U.S. Department of the Interior
Bureau of Land Management

North Bank Habitat Management Area
and
Area of Critical Environmental Concern

Final Environmental Impact Statement

Prepared by
Roseburg District Office
September 2000

United States Department of the Interior

BUREAU OF LAND MANAGEMENT
Roseburg District Office
777 NE Garden Valley Blvd
Roseburg, Oregon 97470

IN REPLY REFER TO:

Dear Reader:

This is the final environmental impact statement (FEIS) for the North Bank Habitat Management Area (NBHMA)/Area of Critical Environmental Concern (ACEC). This document has been developed in cooperation with the U.S. Fish and Wildlife Service and the Oregon Department of Fish and Wildlife. The FEIS analyzes the environmental effects of three alternatives. Each alternative has a different emphasis. The action alternatives were designed to accomplish the purpose and need and resolve the issues that have been identified for the NBHMA. Alternative A is the no action alternative that would continue management as outlined in the Dunning Ranch Exchange environmental assessment (EA) Decision Record. Alternative B proposes to manage the NBHMA through more passive and less intrusive management, while Alternative C proposes more active management of the NBHMA. Alternative C has been identified as the preferred alternative.

The purpose of this FEIS is to examine probable environmental impacts and to assure that those impacts are considered along with technical, regulatory, legal and other factors in the decision making process. Although the analysis in this FEIS will be the basis for the final decisions, there are several distinct steps which must be undertaken prior to final decisions being made. Formal consultation will be undertaken with both the U.S. Fish and Wildlife Service and the National Marine Fisheries Service. The results of these consultations will be incorporated into the Record of Decision (ROD). The ROD will be issued as a separate document.

The analysis provided here has been refined and updated based on public comment, scientific community, interagency review and internal review of the Draft EIS (DEIS). We received 28 letters containing 124 specific comments during the public comment period for the DEIS. The interdisciplinary team assessed these comments using available information, and made changes to the alternatives and analysis. We sincerely appreciate the efforts of those who took the time to provide us with their comments. We feel that your efforts have resulted in improved and stronger alternatives and environmental effects analysis.

We believe that you will find that the FEIS has improved clarity, greater specificity, and evidence to support analytical conclusions. Overall, it is more understandable. The Purpose and Need in Chapter 1 has been clarified, refined and additional specificity has been added. The description of the alternatives in Chapter 2 has been refined to better capture the themes suggested by public comment and more specificity regarding proposed management actions has been added. The description of the affected environment in Chapter 3 has been refined to add additional background information to provide a more solid basis for understanding the environmental effects analysis. The environmental effects analysis in Chapter 4 is more specific and comprehensive, and is better described in quantitative and qualitative terms.

There are two proposals, grazing and timber management, contained in the alternatives that deserve some discussion because of their public interest and sensitivity in relation to management of an ACEC and habitat for the Columbia white-tailed deer (CWTD). Timber management for commercial purposes is not proposed on the over 6,000-acre North Bank ACEC. However, there are 342 acres of the Connectivity/Diversity Block land use allocation within the NBHMA on which timber management would occur. The forest stands on these 342 acres are relatively young and, therefore, active timber management would not occur for at least 30 years. As a result, the environmental analysis and decisions regarding any specific timber management is not ripe for consideration because of the high likelihood that changed circumstances or new information would occur prior to the timber management activity actually being implemented. NEPA analysis will be completed for timber management activities at the time they are proposed and ripe for consideration.

Grazing is also of interest in this EIS. Grazing is normally seen as an activity for the purpose of commodity production. However, in this EIS our use of grazing is different. Based on what we feel is good scientific evidence, grazing has been proposed for the sole purpose of accomplishing ecological objectives related to management of habitat for CWTD. We invite the reader to carefully examine the environmental analysis related to grazing to see why we feel grazing could be a tool in successfully accomplishing the goals of maintaining, protecting and restoring habitat for the CWTD.

We would like to briefly mention stream and watershed restoration activities that are proposed for the NBHMA. We feel that the evidence contained in our analysis and which is illustrated by photographs in this document is dramatic. The streams and riparian ecosystems and associated problems and opportunities on NBHMA are different from those that the Roseburg District typically manages. However, we believe that you will find that the specialists' analyses have been thorough and that the proposals for management are compelling.

If you desire assistance in understanding this document, you may contact Jay Carlson or Ralph Klein at (541) 440-4930. Thank you for your continued interest in the management of your public lands and resources.

Sincerely,

Jay K. Carlson
Field Manager
Swiftwater Resource Area

Roseburg District
North Bank Habitat Management Area
Final Environmental Impact Statement

Draft ( ) Final (X)

Department of the Interior
Bureau of Land Management
Roseburg District

1. Type of Action: Administrative (X) Legislative ( )

2. Abstract: This Final Environmental Impact Statement describes and analyzes the environmental impacts of implementing three alternatives for managing the 6,581 acre North Bank Habitat Management Area. The alternatives include: A) no action alternative, B) passive and less active management alternative, and C) active management alternative. The action alternatives respond to the need for managing habitats on the North Bank Habitat Management Area to maintain or enhance Columbia white-tailed deer, the need to restore and maintain water quality, and the need to manage lands in accordance with existing land use plan decisions. The action alternatives propose different levels of a variety of management actions including planting, seeding, in-stream restoration, upland watershed restoration, development of water sources, development of forage plots, and the maintenance or enhancement of habitat through burning, fertilization, mowing and grazing.

3. For further information contact:

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Table of Contents

Summary xiii
- Introduction xiii
- Purpose and Need xiii
- The Alternatives xiii
- Environmental Consequences of the Alternatives xv
  - Vegetation Management xv
  - Noxious Weeds xvi
  - Timber xvi
  - Aquatic Resources xvii
  - Wildlife xviii
  - Recreation xix
  - Soil Productivity xix
  - Air Quality xix
  - Cultural Resources xix

Chapter One - Purpose and Need 1
- Introduction 2
- Need for the Action 3
- Purpose 4
- Background and Scoping Summary 4
- Key Issues 5
- Legal Requirements 5
- Consistency with State, Local, Tribal and Other Federal Plans 6
- Using the Document 7
- Figure 1. North Bank Habitat Management Area Vicinity Map 8

Chapter Two - The Alternatives 9
- Introduction 10
- Actions Common to All Alternatives 10
  - Roads 10
  - Trails 11
  - Noxious Weeds 12
  - Special Status Animals 12
  - Cultural Resources Education 12
- Actions Common to the Action Alternatives 12
  - Prescribed Burning 12
  - Mowing 13
  - In-Stream Rehabilitation 13
  - Special Status Plants 13
- Description of Alternative A, the No-Action Alternative 13
- Description of Alternative B 13
- Description of Alternative C, the Preferred Alternative 14
- Alternatives Considered but Eliminated from Detailed Study 15
  - Intensive Recreation Alternative 15
  - No Recreation Alternative 16

to return to the table of contents: Click here, Type a 7 and press enter (or return).

Administrative Actions 16
Table 2-1. Road Segments Needing Repair 26
Table 2-2. Road Problem Areas 26
Table 2-3. Management Activities to Enhance Special Status Plants 27
Table 2-4. Approximate Acres Treated by Management Action (Alternative B) 27
Table 2-5. Approximate Acres Treated by Management Action (Alternative C) 27
Table 2-6. Management Objectives and Management Actions by Alternative 28
Figure 2. North Bank Habitat Management Area (Base Map) 17
Figure 3. Trails 18
Figure 4. Roads Alternatives A and C 19
Figure 5. Roads Alternative B 20
Figure 6. Pull Out Areas 21
Figure 7. Water Resources: Springs and Wetlands Potential Development 22
Figure 8. Potential Areas for Deer Forage Plots 23
Figure 9. Timber Management Areas and Areas Managed for Large Residual Conifers 24
Figure 10. Grazing Exclusion Areas 25

Chapter Three - The Affected Environment 51
Introduction 52
Physical Characteristics 52
Geology and Soils 52
Vegetation 53
Fuels 56
Fire History 57
Historical Setting 58
Resources Identified, but Not Used for Planning 59
Columbian White-Tailed Deer 59
Special Status Plants 60
Wildlife 61
Recreation 62
Water Quality 63
Chasm Drainage 65
Powerline (Jackson Creek Drainage) 65
Whitetail Drainage 65
Hydrologic Factors Affecting Water Quality 65
Past Timber Harvest 65
Roads 66
Soil Compaction 67
Fluvial Process 68
Riparian and Wetland Habitat 70
Fisheries 70
Table 3-1. Topography by Slope 76
Table 3-2. Vegetation Types on the North Bank Habitat Management Area 76
Table 3-3. Noxious Weed Species on the North Bank Habitat Management Area 76
Table 3-4. Special Status Plant Species on the North Bank Habitat Management Area 77
Table 3-5. Soil Compaction on the NBHMA 77
Figure 11. CWTD Spring Trend 71

to return to the table of contents: Click here, Type a 7 and press enter (or return).

Figure 12. Vegetation 72
Figure 13. CWTD Marginal Habitat, Early Seral Hardwood\Conifer and Large Residual Conifers .. 73
Figure 14. Fish Distribution 74
Figure 15. Riparian Functioning Conditions and Drainages 75

Chapter Four - Environmental Consequences 79
Introduction 80
Incomplete or Unavailable Information 81
Mitigation and Monitoring 82
Vegetation 82
Prescribed Fire 82
Mowing 84
Seeding and Planting 85
Grazing 85
Fertilization 87
Thinning 88
Cumulative Effects 89
Special Status Plants 92
Noxious Weeds 92
Timber 93
Water Quality 93
Vegetation Mangement 93
Prescribed Fire 94
Grazing 94
Fertilizer and Herbicide 95
Water Source Development 95
Riparian and Stream Rehabilitation 95
Roads 97
Recreation Development 98
Riparian Habitat 99
Stream Rehabilitation 99
Vegetation Management 100
Recreation 100
Aquatic Conservation Strategy 100
Riparian Reserves 101
Key Watersheds 101
Watershed Analysis 101
Watershed Restoration 101
Consistency of the Alternatives with Aquatic Conservation Strategy 101
Cumulative Effects 104
Wildlife 104
Columbian White-Tailed Deer 105
Northern Spotted Owl 107
Bald Eagle and Golden Eagle 108
Raptors 109
Red Tree Vole 110
Species Groups 110

to return to the table of contents: Click here, Type a 7 and press enter (or return).

Group 1, Aquatic Amphibians and Reptiles 112
Group 2, Cavity Dwellers 112
Group 3, Bats 113
Group 4, Open habitat and edge species 113
Group 5, Woodland species 113
Recreation 113
Facility Development and Public Use 114
Soil Productivity 116
Roads and Trails 116
Facility Development 116
Vegetation Mangement 117
Prescribed Fire 117
Mowing 118
Thinning 118
Fertilization 119
Grazing 119
Forage Plots 121
Air Quality 121
Cultural Resources 122
Additional Considerations 122
Unavoidable Adverse Effects 122
Relationship of Short-Term Uses and Long-Term Productivity 122
Irreversible and Irretrievable Commitments of Resources 122
Table 4-1. North Bank Roads within 50 and 100 feet of Stream Channels by Alternative 124

Chapter Five 125
Introduction 126
List of Preparers 126
Government Agencies Provided the DEIS 127
Organizations, Officials and Individuals who Commented on the DEIS 128

Glossary 129

Acronyms and Abbreviations 133

Bibliography 135

Index 144

Appendix A - Vertebrate Wildlife Species of Management Concern 149
Oregon Department of Fish and Wildlife Sensitive Species 149
Plant and Animal Taxa that are Candidates for Listing as Endangered or Threatened 150
SEIS Special Attention Species 150
Rare, Threatened and Endangered Species of Oregon 150
Species Federally Listed as Threatened or Endangered 152
Special Status Species 152
Wildlife Species Habitat Groups (Guilds) 153
Species List for the North Bank Habitat Management Area 155

to return to the table of contents: Click here, Type a 7 and press enter (or return).

Appendix B - Plant List 161
Appendix C - Grazing Plan 169
Appendix D - Response to Comments 173
Introduction 173
ACEC 173
Alternatives 173
Fire 174
Grazing 175
Monitoring 177
Noxious Weeds 177
Recreation 178
Soils 179
Timber 179
Wildlife 180
Water 181
Letters from Governmental Agencies 183

to return to the table of contents: Click here, Type a 7 and press enter (or return).

to return to the table of contents: Click here, Type a 7 and press enter (or return).

Summary

Introduction

The North Bank Habitat Management Area (NBHMA), formerly the Dunning Ranch, was obtained through a land exchange to acquire secure habitat for the federally endangered Columbian white-tailed deer (CWTD), *Odocoileus virginianus leucurus.* The 6,581 acre North Bank Habitat Management Area was acquired in 1994 and is located northeast of Roseburg, Oregon. Due to the area's value as habitat for CWTD, Shrubby Rock Cress, *Arabis koehleri* var. *koehleri*, and False Caraway, *perideria erythorhiza*, 6,221 acres were designated as an Area of Critical Environmental Concern with the remaining 360 acres to be managed for timber production. The area to be managed for timber production became 342 acres designated as Connectivity/Diversity Block with 18 acres designated as Riparian Reserve.

Currently, two remnant populations of the CWTD persist: one in the floodplain of the lower Columbia River, and the Roseburg population within the Umpqua Basin of Douglas County. The CWTD was federally listed as endangered and the state of Oregon listed the species as endangered in 1975. According to the 1983 Revised CWTD Recovery Plan, the Roseburg population would meet recovery objectives for delisting when the species has a minimum viable population of 500 deer distributed within a minimum of 5,500 acres of secure habitat. Current estimates of the Roseburg population are that the CWTD exceeds 5,000 animals and that 9,588 acres are considered secure habitat. The North Bank Habitat Management Area accounts for 6,544 acres of secure habitat and provides for an estimated 200 to 350 CWTD. Approximately 550-640 CWTD reside on secure habitat in the Umpqua Basin.

In addition to management as secure habitat for the CWTD, the acquisition of the NBHMA has provided other management opportunities. There are many forms of recreation that could be accommodated. Many of the streams have reaches that are in a highly degraded condition.

Purpose and Need

The BLM has responsibility under the Endangered Species Act to promote recovery of endangered species. To promote recovery, the BLM needs to manage the NBHMA to improve the physical condition, increase opportunities for dispersal and increase survival of the CWTD. In order to achieve these objectives, the BLM has a need to manage vegetation to maintain and enhance habitat for CWTD.

The BLM has responsibility under the Clean Water Act and the Roseburg District RMP and the Northwest Forest Plan to restore and maintain water quality, rehabilitate and protect fish stocks and their habitat, and to reduce and control sediment input into streams.

The BLM has responsibility under the Roseburg District Resource Management Plan to manage public lands to provide recreational opportunities consistent with applicable laws, regulations, and principles of ecosystem management.

The purpose of the proposed action is to manage the North Bank Habitat Management Area as secure habitat for the Columbian white-tailed deer, other Special Status Species and for recreational opportunities consistent with other management objectives. Based on the purpose and need, the goals for the NBHMA may be summarized as a primary goal of managing habitat for the CWTD and other Special Status Species and as a secondary goal of accommodating other uses that are compatible with the primary goal.

The Alternatives

This Final Environmental Impact Statement (FEIS) assesses three alternatives for the management of the North Bank Habitat Management Area/Area of Critical Environmental Concern. The alternatives are

to return to the table of contents: Click here, Type a 7 and press enter (or return).

designed to accomplish the proposed action and address the purpose and need discussed above while responding to the major issues identified in the scoping process. These issues are Columbian white-tailed deer and Special Status Species, recreational use and facility development, water quality and quantity, and riparian and wetland habitat.

Common to all alternatives would be maintenance of 2.5 miles of roads needed for all weather management, 40 miles of roads in excess of administrative needs would be considered part of the trail system, non-motorized use of roads and trails by the public, infestations of noxious weeds would be controlled as described in the Northwest Area Noxious Weed Control Program EIS, Special Status Species would be managed in accordance with the RMP, and a public archaeology program would be developed.

Actions common to the action alternatives (B and C) would be prescribed fire, mowing, in-stream rehabilitation of degraded stream reaches, and the enhancement of special status plants.

Alternative A is the no action alternative. Alternative A would continue present management activities as described in the Environmental Assessment for the Proposed Dunning Ranch Exchange (Exchange EA). Under Alternative A, management for CWTD would require separate NEPA documentation to implement grazing, prescribed fire, and other management specified under the Exchange EA. For the sake of the analysis in this EIS, Alternative A consists only of the necessary actions to fulfill legal requirements such as noxious weed control and meeting the Clean Water Act. Recreation would not be developed beyond current levels.

Alternative B represents a more passive and less intrusive approach to meeting the purpose and need. Active management would include mowing and would rely heavily on the use of prescribed fire to maintain and improve habitat. The use of fertilizer or forage plots would not be used to enhance forage quantity or quality. Riparian and hydrologic conditions would be improved through road maintenance, road decommissioning and stream rehabilitation. The restoration of stream channels and hydrologic conditions would largely rely on natural recovery processes. Active intervention would include tree planting and the use of heavy equipment from existing roads. Artificial water sources, spring development and creation of additional wetlands would not take place. Road management would focus on maintenance necessary to gain access to implement a management action or to repair road segments that are degrading water quality. Recreational use would occur within the constraints of existing conditions. Existing facilities would be maintained and no new facilities would be developed. The main barn does not meet building code for public use and would be torn down or used for storage.

Alternative C is the preferred alternative. Alternative C represents an active approach to management in meeting the purpose and need. Under Alternative C, active management to maintain or enhance habitat would include the use of prescribed fire, grazing, fertilization, seeding, planing forage plots and mowing. Livestock grazing would be used to maintain and improve CWTD habitat. Timber would be managed on 342 acres but due to the young age of the stands, timber harvest would not occur for 30 years. Riparian and stream restoration would include the use of heavy equipment to accomplish in-stream and stream bank work. The goal of accelerating the time for streams to reach a properly functioning condition would be accomplished by preserving stream reaches that are properly functioning, stabilizing stream banks that are actively eroding, rehabilitating downcut banks and aggrading stream bottoms, and planting vegetation to stabilize stream banks. Water accessibility for wildlife would be enhanced through artificial water sources, spring development and development of wetlands. Recreation use would be accommodated through the development of new facilities and replacing the main barn with a day-use pavilion. One mile of additional trail would be constructed to improve access and disperse public use, and three Watchable Wildlife sites would be developed.

to return to the table of contents: Click here, Type a 7 and press enter (or return).

Environmental Consequences of the Alternatives

The environmental consequences are in summary form in this discussion. The emphasis in this discussion is to provide the reader with a description of the various environmental outcomes and effects. Supporting facts and evidence and logic for the conclusions is generally not given in this summary but may be found in Chapter Four.

Vegetation Management

Under Alternative A, prescribed fire would not be used except to control noxious weeds. Fire suppression would reduce the influence of wildfire resulting in the loss of oak woodlands through conifer encroachment and loss of oak recruitment. Conifers would become the dominant tree in the canopy. Burning the forage base under Alternatives B and C would increase the availability, nutrient level and palatability of forage for CWTD. Under Alternatives B and C, species composition of oak woodland and hardwood/conifer habitat types would be maintained with prescribed fire and selective thinning. Alternative B and C would use thinning and burning on hardwood conifer stands with large conifer and hardwood trees to create an open canopy stand with diverse understories that would be more resistant to stand replacing crown fires.

Mowing would be used under Alternatives B and C to reduce rank grasses, increase palatability and digestibility of grasses, and increase the availability of forbs. Because of limited availability of areas suitable for mowing, the overall benefit to the forage space for CWTD would be minimal.

Seeding and planting under Alternatives B and C would increase the forage base for CWTD, restore canopy cover along streams and increase vegetative competition for unwanted plants and shrubs.

Controlled grazing with cattle under Alternative C would increase the nutrient level, digestibility, palatability, availability and diversity of forage plants for CWTD. Cattle would remove rank vegetation and reduce biomass that creates thatch buildup. When grasses are grazed, leaf volume is increased resulting in higher crude protein levels and increased palatability and digestibility for deer. Limiting grass height through grazing would allow legumes and other forb to receive more light. The result would be an increase in crude protein levels, increased biomass production by forbs and greater availability of the forb component. Controlled grazing would maintain a consistent deer forage base over seasons and years. Legumes and forbs would remain in the forage base be available to deer throughout the year.

Fertilization of grassland and oak woodland would be used in Alternative C in concert with burning, seeding and grazing. Fertilization would increase the growth and crude protein content of grasses and other plant species. This would result in higher quality forage available to deer. Increases in forage production, and increased palatability, nutritional levels and digestibility of normally poor forage plants after fertilization would occur. Deer herds occupying ranges containing forages with high levels of crude proteins and other nutrients exhibit greater productivity and have a greater chance of surviving severe weather during winter months.

Under Alternatives B and C, thinning would be use to remove confers and favor hardwoods. Thinning would result in more fire resistant stands. Selecting hardwoods over conifers would produce habitat more conducive to CWTD. Under Alternatives B and C, thinning, pulling, cutting, seeding and planting would be used to modify canopies, remove invasive plants and increase forage and cover for CWTD in wetland and riparian areas. Removal of invasive plants such as hawthorn, Himalayan blackberry, and rush from wetland areas by cutting and pulling would allow forage species such as native wetland grasses and sedges to increase. This would result in increased forage availability for CWTD later into the summer.

to return to the table of contents: Click here, Type a 7 and press enter (or return).

Natural succession would be allowed to continue under Alternative A due to fire suppression and lack of management intervention resulting in a gradual decline in habitat quality for CWTD. Burning, pulling or cutting of invasive shrubs and trees, mowing, seeding and grazing would control the process of succession resulting in maintenance or enhancement of CWTD habitat under Alternative C and to a lesser extent under Alternative B.

Special status plants would be maintained under Alternative A through implementing RMP direction. Alternative B and C would increase the abundance of four special status plants by approximately 25 percent over current levels. Alternative C would increase the population of Popcorn Flower by 50 to 100 percent over current levels.

Noxious Weeds

Under all alternatives, noxious weed infestations would be controlled using Integrated Pest Management including the use of biological, cultural, mechanical, prescribed burning and chemical means. Noxious weeds would be expected to be reduced by at least 50 percent in priority control areas such as along roads, around buildings, heavily used recreation sites and where infestations threaten resource values.

Medusa head rye is well established and abundant across most grasslands in NBHMA. Though traditional grazing practices have been documented to be an important factor in the spread of noxious weeds, including medusa head rye, grazing practices as prescribed in Alternative C have been shown to effectively control noxious weed infestations by reducing weed vigor, reducing weed seed production and shifting plant communities in favor of desirable species. Although Alternatives B and C would reduce both the abundance and distribution of medusa head rye, it is expected to remain a significant vegetative component in all alternatives.

Timber

Timber management was specified for 360 acres of the ranch in the Exchange EA (p. 7, Dunning Ranch Exchange EA, p. V of the Decision Record, Dunning Ranch Exchange EA). Although the timber production acres are within the NBHMA, they are outside the North Bank ACEC. The area specified for timber management occurs in five separate areas within the NBHMA. These areas include 342 acres designated as Matrix or Connectivity/Diversity Blocks and 18 acres of Riparian Reserves. The 342 acres which are designated as Matrix are the lands that are available to “produce a sustainable supply of timber and other forest commodities” (RMP, p. 33).

The three alternatives would follow the Roseburg District RMP ROD management action/direction for lands designated as Connectivity/Diversity Blocks. The Connectivity/Diversity Blocks are managed on a 150 year area control rotation. Regeneration harvests retain 12 to 18 green trees per acre within harvest units.

The effect on the Annual Sale Quantity (ASQ) of the Roseburg District from these 342 acres is 0.069 million board feet per year or 0.013 million cubic feet per year. This represents approximately 0.15 percent of Roseburg District’s ASQ of 45 million board feet.

On an overall basis, the environmental effects analysis and conclusions pertaining to timber contained in the Roseburg District RMP FEIS would be valid for these 342 acres because of similar environmental conditions and management as analyzed and assumed in the RMP FEIS. These forest stands are approximately 30 to 40 years old. Based on this age and site class, commercial thinning or density management would not take place for 20 to 30 years and regeneration harvest would not take place for 110 to 120 years. Although the broad analysis contained in the RMP FEIS is valid for these acres, reasonable environmental analysis and conclusions specific to these areas are not possible at this time because any timber management on these areas would not take place for at least 20-30 years. The environmental

to return to the table of contents: Click here, Type a 7 and press enter (or return).

effects of this specific proposed timber management is not ripe for analysis because of the high possibility that changed circumstances or new information would occur prior to implementation of the action. Therefore, the environmental analysis and decisions for timber management of these areas will be deferred until such time as implementation is ripe for analysis.

Aquatic Resources

Many stream reaches are not properly functioning because they are highly eroded with down- cutting banks and have deeply incised stream channels. Under Alternative A, no active in-stream rehabilitation would occur. Summertime flows would not increase appreciably, coarse woody debris recruitment would decline, and water and sediment would continue to be routed rapidly through the watershed. Under Alternative B, active restoration would take place but in-stream rehabilitation that would require heavy machinery would be limited to those stream areas within reach of existing roads. Stream restoration under Alternative B would have limited effectiveness because only small portions of stream reaches would receive in-stream rehabilitation. Under Alternative C, active stream restoration would include work that would shape steeply eroded and down-cut stream banks to a favorable angle of repose, placement of in-stream structures, planting woody vegetation, placement of coarse woody debris and stabilization of eroding headwalls. Alternative C would arrest erosion and rehabilitate streams to properly functioning condition in less time compared to Alternatives A and B.

Prescribed burning under Alternatives B and C would have an inconsequential effect on in-stream aquatic habitats because less than 10 percent of NBHMA would be burned annually, burning would be of low intensity, excluded from sensitive areas, and because trees and shrubs that are important for stream bank stability would not be burned.

The grazing of grasses by livestock would not affect water quality because of exclusionary fencing, light grazing prescriptions (50 percent utilization), and frequent movement of cattle to minimize soil disturbance in riparian areas. Trees and shrubs that are the primary vegetation used to stabilize, shade and maintain water quality and fish habitat would not be effected by grazing.

The application of fertilizer and herbicides would occur under Alternative C. The risk of accidental drift of chemicals into streams is expected to be low. Any drift would occur in very small amounts and, therefore, would not affect water quality. Soil conditions and soil properties on NBHMA would naturally reduce nitrogen and herbicides from reaching streams because ammonium and nitrate would adhere to and be immobilized by soil particles that have high clay and organic matter. Stream buffers in which no chemical application would take place would ensure that chemicals would not directly enter a waterway.

The proposed road improvements under Alternatives B and C would result in a 90 percent reduction in sediment transport, improved water routing, reduced gullying and reduced road rutting and, therefore, eliminate measurable effects to water quality and fish habitat.

Recreation under all alternatives would have inconsequential localized and short-term effects on water quality and fish habitat.

There are nine Aquatic Conservation Strategy Objectives. The proposed management actions of the alternatives have been assessed in relationship to these objectives. The complex analysis indicates that the alternatives would be consistent with the Aquatic Conservation Strategy Objectives that have as their goal to maintain and restore water quality and aquatic ecosystems. In general, under Alternative A, present processes and conditions would be maintained and little restoration would take place. Alternative B would maintain present processes and conditions while accomplishing some restoration. Alternative C would maintain present processes and conditions, however, this alternative would accomplish more restoration in quantity and effectiveness compared to Alternative B.

to return to the table of contents: Click here, Type a 7 and press enter (or return).

Wildlife

Columbian white-tailed deer: Under Alternative A, suitability of CWTD habitat would continue to decline as succession converts grasslands, oak savannah, oak woodland and early seral stage hardwood/conifer habitats into closed canopy mixed forest. Approximately 3,900 acres would be maintained in grassland, savannah or oak woodland habitat types that would continue to support CWTD under Alternative B. Alternative C would increase the amount, quality, stability and availability of forage and increase CWTD habitat the most when compared to Alternatives A and B. Alternative C would result in a total of approximately 4,900 acres or 75 percent of the habitat on NBHMA as preferred CWTD habitat. Under Alternative C, increased distribution of water sources and associated vegetation, along with grazing, would increase the carrying capacity of habitat and increase the amount and distribution of wetland associated habitat favored by CWTD. Alternative C would increase seasonal forage availability and quality through development of water sources, forage plots and the use of grazing, therefore, improving the health and condition of CWTD.

Northern spotted owl: In the long term, succession changes in vegetation could create additional northern spotted owl habitat. This potential shift in vegetation would be greatest under Alternative A, less under Alternative B, and would not occur under Alternative C. However, management plans for the northern spotted owls have not identified habitat in the vicinity of NBHMA as needed for recovery purposes and the long-term shift in vegetation to spotted owl habitat would not affect the recovery effort for this species.

Bald eagle and golden eagle: Under Alternative A, long-term loss of open habitats would remove foraging and wintering habitat for eagles. Alternative B would maintain open habitat types that would maintain suitable foraging and wintering habitat for eagles. Alternative C would increase foraging and wintering habitat for eagles.

Raptors: As a general group, raptor species would lose foraging and some nesting habitat as succession creates closed canopy forest types under Alternative A. Under Alternative B, current levels of open habitat types would be maintained through burning and would ensure continue availability and use by most species of raptors. Under Alternative C, foraging and wintering habitat for the majority of raptor species found on NBHMA would increase.

Red tree vole: Increases in conifers would create greater amounts of habitat favorable to this species and red tree vole populations would expand in both numbers and distribution across the NBHMA under Alternative A. Under Alternative B, red tree vole populations would remain about the same as current levels through the maintenance of current proportions of habitat. Under Alternative C, red tree vole populations would be reduced on 4,900 acres of habitat maintained for CWTD versus 3,900 acres under Alternative B.

Species groups: Representative guild groups and individual species that would be effected by loss of key habitat elements under Alternative A include: Group 1- aquatic amphibians and reptiles-western pond turtle; Group 2- cavity dwellers-acorn woodpecker, western bluebird; Group 3- bats-pallid bat; Group 4- open habitat/edge species-common kingsnake, vesper sparrow, western meadowlark, meadow voles, ground squirrels; Group 5- woodland species-none. Overall under Alternative A, species richness or diversity on NBHMA would decline as vegetation succession changes habitat to closed canopy forests and woodlands. Under Alternative B, species currently found on NBHMA habitats would be maintained at current proportions through the use of burning and seeding. For Alternative C, habitat for species in Groups 1, 2, and 4 would increase resulting in potential increases in population numbers. Habitat types for Group 3, bats, would be maintained, although some population decline for conifer-related bat species would occur, while increases in numbers of bats that forage in open areas would occur. Water development under Alternative C would increase potential for increased bat use of habitats across the management area. Habitat for Group 5, woodland species, would decline under Alternative C which would result in a decline in abundance and distribution but not necessarily a decline in species diversity.

to return to the table of contents: Click here, Type a 7 and press enter (or return).

Recreation

Recreation use rate would continue at the present rate without the development of amenities of developed public facilities such as toilets, parking areas and information boards. Alternative C would be least responsive to recreational public demand compared to Alternatives B and C. Under Alternative B, recreational user experience would be enhanced by the availability of some interpretive material at developed pull off locations, however, the visitor numbers would be similar to Alternative A. Under Alternative C, recreation users would have access to a variety of recreation amenities from improvements such as vault toilets, picnic tables, information boards, a pavilion, barbecue pit, water tap, and three wildlife viewing areas for environmental education. Parking within the NBHMA boundaries would increase visitor safety while unloading horses, bikes or people under Alternative C. The number of visitors to the NBHMA under Alternative C would be approximately 50 percent greater than Alternatives A and B. However, the effects of camping and major conflicts between recreation users would be similar under all alternatives because of the overall low numbers of users dispersed throughout the large area of the NBHMA.

Soil Productivity

Erosion and rutting would be greatly reduced under all alternatives through road improvements and maintenance of problem segments. Facility development under Alternative C would cause no measurable change in the amount of erosion because of the small amount of area involved, the protective measures used during construction, and subsequent maintenance of facilities. The effects of prescribed fire under Alternatives B and C would be inconsequential to erosion due to the low intensity of the burns. Alternative C would correct any deficiencies in nutrients that could occur after successive burning through fertilization. Mowing under Alternatives B and C would cause inconsequential compaction and displacement because mowing would be done in one pass during the dry season. Thinning under Alternatives B and C would have minor effects on soil productivity because of the small extent of the area in which soil displacement and compaction would occur. Fertilization under Alternative C would improve soil productivity by increasing nutrients available to plants. Grazing would occur under Alternative C. The grazing would be of light intensity (less than 50 percent utilization under intensive and extensive system) compared to levels previously grazed under 145 years of private ownership. Under a light grazing regime, compaction and the resultant reduction of water infiltration is similar to ungrazed ground. The studies and current condition of soils on the NBHMA after a rest indicate that grazing with 50 percent utilization can be employed with inconsequential long-term impacts to soil productivity. The effects of forage plots on soil productivity under Alternative C would be inconsequential because of their small size and the methods employed in their site preparation.

Air Quality

Total prescribed burning on the Roseburg District is significantly below assumptions in the Resource Management Plan. Impacts on air quality from any alternative would be less than was assumed and analyzed in the RMP. Most prescribed fire would involve burning pastures. The average size of the burn would be 200-300 acres. Particulate matter emissions would be relatively low and much less than for burning wood slash. Impacts from the smoke would be local in nature, short in duration and have minimal impacts on the regional airshed.

Cultural Resources

Measures such as surveys, inventory, evaluation, interpretation, and education required under the RMP to protect cultural resources would be common to all alternatives and result in overall protection of cultural resources.

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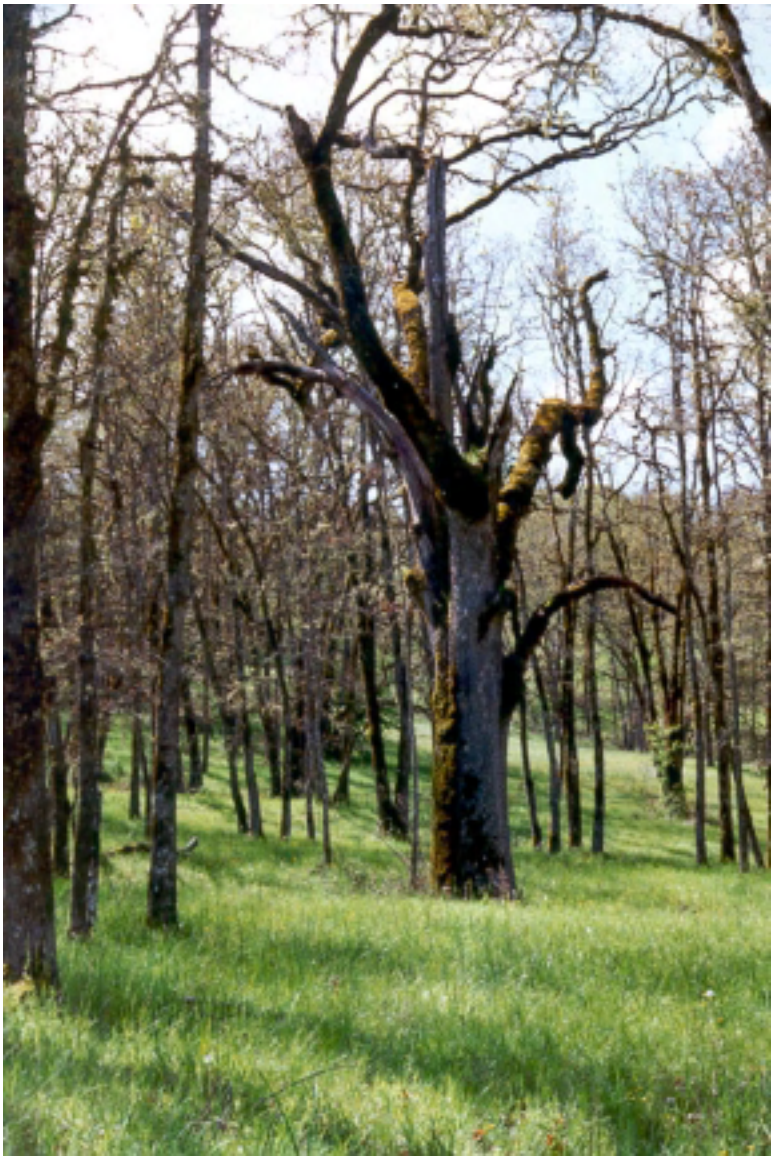
Chapter One

Purpose and Need for Action



to return to the table of contents: Click here, Type a 7 and press enter (or return).

Changes Between The Draft And Final EIS

This chapter has been changed to clarify the purpose and need. Effects analysis from Chapter 1 of the Draft EIS have been removed.

Purpose And Need For Action

Introduction

Under the Endangered Species Act (section 5), agencies are encouraged to conserve threatened and endangered species through land acquisition. The North Bank Habitat Management Area (NBHMA), formerly the Dunning Ranch, was obtained through a land exchange to acquire secure habitat for the federally endangered Columbian white-tailed deer (CWTD), *Odocoileus virginianus leucurus* (Environmental Assessment for Proposed Dunning Ranch Exchange [hereafter referred to as Exchange EA], 1993, page 1). Secure habitat is defined as suitable habitat within the Umpqua Basin of Douglas County on lands owned, controlled, protected or otherwise dedicated to the conservation of the CWTD (CWTD Recovery Plan as revised 1983, page 45). Managing the NBHMA as secure habitat is intended to promote recovery of the CWTD. The BLM has responsibility, under the Endangered Species Act (section 7 (a)(1)), to promote recovery of endangered species. To promote recovery, the BLM needs to manage the NBHMA in a manner which will conserve and protect the existence of Columbian white-tailed deer. Species are recovered when they no longer need the protection of the Endangered Species Act (ESA section 4(b)(3)(B)).

The 6,581-acre North Bank Habitat Management Area (NBHMA) was acquired by the Bureau of Land Management (BLM) in 1994 and is located northeast of Roseburg, Oregon (Figure 1). Due to the area's value as habitat for CWTD, Shrubby Rock Cress (*Arabis koehleri var. koehleri*), and False Caraway (*Perideria erythorhiza*), 6,221 acres were designated as an Area of Critical Environmental Concern (ACEC) (Roseburg District Resources Management Plan [RMP], page 89) with the remaining acres to be managed for timber production (Decision Record, Exchange EA, 1993, page V).

Currently, two remnant populations of the CWTD persist: one in the floodplain of the Lower Columbia River, and the Roseburg population within the Umpqua Basin of Douglas County (Revised Recovery Plan, USFWS, 1983). The species was federally listed as endangered in 1967 when the Columbia River population was estimated at 300 to 400 animals and the population was threatened by continuing habitat destruction in riparian areas (Endangered and Threatened Wildlife and Plants, USFWS, 1994). The state of Oregon listed the species as endangered in 1975 (Marshall, et al., 1996).

According to the 1983 Revised CWTD Recovery Plan, the Roseburg population would meet recovery objectives for delisting when the species has a minimum viable population of 500 deer distributed within a minimum of 5,500 acres of secure habitat. Current estimates of the Roseburg population state that the number of CWTD exceeds 5,000 animals (Watershed Analysis [WA] of the North Bank Watershed Analysis Unit (Oregon Department of Fish and Wildlife (ODFW) data, 1997, pp. 4-5). Approximately 9,588 acres are considered secured habitat in the Umpqua Basin (Peterson personal communication). The NBHMA accounts for 6,554 acres or 68 percent of secure habitat in the Umpqua Basin (Peterson personal conversation). The NBHMA provides habitat for an estimated 200 to 350 CWTD and approximately 550 to 640 CWTD reside on secure habitat in the Umpqua Basin (Recovery Team Memo, S. Denney, June 3, 1997).

to return to the table of contents: Click here, Type a 7 and press enter (or return).

Since acquisition of the NBHMA in 1994 and with the Roseburg population meeting recovery objectives, the state down-listed the CWTD from endangered to sensitive (1995 November ODFW Commission Meeting). Further, the Federal objectives for delisting have been met. The U.S. Fish and Wildlife Service proposed delisting on May 11, 1999 (Federal Register, May 11, 1999 (volume 64, number 90, pp. 25263-25269)).

In addition to management as secure habitat for CWTD, the acquisition of the NBHMA has provided other management opportunities. There are many forms of recreation that could be accommodated. Equestrian use, hunting and hiking have become popular on the NBHMA. Many of the streams have reaches that are in a highly-degraded condition. There is need for the BLM to rehabilitate aquatic habitat. The BLM also has a responsibility under the Clean Water Act to protect waterways from point and nonpoint sources of pollution.

Need for Action

The BLM has a need to manage habitat that will support Columbian white-tailed deer and Special Status Species.

The BLM has responsibility, under the Endangered Species Act (section 7 (a)(1)), to promote recovery of endangered species. To promote recovery, the BLM needs to manage the NBHMA in a manner which will conserve and protect the existence of Columbian white-tailed deer. Promoting recovery would be accomplished through meeting the following objectives:

- Improve physical condition of white-tailed deer.
- Increase white-tailed deer survival.
- Increase opportunity for dispersal of white-tailed deer.

The BLM has a need to manage habitats on the NBHMA, to maintain or enhance CWTD and other Special Status Species. In order to achieve the objectives, the BLM has a need to:

- Manage natural succession of vegetation to maintain, enhance the suitability of habitats for CWTD, and Special Status Species.
- Maintain or enhance oak woodlands, oak savanna, grassland, and riparian habitats.
- Increase forage quantity and quality for CWTD.
- Protect, manage and conserve Special Status Species.
- Propagate experimental populations of selected Special Status Plants.
- Contain or reduce noxious weed infestations (FEIS/RMP, p. 74).

The BLM has a need to manage aquatic resources to:

- Restore and maintain water quality (Clean Water Act, FEIS/RMP, p. 35).
- Protect beneficial uses of Umpqua Basin (FEIS/RMP, p. 35).
- Rehabilitate and protect fish stocks at risk and their habitats (FEIS/RMP, p. 40).
- Reduce/control mass wasting and erosion in order to reduce/control sediment input into streams.

The BLM has a need to manage public lands to:

- Provide a wide range of recreational opportunities (FEIS/RMP, p. 55).
- Minimize recreational conflicts with other uses (FEIS/RMP, p. 55).
- Provide public education of the archaeology program at site 35D061.

In order to meet existing land use decisions, the BLM has a need to:

- Manage 342 acres of the NBHMA as Matrix (Connectivity/Diversity Block) Land Use Allocation (Decision Record, Exchange EA, 1993, p. V).
- Manage 6,221 acres of the NBHMA for the maintenance, protection or restoration of important and relevant resource values of the designated North Bank ACEC (Roseburg District Record of Decision and Resource Management Plan [RMP], p. 50 and Table 5, p.89).

to return to the table of contents: Click here, Type a 7 and press enter (or return).

Purpose

The purpose of the proposed action is to manage the North Bank Habitat Management Area (NBHMA) as secure habitat for the Columbian white-tailed deer (CWTD). Secure habitat is defined as suitable habitat within the Umpqua Basin of Douglas County on lands owned, controlled, protected, or otherwise dedicated to the conservation of the CWTD (CWTD Recovery Plan as revised 1983, p. 45). Managing the NBHMA as secure habitat would promote recovery of the CWTD. Agencies are required to promote recovery (ESA section 7(a)(1)). Species are recovered when they no longer need the protection of the Endangered Species Act (ESA section 4(b)(3)(B)). There also exists an opportunity to manage for Special Status Species (both plant and animal) that are compatible with CWTD management. Another purpose of the proposed action is to ensure the availability of BLM administered lands for a diversity of recreational opportunities consistent with other management objectives and the principles of multiple use.

Based on the needs and purpose described above, the goals for the NBHMA may be summarized as:

Primary Goal: Manage habitat for the CWTD and Special Status Species.

Secondary Goal: Accommodate other uses that are compatible with the primary NBHMA goal.

Background and Scoping Summary

Original scoping for the Dunning Ranch/NBHMA began in 1993 with a *Federal Register* notice announcing a plan amendment and land exchange (*Federal Register*, March 19, 1993, p. 15160 to 15161). Legal notices were also published in the local Roseburg newspaper (*The News Review*, March 19, 26, and April 2, 1993). The BLM mailed a news release on March 18, 1993, to local media sources, environmental groups and timber industries. A few days later, the land exchange was a front page story (*The News Review*, March 21, 1993). Letters announcing the exchange were also sent to 56 adjacent landowners. A land exchange EA and Finding of No Significant Impact (FONSI) were completed later that year (*Federal Register*, September 1, 1993; *The News Review*, Legal Notices, September 8, 1993) and distributed via a mailing list. The decision record was prepared and announced in November (*Federal Register*, November 12, 1993; *The News Review*, Legal Notices, November 12, 1993). The exchange was completed in 1994.

On October 25, 1996, a project initiation letter was signed that began the development of an Environmental Assessment/Habitat Management Plan (EA/HMP) for the NBHMA. The interdisciplinary (ID) team included members of other agencies to facilitate consultation with the United States Fish and Wildlife Service (USFWS) and wildlife management and research with the Oregon Department of Fish and Wildlife (ODFW). This interdisciplinary/interagency team met from November 1996 through August 1997.

Scoping for the NBHMA EA/HMP commenced with a series of open houses held by the NBHMA coordinator in 1996 (September 19, 26, October 3, November 9, November 14, 19, 1996). Meetings were announced by direct mailings and contact with adjacent landowners. The November 14 meeting was announced via a BLM news release to the local media on November 8, 1996. A total of 77 people signed the guest register during the open houses. Attendees expressed concerns about safety issues, types of allowable recreation, potential access sites, availability of water and management of the deer herd.

The EA/HMP and FONSI were distributed for public comment. A Decision Record was signed on February 24, 1998. The NBHMA EA/HMP was subsequently appealed by Umpqua Watersheds on March 19, 1998. A case file was prepared for review by the Interior Board of Land Appeals (IBLA). BLM made, and was granted, a request to remand the decision back to the District in order to reanalyze as an EIS (May 5, 1998). On January 21, 1999, this project was reinitiated as an EIS. A notice was placed in the *Federal Register* on February 4, 1999, that opened a thirty-day public scoping period.

to return to the table of contents: Click here, Type a 7 and press enter (or return).

Key Issues

Four key issues were identified by the public scoping process and the interdisciplinary/interagency team. Major questions regarding each of the issues are presented in italics. In Chapter Two, three management alternatives describe individual management actions pertinent to the key issues.

1. Columbian white-tailed deer and Special Status Species
   •*How will habitat be managed for CWTD and other special status species?*
   •*How will other special status species be affected by the proposed management actions?*
   •*How will recreational activities or developments affect the CWTD and other Special Status species?*

2. Recreational Use and Facility Development
   •*Which recreation uses are considered compatible with the purpose of the NBHMA?*
   •*How restrictive will recreational use of the NBHMA be?*
   •What types of public, recreation facilities will be provided at the NBHMA?

3. Water Quality / Quantity
   •How will management activities affect water quality and quantity?
   •*How will restoration actions improve water quality and quantity?*

4. Riparian / Wetland Habitat
   •*How will management activities affect riparian/wetland habitat?*
   •*How will rehabilitation actions improve riparian/wetland habitat?*

The NBHMA EA addressed "Adjacent Landowners" as a key issue with concerns over how trespass and safety problems (primarily hunting) would be handled. This was not considered as a key issue in this EIS because after five years of federal ownership, the management of the ranch has not lead to an increase in trespass on the adjacent landowners.

The alternatives were developed to consider the above key issues. Following the release of the draft EIS, a public comment period was implemented. The comments were used ro refine and strengthen the alternatives and the environmental effects analysis.

Legal Requirements

There are regulations established for the management of land, wildlife, vegetation, water, and cultural resources.

Special priority is also noted by FLPMA (Sec. 202 C. 3) for retaining those values for which ACEC's were established. The National Environmental Policy Act (NEPA) requires an analysis document on all actions potentially affecting the human environment. The preparation of an EIS would fulfill this mandate. The Endangered Species Act (ESA) of 1973 requires that essential habitats for special status species be managed consistent with the ESA and current recovery plans. This is reiterated as BLM policy in the Bureau Manual (6840.06 Special Status Species Management).

Oregon Administrative Rules (635-51-048) restricts training dogs or allowing them to run loose during the game bird nesting season. Rule 498.102 of the Hunting, Angling and Wildlife Regulations restricts the use of dogs to hunt or track game mammals or birds. Oregon Revised Statutes (ORS 498.000, 1995, p. 56) prohibit harassing or chasing wildlife. Hunting seasons will occur within time frames, limits, and special permits developed by the ODFW in cooperation with the BLM and USFWS. The Migratory Bird Conservation Act provides for the protection of migratory birds, cooperative investigations, maintenance of refuges, and appropriate enforcement. The Bald Eagle Act of 1940 protects eagles and their habitat.

to return to the table of contents: Click here, Type a 7 and press enter (or return).

Noxious weed treatments would be in accordance with the Noxious Weed Act (P.L. 93-629), the Carlson-Foley Act (P.L. 90-583), and the Oregon Administrative Rules (603-052-1200). The 360 acres of O&C lands for timber production would follow the O & C Sustained Yield Act of 1937 and the Northwest Forest Plan.

The Clean Water Act (CWA), Executive Order 11988 (Floodplain Management) and Executive Order 11990 (Protection of Wetlands), require federal agencies to protect wetlands and waterways from point and nonpoint sources of pollution, and to analyze the effects of federal actions on these areas. The objective of the CWA (Section 101a) is to restore and maintain the physical, chemical, and biological integrity of the nation's waters. Implementation of the CWA requires meeting water quality standards (WQS) for point and nonpoint sources of pollution. The EPA and DEQ nonpoint source management strategy considers Best Management Practices (BMP's) a performance standard for meeting WQS. BMP's are described in Appendix D, Roseburg Record of Decision and are consistent with meeting State WQS. The BLM's role in controlling nonpoint sources of pollution concerning the State strategy (in conjunction with EPA) is identified in a Memorandum of Agreement with DEQ. Executive Order 11990 requires federal agencies to avoid, to the extent possible, adverse impacts associated with the destruction or loss of wetlands and to avoid support of new construction in wetlands if a practicable alternative exists. Executive Order 11988 and Floodplain Management 7221 directs the Agency to 1) "avoid to the extent possible the potential short and long-term adverse impacts…" of any actions it may take in the 100-year floodplain, and 2) "avoid direct or indirect support of floodplain development wherever there is a practicable alternative". Before taking any action, the Agency shall determine whether the proposed action will occur in the floodplain, incorporate the public in the decision making process, notify the public as early as possible that a contemplated action or proposed action will occur in the critical floodplain area, and assessment of alternatives and implementation of mitigation measures.

The Architectural Barriers Act of 1969, Rehabilitation Act of 1973, and Americans with Disabilities Act (ADA) of 1990 denote the need and expectation of accessible facilities. Site planning has considered access needs and has ensured that routes to and from major developed areas are accessible and incorporate universal design concepts to meet or exceed minimum standards and measurements for accessibility. The use of existing roads/trails and natural surfaces may not meet minimum slope standards of the ADA due to the steep nature of the terrain.

In accordance with the National Historic Preservation Act, ground disturbing projects would be surveyed for archaeological resources.

The Proposed Action specifies construction of water catchments. Permits would need to be obtained from the State of Oregon Water Resource Department (OAR 690-11-014 (4)(f)).

A right-of-way agreement with Lone Rock Timber Company (R-767) encumbers a portion of the north part of the NBHMA.

Consistency with State, Local, Tribal and other Federal Plans

The U.S. Fish and Wildlife Service and the Oregon Department of Fish and Wildlife were cooperators in the development of this EIS. Notification was provided to certain Tribal Governments (Analysis File, 5/12/97). No concerns were noted.

The action alternatives in this EIS were designed to be in conformance with the *Final - Roseburg District Proposed Resources Management Plan / Environmental Impact Statement* (PRMP/EIS) dated October 1994 and its associated *Roseburg District Record of Decision and Resources Management Plan* (RMP) dated June 2, 1995; and the *Final Supplemental Environmental Impact Statement on Management of Habitat for Late-Successional and Old-Growth Forest Related Species Within the Range of the Northern Spotted Owl* (FSEIS) dated February 1994; and its associated *Record of Decision for Amendments to Forest Service and Bureau of Land Management Planning Documents Within the Range of the Northern Spotted Owl* (ROD) and *Standards and Guidelines for Management of Habitat for Late-Successional and*

to return to the table of contents: Click here, Type a 7 and press enter (or return).

Old-Growth Related Species Within the Range of the Northern Spotted Owl (S&G's) dated April 13, 1994; generally referred to as the "Northwest Forest Plan" (NFP).

Most of the NBHMA (6,221 acres) falls under the NFP designation of "Administratively Withdrawn Lands" and under the RMP as an "Area of Critical Environmental Concern" (ACEC). The RMP requires that we "[r]etain and modify existing Special Areas to maintain, protect, or restore the resource values for which they were originally designated (RMP, p. 50)." Special Areas include ACEC's (RMP, p. 50). Also "[n]ewly acquired or administered lands ...will be managed for their highest potential or for the purposes for which they were acquired (RMP, p. 84)." The NBHMA was acquired to provide secure habitat for CWTD and other special status species and meet requirements set forth in the Columbian White-Tailed Deer Recovery Plan (1983), to move the species toward delisting from the endangered species list (Exchange EA, p. 1).

This EIS was also developed to be consistent with the decisions that were made as the result of the Environmental Assessment for Proposed Dunning Ranch Exchange. This EIS does modify a decision in the Exchange EA to set aside 400 acres for timber production and the location of the acres to be managed for timber production. The Exchange EA specified a contiguous block whereas this EIS proposes to disperse these areas throughout the ACEC. There is a discrepancy between the Exchange EA and the RMP in terms of acres designated as ACEC. The Exchange EA designated approximately 6,181 acres as ACEC (Exchange EA, Exhibit C), however, the RMP (Table 5, p. 89) lists the North Bank ACEC as 6,221 acres. The remaining acres, 400 under the Exchange EA or 360 under the RMP, was intended to be managed for timber production (as per agreement with Douglas County during the exchange process). This EIS adheres to the RMP classification of 6,221 acres as an ACEC. The remaining 360 acres, located in five scattered parcels, are classified as Matrix (Connectivity/Diversity Block) and Riparian Reserve.

To define roles and continue a cooperative interagency framework in implementing this plan, a Memorandum of Understanding (MOU) was signed between the BLM, ODFW, and USFWS. This cooperative agreement follows provisions of the Sikes Act.

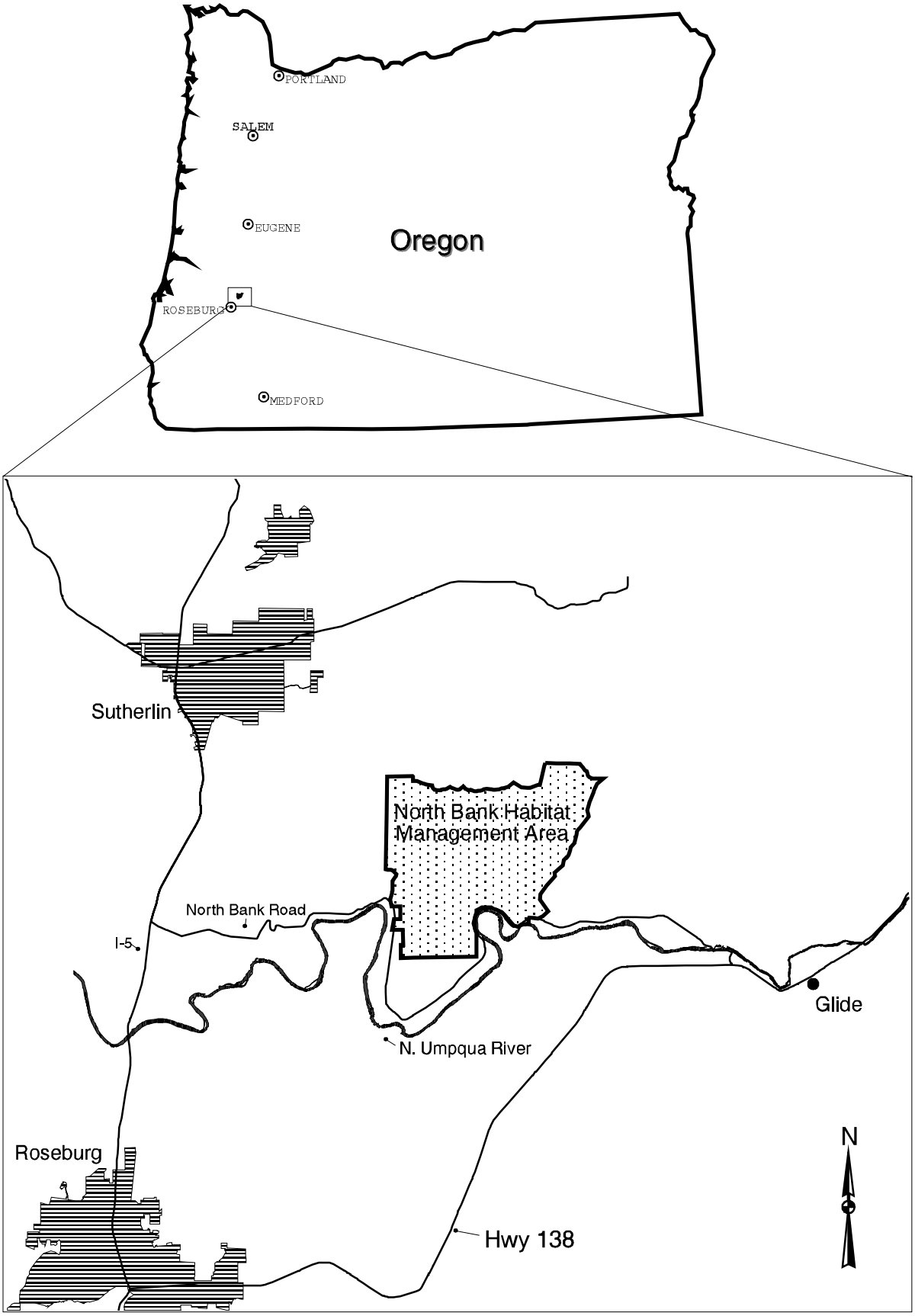
Using this Document

Chapter Two of this document details the objectives and management action/direction of the three alternatives. Chapter Three describes the affected environment. It includes previous land management practices, the current condition of water, soils, flora, wildlife, and other resources of the NBHMA. Chapter Four evaluates the environmental consequences (effects) of each alternative. The appendices provide supporting information. Other materials pertinent to this plan are available in the NBHMA Analysis File at the Roseburg BLM District Office at 777 NW Garden Valley Boulevard, Roseburg, Oregon, 97470.

to return to the table of contents: Click here, Type a 7 and press enter (or return).

Figure 1

North Bank Habitat Management Area Vicinity Map



to return to the table of contents: Click here, Type a 7 and press enter (or return).

Chapter Two

The Alternatives

to return to the table of contents: Click here, Type a 7 and press enter (or return).

Changes Between The Draft And Final EIS

The following changes were made in Chapter Two between the draft and final EIS:

- Chapter organization has been rearranged in order to clarify presentation. Much of the specific management actions of the DEIS was contained in the HMP. This detail has been included in the EIS in order to present the management actions that would occur under the various alternatives.

- Alternative B was modified slightly as the result of public comments that suggested an alternative which would fulfill the purpose and need of the NBHMA with a less intrusive and more passive approach to management. This modified alternative eliminates timber harvest, fertilization and forage plots from Alternative B as described in the DEIS. This modified alternative also adds riparian rehabilitation which was lacking in the DEIS, however, the approach to rehabilitation would be considerably less active than that described in Alternative C.

The Alternatives

Introduction

This chapter presents the No Action and two action alternatives designed to meet the purpose and needs identified in Chapter One. These alternatives represent a reasonable range of potential actions that could occur on the NBHMA. All actions are tiered to and incorporate the management actions described in the Roseburg District Resource Management Plan (RMP) and the Northwest Area Noxious Weed Program EIS (1985). This chapter begins by describing actions that are common to all alternatives. Next, a description of each alternative is provided. Table 2-6 provides the objectives and management actions that would occur under each alternative. This table allows comparison of the differences between management actions of each alternative. The chapter concludes with a summary of alternatives not considered in detail and the rationale for dropping those actions and a listing of administrative actions that could occur as part of the Preferred Alternative. Alternative C is the Preferred Alternative.

Actions Common to All Alternatives

The following management actions apply to all alternatives. Some actions are required by law or policy (e.g. protecting water resources).

1. Roads

Existing roads needed for all weather management (2.5 miles) would be brought up to RMP standards (RMP, Appendix D; pages 136-137) through the addition of crushed rock surfacing and installation of drainage features. This would provide all weather access to the Main Barn, Middle Feeder Barn, and Jackson Ranch (Figure 2). The remaining roads (29.5 miles, Alternatives A and C; or 20.5 miles, Alternative B) would remain as natural surfaced, seasonal access roads. Natural surfaced roads would receive periodic maintenance as needed. Maintenance of naturally surfaced roads would consist of surface blading, installing water control features (ditches, culverts, drain dips, etc.) seeding, mowing and noxious weed control.

