United States Department of the Interior
Bureau of Land Management

Medford District Office
3040 Biddle Road
Medford, Oregon 97504

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Althouse Creek

Watershed Assessment

ALTHOUSE CREEK WATERSHED ANALYSIS

February 2005

Dear Reader:

This Althouse Creek Watershed Analysis (Version 1.0) document was completed in July 2004 to provide an ecological context for a variety of resource management recommendations. It focuses on the Bureau of Land Management (BLM) lands within the Althouse Creek 5th field watershed. The Forest Service completed a watershed analysis for their lands within the Althouse Creek watershed in 1996.

This watershed analysis identifies ecosystem components in the Althouse Creek 5th field watershed and describes their interactions at a landscape scale. The analysis looks at historical and current ecological components and trends. It makes recommendations for future management actions to achieve desired ecological conditions.

As you read this document, it is important to keep in mind that the watershed analysis process is an iterative process. The watershed analysis will be updated when deemed necessary based on new information that becomes available. It is also important to keep in mind that **this analysis document is <u>not</u> a decision document**. Its recommendations are a point of departure for project specific planning and evaluation work. Some of the recommendations may conflict or contradict other recommendations. Project planning, which includes the preparation of environmental analyses and documents as required by the National Environmental Policy Act (NEPA), will take these conflicts into consideration. Some individual recommendations in the watershed analysis may also conflict with management direction provided in the Medford District Resource Management Plan. Regardless of this, future project planning and resource management actions may show deference to objectives and directives of the Medford District Resource Management Plan (RMP).

This watershed analysis will thus be used as a tool in land management planning and project implementation within the Althouse Creek Watershed on Bureau of Land Management (BLM) administered lands. Although ecological information, discussions and recommendations are presented at the landscape scale largely irrespective of administrative ownership, please understand that the BLM will only be implementing management actions on the lands it administers.

Preparation of this watershed analysis follows the format outlined in the draft federal watershed analysis guidelines in the document *Ecosystem Analysis at the Watershed Scale: Federal Guide for Watershed Analysis (Version 2.2), 1995.*

If you have additional resource or social information that would contribute to our understanding of the ecological and social processes within the watershed, we would appreciate hearing about them.

Abbie Jossie
Field Manager
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INTRODUCTION

Preparation of watershed analyses is a key part of the implementation of the 1994 Northwest Forest Plan (NFP). It is primarily conducted at a fifth field watershed scale. It is a process with the purpose of developing and documenting a scientifically - based understanding of the ecological structure and the functions, processes and interactions occurring within a watershed. It is one of the principal analyses used to meet the ecosystem management objectives of the NFP's Standards and Guidelines. It is an analytical process, ***not*** a decision making process. A watershed analysis serves as a basis for developing and assessing project specific proposals and identifying the monitoring and restoration needs of a watershed.

Watershed analysis is designed to be a systematic, iterative and dynamic process for characterizing watershed and ecological processes to meet specific management and social objectives. It is subject to updates and expansion as needed. The Forest Service completed a watershed analysis for their lands within the Althouse Creek watershed in 1996.

This current watershed analysis will thus document the past and current conditions of BLM administered lands in the Althouse Creek Watershed, both physically and biologically. It will interpret the data, identify trends, and make recommendations on managing this watershed toward the desired future condition.

The first part of this analysis will address the core physical, biological and human factors that characterize the watershed and their important ecological functions. Regulatory constraints that influence resource management in the watershed will also be identified. From these, key issues will be identified that will focus the analysis on the important functions of the ecosystem that are most relevant to the management questions, human values or resource conditions affecting the watershed.

Next, current and reference conditions of these important ecosystem functions will be described. How and why ecological conditions and processes have changed over time will be discussed during the synthesis portion of the analysis.

The final portion of the analysis identifies some recommendations for the Althouse Watershed taking into account land management objectives and the demand for the watershed's resources. These recommendations will guide management of the watershed's resources toward desired future conditions.

Four key management planning documents are frequently referred to throughout this analysis. These are:

1. *The Record of Decision for Amendments to U.S. Forest Service and Bureau of Land Management Planning Documents Within the Range of the Northern Spotted Owl* and its Attachment A, entitled the *Standards and Guidelines for Management of Habitat for Late-Successional and Old-Growth Forest Related Species Within the Range of the Northern Spotted Owl* (April 13, 1994) (NFP)

2. *The Final EIS and Record of Decision for the Medford District Resource Management*

Plan (June 1995) (RMP).

3. *Record of Decision* and the *Final Supplemental EIS to Remove or Modify the Survey and Manage Mitigation Measure Standards and Guidelines* (March and January 2004)

4. *Record of Decision Amending Resource Management Plans for Seven Bureau of Land Management Districts and Land and Resource Management Plans for Nineteen National Forests Within the Range of the Northern Spotted Owl*, and its *Final Supplemental EIS for the Clarification of Language in the 1994 Record of Decision for the Northwest Forest Plan* amending wording about the Aquatic Conservation Strategy (March 2004).

The Forest Service Althouse Watershed analysis (May, 1996) is also referenced.

Althouse Creek Watershed Analysis
Interdisciplinary Team Members

The following resource professionals are members of the watershed analysis team which prepared the current document:

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I. CHARACTERIZATION

A. PURPOSE

The purposes of this section are: to identify the dominant physical, biological and human processes and factors in the watershed that affect ecosystem function or condition; to relate these features and processes to those occurring in the Althouse Creek Watershed; to provide the context for identifying elements that need to be addressed in the analysis; and to identify, map and describe the land allocations, the Northwest Forest Plan objectives and some of the regulatory constraints that influence resource management in the watershed (Ecosystem Analysis at the Watershed Scale: Federal Guide for Watershed Analysis (Version 2.2, RIEC 1995)).

B. INTRODUCTION

The Althouse Creek Watershed is located within the Klamath Mountain Physiographic Province of southwestern Oregon. It is in Josephine County, approximately 20 miles southwest of the city of Grants Pass (Appendix A, Map 1). This 5th field watershed is approximately 29,242 acres in size and drains into the Illinois River. The focus of this watershed analysis is the BLM land located in the northern portion of the watershed.

Approximately 14 million years ago, tectonic uplift began and was subsequently shaped by water erosion and deposition into a mountainous terrain with a relatively broad valley floor in the part downstream from Holland. Elevation ranges from 1,340 to approximately 3,680 feet on BLM lands within the watershed. There are approximately 244 miles of stream within the entire Althouse Creek Watershed. Chinook, coho, steelhead and cutthroat can be found within the BLM portion of the watershed. Soils formed from Klamath Province andesitic and dacitic volcanic rocks in upper slopes of the watershed, melange rocks (mixed mafic) intermixed with serpentinized ultramafic rocks mainly in the mid to lower slopes of the watershed, and the broad valley bottom of mixed alluvial material between Holland and the mouth of Althouse Creek. (Ref. USGS, Geologic Map of Klamath Mountains, California and Oregon, Irwin W.P., 1994) The many different soils support diverse forested and non-forested vegetative types. Forests supply wood, recreation, and special products for human purposes while providing habitats for terrestrial and aquatic wildlife and plants. People have settled and developed the toe slopes of the mountains and the valley floors.

C. CLIMATE

The Mediterranean climate, influenced by marine air, has cool, wet winters and warm, dry summers. Average annual precipitation ranges from approximately 56” in the northwest to more than 78” in the south central part of the watershed (BLM isohyetal map, on file). The Illinois Valley Airport Remote Automated Weather Station (RAWS), three miles south of Cave Junction, indicates that the lowest average monthly temperature occurs in January (37.8^{o} F) and the highest in August (91.3^{o} F).

D. LAND OWNERSHIP

This Althouse Creek Watershed Analysis addresses all BLM lands within the 29,242 acre watershed. Table I-1 notes the general land ownership distribution within the watershed.

Table I-1: Land Ownership in the Althouse Creek Watershed

Land Ownership / Administration	Acres	Percent of Total
BLM	4,711	16%
Forest Service	13,793	47%
State/County and Private	10,738	37%
Watershed Total	29,242	100%

Maps 2 and 3 (Appendix A) show the location of BLM-administered land in the watershed.

The NFP and Medford District's RMP made a variety of land use allocations as a framework within which federal land management objectives vary. Table I-2 summarizes these allocations within the watershed. Map 4 shows the location and distribution of the different land allocations.

Table I-2: Land Allocations on BLM-Administered Lands

Land Use Allocation *	BLM Acres	% BLM in Watershed	Comments
Matrix	4,687	99%	33% of matrix acres (1,551 acres) are withdrawn from the timber base
LSR	24	< 1%	East IV / Williams LSR (RO249)
Managed LSR: Spotted owl cores	766	< 1%	
TOTAL – BLM	5,477	100%	

* The riparian reserve allocation occurs within the matrix and LSR allocations. Acreage has not been mapped or determined.

The Althouse Watershed is not designated as a “key” watershed.

Riparian reserves border all the streams on federal land in the watershed. These areas are a critical part of the NFP's Aquatic Conservation Strategy (ACS) to restore and maintain the ecological health of watersheds and aquatic ecosystems. The main purposes of the reserves are to protect the health of aquatic systems and their dependent species as well as provide benefits to upland species. These reserves help maintain and restore riparian structures and functions, benefit fish and riparian-dependent non-fish species, enhance habitats for organisms dependent on the transition zone between upslope and riparian areas, improve travel and dispersal corridors for terrestrial and aquatic animals and plants, and provide greater connectivity of late-successional forest habitat (USDA, USDI 1994a).

E. REGULATORY CONSIDERATIONS

Important federal laws pertinent to management of BLM lands in the watershed include the Clean Water Act (CWA), National Environmental Policy Act (NEPA), Federal Land Policy and Management Act (FLPMA), National Historic Preservation Act (NHPA), Endangered Species Act (ESA), and the Oregon and California Lands Act (O&C Act).

F. EROSION PROCESSES

The common erosion processes occurring in this watershed are concentrated flow erosion (sheet / rill erosion and gully erosion), stream bank erosion, and mass wasting. These erosional processes are driven by gravity and water (precipitation and runoff) on soil shear strength. Other factors that have influenced erosional processes are climate, vegetation and fire. Water erosion is important as it not only detaches soil particles (and sometimes earthen material), but also transports the material downhill.

Concentrated flow erosion is a concern on hill slopes where most vegetation has been removed and roads or other human built features have concentrated runoff in unconsolidated ditches, diverting it to areas where surface protection is inadequate. Soil erosion occurs when soil particles are detached by raindrop splash or when overland flow of water moves particles to another location on the landscape. Eroded soil particles can move from less than an inch to many miles depending on topography and vegetative cover. This erosion is of concern because it can reduce soil productivity and increase sediment in local waterways.

Stream bank erosion occurs as large volumes of water and debris rush through waterways, dislodging soil particles from stream banks and transporting them downstream. This type of erosion is important as it can widen a stream channel, which may cause the stream to spread and become shallower. Also, detached soil sediments may deposit in fish spawning gravel or rearing pools, reducing habitat effectiveness. High road densities may activate this type of erosion especially during times of increased peak flows (see Road Density section below). Deep, fine-textured soils ("Clay Subsoil") that occur at the base of upland areas on fans, foot slopes and terraces are most susceptible to stream bank erosion.

Mass movement processes in the watershed occur in the form of debris slides, and earth flows. These phenomena occur in different areas and under different conditions but most involve water-saturated soil moving downhill. This type of erosion is important in that many tons of soil may be lost on the hillside. Furthermore, soil moving downhill eventually reaches a stream or waterway and can have detrimental effects. Soils that may be susceptible to mass movement in the BLM administered portion of the watershed are predominately the serpentine influence soils (particularly Cornutt) that are on slopes greater than 35%.

These erosional processes, combined with the uplifting of the landscape that has been occurring for the last 14 million years, are primarily responsible for the morphological characteristics of the watershed. As the landscape uplifted, belts of varying rock types were exposed to weathering. Uplift occurred faster than erosion, which resulted in deeply incised stream canyons (draws) with high gradients (Rosgen Aa+) in most of the watershed and in alluviated valley streams with low to moderate gradients and entrenched channels (Rosgen B, C, and F). Riparian areas along these streams provide habitats for plants and animals associated with aquatic systems. Many of the riparian areas have been disturbed as a result of past timber harvest and/or road construction.

Road density is the total road length for a given area, commonly expressed as miles of road per square mile. Road densities in excess of four miles per square mile are considered high and may have detrimental cumulative effects on stream water quality and quantity at the small watershed scale. BLM administered land in the Althouse Creek watershed has variable road densities. The overall road density is somewhat high. Although some road designs are less impacting than others, in general, high road density and future road development may be a concern because roads can intercept surface water and shallow groundwater, routing it to natural drainage ways, which concentrates and increases natural runoff and may cause erosion and sedimentation. In roaded systems, flows from 0.4 to 5 year storm events may result in somewhat greater peak stream flows than if there were no roads.

G. HYDROLOGY

The stream flow in this watershed fluctuates with the seasonal variation in rainfall. Peak flows occur during high-intensity, long duration storm events, usually in the winter and early spring. Stream flows in this watershed are heavily affected by storm events and snow melt. Small streams flowing from serpentine soil areas may be flashy. There are no stream gauges in this watershed and thus there is no historical stream flow data specific to the watershed.

H. WATER QUALITY

Currently, water quality varies throughout the watershed. The first 7.5 miles of Althouse Creek (from its mouth to approximately the mouth of Tartar Gulch) is identified as “water quality-limited” due to warm summer temperature. Observations indicate that other streams in the watershed may warrant examination for water quality limitations due to high summer temperatures, flow modification, and sedimentation.

I. STREAM CHANNEL

The major streams in the watershed can be classified into one of four stream types based on the Rosgen system of stream classification: A, B, C or F. Type A streams are steep, entrenched, cascading, step / pool streams with high energy transport associated with depositional soils and are very stable if bedrock or boulder dominated. Type B streams are moderately entrenched, have a moderate gradient, riffle-dominated channels and infrequently-spaced pools. They have a very stable plan and profile with stable banks. Type C streams are moderately meandering with floodplains on one or both sides of the channel. Type F streams are entrenched, meandering and have a riffle / pool channel on low gradients with high width to depth ratios.

J. VEGETATION

The Althouse Creek Watershed is dominated by mixed conifer and mixed conifer / hardwood forests. Serpentine soils occur extensively in this watershed, particularly at the northwest, east, and western borders of BLM administered lands. These soils generally support the Jeffrey pine plant series. These serpentine areas are habitat for a number of rare plant species and rare plant communities.

Vegetative conditions across the landscape are highly variable. Fire exclusion has resulted in significant increases in stand density (more stems per acre); shifts in species composition (*e.g.*, increases in fire-intolerant, shade-tolerant species); and changes in stand structure. These transformations have increased the forest’s susceptibility to large, severe fires, epidemic attack by insects and disease, and have affected the quality of the habitat for rare plant species present in the watershed.

Plant communities in the Althouse Creek Watershed have been affected by more direct human influences as well through such activities as mining, logging, agriculture, road building and residential development.

The Althouse Creek Watershed contains at least four major plant series: Douglas-fir, Douglas-fir/Tanoak, Jeffrey pine, and White oak. Plant communities (associations) with the same climax dominant(s) are referred to as plant series. The Jeffrey pine series, for example, consists of associations in which Jeffrey pine is the climax dominant (Atzet and Wheeler 1984).

K. SPECIES AND HABITATS

1. Terrestrial

a. Special Status Plants

BLM administered lands are located at the lower elevations of the Althouse Creek Watershed. Botanists have visited the Illinois Valley area since the late 1800s when the renowned Thomas Jefferson Howell lived in the historic town of Waldo and identified many of the botanical rarities. Many of the original type specimens collected by Howell are housed at the OSU herbarium. At least ten species or varieties of vascular plants and five rare plants on the Medford District Special Status Species list are named in behalf of Thomas Howell.

Serpentine influenced or ultra-mafic soils have shaped plant species richness and endemism in the Klamath- Siskiyou Ecoregion. Approximately 41% of Althouse watershed is comprised of these types of soils. Serpentine endemic plants contribute to more than 131 plant species of more than 1859 species reported from the Ecoregion. Over half the vascular plant species on the BLM BSS species list are serpentine endemics.

Eleven (11) species of Bureau Special Status (BSS) vascular plants have been discovered so far within the watershed. *Lomatiun cookii* and *Arabis McDonaldiana*, are federally listed “threatened” plants whose range overlaps the watershed. However, neither of the two species has been discovered in the watershed. One BSS species, Howell’s mariposa lily (*Calochortus howellii*), is an Oregon State “Threatened” species and has been found at fourteen locations within the watershed.

Private lands in the watershed may contribute to potential habitat for rare plants but on a very small scale. Much of the valley floor has been converted to agriculture or pasturelands with low potential for rare plant persistence. However, some serpentine areas and other timbered lands may have some small potential for remnant rare plant populations, even-though regular disturbances including herbicide spraying occur repeatedly over much of the area. No surveys are conducted and no protection measures are required on private lands.

b. Wildlife

Twenty-four (24) acres of the NFP’s designated 122,526 acres East IV / Williams Late-successional Reserve (LSR) are located in the Althouse Creek Watershed. This is less than 1%

of the watershed. LSRs were identified with an objective to protect and enhance conditions of late-successional and old-growth forest ecosystems which serve as habitat for late-successional and old-growth related species.

The diversity of soil types and vegetative communities in the Althouse Creek Watershed provides potential habitat for a variety of sensitive animal species. Some wildlife surveys have been conducted in the watershed, but distribution, abundance and presence of the majority of these species are unknown.

Within the Althouse Creek Watershed, there are over 200 vertebrate and thousands of invertebrate species that might occur. This includes potential habitat for 45 vertebrate Bureau special status species (12 mammals, 19 birds, and 14 reptiles and amphibians) (see Chapter III, Current Condition for a complete list of sensitive species). Other vertebrates of concern include cavity nesting species, band-tailed pigeons and neotropical migrant birds.

Of the 90 special status species, most are associated with older forest habitats. However, other important habitats include riparian, oak stands, meadows, Jeffery pine (serpentine) and special habitats such as caves, cliffs and talus (see Chapter V, Synthesis and Interpretation, for habitat trends).

The threatened northern spotted owl (*Strix occidentalis*) is the only Endangered Species Act (ESA) listed wildlife species known to occur in the watershed. There are six NSO activity centers in the watershed with designated cores. Four cores are along the south edge of BLM ownership and bordering on Forest Service lands. One core is near the northeast corner of the watershed, bordering the Sucker Creek watershed. One core is on an isolated section of BLM lands in T40S, R7W, Sec. 5. In 1992, prior to the implementation of the NFP, the USFWS designated 56,080 acres as critical habitat for the northern spotted owl (CHU # OR-72) and which includes 24 acres of the Althouse Creek Watershed.

It is likely that bald eagles (*Haleaeetus leucocephalus*), an ESA designated threatened species, forage within the watershed. There are no known bald eagle nest sites in the watershed.

The valley bottom habitat contains 9,505 acres of deer winter range. This occurs in the transition zone between the valley bottom habitat of the Illinois Valley and the uplands of BLM and Forest Service lands to the south. It is also a transition from the serpentine influenced soils and edaphic vegetation communities of the Illinois Valley to the richer, more productive soils to the east. Rock habitats and hardwood sites, including important white oak woodlands in the northwest section of the watershed provide important habitat diversity.

2. Aquatic

Within the Rogue River Basin, the Illinois River and its tributaries are important spawning and rearing habitats for both anadromous and resident salmonids. The Illinois River provides an important portion of the remnant native wild fish populations/habitats within the Rogue Basin. Thus, the Illinois River watershed is believed to be the stronghold for wild anadromous fish populations in the Rogue Basin (East Fork Illinois River Watershed Analysis BLM, 2000). Althouse Creek is an anadromous fish stream within the East Fork of the Illinois River (USFS

WA 1996). The Althouse Creek Watershed is partially responsible for the Illinois River having the largest coho salmon population in the Rogue River basin (USFS WA 1996).

There are approximately 244 miles of streams within the full Althouse Creek Watershed (all ownerships). Habitat factors such as stream temperature, water quantity in the summer, number and depth of pools, large woody material, riparian complexity, road / stream crossings and sedimentation are key determinants of salmonid survival and fish productivity. Of these habitat factors, stream temperature is potentially most affected by riparian area conditions and past disturbance. Rearing salmonids require a water temperature of 58ºF for optimum survival condition. Stream temperature is primarily dependent upon the exposure of the water to direct sunlight. The shade component of a riparian area is determined by factors such as canopy cover, aspect, and channel valley form (V-shaped vs. flat). Assuming that the riparian reserve vegetation condition classes essentially mimics that of the watershed as a whole, an estimated 41% of the BLM land is in the mature vegetation condition class, 32% is in the mid vegetation condition class and 14% in the seedling/sapling class. On private land an estimated 52% is in the mid vegetative condition class and 39% is developed although vegetated.

3. Fluvial Streams

Cutthroat trout, winter steelhead, coho and fall chinook salmon are found in the Althouse Creek Watershed. Each is a cold water species and requires a complex habitat, especially in its early life stages. Coho salmon can be considered an indicator species for the health of an aquatic ecosystem. Cutthroat and steelhead typically have a wider range of distribution and are found higher in the tributaries than coho and chinook. Factors limiting salmonid production include: inadequate stream flows in the summer months; high water temperatures; erosion and sedimentation; lack of large woody material in the stream and riparian area; lack of rearing and holding pools for juveniles and adults, respectively; channelization of streams in the canyons and lowlands; and blockages of migration corridors.

Most streams on BLM land in the watershed have had some stream and aquatic habitat surveys completed. The Oregon Department of Fish and Wildlife (ODFW) conducted an aquatic inventory on Althouse Creek for fish habitat in 1993. Several streams which have been surveyed for fish by ODFW or other federal agencies have some portion of their length on BLM land (see fish distribution, Chapter 3).

L. FIRE MANAGEMENT

Fire has been identified as one of the key natural disturbance factors in the watershed. The majority of the watershed has historically experienced a low to mixed severity fire regime. Approximately 63% of the watershed is comprised of mixed severity with a frequency of (35-100+ years) fire regime (Atzet, et. al. 2004). This regime usually results in heterogeneous landscapes. Large, stand-replacing fires may occur but are usually rare events. Such stand-replacing fires may “reset” large areas (10,000-100,000 acres) but subsequent mixed intensity fires are important for creating the landscape heterogeneity. Within these landscapes a mix of stand ages and size classes is a characteristic feature; the landscape is not dominated by one or two age classes. Approximately 29% of the watershed, mostly in the northwest portion, is in a low severity fire regime associated with frequent (0-35 years) fires of low intensity. In a low severity fire regime most of the dominant trees are adapted to resist low intensity fire. One such adaptation is the development of thick bark at a young age. This limits over-story mortality and most of the fire effects occur on small trees in the under-story. Fires in a low severity regime are associated with ecosystem stability, as the system is more stable in the presence of fire than in its absence (Agee 1990). Frequent, low severity fires keep sites open so that they are less likely to burn intensely even under severe fire weather conditions.

Fire regime modification has occurred in the Pacific Northwest due to prolonged fire exclusion. This has increased fuel loads and fuel continuity resulting in more severe fire effects (Agee 1993). The historic the pattern of frequent, low intensity fire has ended. Dead and down fuel and under-story vegetation are no longer periodically removed and the trend is toward ever increasing amounts of available fuels. The longer interval between fire occurrences creates higher intensity stand-destroying events rather than the historic low intensity stand maintenance fires.

It is important to recognize that each vegetative type is adapted to its particular fire regime (Agee 1981). The significance of this is that the historic vegetative types that existed prior to Euro-American settlement cannot be maintained in the present fire regime that has resulted from fire exclusion. An example of decades of fire exclusion contributed to the effects of the 2002 Biscuit Fire. That fire burned almost 500,000 acres and was contained approximately 7 miles to the west of the Althouse Creek watershed boundary.

The serpentine communities are areas in the watershed are fire dependent communities. While much remains unknown about the interaction of fire within areas of serpentine, the presence of various fire adapted species indicates a strong adaptation to fire and the requirement of fire community vitality.

The Jeffrey pine series has a fire return interval of 20 to 50 years (Atzet and Wheeler 1982). Jeffrey pine associations are likely to support small, patchy fires and less likely to suffer catastrophic stand destroying fire due to low fuel loading and widely spaced canopies. Although most sites are open and quick to dry, little fuel is produced and fuel continuity is usually lacking, resulting in low intensity fires that have not, in most cases, significantly altered species composition. Jimerson (1995) notes variable potential for fire exclusion to cause change in the successional pathways of the associations in his Jeffrey pine series in northern California.

Jimerson (1995) also describes shrubs invading and replacing herbaceous species within these Jeffrey pine series. Kagan (1989) speculated that *Senecio hesperius* abundance declined at Cedar Log Flat RNA in the absence of fire, as evidenced by extremely high cover of native grass. Borgias and Beigel (1996) observed that the dominant species of serpentine savannas regenerated readily following wildfire; however the effect of fire on special status plants of serpentine systems is uncertain (Jimerson 1995; Borgias and Beigel 1996).

Other fire adapted species within the serpentine community include western white pine (*Pinus monticola)* and knobcone pine (*Pinus attenuata*). Knobcone pine is an obligate fire type with a strict closed-cone habit. Serotinous cones are one such adaptation towards fire that knobcone pine exhibit. This adaptation, along with the general absence of animal agents that might open cones, leaves the species dependent upon stand-destroying crown fire for reproduction. Fire creates seed bed conditions favorable for germination and seedling recruitment. Most plant species cannot compete with knobcone pine on such poor sites. The discontinuous nature of serpentine prevents all the pines in an area from being killed by any one fire (Vogl 1973).

Natural fires are probably less frequent in knobcone pine forests than in other western closed-cone communities (McCune 1988). The infertile sites where knobcone pine occurs support little undercover. Litter layers are usually moderate (Horton 1949). Fire is essential for the completion of knobcone pine's life cycle. Cones of senescent or dead trees must be opened by fire to perpetuate the groves before trees succumb and add the unopened cones to the decomposing litter (Vogl 1967).

M. AIR RESOURCES

Factors that affect air quality include meteorology and emission sources. Atmospheric stability is of primary importance in emission dispersal. The stability of the air determines the amount of vertical mixing that can occur, which disperses pollutants. Stable air prevents mixing and traps pollutants at the ground level. Unstable air facilitates mixing and dispersal of pollutants.

Seasonal patterns in weather and pollutant emissions influence air quality. The weather pattern in late fall and winter is one of periods of stable air occurring between storm events. These stable periods inhibit dispersion by reducing atmospheric mixing. During the winter, motor vehicles produce more carbon monoxide, and home heating produces fine particulate (PM_{10} and $PM_{2.5}$) when wood is used as a fuel. These factors combine to produce a higher pollution level for these pollutants during winter (ODEQ 1993).

Atmospheric ventilation is usually better during spring and summer. Less carbon monoxide and particulates are produced during this time. These pollutants are normally not a problem during these seasons (ODEQ 1993). Summer air quality is impacted during relatively poor ventilation periods. Ozone concentrations reach peak levels during sunny warm periods of poor ventilation. Ozone and resulting "smog" are the major concerns in the summer season.

Pollution that impacts the Illinois Valley is classified in two categories: area and mobile sources (ODEQ 1993). Area sources are relatively small individual sources of pollution, usually spread over a broad geographic area that collectively contributes emissions. Area sources include wood stoves, slash and field burning, forest fires, backyard burning, and dust emissions from roads and agricultural tilling. Mobile sources include motor vehicles, motor boats, off-highway vehicles, and aircraft. The major impact to air quality in the Illinois Valley is smoke. Pollutants of concern include fine particulate (PM_{10} and $PM_{2.5}$) and carbon monoxide (CO).

N. HUMAN USES

The land ownership pattern of the watershed was molded in the late 1800's and early 1900's. The lands in the watershed in the mid 1800's were public lands owned by the United States and administered by the General Land Office. The first large-scale transfer of public lands from federal ownership was to the state of Oregon following statehood in 1859.

In order to further develop the west, Congress passed laws enabling settlers to develop and obtain ownership of the public lands. These included Donation Land Claim patents, entry under the Homestead Acts, military patents and mineral patents. In addition to these types of deeds, land was deeded to the Oregon and California Railroad (O&C), with some of those lands being sold to private individuals. In reviewing the master title plats for the Althouse Creek Watershed, it is apparent that ownership of several of the low-elevation lands were originally deeded from the United States to private individuals through the above acts of Congress.

Current human use of the watershed includes tourism, agriculture, dispersed recreation, timber production / harvesting, mining, and harvest of forest products. The larger Illinois Valley area is rich in wineries, and people come from all over the region to visit the world-famous wineries in this area. Recreational use of BLM lands in the watershed is dispersed and includes off-highway vehicle (OHV) use, hunting, and hiking, horseback riding, mountain biking. There are currently many non-designated trails and foot paths in the area. The area is rich in mining history, and the evidence of historical uses of the watershed remains today.

II. KEY ISSUES

The purpose of this section is to focus the analysis on the key elements of the ecosystem that are most relevant to the management questions, human values, or resource conditions within the watershed (Federal Guide for Watershed Analysis, Version 2.2, 1995).

Key issues are identified in order to focus the analysis on the unique elements of the watershed. Key issues are addressed throughout the watershed analysis process within the context of related core questions. The key issues identified are summarized in Table II-1. A short narrative which discusses the relevance of each key issue in the watershed follows this table. The issues are not presented in any order of relative importance.

Table II-1: Key Issues

Key Issues	Related Core Topic
A. Fire - The historic fire regime has been altered due to fire exclusion and other management practices. This has impacted the flora, fauna and fire hazard. 1,085 acres (23%) of the BLM acres in the watershed is within the National Fire Plan's Illinois Valley "Community at Risk" (CAR); 3,527 acres (75%) are in the wildland urban interface (WUI) area outside of the CAR; and 99 acres (2%) are outside of both.	Vegetation, Species and Habitats, Human Uses
B. Ultramafic / Serpentine Soils - Forty-one percent of the non-USFS land consists of ultramafic/serpentine derived or influenced soils. As a result, there are extensive unique serpentine plant communities. These soils are sensitive soils.	Erosion Processes, Water Quality, Vegetation
C. Water Quality and Quantity - Issues include: high summer water temperatures, variable water clarity / quality, flow modification, flashy stream flows, periodic high levels of bedload.	Erosion Processes, Hydrology, Stream Channel, Water Quality, Species and Habitats (Aquatic)
D. Fisheries - Fisheries values are high. The majority of wild coho spawning in the Rogue Basin spawn in the Upper Illinois River. The lower portion of Althouse Creek, which has a low gradient and therefore a high potential for coho and chinook use, flows through private land. This portion of Althouse Creek flows through developed agricultural land. Factors influencing fish habitat and water quality associated with agriculture include lack of riparian overstory vegetation, over allocation of water, and potential fish barriers from water withdrawal points.	Stream Channel, Species and Habitats, Water Quality, Hydrology
E. Botanical - Botanical values are exceptionally high due to the high percent of serpentine influenced soils. There is a consequent high incidence of endemic rare plants and a unique assemblage of serpentine associated plant communities.	Species and Habitat
F. Visibility/Tourism - Highly visible area- flat open valley in NW corner allows views of the lower slopes of BLM land-VRM III. The area receives a lot of use from the public, visiting the wineries and Oregon Caves.	Vegetation, Human Uses
G. Forest Habitat Connectivity – Forest habitat is naturally fragmented by serpentine or serpentine influenced soils. This creates habitat types and conditions not conducive for development of late-successional forest habitat. Non-serpentine influenced areas provide for more late-successional forest habitat potential. Some forest lands are partially isolated from surrounding forest habitat by private lands and serpentine inclusions. Connectivity of late-successional forest within the watershed is naturally fragmented the edaphic influences, particularly on BLM lands.	Vegetation, Species and Habitat
H. Cultural Resources – This is an area with a rich mining history.	Human Uses, Vegetation, Stream Channel

A. FIRE

Effective fire suppression in the watershed over the past four decades has resulted in the exclusion of most natural wildfire. Approximately 80% of the watershed is at high or moderate risk of wildfire which could result in the loss of resources, destroy personal property, and create a threat to human life. Management activities such as hazardous fuel reduction can reduce the potential for uncharacteristic wildfires which Jackson and Josephine Counties have experienced the last three years. Mixed land ownership, wildland/urban interface areas, and recreation use increase the complexity of fire prevention, protection, fuels management, and hazard reduction activities.

B. ULTRAMAFIC/ SERPENTINE SOILS

Forty-one percent of the non-USFS land consists of ultramafic/serpentine derived (Dubakella, Pearsoll, and Brockman) or influenced (Cornutt) soils. These occur in soil complexes (multi-soil series) as well as in singular soil series (See Table II-2).

Table II-2: Soils

Map Symbol(s)	Soil Series	% of Non-FS land in the Watershed
11B	Brockman	3
19E, 20F, 21F	Cornutt-Dubakella	23
28F,29F	Dubakella-Pearsoll	5
58F	Pearsoll	10

The areas where these soils predominately occur are: Tartar Gulch, and the ridge slopes in Sections 8, 9, 15, 16, and 17. The usual extent of these types of soils within the Illinois River Sub-basin ranges from 20 to 35%, except in the West Fork of the Illinois and USFS, Middle Illinois which have approximately 50%.

Issues related to these soils are:

- High extent of unique serpentine plant communities on sensitive soils (see Botany section below)
- Fragile soils (TPCC) with special management considerations due to high clay content, very little surface litter and duff protection of mineral soils.
- Other management issues that include history of instability, low germination rates, and slow growing rates of plants usually used for erosion control.

Soils derived from ultramafic/serpentine minerals are sensitive and fragile. They need careful assessment and the consideration of appropriate mitigation with any management activity.

C. WATER QUALITY AND QUANTITY

Althouse Creek is a 303(d) listed as water quality limited due to high summer water temperatures. High water temperatures in streams in the watershed may be due to agricultural water withdrawals, loss of riparian vegetation, and naturally low riparian canopy cover in serpentine areas.

There is extensive stream flow modification on the low gradient streams in the watershed. This may contribute to very low summer stream flows. There are agricultural withdrawals, and some mining ditches that probably intercept runoff and divert stream water contributing to reduced stream flows.

High levels of turbidity and bedload have been observed in Althouse Creek (ref: USFS, Althouse WA). Primary sources of this may be a debris slide at Johnson Point and other debris slides on Forest Service land. Flashy flows are likely common for the local tributary streams as this is typical of small drainages dominated by ultramafic/serpentine soils.

D. FISHERIES

The Illinois River Sub-basin is a stronghold for wild anadromous fish repopulation in the Rogue River Basin. The lower portion of Althouse Creek is low gradient and has potential for coho and chinook habitat. Habitat factors which limit production on these creeks are associated with water withdrawal and low levels of riparian vegetation. The ownership along the lower portion of Althouse Creek is primarily private with a high percentage of agriculture use. Historic mining ditches may intercept flows and increase the drainage network. There are also numerous water withdrawal points in the Althouse Creek Watershed, which reduce the summer water levels in Althouse Creek and its tributaries.

E. BOTANICAL

The Althouse Creek watershed is located within the Klamath-Siskiyou Ecoregion of NW California and SW Oregon. This Ecoregion is recognized as “an area of extraordinary biodiversity” and is regarded as an “area of global botanical significance” (one of seven in North America as defined by the World Conservation Union [IUCN]), a global “centre of plant diversity” (Wagner 1997), and as a proposed “world heritage site” and UNESCO “biosphere reserve” (Vance-Borland et al. 1995). More than 3,500 plant species, including 281 endemics (subspecies level), are known to occur in the Klamath-Siskiyou (Sawyer 1996)” (DellaSala, 1999).

The Althouse Creek watershed is representative of the characteristics typically described for the Klamath-Siskiyou Ecoregion, but on a smaller scale and with lower species diversity and richness. However, the area is still a botanically rich area. Along with Douglas-fir conifer forest plant series that occur on meta-sedimentary formations, ultra-mafic geologic formations occur throughout the watershed with associated endemic vegetation and species diversity. This watershed, although small, contributes to species richness, species endemism and ecosystems of global and regional rarity. The majority of the Bureau special status plant species known to occur within the watershed are endemic to serpentine influenced soils of the Klamath-Siskiyou ecoregion. Other special status plants are found in Douglas-fir conifer forest habitats especially along forest edges and in remnant valley Oregon white oak meadows on the valley floor.

Serpentine habitats are important components of the landscape and support a high density of special status species. Potential threats to these habitats include mining, development, road construction, timber harvesting activities, OHV damage and encroachment of serpentine openings by shrubs due to fire suppression.

F. VISIBILITY / TOURISM

Due to expansive views from the open, flat valley bottom lands in the northwest corner of the watershed, BLM lands are well visible to both residents and tourists in the area. Much of the BLM land in the watershed is located in VRM III classified lands. The area receives moderately high visitor use. Bridgeview Road and Holland Loop Road receive a moderate amount of use by visitors accessing the wineries in the area. The watershed is bounded on two sides by highly/moderately traveled recreational routes. Highway 46 is located north of the watershed and is the road to the Oregon Caves National Monument. The State of Jefferson Scenic Byway, a Forest Service road, travels to Page Mountain Snow Park, and to Happy Camp, further south, and makes up the southwestern boundary of the watershed.

G. LATE-SUCCESSIONAL FOREST CONNECTIVITY

The serpentine influenced soils make the area support Jeffery pine plant associations as well as edaphic influenced endemics. In non-serpentine areas, because the BLM land is close to the valley bottom, it support areas of the Douglas-fir/tanoak plant associations and is common throughout most of the BLM ownership. This, along with human influence, has led to a fragmented landscape and low connectivity in some plant associations. Douglas-fir mature and late-successional forest habitat connectivity in the watershed is primarily reflective of the following factors: 1) the extensive serpentine influenced soils and, 2) human activities such as past logging, mining, agriculture and land development.

Approximately 41% of the watershed has serpentine influenced soils, 18% directly derived from serpentine and 23% is serpentine influenced. While serpentine sites may produce late-successional forests, they seldom produce Douglas-fir late-successional forest habitat. This type of late-successional forest habitat is typically characterized by large diameter trees (>21"), canopy closure >60%, complex vertical structure and both snags and down wood. Douglas-fir/tan oak dominated sites usually have a heavy understory of tan oak. Serpentine dominated areas provide an open forest of Jeffery Pine and a shrub or grassland understory. Scattered serpentine inclusions in the uplands grade these edaphic vegetation assemblages into more Douglas-fir dominated stands toward the east. On non-serpentine sites, the quantity and distribution of late-successional forest habitat has been heavily modified by human activities including mining, timber harvest and a long history of fire suppression and exclusion. On BLM lands, connectivity of late-successional forest within the watershed is fragmented by these edaphic influences.

H. CULTURAL AND HISTORIC SITES

Historic documentation supports evidence of numerous cultural resources within the Althouse Creek watershed. These resources represent the regions early mining activities. These sites include the mining town of Browntown, which was laid out in 1852, mining features along Althouse Creek and its tributaries, which supported over 1500 miners in the early 1850s, and lode mines located in the foothills.

III. CURRENT CONDITION

A. PURPOSE

The purpose of this section is to develop detailed information relevant to the key issues and to document the current range, distribution, and condition of the relevant ecosystem elements.

B. CLIMATE

The Althouse Creek Watershed has a marine influenced Mediterranean climate with cool, wet winters and warm, dry summers. Most of the precipitation is in the form of rain. About 10 to 15% of the BLM portion of the watershed is above 3,000 feet in elevation in the transient snow zone (TSZ). The TSZ is where shallow snow packs accumulate and then melt throughout the winter in response to alternating cold and warm fronts. Average annual precipitation ranges from 56 to 78+ inches. Precipitation level increases in the Forest Service portion of the watershed. The least amount of rain falls in the northwest corner of the watershed and the most, in the southern portion at higher elevations.

C. SOILS

1. Erosion Processes

Erosion hazard is an indication of a soil's susceptibility to particle or mass movement from its original location. Particle erosion hazard for concentrated water flow assumes a bare soil surface condition. If the soil is protected by vegetation, litter, or duff, such that no mineral soil is exposed, concentrated flow erosion is not likely to occur. Streambank erosion is a function of lack of lack of riparian vegetation and exposure to peak stream flows. Mass movement erosion is a function of the mass strength of the soil mantle and underlying geologic material. Large plant root strength plays a role in the susceptibility to mass movement. Most soil and highly-weathered rock is weakest at high moisture levels.

a. Concentrated Flow

The dominant erosion process is concentrated flow erosion. This form of erosion occurs when water accumulates on the soil surface, predominately where there is little or no protective organic material. As the water flows down slope it builds energy which allows for detachment of soil particles that travel as sediment in the flowing water. Sediment is then deposited where flow rates diminish.

Areas that are particularly susceptible to concentrated flow erosion consist of soils of variable parent materials on steep slopes. The following general soil groups fall into this category: Serpentine and serpentine influenced and one “other” soil, 72F, Speaker-Josephine (see Map 20). Of these, the serpentine soils are greatest concern. These soils have high magnesium content and low calcium. Plant communities usually contain only a few species that grow slowly and are tolerant of this condition, arranged in a scattered distribution. This results in thin duff and litter layers. These soils have surface textures ranging from gravelly sandy loam to cobbly clay loam.

These soils have high erosion hazard due to the severity of the slope. The steep slopes give flowing water high erosive energy as it increases velocity running down slope.

Conditions that are most conducive to concentrated flow erosion include: road drainage outlets, unprotected road ditches, areas of bare soil usually created by ground disturbing activities or fire, wheel ruts on natural-surface roads, and highly-altered ground surface created by OHVs or other motorized equipment. Areas of high road density, which often have more intense ground disturbance than would naturally occur, are commonly prone to this type of erosion (see Road Density discussion below).

b. Streambank Erosion

Another process common in the watershed is streambank erosion. This is the loss of streambanks through sloughing, block failure or scouring by high stream flows. Streambank erosion is usually associated with loss of root strength and changes in stream flow energy.

In this watershed, streambank erosion occurs as a result of high peak stream flow combined with exposed deep, fine, and medium-textured soils that make up the streambanks where stream channels are generally “U” shaped or where wide channels occur associated with floodplains. The January 1997 storm, a 30 to 40 year storm event, is an example of an event that would generate sufficiently high peak stream flows that could cause streambank erosion at sites in this watershed where bank protection and root strength were limited.

c. Mass Movement or Mass Wasting

Forms of mass movement that may occur in the watershed include debris slides, and earth flows. These usually occur rapidly and during periods of deep saturation (*e.g.,* the latter half of winter and early spring). A debris slide is a moving mass of soil, rock, and plant material that moves in mass down slope. This leaves a steep-sided, concave scarp. Soils most susceptible to debris slides are those formed in deep colluvial material. Earth flows are characterized by over-thickened clay-rich soils that, when saturated, will ooze slowly down slope. Soils most susceptible to earth flow are deep, clayey soils formed in ultramafic and metamorphic parent material.

There have been no surveys of mass movement features on BLM land. The USFS has observed mass movement features near Johnson Point of newer debris slides at the toe of an earth flow (See USFS, Althouse Watershed Analysis, 1996).

2. Road Densities

Roads on sloping ground intercept surface water and shallow groundwater. The water is commonly routed by the road to a draw or other natural drainageway that is part of the natural stream system. This process causes drainage water to reach streams quicker than would naturally occur. The more roads that exist in a particular area, the greater the potential for increasing peak stream flows. With increased peak flow, streambanks are more susceptible to erosion as the stream channel adjusts to the change in flow pattern. Additional stream sediment caused by this phenomenon comes predominately from eroded streambanks. Other sources of stream sediment are the road surface, slough from steep road banks, and eroded channels created by flows at drainage outlets down slope.

The above gives a general perspective on high road densities. Road design and location on the landscape, however, produce varying effects. For example, an outsloped road with water dips, a rocked surface and outlet filters would produce fewer effects than a lower slope natural-surfaced road with ditches. This is because of differences in proximity to the stream system, degree of concentration / distribution of surface water flow due to road design, and differences in the amount of protection of the road surface.

Based on GIS analysis, there is a small difference in road density between BLM and non-BLM lands (excluding USFS lands). Overall road density is 4.9 miles / mi^2, road density on BLM land is 4.5 miles / mi^2, road density on non-BLM lands is 5.1 miles / mi^2. Generally, these represent high road density levels when considering hydrology. On a section by section basis, road density varies substantially.

D. HYDROLOGY

1. Stream Types and Channel Form

Map 10 includes those streams for which hydrologic data is available. There are approximately 181 miles of streams: 102 miles of perennial streams and 79 miles of intermittent streams in the watershed. Other streams shown on the map are ephemeral with very short periods of flow directly after storm events.

The stream types are defined in the Northwest Forest Plan by the existence of year round flow (perennial) or evidence of defined channel and scour and deposition for intermittent streams needs to be evident. Perennial and intermittent streams have a major influence on downstream water quality. Much of the perennial and some parts of intermittent streams support fish populations. (See Aquatic section) Beneficial uses of these streams include irrigation, aquatic species, and wildlife.

Channel form varies with the landform. Generally, on the gentle valley bottom from the mouth of Althouse Creek to where it enters T40S, R7W, Section 9, the stream channel is broad with a flood plain on one or both sides. For the Althouse Creek stream channel that flows in sections 9 and 15, the gradient steepens to roughly 2 to 3%. The channel narrows to a “U” shape with occasional narrow flood bands on one or both sides. Tributary channels are steeper (>4%) and “V” shaped in draws on upland slopes.

2. Large Wood

Large woody debris in streams serves to dissipate stream energy and slow channel erosion and is a key component of the headwater streams. The amount of large woody debris in small perennial and intermittent streams has been reduced as a result of timber harvest and past “stream cleaning” operations. The low levels of woody debris contribute to reduced channel stability and increased sediment movement downstream during storm events (USDI 1994).

Forest stands along all streams on BLM-administered land generally contain trees of sufficient size to provide a future source of large woody debris. However, past practices, such as salvage logging from riparian zones have reduced resulted in levels that are lower than might otherwise exist and “stream cleaning” removing debris jams to improve fish passage have reduced the amount of large woody debris in the larger perennial streams (USDI 1994).

Riparian surveys have been completed for the BLM land in the watershed. In these surveys, BLM survey crews pick sites that typified a stream reaches. Several vegetative, hydrologic as well as geographic parameters were measured for each of these sites. For this report only large woody material, potential large wood, and stream function rating will be covered.

Large woody material is in or is suspended above the stream channel. It is a structural element that provides for several functions of habitat for aquatic species. Here large wood is defined as having a diameter at breast height (DBH) of ≥16”. Key pieces are those 24” DBH or greater. Key pieces are generally more stable instream and may serve as a point to accumulate smaller pieces of wood.

Stream function ratings were established for each site during surveys. Stream function is based on a number of vegetative and hydrologic categories. The ratings are: Proper Functioning Condition, Functioning at Risk (Upward Trend), Functioning at Risk (Downward Trend), Functioning at Risk (Trend Not Apparent), and Nonfunctional.

Some areas identified as having low levels of large wood in streams and limited recruitment potential in the riparian reserves. Sections 35, 3, 9, and 17 each have more than a mile of streams that are at least Functioning at Risk (nonfunctional not included), but have no more than 1 piece of wood 16 - 24” DBH in 200 feet. All these streams also have 8 or more trees ≥16” DBH within 200 feet of the survey site for potential future large wood.

E. WATER QUALITY/QUANTITY

Water quality varies throughout the Watershed. The Oregon Department of Water Quality (DEQ) has monitored or collected water quality data from various sources on the streams and water bodies of the state. This information is captured in DEQ's 1988 Oregon Statewide Assessment of Nonpoint Sources of Water Pollution, and has been periodically updated and compared to standards. This has led to listing of some streams as "water quality limited". The most recent stage of this process has been the publication for public review of Oregon's 1998 Section 303(d) Decision Matrix by the DEQ.

Table III-1 lists those streams in the Althouse Creek Watershed currently listed as water quality limited. It is based on the DEQ's 1998 303(d) List Decision Matrix.

Table III-1: Oregon DEQ’s 303(d) Listed Streams

Stream & Segment	Parameter / Criterion	Basis for Consideration	Supporting Data or Info	Listing Status

Table III-1: Oregon DEQ's 303(d) Listed Streams

Stream & Segment	Parameter / Criterion	Basis for Consideration	Supporting Data or Info	Listing Status
Althouse Creek from East Fork of Illinois River 7.5miles upstream at Tartar Gulch	Summer Temperature (Fish Rearing, 64ºF)	Exceeded 7 day avg. max. at 5 sites, high 7day average of 69ºF	Exceeded Std.	303(d)

Streams that are 303(d) listed are water quality limited. They are required to be managed under Water Quality Management Plans. Because the Althouse Creek is the mainstem stream in this watershed, all streams that feed into the river will be included in the Water Quality Management Plan. There is not currently data specific to the tributary streams upon which to base an assessment. However, Democrat Gulch, Tartar Gulch appear to be possible candidates for testing of temperature, sedimentation and flow modification. Democrat Gulch has the status of "Need Data" (303d category). It is a candidate for water quality limited status (Sedimentation) but, due to insufficient data, a determination was not possible. .

