurtz creek. The team noted less utilization of the riparian plants in the Story-Fry allotment and more interaction between the stream channel and the riparian area.

Forty-seven photos were taken during this PFC evaluation on Schurtz and are noted as:
Set-A Van Allotment, Calamity Ck. to Story-Fry Allotment, 8 photos misc. #s 9930 thru 9937
Set-B Story-Fry Allotment water gap, 16 photos misc. #s 9938 thru #9956
Set-C Van Allotment, Story-Fry fence to enclosure fence, 23 photos misc. #s 9957 thru #9992

This portion of Schurtz Creek lacks the resiliency that allows a riparian wetland area to withstand (hold together during) high water events. During high water flow events this stream segment has a high probability of further degradation. Floodwater retention is minimal in this segment. This reach segment failed to meet 5 of the six riparian management objectives in the Forest Plan Amendment 29, dealing with water temperature, bank stability, large woody debris, pool frequency, width/depth ratio. Canopy closure was met.

Due to stubble heights of about 2-3 inches it was difficult to identify some riparian plants to species, however we could identify broadleaf sedges, rushes and grasses as plant communities and other key species with deep root masses such as Nebraska Sedge vs shallow rooted grass like species as bluegrass. Identifying these key species allowed us to answer the vegetation questions. Trend is often a difficult determination to make unless previous data exists. At this time the trend is considered "Not Apparent".

Alfred Dunten informed us that the lower part (the steeper gradient and partially confined channel) of Schurtz Creek (starting at a point about ½ way between Calamity and Story Fry allotment) is dry during the late summer.

Thinning selected conifers in the riparian area would provide more sunlight for riparian species and shrubs. Felled trees could be positioned in the stream channel (and floodplain) to increase the large woody debris component creating pools and dissipating stream energy.

Summary Determination

Functional Rating:

Proper Functioning Condition	
Functional-At Risk	X
Nonfunctional	
Unknown	

Trend for Functional-At Risk:

Upward	
Downward	
Not Apparent	X

Are factors contributing to unacceptable conditions outside the control for the manager?

Yes	
No	X

If yes, what are those factors?

☐ Flow regulations	☐ Mining activities	☐ Upstream channel conditions
☐ Channelization	☐ Road encroachment	☐ Oil field water discharge
☐ Augmented flows	☐ Other (specify) _____	

Proper Functioning Condition Assessment Standard Checklist and Evaluation

Name of Riparian-Wetland Area: Schurtz Creek, Van Allotment, Reach 1, Segment 2

Date: 11/15/04

Miles: Segment 2=1.55 mi. of Reach 1= 3.79 mi.

ID Team Observers: Zelle-Range specialist, Rick Vetter- Fisheries Biologist, Lori Bailey- Planner/Botanist, and Barbara Howard and Alfred Dunten, permittees for the Van Allotment

Acres: 7,834 acres Schurtz Creek subwatershed

Stream Overview:

Schurtz Creek is a third order stream and a tributary to Calamity Creek located in the Calamity Creek subwatershed within the Wolf Creek watershed of the Upper Malheur subbasin and lies entirely within the Malheur National Forest. (In 2003 the Schurtz Creek watershed was incorporated into the Calamity Creek watershed) Segment 2 represents that part of Reach 1, which is in the large fenced enclosure at the upper end of the pasture.

Yes	No	N/A	HYDROLOGY
☒	☐	☐	1)Floodplain above bankfull is inundated in “relatively frequent” events
The stream and riparian area are interacting.			
☐	☐	☒	2)Where beaver dams are present they are active and stable
☐	☒		3)Sinuosity, width/depth ratio, and gradient are in balance with the landscape setting (i.e., landform, geology, and bioclimatic region)
Sinuosity and gradient are closer in balance with the natural landscape but overhanging banks are lacking. Width depth ratios are greater than 10.			
☒	☐	☐	4)Riparian-wetland area is widening or has achieved potential extent
☒	☐		5)Upland watershed is not contributing to riparian-wetland degradation