The objectives for the transportation system are to (1) repair existing road problems (see Table 2-1 and 2-2) and (2) have a minimal maintenance road and trail system that provides access for management and non-motorized recreation. Outsloping roads, installing frequent cross drains (drain dips, culverts and waterbars) and having natural (vegetated) surfaces reduces the need for frequent maintenance. The

to return to the table of contents: Click here, Type a 7 and press enter (or return).

following measures would be used to reduce erosion and concentrated run-off associated with roads:

- Constructing driveable, low maintenance drain dips to limit water diversion.
- Stabilizing unstable road cuts and fills.
- Hardening wet areas by using rock aggregate and geofabric.
- Avoiding the use of wet and soft road segments until dry conditions exist.
- Reducing surface erosion by using a grass or gravel surface.
- Providing adequate spacing of drainage features to insure proper drainage.
- Upgrading stream crossings as needed using the 100-year theoretical flood stage as the criteria for design. In-stream culvert placements would be confined to between June 15 and September 15 "to minimize the area of the stream that would be affected by sedimentation during the low flow period" (RMP, p. 142).
- Replacing undersized culverts and repair damaged culverts and down spouts.
- Placing dissipators on outfalls of culverts, where needed, to dissipate water energy and reduce erosion and scouring.
- Seeding cutbanks and fillslopes where erosion and sedimentation problems exist.
- Limiting the use of highway vehicles on unsurfaced roads to dry conditions.

A road inventory was conducted which identified water diversions, dysfunctional drainages, mass wasting, rutting and presence of wet areas. Those road segments are listed in Table 2-1.

These segments would be repaired as follows:

water diversions	-	Install driveable water bars and outslope road surface.
dysfunctional drainages	-	Install higher capacity culverts, reinforce inlet basins and harden culvert outlets.
mass wasting	-	Construct rip rap buttresses and retaining structures.
rutting	-	Blade, shape and outslope road surfaces.
wet areas	-	Reinforce road subgrade with geofabric and rock.

The road inventory also identified specific problem areas that are contributing to degraded hydrologic conditions. Table 2-2 displays the actions that would be applied to correct identified road problem areas.

Motorized use would not be permitted by the public except to access parking areas. State or federal personnel performing official duties or personnel conducting fire fighting or emergency activities would be permitted to use motorized vehicles. Use of highway vehicles on naturally surfaced roads would be seasonally limited, avoiding wet conditions.

2. Trails

Roads in excess of administrative need (40 miles) would be considered part of the trail system (Figure 3). Motorized vehicles may be used by official personnel on trails for emergency use. Official use of all terrain vehicles (ATV's) is permitted on trails as well as maintained roads year round. Official use would typically consist of relatively light and occasional use for research and management purposes primarily by BLM and ODFW personnel. Use of roads and trails by the public for non-motorized recreation such as hiking, equestrian use, primitive camping and mountain biking would be allowed. Cross-country travel would be allowed for non-motorized users. Primitive camping and non-motorized trail use may be seasonally restricted in fawning areas and sensitive areas of Special Status Species (plant and animal). Trails would be maintained as needed. Trails not needed would be allowed to grass over.

Road and trail maintenance would be conducted during dry conditions (typically between May 15 and October 15). Roads and trails would be mowed in high use areas to reduce fire hazard and facilitate use. Road and trail maintenance activities near sensitive areas such as CWTD fawning areas and raptor nest sites would be deferred during specific seasons when Special Status Species may be vulnerable to disturbance.

to return to the table of contents: Click here, Type a 7 and press enter (or return).

3. Noxious Weeds

Integrated Pest Management would be used as described in the Northwest Area Noxious Weed Control Program EIS (1985 and supplement 1987) and The Roseburg District Integrated Weed Control Plan and EA (1995) to control infestations of noxious weeds. Priority would be given to infestations along roads, around buildings, at heavily used recreation sites, and where infestations threaten resource values related to key issues. All control methods available to Integrated Pest Management would be used including biological, manual, mechanical (including prescribed fire), and chemical treatments (Northwest Area Noxious Weed Program EIS, 1985, p. 6 through 13).

4. Special Status Animals

Populations of Special Status animals (Appendix A) would be managed according to the management actions/directions described in the Roseburg District RMP (p. 37 through 39).

5. Cultural Resources Education

A public archaeology program at site 35D061 would be developed to provide educational opportunities.

Actions Common to the Action Alternatives

1. Prescribed Burning

Fire would be applied under the standards set forth in the District Fire Management Plan (1998) and in accordance with the Oregon Smoke Management Plan. A separate, site specific prescribed Burn Plan would be completed for each burn. The Burn Plan would describe ignition techniques and sequences needed to meet the resource objectives. The Burn Plan would also describe measures to reduce smoke emission such as burning when light fuels are dryer allowing more complete combustion. Prior to burning, an on-site smoke permit would be issued by Douglas Forest Protective Association (DFPA) which is a branch of the Oregon Dept. of Forestry (ODF). The State Smoke Management Plan is administered locally by ODF. The permit would establish control and containment strategies as well as provide burning parameters to insure burns during periods of favorable atmospheric conditions that would disperse smoke away from population centers. During periods of extreme fire danger (IFPL level 3 or higher), no burning would be permitted.

Approximately 70-75 % of the NBHMA (4800 acres) would be targeted for some form of prescribed fire treatment. Burning in the first five years of the plan would require burning approximately 1100 acres annually to get the NBHMA habitats on a regular burning rotation. The first full year of the management plan would call for nearly 1200 acres of burning in grassland and oak-savannah vegetation types. Burning would be done to restore habitat and improve forage for CWTD. Prescribed burning is projected to be at three to five year intervals for grasslands and oak-savannah habitats and five to ten years for oak woodlands type. Burns would be timed to discourage annual grasses and noxious weeds.

Burning would normally be done from August through October. The size of individual prescribed fire units would average between 200-300 acres. Several units could be burned sequentially if no mop-up or escapement problems occur. Control lines would be needed for all summer burning projects. Existing roads and riparian areas are planned for use as control lines. The NBHMA also has pre-existing tractor fire trails in place on ridge lines which can be used as control lines during burning. Existing roads would be used for access and as fire lines during burns. New fire trails (up to ten miles) would be constructed for project burns which have no control lines present. Initially, emphasis would be placed on burning areas where roads and existing trails are in place. Newly created fire trails would be waterbarred according to the BMP (Table D-1, RMP, page 136). Burning would be conducted under conditions that result in low intensity fires that would leave plant roots intact. When possible, burns would be timed to discourage annual grasses and increase viability of perennial grasses and forbs. Sensitive soils (sites with slopes over

to return to the table of contents: Click here, Type a 7 and press enter (or return).

65% and sparse vegetation) would be avoided. BMP guidelines for water bars and trail construction (RMP, p. 140) would be used to establish and decommission fire trails.

2. Mowing

Approximately 300 acres of grasslands is available for mowing due to gentle slopes and road accessibility to mowing equipment. It is anticipated that approximately 30 acres would be mowed annually. A given acre could be mowed several times annually.

3. Instream rehabilitation of degraded stream reaches

Rehabilitation would focus on: (1) preserving the best riparian habitats, (2) stabilizing degraded stream banks and headcuts, and (3) aggrading stream channels (see Table 2-6, Riparian / Wetland Habitat Management).

4. Special Status Plants

Populations of Special Status plants would be enhanced (Table 2-3). Any management action that could jeopardize established populations would be mitigated in compliance with the District RMP (Bureau of Land Management 1995).

Description of Alternative A (No-Action Alternative)

Alternative A (No Action Alternative) is defined as “continuing present management activities”. Present management is described in the Exchange EA (p. 3) under the “Proposed Action” paragraph. The No Action Alternative is required by the Council of Environmental Quality in order to provide a baseline for comparison of the action alternatives. The Exchange EA specifies the following management actions that would occur: management for habitat for CWTD (grazing, prescribed fire and other tools), protection of Special Status plants, and management of 2.5 miles of potential anadromous fish habitat. Implementation of future projects such as these would require separate NEPA documentation. The management conceived by the Exchange EA is fully incorporated in one or both of the Action Alternatives (Alternative B and C) of this EIS. Although Alternative A could be implemented if the Action Alternatives are rejected, for the sake of this analysis Alternative A consists only of the necessary actions to fulfill legal mandates such as noxious weed control and meeting the Clean Water Act.

Recreational facilities and access would not be developed beyond current levels; sanitation facilities would remain as they are presently. Non-motorized access by the public would be allowed from access points such as the school bus turnaround, pull offs and Main Barn (by permission). All current roads and trails (Figure 4) would be open to non-motorized recreation. Parking and restroom facilities would not be improved beyond current levels. No new facilities would be developed. Existing facilities would be maintained. The main barn does not meet building code for public use and would be torn down or used for storage and fenced in to discourage public use.

Description of Alternative B

Alternative B represents a more passive and less intrusive approach than Alternative C in meeting the purpose and need as outlined in Chapter One. Active management would be employed to maintain the present mix of vegetation types as described in Chapter Three, to enhance quality of forage, enhance the habitat of Special Status wildlife and plants, and to recover degraded hydrologic conditions. Active management would rely heavily on the use of fire as a tool to maintain vegetation types, improve forage condition for CWTD, and improve conditions for Special Status plants. Table 2-4 displays the approximate acres that would be treated under this alternative for the next ten years. The use of fertilizer or forage plots would not be used to enhance or supplement forage quality.

to return to the table of contents: Click here, Type a 7 and press enter (or return).

Riparian and hydrologic conditions would be improved through road maintenance, road decommissioning and stream rehabilitation. The restoration of degraded stream channels and hydrologic conditions would largely rely on natural recovery processes. However, some instances of active intervention would be under-taken such as tree planting or use of heavy equipment from existing roads and trails and helicopter or cable systems in stream reaches that are not road accessible. Providing artificial water sources, spring development and creation of additional wetlands would not be under-taken. Native plant species would be used as much as possible for revegetating disturbed soil. Road management would focus on maintenance necessary to gain access to implement a management action and to repair road segments that are degrading water quality. Approximately 23 miles of road (Figure 5) would be maintained for administrative use.

Recreational use would be permitted within the constraints of existing conditions (primarily limited parking). Non-motorized access by the public would be provided by the system of roads and trails described previously. Access would be from access points such as the school bus turnaround, main barn and pull offs. Existing facilities would be maintained and no new facilities would be developed. The Main Barn does not meet building code for public use and would be torn down or used for storage.

Description of Alternative C (the Preferred Alternative)

Alternative C represents an active approach to management in meeting the purpose and need as outlined in Chapter One. The present mix of habitat (vegetation types) would be altered to provide greater amounts of favorable habitat for the CWTD. Active management to enhance forage quality and discourage conifer succession would be under-taken. Active management would include the use of fire, grazing, fertilization and seeding; and planting forage plots to elevate forage quality and improve habitat. Timber would be managed on 360 acres, however, due to the young age of the stand, timber harvest is not anticipated within the next 20-30 years. Table 2-5 displays the approximate acres that would be treated under this alternative for the next ten years. The goal of active management would enhance the habitat of Special Status plants as well as expanding certain populations through plantings.

Active management, including the use of heavy equipment, would be under-taken to rehabilitate degraded riparian conditions and achieve specific fish habitat goals including improved spawning habitat, hiding cover, pools, and in-stream flows. Any excess soil material generated from stream rehabilitation, such as pulling back stream banks would be hauled to a suitable stable locations on the NBHMA. The goal is to accelerate time for streams to reach a properly functioning condition Instream rehabilitation would be accomplished by: preserving stream reaches that are stable and properly functioning, stabilizing stream banks and bottoms that are actively eroding, rehabilitating downcut banks and aggrading stream bottoms, and planting vegetation to stabilize stream banks.

Recreational use would be accommodated through the development of new facilities (West Entrance, and Doc's Landing) and tearing down the main barn to be replaced with a day-use pavilion. Parking areas would be constructed to increase accessibility and decrease safety hazards to users while loading and unloading vehicles and horse trailers. Approximately one mile of additional trail would be developed to provide better access throughout the area and disperse public use. Existing pull outs along County Road 200 would be improved to accommodate greater ease of public access and remove a safety concern of vehicles parking along road shoulders (Figure 6). Two stream crossings on Chasm Creek would be provided through the placement of large culverts to enable access for management and recreation. Three Watchable Wildlife sites would be developed to enhance wildlife viewing opportunities for the public (See Figure 3).

Water sources would also be developed to provide additional sources of water. Water accessibility for wildlife would be expanded through artificial water sources, spring development and development of selected wetlands (Figure 7).

Forage plots would be establish in this alternative to provide supplemental feeding for the CWTD. Potential forage plots are identified in Figure 8.

to return to the table of contents: Click here, Type a 7 and press enter (or return).

The Exchange EA made commitment to the harvest timber on a specific block devoted for timber production. This EIS analyzes for timber production on five scattered stands within the NBHMA (Figure 9). The selection of the timber emphasis areas was based on several factors: suitability of soils, access for conventional logging systems, and avoidance of conflicts with other objectives. Timber production would be in conformance with the existing land use plan and consistent with protection of threatened, endangered and special status species (page 5, Dunning Exchange EA). These dispersed timber emphasis areas would be managed under RMP guidelines for Connectivity/Diversity Blocks. This includes management on a 150-year rotation, and retention of 12 to 18 green trees per acre and 120 linear feet of down logs per acre as specified in the RMP within regeneration harvest units. A Riparian Reserve of 180 feet would be maintained along all streams as described in the RMP (p. 24). Thinning from below and regeneration harvests are silvicultural tools that would be used in these areas to meet the objectives. Due to the current age of the timber, it is not anticipated that timber harvest would occur within 20-30 years.

Livestock would be used to improve CWTD habitat by manipulating vegetation by grazing. Grazing practices would comply with *Standards for Rangeland Health and Guidelines for Livestock Grazing Management for Public Lands Administered by the BLM in the States of Oregon and Washington 1997*. Grazing objectives would include providing greater forbs and succulent grass growth, increasing native and desirable perennial grasses by reducing competition from annual grasses that have a lesser forage value and soil holding capacity, and regulating fuel loads for controlled burning. Grazing treatments would be phased in, with full implementation anticipated in six to ten years. Grazing would occur on fewer than 2000 acres per year with full implementation. An initial stocking rate of 1.5 AUM (Animal Unit Month) per acre would be used. An AUM is the amount of forage needed by a cow with a calf for one month. Two types of grazing treatments would be initiated. Intensive grazing would be conducted on highly productive grasslands with forage production potential of three to six AUM 's per acre (Douglas County Soil Survey). Intensive grazing treatments would use temporary fences to create two to six grazing cells for high-intensity, short-duration grazing. Livestock would be in each cell for up to 15 days per year, leaving 350 days per year for plant regrowth and recovery. Extensive grazing would be conducted by drainage. Grazing would be lower-intensity and longer-duration (up to 120 days per grazing unit) than intensive grazing cells. Treatment would be in the fall, after green-up, or in early spring. Up to 50% of annual forage production would be removed by livestock. All areas treated with grazing would be subject to rest-rotation or deferment. Grazing units would be grazed no more than three times in a five year period and no areas would be grazed year round. Livestock would be controlled by herding or fencing. In addition to herding and fencing, livestock would be distributed by salt or mineral blocks and water developments or troughs (Holechek p. 274-5). Fencing would be used to enclose or subdivide drainages and exclude sensitive areas. Approximately 730 acres would be permanently excluded from grazing due to the difficulty of managing livestock in those areas (Figure 10). Additional details on the grazing can be found in the Grazing Plan (Appendix C).

Table 2-6 provides a comparison between alternatives of the various management objectives and actions.

Alternatives Considered but Eliminated from Detailed Study

An Environmental Impact Statement is required to explore and evaluate all reasonable alternatives. This range of alternatives is limited by legal requirements and the requirement to fulfill the Purpose and Need described in Chapter One. The BLM considered two alternatives that were subsequently dropped from further analysis. These alternatives were eliminated because they did not meet the purpose and need for the NBHMA.

Intensive Recreation Alternative

An alternative was considered that would allow more intensive recreational use of the NBHMA. Public scoping identified the need for more recreational opportunities in the Roseburg area. Suggestions included: allowing public motorized access, developing a campground, developing a remote control airstrip, and developing a target shooting area.

to return to the table of contents: Click here, Type a 7 and press enter (or return).

This alternative was not considered in detail since motorized public use would be in conflict with the purpose of the NBHMA to provide secure habitat for the CWTD, the Resource Management Plan (DRMP 1995, page 59) and potential disruption of those resource values that led to designating the area as an Area of Critical Environmental Concern (ACEC). The area was established as a non-motorized area in 1994 (Federal Register, September 9, 1994) to "minimize wildlife disturbance and habitat degradation and to protect soil and water resources." The need to minimize disturbance to the CWTD and other species of special concern and to protect the ACEC values still exist, thus any action to reverse the Off Highway Vehicle (OHV) closure was dismissed. Development of a campground was also determined to be incompatible with both the purpose of managing habitat for CWTD and other Special Status Species and protecting the integrity of the ACEC values. Since the greatest value of the NBHMA is to secure habitat for the CWTD, facility development was minimized. Given the steep terrain of the area and the degraded condition of the roads, developing a campground, particularly one suited for electrical and sewer hook-ups, would not be practical. A remote control airstrip and target range would be used by a relatively small sector of the public, however the noise intrusion would affect other users such as hikers, bikers, horseback riders and picnickers, as well as CWTD.

No Recreation Alternative

Public scoping expressed the concern that any recreation, especially hunting, would jeopardize CWTD and that opening up the area to recreational use was incompatible for an area designed to protect an endangered species. Some adjacent landowners were concerned about the safety of allowing hunting on the area. The Exchange EA (page 5) permits hunting on the NBHMA.

This alternative was not considered in detail because Purpose and Need in Chapter One identified the need to provide a level of recreation that would be compatible with the primary objective of providing secure habitat for the CWTD. Hunting of Columbia black-tailed deer can also in part reduce the competition on CWTD, which would satisfy the purpose and need of this EIS therefore the option to reverse the 1993 EA decision and prohibit hunting was dropped from further analysis.

Administrative Actions

The following administrative actions could occur as part of the Proposed Action Alternative and are considered in the effects analysis in Chapter 4.

- Placement of picnic tables and benches
- Construction of a barbecue pit at the Main Barn Pavilion
- Construction of a water line and water tap for horse users at the Main Barn Pavilion.
- Placement of information boards, interpretive signs or panels, kiosks, trail markers and primitive camper registration boxes.
- Placement of signs, fences, or gates to restrict motorized access beyond the parking areas or to gate off day-use areas.
- Construction of blinds at Watchable Wildlife sites.
- Landscaping of day-use areas (planting shrubs, paving parking lots and walk ways).
- Recreational closures or restrictions needed to protect resources values, minimize user conflicts or promote public safety.
- Granting special recreational permits.
- Service and maintenance of recreational facilities (toilets, parking lots, walkways, etc.).
- Placement of nest boxes, raptor perch poles, and bat houses.
- Construction of temporary fence lines.
- Temporary placement of portable corrals and water troughs.

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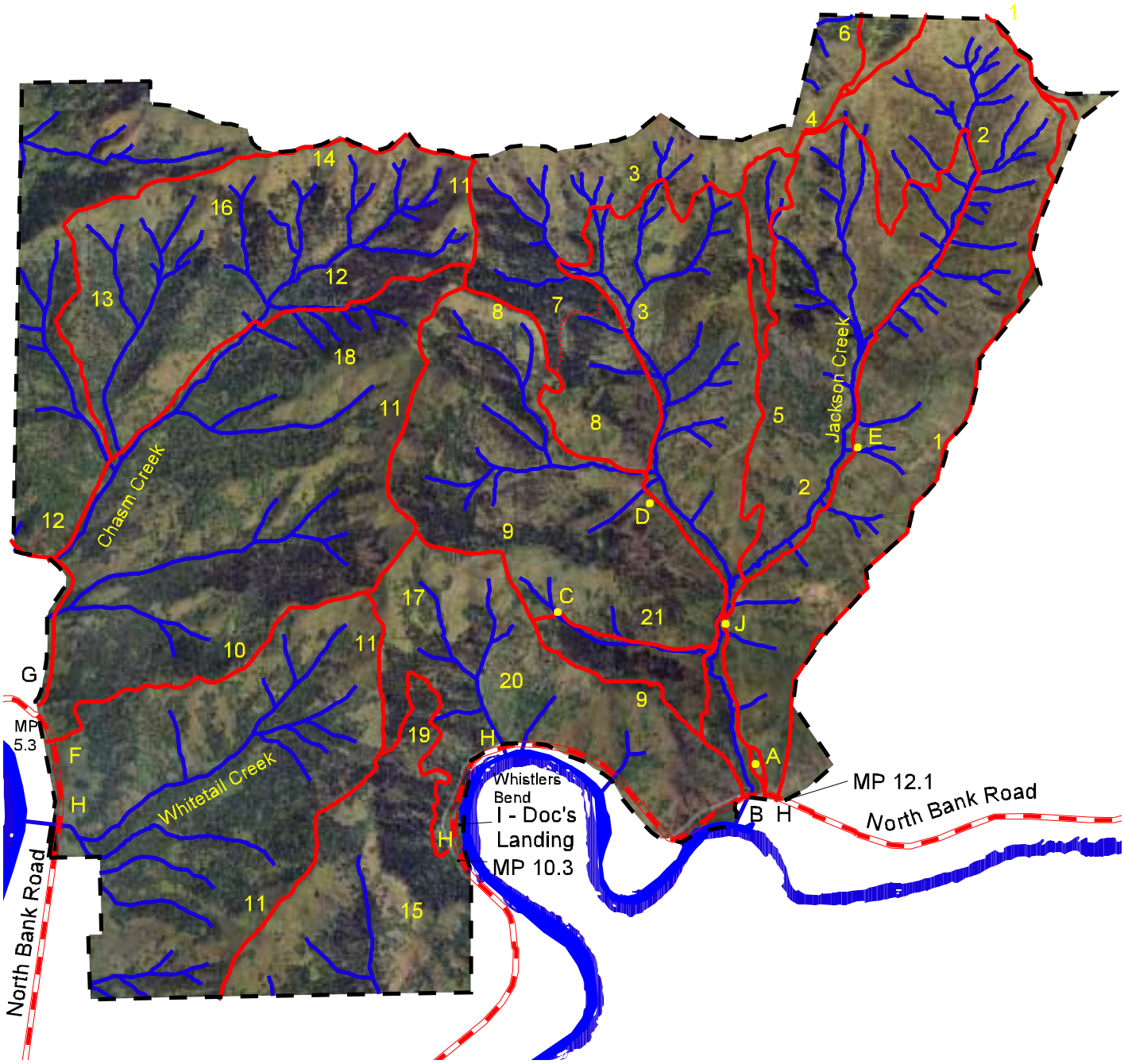
Figure 2

North Bank Habitat Management Area



1. East Boundary
2. Blacktail Basin
3. Soggy Bottoms Way
4. Nowhere Trail
5. Powerline Access
6. North Portal
7. Wrong Way
8. North Gate Trail
9. Thistle Ridge Trail
10. Blacktail Ridge
11. Middle Ridge
12. Chasm Creek
13. Bear Tree Trail
14. North Boundary
15. Whistler's Outlook
16. Lost Canyon
17. South Knob
18. Middle Knob
19. Talburt Trail
20. Poison Oak Patch
21. West Feeder Barn Road

A. Ranch Headquarters
B. Main Entrance
C. West Feeder Barn
D. Middle Feeder Barn
E. East Feeder Barn
F. West Entrance Parking
G. Jackson Ranch Access
H. Horse Access
I. Main Barn Site
MP. Mile Post
Buildings

County Road
Roads(Alt C)
Trail
Streams
North Umpqua River

scale 1:37000
0.5 0 0.5 Miles

Information used for this map was produced using GIS from the North Bank Watershed Analysis

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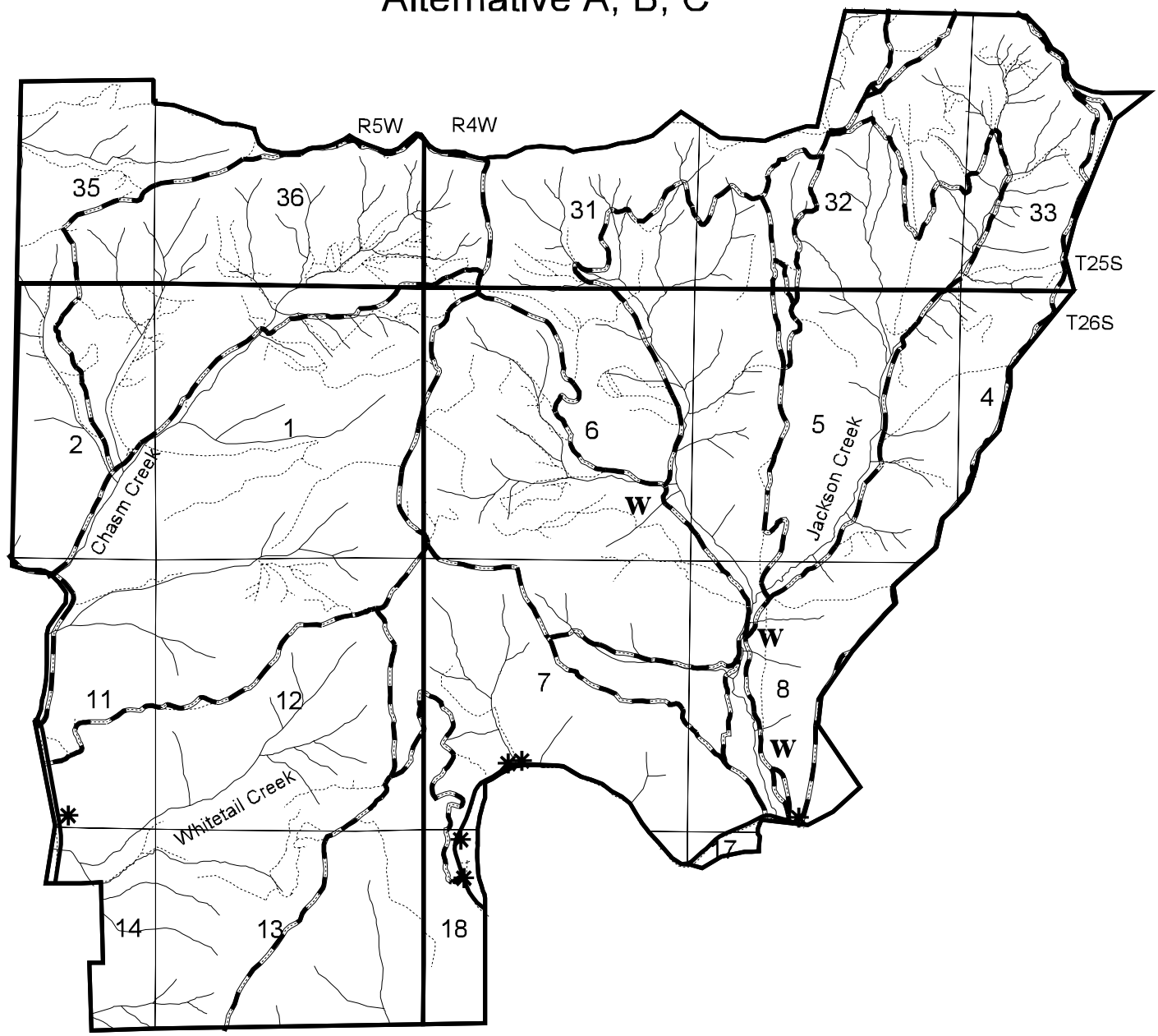
Figure 3

North Bank Habitat Management Area

Trails
Alternative A, B, C



North Bank Boundary
Streams
County Road - 2.5 miles
Roads - 32 miles
Trails - 40 miles
T-R
Sections

✱ - Access Points
W - Watchable Wildlife

scale 1:37000
0.5 0 0.5 Miles

Information used for this map was produced using GIS from the North Bank Watershed Analysis

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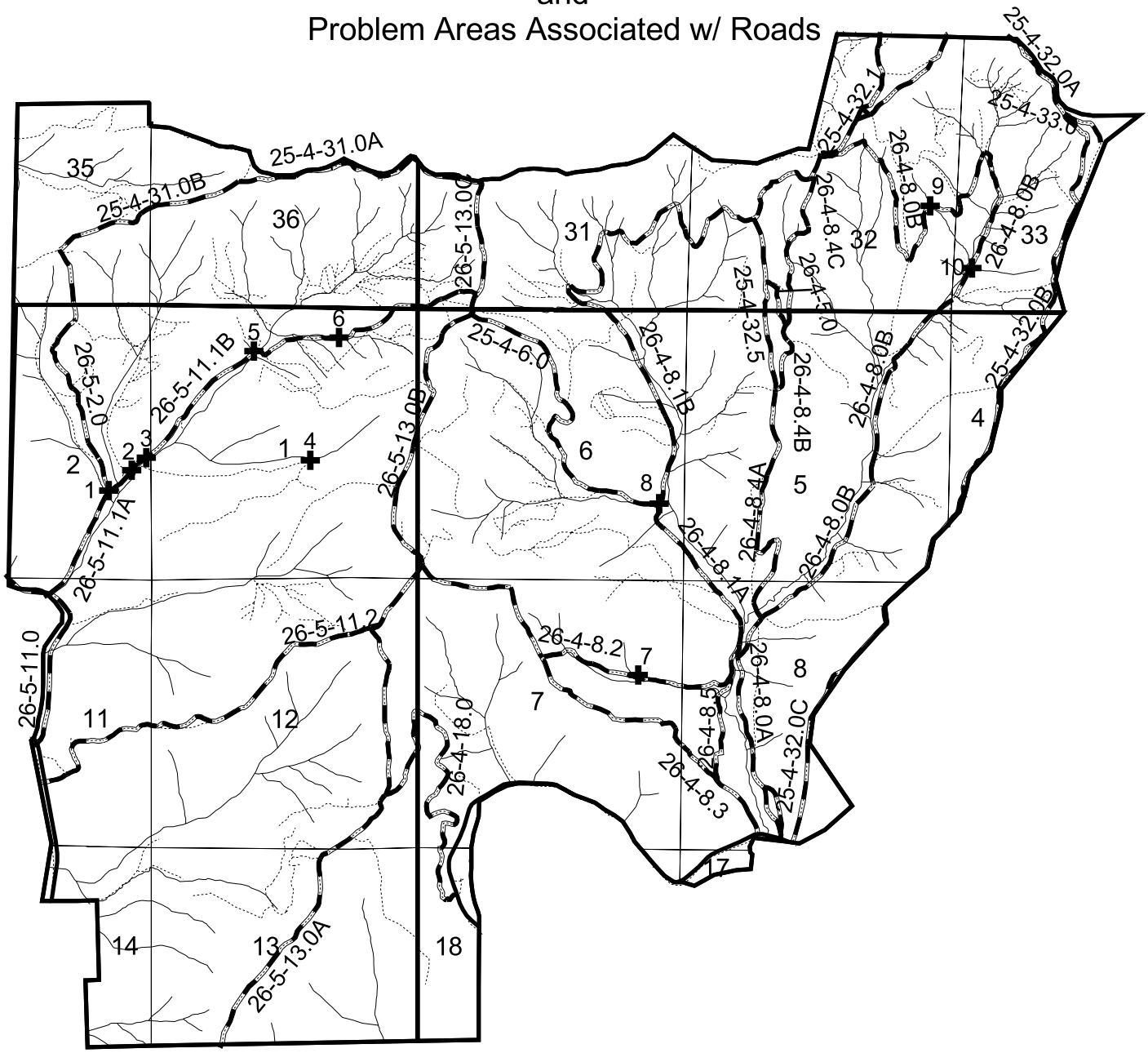
Figure 4

North Bank Habitat Management Area

Roads Alternatives A and C
and
Problem Areas Associated w/ Roads



North Bank Boundary
Streams
County Road - 2.5 miles
Roads - 32 miles
Trails - 40 miles
Problem Areas Associated w/ Roads
T-R
Sections

scale 1:37000
0.5 0 0.5 Miles

Information used for this map was produced using GIS from the North Bank Watershed Analysis

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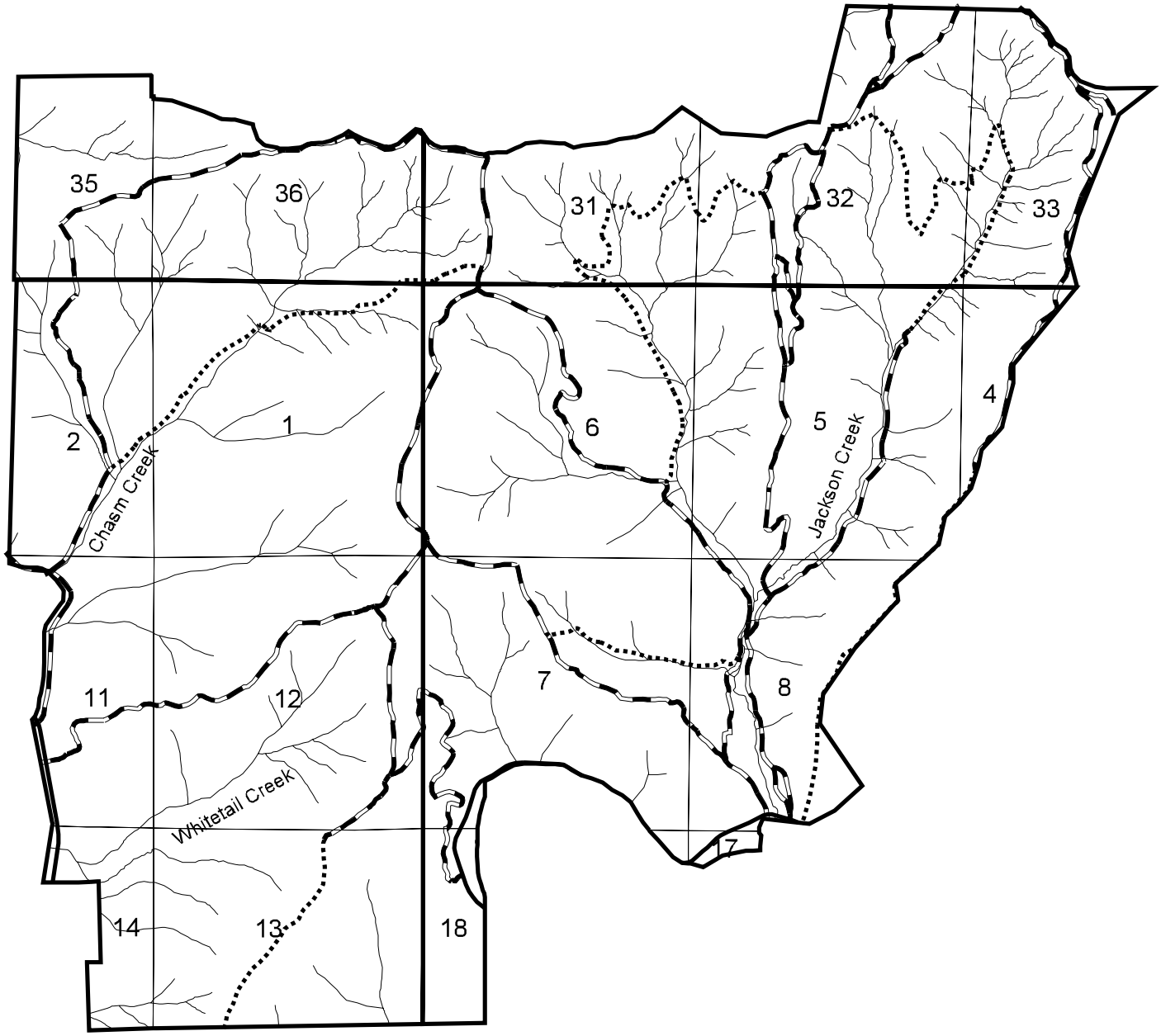
Figure 5

North Bank Habitat Management Area

Roads

Alternative B



Decommission Roads - 9 miles
Roads(Alt B) - 23 miles
County Road
Streams
T-R
Sections

scale 1:37000
0.5 0 0.5 Miles

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Figure 6

North Bank Habitat Management Area
Pull Out Areas

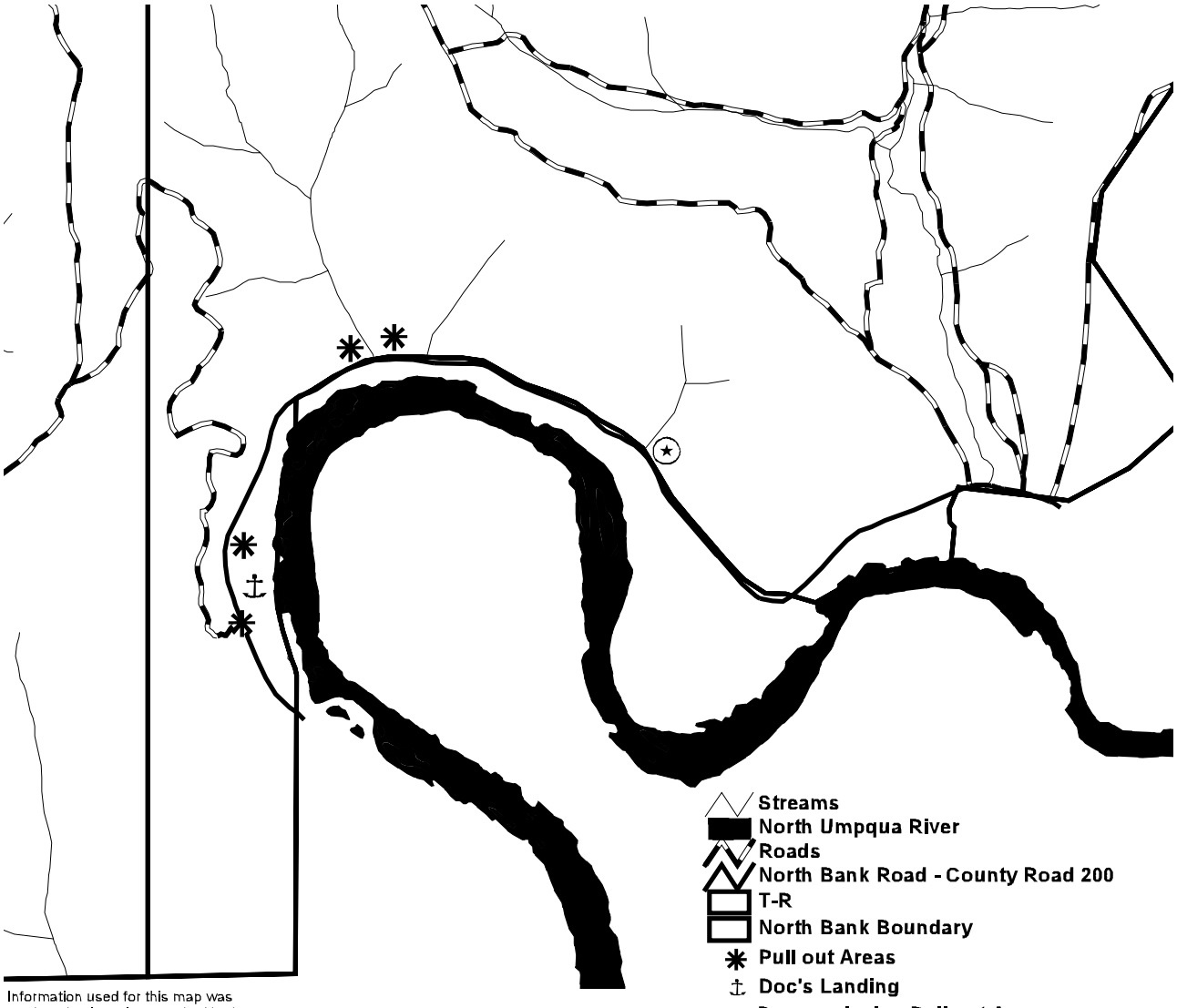

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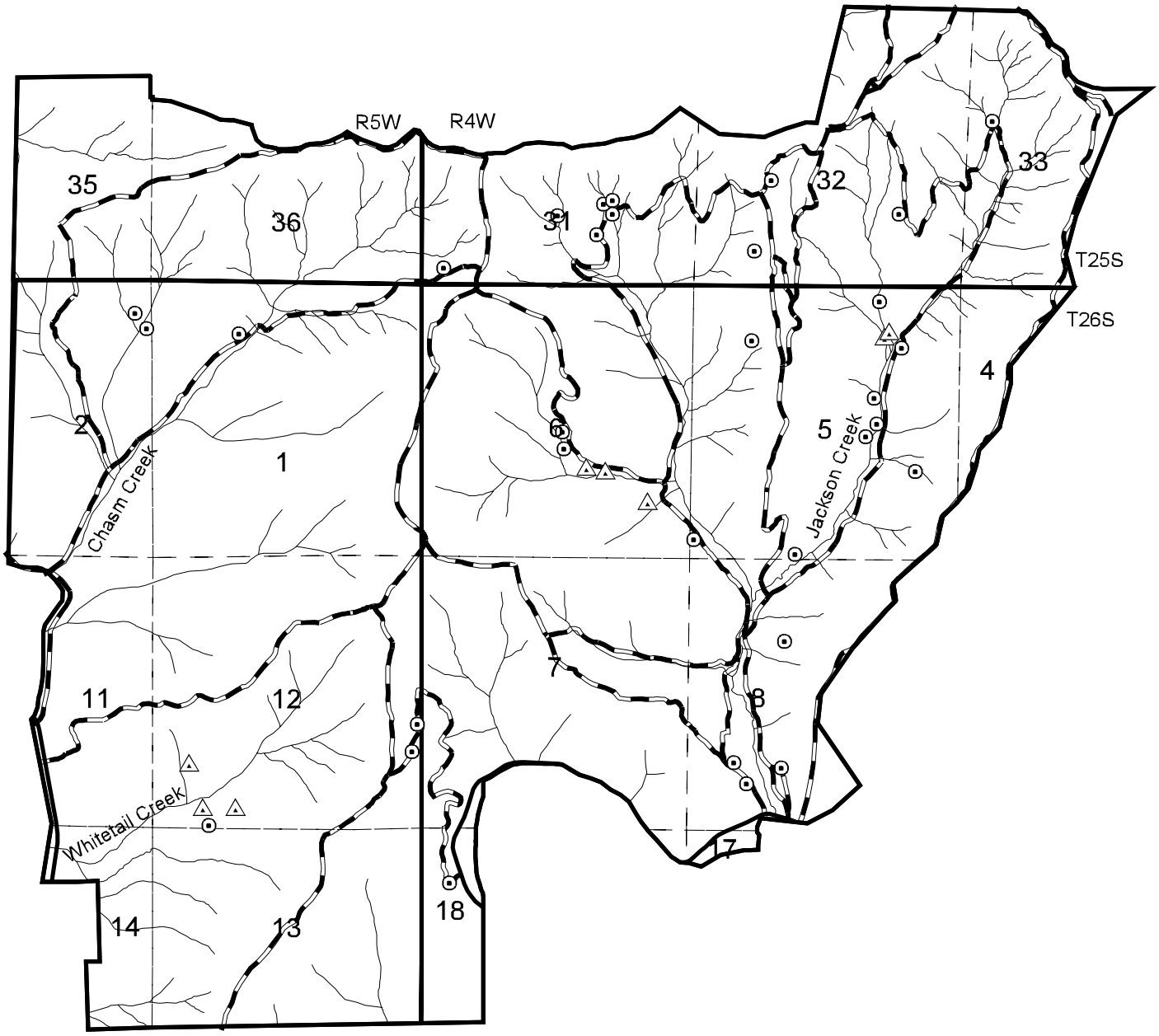
Figure 7

North Bank Habitat Management Area

Water Resources: Springs and Wetlands
Potential Development



North Bank Boundary
Wetlands
Springs
T-R
Streams
Sections
Roads(Alt C)
County Road

scale 1:37000
0.5 0 0.5 Miles

N

Information used for this map was produced using GIS from the North Bank Watershed Analysis

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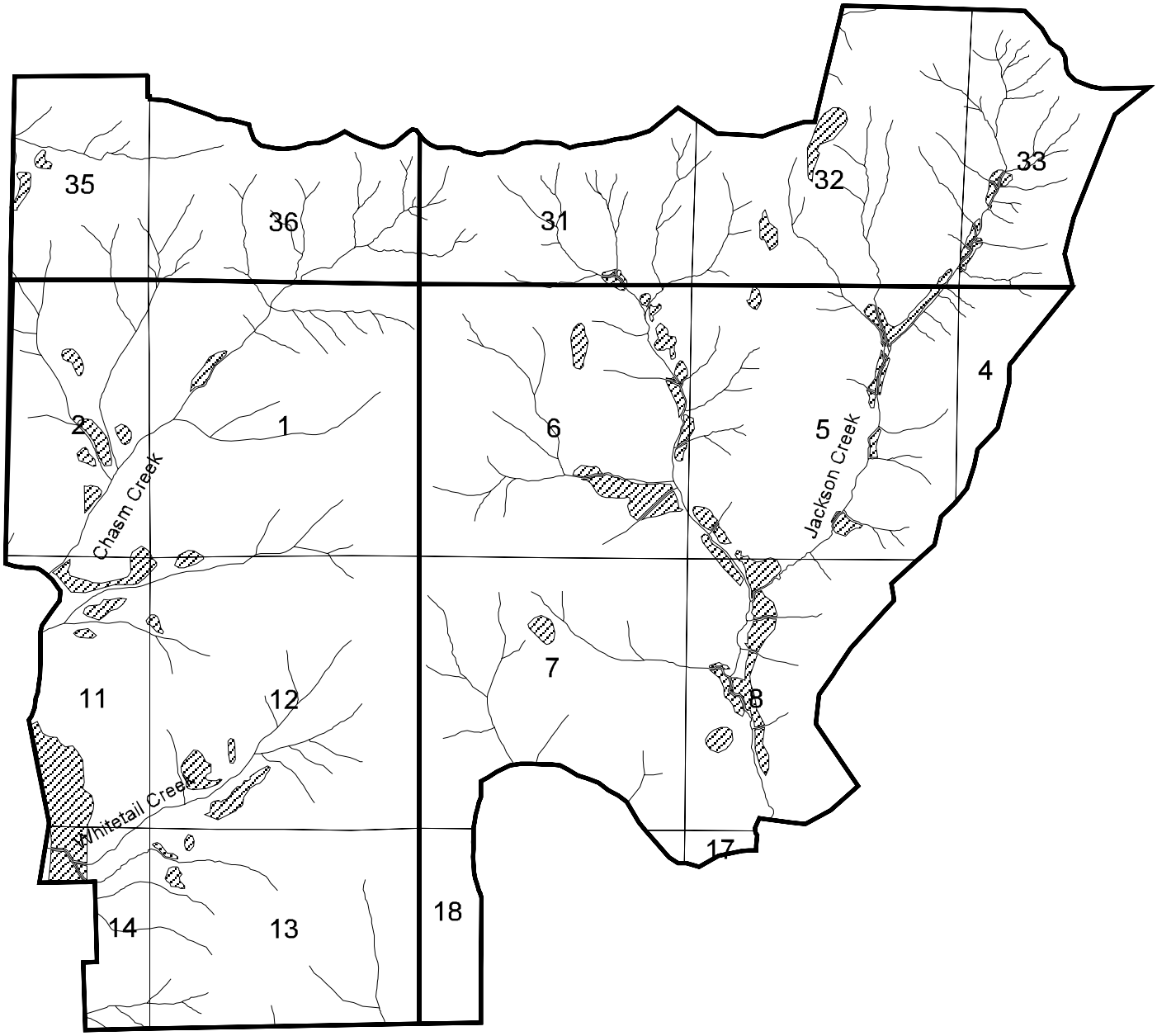
Figure 8

North Bank Habitat Management Area
Potential Areas for Deer Forage Plots



North Bank Boundary
T-R
Streams
Sections
Deer Forage Plots - 240 Acres

scale 1:37000
0.5 0 0.5 Miles

Information used for this map was produced using GIS from the North Bank Watershed Analysis

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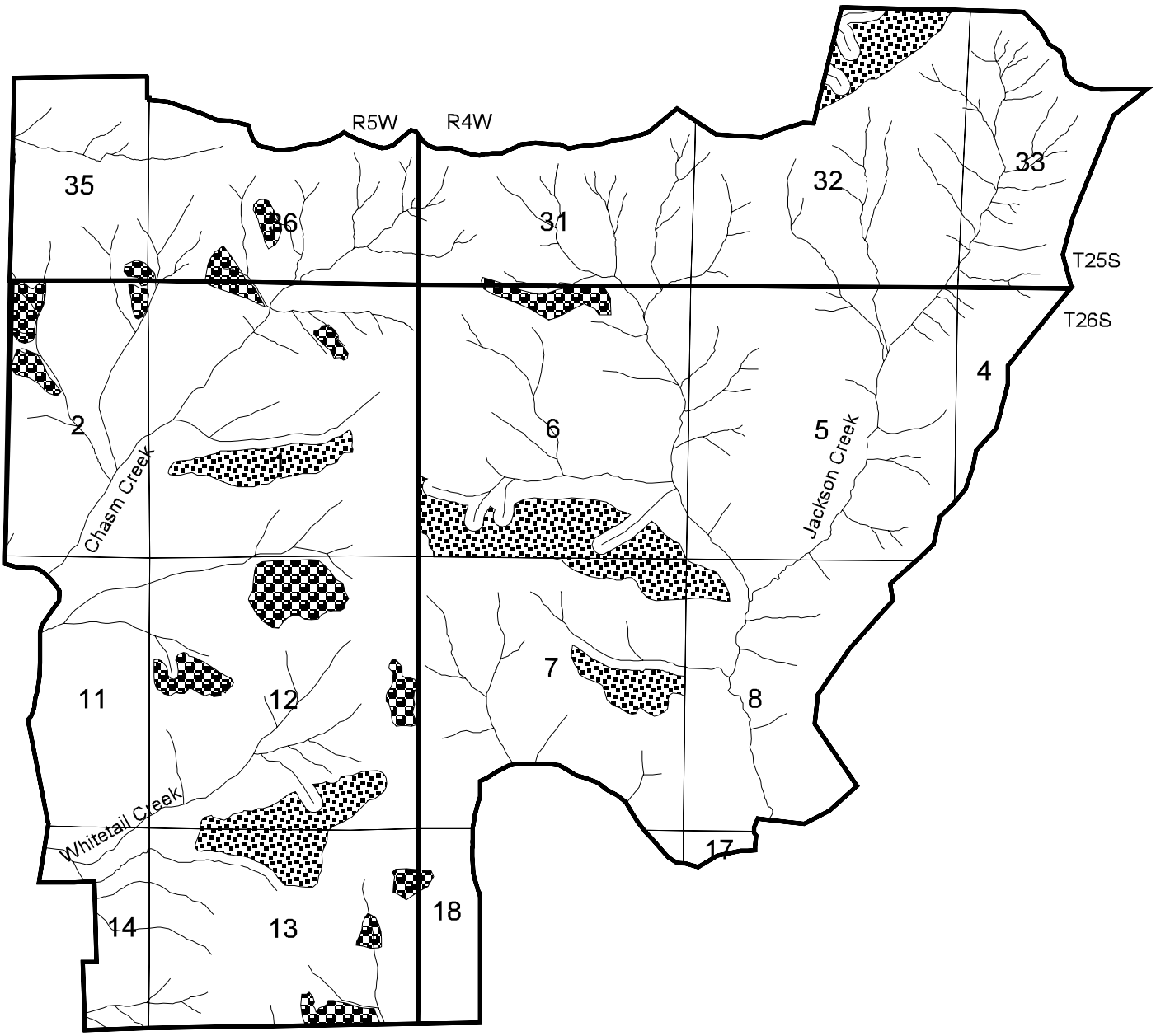
Figure 9

North Bank Habitat Management Area

Timber Management Areas and Areas Managed for Large Residual Conifers



North Bank Boundary
T-R
Streams
Sections
Matrix, Connectivity/Diversity Blocks - 342 Acres
Residual Conifers - 178 Acres

scale 1:37000
0.5 0 0.5 Miles

N

Information used for this map was produced using GIS from the North Bank Watershed Analysis

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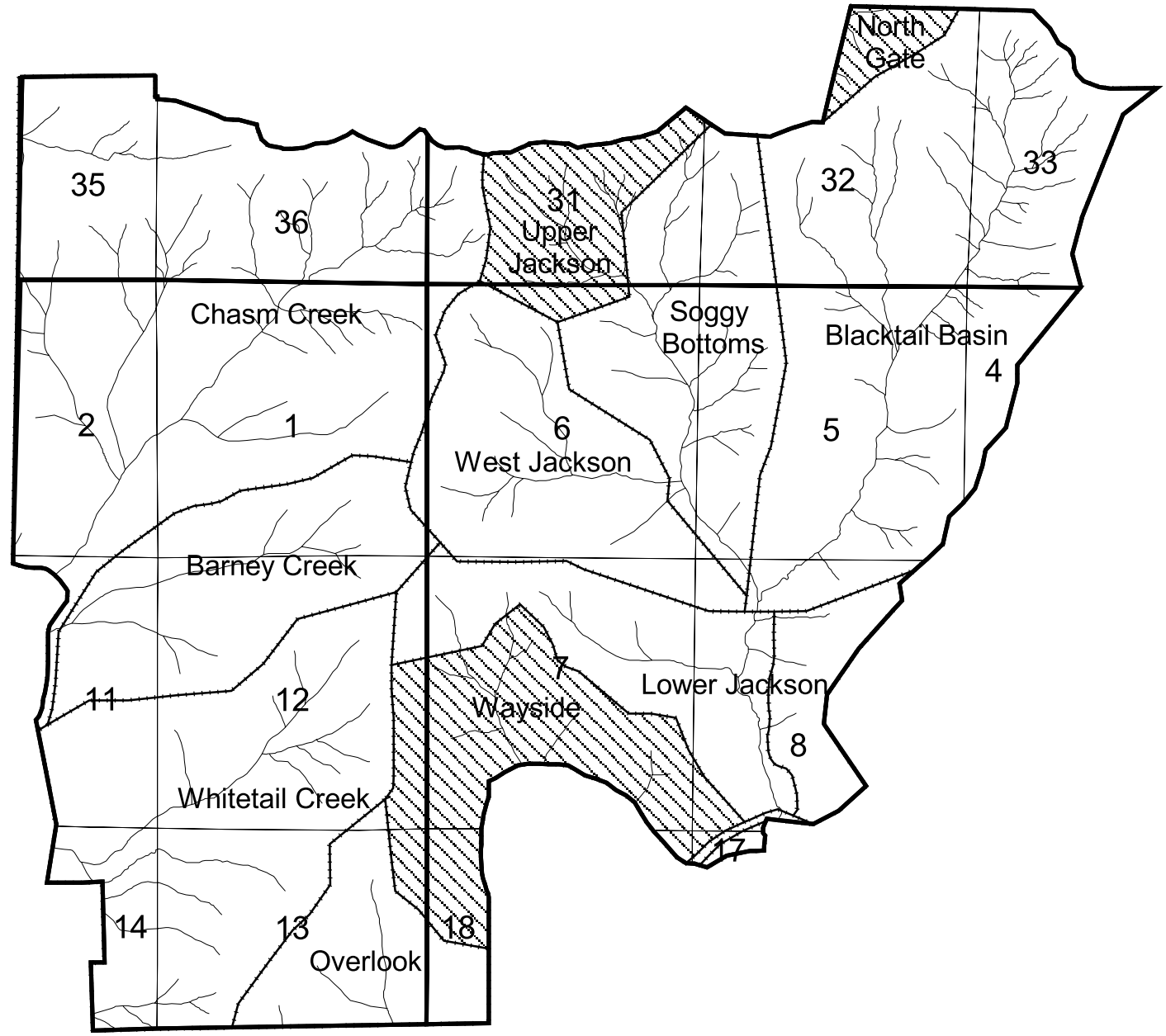
Figure 10

North Bank Habitat Management Area

Grazing Exclusion Areas and Proposed Primary Fences



Exclusion Areas
North Bank Boundary
Proposed Fence Lines
T-R
Streams
Sections

scale 1:37000
0.5 0 0.5 Miles

N

Information used for this map was produced using GIS from the North Bank Watershed Analysis

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Table 2-1. Road Segments Needing Repair	
Road Segment	**Miles**
26-5-11.1A	0.5
26-4-8.1B	2.5
26-4-8.2	0.8
26-4-8.0B	3.6
26-5-2.1	0.7
26-5-11.1B	1.7
25-4-32.3	0.1
26-4-8.0	0.7
26-4-8.4B	1.0
26-4-7.0	0.2
Total	11.8

Table 2-2. Road Problem Areas		
Site No.	**Problem**	**Corrective Action**
1	Stream Crossing Failure & Stream Diversion	Construct a reinforced, low water ford.
2	Stream Crossing	Rock fill with drainage structure.
3	Stream Crossing	Rock fill with drainage structure.
4	Road Slide Stabilization	Stabilizing the failing road fill with a rip rap buttress.
5	Degraded Stream Crossing	Reinforce the fill with rock buttresses and replacing old culvert.
6	Heavily Gullied Road Segment (200 feet)	Fill gullies with rip rap rock.
7	Heavily Gullied Road Segment (0.7 miles)	Fill gullies with rip rap rock and correct drainage problems.
8	Stream Crossing Erosion	Reinforce the stream crossing with rock buttresses.
9	Fill Failure at Stream Crossing	Reinforce the fill slopes with rock buttresses.
10	Fill Failure in Landslide Area	Reinforce the fill slopes with rock buttresses.

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Table 2-3. Management Activities to Enhance Special Status Plants			
Species by Scientific Name and Common Name	**Location**	**Activity**	**Approx. Acres**
Arabis koehleri var. *koehleri* (Shrubby Rockcress)	T. 25 S., R. 5 W., Sec. 36; T. 26 S., R. 4 W. Sec. 7; and T. 26 S., R. 4 W. Secs. 8 and 17	Plant seed and/or vegetative material.	10 5 25
Perideridia erythrorhiza (Red Root Yampah)	T. 26 S., R. 5 W., Secs. 11 and 14	Plant seed and/or vegetative material; prescribe burn every 3 to 5 years; mechanical and manual removal of competing vegetation; integrated pest management for noxious weeds.	60
Plagiobothrys hirtus (Popcorn Flower)	T. 26 S., R. 5 W., Sec. 11; and T. 26 S., R. 4 W., Sec. 6	Plant seed and/or vegetative material; mechanical and manual removal of competing vegetation; integrated pest management for noxious weeds.	1 1
Sisyrinchium hitchcockii (Hitchcock's Blue-eyed Grass)	T. 26 S., R. 5 W., Secs. 11 and 14	Plant seed and/or vegetative material; mechanical and manual removal of competing vegetation; integrated pest management for noxious weeds.	40

Table 2-4. Approximate Acres Projected to be Treated in Ten Years Under Alternative B.			
Burning[1]	**Mowing**	**Planting**	**Thinning**
4,200	300	1,100	3,000

[1]Number represents multiple treatments on acres (double count).

Table 2-5. Approximate Acres Projected to be Treated in Ten Years Under Alternative C.						
Burning[1]	**Mowing**	**Grazing**[1]	**Fertilization**[1]	**Planting Seeding**[1]	**Thinning**	**Timber Management**
4,900	300	4,700	4,900	4,900	4,000	360

[1]Number represents multiple treatments on acres (double count).

to return to the table of contents: Click here, Type a 7 and press enter (or return).

Table 2-6. Management Objectives and Management Actions by Alternative			
Management Objectives	**Management Actions**		
	Alternative A (No Action)	**Alternative B**	**Alternative C (Preferred)**
Vegetation Management			
A. Forage Management			
1. Increase availability, palatability and nutritional level of CWTD forage and browse on approximately 1,900 acres of **Grasslands and Oak Savannah** (see Figure 12) by improving grass stand structure and species composition and increasing desirable perennial grasses and forb frequency.	1. The natural succession of vegetation and habitat would be allowed to continue. Normal fire suppression activities would be undertaken.	1. Forage productivity would be increased through a combination of burning, mowing, and seeding.	1. Forage productivity would be increased through a combination of burning, mowing, seeding, grazing, fertilization and forage plots.
a. Burn to reduce thatch, rank grasses, shrub and conifer encroachment.	Burning None, except for control of noxious weeds.	Burning Approximately 1,900 acres of Grasslands and Oak Savannah habitat would be burned at intervals of three to five years. Approximately 6,300 acres* of this type would be burned per decade, or approximately 630 acres annually. (**Note*: This figure reflects that a given acre could be burned as many as three times in a decade.)	Burning Approximately 1900 acres of Grasslands and Oak Savannah habitat would be burned at five year intervals. Approximately 3,800* acres of this type would be burned per decade or approximately 380 acres annually. (**Note*: This figure reflects that a given acre could be burned as many as two times in a decade.)
b. Mow to reduce thatch, rank grasses and increase opportunity for herbaceous production.	Mowing None.	Mowing Approximately 300 acres of this type would be mowed per decade, or approximately 30 acres annually.	Mowing Approximately 300 acres of this type would be mowed per decade, or approximately 30 acres annually.
c. Seed desirable grasses and forbs after burning to increase the abundance of desirable forage plants.	Seeding None	Seeding Approximately 1,900 acres of this type would be seeded per decade, or approximately 190 acres annually.	Seeding Approximately 1,900 acres of this type would be seeded per decade, or approximately 190 acres annually.

Table 2-6. Management Objectives and Management Actions by Alternative

Management Objectives	Management Actions		
	Alternative A (No Action)	**Alternative B**	**Alternative C (Preferred)**
Vegetation Management - Forage Management (continued)			
d. Graze to increase forage quantity and availability.	Grazing None	Grazing None	Grazing Approximately 1700 acres would be grazed per decade or approximately 170 acres annually. A stocking rate of one AUM per acre of would be used. See Grazing Plan (Appendix C).
e. Amend nutrient-deficient soils to increase plant vigor and shift the plant community to more desirable species.	Fertilizing None.	Fertilizing None.	Fertilizing Up to 1,900 acres would be fertilized per decade or approximately 190 acres annually. Application would be aerially or ground based (tractor, ATV, or by hand). a. Where aerial application is used, streams and wetlands would be buffered by 100 feet. Ground applications by vehicle would buffer streams and wetlands by 25 feet and hand applications by 10 feet. b. If treatment is within 0.75 miles of domestic water intake, adjacent landowners would be notified prior to the date of application. c. Soil testing would be conducted prior to treatment to determine nutrient availability. Soil would be amended with fertilizer, calcium, etc. as needed to increase forage production.