1. Water Temperature

Many factors contribute to elevated stream temperatures in the watershed. Low summer stream flows, hot summer air temperatures, low-gradient valley bottoms, some south aspects, lack of riparian vegetation, and high channel width-to-depth ratios result in stream temperatures that can stress aquatic life. Natural conditions that can affect stream temperature are climate (high air temperatures), below-normal precipitation (low flows), wildfire (loss of riparian vegetation) and floods (loss of riparian vegetation). Human disturbances affecting stream temperatures include water withdrawals, channel alterations and removal of riparian vegetation through logging, mining, grazing or residential clearing (USDI 1998a). Logging, mining, and residential clearing are the three forms of human disturbance that are most evident in this watershed. Some streams in natural (undisturbed) condition may have temperatures that exceed DEQ standards due to lack of vegetation for shade, particularly in rocky, serpentine areas, and warm summer temperatures in this watershed.

The DEQ has established that the seven (7) day moving average of the daily maximum shall not exceed the following values unless specifically allowed under a Department-approved basin surface water temperature management plan:

- 64ºF during times and in waters that support salmonid juveniles rearing (summer)

- 55ºF during times and in waters that support salmon spawning, egg incubation and fry emergence from the egg and from the gravels (late fall into winter).

2. Water Clarity and Sediment

Streams that drain small watersheds that have a high portion of serpentine soils and geology may greater clarity than other streams in the watershed. Tartar Gulch may be such a stream. Greater clarity may be due to the unusual water chemistry attributed to weathering of ultramafic / serpentine minerals. USGS has, for example, tested water chemistry at various sites in the

Rough and Ready Creek system in the West Fork of Illinois 5th Field Watershed. When compared to background levels, test levels of stream water had high levels of Chromium, Nickel, and Magnesium in a base solution dominated by carbonates (USGS 1998). In this aqueous environment, these elements can occur as multivalent cations that attract multiple clay particles. These large clay aggregates drop out of suspension, forming sediment. There is no known field survey or study information that corroborates this hypothesis.

Other parts of the watershed, where streams drain non-serpentine soils, may be sources of turbidity and sediment. This would be more likely to occur where natural and/or man-caused disturbance levels are high. This would include intensively burned upland areas, exposed soil banks created by road building or hydraulic mining, extremely intense logging practices that would remove organic/vegetative cover from mineral soil. The Forest Service (Althouse Watershed Analysis, 1.0, 1996) indicated that a large source of sediment is an earth flow near Johnson Point. The earth flow resulted from old hydraulic mining in the area. Debris slides have developed at the toe of the earth flow adjacent to Althouse Creek. This is an example of how heavy disturbance can create ground instability leading to sedimentation in the stream system.

For further discussion of sediment in streams and sources of sediment see Forest Service watershed analysis (version 1.0) for this watershed.

3. Stream Flow

Stream flow in tributary streams fluctuates with the seasonal variation in precipitation. Generally, tributary streams respond quicker to a storm then the mainstem stream. Streams on the west side of the Althouse Creek Watershed as well as Tartar Gulch drain predominately ultramafic/serpentine uplands with clayey soils and where stream flow may be particularly flashy.

However, flashiness of tributary streams is not entirely reflected by Althouse Creek as it cushions flow flashiness because of other more stable flowing tributaries in the upper watershed and storm fronts can vary in parts of the watershed.

a. Peak Flow

Maximum peak flows generally occur in December, January and February. The maximum flow in the last 38 years of flow gage data on the Illinois River 2.5 miles northwest of Kerby is 92,200 CFS on December 22, 1964 (USGS 2000). There was a USGS stream gauge near Holland on Althouse Creek, 1947 to 1953 (Ref. *http://nwis.waterdata.usgs.gov/or/nwis/discharge*). In that period high peak flows varied from near 400 cubic feet per second (cfs) to 2,000 cfs (1953).

Upland disturbances can result in increased magnitude and frequency of peak flows which may result in accelerated streambank erosion, scouring and deposition of stream beds, and increased sediment transport. The natural disturbance having the greatest potential to increase the size and frequency of peak flows is a severe, extensive wildfire.

In this watershed, the primary human disturbances that potentially affect the timing and magnitude of peak flows include roads, soil compaction (due to logging and agriculture), vegetation removal (forest product harvest and conversion of sites to agricultural use), and rural development. Quantification of these effects on stream flow in the watershed is not available. Roads quickly intercept and route subsurface water and surface water to streams. The road-altered hydrologic network may increase the magnitude of increased flows and alter the timing of when runoff enters a stream (causing increased peak flows and reduced low flows). This effect is more pronounced in areas with high road densities and where roads are in close proximity to streams (USDI 1998a). Road density is discussed in the soils section of this chapter.

Soil compaction resulting from skid roads, agriculture and grazing also affects the hydrologic efficiency within a watershed by reducing the infiltration rate and causing more rainfall to quickly become surface runoff instead of moving slowly through the soil to stream channels (USDI 1998a). The extent of compaction within this watershed has not been quantified for BLM and private lands. Overall, however, as there has been little past management on BLM lands instances of significant soil compaction are unlikely.

Vegetation removal reduces water interception and transpiration and allows more precipitation to reach the soil surface and drain into streams or become groundwater. Until the crown closures reach previous levels, a site is considered to be hydrologically unrecovered. Rates of hydrologic recovery are site-specific and depend on many factors, including the type and extent of disturbance, soils, climate, and rates of revegetation (USDI 1993). Extensive removal of vegetation in the transient snow zone is of particular concern due to alterations of the stream flow regime and resultant increased peak flow magnitudes (USDI 1998a).

No hydrologic cumulative effects analysis (*e.g.*, extent of early seral vegetation, compacted area, TSZ, and road density by subwatershed) has been performed for the Althouse Creek Watershed.

b. Low Flow

In the period of 1947 to 1953 there was a USGS stream gauge near Holland on Althouse Creek, (Ref. *http://nwis.waterdata.usgs.gov/or/nwis/discharge*). Low summer flows were 4 to 6 cfs. Low summer flows reflect low storm activity during the summer and are exacerbated by periods of below-average rainfall. The lowest flow recorded since 1962 downstream of the watershed in the Illinois River at a gauge site 2.5 miles northwest of the town of Kerby was 12 cfs on August 24, 1992 (USGS 2000).

4. Domestic Water

There is little information available about domestic water use in the watershed. Wells are the predominant source for drinking water in this rural watershed. There are no groundwater studies for this area. Water quality and quantity is variable. Quantity varies also due to the nature of the bedrock and limited fracturing that would allow occurrence of aquifers. Quality is also likely variable due to the presence of serpentine/ultramafic rock and the related minerals. There are no authorized uses of public lands to transport water in the watershed.

F. STREAM CHANNELS

A system of stream classification has been developed by Rosgen that is useful in assessing various types of streams as to their sensitivity to disturbance and their recovery potential. Table III-2 provides a description of the classifications for the type of streams common in the watershed. The classifications are symbolized by a combination of letters and numbers. The first letter represents the stream type; the number represents the channel material.

Table III-2: Rosgen Stream Classification

Stream Type	General Description	Landform / Soils / Features
Aa+	Very steep, deeply entrenched, debris transport, torrent streams.	Very high relief. Erosional, bedrock or depositional features; debris flow potential. Deeply entrenched streams. Vertical steps with deep scour pools; waterfalls.
A	Steep entrenched, cascading, step / pool streams. High energy / debris transport associated with depositional soils. Very stable if bedrock or boulder dominated.	High relief. Erosional or depositional and bedrock forms. Entrenched and confined streams with cascading reaches. Frequently spaced, deep pools in associated step / pool bed morphology.
B	Moderately entrenched, moderate gradient, riffle dominated channel, with infrequently-spaced pools. Very stable plan and profile. Stable banks.	Moderate relief, colluvial deposition, or structural. Moderate entrenchment and width / depth ratio. Narrow, gently sloping valleys. Rapids predominate with scour pools.
C	Low-gradient, meandering, point-bar, riffle / pool, alluvial channels with broad, well defined floodplains.	Broad valleys with terraces, in association with floodplains, alluvial soils. Slightly entrenched with well-defined meandering channels. Riffle / pool bed morphology.
D	A braided condition with excessive bedloads. There is a high amount of surface water exposed to solar radiation. Depth is relatively shallow. Sections of Type D are not stable, usually due to excessive load of sediment created from an upstream source during high flows.	Broad valleys with terraces, in association with floodplains, alluvial soils. Slightly entrenched with well-defined meandering channels. Riffle / pool bed morphology.
F	Entrenched meandering riffle / pool channel on low gradients with high width / depth ratio.	Entrenched in highly-weathered material. Gentle gradients, with a high width / depth ratio. Meandering, laterally unstable with high bank erosion rates. Riffle / pool morphology.

Based on aerial photo interpretation, much of the lower broad valley bottom part of Althouse Creek is stream type C or straightened type which may be a type F. Althouse Slough appears to be the old channel of Althouse Creek; its sinuosity indicates it was a “C” stream. Some segments in the mid section, upstream from Tarter Gulch appear to be stream type B flowing through narrow valley bottom. Table III-3 indicates how streams of these types typically behave.

Table III-3: Rosgen Management Interpretations of Various Stream Types

Stream Type	Sensitivity to Disturbance	Recovery Potential	Sediment Supply	Streambank Erosion Potential	Vegetation Controlling Influence
AA+3,4	very low	excellent	low to very low	low	negligible
A2	very low	excellent	very low	very low	negligible
A3	very high	very poor	very high	high	negligible
A4	Extreme	very poor	very high	very high	negligible
B4	Moderate	excellent	moderate	low	moderate
B5	Moderate	excellent	moderate	moderate	moderate
B6	Moderate	excellent	moderate	low	moderate

Table III-3: Rosgen Management Interpretations of Various Stream Types

Stream Type	Sensitivity to Disturbance	Recovery Potential	Sediment Supply	Streambank Erosion Potential	Vegetation Controlling Influence
C3	Moderate	good	moderate	moderate	very high
C4	very high	good	high	very high	very high
D4	very high	poor	very high	very high	moderate
F5	very high	poor	very high	very high	moderate

Ref.: Rosgen, D. *Applied River Morphology*

G. VEGETATION

1. Description

Vegetation data on BLM land was compiled in 1999. The plant series listed below were identified and mapped within the Althouse Creek Watershed.

Basal area (BA) provides a relative measure of site productivity and is used here. An area that can support 200 ft^2/acre of basal area is, for example, more productive than an area that can support 100 ft^2/acre of basal area. Basal area in a plant series considers all species; it is not limited to the tree species that a series is named for. The following discussion indicates the relative productivity of each of the series in the watershed.

a. Douglas-fir (*Pseudotsuga menziesii* ((Mirb.) Franco.))

Douglas-fir is the most common tree species in southwestern Oregon. Sites within the Douglas-fir series average basal area of 254 ft^2/acre (Atzet and Wheeler 1984). Douglas-fir tends to produce conditions that favor fire wherever it occurs. This species is self-pruning, often sheds its needles and tends to increase the rate of fuel buildup and fuel drying (Atzet and Wheeler 1982).

b. Jeffrey Pine (*Pinus jeffreyi* (Grev. & Balf.))

The Jeffrey pine series is confined to areas of ultramafic (serpentine and serpentine influenced) soils (Atzet and Wheeler 1982). Serpentine areas dominated by Jeffrey pine may have the lowest productivity of any conifer series in the Klamath Province with an average basal area of 83 ft^2/acre (Atzet and Wheeler 1984). While not considered important in terms of timber production, these sites are floristically diverse supporting many special status plants. They also have value as unique habitats for a variety of wildlife species.

c. Ponderosa Pine (*Pinus ponderosa* (Laws.))

Basal are of forests in the ponderosa pine series average approximately 170 ft^2 /acre. This series is relatively rare as ponderosa pine does not often play the role of a climax dominant (Atzet and Wheeler 1984). This series tends to occupy hot, dry aspects that burn frequently. Ponderosa pine regeneration is restricted by reducing the number of fire events. Due to the success of fire suppression, overall cover of ponderosa pine has decreased (Atzet and Wheeler 1982). In the Althouse watershed the Ponderosa pine series is often intermixed within the DF and DF/TO series.

d. Tanoak (*Lithocarpus densifloras* (Hook. & Arn.) (Rehd.))

In general tanoak sites are considered productive. Average total basal area for this series is 262 ft^2/acre (Atzet and Wheeler 1984). The tanoak series occurs where both soil and atmospheric moisture are plentiful. The series occurs most frequently on cooler aspects with fine textured soils (Atzet and Wheeler 1984). Fire is the principal inhibitor of dominance of individual tanoak trees (Tappeiner et al.1990). Due to the success of fire suppression efforts, overall presence of this species has increased in the watershed.

e. White Oak (*Abies concolor* ((Gord. & Glend.)Lindl.))

The white oak series occurs at low elevations and is characterized by shallow soils. Average basal area is 46 ft^2/acre. Although Oregon white oak is usually considered a xeric species, it also commonly occurs in very moist locations such as flood plains, on heavy clay soils, and on river terraces. On better sites, white oak is out-competed by species that grow faster and taller (Stein 1990). Water deficits significantly limit survival and growth (Atzet and McCrimmon 1990). White oak has the ability to survive as a climax species as it is able to survive in environments with low annual or seasonal precipitation, droughty soils, and where fire is a repeated natural occurrence (Stein 1990). The natural fire regime of this series is one of high frequency and low intensity. Due to the success of fire suppression efforts over the last 70 years, overall presence of this species has decreased in the watershed.

The Port-Orford-cedar series is present as inclusions in larger mapping units. Port-Orford-cedar (POC) has been located in T40S, R 9W, Sections 9, 17, and 18 of the BLM portion of the watershed. POC requires high daytime humidity. Consequently, POC is associated with stream channels, lower slope positions, or other areas that meet the humidity criteria. POC has the ability to tolerate the chemical composition of ultramafic soils and can compete well there as long as the above mentioned humidity criteria are met. Productivity on ultramafic soils is lower than that seen on non-ultramafics. Basal area averages about 166 ft^2/acre on ultramafic soils compared to 401 ft^2/acre on non-ultramafic soils (Atzet and Wheeler 1984). POC is susceptible to an exotic pathogen, *Phytophthora lateralis* (PL), which is present on both Forest Service and BLM lands within the watershed. Areas with POC downstream from or adjacent to PL infestations are considered to be at risk. There are infected and uninfected POC sites in T40S., R7W, Sections 9, 17, and 18. Additional POC infected sites have been identified but not mapped.

Tables III-4 and III-5 summarize the extent of each of these plant series and vegetation condition class in the Althouse Creek Watershed on other than Forest Service lands. (Plant series acres for the all Forest Service lands are a data gap.)

Table III-4: Major Plant Series on Non-Forest Service Lands

Plant Series	BLM		Non-Federal		BLM + Non-Federal	
	Acres	%	Acres	%	Acres	%
Douglas-fir	1,187	25	4,180	39	5,367	35
Jeffrey pine	518	11	356	3	874	6
Non-Forest	57	1	212	2	269	2
Developed Vegetation	21	1	2,601	24	2,622	17
Douglas-fir/Tanoak	2,921	62	2,676	25	5,597	36
Unknown Series - Riparian Hardwood	3	<1	260	3	263	1
White Oak	3	<1	413	4	416	3
Totals	4,710	100	10,698	100	15,408	100

Data Source = BLM GIS

Table III-5: Vegetative Condition Class On Non-Forest Service Lands

Vegetative Condition Class	BLM		Non-Federal		BLM +Non-Federal	
	Acres	%	Acres	%	Acres	%
Grass or Forbs (Vegetation Class 1)	127	3	115	1	242	2
Shrub (Vegetation Class 2)	303	6	115	1	418	3
Hardwood dominated (Vegetation Class 3)	22	.4	252	2	274	2
Early (stand age < 10 years) (Vegetation Class 4)	47	.9	47	1	94	1
Seedling/Sapling (aver. stand DBH < 5") (Vegetation Class 5)	637	14	87	1	724	4
Poles (average stand DBH 5" to 11") (Vegetation Class 6)	90	2	17	1	107	1
Mid (average stand DBH 11" to 21") (Vegetation Class 7)	1504	32	5645	52	7149	46
Mature (average stand DBH > 21") (Vegetation Class 8)	1946	41	92	1	2038	13
Non-Vegetated (never vegetated and never will be) Vegetation Class 9	18	.3	160	1	178	1
Developed/Vegetated (Vegetation Class 10)	21	.4	4229	39	4250	27
Total	4715	100	10759	100	15474	100

Data Source = BLM GIS

Table III-6 summarizes plant series data combined with vegetative condition class. Additional analysis of site specific vegetative conditions will be necessary to prescribe forest management activities.

Table III-6: BLM and Non-BLM/Non-USFS Land by Dominant Vegetation

Dominant Vegetation	BLM		Non BLM/Non USFS	
	Acres	% of watershed	Acres	% of watershed
Hardwood	22	1	252	2
Hardwood/Conifer	3359	71	6399	59
Douglas-fir	47	1	0	0
Jeffery Pine/Grass	773	16	11	1
Jeffery Pine/Shrub	93	2	679	6
Grass	128	3	3096	29
Shrub	221	5	115	1
Nonvegetated	56	1	160	2

2. Landscape Patterns

a. Serpentine Soils

There is an extensive acreage of serpentine soils present in this watershed which are a dominant basis for the landscape patterns in the watershed. These soils provide habitat for a number of rare plant species. More than one-quarter of the BLM lands within the Althouse Creek Watershed are serpentine or serpentine influenced.

b. Plant Series

The three most common plant communities within the watershed are Douglas-fir/Tanoak, Douglas-fir, and Jeffrey pine. Together they make up 98% of the BLM lands in the watershed. The Douglas-fir/Tanoak series is most common, occurring on 62% of the acres. On BLM lands, the Douglas-fir series is found on 25% of the acres. The third most common plant series in the watershed occurring on approximately 11% of the acres is Jeffrey pine

H. SPECIES AND HABITATS

1. Rare Plant Species and Habitats

a. Special Status Species

The BLM is responsible for management of special status plant species and their habitats, special areas and native plants. Bureau special status species (BSS) occur on all land allocations. The Illinois Valley Botanical Area was established in the 1994 Medford RMP and occupies approximately 90 acres of BLM in the watershed. This designation was established “due to the preponderance of special status species. Actions including timber harvesting will be allowed if they do not conflict with the habitat needs of these plants.” (RMP / ROD, 1994).

A large portion of the BLM lands in the watershed have been surveyed for special status plants. Approximately 3,200 acres (68% of the watershed) has been surveyed for special status vascular plants and 400 acres (9%) for non-vascular plants. From current surveys and informal inventories, 122 populations of BSS vascular and non-vascular populations have been found.

It is likely additional species and new sites will be found as surveys occur in other areas and during different times of the year. Not all rare plants and rare plant populations are discovered during the course of surveys. Some rare plant populations are overlooked or missed and some populations are not present certain years due to varying environmental influences and plant morphological conditions. One hundred and twenty-two (122) records of BSS plants have been located on BLM lands in the watershed which equates to approximately one population every 40 acres in the watersheds. One hundred-five (105) sites are managed as BSS species. The other 8 sites are Bureau tracking species. No BSS nonvascular or fungi populations have been discovered to date.

Table II-7 below lists the 11 BSS plant species that occur in the Althouse Creek Watershed. Grants Pass Willow herb and slender meadow foam are riparian associate species. Howell's mariposa lily, Howell's fawn lily, Howell's silverpuffs are bottom land serpentine endemics. Clustered lady-slipper, Mountain lady's slipper and Firecracker flower are upland conifer associated species. Red larkspur and Short-lobed Indian paintbrush generally occur on rocky, shallow soil sites that are more open.

Table III-7: BSS Species - Status, District Occurrences and Total Individuals (est)

NACODE	Species name	Common Name	2003 Bureau Status	2003 Heritage List#	Medford District Number Sites	Medford District Number of Plants
CAHO11	*Calochortus howellii*	Howell's mariposa lily	STO	1	71	51,235
MIHO2	*Microseris howellii*	Howell's silverpuffs	STO	1	248	171,795
CYFA	*Cypripedium fasciculatum*	Clustered lady's-slipper	BSO	1	562	5,636
EPOR	*Epilobium oreganum*	Grants Pass willowherb	BSO	1	14	1,936
ERHO10	*Erythronium howellii*	Howell's fawnlily	BSO	1	146	82,917
LIGRG2	*Limnanthes gracilis var gracilis*	Slender meadow-foam	BSO	1	69	260726
SEHE2	*Senecio hesperius*	Western ragwort	BSO	1	136	278025
DENU	*Delphinium nudicaule*	Red larkspur	BAO	1	18	31,386
CYMO2	*Cypripedium montanum*	Mountain lady's-slipper	BTO	4	173	1,910
DIID	*Dichelostemma ida-maia*	Firecracker flower	BTO	4	1	37
CABR17	*Castilleja brevilobata*	short-lobe Indian paintbrush	BTO	2	50	7134

Table III-8 summarizes the number of records of BSS plants located in Althouse Watershed over the years. Eleven Bureau special status plant species occur in the Althouse Watershed. Three species, Howell's Mariposa lily, Slender Meadow-foam and Howell's fawn lily and Firecracker flower comprise a significant numbers of sites within the watershed compared to records throughout the district. Two of these species, Howell's Mariposa lily and Howell's fawn lily are serpentine endemics comprise 20% and 30% respectively of the total number of sites reported in the Medford District.

Table III-8: BSS Plant Species: Sites Discovered, % of District Total and District Population Ranges

Bureau Status	Species	Species name	Common Name	Althouse WA		Medford District Database Site Data		
				# Sites	% Of Total Sites	Total Sites	Population Range	# of Populations / # of individuals
STO	CAHO11	*Calochortus howellii*	Howell's mariposa lily	14	20%	71	1 to 10,000	13 / 1000
STO	MIHO2	*Microseris howellii*	Howell's silverpuffs	1	0%	248	1 to 45,000	42 / 1000
BSO	CYFA	*Cypripedium fasciculatum*	Clustered lady's-slipper	41	7%	562	1 to 200	8 / 100
BSO	LIGRG2	*Limnanthes gracilis var gracilis*	Slender meadow-foam	7	10%	69	1 to 50,000	22 / 1000
BSO	ERHO10	*Erythronium howellii*	Howell's fawnlily	44	30%	146	1 to 10,000	17 / 1000
BSO	EPOR	*Epilobium oreganum*	Grants Pass willowherb	1	7%	14	1 to 550	7 / 100
BSO	SEHE2	*Senecio hesperius*	Western ragwort	5	4%	136	1 to 25,000	43 / 1000
BAO	DENU	*Delphinium nudicaule*	Red larkspur	1	6%	18	1 to 10,000	3 / 1000
BTO	CYMO2	*Cypripedium montanum*	Mountain lady's-slipper	5	3%	173	1 to 200	8 / 50
BTO	DIID	*Dichelostemma ida-maia*	Firecracker flower	1	100%	1	37	
BTO	CABR17	*Castilleja brevilobata*	Short-lobe Indian paintbrush	2	4%	50	1 to 2000	2 / 1000
			TOTALS	122	8%	1488		

The following describes the Bureau Special Status plant categories:

Federally listed plant species, species proposed for listing, candidate species and species of concern under the ESA by the U.S. Fish and Wildlife Service (USFWS): This group of plant species is protected under federal law on federal lands. No protection is provided on private lands. The goals are to protect the viability of known populations and their habitat and any designated critical habitats and take any reasonable conservation actions so that they can be removed from protection under the ESA.

State-listed plant species Oregon (STO): Those plants listed or proposed for listing under the Oregon Endangered Species Act as "endangered or threatened". Protection of listed or proposed for listing species is provided on federal lands and conservation measures developed in conjunction with the Oregon Dept. of Agriculture.

Bureau-sensitive Oregon (BSO): This designation includes both federal and state listed species and all species designated by the Oregon Natural Heritage (ONH) as State Rank of 1. The management goal is to conserve populations and habitats and avoid the need to list the species under the ESA.

Bureau assessment Oregon (BAO): A category of species based on ONH State Rank #2. This group is established to provide some protection, but a lower level of protection than BSO species based on local abundance and availability of resources. The goal is to manage where possible so as not to elevate their status to any higher level of concern.

Bureau tracking Oregon (BTO) and **Bureau watch Oregon (BWO):** This group is not included in Special Status species, but is of local concern or interest. Populations and locations are tracked during surveys to assess potential changes to species status.

b. Noxious Weeds and Non-Native Plants

The Althouse watershed is typical of mountainous terrain in the Klamath Mountains connected in the lowlands on fertile flat land with other 5th and 7th field watersheds. Typically the bottom lands have a long and extensive history of human activities and weeds are a common by-product. Most of the weeds identified below are found commonly in the bottom lands as a result of ranches and farm activities, past mining activity, and other development. Most weed sources generally can be traced back to use of the plant for some agricultural purpose or by contaminated crop seeds where the species escapes out of control. On public lands weeds are commonly introduced and spread along roads during road construction and rocking operations or by seeding of poorly selected species to revegetate along disturbed areas.

Much of the watershed has been surveyed for weeds. Weed surveys are combined with vascular plant surveys. When weed populations are discovered site reports are created for future treatment.

Weed elimination treatments have occurred infrequently. Spotted knapweed, meadow knapweed and scotch broom have been treated. Some sites have been treated numerous times over the past 5 years.

Common noxious and exotic weeds present within Althouse Watershed are listed in Table III-9.

Table III-9: Known Noxious Weeds or Exotic Plants

Species	Habitat
Bromus tectorum (Cheat grass)	Disturbed areas.
Centaurea sp. (Meadow Knapweed)	Disturbed areas, meadows, roadsides.
Centaurea solstitialis (Yellow star-thistle)	Disturbed areas, alongside roads, river corridor.
Circium vulgare (Bull thistle)	Disturbed areas, meadows, roadsides
Cystisus scoparious (Scotch broom)	Old homesteads, mining areas, along roadsides, some campgrounds.
Elytrigia intermedia (Intermediate wheat grass)	Introduced grass for revegetation purposes.
Holcus lanatum (Velvet grass)	Introduced grass for feed and revegetation purposes.
Lathyrus latifolius (Everlasting peavine)	Has invaded seeps, springs, meadows, and streams around culverts.
Hypericum perforatum (Klamath weed)	Along roads, landings, meadows, skid trails and plantations.
Rubus discolor (Himalayan blackberry)	Extensive area along roadsides, disturbed areas, homesteads, fields and meadows, seeds carried by birds.
Taraxacum officinale (Dandelion)	Disturbed areas, meadows, roadsides
Trifolium repens (White clover)	Introduced wildlife species to improve habitat.
Verbascum thapsus (Mullein)	Introduced with cattle feed, spread to plantations

c. Habitats

Habitat types can be very clear and definitive at times and at other times there is blending and “fusion”, or transitional zones where characteristics of 2 or more habitat types are combined and co-exist. Although 5 habitat types are identified here, the rare plant species associated with the habitat may not strictly adhere to them. Additional inventory work and habitat correlation studies are needed to determine the quality and quantity of these habitats.

1) Serpentine Habitats

The watershed has both wet and dry serpentine habitats suitable for several endemic special status species. The plants can be found in forest openings, rock outcrops, grasslands or barrens. The species inhabit these ultra-mafic soils sites because of adaptations and specializations developed over time to mineral imbalances in the soil.

Upland and dry serpentine endemics in the watershed: Howell's mariposa lily, Howell's fawnlily, Howell's silverpuffs, western ragwort and short-lobed Indian paintbrush.

Wetland serpentine endemics: Oregon willow herb. Ephemerally wet serpentine soils provide habitat for slender meadow foam and other unusual, but not rare plant species.
.
On BLM lands both wet and dry serpentine areas are sometimes disturbed or destroyed by road construction, timber harvest activities, mining, OHVs or other related activities. Some of the low elevation serpentine barrens were intensively disturbed by hydraulic mining in the 1930s. These areas, especially in areas with mine tailings, may never fully recover.

2) Riparian Habitats

Riparian habitats throughout the watershed may be suitable habitat for California pitcher plant, California lady's slipper, large flowered rush lily, Del Norte willow, Oregon willow-herb, slender meadow-foam, Cook's desert parsley and western bog violet. Perennial riparian habitat is in the form of riverine forests, streambanks, spring-fed seeps, pitcher plant fens and meadows. Riparian habitats have been disturbed through agricultural developments, housing developments, mining, skid trails and OHV use.

3) Forested Habitats

Douglas-fir conifer forested habitats are scattered throughout the watershed on BLM lands. Forests can be dominated by Douglas-fir or tanoak. Many have edges adjacent to serpentine openings where soil types blend together. These forested habitats carry the legacy of effects from timber harvesting, mining, wildfire and fire suppression. Other impacts are related to recreation and road building. Howell's fawn lily, clustered lady's slipper and mountain lady's slipper prefer forested habitat.

4) Valley Bottom Grassland / Savannah Habitats

Few areas of valley grasslands or White-oak stands still exist on BLM land in the watershed. The bunch grass understory is potential habitat for Cook's desert parsley which is a federally listed species. The tufted hairgrass/oatgrass wet meadow community also occurs in the low elevation lands of the BLM. Both of these habitats are highly threatened by development and OHV impacts.

5) Rock Outcrops

There are two special status species that occur on rock outcrops within the watershed: Rogue canyon rockcress and Waldo rockcress.

d. Special Areas

The Illinois Valley Botanical Area was established in the 1994 Medford RMP and occupies approximately 90 acres of public lands within the watershed. This designation was established "due to the preponderance of special status species."

2. Wildlife

a. Special Status Species and Habitats

1) Habitats

Wildlife habitats of southwest Oregon are extremely complex. Terrain, climatic factors and vegetation combine to create the diversity of habitats found from the valley floor to the peaks of the Siskiyou Mountains. Habitats found in the Althouse Creek Watershed include meadows and fields on the valley bottom, riparian areas, white oak stands, Jeffrey pine / serpentine communities (*i.e.*, serpentine barrens) and a variety of other unique areas. The Althouse Creek Watershed is characterized by coniferous forest, shrub, a significant white oak stand in the northwest section of the watershed, and serpentine associated communities.

BLM administered land in the watershed includes 24 acres of designated spotted owl Critical Habitat. This overlaps with LSR lands.

Approximately 41% of the watershed has ultramafic soils, 18% directly derived from serpentine and 23% is serpentine influenced. These serpentine / peridotite areas are characterized by edaphic endemic plants, complex vegetative patterns, shrub dominated communities and Jeffrey pine forests. The vegetation series occurring on these sites do not have the potential for attaining old growth conifer forest conditions.

Outside of the serpentine influenced sites, there are coniferous forests ranging in age and structure. The forests in the watershed have a significant component of hardwood trees, particularly tanoak, that contribute to structural and vegetative diversity.

The plant communities and habitats occurring in the watershed support an array of native wildlife. During their lifetime, animals require food, water, shelter and space to breed and raise young. Some species have adapted to a particular habitat (specialists) while others utilize many different plant communities to fulfill their needs (generalists). Because habitat requirements vary greatly, a single dominant vegetative structure will not meet the needs of all species, and may not meet the need of any one species during all phases of the year.

Habitats of particular interest in the watershed include late-successional forest, meadows, pine stands, oak woodlands, serpentine sites, and riparian habitat. All of these habitats have been impacted by both natural processes and human activity in the watershed.

a) Valley Habitats

The watershed is characterized by numerous drainages flowing toward the mainstem of Althouse Creek. These drainages are typified by a limited area of valley habitat and relatively steep forested hillsides. Almost all valley bottom habitat is on private lands while BLM lands provide the transition from the valley bottom, extending into the uplands. Development, agricultural use and mining are prevalent in the watershed. Where flat terrain does exist, it has, for the most part, been developed. Undisturbed native valley habitats are scarce. The transition from valley to uplands occurs mainly on BLM lands with extensive private in holdings. The uplands occur primarily on Forest Service lands.

Fire exclusion may adversely affect the remaining undisturbed valley habitats. Because non-stand replacing fires are important to the maintenance of many plant communities, its exclusion has contributed to a reduction in the quantity and quality of habitats including oak woodlands, meadows, conifer forests and chaparral. These habitats have been identified as three of the five critical habitats by the Oregon/Washington neotropical bird working group. A basic assumption is that further losses of these habitats would have an adverse impact on neotropical migrant birds.

In southwestern Oregon, native valley habitats have shown some of the greatest declines of any plant communities. This is due to the changing nature of private land management. Little of this habitat type is on BLM lands in this watershed. These stands provide primary nesting habitat for acorn woodpeckers *(Melanerpes formicivorous)* and western bluebirds *(Sialia mexicana)* as well as winter range for blacktail deer *(Odocoileus hemionus)*. Smaller mammals using this habitat include raccoon *(Procyon lotor),* ringtail *(Basariscus astutus),* and grey fox *(Urocyon cinereoargenteus).*

b) Upland Habitats

Most of the federal lands in the watershed are found above the valley floor. Here, forests dominate the landscape, with numerous species of conifers, hardwoods, shrubs, and herbaceous plants. Many of the hardwoods are berry and mast producers that offer a rich food source for wildlife. Mast crop producers include California black oak *(Quercus kelloggii)*, Oregon white oak *(Quercus garryana)*, tanoak *(Lithocarpus densiflorus)*, and California hazel *(Corylus cornuta)*. Berry producing plants such as Pacific madrone *(Arbutus menziesii)* and manzanita *(Arctostaphylos spp.)* are also important crop producers for wildlife.

Habitats within the uplands include late-successional forests, riparian areas and Jeffrey pine savannahs that add diversity to the landscape. Natural disturbances such as fire, wind damage, insects and disease are needed to generate and maintain a number of plant communities and habitats.

Currently, many private lands and county lands are in early seral stage to pole stage, with little mature forest. On federal land, the range includes early to late seral. Many of these stands are the result of past timber harvest and are different structurally in comparison to natural stands. The shift from older forests to younger forests has benefited generalists and early seral species, but has not been advantageous to species that depend on late-successional forest habitat. Additionally, past forest management practices and private land ownership patterns have created heavily fragmented late-successional stands which may not provide interior forest conditions. Serpentine influenced soils have fragmented the landscape and will not provide late-successional habitat, but have not been as heavily impacted by human activities as other forest types.

To facilitate mining activities and timber extraction, numerous roads were constructed throughout the uplands. For species such as black bear, areas with low road densities offer important refugia from disturbance.

Areas with high road densities contribute to disturbance and fragmentation of late-successional forest patches. Roads decrease the effectiveness of a number of habitats. Roads also lead to increases in vehicular/human disturbance and provide access for poaching.

c) Aquatic Habitats

Riparian areas are one of the most heavily used habitats found in the watershed, both by humans and by wildlife. Many life cycle requirements of animals are met in these areas. Aquatic and amphibious species are intrinsically tied to these habitats, as are all the species that feed on these animals.

Riparian habitats have been heavily impacted by mining, road building and logging. The riparian zone on private lands varies from mature stands of conifers to bare streambanks. Most of the private riparian is dominated by hardwoods and young conifers. Riparian areas on federal lands are generally in better condition than those on private land due to past activities such as mining and timber harvest.

The amount of water allowed to flow from the source to the Althouse Creek strongly influences the usefulness of streams to aquatic species. During low flow periods, water withdrawals can determine the absence/presence of many aquatic species.

d) Specialized / Sensitive Habitats

Special and unique habitats include the following: 1) naturally scarce habitats (caves, springs, mineral licks, etc.), 2) rare habitats due to human influence on the environment (low elevation old-growth, oak/grasslands, etc.) and, 3) rare habitats due to the influence of natural cycles (snags, meadow production, bogs, etc.). Often, these habitats receive a higher level of use by wildlife than surrounding habitats, or are essential for certain aspects of a particular animal's life history (*e.g.*, hibernation).

The Althouse Creek Watershed contains a number of unique habitats. The continued maintenance of these habitats will determine the presence of many sensitive species. Relevant sensitive habitats are discussed below.

Late-successional forests and habitat are characterized by different stand parameters. For example, late-successional forests include forest stands greater than 80 years old. Vegetation class descriptions are based on average tree diameter and do not include many of the attributes used to describe late-succession forest habitat elements such as downed material, snags and understory structure that are key to their use by some species and which are not always present in 80+ year stands; at 80 years, a forest will not have the complexity or diversity characteristics of an older forest.

According to the vegetation condition class summary for the watershed, mature forests comprise approximately 1,973 acres of BLM lands. This equates to approximately 15% of the 29,242 acre watershed and 42% of BLM lands in the watershed.

Late-successional forest habitat is often characterized using other descriptors such as multi-storied canopy, high canopy closure (>60%), large trees, snags and large down logs. McKelvey #1 and 2 ratings for northern spotted owl habitat quality are sometimes used as well. Based on this criterion, there are 329 acres of BLM and private lands of late-successional forest habitat, approximately 1% of the watershed. The late-successional habitat on BLM lands in the watershed is along the east edge of the watershed bordering BLM lands in the Sucker Creek watershed and along the south edge of BLM lands bordering Forest Service lands, which have soils more capable of supporting mature forests.

Due to the wide variety of niches, mature and old growth forests have a greater diversity of wildlife species than do younger forested stands. The size of these forest patches and their connectivity largely determine their suitability for many wildlife species such as the American marten (*Martes americana*) and northern spotted owl (*Strix occidentalis*).

Small, fragmented stands may offer refugia for species with limited home ranges, but do not provide optimal habitat for species with larger home ranges and may also be too small to support the maximum diversity of species. Large stands (>80 acres) are very important contributors to maintaining the biodiversity of the watershed. In heavily fragmented environments, larger predators that naturally occur at low densities are lost first (Harris and Gallagher 1989).

On BLM lands in the Althouse Creek Watershed, late-successional habitat/old growth forest patches occur infrequently and their distribution is fragmented. Past management activities such as timber harvesting, mining, agriculture and home developments have reduced the current quantity and distribution of late-successional habitat. Additionally, serpentine derived soils occurring throughout the watershed are not capable of producing late-successional habitat suitable for species such as the spotted owl.

Poor distribution reduces the value of forest patches for species associated with late-succession interior forest habitat. This is particularly true for species with low dispersal capabilities such as the red tree vole and the Del Norte salamander.

Irregular shapes and small size patches increase the amount of edge associated habitat within a stand. This has the effect of reducing interior forest conditions. Generally, 50 to 80 acres of unbroken forest is required to provide these conditions. Stands smaller than this may be unsuitable habitat conditions for many late-successional forest-dependent species and stands of this size may be too small to support some wide-ranging late-successional species. Stands with a high level of "edge" no longer function as interior forest and do not provide suitable habitat for species sensitive to edge effects. The micro-climatic changes of the "edge effect" can be measured up to three tree lengths in the interior of the stand.

Compared to species associated with early successional stages, species that depend on late-successional forests are often poor dispersers and are more vulnerable to extinction in fragmented landscapes (Noss 1992). This is particularly true for flightless species such as the fisher (*Martes pennanti*). Fishers are reluctant to travel through areas lacking overhead cover (Maser et al. 1981) and are at risk for genetic isolation. (Note that there is little potential for suitable fisher habitat in the watershed on BLM or private lands in the watershed.) Species that are more mobile, such as the spotted owl, may be capable of dispersing to isolated patches of habitat but run a high risk of predation when crossing areas of unsuitable habitat.

Meadows within the Althouse Creek Watershed are typically associated with the valley floor and serpentine influenced soils. Earlier in the century, many natural meadows were converted to agricultural land by homesteaders. Currently the greatest threat to this habitat is tree encroachment due to disruption of the natural fire cycle. Meadows are the primary habitat for a number of species such as California vole (*Microtus californicus*) and the western pocket gopher (*Thomomys mazama*) and are the primary feeding location for species such as the great grey owl (*Strix nebulosa*), American black bear (*Ursus americanus*) and neotropical bird species.

Big game winter range in the Althouse Creek Watershed is in poor condition due to fire exclusion. As plants become older, they lose their nutritional value, become woody and less palatable, and often form dense impenetrable stands which impede the ability of animals to browse. This is particularly true of buckbrush (*Ceanothus cuneatus*), an important forage plant. Winter range is defined as land found below 2,000 feet in elevation although it may extend higher in elevation on southern exposed slopes. Ideally, these areas offer a mixture of thermal cover, hiding cover and forage. Historically, the valley floor and adjacent slopes served as winter range for deer and elk. Much of the winter range has had no fire for more than 50 years.

Dispersal corridors aid in gene pool flow, natural reintroduction and successful pioneering of species into previously unoccupied habitat. Animals disperse across the landscape for a number of reasons including food, cover, mates, refuge, and to locate unoccupied territories. The vast majority of animals must move during some stage of their life cycle (Harris and Gallagher 1989).

Dispersal corridors provide hiding and resting cover. Dispersal and migration are key processes for wildlife within and through the watershed. This process is highly dependent on quality, quantity and spatial distribution of appropriate habitat through time. Species habitat requirements vary greatly and a single dominant vegetative structure will not meet the needs of all species.

Migration can occur at a localized level or at a regional level. Species migrating through the watershed on a regional level include animals as diverse as insects, bats and birds. Localized migration allows for species to take advantage of foraging opportunities and cover during inclement conditions. Localized dispersal of species is critical for ensuring gene flow and repopulation of uncolonized habitat.

Generally, dispersal corridors are located in saddles, low divides, ridges, and along Riparian Reserves. Without such corridors, many isolated wildlife habitats would be too small to support the maximum diversity of species. Numerous ridgelines within the watershed allow for localized dispersal as well as regional dispersal. Dispersal between drainages is also accomplished through low divides.

Because they often provide late-successional habitat, Riparian Reserves serve as important dispersal corridors across the landscape for some species.

BLM lands within the watershed do not provide much late-successional forest habitat connectivity between Late-Successional Reserves. This part of the watershed is largely serpentine soil which does not support dense conifer stands or characteristic spotted owl dispersal habitat (11"DBH average trees and a 40% canopy closure).

A spotted owl meta-population is more likely to persist if genetic interchange occurs between spotted owls within reserved areas and between ecological provinces (Thomas et al. 1990). Spotted owls are known to disperse through a wide variety of forest types, although their success can vary greatly depending on the condition of the forest. The more closely their dispersal route vegetation resembles suitable habitat the more likely spotted owls will successfully complete the journey (Thomas et al. 1990).

Minimal dispersal habitat occurs on BLM lands in the watershed and this is further fragmented by private lands. The 518 acres of BLM and 356 acres of private lands dominated by Jeffrey pine are capable of supporting minimal dispersal habitat for spotted owls and some other late-successional dependent species. Their more important function is to provide habitat for species requiring/desiring a moderate canopy cover for dispersal and other life functions.

While the lower watershed, composed primarily of BLM and private lands is fragmented (natural and human influenced), the upper watershed on Forest Service lands provides for more interior forest habitat, but has also been fragmented by past timber harvest.

Within the watershed, important areas for spotted owl habitat are along the east side bordering the Sucker Creek watershed and connecting to Forest Service lands along the south edge of BLM lands. This is also where lands are not serpentine influenced and are capable of supporting late-successional habitat. It is also the area where most spotted owl sites occur.

Oak woodlands/savannahs are a rich resource providing nesting habitat, mast crop production, big game wintering range and sheltered fawning areas. Due to the exclusion of fire, many of these areas are being encroached upon by conifers, though fire intervals are not far from the norm. Federally administered stands of oak woodlands and savannah are scattered throughout the non-USFS portions of the watershed, but are not encompassed in large blocks.

Mine adits play a critical role in the life history of many animals, providing shelter from environmental extremes, seclusion and darkness. Mines are the primary habitat for species such as the Townsend's big-eared bat *(Corynorhinus townsendii)*, a state Critical and Bureau-Sensitive species. Other species such as the bushy-tailed woodrat *(Neotoma cinerea)* and the cave cricket *(Ceuthophilus spp.)* use caves as their primary residence. These sites are also used seasonally for a number of species such as ringtails, roost sites for other bat species and den sites for porcupine *(Erethizon dorsatum)*. A number of mine adits are located on BLM lands within the watershed.

Deer fawning areas are critical for successful maintenance of deer populations. Key components include quality forage, water, cover, and gentle warm slopes. These areas should be free from human disturbance. Fawning areas on federally-administered lands are found in many small meadows scattered throughout the watershed, and in areas with southern exposures. On private lands throughout the watershed, fawning areas can be found. However, disturbance and development have influenced the quality of these sites.

2) Wildlife Species

The high diversity of vegetative communities and consequent high diversity of habitats in the watershed potentially provide for a wide variety of animal species. Relatively few formal surveys for wildlife have, however, been conducted in the watershed. Distribution, abundance, and presence for the majority of species are unknown.

As many as 11 species of bats, 12 species of amphibians, 18 species of reptiles, hundreds of species of birds, and many thousands of species of insects may occur here. Some species of concern potentially occurring within the watershed include cavity nesters, band-tailed pigeons, and neotropical migrant birds. All but three indigenous mammals (grizzly bear, wolf and wolverine) are thought to have the potential to occur in the watershed.

Of the 49 special status species potentially occurring in the watershed, most are associated with older forest habitats. However, other important habitats include riparian, oak stands, meadows, pine savannahs and special habitats such as caves, cliffs and talus (see Chapter V, Synthesis and Interpretation, for habitat trends). Current status is shown in Tables III-11 / 12. Additional species of interest, but without special status are potential inhabitants of the watershed.

Federal agencies are responsible for the active management of special status species and their habitats. The following special status protection categories serve as guidelines for special status species management and their habitats.

Listed and proposed listed species are those species that have been formally listed under the Endangered Species Act by the USFWS as endangered or threatened or officially proposed for listing. The goal is to enhance or maintain critical habitats and increase populations of threatened and endangered species on federal lands. This goal also includes restoration of species to historic ranges consistent with approved recovery plans and federal land use plans after consultation with federal and state agencies.
Candidate and Bureau-Sensitive species are federal or state candidates and those species considered by the BLM to be of concern for becoming federal candidates. The goal is to manage their habitat to conserve and maintain populations of candidate and Bureau-sensitive species at a level that will avoid endangering species and the need to list any species by either state or federal government as threatened or endangered or threatened.

State listed species and their habitats are listed under the Oregon Endangered Species Act.

Conservation will be designed to assist the state in achieving their management objectives.

Bureau-Assessment species are those species considered by the state BLM office as important species to monitor and manage, but not on as crucial a level as candidate or Bureau-sensitive species. The goal is to manage where possible so as not to elevate their status to any higher level of concern.

BLM tracking species are not currently special status species, but their locations are tracked during surveys to assess future potential needs for protection.

a) Special Status Species

In this watershed, the northern spotted owl is the only species listed under the Endangered Species Act known to reproduce in the area. Bald eagles likely forage in the watershed, particularly along the lower areas of the watershed. There are also Bureau special status species (Sensitive, tracking and assessment) and NFP buffer species (NFP, C-49).

Tables III-11 and III-12 list known and potential special status species found in the watershed, along with status and level of survey as of August 2004. This list includes species listed under the ESA, proposed for listing, and candidate species being reviewed by the USFWS. State listed species as well as Bureau assessment species and NFP-ROD “buffer" species are also listed. (For more information on this list and habitat needs see appendix section D.)