Yes	No	N/A	VEGETATION
☒	☐	☐	6)There is diverse age-class distribution of riparian-wetland vegetation (recruitment for maintenance/recovery)
☒	☐	☐	7)There is diverse composition of riparian-wetland vegetation (for maintenance/recovery)
☒	☐	☐	8)Species present indicate maintenance of riparian-wetland soil moisture characteristics
☒	☐	☐	9)Streambank vegetation is comprised of those plants or plant communities that have root masses capable of withstanding high-streamflow events
☒	☐	☐	10)Riparian-wetland plants exhibit high vigor

☒	☐	☐	11) Adequate riparian-wetland vegetative cover is present to protect banks and dissipate energy during high flows
☒	☐	☐	12) Plant communities are an adequate source of coarse and/or large woody material (for maintenance/recovery)
This part of the reach contains large meadows thus large wood debris (LWD) is not as important a factor in the formation of pools as meander scours.			

Yes	No	N/A	EROSION/DEPOSITION
☒	☐		13) Floodplain and channel characteristics (i.e., rocks, overflow channels, coarse and/or large woody material) are adequate to dissipate energy
This part of the reach contains large meadows thus LWD is not as important a factor in the formation of pools as meander scours.			
☒	☐	☐	14) Point bars are revegetating with riparian-wetland vegetation
☒	☐		15) Lateral stream movement is associated with natural sinuosity
☒	☐		16) System is vertically stable
No headcuts were observed			
☒	☐		17) Stream is in balance with the water and sediment being supplied by the watershed (i.e., no excessive erosion or deposition)

Remarks

Due to stubble heights of less than 5 inches on the floodplain it was difficult to identify some riparian plants to species, however we could identify sedges, rushes and grasses as plant communities and other key species with deep root masses as Nebraska Sedge vs shallow rooted grass like species as bluegrass.

Alfred Dunten mentioned that this the first time his cattle have grazed the enclosure since it was established about 1990. However, when he moved his cattle in this year there were already cattle present, and they utilized a significant portion of the riparian forage. Therefore, Alfred did not leave his cattle in the enclosure as long as he anticipated. (18 photos, Van enclosure, Photoset D misc. photo #s 9992-0020)

Summary Determination

Functional Rating:

Proper Functioning Condition X
 Functional-At Risk
 Nonfunctional
 Unknown

Trend for Functional-At Risk:

Upward X
 Downward
 Not Apparent

Are factors contributing to unacceptable conditions outside the control for the manager?

Yes

No

X

If yes, what are those factors?

☐ Flow regulations

☐ Channelization

☐ Augmented flows

☐ Mining activities

☐ Road encroachment

☐ Other (specify) _____

☐ Upstream channel conditions

☐ Oil field water discharge

Proper Functioning Condition Assessment Standard Checklist and Evaluation

Name of Riparian-Wetland Area: Schurtz Creek, Wolf Allotment, Reach 1, Segment 3

Date: 11/15/04

Miles: Segment 3=.25 mi. Reach 1= 3.79 mi.

ID Team Observers: Zolley-Range specialist, Rick Vetter- Fisheries Biologist, Lori Bailey- Planner/Botanist, and Barbara Howard and Alfred Dunten, permittees for the Van Allotment

Acres: 7,834 acres Schurtz Creek subwatershed

Stream Overview:

Schurtz Creek is a third order stream and a tributary to Calamity Creek located in the Calamity Creek subwatershed within the Wolf Creek watershed of the Upper Malheur subbasin and lies entirely within the Malheur National Forest. (In 2003 the Schurtz Creek watershed was incorporated into the Calamity Creek watershed) Reach 1, Segment 3 represents that part of Reach 1, in the Wolf Creek allotment above the Van enclosure to FS Road 17.