Table 2-6. Management Objectives and Management Actions by Alternative

Management Objectives	Management Actions		
	Alternative A (No Action)	**Alternative B**	**Alternative C (Preferred)**
Vegetation Management - Forage Management (continued)			
f. Extend period of green forage availability later into summer/fall.	Forage Plots None.	Forage Plots No active management; however, the burning and mowing described above would also make forage more available in the fall.	Forage Plots Establish forage plots (Figure 8) on up to 250 acres by planting protein-rich leguminous forbs and other species preferred by CWTD. Potential species that could be planted include: subclovers, woodrose, alfalfa, fruit trees (apples, pears, plums, etc.), white clover, deerbrush, smallheaded clover, ceanothus, and vetch. The burning, mowing and water developments described above would also make forage more available in the fall.
2. Increase availability, palatability and nutritional level of CWTD forage and browse in understory on approximately 1,170 acres of **Oak Woodlands** (see Figure 12).	2. The natural succession of vegetation and habitat would be allowed to continue. Normal fire suppression activities would be undertaken.	2. Forage productivity would be increased through a combination of burning, mowing, and seeding.	2. Forage productivity would be increased through a combination of burning, mowing, seeding, grazing and fertilization.
a. Burn to reduce thatch, rank grasses, shrub and conifer encroachment.	Burning None	Burning 1,170 acres of oak woodland would be underburned at five to eight year intervals. Approximately 2,300* acres of this type would be burned per decade or approximately 230 acres annually. (**Note*: This figure reflects that a given acre could be burned as many as three times in a decade.)	Burning 1,170 acres of oak woodland would be underburned at five to eight year intervals. Approximately 2,300* acres of this type would be burned per decade or approximately 230 acres annually. (**Note*: This figure reflects that a given acre could be burned as many as three times in a decade.)

Table 2-6. Management Objectives and Management Actions by Alternative

Management Objectives	Management Actions		
	Alternative A (No Action)	**Alternative B**	**Alternative C (Preferred)**
Vegetation Management - Forage Management (continued)			
b. Mow to reduce thatch, rank grasses and increase opportunity for herbaceous production.	Mowing None.	Mowing Mowing would be used to treat parcels of less than five acres where topography allows.	Mowing Mowing would be used to treat parcels of less than five acres where topography allows.
c. Seed desirable grasses and forbs after burning to increase the abundance of desirable forage plants.	Seeding None.	Seeding Post burn seed and/or plant grasses, forbs and/or shrubs on at least 25% of the burn treated acres (approximately 300 acres).	Seeding Post burn seed and/or plant grasses, forbs and/or shrubs on at least 25% of the burn treated acres (approximately 300 acres).
d. Graze to increase forage quantity and availability.	Grazing None.	Grazing None.	Grazing Grazing would be utilized to treat forage on approximately 1,170 acres as described previously.
e. Amend nutrient-deficient soils to increase plant vigor and shift the community to more desirable species.	Fertilizing None.	Fertilizing None.	Fertilizing Up to 1,170 acres of would be fertilized per decade, or approximately 120 acres annually as described previously.
3. Increase availability, palatability and nutritional level of CWTD forage and browse on approximately 850 acres of **hardwood/conifer habitat** type (see Figure 12) that is currently in an existing grassland/shrub stage of succession.	3. The natural succession of vegetation and habitat would be allowed to continue. Normal fire suppression activities would be undertaken.	3. Forage productivity would be increased through a combination of burning and seeding.	3. Forage productivity would be increased through a combination of burning, seeding, grazing and fertilization.

Table 2-6. Management Objectives and Management Actions by Alternative			
Management Objectives	**Management Actions**		
	Alternative A (No Action)	**Alternative B**	**Alternative C (Preferred)**
Vegetation Management - Forage Management (continued)			
a. Burn to reduce thatch, rank grasses, shrub and conifer encroachment.	Burning None.	Burning Approximately 850 acres of habitat would be burned at three to five year intervals. Approximately 2,800* acres would be burned per decade or approximately 280 acres annually. (*Note: This figure reflects that a given acre could be burned as many as three times in a decade on a three-year burn cycle.)	Burning Approximately 850 acres of this type would be burned at five to eight year intervals. Approximately 1,700* acres would be burned per decade or approximately 170 acres annually. (*Note: This figure reflects that a given acre could be burned as many as two times in a decade on a five-year burn cycle.)
b. Seed desirable grasses and forbs after burning to increase the abundance of desirable forage plants.	Seeding None.	Seeding Post burn seed and/or plant grasses, forbs and/or shrubs that furnish CWTD forage/browse on at least 25% of the burn treated acres (approximately 700 acres).	Seeding Post burn seed and/or plant grasses, forbs and/or shrubs that furnish CWTD forage/browse on at least 25% of the burn treated acres (approximately 400 acres).
c. Graze to increase forage quantity and availability.	Grazing None.	Grazing None.	Grazing Grazing would be utilized to treat forage on approximately 850 acres as described previously.
d. Amend nutrient-deficient soils to increase plant vigor and shift the plant community to more desirable species.	Fertilizing None.	Fertilizing None.	Fertilizing Up to 850 acres of would be fertilized per decade, or approximately 85 acres annually as described previously.
4. Increase availability, palatability and nutritional level of CWTD forage and browse on approximately 970 acres of **modified hardwood/conifer habitat** (see Figure 12).	4. The natural succession of vegetation and habitat would be allowed to continue. Normal fire suppression activities would be undertaken.	4. The natural succession of vegetation and habitat would be allowed to continue. Normal fire suppression activities would be undertaken.	4. Forage productivity would be increased through a combination of burning, seeding, grazing and fertilization.

Table 2-6. Management Objectives and Management Actions by Alternative

Management Objectives	Management Actions		
	Alternative A (No Action)	**Alternative B**	**Alternative C (Preferred)**
Vegetation Management - Forage Management (continued)			
a. Burn to reduce thatch, rank grasses, shrub and conifer encroachment.	Burning None.	Burning None.	Burning Approximately 970 acres of habitat would be burned at three to five year intervals. Approximately 1,900* acres of this type would be burned per decade, or approximately 190 acres annually. (**Note*: This figure reflects that a given acre could be burned as many as two times in a decade on a five year burn cycle.)
b. Seed desirable grasses and forbs after burning to increase the abundance of desirable forage plants.	Seeding None.	Seeding None.	Seeding Post burn seed and/or plant grasses, forbs and/or shrubs that furnish CWTD forage/browse on at least 25% of the burn treated acres (approximately 500 acres).
c. Graze to increase forage quantity and availability.	Grazing None.	Grazing None.	Grazing Grazing would be utilized to treat forage on approximately 970 acres as described previously.
d. Amend nutrient-deficient soils to increase plant vigor and shift the community to more desirable species.	Fertilizing None.	Fertilizing None.	Fertilizing Up to 970 acres of would be fertilized per decade, or approximately 100 acres annually as described previously.
5. Increase availability, palatability and nutritional level of CWTD forage and browse on approximately 300 acres of hardwood/conifer habitat type modified to increase diversity.	5. No active management.	5. Forage/browse condition would be maintained through under burning at five to ten year intervals in modified stands.	5. Not carried into Alt. C, No stands modified.

Table 2-6. Management Objectives and Management Actions by Alternative			
Management Objectives	**Management Actions**		
	Alternative A (No Action)	**Alternative B**	**Alternative C (Preferred)**
Vegetation Management - Forage Management (continued)			
6. Manage **riparian/wetland** habitats to improve suitability for CWTD.	6. No active management.	6. Up to 120 acres of riparian/wetland habitats could be treated to increase cover and forage for CWTD. a. Native shrubs, trees, forbs and grasses or sedges would be planted or seeded in. b. Selectively thin or remove non-native or undesirable vegetation such as hawthorn, Himalayan blackberry and rushes (*juncus* spp.).	6. Up to 120 acres of riparian/wetland habitats could be treated to increase cover and forage for CWTD. a. Native shrubs, trees, forbs and grasses or sedges would be planted or seeded in. b. Selectively thin or remove non-native or undesirable vegetation such as hawthorn, Himalayan blackberry and rushes (*juncus* spp.).
B. Habitat Management			
	The existing vegetation types would be allowed to undergo natural succession. The only active management would be normal fire suppression as described in the District Fire Management Plan (July 30, 1998).	The existing habitat types would be maintained at current proportions by controlling natural progression.	The natural succession of vegetation types would be retarded to enhance and increase CWTD habitat within ten years.

Table 2-6. Management Objectives and Management Actions by Alternative

Management Objectives	Management Actions		
	Alternative A (No Action)	**Alternative B**	**Alternative C (Preferred)**
Vegetation Management - Habitat Management (continued)			
1. Manage **Grassland and Oak Savannah** habitats to retain herbaceous component.	1. No active management.	1. The structural characteristics presently existing on approximately 1900 acres of Grassland and Oak Savannah habitat type would be maintained. Oak savannah habitats would be managed for a canopy cover of 30%. Treatment would consist of: a. Use prescribed fire at intervals of 3 to 5 years. b. Use hand pulling or mechanical pulling or cutting to remove undesirable plants, shrubs or trees that are not eliminated by fire. (e.g. Himalayan blackberry, hawthorn, conifers and non-native shrubs and trees).	1. Approximately 1,900 acres of Grassland and Oak Savannah habitats would be managed to retain the herbaceous component and retard encroachment by tree establishment. Oak savannah habitats would be managed for a canopy cover of 30%. Management actions would retain mature oaks and rejuvenate shrubs, perennial grasses and forbs. This would be accomplished by controlled burning and/or grazing to reduce woody species and seeding to improve habitat for herbaceous vegetation (Gumtow-Farrior, 1992). Treatment would consist of: a. Use prescribed fire at intervals of 5 to 7 years in grazed areas, and intervals of 3 to 5 years in areas not grazed. b. Use grazing, seeding, fertilization, hand or mechanical pulling or cutting to maintain structural characteristics of grassland and oak savannah habitats and remove undesirable plants.

Table 2-6. Management Objectives and Management Actions by Alternative

Management Objectives	Management Actions		
	Alternative A (No Action)	**Alternative B**	**Alternative C (Preferred)**
Vegetation Management - Habitat Management (continued)			
		Thin where needed to maintain a canopy of 30% or less in the oak savannah habitat type.	c. Thin where needed to maintain a canopy of 30% or less in the oak savannah habitat type.
2. Manage **Oak Woodlands** to retain mature oak, shrub and herbaceous components (See Figure 12).	2. No active management.	2. Canopy species composition and structural characteristics would be maintained on approximately 1,150 acres of oak woodland to ensure that no more than 5% of the canopy is composed of conifer tree species. The oak woodland canopy would be maintained at approximately 50% closure (Range of 30% to 100%). Treatment would consist of: a. Underburning oak woodlands with prescribed fire at intervals of five to eight years. b. Selective thinning to reduce conifer encroachment and manage canopy closure (Reigel et al. 1991).	2. Seral advancement would be retarded on approximately 1,150 acres of oak woodland habitat type by managing for an average tree canopy cover of 50% for hardwoods and 5% or less for conifers. Management actions would retain mature oaks and rejuvenate shrubs, perennial grasses and forbs. Treatment would consist of: a. Controlled burning and grazing to reduce conifer encroachment and stimulate herbaceous growth (Gumtow-Farrior, 1992). b. Selective thinning to reduce conifer encroachment and manage canopy closure (Reigel et al. 1991).

Table 2-6. Management Objectives and Management Actions by Alternative

Management Objectives	Management Actions		
	Alternative A (No Action)	**Alternative B**	**Alternative C (Preferred)**
Vegetation Management - Habitat Management (continued)			
			c. Seeding or planting of native shrubs on up to 1150 acres to increase variety of browse.
3. Maintain or improve early-seral stage of the **hardwood/conifer** type to increase suitability for CWTD (See Figure 12).	3. No active management.	3. Approximately 1970 acres of hardwood/conifer vegetation type would be maintained in an existing grass/shrub stage of succession to benefit CWTD. The land base would be maintained in a ratio of approximately 50% grass/forb habitat interspersed with patches of shrub/tree cover as the remaining 50%. Treatment would consist of: a. Prescribed burning at intervals of three to eight years on approximately 850 acres of habitat. Burn under conditions that would allow a "patchy" type of burn. b. Using manual or mechanical methods to thin shrubs and/or trees to maintain forage/cover ratios.	3. Approximately 1970 acres of hardwood/conifer vegetation type would be maintained in an existing grass/shrub stage of succession to benefit CWTD. The land base would be maintained in a ratio of approximately 50% grass/forb habitat interspersed with patches of shrub/tree cover as the remaining 50%. Treatment would consist of: a. Prescribed burning at intervals of three to eight years on approximately 850 acres of habitat. Burn under conditions that would allow a "patchy" type of burn. b. Using manual or mechanical methods to thin shrubs and/or trees to maintain forage/cover ratios. c. Grazing to reduce conifer encroachment and stimulate grass and forb production.

Table 2-6. Management Objectives and Management Actions by Alternative

Management Objectives	Management Actions		
	Alternative A (No Action)	**Alternative B**	**Alternative C (Preferred)**
Vegetation Management - Habitat Management (continued)			
4. Increase growth rates of conifers and hardwoods in approximately 300 acres of mixed species stands and increase diversity of understory vegetation.	4. No active management.	4. Manage residual conifer areas. Canopy closure would be reduced on approximately 300 acres of closed canopy hardwood/conifer habitat type that are currently in mixed species stands to canopy closures of approximately 50% (trees usually greater than 10 inches DBH). Treatment would consist of: a. Manual/mechanical means to thin shrubs and/or trees to reduce fuel loading prior to treatment. b. Underburning stands at five to ten year intervals. c. Thinning hardwoods and conifers to maintain desired canopy density.	4. No active management.
5. Increase CWTD habitat by converting approximately 970 acres of conifer/hardwood considered marginal CWTD habitat into earlier seral stages suitable for CWTD (Figure 13).	5. Allow succession to continue uninterrupted on 970 acres of conifer/hardwood type considered marginal CWTD habitat.	5. Allow succession to continue uninterrupted on 960 acres of conifer/hardwood type considered marginal CWTD habitat.	5. Set succession back on approximately 960 acres of late early seral conifer / hardwood habitat type classified as marginal CWTD habitat to an earlier seral stage consisting of a mixture of approximately 50% grass/forb habitat and 50% shrub/tree cover (Figure 13).

Table 2-6. Management Objectives and Management Actions by Alternative			
Management Objectives	**Management Actions**		
	Alternative A (No Action)	**Alternative B**	**Alternative C (Preferred)**
Vegetation Management - Habitat Management (continued)			
			Treatment would consist of: a. Thinning, slashing and burning existing selected marginal habitat areas. b. Planting, seeding, and fertilization to establish forage and cover species in treated area. c. Prescribed burning at three to eight year intervals, grazing and mechanical methods to maintain acreage in a seral stage and habitat mix suitable for CWTD.
6. Manage residual conifer stands for mature tree attributes.	6. Residual stands of conifers would not be entered to enhance stands.	6. Approximately 180 acres of residual conifer stands would be treated to increase conifer growth rates and reduce competition. (Figure 13). a. Selected stands would be thinned to increase growth of desired trees. b. Habitat would be underburned at intervals of five to ten years to reduce fuels.	6. Approximately 180 acres of residual conifer stands would be treated to increase conifer growth rates and reduce competition. (Figure 13). a. Selected stands would be thinned to increase growth of desired trees. b. Habitat would be underburned at intervals of five to ten years to reduce fuels.

Table 2-6. Management Objectives and Management Actions by Alternative

Management Objectives	Management Actions		
	Alternative A (No Action)	**Alternative B**	**Alternative C (Preferred)**
Special Status Plants			
Protect, manage and conserve existing populations of special status plants.	Existing populations of *Arabis koehleri* var. *koehleri*, *Perideridia erythrorhiza*, *Plagiobothrys hirtus*, and *Sisyrinchium hitchcockii* would be maintained. Management actions that could detrimentally impact established populations (see Table 3-3) would be avoided.	Established populations of *Arabis koehleri* var. *koehleri*, *Perideridia erythrorhiza*, *Plagiobothrys hirtus*, and *Sisyrinchium hitchcockii* would be enhanced.	Established populations of *Arabis koehleri* var. *koehleri*, *Perideridia erythrorhiza*, *Plagiobothrys hirtus*, and *Sisyrinchium hitchcockii* would be enhanced and expanded
		Approximately 140 acres of habitat would be enhanced by increasing numbers of individuals over current levels by 25% in 10 years. Increases would be achieved by planting seed and vegetative material and improving habitat by controlling competing vegetation (grass, forbs, shrubs and trees) and noxious weed infestations. Manual and mechanical techniques including prescribed fire, would be used on competing vegetation.	1. Approximately 140 acres of the habitat would be enhanced by increasing numbers of individuals over current levels by 25% in 10 years. Increases would be achieved by planting seed and vegetative material and improving habitat by controlling competing vegetation (grass, forbs, shrubs and trees) and noxious weed infestations. Manual and mechanical techniques including prescribed fire, would be used on competing vegetation.

Table 2-6. Management Objectives and Management Actions by Alternative			
Management Objectives	**Management Actions**		
	Alternative A (No Action)	**Alternative B**	**Alternative C (Preferred)**
Special Status Plants (continued)			
			2. An additional population of *Plagiobothrys hirtus* (Popcorn Flower) would be introduced into suitable habitat. Introduced populations would be established by removing competitive grass, forbs, and shrubs prior to introduction and planting seed and/or vegetative material on approximately five acres (T. 26 S., R. 4 W., Sec. 6).
Timber Management			
Manage 342 acres for timber production. Contribute to the Roseburg District harvest commitments.	No timber harvest.	No timber harvest.	Harvest would be based on a 150-year rotation and consistent with the Roseburg District RMP's guidelines for Connectivity/Diversity Blocks. Due to the young age of the timber on the NBHMA, timber harvest on the 342 acres specified for timber production would not occur within the next 30 years.
Riparian/Wetland Habitat Management			
1. Reduce and control mass wasting and sedimentation into streams.	1. Repair road segments and problem areas that are contributing to stream sedimentation (see Actions Common to all Alternatives, Chapter 2).	1. Repair road segments and problem areas that are contributing to stream sedimentation (see Actions Common to all Alternatives, Chapter 2).	1. Repair road segments and problem areas that are contributing to stream sedimentation (see Actions Common to all Alternatives, Chapter 2).

Table 2-6. Management Objectives and Management Actions by Alternative			
Management Objectives	**Management Actions**		
	Alternative A (No Action)	**Alternative B**	**Alternative C (Preferred)**
Riparian/Wetland Habitat Management (continued)			
2. Restore and maintain water quality for beneficial users.	2. Meet guidelines of the Clean Water Act by repairing problem areas that contribute to degraded conditions.	2. Decommission nine miles of road (Chasm Creek, Blacktail Basin and Soggy Bottoms road segments). Decommissioning would consist of the removal of culverts and restoring of the natural flow path, seeding bare surfaces and removal from the road system.	2. Fence off all fish-bearing steams, stream rehabilitation sites, stream-side plantings, and sensitive areas by a minimum of 35 feet from stream bank or site when cattle are present.
3. Increase base flows of streams to provide perennial flow into the summer.	3. No active management.	3. No active management.	3. Eight sites (Figure 7) have been identified for potential development to restore existing wetlands or create water sources. Developments would not exceed 5 acres per site and would typically be less than 2 acres. Water sources would be located to maximize water storage potential, allow development of associated shallow water wetlands, restore flows to stream systems, and minimize site impacts from construction. Development would include: construction of earth berm type water impoundments; use of explosives or backhoe to create water sumps; and development in conjunction with road repairs or upgrades, such as the construction of water sumps. Developments such as this would also provide a source of water for wildfire suppression.

Table 2-6. Management Objectives and Management Actions by Alternative			
Management Objectives	**Management Actions**		
	Alternative A (No Action)	**Alternative B**	**Alternative C (Preferred)**
Riparian/Wetland Habitat Management (continued)			
4. Rehabilitate and protect fish stocks at risk and their habitat (RMP p. 40) through a reduction of sedimentation and peak flows associated with roads and instream work to repair degraded stream reaches (Figure 15).	4. No active management other than repair of road problems areas.	4. Rehabilitate degraded stream reaches and wetlands to return them to a Properly Functioning Condition. Riparian and in-stream rehabilitation would include the use of heavy equipment for the placement of stream structures, however equipment would be restricted to existing roads or helicopter or cable systems used in reaches that are not accessible by road. Woody debris would be added to the stream channels and allowed to naturally route through the streams. No wetlands would be developed. In-stream work would be accomplished from July 1 to September 15 to minimize the effects of sedimentation on aquatic organisms. Appropriate BMP's (RMP, p. 141) would be required for all in-stream and riparian work.	4. Rehabilitate degraded stream reaches and wetlands to return them to a Properly Functioning Condition. Rehabilitation would be based on the conditions of stream bank, bank height, and accessibility. The use of heavy equipment (tractors and backhoes) would be employed to accomplish objectives and limited to the dry season. In-stream work would be accomplished from July 1 to September 15 to minimize the effects of sedimentation on aquatic organisms. Any excess soil material generated from stream rehabilitation work would be hauled to suitable stable locations on the NBHMA. Appropriate BMP's (RMP, p. 141) would be required for all in-stream and riparian work.

Table 2-6. Management Objectives and Management Actions by Alternative

Management Objectives	Management Actions		
	Alternative A (No Action)	**Alternative B**	**Alternative C (Preferred)**
Riparian/Wetland Habitat Management (continued)			
	A buffer of 25 feet for tractor or ATV and 10 feet for hand spraying of herbicides for noxious weeds would be maintained along streams.	A buffer of 25 feet for tractor or ATV and 10 feet for hand spraying of herbicides for noxious weeds would be maintained along streams. Projects specifically targeting instream work and riparian zone enhancement would be allowed within buffers.	A buffer of 100 feet for aerial applications of fertilizer. A buffer of 25 feet for tractor or ATV and 10 feet for hand spraying of herbicides for noxious weeds or application of fertilizer would be maintained along streams. Projects specifically targeting instream work and riparian zone enhancement would be allowed within buffers.
		a. Rehabilitate stream banks and headcuts by placing structures such as large wood or rock buttresses below the headcuts. Rehabilitation using heavy equipment would be restricted to existing road. Stream segments to be rehabilitated would be based on the conditions of stream bank, bank height, and site accessibility. Stream banks that lack vegetation would be planted with woody and non-woody vegetation.	a. Rehabilitate stream banks and headcuts by placing structures such as large wood or rock buttresses below the headcuts. Stream banks that are severely downcut would be resloped using backhoes and tractors to provide suitable planting locations for vegetation.
		Planting trees along streams would provide large roots in the future to stabilize the stream channels and reduce erosion and sedimentation.	Planting trees along streams would provide large roots in the future to stabilize the stream channels and reduce erosion and sedimentation.

Table 2-6. Management Objectives and Management Actions by Alternative

Management Objectives	Management Actions		
	Alternative A (No Action)	**Alternative B**	**Alternative C (Preferred)**
Riparian/Wetland Habitat Management (continued)			
		b. Aggrade stream channels by installing grade control structures in the stream in the form of large wood (trees and root wads) or rock in the stream channel.	b. Aggrade stream channels by installing wood (trees and root wads), rock , or other bioengineered structures within the stream channel. Channel widening would be done as appropriate.
		c. Reestablish a canopy cover along streams by planting oaks, Oregon ash, cottonwood and white alder.	c. Reestablish a canopy cover along streams by planting oaks, Oregon ash, cottonwood and white alder.
5. Provide fish passage for stream crossings.	5. Provide fish passage for stream crossings when necessary.	5. Provide fish passage for stream crossings when necessary.	5. Provide fish passage for stream crossings when necessary.
Wildlife Management			
1. Increase water availability in the uplands for CWTD and Special Status Species.	1. No active management.	1. No active management.	1. Provide one source of perennial water for every 320 acres (approximately 20 water sources). This would be accomplished through development of springs and installation of guzzlers (rainwater collection tanks). Selection would be made from a total of 38 potential sites (Figure 7).

Table 2-6. Management Objectives and Management Actions by Alternative			
Management Objectives	**Management Actions**		
	Alternative A (No Action)	**Alternative B**	**Alternative C (Preferred)**
Wildlife Management (continued)			
			a. Spring Development - Approximately 30 spring sites have been identified on the mid to upper slope areas for potential development. Spring development of the selected sites would include: 1) Installation of spring boxes or hand constructed features to hold water that would be piped to a trough or other structure outside of the water impoundment area for storage and availability to wildlife, cattle or equestrian use. The development would be fenced, if necessary, to protect the site from trampling by livestock and recreation use. 2) Improvement to the existing spring development that furnishes domestic water to the host site and office. 3) Development of springs associated with roads. These locations would be developed in conjunction with road repairs or upgrades. Such developments would be protected from vehicle traffic with a special drainage system designed to allow water to flow under the road (vented road subgrade).

Table 2-6. Management Objectives and Management Actions by Alternative			
Management Objectives	**Management Actions**		
	Alternative A (No Action)	**Alternative B**	**Alternative C (Preferred)**
Wildlife Management (continued)			
			4) Installation of guzzlers - Eight potential guzzler sites have been identified on ridge tops around the NBHMA. Guzzlers would provide a source of water to ridge top areas that lack water during the summer months. Installations would be used by wildlife and equestrian users. Guzzlers would be located near existing roads so they can be manually filled during dry summers and used for fire control.
2. Enhance and maintain biological diversity and ecosystem health to contribute to healthy wildlife populations (RMP, p. 37).	2. Wildlife use is limited to existing natural structures and artificial perches and nest boxes.	2. No dispersed structures for wildlife would be developed. Brush and slash resulting from management activities would be piled to create cover for wildlife. This would benefit various species such as rodents, reptiles amphibians and quail.	2. Provide larger tree attributes in selected conifer stands (Figure 9). Older tree/forest attributes would be promoted by snag creation. Brush and slash resulting from management activities would be piled to create cover for wildlife. This would benefit various species such as rodents, reptiles amphibians and quail.
Recreation			
Provide a range of recreational opportunities compatible with the management of CWTD and other Special Status species.	1. The infrastructure consisting of 32 miles of road and 40 miles of trails would be available to the public for non-motorized use (hiking, mountain biking and equestrian). The NBHMA would also be available for primitive camping and hunting according to ODFW regulations.	1. The infrastructure consisting of 32 miles of road and 40 miles of trails would be available to the public for non-motorized use (hiking, mountain biking, equestrian use and primitive camping). Hunting would be allowed in accordance with ODFW regulations.	1. The infrastructure consisting of 32 miles of road and 40 miles of trails would be available to the public for non-motorized use (hiking, mountain biking, equestrian use and primitive camping). Hunting would be allowed in accordance with ODFW regulations.

Table 2-6. Management Objectives and Management Actions by Alternative			
Management Objectives	**Management Actions**		
	Alternative A (No Action)	**Alternative B**	**Alternative C (Preferred)**
Recreation (continued)			
	2. Some trails may be closed due to unacceptable erosion or damage	2. Some trails may be closed due to unacceptable erosion or damage	2. Some trails may be closed due to unacceptable erosion or damage. Approximately one mile of additional trail would be developed to provide better access and disperse public use. New recreational trails would be constructed according to the standards of BLM Handbook H-9114-1 "Trails" (1984). Where roads and trails intersect fence lines, gates would be installed. New fence construction along roads and trails would be set back ten feet where practical. Large culverts would be placed on Chasm Creek to provide stream crossing for equestrian users. Water developments described previously would also be available for equestrian use.
	3. The four existing pullout parking areas along County Road 200 (Figure 6) would not be maintained for public use. One pullout is considered a safety hazard and would be blocked to prevent public use.	3. The four existing pullout parking areas along County Road 200 (Figure 6) would be maintained for public use. One pullout is considered a safety hazard and would be decommissioned.	3. Four existing pullout parking areas along County Road 200 (Figure 6) would be maintained for public use. One pullout is considered a safety hazard and would be decommissioned. Pullouts would be extended a maximum of 50 feet and graveled to accommodate parking, improve public access, and meet safety concerns with loading and unloading of vehicles and parking on road shoulders.

Table 2-6. Management Objectives and Management Actions by Alternative

Management Objectives	Management Actions		
	Alternative A (No Action)	**Alternative B**	**Alternative C (Preferred)**
Recreation (continued)			
	4. The main barn does not meet building code for public use and would be torn down or used for storage and fenced in to discourage public use.	4. The main barn does not meet building code for public use and would be torn down or used for storage and fenced in to discourage public use.	4. Main Barn Pavilion Development - Development would take place on approximately two acres of land presently occupied by the main barn that served the ranch. This barn has been determined as not meeting safety code for public use and would be torn down and disposed of. A group shelter with a cement floor would be constructed on the same site. Parking would be prohibited along the stream bank; parking barriers would be used to protect the stream bank. The parking area would not cut into the hillside. The parking area would be designed to avoid concentrating drainage onto the stream bank, or into the creek. Design features would include outsloping and graveling parking lot to reduce runoff. A double vault toilet would be installed to meet public needs and contain waste. A manure bin would be constructed to contain horse waste in the area. A roof would be built over the bin to prevent water accumulations. The manure bin and vault toilet would be sealed to prevent water contamination by leaching. The toilet would be a minimum of 100 feet from Jackson Creek.

Table 2-6. Management Objectives and Management Actions by Alternative			
Management Objectives	**Management Actions**		
	Alternative A (No Action)	**Alternative B**	**Alternative C (Preferred)**
Recreation (continued)			
			5. West Entrance Development - The development would take place on approximately 1.5 acres. A single vault toilet would be established to meet public needs and confine wastes. The vault toilet would be sealed to prevent water contamination by leaching. 6. Doc's Landing Development - The development would take place on approximately 1.5 acres. A concrete boat ramp would be constructed to accommodate heavy fire suppression equipment, such as water tankers. It would be available for use by the Glide Rural Fire Department and the Douglas Forest Protection Agency in addition to providing recreational river access and other management activities. A single vault toilet would be located near the parking area to accommodate public needs and contain wastes. The toilet would be sealed to prevent water contamination and placed outside the 100-year floodplain.

Chapter Three

The Affected Environment

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Changes Between The Draft And Final EIS

The following changes were made in Chapter Two between the draft and final EIS:

- Chapter organization was rearranged in order to clarify presentation.
- Additional description was added

Affected Environment

Introduction

This chapter describes the conditions currently existing on the NBHMA. This allows the reader to better understand the changes and effects caused by implementing one of the three management alternatives. First, the basic physical setting, including climate, geology, and soils are described. Then the history of the area and cultural values are characterized. Resources identified, but not significant on the area, are then delineated. The chapter concludes by presenting the existing conditions of various resources important to the NBHMA. Many of the characteristics of the NBHMA presented below were transcribed or summarized from the North Bank Watershed Analysis (Roseburg District BLM, 1997).

Physical Characteristics

The NBHMA contains approximately 6,580 acres of land. The topography of the NBHMA is characterized by dissected hills of dominantly moderate steepness, alluvial fans and narrow flood plains. The slope breakdown is given in Table 3-1.

Elevations range from 520 feet at the North Umpqua River to 1,980 feet at the headwaters of Jackson Creek. The topographic relief from the drainage bottom of the major creeks to the adjacent ridge tops is typically 500 to 900 feet. The average annual rainfall is between 34 and 38 inches. Over 80 percent of the precipitation occurs from October to April. Summer maximum temperatures are typically in the low 80’s°F and winter minimum temperatures are typically in the mid 30’s°F; the annual temperatures average 54°F.

Geology and Soils

Roseburg volcanics and associated sedimentary deposits form the major geologic features of the area. The watersheds of Chasm, Powerline (Jackson Creek), and Whitetail Creeks comprise a large portion of the NBHMA and have substantial flood plain and fan deposits of very deep alluvium in the lower reaches. Many stream channel segments of these creeks and their larger tributaries are deeply incised with near vertical banks of eight to twenty feet.

About 90 percent of the area is composed of soils whose clay fraction is high in montmorillonite (National Cooperative Soil Survey of Douglas County, Natural Resource Conservation Service). Montmorillonite is a type of clay with high, moisture related shrink-swell capability. Deep cracks commonly form in these soils with clayey textures during the dry season then seal up during the wet season with very slow moisture infiltration and permeability. These soils exist in both upland sites (colluvial soils and soils formed over bedrock, primarily basalt) and lowland alluvium. Their depths range from very shallow (<10 inches) over hard or soft bedrock to very deep (>60 inches).

The upland soils are typically well to moderately well drained and have a xeric moisture regime (moist wet season profiles that are dry for lengthy periods for the remainder of the year). Water is removed from

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well drained soils readily but not rapidly so that wetness does not inhibit root growth during the growing season. Moderately well drained soils are wet (saturated with moisture) within the root zone for a short period during the growing season. The moderately well drained soils are concentrated around lower order drainages and toe slopes. Soil depths ranging from very shallow to deep (less than 10 to 60 inches) are all well represented at the upland sites. Shallow and very shallow soils over hard bedrock are common but possibly not quite as extensive as the Soil Survey indicates based on site investigations (Cressy, field observations 1996). The largest concentrations of shallow soils are in grasslands. Upland surface soil textures are typically silty clay loams (30 to 40 percent clay) while subsoils are silty clay loams, silty clays and clays (27 to 60 percent clay). Shrink-swell capacities for these soils are moderate to high. The organic matter content is moderate to high (one to six percent). The combination of texture and organic matter makes these soils moderately erodible under bare soil conditions. The most common soil series mapped in the uplands are Climax, Dixonville, Edenbower and Philomath.

A large percentage of soils in lowland riparian zones, floodplains and alluvial fans are moderately well drained to poorly drained. In poorly drained soils, water tables are near or at the surface for lengthy periods of the year. The lowland soils are deep to very deep (40 to greater than 60 inches). Their surface textures are typically silty clay loams and silty clays (30 to 60 percent clay) and their subsoil texture are typically silty clays and clays (40 to 70 percent clay). Shrink-swell capacities for these soils are high. The organic matter of the surface is high (3 to 6 percent) and commonly extends deep down the soil profile. Deep-seated, slow mass movement (creep) occurs on these soils. The most common lowland soil series mapped are Climax, Curtin, Yoncalla and Natroy.

About 90 percent of the soils (both upland and lowland) have high runoff potential. Soils high in mont-morillonite clays, shallow and very shallow soils over hard bedrock and high water tables account for the high percentage.

Six years after the cessation of livestock grazing, light residual compaction typically remains in the surface soils to depths of five to eight inches (Cressy, field observations 1999- 2000 and literature review of research conducted by Bunn and Singleton, 2000). Below is dense subsoil. Apparently there was considerable healing of compaction during that six-year rest period. High shrink-swell soils, good organic matter content and dense root mats of perennials and certain annuals are likely important healing factors which contributed to the current condition of the surface soils in the NBHMA. Open areas completely dominated by the annual grass Medusahead, however, have moderate residual compaction. This condition may be due in part to the weak, shallow root mats of Medusahead. Heavy compaction was only evident in roads and trails. Indicative of the light compaction in the NBHMA is a relatively low soil density, the predominance of stable, mostly small sized surface soil aggregates in the shape of spheres and blocks, fairly good porosity and dense root mats. When dug, these aggregates readily separate and keep their shape with little earth breaking down into individual soil particles. As compaction increases to moderate, soil density and aggregate size increases and porosity decreases. The aggregates begin to get a flattened appearance (the beginnings of platy structure). When dug out, many aggregates do not readily separate. In heavy compaction the surface soil is very dense and breaks into strongly compressed plates or large massive clods. Root masses are thin.

Vegetative Setting

The NBHMA can be described in four distinct habitat types (Table 3-2, Figure 12): Grasslands and Oak Savannah (currently about 1,890 acres or 29% of the NBHMA), Hardwood / Conifer forest (currently about 3,410 acres or 52% of the NBHMA), Oak Woodlands (currently about 1,150 acres or 17% of the NBHMA), and other habitat such as rock outcrops and ash wetlands (currently about 130 acres or 2% of the NBHMA). The Grasslands habitat type is composed primarily of grasses and forbs although it may contain scattered trees and brush patches. The Oak Savannah habitat type consists of a grasslands understory with up to 30% of the cover consisting of oak trees in scattered or in clumps. The Oak Woodlands habitat type is dominated by trees (primarily oaks with scattered conifers). The Hardwood / Conifer habitat type is the typical forested setting associated with low elevation valley fringe. The grasslands and oak/savannah woodlands seem to have dominated this landscape in the past as a result of

to return to the table of contents: Click here, Type a 7 and press enter (or return).

Grassland.

Oak Savannah

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Hardwood Coniifer

Oak Woodland

to return to the table of contents: Click here, Type a 7 and press enter (or return).

soil types and fire regimes. The young conifer stands are a result of harvesting the older timber stands during the last 100 years and natural seeding to Douglas-fir (Figure 12).

Hickman (1994) characterized the area noting that uplands with the best soils contained, "... coniferous forests of Douglas-fir and subordinate species such as Pacific madrone, big leaf maple, California black oak, ponderosa pine, incense cedar, and sometimes Oregon white oak. Drier type soils in the uplands support hardwood dominated stands of Pacific madrone, Oregon white oak, and sometimes California black oak, but may also contain minor amounts of Douglas-fir, ponderosa pine, and incense cedar. Some shallow slopes support only scattered Oregon white oak and grass or shrubs such as wedgeleaf ceanothus and Pacific poison oak ...". "This zone is separated ecologically from the adjacent vegetative zones by its dry, warm climate, the high proportion of hardwoods in the uplands and the absence of indicator species from the Grand Fir Zone." Limited ground surveys have noted that the oaks are typically greater than 100 years old. Dense oak woodlands are undergoing competition mortality, with little regeneration. Conifers are young to mature and typically under 40 years old since most of the conifers were logged off in the last 30 to 40 years. Conifer regeneration is abundant in forested habitats. Although nearly 52% of the area is hardwood/conifer forest, much of this is actually composed of scattered mature oaks, hardwoods, and younger conifers overtopping grasslands with a brush component. Denser conifer stands exist, mostly on north-facing slopes or in larger draws. A timber appraisal noted that hardwood stands contained about 111 trees per acre (tpa), averaged 11.1 inches in diameter at breast height (DBH) and were 64 feet to the commercial top. Conifer stands had 32 tpa, were 14.3 inches in DBH and were 49 feet to a commercial top. Mixed stands contained 77.4 tpa, averaged 12.7 inches in DBH and were approximately 60 feet to the commercial top.

Fuel Setting and Description

Approximately 50% of the NBHMA consists of the hardwood/conifer vegetation type. Much of this type consists of mature oak, hardwoods, and younger conifers overtopping grasslands and a component of brush. This fuel type is typical of Fuel Model (FM) 9 (fire is carried primarily by hardwood litter). Flare ups and torching of trees would occur when heavier concentrations of fuel is encountered. There are areas with dense conifer stands, usually in the draws and on the north slopes. Conifers occupied more of the site in the past, but were logged off in the last 30-40 years. Many times the oak/hardwoods were left as shade trees because they provided little value for harvest. Some of the land was burned to reduce slash and encourage grasses. The use of fire for slash burning is not well documented. It might have been a limited application, with extensive grazing reducing slash through compaction as the more common approach.

Another 27% of the NBHMA is considered oak woodland and oak savannah. In the more open oak/hardwood areas, grazing had reduced much of the brush, and crushed or compacted much of the natural fuel (i.e. branches and stems). Many of these oak/hardwood areas have been heavily grazed, and occasionally burned, leaving little natural fuel accumulations. These conditions will change over time without fire or grazing being applied. The absence of grazing in the last six years has allowed brush to occupy more of the ground. These fuel types can also be considered Fuel Model 9. Fire behavior would be characterized as moderately fast moving ground fires that occasionally flare up when a "jackpot" of heavy fuels are encountered. The intensity of most fires in these types is low to moderate, with flashy, short-duration fires moving quickly through the woodlands. As grazing is curtailed, ground fuels and ladder fuels, (i.e. brush and conifers reproduction) will increase as will the fire intensity. Mature oaks are considered somewhat resistant to fire because of their relatively thick bark and height of crown from ground level. A combination of manual fuel treatments and burning on a 5-10 year rotation is being used by Department of Natural Resources in Washington to maintain oak woodlands.

Approximately 18% or over 1,200 acres of land is classified as grassland. The fire behavior Fuel Models for this type are FM 1 (short grass less than one foot) and FM 3 (tall grass over two and one half feet). Fires in these types are surface fires that can move very rapidly. Much of this grassland type has been burned periodically to benefit cattle. Burning this fuel type regularly appears to be beneficial to grazing animals as it provides for better forage. If grazing practices are no longer allowed on this property, a

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regular burning regime of three to five years may be needed to restore/maintain these grasslands.

The fire regime for the NBHMA is a specialized one as the vegetation has been manipulated for centuries by Indians, settlers, and ranchers. Typical forests north of Roseburg have fire regimes with very infrequent fires that can be very intense and destructive. Fire return intervals can be as great as 300 years. The NBHMA has been burned and grazed and harvested for hundreds of years. Based on the current vegetation, (heavy to grassland, oak-savannah, and oak-hardwood forests) the fire regime is considered a Low-Severity Regime. These plant communities recover rapidly from fire and are directly or indirectly dependant on fire for there continued persistence. This regime is characterized by frequent fires burning with low intensity. The frequency of fire has been greatly influenced by human caused fires.

Natural fire starts (lightning) have been very limited. Historical records show that lightning and human caused fires are not that common on the NBHMA. Fire start information from the Oregon Department of Forestry from 1967 to 1999 show a total of 23 fires had occurred. Lightning accounted for less than 20% of the starts. Human caused fires accounted for more than 50% of the fires. Most of the fires were small although a fire caused by a machinery operator in 1985 was a size class D fire (100-300 acres). The NBHMA is considered to be in a low fire occurrence area. Using recent fire history data, a risk assessment was done and results show the NBHMA has a low fire risk rating. Activities within the use area like camping, hunting and recreational use and a major travel corridor on the south boundary add to the risk for human-caused fires occurring.

The Bureau of Land Management has a master cooperative fire protection agreement with the Oregon Department of Forestry (ODF). This agreement gives the responsibility of fire protection of all lands within the NBHMA to the Oregon Department of Forestry. This contract directs ODF to take immediate action to control and suppress all fires. Their primary objective is to minimize total acres burned while providing for fire fighter safety. The agreement requires ODF to control 94 percent of all fires before they exceed 10 acres in size.

Due to ownership patterns and political constraints in southwest Oregon, the use of natural ignited prescribed fire (NIPF) to meet resource objectives is not recommended. There are stipulations within the protection agreement with ODF that allows BLM to designate areas that require special fire management activities during suppression efforts. The District Fire Management Plan (FMP) also requires specific fire suppression and rehabilitation measures.

Fire History

Fire played a major role in the development of the current landscape at the NBHMA, although to what extent we will never fully understand. The North Bank Watershed Analysis documents the use of fire. Native Americans had for thousands of years burned off the river bottoms and valley areas where they had resided. Many burns were completed in late summer and early fall and sometimes these fires burned up into the timbered foothills until extinguished by heavy rains. This is substantiated in historical documentation from the 1851 Diary of George Riddle. “In all the low valleys of the Umpqua there was very little undergrowth, the annual fires set by the Indians preventing young growth of timber. The NBHMA lands were probably burned on a regular basis in the past, first by Indians, and then later by homesteaders and ranchers.”

According to Fred Reenstjerna, Curator of the local museum, it was common practice in the 1800’s for the homesteaders to clear the land of the “useless” softwood trees like Douglas-fir and to encourage the development of grass and forbs for grazing animals. These settlers used the hardwood trees for building homes, barns, and other structures. The hardwoods were considered more valuable for lumber and in course more land was cleared to benefit grazing animals. Settlers would use fire at times to rid the land of slash and brush and to increase forage.

County surveyor notes from 1850’s describe lands occupied by the NBHMA as containing “large amounts of good grazing land well adapted to the raising of stock”. The surveyors notes from 1855 describe land

to return to the table of contents: Click here, Type a 7 and press enter (or return).

in Township 26-5 as “hilly on the north and south sides and mostly valley in the center. The hills are principally oak openings and prairie, generally brush with fir timber on the north sides and in ravines”.

Historical Setting and Impact on the Area

Prehistoric use of the area appears to have followed a pattern similar to that observed over much of western North America. The initial occupation was perhaps by the transitory Clovis peoples who focused on the hunting of big game, such as mammoth and ground sloth. As time passed and the big game populations disappeared, the people broadened their resource base to include many plants and animals. They became more sedentary, eventually aggregating in pithouse villages.

Euroamerican settlement became more active in the mid-nineteenth century. Much of the NBHMA passed into private ownership through the provisions of the Land Act of 1820. By 1870, the NBHMA was essentially owned by two individuals with an east-west split of the ownership. It came into single ownership in the 1980’s. In the early 1990’s, the Roseburg District began to look at ways to secure the Columbian white-tailed deer habitat that would make the de-listing of the species possible. The property was acquired by trading 360 acres of BLM timberland for the Dunning Ranch. The property passed to public ownership managed by the BLM in 1994.

While in private ownership, the land was primarily used for livestock grazing since the steepness of the terrain made it unsuitable for crop production. Although no exact records have been found, the area may have been used for livestock grazing for most of the last 145 years. This pattern of use has moved the area outside the range of natural variability. This has impacted the landscape as grasslands were subjected to grazing by cattle and sheep. Exotic vegetation was introduced by planting non-native pasture grasses and through the spread of weed species which has largely displaced native flora. Fire use was reduced, although it was used on a more regular basis on the eastern portion of the area for cattle forage enhancement. The area was intensively logged from the 1960’s, thus few older trees exist on the area. Some timber stands were converted to pasture/grasslands.

Prior to the early 1960’s, there was very little development along North Bank Road from Wilbur to Glide. Land ownership in the area along North Bank Road consisted primarily of five or six major ranches. As access increased into the North Bank area, several portions of ranches were sold to developers and rural residential development began. On properties surrounding the NBHMA, many segments along the North Umpqua River have been developed. The riparian area is key habitat for CWTD, especially during the summer when water in the uplands dries up. In addition to natural riparian vegetation, the deer are now attracted to the succulent forage created by hay fields and residential landscape plantings. The deer browse these enough to cause plant damage. The problem is compounded by the fact that some landowners attract deer into their yards by providing food, thus further encouraging the deer to concentrate and stay in residential areas. Concentrating in residential areas makes the deer more susceptible to disease, inbreeding and vehicle related mortality.

Since BLM acquisition in 1994, no grazing, controlled burning, or logging has occurred. This has resulted in some components of CWTD habitat improving and some habitat components declining, depending on the vegetation type. Some riparian areas have improved while much of the grass and grass/forb areas are declining. Several years of annual growth with no grazing or prescribed fire has resulted in grasslands with thick, dense mats of dead vegetation reducing forage value to CWTD. New annual growth in these areas is much reduced and deer seldom forage on grasslands mixed with old dead vegetation. Shrub lands have expanded and conifers have continued to encroach into hardwood areas making those areas less desirable to CWTD. The North Bank WA contains a more detailed description of the historical setting of this area.

to return to the table of contents: Click here, Type a 7 and press enter (or return).

Resources Identified, but Not Used for Planning

The federally listed northern spotted owl (endangered) and marbled murrelet (threatened) are unlikely to nest on the property (Exchange EA and Decision Record for the NBHMA 1993, Watershed Analysis 1997). For these species, nesting opportunities are limited by the lack of adequate habitat, habitat fragmentation, or distance from foraging areas. Because nesting opportunities on the NBHMA are unlikely for these species, they were not considered during the planning process.

Bald eagles (federally threatened) have been observed on the area during the winter with a historic nest site and active nest within 2.5 miles. As the Decision Record and consultation with the USFWS noted (Exchange EA, ROD, 1993, page vii), public ownership of the NBHMA would not likely have an adverse affect on the bald eagle and would have a positive benefit in securing winter habitat and potential nest sites. Since the species was not nesting on the area and all alternatives secure winter habitat and potential nest sites, the bald eagle was not considered further in the planning process.

Columbian White-tailed Deer

The CWTD occurs throughout the NBHMA and surrounding areas. It is currently listed as a federally endangered species; however, it has been proposed for delisting (Federal Register: May 1, 1999 Vol. 64, Number 90, pages 25263 - 25269). The state de-listed the CWTD from endangered to sensitive in 1995 (November 1995 ODFW Commission meeting).

The Roseburg population of CWTD has fluctuated widely in the past (Figure 11). Severe weather has been known to impact CWTD. An abnormally long period of sub-zero temperatures with deep snow cover during the winter of 1969-1970 contributed to a population decrease at that time. CWTD have since recovered and currently exceed 5,900 animals in the Umpqua Basin (ODFW report, unpublished). Currently, CWTD are found from Myrtle Creek in the south, to Elkhead in the north past Glide on Highway 138 to the east and south along the bottom lands of Little River. The population has expanded its range to Umpqua and possibly beyond to the west. Despite the apparent increase in population and the acquisition of secure habitat, less than ideal habitat could still affect the Roseburg population. Research and annual inventory work throughout the range shows that reproduction is very low (Kistner and Denney, 1990, page 6) and fawn survival during the first month of life is less than 50% (Ricca and Jackson ODFW 1996 & 1997 field work). Both of these conditions indicate poor nutritional levels and are indicative of a population that may be at carrying capacity for the habitat (*Quality Deer Management*, 1995; Hall, et. al. 1984). Hunters that have taken blacktail deer from the management area have also commented on the poor body condition of both bucks and does that have been harvested during the last two years (Mires, personal conversations with hunters).

Since the BLM acquired the NBHMA, considerable effort has been focused on gaining more knowledge on CWTD. Much of the effort has occurred on and near the NBHMA. Two graduate research projects through Oregon State University (OSU) are nearing completion and another graduate research project has just begun. Besides those formal research projects, ongoing activities involving CWTD include: genetic analysis (Texas A & M University), a fawn mortality study (ODFW), a capture and relocation trial (ODFW), a deer health study conducted by the National Wildlife Health Center in Wisconsin, and necropsies of deer. Some findings include: (1) fawn survival is low and there is evidence that some fawns are being abandoned by their mothers; (2) necropsies of deer indicate most adult deer, both male and female, have very low fat reserves and are considered in poor physical condition; and (3) female deer with fawns have virtually no fat reserves (personal conversation, T. Hensley, USDA Veterinarian). Examination of a CWTD fawn from an area with better forage conditions revealed apparently normal internal deposits of fat (ibid). NBHMA white-tails are eating low quality forage such as rushes. Internal and external parasites are abundant. CWTD tend to concentrate in the creek bottoms during the dry seasons. Collectively, the information suggests CWTD are at a population density that is at the upper end of the carrying capacity of their existing habitat.

to return to the table of contents: Click here, Type a 7 and press enter (or return).

Animals in a poor nutritional state are more susceptible to diseases, parasites, and the effects of extreme weather. While diseases such as blue tongue and epizootic hemmorhagic disease have been mentioned as potential threats to the deer (Kistner and Denny, 1990) there is no record of these diseases causing any problems in the area. Likewise, there is no evidence that disease transmission between livestock and deer has ever been a problem in Douglas County. Since the NBHMA was acquired, an attempt has been made to inventory CWTD numbers with the use of Forward Looking Infra-red scanners (FLIRS) in a helicopter. FLIRS counts have estimated the NBHMA has a population of 152 to 212 animals and a density ranging from 11.1 to 14.8 animals per square mile. Population trends are monitored within the current range of the CWTD. The North Bank Road is included in the inventory. Data indicates that CWTD numbers increased in the mid 1980's and have remained relatively stable during the 1990's (Figure 12).

Research and personal observation by wildlife biologists indicate that the principle habitats utilized by CWTD are oak savannah/oak woodland types and riparian areas associated with oak complexes as the preferred habitat. Preliminary research conducted on the NBHMA confirms the association of CWTD to riparian and riparian/oak habitats (Black, personal communication). This habitat type occurs principally in lower elevation areas throughout the Umpqua Valley and makes up approximately 30% of the NBHMA. Portions of the hardwood/conifer type also contribute to this high CWTD use area making the actual percentage over 30% (Figure 13). Oak savannah and woodlands are also desirable for development or ranching. Commercial and residential development, plus clearing for pasture and firewood, has heavily impacted the oak habitat found in the valley. This process appears to have accelerated during the last 15 years throughout the range of the Roseburg population of CWTD, including areas near the NBHMA.

The cessation of management practices such as grazing and burning during the 1994 through 1999 period have allowed vegetative changes to take place. During this period, thatch has built up in grassland areas resulting desirable forbs and grasses being covered by the thatch layer which hinders the growth and expansion of these species with a resulting loss of plant diversity. This has resulted in a loss of forage for CWTD. In addition, thatch layers appear to retard fall and spring green up and availability of important forage plants by insulating soils and eliminating light required for many plants to initiate growth. Along with this, is the increasing invasion of undesirable shrub species, most notably one-seeded hawthorne (*Crataegus monogyna*). This shrub tends to form impenetrable thickets that reduce forage for deer. Within the oak woodland areas, conifer seedlings have established and will dominate oak areas if not controlled. In the meadow areas, significant cedar encroachment is taking place and will eventually cover suitable forage areas. All of these responses have reduced forage for CWTD. (Personal observation, G. Mires, BLM; M. Black, ODFW)

Along with the direct loss of habitat is the apparent slow regeneration of white oak woodland which are believed to have contributed to the decline in the CWTD population. Based on preliminary work done in the NBHMA, there is very little evidence of established seedlings within the areas that have been surveyed. The key to maintaining a viable population of CWTD within the analysis area is to ensure that the NBHMA is managed to maintain or develop habitat types that will support healthy CWTD. Preliminary results from recent research indicate that CWTD rely heavily on plant species that are associated with moist growing sites. This is most dramatic during the late summer and fall time periods which are quite dry. CWTD distribution on the NBHMA is less confined during the times of year when water and green vegetation is available in the uplands (Black, personal observation).

Special Status Plants

Botanical surveys were conducted on the NBHMA shortly after it was acquired by the Bureau. One hundred and four exotic plant species were identified. Non-native species are so widespread that few patches of native plant assemblages were identified. The overstory component consists of primarily native species, but the grass layer is dominated by non-native grasses and some highly undesirable non-native forbs are widespread. Some of the more common examples are: Medusahead (*Taeniatherum caput-medusae*), Tall fescue (*Festuca arundinacea*), Dog-tail grass (*Cynosurus echinatus*), field hedge parsley (*Torilis arvensis*), subterranean clover (*Trifolium subterranaeum*), and common vetch (*Vicia sativa*). Appendix 2 contains a list of plants found on the NBHMA. Thirteen particularly undesirable plants

to return to the table of contents: Click here, Type a 7 and press enter (or return).

classified as noxious weeds have been identified (Table 3-3). Several patches of noxious weeds (mainly thistle and Scotch broom) exist and tansy ragwort, Italian thistle, Canada thistle, milk thistle, and St. John's-wort are common and widespread.

Eleven special status plant species are known to occur on the NBHMA (Table 3-4). Red root yampah, Howell's false caraway, Hitchcock's blue-eyed grass, saw-toothed sedge, and firecracker plant occur in meadow and oak savannah habitat. The shrubby rock cress grows on basaltic rock outcrops. A portion of its habitat has already been lost due to quarry development near the NBHMA on private property. Habitat has also been impacted by wildfire. The coffee fern occurs on mossy covered rock outcroppings in two locations. The mistmaiden grows in open areas with shallow soils which are rocky and retain moisture. Popcorn flower occurs in open vernal wetlands and the crumia moss grows on rocks along streams. Olney's sedge occurs along meadow edges and in riparian hardwood forests.

Wildlife

The NBHMA contains a wide diversity of habitat types. This mosaic of grassland, savannah, mixed conifer, and oak woodland habitat creates ideal conditions to support a diversity of wildlife species. There are approximately 216 vertebrate species present on the NBHMA of which 135 are bird species which use or are expected to use the NBHMA (Appendix A). Some species use the area for nesting, other species use the area during the winter and still others use it during migration or dispersal from natal nest sites. Twelve of the avifauna species are species of management concern (Appendix 1). Of these, the Vaux's swift, acorn woodpecker, northern pygmy owl, pileated woodpecker, purple martin, and western bluebird require forest conditions that favor mature trees with snag and cavity development. There are also three federally listed species: the bald eagle, marbled murrelet, and northern spotted owl. Bald eagles winter on the area, nest within three miles of the property, and could eventually nest on the NBHMA. The NBHMA is outside the range of the marbled murrelet. There are three historic or current northern spotted owl nest sites within two miles of the NBHMA. Golden eagles are frequently observed utilizing the NBHMA. They are protected by the Bald Eagle Protection Act (16 U.S.C. & 668-668d, June 8, 1940, as amended 1959, 1962, 1972 and 1978). In addition to the above species, the Bureau also manages for other raptors. From 1983 to 1994, winter raptor surveys were done in the vicinity. During the time surveys were conducted, it was noted that the number of raptors per mile was highest along County Road 200, part of which traverses the NBHMA. Rural residential development near the NBHMA increased during this time period, the magnitude of which appears to have had an adverse impact on raptors in the lower elevations (Watershed Analysis 1997). Adverse impacts to wintering raptors within the NBHMA has resulted from vegetative change that has taken place in the grassland areas. As a result of increased grass height and thatch buildup, prey species that are active in the winter have become less available to raptors. This condition persists throughout the year but is most noticeable during the winter months when many raptor species tend to congregate in the lowland areas (Mires, personal observation).

Neotropical migrants such as swallows, thrushes, vireos, flycatchers, and warblers are also a group of management emphasis for the BLM. Currently, little is known about the status of most of these bird species on the property or their status in oak woodland habitats throughout the Umpqua Valley (Cross and Simmons, 1983). The habitat requirements for these species varies widely. Some of these species require fairly large, contiguous blocks of either grassland or forest habitat for successful nesting. Other species prefer smaller patches of habitat which contain more edge. Pre-project clearance surveys and specific research/monitoring projects will help provide information on the distribution and status of these species on the property.

Of the 55 mammal species which have been documented on the property or are likely to occur, 12 are listed as species of management concern (Appendix A). In addition to the CWTD, bats, the ringtail, and red tree vole were considered in the analysis of each alternative (Appendix A). The specific habitat needs of the bats vary by species, but generally include a need for older stands of timber and water. As noted previously, most of the conifer stands on the NBHMA are young; however, most of the oaks are 100 or more years old. As these areas mature, the addition of more cavities and loose bark will be beneficial to most bat species. Ringtails prefer rocky cliffs or canyons near water. This habitat type is limited on the

to return to the table of contents: Click here, Type a 7 and press enter (or return).

NBHMA especially during the dry season as upland sources of water become dry. Although the red tree vole is an old-growth associate (Thomas, et al., 1993), it has been documented on the property in small stands of second-growth conifers. This could indicate that the vole is more wide spread than was previously thought. Overall, quantitative data on the presence and status of these species on the NBHMA is not available.

Of the vertebrate species that occur on the NBHMA, Columbian black-tailed deer, cougar, bear, and western grey squirrels are considered game animals by the Oregon Department of Fish and Wildlife (ODFW). Game birds that occur in the area include mountain quail, California Valley quail, blue grouse, wild turkey, mourning dove, band-tailed pigeon, Canada geese, and other waterfowl. Hunting on the area is regulated by ODFW. Future changes in current hunting practices would depend on both agency's management objectives and population levels of game species. Predators on the NBHMA include coyote, cougar, bear, bobcat, fox (two species), raccoon, weasel, mink, skunk, bald eagle, golden eagle, red-tailed hawk, and the great-horned owl. These predators use existing wildlife populations as their source of prey.

The NBHMA contains habitat for approximately 16 species of reptiles and ten species of amphibians of which six species are on the sensitive species list for Oregon and are also Bureau sensitive species (Appendix A). Urban development and expanded farming operations in the Western Interior Valleys have contributed to the decline of the sharptail snake and western pond turtle (Puchy and Marshall, 1993). The turtle has suffered additional losses of riparian and wetland habitat. The clouded salamander likely declined in the Umpqua Valley because of forestry practices. The cause for declining populations of the foothill yellow-legged frog and the red-legged frog is unknown (Puchy and Marshall, 1993).

Field surveys have documented Coho salmon, steelhead, and cutthroat trout in approximately three miles of stream. Fish are absent in the upper reaches of all streams because of the lack of water in the summer months (Figure 14). Jackson Creek has the greatest potential for increased fish populations, but it is also limited by water during the summer, hiding cover, and elevated water temperatures. Healthy fish populations are not present within any of the NBHMA drainages. Based on the current degraded condition of the NBHMA's streams, it is unlikely that fish habitat or production will improve without active in-stream and riparian restoration.

In summary, the diversity of habitats present on the NBHMA contributes to the diversity of animals present on the property. Rural developments and agricultural expansion is expected to continue within the Umpqua Valley and oak savannahs will continue to be lost and not replaced (Puchy and Marshall, 1993). As the habitats surrounding the NBHMA are altered by human activities, the value of the NBHMA will increase in terms of providing secure habitat for wildlife. Oak savannahs and oak woodlands may become increasingly rare in the valley's landscape, yet these areas provide important habitats for over 140 species of wildlife (Gumtow-Farriar and Gumtow-Farrier, 1992).