Table III-11: Special Status Species (Vertebrates)

Common Name	Scientific Name	Presence	Status*	Survey Level on BLM (as of 7/2004)
Gray wolf	*Canis lupus*	absent	FE,SE	none to date
Red tree vole	*Aborimus longicaudus*	suspected	BT	none to date
White-footed vole	*Aborimus albipes*	unknown	BT, SU	none to date
Fisher	*Martes pennanti*	suspected	BS,SC,FC	limited
California wolverine	*Gulo gulo luteus*	unknown	BS,ST	limited
American marten	*Martes americana*	unknown	BT,SV	limited
Ringtail	*Bassacriscus astutus*	present	BT,SU	limited
Peregrine falcon	*Falco peregrinus*	migratory	BS,SE, BOCC	none to date
Bald eagle	*Haliaeetus leucocephalus*	Suspected	FT,ST	limited
Northern spotted owl	*Strix occidentlis*	Present	FT,ST	limited surveys
Marbled murrelet	*Brachyramphus marmoratus*	Unknown	FT	most suitable habitat
Streaked horned lark	*Eremophila alpestris strigata*	Unknown	FC, BOCC	None to date
Northern goshawk	*Accipiter gentilis*	suspected	BS,SC	None to date
Mountain quail	*Oreortyx pictus*	suspected	BT,SU	None to date
Pileated woodpecker	*Dryocopus pileatus*	Present	BT,SV	incidental sightings
Lewis' woodpecker	*Melanerpes lewis*	Present	BS,SC,BOCC	incidental sightings
White-headed woodpecker	*Picoides albolarvatus*	unknown	BS,SC,BOCC	None to date
Flammulated owl	*Otus flammeolus*	unknown	BS,SC.BOCC	None to date
Purple martin	*Progne subis*	unknown	BS,SC	None to date
Great gray owl	*Strix nebulosa*	unknown	BT,SV	most suitable habitat
Burrowing owl	*Athene cunicularia hypugaea*	Unknown	BS, BOCC	None to date
Western bluebird	*Sialia mexicana*	Present	BT,SV	None to date
Acorn woodpecker	*Melanerpes formicivorus*	unknown	BT	None to date
Tricolored blackbird	*Agelaius tricolor*	unknown	BA,SP, BOCC	None to date
Black-backed woodpecker	*Picoides arcticus*	unknown	BS,SC,	None to date
Three-toed woodpecker	*Picoides tridactylus*	Unknown	BS	None to date
Williamson’s sapsucker	*Sphyrapicus thyroideus*	Unknown	BT, BOCC	None to date

Table III-11: Special Status Species (Vertebrates)

Common Name	Scientific Name	Presence	Status*	Survey Level on BLM (as of 7/2004)
Bank swallow	*Riparia riparia*	migratory	BT,SU	None to date
Olive-sided flycatcher	*Contopus cooperi*	suspected	BT,SV,BOCC	None to date
White-tailed kite	*Elanus leucurus*	unknown	BA	None to date
Ferruginous hawk	*Buteo regalis*	Unknown	BS	None to date
Swainson's hawk	*Bureo swainsoni*	Unknown	BT, BOCC	None to date
Western meadowlark	*Sturnella neglecta*	Unknown	BT	None to date
Willow flycatcher	*Epidonax traillii brewsteri*	unknown	BT,SV	none to date
Yellow-breasted chat	*Icteria virens*	Unknown	BT	None to date
Pygmy nuthatch	*Sitta pygmaea*	Unknown	BT	None to date
Band-tailed pigeon	*Comumba fasciata*	Unknown	BT	None to date
Black-throated sparrow	*Amphispiza bilineata*	Unknown	BT	None to date
Black tern	*Childonias niger*	Unknown	BT	None to date
Rufous hummingbird	*Selasphorus rufus*	unknown	BOCC	None to date
Common nighthawk	*Chordeiles minor*	Unknown	BT	None to date
Greater sandhill crane	*Grus cnandensis tabida*	Unknown	BT	None to date
Trumpeter swan	*Cygnus buccinator*	Unknown	BA	None to date
Townsend's big-eared bat	*Corynorhinus townsendii*	present	BS,SC	limited surveys
Fringed myotis	*Myotis thysanodes*	suspected	BA,SV	limited surveys
Yuma myotis	*Myotis yumanensis*	suspected	BT	limited surveys
Long-eared myotis	*Myotis evotis*	suspected	BT,SU	limited surveys
Long-legged myotis	*Myotis volans*	suspected	BT,SU	limited surveys
Silver-haired bat	*Lasionycterus noctivagans*	suspected	BT,SU	limited surveys
Pacific pallid bat	*Antrozous pallidus*	unknown	BA,SV	limited surveys
Brazilian free-tailed bat	*Tadarida brasiliensis*	unknown	BT	limited surveys
Yuma myotis	*Myotis yumanensis*	Unknown	BT	Limited surveys
California myotis	*Myotis californicus*	Unknown	BT	Limited surveys
Hoary bat	*Lasiurus cinereus*	Unknown	BT	Limited surveys
Western gray squirrel	*Sciurus griseus*	present	BT,SU	none to date
Northwestern pond turtle	*Clemmys marmorata*	unknown	BS,SC	none to date
Foothills yellow-legged frog	*Rana boylii*	unknown	BA,SV	none to date
Northern Red-legged frog	*Rana aurora*	suspected	BT,SU	none to date
Clouded salamander	*Aneides ferreus*	suspected	BT,SU	none to date
Southern torrent salamander	*Rhyacotriton variegatus*	present	BT,SV	none to date
Black salamander	*Aneides flavipunctatus*	unknown	BA,SP	none to date
Sharptail snake	*Contia tenuis*	suspected	BT,SV	none to date
California mountain kingsnake	*Lampropeltis zonata*	suspected	BT,SV	none to date
Common kingsnake	*Lampropeltis getulus*	suspected	BT,SV	none to date
Northern sagebrush lizard	*Sceloporus graciosus*	unknown	BT	none to date
Oregon spotted frog	*Rana pretiosa*	Unknown	FC	none to date
Cascades frog	*Rana cascadae*	Unknown	BT	None to date
Del Norte salamander	*Plethodon elongatus*	suspected	BA,SV	none to date
Siskiyou Mountain's salamander	*Plethodon stormii*	Unknown	BS	None to date
Western toad	*Bufo boreas*	suspected	BT,SV	none to date
Tailed frog	*Ascaphus truei*	present	BA,SV	limited surveys

*STATUS ABBREVIATIONS: FE--Federal Endangered; FT--Federal Threatened; FP--Federal Proposed; ST--State Threatened; FC – Federal Candidate; SP--ODFW Peripheral or Naturally Rare; SU--ODFW Undetermined; SC--ODFW Critical; SV--ODFW Vulnerable; BS--Bureau Sensitive; SM--Survey and Manage; BT -Bureau Tracking; BA- Bureau Assessment; SE--State Endangered
BOCC – US Fish and Wildlife Service Birds of Conservation Concern list (2002)

Table III-12: Special Status Species (Invertebrates)

Common Name	Presence	Status**	Survey Level (as of 9/2003)
Oregon Megomphix Snail	Unknown*	BT	None to date
Oregon Shoulderband Snail	Unknown*	BS	None to date
Chase Sideband Snail	Unknown*	BS	None to date
Crater Lake Tightcoil Snail	Unknown*	BS	None to date
Evening Fieldslug	Unknown*	BS	None to date
Fall Creek Pebble Snail	Unknown*	BS	None to date
Keene Creek Pebble Snail	Unknown*	BS	None to date
Klamath Pebble Snail	Unknown*	BS	None to date
Nerite Pebble Snail	Unknown*	BS	None to date
Scale Lanx Snail	Unknown*	BS	None to date
Siskiyou Hesperian Snail	Unknown*	BS	None to date
Travelling Sideband Snail	Unknown *	BS	None to date
Montane peaclam	Unknown*	BS	None to date
Cooley's Acalypta Lace Bug	Unknown *	BT	None to date
Franklin's bumblebee	Unknown *	BS	None to date
Mardon Skipper Butterfly	Unknown*	FC	None to date
Gray-blue Butterfly	Unknown *	BT	None to date
Coronis Fritillary Butterfly	Unknown *	BT	None to date
Siskiyou (Chloealtis) short-horned grasshopper	Unknown*	BS	None to date

* = Suspected on Medford District BLM, unknown if range extends into this watershed
** STATUS: BS = Bureau Sensitive; BT=Bureau Tracking

b) Threatened or Endangered Species

Northern Spotted Owl (Threatened) - There are six spotted owl cores on BLM lands in this watershed. BLM lands within the watershed are also likely used for foraging and dispersal. Twenty-four acres of BLM land is in a designated Critical Habitat for the northern spotted owl by the U.S. Fish and Wild Service (USFWS). Within the watershed, surveys for northern spotted owls have been conducted since the mid-1970s. There are six managed LSRs reflecting 6 spotted owl core areas. One additional spotted owl site has part of its home range in the watershed.

The USFWS uses thresholds for suitable habitat around spotted owl sites as an indication of a site's viability and productivity. These thresholds have been defined as 50% of the area within 0.7 mile of the center of activity (approximately 500 acres) and 40% of the area within 1.3 miles (approximately 1,388 acres).

To evaluate this in the watershed, forest conditions based on the McKelvey model were mapped using aerial photo interpretation, ground truthing and roadside reconnaissance.

The McKelvey Rating System is based on a model that predicts spotted owl population based on habitat availability. Stands were examined for criteria such as canopy layering, canopy closure, snags, woody material and other features. Biological potential of a stand to acquire desired conditions is also taken in consideration. The McKelvey Rating System uses the following six classes:

Class 1- Spotted owl nesting, roosting, and foraging habitat
Class 2- Spotted owl roosting and foraging

Class 3- Currently does not meet 1 or 2 criteria
Class 4- Will never meet 1 or 2 criteria
Class 5- Currently does not meet 1 or 2, but meets dispersal
Class 6- Will never meet 1 or 2 but meets dispersal

The BLM portion of the Althouse Creek Watershed encompasses 4,711 acres (16% of the watershed). There are 329 acres of BLM land classified as suitable spotted owl roosting and foraging habitat (McKelvey rating #1 and #2). The largest patches are found in T39S,R7W, Section 35 and T40S,R7W, Section 15. On private land within the watershed, there are no acres meeting McKelvey 1 criteria, and 63 acres that meet McKelvey 2 criteria (Table III-13).

Dispersal habitat for spotted owls (McKelvey #5) is defined as stands that have a canopy closure of 40% or greater, and are open enough for flight and predator avoidances. In the watershed, there are currently 1,780 acres of BLM land and 157 acres of private land of dispersal habitat. This habitat is scattered throughout the watershed on the non-serpentine soils. There is no McKelvey class #6 in the watershed.

Table III-13: McKelvey Rating Classes for the Althouse Creek Watershed

McKelvey Class	BLM Lands		Non-federal Lands		BLM + Non-federal Lands	
	Acres	% of watershed	Acres	% of watershed	Acres	% of watershed
1	113	0.4%	0	0	113	0.4%
2	216	1%	63	< 0.1%	279	1%
3	1323	5%	3182	11%	4505	15%
4	1268	4%	7310	25%	8578	29%
5	1780	6%	157	0.5%	1937	7%
6	0	0	0	0	0	0

*This information was collected during the summer of 1997, and may not reflect current condition. Federal acres managed by the Forest Service are not included in this table.

Marbled murrelet (threatened) critical habitat was designated by the USFWS in May 1996. Although no land within the Althouse Creek Watershed was identified as critical habitat, federal agencies are still responsible for determining absence/presence in suitable habitat within 50 miles of the coast. There are no known nest locations within the watershed and the species is unlikely to occur in the watershed.

Nesting habitat for the marbled murrelet consists of older forested stands with trees that have large moss-covered limbs and high (70+%) canopy closure. This habitat is further defined by its distance from the coast. Based on BLM inventory data information and field verification of McKelvey rating, approximately 69 acres of suitable marbled murrelet habitat are found on lands managed by the BLM in the watershed. This land, for the most part, corresponds with spotted owl suitable/optimal habitat (McKelvey #1).

It is unknown if the stands within the watershed that contain components for marbled murrelet would be used by them. These sites are generally warmer and drier then those lands located closer to the coast that are occupied by nesting murrelets. The BLM has conducted some surveys in the planning area and has not detected these birds.

Bald Eagle (Threatened) - At this time, there are no known nest sites documented within the watershed. Bald eagles are likely present in the watershed at least seasonally. The area along the creek represents potentially suitable winter and foraging habitat. Nesting habitat may occur on mature forests within sight of the creek. Preferred nesting habitat consists of older forests, generally near water, with minimal human disturbance.

c) Other Species of Concern

Peregrine falcons nest on ledges located on cliff faces. There are no known historic or current peregrine falcon nests within the Althouse Creek Watershed.

Neotropical migratory birds inhabit the watershed. Neotropical migrants are species of birds that winter south of the Tropic of Cancer and breed in North America.

More than twenty years of Breeding Bird Surveys (BBS), Breeding Bird Census (BBC), Winter Bird Population Study, and Christmas Bird Counts indicate that many species of birds are declining precipitously. This is particularly true for birds that use mature and old-growth forest either in the tropics, in North America or both (DeSante & Burton 1994). Rates of decline are well documented for birds on the east coast of North America, and less so on the west coast.

Among the explanations for these declines is the belief that an area effect occurs, in which certain interior dwelling bird species fail to breed because the available breeding habitat is too small. Larger habitat blocks therefore may provide an important habitat function in serving as a “source” for breeding birds. This occurs when there is enough suitable habitat to recruit new individuals into the populations faster than individuals are lost, potentially providing for migration into unoccupied habitat.

In 1992 the BLM signed a multi-agency agreement called "Partners in Flight." The purpose of this program is to establish a long-term monitoring effort to gather demographic information. This monitoring will establish the extent that deforestation and forest fragmentation have on temperate breeding bird populations on the scale of the continental United States and Canada.

The Althouse Creek Watershed contains a number of neotropical migrants that utilize various habitats. Studies conducted on the Medford District have found that they comprise between 42% and 47% of the breeding species occurring in lower elevation forests dominated by Douglas-fir (Janes 1993). In higher elevation forests dominated by white fir, neotropical migrants are less abundant contributing to a smaller portion of the bird species present.

For neotropical migrants, habitats of particular concern include valley brush fields, old-growth, riparian, and oak woodland communities. Depending on the season, neotropicals often use more than one habitat type. Overall, 46% of neotropical migrants are habitat generalists using four or more habitat types, while 34% are habitat specialists utilizing only one or two habitats. Table III-14 provides information on general population trends in the North Pacific Rainforest as rated by Partners in Flight. Note that these may not be applicable or accurate for the watershed itself.

Table III-14: Potential Neotropical Birds in Althouse Creek Watershed

COMMON NAME	PRESENCE	TREND*
Green-winged teal	present	insufficient data
Sora	present	insufficient data
Turkey vulture	present	insufficient data
Osprey	present	Significant increase
Flammulated owl	unknown	insufficient data
Common nighthawk	present	insufficient data
Rufous hummingbird	present	Decline
Calliope hummingbird	unknown	insufficient data
Western kingbird	present	Moderate decline
Ash-throated flycatcher	present	insufficient data
Western wood-pewee	present	Significant decline
Olive-sided flycatcher	present	Significant decline
Hammond's flycatcher	present	Significant increase
Dusky flycatcher	present	insufficient data
Pacific-slope flycatcher	present	Stable
Vaux's swift	present	Possible increase
Tree swallow	present	insufficient data
Northern rough-winged swallow	present	Moderate decrease
Violet-green swallow	present	Stable
Cliff swallow	present	Stable
Barn swallow	present	Significant decline
House wren	present	insufficient data
Blue-gray gnatcatcher	present	insufficient data
Swainson's thrush	present	Stable
Cassin's vireo	present	Moderate decline
Warbling vireo	present	Possible increase
Townsend's warbler	present	Stable
Hermit warbler	present	Stable
Black-throated gray warbler	present	insufficient data
Nashville warbler	present	Stable
Macgillivray's warbler	present	insufficient data
Yellow warbler	present	Moderate decrease
Orange-crowned warbler	present	Moderate decline
Common yellowthroat	present	Significant increase
Yellow-breasted chat	present	Stable
Wilson's warbler	present	Stable
Brownheaded cowbird	present	Significant decline
Northern oriole	present	Decline
Western tanager	present	Stable
Chipping sparrow	suspected	Significant decline
Green-tailed towhee	present	stable/increase
Black-headed grosbeak	present	Stable
Lazuli bunting	present	Possible decline

* Based on information from Partners in Flight in the North Pacific Rainforest and might not necessarily represent nationwide figures.

Unusual sightings - The rocky terrain and mine shafts found within the Althouse Creek Watershed provide suitable habitat for ringtail cats. These nocturnal animals are frequently seen along river corridors and are likely to occur in the watershed.

Game species within the Althouse Creek Watershed include: blacktailed deer, black bear, mountain lion, wild turkeys, ruffed grouse, blue grouse, grey squirrels, and mountain and valley quail. Management of game species are the responsibility of the Oregon Department of Fish and Wildlife. The entire watershed is open to hunting during the appropriate season for game species. Information from the ODFW indicates that blacktailed deer populations are stable overall and meeting department goals. Elk are not known to occur in the watershed. There are 9,505 acres of deer winter range in the valley bottom.

Black bear populations are extremely hard to monitor due to their secretive nature. The population in the watershed appears to be stable. Cougar populations throughout Oregon appear to be stable and have relatively high population densities in southwest Oregon.

Grouse and quail populations are cyclic and largely influenced by weather. Long-term trends appear to be stable. Wild turkeys have been introduced and populations appear to be expanding.

In general, game species are generalists that benefit from edge habitats. Past land management practices both on private and federal lands have increased the overall amount of forest edge within the watershed. At the same time, road density has also increased. Roads affect the suitability of all habitat types. Studies have shown that high road densities have adverse affects on deer and elk populations and lead to increased poaching opportunities. Unroaded areas offer better refugia for deer and other game species.

Band-tail pigeons *(Columba fasciata)* are known to occur in the watershed. Throughout their range, they have shown a precipitous decline in population since monitoring began in the 1950's (Jarvis et al. 1993). These birds are highly prized as a game species and restrictive hunting regulations have not led to an increase in bird populations. Habitat alteration due to intense forestry practices may partially explain their decrease in population (Jarvis et al. 1993).

Band-tail pigeons are highly mobile and utilize many forest habitat types. Preferred habitat consists of large conifers and deciduous trees interspersed with berry and mast producing trees and shrubs. In the spring and fall, large flocks migrate through the watershed. The birds use higher elevation habitats to feed on blue elderberries, manzanita berries, and Pacific madrone berries. Fire exclusion has adversely impacted these food sources.

Cavity dependent species include birds such as western bluebirds and northern pygmy owls *(Glaucidium gnoma.* Past silviculture and agricultural practices have degraded habitat for these species which use snags and downed logs. In areas previously harvested, silviculture focused on even-aged stands which are typically low in residual snags and down logs. Fire suppression also reduced the amount of snags in the watershed. Fires, insects and other disturbance are important generators of snags. Species associated with habitat generated from disturbance events have also declined.

Exotic species have become established in the watershed and compete with native species for food, water, shelter and space. Bullfrogs (*Rana catesbeiana*) compete with native frogs and consume young western pond turtles (*Clemmys marmorata*). Opossums (*Didelphis virginiana*) occupy a similar niche with native stripped skunks (*Mephitis mephitis*) and raccoons (*Procoyon lotor*). They also consume young birds, amphibians and reptiles. Other introduced species include European starlings (*Sturnus vulgaris*), ring-necked pheasants (*Phasianus colchicus*) and turkeys (*Meleagris gallopavo*). These species can negatively impact native flora and fauna.

Table III-15: Federal Habitat Trends for Species of Concern

Common Name	Habitat	Habitat Trends expected within the Watershed (BLM lands)
Grey wolf	Generalist, prefers remote areas	Extirpated from the watershed
White-footed vole	Riparian alder/small streams	Increase as riparian areas recover from past disturbance
Red tree vole	Mature conifer forest	Decrease in the watershed
Fisher	Mature conifer forest	Decrease in the watershed
California wolverine	Remote/high elevation forest	Decrease in the watershed
American marten	Mature conifer forest	Decrease in the watershed
Ringtail	Rocky bluffs, caves and mines	Possible decrease as hard rock mines/quarries collapse or reopen; possible increase with riparian habitat recovery
Peregrine falcon	Remote rock bluffs	Stable
Bald eagle	Riparian/mature conifer forest	Possible increase as riparian areas recover from past disturbance, decrease on matrix lands
Northern spotted owl	Mature conifer forest	Decrease in the watershed
Marbled murrelet	Mature conifer forest	Likely not in the watershed
Northern goshawk	Mature conifer forest	Decrease in the watershed
Mountain quail	Generalist	Possible increase in the watershed (yearly variability)
Pileated woodpecker	Mature conifer forest/snags	Decrease in the watershed / Stable overall
Lewis' woodpecker	Oak woodlands	Decrease until management strategy for oak woodlands is implemented
White-headed woodpecker	High elevation mature conifer forest	Possible increase in the watershed as pine habitat develops
Flammulated owl	Mature ponderosa pine/mature Douglas-fir forest	Decrease in the watershed
Purple martin	Forage in open areas near water/cavity nesters	Increase as riparian areas recover and forests mature in the LSR. Possible decrease in matrix.
Great grey owl	Mature forest for nesting / meadows & open ground for foraging	Increase in foraging habitat and decrease in nesting habitat.
Western bluebird	Meadows/open areas	Decrease until management strategy for oak woodlands is implemented.
Acorn woodpecker	Oak woodlands	Decrease until management strategy for oak woodlands is implemented.
Tricolored blackbird	Riparian habitat/cattails	Stable/increase as riparian habitat recovers
Black-backed woodpecker	High elevation mature conifer forest	Decrease in the watershed
Northern pygmy owl	Conifer forest/snags	Decrease in the watershed
Grasshopper sparrow	Open savannah	Decrease until management strategy for savannah habitat is implemented.
Bank swallow	Riparian	Increase as riparian habitat recovers
Townsend's big-eared bat	Mine adit/caves	Decrease as mines/quarries collapse or reopen and human disturbance increases
Fringed myotis	Rock crevices/snags	Decrease in the watershed
Silver-haired bat	Conifer forest	Decrease in the watershed
Yuma myotis	Large trees/snags	Decrease in the watershed
Long-eared myotis	Large trees/snags/stumps	Decrease in the watershed
Long-legged myotis	Large trees/snags	Decrease in the watershed
Pacific pallid bat	Large trees/snags/rock crevices	Decrease in the watershed
Western pond turtle	Riparian/uplands	Increase as riparian habitat recovers
Foothills yellow-legged frog	Riparian/permanent flowing streams	Increase as riparian habitat recovers
Red-legged frog	Riparian/slow backwaters	Increase as riparian habitat recovers
Clouded salamander	Mature forest/snags/down logs	Decrease in the watershed
Southern torrent salamander (Variegated salamander)	Riparian/cold permanent seeps/streams	Increase as riparian habitat recovers

Table III-15: Federal Habitat Trends for Species of Concern

Common Name	Habitat	Habitat Trends expected within the Watershed (BLM lands)
Black salamander	Talus/down logs	Decrease in the watershed
Del Norte salamander	Talus	Decrease in the watershed
Tailed frog	Riparian/mature forest	Increase as riparian habitat recovers
Western toad	Humid areas with dense undergrowth / bark / decomposed down logs	Decrease in the watershed
Sharptail snake	Valley bottom	Stable
Calif. Mt. Kingsnake	Generalist	Stable
Common kingsnake	Generalist	Stable
Northern sagebrush lizard	Open brush stands	Decrease as meadows are encroached upon and increased shrub canopy closure
Johnson's waterfall carabid beetle	Riparian / aquatic	Increase as riparian habitat recovers
Deschute's sideband snail	Mature coniferous forest	Decrease in the watershed
Green sideband snail	Mature coniferous forest	Decrease in the watershed

3. Aquatic Habitats and Species

a. General

Within the Rogue River Basin, the Illinois River and its tributaries are important spawning and rearing habitats for both anadromous and resident salmonids. The Illinois River constitutes an important portion of the remnant native wild fish population/habitat within the Rogue River Basin. Thus, the Illinois River Watershed is believed to be the stronghold for wild anadromous fish populations in the Rogue Basin.

There are approximately 102 miles of perennial streams in the entire watershed including private and USFS land. There is an estimated 79 miles of intermittent streams and 62 miles of ephemeral draws in the entire watershed. (See Map 10) The majority of BLM land, including the riparian reserves, is dominated by the Douglas-fir/tan oak plant series. The Douglas-fir plant series is the second most common.

Large woody material contributes to riparian and stream habitat by providing shade and retention of detritus for terrestrial and aquatic insects. Large woody material is important for creating the habitat complexity needed to rear juvenile anadromous fish and to provide cover for adults during migration. Stream meander is important for dissipating stream velocity and increasing winter refuge habitat for juvenile fish, especially for coho salmon. Pool habitat is of particular significance to juvenile salmon during all life stages of their life cycle. Adult and juvenile fish production can also be limited by migration barriers such as road culverts. Yearling juvenile fish can move miles within one watershed, especially during summer months when they seek cool waters. Excessive sedimentation, especially if delivered at the wrong time intervals, can delay adult migration and spawning and suffocate eggs in redds. Suspended sediment can cause gill damage and secondary infections on over wintering juvenile fish which have been stressed from the lack of sufficient over winter habitat to allow escape from high water velocities.

Roads located next to streams can disconnect streams from the floodplain, impede stream meander and act as heat sinks. Certain kinds of timber harvesting and the presence of roads can accelerate surface water runoff and erosion of sediment into the streams, resulting in decreased macro invertebrate and fish production. Logging roads produce the most sediment generated among forest management practices. The density and length of road distribution can be major factors in determining the level of sediment production.

Off-channel habitat areas in unconfined and lower gradient streams provide refuge areas for coho salmon when they typically migrate downstream during the fall and winter when the habitat is available. Juveniles will then leave winter habitat and migrate to sea at the end of their first year. Properly functioning off-channel habitat areas have frequent active side-channels related to large wood and geomorphology.

When under stress from water temperatures exceeding 70ºF, salmonid fish populations may have reduced fitness, greater susceptibility to disease, decreased growth and changes in time of migration or reproduction.

The cumulative effect of past land use and management activities has been a substantial alteration of the timing and quantity of erosion and changes in stream channels, both of which have affected fish habitat and production. Streams and riparian areas on federal lands are in better condition than streams on non-federal lands. Thus, public lands in the watershed play an important role in the survival of salmonids as they provide cool water and large woody material to fish habitat lower in the system, and provide refugia during summer months when water temperatures are lethal in the valley segments.

The Medford District RMP (p. 50) identifies Althouse Creek as having a number 1 priority for potential fish habitat improvement projects. This priority level indicates a high potential for increasing fish production capability in a cost-effective manner. The RMP (p. 50) also suggests acquiring block ownership, among other items, to improve watershed management for sensitive fish species such as coho and winter steelhead. The Althouse Creek was one of the areas listed for land acquisition needed to improve fish production.

There are 25 placer mines within the BLM portion of the watershed, with no indications of major future mining projects. These are primarily dredging sites, with only a few actively mining.

There are ten legal points of water diversion (includes springs) located on BLM land within the Althouse Creek watershed. One hundred and forty legal points of diversion (includes wells, sumps, and springs) are located within the entire Althouse Creek Watershed. These points of diversion have the potential to be fish passage barriers and be over diverting water.

The Illinois Valley Soil and Water Conservation District has conducted a number of stream restoration projects in the Illinois Valley. These projects, some funded by BLM, have included improving points of diversion and bank stabilization. See Table III-16 for a list of recent projects in the Althouse Creek watershed on private land by the Illinois Valley Soil and Water Conservation District.

Table III-16: Illinois Valley Soil and Water Conservation District: Projects in the Althouse Creek Watershed.

Year	Project Name	Project Type	Location

Table III-16: Illinois Valley Soil and Water Conservation District: Projects in the Althouse Creek Watershed.			
1997	Fincher	Bank Stabilization	Lower Althouse Creek
1999	Notter	Bank Stabilization	Lower Althouse Creek
2001	Fincher-James	Replaced a pushup dam with an infiltration gallery.	Lower Althouse Creek
2003-2004*	Houck-George	Developing a diversion alternative to a pushup dam.	Lower Althouse Creek

* Ongoing project

b. Stream Habitat Conditions

Table III-17 summarizes stream habitat conditions from an Oregon Department of Fish and Wildlife (ODFW) physical habitat stream survey completed in 1993 on the entire length of Althouse Creek. The conditions are summarized based on the ODFW habitat benchmark standards (Table III-18).

Table III-17: Class I-IV Stream Habitat Conditions

Stream Reach (river mile)	Fish Bearing (Y/N)	LWD Pieces	% Gravel in Riffles	% Shade	Pool Freq.	% Pools	Avg. Gradient (%)
Althouse Creek Reach 1 (0-3)	Y	U	D	U	A	A	1.3
Althouse Creek Reach 2* (3-5.6)	Y	-	-	-	-	-	-
Althouse Creek Reach 3 5.6-7.9)	Y	U	A	U	U	U	2.8
Althouse Creek Reach 4 7.9-14.7)	Y	U	A	A	U	U	5.2
Althouse Creek Reach 5 14.7-16.4)	Y	U	U	A	U	U	16.5

U = Undesirable, A = Adequate, D = Desirable
* Survey for this reach not conducted due to access being denied.

Table III-18: Oregon Department of Fish and Wildlife Habitat Benchmarks

Habitat Type	Undesirable (U)	Adequate (A)	Desirable (D)
LWD pieces / 100 m stream length	< 10	χ	> 20
Gravel in Riffles (%)	> 20	χ	< 10
Shade (%)	< 60	χ	> 70
Pool Frequency (Channel Widths Between Pools)	> 20	χ	5-8
Percent Pools	< 10	χ	>35

The ODFW surveys indicate that shade levels in the four reaches surveyed are below desirable levels. One of the reaches fell into the undesirable category. Percent gravel in riffles is an indicator of potential spawning gravel for salmonids. One of the reaches had adequate amounts of gravel and the other three were below desirable levels. Channel widths between pools is an indicator of pool frequency in the reach. Pools are important habitat for juvenile and adult fish. In Althouse Creek, three out of the four reaches surveyed fell into the undesirable category. The low number of pool frequency in the reaches indicates a lack of refuge areas for fish during low and high flow periods. Percent habitat as pools is also below the ODFW benchmarks in Reach 3,4, and 5. This suggests that Althouse Creek is low in stream complexity. Large woody debris in the stream provides cover and complexity. All of the Althouse reaches surveyed indicated low levels of wood. Both the number of pieces per 100 meters and volume of woody debris in the stream were well below desired levels. The proportion of actively eroding banks is 15.7% in reach 1, 2.4% in reach 2, 5.5% in reach 3, 5.5% in reach 4, and 3.3% in reach 5. Althouse Creek, from the mouth to river mile 7.5, is 303(d) listed for summer temperatures; the seven-day average maximum stream temperature has exceeded the DEQ standard of 64ºF. (See Water Quality/Temperature, Chapter 3).

Althouse Creek is an important fish-bearing tributary to the East Illinois River. However, Althouse Creek has been greatly altered through water withdrawal, loss of riparian vegetation, and mining operations.

The BLM stream survey crew conducted an ODFW aquatic inventory habitat survey along the BLM portion of Althouse Creek in 2003 (Table III-19). This information can be used to compare survey results / existing conditions with the ODFW habitat benchmark standards. The survey found large woody debris to be low in the entire surveyed section. Riffles was the dominate habitat type in all of the surveyed reaches. The percent of banks actively was very low with 0% in two reaches and 1% in two reaches.

Table III-19: BLM Stream Survey results on Althouse Creek

Stream	Primary Land Use	Secondary Land Use	Riparian Vegetation	Width to Depth Ratio	Pool Frequency	Avg. Gradient (%)
Althouse Creek Reach 1	Partial cut timber	Mining	Deciduous dominated with some conifers	20	3.6	3.6
Althouse Creek Reach 2*	Mining	Partial cut timber	Deciduous dominated with some conifers and shrubs	26	2.4	2.9
Althouse Creek Reach 3	Mining	Large timber	Deciduous dominated with some conifers	15.3	9.2	3.2
Althouse Creek Reach 4	Mining	Partial cut timber	Deciduous dominated with some conifers	12.8	5.9	3.4

c. Large Woody Material

Streams in the Althouse Creek Watershed typically have the same primary factors limiting salmonid production: instream habitat complexity is low due to low densities of large woody material key pieces (≥24" in diameter with a length which is equal to or greater than the bankfull width); stream shade less than 60%; and lack of mature trees, especially conifers, >32 inches in diameter within 100 feet of the stream. The ODFW survey found low levels of large woody debris in the entire section of the mainstem of Althouse Creek.

Large wood is an important component of stream habitat. It plays a critical part in determining the productivity of the stream. It is an important determinate of stream hydraulics, microsite habitat conditions, feeding substrate, and pool and drop creation. The Southwest Oregon Late-Successional Reserve Assessment (USDA-USDI 1995) has listed desirable minimum levels for coarse woody material (outside of the stream channel) after stand-replacement (fire with timber salvage) and non-stand replacement (commercial thinning) events. There are 24 acres of LSR in the BLM administered portion of the Althouse Creek Watershed. The reference above is cited because the LSR standards, along with the ODFW benchmarks for instream conditions, may be applied to Riparian Reserves.

Serpentine and non-serpentine areas differ in ability to provide the riparian and stream attributes listed above. Streams in serpentine areas are naturally lacking many of the attributes characteristic of salmonid habitat. Some of the streams on BLM land in section 9 and 17 are in serpentine areas. Other serpentine areas with streams may occur on BLM land. They currently have inadequate levels of instream large woody material. However, the natural levels of wood in these systems may be below ODFW standards. The ODFW benchmarks and standards of other agencies as they apply to serpentine areas are currently under review.

d. Macroinvertebrates

Macroinvertebrate surveys were conducted on Althouse Creek for BLM in 1998 and again in 2002 by Aquatic Biology Associates, Inc. The same area surveyed was located in T40S R7W section 9, in the northwest corner. In both years Althouse Creek was surveyed, the macroinvertebrate habitat condition within the erosional habitat and detritus habitat was low. The margin habitat was moderate for macroinvertebrate habitat conditions. (See Table III-18)

Sensitive or threatened and endangered macroinvertebrate taxa were not found at the survey site. Long-lived taxa richness (in all three habitat types) was low to moderate indicating that flow is perennial, but that habitat complexity and retention mechanisms are not optimal. The survey noted that summer water temperatures are high enough to be lethal to nearly all cold water invertebrate biota. The near absence of cold water invertebrate biota indicates that water temperatures are non-supportive of salmonids. Tolerant invertebrate showed low abundance and richness. Very highly tolerant taxa associated with lentic, lower gradient or riverine habitats were absent.

The survey noted what they believed to be the most significant factors limiting the integrity of the benthic invertebrate community:

- Overall lack of habitat complexity. The channel was wide, shallow and sluiced out, with very low roughness to the channel. There was no large woody debris. Pool and pocket development was poor. It should be noted that the study site was all erosional habitat.
- This appeared to be a moderate-high flashy system. Disturbance to the benthic community from scouring and resorting of substrates will be high every few years.
- Summer water temperatures were high enough to be lethal to almost all the cold water invertebrate biota.
- Embeddedness was moderate. Siltation was moderate to high.
- There was a major water diversion just above the study site. This may exacerbate water temperature and habitat quality problems during summer low flows.

The survey noted that this site has a high potential for macroinvertebrates and recommended rehabilitation efforts should probably concentrate on temperature and silt problems first, before trying to increase habitat complexity.

There are many factors which have contributed to the low macroinvertebrate condition in these reaches. The lack of large, instream wood decreases the ability of the stream to retain detritus and nutrients upon which the macroinvertebrates are dependent. Additionally, without large wood to dissipate energy from high peak flows, macroinvertebrate populations are vulnerable to winter scour. Naturally flashy hydrology in serpentine areas within the Althouse Watershed may have been magnified by the impacts of historic mining, riparian alteration, and flooding on

Althouse Creek.

Table III-20: Macroinvertebrate Condition on Althouse Creek

Stream	Date	Erosional Habitat	Margin Habitat	Detritus Habitat
Althouse Creek T40S R7W section 9	1998	Low (51.6%)	Moderate (70.4%)	Low (69.8%)
Althouse Creek T40S R7W section 9	2002	Low (54.0%)	Moderate (70.4%)	Low (67.7%)

Table III-21: Macroinvertebrate Bioassessment Scores

Bioassessment Score	Erosional Habitat (%)	Margin Habitat (%)	Detritus Habitat (%)
Very High	90-100	90-100	90-100
High	80-89	80-89	80-89
Moderate	60-79	70-79	70-79
Low	40-59	50-69	50-69
Very Low	< 40	< 50	< 50

Source: Aquatic Biology Associates 1998

e. Special Status Species

The coho salmon (*Oncorhynchus kisutch*) is the only federally ESA listed (threatened) fish within the Althouse Creek Watershed. Table III-21 lists the Special Status and Federally-Listed aquatic species found in the Althouse Creek Watershed.

Table III-22: Summary of Environmental Factors and Potential Mechanisms of Mortality Affecting Freshwater Habitat Capacity and Related Density-independent Survival (By Life Stage) of Coho Salmon

Life Stage	Factors affecting population productivity	Potential mechanisms affecting survival
Egg to emergent fry	Substrate stability, amount of fine sediment in spawning gravels, spawning gravel permeability, water temperature, peak flows	High flow events cause loss of eggs due to streambed scour and shifting; reduced flow and DO levels to eggs due to high sedimentation cause increased mortality; high fine sediment levels cause entombment of fry; increased temperatures advance emergence timing, thereby affecting survival in next life stage; anchor ice reduces water exchange in redd causing low DO levels and/or eggs to freeze.
Emergent fry to September parr	Flow dynamics during emergence period, stream gradient, number of sites suitable for fry colonization, predators, temperature[1], nutrient loading[1]	Loss of emergent fry occurs due to being displaced downstream by high flows; advanced emergence timing causes fry to encounter higher flows; high gradient and lack of suitable colonization sites for emergent fry cause fry to move downstream increasing risk of predation; stranding and excessive temperature promote disease and cause mortality; temperature and nutrient changes affect growth thereby affecting other causes of density-independent loss.
September parr to smolt	Fall and winter flows, number of accessible winter refuge sites, temperature, predators	Displacement during high flows; stranding and death due to dewatering; loss of predators; loss due to poor health associated with winter conditions[1]

1 Effects likely have both density-independent and dependent components. (adapted from NMFS 1997)

Table III-23 lists special status and federally-threatened aquatic species in the Althouse Creek Watershed.

Table III-23: Special Status and Federally-Listed Aquatic Species

Species	Status
Winter Steelhead	Ruled not warranted for federal listing (4/01)

Table III-23: Special Status and Federally-Listed Aquatic Species

Species	Status
Klamath Mountain Province ESU	Bureau Assessment Species in Oregon Oregon Natural Heritage Program* Status List 2
Fall Chinook salmon Southern Oregon Coast/California Coast	Ruled not warranted for federal listing (9/99) Bureau Sensitive Species in Oregon Oregon Natural Heritage Program* Status List 2 State of Oregon critical
Cutthroat Trout	Ruled not warranted for federal listing (4/99)
Coho salmon Southern Oregon/Northern California	Federally Threatened Critical Habitat Designated (Endangered Species Act) Essential Fish Habitat Designated (Magnusun-Stevens Act) Oregon Natural Heritage Program* Status List 1 State of Oregon critical
Pacific lamprey	Bureau Tracking in Oregon Oregon Natural Heritage Program* Status List 2 State of Oregon Vulnerable

* Oregon Natural Heritage Program Status:
List 1: Taxa that are threatened with extinction or presumed to be extinct throughout their entire range
List 2: Taxa that are threatened with extirpation or presumed to be extirpated from the state of Oregon.
List 3: 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: Taxa which are of concern, but are not currently threatened or endangered.

Source- http://web.or.blm.gov/or930/sssdb/

f. Salmonid Distribution

Stream surveys have been conducted by ODFW and the USFS on many streams in the watershed. These surveys verify salmonid distribution. The results are presented in Table III-24. The potential use based on habitat for the entire watershed includes: chinook 8 miles, coho 17 miles, steelhead 12 miles, and cutthroat 29 miles. (See Maps 11 and 12, Salmon and Trout Distribution)

Table III-24: Salmonid Distribution Within the Althouse Creek Watershed (in miles)

Stream Name	Resident Trout	Winter Steelhead	Coho Salmon	Fall Chinook Salmon
Althouse Creek	15.1	13.5	11.9	0.5
Democrat Gulch	-	-	-	-
Number 7 Gulch	0.25	0.1	-	-
Blind Sam Gulch	-	0.1	-	-
Number 8 Gulch	0.1	0.1	-	-
West Fork Althouse	1.3	-	-	-
East Fork Althouse	3.7	-	-	-
Run Gulch	0.4	0.4	-	-
Deadman Gulch	0.1	-	-	-

Source: ODFW 2002 Fish Distribution Database

Anadromous salmonids present within the watershed are: fall chinook (*Oncorhynchus tshawytscha*), coho salmon (*O. kisutch*), and winter steelhead (*O. mykiss*). These species represent important fish populations within the ESUs (Evolutionarily Significant Unit) of the province.

Resident salmonids within the watershed include rainbow trout (*O. mykiss*) and cutthroat trout (*O. clarki*).

Both resident and anadromous salmonid population trends have been in decline for decades and are considered to be at depressed population levels throughout the Illinois River basin (USDA; USDI 1997). Historically, ODFW harvest data was the only measure of anadromous fish population levels within the Illinois River basin. As a result of declining population levels, ODFW presently prohibits trout fishing within the entire Illinois River basin.

Coho salmon within Althouse Creek Watershed are part of the Southern Oregon / Northern California Coho ESU, which was federally listed as threatened on May 6, 1997 (Fed. Reg./Vol. 62, No. 87). The ESU includes all naturally spawned populations of coho salmon in coastal streams between Cape Blanco, Oregon, and Punta Gorda, California. Most of the coho in this ESU are in the Rogue River, with the largest remaining population in the Illinois River (Stouder et al. 1997). Currently summer water temperatures in the valley limit coho production from reaching historical levels (USDA, USDI 1997).

Habitat designated by the National Marine Fisheries Service (NMFS) as critical to the recovery of Southern Oregon/Northern California coho encompasses accessible reaches of all rivers (including estuarine areas and tributaries) between the Mattole River in California and Elk River in Oregon, inclusive. Critical habitat includes all waterways, substrate, and adjacent riparian zones below long standing, naturally impassible barriers (*e.g.*, natural waterfalls in existence for at least several hundred years). Adjacent riparian zones have been redefined by NMFS as part of critical habitat designation and are now based on a functional (rather than quantitative) description. Based on NMFS criteria, critical habitat includes riparian areas that provide: shade; sediment, nutrient or chemical regulations; stream bank stability; and large wood or organic matter. It is important to note that habitat quality is intrinsically related to the quality of riparian and upland areas and of inaccessible headwater or intermittent streams that provide key habitat elements crucial for coho in downstream reaches. More detailed critical habitat information (*e.g.*, specific watersheds, migration barriers, habitat features, and special management considerations) for this ESU can be found in the May 5, 1999 Federal Register notice. (Fed. Reg./Vol. 64, No. 86)

The Magnuson-Stevens Fishery Conservation and Management Act, Public Law 94-265 as amended through October 11, 1996 was passed to provide for the conservation and management of fisheries. This act designated Essential Fish Habitat for Southern Oregon/Northern California coho.

Chinook salmon within the Althouse Creek are fall-run and belong to the Southern Oregon and Northern California coastal chinook ESU, which was proposed for listing on March 9, 1998. In September 1999, NMFS identified this ESU as not warranted for listing under the Endangered Species Act. The USFS Regional Forester, however, designated chinook salmon and other salmonids within the Pacific Northwest Region as sensitive for Forest Service management purposes (FC 2670-1920; August 20, 1997)

The Magnuson-Stevens Act also designated Essential Fish Habitat for chinook.

Steelhead trout within the Althouse Creek Watershed are winter run and belong to the Klamath Mountains Province ESU, which was ruled not warranted for listing in April, 2001. Activities such as logging and road building have impacted critical steelhead habitat along the southern Oregon coast where watersheds are particularly unstable. The winter steelhead population in

Illinois River has declined based on catch records. Sport harvest declined from 2,500 fish in the 1970s to less than 200 fish in 1992. Irrigation withdrawals have been a major impact to steelhead production in the Illinois River basin. This was particularly severe during the recent drought.

Resident cutthroat and rainbow trout are distributed throughout many of the reaches of all tributaries above and below anadromous fish barriers. The Southern Oregon / California Coast ESU of cutthroat trout was ruled not warranted for listing in April, 1999. The resident rainbow population within Illinois River is sympatric with winter steelhead. The Illinois River trout population appears to be much smaller than that observed in the 1950s.

Pacific lamprey (*Lampetra tridentatus*) are anadromous and believed to use Althouse Creek and maybe some tributaries for spawning. The juveniles rear in the tributaries until they are ready to migrate to the ocean. Little is known about lampreys in the Illinois Watershed or Rogue basin, although it is assumed their distribution overlaps that of steelhead. **Western brook lamprey** (*Lampretra richardsoni)* are also believed to inhabit Althouse Creek.

Reticulate sculpin (*Cottus perplexus*) and **coast range sculpin** (*Cottus aleuticus*) are found throughout the Althouse Creek Watershed. Their range overlaps that of resident trout.

The **speckled dace** (*Rhinichthys osculus*) is a native fish found within the Althouse Creek Watershed. Its range overlaps that of resident trout.

Non-native fish - The redside shiner (*Richardsonius balteatus*) is an exotic species that is thought to inhabit the mainstem of Althouse Creek and in tributaries and irrigation ditches with characteristically higher temperatures and lower flows than the upstream reaches. Redside shiners were first identified in the lower Illinois River at the base of Illinois River falls in May 1960. These fish compete directly with juvenile salmonids and are able to reduce trout production up to 54% in warm water (66.2º to 71.6ºF) (Reeves 1987).

g. Fish Passage Barriers

Fish barriers can be defined as any physical/chemical/biological factor that prohibits upstream or downstream migration of juvenile or adult fish. Examples are dams, culverts, low water flow, temperature, waterfalls, and predation.

The BLM conducted a culvert inventory in 2002. Table III-25 indicates the major culverts located on BLM land within the Althouse Watershed. Four of these culverts likely block juvenile passage at all times. Adults would most likely not be able to pass three of these culverts due to rocks located at the base of the outlet. Potential coho habitat exists upstream of some of these culverts.

Table III-25: Salmonid Distribution Within the Althouse Creek Watershed (in miles)

Priority for Replacement	Stream Name	Map Key Number*	Miles of Habitat above culvert			Drop to Stream in Winter (ft.)
			Coho	Steelhead	Cutthroat	

1	Althouse Creek Tributary	40-7-15-01	0	0.45	0.45	3.0
2	Blind Sam Gulch	40-7-15-03	0	0.40	0.40	2.00
3	Althouse Creek Tributary	40-7-9-01	0	0	1.20	1.70
4	Democrat Gulch	39-7-27-01	0	0	0.21	2.40
5	Althouse Creek Tributary	40-7-15-02	0	0.15	1.05	0.30

* See culvert inventory surveys for Map Key Number locations.

I. FIRE MANAGEMENT

Ecosystems are dynamic entities whose basic patterns and processes are shaped and sustained on the landscape not only by natural successional processes, but also by abiotic disturbance such as fire, drought, and wind. Such forces are often unpredictable temporally and spatially, maintaining a mosaic of successional stages over natural communities, thus influencing the range of natural variability of ecosystem structure, composition, and function (Kaufmann et al. 1994). Fire as one of these forces is complex: the results are often not repeatable, and the conclusions are often contradictory (Pyne 1996).

Fire has always played an integral part in the creation of the forest environment in the Pacific Northwest (Agee 1981) as well an important part of shaping plant communities in southwestern Oregon (Atzet and Wheeler 1982). Overall, the Althouse Creek watershed can be considered a fire-dependent ecosystem with numerous fire-adapted species of plants and animals noted. Fires and ecosystems have interacted throughout time and as described by Mutch (1994), fires provide: nutrient cycling, plant succession and wildlife habitat regulation, biological diversity, reduced biomass, and insect and disease population control

When looking at the historic landscape, human development, and values placed on the landscape, several elements of wildland fire should be considered. These elements include historic fire regime, condition class, fire hazard, fire risk, and values at risk. All of these elements can play a significant role in determining management direction for a given area.

Fire regimes are the manifestation of the biological, physical, climatic and anthropogenic components of an ecosystem as reflected in the fire frequency (how often a fire occurs), fire intensity (rate of energy released), fire size, seasonality (season of occurrence), and severity (type of fire – e.g., crown, surface, ground). This is a relationship that perpetuates itself in a circular and stable pattern. The biotic components are an expression of the fire regime which, in turn, maintains the pattern and occurrence of fire. However, when any components of the ecosystem are modified, the fire regime is prone to change.

Several classification and descriptions of fire regimes occur on a national and regional scale (Heinselman 1981; Davis and Mutch 1994; Agee 1981). For the purposes of this document, classifications and descriptions based upon the above and developed by the Oregon BLM State Office and the Pacific Northwest Region of the Forest Service will be utilized. One cautionary note is the realization that simplification emerges from categorization, exceptions abound, and combinations of fire regimes are likely to apply to single ecosystems. The following seven fire regime categories have been developed for Oregon and Washington:

I	0-35 years, low severity.
II	0-35 years, stand-replacing, non-forest
III	35-100+ years, mixed severity
IV	35-100+ years, stand-replacing
V	>200 years, stand-replacing
VI	No fire
VII	Non-forest

Natural areas within the Althouse Creek Watershed fit into three of these classes. Identification of the fire regime along with a general discussion on plant community, fire type, and fire severity follows:

I **0-35 years, low severity**.
Typical climax plant communities include ponderosa pine, eastside/dry Douglas-fir, pine-oak woodlands, Jeffery pine on serpentine soils, oak woodlands, and very dry white fir. Large stand-destroying fires can occur under certain weather conditions, but are rare events (i.e., every 200+ years).

III. **35-100+ years, mixed severity**
This regime usually results in heterogeneous landscapes. Large, stand-destroying fires may occur but are usually rare events. Such stand-destroying fires may "reset" large areas (10,000-100,000 acres) but subsequent mixed intensity fires are important for creating the landscape heterogeneity. Within these landscapes, a mix of stand ages and size classes are important characteristics; generally the landscape is not dominated by one or two age classes.

IV. **<50 years, mixed severity**
Potential plant communities include mixed conifer, very dry westside Douglas-fir, and dry grand fir. Lower severity fire tends to predominate in many events.

The persistence of certain species in southwestern Oregon through the millennia can be attributed to their adaptations to fire (Kauffman 1990). Adaptations for fire survival are adaptations to a particular ecosystem and its specific fire regime. If the regime is altered, the capacity for that species to survive in the environment may be greatly changed. Hence, if an area has a fire regime that experienced frequent fire, and through suppression that regime has been altered, the hazard of catastrophic fire has been increased, posing a greater risk to adjacent land and land values.

Ecosystems have been dramatically changed due to fire exclusion and other human activities such as grazing and timber harvest (Kaufmann et al. 1994). The extent and impact of this change due to fire exclusion can often be correlated to the fire regime itself. Thus, a fire regime characterized by long return interval crown fires and severe surface fires would be impacted less by fire exclusion than a regime of frequent, light surface fires with a 1 to 25 year return interval. This is due to fire visiting the frequent, low intensity regime on more of a regular basis versus that of the long interval regime. With the aggressive program of fire suppression for the last 100 years, a regime that would be visited by fire every 100 to 300 years may not be impacted as much as an area with a shorter historical fire regime. Detrimental effects in the longer return-interval fire regimes will take longer to appear. Old, dense stands, covering a large portion of the landscape, can dramatically increase the size and severity of wildfires (Barrett et al. 1991) and insect epidemics (Mutch 1994).