Yes	No	N/A	HYDROLOGY
☒	☐	☐	1)Floodplain above bankfull is inundated in “relatively frequent” events
The stream and riparian area are interacting.			
☐	☐	☒	2)Where beaver dams are present they are active and stable
☒	☐		3)Sinuosity, width/depth ratio, and gradient are in balance with the landscape setting (i.e., landform, geology, and bioclimatic region)
☒	☐	☐	4)Riparian-wetland area is widening or has achieved potential extent
☒	☐		5)Upland watershed is not contributing to riparian-wetland degradation

Yes	No	N/A	VEGETATION
☒	☐	☐	6)There is diverse age-class distribution of riparian-wetland vegetation (recruitment for maintenance/recovery)
☒	☐	☐	7)There is diverse composition of riparian-wetland vegetation (for maintenance/recovery)
☒	☐	☐	8)Species present indicate maintenance of riparian-wetland soil moisture characteristics
☒	☐	☐	9)Streambank vegetation is comprised of those plants or plant communities that have root masses capable of withstanding high-streamflow events
☒	☐	☐	10)Riparian-wetland plants exhibit high vigor

☒	☐	☐	11) Adequate riparian-wetland vegetative cover is present to protect banks and dissipate energy during high flows
☒	☐	☐	12) Plant communities are an adequate source of coarse and/or large woody material (for maintenance/recovery)

Yes	No	N/A	EROSION/DEPOSITION
☒	☐		13) Floodplain and channel characteristics (i.e., rocks, overflow channels, coarse and/or large woody material) are adequate to dissipate energy
☒	☐	☐	14) Point bars are revegetating with riparian-wetland vegetation
☒	☐		15) Lateral stream movement is associated with natural sinuosity
☒	☐		16) System is vertically stable
No headcuts were observed			
☒	☐		17) Stream is in balance with the water and sediment being supplied by the watershed (i.e., no excessive erosion or deposition)

Remarks

Good establishment of woody shrubs along the stream banks, improved bank stability, stream channel narrows. Cottonwood were observed at waypoint 11T 0359354;4874870. (4 photos, between Van/Wolf allotment fence and FS road 17, photoset E, misc. photo #s 0021- 0025)

Summary Determination

Functional Rating:

Proper Functioning Condition **X**
 Functional-At Risk
 Nonfunctional
 Unknown

Trend for Functional-At Risk:

Upward **X**
 Downward
 Not Apparent

Are factors contributing to unacceptable conditions outside the control for the manager?

Yes
 No **X**

If yes, what are those factors?

☐ Flow regulations ☐ Augmented flows ☐ Mining activities
☐ Channelization ☐ Road encroachment

_____Other (specify) _____

_____Upstream channel conditions
_____Oil field water discharge

APPENDIX J

PACFISH Enclosure B

Appendix J

PACFISH Enclosure B

United States **Forest** **R-6**
Department of Service
Agriculture

Reply to: 2670

Date: August 14, 1995

Subject: PACFISH Grazing Guidelines Revision

To: PACFISH Forest Supervisors

Enclosed is a revision of Enclosure B - Recommended Livestock Grazing Guidelines, sent to you in a memo dated May 24, 1995, providing feedback to questions raised at the PACFISH Implementation Workshops. Please replace the original Enclosure B with this revision dated July 31, 1995. It should be understood that this revision does not alter the intent or intended implementation of the subject guidelines as originally written but rather attempts to further clarify them to avoid possible misinterpretation.

If you have any questions, please contact Ron Wiley (503-952-6418), Wayne Elmore (503-447-4115), or Don Nelson (503-326-5917).

/s/Gordon Haugen
GORDON HAUGEN
Columbia River
Basin/PACFISH Coordinator

Enclosure

ENCLOSURE B

RECOMMENDED LIVESTOCK GRAZING GUIDELINES (Rev. 7/31/95)

KEY ASSUMPTIONS

*Influences of livestock grazing must result in riparian restoration at a minimum of "near natural" rates. We recognize that some environmental effects are inherent with the presence of livestock. However, we believe that "near natural" rates of recovery can be provided if we limit environmental effects to those that do not carry through to the next year, thereby avoiding cumulative, negative effects.

- a) Condition thresholds are not exceeded;
- b) Standards and Guidelines for forage and browse utilization are not exceeded;
- c) A 70% rate of recovery is documented.

"Carryover effects": Pacfish/Infish implies, but does not clearly state, that if we meet the standards and guidelines and do not exceed the condition thresholds, there will be an acceptable level of carryover effects. The level of these carryover effects needs to be disclosed in the appropriate decision document.