The NBHMA provides potential reproductive, forage and/or passage habitat for 34 animal species of special concern (Appendix A). It also provides the necessary requirements for six plant species of special concern.

Recreation

Public access is by foot, horse or bike; only non-motorized recreation is allowed. Hikers, mountain bikers, bird watchers, hunters, and equestrian users have been observed using the area. All current roads and trails are open for non-motorized use and cross-country travel is not restricted. Public use of the area is currently at a low volume. Some camping has occurred at roadside pull-offs and in the interior of the NBHMA. Camping on the property is currently unregulated.

to return to the table of contents: Click here, Type a 7 and press enter (or return).

ODFW regulates hunting seasons on the NBHMA. Regulations are developed with the cooperation of the USFWS and BLM. Currently, North Bank is open to game bird hunting by the general public and limited permit entry deer hunting. Big game controlled hunts are limited to youth and master hunters. Future changes in current hunting regulations and practices would depend on all three agency's management objectives and population levels of game species. Use of firearms for other purposes are not permitted by BLM under federal regulations.

Loose dogs and dog training are prohibited on the NBHMA from April 1 until July 31 by Oregon Administrative Rules (635-51-048). Unleashed dogs that are used for specific management purposes by authorized personnel would be allowed with permission from the BLM.

Currently, facility development has consisted of conversion of the existing house to an office/meeting area, creating a pad with hookups for host trailer housing and placement of portable chemical toilets at the West Entrance and Main Barn. A school bus turnaround was constructed to improve safety near the west gate. The roads at the West Entrance and Main Barn have been graveled to improve management access. Some structures at the Main Barn site have been dismantled to reduce safety hazards. The remaining structure is an open air, covered shelter, with a dirt floor. This structure has been evaluated for structural integrity and safety and does not meet building code for a group shelter in its current state. The west feeder barn, middle feeder barn, and east feeder barn are still present on the property (Figure 2). Hazards from loose boards, nails, and structural weakness may still be present.

Pull out parking exists in several locations along the shoulder of County Road 200. Parking in front of the gates is prohibited in order to keep the entrance points clear of obstructions for management or research access. A graveled school bus turnaround exists about a quarter mile east of the Jackson Ranch and West Entrance. Pull out parking on the south side of County Road 200 requires users to cross over the road to gain access. Parking at Doc's Landing has been created by vehicles driving to the area and parking on the natural surface. Signs of soil and vegetation compaction are evident as the vehicles attempt to get as far off the road as possible.

Water Quality and Quantity

The NBHMA contains parts of five drainages. Three major drainages (Chasm, Whitetail and Jackson Creeks) flow toward the North Umpqua River and two smaller drainages flow into Cooper Creek Reservoir and Calapooya Creek. In the three major drainages, 40 to 99% of the drainage is contained within the boundaries of the NBHMA. Overall, there are approximately 49 miles of streams within the NBHMA. The streams in the area are predominantly intermittent or seasonal, although some water can be found in residual pools in Jackson and Whitetail Creeks. Summer pools remain suitable for fish, indicating some influence by ground water from springs or from land flows. Tributaries of the main streams are ephemeral and only flow in direct response to precipitation.

Human uses within the NBHMA have altered riparian areas and stream channels (North Bank WA, Human Uses and Vegetation Sections). Actual changes in riparian diversity and function are not known, but streams within the NBHMA are currently degraded. The general condition of the NBHMA stream channels are characterized as follows:

1. Stream reaches that are deeply incised with some areas as deep as 20 feet.
2. Large wood to dissipate stream energy, trap sediment and gravels and form pool habitat is lacking.
3. Floodplains are lacking or existing floodplains are disconnected from streams.
4. Stream shade is lacking.
5. Wide (approximately 100 feet) riparian area to store and release water during periods of little to no precipitation are scarce.

The factors above do not necessarily occur everywhere and some stream reaches are in a Properly Functioning Condition (PFC). The factors above probably contribute to stream reaches flowing intermittently or during storm events (ephemeral). It seems likely that historically more stream reaches flowed year-round (perennial). Climate conditions also contribute to flow conditions as the area has undergone four distinct wet/dry periods since the Roseburg weather station was initiated in the 1850's.

to return to the table of contents: Click here, Type a 7 and press enter (or return).

Historically the NBHMA was used for cattle production. Grazing pressure may have been higher in the riparian areas, particularly during the dry season due to the availability of water. This may have caused bank and vegetation trampling, compaction, removal of streambank and riparian zone vegetation which likely contributed to degraded riparian conditions. Intensive timber harvest and slash burning also occurred as well. Past management practices that altered vegetation likely impacted the watershed. These practices are believed to have resulted in higher peak flows which resulted in the down cutting of stream channels and stream degradation; therefore, it is reasonable to assume that historically the riparian areas were wider, contained more diverse tree and plant communities, and had more wetland habitat than what exists today.

In 1991, the BLM Director approved the *Riparian-Wetland Initiative* for the 1990's, which establishes national goals and objectives for managing riparian-wetland resources on public lands. One of the chief goals of the initiative is to restore and maintain riparian-wetland areas so that 75 percent or more are in a Properly Functioning Condition (PFC). Riparian and wetlands are properly functioning when adequate vegetation, landform, or large woody debris is present to dissipate stream energy associated with high 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 that stabilize streambanks 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 of biodiversity (BLM TR 1737-9, 1993). A properly functioning riparian system provides a wide array of vegetation and habitat diversity for wildlife, fish, and watershed protection. An assessment of PFC was done on 16.5 miles of streams of North Bank Watershed Analysis Unit reveals that 3.5% are in PFC with adequate vegetation, proper landform, or large woody debris to dissipate stream energy. Nearly 34% of the streams inventoried are functioning at risk with an upward trend meaning the condition is likely to improve and 11% are functioning at risk with no apparent trend. Approximately 44% of the inventoried streams were functioning at risk with a downward trend meaning that the riparian area is functioning, but some soil, water, or vegetation attributes are causing the system to be susceptible to degradation (Figure 15). Approximately 8% of the assessed streams are nonfunctional, lacking vegetation, landform, or woody debris to dissipate stream energy and reduce erosion.

Degraded Stream with deeply incised channel.

to return to the table of contents: Click here, Type a 7 and press enter (or return).

Below is a summary of the current condition of three major drainages on the NBHMA:

Chasm Drainage

Survey notes indicate that a large portion of the main stream and the confluence of smaller tributaries intersecting Chasm Creek are deeply incised. Stream headcuts (a change in channel gradient due to erosion) were observed along Chasm Creek and its tributaries. The change in stream gradient due to headcutting is approximately 2 to 6 feet. There are road/stream crossing problems along Chasm Creek where undersized culverts and poor design features were used by previous landowners.

Powerline (Jackson Creek) Drainage

Riparian vegetation within the Powerline drainage is either nonexistent, lacking diversity, or too narrow. Many areas lack sufficient vegetation to provide stream-side shade and protect streambank integrity. The survey notes indicate that a large portion of west fork and the upper east fork of Jackson Creek are downcut and other tributaries are downcut to a lesser degree. The lower stream reaches of Jackson Creek appear relatively stable (e.g., excessive downcutting is not occurring) which may indicate some natural recovery is occurring. Riparian vegetation, such as sedges are becoming established on some streambanks. Some banks are being undercut and sloughing into the creek, widening the channel and building floodplain areas. The tributaries of Jackson Creek have not been inspected.

Whitetail Drainage

The PFC survey notes that Whitetail Creek is severely downcut.

Hydrologic Factors Affecting Water Quality

The NFP FSEIS (pp. 3&4-54 through 55) describes two classes of changes that effect the hydrologic processes. One consists of the removal of vegetation (timber harvest) and the other consists of those that control infiltration and the flow of surface and subsurface water (primarily roads and compaction of soil). These effects result in accelerated rates of erosion and sedimentation.

The hydrologic processes on the NBHMA are strongly influenced and controlled by the relatively uniform geology – fine-grained, massive bedrock, and clayey soils. According to the WA, “About 90% of the North Bank WAU is occupied with clayey and very clayey soils high in montmorillonite …” and “… with very slow infiltration and permeability in the wet season.” A majority of the remaining 10% is exposed bedrock. Both components have a high runoff and low erosion potential. The stream flows are influenced to a large degree by the high runoff potential of the clayey soils and of exposed, low permeability bedrock. Some increase in peak flows could be attributed to vegetation alteration in the area, in particular past harvesting of conifers. The natural erosion rates of undisturbed clayey soils in the area are rated as low to very low. The surface erosion coefficients (interrill erodibility, rill erodibility and critical shear stress) for clayey soils are low, on the order of five to ten times lower than loamy soils, and on par with gravely soils. Rill and gully erosion was observed only along steep road segments, and below some road culverts on slopes that are steeper than 10%. Erosion of bare stream banks is slow, and depends primarily on slumping of the banks.

Removal of Vegetation from Past Timber Harvest

Little is known about timber harvest practices on the NBHMA. Aerial photographs from 1963 show approximately 45% of both the Jackson Creek and Chasm Creek drainages were logged. Generally, clearcuts or partial cuts were conducted (North Bank WA 1997). A vegetation map from 1900 (WA - Figure 3-3) shows that less than 20% of the Chasm Creek drainage and 35% of the Powerline drainage were classified as “Woodland”. The WA estimates that approximately 45% of the Chasm and Powerline drainages were affected by timber harvest activities by 1963. Since then, some recovery of the conifer vegetation has occurred. Results from studies of small experimental water-

to return to the table of contents: Click here, Type a 7 and press enter (or return).

sheds suggest that changes in hydrologic processes due to timber harvest and roads result in increased peak flows. However, results are extremely variable, with peak flow increases differing by location, size of the runoff event, amount of disturbance, time of year, type of climatic event and time since disturbance. The effects of roads and timber harvest on floods are not well defined and difficult to detect. Flows generated from early fall rains are not considered channel forming; lacking the tractive shear forces that affect the fluvial morphology. The higher recurrence interval flows (primarily during the later part of fall and winter, soil moisture differences), depression storage, and interception play a minor role in slowing down the runoff into stream channels. In the case of NBHMA, the other elements of runoff from land (soil moisture groundwater and interflow) are of low consequence, because of the very low infiltration and permeability ranges of the clayey soils and bedrock. These units occupy, as previously mentioned, more than 90% of the watersheds. As a result, the surface runoff is the predominant part of the water routing. Residents of the Umpqua Basin are familiar with the instantaneous water flows, as reflected in flooded back yards and basements.

Riparian vegetation plays an important role in streambank stability and can minimize effects of increased high flow events on stream bank erosion. However, riparian overstory vegetation is currently lacking throughout much of the NBHMA resulting in very little large woody debris in streams, increases in stream temperature during the summer, and less summer flow in streams. Large woody debris in streams can increase habitat complexity by forming pools, storing sediment, and creating localized favorable flow conditions.

Roads

Roads can contribute a significant source of sedimentation to streams. "Sedimentation from this source is often much greater than from all other land management activities combined [FSEIS, pp. 3&4-58]". A road inventory was conducted as a part of this analysis. The length of visible and identifiable roads and trails was measured at 39.2 miles. This translates to a road density of 3.8 miles per sq. mile. Only 1.6 miles of roads (4% of the total identifiable roads) are surfaced with crushed rock, specifically Roads No. 26-4-8.0A and 26-5-11.0. An additional 35.4 miles consisting primarily of skid and fire trails were identified from older aerial photographs. The majority of skid trails are overgrown with vegetation and are therefore "invisible" (i.e., not having a significant effect) to the geomorphic and hydrologic processes. The fire access trails run primarily along ridge-tops on bedrock; insignificant environmental effects can be attributed to these landscape features. An exhaustive inventory of the skid and fire trails was not conducted because they were unidentifiable on the ground (primarily old skid trails), or because no real or potential problems could be associated with them (primarily ridge-top fire trails). A typical road segment is native road surface, that is outsloped and has small cuts and fill slopes. The average number of water diversions was five per mile; the number of dysfunctional drainages was four per mile; the average mass wasting area was 955 square feet per mile; the average length of ruts was 680 feet per mile; and the average number of wet areas was three per mile.

The existing, identifiable roads in the three distinctive watersheds in the NBHMA occupy between 2% and 3% of the area. Research indicates that there could be an increase in peak flows due to roads in small watersheds (sixth and seventh-field levels) however, "… this change was not statistically significant …" (Grant & Jones, 1996); and flows increased "… but only when roads occupied at least 12% of the watershed …" (Harr, Harper, Krygier, 1975).

For the WAU which encompasses the NBHMA, road and trail densities, as interpreted from aerial photos, satellite imagery, have at least twice the density of the streams. On the NBHMA, numerous skid trails exist and run along the valley bottoms or in the stream channels. Some bladed trails also go directly up ridge noses on steep slopes. These trails may have been created for fire breaks for timber or pasture management. The compacted surface of the roads/trails and exposed bedrock have contributed to decreased moisture infiltration and higher runoff. Valley bottom and midslope road and trail segments have captured surface and subsurface flows which have contributed to higher

to return to the table of contents: Click here, Type a 7 and press enter (or return).

velocity runoffs, faster delivery to stream systems via ditchlines, and likely higher peak flows of the affected streams (Wemple, 1994). Analysis indicates, however, that the contribution to peak flows has been minor.

A sediment transport analysis was conducted and indicates that a relatively small amount of sediment is delivered into streams from the unsurfaced road surfaces. The primary reason is the very low inter-rill and rill erodibility of the clayey soils, grassed road surfaces and exposed bedrock within the road prism. Except for the road segments with gravel surfaces, the roads do not have ditches that would collect and facilitate sediment transport along the road prism. Slope stability analysis indicates that road cuts made in clay could be considered stable, i.e., would not need mechanical stabilization, if the height of the cut was less than 12 feet along planar or convex slopes, and less than four feet along concave slopes, where the influence of surface and ground water is present. There are only a few areas where road cuts exceed these heights. There are no areas in the NBHMA where roads impact directly the streams, except where roads cross the streams. A road inventory of nearly 40 miles of road was conducted during September 1999 in order to assess conditions of the existing road network, prioritize problem areas for upgrade and recommend site-specific and objective-specific projects. The road inventory identified ten problem areas that are contributing to degraded hydrologic conditions. Repair of these problem areas would substantially diminish road related impacts to water quality. Roads, with the exception of identified problem areas, however, are contributing only minor amount of sediment to the streams.

Soil Compaction

Soil compaction of riparian and upland areas has been suggested as one of several possible explanations for higher runoff and subsequent degradation of the stream system. Field testing was conducted at four sites along the lower portions of the east and west forks of Jackson Creek. Numerous randomly selected sites were tested in the traveled road surface, in the riparian areas (all within 50 feet from stream), and at reference, undisturbed sites outside the road prism and riparian areas. A total of 378 discrete tests were performed (162 along road prism, 153 at upland sites, and 63 tests in riparian areas). Relative density (Dr) is a standard measurement of soil compaction (densification) and is the expressed in a percent of maximum density for the material. The relative density of

Natural surface road that is “grassed over”.

to return to the table of contents: Click here, Type a 7 and press enter (or return).

naturally deposited soils (normally consolidated) ranges between 45% and 65%. In the analysis for the NBMHA, the reference or "natural" density was the density measured along the uplands, i.e., outside of the road prism and the riparian area. The analysis of compaction within the road prism suggests the following:

The results of soil compaction testing of the road surfaces indicates that there is only minimal difference (<10%) in soil densities between the road surface and the reference upland (Table 3-5). No evidence of any large-scale compaction along the road surfaces was found. The general theory of compaction confirms the findings; namely, the compaction of clayey soils is difficult, requiring the correct "optimum moisture", and effective equipment such as a sheep's-foot compactor. Most of the past traffic on the roads consisted of lightweight vehicles, and primarily out of the "optimum moisture" window for an effective compaction to take place.

Analysis of the compaction data indicates no compaction of soil is present within the riparian areas, as compared to the natural, upland soils. Based on the above testing, it can be concluded that there is little or no significant compaction of the soils in NBHMA, and therefore, the quantities and the timing of the peak flows in the streams would not be affected to a measurable degree by compaction along the roads or in riparian areas.

Fluvial Process

The fluvial geomorphology is affected by the naturally high runoff rates, and by the fine-grained sediment input from the uplands. The numerous landflows (deep-seated, slow moving landslides) have controlling effects on the evolution of the stream channels within the NBHMA. A sediment budget analysis was performed for the east fork of Jackson Creek. The analysis considered stream bed erosion, mass wasting along the stream banks (sloughs and landflows), and surface erosion along a 400-ft wide stream corridor, including roads. Assumptions were made for the number and size of bank sloughs and erosion of the stream bed. These assumptions were based on actual measurements and past observations along the north fork of Jackson Creek. The results of the analysis indicates the following:

- The amount of sediment generated and delivered into the stream from erosion and mass wasting in the stream channels is 375 to 425 tons/year mile.

- The amount of sediment actually delivered from the surface erosion in the 400-ft stream corridor, which includes roads, is three to five tons/year-mile.

The primary sources of sediment in the NBHMA are in-stream bank erosion and active land flows along the stream banks. The percent of sediment delivery from surface erosion of the uplands to the sediment input from channel erosion ranges between 0.5% and 1.5%. Most of the fine-grained sediment (85% to 90%) is delivered rapidly as suspended sediment or washload into the North Umpqua River.

Erosion of land surface and along stream banks is a natural phenomenon. Numerous stream segments exhibit excessive erosion, primarily by slumping. These areas are primarily along stream segments where there is a lack of mature vegetation (trees). Substantial canyon-like gullies have developed, resulting in unstable stream banks. The contribution of sediment from the degraded stream segments is on the order of 50% to 75% of the total sediment budget generated along the stream banks. Research indicates that the rate of movement of deep-seated slides (landflows) is tied directly to fluctuation in average annual rainfall. Reportedly, Oregon is in the early stages of a long-term wet cycle. Heavy rains, substantially exceeding averages, over the past three years, and the potential for higher-than-average rain in the next 10 to 20 years, increases the likelihood for additional and accelerated land-flow movement and slides. Tree removal has little, if any influence on the movement of these deep-seated slides; the primary root mass of the trees extends to no more than three feet, or so, and the evapo-transpiration influence of the trees would not affect (lessen) the overwhelming effects of prolonged, wet periods, when the most landslide activities occur. Geotechnical analysis indicates that land instability can be expected in an area with slopes over 25%,

to return to the table of contents: Click here, Type a 7 and press enter (or return).

Lack of streamside vegetation.

Slumping of deeply incised stream channel.

to return to the table of contents: Click here, Type a 7 and press enter (or return).

areas with deep soils and ground water influence i.e. draws filled with colluvium, and hill slopes adjacent to streams.

Riparian and Wetland Habitat

Many of the riparian and wetland habitats on the NBHMA lack sufficient vegetation to stabilize, shade, and support healthy riparian communities. Existing vegetation near many of the streams is dominated by grasses and other non-woody vegetation. While they can hold soil in place, shrubs and trees would provide better long-term stability to these areas. Fire suppression and the lack of grazing in recent years have also allowed unnaturally high fuel loadings to accumulate and discouraged the regeneration of riparian woody vegetation.

Fisheries Species and Habitats

Fish are present in approximately three miles of stream on the NBHMA (see figure 4). However, most of this habitat is only available in the winter and early spring. None of the streams in the NBHMA are currently suitable for healthy fish populations due to low summer flows and elevated summer temperatures. Fish are present in Jackson Creek and its tributaries approximately two miles up from the confluence with the North Umpqua River. The lower mile has the greatest potential for improving fisheries habitat. Coho salmon, steelhead, and cutthroat trout have been documented in Jackson Creek. Most of the stream crossings (culverts) that cross major drainages show signs of instability and deterioration. Some have failed, or are at high risk of failure. These structures have the potential of delivering substantial amount of fine sediment into the stream below and the road access would be lost.

Oregon Department of Fish and Wildlife (ODFW) surveys for the Powerline drainage assessed this stream as “poor”. The limiting factor was lack of water in the summer months. Fall surveys, in the Powerline drainage, documented few remaining pools, but where there was water, fish were present.

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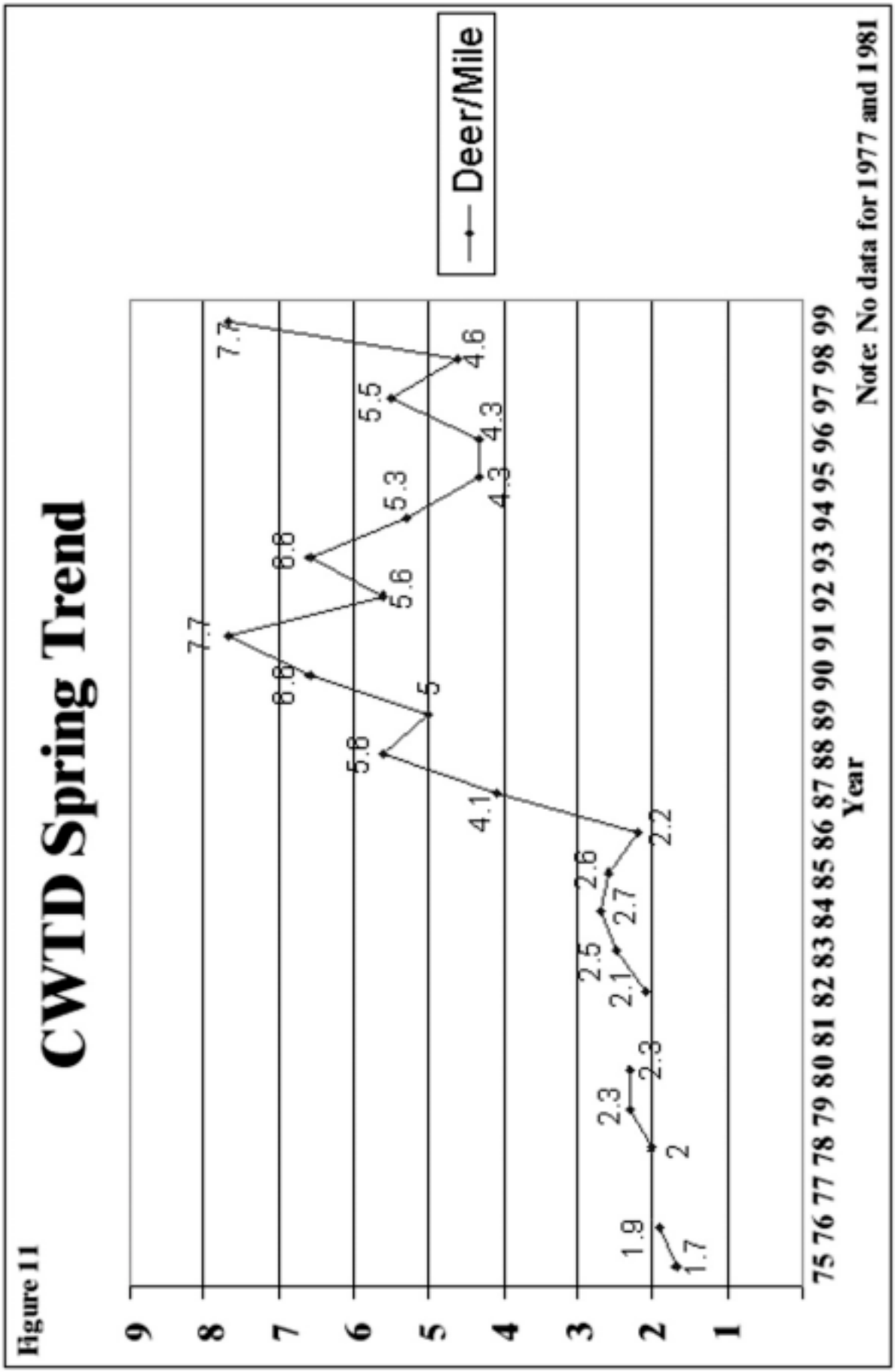

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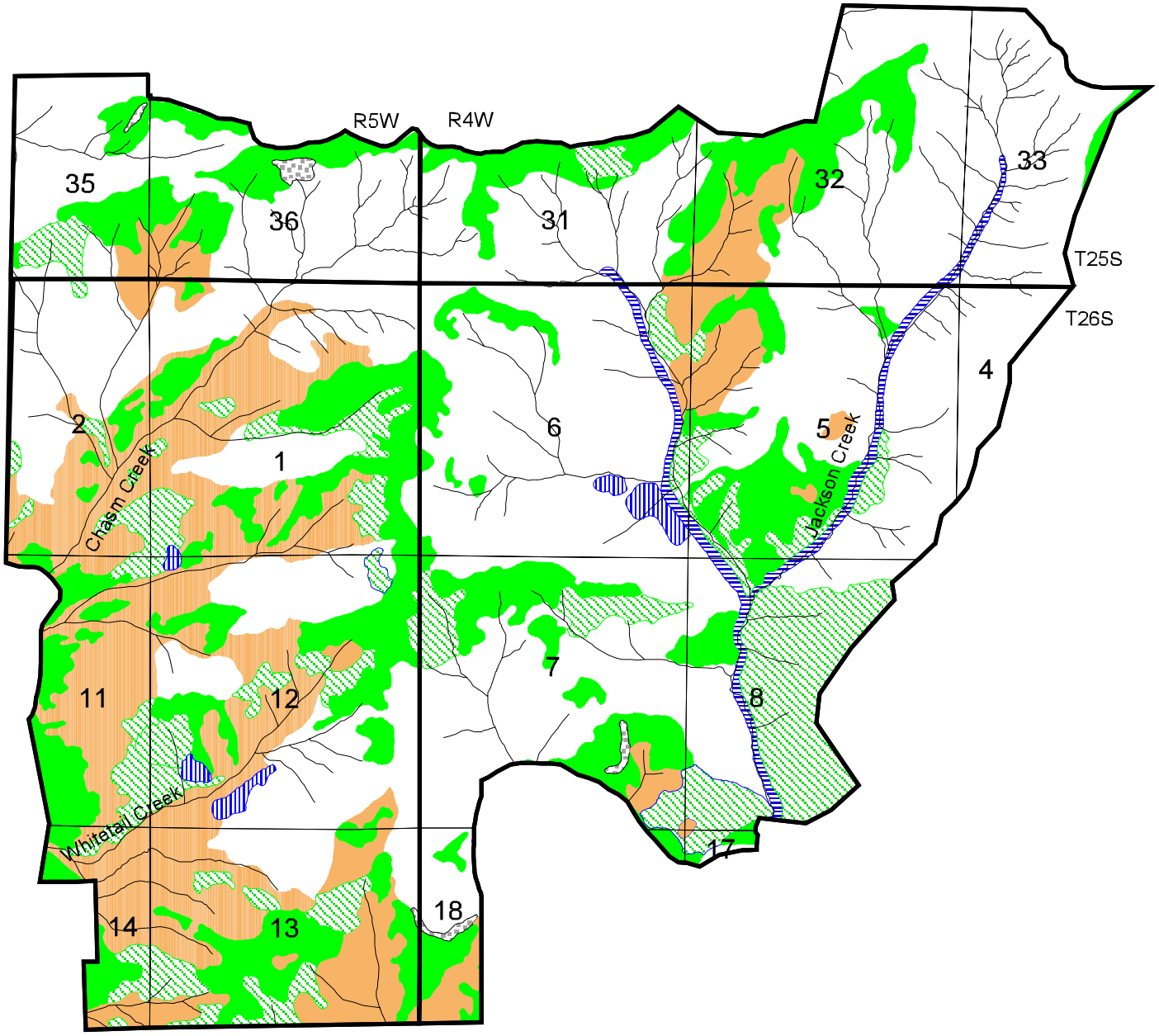
Figure 12

North Bank Habitat Management Area
Vegetation



North Bank Boundary
T-R
Streams
Sections
Vegetation
Grass Lands
Hardwood/Conifer
Oak Savannah
Oak Woodlands
Riparian Vegetaion
Wetlands Vegetaion
Rock Outcrops

scale 1:37000
0.5 0 0.5 Miles

N

Information used for this map was produced using GIS from the North Bank Watershed Analysis.

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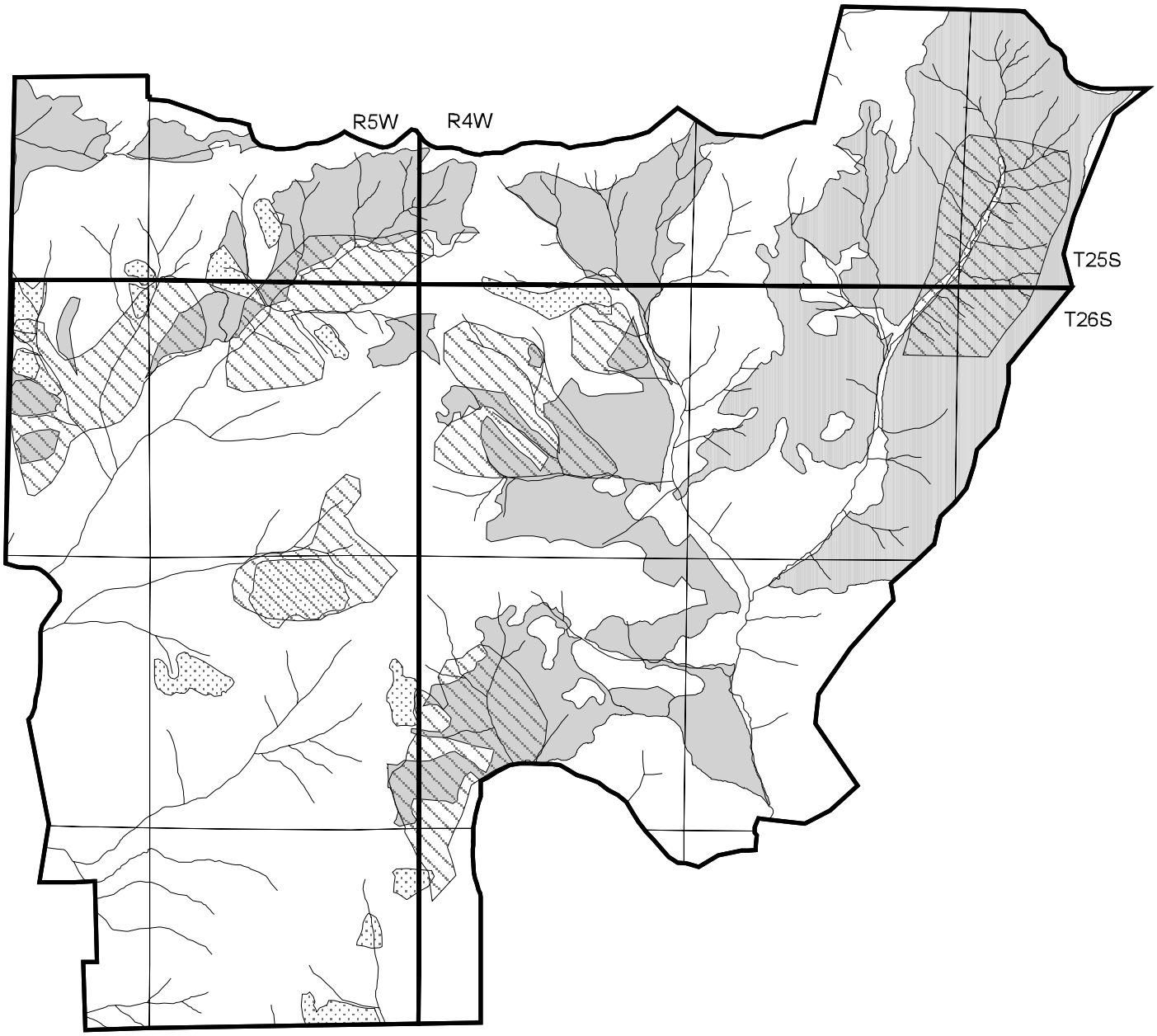
Figure 13

North Bank Habitat Management Area

CWTD Marginal Habitat, Early Seral Hardwood/Conifer and Large Residual Conifers



North Bank Boundary
Marginal Habitat - 955 Acres
Large Residual Conifers - 175 Acres
Early Seral Hardwood/Conifer - 1971 Acres
T-R
Sections
Streams

scale 1:37000
0.5 0 0.5 Miles

N

Information used for this map was produced using GIS from the North Bank Watershed Analysis

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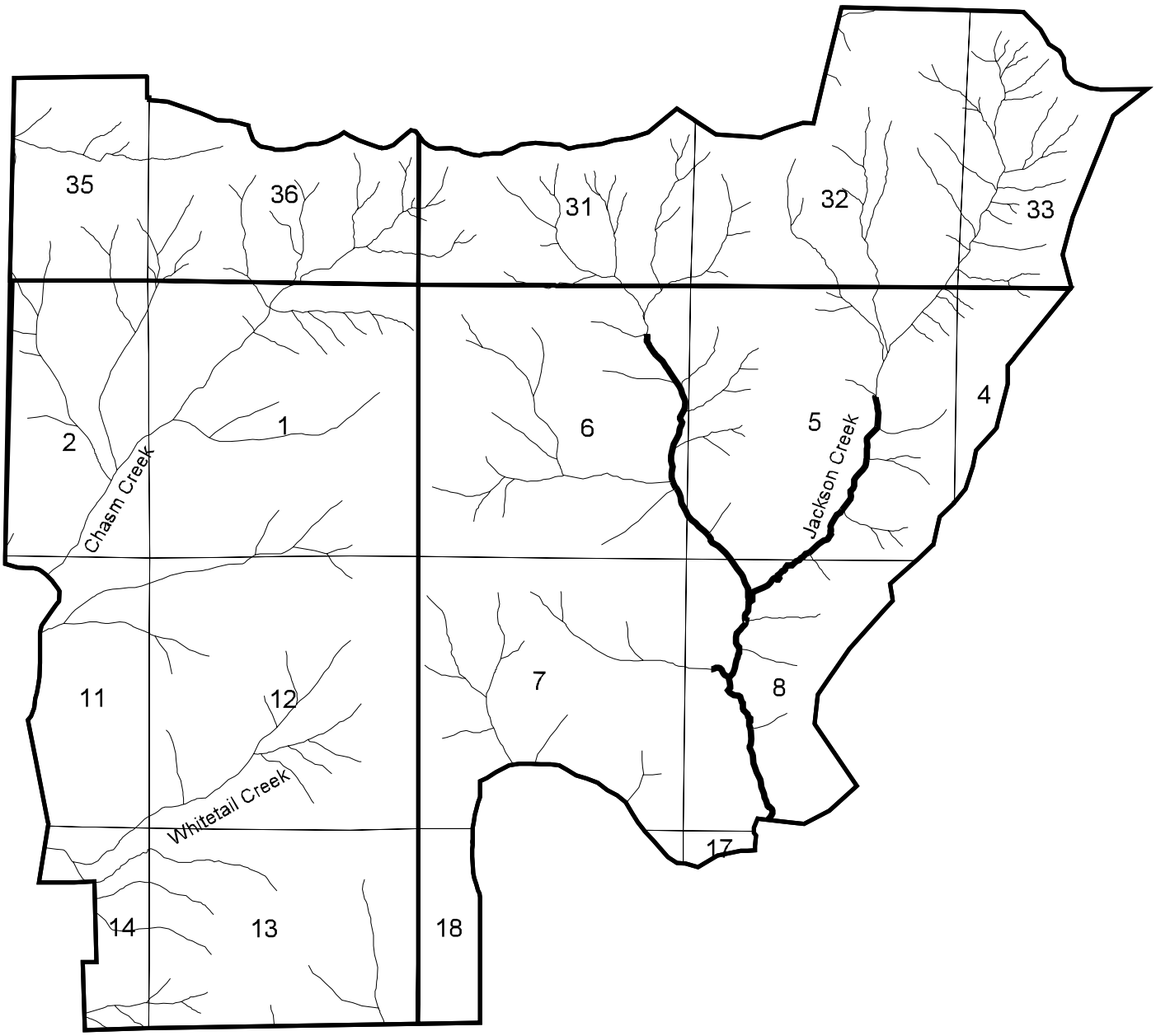
Figure 14

North Bank Habitat Management Area

Fish Distribution



North Bank Boundary
Fish presence
Streams
T-R
Sections

scale 1:37000
0.5 0 0.5 Miles

N

Information used for this map was produced using GIS from the North Bank Watershed Analysis

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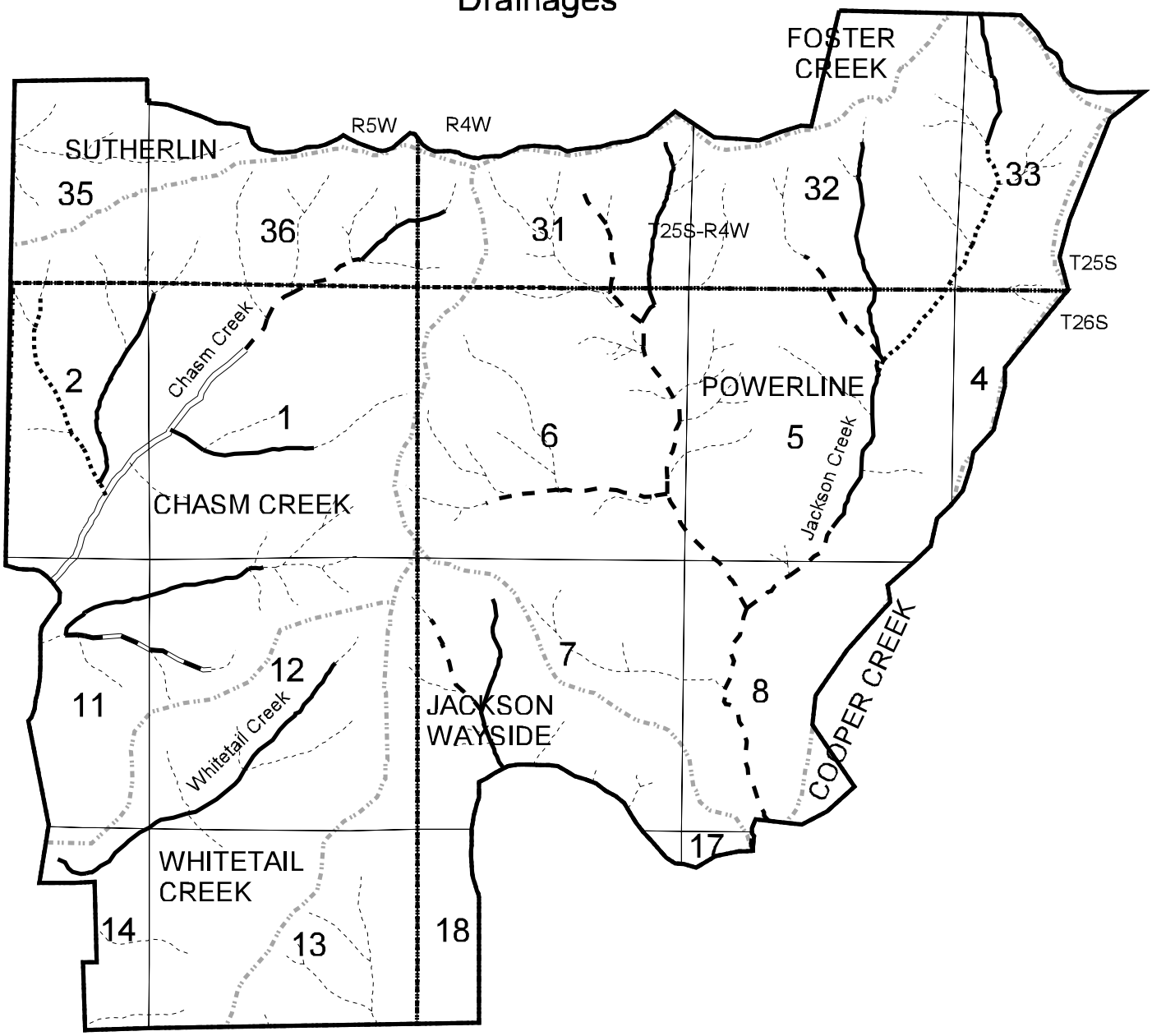
Figure 15

North Bank Habitat Management Area

Riparian Functional Conditions and Drainages



North Bank Boundary
Sections
Non-Functioning Streams
Upward
Downward
Not Apparent
Functioning Streams
No Data
T-R
Drainages

scale 1:37000
0.5 0 0.5 Miles

Information used for this map was produced using GIS from the North Bank Watershed Analysis

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to return to the table of contents: Click here, Type a 7 and press enter (or return).

Table 3-1. Topography by Slope		
Percent Slope	**Area in Acres**	**Percent of Area**
0 - 10	150	3
10 - 35	2,950	45
35 - 60	2,990	45
60 - 85	470	7
>85	20	<1

Table 3-2: **Vegetation Types on the North Bank Habitat Management Area**
(Calculated by GIS information and proportionally adjusted to add up to the 6,581 acres recorded in county tax records.)

Vegetation	Acres	Percent of Landscape
Hardwood/Conifer	3,413	51.9
Grassland & Improved Pasture	1,208	18.4
Oak Woodlands	1,152	17.5
Oak Savannah	677	10.3
Riparian areas	78	1.2
Wetlands	36	0.5
Rock Outcrops	17	0.2
Total	6,581	100.0

Table 3-3. Noxious Weed Species on the North Bank Habitat Management Area		
Family	**Species**	**Common Name**
Asteraceae	*Carduus pycnocephalus*	Italian plumeless thistle
	Centaurea solstitialis	yellow star-thistle
	Cirsium arvense var. horridum	Canada thistle
	Cirsium vulgare	bull thistle
	Senecio jacobaea	tansy ragwort
	Silybum marianum	milk thistle
	Xanthium spinosum	spiny cocklebur
	Centaurea pratensis	Meadow Knapweed
Convolvulaceae	*Convolvulus arvensis*	field morning-glory
Equistaceae	*Equisetum telmteia*	giant horsetail
Fabaceae	*Cytisus scoparius*	Scotch broom
Hyperaceae	*Hypericum perforatum*	common St. John's-wort
Poaceae	*Taeniatherum caput-medusa*	medusa head rye

to return to the table of contents: Click here, Type a 7 and press enter (or return).

Table 3-4. Special Status Plant Species on the North Bank Habitat Management Area		
Family	**Species**	**Common Name**
Apiaceae	*Perideridia erythrorhiza*	red root yampah
	Perideridia howellii	Howell's false caraway
Brassicaceae	*Arabis koehleri var. koehleri*	shrubby rockcress
Boraginaceae	*Plagiobothrys hirtus*	popcorn flower
Cyperaceae	*Carex gynodynama*	Olney's hairy sedge
	Carex serratodens	saw-tooth sedge
Hydrophyllaceae	*Romanzoffia thompsonii*	Thompson's mistmaiden
Iridaceae	*Sisyrinchium hitchcockii*	Hitchock's blue-eyed grass
Liliaceae	*Dichelostemma ida-maia*	firecracker plant
Polypodiaceae	*Pellaea andromedaefolia*	coffee-fern
Pottiaceae	*Crumia latifolia*	crumia moss

Table 3-5. Soil Compaction on the North Bank Habitat Management Area						
Drainage	**Relative Density (Dr) %**			**Relative Density (Dr) %**		
	Natural	**Road**	**% change**	**Upland**	**Riparian**	**% change**
Jackson Creek East	62	65	+5	58	49	-18
Jackson Creek West	56	60	+7			

to return to the table of contents: Click here, Type a 7 and press enter (or return).

to return to the table of contents: Click here, Type a 7 and press enter (or return).

Chapter Four

Environmental Consequences

to return to the table of contents: Click here, Type a 7 and press enter (or return).

Changes Between The Draft And Final EIS

The following changes were made in Chapter Four between the draft and final EIS:

- Chapter presentation has been reorganized in order to present effects of the various management actions to individual resources rather than by Key Issue as in the DEIS.

- Additional detail was included in order to analyze those issues raised as the result of public review of the draft. Certain analysis of environmental effects of proposed management actions, such as stream restoration, grazing, and prescribed fire; has been strengthened or added to improve the understanding and comparison of alternatives.

Environmental Consequences

Introduction

This section forms the scientific and analytical basis for the comparisons of the alternatives. The probable consequences (impacts, effects) each alternative would have on selected resources are described. This section is organized by the effects on the selected resources by alternative. Analysis considers the direct impacts (effects caused by the action and occur at the same place and time), indirect impacts (effects caused by the action and occur later in time or farther removed in distance) and cumulative impacts (effects of the action when added to other past, present and reasonably foreseeable future actions) on the resource values.

BLM Handbook H-1790-1 (Appendix 5) contains a listing of "Critical Elements of the Human Environment". This list of elements must be considered in all EIS's. These are elements of the human environment subject to requirements specified in statute, regulation, or executive order. An analysis of all alternatives concluded that there would be no effect on: Invasive, Nonnative Species (E.O. 13112), Prime or Unique Farmlands (Surface Mining Control and Reclamation Act of 1977), Floodplains (E.O. 11988), Native American religious concerns (American Indian Religious Freedom Act of 1978), hazardous wastes (Resource Conservation and Recovery Act of 1976 and Comprehensive Environmental Response, Compensation, and Liability Act of 1980 as amended), Wild and Scenic rivers (Wild and Scenic Rivers Act), or wilderness (Federal Land Policy and Management Act of 1976 and Wilderness Act of 1964). These no effect conclusions were reached primarily because these resources were either not present on the NBHMA or because none of the alternatives were relevant to these resources. Of the resources present, the NBHMA has low potential for mineral value (ROD, Exchange EA 1993). Cultural resources would be mitigated by pre-project surveys and the development of a public archaeology program. No adverse effects on the federally listed northern spotted owl, marbled murrelet, and bald eagle are likely. The area is outside of the range of the marbled murrelet and habitat is marginally suitable for use by spotted owls. Bald eagles winter in the area and some suitable nesting habitat is present. Management practices would maintain or enhance conditions desirable to eagles.

According to the Executive Order 12898, each agency shall analyze the environmental effects including human health, economic and social effects of federal actions including the effects on minority populations. This EIS is tiered to the Roseburg District RMP FEIS (USDI, Bureau of Land Management, 1995) and to the Northwest Area Noxious Weed Control Program Environmental Impact Statement (USDI, Bureau of Land Management, Washington Office, Washington, D.C. 1985) which have analyzed the effects of the proposed management actions including human health, economic and social effects. The NBHMA is located in Douglas County, Oregon. According to the 1990 Census, the population of Douglas County by race and origin is: 96.9 percent white, 0.2 percent black, 1.6 percent Native American, 0.7

to return to the table of contents: Click here, Type a 7 and press enter (or return).

percent Asian or Pacific Islander, 2.4 percent Hispanic (any race) and 0.7 percent other race. According to 1993 estimates,15,442 people or 15.6 percent of the population of Douglas County are below poverty level (Frewing-Runyon, 1999). The demographic information for the state of Oregon is: 92.8 white, 1.6 black, 1.4 Native American, 2.4 Asian or Pacific Islander, 4.0 percent Hispanic (any race) and 1.8 percent other race. According to 1993 estimates, 406,722 people or 13.2 percent of the population of the state of Oregon live below the poverty level (Frewing-Runyon, 1999). There are no known unique or special resources in on the NBHMA that would attract minority or low income populations for religious, employment, subsistence or recreation. Employment created by contracting resource management activities such as construction or restoration would be done by local contractors who perform similar services throughout Douglas County. These contracted activities would not be unique to the NBHMA. There is an American Indian archeological site at NBHMA which has been undergoing excavation and is of cultural importance to Native Americans. Tribes and tribal members have been consulted and involved in the excavation and analysis of this site. Outreach for this EIS has included mailings of scoping notices and the Draft EIS to tribes and government agencies. There are no impacts to low-income or minority populations that have been identified by BLM internally or through the public involvement process.

The basis for evaluating the environmental consequences is the affected environment described in Chapter Three. The affected environment is the present condition of the NBHMA, prior to the implementation of any alternative described in this document.

Cumulative effects descriptions are imbedded in the overall discussion of environmental consequences. However, the description of cumulative effects for wildlife, vegetation and water resources is provided separately.

This chapter includes a discussion required by the Council on Environmental Quality (CEQ) that an EIS discloses "... any adverse environmental effects which cannot be avoided should the proposal be implemented, the relationship between short-term uses of man's environment and the enhancement of long-term productivity, and any irreversible or irretrievable commitments of resources which would be involved in the proposal should it be implemented" (40 CFR 1502.16).

Incomplete or Unavailable Information

There is less than complete knowledge for many of the relationships and conditions of wildlife species and their habitat, watersheds and ecosystems. The interdisciplinary team for this FEIS examined the scientific information and data as well as relying on first hand professional experience and observations regarding the species and natural resources of the North Bank Habitat Management Area in analyzing the effects of the alternatives. There is a substantial amount of credible information about the topics of this environmental impact statement, the central relationships and basic data are well established. The best available information was used to evaluate the alternatives.

When encountering a gap in information, the question implicit in the Council on Environmental Quality regulations on incomplete and unavailable information was posed: Is this information "essential to a reasoned choice among the alternatives"? (40 CFR 1502.22(a)). While additional information would often add precision to estimates or better specify a relationship, the basic data and central relationships are sufficiently well established that any new information would not likely reverse or nullify understood relationships. Although new information would be welcome, no missing information was determined as essential to making a reasoned choice among the alternatives.

All other things being equal, the greater the uncertainty, the more difficult it is to manage risk inherent in managing natural resources. Should there be new scientific information on change in habitat conditions not projected, there are provisions for changing management of the NBHMA to reflect the new information and the management practices for which it calls.

to return to the table of contents: Click here, Type a 7 and press enter (or return).

Mitigation And Monitoring

Mitigation is important in the design and implementation of any alternative. In general, mitigation is a measure taken to cause an action to become less harsh or less severe. Mitigation in this FEIS is included in the design of the action alternatives. Agencies are required to identify adopted mitigation and related monitoring in the Record of Decision for Environmental Impact Statements (40 CFR 1505.2(c)).

Monitoring is an essential component of natural resource management because it provides information on the relative success of management strategies. The implementation of the selected alternative will be monitored to ensure that management actions are implemented as planned and that objectives are being met. The monitoring process will collect information on a sample basis. Monitoring could be so costly as to be prohibitive if it is not carefully and reasonably designed. It will not be necessary or desirable to monitor each management action of every project. Unnecessary detail and unnecessary costs will be avoided by focusing on key monitoring questions and proper sampling methods. The level and intensity of monitoring will vary, depending on the sensitivity of the resource or area and the scope of the management activity.

Monitoring of the selected alternative will be conducted as identified in the Roseburg District RMP Monitoring Plan. Additional specific monitoring will be provided in the Record of Decision for this FEIS when the selected alternative and management actions which will be adopted are known. The specific monitoring plan for the selected alternative will be tiered to the Roseburg District RMP monitoring plan.

Vegetation Management

Vegetation on the NBHMA would be manipulated under both action alternatives in order to enhance CWTD populations. The forage base on approximately 1900 acres of grasslands and oak savannah as well as the forage understory on 1170 acres of oak woodlands and 1970 acres of early seral hardwood/conifer stands is available for management to improve forage quality. Approximately 960 acres of the hardwood/conifer vegetation type is currently in a shrub/tree seral stage and 300 acres in a closed canopy stage having limited or little use by CWTD as habitat available for manipulation to improve habitat. The following management actions are proposed for use under the alternatives B and C that would effect the vegetation types found on the NBHMA: prescribed fire, mowing, seeding/planting, grazing, fertilization and thinning.

Prescribed Fire

Alternative A

Fire or other human influences are largely responsible for maintaining many of the grassland types (Franklin and Dyrness, 1973; Agee 1993). Under Alternative A, prescribed fire would not be used except to control noxious weeds. Normal fire suppression undertaken under this alternative would reduce the influence wildfire would have in maintaining the occurrence of these habitat types, resulting in the loss of oak woodlands through conifer encroachment and loss of oak recruitment. Conifers would become the dominant tree in the canopy resulting in the loss of oaks and associated understory shrub and forb species through competition and shading (Franklin, Gumtow-Farrior, 1991,1992; Agee; 1993).

Without fire, oak regeneration has declined in many oak woodland habitat types. "... [h]igher fire frequencies in the past may have created conditions more conducive for oak regeneration (*The Role of Fire in Oak Woodlands*, 1999). McClaren and Bartolome (1989) compared oak stand age structure with fire history, and showed that oak recruitment was associated with fire events" (*The Role of Fire in Oak Woodlands*, 1999). "Oak recruitment has been rare since fire suppression" (ibid). The increase in conifers and canopy density from succession would result in increased fuel loadings making the resulting stands increasingly susceptible to a stand replacing fire. Without recurrent

to return to the table of contents: Click here, Type a 7 and press enter (or return).

prescribed fire, oak woodlands would be lost due to loss of regeneration and seral progression into a conifer woodland type (Franklin, et.al., 1973; Agee, 1993).

Alternatives B and C

Burning the forage base on a three to five year interval under Alternative B or a five to seven year interval under Alternative C would increase the availability, nutrient level and palatability of forage for CWTD. Larger conifer trees and/or shrubs such as hawthorn are fire tolerant and would need to be cut or pulled to remove them from the habitat areas. Other fire tolerant shrubs such as wedgeleaf ceanothus and poison oak, normally found in grassland and oak savannah areas, would be left.

The availability of forage would increase through a reduction of the thatch layer and improved conditions for seed germination and establishment by allowing greater opportunity for seed contact with bare soil and thereby increasing the potential for germination. Under a three year burning cycle (Alternative B), thatch buildup would be reduced and overall production of forage without complementary treatments such as fertilization would begin to decline after several burn cycles due to a loss of nutrients through volatilization caused by burning (Agee, 1993; Walstad, et.al., 1990) and possible loss of plant diversity. Burning would also eliminate many invasive species of shrubs and trees such as young conifers that do not tolerate fire or recurrent burning over such a short time period (Franklin, et. al. 1973; Proceedings, Pillsbury, et. al., 1996; Agee, 1993). This would result in a 15% to 60% increase in forage production potential based on the amount of soil surface that is exposed by thatch removal (Holechek, 1998; BLM Report, Roan, 6/2000). Although clovers would be maintained in the forage base, if originally present, low forage value annual grasses such as medusa head, cheatgrass and noxious weeds would be favored by repeated, frequent burning and could replace many CWTD preferred forage species, both forbs and grasses (Vallentine, 1971; Shelley and Petroff, 1999). Without additional treatment such as grazing or mowing, the effect of burning on forage production would begin to decline after the first year of burning. As the amount of rank and dead material begins to accumulate, nutrient levels, palatability and availability would decline. Accumulations of thatch would become evident in more highly productive growing sites by three years after burning (Mires, personal observation). Forage availability would go through a cycle of high availability after the first year of burning, becoming increasing less available until the forage areas are burned again.

Forage nutrient levels would increase the year of burning as nutrients contained in dead vegetation would be returned to the soil, becoming available for plant growth (Holochek, 1998). An increase in nitrogen level would increase crude protein values of forage (Miller, et. al., *Quality Deer Management*, 1995; Hall, et. al. 1984; Vallentine, 1980). Green forage would become available from fall green-up to summer dry out. Burning would stimulate germination of forb and legume seeds present in the soil. Many of the forbs and legume species have high palatability and nutritional values for Deer (Hall, et. al., 1980; Miller, et. al. 1995; Holochek, 1998).

Nutritional value and palatability of shrubs (Stewart, 2000) present in the grassland and savannah habitats would increase over the short-term as older, woody portions are removed by burning and sprouting is stimulated (Holochek, 1998; Agee, 1993). Recurrent burns over a time span as short as three years would remove fire intolerant shrubs and reduce the vigor and numbers of fire tolerant shrubs such as poison oak after approximately three burn cycles in ten years. This would reduce availability of browse species in the grassland and savannah habitat types.

On an overall basis, short-term increases of CWTD forage would be produced by burning due to removal of thatch, release of nutrients to the soil, stimulation of growth of forbs and stimulation of sprouting by shrubs. After two or three burning cycles under Alternative B there would be long-term loss of soil nutrients, loss of fire sensitive plants and shrubs, and potential increases in non-native annual grasses and noxious weeds (Sheley and Petroff, 1999).

Prescribed burning under Alternative C would help ensure a more even grazing treatment of forage areas. When forage areas are burned, rank, less palatable plant material is removed and livestock would tend to graze over the entire burn area, creating more uniform conditioning of forage versus

to return to the table of contents: Click here, Type a 7 and press enter (or return).

continually re-grazing sites that have the best forage prior to burning (Holochek, 1998; Vallentine, 1980). The increase in time between burn treatments in Alternative C as compared to Alternative B would allow shrubs to regain vigor, allowing most shrub species to tolerate burn treatments.

Under Alternative B and C, species composition of the oak woodland and hardwood/conifer habitat types would be maintained with prescribed burning and selective thinning. Prescribed under-burning of oak woodland at five to seven year intervals under Alternative B and at eight to ten year intervals in combination with controlled grazing under Alternative C, would remove fire intolerant shrubs and smaller conifers and remove woodland litter and thatch. Fire would help maintain the open canopy nature of the stand by removing tree seedlings and fire susceptible overstory trees. Burning would reduce fuel buildups in the understory, remove rank growth from shrubs and stimulate re-sprouting of fire tolerant shrubs such as poison oak and snowberry and stimulate new growth in shrubs, forbs and grasses. Burning would release nutrients to the soil which would result in more nutritious, palatable and digestible forage and browse for deer.

Burning at a three to five year interval under Alternative B would keep fuel buildups down, resulting in cooler, more controllable prescribed burning. The same effect would result under Alternative C with an eight to ten year burn cycle in combination with grazing. Burning would help maintain oak woodland by stimulating oak sprouting and oak reproduction (ibid). Recruitment of oak has been shown to be associated with fire events (*The Role of Fire in Oak Woodlands*, 1999; Gumtow-Farrior, 1991-1992; Franklin, et.al., 1973). In addition, shrub basal sprouting would be stimulated which would furnish younger, more palatable, digestible and available browse for deer. (*Quality Deer Management*, 1995;). Burning at longer intervals under Alternative C would allow shrubs to recover between burns resulting in the persistence of browse species such as snowberry and poison oak in the woodland habitat type (Vallentine, 1980).

Under Alternatives B and C, thinning and burning would be used on 180 acres of hardwood/conifer with large conifer and hardwood trees (Figure 9) to create open canopy stands with diverse understories. Thinning would reduce competition for space, light and nutrients and thereby increasing growth rates on the remaining trees. Crown to height ratios would increase and structural attributes such as large limbs and craggy bark would develop in conifers sooner than in stands that are not thinned. By increasing distance between crowns and removing subdominant trees during thinning, managed stands would be more resistant to stand replacing crown fires (Agee, 1993). Using prescribed fire to underburn thinned stands would reduce fuel loads, increasing resistance to stand replacing fires. Burning on a five to ten year interval would maintain the open characteristics of the stand over time and limit fuel buildups. Opening stands and reducing ladder fuels and other fuel loads would create a more fire resistant stand (Agee, 1993). Maintaining open canopy stands would allow a diverse understory to develop, increasing the diversity over what would be found in untreated stands.

Mowing

Alternative A

No mowing would be done under this alternative.

Alternative B and C

The potential exists for machine mowing on approximately 300 acres of scattered mostly grassland/savannah habitat parcels within the NBHMA. Mowing would be used under Alternatives A and B to reduce stem volume of rank grasses, increase the palatability and digestibility of grasses and increase availability of more palatable forb species on selected parcels. Palatability and digestibility of grasses would increase if mowing takes place in early growth stages which would result in a greater leaf to stem ratio. The leaves of grasses are the most palatable, nutritious and digestible portions of the plants for deer. Additionally, by removing rank stems and lowering the height of grasses, high forage value forbs such as clovers and other legumes would be more available for consumption by deer.

to return to the table of contents: Click here, Type a 7 and press enter (or return).

The effectiveness of mowing would be limited due to topography, access and soil moisture levels that would preclude equipment use during the active growing seasons for grasses. Because of limited available acreage, extensive use of mowing would not be practical therefore the overall benefit to the forage base for CWTD would be minimal.

Seeding/Planting

Alternative A

No seeding or planting would be done under this alternative.

Alternative B and C

Effects of post burn seeding in Alternatives B and C would be the same. Seeding and planting would maintain structural characteristics of the grassland types while at the same time increasing plant diversity. Seeding would increase the forage base for CWTD and increase vegetative competition for unwanted plants and shrubs (Shelley and Petroff, 1999).

Seeding with a mixture of cool season and warm season grasses, legumes and other forbs after burn treatments would increase availability and abundance of forage plants on treated acres. Increases in plant diversity would increase seasonal availability of green forage over what is currently available. Increases in desirable plants due to seeding in bare soil areas created by thatch removal would reduce the potential invasion of annual grasses and weeds favored by burning disturbance (Sheley and Petroff, 1999). Including seed of nitrogen fixing plants such as legumes in seed mixes would increase soil fertility, partially offsetting losses created by burning (Agee, 1993). Clover species are especially favored for nitrogen fixing capabilities and deer forage value (Miller, et. al., *Quality Deer Management*, 1995). Seeded areas would maintain forage productivity and forage availability to deer for approximately two years, post treatment. After two or three growing seasons without additional treatments, such as burning or grazing; grasses and forbs would increase in rankness, lowering palatability and digestibility. Decreases in availability of forbs would become evident as rank grasses increase.

CWTD would benefit from maintenance of the grassland/oak savannah habitat type required by the species (Ricca, 1999; Smith, 1981; Whitney, in prep. 2000). Increased plant diversity due to seeding and planting would increase the diversity and seasonal availability of forage. Under Alternative B, forage condition and availability would be dependent on a short burn cycle and be cyclic over a three to five year period. Under Alternative C, burning on a five to seven year cycle would be used in concert with grazing and fertilization. Grazing and fertilization would maintain fairly constant nutrient levels and availability in the forage base between burn treatments.