Historically, wildland fire burned frequently across most of the Illinois Valley landscape. In recent decades the nature of fire on these lands has changed due to effective fire suppression policies. A consequence of this has been continued fuel accumulation which has resulted in significant changes in land condition as well as wildland fire behavior. Effects of fire exclusion have created vegetation and fuel conditions that can produce wildfires with a higher potential to be of a large and uncharacteristic nature and a greater level of difficulty in suppressing leading to high severity results. Increases in both the vertical (ladder fuels) and horizontal continuity (dead and down material) exist throughout the watershed. Greater levels of dead and down material increase the fire intensity, and with ladder fuels present, provide great opportunity for fire starts to reach the forest canopy resulting in stand replacing crown fires.

1. Fire Condition Class

A series of fire condition classes have been developed to describe how far from normal the historic fire regime currently is considering key ecosystem components (Hardy et al. 2000). This coarse scale assessment quantifies land condition, the result of fire exclusion and other influences (timber harvesting, grazing, insects and disease, and the introduction and establishment of non-native plant species). Changes to key ecosystem components have been identified such as species composition, structural stage, tree or shrub stand age, and canopy closure. This analysis attempts to quantify the extent of the fire management problem and the degree of required restoration and maintenance treatments. Table III-26 summarizes the three fire condition classes, attributes of each class, and general management options.

Table III-26: Fire Condition Class

Fire Condition Class	Attributes	Example of Management Options
Condition Class 1	- Fire regimes are within or near an historical range. - The risk of losing key ecosystem components is low. - Fire frequencies have departed from historical frequencies (either increased or decreased) by no more than one return interval. - Vegetation attributes (species composition and structure) are intact and functioning within an historical range.	Where appropriate, these areas can be maintained within the historical fire regime by treatments such as fire use.
Condition Class 2	- Fire regimes have been moderately altered from their historical range. - The risk of losing key ecosystem components has increased to moderate. - Fire frequencies have departed (either increased or decreased) from historical frequencies by more than one return interval. This change results in moderate changes to one or more of the following: fire size, frequency, intensity, severity, or landscape patterns. - Vegetation attributes have been moderately altered from historic ranges.	Where appropriate, these areas may need moderate levels of restoration treatments, such as fire, manual or mechanical treatments, to be restored to the historical fire regime.
Condition Class 3	- Fire regimes have been significantly altered from their historical range. - The risk of losing key ecosystem components is high. - Fire frequencies have departed (either increased or decreased) by multiple return intervals. This change results in dramatic changes to one or more of the following: fire size, frequency, intensity, severity, or landscape patterns. - Vegetation attributes have been significantly altered from historic ranges.	Where appropriate, these areas need high levels of restoration treatments, such as hand or mechanical treatments. These treatments may be necessary before fire is used to restore the historical fire regime.

The majority of the Illinois Valley can be classified as fire condition class 2 and 3.

2. Wildland-Urban Interface

The wildland urban interface exists where people and their developments meet or intermix with wildland fuels. Illinois Valley and much of the Althouse Creek Watershed are within the wildland/urban interface. The Illinois Valley has also been identified as a Community at Risk under the National Fire Plan (Federal Register 2001). As such, special attention is placed at a regional and national level to all wildland/urban interface communities within the vicinity of Federal lands that are at high risk from wildfire. A community is a defined area where residents live and are provided services such as fire protection, water, law enforcement, etc. The vicinity of federal lands is defined as within the range in which fires can travel. High-risk exists where there is land condition that is characterized by high risk fire regimes. For example Fire Condition Classes 2 and 3 are considered high risk fire regimes.

3. Fire Hazard, Wildfire Ignition Risk, Values at Risk

Fire hazard, wildfire ignition risk, and values at risk are conditions that are used to better understand and plan for potential fire management problems and to identify opportunities to manage the watershed to meet goals, objectives and desired future conditions. Wildfire occurrence can often prevent the successful achievement of short-term and mid-term land management goals and objectives. Stand-destroying wildfire can prevent the development of mature and late-successional forest conditions as well as convert existing mature forests to early seral forests.

The data collected for hazard, ignition risk, and values at risk for loss from wildfire are summarized in Tables III-27 through III-31. Ratings are displayed on Maps 14-18 (Appendix A). Rating classification criteria are summarized in Appendix E.

a. Fire Hazard

Effects of fire exclusion have created vegetation and fuel conditions that can produce wildland fires with a higher potential to be of a large and uncharacteristic nature and a greater level of difficulty in suppressing. Increases in both the vertical (ladder fuels) and horizontal continuity (dead and down material) can be noted throughout the watershed. Greater levels of dead and down material increase the fire intensity, and with ladder fuels present, provide great opportunity for fire starts to reach the forest canopy resulting in stand-killing crown fires. Such can further impact the means in which prescribed fire is applied to the landscape.

Hazard is based on the fires ability spread and ease of suppression once a wildland fire has ignited. The actual hazard rating used in this analysis is based on weighted values of five elements: ladder fuel presence, fuel model, slope, position on slope, and aspect.

Ladder fuel presence determines the ease of a fire moving from a surface fire into the crown canopy. This impacts the ability to easily suppress a fire. Fuel model is based on the 13 fuel models in the Fire Behavior Prediction System as developed by the USFS Fire Science

Laboratory. The fuel models can predict the rate of spread, flame length, fireside intensity, heat per unit area, and other elements of concern in the suppression of wildland fire. Slope impacts the rate of spread as fire travels faster up steeper slopes then it does on flat terrain. Location of a fire start on the slope impacts the ability of a fire to spread. Fire spread is mainly up slope to the ridge and back down the opposite side, with slower backing down slope spread. Aspect impacts fire spread; southern aspects are drier and promote more active fire behavior whereas northern aspects are typically moister with lower levels of fire behavior. Table III-27 summarizes the acres in each hazard class.

Table III-27: Hazard Classification

Ownership	Acres	High Hazard		Moderate Hazard		Low Hazard	
		Acres	% of ownership	Acres	% of ownership	Acres	% of ownership
BLM	4,698	2,144	46%	2,078	44%	476	10%
Non-BLM	10,713	5,605	52%	4,342	41%	766	7%
All Ownerships	15,411	7,749	50%	6,420	42%	1,242	8%

Based upon the previous mentioned criteria, only 8% of the land in the area addressed in this watershed is at a low hazard condition with half being in a high hazard condition. The primary factor is exclusion of the natural fire process.

b. Fire Risk

Fire risk is defined as the source of ignition. Human actions greatly influence the pattern of fire occurrence and the number of fires in the watershed. The watershed as a whole has a high risk of human-caused ignition. Human uses which create ignition risk include residential, industrial (light manufacturing, timber harvest, mining/quarry operations), recreational, tourist, and travel activities. Human use within the watershed is high. The human-caused fire occurrence pattern for the watershed would generally be a fire starting at low elevations or along roads and being suppressed before it could burn up to the ridges.

Lightning occurrence in the watershed has been moderate with only 20% of the fire starts resulting from lightning in the past 35 years. The watershed typically experiences at least one lightning storm event every two to three summers. Multiple fire starts may result from these storms.

Historical fire occurrence on BLM and private lands was reviewed based on available data of fires where management action was taken and a fire report was completed between 1968 and 2003. While data is available prior to 1968, it is incomplete for analysis purposes. During the 35 year time period, 82 fires occurred within the non-USFS portion of the watershed (Table III-28). No fire exceeded 10 acres in size during the 35 year period.

Table III-28: Fire Occurrence 1968-2003
Althouse Creek Watershed

Cause	Total Number of Fires	Yearly Average Number of Fires
Human	66	1.9
Lightning	16	.5
Total	82	2.4

Fifty-eight percent of the analysis area is a high risk category with only 7% in a low risk category. Human presence and use within the watershed produces high risk for wildfire occurrence. Table III-29 summarizes the acres in each risk class.

Table III-29: Risk Classification

Ownership	Acres	High Risk		Moderate Risk		Low Risk	
		Acres	% of Ownership	Acres	% of Ownership	Acres	% of Ownership
BLM	4,699	1,329	28%	2,447	52%	923	20%
Non-BLM	10,712	7,576	71%	2,959	28%	177	1%
All Ownerships	15,411	8,905	58%	5,406	35%	1,100	7%

c. Values at Risk

Values at risk are the resource and human values for components of the watershed. Property and resources that could be negatively impacted by fire are the basis for value. Known special status plant and animal sites are included. The watershed has one-third of its area in the high category for values. This is due largely to the amount of private land, especially residential areas, and the high wildlife, recreational, and other forest resource values within the watershed. Table III-30 summarizes the values at risk classification in the watershed.

Table III-30: Values at Risk Classification

Ownership	Total Acres	High Values at Risk		Moderate Values at Risk		Low Values at Risk	
		Acres	Ownership	Acres	Ownership	Acres	Ownership
BLM	4,698	1,031	22%	2,635	56%	1,032	22%
Non-BLM	10,713	4,267	40%	5,687	53%	759	7%
All Ownerships	15,411	5,298	34%	8,322	54%	1,791	12%

d. Areas of High Hazard, Risk and Value at Risk

When high hazard, risk and values at risk converge on the same piece of land, there is reason for concern. The analysis area has 7% of the area with a rating of high for all three factors. These are areas that have a priority for management review and action to reduce the hazard and consider actions to be taken to reduce the risk. Table III-31 summarizes where high hazard, risk, and values converge.

Table III-31: Areas of High Rating in Hazard, Risk, and Values at Risk Classification

Ownership	Acres	High Ratings in All Three Categories: Hazard, Risk, Values at Risk	
		Acres	Ownership
BLM	4,698	27	0%
Non-BLM	10,713	1,105	10%
All Ownerships	15,411	1,132	7%

J. AIR RESOURCES

Air quality in the Illinois Valley is good with limited local emission sources and generally good wind dispersion. Existing sources of emissions include occasional construction and logging equipment, light industry, vehicles, road dust, residential wood burning, campfires, and prescribed fire. Emissions are limited with greatest impacts occurring during times of heavy wildfire activity within the region, usually in late summer. For example, during the 1987 Silver Fire, over a 57 day period, over 53 million pounds of respirable particulate matter may have been produced (Hardy 1992). Winter and occasionally late summer temperature inversions commonly develop in the Upper Illinois Valley and have the potential to trap smoke, reducing its dispersal.

Grants Pass and Medford are the closest designated non-attainment areas to the Althouse Creek watershed. These are areas where air quality standards are typically not met. Other population centers around the Upper Illinois Valley where minimizing smoke impacts is an issue include Cave Junction, Takilma, Kirby, and Selma. Class I areas within the region include the Kalmiopsis Wilderness on the Siskiyou National Forest, Mountain Lakes Wilderness, on the Rogue National Forest, and Crater Lake National Park.

Oregon Department of Environmental Quality (in cooperation with the USFS) has one nephelometer in the Illinois Valley near Cave Junction at the Illinois Valley Airport. A nephelometer is an optical instrument that measures visibility and scattering coefficient (b_{scat}) of ambient air by directly measuring the light scattering due to particles and atmospheric gases. This nephelometer operates year round and was installed in 1999 with a primary purpose to monitor any impacts from area prescribed burns. Nephelometer data for this site is used for comparison purposes and not to determine compliance with the NAAQS. Limited light scatter (b_{scat}) date analyzed from January 2000 to September 2001 show the highest levels occurring primarily in November with high levels from late October into early February. Small spikes were noted for one prescribed burn that occurred within the area at the end of March 2000, where smoke was documented heading towards the Cave Junction area.

Visibility is monitored in federal Class I areas during the summer season. Wildland fires occurring in the summer have the greatest impact to visibility within the Illinois Valley. Shifts in past prescribed burning practices from summer and early fall have improved visibility impairment over the 1982-84 baseline levels. Currently, prescribed burn activity in this area occurs during the months of March through May and October into December.

Light scattering has been measured in Grants Pass since 1991. Measurements through 1993 show peak 1-hour and 24-hour averages occur in December and January. This impact is primarily the result of wood burning stoves and atmospheric stability that occurs during this time of the year.

The principal impact to air quality in the Illinois Valley and surrounding area is expected to be the temporary visibility impairment caused by smoke from wildland and prescribed fires. Potential short duration (single day to several weeks), high level PM10 and PM2.5 emissions would be expected from major wildfire events within the local area or region. Prescribed burning PM10 emissions would not be expected to exceed PM10 standards. If this did occur, it most likely would be highly localized and no more than a single day in duration.

Nearby, Grants Pass continues to be classified as a non-attainment area for fine particulate (PM10). Grants Pass last exceeded the PM10 24-hour average standard in 1987. Difficulty in meeting the PM10 standard was due primarily to effects from residential wood heating. Maximum levels recorded between 1987 and 1993 occurred in December and January, with the exception of 1987 when September had the maximum level due to widespread large fires burning at the time. Maximum levels have never been reached in the spring and summer months.

Grants Pass continues to be classified as a non-attainment area for carbon monoxide 1-hour average and 8-hour average standards. Grants Pass last exceeded the 1-hour standard in 1990 and the 8-hour standard in 1991. Maximum averages all occurred from December through February. Maximum levels have never been reached during the spring and summer months. A request for re-designation as an attainment area for CO is planned.

Wildfires have the potential to emit large quantities of smoke over long periods of time and at uncontrollable times. While prescribed fire produces smoke, smoke management guidelines manage the quantities, duration, and timing of prescribed burns.

Prescribed burning is constrained July 4 through Labor Day by the Oregon Visibility Protection Plan. The Medford District has traditionally completed prescribed burning operations by the middle of May, and does not resume burning until October. Potential impacts from prescribed burning smoke could occur from other federal and private burning west of the coastal crest and north of the Medford District, where conditions allow a broader burn season in the spring and earlier resumption in the fall. However, almost no prescribed burning is conducted in July and August in the vicinity of the Illinois Valley. The largest potential impact to air quality during this period is from residual smoke resulting from wildland fire in the region or in the immediate vicinity. Historically, long lasting, large wildland fires that produce larger volumes of smoke during the months of August and September have been common in this region.

The Clean Air Act, as amended, directs the State of Oregon to meet or exceed national ambient air quality standards by 1994. The Oregon Smoke Management Program (OSMP), a part of the required State Implementation Plan (SIP), identifies strategies for minimizing the impacts of smoke from prescribed burning on the densely-populated, designated, non-attainment, and smoke sensitive areas within western Oregon. Particulate matter with a size of 10 microns or less (PM10) is the specific pollutant addressed in the SIP. Particular matter at the 2.5 micron level and less is scheduled to be the new criteria pollutant once the Environmental Protection Agency has established its rules and regulations. For comparison of particulate matter size, a human hair is about 70 micrometers in diameter (EPA 1998).

Burning wildland vegetation causes emissions of many different chemical compounds (e.g., NO_x, CO and various organic compounds). The components and quantity of emissions depend in part on the types of fuel burned, their moisture content, and the temperature of combustion. Complex organic materials may be absorbed into or onto condensed smoke particles. Tests indicate that, on average, 90% of smoke particles from wildland and prescribed fires are PM10, and 70% are PM25 (EPA 1998).

Historically, EPA's National Ambient Air Quality Standards (NAAQS) for particulate mater (PM) tended to focus emission control efforts on “coarse” particles (those larger than PM25). Before 1987, EPA's PM standards focused on “Total Suspended Particles”, including particles as large as 100 micrometers in diameter. The EPA revised the standards in 1987 to focus control on PM10 in response to new science showing that it was the smaller particles capable of penetrating deeply into the lungs that were associated with the most adverse health effects.

Visibility conditions are affected by scattering and absorption of light by particles and gases. The fine particles most responsible for visibility impairment are sulfates, nitrates, organic compounds, soot and soil dust. Fine particles are more efficient per unit mass than coarse particles at scattering light. Light scattering efficiencies also go up as humidity rises, due to water adsorption on fine particles, which allow the particles to grow to sizes comparable to the wavelength of light. Naturally occurring visual range in the West is between 120 to 170 miles.

Visibility is an important public welfare consideration because of its significance to enjoyment of daily activities in all parts of the country. Protection of visibility as a public welfare consideration is addressed nationally through the secondary PM NAAQS which are equivalent to the primary PM NAAQS. Visibility protection is particularly important in the 156 mandatory Class I Federal areas.

K. HUMAN USE

1. Socioeconomic Overview

The Althouse Watershed is located in the southern portion of Josephine County. The county has a population of 75,726. For Josephine County, the percent of the population age 65 and older is 20%, exceeding the state average of 12.8%. The unemployment rate has been considerably higher than the state average and wages have been among the lowest in the state. Josephine County ranks among the highest for poverty. College educated individuals comprise 14% of the population, compared to 25% for the state. For Cave Junction, the closest town to the watershed, the population is 1,363. Educationally, 7.6% of the population has a bachelor’s degree or higher. The per capita income is $10,556 and the median family income is $22,500. Twenty eight percent of the individuals live below the poverty level. (U.S. Census Bureau, 2000)

The county timber harvest fell by 67% between 1988 and 1994 (Reid 1996). Employment is primarily in manufacturing, followed by the combination of health, education, and public administration, and then by retail and wholesale trade (Illinois Valley Community Response Team, undated). The historical dependence on resource extraction economy including logging and mining is apparent. Eco-tourism and new industrial centers have been targeted as primary goals in recent regional strategic plans for community development (Illinois Valley CRT 1995; USDI 1998b.) The Illinois Valley has been designated an Enterprise Community due to high unemployment, poverty and economic dependence on timber products. This has led to an infusion of federal and state grants for infrastructure and other aspects of economic development. Much of the economic development has taken the form of tourism, especially eco-tourism in the development of outdoor recreation opportunities.

There are no major towns located in the watershed. The watershed is bounded by Holland Loop

Road to the north, Bridgeview/Takilma Road to the west and the State of Jefferson Scenic Byway to the southwest. Dick George Road is located in the northwest portion of the watershed. The majority of the residences in the watershed are located in the northwest portion of the watershed. Scattered residences are located along Althouse Road and off Holland Loop Road. Holland, a small hamlet, is located in the northern part of the watershed. Holland consists of a store and scattered residences.

The Althouse Creek Watershed is important to people for a variety of reasons, including water for domestic, irrigation, wildlife and recreational uses; mining, especially gold; timber; mushroom and other special forest products; agricultural uses; wineries; and hunting. (Althouse Watershed Analysis, Forest Service, 1996).

2. Recreation

a. Dispersed Recreation

Dispersed recreation on BLM lands in the watershed includes off-highway vehicle (OHV) use, hunting, mountain biking, hiking, horseback riding and driving for pleasure. There are a host of non-designated hiking, horseback riding and Off Highway Vehicle (OHV) trails within the watershed. These are not currently mapped.

There are three OHV land designations. In the Althouse Creek Watershed (RMP), OHV use is limited to designated roads and trails on 1,980 acres. These limited areas are in the Port-Orford-Cedar infestations, the Illinois Valley Botanical Emphasis Area, the Late-successional Reserve, riparian reserves, and wetlands/ponds. On 2,731 acres, OHV casual use is permitted. There are no acres on BLM lands in the watershed that are designated as closed to OHV use..

b. Developed Recreation

There is no developed recreation on BLM lands in the watershed. There are some developed recreation opportunities on Forest Service lands within the watershed. Page Mountain, a day use area/winter recreation area is at the southern edge of the watershed. Bolan Lake Campground/Trail and lake is also on Forest Service lands at the southeastern edge of the watershed. The State of Jefferson Scenic Byway is located on the southwestern edge of the watershed.

3. Roads

Most roads in this watershed were constructed to support timber management and mining. Roads located on private lands, are typically natural surfaced and lack appropriate drainage structures. The mid-slope and low-elevation natural surface roads can be a source of erosion and sedimentation of streams.

Road construction and improvement across BLM lands stemmed primarily from timber management mandates. Road conditions vary depending on the degree/type of use, road surface type, soil type, maintenance, and road standards. Many of the roads located on BLM lands, are insloped, aggregate surfaced road with ditch relief culverts. Limited funding and declining timber harvest activities have resulted in some BLM roads being maintained to current road maintenance level standards. As road maintenance activities are deferred, roads fall into a further state of disrepair. Some of the BLM roads within the watershed are in need of road renovation / reconstruction work which is more extensive than road maintenance. BLM roads are continually evaluated for decommissioning or improvements needs / potential.

Prior to 1992, road drainage culverts on BLM land in the Althouse Creek Watershed were designed for to accommodate a 25 to 50 year flood event or were sized based on channel width and stream flow. Culvert designs did not consider native and anadromous fish passage for all life stages. Concentrated water flow through many of these structures was too great to allow fish movement upstream. Scour at the exit of these structures created pools and, over time, drops developed which restricted all movement of fish beyond these points and greatly reduced spawning habitat. Contemporary culverts are designed to accommodate bed load and debris transport for a 100-year flood event and to assure passage of native and anadromous fish (NFP and RMP guideline). Existing culverts are periodically evaluated for future replacement needs to meet this standard to meet the 100-year flood event.

Road density and road surface type vary in the watershed. Table III-32 summarizes road mileage based on different surface types and ownerships in the full watershed. There are a total of 33.0 miles of roads on BLM land in the watershed with an average road density of 4.5 miles per square mile.

Table III-32: Summary of Road Mileage by Surface Type

Road Ownership	Surface Type	Miles	Total
BLM	Natural (NAT)	6.1	3%
BLM	Pit Run Rock (PRR)	4.1	2%
BLM	Grid Rolled Rock (GRR)	1.9	1%
BLM	Aggregate Surface Coarse (ASC)	15.9	8%
BLM	Unknown various types	1.6	1%
Private & Other Agencies	Bituminous Surface Treatment (BST)	5.1	2%
Private & Other Agencies	Unknown / Various Types (UNK)	165.3	83%
Total Estimated Road Miles		200	

4. Minerals and Mining

a. Minerals

1) Mining Claims (current active claims)

There are no mining claims in T39S, R7W. There are 28 mining claims in T40S, R7W, all of which are placer claims. The majority of the claims are on Althouse Creek, Tarter Gulch, and Democrat Gulch. There are 2-4 mining notices for activities on those claims, but no activity other than to use a four inch dredge is proposed.

Althouse Creek was placer mined in the 1970s and early 1980s by several individuals. One noticeable mining location was an area several acres in size on both sides of Althouse Creek, but most work involving heavy mechanized equipment was on the west side of the creek. The activity was short in duration.

In Democrat Gulch past mining activity included large scale excavation and a processing plant. Mining no longer is occurring there, but evidence is still readily apparent and consists of several ponds from ¼ to several acres in size. No mining notice is on file covering this area.

There are two mining claims in T40S, R8W both of which are placer claims. No active mining occurring at this time.

The rights of mining claimants for activities on unpatented claims are outlined in Appendix B.

On lands administered by the BLM, there are three levels of mining operations that may occur. The lowest impact level of operations is considered casual use. Casual use operations include those operations that usually result in only negligible surface disturbance. These types of operations usually involve no mechanized earthmoving equipment or explosives, and do not include residential occupancy. No administrative review of these types of operations is required. The extent of casual users is not known.

Mining activity above casual use but primarily exploratory in nature requires the filing of a mining notice pursuant to the BLM Surface Management Regulations (43 CFR 3809). The mining notice informs the BLM of the level of operations that will occur, the type of existing disturbance at the location of the operations, the type of equipment to be used in the mining operations, and the reclamation plans following the completion of the mining activities. A reclamation bond is required before mining may commence as outlined in the mining notice. There have been no mining notices submitted for operations proposed to occur on the BLM-administered lands within the watershed.

A Notice of Intent to Operate (NOI) is generally required for mining operations above casual use, for activities above the exploratory level (bulk sampling of greater than 1,000 tons of ore).

The review of plans of operations involves a NEPA environmental review. A reclamation bond is required to be submitted before approval of a plan of operations. One plan of operations has been submitted for proposed activities within the watershed. This plan of operations was submitted by Walter Freeman representing Nicore Mining.

In addition to federal laws, mining claimants must comply with state laws where applicable. Requirements include:

1 The State Department of Environmental Quality monitors and permits dredging activities and activities where settling ponds are used.

2 The Department of Geology and Mineral Industries (DOGAMI) permits all activities over one acre in size and ensures reclamation is completed in a timely manner. DOGAMI requires reclamation bonds where applicable.

3 The Division of State Lands permits instream activities where the removal or displacement of material is anticipated and where the movement of a stream channel is planned. DSL also permits dredging within anadromous fish bearing streams.

4 The Department of Fish and Wildlife (ODFW) monitors turbid discharges from mined sites. ODFW also recommends preferred dredging periods for operations within anadromous fish bearing streams. ODFW also approves variances for operations outside the preferred work periods where applicable. Dredging within the Illinois River and tributaries is allowed between June 15 and September 15 annually.

If mining claim occupancy is proposed by the operator/claimant, the use is reviewed by the BLM's Authorized Officer. The occupancy must be determined to be reasonably incident to mining and reviewed in a manner similar to a plan of operations. No occupancy may occur until the proposed occupancy is reviewed and written permission is issued by the authorized officer pursuant to the BLM Mining Claim Use and Occupancy Regulations (43 CFR 3715).

2) Mining related occupancies

There are currently no authorized mining related occupancies within the watershed. There are two residential occupancies within the watershed which the occupants assert are mining related. However, no written authorization was given by the BLM concurring with the occupancies. The two existing unauthorized occupancies consist of a mobile home and outbuildings in T40S, R7W, Section 4 (SW1/4); and a small travel trailer and outbuildings in T40S,R7W, Section15 SE1/4SW1/4 (near USFS boundary).

There are currently 2-3 locations where there is mining equipment on BLM lands. This equipment is associated with a mining notice, and is authorized by BLM to be located there.

b. Surface Uses of a Mining Claim

There are instances in the western United States where mining claimants may have surface rights on the public lands administered by the BLM (Public Law 167). Where the claims have surface rights the miner may assert control over the surface related to the use of such surface by the public. In addition, the miner and BLM would negotiate the cutting and removal of timber or mineral materials on the claim, and where such removal is done, the proceeds is placed in an escrow fund until the claims are abandoned or patented.

A review of the BLM lands in the watershed shows all public land is managed by the BLM, and no surface rights for mining claimants exist.

c. Mineral Potential

Lode: The mineral potential for nickel and chromite is moderate southeast of O'Brien. A moderate potential for copper and cobalt exists in the vicinity of Waldo Hill and trends north-northeast along the ridge system towards French Flat.

Placer: High bench gravels surrounding the old town site of Waldo were mined near the turn of the century and revealed variable concentrations of gold and platinum. The potential for placer deposits within the present day Althouse Creek and its tributaries also exists where older deposits have been incised and redistributed.

d. Physical Condition Resulting from Past Mining Activities

The existing physical condition of areas that have been mined is variable. Those areas mined along the West Fork of the Illinois River appear to be in satisfactory condition; however, short-term and long term visual impacts may occur where dredging undermines the shoreline. Evidence of past mining activities can be found throughout the watershed. There are several abandoned mining ditches and rock piles that in most cases have become overgrown with forest.

5. Cultural Resources

There have been no systematic cultural resource surveys in the Althouse Creek watershed. Three historic sites are currently recorded in the watershed. Historic documentation provides evidence that numerous cultural sites probably exist within the watershed however these are currently not recorded. Historic sites represent a full range of local mining history. The mining site chronology extends from the discovery of gold in Sailor's Gulch in the early 1850s to more recent prospecting in the 1930s and 1940s and includes sites representing all the important technological developments associated with hydraulic and lode mining.

6. Lands/Realty

The BLM land ownership pattern in the watershed is mostly a scattered mosaic. The primary BLM ownership in the watershed consists of public domain lands that have never left the ownership of the United States. The remainder of BLM lands within the watershed are Oregon and California Revested Railroad grant lands (O&C lands).

The private land ownership was molded by the transfer of public lands from the United States to private individuals through several different land disposal authorities including homesteading, mineral patents, donation land claims, etc. This sometimes leaves the private landowners with access problems and needs that entail rights-of-way across BLM-administered lands.

BLM rights-of-way issued to private landowners include roads, water systems, power lines, phone lines, and communication sites. The actual locations of these rights-of-way can be found in Master Title Plats kept updated at the Medford District BLM Office.

There are only two FLPMA rights-of-way within the watershed. One is for non-commercial (residential) access to private property, and one for a powerline right-of-way in T40S, R8W, Section 23. There is a right-of-way application in T39S, R7W, Section 34 for the use of a spring diversion and associated pipeline for domestic water use.

There are no leases or permits for residential occupancy or agricultural uses within the watershed.

In the Watershed, there is 11.53 acres of O&C land identified as land tenure zone 3 land (T40S, R8W, Section 1) per the Medford District RMP. Land tenure zone 3 lands may be disposed of through a sale as authorized by FLPMA. Disposal is at the discretion of the Authorized Officer. The parcel is approximately ¼ mile long by 400 feet in width. It was created following Donation Claim patents that deeded irregular shaped parcels into private ownership. This left odd shaped remnants of public lands.

There are no proposed or pending land sales or exchanges.

7. Illegal Dumping

Illegal dumping occurs throughout the watershed. Several dump contracts have been awarded to clean up these areas over the past several years.

IV. REFERENCE CONDITION

A. PURPOSE

The purpose of this section is to assess how ecological conditions have changed over time as the result of human influence and natural disturbance, and to develop a reference for comparison with current conditions and with key management plan objectives (Federal Guide for Watershed Analysis, version 2.2, 1995).

B. CLIMATE

The climate of southwestern Oregon has not been static. During the Holocene (the past 10,000 years), shifts in temperature and precipitation have affected the type and extent of vegetation, the viability of stream and river flows, fish and animal populations, and human access to higher elevations. At the beginning of the Holocene, temperatures were rising and the climate was warmer and drier than today. This trend continued until sometime after 6,000 years ago when wetter and cooler conditions began to prevail. During the past few thousand years, modern climate and vegetative patterns have prevailed. However, during this latter period the environmental forces have not been constant. Fluctuating cycles of drier and wetter conditions, varying in duration, characterize the modern climatic pattern (Atwood and Grey 1996).

This long period of drier and warmer conditions in southwestern Oregon began to change at some point in the mid Holocene. The onset of wetter, cooler conditions gradually changed vegetation patterns, as well as the quantity and distribution of game animals and migrating fish (Atwood and Grey 1996).

C. EROSION PROCESSES

Prior to Euro-American settlement there were more mature forests with openings caused by Native American burning practices and natural lightning caused fires. Vegetation, coarse woody material, and organic matter on the forest floor protected the soil from erosion.

The historic erosion processes were generally the same as those described under the Current Conditions section. Native people probably did not accelerate the rate of erosion by their burning practices because burning was frequent enough to limit accumulation of fuels and therefore fires were probably more like mosaic broadcast burns. Native burning practices generally involved burning nearly level to gently sloping areas in valley bottoms, foot slopes, some steeper mid-slopes, and some upland meadows. Their fires were spotty and designed to enhance habitats and thus increase numbers of desirable plant and animal species (USDI 1997). The referenced document refers to conditions in southwestern Oregon with specific application to the Grave Creek Watershed. Frequent burning by the native people created park-like forests of scattered trees unlike the dense forests we see today (Pullen 1996). The practice of fire suppression began in 1903 (McKinley and Frank 1996).

Concentrated flow (gully and rill) erosion occurred mainly in draws where channels were created. The density of these channels varied with climatic cycles. During wet cycles, intermittent stream channels were more common. During dry cycles, cobbles, gravel, and plant debris accumulated in the draws, burying the channel (USDI, 1998a). According to Pullen (1996), the Native Americans recognized the value of riparian areas for humans and animals and therefore did not burn within them. Furthermore, the riparian areas of perennial and intermittent streams were likely very moist due to the stream influence and less vegetation density from Native American burning.

Mass movement or slides may have occurred in ultramafic areas with greater than 40” deep, extremely stony fine-textured soils and slopes greater than 20%. Accelerated mass movement can be caused by a reduction of root strength or an increase in moisture content, a result of decreased transpiration. It is doubtful that native people's land management practices affected the rates of mass movement. The native people's burning practices had their greatest effects on shallow-rooted plants that rapidly regenerated. Plants with the greatest root strength at depth were negligibly affected by burning.

Native people created foot trails instead of roads. These narrow foot trails had very little effect on erosion, water quality or water quantity. In the 1850s, with the settlement of the area for mining and later farming, trails and wagon roads began to be constructed. With increased roads came increased erosion from ditch line erosion and cutbank and fill failures. In the early 1900s a seventeen ton machine known as The Beast was used in Josephine County to haul lumber over roads; it damaged bridges and culverts (Booth 1984) and compacted soils considerably.

In the latter half of the 19th century miners engaged in intense hydraulic mining on the main stem and half a mile up most tributaries to Althouse Creek. “When a prospect looked good, a crew was brought in to mine using hydraulic giants. The hydraulic miners used water pressure to wash the banks and benches, actually moving all overburden down to bedrock…” (ref. USFS, Althouse Watershed Analysis, version 1.0, 1996) and changing location of the stream channel. Fines were flushed downstream.” hydraulic mining resulted in approximately 8 miles of ditch construction, 14 miles of bench, bank and vegetation removal…”. Soil and native vegetation was replaced by exposed bedrock and coarse mine tailings. The ditches used for hydraulic mining likely diverted some natural surface water and shallow ground water flow.

With the coming of the 20th century came mechanized transportation and equipment. More roads were built to provide better access for development opportunities, in agriculture and logging as well some mining. Early roads were generally very rough with wheel ruts after winter rains where the grade was simply cut in local soil. As reblading occurred, the road grade would drop creating a ditch affect, thus catching natural surface water and shallow ground water flow.

D. HYDROLOGY

1. Floods

Periodic flooding within the Rogue River Basin has had devastating consequences for the cultural environment. River flows were high enough during major flood years to destroy bridges, roads, buildings, and mining structures, and to inundate agricultural lands and stream courses. The December 1861 flood destroyed improvements and crops along the Applegate River (Atwood and Grey 1996). The flood of 1890 wiped out almost all of the barns and houses along the Rogue River including the Applegate River (Atwood and Grey 1996). Similar events most likely occurred in the upper Illinois. No written record exists of flood impact on human improvements, soil vegetation, or aquatic life before Euro-American settlement and development, although certainly catastrophic one-hundred year floods occurred then, as in the recent past (Atwood and Grey 1996).

Warm rain on snow events have occurred throughout the Euro-American history of the Rogue River and its tributaries. These events have resulted in increased flooding (Hill 1976). An article in the Rogue River Courier, dated January 29, 1903, stated that since Euro-American settlement in this area in the 1850s, there had been floods in 1853, 1861, 1862, 1866, 1881 and 1890. All of these, except for the flood of 1890 which was a rain event, were caused by rain on snow events.

Major floods of record in the 1900s occurred in 1927, 1955, 1964, and 1974 (Atwood and Grey 1996). Another major flood occurred in 1997, during which the Rogue River was swept clear of every bridge between Grants Pass and the Pacific Ocean (Rogue River Courier, March 4, 1927).

2. Droughts

In southern Oregon drought conditions were noted in 1841, 1864, 1869-74, 1882-85, 1889, 1892, 1902, 1905, 1910, 1914-17, 1928-35, 1946-47, 1949, 1959, 1967-68, 1985-88, 1990-92, and 1994 (LaLande 1995). During the drought years, many of the smaller streams in the area went dry and the larger streams had low flow. The effect of droughts was intensified by high water usage for agriculture and mining. The controversy over who should have primary access to the limited water supply (farmers or miners) was described in an 1861 editorial (McKinley and Frank 1996).

3. Beaver Dams

Beaver dams were prevalent on the Illinois River system before Euro-American influence. Beaver dams added woody material to streams, trapped and stored fine sediments, and reduced water velocities. As a result, riparian zones were wider than they are today. Between 1827 and 1850, fur traders removed most beaver from the region. Consequently, the dams were no longer maintained and were destroyed over time. The loss of beaver dams likely resulted in scouring of channel beds and banks, increased width / depth ratios, narrower riparian zones and fine sediment deposition in pools.

4. Mining Effects

Within the East Fork Illinois River Watershed, placer mining for gold was initiated in Sailor, Allen, and Scotch Gulches (as well as in Althouse Creek). These areas were intensively mined and lasted only a few years (Ramp and Peterson 1979:30). Placer mine tailings were usually dumped in piles in the flood plain. Given the time frame in which placer mining occurred, natural restoration of stream and flood plain has occurred to some degree.

Beginning around 1860, a system of ditches was developed for mines in the East Fork Illinois River system to bring water to the hydraulic mine operations. See discussion of hydraulic mining under Erosion Processes above.

E. STREAM CHANNELS

Prior to Euro-American settlement, the steeper, headwater streams in the Althouse Creek Watershed had varying amounts of large woody material (LWM). Generally, the forested, non-serpentine streams had sufficient amounts to create pools and meanders. Forests, in these areas, along the streams provided shade and an abundant source of LWM resulting from tree mortality. The coarse wood provided both structure and nutrients for the stream. Areas that were influenced by ultramafic/serpentine, such as Tartar Gulch sub-watershed, likely had fewer trees and, therefore, less instream LWD. The streams were longer, more complex and provided more aquatic habitat. Beaver eradication, mining, agricultural development, and large wood removal all resulted in straighter stream channels and decreased sinuosity. When clearing for pastures and fields, numerous sloughs, bayous, overflows, and springs in the watershed were channelized to increase the size of fields and pastures (McKinley and Frank 1996). This is likely true for the Althouse Creek Watershed. Althouse Slough is likely the former channel of Althouse Creek that was replaced by a constructed channel that has since evolved into the current Althouse Creek channel. Marsh communities were so effectively altered that now their locations are unidentifiable (McKinley and Frank 1996). Decreased sinuosity from mining and agriculture has resulted in decreased surface area of the streams, channel downcutting, and decreased groundwater recharge.

F. WATER QUALITY

Overall, prior to Euro-American settlement, historical summer water temperatures were likely lower than today due to lower width-depth ratios and more riparian vegetation. Given the fire occurrence prior to 1920, some stream reaches could have been sparsely vegetated for periods of time, resulting in higher water temperatures during that time (USDI 1998a).

Agriculture and mining in the late 1800s and early 1900s resulted in reduced riparian vegetation which allowed more solar radiation to reach streams. Increased water temperatures resulted from this activity. Irrigation withdrawals lowered stream flows and increased the surface area of the water receiving solar radiation. This also increased stream temperatures. This remains a problem today.

Sediment loads and turbidity were historically lower due to fewer sediment sources prior to Euro-American influences. Sedimentation and turbidity rose dramatically with hydraulic mining, land clearing, intense logging, road building, and settlement along the Illinois River and its tributaries.

G. VEGETATION

Historical vegetation patterns or reference condition alludes to the forests or vegetation that existed on a site prior to significant Euro-American modification. Examples of significant Euro-American modification include clearing for settlement and agriculture, human development (homes, buildings, roads, etc.), timber harvesting, mining, grazing, and fire exclusion.

The information presented here was gathered from a 1936 Forest Type Map for the southwest quarter of the state of Oregon (Andrews 1936) and 1916, 1925, and 1944 inventories.

Enough information is present in the1936 type map and additional inventories to develop approximate major plant series and also to estimate the extent of fire occurrence. The information in the survey notes described non-forest land types, noncommercial forest types, and timberland types.

1. Forest Stand Types

The information below covers BLM lands within the Althouse Creek Watershed.

Table IV-1: Althouse Historical Vegetation *

T-R-SEC (40 ac subdivision))	Year Examined	Major Series	Late-successional Forest	Unique Features
40-8-23 - SE,SE	1916	JP	N	Serpentine Outcrops
40-8-23 - NW,NW	1916	DF	N	
40-7-3 - NE,SW	1923	DF/PP	N	Rocky Soil, Glades & Brush
40-7-3 - NW,SW	1925	DF/PP	N	
40-7-3 - “Lot 3”	1916	DF/PP	N	Heavy Scrub Oak
40-7-3 - “Lot 4”	1916	DF/SP	N	Heavy Scrub Oak, grass
40-7-3 - SW,NW	1916	DF/SP	N	Heavy Scrub Oak, snow brush, bunch grass
40-7-3 - SE,NW	1916	DF/SP	N	Heavy growth chaparral
40-7-3 - NE,SE	1925	PP	N	
40-7-3 - NW,SE	1925	PP/DF	N	
40-7-3 - SW,SE	1925	DF	N	
40-7-3 - SE,SE	1925	DF	N	Open Glades & dense patches of brush
39-7-25 - SW,SW	1918	DF	Y	Burned 20A

* (derived from 1916-1944 data

2. Landscape Patterns

Late-successional Forests. – Only 320 acres located in eight 40 acre segments could be considered as late-successional forest. This is based on volume of 10mbf/acre of trees greater than 16” DBH

Pine species (Jeffrey, ponderosa, and sugar) were common species or species group on located in 29 forty acre segments.

Wildfires - There are only six forty acre segments with mention of burned areas in the 1916, 1925, 1936 and 1944 inventories.

Tanoak Series - There is no mention of the tanoak series in 1916, 1925, 1936 and 1944 inventories.

H. SPECIES AND HABITATS

1. Terrestrial

a. Special Status Plants

By 1852 major gold mining operations were underway. "Althouse Creek saw the most intense activity, supporting over a thousand miners along ten miles of its length for perhaps fifteen years" (Stories on the Land, An Environmental History of Applegate and Upper Illinois Valley,G. McKinley and D. Frank,1995).

The above quote demonstrates how quickly and extensively gold and miners occupied the watershed and altered the existing condition. Streams and riparian habitat were drastically modified over and over again. Given the amount of disturbance of the watershed early in recorded history and the amount of disturbance caused by mining operations over 150 years, it's very difficult to determine the extent of impacts to the vegetative communities, potential habitat and rare plant populations that existed prior to European settlement, other than to assume that it was extensive.

Hickman (1997) used soils maps, geomorphic features and the 1855 cadastral survey to create a map of potential climax vegetation for the Illinois Valley. He stated that non-serpentine terraces near or on the valley floor could have been Douglas-fir with sugar pine as the potential climax vegetation. He stated that Douglas-fir with a mixed hardwood component would dominate most of the uplands with little tanoak influence on northerly aspects. Numerous saw mills cut timber in the watershed and used the lumber for houses, barns and fence construction. Valley bottom flat-lands were cleared and developed for farming and ranching. It could be inferred from Hickman's work, that historic habitat for rare plant species associated with late-successional Douglas-fir forests in the Althouse Creek Watershed was more extensive and contiguous, at least on north-facing slopes based on past disturbance, and therefore more populations of known rare plant species probably existed and possibly other rare species were present in the past.

The south-facing aspects in the watershed were probably always moisture limited and associated more with Ponderosa pine or Jeffery pine forest types in the overstory and a mixed shrub, forb and grass community understory. The optimum habitat for rare plant species associated with pine communities was most likely more abundant and contiguous before mining activities and associated timber harvesting industry became more extensive. Numerous fires probably helped maintain a competitive niche for rare plant species in the understory. The current list of rare plants were probably never dominant species in the herbaceous layer, except in rare occasions, but most likely the number of rare plant populations was higher as a result of more extensive and higher quality habitat. The frequency rate of rare plant populations was probably higher in the watershed in the past and the numbers of individuals higher per population.

Since serpentine habitats occur as a result of underlying parent rock, the extent of ultra-mafic influenced land is static and should contain similar diversity of plant species as in the past. However, serpentine areas were heavily mined and streams and riparian habitat severely altered repeatedly over the past 150 years and lost. Significant amounts of high quality habitat for serpentine endemic plants have been reduced, in uplands, ephemeral areas and riparian areas. Serpentine wetlands have been drained and modified and habitat lost.

Oak woodlands and grasslands on and above the valley floor were healthier due to regular fire intervals which would have rejuvenated the native vegetation community. Most of these lands are currently owned and managed for agricultural use by private land-owners. The sweet of rare plant species associated with these communities, more than likely, would have been more vigorous, abundant and extensive. However it's very difficult to recreate in our minds and describe how past conditions looked. Even if we assume the translocation of certain plant communities by association to farmlands and ranches through juxtaposition and similar vegetation community types, we can only assume the general characteristics and very few specifics. However we know that no non-native species would have existed.

Prior to the combustion engine, the main mode of travel was by foot, horse and wagon. These modes of transportation created less impacts and to native habitats, especially grasslands. Wet meadow habitats could have been more extensive which, in turn, means that the proposed endangered plant, *Lomatium cookii* could have been more prevalent.

Historically, noxious weeds and non-native species were not a concern. There is no relevant information available from the Illinois Valley on this topic.

b. Wildlife

Prior to European settlement, Native Americans managed the landscape using fire to burn off undesirable vegetation and to promote growth of desired products. Wildlife was extensively used by these people to meet their everyday needs. Human use of these wildlife resources occurred at a sustainable level.

Many habitat types were created and maintained by disturbance events, specifically fire. Consequently, fire suppression has changed vegetation patterns and historic habitat distribution. Fire adapted habitats and associated wildlife species have been adversely affected by fire suppression. This is particularly true for meadows, oak/savannahs and pine stands.

White oak stands provide nesting habitat for various species, acorn crops for wildlife forage, and big game winter range. The open condition and the grass understory are highly beneficial to a number of game animals and ground nesting birds. A variety of bird species such as the acorn woodpecker *(Melanerpes formicivorus)*, western blue bird *(Sialia mexicana*) and Lewis' woodpecker *(Melanerpes lewis)* are intricately tied to the riparian areas within these stands. Species such as the sharptailed snake *(Contia tenuis)*, common kingsnake *(Lampropeltis getulus)*, and mountain kingsnake *(Lampropeltis zonata)* use the grassland-riparian interface area as their primary habitat.

Historically, the amount and distribution of old-growth forest in the watershed was in a state of constant fluctuation. Early seral stands were created by disturbances such as wind throw, fire, disease and human activity such as commercial timber harvest, agriculture, and mining.

According to 1936 records, approximately 40% of the watershed contained old growth Douglas-fir. This wide distribution of old growth forest allowed for connectivity and dispersal of species associated with this habitat.

Ripple (1994) estimated that 89% of the forest in the large tree size class was in one large patch that extended throughout most of western Oregon. Landscape patterns within the watershed suggest that a similar distribution of Douglas-fir old growth occurred historically. Due to the connectivity of the older forests, animal dispersal, recolonization of former habitats, and pioneering into unoccupied territories was accomplished more effectively than it is today.

However, not all mature/old growth forests occurred in contiguous patches. Throughout the watershed, large areas of serpentine influenced soils were characterized by vegetation not capable of attaining old growth characteristics. Meadows were interspersed throughout the landscape and created habitat for early successional and edge associated species. Serpentine areas and meadows created natural barriers to dispersal for some species associated with old growth forests.

Old growth/mature forest associated species such as the northern spotted owl (*Strix occidentalis*), pileated woodpecker *(Dryocopus pileatus)*, northern flying squirrel *(Glaucomys sabrinus)* and red tree vole *(Phenacomys longicaudus)* were found in greater numbers than they are now. Due to the historic connectivity of mature habitat, species that benefited from edge environments, like striped skunks *(Mephitis mephitis),* may have been less common than they are today.

Riparian corridors provide habitat for a myriad of wildlife species. Beavers *(Castor canadensis*) acted as a keystone species (species whose impact on the habitat is greater than their numbers would normally indicate and which provide critical habitat support), creating backwater sloughs behind their dams, and adding fine woody material to the stream which served as fish cover. Waterfowl such as ducks and geese also benefited from the nesting habitat created as a result of beaver ponds.

Within a riparian area, the diversity of wildlife species is not restricted to the water surface. A profusion of aquatic insects supported an assortment of vertebrate species including anadromous fish. As the adult fish returned to their native streams, spawned and died, their carcasses produced a rich source of food that supported minks *(Mustela vision)*, American black bears *(Ursus americanus)*, grizzly bears, bald eagles *(Haliaeetus leucocephalus)* and a number of other scavenger species.

Human activities have impacted water quality and the overall condition of riparian areas. Timber harvest and road building have led to increased sedimentation, increased stream temperatures, and decreased stream stability and structural diversity, all of which negatively affect aquatic and semi-aquatic wildlife.

More than any other human activity, mining has altered many aquatic systems in the watershed. Mining diverted water flows, altered stream channels and resulted in timber harvesting, road building and the movement of large quantities of soil and rock. Although widespread mining is no longer practiced in the watershed and water quality has improved, its historical impacts persist.

It is likely that many native aquatic and amphibious species are less prevalent now than they were during pre-settlement time. In general, the riparian habitat in the watershed has been degraded from historic conditions and supports lower levels of species diversity than in the past.

Mortality associated with natural attrition and pulse events such as fire, windthrow and insect infestations created snags that provided habitat for a wide range of species. Historically, snag and coarse wood development were more likely to occur in pulses than they do today. These pulse events strongly influenced the spatial and temporal recruitment of snags and coarse wood. Timber harvest and fire exclusion have reduced the influence of pulse events on the recruitment and availability of snags and down wood.