*Adverse affect to aquatic habitat associated with livestock grazing can be avoided, and riparian restoration provided by controlling:

- season of use (tied to plant phenology and soil characteristics rather than calendar dates); and
- amount of use.

*Providing for the health, form and function of riparian systems should remain the focus of management efforts.

*Stream gradient, inherent stability characteristics, potential vegetative communities, and type of degradation (i.e., vegetation vs. bank/channel characteristics) are important factors in determining restoration potential and guidelines that will lead to restoration.

*Guidelines for developing allotment specific prescriptions can be identified at the programmatic level. However, in general, the prescriptions themselves must be developed to fit "on-the-ground" conditions within the context of those guidelines.

*In some definable cases, avoiding adverse affects can only be accomplished by suspending livestock grazing. These cases include problems related to ecological status.

*Effective monitoring using specific measurement approaches, as well as administration, are essential.

PROGRAMMATIC GUIDELINES FOR LIVESTOCK GRAZING

As noted in the assumptions above, the goals, or desired outcomes of management efforts provide the foundation for the recommended programmatic livestock grazing guidelines. The guidelines and resulting site specific prescriptions are of value only to the extent they contribute to meeting these goals. The Environmental Assessment for PACFISH interim direction provides suitable riparian goals for the land management agencies (See PACFISH EA, APPENDIX, pages C-3 and C-4). All management activities implemented, including non-livestock related activities, should contribute to accomplishment of these goals.

Where these goals are met, the following on-the-ground attributes will be evident (See BLM Technical Reference 1737-9, Process for Assessing Proper Functioning Condition):

- (1) Floodplains are inundated by relatively frequent events (i.e., 1-3 years).
- (2) Stream sinuosity, width/depth ratio, and pool frequency reflect the capabilities of the setting (i.e., landform, geology, and bioclimatic region).
- (3) Lateral stream movement is associated with natural sinuosity (i.e., streambank stability reflects the inherent capabilities of the setting).
- (4) The overall system is vertically stable.
- (5) Streambank morphology reflects the inherent capabilities of the ecological setting.
- (6) Upland watershed conditions within the allotment are not contributing to degradation of riparian habitat conservation areas.
- (7) Riparian vegetation characteristics:
 - diverse age structure for woody species (where such species are a part of the natural system);
 - plants exhibit high vigor;
 - species present indicate maintenance of riparian soil moisture;
 - streambank vegetation protects stream banks and dissipates energy during high flows (i.e., consider community type composition, rooting characteristics, and plant density); and
 - provide an adequate source of coarse and/or large woody debris (where such debris is a part of the natural system).

MANAGEMENT CONSIDERATIONS

Based on the key assumptions previously outlined, the following guidelines are recommended for use in modifying applicable allotment management plans/annual operating plans/project decision

documents/instructions to permittees to provide a high degree of assurance that objectives for conservation and restoration of anadromous fish habitat will be met.

These recommendations do not specifically address "priorities" for taking action. Taking action to conserve Columbia River Anadromous Fish is not optional. However, we believe priorities can be identified where there are insufficient resources to "do it all." Those priorities are as follows:

- 1) Maintain or improve conditions, where the criteria for "late seral" ecological status are met or exceeded (i.e., it is easier to protect healthy riparian systems than restore degraded ones).
- 2) Adjust management practices, where the criteria for "mid-seral" ecological status are met but the trend is static or downward. This is especially important, where vegetative factors are primarily responsible for the mid-seral rating (i.e., making adjustments at this stage is likely to prevent stream bank/channel damage of a lasting nature).
- 3) Adjustments in management practices, where the criteria for "early seral" ecological status are met, and primarily tied to deteriorated stream bank/channel conditions (especially in cases of severe channel downcutting where channel evolution has not re-created a floodplain), may contribute little to the recovery of the system in the near term.