Planting native grasses, sedges, and other preferred forage plants in bare soil areas following treatments, would establish those plants and create a competitive advantage for preferred species over the more invasive, less desirable species in wetlands and riparian areas. Planting tree species such as Oregon ash and white alder in riparian areas of little or no tree cover would provide root support to stream banks, add canopy creating shade resulting in cooler ground and water temperatures in the summer months and greater cover for CWTD, as well as providing a source for future large woody debris for stream structure.

Grazing

Alternative A and B

No grazing would be done under these alternatives.

to return to the table of contents: Click here, Type a 7 and press enter (or return).

Alternative C

Alternative C would employ controlled grazing (see Grazing Plan, Appendix C) with cattle to increase the nutrient level, digestibility, palatability, availability and diversity of forage plants for CWTD (Holochek, 1998;Vallentine, 1980; Hall, et. al. 1984). Cattle would remove rank portions of grasses and reduce biomass of vegetation that creates thatch buildup. When grasses are grazed, leaf volume is increased, resulting in grass forage that is higher in crude protein levels and more palatable and digestible for ruminants (Holochek, 1998; Stoddart and Smith, 1955) (Stewart, 2000). Limiting grass height through grazing would allow legumes and other forbs growing in grazed areas to receive more light. The result would be an increase in crude protein levels, increased biomass production by forbs and greater availability of the forb component for grazing animals. Limiting grass height would allow plant species diversity to be maintained or increased. Depending on plant species, seasonal availability of green forage plants would increase due to earlier spring green-up resulting from removal of taller vegetation by grazing and less dry plant material covering drought tolerant forbs later in the summer.

Grazing after burning and during fall green-up would increase seed germination and growth potential of newly seeded areas (Gelbard and Belsky, 2000; Holochek, 1998; Savory, 1999). Hoof action of grazing animals would prepare bare soil areas by pushing seed into contact with soils and roughen the soil surface which slows surface water movement thereby increasing soil moisture and aiding seed germination. Grazing would reduce foliar competition between seedlings and established plants. Without concurrent seeding of preferred species of plants, increases or invasion of non-desirable species could occur if seed sources were available (Gelbard and Belsky, 2000).

Grazing would reduce fuel loading resulting in less fire hazard during the dry portions of the year and cooler burns with prescribed fires. Prescribed burning with lowered fuel loads would create less risk to deer habitat and a decreased potential for fire escapement. Grazing would remove small shrub and tree seedlings, reducing required prescribed fire frequency from a three year interval to a five to seven year interval to control encroachment by shrubs and trees.

Due to the digestive process, grazing animals would increase the rate at which nutrients in vegetation are recycled and become available for plant growth over normal decomposition processes occurring in grasslands (Hobbs, 1996). Return of nitrates to the soil for plant growth would increase crude protein levels of the benefitting plants, increasing nutrient value to deer.

In summary, controlled grazing systems would maintain a consistent deer forage base over seasons and years. Little fluctuation of forage production or availability from one year to another would occur. By controlling grass biomass, legumes and other forbs would remain in the forage base and be available to deer throughout the year. Instead of becoming rank, grasses would be maintained in conditions that are palatable and digestible for deer during the growing season. (Stewart, 2000)

Although livestock grazing has and continues to be one of the major factors that have influenced change in oak woodlands by destroying oak sprouts, shrubs and native grasses (Franklin, 1973; Riegel et.al., 1991), ”Grazing management that emphasizes timing of grazing to coincide with growth stages of undesirable annual grasses may promote *Quercus* seedling establishment and favor recruitment of perennial grasses [(Riegel, 1991]”. Controlled grazing in oak woodlands would reduce annual fuel loading and prevent accumulation of litter and thatch. Reductions in fuel loadings would allow cooler controlled burning and reduce the potential for wildfire. Cool burns are less likely to cause mortality to oaks (Agee, 1993). Grazing, in concert with seeding, would increase establishment of preferred understory species by reduction of competitive vegetation and creating soil conditions for seedling establishment. Likewise, controlled seasonal grazing would reduce competition of understory plants with oaks.

to return to the table of contents: Click here, Type a 7 and press enter (or return).

Fertilization

Alternatives A and B

No fertilization would take place in either alternative.

Alternative C

Fertilization of grassland and oak woodland habitats would be used in Alternative C in concert with burning, seeding and grazing. "Abundance and condition of wildlife can be related directly to soil fertility. This is especially true for deer, since they feed on plants and therefore are only one step removed from the soil itself." (Miller, et. al., *Quality Deer Management*, 1995, p. 129). Addition of soil amendments such as phosphorus, nitrates and sulphur to soils deficient in one or all of these nutrients would be reflected in growth reaction and nutrient levels in the plants growing in the area that would be treated by fertilization. Depending on season of application, fertilization would increase the growth and crude protein content of grasses and other plant species that are actively growing when fertilizers are applied (Vallentine, 1980). This would result in higher quality forage available to deer. Increases in palatability, nutritional levels and digestibility of normally poor forage plants after fertilization also have been noted (Holochek, 1998). Enhancement of soil fertility would increase the potential of favorable forage plants to out-compete many low value plants and noxious weeds that do best on poorer soils lower in nutrients (Shelley and Petroff, 1999; Holochek, 1998).

Forage production levels would increase on sites receiving fertilization through stimulation of growth. Increases of leaf mass on grasses, legumes, other forbs and shrubs increases the percentage of plant biomass that has higher nutritive and digestible qualities for deer than coarse stems and shoots (Stewart, 2000). Increases in root depth and biomass would occur in many species of grasses and other plants with application of fertilizers. This would allow plants to have access to soil moisture and nutrients during a greater portion of the year which would increase the length of time that green forage would be available for deer and other grazers (Holochek, 1998). Plants that have been fertilized tend to green-up earlier in the year and maintain growth longer as a result of increased root mass. Increases in root biomass and depth would increase plant productivity and make plants more resistant to grazing pressure.

Nutrient levels in forage have a direct effect on reproductive capacity of deer (Miller, et. al., *Quality Deer Management*, 1995; Hall, et.al., 1984). Deer herds occupying ranges containing forages with high levels of crude proteins and other nutrients such as phosphorus, exhibit greater productivity than herds occupying less suitable habitats (Miller, et. al., *Quality Deer Management*, 1995). Deer herds having access to nutritious forage during late summer through fall have a greater chance of surviving severe weather over the winter months. Nutrition levels of forage in habitats supporting deer have a direct effect on how well the deer population can recover from severe loss due to weather or other events. Fertilization applications would have long-term effects on the productivity, survivability and recovery potential of the NBHMA deer population by increasing and maintaining nutrient levels, palatability, digestibility and availability of forage.

There is little information regarding the effect of fertilization on oak trees. One reference noted an increase in soil nutrients created by burning resulted in an increase in acorn production (Pillsbury, Verner, et.al. Proceedings, 1996). Observation of oaks growing in woodlands and savannahs adjacent to the NBHMA that are subjected to burning, seeding and fertilization at three to four year intervals show little indication of higher mortality than adjacent stands on the management area (Mires, Personal Observation).

to return to the table of contents: Click here, Type a 7 and press enter (or return).

Thinning for Habitat Manipulation

Alternative A

No thinning would be done under this alternative. Lack of thinning, slashing and burning to re-create and maintain an early succession habitat type would result in the continued loss of habitat capable of supporting CWTD.

Alternative B and C

Thinning to a canopy closure of approximately 50% would increase light levels in the understory, allow trees to develop larger crowns (higher crown to height ratio) and increase diameter growth through a reduction in competition for moisture, soil nutrients and light. Thinning would be used to remove conifers and favor hardwoods, with oaks and large madrone being preferred species for retention. Thinning would reduce fuel loads and increase crown to crown distances, resulting in a more fire resistant stand (Agee, 1993). Removal of conifers would control advancement of the stands towards coniferous forest and limit conifer competition in oak woodlands (Agee, 1993). Thinning would open the canopy by removing conifers, selected oaks and other hardwoods. Thinning would also increase the amount of light reaching the ground resulting in higher nutritional levels in available forage through increased photosynthesis (Miller, et. al., *Quality Deer Management*, 1995; Hall, et.al., 1984). Selecting for hardwoods such as oak and madrone over conifers would produce habitat more conducive to CWTD (Ricca, 1999; Smith, 1981).

Under Alternative C, existing canopies of hardwoods and conifers would be reduced to 30% or less which would create a savannah habitat type enabling grasses and forbs to become established (Agee, 1993). Slashing and burning shrub thickets would open the understory to light, increase grass/forb production and stimulate basal sprouting on most shrub species. Thinning, slashing and burning would create a grassland/shrub, hardwood/ savannah habitat type on those acres treated (Franklin, et.al., 1973; Maloney, 1997). Under Alternative C, treated acres would be seeded or planted with preferred CWTD browse/forage species and fertilized. Seeding and fertilization would increase grass/forb density in the treated area and furnish competition for invasive and less desirable species of plants (Agee, 1993; Shelley and Petroff, 1999). Increased competition from increased density of grasses and forbs would act to retard the process of succession (Franklin, 1973; Agee, 1993). Post burn seeding, planting and fertilization would be used to establish a forage base of grasses, forbs and shrubs for CWTD. Grazing and prescribed burning would be used to maintain the early seral stage and forage condition after establishment of a grassland/shrub-grassland savannah habitat type.

Under Alternatives B and C, thinning, pulling, and cutting, would be used to modify tree canopies, remove invasive plants and increase forage and cover for CWTD in existing wetland riparian areas. Removal of invasive plants such as hawthorn, Himalayan blackberry and rush (*Juncus, spp*), from wetland areas by cutting and pulling would allow forage species such as native wetland grasses and sedges (*Carex, spp.*) to increase through a reduction in competition. This would result in increased forage availability for CWTD later into the summer season. These actions would maintain current riparian vegetation, remove invasive plants and increase cover and forage value for CWTD on approximately 115 acres of key CWTD habitat (Ricca, 1999; Whitney, 1999; Whitney, in prep., 2000). Thinning in areas of high canopy density over wetlands would allow more sunlight to reach the understory, resulting in greater diversity of understory plants (*Quality Deer Management*, 1995; Agee, 1993). An increase in understory vegetation would create an increase in forage cover for CWTD. Removal of conifers from the canopy so they occupy no more than five percent of the canopy composition would reduce competition to wetland/riparian hardwoods, reducing the potential for competitive exclusion of hardwoods (Agee, 1993).

to return to the table of contents: Click here, Type a 7 and press enter (or return).

Cumulative Effects

Alternative A

After six years of public ownership without burning, grazing, fertilization or other treatments; pasture grasses have become rank. As grasses become rank, lignin content increases resulting in decreased palatability and digestibility by deer. As dead vegetation accumulates it forms a thatch layer. This, along with current grass growth, shades out many of the plants used by CWTD such as clovers, other legumes and forbs formerly present in the forage base (Mires, Black, personal observation). Nutrient levels decline in available green plants as more of the nutrient capital is held in dead vegetative material which only releases slowly through decomposition. Additionally, accumulations of dead plant material insulate soils which delays spring germination of forage plants, including grasses. This action shortens the growth season for much of the vegetation that has spring green-up and reduces availability of seasonal plants for CWTD. After summer drying, standing dead material covers vegetation that begins growth with fall rains. This limits availability of quality forage in the winter months over much of the habitat types most critical to CWTD. In some grasslands, it is estimated that thatch layers currently prevent plant growth on up to 60% of available soil surface due to the mulching effect (range 15% to 60%; BLM Report, Roan, 6/2000).

Presence of open growth form of oaks in closed oak woodlands indicate that more open woodlands and oak savannahs have become closed canopy woodlands. Some oak stands, both open and closed canopy, have been overtopped by conifers, primarily Douglas-fir, and are becoming closed canopy conifer stands. This process has been documented by Franklin, Gumtow-Farrior and other researchers in the Willamette valley, and California (proceedings) and has been substantiated for the Umpqua valley (Riegel, 1991).

Natural successional processes would be allowed to continue due to fire suppression and lack of management intervention. Grasslands and savannahs occupying more fertile soils would progress through a shrub stage into a closed canopy hardwood/conifer or conifer forest type while those occupying wet saturated soils or very dry soils would take longer (Franklin and Dryness, 1973). Natural succession would result in habitat types consisting of mixed hardwood conifer forest with scattered openings where soil types would not permit tree establishment. Observation of vegetative succession on habitat types in the Umpqua basin, similar to those on the NBHMA, indicate that the majority of grassland areas would become shrub/tree habitat types within twenty years, and closed canopy hardwood /conifer woodlands in thirty to forty years (Mires, personal observation 1956 - 2000).

The advancement from grasslands and oak/savannah to an eventual woodland type would result in a loss of CWTD forage and creation of habitat types not favored by CWTD (Ricca, et. al., 1999; Smith, 1981). Lack of management action would result in the loss of forage on approximately 1,900 acres of grassland and savannah and 1970 acres of early seral stage tree/shrub component of hardwood/conifer habitat capable of supporting CWTD. Forage availability, palatability and nutrient levels for CWTD would continue to decline across the forage base. The low nutritive value of forage on the NBHMA is indicated by poor body condition in deer, fawn abandonment and low fawn recruitment (*Quality Deer Management*, 1995; personal conversation, D. Jackson, 1999, 2000). Although difficult to quantify, deer condition and population would gradually decline as the result of this decline in habitat quality.

Lack of management treatment such as thinning and burning, would result in increased fuel buildups. High fuel loading increases risk of stand replacing wildfire and subsequent loss of habitat diversity in the management area. Eventually, both closed canopy and open canopy oak woodland would become coniferous forest types, probably Douglas-fir in the Umpqua Valley (Franklin and Dyrness, 1973; Reigel, et. al., 1991; Agee, 1993).

Although little is known about successional processes in oak woodlands in Oregon, except in the Willamette Valley (Franklin, 1973), available evidence indicates that interior valley oak woodlands

to return to the table of contents: Click here, Type a 7 and press enter (or return).

on the NBHMA would progress in a direction similar to the Willamette Valley oak woodlands that would affect forage availability for CWTD.

Currently much of the hardwood/conifer vegetation type has advanced beyond the vegetational stage that furnishes CWTD forage and preferred cover types (Ricca, 1999: Smith, 1981). As succession continues, a mixed forest of hardwoods and conifers would occupy these acres (Franklin et.al., 1973). As canopies close and light is lost, only a few species of shade tolerant shrubs, forbs and grasses would be left in the understory vegetation due to lower levels of photosynthesis, resulting in a loss of forage plants and overall diversity in the understory of the stands (Hall et.al., 1984). As hardwoods such as oak and madrone are overtopped by faster growing conifers, the stands would again lose diversity as many of the hardwoods are shaded out and lost due to competitive exclusion. Oaks are most susceptible to shading (Agee, 1993) however the more shade tolerant madrone would persist in the stands. Eventually stands of this type would form a mixed evergreen stand consisting of Douglas-fir, ponderosa pine, incense cedar and madrone as primary constituents of the overstory (Franklin et.al., 1973).

Succession would be allowed to continue on approximately180 acres of hardwood/conifer stands that contain large, residual hardwood and conifer trees. Succession would result, on most sites, in closed canopy stands of mixed conifer and hardwood species. In the Umpqua Valley, including the NBHMA, stands would be dominated by Douglas-fir with intermixed incense cedar and ponderosa pine. Madrone with scattered black oaks would be the likely hardwood components in the secondary canopy (Franklin, et. al., 1973). Understory vegetation would consist of scattered shade tolerant plants such as sword fern until canopy mortality created light gaps which would allow species diversity to increase. As succession advances, larger trees in the stands will become increasingly susceptible to stand replacing fires due to fuel buildups, increases in canopy density and growth of ladder fuels. This habitat type would continue to have little value for producing forage capable of supporting grazing/browsing species of wildlife, including CWTD.

The lack of fire or other influences would allow current successional processes to continue, resulting in structural changes to the forage base and the eventual loss of Grassland, Oak Savannah and Oak Woodland habitat types (Gumtow-Farrior, 1991, 1992; Agee, 1993; Franklin, 1973). Habitat and forage loss would substantially reduce CWTD from an area acquired as secure habitat for CWTD.

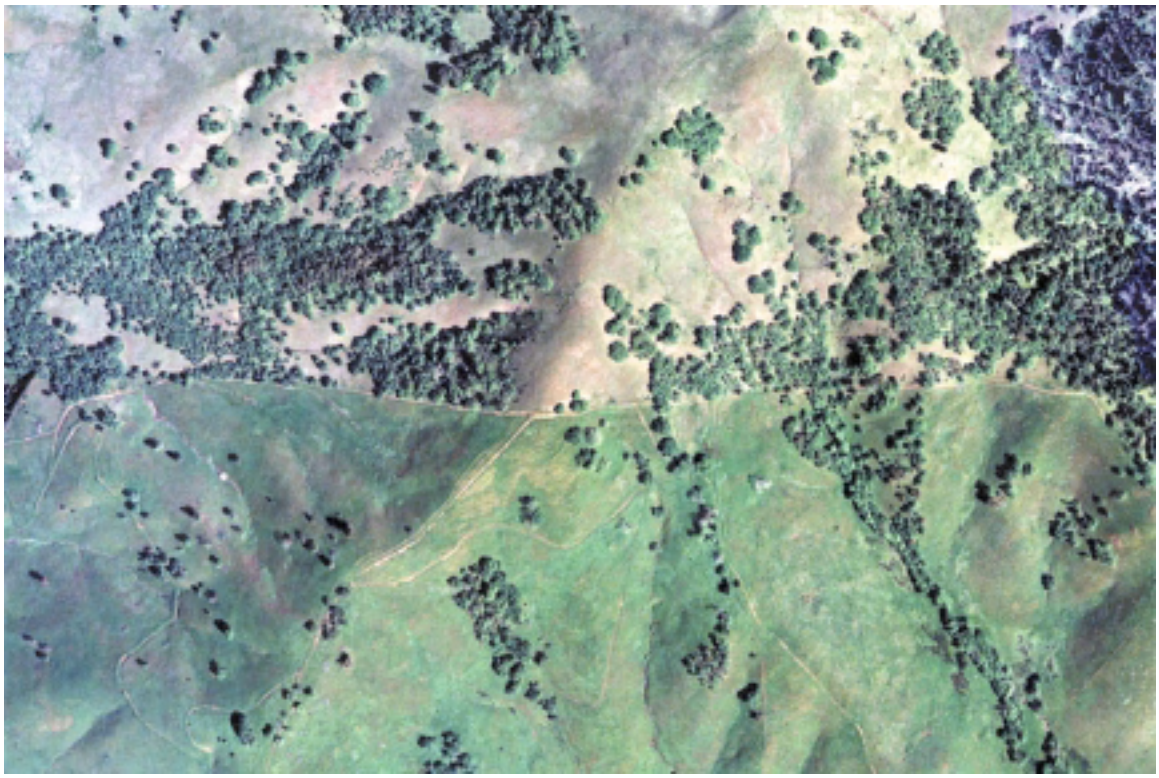
Alternatives B and C

Burning, pulling or cutting of invasive shrubs and trees, mowing, seeding, and grazing and fertilization (Alternative C) would result in the maintenance of grassland and oak savannah habitat. As long as these practices are continued, the forage availability, nutrient level and palatability would be increased and the quality of this habitat would be cumulatively improved.

Under Alternatives B and C, burning and thinning of oak woodland would prevent successional processes from changing oak woodland into conifer forest (Agee, 1993) which would maintain oak woodland that is currently suitable CWTD habitat (Ricca, 1999; Smith, 1981). Opening the canopy in the stands would result in increased plant diversity in the understory by allowing light and moisture to reach understory vegetation (Miller, et.al., *Quality Deer Management*, 1995; Hall, et.al., 1984; Agee, 1993).

Under Alternative B, approximately 960 acres of the hardwood/conifer vegetation type is currently in a shrub/tree seral stage and becoming marginal habitat for CWTD, or has been lost due to advancing succession, would be allowed to continue to develop into a hardwood conifer forest. Under Alternative C, thinning, slashing and burning would be used to remove small trees and shrubs which would result in returning these acres of the hardwood/conifer vegetation type to an early seral stage of succession. These early successional stage would be maintained by the use of burning, seeding, fertilization and grazing. This would result in an increase the amount of suitable CWTD habitat available on the management area by approximately 960 acres, an increase of 24% over what is now considered suitable CWTD habitat.

to return to the table of contents: Click here, Type a 7 and press enter (or return).



Fenceline between NBHMA (above) and private ranch (below), contrast shows difference in grasslands with active management of burning, fertilizing and grazing.

Conifers encroaching on oak woodland.

to return to the table of contents: Click here, Type a 7 and press enter (or return).

Special Status Plants

Alternative A

The management of special status plants would be in compliance with the Roseburg District Resources Management Plan (RMP) management action/direction (Roseburg District, Bureau of Land Management; 1995), the Endangered Species Act, and approved recovery plans. Surveys would be conducted in accordance with RMP management action/direction and approved protocols. Project associated impacts would be avoided or mitigated so that the condition of individual special status plant populations would remain static.

Alternatives B and C

Alternative B would manage special status plant populations in compliance with RMP standards and enhance populations of four special status plants, Shrubby Rock Cress (*Arabis koehleri* var. *koehleri*), Red Root Yampah (*Perideridia erythrorhiza*), Popcorn Flower (*Plagiobothrys hirtus*), and Hitchcock's Blue-eyed Grass (*Sisyrinchium hitchcockii*). Management prescriptions include planting vegetative stock or seed, controlling competing vegetation using mechanical or manual methods and managing noxious weeds using integrated pest management. Management in this alternative would be expected to increase the abundance of these species by approximately 25 percent over current levels (ranging from approximately 10 to 400 individuals) based on the success of past restoration efforts (Kierstead 1986, Amsberry and Meinke 1999, Roberts and Meinke 2000).

Alternative C would establish one new population of Popcorn Flower in addition to implementing the enhancement activities identified for the four species in Alternative B and managing all populations in compliance with RMP standards. The abundance and amount of occupied habitat for Popcorn Flower would be expected to increase by 50 to 100 percent over current levels (approximately 1 acre and 8000 plants) based on the success of previous introduction efforts (Amsberry and Meinke 1999). The abundance of Shrubby Rock Cress, Red Root Yampah, and Hitchcock's Blue-eyed Grass would be expected to increase by at least 25 percent over current levels (ranging from approximately 10 to 400 individuals) based on past restoration efforts (Kierstead 1986, Amsberry and Meinke 1999, Roberts and Meinke 2000).

Management (Alternatives B and C) would be expected to increase the abundance of four special status plants, Shrubby Rock Cress (*Arabis koehleri* var. *koehleri*), Red Root Yampah (*Perideridia erythrorhiza*), Popcorn Flower (*Plagiobothrys hirtus*), and Hitchcock's Blue-eyed Grass (*Sisyrinchium hitchcockii*) by approximately 25 percent over current levels. The abundance and amount of occupied habitat for Popcorn Flower would be expected to increase by 50 to 100 percent over current levels (Alternative C).

Noxious Weeds

Noxious weed infestations would be controlled using Integrated Pest Management in compliance with the Northwest Area Noxious Weed Control Program ROD and supplemental ROD (Bureau of Land Management 1986, 1987), the District RMP (Bureau of Land Management 1995) and the Roseburg District Integrated Weed Control Plan and EA (1995) under all alternatives. Integrated Pest Management includes the use of biological, manual, mechanical (including prescribed burning), and chemical means to control noxious weeds. Because of this strategy of Integrated Pest Management, the abundance and distribution of established noxious weed infestations would be expected to remain static (no further spread) and small outlier infestations would be expected to be reduced by 50 to 100 percent in priority control areas such as along roads, around buildings, heavily used recreation sites, and where infestations threaten resource values related to key issues (Roseburg District Integrated Weed Control Plan and EA (1995).

Medusa head rye is well established and abundant across most grassland communities in the NBHMA. Though traditional grazing practices have been documented to be a significant factor in the spread

to return to the table of contents: Click here, Type a 7 and press enter (or return).

noxious weeds, including medusa head rye, grazing practices as prescribed in Alternative C have been shown to effectively control noxious weed infestations by reducing weed vigor, reducing seed production, and shifting plant communities in favor of desirable species (Sheley et al. 1996). The combination of vegetation management techniques prescribed in Alternative B and C to improve habitat conditions for CWTD would be expected to reduce both the abundance and distribution of medusa head rye in the grassland community below current levels and those expected in Alternative A (Miller et al. 1999). Medusa head rye would be expected, however, to remain a significant vegetative component in all alternatives.

Timber

Timber management was specified for 400 acres of the ranch in the Exchange EA (page 7, Dunning Ranch Exchange EA, page V of the Decision Record, Dunning Ranch Exchange EA). Although the timber production acres are within the NBHMA, they are outside the North Bank ACEC. The area specified for timber management occurs in five separate areas within the NBHMA (Figure 9). These areas include 342 acres designated as Matrix or Connectivity/Diversity Blocks and 18 acres of Riparian Reserves. The 342 acres which are designated as Matrix are the lands that are available to "produce a sustainable supply of timber and other forest commodities" (RMP, p. 33).

The three alternatives would follow the Roseburg District RMP ROD management action/direction for lands designated as Connectivity/Diversity Blocks. The Connectivity/Diversity Blocks are managed on a 150 year area control rotation. Regeneration harvests retain 12 to 18 green trees per acre within harvest units.

The effect on the Annual Sale Quantity (ASQ) of the Roseburg District from these 342 acres is 0.069 million board feet per year or 0.013 million cubic feet per year. This represents approximately 0.15 percent of Roseburg District's ASQ of 45 million board feet.

On an overall basis, the environmental effects analysis and conclusions pertaining to timber contained in the Roseburg District RMP FEIS would be valid for these 342 acres because of similar environmental conditions and management as analyzed and assumed in the RMP FEIS. These forest stands are approximately 30 to 40 years old. Based on this age and site class, commercial thinning or density management would not take place for years and regeneration harvest would not take place for 110 to 120 years. Although the broad analysis contained in the RMP FEIS is valid for these acres, reasonable environmental analysis and conclusions specific to these areas are not possible at this time because any timber management on these areas would not take place for at least 20-30 years. The environmental effects of this specific proposed timber management is not ripe for analysis because of the high possibility that changed circumstances or new information would occur prior to implementation of the action. Therefore, the environmental analysis and decisions for timber management of these areas will be deferred until such time as implementation is ripe for analysis.

Water Quality

Factors that could contribute to degraded water quality includes continuing existing sources of sedimentation to streams and degraded riparian conditions, as well as management activities that could introduce sediment or chemicals into the streams.

Vegetation Management

Generally, alterations in peak flow quantities and timing is affected by changes of the landscape, in particular, alteration of existing vegetative cover. The magnitude of these changes (increases or decreases) depend primarily on the extent of these changes and on the alterations of flow patterns within a watershed.

to return to the table of contents: Click here, Type a 7 and press enter (or return).

Prescribed Fire

Under Alternative B, burning would occur on approximately 4200 acres for ten years, or 420 acres annually compared to Alternative C, in which approximately 4900 acres are proposed, or 490 acres annually. The level of risk to riparian habitat and water quality from prescribed burning from increased sediment yields to streams, depends upon local terrain and soil conditions, fuel loadings, and weather (Beschta et al., 1990). The risk of increasing sedimentation and flow appears higher on 7% of the NBHMA because of steeper slopes (between 60 - 85%), and the presence of first and second order (headwater) streams that would not be protected during prescribed burning. Conversely, risks would be lower on 90% of the NBHMA where slopes range from 10 - 60% because sedimentation is less likely on gentler slopes. The effects of burning to headwater stream reaches may accelerate existing head-cutting due to potential losses in root strength, but is expected to affect only a small percentage of the 41 miles of first and second order streams proposed for annual burning under Alternatives B and C. Moreover, trees adjacent to stream channels are expected to withstand low intensity burning and the integrity of stream banks and water quality would be maintained.

The effects to peak flows would increase initially from decreased evapotranspiration and then decrease as grasses, shrubs and trees become established. Actual flow responses would vary depending on size of the burn. Prescribed burning on NBHMA is expected to average 400 - 500 acres annually which represents 7% of the NBHMA. Prescribed burning that causes a 10% removal of grass and scrub habitat may result in approximately 10 mm increase in annual water yields, but this would depend on mean annual precipitation and year-to-year precipitation (Bosch and Hewlitt 1981). An increase of this small a magnitude in annual water yield would likely have an inconsequential effect on in-stream aquatic habitats because less than 10% of NBHMA would be burned annually under all alternatives.

The risks of negative effects to water quality are expected to be less under Alternative C compared to Alternative B because fewer acres are proposed for burning annually after the initial phase-in period.

Grazing

No grazing is proposed under Alternatives A and B. Under Alternative C, a variable width exclusion area between 35-100 feet would be established on fish-bearing streams, stream rehabilitation sites, stream-side plantings, and sensitive areas to protect water quality, channel morphology and stream banks. The size of the exclusion areas depends on the site specific conditions such as erosion control, excess nutrient removal, stream shade and channel morphology to adequately protect riparian conditions (Robinson et al. 1997, Castelle et al. 1994, and NRCS, 1997).

Fencing, season of use and frequent movement of livestock would be used to exclude livestock from streams, natural seeps and springs, sensitive riparian areas such as headcuts and streambanks with a likelihood of mass wasting, and stream restoration areas (see Appendix C, Grazing Plan). Moreover, the existing trees adjacent to streams would not be affected by grazing, and new riparian planting would be fenced out to exclude cattle and horses. The removal of grasses by livestock would not affect existing water quality, because of exclusionary fencing, light grazing prescriptions (50% utilization), and frequent movement of cattle to minimize soil disturbance in riparian areas as well as management adjustments made as the result of monitoring. The implementation of the above practices is likely to maintain water quality.

The Soil Conservation Service model was employed to determine potential effects on the volume and rate of runoff (peak flows) due to grazing (Kent, 1973). This model was chosen because of its widespread use and greater ability to approximate changes in flows on the NBHMA compared to other models. Two separate storm events, occurring during the months of March and April of 2000, were modeled in order to obtain accurate modeling. The percent pasture was estimated at 70% for Jackson, 60% for Whitetail, and 50% for Chasm from 1994 aerial photos. Model runs were conducted for differing amounts of grazing in each of the aforementioned watersheds. For Alternative C, model results and associated sensitivity analysis determined that peak flows would not be

to return to the table of contents: Click here, Type a 7 and press enter (or return).

especially sensitive to the amount of land in pasture or livestock grazing under light prescriptions. An immeasurable or negligible increase in peak flows and annual water yields would not be predicted from model results.

Fertilizer and Herbicide

The application of fertilizer (Alternative C) and herbicides for noxious weed control would occur under Alternative B and C. The risk of accidental drift of chemicals into streams is expected to be a low or rare occurrence and in very small amounts, and therefore would not adversely affect water quality (Fredriksen, Moore, and Norris; 1975). Monitoring of stream water on the Roseburg District in 1997 and 1998 found that nitrogen concentrations were elevated in one out of 72 samples (1%) following treatment, but returned to pretreatment levels within two days after applications in a forested environment (Roseburg BLM water quality monitoring, 1997 and 1998). The existing soil conditions and soil properties on the NBHMA may naturally reduce nitrogen and herbicides reaching streams. Soil properties would slow nitrogen movement in riparian areas because ammonium, nitrite, and nitrate would adhere to soil particles. Soil conditions with high clay and organic matter content coupled with deep soils would immobilize ammonium (Brady, 1990).

A variable exclusion area for fertilizer applications, seasonal restrictions, application methods and the existing soil conditions together would minimize fertilizer from reaching streams. The application of herbicides would be targeted at single or small groups of noxious weeds. A low risk of chemicals reaching streams is expected due to the above methods, therefore the use of herbicides and fertilizers is not likely to effect water quality.

Water source developments

No water sources would be developed under alternatives A and B.

Under Alternative C, development of water sources would increase habitat for aquatic species and wildlife by increasing the amount of available water. Water developments would store water to be available during summer low flows by raising the water table and increasing vegetative growth and soil moisture. Spring and wetland developments would be scattered throughout the NBHMA to limit the distance species must travel to find water and distribute animal use. Guzzlers and spring developments would be located outside stream channels and unstable areas. In-stream processes would be protected by exclusionary fences along sensitive and unstable areas, piping water to off site locations and limiting the size and number of developments. Effects to fisheries habitat and water quality from installing guzzlers and spring and wetland developments would be inconsequential.

Riparian and Stream Rehabilitation

“Proper Functioning Condition” (PFC) stream surveys indicate that many stream reaches are “not properly functioning” due to excessive stream down-cutting (Figure 15). No active in-stream rehabilitation, wetland and spring developments, prescribed burning, or grazing activities would occur under Alternative A, however, passive rehabilitation, defined as natural vegetative growth and routine road maintenance, would occur. Riparian and stream-side planting would not occur and stream reaches devoid of riparian shade would allow direct solar radiation to reach streams and contribute to increased stream heating during the summer months. Summertime flows are not likely to increase appreciably, with other factors (e.g. climate) being equal, due to lack of riparian vegetation to store, and release water during the summer months. Coarse woody debris recruitment is likely to decline as alders die off and future sources are not available over time. Observations of riparian areas along Jackson Creek indicate alder mortality with little to no tree regeneration along the upper stream reaches. Where deciduous trees such as alder are present, coarse woody debris recruitment from these species tends to occur after 50 years or more (Grette, 1985; Heimann, 1988; Andrus et al., 1988). Water and sediment are likely to be routed through the watershed rapidly due to the lack of in-stream coarse woody debris to slow water velocity, trap gravels, moderate downstream sediment movement, and potentially reduce the shear stress on bed and banks (Sullivan et al., 1987; Andrus et al., 1988; Sedell et al., 1988).

to return to the table of contents: Click here, Type a 7 and press enter (or return).

The Action Alternatives differ in the type, amount and extent of activities to rehabilitate stream reaches. Jackson Creek was determined to have the highest potential for stream rehabilitation activities. Alternative B restricts the use of equipment and in-stream structure placement to stream reaches that are accessible by existing roads, whereas Alternative C would access to streams in areas without existing roads. Approximately 1.5 miles of streams are within 100 feet of roads and are potentially accessible under Alternative B. Most of the streams would be accessible for stream rehabilitation under Alternative C. Under Alternative B, the remaining stream reaches that are not accessible by roads would recover naturally and the recovery time of streams would be similar to Alternative A. Alternative C represents a more active approach to stream rehabilitation, and includes the use of heavy equipment near streams to shape streambanks to a favorable angle of repose and placement of in-stream structures, such as boulder weirs and coarse woody debris. Stream rehabilitation under Alternatives B and C would improve in-stream conditions primarily by increasing the amount of in-stream coarse woody debris and trees along stream banks. Trees and vegetation would be planted along streams under Alternatives B and C to provide root strength to streambanks, stream-side shade, sources of coarse woody debris, reduced in-stream erosion and improved stream and riparian flow interactions over time.

Measures to reduce sediment displacement produced from in-stream rehabilitation activities under Alternative C include seasonal restrictions and rehabilitating areas by seeding, planting and erosion control treatments where soil disturbance occurs. Riparian and in-stream projects would be conducted during the summer when streams are dry, or a series of isolated pools and downstream sediment transport is not a likely response. Any excess soil material generated from stream rehabilitation, such as pulling back stream banks would be hauled to suitable stable locations on the NBHMA. First through fourth order stream reaches would likely widen in areas of coarse wood placement, and route additional sediment through the stream network as streams naturally adjust (Bilby and Bisson, 1996). This natural lateral migration would be a necessary step to rehabilitating stream reaches by building an internal floodplain and becoming stable over time (Chaney, Elmore and Platts; 1990). Trees directly contributing to streambank integrity and shade would not be removed under Alternatives B and C. The first fall storms following stream rehabilitation activities would likely route displaced sediment downstream for one to three years.

A small number of stream head-cuts (areas along streams where a dramatic change in channel gradient has occurred due to head-ward erosion) would need to be stabilized using large rock in cases where long-term grade controls are necessary and the stream reach is not likely to change over time. A moderate amount of sediment transport from head-cut stabilization projects would be expected for one to three years following in-stream rehabilitation activities as streams adjust to bankfull flows, or flows greater than a 1.5 year recurrence interval, and new stream channel dimensions. The long-term effects of head-cut stabilization are that these localized areas would not be free to adjust laterally to changes in flow and sediment that would occur over time. As stream rehabilitation projects are implemented, such as streambank pull-back, road and stream crossing improvements, and placement of coarse woody debris, stream reaches would be expected to naturally adjust to changes in stream dimensions over a period of decades. Rock buttressing may preclude the aforementioned stream adjustments from occurring. There is some potential for localized stream bed and bank scouring around these structures, however proper design of structures would reduce or eliminate this potential.

The risk of not stabilizing all stream head-cuts and effects to in-stream aquatic habitats appears low. For example, head-cuts along Jackson Creek are located in non-fish bearing reaches and most of the head-cuts are located in vegetated areas with tree and shrub roots maintaining streambank stability. Currently, the head-cuts are functioning as stream grade controls and are dissipating stream energy due to the “waterfall” affect on streamflow. The potential collapse of a head-cut is likely to cause tree(s) to fall, bank erosion, and increase in-stream coarse woody debris, which research indicates traps gravels, particulate organic matter, wood and sediment (Bilby and Bisson, 1996). This recovery process is likely to take several decades due to the incised nature of the stream profile that results in fallen trees initially bridging the stream followed by their collapse over time and initiation of the sediment trapping process.

to return to the table of contents: Click here, Type a 7 and press enter (or return).

Small amounts of sediment would be displaced in stream reaches during the replacement of stream crossings, but would remain localized due to restricting road improvements to the summer and because stream flow would be interrupted (or intermittent) during this period. The replacement of under-sized culverts would likely produce short-term sediment inputs to streams during the removal of road fills and culvert replacement. Implementation of erosion control plans would lessen short-term impacts to an insignificant level. Long-term effects on sedimentation from culvert replacements would be greatly reduced because culverts are sized to meet a 100-year flood and the risk of mass wasting from stream diversions are greatly reduced over the long term. Downstream sediment transport would be much greater from failed stream crossings under Alternative A compared to sediment displaced during stream crossing replacements under Alternatives B and C.

Roads

The treatment of roads are the same under all alternatives (see Chapter 2, Roads) except for the decommissioning of nine miles of road under Alternative B. Roads have the potential effect of extending the stream network and the routing of fine sediment and concentrating overland flow into streams during winter storms (Wemple, 1996). On the NBHMA this effect is largely confined to road segments typically 600 feet long and located at the approaches to stream crossings or where flow has been diverted off roads. These segments total approximately three miles, effectively extending stream lengths by this amount.

Rill and gully erosion is only present along steep road segments and below road culverts on slopes that are steeper than 10%. Sediment transport analysis and field evidence indicates that a relatively small amount of sediment is actually delivered into streams from the natural (dirt) road surfaces (Broda, unpublished report, 1999), because of the very low erodibility of the clayey soils, substantial vegetative buffer (50 ft +) and grassed road surfaces. An assessment of the erosion and sediment delivery from road surfaces was modeled for the roads in the NBHMA using the XDS Cross-Drain Spacing Program (USDA, 1998). The analysis indicates the importance of cross-drain spacing on sediment delivery. The average distance between cross drains is 600 feet. Most of the road segments that parallel creeks have gradients of two to four percent, with a vegetation buffer varying between 75 and 200 ft. From the model, reducing the distance between drainages to 200 feet would reduce sediment yield by 75 to 80 percent. Other roads that are greater than 200 feet away from streams and drainages would not deliver measurable amounts of sediment into these streams because vegetation slows the flow of water and filters out sediment before it can reach the stream. The additional flow and sediment from roads are likely inconsequential compared to the current in stream bank erosion.

Roads convert normally subsurface flow into surface flow and extend the stream network during winter base flow conditions (Wemple, 1996). The clayey soils along the road surfaces have substantially the same infiltration and runoff properties as the surrounding uplands, i.e., low infiltration and permeability. Due to the low soil permeability and small size of road cuts occurring on the NBHMA, only minor amounts of subsurface flows are intercepted. Seven miles of roads are within 50 feet of streams and approximately three miles may be contributing additional flow and fine sediment to streams (Table 4-1). Most of the three miles are located on the approaches to stream crossings where an inadequate number of cross drains are present or rutted road segments are carrying flow and sediment to streams during the winter months (see Table 2-2). The volume of sediment and flow originating from three miles of roads appears small (approx. < 10%) compared to in-stream erosion, based on field observations and several sediment samples taken in Jackson Creek during winter base flow. The natural flow patterns have been altered, as the road inventory indicates (average four diversions per mile). The flow alteration resulted in reduction of the flow gradient (roads have generally flatter grades than the tributary stream channels), and the length of the flow has been increased. An engineering analysis indicates that the flow velocities have been reduced by 25% to 50% at the diversion points ("dysfunctional drainages"), effectively reducing the timing of delivery from the tributary channels. In addition, majority of the road surfaces is vegetated with grass, further reducing the potential for increased runoff and reduced timing of the peak flows. Based on the above rationale, it can be concluded that the quantities and the timing of the peak flows in the streams were not altered to a measurable degree by the roads in the NBHMA.

to return to the table of contents: Click here, Type a 7 and press enter (or return).

Sediment transport analysis and field evidence indicate that a relatively small amount of sediment is delivered into stream from the unsurfaced road surfaces. The primary reason is the very low inter-rill and rill erodibility of the clayey soils, grassed road surfaces and exposed bedrock within the road prism. The majority of the roads (96%) have native surface, and over 95% have no ditch. Except for the road segments with gravel surfaces, the roads do not have ditches that would collect and facilitate sediment transport along the road prism.

Slope stability analysis indicates that road cuts made in clay could be considered stable, i.e. would not need mechanical stabilization, if the height of the cut was less than 12 feet along planar or convex slopes, and less than four feet along concave slope, where the influence of surface and ground water is present. There are only a few areas where road cuts exceed these heights. There are no areas in the NBHMA where roads directly impact the streams, except where roads cross the streams.

Erosion and sediment transport from the road system would be reduced by adding cross drain structures such as: low water fords, waterbars, rolling dips and culverts. Reducing the flow paths (distance between drainage structures) which would reduce the erosive power of the collected water, and consequently reduce the amount of sediment transport. Road gullying would be reduced by dispersing water (adding drainage structures), and armoring the road surface with rock or a vegetative cover. Road rutting would be prevented by covering the native surfaces with aggregate, vegetative cover or restricting traffic during the wet season. The proposed improvements would result in a 90 percent reduction in sediment transport, improved water routing, reduced gullying and reduced road rutting (Broda, Geotechnical Evaluation, 1999), and therefore eliminate measurable effects to water quality and fish habitat. The additional flow and sediment from roads are inconsequential compared to the current in stream bed and bank erosion. Stream down-cutting and the amount of “not properly functioning and functioning at risk” stream reaches seems to support this assertion (Figure 15). Suspended sediment and flow measurements during year 2000 winter base flows yielded approximately 20 tons/year. In the forested ecosystem of Smith River, sediment yields during the same time period were approximately 20 tons/year, but streamflows were three times higher (Rumbold, 2000). The installation of stream crossings, cross drains, and road improvements are likely to produce a short-term small amount of sediment downstream (compared to mass wasting and debris flows) and cause localized in-stream erosion as channels adjust to new structures. The long-term effects of road improvements to the aquatic habitat would be a reduction in sediment and flow delivery to streams. For example, reducing the cross drain spacing from 330 to 200 feet on a 4% road grade would reduce the average annual sediment yield by 50%.

Recreational Development

The proposed Doc’s Landing development is partially within the 100-year floodplain of the North Umpqua River, which includes approximately half the length of the proposed boat ramp. The proposed small parking area would be located outside the 100-year floodplain (FEMA, 1978). The parking area is on a high terrace at approximately 620 feet elevation. A concrete boat ramp and adjacent parking area would be constructed on an existing unsurfaced road and casual use parking area. The elevation (above sea level) of the county road and the proposed boat ramp location takeoff is 647 feet. The elevations of the 100-year, 25-year and 10-year floods at this location are 606, 600, and 596 feet, respectively (USGS Open File Report, 1973).

The proposed project would increase the amount of impervious area within the 100-year floodplain by less than an acre. Minor amount of ground disturbance would occur on an additional acre within the flood-plain for day use activities. The boat ramp would be permanently converted from grasses, small shrubs to an impervious surface. The effects to riparian function (i.e. floodplain roughness due to vegetation and downed coarse woody debris) and water quality of the river would be inconsequential because the area would remain predominately in grasses and small shrubs. Small amounts of sediment and concrete during construction activities would be delivered to the North Umpqua River, but would have an inconsequential effect on the sediment regime of the river. The construction activities will occur during the summer low flow period when sediment delivery is not a likely response.

to return to the table of contents: Click here, Type a 7 and press enter (or return).

The removal of effective stream shade and concurrent warming of the river during the summer would not occur. Normally, large wood is not expected to enter the river in the project area due to the existing habitat and the county road along the river. No adverse effects on peak, base, and low flows are expected due to the limited scope of the project.

The remaining recreational developments would have inconsequential effects to water quality because the amount of ground disturbance would be minimal and development would take place on previously disturbed ground and be outside the stream channel.

Riparian Habitat

Stream Rehabilitation

Under Alternative A, no in-stream or riparian restoration work would occur. Erosional processes would continue at existing rates and levels. Degradation of water quality from in-stream erosion, lack of structure, insufficient shade and low summer flows would continue to depress fish populations. Fish habitat sufficient to recover and/or improve populations would be absent until riparian areas become naturally stocked with trees and trees grow to sufficient size to stabilize the stream banks and offer a continual source of large woody material to stream channels. In most cases this process would take several decades to complete.

Alternative B differs from the Alternative C in the type of activities that would be used to restore streams and the extent to which these activities would occur. Under Alternative B, in-stream placement of structures would be restricted to areas where equipment could gain access to stream channels from existing roads. Approximately three percent of streams could be accessed from existing road. The remaining 97 percent not accessible from roads would continue having degraded water quality from sediment, insufficient shade, and eroding cut banks that lack suitable soils for vegetation to become established. Alternative B would start the streams on a trajectory towards recovery, but would rely on natural recovery of vegetation for the most part. Fish habitat sufficient to recover and/or improve populations would not be expected until the stream system is sufficiently vegetated and stabilized. The amount of time for this process to occur would be similar to Alternative A.

Under Alternative C there would be active management to restore water quality and fish populations. Stream reaches that are non-functional would be restored through in-stream structure placement and stream bank manipulation. Structures would be placed where they would be most effective in slowing stream bank erosion and restoring fish habitat. Equipment would be used in-channel for structure placement and stream bank alterations. Pulling back and re-sloping cut banks would require the use of machinery to move bank material. Measures intended to reduce the amount of sediment produced from these activities including timing restrictions, enforcement of effective erosion control plans, and removing fish from pools directly below work sites would reduce the potential for negative effects to fisheries from work related sediment.

Stream rehabilitation under Alternative B and C would improve instream and riparian functionality primarily by increasing the amount of woody vegetation along stream banks. Additional woody material would serve to stabilize stream banks thus reducing instream erosion, increase shade, decrease water temperature, and improve summer flows through water storage. Under Alternative C, suitable planting spots would created by pulling back and re-sloping cut banks (serrated cuts). Under Alternative B, trees would planted where suitable conditions exist. Long-term benefits to fisheries derived from improved stream bank conditions would be greater under Alternative C, because of the greater amount of stream banks that would could become suitable for planting vegetation compared to Alternative B.

Stream processes and water quality would continue at existing levels until planted vegetation becomes established and begins to influence water routing processes. Mature trees in riparian areas would stabilize stream banks, add shade, store water for use during summer low flows, and become a long-term source of

to return to the table of contents: Click here, Type a 7 and press enter (or return).

instream material. No adverse effects are expected to occur that would result negative impacts to water quality and/or fish populations.

Under Alternative B and C, all in-stream and riparian actions, including restoration actions, may degrade water quality and fish habitat in the short-term (less than two years). In most cases, degradation of water quality would be confined to the duration and location that work is actually occurring.

Vegetation Management

No burning, grazing, or fertilization would be prescribed under Alternative A. Spraying of noxious weeds would occur and is addressed below.

Prescribed burning would be similar under both of the action alternatives, although prescribed burning would be more frequent under Alternative B. Burning would be used to change plant succession and alter the vegetation in both upland and riparian areas. Burning prescriptions would be applied that protect and enhance the growth and vigor of hardwood and conifer tree species. Burning would be of low intensity and excluded from sensitive areas therefore, no change in the amount or quality of the vegetation needed to maintain the current level of water quality and fish habitat would result from prescribed burning at the proposed level.

No grazing would occur under Alternative B. Grazing under Alternative C would not change the amount or condition of trees and shrubs within riparian areas. Trees and shrubs are the primary vegetation used to stabilize, shade, and maintain water quality and fish habitat. Removal of grasses by cattle would have no effect to stream shading, in-stream flows, or long-term recruitment of coarse woody material. Exclusionary fences, light grazing prescriptions, and frequent movement of cattle would prevent sedimentation of streams.

No fertilizing would occur under Alternative B. Fertilizing under Alternative C would not alter the vegetation needed to maintain water quality and habitat sufficient to support healthy fish populations. Project timing, application methods, and no fertilization stream buffers would ensure fertilizers do not directly enter a waterway.

Spraying of noxious weeds under all alternatives would not alter the vegetation needed to maintain water quality and habitat sufficient to support healthy fish populations because project timing, application methods, and stream buffers would ensure that chemicals do not directly enter a waterway.

Recreation

Under the “No Action” alternative, recreation would continue at existing levels. Beneficial and detrimental effects to fisheries from recreation would remain as they currently are. Recreation outside of riparian areas would have no effect to fisheries because there would be no effects to water quality or riparian vegetation. Hiking, mountain biking, and horse riding would be largely be concentrated along existing trails therefore effects to fish habitat associated with water quality would be short-term, minor, and localized. Primitive camping in riparian areas would adhere to “leave no trace” camping standards, therefore, effects to fisheries would be inconsequential because water quality and riparian vegetation would be maintained. The primary difference between Alternative B and Alternative C, is the amount of facility developments and the level of recreation expected to result from these improvements.

Aquatic Conservation Strategy

Four components of the ACS are integral in both the NFP and RMP in developing and implementing projects that are consistent with ACS objectives. These four components are: Riparian Reserves; Key Watersheds; Watershed Analysis; and Watershed Restoration. The following narrative addresses how each of these components relates to both the alternatives and the fifth field watershed.

to return to the table of contents: Click here, Type a 7 and press enter (or return).

Riparian Reserves

The reserve system was established to provide areas necessary for maintaining hydrologic, geomorphic, and ecological processed that directly affect functions vital to aquatic and upland species dependant on these areas. The NFP prescribed Standards and Guidelines and the RMP prescribed Management Actions for the Riparian Reserve would also apply to the riparian areas within the NBHMA. Riparian Reserves on the NBHMA would approximate 180 feet along both sides of non-fish bearing streams and 360 feet along fish bearing stream (NBHMA WAU).

Key Watersheds

The North Bank Habitat Management Area (NBHMA) is part of the Lower North Umpqua fifth-field watershed. The Lower North Umpqua is not a key watershed.

Watershed Analysis

Watershed Analysis was completed for the NBHMA in 1997. Projects proposed under the North Bank EIS largely stem from recommendations in the North Bank WAU.

Watershed Restoration

The focus of the NBHMA is restoration of habitats to support and improve CWTD, wildlife and fisheries.

Consistency of the alternatives with the Aquatic Conservation Strategy Objectives

The "no action" alternative (Alternative A) would restrict activities within riparian areas to maintaining the existing road network and would allow the existing level of recreation to continue. The existing riparian conditions would continue to recover naturally, in all ACS objectives and maintain the current processes. The following discussion applies only to Alternatives B and C (action alternatives). For the purposes of ACS analysis long-term is defined as five to fifty years.

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

Adding in-stream habitat structures, stream bank stabilization, road renovation, and riparian planting would promote and improve fish populations and habitat. In-stream structures would restore habitat components currently lacking and critical for fulfilling life history requirements. Re-sloping vertical stream banks (Alternative C only) would allow vegetation to become established, ensuring long-term recovery of watershed and landscape features. Road renovation would reduce the degradation of fish habitat from sediment to a small degree and improve water quality for fish and aquatic species. The current riparian vegetation is dominated by non-native and noxious plants. Management activities designed to improve CWTD habitat would favor native plants, thereby improving habitat for native species and populations. Burning, grazing, other vegetation management, and recreational site developments (Doc's Landing, pull-off parking, etc.) would not alter the distribution, diversity, and complexity of watershed and landscape features, thereby maintaining the condition of these features in the long-term and at the fifth-field watershed scale.

ACS Objective 2 - *Maintain and restore spatial and temporal connectivity within and between watersheds. Lateral, longitudinal, and drainage network connections include floodplains, wetlands, upslope areas, headwater tributaries, and intact refugia. These*

to return to the table of contents: Click here, Type a 7 and press enter (or return).

network connections must provide chemically and physically unobstructed routes to areas critical for fulfilling life history requirements of aquatic and riparian-dependent species.

Enhancing woody vegetation along stream banks and within the riparian areas would restore connectivity within and between watersheds. Improved connectivity would promote unobstructed routes critical for fulfilling aquatic and riparian dependent species life histories. Stabilizing stream banks would provide for improved floodplain connections, restoring in-stream flows and habitat in headwater areas currently lacking in year round water. Within the NBHMA connectivity with other watersheds exist as disconnected grasslands and patches of oak savannah. Actions not intended to restore aquatic habitats, such as grazing, burning, and recreation would not alter the existing quality of watershed connectivity. Drainage network connections including floodplains, wetlands, and critical upslope areas would be excluded from vegetation management actions or managed in a manner that maintained the integrity of these areas, therefore maintaining these habitats in the long-term and watershed scale.

The roads in the NBHMA have impacted the connectivity within the watershed to a measurable degree; primarily by disrupting and altering the overland flow patterns downslope from the roads. The visible results of the changes in water routing across the roads are reflected in the numerous gullies along the road prism (primarily along roads with steep gradients, +10%), as well as downslope from water concentration points. The proposed corrective measures would restore the natural water routing patterns (under all three alternatives) by increasing the number of cross drains to reflect the natural drainage pattern, upgrading the existing drainage structures, and limiting the existing and potential rutting of the road surfaces.

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

In-stream and riparian treatments would be implemented to increase fish population and improve the quality of water delivered to the North Umpqua River. Under Alternative C, restoration of streams would include restoring shorelines, banks, and bottom configurations. This would be accomplished by adding structure and vegetation to areas that are currently not stable and in jeopardy of continued erosion, pulling back stream banks, adding structure to the channel, and re-vegetating bare areas. Shores and banks would stabilize with added vegetation. In-stream structure placed in stream channels would trap sediment and gravel and restore bottom configurations. Under Alternative C, vegetation management actions such as grazing, burning and thinning for the CWTD but not intended to restore aquatic habitats would be excluded from sensitive areas, riparian rehabilitation areas, and fish-bearing streams. Grazing and burning prescriptions would limit the effects of these actions on aquatic systems, including shorelines banks, and bottom configurations. Vegetation management would occur in areas that are currently degraded. As proposed, grazing, burning, and vegetation management would not result in additional degradation of these areas, and therefore, maintain these habitats in the long-term and watershed scale.

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

In-stream and riparian treatments would improve the quality of water delivered to the North Umpqua River. Structures in conjunction with increased stream bank vegetation in perennial streams would decrease water temperature and increase summer low flows by adding woody vegetation to shade streams and store water. Additional water storage would increase the amount of habitat available for aquatic and riparian communities. Vegetation management proposed under alternative C, would be done in a manner that limits the potential for sediment to be transmitted downstream. Vegetation management would occur in areas that currently lack flowing water during most of the year. As proposed, grazing, burning, and vegetation management would not result in additional degradation

to return to the table of contents: Click here, Type a 7 and press enter (or return).

of water quality thereby maintaining water quality necessary to support aquatic ecosystems in the long-term and fifth-field watershed scale

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

The primary sources of sediment in the NBHMA are in-stream bank erosion, mass wasting along stream banks and active land flows along the stream banks. Roads contribute only minor amount (less than 5%) of sediment to the streams. Sediment delivery, volume, storage, and transport would be restored primarily through stream bank re-sloping, and re-vegetating, installing in-stream structures, and road rehabilitation. Restoration activities that have the potential to result in increased sedimentation would be mitigated by applying BMP's, and no entry buffers. Sediment generated from vegetation management actions would be short-term, localized, and minor. Restoration activities would promote restoration of the sediment regime under which the NBHMA evolved. Burning, grazing, recreation site developments, and other activities proposed under Alternatives B or C would have inconsequential effects to the existing sediment regime and result in maintaining this process in the long-term and watershed scale.

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

Stream rehabilitation would focus on restoration of in-stream flows. Fish populations throughout the NBHMA are limited by the amount of water in the streams during summer low flows. Adding in-stream structure, creating wetlands, and improving stream bank conditions for re-colonization of vegetation would be used to increase flows through water storage. Vegetation important for water storage would be protected by applying vegetation management prescriptions and exclusion areas that maintained sufficient vegetation to sustain in-stream flows. Hardwood and conifer trees within understocked riparian areas would be planted to increase stability and water storage. Existing hardwoods and conifers that contribute shade and stability to streams would be protected from vegetation management actions, maintaining patterns of nutrient and wood routing. Under alternative C, grazing and burning would remove vegetation and modify the timing and quantity of water delivered to streams. The amount of vegetation removed and the effects to in-stream flows would be confined to the drainage where the vegetation was removed, and the season immediately following the vegetative treatment. In-stream flows sufficient to sustain riparian and aquatic habitats would be maintained at the watershed scale.

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

Floodplains would be reconnected with the channel using in-stream structure and stream bank manipulation. Wetlands would be developed and water tables raised to store water for use during summer months. Renovation would improve the timing and variability of floodplain innundation, by reducing road related water runoff and allow soils to hold water a release it over time. Functioning floodplains are currently lacking along most of the streams within the NBHMA. Under Alternative C, vegetation management, including grazing and burning in areas lacking floodplains would maintain the present condition of this habitat. Where functioning floodplains exist, vegetation management would be excluded, or prescribed in a manner that protects their integrity, thereby maintaining the timing, variability, and duration of floodplain innundation.

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

to return to the table of contents: Click here, Type a 7 and press enter (or return).

Management actions would contribute to the restoration of the species composition and structural diversity of plant communities by converting the existing non-native and noxious weeds to favorable early seral species. Planting woody vegetation would stabilize stream banks, reduce the amount of surface and bank erosion, and provide a future source of coarse woody debris in the long-term. In-stream structures would also be used to add stream stability and sustain the physical complexity of streams until the riparian areas are sufficiently recovered and woody debris becomes available. Under Alternative C, vegetation management objectives would be achieved primarily through the use of cattle and prescribed fire. Control of noxious weeds would be achieved by mechanical or biological methods or spraying of individual plants. Grazing, the use of fire, and spraying would all reduce the amount of non-native and noxious weeds on the NBHMA and provide suitable conditions for favorable species to become established. Where vegetation management is applied, native species would be benefitted thus restoring long-term species composition and structural diversity of plant communities.

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

Restoration of streams and riparian areas for the purpose of improving fish and wildlife populations, including CWTD, is the primary focus of Alternative B and C. Stream rehabilitation, vegetation management, and improvements to the existing road network would all be used to rehabilitate and improve habitats for use by native species. As a result of rehabilitation, vegetative manipulation, and recreation site developments; short-term and minor localized effects to aquatic and riparian habitats, and species associated with these habitats, may occur; but improvements would have long-term benefits to habitats and is expected to result in greater species richness and increased health of individual species. Actions under alternative B and C would restore habitat for native species, primarily CWTD and anadromous salmonids.

Cumulative Effects

Alternative A

The processes currently degrading riparian and in-stream habitat would be allowed to continue. Stream reaches would continue to down-cut to some base level, increase stream width, and subsequently widen enough to build a stable channel and internal floodplain over a period of decades (Chaney, Elmore, and Platts 1990).

Alternative B and C

It is expected that as riparian and wetland areas are developed under Alternatives B and C, additional water would be stored, thereby increasing the potential of establishing perennial flows in these areas over the long-term. Long-term effects to hydrology, water quality and quantity from in-stream rehabilitation projects are expected to be reduced sediment transport from erosion, increased stream shade and base flows over time, moderate water velocities, improved water storage, improved shade as trees grow in height, and a reduction in sedimentation from road improvements and stream crossing replacements. Additional water storage would increase the amount of habitat available for aquatic and riparian communities. Restoration would ultimately result in long-term, improved habitat conditions for the majority of native plant and animal species.

Wildlife

Effects to wildlife species or species groups are based on how they react to habitat conditions maintained, created or lost by the actions applied under each alternative. Effects of individual management actions such as burning, thinning and fertilization to vegetational habitat types under each alternative have been analyzed in previous sections. Wildlife species considered individually for effects analysis are those listed as threatened or endangered under federal regulation and species designated as Survey and Manage

to return to the table of contents: Click here, Type a 7 and press enter (or return).

species under the ROD for the Northwest Forest Plan that occur or are found near or on the NBHMA (Appendix A).