Large predator species such as grizzly bears and wolves *(Canis lupus)* were present in the watershed (Bailey 1936) and, along with cougar *(Felis concolor)* and black bear *(Ursus americanus),* maintained the balance between species such as Roosevelt elk *(Cervus elaphus)* and blacktailed deer *(Odocoileus hemionus)* with the available forage.

Wolverines *(Gulo gulo luteus)* remained at high elevations throughout the year. This species is an opportunistic predator, feeding on animals such as porcupines *(Erithizon dorsatum)* and occasional winter kills. Grey foxes *(Urocyon cinereoargenteus)* used the valley and nearby brushy slopes as their primary habitat.

Predators benefited many other species by preying on small mammals such as raccoons *(Procyon lotor)* that fed on the young birds in ground nests. Predators also made carcasses available in the winter that benefited species as diverse as the striped skunk *(Mephitis mephitis*) and the black-capped chickadee *(Parus atricapillus*).

Historically, the landscape was open and animal movement was largely unrestricted. Many animals would seasonally migrate to take advantage of food, shelter and water. For example, deer and elk primarily wintered in the oak/savannahs, and spent warmer seasons in the uplands.

In the early spring, black bears sought green grass to activate their digestive system. Winter kills that remained were utilized by the bears at this time. During early summer, California ground-cone *(Boschniakia spp.)* became an important part of their diet, until berries were available. As fall approached, the salmon returned to the river, spawned and died. This abundant food source was available to a host of consumers and scavengers.

Historically, exotic species such as bullfrogs, starlings, house sparrows, opossum and largemouth bass were not found within the watershed. Their current presence, the result of both intentional and accidental introductions, has impacted native populations through displacement, competition, predation and disease.

c. Riparian

Over time, water quality has varied greatly. Prior to the introduction of widespread mining activities, water quality was high. Seeps, springs, snow and riparian vegetation all contributed to keeping the water cool. During the winter and spring, occasional floods would flush the system clear of sediment deposited from natural slides and erosion.

Stream courses with higher gradients were primarily lined by conifers with a narrow band of deciduous trees and were well defined by entrenched channels. On BLM lands, most streams were characterized by plant series such as Ponderosa pine and Jeffrey pine which were not capable of providing Douglas-fir late-successional forest habitat.

As the streams dropped to the valley floor, wide floodplains were developed and the streams began to meander, taking on a variety of courses from year to year. These highly sinuous stream systems consisted of undercut banks, oxbows, and woody material that created a diverse aquatic system and associated habitats. Here, the riparian zone would have widened, with deciduous trees playing a more important role than they did in the uplands. Because conifers near the streams had a longer fire return interval, they were more likely to progress to mature stand conditions. This provided a source of large wood in the streams.

Many wildlife species contributed to riparian corridor diversity. Beavers *(Castor canadensis*), as a keystone species, created backwater sloughs behind their dams and added fine woody material to the stream, providing fish cover as well as nesting habitat for species such as ducks and geese.

The diversity of wildlife species was not restricted to the surface, as a profusion of aquatic insects took advantage of the variety of available niches. These insects in turn supported an assortment of vertebrate species including anadromous fish. As the adult fish returned to their native streams, their carcasses produced a rich source of food that, in turn, supported minks *(Mustela vision)*, American black bears *(Ursus americanus)*, grizzly bears *(Ursus horribilis)*, bald eagles *(Haliaeetus leucocephalus)* and a number of other scavenger species.

2. Aquatic

a. Fisheries

Pre-Euro-American Settlement: A pre-Euro-American view of the Althouse Creek Watershed would have included sustained populations of beaver and salmon, particularly in the lower Althouse Creek. In addition, there would have been a mixture of mature conifers and hardwoods and riparian zones would have had dense canopies, most notably on the valley bottoms where alluvium is derived from ultramafics but serpentine conditions do not dominate. Summer water temperatures in these valley bottom reaches were probably cool and not a limiting factor in salmonid production. In the upper reaches of Althouse Creek, stream temperatures may have been cooler than today due to narrower channels and more shade, but the understory of some streams was probably less brushy than it is now. In the Jeffrey Pine plant series, the pine understory was sparse due to frequent fire and probably consisted of a grass layer. Stream temperatures in these areas may have been higher than current water quality standards (see Water Quality/Temperature, Chapter 3). In the valley bottoms and less so in the serpentine areas, there would have been large woody material dispersed throughout the streams providing complex habitats for resident trout, juvenile steelhead and salmon. There probably would have been an abundance of fish in many valley bottom reaches of most streams. Native Americans relied heavily on salmon, steelhead, lamprey and suckers for subsistence and ceremonial purposes.

Prior to Euro-American settlement, streams in the valley alluvium meandered with unconstrained channels. Multiple stream channels dissipated flows and created fish habitat. Riparian vegetation and adequate connections to the floodplain limited the effects of annual peak flows. Winter scour had less impact on macroinvertebrate and fish populations, especially in low gradient reaches. In addition, large riparian down wood held back spawning gravels during high flow events in some of the watershed's steeper gradient streams. Sediment in the spawning gravels was not limiting to fish or macroinvertebrate populations. Occasionally, landslides delivered sediment to streams. However, large wood almost always accompanied the sediment delivery. The wood controlled sediment movement throughout the system and the sediment did not embed itself into the spawning gravel. Erosion and sedimentation were in balance with stream transport capacity resulting in pools with good depth and cover.

Post-Euro-American Settlement: Euro-Americans trapped beaver extensively and as a result, complex, deep pools started disappearing throughout the watershed. Coho salmon populations began declining. In addition, mining roads and other travel ways began to be more numerous. This led to an increase in peak winter flows, especially when roads were located near streams. Sedimentation of streams increased as well.

Mining occurred throughout the Rogue basin. Extensive mining in the early 1900s caused the Rogue River to run brick red with silt (ODFW 1994). Stream sedimentation contributed to a decline in salmonid populations throughout the watershed, and water temperatures increased as riparian vegetation was removed. The 1964 flood eroded banks and widened channels that had begun to recover following the impact of mining.

Mining in the Althouse Creek drainage began the 1850's, peaking in the 1860's. This mining consisted of panning, sluicing, and hydraulic mining. The hydraulic mines would wash the material from banks. This process also involved removing vegetation from the area. The USFS Watershed Analysis suggests most tributaries to Althouse Creek were mined approximately 0.5 miles up from the mouth. Reports also indicate that the stream channel may have been moved in order to mine under the original channel (USFS WA, 1996).

There was agricultural activity within the Althouse Creek Watershed. Fields were plowed close to the streambanks. Trees and other riparian vegetation were removed, thereby reducing stream shade. In addition, agricultural runoff added excess sediment to streams and increased stream temperatures. Irrigation diversions limited salmonid survival wherever they occurred. Water rights allowed complete diversion of stream flows for irrigation. Fish screens on irrigation diversions were a relatively new phenomenon and consequently, large numbers of salmon and trout ended up in farmer's fields.

Past timber harvest has had a big impact on juvenile coho salmon, steelhead, and cutthroat trout habitat, especially in non-serpentine areas. Streamside trees were harvested due to their size, value and ease of logging. When the majority of the large wood was removed, there was little available for recruitment for fish habitat. Habitat complexity rapidly declined, as did the coho salmon, steelhead, and cutthroat trout populations which were dependent upon the large wood. Coho salmon were most affected by the loss of large wood, since juvenile coho require complex pools for rearing habitat. In addition, coho are found in lower gradient stream reaches than resident trout and steelhead, and are not distributed as far upstream. As a result, when the lowland habitat was altered, there were limited refugia for the coho salmon.

Road construction increased with timber harvest, compounding the problem of limited juvenile habitat. Sedimentation increased and limited salmonid production. Peak winter flows increased as a result of increased road density. High winter scour limited macroinvertebrate populations and transported wood away from streams. Fish habitat declined. In addition, stream-side roads limited stream meander and the development of multiple channels. Peak flows did further damage, as the streams could not naturally diffuse the high energy from flood events.

In 1973, a USFS report noted that within the Illinois River, chinook, coho, winter-run steelhead, and sea-run cutthroat trout were of great economic and recreational value. Coho and chinook contributed less to the sport or commercial fishery than steelhead. Large populations of adult steelhead were spawning in Althouse Creek. (USFS Illinois River Study, Wild and Scenic Rivers System Sept. 7, 1973)

I. FIRE

The majority of lands within the Althouse Creek Watershed have an historical mixed severity fire regime. The mixed severity fire regime is characterized by both lower severity more frequent fires and infrequent large, stand-replacing fires every 35-100+ years (Agee 1990). Landscapes in a mixed severity regime often consist of a mix of stand ages and size classes. Almost 30% of the watershed is considered a low severity fire regime with frequent (0-35 years) fires.

Moderate or mixed severity fire regimes are the most difficult to characterize. Fire frequencies usually range from 25 to 100 years and individual fires often show a wide range of effects, from high to low severity. The overall effect is patchiness over the landscape as a whole. Tanoak-Douglas-fir forests which comprise 36% of the analysis area have a complex fire disturbance history. Atzet and Wheeler (1982) estimated a 20 year fire return for interior southwestern Oregon tanoak-Douglas-fir stands. A high percentage of natural stands have a history of frequent surface fires, resulting in 2 or 3 storied stands with each story being even aged. The layered under-story vegetation often contributes to the intensity of the fire: waxy-leaved shrubs and trees can carry flames into the over-story, creating a high intensity fire.

“Following intense fires, which occur in patches on the landscape, tanoak sprouts from root collars, while Douglas-fir must reestablish from seed. Either species can dominate the stand, or the stands may contain a mixture of both. If tanoak dominates, it will form a solid canopy and exclude Douglas-fir until that canopy begins to break up between age 60 and 100 years. The eventual stand will be a mix of the two species. If the stand is mixed from the beginning, Douglas-fir will begin to dominate after 15 - 30 years because of a faster growth rate at that age. When the Douglas-fir begins to break up, tanoak established in the under-story is released, forming a mix of the two species (Thornburgh 1982). However, examples of such stable, two-storied stands are rare because of fire history. Successive intense fires may result in hardwood dominated stands while less intense fires may result in stands with several age classes dominated by the species best able to take advantage of the environment following a fire”(Agee, 1990).

Fires in the low severity regimes are associated with ecosystem stability, as the system is more stable in the presence of fire than in its absence (Agee 1990). Frequent, low severity fires maintain fuels so they are less likely to burn intensely, even when there is severe fire weather.

Under the identified natural fire regimes, limited over-story mortality occurs. The majority of the dominant over-story trees are adapted to resist low intensity fires because of thick bark developed at an early age. Structural effects of these fires are on the smaller under-story trees and shrubs which, along with down woody fuels, are periodically removed or thinned by low intensity fires. The resulting understory is low, open, and park-like in appearance over a vast majority of the landscape.

With the advent of fire exclusion, the pattern of frequent, low intensity fire ended. Dead and down fuel and under-story vegetation are no longer periodically removed. Species composition changes and thinner barked, less fire-resistant species increase in number and percentage of site occupancy. This creates a trend of ever increasing buildup in the amount of live and dead fuel. The under-story becomes dense and choked with conifer and hardwood reproduction. The longer interval between fire occurrences allows both live and dead fuel to build up. This creates higher intensity, stand-destroying replacement fires rather than the historical low intensity ground fires that maintained park-like stands.

The reference condition for fuel conditions in the pre-European settlement period would have been one of low build-up over the majority of areas. Lack of fire suppression and Native American use of fire maintained a comparatively open forest under-story with little fuel accumulation or under-story vegetative growth. This would have occurred across the watershed with only isolated areas of dense undergrowth and fuel accumulation. These areas would have changed over time. Location would have largely been dependent on the lightning occurrence pattern, with the exception of areas used by Native Americas. The build up of fuel and vegetation that has resulted from modern human settlement and subsequent fire exclusion has created a hazardous situation that is outside the reference condition and natural range of variability.

J. AIR RESOURCES

Lower air quality due to natural and human ignition sources has historically occurred in the spring, summer, and fall in southern Oregon. Numerous references are made by early Euro-American explorers and settlers of Native American burning and wildfire occurrence in southern Oregon. Smoke-filled skies and valleys were once typical during the warm seasons. Air quality impacts from natural and prescribed fires declined with active fire suppression and a reduction in burning associated with settlement and mining. Factors influencing air quality shifted away from wildfire and human burning to fossil fuel combustion as population and industry grew. This created a shift in the season of air quality concern to the winter months when stable air and poor ventilation occur. By the 1970s, fossil fuel emissions became a major factor along with wood stove and backyard burning. Prescribed burning related to the forest industry increased throughout this period and was an additional factor, particularly in the fall. Regulation of prescribed burning smoke emissions and environmental regulation of fossil fuel combustion sources has lead to a steady improvement in air quality since the 1970s.

The historical fire regime created a pine-dominated forest characterized by little dead and down ground fuels and few standing snags (USDA, USDI 1994a). Upland vegetation had a considerably less dense under-story. Coarse down woody accumulations were relatively light because frequent low intensity fires consumed the majority of the down wood. Less smoke and particulates were produced in the past, as there was less material to burn.

Air quality as a reference condition is determined by legal statute (the Clean Air Act and the Oregon State Air Quality Implementation Plan). Management actions must conform such that efforts are made to meet National Ambient Air Quality Standards, prevent significant deterioration, and meet the Oregon visibility protection plan and smoke management plan goals.

K. HUMAN USES

1. Prehistory and Ethnography

Archaeological evidence dates occupation of southwest Oregon back at least 10,000 years. The early prehistory of the people that inhabited the interior valleys is not as clearly understood as other areas in Oregon. This is in part due to research being oriented more towards coastal areas than interior valleys and the lack of archaeological sites dating to pre-Holocene times (Tveskov et al. 2002). The majority of prehistoric sites recorded in southwest Oregon date to the late Holocene period which provides a comprehensive view of the cultural practices of the people inhabiting the area 1,500-2,000 years ago. Ethnographic research gathered in the late 19th and early 20th century from informants living at the Siletz and Grand Ronde Reservations provide invaluable information, but the small number of informants, the number of years away from their traditional lands, and the influence of white culture most likely had a direct affect on the accuracy of the information gained (Tveskov et al. 2002; Pullen 1996; LaLande 1990; Gray 1987; Beckham 1978).

The various groups who lived in close proximity to the watershed were the Takelmas (Penutian speakers), and Dakubetede (Athapascan). At the time of white contact, the Native Americans living in the Rogue and Illinois valleys spoke different languages but were culturally very alike and practiced similar lifeways (Tveskov et al. 2002; Jones 2001; Pullen 1996). The watershed was likely utilized by different Native American groups, with territorial boundaries over-lapping. Each group occupied a nuclear territory along their respective river drainages, but utilized the surrounding uplands to gather a wide variety of plant foods, hunt deer and elk, and to gather material for making baskets and tools (Jones 2001; Pullen 1996:IV-1; Gray 1987). (Added 9-14-04 LB).

The people were hunter-fisher-gatherers following a subsistence pattern of procuring food as it became available throughout the different seasons. Primary food resources included the acorn, camas, fish, seeds, nuts, deer, and berries. People wintered in small permanent villages and dispersed during the spring, summer, and fall to utilize upland resources, returning to their permanent villages in mid-autumn. The winter villages were normally located at low elevations close to the confluence of two streams, or in areas where food resources were abundant. Permanent structures were made of sugar pine boards set vertically over a semi-subterranean, rectangular structure with a gabled roof. Other village structures would have included sweat lodges and drying racks. Men and women had separate sweat lodges, with the men’s being more substantial. When gathering resources at the higher elevations, brush structures may have been constructed for shade, but no permanent structures would have been built (Gray 1987).

The social organization of the Takelma and Athapascan groups was relatively simple. Basic elements included the family and the village which were autonomous. The villages were usually headed by one or more powerful families, with power being gauged by the acquisition of material goods. These powerful families would be lead by a head man or 'chief' and their positions were maintained through marriage into other wealthy families and by negotiating social and economic activities that strengthened their position in the community (Tveskov etal. 2002:13). Known ceremonies among the Takelma and Athapascan included those related to birth, puberty, marriage, death, subsistence, and wealth display (a more detailed account can be found in Gray 1987 and Sapir 1907).

With the large influx of miners and settlers into the area in the 1850s, conflict with the Native American groups increased. Food was becoming scarce for the Native Americans living in southern Oregon. Areas formally inhabited by the Indians were being settled on by the whites. Former hunting grounds were decimated by cows and pigs raised by the settlers, and rivers and streams became choked with sediment from placer mining activities depleting the salmon runs. Extermination of the Indians became the policy of self-regulated military volunteers. This conflict escalated into the Rogue River Indian Wars of 1852-1856. By 1856, most Native Americans living in the Rogue and Illinois valley were forcibly relocated to the Coast Reservation in northern Oregon.

Today the descendents of these people are included in the Confederated Tribes of Grand Ronde and the Confederated Tribes of the Siletz. These tribes take an active role in the management of their native lands and the continued education of the general public.

Little is known of the archaeology of the upper Illinois River Watershed, especially in the Althouse Creek watershed. The oldest recorded site in our immediate area is located at Marial on the Rogue River, 21.9 miles below Grave Creek. This site has been dated to around 8,000 years before present (Schriendorfer 1985). Recorded archaeological sites downstream of the watershed include the McCaleb's Ranch site (35JO32) possibly correlated with the ethnographic site "Talsalsan", and the Gallaher site (35JO28), a late Archaic site that was possibly occupied to the mid-1800s. In addition, pit house village sites have been recorded on the wild section of the Illinois River (Steep 1994). Four prehistoric sites are recorded for the watershed (three USFS and one BLM).

2. Regional Culture-History

Although early prehistory of southwest Oregon remains poorly understood, there is a general consensus of the chronology of the gradual transformation of local groups from nomadic big game hunters to semi-sedentary "foragers", and then sedentary "collectors" (Goebel and LaLande 1997:18). Goebel and LaLande (1997) present a four-part culture-history scheme. The following is the sequence proposed by Goebel and Lalande (1997:18):

Paleoindian Period (about 12,000 years ago until approximately 9,000 years ago: documented by the presence of a few "Clovis", fluted projectile points found in southwestern Oregon; probable focus on hunting of large, now-extinct mammals.

Early Archaic Period (about 9,000 to 6,000 years age): documented by a few sites in the lower Rogue River and Applegate River drainages; probable transition to broader-based hunting and gathering; characterized by wide-stem and large leaf-shaped projectile points; period-experienced onset of hotter-drier conditions (the "Altithermal").

Middle Archaic Period (about 6,000 to 2,000 years ago): documented by larger number of sites (including a few in the Upper Rogue area); period of increased reliance on certain resources and beginnings of more settled, village pattern; proliferation of variety of projectile points; probable reliance on fire to manage vegetation after close of "Altithermal".

Late Archaic Period (about 2,000 to 200 years ago): documented by largest number of regional archaeological sites studied to date; period of increased sedentism and storage of food surpluses (salmon, acorn meal); growing populations, aggregated during winter at major village sites on river terraces.

3. Burning by Native Americans

Fire is an important aspect of ecosystem function in southwest Oregon. Major plant communities are dependent on fire and other types of disturbance to successfully maintain ecosystem health (Atzet and Martin 1991). In this respect, Native Americans played an active role in maintaining fire dependent communities over time, and in establishing themselves as the dominant "edge dependent species" (Bean and Lawton 1993; Lewis 1989, 1993).

Native American burning practices provided small and big game habitat, natural fuel breaks, various edible plant foods, materials for basketry, and other technological uses. Other uses for fire included hunting, crop management, insect collection, pest management, warfare, food preparation, and clearing areas for travel (Williams 1993). Fire also recycles nutrients, provides vistas, and often destroys forest pathogens. See Williams (1993) for a recent bibliography of the use of fire by Native Americans.

Until recently, specific ethnographic information for the use of fire in southwest Oregon was limited (Lewis 1989). However, research specific to the Applegate and Illinois Valleys has been published (McKinley and Frank 1995; Pullen 1995). In addition, detailed information is available for the Willamette Valley (Boyd 1986), and it is possible to extrapolate techniques to native populations in this watershed based on similarities of plant communities. Similar plant communities also occur in northern California, such as chaparral, and ethnographic data is available for burning by those tribes. Native people's burning practices in southwest Oregon must have functioned similarly to those described for such tribes as the Miwok, Hupa, Tolowa, and Wintun in California (Lewis 1989, 1993). Also see Blackburn and Anderson (1993).
The following review is based on Lewis (1989) and Pullen (1995). In addition, Pullen (1995) provides an extensive review of historical journals and other writings illustrating Applegate and Illinois Valley plant communities at the time of historic contact.

Riparian Zones - Conifers were an important part of riparian zones along the Illinois River and their tributaries: ponderosa pine along the upper Illinois River (Illinois Valley) and Douglas-fir on its lower reaches.

Valley Floor-Oak-Grasslands - These plant communities were burned beginning as early as late July and continuing through September. Burning often occurred after spring rains. Burning initiated early grass growth and provided habitat for game. It also controlled acorn-destroying insects (McCarthy 1993). Native American seasonal habitation sites are usually found along the boundaries of this zone. Recent research indicates that more oak-pine habitat existed in the past and that these communities were specifically maintained by native burning (Pullen 1995). Open ponderosa pine stands was maintained, interspersed with open groves of Oregon white oak.

Valley Slopes – North facing slopes in the Illinois Valley were covered with open stands of ponderosa and sugar pine and occasionally Douglas-fir. South facing slopes were covered with grass, except along ravines where oaks, chaparral, and scattered ponderosa pine occurred.

Chaparral - Fires were usually initiated in the fall. The primary goal was to maintain a mosaic of early to mid-seral plant communities that functioned as small and big game habitat. Edible plant species were also produced. This mosaic created natural fuel breaks. Spring burning helped to maintain more permanent openings.

Mid-Elevation Forests - Fire was possibly used to maintain open understories in stands dominated by Douglas-fir and ponderosa pine. Fires eliminated the build up of ladder fuels that could contribute to stand replacement fires. Meadows were maintained but overall native use of fire in this zone was limited.

Upper Elevation Forests - Upper elevation forests in the Illinois River drainage were composed of mature fir, pine and cedar. Meadows were likely maintained by native burning but overall use of anthropogenic fire in this zone was limited.

One of the management objectives of native burning was the maintenance of wildlife habitat; therefore a brief discussion of wildlife populations at the time of contact is in order. Based on a review of historic sources, Pullen (1995) provides the following general observations:

Deer, elk, bear and wolf - Deer, elk, bear and wolf populations were much higher before or during Euro-American contact. This can be attributed to the positive effects of native burning.

Beaver - Large numbers of beaver existed along the Applegate River and there may have been large populations in the Illinois River drainage as well.

Rabbits and squirrels - Rabbits and squirrel populations may have been considerable in the Illinois Valley. Jack rabbit populations may have been high due to the maintenance of quality habitat in the valley. Silver gray squirrel populations would have benefited from fire maintained oak-pine woodland habitats.

4. Native American Management of the Anadromous Fish Resource

The importance of anadromous fish resources to Native Americans is well documented in the ethnographic literature for northwestern California and southwestern Oregon (Hewes 1942, 1947; Kroeber 1925; Kroeber and Barrett 1960; Suttles 1990). Native peoples were familiar with all major fish species: trout, salmon, steelhead, silverside, and Chinook (Gray 1987). In addition, fresh water fish, mussels, and crawfish were taken. Riparian products include willows and other wetlands materials used in basketry. Chinook salmon (*Oncorhynchus tschawytscha*) and silver or coho salmon (*O. kisutch)* dominated aboriginal fish harvest. The abundant seasonal runs and ease of procurement of anadromous fish strongly influenced the distribution of Native American settlements and the spiritual life of native peoples. The distribution of villages and camps along the Rogue and Illinois Rivers and their tributaries attest to the importance of obtaining and processing fish. Major villages were often located near falls or rapids to facilitate harvesting. Examples are the village sites at Gold Hill and Marial on the Rogue River, the village site of *Tlegetlinten* located at the confluence of the Rogue and Illinois Rivers, and McCabe's Ranch located within walking distance to the falls on the Illinois River.

Harvesting of anadromous fish was incorporated in a larger web of ceremonial interactions. Ritual procedures were used to organize harvest of a variety of food resources and to insure a sustainable resource. Part of the yearly ritual cycle was devoted to salmon (Sewezy and Heizer 1977). Tribes in northwest California and southwest Oregon had "first salmon" rites which were often held with the onset of the spring king salmon run, a fish migration of major importance. These rites were used to recount orally the myth of the origins and travels of the first Salmon, who became a culture-hero and was invited to ascend the rivers and streams again. Priests or formulists controlled the timing of rituals in northwestern California (Kroeber 1925). Tribal members were strictly forbidden to eat salmon until rituals were completed, and often up to ten days afterwards. These restrictions had the ecological effect of avoiding premature harvest of salmon and also insured that a portion of the run could travel upriver. Inter-tribal conflicts concerning downstream over-harvest were thus avoided. A first salmon ceremony was performed at Ti'lo-mi-kh falls in Takelma territory (upriver of Goldhill, Oregon). This was a central place that drew people from the entire watershed (Gray 1987). The first five or ten chinook salmon, among Athapaskans, was eaten ritually by the entire group (Miller and Seaburg 1990). Failure to incorporate salmon into the ritual cycle was believed to result in poor fish runs or failures of entire watersheds to produce fish.

Ritual specialists also organized the building of fish dams and weirs at critical locations. Weirs were left open at night both to ensure that facilities weren't damaged as well as to allow the continued passage of fish upriver. Dams were removed after a set fishing period (Waterman and Kroeber 1938).

5. Early History

Historic exploration into the North Pacific began in the early part of the 16th century, a product of the Renaissance and Enlightenment in western Europe. Spanish explorers spurred on by the acquisition of dazzling amounts of wealth, began to seek more wealth and such fabled geographic locations as the Northwest Passage. Maritime exploration along the southwest Oregon coast began in the late 18th century, but the interior remained unknown to white explorer's until the early part of the 19th century (Beckham 1978). The first Euroamericans arrived in southwestern Oregon in 1827. They were fur trappers who worked for the Hudson's Bay Company led by Peter Skene Ogden. In a quest for furs his Snake Country Brigade headed from the Klamath River over the Siskiyou Mountains and entered the Rogue River Valley. Fur trappers continued to travel through Southwestern Oregon gaining knowledge of the land. Little was done to publicize this knowledge since the Hudson's Bay Company wanted to keep out competitors (Beckham 1978). When gold was located in Josephine County in 1850, a large influx of Euroamericans came through southern Oregon and settlements and towns began to develop and grow.

6. Gold Mining

The discovery of gold at the mouth of Josephine Creek in the summer of 1850 brought about tremendous change in the Illinois Valley. The first known trails into the Illinois Valley from the west were opened in early 1851, bringing people from Trinidad, California, and over the Siskiyous from above present day Happy Camp. Mining activities at first centered on Josephine and Canyon Creeks, but after 1852, exploration for gold revealed extensive deposits on the alluvial flats of the upper Illinois River and along the streams and gulches that feed the East Fork of the Illinois River. Reviews of regional environmental and mining history are found in McKinley and Frank (1996), Ramp and Peterson (1979), and Francis (1988).

Althouse Creek, just east of the West Fork Illinois Watershed, saw a tremendous amount of gold mining activity, supporting over a thousand miners along ten miles of its length for perhaps ten years (McKinley and Frank 1996). By 1853, Browntown was a thriving mining center on Althouse Creek, serving miners in the area. In 1852 a trail was opened up from Crescent City, California, which led to an increase in miners coming into the valley. Both the Illinois River and Althouse Creek were named by three brothers, Samuel, John, and Philip Althouse. These pioneers moved from Illinois in 1847 and mined on the Illinois River and Althouse Creeks (Pfefferle 1977).

Mining in the Althouse Creek drainage began in the 1850's with the original gold rush to the Northwest. This original mining peaked in the 1860's, and gradually declined until the present. The early mining consisted of panning, sluicing, and hydraulic mining. The miners prospected by panning and sluicing banks and benches throughout the drainage. When a prospect looked good, a crew was brought in to mine using hydraulic giants. Hydraulic mining enabled miners to work large amounts of gravel in a short period of time. In addition to its productivity hydraulic technology was relatively inexpensive (USDI 2000). The hydraulic miners used water pressure to wash the banks and benches, actually moving all overburden down to bedrock through a sluice box located at the lowest end of the project. All vegetation within the mine area was stripped off prior to the washing process. The hydraulic mining required miles of ditch line in order to maintain water pressure and volume necessary to move the overburden.

The hydraulic mining started near the mouth of Number Seven Gulch and moved upstream through Althouse Creek to approximately one mile upstream on the , and one mile above Iron Gulch on the East Fork. Most tributaries to Althouse Creek were mined approximately 1/2 mile up from their mouths. The hydraulic mining resulted in approximately 8 miles of ditch construction, 14 stream miles of bench, bank, and vegetation removal, 18 miles of trail construction, and the construction of three town sites known as Browntown, Tigertown, and Grassy Flats. Browntown has long since disappeared, but was located at the confluence of Walker Gulch with Althouse Creek. It was your typical, lively mining town. The town was named for “Webfoot” Brown, the butcher of the camp. In 1853 Browntown boosted ten to twelve stores, several saloons, and a good hotel (Oregon Mining Journal 1900). During the 1960s Elwood Hussey offered gold mining excursions to Browntown for a nominal fee. He would supply customers with a pick and pan, and old-time miners were on hand to show the customers how to pan and find gold. He also offered pack trips along old trails including one to Bolan Lake. Cabins were scattered throughout the drainage, it is estimated that up to 100 cabins once stood along Althouse Creek. Some reports indicate that the stream channel mined by the hydraulic miners was moved whenever possible in order to mine under the original channel.

Many of the ditches and flumes were constructed by Chinese laborers. The Chinese usually worked in gangs or "companies" overseen by a "boss-man" manager. Many Chinese laborers left the construction jobs to work over the depleted placers deserted by the original miners. The Chinese would work the tailings and bedrock with patience and diligence and in some cases were rewarded with wealthy finds overlooked by the earlier miners. The influx of Chinese into the area was greatest from 1860-1870. In Waldo one of the four hotels was for Chinese only. Because of the success of the Chinese miner, many white miners became jealous and hostile toward the Chinese. This hostility was represented through the Immigration Act of 1880 which cut off the flow of Chinese into America.

Some of the largest gold nuggets found in southern Oregon were discovered along Althouse Creek. In 1858 an $800.00 nugget was located at Slug Bar, and in 1859, on the east fork of Althouse Creek a piece of gold weighing 204 ounces, 17 pounds troy, and worth $3,500.00 was found (Sourdough Gazette 1973).

Below Number Seven Gulch miners found the overburden to be too deep to hydraulic mine economically. One mile below Tarter Gulch is one of the few known areas in the Althouse drainage to be mined by heavy equipment. A 20 acre bench was mined from the 1930's to the late 1940's with a 5 story high floating dredge. A large deep hole was dug in the bench with a dragline to give the dredge a place to float and get started. The dredge was powered by diesel engines and used a siphon system to suck placer gravels through a sluice system. It is believed this mine operation also changed the channel of Althouse Creek. The floating dredge operation was responsible for the removal of approximately twenty acres of vegetation and removed all fines from the twenty acre bench changing it from a heavily timbered riparian flat, to a 20 acre tailing pile.

Numerous load claims exist within the drainage. These claims are generally found on ridges or side slopes and are not associated with riparian areas. Most mining on load claims is from tunneling underground and milling hardrock deposits on site. Load claims were commonly worked from 1850 to around 1950.

The earliest miner's councils to organize into mining districts were Sailor's Diggings and Althouse in April of 1852. These early day districts governed by a miner's council were the law of the land prior to the formation of a formal government.

During the 1970's, a couple of bench placer operations took place just below Number Seven Gulch. These operations consisted of mining by the current standard method of clearing the bench of vegetation, stockpiling overburden, processing the mine ore through a wash system, constructing settling ponds to hold and settle waste water before it re-enters the stream channel. These operations lasted only a few seasons and are now starting to grow alders and brush.

The mining history below the valley floor is unknown. Some long time residents recall stories of a major channel change near the valley floor to facilitate mining that diverted over three miles of the original channel.

Mines and later copper processing facilities produced a demand for forest products, and almost certainly impacted forests heavily at the local level. Flumes, chutes and towns needed building materials. Two whipsaws in the Waldo area in the 1850s were producing up to 20,000 board feet per week for mining operations, and Chinese miners ran a mill for the Sailor Diggings. Large pines were the preferred species. By 1886, J.W. Bennet opened a water run lumber mill in Butcher Gulch near Waldo. Other mills opened in the 1890s but lumbering really didn't take off in the region until the 1950s (McKinley and Frank 1996).

7. Roads

Before European settlement of the west, ground disturbances were caused by animals, native people and natural events. As the west developed, animal trails and foot paths became narrow roads used to transport people and supplies mainly along streams, ridges and through saddles. These roads were generally naturally surfaced; the amount of associated sediment flow depended upon use, location, weather conditions, and soil type. As the use of these roads increased over the years, the roads themselves changed in design. Many of today's highways began as trails and are now widened, realigned, and surfaced to meet the increase and change in vehicle traffic. Even with the increase in traffic flow, crushed rock surfacing, asphalt, modern techniques in road stabilization, and improved road drainage have actually decreased sedimentation and erosion along the original natural-surfaced roads.

8. Recreation

During the earliest years of the twentieth century, recreational activity was intertwined with work and food acquisition (Atwood and Grey 1996). The 1930s brought about the Civilian Conservation Corps (CCC) which, among other duties, was responsible for building roads. These new roads provided recreational opportunities that were not previously available to many people. People began using roads to access sites for hiking, camping and driving for pleasure. Other recreational activities included hunting and horseback riding.

V. SYNTHESIS AND INTERPRETATION

A. PURPOSE

The purposes of the synthesis and interpretation section of the watershed analysis is to compare existing and reference conditions of specific ecosystem elements, to explain significant differences, similarities or trends and their causes, and to assess the capability of the system to meet key management plan objectives.

B. EROSIONAL PROCESSES

The major changes between historic reference conditions and current conditions are due to increases in the intensity and the types of human interaction with the environment. Native people's burning practices were limited to valley bottoms, gently sloping foot slopes, mid-slopes, and isolated upland meadows. The fires were spotty. This contrasts strongly with the use of fire to clear the land for mining, hydraulic mining, agriculture and forest management that has occurred since the end of the middle of the nineteenth century.

Forest management on both private and public land has included fire suppression, road construction, and logging with yarders on steep slopes and tractors on gentle to moderate slopes. Fire suppression has resulted in accumulation of fuels. A consequence of this is that when wildfires occur, they can burn extensively and with high intensity. A high-intensity fire consumes the duff, litter and most of the coarse woody material. The top layer of mineral soil impacted by a high-intensity fire commonly shows color changes due to consumption of organic matter and the effects of heat on the mineral components. This leaves bare soil conditions that are highly susceptible to erosion.

A review of the fire hazard (Map 14) and high priority hazard treatment (Map 18) as compared to soil depth and parent material (USDA, USDI 1997) shows a correlation between non-ultramafic parent materials and high fire hazard. This is likely due to vegetation patterns under fire suppression management policies which typically causes these stands to become dense and overstocked in most soils in this area of high precipitation. Vegetation on ultramafic derived soils that produces scattered vegetation due to soil chemistry that limits plant species and rate of growth, is an exception to this. Areas of high fire hazard are of concern because, if left in this condition. There continues to be the potential for extensive erosion after catastrophic fire.

Any surface disturbing (including burning) treatment on slopes of ultramafic soil is of concern because of these soils’ tendency to erode. Plant communities usually contain only a few species tolerant of the unusual soil chemistry that grow slowly and are arranged in a scattered distribution. This results in thin duff and litter layers. These soils often have high erosion hazard due to the severity of the slope. The steep slopes give flowing water high erosive energy as it increases velocity running down slope. Reestablishing vegetative cover may be difficult.

C. HYDROLOGY

The stream flow regime in the Althouse Creek Watershed reflects human influences that have occurred since European settlers arrived. Changes in the stream flow regime due to human disturbance have not been quantified. Changes may include channel widening, bank erosion, channel scouring and increased sediment loads. Stream surveys of Class 3 and 4 streams need to be completed.

Road construction, timber harvest, water withdrawals and fire suppression are the major factors having the potential to adversely affect the timing and magnitude of stream flows in portions of this watershed. Extensive road building and timber harvest have raised the potential for increasing the magnitude and frequency of peak flows in many tributaries. As the vegetation in harvested areas recovers, the magnitude and frequency of peak flows diminish. Permanent road systems will prevent stream flows from returning to pre-disturbance levels (USDI 1998a). However, road construction and reconstruction techniques can minimize the long-term effects by spreading runoff so that most is subject to soil infiltration.

Effects of roads vary with their location on the landscape. Roads, particularly those adjacent to streams, have a direct effect on stream flow patterns and water quality. Roads were historically built where the natural gradients made road location and construction easiest, generally in bottoms where stream were located. Added investments for improvements and tributary roads over time would make many these roads nearly permanent in spite of their poor location from a hydrologic and erosion perspective.

Hydrologic cumulative effects analyses have not been completed for subwatersheds within the watershed. However, estimates based on GIS mapping indicate that generally areas of BLM land and non-BLM land have similar road densities at moderately high levels of 4.5 and 5.1 miles of road per square mile. Road density is considered to be high when it is greater than four miles of road per square mile.

High road densities combined with patch clearcuts result in substantial increases in low-range peak flows in small streams (Beschta 2000). Other effects that may be attributable to high road densities combined with clearcuts are destabilization of stream channels and a reduction in intermediate and low flows.

D. WATER QUALITY

Changes in water quality, including temperature, from reference conditions to current conditions, that can stress aquatic life, are predominantly caused by riparian vegetation removal, water withdrawals, and roads. Water quality elements known to be affected the most by human disturbances are temperature, sediment and turbidity.

The recovery of riparian vegetation will provide shade and should bring about the reduction of stream temperatures except where soils are derived from serpentine/ultramafic material. Road maintenance (*i.e.,* drainage improvements including surface regrading to outslope wherever possible) and decommissioning would decrease sedimentation in the analysis area (USDI 1998a).

Water withdrawals are active during the irrigation season on private land. Increased irrigation efficiency would leave more cool water in the stream system and decrease the amount of warm water that gets back into the system. This is an issue on private land.

E. STREAM CHANNELS

Channel conditions and sediment transport processes in the Althouse Creek Watershed have changed since Euro-American settlers arrived in the 1830s. This was primarily a result of mining, road building, and agricultural development. Hydraulic mining resulted in entrenched channels with greater width-depth ratios. Increased instream gradients and sediment transport are consequences of the larger width-depth ratios (USDI 1998a)

Sediment is mainly transported from road surfaces, fill slopes, streambanks and ditch lines. Increases in sediment loads due to roads are generally highest during the five-year period after construction. However, roads can continue to supply sediment to streams as long as the roads exist. Road maintenance, renovation and decommissioning may, in some instances, reduce the amount of sediment moving from the roads to the streams. Roads constructed adjacent to stream channels tend to confine the stream and restrict the natural tendency of stream channels to move laterally. This can lead to downcutting of the stream bed and bank erosion. In such cases, obliteration of streamside roads would improve the situation (USDI 1998a).

Past removal of riparian vegetation and large wood from streams has had a major detrimental effect on the presence of large wood in the stream channels. There is a minimal amount of large wood in the analysis area with many areas lacking a source or reservoir for short-term recruitment. Large wood can perform an important function of reducing stream velocities during peak flows and trapping and slowing the movement of sediment and organic matter through the stream system. It also helps diversify aquatic habitat. Riparian reserves along intermittent, perennial nonfish-bearing, and fish-bearing streams will provide a long-term source of large woody material recruitment for streams on federal land once the vegetation has been restored (USDI 1998a). Stream surveys are needed for the Class 3 and 4 streams to quantify where large wood is below benchmark standards.

F. VEGETATION

The vegetative and structural conditions of the forests in the watershed have seldom been constant and have changed frequently with historical disturbance patterns. Disturbance has played a vital role in providing for a diversity of plant series, seral stages, and distribution of series and stages, both spatially and temporally. The presence of fire, insects, disease, periods of drought, and the resultant tree mortality have always been part of the ecosystem processes.

The increased fire exclusion in relatively recent times has driven forest structure towards a higher level of complexity in the current forest stands. This has occurred on the full range of sites including sites where it is not sustainable, such as those areas that historically supported pine species. Due to both timber harvesting and fire exclusion, there has been a substantial reduction in the presence of pine species over the past 50-75 years.

Consideration of the watershed’s vegetation, reference and current condition and successional patterns indicates three distinct areas for watershed management consideration.

1. Plant Series

In the past, the Douglas-fir series was the dominant plant community in the watershed and remains so today. In 1936, 63% of the acres inventoried were in the Douglas-fir series. Today, the Douglas-fir series has been inventoried on 25% of the acres, a decrease of approximately 35%. In 1936, there was no mention of the tanoak series in the watershed. Today, the Douglas-fir/ Tanoak plant community covers 62% of the watershed acres inventoried.

It is difficult to assess the changes in the Jeffrey pine series as the 1936 type maps combined areas with all pine species. However, if the areas deemed non-commercial in 1936 are lumped with all pine areas, the total is 36%. Today, the ponderosa and Jeffrey pine series account for 11% of the acres inventoried. This is a decrease of about 25%.

This change in series composition shows the following trend: species that are more shade tolerant and fire intolerant are increasing. For example, tanoak is moving into what would have been Douglas-fir sites had fire disturbance taken place over the past 70+ years. Pine series are being encroached upon by Douglas-fir and their vigor and extent is declining. These correlations are rough but demonstrate changes in plant communities over time.

2. Late-Successional Forest

In 1936, 40% of the inventoried acres were classified as Douglas-fir old growth. Today, about 10% of the land has trees with an average DBH greater than 21" (late-successional forest). Most of the reference condition old growth was present on what is now private land. Mining, logging, and development have removed most of the late-successional forest from this watershed. The remaining late-successional forest is split between the BLM and non-Federal lands.

3. Fire Events

Historically, fire has had a great influence on vegetation conditions and distribution. Fire suppression policies have reduced the effect of fire on vegetation conditions over the past few decades. A review of fire records indicates that since 1968, 82 fires have occurred all of them kept small due to suppression success.

4. Size Class Distribution

A high percentage of the watershed (60%) exists in the 5-21" DBH range. Fire exclusion this century has permitted dense pole stands to develop throughout the watershed, crowding out important mid-seral species less tolerant of shade such as Ponderosa pine, Pacific madrone, California black oak and Oregon white oak. When forests remain at unsustainable densities for too long, a number of trends begin to occur that effect stand health. Species composition, relative density, percent live crown ratio, and radial growth are all indicators of how forests can be expected to respond to environmental stresses. Potential for a stand destroying fire in these dense stands, particularly in the rural interface, is high.

5. Port-Orford-Cedar / *Phytophthora lateralis*

The fatal root disease caused by *Phytophthora lateralis* threatens the development of large (greater than 21"DBH) Port-Orford-cedar in the watershed. Infestations of the root disease are found in Whiskey Creek and in the Althouse Creek, downstream from the confluence of Whiskey Creek and Althouse Creek.

G. SPECIES AND HABITATS

1. Rare Plant Species and Habitats

a. Special Status Species

Habitat for special status plant species has been reduced substantially from historic conditions. The changes occurred primarily as a result of land development, timber harvesting, forest fragmentation, agricultural use, mining, and rural residential development. As a result of the loss of habitat it could be assumed that there have been considerable changes in rare plant site density. In addition some species may have been extirpated within the watershed. Without documented information of rare plant species occurrences, distribution or abundance prior to this extensive agricultural development, mining and timber harvesting era, it is difficult to determine at what historic levels rare plant species occurred within the watershed.

Due to the intensive and extensive manner private lands are managed, it is expected that a majority of all rare plant species populations will persist only on public lands. Public land managers pro-actively survey for rare plant population and design protection measures when necessary to ensure viability of the population and habitat. There are no similar efforts on private lands, except in rare occasions by extraordinarily concerned individual land owners.

Changes in habitat are especially evident where intensive mining and agricultural development took place. Many of these areas occur on private lands, although a large amount of mining operations occurred on public lands. Some areas have recovered considerably since mining operations have ceased, but other areas were so extensively altered by mine tailings, water giants and sluicing operations that they may never have the capacity to recover. Agricultural lands have eliminated and modified the low elevation lands where habitat for many rare upland species that enjoy more open conditions would have existed. The same conclusion can be drawn for these upland species that they have lost significant habitat, probably lost some rare plant populations and possibly lost entire species as a result of agricultural land development.

Rare plant occurrences are more susceptible to extirpation by chance events, both natural and human, such as a hot-burning wildfire, landslides, OHV activities etc. As human the population increases in the watershed and the amount of activity rises, it is reasonable to expect an overall increase risk to rare plants in the long term. For example, wildfires are not uncommon in the watershed. The chance of wildfires increase with increased human activity. In addition fuel loadings have increased over the past decades resulting in an increased potential for catastrophic fire events when they occur that increases the risk of rare plant population loss. Another example is the increase in OHV activity in the watershed. OHV activity is rising dramatically in the area as affluence and leisure time increase. Many of the rare plant sites within the watershed occur in locations suitable for OHV use and are at increased risk of damage or loss due to recreational use in sensitive areas.

While some species have no doubt declined, other rare plant species are adapted to the more recent conditions and persistent in disturbed areas. Others easily establish themselves by seed or vegetative propagules, while others take years for optimum habitat conditions to redevelop after disturbances. Some of the rapidly establishing species would be Howell's silver puffs, Grants Pass willow herb, Slender mead-foam, Red larkspur, Firecracker flower and Short-lobed Indian paintbrush. Populations and habitat of these species can be easily managed to maintain viable populations.

The reduction and/or alteration of late-successional conifer habitat lend uncertainty to the long-term stability of populations of conifer dependant rare plant species. Rare plant species that are adapted to late-successional conifer conditions may become more isolated due to reduced opportunities for new population establishment and survival. Very little late-successional conifer habitat exists on private lands and it is anticipated that the current level will continue to decline. The use of broad-leaf herbicides on private forest lands may also contribute pressure on populations of these species on those lands.

Besides reduced late-successional conifer forest habitat, the biggest impact affecting species diversity is the reduction in number and size of natural openings as well as increased density of vegetation in edge habitat between the hardwood/conifer forest and openings. Many of these openings and meadows are filling in with shrubs and trees due to lack of fire and shrinking meadow habitat. This reduces the optimum habitat of populations for species such as Howell's fawn lily and Howell's Mariposa lily. Actively managing these habitats for shade intolerant rare plant species is important towards maintaining these species.

Similarly, managing serpentine areas where serpentine endemic rare plants occur to minimize disturbances and optimize habitat conditions is important as it harbors the highest concentrations of special status plants in southwestern Oregon. Both upland serpentine areas and serpentine fens may require habitat restoration activities such as periodic fires to improve habitat conditions. Improved habitat would occur with reduced thatch and reduction in shrub encroachment, plus periodic nutrient pulses as a result of fire. For serpentine fens in particular, this is important since four taxa of the rarest special status plants occur only in fens.

While maintaining such habitats, special status vascular and nonvascular plant species will remain in the ecosystem. Continuing surveys and the identification of key habitat areas will provide the basis for proactive management that maintains or improves special status plant populations.

An analysis could be conducted on a species by species basis or by groups of species associated by habitat types to compare the current amount of suitable habitat and number of known rare plant occurrences to the estimated amount of habitat lost by human activity. These results should provide a comparison of current species and occurrences to an estimated historic level of occurrences. However, that type of analysis has not been completed for Althouse Cr Watershed Analysis.

Very limited surveys and habitat assessments have been completed for nonvascular plants within the watershed. The watershed could be relatively rich in rare non-vascular plants due to the diversity of habitats that occur and the number of known sites in adjacent watersheds. No surveys or inventories exist for fungi within the watershed. The Illinois valley is famous for the number of commercial fungi species and the amount picked every year. The valley attracts unknown hundreds of pickers every year and is renown in the northwest for chantrelles, bolletes and matsutakis, to name a few. It is reasonable to assume that fungi habitat is very good and that fungi diversity is high with the potential of unusual and rare fungi possibly occurring in the watershed.

2. Wildlife

When compared to reference conditions, there is less late-successional forest and less connectivity today. Past management activities such as timber harvesting and mining have reduced the quantity and distribution of late succession forest. The pattern of private land ownership combined with conversion of much of these lands for agriculture or home developments has also contributed to the decline of late-successional forests. This increased fragmentation due to human influences adds to the natural fragmentation due to serpentine influences on vegetation communities and thus habitats.

An increase in the number of roads in the watershed has contributed to fragmentation of old-growth forest patches and created additional "edge" habitat. This has influenced interior forest conditions and allowed for habitat generalist species to compete with old-growth dependent species. Species such as the great horned owl (*Bufo virginianus*) utilize fragmented landscapes and prey on spotted owls. For big game, roads have allowed for increased disturbance, poaching and decreased habitat effectiveness.

The reduced small and isolated late-successional forest patches within the watershed are not large or widespread enough to provide habitat for significant source populations. More likely, some of these sites may act as sink population habitats for individuals emigrating from adjacent Forest Service lands where late-successional forest patches are larger and better distributed.