RECOMMENDATIONS

*Continue current grazing prescriptions in pastures/allotments where ecological status is "late seral" (or better) based on either riparian vegetation or stream bank/channel conditions. Ensure residual herbaceous vegetation heights of at least 4 to 6 inches, and that no "condition thresholds" are exceeded. (See Key Definitions - Ecological Status and Residual Herbaceous Vegetation Heights)

*Where ecological status is "mid-seral," limit grazing in pastures/allotments to provide at least 6 inches of residual herbaceous vegetation and to ensure that no "condition thresholds" are exceeded. For moderate and low gradient (i.e., Rosgen "B" and "C" channel types) channels, with substrates composed of medium to fine easily eroded materials, also limit use to early season grazing to provide for recovery of stream bank/channel characteristics. (See Key Definitions - Early Season Grazing)

*In pastures/allotments where ecological status is "early seral", the following is strongly recommended:

-In moderate and low gradient (i.e., Rosgen "B" and "C" channel types) channels, with substrates composed of medium to fine easily eroded materials, consider rest.

-In all moderate to high gradient stream systems (Rosgen "A" and "B" type channels) with coarse substrate materials that provide inherent stability, whose ecological status rating of early seral is tied entirely to vegetation characteristics, grazing may be permitted if limited to early season use, residual herbaceous vegetation heights of at least 6 inches are met, and no "condition thresholds" are exceeded.

*Where early season grazing, as prescribed above, would result in adverse affects or is impractical, mid- or late-season grazing may be alternatives. However, residual herbaceous vegetation requirements would still have to be met and no "condition thresholds" could be exceeded.

*Appropriate "condition thresholds" will be monitored in all pastures/allotments. Results are to be reported on an annual basis, and appropriate adjustments made to the annual operating plans. (See likely consequences of implementation of this recommendation in the following section.)

KEY DEFINITIONS

Condition Thresholds: A number of indicators of impending impacts that would carry over to the next year would be monitored during the period of use and act as "triggers" to prevent damage. These should not be exceeded anytime during the grazing season. The recommended triggers and associated threshold values are as indicated below:

New bank alteration: bank instability that becomes evident after livestock grazing is initiated in a pasture/allotment in a given year. This assumes that early season use occurred following peak flows, when most of the additional bank damage can be tied to land use activities. The recommended threshold is 5% of the lineal bank distance (includes both sides of the stream).

Riparian area alteration: two measures of riparian area alteration are proposed. Each keys on areas away from stream banks that are good early indicators of impending riparian damage.

- The first relates to use of "riparian islands" - those portions of riparian areas slightly higher and drier than the rest of the riparian area. These are often dominated by Kentucky bluegrass. The recommended threshold is 25% of the areas with visible trampled soils or a vegetation height of 2 inches, which ever is reached first.

- The second measure relates to livestock use of "riparian sinks" - those portions of riparian areas slightly lower and more moist than the rest of the riparian area. These are often dominated by carex species. The recommended threshold is utilization in excess of a vegetation height of 3 inches.

- Riparian "island" and "sinks" are not significant components of all riparian areas. Generally only one of these features would be used as an indicator of impending riparian damage (i.e., the one that represents a significant component of the riparian area away from the stream side and/or which first shows signs of damage).

Woody vegetation utilization: proposed limitations on season and amount of use, suggest that woody vegetation utilization would seldom be of concern. Monitoring of this feature would generally be limited to those circumstances where the prescription calls for mid- or late-season grazing or where there is a documented problem with woody vegetation

utilization. The recommended threshold is 30% of the current year's growth, measured as incidence of use.

Early Season Grazing: Early season grazing is defined in terms of the phenology of the vegetation. Early season grazing is limited to that period where upland vegetation is green but not drying. It typically begins about the second to third leaf stage and ends between boot and flowering of perennial upland bunch grasses. Caution should be used to avoid soil compaction and bank alteration from physical damage that can occur in some settings with early season grazing.

Ecological Status: Al Winward, in Clary and Webster (1989), defined "ecological status" as a measure of the degree of similarity between current vegetation and potential vegetation for a given riparian area. Our definition of "ecological status" adds to Winward's definition, recognizing the importance of stream bank and channel features. Definitions follow for each of the categories:

In those areas where livestock are a significant factor in the streambank rating, use both or either/or the vegetative factor and the streambank factor in determining the seral stage.

Early Seral *

- Percent similarity of riparian vegetation to the potential natural community/composition $\leq$ 25%; or,
- Stream bank/channel condition rating "poor".