Species found on the 1997 state list of sensitive species, the Oregon Natural Heritage Program (March 1998) compilation of Rare, Threatened and Endangered Species of Oregon (Appendix A), and species listed as occurring on the NBHMA (Appendix A) are analyzed in groups by habitat needs or guilds (Appendix A). Some species may occupy more than one guild, depending on life history requirements. Guilds listed in the appendix are not all inclusive, but enough species are included in each guild to represent a cross section of life forms. Analysis for effects of alternatives on the guilds reflect effects to wildlife species that share similar habitat attributes in the individual guilds. Effects of alternatives to birds of prey or raptors as a species group is of special concern to the Bureau of Land Management and are discussed as a group.

The scope of effects analysis for wildlife species in this document is limited to individuals and species groups currently found on the NBHMA. Effects on individual species and species groups are general in nature, e.g. loss of snags will reduce habitat on the NBHMA for cavity dwellers that excavate in snags. Common names of wildlife species are used in this effects analysis. For proper names, see Appendix A.

Road and trail maintenance would have an inconsequential effect on habitat for wildlife species. The principle effect would be from disturbance due to use of heavy machinery used on road restoration or maintenance. Disturbance would take place outside of nesting and fawning seasons, would be measured in hours or days, and would not take place during wet periods. Effects to wildlife would be inconsequential.

Construction activities for pond development, stream rehabilitation, recreational development and river access would focus disturbance in designated areas such as pond sites or recreational developments and access routes to those construction sites. Disturbance from heavy equipment would be of longer duration than that of road maintenance activities but would take place during the same time periods outside critical seasons for wildlife species. Depending on the extent of individual projects, disturbance would be present from a week or two to several months. The majority of longer term construction activity would be involved with rehabilitation or creation of habitat on the management area. Short-term disturbance that has little effect to wildlife would result in long-term benefit to wildlife through habitat restoration or creation. Disturbance would be in limited areas on the NBHMA so disturbances to wildlife would not be widespread.

Explosives are a commonly used tool to manipulate habitat for wildlife, especially where use of heavy equipment is limited by wet soils or access. Use of explosives during construction activities would create a very short-term disturbance to wildlife. Experience in explosive use for pond creation has shown that the noise created by explosives is of very short duration and results, in at most, a startle response in wildlife species that have been observed. (Mires, personal observation) Disturbance created by human activity needed to prepare a site for blasting would move sensitive species away from the immediate project area prior to setting off explosives. Little effect to wildlife species from either disturbance or direct impact from a blast would be expected.

Control of noxious weed species under all alternatives would remove some seed sources used as food by species such as goldfinches, but would have little overall effect to bird or mammal species on the management area. Reduction of noxious weeds would allow an increase in grasses and forbs which would benefit wildlife species such as CWTD, small mammals and grain eating birds.

Columbian White-tailed deer

Alternative A

Suitability of CWTD habitat would continue to decline as succession converts grasslands, oak savannah, oak woodland and early seral stage hardwood/conifer habitats into closed canopy mixed forest (Agee, 1993; Franklin, 1973; Gumtow-Farrior, 1992). CWTD are an early seral species (Smith, 1983; Ricca, 1999; Whitney, 2000). As habitat succession advances, cover becomes dense

to return to the table of contents: Click here, Type a 7 and press enter (or return).

and the species composition of woodlands changes to a mixed conifer habitat type with oaks and forage plants being shaded out. As a consequence, forage nutrition and availability would continue to decline resulting in a lowering of the carrying capacity of the management area. Forage and habitat for CWTD would be lost, resulting in the loss of CWTD from those acres that no longer maintain suitable habitat. The forage base (approximately 3900 acres) has experienced an estimated 50% loss in six years since acquisition due to thatch buildup and noxious weed populations (BLM report, Roan, 6/2000). Indicators of poor nutritional levels and availability of forage for both species of deer on the management area are beginning to be exhibited. Considering the indicators and estimated losses of forage to date, an estimated loss of 90% of CWTD forage (approximately 3500 acres) within 20 years under Alternative A would be expected.

Alternative B

Approximately 3,900 acres would be maintained in grassland/savannah or oak woodland habitat types and continue to support CWTD. Availability of forage for CWTD would increase by an estimated 100% over current levels as a result of prescribed burning to remove thatch. Prescribed burning would increase nutrient levels in forage resulting in higher fawn survival in the early summer. Increased body condition in both adults and fawns would increase overwinter survival. An increase in forage availability and nutritional levels would increase the carrying capacity of the NBHMA for CWTD. Increases in forage availability and nutrition, although cyclic under Alternative B, would result in healthier CWTD. CWTD in better body condition would be better able to withstand severe weather events or disease enabling the population to be better able to recover from losses. The 3,900 acres of habitat capable of supporting CWTD would be maintained, compared to the loss of that same amount under Alternative A.

Alternative C

Alternative C results in greater increases in the amount, quality, stability and availability of forage and increases in CWTD habitats compared to Alternative B. Conversion of 970 acres of marginal hardwood/conifer vegetation type into suitable CWTD habitat would result in a total of approximately 4,900 acres or 75% of the habitat found on the NBHMA being in habitats that are preferred by CWTD. Use of seeding, fertilization and grazing and creation of forage plots would increase forage availability, nutritional level, palatability and digestibility over Alternatives A and B. Forage quality and availability would be more stable with a combination of burning and grazing treatments found in Alternative C. The resulting increase in carrying capacity on the NBHMA would allow deer populations (both white and black-tail deer) to increase. Stability in forage quality and availability would increase fawn survival, lessen chances of fawn abandonment and increase overwinter survival for both fawns and adults. Stable nutritional levels and availability of forage would increases condition of deer and would increase the reproductive capacity of deer. Increased reproductive capacity would allow the population to recover in the event the population is reduced by some stochastic event such as severe weather. Rapid recovery of the NBHMA population would lessen the chances the species would be need to be re-listed under the Endangered Species Act once it is de-listed. Increases in water distribution and seasonal availability as a result of stream rehabilitation, wetland enhancement, spring development and construction of ponds would increase distribution of CWTD use across the NBHMA.

Research “suggest that CWTD utilize forage plots that are often associated with wetland plant communities” (Smith, 1983: Whitney, personal conversation). This factor is substantiated with habitat use research that indicates CWTD select riparian habitat types more frequently than other habitats, based on availability, and that habitats within 200 meters of riparian areas are used to a greater extent than those further away (Ricca, 1999). Increasing distribution of water sources and associated vegetation, along with grazing would increase the carrying capacity of habitat and increase amounts and distribution of wetland associated habitat favored by CWTD. Further, increases in seasonal forage availability and quality through development of water resources, forage plots and grazing would improve the health and condition of CWTD.

to return to the table of contents: Click here, Type a 7 and press enter (or return).

Management of 360 acres for timber production would have little effect to CWTD on the management area. Most of the acreage selected for timber production is not suitable habitat for CWTD at present. Harvest of conifers at rotation age would create early seral habitat types that would be favorable for CWTD until conifer reproduction excludes forage species. Timber harvest would result in a short-term benefit to CWTD due to forage production on the designated 360 acres. Recreational development at three sites would result in the loss of approximately three additional acres of wildlife habitat. Water access would benefit CWTD through increasing potential for habitat management through prescribed burning and fire suppression when needed.

Increased development at the school bus turnaround on the west side would remove an inconsequential amount of grassland. Recreational development and associated stream rehabilitation at the main barn area would result in increased habitat values at that site by increasing availability of water, reducing the area of development and planting trees and shrubs as landscaping. Recreational development would increase the potential for more visitors, resulting in more disturbance to wildlife, however, size limitations on recreational access sites and distribution of access points would limit concentrated use. Disturbance to CWTD from recreational development or use would be inconsequential.

Overall, Alternative C would increase CWTD habitat to approximately 4,900 acres or 75% of the land base of the NBHMA, versus approximately 3,900 acres or 60% in Alternative B and a loss of 3,900 acres in Alternative A. Improved forage availability, nutritional levels, palatability and distribution along with well distributed perennial water sources and a reduction of cyclic forage availability found in Alternative B would increase carrying capacity, stabilize the forage base and improve the condition (health) of the CWTD population on the management area.

Northern Spotted Owl

Alternative A

Seral progression would allow coniferous habitat favorable to spotted owls to develop on the NBHMA. As conifers encroach on existing habitat types and multistoried canopies develop, foraging and dispersal habitat would be created. Eventually, with fire exclusion, structural characteristics of forested habitat would allow nesting, foraging and dispersal by spotted owls although little effect to spotted owl populations in the vicinity of the NBHMA would be expected due to the time period required for suitable habitat to form. Additionally, management plans for spotted owls have not identified habitat in the vicinity of the NBHMA as being needed for recovery purposes for the owls.

Alternative B

Approximately 2,200 acres of hardwood/conifer vegetation type currently in a shrub/tree or closed canopy stage of succession would be allowed to continue successional development. In approximately 30 years, approximately 60% of the acreage (1,300 acres) that has the highest component of conifers would become suitable as dispersal and foraging habitat for the spotted owls. Eventually, habitat would become suitable for nesting, foraging and dispersal as multiple canopies and structure develop in the forest stands. Approximately 900 acres of the 2,200 acres that has little conifer component would become closed canopy hardwood/conifer woodland, consisting primarily of incense cedar and madrone. Stands of this type support prey species such as woodrats that are utilized by spotted owls and many other predators. Maintaining early seral habitat types on 3,900 acres for CWTD under Alternative B would not allow spotted owl habitat to develop through succession on those acres.

Alternative C

Alternative C would create and maintain approximately 4,900 acres of the NBHMA in early seral stage habitats most beneficial to CWTD. This action would remove that acreage from a potential

to return to the table of contents: Click here, Type a 7 and press enter (or return).

habitat base for spotted owls. Approximately 360 acres of conifer habitat would be managed for timber production. During the growth period of selected timber management stands, size and structure would develop that would furnish dispersal and foraging habitat for spotted owls. At the rotation age of 150 years, that habitat would be lost. The remaining 1,300 acres of hardwood/conifer vegetation type would advance through succession, developing sufficient structure for nesting, foraging and dispersal in the future.

Bald Eagle and Golden Eagles

Alternative A

Up to six bald eagles, both adults and immatures and up to four Golden eagles have been noted on the NBHMA at one time during past winters (Mires, personal observation). Loss of open habitats would remove grassland and oak savannah currently utilized as foraging and wintering habitat for eagles. As open areas transition into woodlands, forage areas are lost and prey bases would become unavailable to eagles throughout the year. Nesting/roosting habitat potential would increase as trees become larger and more capable of supporting large nest structures. This would increase opportunities for bald eagles to nest close to the North Umpqua river. Due to the amount of residential development and conversion of open habitats being converted to timberlands on other properties in the vicinity of the management area, foraging and wintering habitat on the NBHMA is becoming increasingly more valuable for bald eagles. Reduction of currently suitable foraging habitat would add to the cumulative loss of habitat resulting in a concurrent reduction in the ability of the area to support bald eagles during both nesting and wintering periods. Golden Eagles nest in existing large conifers and hunt open grasslands and oak savannah for rabbits, ground squirrels and other small to medium sized mammals. As open habitats decline under Alternative A, foraging areas for Golden Eagles would decrease along with their prey base. Although foraging habitat is available on adjacent properties, it is being lost through residential development and conversion to timberlands. Whether or not the loss of foraging habitat on the NBHMA would affect their continued nesting on the management area is unknown.

Alternative B

Maintenance of open habitat types on the management area would maintain suitable foraging and wintering habitat for eagles. Increases in the availability of large trees would increase the number of potential nest sites. Prescribed burning would maintain open habitats and the prey species that eagles depend upon during wintering and nesting seasons. Maintenance of the prey base and increased availability of that prey base as a result of vegetation management such as burning, would support reproduction by eagle pairs that use the area. Use of prescribed burning to create and maintain open grassland and savannah type habitats would maintain approximately 2,750 acres of open habitat that would be lost to eagle use under Alternative A.

Alternative C

Foraging and wintering habitat for eagles would increase from approximately 2,750 acres under Alternative B to approximately 3,700 acres. Treatment of 180 acres of residual conifers to increase crown structure and diameter would increase nesting potential for both eagle species under Alternatives B and C. Increasing early seral acreage would increase prey species habitat and potentially increase the prey base for eagles. Construction of ponds would furnish opportunities for waterfowl and increase the potential prey base for both golden and bald eagles. Burning and grazing would reduce cover for prey species, increasing prey availability to both species of eagles. Development of recreation access sites would have no effect on known nest sites of golden eagles. Bald eagles are not known to nest on the management area. Use patterns by recreationists have been fairly well established during the last six years. There has been little indication of disturbance to known golden eagle nest sites during critical periods (Mires, personal observation). An increase in recreational use that follows established use patterns would have little effect to the known sites.

to return to the table of contents: Click here, Type a 7 and press enter (or return).

Raptors

Alternative A

As a general group, raptor species that occur on the management area would lose foraging and some nesting habitat, as succession creates closed canopy forest types. For all species, loss of open grassland and savannah type habitats would reduce or eliminate foraging habitat. Loss of edge between contrasting habitat types would reduce the amount of foraging habitat available for such species as Sharp-shinned and Coopers hawks. Species such as Red-tailed hawks nest in large trees in savannah type habitat and forage in the same areas. Great-horned owls nest in woodland areas and hunt adjacent open grasslands. Northern harriers forage and nest in grasslands. Loss of open habitat would eliminate these three species from the NBHMA. Others, such as American Kestrels and western screech owls nest in cavities in larger trees and snags, showing a preference for "large open-form oaks with cavities in savannah habitat" (Altman, 2000). Loss of oaks to conifer encroachment would eliminate nesting structure and foraging habitat for these two species. Continued loss of grassland habitats through succession would also result in the loss of wintering habitat for many species of raptors, including eagles, that depend on open grasslands and the prey bases they support. Cumulative effects of succession under Alternative A would result in the loss of the majority of raptor species now found on the management area.

Alternative B

Maintenance of current levels of open habitat types through burning would ensure continued availability and use by most species of raptors. Additionally, removal and control of thatch buildup and removal of dry grass through frequent burning would limit cover for prey species. Meadow voles form the primary prey base for hawks and owls on the grassland portions of the management area and as thatch buildup becomes thicker, prey species become less vulnerable to predation. Late summer or early fall prescribed burning would increase the availability of prey species over the winter months for most raptor species that winter on the management area and prey on small rodents. Reduction of thatch would increase prey availability during early spring and summer months when raptor nesting is occurring and high numbers of prey are required for nestlings. Burning would increase the availability of prey species for raptors on approximately 3,900 acres of habitat, including oak woodlands under Alternative B compared to a loss of the same acreage if succession is allowed to continue under Alternative A.

Alternative C

Foraging and wintering habitat for the majority of raptor species found on the NBHMA would increase. Foraging habitat would increase from approximately 3,900 acres under Alternative B to approximately 4,900 acres. The increase in foraging habitat would increase prey numbers and availability. Forage management for CWTD through burning and grazing would reduce cover for prey species and increase availability to raptors during nesting and wintering periods. Rehabilitation of streams and riparian areas would increase habitat for many passerine bird species. This would result in an increased prey base for raptors such as American kestrels, sharp-shinned hawk and Coopers' hawk. Creation of ponds and associated wetland habitats would increase the potential for waterfowl use, species used as prey by wintering prairie falcons and Coopers' hawks and as nesting habitat for northern harriers and short-eared owls. Conversion of 970 acres of shrub/tree stage hardwood/conifer vegetation type to a grassland/savannah habitat type would have little effect on nesting habitat for raptors. It would increase foraging habitat to the acreage noted previously over that maintained in Alternative B. Recreational developments along the periphery of the NBHMA would not affect any known raptor nest sites. Increased recreation would have little effect on known nest sites unless use patterns change substantially over what has been established through prior use.

to return to the table of contents: Click here, Type a 7 and press enter (or return).

Red Tree Vole

Alternative A

Red tree voles (RTV) are restricted to conifer habitat types and are thought to depend on old growth conifer habitat (Appendix J, ROD). On the NBHMA, red tree vole's have been found in several locations in small conifers (Mires, personal observation). Occurrence of RTV's at these sites would indicate that increases in conifers would create greater amounts of habitat favorable to this species and that red tree vole populations would expand both in population numbers and distribution across the NBHMA. This assumption is based on the species dependence on conifer occurrence and that no other factor would limit their ability to utilize increased availability of conifers.

Alternative B

Maintenance of current proportions of habitat would maintain currently occupied RTV habitat. Prescribed burning would be used to control conifer encroachment in oak woodland and oak savannah/grassland areas and early seral hardwood/conifer vegetation types. Larger, fire resistant conifers would be left but seedlings and small (less than approximately eight years of age) saplings would be eliminated (Agee, Franklin; 1983). Reduction of seedlings would occur in oak woodland and oak savannah stands that currently have conifer trees occupied by red tree voles. Vole populations are in areas that were burned by previous livestock operators (Mires, personal conversation, Rick Paul). Considering histories and current occupancy by RTV's, existing occupied trees and RTV's in oak savannah and oak woodland areas would be expected to survive low intensity prescribed fires. Prescribed burning would prevent continuing encroachment of conifers and reduce fuel loads on approximately 3,900 acres. Conifers would not increase in abundance, resulting in a decrease in potential for RTV conifer habitat to develop through succession on those acres. Reduction of fuels would reduce the chance that stand replacing fires would occur that would eliminate RTV habitat completely. Approximately 2,660 acres, including 180 acres of conifer and 300 acres of mixed hardwood/conifer woodland, would potentially become RTV habitat under Alternative B compared to 6,500 acres of potential habitat development under Alternative A.

Alternative C

Effects to RTV's would be the same as those discussed under alternative B except conifer competition would be reduced on approximately 4,900 acres of habitat maintained for CWTD versus 3,900 acres under Alternative B. Thinning of large conifers would be undertaken in order to reduce competition to oak woodlands. To date, surveys have found two locations for RTV's, neither of which would be affected by management actions proposed under Alternative C. Succession would be allowed to continue on approximately 1,700 acres which would result in development of potential habitat for RTV's as conifers achieve dominance in the future.

Species Groups

Alternative A

The following effects to species that share similar life histories and habitat affinities are based on groupings found in Appendix A. Individual species from all but one species group would lose habitat elements through vegetative succession processes. Many species would be able to persist as vegetative succession takes place if key habitat elements such as shrubs and small openings are available. Species such as the Western Bluebird, Vesper sparrow and Meadowlark, that depend on more open habitats would be lost over time. Likewise, the Western Pond Turtle needs open meadow type environments in order to successfully lay eggs and reproduce. As succession progresses, almost all existing open areas would be lost (Franklin, et. al., 1983). Representative guild groups and individual species that would lose key habitat elements from the NBHMA under Alternative A include: Group 1 - aquatic amphibians and reptiles (western pond turtle); Group 2 - cavity dwellers

to return to the table of contents: Click here, Type a 7 and press enter (or return).

(acorn woodpecker, western bluebird); Group 3 - bats (pallid bat); Group 4 - open habitat/edge species (common kingsnake, vesper sparrow, western meadowlark; meadow voles, ground squirrels); Group 5 - woodland species (none).

As succession takes place over time and habitats mature, structural elements and environmental conditions within habitats would change. As change takes place, different species or guild groups would be able to utilize habitats that are being formed. For example, as large tree structure such as craggy bark or snags develop in conifer habitats, all but two of the bat species would benefit (Perkins, J.M., 83-0-08). Likewise, species that are cavity dependent but do not require grasslands or other specific habitat types, would persist with the potential for population expansion over time as more cavities become available. This would be the case with many species such as pygmy owls, screech owls, nuthatches and chickadees. Species dependent on open grassland type habitats for all or a portion of their life history needs would be lost as early seral stage habitat and oak woodlands change to mixed hardwood/conifer woodland or forest. Overall, species richness or diversity would decline over time as grasslands, oak savannahs and oak woodlands are replaced by mixed conifer forest habitat types, primarily as a result of “normal” fire suppression.

Of the three alternatives, lack of prescribed burning or other fuel reduction actions combined with fire suppression under Alternative A, pose the greatest threat to all habitats and associated wildlife species found on the management area. Without prescribed fires and with fire suppression, fuel loads and intermediate canopies would continue to build, increasing the risk of stand replacing fires (Agee, 1993). Stand replacing fires moving through oak woodland and conifer habitat types would kill the majority of trees, resulting in the loss of woodland habitat types and associated wildlife species. Continued suppression of fires would result in the loss of habitat diversity as hardwood/conifer and conifer stands occupy most of the acreage on the management area. (Agee 1993, Franklin, et.al., 1973).

Levels of proposed road maintenance would not have a noticeable effect on species or species groups now found on the NBHMA. Road maintenance would not change existing habitat and would allow access for management purposes such as fire suppression. To a great extent, roads and trails would govern recreational access and use, limiting disturbance to wildlife in areas with little easy access. This would result in much of the management area receiving little or no use by recreationists under this alternative.

Continued stream and wetland degradation that would take place under Alternative A would reduce habitat for species such as the foothill yellow-legged, northern red-legged frogs and other amphibians as water availability and quality declines. Key CWTD habitat areas associated with water would decline under Alternative A.

Facilities supporting recreational use would remain as they are currently. Based on five years of observation, no effect to wildlife species from recreational facilities has been noted (Mires, personal observation). The area currently affected by development for recreation is less than 1.5 acres of the 6,580 acre management area. Recreational use levels that have occurred during the last six years appear to have little effect to wildlife or habitats on the management area.

Alternative B

For species currently found on the NBHMA, habitats would be maintained at current proportions under Alternative B through the use of burning and seeding. Habitat for Group 2 species (bats) would show an increase due to development of large tree attributes such as large crowns and craggy bark in conifer habitats. Lack of open water may be a limiting factor for bats. All other species groups would be maintained at approximate current levels. Habitat such as white oak woodland would increase in vigor over time due to management action (Gumtow-Farrior, 1991, 1992). Overall, Alternative B would maintain current habitat diversity and possibly increase habitat suitability for early seral species that presently occur. Alternative B would maintain early seral

to return to the table of contents: Click here, Type a 7 and press enter (or return).

habitats on approximately 3,900 acres which would be lost as habitat under Alternative A. Overall, species currently present on the NBHMA would be maintained and numbers of some would increase as some habitats are improved.

Alternative C

Alternative C effects to species groups that occupy the NBHMA are the result of the combined effects of management actions such as burning, seeding, grazing, fertilization, stream rehabilitation, spring development and pond construction. All actions are aimed at producing and maintaining habitat for wildlife with a primary emphasis on CWTD. Implementation of Alternative C would have the following effects to wildlife groups found on the NBHMA:

Group 1, Aquatic Amphibians and Reptiles

Increases in perennial streamflows would benefit species such as foothills yellow-legged frogs and aquatic garter snakes. Pond and spring developments would create breeding habitat for red-legged frogs and long- toed salamanders, with larger pond developments furnishing habitat requirements for western pond turtles. Emergent wetlands associated with larger ponds would furnish rearing habitat for western pond turtles and amphibian larvae. Alternative C would create habitat resulting in an increase in occurrence and distribution of group 1 species. Fertilization under alternative C would have a slight potential to increase nitrate and nitrate levels of water sources on the NBHMA which might affect amphibians. (See soils and water quality discussions) One laboratory study (Marco, A, et.al.; 1999) indicated that some species of amphibian larvae were sensitive to nitrate and nitrite in water over time periods of up to 15 days. These laboratory tests indicated that larvae of species such as pacific tree-frogs and red-legged frogs, had higher tolerance than other species such as spotted frogs to nitrate and nitrite levels. Testing was not done under biotic conditions in which vegetation and algae would have utilized nitrates and nitrites and removed them from the water. Effects on larvae were a result of chronic exposure that may not occur under biotic or natural conditions. Bury, et.al. found that levels of nitrates and nitrates affecting red-legged frogs would not be exceeded from fertilization of forest ecosystems and further noted that pond breeding amphibians such as red-legged frogs and northwestern salamanders have a high tolerance to nitrates and nitrites (Bury, R. B., 2000). Further research from U.S. EPA lab at Corvallis (Nebeker, 2,000) substantiate Bury, in that species expected to occur or are occurring on the NBHMA would not be adversely affected by levels of nitrates and nitrites that would be expected as a result of fertilization on the management area.

Fall application of fertilizers would also limit exposure of amphibians to nitrates and nitrites. If fertilizers were to affect water, it would be most likely to occur after the onset of fall rains. As all amphibians that would be found on the management area breed after approximately mid-February and larvae hatch from mid to late March, little exposure of the larvae to nitrates and nitrites would be expected. Available nitrates and nitrites would also be absorbed by vegetation during growth periods from fall to early spring, making them less available to enter or remain in water bodies. Overall, application of fertilization to increase forage production for CWTD would have little potential effect to amphibians that occur or are expected to occur on the management area. Little opportunity for these species presently exists and would not be created under Alternatives A and B.

Group 2, Cavity Dwellers

Cavity dweller habitat would be maintained in oak woodlands and hardwood/conifer woodland. Maintenance of oak and hardwood woodlands would maintain habitats that are particularly rich in natural cavities (Gumtow-Farrior, 1991). Underburning woodland habitat types and thinning would create tree mortality which would furnish snag habitat for cavity excavators. Alternative C would not reduce current habitat levels and may increase snag availability for cavity dwellers. Effects to cavity dwellers would be comparable to Alternative B. Alternative A would create more opportunities for cavities than Alternative C but species diversity would be less due to loss of open habitats utilized by cavity dwellers such as bluebirds and reduction of oak woodlands required by acorn woodpeckers.

to return to the table of contents: Click here, Type a 7 and press enter (or return).

Group 3, Bats

Alternative C would create open water sources that furnish foraging and drinking sites for bats. Availability of cavities and snags utilized by bats would be the same as discussed for cavity dwellers in this alternative. Conifer habitat which some species of bats depend on for roosting would decrease (Perkins, 1983) over levels maintained in Alternatives A and B. Under Alternative C, bat species that presently occur on the management area would be maintained with potential for increases in numbers and species due to availability of water.

Group 4, Open habitat/edge species

Approximately 4,900 acres of grassland, oak savannah and open oak woodland would be created or maintained. Burning and moderate grazing would maintain nesting and foraging habitat conditions in grasslands for species such as Vesper sparrows, meadowlarks and northern harriers (Altman, 2000). Maintenance and creation of open woodlands would increase edge type habitat over that in Alternatives A and B. Species such as western bluebirds, pallid bats and reptiles such as common kingsnakes, western rattlesnakes and alligator lizards would benefit from increases in woodland edges. Overall, increases in open and edge habitats under Alternative C would increase the distribution and occurrence of most Group 4 species over other alternatives.

Group 5, Woodland Species

Habitat for woodland species would decline under Alternative C compared to levels developing under Alternative A or being maintained under Alternative B. All Group five species would be maintained under Alternative C but habitat levels, thus population levels would be lower in this species group that in the other two alternatives.

In summary, under Alternative C, habitat for species in Groups 1, 2, and 4 would increase, resulting in potential increases in population numbers. Habitat types for Group 3 (bats) would be maintained, although conifers would be present in lower numbers than in other alternatives. Some population decline for conifer related bat species would be expected while increases in numbers in species that forage in open areas would be a result of increased amounts of open habitats. Water developments would increase potential for increased bat use of habitats across the management area. Habitat for group 5, woodland species, would decline which would result in a decline in abundance and distribution but not necessarily a decline in species diversity.

Recreation

This discussion addresses the effects of the alternatives to the recreation resource. Environmental consequences to other resources caused by public use are addressed elsewhere in this chapter under the resource being impacted.

Facility Development and Public Use

Alternative A

This Alternative would be the least restrictive alternative for road use since it would allow all current roads to be maintained for management activities (32 miles). Although some roads are currently unusable, they could be repaired to provide management and public access. This alternative would eventually provide the same number of miles of maintained roads as Alternative C, and more than Alternative B for access to mountain bikers, equestrian users, hikers and hunters. Ingress into the NBHMA in Alternative A is, however, the most restrictive since users must walk into the area from County Road 200. Motorized access to the Main Barn area is not allowed, except by special authorization, which creates a longer hike for users but less effects by motorized use into the area.

to return to the table of contents: Click here, Type a 7 and press enter (or return).

Users and motorists on County Road 200 would continue to face safety hazards of adjacent highway traffic since pull offs are small and are very close to the highway. Primitive camping would be unregulated, but would implement standards of the Leave No Trace program. This would help eliminate or reduce natural resource impacts such as fire hazards, site trampling, soil compaction, littering, and improper disposal of waste products (Morgan). Numbers of visitors to the NBHMA have been low on weekdays (5-10 people per day) and slightly higher on nice weather weekends and holidays (10-40 people per day) (Mires, personal observation). Without the amenities and draw of developed public facilities (toilets, parking areas, information boards), use rates would continue to be the same. This alternative would result in less potential harassment of wildlife, soil compaction, post holing along trails by equestrian users, rutting by mountain bikes, littering and sanitary problems compared to Alternative C because of the lower number of users under Alternative A, however it would be least responsive to recreational public demand that has been demonstrated in public comments. Special Status plants maintenance or expansion would provide an opportunity for recreation users to study and enjoy plants in an outdoor setting (Alternatives A, B, and C).

Alternative B

This alternative would contain the fewest maintained roads (23 miles), however, recreationists could still use all 32 miles of roads since nine miles of decommissioned road could be converted to trails for public use. Access restrictions and the lack of developed parking facilities inside the NBHMA, would be the same as Alternative A, except for four parking pull offs adjacent to County Road 200 that would be maintained for safer user access. The user's experience would be enhanced by the availability of some interpretive material at these pull off locations. Implementing the Leave No Trace program would help improve sanitation problems, reduce litter, reduce fire hazards, protect riparian areas, and minimize campsite impacts. Alternative B would have environmental effects and visitor numbers similar to those described in Alternative A.

Alternative B and C

Vegetation treatment through reseeding of grasses would improve aesthetics and increase the opportunity to view native wildlife in an enhanced habitat. Burning would temporarily restrict recreation users from using the area due to safety concerns and would create a temporary visual impact on the surrounding landscape burned. Increased forage and cover would improve wildlife numbers and increase watchable wildlife opportunities and hunting success. Meeting the guidelines of the Clean Water Act would increase visual aesthetics and user safety of water resources. Repairs to road segments and problem areas contributing to stream sedimentation (near riparian sites) would reduce muddy runoff along roads where users commonly travel. Rehabilitating degraded stream reaches and wetlands would improve area aesthetics and provide increased watchable wildlife opportunities.

Alternative C

Thirty-two (32) miles of road would be maintained for public use. The alternative would also allow expansion of additional trails to improve access, disperse the public throughout the area, or avoid sensitive areas. Public access would be enhanced by allowing motorized access into the Main Barn area and developing parking facilities at the Main Barn, West Entrance, and Doc's Landing. Compared to Alternative A, users would derive the greatest benefit by having access to a variety of recreation amenities from improvements such as: vault toilets, picnic tables, information boards, a pavilion, BBQ pit, water tap, manure bin, and three wildlife viewing areas for environmental education to visitors. Parking within the NBHMA boundaries would increase visitor safety while unloading horses, bikes, or people. Implementing the Leave No Trace program would promote similar consequences as those listed in Alternatives A and B.

The number of visitors to the NBHMA in Alternative C would be higher than Alternatives A or B, by an estimated at 50%, (Morgan) due to the development of facilities such as parking areas, vault toilets, watchable wildlife sites, information boards, picnic tables, pavilion, water taps and a boat ramp. A wider distribution of users throughout the NBHMA is anticipated under Alternative C because the West Entrance and Main Barn developments would accommodate motorized access into

to return to the table of contents: Click here, Type a 7 and press enter (or return).

the these other areas. The difference of visitor use numbers between alternatives is inconsequential. A 50% increase above five to ten people who may visit the area on weekdays or 10 to 40 people on weekends or holidays would still be considered low use considering the vast area (6,580 acres) that the NBHMA offers for dispersed use.

Compared to Alternative A, visual contrasts would be created under Alternative C by developments at the West Entrance, Doc's Landing, and four pull off parking spots along the County Road. Some travelers would consider the developments as visual intrusions while others who use them, appreciate the infrastructure support they provide (Morgan). The loss of visual qualities to travelers along the route would be inconsequential because of the small size of development (less than four acres combined).

Compared to Alternatives A and B, long-term benefits would be realized at Doc's Landing by replacing a narrow, dirt access ramp to the North Umpqua River with a surfaced ramp. This would provide a year-round water access point for the Glide Rural Fire Department for emergency drafting of water needed on structure fires. Otherwise, the fire trucks would have to travel an additional five miles one way to Glide in emergency response situations (structure fires). Valuable time would be lost in travel. Water resources would also be used from the river for emergency wildland fire suppression where safety of people, possibly homes, and natural resources are dependent to quick response and suppression times. Recreational access would also be provided at the ramp for fishermen and rafters accessing the river as a put-in or take-out point.

Cumulatively, Alternative C contains a more development than Alternative A, but would improve public safety by providing parking farther off County Road 200, providing sanitation facilities (vault toilets), and improving access to the Main Barn, West Entrance and Doc's Landing. These infrastructure enhancements would meet public needs and provide increased educational opportunities over Alternatives A and B to help increase user ethics.

Common to all three alternatives, major conflicts would not exist between recreation users because public motorized use is not allowed. Traditionally on other BLM lands, conflicts are highest between non-motorized and motorized users (Morgan, personal observation). At the NBHMA, only minor conflicts occur between hikers, mountain bikers, hunters, equestrian users, and other non-motorized users (Mires, personal observation). Conflicts could result as users participate in activities which have different expected outcomes, for example, consumptive (hunting) vs. non-consumptive (hiking). Conflicts received during the public comment period noted the following: hunters become upset when equestrian users, hikers or mountain bikers traverse through and disturb an area they are stalking game in; the latter groups may not be comfortable in close proximity of hunters with firearms or knowing that game animals may be killed; hikers and mountain bikers disdain pot holes created by horses in soft, wet areas; hikers have a low tolerance for mountain bikers who leave ruts along a trail in wet weather, nature enthusiasts have a low tolerance for campers, mountain bikers and hunters who are more consumptive of the natural resources than they are.

Effects of camping would be similar under all alternatives. Camping near streams could affect water quality by increasing the potential for pollutants entering streams. Sites used repeatedly could result in temporary loss of riparian vegetation because of compaction and the trampling of streamside vegetation. Effects would be inconsequential because of the low number of users dispersed throughout the large area of the NBHMA Excessive use of individual campsites has not been documented since camping within the interior of the NBHMA has been very light. The heaviest use occurs during hunting season (Mires, personal observation). The Leave No Trace program standards would be implemented under all alternatives and would help promote higher user awareness and user ethics to minimize impacts on natural resources of the area, as previously described.

The management of vegetation would have effects on recreationists. Recreationists would be in occasional proximity of domestic livestock. User attitude could vary according to an individuals tolerance of sharing the area with cattle. Livestock travel on wet roads and trails would create rutted and post holed surfaces that could hinder mountain bike and hiking travel on the same routes. Effects would be consequential because the routes are focused to narrow travel corridors (roads and

to return to the table of contents: Click here, Type a 7 and press enter (or return).

trails). Fences would create travel difficulties since users are not restricted to roads and trails. Rider and horse safety hazards would exist in situations where a horse spooks into a fence . Enhanced vegetation resulting from fertilizing would benefit aesthetic values of vegetation in the area. Water impoundments would be constructed and made available to equestrian users for watering horses. Drinking water for horses would provide increased riding time on warm or hot days before having to return to the staging area. Impoundments would be a safety hazard to uninformed recreationists who drink possible contaminated water. Development of wildlife guzzlers would enhance the probability of wildlife observation opportunities or hunter success.

Summary

Alternative C would promote greater safety by enhancing pullouts and interior ranch parking, reduce user conflicts by providing a variety of parking areas to disperse use, and accommodate user needs by providing a moderate number of vault toilets, water spigots, parking stalls, picnic tables, pavilion, and interpretation materials compared to Alternatives A and B. The difference between Alternatives A, B, and C is consequential to public users due to the importance of facility development proposed in C, and none in A or B.

Soil Productivity

Effects to soils under the alternatives result from roads and trails, facility development and vegetation management (prescribed fire, mowing, thinning, fertilizing, grazing and forage plots). These effects are described and compared below.

Roads and trails

Under Alternatives A, B and C improvements to drainage and the hardening of soft spots on selected steep grades would greatly reduce rutting and erosion along problem segments. Drainage improvement would prevent further loss of soil where captured drainage has been routed onto sensitive alluvium in riparian zones, creating gullies. A large percentage of road prisms are grassed over and stable to erosion. The protective grass cover would be maintained with light vehicle use and avoidance of use by road vehicles during the wet season. Road drainage and related sedimentation is addressed under the water quality section.

Under Alternative B nine miles of roads would be decommissioned. Soil productivity and vegetation would slowly increase inside the road prisms except where occasional ATV travel and non-motorized recreation use maintain paths. The improvements would cover up to six acres of road prism (about 0.1 percent of the NBHMA) and would be greatest along three miles of lowland segments where soils are deeper and more productive (about three acres of riparian habitat out of a total of about 520 riparian acres).

There is essentially no difference in the effects of drainage and erosion between the three alternatives. Alternative B, due to the nine miles of road decommissioning, would improve soil productivity at a level higher than under Alternatives A and C. The effects of decommissioning to soil productivity, however, would be inconsequential when considering the total amount of riparian habitat in the NBHMA.

Facility developments

Under Alternatives A and B no land would be disturbed for facility development. Under Alternative C, the West Entrance would be expanded from 0.5 to 1.5 acres. At the Main Barn site, the existing barn site would be torn down and replaced with a smaller group shelter. Doc's Landing (1.5 acres) would be surfaced with concrete or pavement. The total extent of facility development would be about four acres (less than 0.1 percent of the NBHMA). New disturbances would permanently remove about three acres of land from the productive land base. Construction of these facilities would create short-term erosion as a

to return to the table of contents: Click here, Type a 7 and press enter (or return).

result of ground disturbance. This erosion would be minor because construction would be limited to the dry season and revegetating of sites before fall rains. There would be no measurable change in the amount of erosion as the result of facility development. The paving of Doc's Landing would reduce erosion and eliminate rutting. The total extent of facility development would be about four acres (less than 0.1 percent of the NBHMA). New disturbances would permanently remove about three acres of land from the productive land base.

Vegetation Management

Prescribed Fire

On an annual basis, 800 to 1200 acres would be burned. Approximately 4200 acres (Alternative B) and 4900 acres (Alternative C) would be available for burning. Prescribed fire would occur on a shorter rotation under Alternative B (every three to five years) than under Alternative C (every five to eight years). The effects of prescribed fire would be similar under Alternatives B and C. Cumulative nutrient losses and erosion due to prescribed burns would be greater under Alternative B because of shorter burn cycles.

Under Alternatives A, B and C, the direct effects to soil productivity would be small in grassland fires. Soils are a good insulators to heat, particularly those high in clay (Barnett, 1989). As a result, heat penetration depends more on duration of exposure to flame than on how intense the fire burns (Barnett, 1989). Grass fires may be intense but they are fast moving, are of short duration and do not kill the roots of perennials. Typical fuel loads in grasslands of less than 2.5 ton per acre result in little penetration of heat into the soil (Barnett, 1989; Clark and Starkey, 1990; Ortmann, et.al., 2000). Typical grassland fuel loads in the NBHMA would range from 0.6 to 1.3 tons/acre (Roan, 2000). Losses of nitrogen and sulfur are often unaffected by burns in rangeland soils (Clark and Starkey, 1990). In grasslands, losses are largely limited to above ground biomass (Clark and Starkey, 1990). The direct effects of prescribed fire to the NBHMA grassland soils would be the same as described above. Where fuels are primarily grass and forbs, only low levels of soil organic matter and nutrients (primarily nitrogen and sulfur) would be directly lost. These losses would be primarily through volatilization to the atmosphere. Other nutrients released including potassium, phosphorous and mineralized nitrogen would move little in the typical high clay/high organic matter soils (McNabb and Cormack, 1990) and would be available for green-up (short-term effect). Rapid green-up would also be a factor in limiting nutrient loss by tying up nutrients in biomass (McNabb and Cormack, 1990). Prescribed burns would stimulate legume growth and nitrogen fixation, especially after the first burn rotation when heavy thatch would be removed.

In grassland savannahs, woodlands and in shrub environments, the effects of prescribed burning under Alternatives B and C would be similar to grasslands with the following exception: perceptible effects (alteration of surface soil structure and loss of surface soil organic matter, nitrogen and sulfur) of a spotty nature (small, generally widely spaced patches) would occur where there are buildups of woody debris or dense shrub (Cressy, field observations 1990-2000). Where dense patches of shrubs are present, burning would volatilize more nitrogen and sulfur than in grasslands. Over a series of burn rotations deficiencies in nitrogen and sulfur could develop but would be corrected by fertilization or by seeding nitrogen fixing legumes and shrubs.

Generally, prescribed burns on rangelands in western Oregon have not caused excessive erosion because green-up is normally rapid after fall burning (Buckhouse, personal conversation, 1999). Soil loss of 1000 KG/hectare/year (0.45 tons/acre/yr or 0.003 inches) are typical. Tenfold increases have occurred in instances of drought retarded green-up or early season, long return interval storms. For most years on the NBHMA, post burn erosion (indirect, short-tem effect) with respect to soil productivity would be within acceptable limits (based on Soil Loss Tolerance "T" values). Soil Loss Tolerance "T" values are guidelines for the average rate of soil loss per year that can be sustained in the long-term and maintain the same level of soil productivity (Soil Survey Manual, 1993) and are described as follows on the next page:

to return to the table of contents: Click here, Type a 7 and press enter (or return).

1 ton/acre/year(0.007 inches of soil) for a shallow soil(less than 20 inches)
2 tons/acre/year(0.013 inches of soil) for a moderately deep soil(20 to 40 inches)
3 tons/acre/year(0.020 inches of soil) for a deep soil(40 to 60 inches)
5 tons/acre/year(0.033 inches of soil) for a very deep soil(greater than 60 inches)

Long-term averages for yearly soil loss would be within acceptable limits after factoring in the exceptional years when tolerance values might be exceeded. This assessment is based on the following evidence that the NBHMA fits Buckhouse's general assessment of western Oregon rangelands (Buckhouse, personal conversation, 1999):

1. Multiple year observations of the post burn erosion and stream water quality by local ranchers and Jerry Mires on areas inside and adjacent to the NBHMA indicate low erosion rates: (Mires, personal conversation, 1999).

2. Current evidence of old sheet and rill erosion on the NBHMA 1994 is lacking (Cressy, field observations, 2000).

3. Strong aggregate stability of the surface soil is typical (Cressy, field observations, 2000).

There would be no prescribed burning under Alternative A except for noxious weed control. Because of the high density of vegetation and soil characteristics sheet erosion would generally continue to be very low outside of incised stream banks and certain road segments. As fuel loads in the woodlands and shrub areas build over time, the danger of wild fires of larger extent, hotter intensity and longer duration would increase. The effects of such a fire (nutrient and organic matter loss, damage to the soil structure, risk of short-term erosion) would be of a magnitude higher than under the prescribed burns of Alternatives A and B. A large intense wildfire, especially if it spreads to crowns, would be of consequence to soil productivity (supporting information in McNabb and Cormack, 1990).

Mowing

Effects under Alternatives B and C would be the same. Mowing would be limited to grasslands and riparian areas under 20 percent slope without trees and large brush (about 300 acres). The clippings from mowing would provide a mulch for the soil. As the mulch decomposes nutrients would become available to the soils and plants. Compaction and displacement would be inconsequential because mowing would be done in one pass and during the dry season. Wetlands with poorly drained soils would be excluded where drying does not sufficiently occur in the dry season.

Thinning

Under Alternatives B and C, thinning would be done to modify habitat. The logs and slash may be left in place or yarded. Yarded logs would cause superficial soil displacement and light compaction in the upper five inches of soil where logs would be dry-season yarded along the soil surface and slash levels low. In heavy slash there are no such effects because the slash would provide a cushioning effect to yarded logs (Cressy, field observations 1998 and 2000). The resulting yarding trails are generally less than six feet wide and spaced about 150 to 200 feet apart. Yarding trails would occupy less than five percent of the thinning unit. Roads exist from previous entries (before BLM acquired the NBHMA). About two miles of roads could be reopened to access thinning areas. This would result in soil displacement and compaction on three acres (assuming a 12 foot running surface and 1.5 acres per mile of road). Thinning would occur on less than 10 percent of the NBHMA and of the areas that would be thinned, less than 0.5 percent of the NBHMA would be skid trails. Loss of soil productivity would be inconsequential because of the small extent of area in which soil displacement and compaction would occur.

to return to the table of contents: Click here, Type a 7 and press enter (or return).

Fertilization

Fertilizer would only be used under Alternative C. Nitrogen would be the only element of concern because of its high mobility in certain forms (nitrates in particular - McCoy, personal conversation, 1997). The typical high organic matter and clay content of NBHMA soils (high nutrient holding properties) would effectively reduce mobility of nutrients. Application rates of urea, far in excess of those planned, would have to be applied on local grasslands for appreciable amounts of nitrogen to percolate below the root zones or to volatilize to the atmosphere (McCoy, personal conversation). Phosphorous and potash added in fertilization would move very little in the soil (McCoy, personal conversation,). Fertilization would improve soil productivity by increasing nutrients available to plants.

Alternative C would give the flexibility to deal with soil nutrient deficiencies. Fertilization could become necessary over a series of burning and grazing rotations because of losses due to volatilization, leaching, and erosion. Soil nutrient testing would prevent unnecessary fertilization. Under both Alternative B and C, legume seed innoculated with nitrogen fixing bacteria would be included in seeding mixes. Legumes synthesize atmospheric nitrogen which in turn become available in the soil. The nitrogen mineralized by these legumes would reduce the levels of nitrogen fertilization needed although a high density of these plants would be needed for substantial reduction.

Grazing

Grazing would only occur under Alternative C with wet season fall and spring grazing in the uplands and dry season grazing in the lowland and riparian zones. It would be of light intensity (no more than 50 percent utilization under intensive and extensive systems) compared to levels previously grazed under 145 years of private ownership. Grazing would occur as frequently as three out of every five years.

Under a light grazing regime, compaction and the resultant reduction of water infiltration into the soil are significantly less than under a heavy grazing regime and often is not that much different than ungrazed ground. Increases in runoff under light grazing are significantly less than under a heavy grazing regime. Intensive grazing decreases infiltration more than extensive grazing (Holechek, et.al., 1998). This applies over a wide range of climates, soil types and vegetative communities (Trimble and Mendel, 1995; Mwendera and Saleem, 1997; Meehan and Platts, 1978; Frazier, et.al., 1995; Holechek, 1998).

Compaction directly decreases a plants ability to grow. Increased runoff increases erosion risks. Compaction from grazing rarely extends more than 10 inches below the surface (Trimble and Mendel, 1995). The most noticeable deterioration occurs 2 to 4 inches below the surface (Bunn and Singleton, 2000). The effects of compaction are largely ameliorated with rests of two to six years (Clary, 1995; McGinty, 1977; Frazier, et.al., 1995; Trimbell and Mendel, 1995). Compaction at the surface can be ameliorated by freeze-thaw and shrink-swell cycles, biologic activity and root action (Bunn and Singleton, 2000; Nguyen, et.al., 1998; Jones, et.al.,1999). Perennial grass or a healthy sod cover absorbs much of the impact of cattle hooves (Trimble and Mendel, 1995; Sharrow, personal conversation, 2000), however treading damage can be consequential on moist soils during the wet season (Nguyen, et.al., 1998). On moist soils hooves can penetrate up to 1.2 inches causing some damage and greater than 1.2 inches on wet soils burying some plants (Bunn and Singleton, 2000). Skid damage (hooves pushing downslope, displacing soil) can be common on moist, steeper slopes, greater than 50 percent in one study (Nguyen, et.al., 1998). On soils which are saturated with moisture at the surface at the time of grazing (very wet), heavy damage to vegetation and severe puddling and compaction, slow to heal, have often occurred (Bunn and Singleton, 2000).

Stream banks can be readily destabilized and be made prone to slough with treading (Trimble and Mendel, 1995).

The 145 years of grazing under private ownership occurred during both wet and dry season conditions. Six years after the cessation of livestock grazing in 1994 the typical surface soils are com-

to return to the table of contents: Click here, Type a 7 and press enter (or return).

posed of stable aggregates. These aggregates have a structure (combination of granular and blocky) which is in a slightly altered state from a natural, undisturbed surface soil. This condition indicates that light residual compaction remains after six years of rest based on approximately 50 soil profiles observed at various locations in the NBHMA (Cressy, 1999- 2000 and [Bunn and Singleton, 2000]). High shrink-swell soils, good organic matter content and dense root mats are likely important healing factors which contributed to the current condition of the surface soils in the NBHMA.

The studies and current condition of soils on the NBHMA after a rest indicate that grazing with 50 percent utilization followed by rest periods can be employed with inconsequential long-term impacts to soil productivity when soil moisture levels and vegetative cover are taken into account. Under dry season, lowland grazing of Alternative C, temporary fencing would be employed to keep cattle out of riparian areas that are sensitive to grazing disturbance such as stream banks of incised streams and wetlands whose surface soils are saturated with moisture during the grazing period. Intensive grazing would mostly be done in the lowlands. Dry surface conditions would hold down increases in compaction and decreases in infiltration associated with intensive grazing.

Alternative C employs wet season upland grazing. Cattle are expected to avoid riparian zones of the higher order streams and the associated stream banks which are particularly sensitive to trampling because of cold air drainage temperatures would tend to force cattle to use the warmer uplands (Borman, 1999). Cattle are also expected to avoid ground steeper than 60 percent in grazing (Cressy, personal observation). Where they need to cross this steeper ground to access more desirable places to graze, existing animal trails would be highly utilized. This cattle behavior would limit impacts to the steeper slopes which are more sensitive to sliding damage and erosion. The effects of increased compaction and decreased infiltration on upland sites would be mitigated by the predominant use of extensive grazing, mineral block placements and prompt movement when desired utilization is achieved. Grazing following burning would not occur until vegetative coverage is sufficiently established to better able to withstand the effects of grazing and trampling. With little soil exposure, the erosion associated with grazing would be low even though runoff would be slightly elevated during parts of the wet season because of compaction. Elevated runoff due to compaction would be primarily confined to the early and late wet seasons. Compaction would usually have little effect on runoff during the mid part of the wet season. As perennials become more established with subsequent vegetation management treatments, the protection from hoof impact would increase further. Compaction would largely be ameliorated with the inclusion of up to two year rest periods.

There would be a difference in magnitude between the effects on soil productivity of Alternative B's shorter rotation prescribed burns and the combined effect of Alternative C's longer rotation prescribed burns and grazing/rest cycles. Burning under Alternative B would result in greater direct loss of nutrients (volatilization of nitrogen and sulfur) than under Alternative C. Erosion due to burning would be greater under Alternative B than under Alternative C but the difference would be offset to a small degree by erosion resulting from grazing under Alternative C. Grazing would result in a very small percentage of soil exposed to erosion in comparison to burning. In addition, cattle would be excluded from sites more sensitive to erosion (steep stream banks and many first order streams). Perennial grass and forb establishment would progress quicker under Alternative C than under Alternative B creating a higher resistance of soil to erosion during vegetation management treatments more quickly.

Field observations (Cressy, 2000) were made on two private ranches adjacent to the NBHMA, one upland and one lowland, after they were grazed during the wet season of 1999-2000 in an attempt to determine potential impacts from grazing and burning that could be expected on the NBHMA. Both sites have the same soil types as the NBHMA. The upland site was prescribed burned in the late summer of 1998 and grazed at an intensity greater than 50 percent utilization. The upland site is on 30 to 65 percent slopes and is well drained. The most common level of compaction is moderate. High compaction is in the established animal trails and scattered spots where hoofs penetrated the sod. Cattle avoided the one slope which was above 60 percent. There is no compaction and the grass is tall and thick. Both high and moderate compaction states are common on the lowland site where slopes are gentle (near level to 10 percent) and water tables are at or near the surface during

to return to the table of contents: Click here, Type a 7 and press enter (or return).

the wet season (mostly somewhat poorly drained). However, compaction is light under an oak canopy where soil drainage is better and the grass thick. Signs of sheet and rill erosion at both sites is not readily evident (masked by the trampling of hooves). The overall level of erosion for that year was probably low, however, since signs of heavier erosion would have survived the trampling, if present. One first order stream at the upland site had signs of bank instability. The channel was incised 40 inches and had one small stream bank slipout and a slumping head. The direct effects on NBHMA soil physical properties would likely be similar to that which was observed on the adjacent private land.

Forage Plots

The effects of forage plots on soil productivity under Alternative C would be inconsequential. Forage plots up to two acres in size would be established on slopes up to10 percent. Water tables are commonly within 0.5 to 4.0 feet of the surface during the wet season (Douglas County Soil Survey; Cressy, field observations, 2000). Some areas could still have high water tables going into the dry season. Plowing and discing would be timed to occur late enough in the dry season to avoid breaking down favorable soil structure (granular and blocky) and porosity when conditions are too wet in the plow zone but not so late as to create large clods when soils are too dry. Where dense clays are within the plow zone, discing would be done since plowing would bury the surface soil which has superior texture and structure for plant growth. In the long-term, favorable soil structure and porosity can be maintained and depletion of organic matter through oxidation kept low when plowing/discing infrequently occurs (Brady, 1974). Forage plots and seed bed preparation would only be necessary to rejuvenate desirable forage. Subsequent seed bed preparations could be accomplished through no till methods which disturb the soil to a considerably less extent than plowing and discing.

The erosion rate for the first year after a plowing and seeding for these 30 to 100 feet slope lengths would be about 0.2 to 2.1 tons/acre year or 0.0013 to 0.014 inches of soil depth per year (universal soil loss equation, assuming no mulch for a cover factor). For subsequent years the erosion rate would essentially drop to zero until that time plowing and seeding might again needed years later. The short-term and long-term average soil losses would be well within the Soil Loss Tolerance “T” values. Total erosion for discing would be similar.

Air Quality

Fire management activities on the NBHMA must comply with federal, state, and local air pollution standards as provided by Section 118 of the Clean Air Act. The management of Air Quality as a result of any management activities is covered by the Roseburg District RMP which is tiered to this document. These management activities could include prescribed burning, road construction, and herbicide applications. Impacts to air quality from prescribed fire would be the most common occurrence.

Most of the prescribed fire activities would involve burning pastures and under burning ground fuels in oak-savannah types. Pasture burning would generally be completed during DEQ’s “open burning season”. Burning in pastures would produce a fuel consumption rate of 1.5 - 2.5 tons per acre. The average size of the pasture burn will be 200-300 acres. Particulate matter emissions (PM10) produced by pasture burning would be approximately 10 pounds per ton of grass, a relatively low number and much less than for burning wood slash (Mike Ziolko, Smoke Management Specialist, Oregon DEQ; telephone conversation, 03-23-00). The season for burning would be mid to late summer, so the two or three burns per summer would be spread over a two month period. Impacts from the smoke would be local in nature, short in duration, and have minimal impacts on the regional airshed.

The nearest Class I areas are Diamond Peak Wilderness and Crater Lake National Park (recreation areas) which are approximately 80 miles east of the management area. Roseburg, Oregon is a designated area (DA) in which smoke management activities are closely followed by ODF. Roseburg is currently in compliance with both state and federal clean air standards. The Roseburg BLM has not caused an

to return to the table of contents: Click here, Type a 7 and press enter (or return).

intrusion into any DA for a number of years. Burning during weather conditions which allow for good dispersion and using transport winds to carry smoke away from population centers is planned. The adjacent landowners would be notified by the North Bank Manager prior to ignition. Pasture burning is a common occurrence during the late summer months and ODF notifies the public through news releases and public notices published in the local newspaper.

The focus of cumulative effects is on PM10 standards. The average amount of PM emissions is 10 lbs per ton of grass consumed, compared to 26 lbs per ton of slash burned. Pasture burning of grasses/shrubs would be the primary management activity affecting air quality on the NBHMA. Grass pastures produce approximately two tons of grass fuel per acre. Under Alternative B burning 420 acres per year would produce approximately 4.2 tons of PM 10 emissions. Burning under Alternative C would produce about 4.9 tons while burning 490 acres annually. Total prescribed burning acreage on the District is significantly below predictions in the RMP. Impacts on air quality from any alternative would be manageable and less then what was analyzed for in the RMP.

Cultural Resources

The potential for adverse impacts on currently unidentified cultural resources varies with the amount of surface disturbing activity permitted under each alternative. Proposed activities that could contribute to adverse impacts include road maintenance, trail development, recreation facility developments, vegetation conversions, and wildlife water developments. Alternatives with little or no ground disturbance such as Alternatives A and B would have a low potential for impacting cultural resources, Alternative C would have a moderate potential. Affirmative measures common to all alternatives such as inventory, evaluation, interpretation, and education would have some positive impacts. Some adverse impacts would occur regardless of which alternative is selected due in large part to natural deterioration and erosion.

Additional Considerations

Unavoidable Adverse Effects

Potential adverse effects which could not be avoided if the various alternatives were implemented have been presented earlier in this chapter.

Relationship of Short-Term Uses and Long-Term Productivity

Short-term for the sake of this plan is considered to be ten years or less and long-term is greater than ten years unless stated otherwise in the text. The implementation of Alternatives B and C would result in a possible short-term decline in water quality (generally one year or less) due to instream and riparian enhancement projects. This short-term loss is expected to be minor given the use of sediment limiting Best Management Practices and based on the environmental consequences analysis of resources described in this chapter. Additionally, such projects are in stream reaches that are intermittent and would be accomplished during the summer dry season when the streams are dried up. Such decreases would be confined to localized sediment input into streams during implementation or as a first season sediment flush following fall rains. The condition and productivity of the riparian system would be greatly enhanced in the long-term.

Irreversible and Irretrievable Commitments of Resources

An irreversible commitment is a commitment that cannot be reversed. An irretrievable commitment is a commitment that is lost for a period of time. An irreversible commitment of crushed rock for road surfacing and petrochemicals for management activities would occur under all alternatives. Rock sources

to return to the table of contents: Click here, Type a 7 and press enter (or return).

on the NBHMA could be developed as a source of rock for road repairs and in-stream structures. The existing rock sources are of low grade; therefore, crushed rock would be obtained from commercial sources away from the NBHMA.

Alternative C would result in an irretrievable commitment of resources due to the construction of a parking lots and recreational sites. The vegetation and soil resources at a particular location would be irretrievably lost during the time period that a parking lot existed. An irretrievable commitment of resources of land converted to riparian areas and standing water would occur as well.

to return to the table of contents: Click here, Type a 7 and press enter (or return).

to return to the table of contents: Click here, Type a 7 and press enter (or return).

Chapter Five

to return to the table of contents: Click here, Type a 7 and press enter (or return).

Introduction

This chapter contains a list of those that participated in the preparation of this EIS as well as a list of those who commented on the North Bank Habitat Management Area/ACEC Draft Environmental Impact Statement. A mailing list was assembled consisting of those individuals and organizations who requested and/or were sent full copies of the DEIS. Each person and organization who attended the NBHMA Open House or submitted substantive written comments during the public comment period were also included on the mailing list. The public comment period for the DEIS extended from December 28, 1999 through February 28, 2000. The Roseburg District received 28 letters from 25 individuals, officials and organizations. Some individuals and organizations sent more than one letter. The 28 letters contained 124 comments. Certain governmental agencies were also provided copies of the DEIS as a courtesy.

List of Preparers

This is a list of individuals that contributed to this EIS. These people served on the ID Team that developed the alternatives and analyzed the environmental consequences. The ID Team is a multi-agency interdisciplinary group composed of BLM personnel and personnel from other agencies.

Name	Contribution(s)	Degree(s)	Years of Experience
Bureau of Land Management			
Isaac Barner	Archaeologist	B.A. Anthropology M.S.	25
Karel Broda	Geotechnical Engineer	Geotechnical/Environmental Engineering	23
Kevin Cleary	Fires/Fuels	B.S. Forestry	5
Dan Cressy	Soils	B.S. Soils	22
Russ Holmes	Botany & Special Status Species	B.S. Biology/M.S. Biology	20
Phil Hall	Planning, NEPA	B.S. Forestry B.S. Conservation	24
Al James	Silviculture	B.S. Forestry	22
Jeanne Klein	Botany & Noxious Weeds	B.S. Rangeland Resources	6
Ralph Klein	Project Lead/ID Team Facilitator	B.S. Wildlife Sciences	22
Jim Luse	NEPA Coordinator	B.S. Forestry	25
Jerry Mires	Wildlife	B.S. Wildlife Sciences	25
Gregg Morgan	Recreation	B.S. Recreation	20
Jim Ramakka	Biologist	B.S. Wildlife Science M.S. Wildlife Management	27
Ed Rumbold	Hydrology	B.S. Natural Resources Management	14

to return to the table of contents: Click here, Type a 7 and press enter (or return).

Name	Contribution(s)	Degree(s)	Years of Experience
Bureau of Land Management			
Garth Ross	Fisheries	B.S. Wildlife	11
United States Fish & Wildlife Service			
Dave Peterson	Wildlife & Special Status Species	B.S. Zoology M.S. Wildlife Sciences	24
Oregon Department of Fish & Wildlife			
Mike Black	Wildlife & Special Status Species	B.A. Biology M.A. Zoology	27

Government Agencies (County, State, and Federal)

The following governmental agencies were provided a copy of the DEIS and/or provided an opportunity to comment during public scoping or the public comment period.