While habitats in this watershed, particularly on BLM lands, is naturally fragmented due to edaphic influences, when compared to reference conditions, late-successional forest patches are currently more fragmented. This has reduced dispersal opportunities at both a local and landscape level. The purpose of providing connectivity is to facilitate dispersal and migration, and genetic exchange between individuals. Connectivity is particularly important for certain fur bearers, such as fisher and marten (USDA, USDI 1994a), and species such as the northern spotted owl, which depends on higher levels of canopy closure to successfully move between habitats without increased risk of predation by great-horned owls or red-tailed hawks (Foresman 1984).

In the Klamath Province and on the adjacent Siskiyou National Forest, fire is the most important agent of disturbance (Atzet and Martin 1991; USDA, USDI 1995). However, fire has largely been excluded from the watershed for more than 65 years. Historically, these areas burned more frequently, reducing ladder fuels and the potential for larger, stand-replacing fires. Due to fire exclusion, the accumulation of ladder fuels currently poses a greater threat than was historically present. For example, research by Atzet and Martin (1991) found that fire exclusion in Douglas-fir forests has contributed to reducing fire disturbance by more than twice the historical average.

This has created significantly greater risks of stand-replacement fires and the habitats these stands provide.

Fire suppression has also contributed to overstocked stands with many younger trees. This overstocking level and recent drought conditions have increased the water stress on older overstory trees. As a result, there is an increased risk of disease and insect infestation.

Tree species composition has been influenced by fire suppression. Pine, madrone and black oak have been (and are being) replaced by more shade tolerant species such as tanoak and Douglas-fir.

Fire exclusion has resulted in encroachment of meadows by species such as incense cedar and Douglas-fir. Additionally, fire exclusion has contributed to decadent brush fields and the loss of forbs and grasses typically associated with lower brush canopy closure.

In general, management of habitat for target species such as the spotted owl or red tree vole will depend upon the ability to maintain existing late-successional forests while at the same time managing young stands so they will achieve desired stand conditions as quickly as possible. Declines of late-successional forest would further reduce dispersal opportunities and viability of species associated with this habitat.

Utilizing fire in meadows will be essential to restoring these sites. Otherwise it is likely that increased brush canopy closure and encroachment by fire intolerant species will result in smaller and less productive meadows. Species that utilize meadows for foraging and nesting will lose additional habitat if current trends continue.

3. Aquatic Species and Habitats

a. Stream and Riparian Trends

Current aquatic habitat conditions on federal and non-federal land in the Althouse Creek Watershed differ appreciably from the reference condition. This has resulted from changes in the following major watershed attributes: (1) seral stage of vegetation in riparian zones; (2) the amount of stream flow between early summer and fall, and (3) the rate and magnitude of sediment delivery. On both federal and non-federal lands, the changes in watershed processes have been brought about through mining, logging, associated road network development, wildfire exclusion, and water withdrawal. On non-federal lands, agriculture and development in the floodplain have been additional major factors changing aquatic habitat conditions.

b. Riparian Reserves and Large Woody Material

The majority BLM lands are in the Douglas-fir/tan oak plant series, with the Douglas-fir plant series the second most common. Wildfire exclusion has allowed the encroachment of shrubs into Jeffrey pine stands, excluding new pine seedlings. The change in seral stage, coupled with fire exclusion, has resulted in changes to the character of coarse wood on the ground in the Riparian Reserves. All decay classes of woody material are now more likely to be found because the material is not being consumed by frequent past fires. The mature size class probably has become less available with time, however, as recruitment is increasingly from the mid-seral stage.

The change from reference condition has been toward a mid-seral stage, with less structural and species diversity, less shade, and fewer mature trees as a source of future coarse wood. Logging in these stands has reduced the amount of coarse wood available to riparian-dependent species, both through removing mature trees and by post-harvest burning.

In many areas riparian vegetation has changed from forest stands dominated by mature trees to stands of poles and small trees. On private land, logging and the development of valley bottoms have degraded riparian habitats which were capable of having late-successional habitat. The long term trend on BLM land is an increase in late-successional forest characteristics in Riparian reserves.

c. Instream Large Woody Material

The difference between the reference and current conditions regarding instream large woody material is a decline in quantity, quality, and function across the watershed. Logging, mining, and clearing of riparian vegetation for agriculture and residential development have reduced the amount of large wood in streams by removing the source from the adjacent slopes. In addition, large wood was most likely cleared out of stream channels when it appeared to pose a risk to structures or a blockage to fish passage.

The quality of instream large wood has declined as mature trees have been removed and streamside forests have become dominated by smaller trees. Smaller material in streams decays sooner and gets flushed out of the stream system easier. Where conifers have been removed and hardwoods have become more prevalent, large wood quality also has been degraded because hardwoods decay rapidly instream.

The function of large woody material in the watershed has been degraded as the amount and quantity of instream wood have decreased. Streams have become ecologically simplified and less effective in dissipating stream flow energy, scouring pools, providing complex habitat for fish, amphibians and invertebrates, and providing organic detritus. Deforested slopes may fail as a result of road failure or natural causes, but in either case, the debris flow no longer carries large wood to the stream along with the sediment load. This represents a break in an important watershed mechanism for supplying the system with large wood. Channelized river sections which have been straightened and disconnected from the floodplain cannot hold large wood in place as well as natural channels so it leaves the system sooner. When the wood cannot function to shape the channel, fewer meanders and side channels develop to provide needed rearing habitat.

Another change from the reference condition is the presence of Port-Orford-cedar root disease. An infestation has been identified adjacent to the Althouse Creek through section 9 and adjacent to an unnamed tributary in section 17. As the Port-Orford-cedar dies, the result may be an addition of large wood into the stream. However, the loss of Port-Orford-cedar from the riparian corridor will remove a source of long term recruitment of large wood.

d. Sedimentation

Stream sedimentation is an issue in the Althouse Creek watershed, especially considering the large amount of private ownership in the lower portion of the watershed. Past mining, logging practices and road building account for the changes in the sedimentation of the watershed from the reference condition to the current condition. Increases in peak flows, coupled with the removal of riparian vegetation and instream wood, led to increased scour, increased bank erosion, and increased sediment delivery to aquatic systems.

Stream sedimentation from federal lands is expected to decline with the continued implementation of the ACS. New activities designed to these standards will not contribute to existing sedimentation problems. However, there may not be an appreciable decrease in the overall amount of sediment deposited in streams if road construction standards and logging practices do not substantially improve on non-federal lands. Many roads and tractor skid roads on private lands do not receive regular maintenance, nor were most of them designed with adequate drainage or erosion control features. Sediment from these areas could create adverse cumulative effects downstream.

e. Stream Flow

The decrease in the amount of water available to fish during low- flow periods is due to irrigation withdrawal. Increased width-depth ratio and decreased riparian canopy cover have resulted in shallow warmer water. There are approximately 94 water diversions in the entire Althouse watershed. Changes in these stream attributes from reference conditions are a result of agriculture and development, road density, mining and logging. Irrigation withdrawals exacerbate the adverse effects of land management and continue to cause declines in native fish populations. Past land use practices which increased peak flows have had the effect of destabilizing banks and widening channels.

Summer stream flows on federal lands are expected to increase in the future, as a result of the Northwest Forest Plan Standards and Guidelines. Intensity and frequency of peak flows will diminish as vegetation regrows in previously harvested areas. Potential indirect adverse effects of altered peak flows on salmonid production and survival should diminish. In the lower reaches of the watershed, low flows are expected to continue to be a limiting factor for salmonid survival due to the effect on rearing habitat.

f. Stream Temperature

Stream temperatures are no doubt higher than at the time of the reference conditions due to loss of riparian canopy cover and decreased summer flows. Natural causes of riparian canopy loss in the watershed include floods and wildfires, although the effect of fire has been decreased due to wildfire exclusion over most of the analysis area. Logging, mining, and residential/agricultural clearing are the three forms of human disturbance that are most evident in this watershed. Some streams in natural (undisturbed) condition may naturally have temperatures that exceed DEQ standards due to lack of vegetation for shade, particularly in rocky, serpentine areas, and warm summer temperatures in this watershed (see Current Condition, Stream Temperature).

Until adequate canopy closure is attained within the Riparian Reserves, summer temperatures will continue to exceed DEQ standards within the first 7.5 miles of Althouse Creek which is currently listed on the 303(d) list. Summer stream temperatures in areas with predominately federal land holdings should decrease with continued implementation of the ACS. Within the low-gradient reaches of the valley floor where private land ownership dominates, summer stream temperatures are not likely to improve as riparian vegetation is not returned and the demand on water allocation remains.

g. Aquatic Species

Factors outside the Althouse Creek Watershed which have already resulted in a change from the reference condition will continue to influence anadromous fish returns to the watershed. These include ocean productivity, recreational and commercial fish harvest, predation in the Illinois and Rogue Rivers, and migration and rearing conditions in the Rogue and Illinois Rivers.
Coho salmon are federally listed as threatened. Implementation of the Aquatic Conservation Strategy on federal land will improve watershed health. The likelihood of recovery of anadromous fish habitat in Althouse Creek is moderately low, however, because the majority of the lower watershed is privately owned. Changes in summer temperatures and the loss of stream complexity in Althouse Creek have affected coho and steelhead freshwater rearing habitat. The lower reaches have been affected most by the development of private land. As a result, the potential is great for private land owners to affect stream health downstream of federal ownership. However, sections of Althouse Creek on BLM and FS land are most likely to continue to provide the best coho and steelhead habitat. Key watersheds within the Illinois Basin will allow remnant stocks of coho to survive while areas disturbed by past practices recover.

More sediment and temperature intolerant aquatic insect taxa will be present in the Illinois River tributaries as watershed conditions improve. Collector-dominated communities in these small streams would gradually shift to scrapers and shredders as canopy closure and the conifer component increases, especially in non-serpentine areas. In Althouse Creek, increased woody material will retain detritus and encourage communities of macroinvertebrates intolerant of scouring and degraded conditions.

In the past, mining had a great impact on fish habitat conditions. With the reduced mining activity, this has much less of an impact on fish habitat and it is a source that will continue to diminish over time.
The large amount of private ownership within the lower section of the Althouse Watershed will continue to have an effect on the fisheries conditions in the watershed. Current resource management practices and water diversions on private lands, which are beyond the scope of the Aquatic Conservation Strategy, will continue to limit potential for recovery of salmon and steelhead habitat and populations. Removal of fish passage barriers and the improvement of water withdrawal methods (*e.g.*, gravel push-up dam removal and creating more efficient irrigation systems) would contribute appreciable to improving aquatic conditions. Joint projects by the BLM and the Illinois Valley Soil and Water District on private land have been effective and provide a watershed model for future irrigation and fish passage improvement.

Private forest lands will no doubt continue to be managed primarily for wood production. The cumulative effects of management activities on private land have altered the timing and quantity of erosion and have changed stream channels, both of which have affected fish production. Streams and riparian areas with federal ownership are generally in better condition than streams on private lands. This trend will likely continue.

H. FIRE MANAGEMENT

There is a high potential for a large scale, high severity wildfire within the watershed. Mixed land ownership, wildland urban interface area, and recreational use increase the complexity of fire prevention, protection, fuels management, and hazard reduction programs. All have increased the risk.

Fire exclusion has created vegetative and fuel conditions with high potential for large, destructive, and difficult-to-suppress wildfire occurrence. The watershed analysis area has a large number of sites which are at a high risk of loss from wildland fire. High severity, stand replacement wildfire presents a threat to human life, property, and nearly all resource values within the watershed. Management activities can reduce the potential for stand destroying fires through hazard reduction treatments. Public acceptance of hazard reduction management activities will be critical for the long-term health and stability of the forest ecosystem within the watershed. Collaborative planning efforts with other federal, state and county agencies such as the Josephine County Integrated Fire Plan will contribute to a landscape scale approach to watershed fuels reduction and ecosystem restoration projects.

A major difference between the existing and the reference condition is the change in the fire regime. This has been highlighted with the discussion of fire condition class and the extent of the watershed that is considered in fire condition classes II and III. The general area has gone from a low severity to a high severity fire regime. Previously, fire occurred frequently and burned with low intensity, and functioned largely in maintaining the existing vegetation. Currently, fire is infrequent, high intensity, causes high levels of mortality, and terminates vegetation conditions rather then maintaining them, as was shown by the 2002 Biscuit Fire. This effect has resulted from nearly a century of fire suppression and exclusion. The change in vegetative conditions, fuel profile, and amount of fuel now present could support a large wildfire that would have severe effects on vegetation, erosion, habitat, and water quality. The current trend is for increasing fuel hazard buildup and increasing risk for fire ignition due to population growth and human use within the watershed and adjacent region.
The change is great in magnitude and is widespread throughout the watershed. Only 8% of the analysis area is currently in a low hazard condition. High hazard conditions occur throughout the watershed, covering one half of the analysis area. Vegetation in the watershed is at a high degree of risk for mortality and stand replacement from wildfire. The existing and future trend in fuel and vegetative conditions is a dominant factor that may define or limit achieving many management objectives for the watershed.

Risk of ignition has increased within the watershed. This is a result of the higher population residing within and adjacent to the watershed. Development has been substantial in the past decade and it appears that it will continue at the same rate.

I. HUMAN USE

Significant changes have occurred in the watershed due to mining, timber harvesting, road building and development. The Illinois Valley is increasing in population due to the influx of out-of-state individuals purchasing property. With this increase in population and access has come an increased use of public lands. The type of recreational use is also changing from non-motorized to motorized (before roads, there were mainly trails which accessed the area). In the past 10 years, there has been less federal timber cutting. Due to the increase in population and access, as well as an increase in landfill fees, there has been an increase in the illegal use of the watershed such as refuse dumping, living on BLM land and firewood cutting and collection.

Settlement patterns in the watershed have shifted from the town site of Browntown in the middle part of the watershed (over 100 years ago) to the north and west. Most of the settlement has occurred in the flat, valley of the northwest portion of the watershed. The area is slowly growing, with economic development centered on tourism, due to the fact that highway 199, a major route to the coast from southern Oregon, is located just west of the watershed. Cave Junction, just three miles northwest of the northern portion of the watershed, is the second largest community in Josephine County. Highway 46 to the Oregon Caves National Monument is also a major tourist attraction in the area. The development of wineries is bringing more tourists into the watershed. As of 1997, approximately 15,000 people lived in the Illinois Valley, scattered in the backwoods and small hamlets such as Takilma, Selma, O'Brien, and Holland (Cosby 1997).

Human use has led to increased erosion over reference conditions. Erosion and sedimentation is due to additions of increased runoff from roads, parking lots, roofs and other surfaces where there is no or little soil infiltration. Agricultural and forest management practices have also caused erosion and sedimentation. Stream channelization has created destabilized stream channels with increased bank erosion and, therefore, added sediments to streams. Clearing of riparian vegetation in developed areas has created increased water surface exposure to sunlight which results in increased summer stream temperatures.

These social or demographic changes/trends have implications potential management activities and demands. Anticipated due to an increase in population is an increase in demand for use (or abuse) of public lands, a continuation of the illegal activities in the watershed (e.g., dumping, poaching).

As previously discussed, a major change regarding fire in the landscape has been occurring since the interruption of Native American periodic burning of specific plant communities, especially those communities found at the interface of oak-pine valley woodlands and forested slopes. An informal fire study done in mixed conifer stands, somewhat adjacent to the valley floor, noted that the last time fire had moved through the area was in the 1860s (Dick Boothe, personal communication). This would roughly correspond to the period of time after the Rogue Indian Wars and the removal of Native Americans.

Miners tended to burn indiscriminately to improve access to mining areas. Burning by miners and other Euro-Americans amounted to an *"ecological transition"* which changed the distribution of habitats and seral communities across the landscape which may have contrasted sharply with communities that resulted from Indian burning. The legacy of mining and the subsequent mix of plant communities across the landscape may bias our vision of what we consider to be pre-settlement conditions.

Fire suppression policy also influenced the composition and structure of plant communities. Following WWII, new techniques such as smoke jumping and easy access to previously unroaded areas allowed for more efficient fire suppression. In addition, large fires primarily caused by lightning, such as the Longwood Fire of 1987, still periodically dominate the landscape.

Burning by miners, fire suppression, and the natural fire frequency of the area can lead to questioning the degree and intensity of Native American burning to manage habitats. Is it possible to separate out the effects of Native American habitat management from naturally occurring fire? If we allow for a long time frame in which native people used fire, possibly thousands of years in specific habitats, we can posit that a number of plant communities (*e.g.,* pine-oak savannahs and meadows) were primarily anthropogenic in nature and owed their continued existence to the periodic and systematic use of fire by Native Americans. In this context, prescribed fire will play a critical role in maintaining the vitality of the watershed over time and restoring specific pre-settlement plant communities where that is a goal.

Early placer and hydraulic mining profoundly altered riparian and other habitats that are still in various degrees of recovery. Sediment loads from large scale hydraulic mining operations in the watershed had an impact on anadromous fish and water withdrawal may have had an impact on water temperature which in turn affected fisheries. Areas within the reaches of the upper East Fork Illinois River were heavily impacted by mining activities. In some areas, the streambeds were virtually turned upon themselves (McKinley and Frank, 1996). An article in the Oregon Mining Journal (1900) printed the following about Althouse Creek:

> "A stranger going into this old camp today and seeing the miles of rock piles and boulders might conclude, if he knew nothing about mining, that the creek had been struck by a cyclone. If a mining man, he might conclude that the country was worked out".

The timing of the mining season played a major role in terms of severity. LaLande (1995) has pointed out the seasonal effect of severity: the effect upon anadromous species was more pronounced in the fall, when lower water levels and stream turbidity created an environment detrimental to the fall runs of chinook and coho salmon. Winter resident species were also impacted. The effect from stream channelization extended beyond seasonal impact. As streams were channelized their ability to hold water was decreased, with an overall loss of moisture in riparian and marsh communities and a resultant loss of moisture dependent plant species.

VI. MANAGEMENT RECOMMENDATIONS

A. PURPOSE

The purpose of this section is to bring the results of the previous steps to conclusion by focusing on recommendations that are responsive to watershed conditions and processes identified in the analysis. Recommendations also document logic flow through the analysis, linking issues and key questions from step 2 with the step 5 interpretation of ecosystem understandings. Recommendations also identify monitoring and research activities that are responsive to the issues and key questions and identify data gaps and limitations of the analysis (*Federal Guide for Watershed Analysis, Version 2.2, 1995.)*

B. RECOMMENDATIONS

Tables VI-1 through VI-3 list potential management actions for the Althouse Creek Watershed. It is organized by NFP land allocations. Actions that are required by the RMP, NFP, or other decisional document may not be included in these recommendations tables.

It is important to keep in mind that these recommendations are **not** management decisions. In fact, recommendations may conflict or contradict one another. No appreciably attempt was made to reconcile them. They are intended as a point of departure for project specific planning and evaluation work. Project planning then includes the preparation of environmental assessments and formal decision records as required by the National Environmental Policy Act (NEPA). It is within this planning context that resource conflicts would be addressed and resolved and the broad recommendations evaluated at the site specific or project planning level. Project planning and land management actions would also be designed to meet the objectives and directives of our Medford District Resource Management Plan (RMP).

Table VI-1: Recommendations – All Land Allocations

Land Alloc.	Issue / Concern	Related Core Topic	Location	Recommendation
All	Ponds	Human Uses (Fire), Species and Habitat (Wildlife)	BLM lands	Where possible, maintain and improve ponds for wildlife, road maintenance and fire suppression.
All	Deer Winter Range	Species and Habitat (Wildlife)	Below 2,000'	Seasonally close roads in deer winter range areas. Minimize permanent road construction and restrict management activities between November 15 and April 1
All	Mines	Species and Habitat (Wildlife)	BLM lands	Prevent or minimize disturbance to mine habitats (e.g., bats) through the use of closures, buffers and seasonal restrictions.
All	Watershed with Mixed Ownership	All	Non-BLM lands	Work with land owners, watershed councils, partnerships, etc. on projects, planning, and activities to promote a healthy watershed. Potential projects include working with Special Status species and their habitats; restoring riparian and fish habitat; modifying irrigation diversions and fish barriers that jeopardize juvenile fish passage; roads; wildlife; fire; recreation projects and vegetation treatments.

Table VI-1: Recommendations – All Land Allocations

Land Alloc.	Issue / Concern	Related Core Topic	Location	Recommendation
All	Meadows, Oregon White Oak, Ponderosa/ Jeffrey Pine Sites	Species and Habitat (Botany, Wildlife), Vegetation	BLM and private lands	Restore and maintain meadows, Ponderosa pine, Jeffrey pine and Oregon white oak plant communities. Appropriate methods may include thinning, brushing and burning. Efforts will be made to utilize native plant materials.
All	Noxious Weeds	Species and Habitat (Botany), Vegetation	BLM and private lands	Develop an active noxious weed control program in the watershed.
All	High Intensity Fire Occurrence	Fire, Erosion Processes, Species and Habitat (Fisheries, Wildlife)	Watershed Wide	Prioritize and implement fuel hazard reduction treatments at strategic locations. These sites could be located on ridge tops, roads or other natural or human made features which can function as suppression anchor points or barriers to slow wildland fire spread. Collaborative multi-agency planning efforts should be continued to identify areas of highest fire risk and hazard.
All	Helispots/ Pump Chances	Fire	Watershed Wide	Maintain existing helispots and pump chances.
All	Fire Hazard	Fire, Human Uses	Watershed Wide	Pursue both mechanical and prescribed fire treatments to reduce fire hazard. Focus on high priority and wildland/urban interface areas. Encourage a coordinated and collaborative approach with private landowners, Forest Service, Josephine County and ODF. Brush roads to allow for safe public and emergency traffic access.
All	Dispersed Recreation	Human Uses	Watershed wide	Encourage cooperative agreements and MOUs between BLM, other government agencies and private land owners to promote recreation opportunities.
All	Illegal dumping, firewood cutting	Human Uses	BLM lands	Minimize illegal dumping and illegal firewood cutting by enforcing rules and regulations, limiting access, increasing visible presence in the area and educational efforts about protection of resources.
All	OHV inventory	Human Uses, Species and Habitat, Vegetation	BLM	Inventory for OHV trails on BLM. Designate and sign trails.
All	Botanical restoration	Species and Habitat (Botany)	Watershed Wide	Maintain / improve habitats using prescribed fire, manual thinning and other methods while protecting special status plants known to be intolerant to burning.
All	Plant species composition	Vegetation, Species and Habitat (Wildlife, Botany)	BLM lands	Encourage forest stand resilience. Conduct density management (thinning) in natural and planted stands. In mature stands, use variable treatments that are incremental in implementation and result in high habitat diversity within stands and across the landscape. Objectives should include reduction of stem numbers, species selection to provide a species mix that more closely resembles that thought to occur prior to fire exclusion and logging. Utilize prescribed fire to reduce the activity fuels (slash) created by density management. Conduct forest management activities in a manner that mimics natural disturbance, and maintains special status species and structural diversity.

Table VI-1: Recommendations – All Land Allocations

Land Alloc.	Issue / Concern	Related Core Topic	Location	Recommendation
All	Port-Orford-cedar	Vegetation, Water Quality, Species and Habitat (Aquatic)	BLM and FS lands	Prevent export of POC root disease to uninfested sites. In POC areas, follow the POC ROD and take extra steps to restore or maintain healthy POC in its range. Reduce vehicle access to uninfected Port-Orford-cedar locations and enforce road closures in infected POC areas.
All	Roads / Port-Orford-cedar	Vegetation, Water Quality, Species and Habitat (Aquatic)		Prevent the export of POC root disease to uninfested sites by incorporating appropriate POC management practices with road work projects. Roads currently identified as concerns are 40-7-4, 40-7-11.1, 40-7-14.0, 40-7-17.0, and 40-7-18.0.
All	Species composition	Vegetation, Fuels, Botany, Fisheries, Wildlife, Hydrology	Watershed wide	Reduce tanoak and other encroaching vegetation that has developed in the absence of fire disturbance.
All	Quarries	Species and Habitat (Aquatic), Erosion Processes, Water Quality		Continue to develop and utilize rock sources with in the watershed to produce, aggregate for road maintain and road surfacing, rip rap for slope protection, rock for stream enhancement projects and other miscellaneous uses in accordance with long term management objectives. Focus on Tarter Gulch Quarry in T40S R7W Sec 4.
All	Access	Fire, Vegetation, Species and Habitat (Fisheries)	BLM lands	Try to acquire access over existing roads to sections 5, 8 (T40S, R7W) and 34 (T39S, R7W) to meet long term management objectives. Maintain and enhance strategic road access for wildfire suppression forces. Access is critical in the short term to reduce large fire occurrence potential. This is especially important where we have high value forest stands or other high values at risk. Decommissioning of roads should not occur until hazard reduction and maintenance plans are in place. Consideration should be given for erosion and sedimentation.
All	Serpentine Areas / Erosion	Erosion Processes, Water Quality, Vegetation, botany	BLM	In serpentine areas, treatment prescriptions and actions will be series-based and will include considerations of conservation of duff and litter. Reduce erosion in Jeffrey pine sites. Institute low intensity prescribed fire to reduce herbaceous layer accumulation and shrub / tree encroachment. Minimize ground disturbing activities such as OHV use. Protect rare plant sites.
All	Mature Stands / Connectivity	Vegetation / Species and Habitat (Wildlife, Botany)	BLM lands	Design vegetation treatments for continued and potential development of connectivity corridors. Where feasible, prioritize these corridors in and adjacent to Riparian Reserves.
All	Deer Habitat	Species and Habitat	Watershed Wide	Enhance deer foraging habitat by creating small openings, conducting prescribed burns and seeding closed roads with native grasses.
All	Species Composition	Vegetation, Botany	Watershed Wide	Increase the amount and percent cover of fire tolerant species, shade intolerant tree form hardwood species and pine, particularly on non-serpentine soils.

Table VI-1: Recommendations – All Land Allocations

Land Alloc.	Issue / Concern	Related Core Topic	Location	Recommendation
All	Occupancy trespass	Human Uses	BLM lands	There are two residential occupancy trespasses on BLM lands. Resolve these cases in accordance with the BLM Mining Claim Use and Occupancy Regulations (43 CFR 3715).

Table VI-2: Recommendations - Riparian Reserve Land Allocation

Land Alloc.	Issue / Concern	Related Core Topic	Location	Recommendation
Riparian Reserve	Riparian Reserve Mgmt., Reserve widths	Species and Habitat	BLM lands	Retain interim riparian reserve widths outlined in the NFP and RMP. Based on site conditions and analysis, manage vegetation and conditions inside Riparian Reserves to promote or accelerate ACS attainment, especially long term. Use thinning, prescribed fire or mechanical treatments to reduce fuels.
Riparian Reserve	Late-successional forest (non-serpentine)	Species and habitats	BLM lands	The existing natural late-successional forest stands in the riparian reserve may provide a template for guide prescriptions in other adjacent stands
Riparian Reserve	Large Woody Material (instream and riparian)	Species and Habitat (Aquatic), Erosion Processes, Water Quality, Water Quantity	BLM lands	Where appropriate based on local site conditions of the riparian plant community, improve instream complexity by adding key pieces of wood and increase potential large wood recruitment.
Riparian Reserve	Fish passage / Culverts / Barriers	Species and Habitat (Aquatic), Human Uses	BLM lands	Improve or replace culverts and remove barriers at stream crossings that impede juvenile and adult fish passage. Stream crossings should be built with natural streambed.
Riparian Reserve	Water Temperature	Water Quality, Species and Habitat (Aquatic)	BLM lands	Wherever early to mid seral stages occur along creeks, treat vegetation to expedite larger tree growth to improve stream shade and temperature for summer rearing for fish and other aquatic organisms.
Riparian Reserve	Sediment management (roads, mining, OHVs)	Human Uses, Erosion Processes, Water Quality	BLM lands	Conduct sediment evaluations and follow TMOs. Corrective measures may include road surface design and reduction of drainage ditch (roads and mining) flow into natural tributaries. Address mining and OHV issues.
Riparian Reserve	Sedimen-tation	Aquatic Species and Habitat, Erosion Processes, Water Quality	BLM lands	Reduce spawning or riffle substrate embeddedness to 30% or less and sand content to 20% or less by reduction of fine sediment load and addition of structure.
Riparian Reserve	Instream flows	Species and Habitats	Watersh ed Wide	Work with watershed council, agencies and private landowners to improve water utilization, create fish-friendly water diversions, maintain instream flows, and minimize aquatic resource impacts.

Table VI-3: Data Gaps

Core Topic	Data Gaps
Soils	- Soil erosion sources have not been mapped or specified for location or mechanism. There is no information specific to this watershed regarding soil dependent biological communities. - Field surveys for mass movement features in areas mapped with high susceptibility have not been completed. Also field survey for areas with streambank erosion features. Inventory and monitor for compaction and disturbance features, check for indicators of changes in productivity. -The extent of compaction within this watershed is not quantified for BLM and private lands.
Vegetation	- Plant series data needs to be combined with vegetative condition class to determine management opportunities. For example, information on the amount of acres in the Douglas-fir series is available as is information on the amount of pole stands, but not Douglas-fir pole stands. A second example could be acres of Ponderosa pine and white oak being encroached upon by Douglas-fir that require restoration treatments.
Fire	- A list of smoke-sensitive area residents (for prescribed burning) does not exist for use in burn notification. - A full understanding of fire effects in serpentine ecosystems is not complete. - No data for fire hazard, wildland fire risk, values at risk, or fuel models for FS lands
Botany	- A comprehensive survey of special status plants (both vascular and nonvascular) has not been completed within the watershed. - A comprehensive analysis of special status plant species and sites (both vascular and nonvascular) within the watershed has not been completed. - Rare fungi surveys have not been completed. No information exists on fungi within the watershed (species, occurrences, rare fungi, etc) - Effectiveness of past protection measures for rare plant sites. - Noxious weeds: Systematic surveys have been not been conducted. - Weed treatment effectiveness monitoring results are lacking..
Fisheries	- Physical habitat surveys have not been completed in most streams. - Comprehensive surveys to monitor relative abundance and distribution of fish species and to classify all streams are needed. Continue benthic macroinvertebrate surveys. Repeating such surveys at 5-10 year intervals would provide better baseline information and trend identification. - Monitor water withdrawal sites for fish passage and proper screening.
Hydrologic / Riparian / Stream inventory	- Comprehensive information regarding headwater conditions for streams relative to sediment production, water contribution and riparian potential does not exist. - Quantitative stream flow data for Althouse Creek and its tributaries is unknown. - No quantification of hydrologic conditions indicating cumulative effect conditions (e.g., extent of equivalent clear cut area, compacted area, TSZ) has been performed for Althouse Creek - Water temperature data is needed for Democrat Gulch and Tartar Gulch.
Wildlife	- Relatively few formal wildlife surveys have been conducted in the watershed. Distribution, abundance and presence of the majority of the species are unknown. Presence / absence information for most special status species is unknown. There exists little information on special status species habitats and condition of these habitats in the watershed. Location of unique habitats such as wallows, mineral licks, and migration corridors are for the most part unknown. - The location of all mining shafts / adits is needed to assess the extent and value of them as habitat.
Human Use	- Roads: BLM noncapitalized roads and skid trails have not been inventoried. - The last TMO inventory was in 2000. Road conditions may have changed since then. - Recreation: There has been no comprehensive inventory of the amount or type of recreational use of the area. Not all dispersed recreation trails and mining ditches have been inventoried and mapped. - Mining: A comprehensive inventory of mining shafts / adits has not been done to determine access and safety issues. - Cultural: A comprehensive survey of cultural resources has not been conducted for the watershed. - Special forest products use data is poor-

TECHNICAL REFERENCES CITED

Agee, J.K. 1981. Fire Effects on Pacific Northwest Forests: flora, fuels, and fauna, p.54-66. In Proc., Northwest Fire Council

Agee, J.K. 1990. The Historical Role of Fire in Pacific Northwest Forests. In Walstad, J., et al. (eds.), Natural and Prescribed Fire in Pacific Northwest Forests: pp.25-38. Corvallis: Oregon State University Press.

Agee, J.K. 1993. Fire Ecology of Pacific Northwest Forests. Covelo, CA: Island Press.

Andrews, H..J. 1936. Forest Type Map, State of Oregon (southwest quarter). Portland, Oregon: U.S. Department of Agriculture, Forest Service, Pacific Northwest Experiment Station.

Aikens, C.M. 1993. Archaeology of Oregon. Bureau of Land Management. Portland, Oregon.

Amsberry, K, and R. J. Meinke. 2002. Reproductive ecology of *Fritillaria gentneri*. Unpublished report prepared for the US Fish and Wildlife Service and the Medford Bureau of Land Management, Medford, Oregon.

Atwood, K. and D.J. Grey. 1996. People and the River: A History of the Human Occupation of the Middle Course of the Rogue River of Southwestern Oregon, Volume I. USDI, BLM, Medford.

Atzet, T., and R. E. Martin. 1991. Natural Disturbance Regimes in the Klamath Province. In Proceedings of the Symposium on Biodiversity of Northwestern California. Wildland Resources Center: University of California, Berkeley.

Atzet, T.A. and D.L. Wheeler. 1982. "Historical and Ecological Perspectives on Fire Activity in the Klamath Geological Province of the Rogue River and Siskiyou National Forests." U.S. Department of Agriculture, Forest Service, Siskiyou National Forest, P.O. Box 440, Grants Pass, Oregon 97526.

Atzet, T.A.and D.L. Wheeler. 1984. "Preliminary Plant Associations of the Siskiyou Mountain Province." U.S. Department of Agriculture, Forest Service, Siskiyou National Forest, P.O. Box 440, Grants Pass, Oregon 97526.

Atzet, T.A. and L.A. McCrimmon. 1990. "Preliminary Plant Associations of the Southern Oregon Cascade Mountain Province." U.S. Department of Agriculture, Forest Service, Siskiyou National Forest, P.O. Box 440, Grants Pass, Oregon 97526.

Atzet, T.A., D. White, C. Martin, et al. 2004. First draft fire regime Althouse 5^{th} field HUC, as determined in DRAFT #1 for SW Oregon Fire Management Plan.

Bailey, V. 1936. The Mammals and Life Zones of Oregon. North Am. Fauna 55: 416 p.

Barrett, S.W., S.Arno, and C.H. Key. 1991. Fire regimes of western larch-lodgepole pine forests in Glacier National Park, Montana. Can. J. For. Res. 21:1, 7, 11-20.

Bean, L.J. and H.W. Lawton. 1993. Some Explanations for the Rise of Cultural Complexity in Native California with Comments on Proto-Agriculture and Agriculture. In Before the Wilderness: Environmental Management by Native Californians. Ballena Press. Menlo Park, California.

Beschta, R.L., M.R. Pyles, A.E. Skaugest, C.G. Surfleet. 2000. Peakflow responses to forest practices in the western cascades of Oregon, USA. Jour. of Hydrology 233 (2000) 102-120.

Blackburn, T. and K. Anderson. 1993. Introduction: Managing the Domesticated Environment. In Before the Wilderness: Environmental Management by Native Californians. Ballena Press. Menlo Park, California.

BLM Manual 1745, Introduction, Transplant, Augmentation and Reestablishment of Fish, Wildlife and Plants: (March 1992).

BLM Manual 6840, Special Status Species Policy: (January 2001)

Booth, P.T. 1984. Grants Pass the Golden Years 1884-1984. Grants Pass Centennial Commission, Grants Pass, Oregon.

Boothe, Dick, personal communication.

Borgias, D. and J. Beigel. 1996. Post fire vegetation recovery in the serpentine fens and savannas of Josephine Creek. Unpublished report on file at the Siskiyou National Forest, Grants Pass, Oregon.

Boyd, R. J. 1986. Strategies of Indian Burning in the Willamette Valley. Canadian Journal of Anthropology 5:65-86.

Brock, R., and R. Callagan. 2002. Siskiyou Biosurvey LLC. Site Review of *Fritillaria gentneri* on Bureau of Land Management lands. 2002 monitoring report. Internal Report. Medford District, BLM, Medford, Oregon.

Brown, F.R. (ed.). 1985. Management of Wildlife and Fish Habitats in Forest of Western Oregon and Washington. Part 1, Chapter Narratives. pg 129-169. Pacific Northwest Region, Forest Service, U.S. Department of Agriculture, Portland, Oregon. Publication No. R6-F&WL-192-1985.

Budy, E. and W. Tonsfeldt. 2000. Esterly Lakes Cultural Resource Survey: Human Landscapes in the Historic Waldo, Takilma and Blue Creek Mining Districts. Medford District BLM. Medford, Oregon.

Cosby, L. 1997. Social Module: Stair Creek Watershed Analysis. Report on file, Galice Ranger District. Siskiyou National Forest, Grants Pass, Oregon

Davis, K.M. and R.W. Mutch. 1994. Applying ecological principles to manage wildland fire, *in* Fire in Ecosystem Management, training course (Natl. Adv. Res. Tech. Cnt.).

DellaSala, D. and Reid, S. and Frest, T. and Strittholt, J. and Olsen, D. 1999. A global Perspective on the Biodiversity of the Klamath-Siskiyou Ecoregion. Natural Areas Journal19:300-319.

DeSante, D.F. and K.M. Burton. 1994. 1994 M.A.P.S. Manual: Instructions for the Establishment and Operation of Stations as Part of the Monitoring Avain Productivity and Survivorship Program. The Institute for Bird Populations, Point Reyes Station, CA

Endangered Species Act of 1973 (16 U.S.C. 1531 *et seq.*), as amended.

Executive Order 13112: Invasive Species: (February 3,1999).

Federal Register. May 6, 1997. Listing of Southern Oregon, Northern California Coho. Vol 62. No.87. OK SM

Federal Register. May 5, 1999. Southern Oregon, Northern California Critical Habitat Designation. Vol 64. No. 86. OK SM

Federal Register. August 17, 2001. Urban wildland interface communities within the vicinity of federal lands that are at high risk from wildfire; Vol. 66, No. 160

Francis, D. 1988. A History of Josephine County, Oregon. Josephine County Historical Society. Grants Pass, Oregon.

Fredericks, Nancy. 1988. Species Management Guide for *Calochortus howellii* Wats. Salem, OR: Oregon State Department of Agriculture.

Forseman, E.D., E.C. Meslow, and H.M. Wight. 1984. Distribution and biology of the spotted owl in Oregon. Wildlife Monographs 87:1-64

Gray, D.J. 1987. The Takelma and their Athapascan Neighbors: A New Ethnographic Synthesis for the Upper Rogue River Area of Southwestern Oregon. University of Oregon Anthropological Papers 8. Eugene, Oregon.

Hardy, C.C. 1992. Wildfire smoke production: the Silver Fire as a case example i*n* Fire in Pacific Northwest ecosystems symposium, Portland, OR. P. 32-34.

Hardy, C.C., D.L. Bunnell, J.P. Menakis, K.M. Schmidt, D.G. Long, D.G. Simmerman, and C.M. Johnston. 2000. Coarse-scale spatial data for wildland fire and fuel management. Website at http://www.fs.fed.us/fire/fuelman/.

Harris, L.D. and P.B. Gallagher. 1989. New Initiatives for Wildlife Conservation: The Need for Movement Corridors. Pp. 11-34 in G. Mackintosh (ed.), In Defense of Wildlife: Preserving Communities and Corridors. Defenders of Wildlife,

Heinselman M.L. 1981. Fire intensity and frequency as factors in the distribution and structure of northern ecosystems, pp. 7-57 in H.A. Mooney et al., Proceedings of the Conference, Five Regimes and Ecosystem Dynamics, Gen. Tech. Rep. WO-26. USDA, For. Serv.

Hewes, G.W. 1942. Economic and Geographic Relationships of Aboriginal Fishing in northern California, California Fish and game 28: 103-110.

Hewes, G.W. 1947. Aboriginal Use of Fishing Resources in northwestern North America. Unpublished PhD dissertation. University of California, Berkeley.

Hickman, O.E. 1997. Potential Natural (Historic?) Vegetation of the Central Illinois River Valley. Proceedings of the First Conference on Siskiyou Ecology: 47-55.

Hill, E.M. Undated. Josephine County Historical Highlights Volumes I & II, Josephine County Hist. Society, 1976.

Horton, J.S. 1949. Trees and shrubs for erosion control of southern California mountains. Berkeley, CA: U.S. Department of Agriculture, Forest Service, California [Pacific Southwest] Forest and Range Experiment Station; California Department of Natural Resources, Division of Forestry. 72 p. [10689]

Illinois Valley Community Response Team. Undated. Profile: Illinois River Valley. Brochure available at Illinois Valley Visitor Center.

Illinois Valley Community Response Team. 1995. Illinois Valley Strategic Plan for Community Development: From Vision to Action. Available at the CRT office, Cave Junction, Oregon.

Janes, S.W. 1993. Neotropical Migrant Bird Studies; Medford District: BLM. Unpublished report.

Jarvis, R.L. and J.P. Leonard. 1993. Nesting and Foraging Ecology of the Band-Tailed Pigeons - Neotropical Migrant in Western Oregon, Progress Report. Department of Fish and Wildlife, Oregon State University, Corvallis, Oregon.

Jimerson, T.M, et al. 1995. A Field Guide to Serpentine Plant Associations and Sensitive Plants in Northwestern California. PSW R5-ECOL-TP-006 USDA Forest Service.

Kagan, J. 1989. Draft species management guide for *Senecio hesperius*. Portland: Oregon Natural Heritage Program.

Kagan, J. 1986. A new species of Lomatium (*Apiaceae*), from southwest Oregon. Madrono 33 (1): 71-75.

Kalin-Arroyo, M.T. 1973. A taximetric study of the infraspecific variation in autogamous *Limnanthes floccosa (Limnanthaceae*). Brittonia 25: 177-191.

Kauffman, J.B. 1990. Ecological relationships of vegetation and fire in Pacific Northwest forests. In Walstad, J., et al. (eds.), natural and prescribed fire in Pacific Northwest forests: pp.39-52. Corvallis: Oregon State University Press.

Kaufmann, M.R., Graham, R.T. , Boyce, D.A., Jr., Moir, W.H., Perry, L., Reynolds, R.T., Bassett, R.L., Mehlhop, P., Edminster, C.B., Block, W.M. and Corn, P.S. 1994. An ecological basis for ecosystem management. Gen. Tech. Rep. RM-246. Fort Collins, CO: USDA, For. Serv. Rocky Mt. For. and Rng. Exp. Sta. 22 p.

Kaye, T. 2002. *Lomatium cookii*, Population monitoring in the Illinois Valley, Josephine County, Oregon. Annual progress report prepared for the Medford Bureau of Land Management on long term monitoring. BLM, Medford, Oregon.

Kendal, D.L. 1990. Takelma. In Handbook of North American Indians: volume 7. Smithsonian Institution. Washington, D.C. pages: 589-592.

Kroeber, A.L. 1925. Handbook of the Indians of California. Bureau of American Ethnology. Bulletin 78 Washington.

Kroeber, A.L., and S.A. Barrett. 1960. Fishing among the Indians of northwestern California University of California Anthropological Records 21(1): 1-210. Berkeley.

LaLande, J. 1995. An Environmental History of the Little Applegate River Watershed. U.S. Department of Agriculture, Forest Service, Rogue River National Forest, Medford, Oregon.

Lewis, H. T. 1989. Reconstructing Patterns of Indian Burning in Southwest Oregon. (In) Living with the Land: The Indians of Southwest Oregon. Southern Oregon Historical Society. Medford, Oregon.

Lewis, H.T. 1993. Patterns of Indian Burning in California: Ecology and Ethnohistory. (In) Before the Wilderness: Environmental Management by Native Californians. Ballena Press. Menlo Park, California.

Maser, C., B.R. Mate, J.F. Franklin, and C.T.Dyrness. 1981. Natural History of Oregon Coast Mammals. USDA Forest Service General Tech. Rep. PNW-133, 496 p. Pacific Northwest Forest and Range Experiment Station, Portland, Oregon.

McCarty, H. 1993. Managing Oaks and the Acorn Crop. In Before the Wilderness: Environmental Management by Native Californians. Ballena Press. Menlo Park, California.

McCune, B. 1988. Ecological diversity in North American pines. American Journal of Botany. 75(3): 353-368. [5651]

McKinley, G. and D. Frank. 1996. Stories of the land: An environmental history of the Applegate and Upper Illinois valleys. Medford: Bureau of Land Management, Medford District.

Miller, J., and W.R. Seaburg. 1990. Athapaskans of southwestern Oregon. In Handbook of North American Indians. vol. 7. pp. 580-588. Washington: Smithsonian Institution.

Mousseaux, M. 2004, French Flat. Kalmiopsis, Vol.11:46-53.

Mutch, R. 1994. Fighting fire with prescribed fire: A return to ecosystem health. J. of For. 92:11 31-33.

Noss, R.F. 1992. The Wildlands Project - Land Conservation Strategy. Pages 10-25 in Wild Earth. Special Issue: "The Wildland Project: Plotting a North American Wilderness Recovery Strategy." Cenozoic Society Inc., Canton, New York.

Oregon Department of Environmental Quality. 1988 Oregon Statewide Assessment of Nonpoint Sources of Water Pollution. Planning & Monitoring Section, Water Quality Division, 811 SW Sixth Avenue, Portland, Oregon 97204.

Oregon Department of Environmental Quality. DEQ, February 1998. 303(d): Final List Decision Matrix, Internet.

Oregon Department of Environmental Quality. 1993. State of Oregon Grants Pass UGB Carbon Monoxide Attainment Year SIP Emission Inventory.

Oregon DOGAMI. 1979. Geology and Mineral Resources of Josephine County, Oregon. Bulletin 100. Portland, Oregon.

Oregon Department of Fish and Wildlife. 1994. *Rogue Basin Fish Management Plan*, Oct. 1994. OK SM

Oregon Natural Heritage Information Center. *Rare, Threatened and Endangered Species of Oregon*, May 2004.

Policy on Use of Native Species Plant Materials - BLM Oregon/Washington: (December 15, 2000).

Pfefferle, R. 1977. Golden Days and Pioneer Ways. Grants Pass, Oregon:Bulletin Publishing Company

Pullen, R. 1996. Overview of the Environment of Native Inhabitants of Southwestern Oregon, Late Prehistoric Era. Pullen Consulting, Bandon, Oregon.

Pyne, S.J., R.D.Laven and P.L. Andrews. 1996. Introduction to Wildland Fire. New York, NY: John Wiley & Sons.

Ramp, L. and N.V.Peterson, 1979. Mineral Locality Map of Josephine County, Oregon: Oregon Department of Geology and Mineral Industries Bulletin 100.

Reed, R.(ed). 1996. Oregon: A Statistical Overview. Southern Oregon Regional Services Institute. SOU, Ashland OR.

Reeves, G., F.H. Everest, and J.D. Hall. 1987. Interactions between the redside shiner (R*ichardsonius balteatus*) and the steelhead trout *(Salmo gairdneri*) in western Oregon: the influence of water temperature. C. J. Fish. Aquat. Sci. 44: 1603-1613. OK SM

Regional Interagency Executive Committee (RIEC). Ecosystem Analysis at the Watershed Scale. Federal Guide for Watershed Analysis, Version 2.2, Portland, Oregon 1995.

Ripple, W.J. 1994. Historic Spatial Patterns of Old Forests in Western Oregon. Journal of Forestry. Nov: 45-59.

Rogue River Courier, Oregon, January 29, 1903.

Rogue River Courier, Oregon, March 4, 1927.

Ross, R.E. 1990. Prehistory of the Oregon Coast. In Handbook of North American Indians. vol.7. pp 554-559. Washington: Smithsonian Institution.

Schreindorfer, C. 1985. Marial 1984: Archaeological Investigations at 35CU84. Report on file Bureau of Land Management, Medford District. Medford, Oregon.

Sewezy, S.L., and R.F. Heizer. 1977. Ritual Management of Salmonid Fish Resources in California. Journal of California Anthropology. vol. 4 (1): 7-29.

State of Oregon. 1942. Oregon Metal Mines Handbook. Department of Geology and Mineral Industries. Bulletin no. 14-C. Portland, Oregon.

Stein, W.I.. 1990. Quercus garryana Dougl. ex Hook,: Oregon white oak. In: R.M Burns and B.H. Honkala, Barbara H., tech. coords. Silvics Of North America: Volume 2, hardwoods. Agricultural Handbook 654. Washington DC: Forest Service, USDA. pp. 650-660.

Stouder, D.J., P.A. Bisson, and R.J. Naiman. Eds. 1997. Pacific salmon and their ecosystems, status and future options. Chapmand and Hall.

Suttles, W., 1990. Environment. In Handbook of North American Indians. vol. 7. pp. 16-29. Washington: Smithsonian Institution.

Tappeiner, J.C., P.M. McDonald, and D.F.Roy, 1990. Lithocarpus densiflorus (Hook.and Arn.)Rehd.: Tanoak. (In): Burns, Russell M.; Honkala, Barbara H., tech. coords. Silvics Of North America: Volume 2, hardwoods. Agric. Handb. 654. Washington DC: Forest Service, U.S. Department of Agriculture: 417-425.

Tonsfeldt, Ward, for Kay Atwood Consulting. 2000. Management Plan for the Historic Waldo Placer Mining District. Medford District BLM, Medford, Oregon.

U.S. Census Bureau ,Census 2000

U.S. Environmental Protection Agency. 1998. Interim air quality policy on wildland and prescribed fires. 39p.

USDA, Forest Service. 1973. Illinois River Study, Wild and Scenic Rivers System.

USDA, Forest Service. 1996. Althouse Creek Watershed Analysis. Siskiyou National Forest, P.O. Box 440, Grants Pass , OR 97526.