Mid-Seral *

- Percent similarity of riparian vegetation to the potential natural community/composition 26-50% or better; and,
- Stream bank/channel condition rating of at least "fair".

Late Seral *

- Percent similarity of riparian vegetation to the potential natural community/composition $\geq$ 50%; and,
- Stream bank/channel condition rating "good" or better.

* If similarity of riparian vegetation information is lacking or cannot be readily obtained, use BLM Technical Reference 1737-9, Process for Assessing Proper Functioning Condition, or other rating systems. In using the previously mentioned technical reference, the following approximate crosswalk may be applied to relate functioning condition and ecological status:

-Proper Functioning Condition - continue current management if monitoring data supports or use recommendations for late seral.

-Functional-At Risk, upward trend - continue current management if monitoring data supports or use recommendations for mid-seral.

-Functional-At Risk, static trend - use recommendations for mid-seral or early seral depending on site specific conditions.

-Functional-At Risk, downward trend; or,

-Non-Functional, use recommendations for early seral.

Greenline: That specific area on or near the waters edge where a more or less continuous cover of perennial vegetation is encountered. Natural plant species forming the greenline are composed primarily of large, hydric species such as beaked sedge, Nebraska sedge, bluejoint reedgrass, or other especially strong rooted species capable of buffering the forces of water at the bankfull discharge level. Disturbance activities, such as overgrazing or trampling by animals or people, result in changes to shallow rooted species such as Kentucky bluegrass, which have a reduced ability to buffer water forces.

Late Season Grazing: Late season grazing generally begins after sugar storage in woody vegetation is complete and leaf fall has started. Upland plant seeds have shattered and mean air temperatures begin to cool.

Near Natural Rate of Recovery: Synonymous with PACFISH requirement not to "retard" or "measurably slow" recovery of degraded riparian features. Further defined in these recommendations within the context of effects that "carry over to the next year." Any effect that carries over to the next year is likely to result in cumulative negative effects, and measurably slow recovery of degraded riparian features.

Residual Herbaceous Vegetation Height: Residual herbaceous vegetation height, measured at the end of the growing or grazing season (which ever occurs latest), is used as an indicator of a system's ability to withstand erosive stream flows, filter sediment and build stream banks. Residual herbaceous vegetation height measurements are to be taken on those hydric species along the greenline with the capability to buffer water forces. (See above discussion of "greenline.")

APPENDIX K

Recreational Fisheries



United States Department of the Interior

FISH AND WILDLIFE SERVICE
Washington, D.C. 20240

Effective: June 7, 1995
Expires: Indefinite

NATIONAL POLICY ISSUANCE #96-07

SUBJECT: Executive Order 12962 - Recreational Fisheries

A. PURPOSE: To conserve, restore and enhance aquatic systems to provide for increased recreational fishing opportunities nationwide.

B. PRIMARY PROVISIONS:

1. Federal Agencies shall, to the extent permitted by law and where practicable, and in cooperation with States and Tribes, improve the quantity, function, sustainable productivity, and distribution of U.S. aquatic resources for increased recreational fishing opportunities.
2. A National Recreation Fisheries Coordination Council is established, consisting of seven members from the Departments of the Interior, Commerce, Agriculture, Energy, Transportation and Defense and the Environmental Protection Agency. The representatives from the Departments of Commerce and the Interior will co-chair the Coordination Council.
3. The Coordination Council, in cooperation and consultation with others, will develop a comprehensive Recreational Fishery Resources Conservation Plan setting forth a 5-year agenda for Federal agencies.
4. All Federal agencies will aggressively work to identify and minimize conflicts between recreational fisheries and their respective responsibilities under the Endangered Species Act. The Fish and Wildlife Service and the National Marine Fisheries Service will develop a joint agency policy towards this end.
5. The role of the Sport Fishing and Boating Partnership Council will be expanded to assist in the implementation of the Order.

C. INCORPORATION: In order to assure that the provisions of the Executive Order (Appendix) are known throughout the Service, it is hereby incorporated in the National Policy Issuance system. The Executive Order was signed by the President on June 7, 1995.

Date: 12/20/96

Bruce Blanchard
Deputy Director - Staff