Confederated Tribes of Coos, Lower Umpqua, and Siuslaw
Confederated Tribes of Grande Ronde
Confederated Tribes of Siletz
Department of the Interior
- Bureau of Land Management Planning and Environmental Coordination (WO-210)
- Office of Environmental Affairs

Douglas County Board of Commissioners
Douglas County Library
Douglas County Parks
Environmental Protection Agency
- Office of Federal Activities
- Office of Environmental Policy and Compliance
- Regional Office

National Marine and Fisheries Service
Oregon Department of Fish & Wildlife
Oregon State Department of Agriculture
U.S. Fish & Wildlife Service
U.S. Forest Service
- Umpqua National Forest, Supervisor's Office

to return to the table of contents: Click here, Type a 7 and press enter (or return).

Organizations, Officials and Individuals who Commented on the DEIS

Comments were received from the following individuals, organizations or governmental agencies during the public comment period for the DEIS.

John Amneus
Ken Carloni
Defenders of Wildlife
Douglas County Commissioners
Glide Rural Fire Protection District
Doug Holloway
Idaho DEQ
Leonard Janssen
Loyce Krogel
National Wild Turkey Federation
Oregon Equestrian Trails
Oregon Hunter's Association
OSU Fish and Wildlife Research Unit
John and Beth Paulson
John C. Price
Winston Smith
Richard Sommer
Steamboaters
Jill Rich-Talburt
James Talburt
Umpqua Valley Audubon Society
Umpqua Watersheds
US Environmental Protection Agency
Stan & Kathy Vejtasa
John Woodman

to return to the table of contents: Click here, Type a 7 and press enter (or return).

Glossary

ACEC - Area of Critical Environmental Concern - An area of BLM-administered lands where special management attention is needed to protect and prevent irreparable damage to important historic, cultural or scenic values, fish and wildlife resources or other natural systems or processes; or to protect life and provide safety from natural hazards (RMP, p.101).

Aggrade - To fill and raise the level of a streambed by deposition of sediment.

Alluvial (Alluvium) - Originated through the transport by and deposition from running water (FEMAT, p. IX-2).

Aquatic ecosystem - Any body of water, such as a stream, lake or estuary, and all organisms and nonliving components within it, functioning as a natural system (FEMAT, p. IX-2).

Aquatic habitat - Habitat that occurs in free water (FEMAT, p. IX-2).

At risk - Riparian-wetland areas that are in functional condition, but an existing soil, water, or vegetation attribute makes them susceptible to degradation. An "at risk" designation is based upon an assessment of Proper Functioning Condition per Riparian Area Management: A user guide to assessing proper functioning condition and the supporting science for lotic areas. 1998 (USDI - BLM manual TR 1737-15, p. 126).

AUM (Animal Unit Month) - The amount of forage necessary for the sustenance of one cow with calf or its equivalent for one month (Roseburg District ROD/RMP, p. 101).

Beneficial Use - In water use law, reasonable use of water for a purpose consistent with the laws and best interests of the people of the state. Such uses include, but are not limited to, the following: instream, out of stream, and ground water uses, domestic, municipal, industrial water supply, mining, irrigation, livestock watering, fish and aquatic life, wildlife, fishing, water contact recreation, aesthetics and scenic attraction, hydro power, and commercial navigation (FEMAT, p. IX-3).

Bioaccumulation - Accumulation of substances within a living organism.

Biodegradation - Decomposition by natural biological processes.

BMP - Best Management Practices - Methods, measures, or practices designed to prevent or reduce water pollution. Not limited to structural and nonstructural controls, and procedures for operations and maintenance. Usually, Best Management Practices are applied as a system of practices rather than a single practice (RMP, p. 102).

Carrying Capacity - The maximum number of organisms that can be supported in a given area of habitat at a given time (FEMAT, p. IX-5).

Conifer - A tree belonging to the order Gymnospermae, comprising a wide range of trees that are mostly evergreens. Conifers bear cones (hence, coniferous) and needle-shaped or scalelike leaves (FEMAT, p. IX-7).

Cumulative Effects - Those effects on the environment that result from the incremental effect of the action when added to the past, present, and reasonably foreseeable future actions regardless of what agency (federal or nonfederal) or person undertakes such other actions. Cumulative effects can result from individually minor but collectively significant actions taking place over a period of time (FEMAT, p. IX-8).

to return to the table of contents: Click here, Type a 7 and press enter (or return).

DBH - Diameter at Breast Height - The diameter of a tree 4.5 feet above the ground on the uphill side of the tree (RMP, p. 104).

Decommission - To remove those elements of a road that reroute hillslope drainage and present slope stability hazards. Another term for this is "hydrologic obliteration" (FEMAT, p. IX-8).

Down Cutting - A general term that describes the relationship of a stream to its valley and landform features. It is quantitatively defined as the vertical containment of a stream and to the degree it is incised in the valley floor.

Extirpation - The local extermination of a species.

Forb - A low-growing herbaceous (non-woody) plant that is not a grass, sedge, or rush (The Northwest Area Noxious Weed Control Program EIS, p. 281).

Grassland - Habitat composed primarily of grasses and forbs. These areas may contain scattered trees and/or shrubs.

Guzzler - A structure designed to capture and store rainwater for use by animals. Usually consists of a catchment apron, holding tank and water trough or fountain. Does not rely on stream or spring systems to fill with water.

Headcuts / headcutting - Hydrology and soils term - The process by which erosion moves up a stream channel towards the headwaters, usually creating deep gullies in the lower portions of the stream below the area of active erosion.

Hydrologic Group - The description of the runoff potential of an area based on the natural physical properties of soil and bedrock, but does not consider slope. Generally high runoff potential may describe an area of low permeability, such that water reaches stream channels faster than areas with low-moderate runoff potential.

Incised stream bank - other terms are down-cutting, confinement, entrenchment and channelization. It describes the relationship of a stream to its valley; and refers to a stage in stream evolution where degradation of stream bed is occurring more rapidly than aggradation due to sediment transport capacity exceeding supply (Rosgen 1996, Shields 1994).

Integrated Pest Management - Use of combined methods to control noxious pests or weeds. In this document it refers to the combined use of biological controls (insects, pathogens), manual labor (hand pulling, cutting), mechanical methods (mowing, tilling, scraping, etc.) and/or use of herbicides. In certain instances, combinations of these methods may be required to eliminate or control infestations.

Leave No Trace Camping - A program which teaches and develops practical conservation techniques based on six principles (plan ahead and prepare; travel and camp on durable surfaces; pack it in, pack it out; properly dispose of what you can't pack out; leave what you find; and minimize use and impact of fire), and is designed to minimize impacts of visitors on the back country environment.

Long-term - A time period greater than ten years.

Moderately well drained - Soil drainage class where water is removed from the soil somewhat slowly, so that the profile is wet for a small but significant part of the time. Moderately well drained soils commonly have a slowly permeable layer within or immediately beneath the A and B horizons, a relatively high water table, additions of water through seepage, or some combination of these conditions (Soil Survey Manual, 1951, p.171).

Noxious Weed - A plant specified by law as being especially undesirable, troublesome, and difficult to control (RMP, p. 108).

to return to the table of contents: Click here, Type a 7 and press enter (or return).

Oak Savannah - Grasslands containing scattered oak trees. Typically, canopy closure of oaks ranges up to 30%.

Oak Woodlands - Wooded area in which the dominant tree species are oak and the canopy closure 30% or greater.

Outsloped roads - A road design that allows water runoff to flow directly to the edge of a road without pooling on the road.

PFC (Properly Functioning Condition) - Riparian - Wetlands are functioning properly when adequate vegetation, landform, or large woody debris is present to dissipate stream energy associated with high 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 that stabilize streambanks 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 of biodiversity (BLM TR 1737-9, 1993)

Poorly drained - Water is removed so slowly that the soil remains wet for a large part of the time. A water table is commonly at or near the surface for a considerable part of time. Poorly drained conditions are due to a high water table, to a slowly permeable layer within the profile, to seepage, or to some combination of these conditions. Wetlands are commonly associated with poorly drained soils (Soil Survey Manual, 1951, p. 170).

Post holing - In common usage, referring to deep hoof prints left after heavy animals cross wet ground.

Rank - Growing or grown vigorously and coarsely; overly luxuriant.

Responsible official - An employee of the Bureau of Land Management to whom has been delegated authority to make decisions and authorize actions related to this project.

Riparian areas - Locations that maintain vegetation that is influenced by saturated soil conditions. These areas may be found along stream and pond margins and in springs, seeps, bogs and wetlands.

Riparian zone - That area of vegetation that exists between aquatic habitats and dry, well drained, upland habitats. The zone is indicated by the presence of riparian vegetation such as sedges, rushes, and other vegetation requiring saturated soil. The area may also be a designated zone that begins at an aquatic habitat type and extends a certain designated distance upland from habitat such as a stream, pond, or wetland.

Road - A vehicle route (permanent road) generally over 50 inches wide which has been improved and maintained to ensure relatively regular and continuous use. This could include rocked or grass covered roads. Mainly used for vehicle traffic, recreation trails and fire control.

Sensitive areas - Locations that are determined to be important to individual species at some time in their life history and that may be damaged by noncompatible uses or areas of fragile habitat types. Examples may be a rare plant location that could be damaged through management or recreational activities or areas such as fawning locations that are important for CWTD and sensitive to disturbance. Habitat types that may be listed as sensitive due to the potential for adverse impacts include riparian areas, rock outcrops, and wet meadows.

Sensitive species - These are species of plants or animals that are listed by the State of Oregon or federal government because of such things as rareness, have threats to their continued existence, may be listed as Threatened or Endangered, may occur only in specialized habitats, or are designated by a government agency as a specie of concern. List of sensitive species contained in this document have been derived from both state and federal sources.

to return to the table of contents: Click here, Type a 7 and press enter (or return).

Short-term - A time period less than or equal to ten years.

Soil Structure - The combination or arrangement of primary soil particles (sands, silts and clays) into secondary particles or units. The secondary units are characterized and classified on the basis of size, shape, and the degree of distinctiveness (Brady, 1990, p. 595). In granular structure, individual grains are grouped into spherical aggregates with indistinct sides. A well granulated soil generally has the most desirable structure for plant growth. Granular structure most often occurs in the surface soil. In blocky structure, soil particles combine into units with block-like shapes. Blocky structure is common in the subsoil.

Soil texture - The relative proportions of sand, silt and clay in a soil (Brady, 1990, p. 595).A clay texture has greater than 40 percent clay. A soil with a clay texture is called clayey when it has 40 to 60 percent clay and very clayey when it has greater than 60 percent clay. A typical silty clay loam texture has 35 percent clay, 55 percent silt, and 10 percent sand. A typical silt loam texture has 15 percent clay, 65 percent silt and 20 percent sand.

Special Attention Plants - Plant species falling in any of the following categories:
- Survey and Manage Species
- Protection Buffer Species (RMP, p. 40)

Special Status Plants - Plant species falling in any of the following categories:
- Threatened or Endangered Species
- Proposed Threatened or Endangered Species
- Candidate Species
- State Listed Species
- Bureau Sensitive Species
- Bureau Assessment Species (FEMAT, p. IX-33)

Take - Under the Endangered Species Act, “take” means to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect an animal, or to attempt to engage in any such conduct (FEMAT, p. IX-36).

Thatch - A mat of dead vegetation that covers the ground. Specific to NBHMA, thatch is usually composed of dead stalks of non-native grasses or other vegetation that have formed a mat which restricts the growth of other forms of vegetation.

Trail - A route used primarily by hikers, horseback riders, or mountain bikers. These routes may be roads (existing non-permanent roads, jeep trails) converted to trail use (generally over 50 inches wide) or conventional trails (generally less than 50 inches wide). The surface may be natural or rocked.

Vented subgrade - The separation and protection of springs located along the roads to allow the water to pass under the road surface, without being degraded by the road traffic.

Well drained - Soil drainage class where water is removed from the soil readily but not rapidly. Well drained soils commonly retain optimum amounts of moisture after rains for plant growth. Water tables do not build up within 40 inches of the surface (Soil Survey Manual, 1951, p. 171).

Xeric moisture regime - The yearly soil moisture levels and distributions in a typical Mediterranean climate where winters are moist and cool and summers are warm and dry. One of the requirements is that the soil is dry in all parts of the moisture control section (this is at 10 to 40 inches of depth in the deeper soils) for 45 or more consecutive days in the four months following the summer solstice (Keys to Soil Taxonomy, 1992, p. 37).

to return to the table of contents: Click here, Type a 7 and press enter (or return).

Acronyms and Abbreviations

ACEC	Area of Critical Environmental Concern
ACS	Aquatic Conservation Strategy
ASQ	Allowable Sale Quantity
BMP	Best Management Practices
CEQ	Council of Environmental Quality
CFR	Code of Federal Regulations
CWA	Clean Water Act
DEIS	Draft Environmental Impact Statement
DEQ	Oregon Department of Environmental Quality
DOI	United States Department of Interior
EA	Environmental Assessment
EIS	Environmental Impact Statement
EPA	Environmental Protection Agency
ESA	Endangered Species Act
FEIS	Final Environmental Impact Statement
FEMAT	Forest Ecosystem Management Assessment Team
FLPMA	Federal Land Policy and Management Act
FSEIS	Final Supplemental Environmental Impact Statement
FWS	United States Fish and Wildlife Service
GFMA	General Forest Management Area
GIS	Geographic Information System
HMP	Habitat Management Plan
IDT	Interdisciplinary Team
MBF	Thousand Board Feet
MCF	Thousand Cubic Feet
MMBF	Million Board Feet
MMCF	Million Cubic Feet
NBHMA	North Bank Habitat Management Area
NFP	Northwest Forest Plan
NPS	Non-Point source
NRCS	Natural Resource Conservation Service
O&C	Oregon and California Act of 1937 (also Revested Oregon and California Railroad and reconveyed Coos Bay Wagon Road Grant Lands)
ODF	Oregon Department of Forestry
ODFW	Oregon Department of Fish and Wildlife
ONHP	Oregon Natural Heritage Plan
ORS	Oregon Revised Statutes
ORV	Off-Road Vehicle
OSU	Oregon State University
PCT	Precommercial Thinning
PD	Public Domain
PL	Public Law
PSQ	Probable Sale Quantity
REO	Regional Ecosystem Office
RMP	Resource Management Plan
RNA	Research Natural Area
ROD	Record of Decision
SEIS	Supplemental Environmental Impact Statement
T&E	Threatened and Endangered (species)
TMDLs	Total Maximum Daily Loads
USDA	United States Department of Agriculture
USDI	United States Department of Interior
USGS	United State Geologic Service
USFS	United States Forest Service
USFWS	United States Fish and Wildlife Service
WQMP	Water Quality Management Plan

to return to the table of contents: Click here, Type a 7 and press enter (or return).

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to return to the table of contents: Click here, Type a 7 and press enter (or return).

to return to the table of contents: Click here, Type a 7 and press enter (or return).

Index

Air quality xix, 121, 122
Allowable sale quantity xvi, 93
Aquatic conservation strategy xviii, 101 - 104
Area of Critical Environmental Concern xiii, xiv, 2, 3, 5, 7, 16, 93
Bald eagle xviii, 5, 59, 61, 80 108
Barn xiv, 10, 13, 14, 16, 113 - 116
Best Management Practices 6, 122
Burning xiv, xix, 12, 15, 82 - 84, 94, 117, 118
Camping xix, 11, 100, 114, 115
Clean Air Act 121, 122
Clean Water Act xiv, 3, 6, 13, 114
Coho salmon 70
Columbian white-tailed deer xiii - xv, xviii, 2 - 7, 11 - 14, 16, 58 - 60, 82 - 85, 87 - 90, 101, 102, 104 - 107, 109 - 112
Compaction, soil 52, 53, 67, 68, 114, 116, 118 - 120
Connectivity/Diversity Blocks xiii, xvi, 3, 7, 15, 93
Consultation 4
Cultural resources xiv, xix, 6, 12, 80, 122
Cumulative effects 81, 89, 104, 109, 122
Doc's Landing 14, 63, 98, 101, 114 - 117
Early seral 82, 88 - 90, 105, 106, 111
Endangered Species Act 2, 3, 5, 92, 106
Equestrian 3, 11, 113, 115
Erosion 3, 11, 63 - 69, 94, 96 - 99, 102 - 104, 116 - 121
Exclusion areas 94, 103
Facilities xiv, xix, 4 - 6, 111, 113 - 115
Fencing, fences, fence 15, 16, 94, 95, 100, 120
Fertilization xiv, xv, xvii, xix, 10, 14, 82, 83, 85, 87 - 89, 100, 104, 106, 112, 117, 119
Fire xiv, xix, 11 - 14, 57, 80, 82 - 84, 94, 117, 118
Fish xvii, 3, 13, 14, 70, 94, 96, 100
Fluvial processes 68, 116, 120
Forage plots xiv, xviii, 106, 116, 121
Forage xiv, xv, xviii, 10, 13, 14, 56 - 60, 82 - 90, 106 - 109, 112, 113, 121
Forbs 13, 15, 83 - 87, 89, 90, 105, 106, 117
Goal, primary 4
Goal, secondary 4
Grasslands xv, xviii, 3, 12, 53, 54, 82 - 90, 105 - 112, 117
Grazing xiv, xvi, xvii, xviii, 14, 15, 53, 58 60, 80 - 96, 100 - 104, 106, 108, 109, 112, 113, 119 - 121
Guzzler 95, 116
Hardwood conifer xviii, 3, 12, 53, 55, 56, 82 - 90, 105 - 112, 117
Herbicides xviii, 95
Issues 5, 80, 92
Livestock 14, 15, 58, 86, 94, 95, 119, 120
Long-term effects xix, 83, 84, 87, 88, 96, 98 - 105, 115, 120 - 122
Marginal Habitat 90
Medusa head 83, 92, 93
Mitigation 6, 82
Monitoring 82, 94, 95
Mowing xiv, 13, 82 - 85, 90, 116, 118
Native Americans 58, 80
Noxious weed(s) xiv - xvi, 4, 6, 12, 53, 60, 80, 82 - 84, 87, 92, 95, 100
Oak savannah xv, xviii, 3, 12, 53, 54, 56, 82 - 90, 105 - 112, 117
Oak woodland xv, xviii, 3, 12, 53, 55, 56, 82 - 90, 105 - 112, 117
Off-highway vehicle(s) 16
Peak flow(s) 63 - 66, 93, 94, 97

to return to the table of contents: Click here, Type a 7 and press enter (or return).

Planting xiv, 14, 82, 84, 85, 88, 90, 94, 96, 100, 101, 103, 104, 106
Prescribed fire xiv, xv, 12 - 14, 57, 82 - 84, 94, 117, 118
Public access 14, 62, 63, 113 - 116
Pullouts 14, 63, 115
Recreation xiv, xvii, xix, 3, 13 - 16, 62, 63, 98 - 100, 113 - 116
Rehabilitation xv, xvi, 3, 10, 13, 14, 95 - 97, 99 - 104
Riparian areas xiv, 2, 12, 14, 63 - 66, 70, 95 - 97, 99 - 104
Riparian Reserves xvi, 7, 15, 101
Road(s) xiv, 6, 11, 14, 66, 67, 97, 98, 113 - 116, 122, 123
Sedimentation (sediment) 3, 93, 95 - 104, 116, 122
Seeding xiv, xv, 11, 82, 85, 90, 96, 106, 112, 117, 119, 121
Sensitive areas 94, 100, 102, 114
Short-term effects 82 - 84, 96, 97, 99, 100, 103 - 107, 118, 121 - 122
Smoke 12, 121, 122
Soil(s) xvii, xix, 12, 13, 52, 53, 67, 68, 82 - 89, 116 - 121
Special Status Plants xiv, xvi, 13, 60, 61, 92
Spotted owl xviii, 59, 80, 107, 108
Springs 63, 64, 94
Streams xiv, 3, 63 - 66, 93 - 104, 115, 119, 120, 122
Thinning xv, xvi, 15, 82, 84, 88 - 90, 93, 112, 113, 118
Timber harvest xiv, xvi, 10, 14, 15, 65, 66, 93
Trails 6, 11, 14, 62, 63, 100, 113 - 116
Vegetation xv, 3, 53 - 56, 82 - 91, 93 - 95, 100, 117, 118
Watchable Wildlife 14, 16, 114
Water quality xiv, 3, 5, 6, 13, 14, 63 - 67, 93 - 104
Watershed analysis 2, 63, 65, 66, 101
Wetland(s) xiv, xv, xviii, 5, 6, 14, 63 - 66, 85, 88, 95, 101 - 104, 106, 111, 118
Wildfire 56, 57, 82, 86, 89, 118
Wildlife xiv, xviii, 2, 5, 61, 62, 104 - 113

to return to the table of contents: Click here, Type a 7 and press enter (or return).

Appendices

to return to the table of contents: Click here, Type a 7 and press enter (or return).

to return to the table of contents: Click here, Type a 7 and press enter (or return).

Appendix A. Vertebrate Wildlife Species of Management Concern

Species of management concern is a term used as a designation in this document to highlight vertebrate species that occur on the North Bank Habitat Management Area and are listed by BLM, other federal or state agencies or the Oregon Natural Heritage Program, due to concerns of their continued viability in the state of Oregon or specifically defined counties or provinces in Oregon. There is no legal requirement, such as those under the federal Endangered Species Act, to manage habitat specifically for species of management concern listed in this document unless they are listed federally as Threatened and Endangered or are on the Survey and Manage List under the ROD for the Northwest Forest Plan.

A. Oregon Department of Fish And Wildlife Sensitive Species

The following species are those listed by the Oregon Department of Fish and Wildlife in their December 15, 1997 document, "Oregon Department of Fish and Wildlife Sensitive Species". An explanation of classification categories used by the Oregon Department of Fish and Wildlife (ODFW) is as follows:

Critical (C) -"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 which are at risk throughout their range and some disjunct populations".

Vulnerable (V) - "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, populations are sustainable and protective measures are being implemented; in others, populations may be declining and improved protective measures are needed to maintain sustainable populations over time"

Undetermined Status (U) - "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 would be needed before a judgment can be made".

Note: Endangered or Threatened species status mentioned in the above definitions is relevant only to State designation as state endangered or threatened, not federal.

	ODFW Status	Common Name	Scientific Name
1.	V	Common Kingsnake	*Lampropeltus getulus*
2.	V	Foothill yellow-legged frog	*Rana boylii*
3.	U	Red-legged frog	*Rana aurora*
4.	V	Sharptail snake	*Contia tenius*
5.	C	Western pond turtle	*Clemmys marmorata*
6.	V	Pileated woodpecker	*Dryocopus pileatus*
7.	C	Purple martin	*Progne subis*
8.	C	Vesper sparrow	*Pooecetes gramineus affinis*
9.	V	Fringed myotis	*Myotis thysanodes*
10.	V	Pallid bat	*Antrozous pallidus*
11.	U	Western gray squirrel	*Sciurus griseus*
12.	V	Columbian White-tailed deer*	*Odocoileus virginianus leucurus*

* Columbian White-tailed deer has been removed from Oregon State list of Endangered species, it is still on the Federal list as endangered. De-listing of the species federally is currently (7/2000) in progress.

to return to the table of contents: Click here, Type a 7 and press enter (or return).

B. Review of Plant and Animal Taxa that are Candidates for Listing as Endangered or Threatened Species

50 CFR Part 17 was listed in the Federal Register Notice on Wednesday, February 28, 1996. This listing was reviewed and no vertebrate wildlife species found on the NBHMA were listed as candidates as of the date of this CFR notice.

C. SEIS Special Attention Species

The Roseburg BLM District Resources Management Plan (June 1995) listed the following vertebrate wildlife species for specific management (Appendix H, p. 177) as a Survey Strategy 2 (Species requiring surveys prior to activities and manage sites):

Red Tree Vole	*Phenacomys longicaudus*

D. Migratory Nongame Birds of Management Concern in the United States

This list was prepared by the Office of Migratory Bird Management (US Fish and Wildlife Service, Washington, D.C., 1995).

Vaux's Swift	*Chaetura vauxi*
Rufous Hummingbird	*Selasphorus rufus*
Red-Breasted Sapsucker	*Sphyrapicus ruber*
Olive-Sided Flycatcher	*Contopus sordidulus*
Pacific Slope Flycatcher	*Empidonax difficilis*
Peregrine Falcon	*Falco peregrinus*
Hermit Warbler	*Dendroica occidentalis*

E. Rare, Threatened and Endangered Species of Oregon

(Oregon Natural Heritage Program, March 1998)

Following are Oregon Natural Heritage Program (ORNHP) designations for species maintained on the ORNHP databases that occur or are expected to occur on the NBHMA. State and Federal Status has not been repeated for species on the following list.

SPECIES	TNC RANK	TNC LIST
Northern red-legged frog (*Rana aurora aurora*)	G4T4 S3S4	3
Foothill yellow-legged frog (*Rana boylii*)	G3 S3?	3
Clouded salamander (*Aneides ferreus*)	G3T3 S4	2
Northwestern pond turtle (*Clemmys marmorata marmorata*)	G3T3 S2	2

to return to the table of contents: Click here, Type a 7 and press enter (or return).

SPECIES	TNC RANK	TNC LIST
Sharptail snake (*Contia tenuis*)	G5 S3	4
Common kingsnake (*Lampropeltus getulus*)	G5 S2	3
Pileated woodpecker (*Dryocopus pileatus*)	G5 S4?	4
Bald eagle (*Haliaeetus leucocphalus*)	G4 S3B, S4N	1
Acorn woodpecker (*Melanerpes formicivorus*)	G5 S3?	3
Oregon vesper sparrow (*Pooecetes gramineus affinis*)	G5T3 S3B, S2N	3
Purple martin (*Progne subis*)	GT5 S3B	3
Western bluebird (*Sialia mexicana*)	G5 4B, S4N	4
Pallid bat (*Antrozous pallidus*)	G5 S3	3

Definitions of rankings and list status are as follow:

TNC - Natural Heritage Network Ranks

The ranking system used by the ORNHP in the prior lists is as follows: The top line is the global rank and begins with a "G". The number relates to the relative abundance of the species based on known occurrences as listed: On the second line, the "S" denotes the state designation.

1 - Critically imperiled because of extreme rarity or because it is somehow especially vulnerable to extinction or extirpation, typically with 5 or fewer occurrences.

2 - Imperiled because of rarity or because other factors demonstrably make it very vulnerable to extinction (extirpation), typically with 6-20 occurrences.

3 - Rare, uncommon or threatened, but not immediately imperiled, typically with 21-100 occurrences.

4 - Not rare and apparently secure, but with cause for long-term concern, usually with more than 100 occurrences.

5 - Demonstrably widespread, abundant, and secure.

? - Not yet ranked, or assigned rank is uncertain.

Listing Categories

List 1 - Contains taxa that are threatened with extinction or presumed to be extinct throughout their entire range.

to return to the table of contents: Click here, Type a 7 and press enter (or return).

List 2 - Contains taxa that are threatened with extirpation or presumed to be extirpated from the state of Oregon.

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 which are of conservation concern but are not currently 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.

F. Species Federally Listed as Threatened or Endangered

The following species occur on the NBHMA or occur in close proximity to the management area:

Endangered

1. Columbian White-tailed deer *Odocoileus virginianus leucurus*

NOTE: The Columbian White-tailed deer is currently in the process of being de-listed federally. The species has been de-listed from state Endangered Species status as noted previously.

Threatened

1. Northern Spotted Owl *Strix occidentalis caurina*
2. Bald Eagle *Haliaeetus leucocephalus*
3. Golden Eagle *Aquila chrysaetos*

Golden eagles are protected under the Bald Eagle Act of 1940, as amended. Additional protection above that of the endangered species act is afforded both golden and bald eagles under the Bald Eagle Protection Act of 1940, as amended.

G. Special Status Species (USDI, Bureau of Land Management; BLM Oregon & Washington, January 19, 2000)

The following list is of species that the BLM considers sensitive and has assigned to one of three categories and may occur or have been documented on the NBHMA. Bureau Sensitive (BS) designation includes species that could easily become endangered or extinct in a state. They are restricted in range and have natural or human-caused threats to survival. Bureau Sensitive species are not federally or state listed but are eligible for federal or state listing or candidate status. Thus species that are Oregon State critical or ORNHP List 1 are considered Bureau Sensitive species. Bureau Sensitive species are designated by the State Director and are typically tiered to the state wildlife agencies' designations. Bureau manual 6840 policy requires that any Bureau action will not contribute to the need to list any of those species (i.e., equivalent to policy applied to federal candidate species).

Bureau Assessment (BA) species are "plant and animal species which are not presently eligible for official federal or state status but are of concern in Oregon or Washington may, at a minimum, need protection or mitigation in BLM activities. These species will be considered as a level of special status species separate from Bureau sensitive, and are referred to as bureau assessment species."

Bureau Tracking species (BT) are those listed "to enable an early warning for species which may become threatened or endangered in the future. Districts are encouraged to collect occurrence data on species for which more information is needed to determine status within the state or which no longer need active management. Until status of such species changes to federal or state listed, candidate or assessment species, 'tracking species' will not be considered as special status species for management purposes."

to return to the table of contents: Click here, Type a 7 and press enter (or return).

Species listed are by common name, refer to species lists for proper names if required.:

Bureau Sensitive Species:

1. Northern Goshawk
2. American Peregrine falcon
3. Oregon Vesper sparrow
4. Purple Martin

Bureau Tracking Species:

1. Pallid bat
2. Fringed myotis
3. Yuma myotis
4. Western Grey squirrel
5. Olive-sided grey squirrel
6. Pileated woodpecker
7. Acorn woodpecker
8. Allens' humming bird
9. Western bluebird.

Bureau Assessment species

No bureau assessment species are listed.

H. Wildlife Species Habitat Groups (Guilds)

The following wildlife species are placed in groups or guilds as a basis for analyzing effects in Chapter 4. The species found within guilds share similar life histories and habitat affinities. Any change to habitat would be considered to have similar effects to all species in that group. Some species are in more than one group.

Group 1. Aquatic Amphibians and Reptiles

Foothill Yellow-legged frog
Red-legged frog
Western Pond Turtle

Group 2. Cavity Dwellers

Clouded salamander
Acorn Woodpecker
Northern Pygmy Owl
Pileated Woodpecker
Purple Martin
Western Bluebird
Red tree Vole

Group 3. Bats

Little Brown Myotis
California Myotis
Hairy Winged Myotis
Fringed Myotis
Yuma Myotis
Pallid Bat

Group 4. Open Habitat/Edge Species

Common Kingsnake
Western Pond Turtle
Purple Martin
Western Bluebird

to return to the table of contents: Click here, Type a 7 and press enter (or return).

Acorn Woodpecker
Vesper Sparrow
Pallid Bat
Vaux's Swift
Rufous Hummingbird
Mountain Quail
Western Meadowlark

Group 5. Woodland Species

Clouded Salamander
Sharptail Snake
Acorn Woodpecker
Northern Pygmy Owl
Pileated Woodpecker
Red-breasted sapsucker
Olive-sided Flycatcher
Pacific Slope Flycatcher
Hermit Warbler
Western Gray Squirrel

to return to the table of contents: Click here, Type a 7 and press enter (or return).

I. Species List For The North Bank Habitat Management Area

The following list contains the vertebrate species that occur or are suspected to occur on the NBHMA.

Avifauna List

Raptors

1.	Bald Eagle	*Haliaeetus leucocphalus*
2.	Golden Eagle	*Aquila chrysaetos*
3.	Red-tailed Hawk	*Buteo jamaicensis*
4.	Northern Harrier	*Circus cyaneus*
5.	Sharp-shinned Hawk	*Accipiter striatus*
6.	Cooper's Hawk	*Accipiter cooperi*
7.	Northern Goshawk	*Accipiter gentilis*
8.	American Kestrel	*Falco sparverius*
9.	Merlin	*Falco columbarius*
10.	Peregrine Falcon	*Falco peregrinus*
11.	Prairie falcon	*Falco mexicanus*
12.	Black-shouldered Kite	*Elanus caeruleus*
13.	Rough-legged Hawk	*Buteo lagopus*
14.	Osprey	*Pandion haliaetus*
15.	Great-horned Owl	*Bubo virginianus*
16.	Barred Owl	*Strix varia*
17.	Barn Owl	*Tyto alba*
18.	Screech Owl	*Otus kennicotti*
19.	Pygmy Owl	*Glaucidium gnoma*
20.	Saw-whet Owl	*Aegolius acadicus*
21.	Spotted Owl	*Strix occidentalis*
22.	Turkey Vulture	*Cathartes aura*

Waterfowl

1.	Canada Goose	*Branta canadensis*
2.	Mallard	*Anas platyrhynchos*
3.	Green-winged Teal	*Anas creca*
4.	Wood Duck	*Aix sponsa*
5.	Hooded Merganser	*Lophodytes cucullatus*
6.	Common Merganser	*Mergus merganser*
7.	Ring-neck Duck	*Athya collaris*
8.	Greater Scaup	*Athya marila*
9.	Lesser Scaup	*Athya affinis*
10.	Western Grebe	*Aechmophorus occidentalis*

Wading Birds

1.	Green Heron	*Butorides virescens*
2.	Great Blue Heron	*Ardea herodius*
3.	Great Egret	*Casmerodius albus*
4.	Virginia Rail	*Rallus limicola*

Shorebirds

1.	Killdeer	*Charadrius vociferus*
2.	Western Sandpiper	*Calidris mauri*
3.	Common Snipe	*Gallinago gallinago*

Kingfisher

1.	Belted Kingfisher	*Ceryle alcyon*

to return to the table of contents: Click here, Type a 7 and press enter (or return).

Grouse, Quail, and Pheasants

1.	Blue Grouse	*Dendragapus obscurus*
2.	Ruffed Grouse	*Bonasa umbellus*
3.	California Quail	*Callipepla californica*
4.	Mountain Quail	*Oreortyx picta*
5.	Wild Turkey	*Meleagris gallopavo*

Pigeons and Doves

1.	Band-tailed Pigeon	*Columba fasciata*
2.	Mourning Dove	*Zenaida macroura*
3.	Rock Dove	*Columba livia*

Jays and Crows

1.	Steller's Jay	*Cyanocitta stelleri*
2.	Scrub Jay	*Aphelocoma coerulescens*
3.	Northwestern Crow	*Corvus caurinus*
4.	Common Raven	*Corvus corax*

Woodpeckers

1.	Common Flicker	*Colaptes auratus*
2.	Pileated Woodpecker	*Dryocopus pileatus*
3.	Acorn Woodpecker	*Melanerpes formicivorus*
4.	Red-breasted Sapsucker	*Sphyrapicus ruber*
5.	Hairy Woodpecker	*Picoides villosus*
6.	Downy Woodpecker	*Picoides pubescens*

Goatsuckers, Swifts and Hummingbirds

1.	Common Nighthawk	*Chordeiles minor*
2.	Vaux's Swift	*Chaetura vauxi*
3.	Anna's Hummingbird	*Calypte anna*
4.	Rufous Hummingbird	*Selasphorus rufus*

Swallows

1.	Violet-Green Swallow	*Tachycineta thalassina*
2.	Barn Swallow	*Hirundo rustica*
3.	Tree Swallow	*Tachycineta bicolor*
4.	Rough-winged Swallow	*Stelgidopteryx serripennis*
5.	Cliff Swallow	*Hirundo pyrrhonota*
6.	Purple Martin	*Progne subis*

Thrushes

1.	American Robin	*Turdus migratorius*
2.	Varied Thrush	*Ixoreus Bonaparte*
3.	Hermit Thrush	*Catharus guttatus*
4.	Swainson's Thrush	*Catharus ustulatus*
5.	Townsend's Solitaire	*Myadestes townsendi*
6.	Western Bluebird	*Sialia mexicana*

Wrens

1.	House Wren	*Troglodytes aedon*
2.	Winter Wren	*Troglodytes troglodytes*

to return to the table of contents: Click here, Type a 7 and press enter (or return).

Meadowlarks, Blackbirds And Orioles

1.	Western Meadowlark	*Sternela neglecta*
2.	Red-winged Blackbird	*Agelaius phoeniceus*
3.	Northern Oriole	*Icterus galbula*
4.	Brewer's Blackbird	*Euphagus cyanocephalus*
5.	Brown-headed Cowbird	*molothrus ater*

Starlings

1.	European Starling	*Sternus vulgaris*

Tanagers

1.	Western Tanager	*Piranga ludoviciana*

Weaver Finches

1.	House Sparrow	*Passer domesticus*

Vireos

1.	Hutton's Vireo	*Vireo huttoni*
2.	Cassins' Vireo	*Vireo cassinii*
3.	Warbling Vireo	*Vireo gilvu*

Titmice, Bushtits, Nuthatches And Creepers

1.	Black-capped Chickadee	*Parus atricapillus*
2.	Chestnut-backed Chickadee	*Parus rufescens*
3.	Mountain Chickadee	*Parus gambeli*
4.	White-breasted Nuthatch	*Sitta carolinensis*
5.	Red-breasted Nuthatch	*Sitta canadensis*
6.	Brown Creeper	*Certhia americana*
7.	Wren-tit	*Chamaea faasciata*
8.	Common Bushtit	*Psaltriparus minimus*

Tyrant Flycatchers

1.	Western Kingbird	*Tyrannus verticalis*
2.	Western Wood Peewee	*Contopus sordidulus*
3.	Ash-throated Flycatcher	*Myiarchus cinerascens*
4.	Olive-sided Flycatcher	*Contopus borealis*
5.	Dusky Flycatcher	*Empidonax oberholseri*
6.	Hammond's Flycatcher	*Empidonax hammondii*
7.	Willow Flycatcher	*Empidonax traillii*
8.	Pacific-slope Flycatcher	*Empidonax difficilis*

Kinglets and Waxwings

1.	Golden-crowned Kinglet	*Regulus satrapa*
2.	Ruby-crowned Kinglet	*Regulus calendula*
3.	Cedar Waxwing	*Bombycilla cedrorum*

Wood Warblers

1.	Orange-crowned Warbler	*Vermivora celata*
2.	Nashville Warbler	*Vermivora ruficapilla*
3.	Yellow-rumped Warbler	*Dendroica coronata*
4.	Black-throated Gray Warbler	*Dendroica nigrescens*
5.	Townsend's Warbler	*Dendroica townsendi*
6.	McGillvray's Warbler	*Oporornis tolmiei*

to return to the table of contents: Click here, Type a 7 and press enter (or return).

7.	Wilson's Warbler	*Wilsonia pusilla*
8.	Yellow Warbler	*Dendroica petechia*
9.	Hermit Warbler	*Dendroica occidentalis*
10.	Common Yellowthroat	*Geothlypis trichas*
11.	Yellow-breasted Chat	*Icteria virens*

Grosbeaks, Finches, Sparrows and Buntings

1.	Black-headed Grosbeak	*Pheucticus melanocephalus*
2.	Evening Grosbeak	*Coccothraustes vespertinus*
3.	Lazuli Bunting	*Passerina amoena*
4.	Purple Finch	*Carpodacus purpureus*
5.	House Finch	*Carpodacus mexicanus*
6.	Pine Siskin	*Carduelis pinus*
7.	American Goldfinch	*.Carduelis tristis*
8.	Lesser Goldfinch	*Carduelis psaltria*
9.	Red Crossbill	*Loxia curvirostra*
10.	Spotted Towhee	*Pipilo erythrophthalmus*
11.	Savannah Sparrow	*Passerculus sandwichensis*
12.	Vesper Sparrow	*Pooecetes gramineus*
13.	Chipping Sparrow	*Spizella passerina*
14.	White-crowned Sparrow	*Zonotrichia leucophrys*
15.	Golden-crowned Sparrow	*Zonotrichia atricapilla*
16.	Fox Sparrow	*Passerella iliaca*
17.	Song Sparrow	*Melospize melodia*
18.	Dark-eyed Junco	*Junco hyemalis*

Avifauna list reviewed,7/2000 (L. Gayner, G. Mires).

Mammalian Species List

This list has been compiled with information gained through direct observation of the species or diagnostic signs and/or by utilizing known range and habitat affinities of some species. Note: Ten species removed from list in 1999 draft due to updated information (Revised 6/2000).

1.	Common Opposum	*Didelphis marsupialis*
2.	Trowbridge shrew	*Sorex trowbridgii*
3.	Vagrant shrew	*Sorex vagrans*
4.	Shrew-mole	*Neurotrichus gibsii* (Baird)
5.	Townsends mole	*Scapanus townsendii* (Bachman)
7.	Little Brown Myotis	*Myotis lucifugus* (LeConte)
8.	Yuma Myotis	*Myotis yumanensis* (H. Allen)
9.	Fringed Myotis	*Myotis thysanodes* (Miller)
10.	Hairy-winged Myotis	*Myotis volans* (H. Allen
11.	California Myotis	*Myotis californicus* (Audubon and Bachman)
12.	Big Brown Bat	*Eptesicus fuscus* (Palisot deBeauvois)
13.	Pallid Bat	*Antrozous pallidus* (LeConte)
14.	Black-tailed Jackrabbit	*Lepus californicus* Gray
15.	Brush Rabbit	*Sylvilagus bachmanii* (Waterhouse)
16.	Calif. Ground Squirrel	*Otospermophilus beecheyi* (Richardson)
17.	Townsend Chipmunk	*Eutamias townsendii* (Bachman)
18.	W. Grey Squirrel	*Sciurus griseus* Ord
19.	N. Flying Squirrel	*Glaucomys sabrinus* (Shaw)
20.	Mazama Pocket Gopher	*Thomomys mazama* Merriam
21.	Beaver	*Castor canadensis* Kuhl
22.	Deer Mouse	*Peromyscus maniculatus* (Wagner)
23.	Dusky-footed Woodrat	*Neotoma fuscipes* Baird

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24.	Red Tree Mouse	*Phenacomys longicaudis* True
25.	Calif. Meadow Mouse	*Microtus californicus* (Peale)
26.	Muskrat	*Ondatra zibethica* (Linnaeus)
27.	House Mouse	*Mus musculus* Linnaeus
28.	Porcupine	*Erethizon dorsatum* (Linnaeus)
29.	Nutria	*Myocastor coypu* (Molina)
30.	Coyote	*Canis latrans* Say
31.	Red Fox	*Vulpes fulva* (Desmarest)
32.	Gray Fox	*Urocyon cinereoargenteus* (Schreber)
33.	Black Bear	*Ursus americanus* Pallus
34.	Raccoon	*Procyon lotor* (Linnaeus)
35.	Ermine	*Mustela erminae* Linnaeus
36.	Long-Tailed Weasel	*Mustela frenata* Lichtenstein
37.	Mink	*Mustela vision* Schreber
38.	Spotted Skunk	*Spilogale putorius* (Linnaeus)
39.	Striped Skunk	*Mephitis mephitis* (Schreber)
40.	River Otter	*Lutra canadensis (Schreber*)
41.	Cougar	*Felis concolor* Linnaeus
42.	Bobcat	*Lynx rufus* (Schreber)
43.	Roosevelt Elk	*Cervus canadensis roosevelti*
44.	Blacktail Deer	*Odocoileus hemonius columbianus*
45.	Columbian White-Tailed Deer	*Odocoileus virginianus leucurus*

Reptile and Amphibian List

This list has been compiled with information gained through direct observation of the species and/or by utilizing information on range and habitat affinities of some species. Some inventory work has been done in the vicinity of the management area, which lends support for listing some species (list revised, 6/2000).

Reptiles

1. Western Pond Turtle	*Clemmys marmorata*
2. Western Rattlesnake	*Crotalus viridis*
3. Common Kingsnake	*Lampropeltis getulus*
4. Ringneck Snake	*Diadophis punctatus*
5. Sharp-tailed Snake	*Contia tenuis*
6. Racer	*Coluber constrictor*
7. Pacific Gopher Snake	*Pituophis melanoleucus*
8. Rubber Boa	*Charina bottae*
9. Western Aquatic Garter Snake	*Thamnophis couchi*
10. Western Terrestrial Garter Snake	*Thamnophis elegans*
11. Northwestern Garter Snake	*Thamnophis ordinoides*
12. Common Garter Snake	*Thamnophis sirtalis*
13. Western Skink	*Eumeces skiltonianus*
14. Western Fence Lizard	*Scleroporus occidentalis*
15. Southern Alligator Lizard	*Elgaria multicarinata*
16. Northern Alligator Lizard	*Elgaria coerulea*

Amphibians

1. Bullfrog	*Rana catesbeiana*
2. Western Chorus Frog	*Pseudacris triseriata*
3. Foothill Yellow-legged Frog	*Rana boylei*
4. Northern Red-legged Frog	*Rana aurora*
5. Long-toed Salamander	*Ambystoma macrodactylum*
6. Clouded Salamander	*Aneides ferreus*
7. Ensatina	*Ensatina eschscholtzi*
8. Roughskin Newt	*Taricha granulosa*
9. Western Red-backed Salamander	*Plethodon vehiculum*

to return to the table of contents: Click here, Type a 7 and press enter (or return).

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Appendix B. Plant List

Field inventories conducted on the NBHMA have revealed the presence of the following plant species:

Scientific Name	Common Name	Exotic	Noxious	Status [1]
Abies Grandis	Grand Fir			
Acer Circinatum	Vine Maple			
Acer Macrophyllum	Big Leaf Maple			
Achillea Millefolium Ssp.lanulosa	Common Yarrow	Yes		
Achlys Triphylla	Vanillaleaf			
Adenocaulon Bicolor	Pathfinder			
Adiantum Pedatum	Northern Maidenhairfern			
Agoseris Grandiflora	Large Flowered Agoseris			
Agoseris Heterophylla Var Heterophylla	Annual Agoseris			
Agrostis Alba	BentgrassYes			
Aira Caryophyllea	Silver Hairgrass	Yes		
Alchemilla Occidentalis	Western Lady's Mantle			
Alnus Rhombifolia	White Alder			
Alopecurus Pratensis	Meadow FoxtailYes			
Amsinckia Intermedia	Ranchers Fiddleneck			
Anagallis Arvensis	Scarlet Pimpernel	Yes		
Anemone Deltoidea	Western White Anemone			
Antennaria Racemosa	Raceme Pussy Toes			
Anthemis Arvensis	Field Chamomile	Yes		
Anthemis Cotula	Mayweed Chamomile	Yes		
Anthoxanthum Odoratum	Sweet Vernalgrass	Yes		
Aquilegia Formosa	Red Columbine			
Arabis Koehleri Var. Koehleri	Shrubby Rockcress			Bs
Arbutus Menziesii	Pacific Madrone			
Asarum Caudatum	Wild Ginger			
Astragalus Accidens	Thicket Milk Vetch			
Avena Barbata	Slender Oat	Yes		
Barbarea Verna	Belle Isle Cress	Yes		
Bellis Perennis	English Daisy	Yes		
Berberis Aquifolium	Shining Oregon Grape			
Berberis Nervosa	Dull Oregon Grape			
Blechnum Spicant	Deer-fern			
Boykinia Major	Mountain Boykinia			
Brassica Campestris	Field Mustard	Yes		
Brassica Nigra	Black Mustard	Yes		
Briza Minor	Little Quaking-grass	Yes		
Brodiaea Congesta	Congested Brodiaea			
Brodiaea Hendersonii	Henderson's Brodiaea			
Brodiaea Hyacinthina	Hyacinth Brodiaea			
Brodiaea Pulchella	Field Brodiaea			
Bromus Carinatus	California Brome-grass			
Bromus Mollis	Soft Brome-grass	Yes		
Bromus Rigidus	Ripgut Brome-grassYes			
Bromus Sterilis	Poverty Brome	Yes		
Bromus Tectorum	Cheatgrass	Yes		
Calocedrus Decurrens	Incense Ceder			
Calochortus Tolmeii	Tolmie's Mariposa Lily			
Calypso Bulbosa	Fairy Slipper			

to return to the table of contents: Click here, Type a 7 and press enter (or return).

Camassia Leichtlinii Var. Leichtlinii	Leichtlin's Camas				
Camassia Quamash	Common Camas				
Cardamine Oligosperma	Little Western Bittercress				
Cardamine Pulcherrmia	Slender Toothwort				
Carduus Pycnocephalus	Italian Plumeless Thistle	Yes	Yes		
Carex Athrostachya	Slenderbeak Sedge				
Carex Densa	Dense Sedge				
Carex Deweyana	Dewey Sedge				
Carex Gynodynama					Tr
Carex Obnupta	Slough Sedge				
Carex Pachystachya	Olney's Hairy Sedge				
Carex Serratodens	Saw-tooth Sedge				As
Carex Stipata	Owlfruit Sedge				
Carex Tumulicola	Splitawn Sedge				
Carex Unilateralis	Lateral Sedge				
Ceanothus Cuneatus	Common Buckbrush				
Ceanothus Integerrimus	Deerbrush				
Ceanothus Sanguineus	Redstem Ceanothus				
Centaurea Pratensis	Meadow Knapweed		Yes	Yes	
Centaurea Solstitialis	Yellow Starthistle		Yes	Yes	
Centaurium Umbellatum	Common Centaury		Yes		
Cerastium Arvense	Field Chickweed		Yes		
Cerastium Viscosum	Sticky Chickweed		Yes		
Cerastium Vulgatum	Common Chickweed		Yes		
Chrysanthemum Leucanthemum	Oxeye Daisy		Yes		
Cichorium Intybus	Wild Chicory		Yes		
Cicuta Douglasii	Western Water-hemlock		YesYes		
Circaea Alpina	Enchanter's Night Shade				
Cirsium Arvense	Canada Thistle		Yes	Yes	
Cirsium Remotifolium	Weak Thistle				
Cirsium Vulgare	Common Thistle		Yes	Yes	
Clarkia Quadrivulnera	Small-flowered Clarkia				
Claytonia Lanceolata	Wetern Springbeauty				
Claytonia Parviflora	Streambank Springbeauty				
Claytonia Rubra	Redstem Springbeauty				
Clintonia Uniflora	Queen's Cup				
Collinsia Grandiflora	Large-flowered Blue Eyed Mary				
Collinsia Rattanii	Rattan's Collinsia				
Convolvulus Arvensis	Field Morning Glory		Yes	Yes	
Convolvulus Nyctagineus	Night-blooming Morning Glory				
Corallorhiza Striata	Striped Coralroot				
Cornus Nuttallii	Western Flowering Dogwood				
Cornus Stolonifera Var. Occidentalis	Crest Dogwood				
Corylus Cornuta Var. Californica	Hazelnut				
Crataegus Douglasii	Black Hawthorn				
Crataegus Monogyna	One-seeded Hawthorn		Yes	Yes (Douglas County)	
Crepis Capillaris	Smooth Hawksbeard		Yes		
Cryptantha Intermedia Var. Grandiflora	Common Cryptantha				
Cynoglossum Grande	Pacific Hound's Tongue				
Cynosurus Cristatus	Crested Dogtail Grass		Yes		
Cynosurus Echinatus	Hedgehog Dogtail Grass	Yes			
Cystopteris Fragilis	Brittle Bladder-fern				

to return to the table of contents: Click here, Type a 7 and press enter (or return).

Cytisus Scoparius	Scot's Broom	Yes	Yes	
Dactylis Glomerata	Orchardgrass	Yes		
Danthonia Californica	California Oatgrass			
Danthonia Unispicata	Few-flowered Wild Oatgrass			
Daucus Carota	Wild Carrot	Yes		
Daucus Pusillus	American Carrot			
Delphinium Menziesii	Menzies' Larkspur			
Deschampsia Caespitosa	Tufted Hairgrass			
Deschampsia Elongata	Slender Hairgrass			
Dianthus Armeria	Deptford Pink	Yes		
Dicentra Formosa	Bleedingheart			
Dichelostemma Ida-maia	Firecracker Flower			Tr
Digitalis Purpurea	Foxglove	Yes		
Dipsacus Sylvestris	Common Teasel	Yes		
Dodecatheon Hendersonii	Henderson's Shooting Star			
Draba Verna	Spring Whitlow-grass	Yes		
Dryopteris Arguta	Coastal Shield Fern			
Elymus Glaucus Var. Jepsonii	Western Ryegrass			
Epilobium Angustifolium	Fireweed			
Epilobium Ciliatum	Watson's Willow Herb			
Equisetum Arvense	Common Horsetail		Yes	
Equisetum Hyemale	Common Scouring-rush			
Equisetum Telmateia Var. Braunii	Giant Horsetail		YesYes	
Eremocarpus Setigerus	Turkey Mullein			
Eriogonum Nudum	Barestem Buckwheat			
Eriophyllum Lanatum Var. Achillaeoides	Wooly Sunflower			
Erodium Cicutarium	Stork's Bill	Yes		
Erysimum Asperum	Prairie Rocket			
Erythronium Oregonum	Giant Fawn-lily			
Eschscholzia Californica	Gold Poppy			
Festuca Arundinacea	Tall Fescue	Yes		
Festuca Bromoides	Small Festuca	Yes		
Festuca Californica	California Fescue			
Festuca Idahoensis	Idaho Fescue			
Festuca Megalura	Foxtail Fescue			
Festuca Microstachys	Small Fescue	Yes		
Festuca Occidentalis	Western Fescue			
Festuca Roemeri	Roemer's Fescue			
Festuca Rubra	Red Fescue			
Fragaria Vesca Var. Bracteata	Woods Strawberry			
Fragaria Vesca Var. Crinita	Woods Strawberry			
Fraxinus Latifolia	Oregon Ash			
Fritillaria Lanceolata	Mission Bells			
Galium Aparine				
Gaultheria Shallon	Salal			
Geranium Carolinianum	Carolina Geranium			
Geranium Columbinum	Long-stalked Geranium	Yes		
Geranium Dissectum	Cut-leafed Geranium	Yes		
Geranium Molle	Dovefoot Geranium	Yes		
Geum Macrophyllum Var. Macrophyllum	Oregon Avens			
Gilia Capitata Var. Capitata	Bluefield Gilia			
Glyceria Elata	Tall Manna Grass			
Heracleum Lanatum	Cow Parsnip			

to return to the table of contents: Click here, Type a 7 and press enter (or return).

Hieracium Albiflorum	White Flowered Hawkweed		
Holcus Lanatus	Common Velvetgrass	Yes	
Holodiscus Discolor	Creambush Ocean-spray		
Hordeum Brachyantherum	Meadow Barley		
Hordeum Jubatum	Squirreltail Barley		
Hordeum Murinum	Mouse Barley	Yes	
Hypericum Perforatum	Common St. Johns Wort	Yes	Yes
Hypochaeris Glabra	Smooth Cats Ear	Yes	
Hypochaeris Radicata	Spotted Cats Ear		
Iris Chrysophylla	Slender Toothed Iris		
Iris Tenax	Oregon Iris		
Juncus Bufonius	Toad Rush		
Juncus Effusus	Common Rush		
Juncus Patens	Spreading Rush		
Juncus Tenuis	Poverty Rush		
Lamium Purpureum	Purple Dead Nettle	Yes	
Lathyrus Aphaca	Yellow Pea	Yes	
Lathyrus Sphaericus	Grass Peavine	Yes	
Lemna Minor	Water Lentil		
Ligusticum Apifolium	Celery-leafed Lovage		
Limnanthes Douglasii	Douglas' Meadowfoam		
Linanthus Bicolor	True Babystars		
Linnaea Borealis Var. Longiflora	Western Twinflower		
Linum Angustifolium	Narrow-leafed Flax	Yes	
Lithophragma Bulbifera	Bulbiferous Fringecup		
Lithophragma Parviflora	Small Flowered Fringecup		
Lolium Multiflorum	Italian Ryegrass	Yes	
Lolium Perenne	English Ryegrass	Yes	
Lolium Rigidum	Wimmera Ryegrass	Yes	
Lomatium Hallii	Hall's Lomatium		
Lomatium Utriculatum	Common Lomatium		
Lonicera Hispidula	Hairy Honeysuckle		
Lotus Corniculatus	Birdsfoot-trefoil	Yes	
Lotus Micranthus	Small-flowered Deervetch		
Lotus Pinnatus	Meadow Deervetch		
Luina Nardosmia Var. Glabrata	Silvercrown Luina		
Lupinus Bicolor	Two-color Lupine		
Luzula Campestris	Field Woodrush		
Lythrum Hyssopifolia	Hyssop Loosestrife		
Madia Madioides	Woodland Tarweed		
Maianthemum Stellatum	Starry False Solomon's Seal		
Malva Neglecta	Common Mallow		
Marah Oreganus	Oregon Wild Cucumber		
Matricaria Matricarioides	Pineapple Weed		
Medicago Arabica	Spotted Medick	Yes	
Melica Geyeri	Geyer's Oniongrass		
Melica Harfodii	Harfords Melic		
Melica Spectabilis	Purple Oniongrass		
Melica Subulata	Alaska Oniongrass		
Mentha Pulegium	Pennyroyal	Yes	
Micropus Californicus	Slender Cottonweed		
Mimulus Alsinoides	Chickweed Monkey-flower		
Mimulus Guttatus Var. Depauperatus	Yellow Monkey-flower		
Monardella Odoratissima	Monardella		

to return to the table of contents: Click here, Type a 7 and press enter (or return).

Montia Fontana	Water Chickweed			
Montia Sibirica	Sibirian Montia			
Myosotis Discolor	Yellow and Blue Foget-me-not	Yes		
Navarretia Intertexta Var. Intertexta	Needle-leaf Navarretia			
Nemophila Menziesii Var. Atomaria	Baby Blue-eyes			
Nemophila Parviflora	Small-flowered Nemophila			
Orthocarpus Attenuatus	Narrow-leaved Owl-clover			
Osmorhiza Chilensis	Mountain Sweet-root			
Oxalis Suksdorfii	Western Yellow Oxalis			
Pachistima Myrsinites	Oregon Boxwood			
Parentucellia Viscosa	Yellow Parentucellia		Yes	
Pellaea Andromedaefolia	Coffee-fern			As
Perideridia Erythrorhiza	False Caraway			Bs
Perideridia Howellii	Howell's False Caraway			Tr
Phacelia Capitata	Scorpionweed			
Phacelia Hastata	Silverleaf Phacelia			
Phacelia Heterophylla Var. Heterophylla	Varileaf Phacelia			
Philadelphus Lewisii	Mock Orange			
Phoradendron Villosum	Mistletoe			
Physocarpus Capitatus	Pacific Ninebark			
Pinus Ponderosa	Ponderosa Pine			
Piperia Unalascensis	Alaska Rein Orchid			
Pityrogramma Triangularis	Goldback Fern			
Plagiobothrys Hirtus	Rough Popcorn Flower			Fp
Plagiobothrys Nothofulvus	Rusty Plagiobothrys			
Plantago Lanceolata	Buckhorn PlantainYes			
Plantago Major Var. Major	Common Plantain			
Plectritis Congesta	Rosy Plectritus			
Poa Annua	Annual Bluegrass		Yes	
Poa Bulbosa	Bulbous Bluegrass		Yes	
Poa Pratensis	Kentucky Bluegrass		Yes	
Polypodium Glycyrrhiza	Licorice-fern			
Polypodium Hesperium	Licorice Fern			
Polypogon Interruptus	Ditch Polypogon		Yes	
Polypogon Monspeliensis	Annual Rabbitsfoot GrassYes			
Polystichum Munitum	Common Sword Fern			
Potentilla Gracilis Var. Gracilis	Slender Cinquefoil			
Prunus Subcordata	Western Plum			
Prunus Virginiana Var. Demissa	Western Chokecherry			
Pseudotsuga Menziesii	Douglas Fir			
Psilocarpus Tenellus Var. Tenellus	Slender Woolly-head			
*Pteridium Aquilinun Var. Pubescens*Bracken Fern				
Quercus Garryana	Oregon White Oak			
Quercus Kelloggii	Kellogg's Oak			
Ranunculus Lobbii	Lobb's Water-buttercup			
Ranunculus Muricatus	Spiny-fruit Buttercup			
Ranunculus Occidentalis Var. Occidentalis	Western Buttercup			
Ranunculus Orthorhynchus	Straightbeak Buttercup			
Ranunculus Uncinatus	Little Buttercup			

to return to the table of contents: Click here, Type a 7 and press enter (or return).

Rhamnus Purshiana	Cascara			
Rhus Diversiloba	Poison Oak			
Ribes Sanguineum	Red Currant			
Romanzoffia Californica	California Mistmaiden			
Romanzoffia Thompsonii	Thompson's Mistmaiden			Bs
Rorippa Curvisiliqua Var. Curvisiliqua	Western Yellowcress			
Rorippa Nasturium-aquaticum	Water-cress	Yes		
Rosa Eglanteria	Sweetbriar	Yes		
Rosa Gymnocarpa	Little Wild Rose			
Rubus Discolor	Himalayan Blackberry	Yes		
Rubus Laciniatus	Evergreen Blackberry	Yes		
Rubus Leucodermis	Blackraspberry			
Rubus Parviflorus	Thimbleberry			
Rubus Ursinus	Pacific Blackberry			
Rumex Acetosella	Field Sorrel	Yes		
Rumex Crispus	Curley Dock	Yes		
Sambucus Cerulea Var. Cerulea	Blue Elderberry			
Sanguisorba Minor	Garden Burnet	Yes		
Sanicula Bipinnatifida	Purple Sanicle			
Sanicula Crassicaulis Var. Crassicaulis	Pacific Sanicle			
Sanicula Crassicaulis Var. Tripartita	Pacific Sanicle			
Satureja Douglasii	Yerba Buena			
Saxifraga Gormanii	Gorman's Saxifrage			
Saxifraga Howellii	Howell's Saxifrage			
Saxifraga Integrifolia	Swamp Saxifrage			
Saxifraga Nuttallii	Nuttall's Saxifrage			
Sedum Spathulifolium	Broad-leafed Stonecrop			
Selaginella Wallacei	Wallace's Selaginella			
Senecio Jacobaea	Tansy Ragwort	Yes	Yes	
Senecio Vulgaris	Common Groundsel	Yes		
Sherardia Arvensis	Blue Field Madder	Yes		
Sidalcea Virgata	Rose Checker Mallow			
Silene Gallica	Windmill Pink	Yes		
Silene Hookeri Ssp. Hookeri	Hooker's Silene			
Silybum Marianum	Milkthistle	Yes	Yes	
Sisyrinchium Angustifolium	Narrowleaf Blueeyed Grass			
Sisyrinchium Bellum	Blue-eyed Grass			
Sisyrinchium Douglasii	Grass Widows			
Sisyrinchium Hitchcockii	Hitchcocks Blue-eyed Grass			Bs
Smilacina Stellata	Starry False Solomon's Seal			
Sochus Asper	Prickly Sowthistle	Yes		
Spergularia Rubra	Red Sandspurry	Yes		
Stachys Rigida	Rigid Hedge Nettle			
Stellaria Crispa	Crisped Starwort			
Stellaria Media	Common Chickweed	Yes		
Stipa Lemmonii	Lemmon's Needlegrass			
Symphoricarpos Albus Var. Laevigatus	Common Snowberry			
Symphoricarpos Mollis Var. Hesperius	Creeping Snowberry			
Synthyris Reniformis	Snow Queen			
Taeniatherum Asperum	Medusahead Wildrye	Yes		

to return to the table of contents: Click here, Type a 7 and press enter (or return).