USDA, Forest Service. 1997. FC 2670-1920.

USDA, Soil Conservation Service. 1983. Soil Survey of Josephine County Oregon, 258 p. .

USDA, USDI. 1994a. Record of Decision for Amendments to the Forest Service and Bureau of Land Management Planning Documents within the Range of the Northern Spotted Owl. Standards and Guidelines for Management of Habitat for Late-Successional and Old- Growth Forest Related Species Within the Range of the Northern Spotted Owl. Portland, Oregon.

USDA Forest Service and USDI Bureau of Land Management, USDI Fish and Wildlife Service, USDI National Park Service, Environmental Protection Agency, USDC National Oceanic and Atmospheric Administration. 1994. Forest Ecosystem Management: An ecological, economic, and social assessment. Report of the forest ecosystem management assessment team. July 1993. Portland, OR.

USDA, USDI. 1994b. Final Supplemental Environmental Impact Statement for Management of Habitat for Late-Successional and Old- Growth Forest Related Species within the Range of the Northern Spotted Owl, Volumes I and II. Portland Oregon.

USDA, USDI. 1994c. Final Supplemental Environmental Impact Statement for Management of Habitant for Late-Successional and Old- Growth Forest Related Species within the Range of the Northern Spotted Owl. Appendix J-2: Results of Additional Species Analysis. Portland Oregon.

USDA Forest Service, USDI Bureau of Land Management, National Marine Fisheries Service, Fish and Wildlife Service. 1999. Streamlined consultation procedures for section 7 of the Endangered Species Act. July 27, 1999. Portland, Oregon. BLM IB OR-99-276.

USDA, USDI. 1994d. Applegate Adaptive Management Area Ecosystem Health Assessment.

USDA, USDI. 1995. Southwest Oregon Late-Successional Reserve Assessment, Siskiyou National Forest, P.O. Box 440, Grants Pass , Oregon 97526; and Medford District Bureau of Land Management, 3040 Biddle Road, Medford, Oregon 97504. OK SM

USDA,USDI. 2000. East Fork Williams River Watershed Analysis. Version 2.0. OK SM

USDA, Forest Service USDI, Bureau of Land Management. 1997. West Fork Illinois River Watershed Analysis. Iteration 1.0. Siskiyou National Forest, P.O. Box 440, Grants Pass , Oregon 97526. OK SM

USDA, USDI. 1998. Applegate Adaptive Management Area Guide.

USDA, USDI. 1999. Management Recommendations for Vascular Plants, Portland, Oregon.

USDA, Forest Service. 1997. FC 2670-1920.

USDA Forest Service and USDI BLM. 2001. Rogue River/South Coast FY01/02/03 Timber sale projects biological assessment and biological opinion #1-7-01-F-032. Medford District Bureau of Land Management, Rogue River and Siskiyou National Forests, Portland Field Office of the US Fish and Wildlife Service

USDI, Bureau of Land Management, Medford District 1993. L. Lindell, Inter-office memo: Cumulative Watershed Analysis Screening Process.

USDI, Bureau of Land Management, Medford District, 1995. Record of Decision and Resource Management Plan, Medford, Oregon. OK SM

USDI, Bureau of Land Management, Medford District. 1997. Grave Creek Watershed: Environmental History.

USDI, Bureau of Land Management, Medford District 1998a. Applegate-Star / Boaz Watershed Analysis, Medford, Oregon. .

USDI, Bureau of Land Management, Medford District, 1998b. Rough and Ready Area of Critical Environmental Concern (ACEC) Management Plan and Environmental Assessment, Medford, Oregon..

USDI, Bureau of Land Management, Medford District, 2004. Location and population records, Medford Rare Plant Database. BLM, Medford, Oregon.

USDI Fish and Wildlife Service. 2002b. Draft recovery plan for *Fritillaria gentneri*. Portland, Oregon.

USDI, Bureau of Land Management. 2004. *http://web.or.blm.gov/or930/sssdb/***.** Summary of status of species.

USDI, US Geological Survey. 1994. Geologic Map of the Klamath Mountains, California and Oregon, Map I-2148

USDI, US Geological Survey. 1998. Geochemical Baselines for Surface Waters and Stream Sediments and Processes...Rough and Ready Creek. Open File Report 98-201. Southwestern Oregon.

USDI, US Geological Survey. 2000. Water Data Report OR-00-1.

Vogl, R.J. 1967. Fire adaptations of some southern California plants. In: Proceedings, Tall Timbers fire ecology conference; 1967 November 9-10; Hoberg, California. No. 7. Tallahassee, FL: Tall Timbers Research Station: 79-109. [6268]

Vogl, R.J. 1973. Ecology of Knobcone Pine in the Santa Ana Mountains, California. Ecol. Mono.. 43: 125-143. [4815]

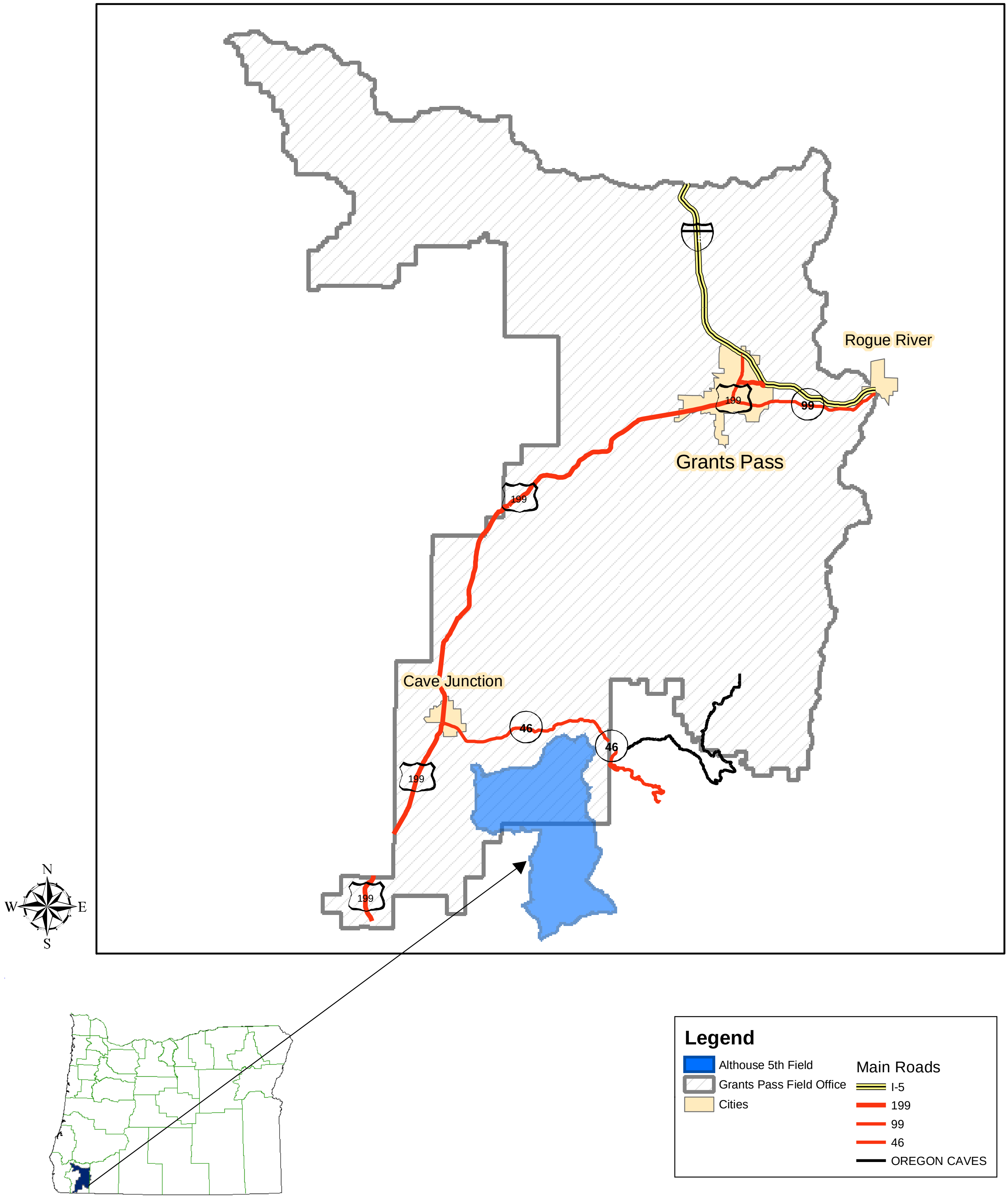
Vorobik, L. 2002. The *Arabis macdonaldiana* group and revision of the purple-flowered *Arabis* from SW Oregon and NW California. Publication in press. Berkeley, California.

Waterman, T.T. and A.L. Kroeber. 1938. The Kepel Fish Dam. University of California Publications in American Archaeology and Ethnology 35: 49. 80.

Wilcox, B.A. and D.D. Murphy. 1985. Conservation Strategy: The Effects of Fragmentation on Extinction. American Naturalist 125: 879-887.

Williams, G. W. 1993. References on the American Indian Use of Fire in Ecosystems. unpublished paper. USDA Forest Service. Pacific Northwest Region.

Appendix A: Maps



ALTHOUSE CREEK
HYDROLOGIC UNIT BOUNDARY

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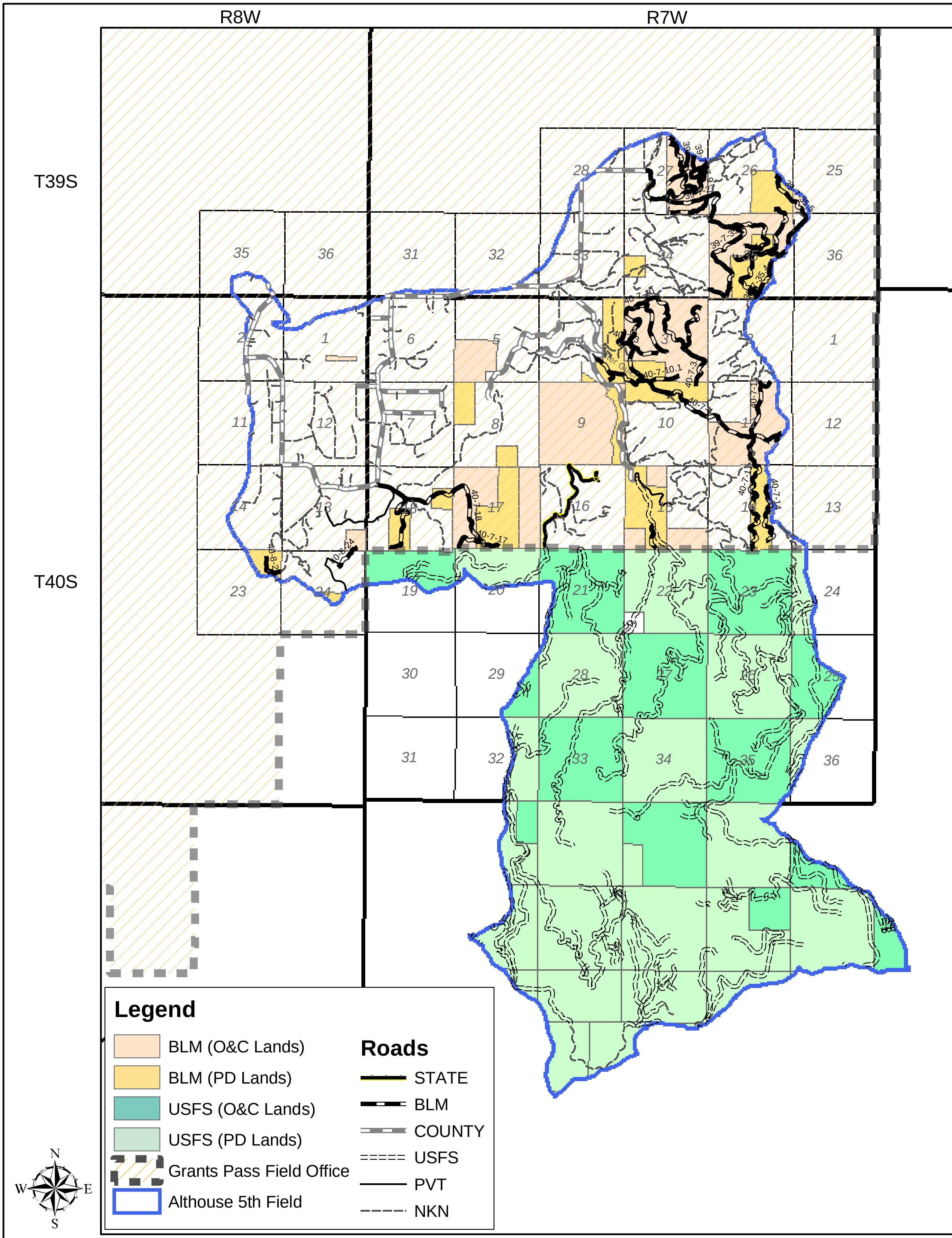

ALTHOUSE CREEK WATERSHED

Map 2

Government Ownership

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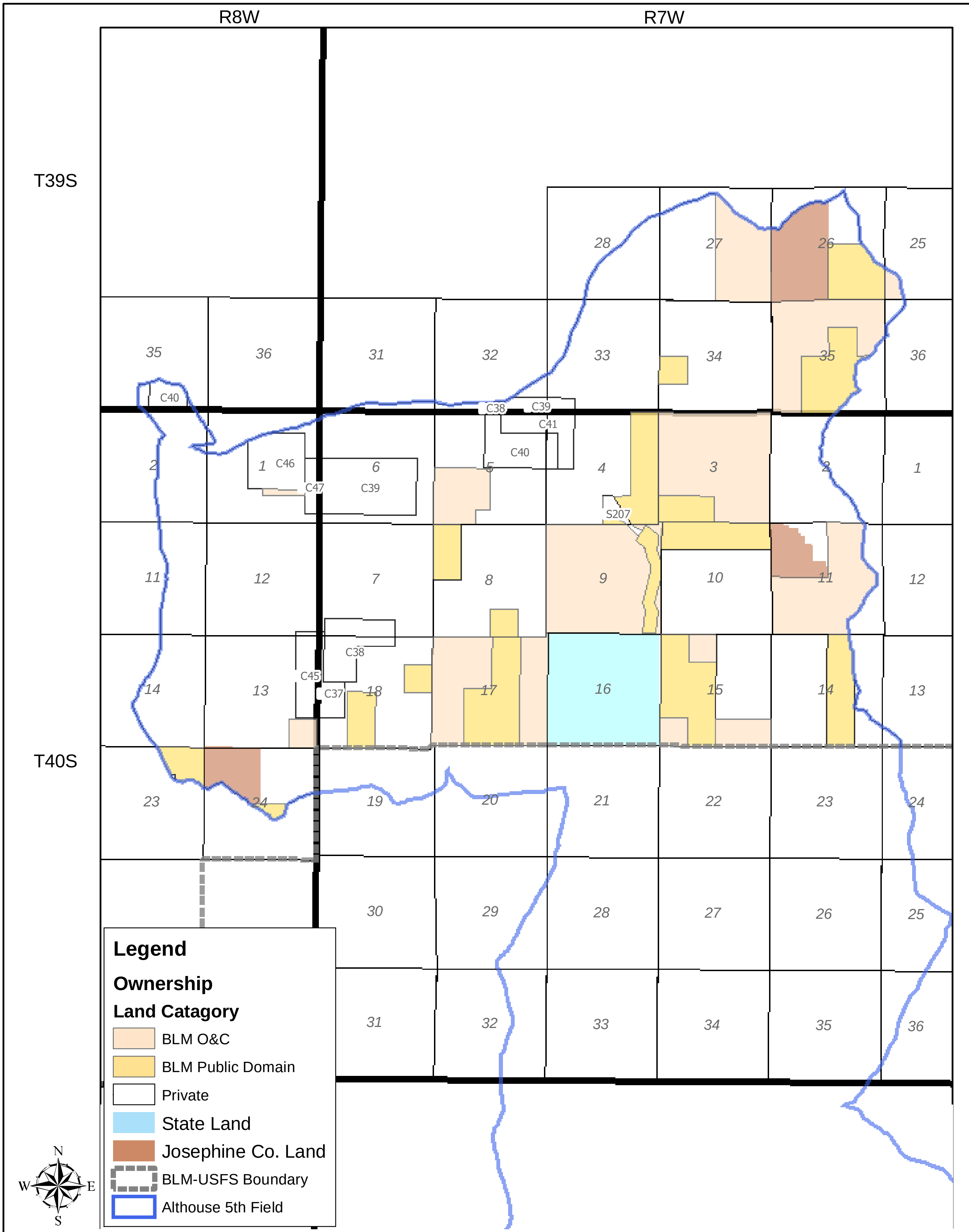

ALTHOUSE CREEK WATERSHED

Map 3
Government Ownership

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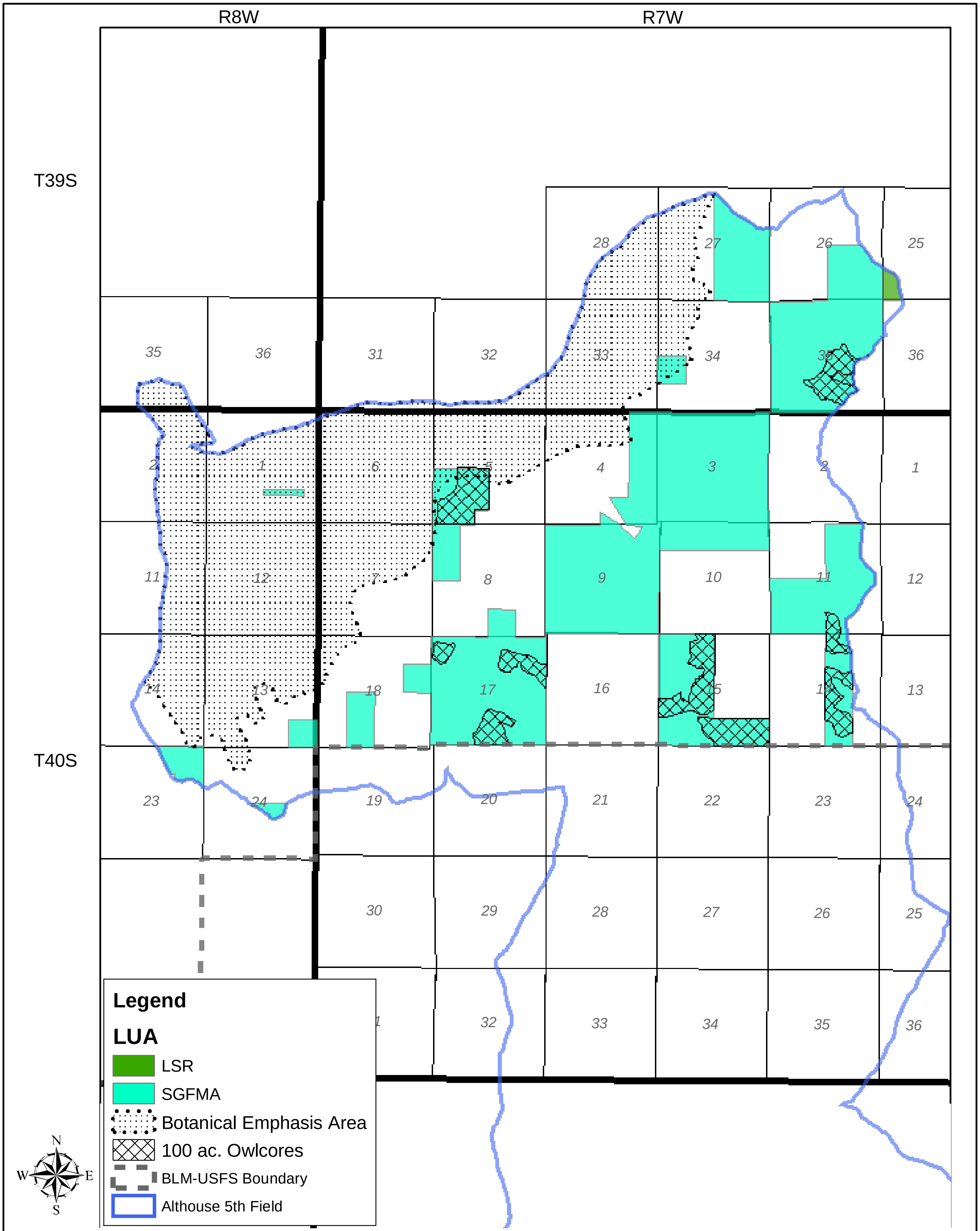

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Map 4
Land Use Allocations

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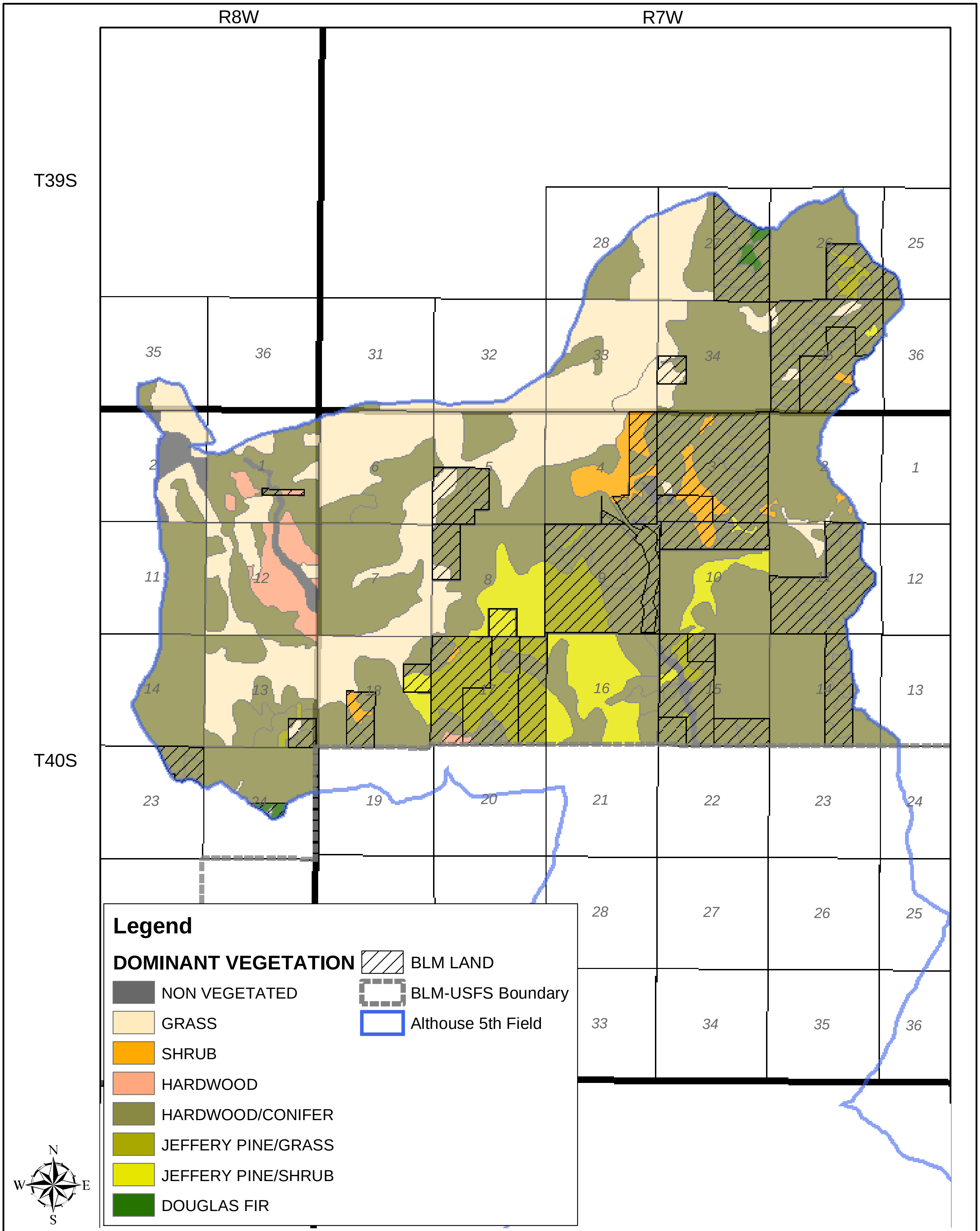

ALTHOUSE CREEK WATERSHED

Map 5
Dominant Vegetation

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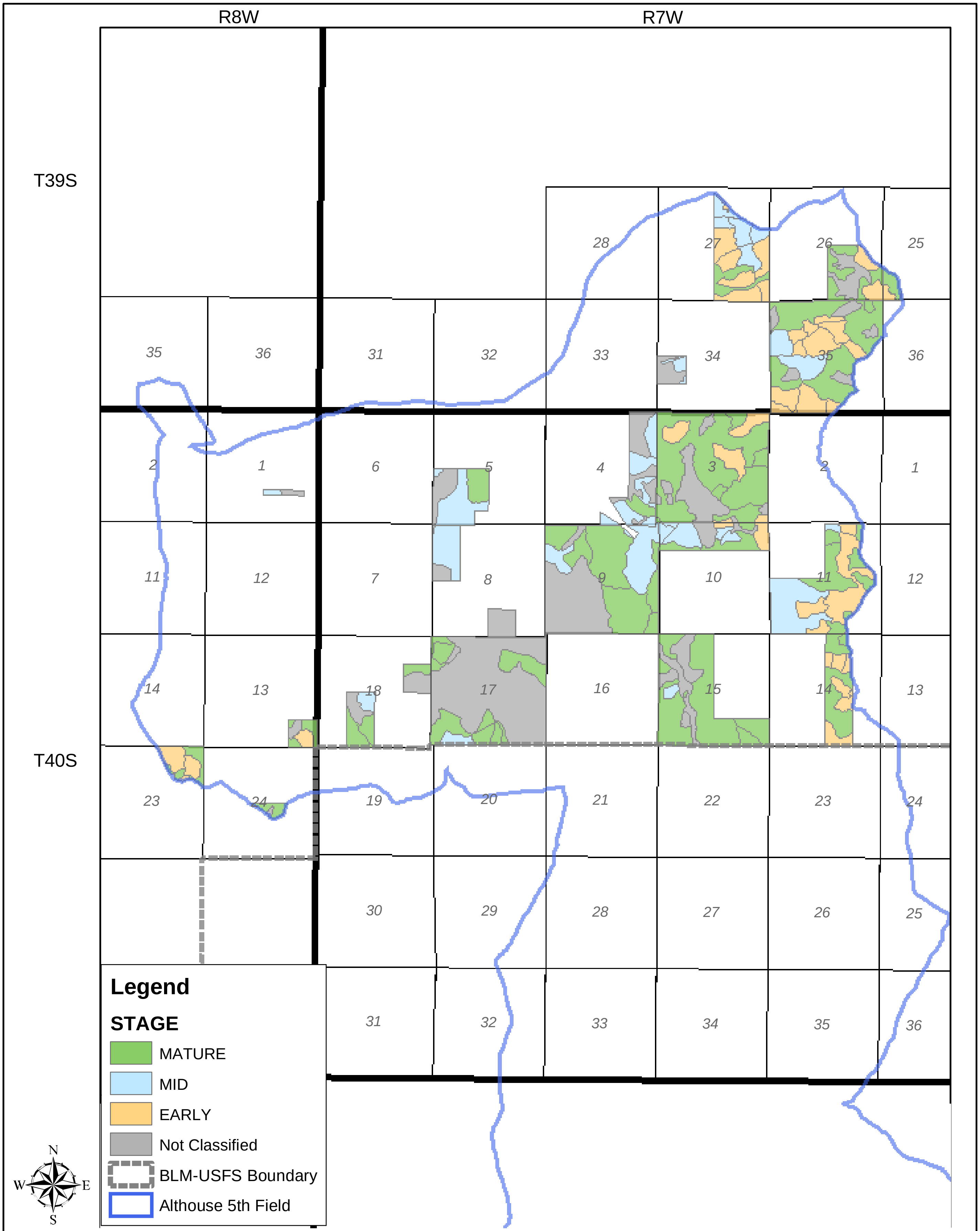

ALTHOUSE CREEK WATERSHED

Map 6
Seral Stage on BLM Lands

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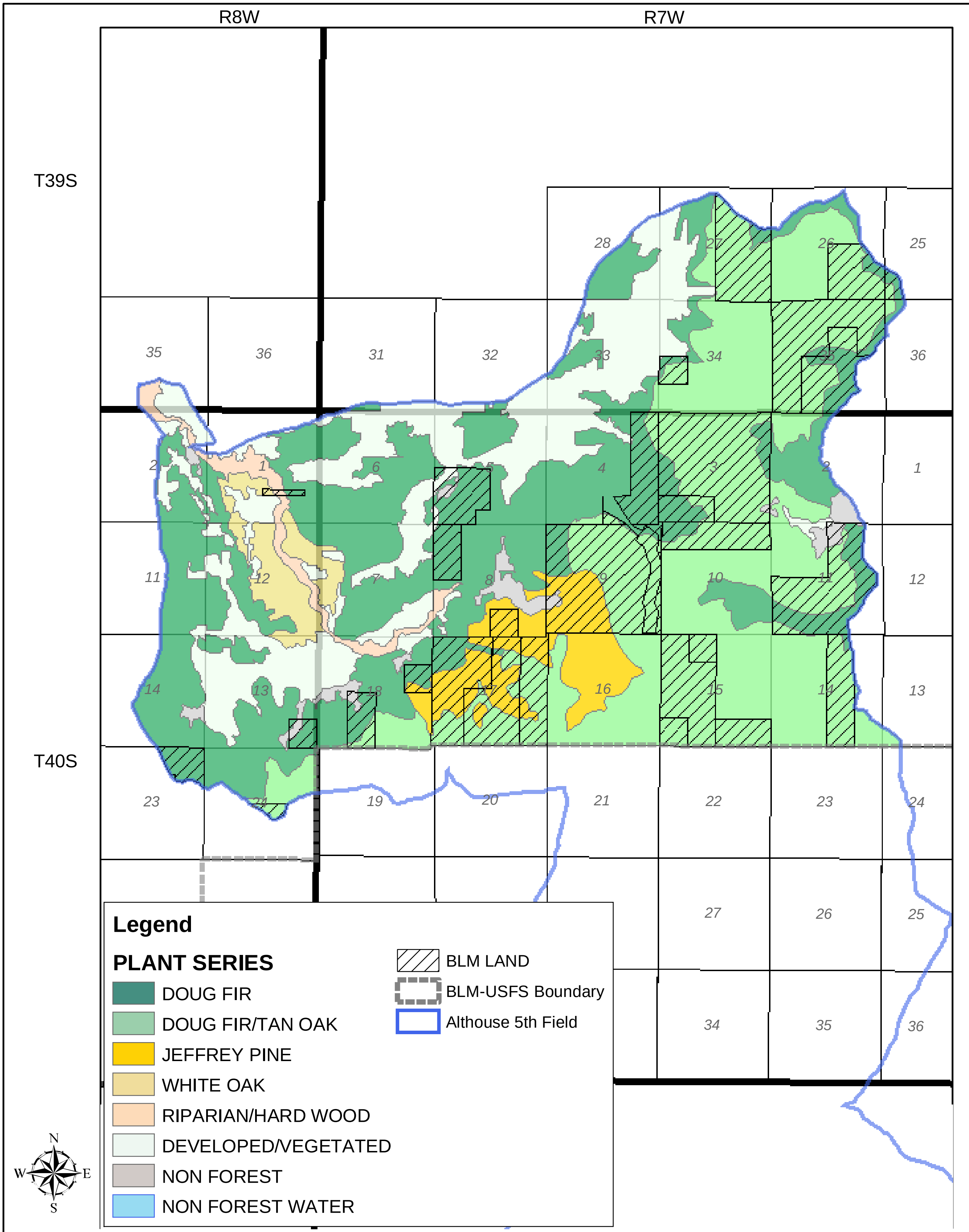

ALTHOUSE CREEK WATERSHED

Map 7
Plant Series

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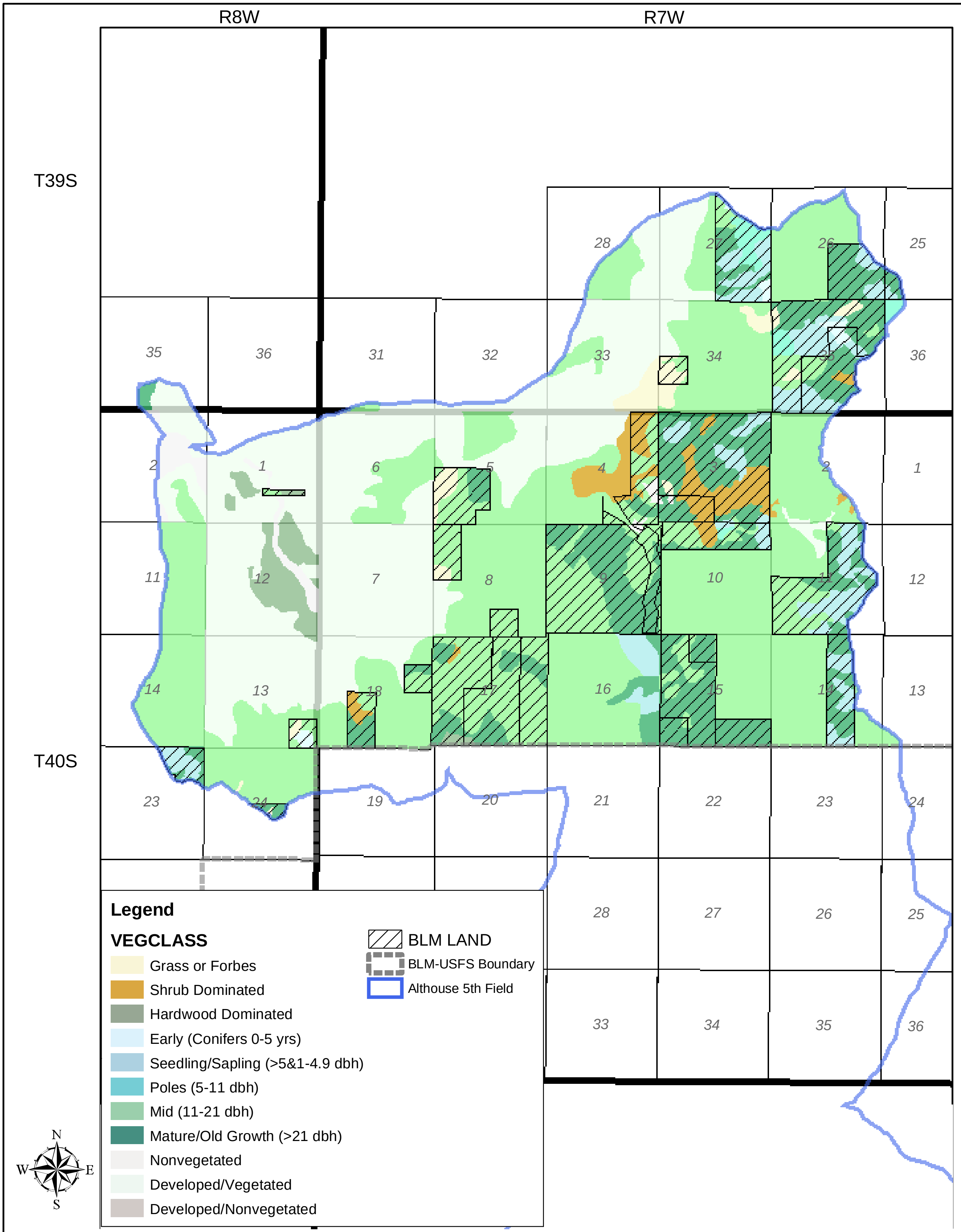

ALTHOUSE CREEK WATERSHED

Map 8
Vegetative Condition Class

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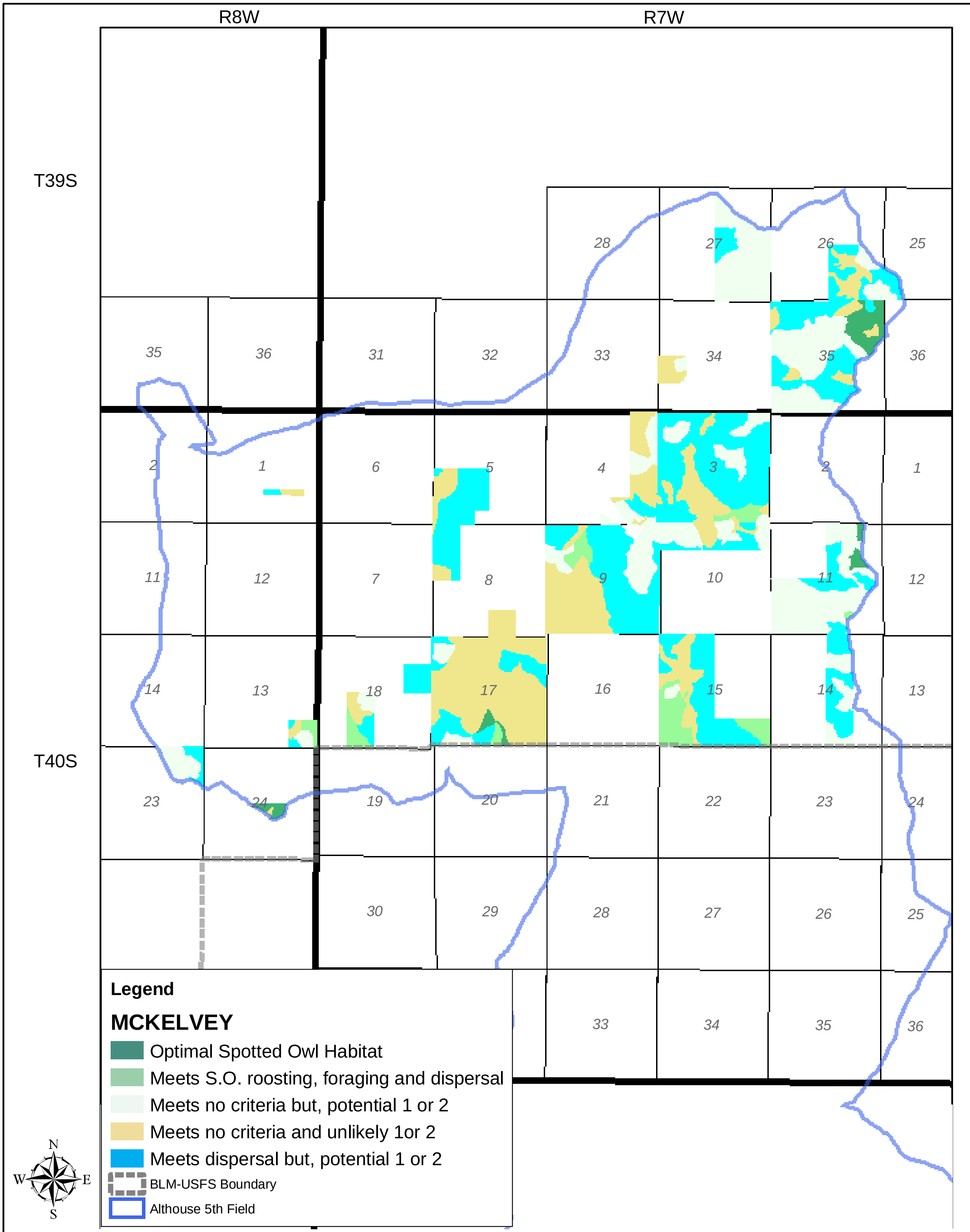

ALTHOUSE CREEK WATERSHED

Map 9
Spotted Owl Habitat

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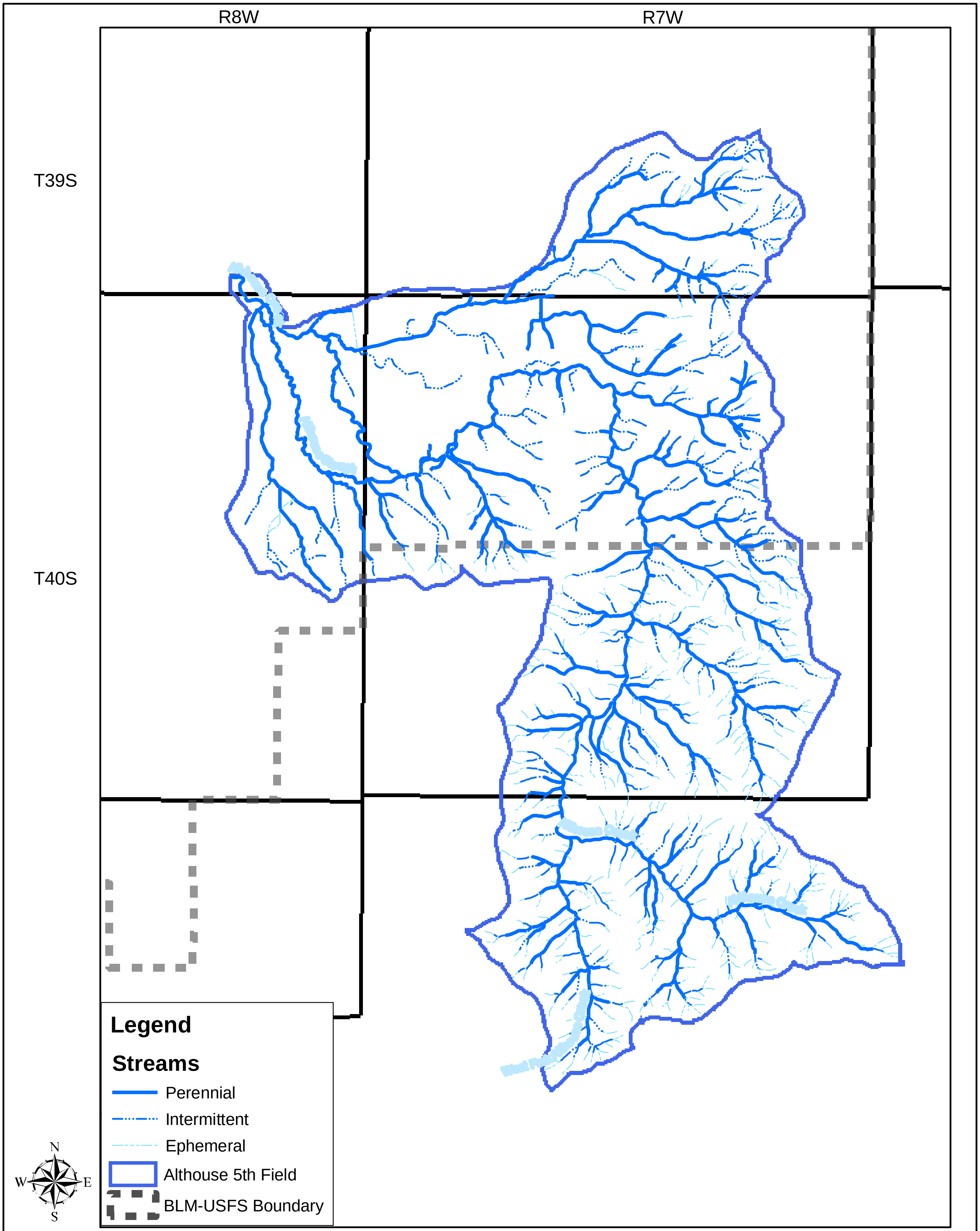

ALTHOUSE CREEK WATERSHED

Map 10
Streams Planflow

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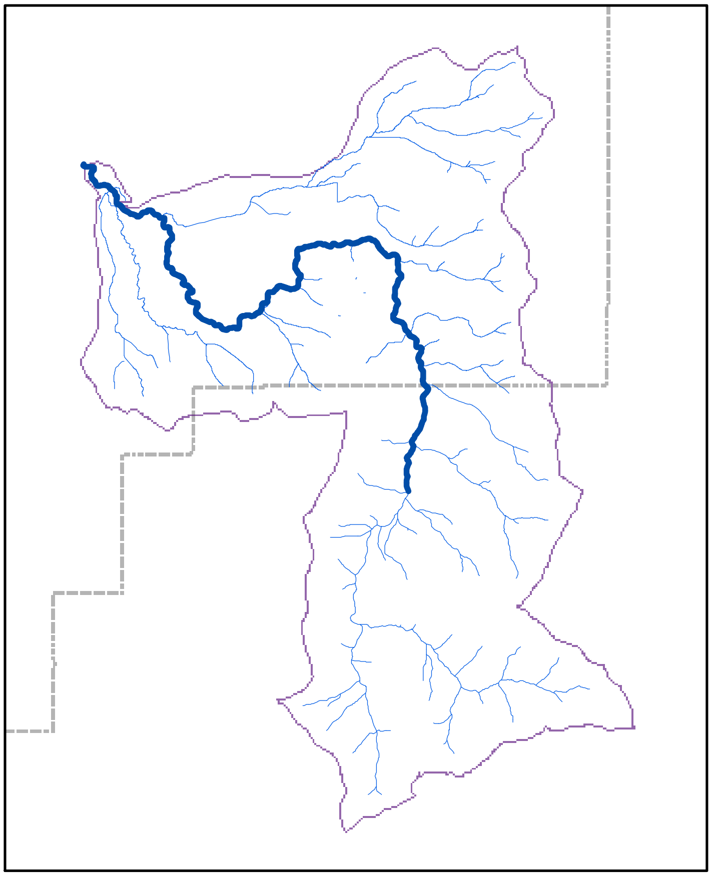
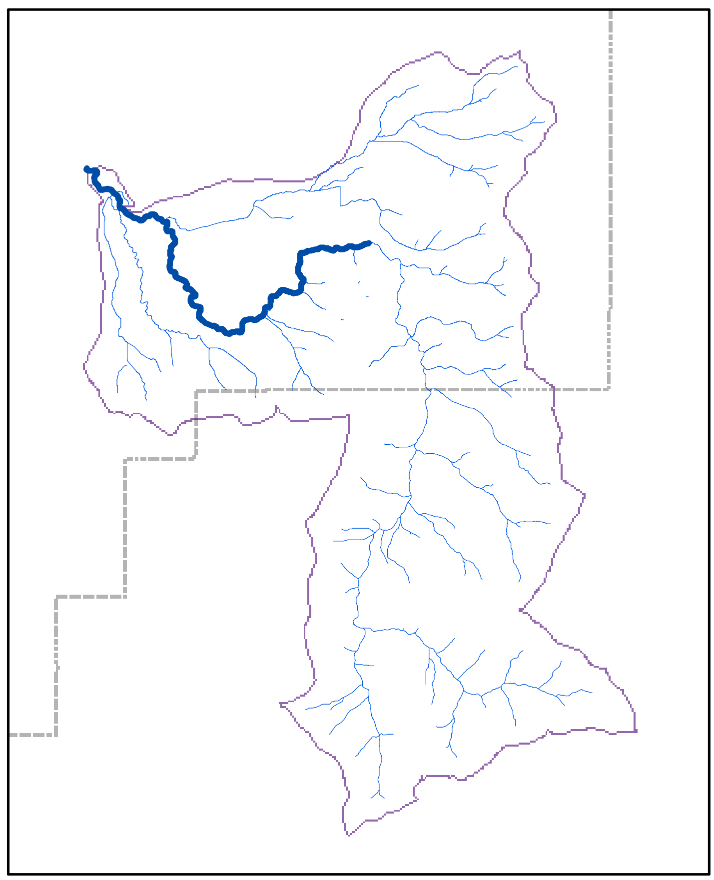
COHO



CHINOOK



Legend

- Distribution of fish
- Streams *(Streamorder > 1)*
- Althouse 5th Field
- BLM-USFS Boundary