Tanacetum Vulgare	Common Tansy	Yes	
Taraxacum Laevigatum	Red Seeded Dandelion	Yes	
Taraxacum Officinale	Common Dandelion	Yes	
Tellima Grandiflora	Fringecup		
Thalictrum Occidentalis	Western Meadowrue		
Thysanocarpus Curvipes	Sand Fringepod		
Tillaea Erecta	Erect Pygmy Weed		
Tolmiea Menziesii	Youth on Age		
Tonella Tenella	Small-flowered Tonella		
Torilis Arvensis	Field Hedge-parsley	Yes	
Tragopogon Dubius	Yellow Salsify	Yes	
Trentalis Latifolia	Western Starflower		
Trifolium Angustifolium	Narrow-leaved Clover	Yes	
Trifolium Bifidum	Notchleaf Clover		
Trifolium Ciliolatum	Foothill Clover		
Trifolium Dubium	Least Hop Clover	Yes	
Trifolium Eriocephalum Var. Eriophalum	Woolly-head Clover		
Trifolium Macraei	Macrae's Clover		
Trifolium Microcephalum	Smallhead Clover		
Trifolium Pratense	Red Clover	Yes	
Trifolium Repens	White Clover	Yes	
Trifolium Subterraneum	Subterranean Clover	Yes	
Trifolium Tridentatum	Sand Clover		
Trifolium Variegatum	White-tip Clover		
Trillum Ovatum	Western Trillum		
Typha Latifolia	Cattail		
Umbellularia Californica	California Laurel		
Urtica Dioica Var. Layallii	Lyall Nettle		
Vancouveria Hexandra	White Inside-out-flower		
Veratrum Insolitum	Siskiyou False Hellebore		
Verbascum Blatteria	Moth Mullein	Yes	
Verbascum Thapsus	Common Mullein	Yes	
Veronica Americana	American Brooklime		
Veronica Arvensis	Wall Speedwell	Yes	
Vicia Cracca	Bird Vetch	Yes	
Vicia Hirsuta	Tiny Vetch	Yes	
Vicia Sativa	Common Vetch	Yes	
Vicia Tetrasperma	Slender Vetch	Yes	
Viola Howellii	Howell's Violet		
Whipplea Modesta	Whipplevine		
Woodwardia Fimbriata	Giant Chain Fern		
Xanthium Spinosum	Spiny Cocklebur	Yes	Yes
Zigandenus Venenosus	Meadow Death Camas		

[1] Status
BS - Bureau Sensitive
TR - Tracking Species
AS - Bureau Assessment Species
FP - Federally Protected (proposed Endangered)

to return to the table of contents: Click here, Type a 7 and press enter (or return).

to return to the table of contents: Click here, Type a 7 and press enter (or return).

Appendix C. NBHMA Grazing Plan

This Grazing Plan is designed to provide analytical assumptions and information for analysis of environmental effects. Grazing is designed to improve forage quality and availability for CWTD in the summer to fall seasons, because mid to late summer and fall forage is limiting deer survival over winter (Mires, Black and Peterson). Grazing practices would comply with *Standards for Rangeland Health and Guidelines for Livestock Grazing Management for Public Lands Administered by the BLM in the States of Oregon and Washington* (1997).

Grazing treatments will be phased in, with full implementation anticipated in six to ten years. Grazing would occur on fewer than 2000 acres per year with full implementation. The following is an initial treatment plan. As treatments are implemented, they will be monitored for vegetative response. After three years of treatments and evaluation, grazing would be adjusted to improve benefits to CWTD. Adjustments to grazing could include changes in stocking rate, discontinuation of grazing and/or expansion of grazing treatments to other drainages.

Two types of grazing treatments (intensive and extensive) would be used. Initial stocking rates were taken from the Douglas County Soil Survey. They are based on the potential soil productivity with intensive management practices like reseeding and fertilizing. For sustainable yield on less intensively managed land, one half of the stocking rate listed in the soil survey is recommended (Walt Barton, personal conversation). Many of the soil types identified on NBHMA do not have recommended stocking rates, so similar soils with the same vegetation type were used for initial stocking rates. Stocking rates are described as Animal Unit Months or AUM's per acre. Recommended rates range from 2-3 to 6 AUM's per acre for each vegetation type. An AUM is the amount of forage needed by a cow with a calf for one month. Actual forage production will vary from year to year due to biological, climatic and management factors. It will be measured annually and stocking rates adjusted to meet vegetation management objectives. Up to 50% of annual forage production could be removed without reducing long term productivity of the plants (Dietz, 1988.). Grazing treatments would be conducted at or below this level.

Table 1 shows estimated forage production potential for the major soil type in each vegetation type. The table shows a conservative estimate of forage production as smaller acreage with higher productivity were included in each vegetation type. Actual forage production will vary from year to year due to biological, climatic and management factors. Production would be measured annually and stocking rates adjusted to meet vegetation management objectives.

Table 1. Acreage Identified for Grazing Treatments with Projected Forage Production

Vegetation Type	Acres	Forage Production from major soil type in AUM's?Acre	Total Forage Production Acres X AUM's/Acre
Grassland	1053	2-3	2106-3159
Oak Savannah	631	2-3	1262-1893
Oak Woodland	1144	2-3	2288-3432
Hardwood/Conifer	804	3	2412
Total	3632		8068-10896

Intensive grazing would be conducted on highly productive grasslands with forage production potential of three to six Animal Unit Months (AUM's) per acre (Douglas County Soil Survey). An initial stocking rate of 1.5 AUM's per acre or 75 total AUM's (the equivalent of 75 cows for one month) would be used. Intensive grazing treatments use temporary fence to create two to six grazing cells for high-intensity, short-duration grazing. Livestock would be in each cell for up to15 days per year, leaving 350 days per year for plant regrowth and recovery. Intensive grazing concentrates animals to minimize selectivity. This effectively reduces coarse and standing dead material and would also result in more palatable, nutritious succulent regrowth in summer and fall. Grazing would start in early summer after soils have dried sufficiently to minimize soil impact, but while there is enough moisture for vigorous regrowth of grasses and forbs. Livestock would be closely monitored and would not have access to streams or streamside rehabilitation projects. Water would be pumped or trucked into troughs within each grazing cell.

to return to the table of contents: Click here, Type a 7 and press enter (or return).

Extensive grazing would be conducted by drainage. See map of proposed primary fences (Figure 10). Forage production potential is two to six AUM's per acre (Douglas County Soil Survey). A stocking rate of one AUM per acre of Grassland/Savannah/Oak Woodland would be used. Grazing would be lower-intensity, longer-duration (up to 120 days per grazing unit) than intensive grazing cells. Treatment would be in the fall, after green-up, or in early spring. Livestock would be controlled by herding or fencing. Fencing would be used to enclose or subdivide drainages and exclude sensitive areas. Some riparian areas may be grazed as riparian areas are least attractive to livestock at his time (Borman, personal conversation).

Table 2. Proposed Grazing Treatments, Acreage and AUM's for First Six Years

Year	1	2	3	4	5	6
Blacktail Drainage	IG- 50Ac	IG- 50Ac	IG- 50Ac			IG- 50Ac EG- 400 Ac
Lower Jackson		EG- 140 Ac	EG- 140 Ac		EG- 360 Ac	
Overlook		EG- 250 Ac		EG- 250 Ac		EG- 250 Ac
Whitetail Creek			IG- 50 Ac EG- 610 Ac	IG-50 Ac EG- 610 Ac		IG-50 Ac EG- 610 Ac
Barney Creek				EG-360 Ac	EG- 360 Ac	
West Jackson					EG- 190 Ac	
Soggy Bottoms					EG- 260 Ac	
Chasm						
Annual Acres	50	440	850	1270	1170	1360
Annual AUM's	75	465	875	1295	1170	1410

IG = Intensively graze EG = Extensively graze

Implementation year one

1. Intensively graze approximately 50 acres in Blacktail Drainage.

Implementation year two

1. Continue intensive grazing strategy in Blacktail Drainage.
2. Extensively graze approximately 140 acres of Lower Jackson - Use herding or temporary fence to control livestock.
3. Begin extensive grazing on Overlook. A stocking rate of 1 AUM per acre or the equivalent of 83 cows for three months would be used initially. Herd livestock or build fence.

Implementation year three

1. Continue intensive grazing strategy in Blacktail Drainage.
2. Continue extensive grazing treatment on Lower Jackson.
3. Begin intensive grazing on approximately 50 acres in Whitetail Drainage.
4. Extensively graze approximately 610 acres in Whitetail Drainage - Use herding or permanent fencing to enclose Whitetail Drainage. A stocking rate of 1 AUM per acre of Grassland/Savannah/Oak Woodland or the equivalent of 220 cows for three months would be used. Herd livestock or build fence.

Implementation year four

1. Continue extensive grazing on Overlook.
2. Extensively graze approximately 610 acres in Whitetail Drainage.
3. Continue intensive grazing on approximately 50 acres in Whitetail Drainage
4. Begin extensive grazing on Barney Creek. A stocking rate of 1 AUM per acre Grassland/Savannah/Oak Woodland or the equivalent of 120 cows for three months would be used. Herd livestock or build fence.

to return to the table of contents: Click here, Type a 7 and press enter (or return).

Implementation year five

1. Expand extensive grazing treatment on Lower Jackson. A stocking rate of 1 AUM per acre Grassland/Savannah/Oak Woodland or the equivalent of 120 cows for three months would be used. Herd livestock or build fence.
2. Continue extensive grazing on Barney Creek.
3. Initiate extensive grazing on West Jackson and Soggy Bottoms. Herd livestock or build fence.

Implementation year six

1. Repeat Intensive grazing on approximately 50 acres in Blacktail Drainage.
2. Initiate Extensive grazing on Blacktail Drainage. Herd livestock or build fence.
3. Repeat Extensive grazing on Overlook.
4. Repeat Intensive and Extensive grazing treatment on Whitetail Creek.

Grazer Selection. Kind and class of livestock were evaluated for thatch reduction, dietary overlap, herding or fencing needs. Yearling to adult cattle would have the highest likelihood of meeting objectives for Vegetation Management as they will utilize grass that is of little value to CWTD. Yearlings tend to be more mobile than cows with calves and would utilize uplands more effectively. Deer friendly fences will hold yearling or older cattle. Cattle are grazers and their diet consists primarily of grass, so dietary overlap with CWTD is minimized. Sheep and goats could be used, but their preference for forbs and shrubs overlap with CWTD preference. Fences needed to contain these animals would be more likely to impede deer movement. More exotic domesticated animals like llamas and alpacas were not considered due to availability.

Table 3. Grazer Selection Rationale

Animal Type	Primary Diet	Thatch reduction	Dietary overlap with CWTD	Can be herded	Contained with Deer friendly fencing?
Cattle	Grass	higher	low	yes	yes
Sheep	Forbs/grass/shrubs	lower	high	yes	no
Goats	Shrubs/forbs	lower	high	yes	no

Grazing Units -Grazing units were delineated by drainage. If fences are used to manage livestock, they will follow drainage boundaries and tend to be on ridges. Cross fencing may be installed to subdivide the drainages and improve vegetation management by controlling livestock. Fences will be built as needed.

Handling Facilities - Corrals and livestock handling facilities could be temporary or permanent structures. If permanent structures are built, sites have been identified for these facilities, one on the east side near the main barn and one on the west side approximately 1/4 mile from the west gate. Selected locations are out of riparian or sensitive areas.

Livestock Distribution- In addition to herding and fencing, livestock would be distributed by salt or mineral blocks and water developments or troughs. (Holechek pg 274-5).

Exclusion Areas -730 acres would be permanently excluded from grazing due to the difficulty of managing livestock in those areas. Special Status plant sites and targeted noxious weed sites would also be excluded from grazing by herding, season of use, or with temporary fencing. Fencing or herding would be used to exclude livestock from fish-bearing streams, natural springs, sensitive riparian areas (head cuts, unstable stream banks, and sites of recent improvements [seedings, stream restoration, and erosion control structures]).

to return to the table of contents: Click here, Type a 7 and press enter (or return).

to return to the table of contents: Click here, Type a 7 and press enter (or return).

Appendix D. Response to Comments

Introduction

The public comment period for the Draft Environmental Impact Statement for the North Bank Habitat Management Area/ ACEC began December 28, 1999 and closed February, 28, 2000. The Roseburg District received 28 letters containing 124 comments concerning the Draft EIS. Letters were received from agencies, officials, scientists, organizations and individuals. A list individuals who commented may be found in Chapter 5.

The comments are presented in alphabetical order by topics. Topics are ACEC, Alternatives, Fire, Grazing, Monitoring, Noxious Weeds, Recreation, Soils, Timber, Water and Wildlife.

ACEC

Comment: The RMP prohibits ATV use, road construction in ACECs.

Response: Motorized use will be limited to official use year-round on 6581 acres of public land within the North Bank Habitat Management Area. Motorized use will be closed to the general public and official use will be allowed as determined by the Authorized Officer." (RMP pg 59)
Road construction is not prohibited in ACECs (Areas of Critical Environmental Concerns). Road construction is, however, prohibited in ACEC/RNA (Areas of Critical Environmental Concerns/Research Natural Area) (RMP pg 59). The NBHMA is not designated as a ACEC/RNA (RMP pg. 89, Table 5).

Comment: The NBHMA should have a mineral withdrawal because it is an ACEC.

Response: The RMP specifically require ACEC/RNA to have a mineral withdrawal (RMP pg 51). The NBHMA is an ACEC, but is not a Research Natural Area, therefore a mineral withdrawal is not required.

Alternatives

Comment: Alternative B does not include stream restoration..

Response: Stream restoration has been added to alternative B in the FEIS. The extent of rehabilitation is less than alternative C because heavy equipment (used in reshaping deeply incised stream banks and placing large wood) would be restricted to existing roads. Planting trees to establish a canopy cover would be similar under Alternatives B and C.

Comment: BLM needs to have an alternative that excludes grazing, timber harvest, minimal facility development and meets the needs of CWTD.

Response: Alternative B has been modified in the FEIS. Alternative B excludes grazing, timber harvest and fertilization. Facility development under this alternative is minimal.

Comment: FEIS needs to state whether the alternatives are in compliance with the RMP (NFP).

Response: The FEIS proposes alternatives that are intended to be in compliance with the RMP (NFP). Analysis if the relationship of the alternatives to the Aquatic Conservation Strategy Objectives has been added to the FEIS. The decision maker will determine, in the Record of Decision, if proposed management actions are in compliance with RMP. If the decision maker determines an action is not in compliance, the action will be dropped or a plan amendment will be done before the action is implemented.

Comment: There needs to be public involvement in plan amendments or revisions of the RMP that are associated with the

to return to the table of contents: Click here, Type a 7 and press enter (or return).

proposed alternatives. The plan amendments should be completed before the EIS is finalized.

Response: The responsible official will determine if a plan amendment is needed. That determination will be documented in the Record of decision. The public will have opportunities to be involved on proposed plan amendments as set forth in BLM Planning Regulations (43 CFR 1600).

Comment: BLM must survey for Survey and Manage species before any ground disturbing activities.

Response: The Alternatives have been revised so that management actions in the NBHMA will be in compliance with the RMP for Survey and Manage Species.

Comment: What are the cumulative impacts on the NBHMA?

Response: Cumulative effects analysis is contained and imbedded in the discussions of environmental consequences in the FEIS.

Fire

Comment: Air quality analysis is inadequate. What are the estimated emissions from planned burns? Any smoke sensitive areas (Class I) nearby? What actions will be taken to mitigate smoke intrusions? How will the public be notified, etc.

Response: All prescribed burning will be conducted consistent with the Federal Clean Air Act, the Oregon Department of Environmental Quality's (DEQ) Smoke Management Plan, as administered at local levels by The Oregon Department of Forestry (ODF). Generally a separate, site specific prescribed fire plan would be completed for each burn. It would determine ignition techniques and sequences needed to meet the resource objectives set forth in the HMP. The burn plan would also describe measures to reduce smoke emission such as burning when light fuels are dryer allowing more complete combustion. Burning will be done during periods of unstable atmospheric conditions which will help disperse the smoke.

On average 400 to 600 acres of prescribed fire per year is projected. Most of the burning will involve pasture burning with some underburning of ground fuel in oak-savanna types. Pasture burning would generally be completed during DEQ's "open burning season". Burning in pastures will produce a fuel consumption rate of 1.5 - 2.5 tons per acre. The average size of the pasture burn will be 200-300 acres. Particulate matter emissions (PM10) produced by pasture burning would be approximately 10 pounds per ton of grass, a relatively low number and much less than for burning wood slash (Mike Ziolko DEQ). The season for burning will be mid to late summer, so the 2 or 3 burns per summer will probably be spread over a 2 month period. Impacts from the smoke will be local in nature, short in duration, and have minimal impacts on the regional airshed.

The nearest Class I areas are Diamond Peak Wilderness and Crater Lake National Park (recreation areas) which are approximately 80 miles east of the management area (RMP). Roseburg, Oregon is a designated area (DA) in which smoke management activities are closely followed by ODF. Roseburg is currently in compliance with both state and federal clean air standards. Burning during weather conditions which allow for good dispersion and using transport winds to carry smoke away from population centers is planned. The adjacent landowners will be notified prior to ignition. Pasture burning is a common occurrence during the late summer months and ODF notifies the public through news releases and public notices published in the local newspaper.

Other alternatives to burning have been considered and are proposed. Grazing and mowing are two such alternatives.

Comment: Lack of description of size of burns and return intervals. Some research suggests prescribed fire may produce temporary reductions in forage availability.

Response: The DEIS should state that the average pasture burn (grasslands) will be 200-300 acres. Perhaps 400 to 600 acres of prescribed fire treatment would be used each year. The interval between burns would be 3-8 years depending the selected alternative. Burning in the oak - savanna and oak - woodlands will probably require smaller scale burn units due to increased risk of escape.

to return to the table of contents: Click here, Type a 7 and press enter (or return).

Burning will be done in the late summer before the advent of Fall rains. Burning when soil moisture is low, and plants are severely stress can result in reduced forage yields and other undesirable effects leading to soil erosion. The perennial grasses targeted for burning will be dormant and have growing point at or below the soil surface. The Fall rains will arrive shortly after burning, increasing soil moisture. Grass yields are expected to increase because the burn has blackened the soil, allowing it to warm more quickly and stimulate earlier plant growth. Competing weeds are also suppressed as a result of prescribed fire (Nebraska Cooperative Extension). The benefits of prescribed fire can include: increasing grass nutritive quality, palatability, availability and yield, improving wildlife habitat, while reducing hazardous fuels, suppressing unwanted plants.

Grazing

Comment: Livestock grazing has known negative impacts, including impacts to sensitive areas including Riparian Reserves not analyzed in the DEIS.

Response: Analysis of the effects of grazing has been added to the FEIS.

Comment: Livestock can damage unknown rare plant sites.

Response: Surveys to locate rare plants sites would be conducted prior to grazing treatments. These sites would be protected by fencing or deferring treatments until rare plants or their habitat are not susceptible to damage by livestock.

Comment: Will vegetation management treatments particularly grazing occur on the whole area?

Response: All vegetation management treatments combined (including grazing, seeding, prescribed burns, thinning and fertilization) will limited to 2000 acres per year, leaving more than two thirds of the NBHMA untreated each year. Livestock will be permanently excluded from more than 740 acres.

Comment: DEIS does not analyze why grazing is needed in addition to prescribed fire.

Response: This analysis has been added the FEIS.

Comment: There is no credible research that supports the use of hoof action to prepare seedbeds, scientific data supports the opposite (Gelbard and Belsky).

Response: There is a substantial amount of research that supports the use of hoof action to increase seeding success. For example Winkle, et al. says “Favorable microsites for seedling establishment are described as “safesites.” “Safesites may occur naturally as cracks and depressions in the soil surface, gravel, plant litter or be prepared by seed bed equipment and livestock trampling”, “artificial microsites produced by livestock trampling and mechanical seedbed preparation [are] more favorable for germination than the bare soil surface.” Stoddard and Smith also discuss this technique in Range Management, “sheep are often passed over an area, after or before, broadcast seeding to loosen the soil and cover the seed”.

Comment: BLM should use native species when seeding.

Response: Site adapted native grasses will be used in reseeding projects, where they are practicable. Native grass seed has already been collected from the North Bank Habitat Management Area for propagation and replanting.

Comment: Current science disagrees with claim that grazing “will improve riparian and wetland habitat”(Gelbard and Belsky). “... restablishment of natives perennials is most likely to result from the elimination of livestock in high rainfall areas or in habitats characterized by high soil moisture availability.”

Response: The scientific evidence shows that overgrazing is detrimental to riparian zones, but well managed livestock can graze and improve riparian vegetation. Successful Strategies for Grazing Cattle in Riparian Zones, a BLM Technical Bulletin, reviews a variety of articles/publications on grazing riparian areas. These references include case studies of riparian areas that have been enhanced by grazing management, considerations for successful riparian grazing strategies and livestock management for maintaining and restoring riparian functions.

to return to the table of contents: Click here, Type a 7 and press enter (or return).

In the 1970's William Platts, a leading researcher on the impact of grazing on fish habitat, did not believe there were "any widely used livestock grazing strategies that were completely capable of maintaining high levels of forage use while rehabilitating damaged streams and riparian zones". By 1986 Platts, admitted that those conclusions no longer apply (Ehrhart 1997).Scientific and popular literature contain numerous examples of the damage livestock can do to riparian areas. It is clear that improper livestock grazing can affect the riparian stream habitat. However, "improper riparian grazing" and "riparian grazing" are not synonymous. With site specific management many pastures containing a variety of riparian types may be grazed without adversely impacting the health of the riparian area.

Comment: Where will livestock be quarantined until weed seeds pass through their gut? What is the impact to that area and cost of feeding during quarantine?

Response: Livestock will not be held in quarantine on the NBHMA, so there will be no impact to holding areas and no cost associated with feeding during holding period. If animals are brought from adjacent areas, and/or utilized before seed set, there is little likelihood of livestock introducing noxious weeds. Feeding livestock weed free forage for 2-3 days is recommended for areas that are relatively weed free- since the NBHMA is already infested with noxious weeds, quarantining animals is unnecessary unless the animals are brought from infested areas at the time when noxious weeds are producing seed.

Comment: Cattle grazing has contributed to the current poor condition of the NBHMA and is unlikely to cause the opposite effect.

Response: Many factors contributed to the current vegetative condition. Without past records and/or research, the causes are only suspected. There is evidence that the condition may be due to causes other grazing. eg Smith found that the herbaceous layer in the interior valleys of the Umpqua River Basin are dominated by undesirable exotic species even where there was no history of grazing. Carefully regulated grazing by domestic livestock can be used to control vegetation types (BLM Manual 9220, Integrated Pest Management) this includes reducing the abundance of undesirable species.

Comment: The number of livestock used to graze the NBHMA was not disclosed. A grazing management plan with limitations is needed.

Response: Projected livestock stocking rates and a grazing plan have been added to the FEIS.

Comments: Livestock could further decrease the cover of native bunchgrasses by injuring their shoots and preferentially grazing native plants (Gelbard and Belsky).

Response: A plant's response to grazing and trampling depends on several factors including the unique characteristics of that species, the time of year, number of times a plant is grazed and the amount of tissue that is removed. Studies show that moderate grazing can increase grass production (Mullahey 1991) and shift the species composition to favor native grasses (Deitz, 1989).

The preference of a grazing animals is dependant on the forage species that are available at a given time. The season during which plants are grazed profoundly influences their desirability to grazers. The same species varies in palatability over the course of the year and studies show that even within the same species on the same site, animal preference varies (Stoddard and Smith pgs 130-136).

Comment: BLM should make clear the purpose and need of grazing.

Response: This has been clarified in the FEIS.

Comment: The DEIS failed to analyze grazing impacts.

Response: Grazing analysis has been added to the FEIS.

Comment: There are no grazing goals in the RMP or DEIS as required by 43 USC 4100.0-8

to return to the table of contents: Click here, Type a 7 and press enter (or return).

Response: The goals of grazing have been clarified in the FEIS. The goals of grazing are to increase availability, palatability and nutritional level of CWTD forage and to manage natural succession to maintain and enhance the suitability of habitat for CWTD.

Comment: The EIS needs to show cost of management activities.

Response: Cost-benefit analysis is not required in the EIS (40 CFR 1502.23).

Comment: BLM does not disclose the purpose of exclusion areas. Proposed exclusion sites are not adequate to use for control sites for monitoring the effects of grazing.

Response: Exclusion areas are not for the purpose of monitoring. These areas exclude grazing from areas that would be difficult to manage livestock or special status plant areas.

Monitoring

Comment: There is no baseline monitoring for vegetation, sediment regimes or noxious weeds. DEIS fails to monitor CWTD populations and population responses to management.

Response: Monitoring is discussed in the FEIS. A detailed monitoring plan will be included as part of the Record of Decision. ODFW will be monitoring CWTD population as part of the delisting process.

Comment: DEIS does not disclose a monitoring budget.

Response: A monitoring budget is not required by NEPA.

Noxious Weeds

Comment: Disturbed sites around water sources, roads, corrals act as conduits for weed spread.

Response: The FEIS acknowledges that disturbed sites may act as weed vectors. Weed control is planned to manage those sites to reduce weed habitat and spread.

Comment: How can grazing control weeds when cattle introduce and spread noxious weeds?

Response: Weed seed dispersal by livestock is minimized by grazing weed infested areas when weeds are not flowering or producing seed. Grazing animals have been used successfully to control noxious weed infestations by reducing weed vigor, seed production and shifting plant communities in favor of desirable species (Sheley 1996). Managing livestock grazing to promote healthy perennial plant communities reduces weed establishment. This discussion has been added to the EIS.

Comment: DEIS does not describe what target plants are subject to herbicide treatment and why it is necessary.

Response: Only noxious weeds are subject to herbicide treatment. These are listed in table 3-2. Herbicide treatment is necessary, as these plants are particularly difficult to control and other methods (manual pulling and biological controls) have been insufficient to achieve an acceptable level of control.

Comment: Road closures should be considered to reduce fire hazard and weed spread.

Response: Roads on NBHMA are closed to public vehicular use. Road use is for administrative use or by special use permit.

Comment: Noxious weed EIS is out of date**.** BLM should consider new information on effects of herbicides and fertilizers on wildlife and water quality. Ewing (1999) found herbicides effect fish. BLM should not spray herbicides within the riparian reserves.

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Response: Two literature reviews were done (EATON 1991, 1999) to determine if there was new scientific information that would lead to a change in the analysis of Supplement Record of Decision for the Northwest Area Noxious Weed Control Program (1987). The results were that there was no new information that would lead to a change in the analysis. Herbicides and application methods used by BLM, were not discussed in Ewing (1999). Best management practices (RMP pg 140) calls for the restricted used of chemicals in riparian reserves. Herbicide use by the BLM is restricted to use on noxious weeds only and application is to targeted plants only.

Recreation

Comment: Equestrian users desire more parking spots for vehicles with horse trailers at the west entrance than is identified in the preferred alternative.

Response: The size of parking lots is designed to limit the number of vehicles that can park within the NBHMA. This is intended to be a design feature which limits the number of people that enter the ranch to minimize impacts on the CWTD. In the FEIS, parking design is changed to accommodate 14 single parking spots or seven oversize units (truck and trailer). Parking spots accommodate two singles, head to head, or one oversize unit (vehicle and trailer), up to the specified 14 singles or seven doubles. The gross area has not been changed, only reconfigured to provide parking options for either single units or vehicles with a trailers.

Comment: Access is limited to the Main Barn Area. by the main gate. The Main gate should be open during daylight hours. Parking for ten vehicles with trailers at the Main Barn is not adequate. If hunters or campers park in the ten spots, there will be no room for horse people to park. There are not enough parking spaces for group functions.

Response: The main gate would be open during daylight hours. Hours for the gate closure and opening will be posted so public users will be aware of opening and closing times. The size of parking lots is designed to limit the number of vehicles that can park within the NBHMA. This is intended to be a design feature which limits the number of people that enter the ranch to minimize impacts on the CWTD.

Comment: Parking at the main entrance (on the County road) is dangerous.

Response: Parking outside the Main gate is not regulated by BLM as it lies within the County Right of Way. After implementation of the plan, five pull-off parking spots will be developed off County road 200 in strategic locations with user safety in mind. The main gate will be open during daylight hours.

Comment: BLM should avoid recreational and facilities development activities that would negatively impact the CWTD.

Response: The alternatives do not propose recreational and facilities development activities that would harm the CWTD. The secondary goal of the NBHMA is to accommodate other uses that are compatible with CWTD and Special Status Species management. Specific activities that could impact the CWTD were considered but eliminated which include public motorized use, campground development, remote control airstrip development and a shooting area.

Comment: There is no mention of gates on existing trails for recreational access. All proposed fencing should provide gates at all trail crossings. Barb wire fences should be 10 feet from trails where they parallel for safety reasons. Minimize interior fencing, if possible to meet management objectives.

Response: The FEIS has been changed in response to this concern. Interior fencing would be used to manage livestock grazing as appropriate to manage habitat for the CWTD.

Comment: Will primitive campers be monitored by parking fees? Will there be designated camp areas with fire pits?

Response: No parking fees are proposed in the immediate future for users of North Bank area. Registration by primitive campers is required for information purposes only. Primitive camping is not be restricted to designated sites. Campsite selection is left to the discretion of the user. However, primitive camping restrictions include: adhering to the Leave No Trace program, complying with fire restrictions during dry seasons. Specifics are to be posted at each parking area.

to return to the table of contents: Click here, Type a 7 and press enter (or return).

Comment: Restrictions should be placed on wintertime horseback and mountain bike riding, and on the number of horses and mountain bikes that use roads. Under the proposed alternative, an unlimited number of mountain bikes and horses are allowed on roads and trails during all weather. The DEIS specifies that some restrictions might be applied in the future in wetlands and sensitive areas. Roads and trails used by horses during the wet season become gullies and are unhikable by foot traffic. BLM should restrict horses and mountain bikes in the wet season now and not wait.

Response: Restrictions on the number of users that can use the North Bank area at any one time are in effect by limitations put on the size of parking areas. Once a lot is full, no additional use is authorized at that location. This also limits large group activities to maintain the primary goal of ensuring habitat for the CWTD and special status species over time.

BLM will improve several travel routes where moisture is currently prevalent. After drainage and run-off problems have been corrected or the route had been hardened through engineering efforts of fiber and rock base materials impacts by horse use will be minimized. In other areas where moisture creates significant soggy areas, horse and mountain bike use will be restricted seasonally.

During the wet season, inclement weather results in a decline of visitor participation in the North Bank area, particularly campers, hikers and mountain bikers. Equestrian use still occurs in limited numbers since this area is considered a low level use area, without snow levels found during the winter at higher elevations on USFS lands.

Soils

Comment: The trampling of livestock creates injurious compaction. Compaction damages plants and causes plant roots to be more concentrated near the soil surface. It also decreases soil infiltration and increases runoff.

Response:. Analysis of grazing and compaction has been added to Chapter 4 of the FEIS.

Comment: The hooves of livestock damages microbiotic soil crusts.

Response: Microbiotic crusts consists of living organisms including cyanobacteria lichens and mosses., their by-products and the soil particles bound together by them. Although they are found in most habitats they do not form prominent nor common features in most environments of western Oregon(grasslands and oak woodlands included) as they do in the arid and semiarid environments of the interior western United States. In these semi-arid and arid environments where a relatively large percentage of ground is naturally exposed between they have important soil stability functions. Nearly all of the scientific research and literature on microbiotic crusts comes from these regions, attesting to their importance there. In the grasslands and woodlands of the NBHMA microbiotic crusts have not been observed (Introduction to Microbiotic Crusts. USDA, Natural Resource Conservation Service Publication, 1997).

Comment: Salt licks will contaminate soil with salt.

Response: Effects of salt licks on soil productivity are inconsequential because pans would be placed under salt blocks and salt blocks would be dispersed

Comment: Cattle holding pens will have to be constructed and the lands under the pens sacrificed permanently to a degraded state. Cattle manure will be prevalent around the most desirable camping spots.

Response: Loss of soil productivity from cattle in holding pens would be inconsequential because of the short duration cattle would be in holding pens and the small areal extent (less than 3 acres or less than 0.5 percent of the NBHMA).

Timber

Comment: Commercial harvest of trees (or trading trees in leu of payment), in ACECs, is prohibited. Logging to improve CWTD habitat is not substantiated by research.

to return to the table of contents: Click here, Type a 7 and press enter (or return).

Response: Areas designated for commercial timber harvest (matrix) are not included in the ACEC. However, commercial timber harvest areas do occur as islands of matrix, connectivity/diversity blocks within the boundaries of the ACEC. Effects of timber harvest on white-tailed dear is inconsequential because of the limited extent 342 acres (less than 0.5% of the NBHMA). The commercial harvest of timber on 342 acres is not part of the ACEC and is not done for the purposes of improving CWTD habitat.

Comment: Matrix lands should be removed from within ACEC.

Response: Matrix lands have been excluded from the ACEC. However, these Matrix, Connectivity/Diversity Block lands occur as islands within the ACEC.

Comment: If 360 acres, of BLM lands, were exchanged for the NBHMA, then 360 acres, not 400, should be managed for timber. It is more important that the DEIS is in compliance with the RMP than EA's.

Response: The FEIS has resolved discrepancies between Exchange EA and RMP.

Comment: Trees harvested on NBHMA should be used to benefit wildlife and stream restoration. An alternative to harvesting trees is to girdle them or cut the trees, leave the boles and burn the crowns.

Response: Harvested trees may be used for stream restoration and wildlife.

Comment: Logging has impacts such as: increased road maintenance, road dust that can reach streams and soil disturbance. BLM needs to analyze impacts of logging.

Response: Site specific environmental analysis will be conducted at the time specific timber harvest is proposed on the 342 acres available for commercial timber harvest on matrix lands. Active timber management on these acres will not occur for 30 years because of the young age of the forest stands.

Wildife

Comment: Does artificial structures include brush piles and feed areas?

Response: Artificial structures include man made structures such as bird boxes, bat houses, nest platforms and could include brush piles.

Comment: The DEIS does not limit or explain the scope of using explosives, or analyze impacts, especially if blasting would occur in Riparian Reserves.

Response: This analysis has been added to the FEIS.

Comment: Loose dogs should not be allowed on the NBHMA at any time of the year. This area will have high public use year around, and everybody has dogs. Dogs will chase deer.

Response: Oregon Administrative Rules regulates use of dogs and harassment of wildlife.

Comment: The amount of fencing, would be detrimental to equestrians, recreationists and possibly to the Columbian White-tailed deer.

Response: Existing fencing would be removed, replaced where needed, or added to other areas in order to maintain control over grazing. Interior fencing and boundary fencing not adjacent to livestock operations would be "deer friendly" compared to the existing woven wire.

Comment: Effects of fertilizers on forage and wildlife has not been adequately addressed.

Response: The analysis of fertilizer on forage and wildlife has been added to the FEIS.

to return to the table of contents: Click here, Type a 7 and press enter (or return).

Comment: Only native species, especially native bunch grasses, should be used for forage plots.

Response: Forage plots are intended to furnish a small area of the most nutritious forages available for CWTD. For the most part, legumes would be used due to their nutritive value and competitive advantage over grasses.

Comment: Effects of cattle grazing on forage plots has not been analyzed. None are in grazing exclusion areas.

Response: Analysis has been added on the effect of controlled livestock grazing on CWTD forage, including forage plots. The two large grazing exclusion areas have little potential to have forage plots developed because of steep topography.

Comment: There is little empirical evidence to support the use of forage plots.

Response: Analysis and supporting information concerning the use of forage plots has been added to the FEIS.

Comment: Hunting should not be allowed due to the potential to kill CWTD.

Response: Hunting is controlled by the Oregon Department of Fish and Wildlife. Analysis in this EIS is limited to effects of the alternatives on CWTD habitat.

Comment: The DEIS did not explain the scope of using explosives or analyze the impacts.

Response: This analysis has been added to the FEIS.

Comment: Loose dogs should not be allowed on the NBHMA at any time of the year because the dogs will chase deer.

Response: Oregon Administrative Rules regulate the use of dogs and the harassment of wildlife.

Comment: The FEIS should state the NBHMA is managed as secure habitat for the CWTD.

Response: A statement on managing the NBHMA as secure habitat has been added to the FEIS, in the Purpose and Need section.

Comment: Proposed management suggest raising the carrying capacity of CWTD. If this is true, it should be stated in the primary goal.

Response: The primary goal is to manage habitat to maintain CWTD. The BLM viewed the evidence of poor CWTD condition (on NBHMA) as a compelling need to improve the habitat to improve condition of CWTD.

Comment: DEIS does not give empirical data or scientific basis to support recreation and facility development being compatible with CWTD.

Response: The effects analysis of recreation and facility development has been strengthened in the FEIS.

Water

Comment: How can BLM comply with the Standards and Guides for Riparian Reserves when there are no Riparian Reserves recognized in the NBHMA?

Response: Riparian Reserves have been recognized in accordance with the RMP and NFP in the FEIS. The action alternatives have been designed to be consistent with standards and guidelines for Riparian Reserves.

Comment: The Clean Water Act forbids Federal Agencies from actively degrading water quality limited streams, and it also forbids Federal Agencies from allowing streams to become further degraded. The proposal to allow grazing units in riparian areas clearly violates this law.

to return to the table of contents: Click here, Type a 7 and press enter (or return).

Response: Grazing would only be used as a management tool to improve habitat for White-tailed deer. The proposed stream and upland riparian treatments specified in the FEIS are intended to rehabilitate degraded streams by limiting sediment, re-vegetating and stabilizing stream banks, thus decreasing stream temperature and improving water quality.

Comment: Diverting water away from streams into artificial enclosures further reduces the summertime flow of degraded streams. This is illegal according to the Clean Water Act, which specifies that streams in degraded condition cannot be further degraded.

Response: The BLM does not propose to reduce stream flow. Crosby, et al. found that storing water and releasing it in the summer months can increase water available during times of low flow. Development of water resources and associated habitat is critical to enhancing conditions on the management areas for CWTD. Additionally, the lack of water in the summer months is the limiting factor in classifying Jackson Creek as "poor" habitat and "opportunities to enhance fisheries habitat should focus on restoring summer flows".

Comments: The BLM is proposing to develop half of the 40 springs on the NBHMA for wildlife and cattle sources. Changing the habitat of 50% of the naturally occurring springs and wetlands was not analyzed in the DEIS.

Response: Alternative C proposes to develop 20 water sources. Six of the 20 water sources would be self contained guzzlers. The effects of the proposed management actions regarding habitat, water quality and the Aquatic Conservation Strategy Objectives have been analyzed in the FEIS.

Comment: The impacts of compaction and related water runoff that are associated with cattle grazing has not been analyzed in the DEIS.

Response: This analysis has been added to the FEIS.

Comment: The negative impacts of roads, specifically erosion and sediment delivery, on water quality has not been adequately analyzed.

Response: This analysis has been strengthened in the FEIS.

Comment: Restoration of deeply down-cut streams should be preferably done with large woody material to improve stream aggredation, headcut and bank stabilization.

Response: A variety of bio-engineering and stabilization methods would be used in stream restoration. These methods may include slope stabilization, grade control structures and placement of large woody materials, root wads and rock.

Comment: Erosion and sedimentation from roads and trails during the rainy season has not been adequately analyzed in the DEIS.

Response: This analysis has been strengthened in the FEIS.

Comment: Proposed restoration of riparian zones in streams is not analyzed in sufficient detail in the DEIS.

Response: Additional details have been added to the FEIS.

Comment: Aquatic Conservation Strategy Objectives should apply to NBHMA.

Response: An analysis of how the alternatives meet the Aquatic Conservation Strategy Objectives has been added to the FEIS. The responsible official will determine, in the Record of Decision, if proposed management actions are in compliance with Aquatic Conservation Strategy. If the responsible official determines an action is not in compliance, the action will be dropped or a plan amendment will be done before the action is implemented.

Comment: Figures showing streams should include stream names.

Response: Streams have been labeled in the FEIS.

to return to the table of contents: Click here, Type a 7 and press enter (or return).

GLIDE RURAL FIRE PROTECTION DISTRICT

Post Office Box 446 • Glide, Oregon 97443
Phone: (541) 496-0224 • Fax: (541) 496-0762

March 3, 2000

Ralph Klein, Team Leader
U.S. Department of the Interior
Bureau of Land Management
777 N.W. Garden Valley Blvd.
Roseburg, Oregon 97470

Re: North Bank Habitat Management Area Draft E.I.S.

Mr. Klein:
Glide Rural Fire Protection District has received a copy of the draft North Bank Habitat Management Area Environmental Impact Statement and Habitat Management Plan. The fire district has a vested interest in both documents and the land being managed in this area.

Glide Rural Fire Protection District is legally responsible for providing service to some or all of the North Bank Habitat Management Area (NBHMA), including but not limited to, fire protection of wildland areas, existing or proposed structures, and vehicles.

Douglas Forest Protective Association (DFPA) assists Glide Rural Fire District in defending life and property from wildland fire situations in this area. This area has been deemed a classic "Mixed Rural Interface" fire protection hazard for the fire district. This places a high risk to our operations in this area. One major problem in delivering service to this area is the lack of water supply for fire protection and poor to non-existent access to the North Umpqua River.

Furthermore, the proposed management plan calls for prescribed burning for control of vegetation. The fire district supports prescribed burning, primarily because it has been proven to reduce the danger to fire fighters, as well as lives, and property of the public. However, prescribed fires have been known to escape the best of defensive lines and this could pose a threat to lives and structures in the area.

In considering the above listed factors, Glide Fire District supports "Alternative C" as the preferred action by the B.L.M. because it will provide an avenue to improve public safety for this area which is lacking in water supply / access for fire protection. Alternative C specifically increases the fire protection for existing structures on public and private lands in the area, including the proposed pavilion, the old Dunning ranch structures, and area homes through reduced drive time to refill fire apparatus.

Glide Fire District requests that if "Alternative C" is selected the proposed boat launch at "Docs Landing" be built to withstand a fire engine that weighs 54,000 pounds and is thirty two feet in length with ample room to access the water by drafting. This is needed because the weight of fire apparatus using the site would be no more than this.

As background information, the fire district would like to add that the residents of the Echo Bend Estates area have been concerned for some time about the lack of water supply for fire protection. The selection of "Alternative C" would be one step towards helping resolve this important public safety issue while at the same time meeting the needs of recreation.

On behalf of Glide Rural Fire District I would like to take this opportunity to thank you for accepting our input on this important issue.

Sincerely,

Sam Phillips
Assistant Fire Chief

cc: file
Fire Chief

to return to the table of contents: Click here, Type a 7 and press enter (or return).

Post-it® Fax Note 7671	Date 3/13/00	# of pages ▶ 13
To Jerry Meyers	From Diane Riley	
Co./Dept.	Co. DEQ	
Phone #	Phone #	
Fax # 541-440-4948	Fax #	

STATE OF IDAHO
DIVISION OF
ENVIRONMENTAL QUALITY

1410 North Hilton • Boise, Idaho 83706-1255 • (208) 373-0502

Dirk Kempthorne, Governor
C. Stephen Allred, Administrator

March 13, 2000

Mr. Ralph Klein
Swiftwater Field Office
Bureau of Land Management
777 NW Garden Valley Blvd.
Roseburg, OR 97470

Dear Mr. Klein:

This letter is in response to the Federal Register (Vol. 64, No. 250; December 30, 1999) notice of availability of the North Bank Habitat Management Area/ACEC Draft Environmental Impact Statement (DEIS). Our comments address air quality issues related to the use of wildland and prescribed fire. We appreciate the need to use prescribed fire as a forest health tool, but this must be done in conjunction with protecting human health and welfare. We request that any wildland and prescribed fires be conducted consistent with the Federal Clean Air Act and any associated federal, state, and local policies and regulations.

The project would involve the use of prescribed burning on up to 2,000 acres per year. Although the project area is a long distance away from Idaho, we have been impacted by smoke transported from as far as western Oregon and northern California. The air quality analysis in the DEIS for this burning is wholly inadequate. For example, what are the estimated emissions from the planned burns? What are the nearby smoke sensitive areas including Class I areas? What actions will be taken to mitigate any smoke intrusions? How will the public be notified of the planned burns? Were alternatives considered and if so, what are the resulting emission reductions? We are enclosing an overview of air quality issues to assist you with expanding your air quality analysis.

We support a coordinated effort between state, interstate, federal, tribal, and local agencies. All planned wildland and prescribed fire activities must include careful consideration of air quality impacts and requirements. We look forward to working with you as you develop the DEIS and at the individual project level as well. Thank you for the opportunity to comment and if you have any questions, please contact me by phone at (208)373-0214, by e-mail at driley@deq.state.id.us, or at the address on the letterhead.

Sincerely,

Diane Riley

Diane Riley
Air Quality Analyst
Air Quality Management Unit

DR/slh C:\HAYLRTT\WP61\DIANE\KLEIN.WPD

Enclosure

cc: COF
Smoke Management File

to return to the table of contents: Click here, Type a 7 and press enter (or return).

Specific Comments on Federal Register Notice Vol. 64, No. 250; December 30, 1999

Idaho Division of Environmental Quality

The Idaho Division of Environmental Quality (DEQ), State Air Quality Program Office specifically, has the primary responsibility to carry out the requirements of the Federal Clean Air Act (CAA) in Idaho. DEQ has a state office in Boise and six regional offices (see Attachment 1). The state office staff oversee air quality compliance and enforcement, and support ambient air quality monitoring and planning activities. The regional office air quality staff issue air quality permits, operate the monitoring sites, conduct source inspections, work with the local communities, handle complaints, and prepare and implement plans.

DEQ is concerned about smoke emissions for several reasons. The state of Idaho is 64 percent federal lands and is surrounded by states where wildland and prescribed fires can be a major source of emissions. The Federal Wildland Fire Management Policy and Program Review Implementation Action Plan Report (May 1996) calls for an expanded program to reintroduce fire in fire-dependent ecosystems. This may mean a ten fold or more increase in the use of wildland and prescribed fire. EPA regulations and policies have increased the need for managing fire emissions. The following paragraphs discuss the most relevant regulatory issues for wildland and prescribed fire.

National Ambient Air Quality Standards

The National Ambient Air Quality Standards (NAAQS) are established by EPA to protect human health and welfare. There are NAAQS for the following six air pollutants: carbon monoxide, ozone, nitrogen dioxide, sulfur dioxide, lead, and particulate matter (see Attachment 2). An area that violates any of the NAAQS is designated nonattainment for the specific NAAQS. Of the six, particulate matter (PM) is the pollutant of most concern for smoke emissions. There are four forms of the PM NAAQS. Prior to July 1997, there were only two, the annual and 24-hour PM_{10} NAAQS. PM_{10} stands for PM less than 10 micrometers in aerodynamic diameter which is equivalent to 1/25,000th of an inch. Last July 1997, EPA promulgated new PM NAAQS. In addition, there is now an annual and 24-hour $PM_{2.5}$ NAAQS. $PM_{2.5}$ stands for PM less than 2.5 micrometers in aerodynamic diameter which is 1/4 the size of PM_{10}. Attainment/nonattainment designations for the new $PM_{2.5}$ NAAQS will begin in the year 2002.

Once an area has been designated nonattainment, DEQ must prepare an attainment plan to meet the NAAQS by EPA specified deadlines. A nonattainment area plan can take several years to complete and generally includes: background information, air quality and meteorological assessments, emissions inventories, control measures, modeled attainment demonstrations, and contingency measures for the specific nonattainment area. Idaho state currently has three nonattainment areas for PM_{10}: Portneuf Valley (Pocatello area); Pinehurst; and Sandpoint. A portion of Kootenai County (Coeur d'Alene area) is a proposed PM_{10} nonattainment area (see Attachment 3). Fort Hall Indian Reservation is a tribal/EPA nonattainment area for PM_{10}. The NAAQS violations are the result of exceedences of the 24-hour PM_{10} NAAQS in the winter as well as an exceedence of the annual PM_{10} NAAQS in Portneuf Valley. These nonattainment areas

to return to the table of contents: Click here, Type a 7 and press enter (or return).

have not had exceedences in over three years and are eligible for redesignation as attainment areas.

There is also a statewide State Implementation Plan (SIP). The statewide SIP includes information on DEQ's general authority to regulate air quality, stationary source permitting, compliance, enforcement, and monitoring programs, nonattainment area plans, rules, statewide emissions inventory, and air stagnation advisories.

Health Effects

$PM_{2.5}$ can lodge deeply in the lungs and are more likely to cause health effects than PM_{10}. The majority of PM from smoke emissions is composed of organic and elemental carbon, and inorganic ash in the $PM_{2.5}$ size class. Toxic gases such as polynuclear aromatic hydrocarbons (PAH) can condense and absorb into particles. DEQ believes that the new $PM_{2.5}$ NAAQS will be more difficult to meet compared to the PM_{10} NAAQS, particularly for wildland and prescribed fire.

Monitoring

DEQ operates an extensive ambient air monitoring network to monitor for the NAAQS (see Attachment 4 and 5). Sites are located in Idaho's major urban areas as well as a few remote areas. The data from DEQ's network is available to the public.

General Conformity

The 1977 CAA amendments made it very clear that the Federal Government is subject to the CAA requirements. Section 118(a) states that any air polluting activity under the jurisdiction of the Federal Government "shall be subject to, and comply with, all Federal, State, interstate, and local requirements, administrative authority, and process and sanctions respecting the control and abatement of air pollution in the same manner, and to the same extent as any nongovernmental entity."

The 1990 CAA amendments added that the above shall apply to any requirement whether substantive or procedural, any fees or charges imposed by state and local agencies to defray program costs, and any federal, state, or local exercise of authority, process, or sanctions. The 1990 amendments also required EPA to establish the transportation and general conformity regulations. The general conformity rule, promulgated in November 30, 1993, applies to non-transportation related federal activities such as prescribed fire. A conformity determination must be made for projects emitting air pollutants over specified de minimis levels to show that the projects will not contribute to any NAAQS violations. If a project is found to contribute to NAAQS violations, then emissions must be reduced or offset (another source's emissions are reduced). Attachment 6 is a table that indicates the de minimis levels for the different nonattainment areas.

to return to the table of contents: Click here, Type a 7 and press enter (or return).

Visibility

The 1977 CAA amendments, section 169A, established the following national visibility goal: "Congress hereby declares as a national goal the prevention of any future, and the remedying of any existing, impairment of visibility in mandatory Class I Federal areas which impairment results from manmade air pollution." One hundred and fifty six Class I areas were established in 1977 and included all national parks greater than 6,000 acres, all wilderness areas greater than 5,000 acres, and a few other areas. Class I areas are subject to the most stringent restrictions on how much additional pollution (increment) can be allowed. States containing Class I areas are to develop state visibility plans including long term strategies and monitoring programs to meet this national goal. Only seven states have approved visibility plans. All other states, including Idaho, are under federal implementation plans. Idaho has all or portions of five Class I areas: Selway-Bitterroot; Hell's Canyon; Sawtooth; Craters of the Moon; and Yellowstone (see Attachment 3).

In the mid-1980's, the IMPROVE (Interagency Monitoring of Protected Visual Environments) network began operation. Currently there are at least 75 sites (see Attachment 7) in or near Class I areas. This network is currently being expanded to include 110 sites. These sites monitor visibility through optical, particle, and visual measurements. This data is also available to the public. The data are used to establish background visibility levels, identify chemical species and emission sources, and document long-term visibility trends for assessing progress toward the national visibility goal.

The 1990 CAA amendments established the Grand Canyon Visibility Transport Commission (GCVTC) which issued a report to Congress with recommendations in 1996 on how to address visibility for 16 Class I areas in the Colorado Plateau. Southwestern Idaho was identified as a clean air corridor for these Class I areas. The Western Regional Air Partnership includes federal, state, tribal, private, and public representatives from ten western states. It was formed to implement the recommendations from the GCVTC report. The recommendations were used by EPA to develop the new regional haze regulations which were published on July 1, 1999. The regulations require all states to develop visibility plans to address regional haze impairment to Class I areas within their state and to Class I areas outside their state which may be affected by emissions from within their state.

Smoke Management

Idaho Code includes two advisory programs related to smoke management. 1) The air quality advisory program is primarily to address woodstove and fireplace emissions during the winter. There are air quality advisory programs in Coeur d'Alene, Pinehurst, Sandpoint, Ada County, and Pocatello. 2) An air stagnation advisory issued by DEQ bans all open burning and can apply to any area in the state experiencing critical air quality levels (IDAPA 16.01.01.550-562). An air stagnation advisory is issued when a NAAQS violation is possible or occurring. There are also restrictions for burning of some materials such as trade waste, residential solid waste, garbage, tires, and plastics (IDAPA 16.01.01.600-616).

to return to the table of contents: Click here, Type a 7 and press enter (or return).

Idaho prefers to have voluntary rather than mandatory smoke management programs. A Memorandum of Understanding (MOU) between DEQ and the U.S. Forest Service (USFS) Regions 1, 4, and 6 has been in effect since 1988. The MOU is an agreement for the agencies to share information with each other. There has been a voluntary smoke management program for forest burning in northern Idaho since 1990. This is a joint program with the state of Montana and operates from September through November. Daily forecasts are made to determine if any restrictions are needed. As of fall, 1999, the program will include southern Idaho and the spring/summer burn seasons for both Montana and Idaho.

EPA released its "Interim Air Quality Policy on Wildland and Prescribed Fires" on May 21, 1998. The objective of the policy is to provide for fire to function naturally in the wildlands while protecting public health and welfare. The policy provides great incentive for states and federal land managers to work together to develop state smoke management programs. The programs, certified by the EPA, can be voluntary or mandatory at the state's choice, and will not be a required component of a SIP. If a NAAQS violation occurs due to wildland or prescribed fire emissions and there is a certified state smoke management program, EPA will have the discretion to not designate an area nonattainment or, if the area is already a nonattainment area, to not require a mandatory smoke management program. The policy specifies required elements of a smoke management program and burn plans including minimizing smoke impacts and considering alternative treatments to fire. In addition, if fire emissions are managed within a state smoke management program, then general conformity requirements are met.

Additional Sources of Information

The USFS has prepared the following documents: "Guidelines for Evaluating Air Pollution Impacts" (1992); "National Strategic Plan for Air Resources Management" (1994); "A Desk Reference for NEPA Air Quality Analysis" (1995); "A Screening Procedure to Evaluate Air Pollution Effects in Region 1 Wilderness Areas, 1991"; "Air Quality Conformity Handbook" (1995); and "When and How to Monitor Prescribed Fire Smoke: A Screening Procedure" (1997). The Interior Columbia Basin Ecosystem Management Project (ICBEMP) draft EIS and supporting documents also contain much information on fire.

The U.S. EPA has prepared the following documents: "Prescribed Burning Background Document and Technical Information Document for Prescribed Burning Best Available Control Measures" (U.S. EPA, 1992); "Interim Air Quality Policy for Wildland and Prescribed Fire" (1998); and "Proposed Regional Haze Regulations" (62FR41138, 7/31/97).

to return to the table of contents: Click here, Type a 7 and press enter (or return).

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 10
1200 Sixth Avenue
Seattle, WA 98101

Reply To
Attn Of: ECO-088

FEB 14 2000

REF #99-006-BLM

District Manager
Roseburg District
Bureau of Land Management
777 NW Garden Valley Blvd.
Roseburg, Oregon 97470

RE: North Bank Habitat Management Area/ACEC

Dear District Ranger:

The Environmental Protection Agency (EPA) has reviewed the Draft Environmental Impact Statement (draft EIS) for the **North Bank Habitat Management Area/ACEC** in accordance with our responsibilities under the National Environmental Policy Act and §309 of the Clean Air Act. The draft EIS analyzes three alternatives for managing the habitat of the Columbian white-tailed deer (a federally listed "endangered" species) and other rare plants and wildlife species. The document also identifies and analyzes specific habitat restoration and recreation projects. Alternative C was listed as the preferred alternative

Based on our review, we have assigned a rating of LO (Lack of Objections) to the Agency Proposed Action. This rating and a summary of our comments will be published in the *Federal Register*.

The proposed project will benefit and hopefully increase the Columbian white-tailed deer population. Road restrictions, trail maintenance, camping restrictions and environmental education programs will help improve deer habitat while maintaining recreation opportunities within the area. Although there are some proposed developments in the management area, these developments are minimal and would not significantly impact the environment.

Thank you for the opportunity to review this draft EIS. Should you have any questions, please feel free to contact Anna Maria Muñoz of my staff at (206) 553-0266.

Sincerely,

Richard B. Parkin, Manager
Geographical Implementation Unit

to return to the table of contents: Click here, Type a 7 and press enter (or return).

RDR
Jay
Jim L.

BOARD OF COMMISSIONERS

DOUG ROBERTSON JOYCE MORGAN MIKE WINTERS

1036 S.E. Douglas Ave., Room 217 • Roseburg, Oregon 97470 • (503) 440-4201

DOUGLAS COUNTY

BUREAU OF LAND MANAGEMENT
Received
FEB 16 2000
ROSEBURG DISTRICT

February 11, 2000

Ralph Klein
Swiftwater Field Office
Roseburg District
Bureau of Land Management
777 NW Garden Valley Blvd.
Roseburg, Oregon 97470

RE: North Bank Habitat Management Area/ACEC
Draft Environmental Impact Statement

Dear Mr. Klein:

The Board of Commissioners of Douglas County, Oregon has reviewed the Draft Environmental Impact Statement on revising the North Bank Habitat Management Area/ACEC and offer the enclosed comments for your review.

As indicated in more detail in our enclosed comments, we support the proposed management plan. We suggest however that the final environmental impact statement clearly identify that under all alternatives, including the no action alternative, the property represents secure habitat for the Columbian White-tailed deer.

BOARD OF COUNTY COMMISSIONERS
OF DOUGLAS COUNTY, OREGON

Michael J. Winters, Chair

Doug Robertson, Commissioner

Joyce Morgan, Commissioner

to return to the table of contents: Click here, Type a 7 and press enter (or return).

COMMENTS OF THE
BOARD OF COMMISSIONERS
OF
DOUGLAS COUNTY, OREGON
ON THE
NORTH BANK HABITAT MANAGEMENT AREA/ACEC
DRAFT ENVIRONMENTAL IMPACT STATEMENT

1. The Draft Environmental Impact Statement ("DEIS") (p. 8), notes that the Columbian White-tailed Deer ("CWTD") currently inhabiting the North Bank Habitat Management Area ("NBHMA") are in poor nutritional state. The opinion of wildlife professionals attribute this nutritional condition to a lack of adequate forage. We suggest that this opinion be accompanied by a footnote or other reference that documents the scientific and other sources relied upon for this statement. It may be sufficient to simply reference the discussion on pages 53-54 of DEIS.

2. As with the previous comment, the following statements found on page 10 of the DEIS, should also be accompanied by footnotes or other references that document the basis for the statement:

   a. "habitat management can be used to enhance forage quality and /or quantity to increase deer survival and reproduction;"
   b. "(h)abitat management can also be used to help disperse the deer across the property;" and,
   c. "(w)ithout grazing and fire, natural succession would be expected to progress and cause loss of habitat favorable to CWTD."

3. Since controlled hunting is a management tool appropriate for managing the populations (ie. Black Tailed Deer) within the ACEC, we support the decision to drop from consideration any prohibition of hunting. It is our position that hunting for population control is an appropriate management tool. Since management of wildlife populations is solely vested with the ODF&W, it is appropriate that ODF&W and the BLM cooperate in establishing population levels.

4. We suggest that the situations wherein the preferred alternative of the management plan will deviate from the

   Resource Management Plan as amended by the Northwest Forest, be documented and made available for public review and comment.

to return to the table of contents: Click here, Type a 7 and press enter (or return).

5. Among the actions common to all alternatives should be a monitoring program. The DEIS references research efforts on habitat use, movements, reproduction and survival, and competition, we support continuation of these research efforts and incorporation of similar studies as part of a ongoing monitoring plan.

6. Since all alternatives, including the no-action alternative, represent "secure habitat" as defined by the 1983 Revised CWTD Recovery Plan, we suggest that this statement be clearly stated in the EIS.

7. In Alternative C (DEIS,p. 29), reference is made to the establishment of new sources of perennial water for wildlife, we suggest that the EIS include a discussion of the impacts on the population if these developments are constructed as well as provide a description of impacts if no developments are constructed.

to return to the table of contents: Click here, Type a 7 and press enter (or return).

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