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ALTHOUSE CREEK WATERSHED

Map 11

Distribution of COHO & CHINOOK Salmonids

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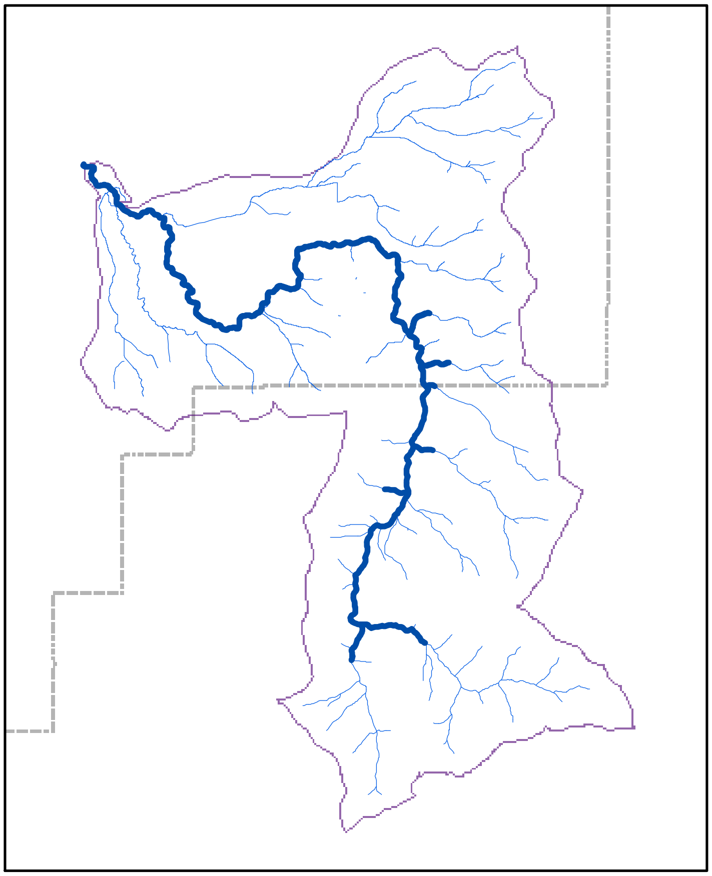
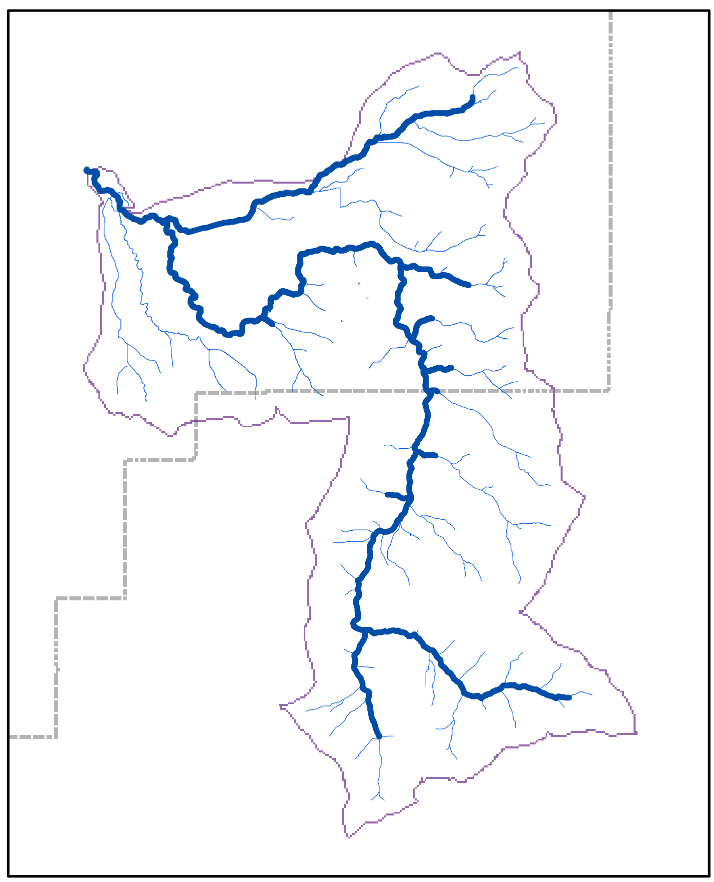
STEELHEAD



CUTTHROAT



Legend

- Distribution of fish
- Streams *(Streamorder > 1)*
- Althouse 5th Field
- BLM-USFS Boundary

ALTHOUSE CREEK WATERSHED

Map 12
Distribution of STEELHEAD & CUTTHROAT

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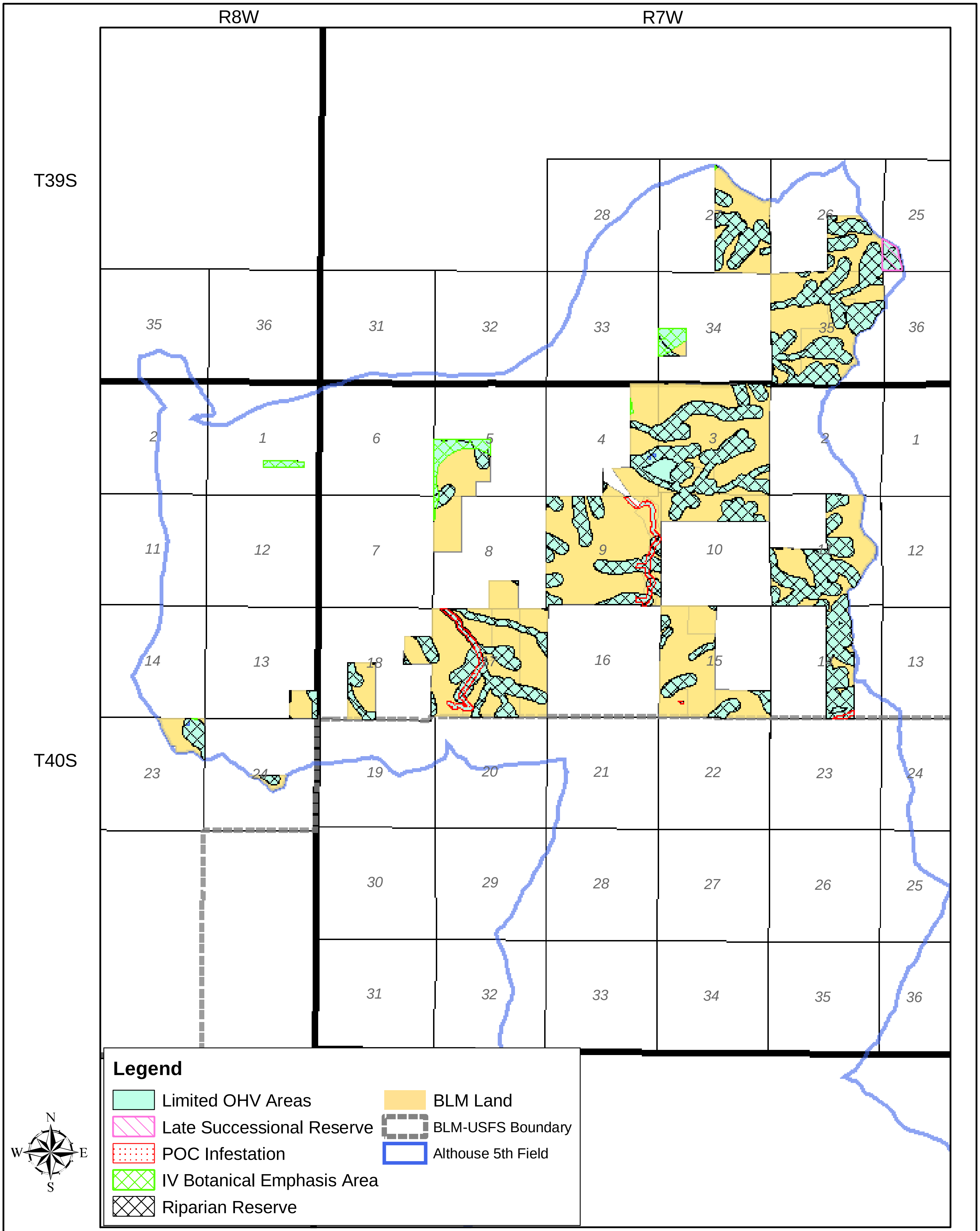

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Map 13
OHV Allocations

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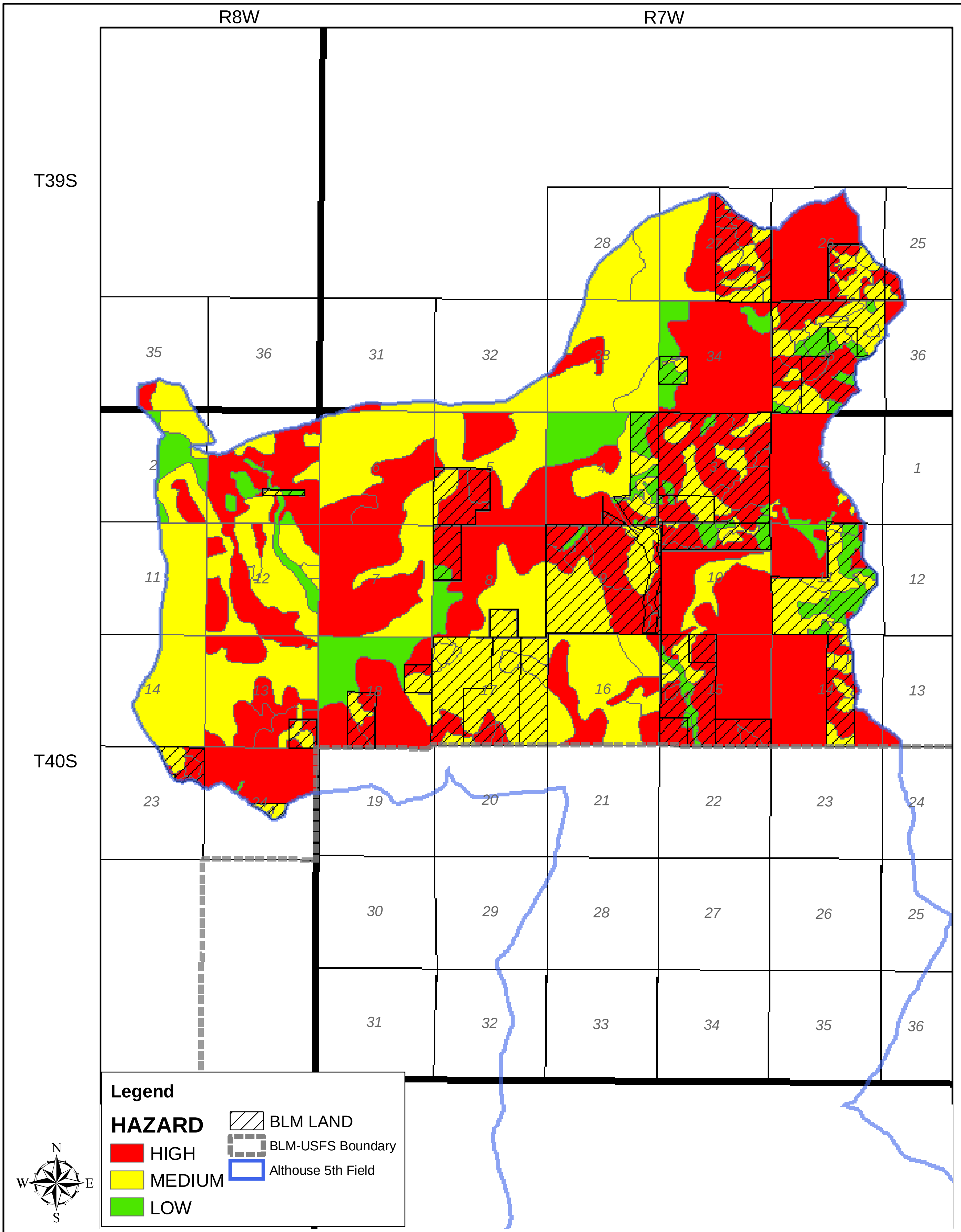

ALTHOUSE CREEK WATERSHED

Map 14
Fire Hazard Rating

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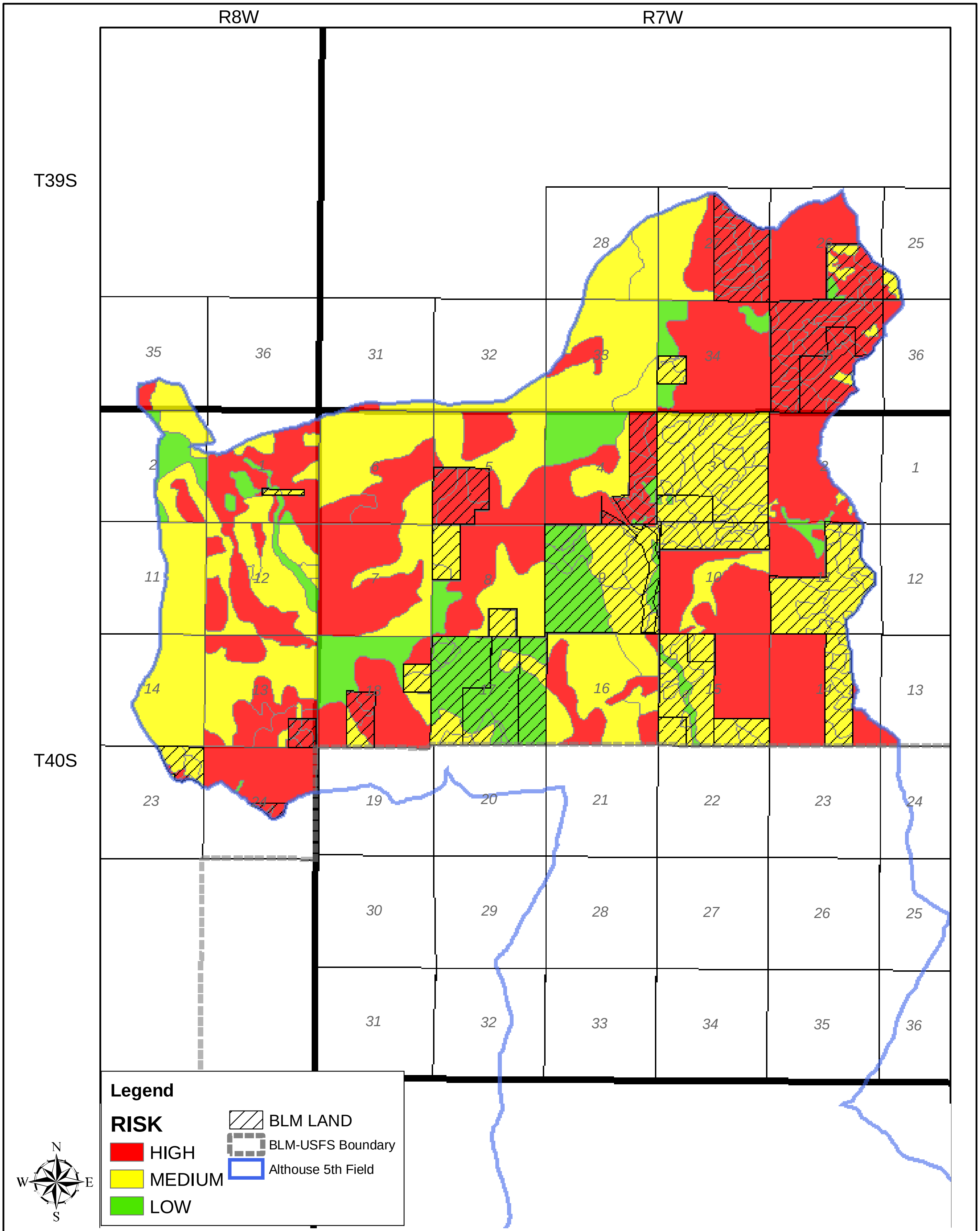

ALTHOUSE CREEK WATERSHED

Map 15
Fire Risk Rating

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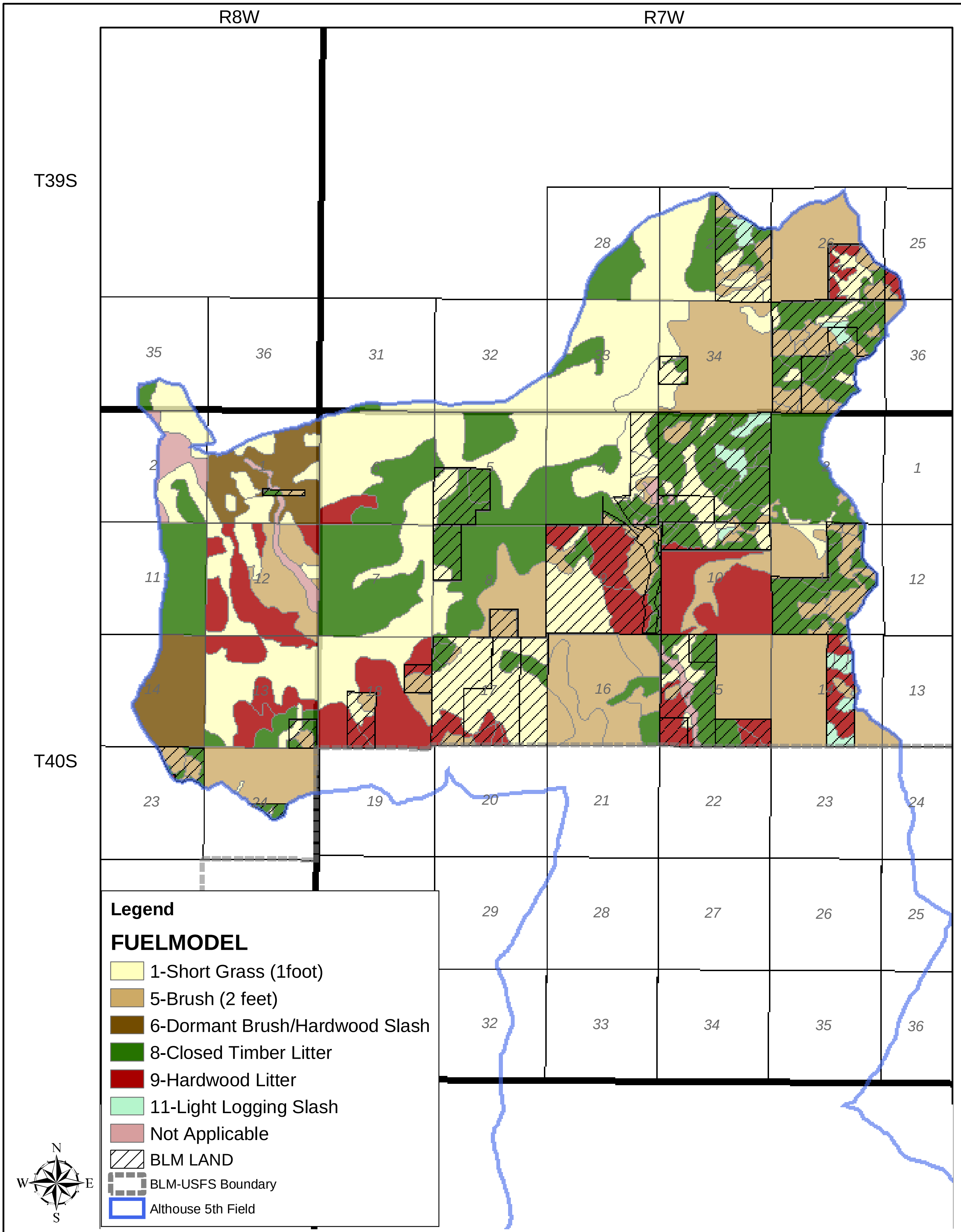

ALTHOUSE CREEK WATERSHED

Map 16
Fire Fuel Models

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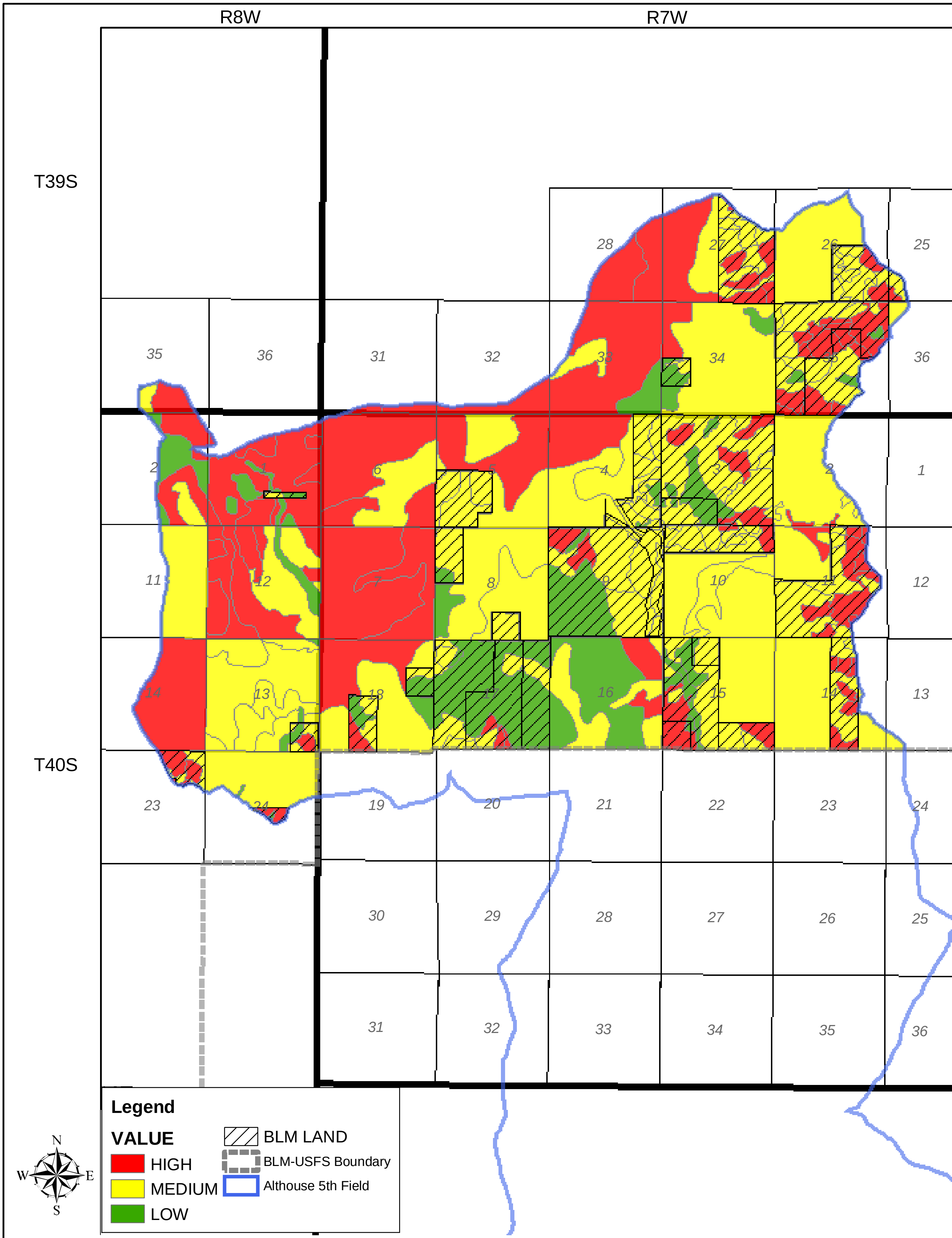

ALTHOUSE CREEK WATERSHED

Map 17
Fire Value Rating

1:75,000

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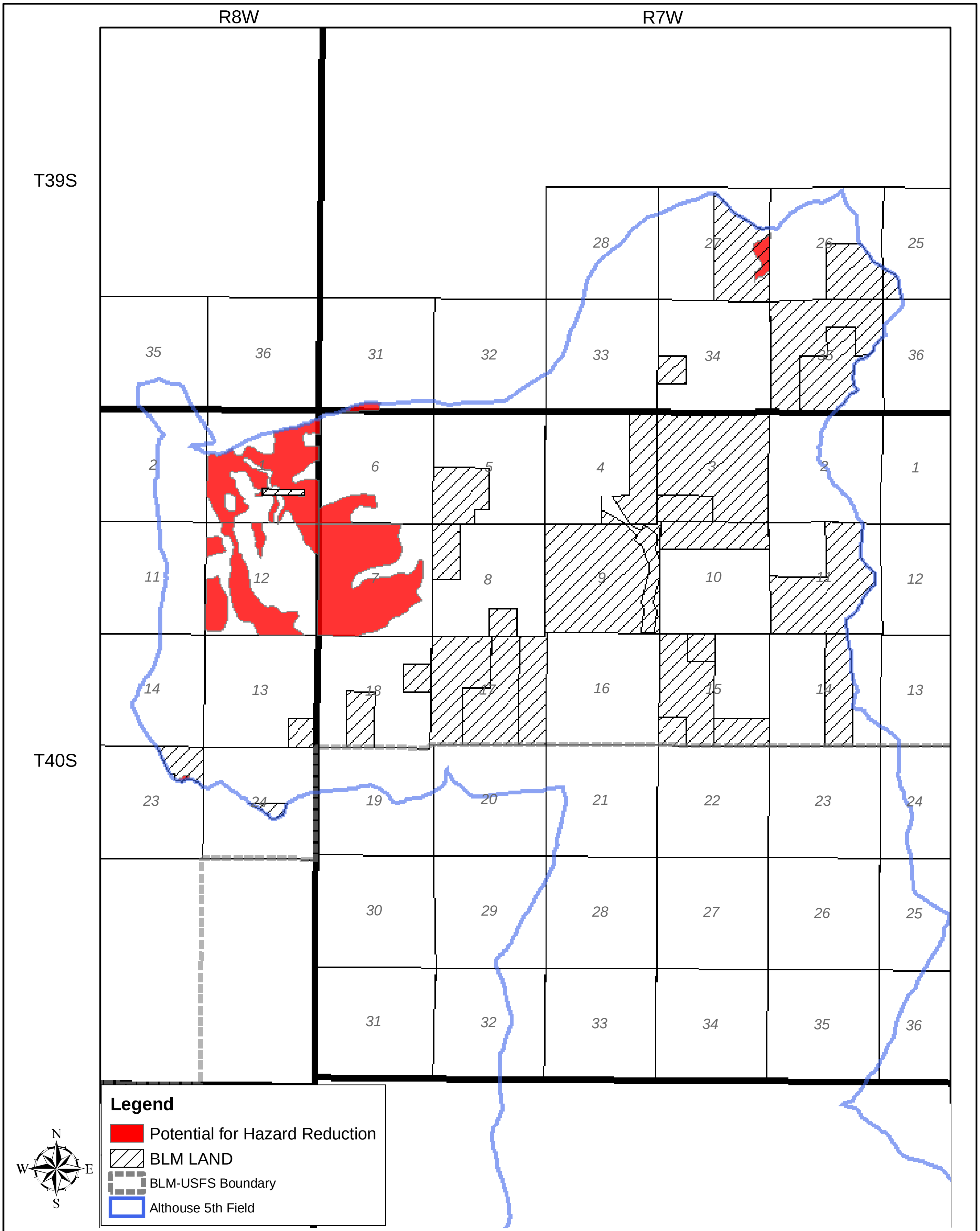

ALTHOUSE CREEK WATERSHED

Map 18

Potential High Priority Hazard Reduction Treatment Areas

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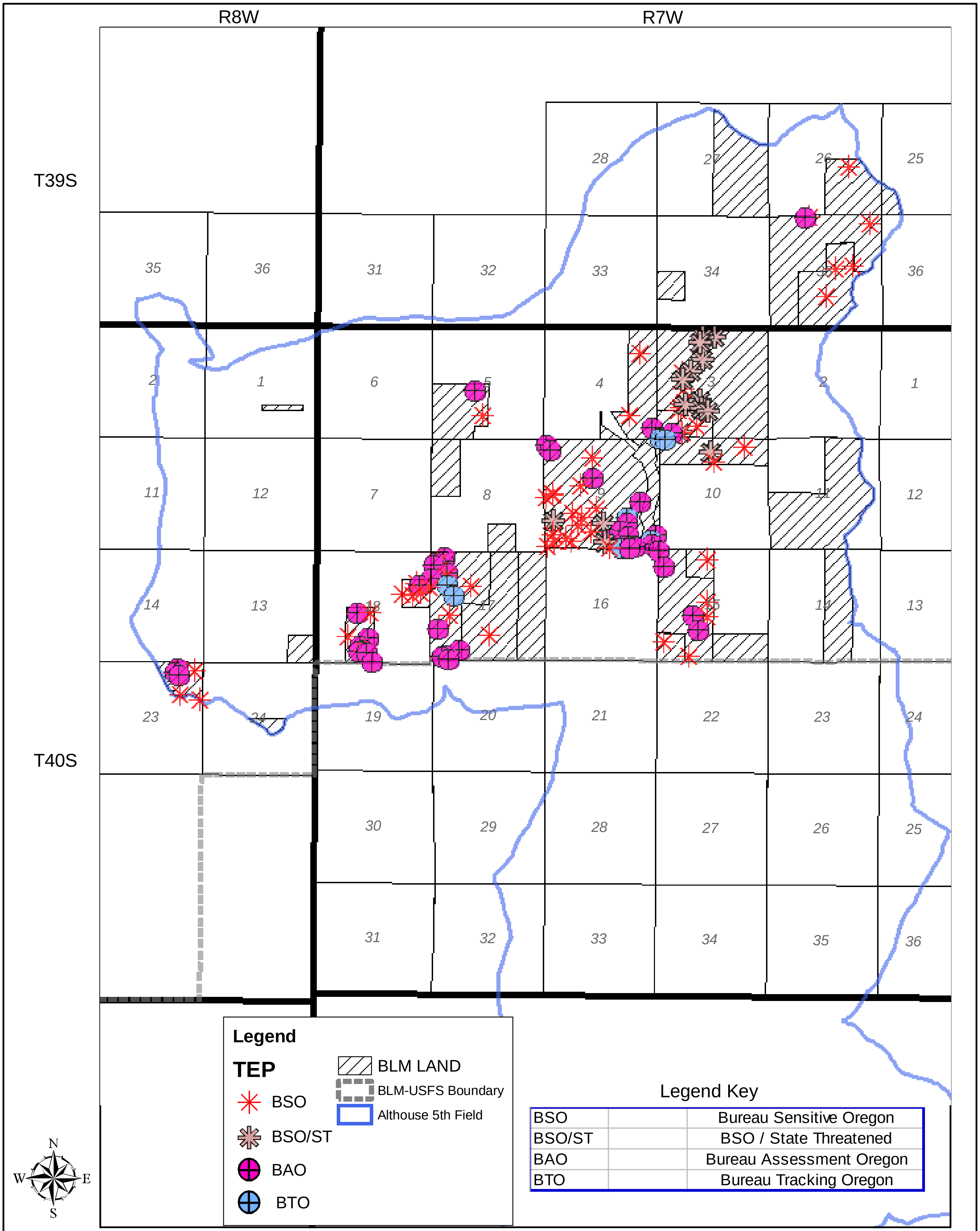

ALTHOUSE CREEK WATERSHED

Map 19

Threatened and Endangered Plants

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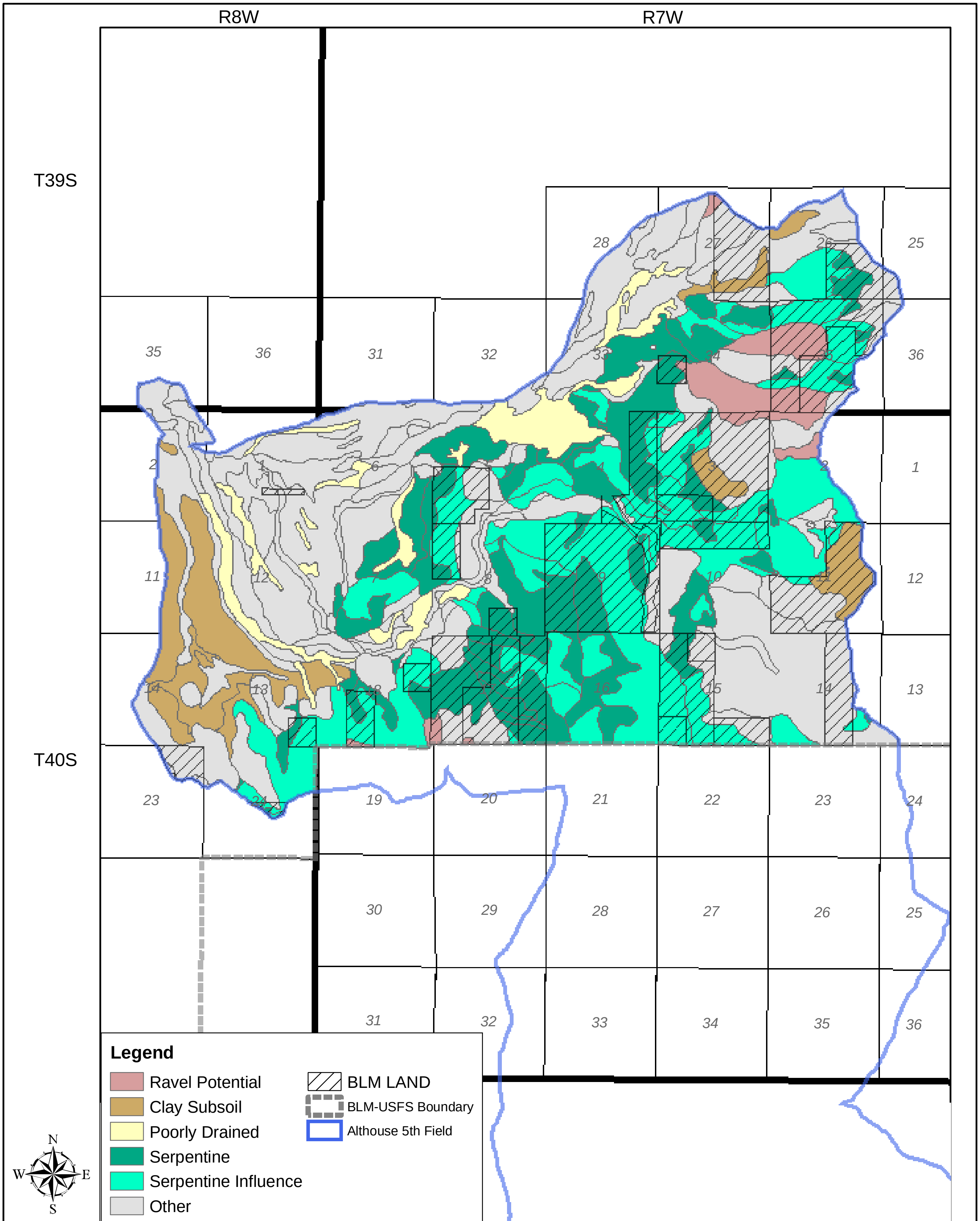

ALTHOUSE CREEK WATERSHED

Map 20
General Soil Types

1:75,000

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Appendix B: Mining Claim Information

A mining claimant or operator has the right to prospect and develop the mining claim as authorized by the General Mining Laws and amendments. Acceptable activities that normally occur on mining claims include the development of the mineral resources by extracting the gold-bearing gravels, or ore, from the claim, manufacturing of the mineral materials utilizing a trommel and sluice box system, or a mill site of some sort. After the gold is extracted the tailings (waste material) are stockpiled to either be utilized in the reclamation of the site or removed to an appropriate location. Timber on site may be used in some situations if outlined in a mining notice or plan of operations.

The operator or claimant will be allowed to build structures and occupy the site where such uses are incidental to mining and approved in writing by the appropriate BLM Authorized Officer. The use and occupancy of a mining claim will be reviewed on a case-by-case basis to determine if such uses are incidental. A letter of concurrence will be issued only where the operator shows that the use or occupancy is incidental to mining and that substantially regular mining activity is occurring. Issuance will be subject to the operator complying with all state, federal, and local governmental codes and regulations. This means that in addition to meeting the requirements to mine on a regular basis the claimant will need to meet the standards of the Oregon Uniform Building Codes and all state sanitation requirements.

The filing of mining claims gives the claimant the rights and ownership of the minerals beneath the surface of the lands encumbered by the mining claims. In most cases, management of the surface of the claims rests with the appropriate federal agency having jurisdiction.

The claimant or operator has the right to use that portion of the surface necessary to the development of the claim. In cases where the surface of the claims are administered by the BLM or Forest Service, the claimant or operator may, for safety or security reasons, limit the public access at the location of operations. Where there are no safety or security concerns, the surface of the mining claims is open to the public.

In some instances the surface of the mining claim is managed by the claimant. These are usually claims that were filed before August, 1955 and determined valid at that time. The claimants in these cases have the same rights as outlined above. However, they have the right to eliminate public access across that area where they have surface rights.

Appendix C: Road Information

1. Definitions

BLM Capitalized Roads: The BLM analyzes Bureau-controlled roads to determine capitalized or noncapitalized classification. During this analysis, the BLM considers many elements including the present and future access needs, type of road, total investment, and the road location. Each capitalized road is identified with a BLM road number and a capitalized value. BLM capitalized roads are managed and controlled by the BLM.

BLM Noncapitalized Roads and Skid Trails: BLM noncapitalized roads and skid trails are not assigned a capitalized value. Noncapitalized roads are generally jeep roads and spur roads that exist due to intermittent public and administrative use. Skid trails are ground disturbances, created under a timber sale, that have not been restored to their natural condition.

Non-BLM Roads and Skid Trails: Non-BLM roads and skid trails are administered by private land owners or other governmental agencies. The BLM has no control over these roads.

Quarries: Quarries are areas of land suitable for use as a rock source to develop aggregate material for the surfacing of roads, rip rap for slope protection, rock for stream enhancement projects, and for other miscellaneous uses. Examples of data elements for quarries: active quarry, depleted quarry.

Road Data Elements: Information on data elements is available through the Medford District road record files, right-of-way (R/W) agreement files, easement files, computer road inventory program, GIS maps, transportation maps, aerial photos, and employee knowledge of existing road systems. When data gaps are determined to exist, field data will be gathered to eliminate the gaps and at the same time existing data element information will be verified. Some information on private roads does exist, but the majority will need to be researched by the BLM through privately-authorized field investigations and answers to BLM's request for information from private land owners. Examples of data elements for roads: road density, road surface, surface depth, road use, road drainage, road condition, road grade, gates, R/W agreements, easements, maintenance levels, and barricades.

Transportation Management Objectives (TMOs): The TMO recommends one or several management actions for each Bureau controlled road within an analysis area as determined by present and future road management needs. TMOs support the attainment of many of the *Standards and Guidelines* of the Northwest Forest Plan as well as the Management Action/Direction of the Districts' ROD/RMPs (Western Oregon Transportation Management Plan, June 1996). TMO acronyms used in the tables in this section are as follows:

NULL No recommendation - the TMO has not been completed or no decision has been made yet.
UCG No change of existing road status.
IMP Road to be improved or reconstructed.
OMLU Road to remain open and there will be an upward change in the maintenance level.
OMLD Road to remain open and there will be an downward change in the maintenance level.
OR2T Road to be converted to a trail and left open.
CSC Road to be closed on a seasonal basis.
CST Road to be closed temporarily (from one to five years).
CDR Road to be closed long term (for more than five years).
CFD Road to be closed permanently and fully decommissioned.
COB Road to be closed permanently and completely obliterated.
RFI Road to be removed from inventory. (Decommissioned, not built, no access, etc.)

2. Definition of Columns in Watershed Road Information Tables

T = Township, R = Range, Sec = Section, Seg = Road Segment
These columns describe the road number, location of the beginning point of the road, and the road segment. Example of a road number: 35-7-24 A.
Name = Name of the road.
Total Miles = Total length of the road in miles.
TMO Recommended:
Improve: may include installing culverts, drainage dips or water bars for erosion control, out sloping the road prism, and aggregate surfacing or re-surfacing.

Decommission road: includes installing a berm/log barricade and allowing the road surface to naturally revegetate.
Surface Type = Road surface type.
NAT = Natural, PRR = Pit Run, GRR = Grid Rolled, ABC = Aggregate Base Course, ASC = Aggregate Surface Course, BST = Bituminous Surface Treatment
Road Width = Subgrade width of the road in feet.
Surface Depth = Road surfacing depth in inches.
Who Controls = Who controls the road.
BLM = Bureau of Land Management, PVT = Private, OTA = Other agency.
Access Rights = Who has access rights on the road.
BA = BLM administrative use only, BP = BLM and public use, PVT = Private but access allowed to BLM, NKN = Unknown

BLM Maintenance Levels (Under Column for Cus. Mtn. and Opr. Mtn):

Level 1: This level is the minimal custodial care as required to protect the road investment, adjacent lands, and resource values. Normally, these roads are blocked and not open for traffic or are open only to restricted traffic. Traffic would be limited to use to high-clearance vehicles. Passenger car traffic is not a consideration. Culverts, waterbars / dips and other drainage facilities are to be inspected on a three-year cycle and maintained as needed. Grading, brushing, or slide removal is not performed unless they affect roadbed drainage. Closure and traffic restrictive devices are maintained.

Level 2: This level is used on roads where management requires the road to be opened seasonally or for limited passage of traffic. Traffic is generally administrative with some moderate seasonal use. Typically these roads are passable by high-clearance vehicles. Passenger cars are not recommended (user comfort and convenience and are not considered priorities). Culverts, waterbars / dips and other drainage facilities are to be inspected annually and maintained as needed. Grading is conducted as necessary only to correct drainage problems. Brushing is conducted as needed (generally on a three-year cycle) only to facilitate passage of maintenance equipment. Slides may be left in place provided that they do not affect drainage and there is at least 10 feet of usable roadway.

Level 3: This level is used on intermediate or constant service roads where traffic volume is significantly heavier approaching a daily average of 15 vehicles. Typically, these roads are native or aggregate surfaced, but may include low use bituminous surfaced road. This level would be the typical level for log hauling. Passenger cars are capable of using most of these roads by traveling slow and avoiding obstacles that have fallen within the travelway. Culverts, waterbars / dips and other drainage facilities are to be inspected annually and maintained as needed. Grading is conducted annually to provide a reasonable level of riding comfort. Brushing is conducted annually or as needed to provide concern for driver safety. Slides affecting drainage would receive high priority for removal, otherwise they would be removed on a scheduled basis.

Level 4: This level is used on roads where management requires the road to be opened all year and has a moderate concern for driver safety and convenience. Traffic volume is approximately a daily average of 15 vehicles and will accommodate passenger vehicles at moderate travel speeds. Typically, these roads are single lane and bituminous surfaced, but may also include heavily-used aggregate surfaced roads as well. The entire roadway is maintained on an annual basis, although a preventative maintenance program may be established. Problems are repaired as soon as discovered.

Level 5: This level is used on roads where management requires the road to be opened all year and has a high concern for driver safety and convenience. Traffic volume exceeds a daily average of 15. Typically, these roads are double or single lane bituminous, but may also include heavily used aggregate surfaced roads as well. The entire roadway is maintained on an annual basis and a preventative maintenance program is also established. Brushing may be conducted twice a year as necessary. Problems are repaired as soon as discovered.

Road Closure information:

Closure status:

OP - Open
SC - Seasonal closure - Temporary
ST - Short term closure - Temporary (1-5 yrs)
DR - Decommission of road - Long term (more than 5 yrs)
FD - Full decommission of road - Permanent
OB - Obliteration of road - Permanent

Closure reason:

WLD - Wildlife / big game hunting concerns
OWL - Northern Spotted Owl
FSH - Fisheries
REC - Recreation
MNT - Maintenance problem
OTE - Other threatened & endangered species
ADM - Administrative reasons
POC - Port-Orford-cedar protection
NOX - Noxious weed control
OTH- Other

Closure device:

BLD- Boulders
CBL - Cable
EBM - Earth berm
GT - Gate (location if other than this road)
INA - Inaccessible (vegetation or other blockage)
LOG - Log barricade
GR - Guard rail
JW - Concrete (jersey wall)
FNC - Fence
SGN - Sign
OTH- Other

Table C-1: Roads Data Report Althouse Watershed

Road Number	Road Name	TMO REC.	O&C Miles	PD Miles	Other Miles	Total Miles	Surface Type	Road Width	Surface Depth	Who Controls	Access Rights	Maint. Level	Who Maintains	Road Class
39S-7W- 27.00A	HOLLAND MAINLINE	CSC	0.00	0.00	0.63	0.63	PRR	16'	6"	BLM	BP	3	NKN	LOC
39S-7W- 27.00B	HOLLAND MAINLINE	CSC	0.51	0.00	0.00	0.51	ASC	16'	6"	BLM	BP	3	BLM	LOC
39S-7W- 27.00C	HOLLAND MAINLINE	CSC	0.37	0.00	0.43	0.80	ASC	16'	6"	BLM	BP	3	BLM	LOC
39S-7W- 27.00D	HOLLAND MAINLINE	CSC	0.58	0.60	0.00	1.18	ASC	16'	6"	BLM	BP	3	BLM	LOC
39S-7W- 27.00E	HOLLAND MAINLINE	CSC	0.70	0.09	0.00	0.79	ASC	16'	6"	BLM	BP	3	BLM	LOC
39S-7W- 27.01A	ROBINSON HILL P	CSC	0.55	0.00	0.00	0.55	ASC	14'	6"	BLM	BP	3	BLM	LOC
39S-7W- 27.01B	ROBINSON HILL P	CSC	0.30	0.00	0.00	0.30	ASC	14'	6"	BLM	BP	3	BLM	LOC
39S-7W- 27.01C	ROBINSON HILL P	UCG	0.19	0.00	0.00	0.19	NAT	16'		BLM	BP	2	BLM	LOC
39S-7W- 27.02A	ROBINSON HILL A	CSC	1.09	0.00	0.00	1.09	GRR	14'	8"	BLM	BP	3	BLM	LOC
39S-7W- 27.04__	ROBINSON HILL SP	CDR	0.25	0.00	0.00	0.25	NAT	14'		BLM	BP	2	BLM	LOC
39S-7W- 27.05__	ROBINSON HILL SP	CDR	0.23	0.00	0.00	0.23	GRR	14'	8"	BLM	BP	2	BLM	LOC
39S-7W- 27.07__	ROBINSON HILL SP	CDR	0.11	0.00	0.00	0.11	NAT	14'		BLM	BP	2	BLM	LOC
39S-7W- 27.08__	HOLLAND SP	NULL	0.60	0.00	0.00	0.60	NAT	14'		BLM	BP	2	BLM	LOC
39S-7W- 27.09A	ROBINSON HILL SP	CSC	0.23	0.00	0.00	0.23	ASC	14'	6"	BLM	BP	3	BLM	LOC
39S-7W- 27.09B	ROBINSON HILL SP	CST	0.21	0.00	0.00	0.21	GRR	14'	8"	BLM	BP	2	BLM	LOC
39S-7W- 27.09C	ROBINSON HILL SP	CST	0.14	0.00	0.00	0.14	NAT	16'		BLM	BP	2	BLM	LOC
39S-7W- 27.10A	ROBINSON HILL SP	CSC	0.18	0.00	0.00	0.18	ASC	16'	6"	BLM	BP	2	BLM	LOC
39S-7W- 27.10B	ROBINSON HILL SP	CSC	0.01	0.00	0.00	0.01	NAT	16'		BLM	BP	2	BLM	LOC
39S-7W- 35.00A	HOLLAND SP A	CSC	0.97	0.38	0.00	1.35	PRR	14'	6"	BLM	BP	3	BLM	LOC
39S-7W- 35.00B	HOLLAND SP A	CSC	0.30	0.00	0.00	0.30	PRR	14'	6"	BLM	BP	3	BLM	LOC
39S-7W- 35.01__	CLAIM RIDGE B	CDR	0.29	0.00	0.00	0.29	NAT	14'		BLM	BP	2	BLM	LOC
39S-7W- 35.02__	CLAIM RIDGE A	CDR	0.21	0.00	0.00	0.21	ASC	16'	6"	BLM	BP	2	BLM	LOC
39S-7W- 35.03__	CLAIM RIDGE P	CSC	0.00	1.58	0.00	1.58	ASC	16'	6"	BLM	BP	3	BLM	LOC
39S-7W- 35.04__	CLAIM RIDGE E-T	CFD	0.21	0.45	0.00	0.66	NAT	12'		BLM	BP	2	BLM	LOC
39S-7W- 35.05__	CLAIM RIDGE SP	CSC	0.74	0.46	0.31	1.51	ASC	17'	6"	BLM	BA	3	BLM	LOC
40S-7W- 03.00__	REPUBLICAN GULCH	UCG	0.36	0.00	0.00	0.36	NAT	14'		BLM	BP	1	BLM	LOC
40S-7W- 03.01A	REPUBLICAN GULCH SP	UCG	0.03	0.00	0.00	0.03	GRR	17'	6"	BLM	BP	1	BLM	LOC
40S-7W- 03.01B	REPUBLICAN GULCH SP	UCG	0.87	0.00	0.00	0.87	NAT	14'		BLM	BP	1	BLM	LOC
40S-7W- 03.02__	REPUBLICAN GULCH SP	UCG	0.67	0.00	0.00	0.67	NAT	14'		BLM	BP	2	BLM	LOC
40S-7W- 04.00A	TARTER GULCH	UCG	0.04	1.23	0.67	1.94	ASC	14'	4"	BLM	BP	3	BLM	LOC
40S-7W- 04.00B1	TARTER GULCH	UCG	0.59	0.00	0.00	0.59	ASC	14'	6"	BLM	BP	3	BLM	LOC
40S-7W- 04.00B2	TARTER GULCH	UCG	0.35	0.00	0.00	0.35	ASC	14'	4"	BLM	BP	3	BLM	LOC
40S-7W- 04.01_	T GUL SPUR	UCG	0.00	0.11	0.00	0.11	ASC	14'	4"	BLM	BP	1	BLM	LOC
40S-7W- 10.00__	REPUBLICAN GULCH	UCG	3.30	0.00	0.00	3.30	ASC	14'	6"	BLM	BP	3	BLM	LOC
40S-7W- 10.01__	TARTER GULCH SP	CFD	0.20	0.17	0.00	0.37	GRR	14'	6"	BLM	BP	3	BLM	LOC

Table C-1: Roads Data Report Althouse Watershed

Road Number	Road Name	TMO REC.	O&C Miles	PD Miles	Other Miles	Total Miles	Surface Type	Road Width	Surface Depth	Who Controls	Access Rights	Maint. Level	Who Maintains	Road Class
40S-7W- 11.00__	TARTAR GULCH A SP	UCG	0.66	0.00	0.00	0.66	ASC	17'	6"	BLM	BP	3	BLM	LOC
40S-7W- 11.01__	TARTAR GULCH B SP	UCG	0.34	1.44	0.00	1.78	ASC	17'	6"	BLM	BP	3	BLM	LOC
40S-7W- 14.00__	BOLEN LAKE SP	CST	0.00	0.70	0.23	0.93	ASC	16'	6"	BLM	BA	3	BLM	LOC
40S-7W- 15.00A	MCCLOSKEY ACCESS	IMP	0.00	0.70	0.00	0.70	NAT	14'		PVT	PVT	2	NKN	LOC
40S-7W- 17.00__	PITHOUSE CK SP	IMP	0.26	0.00	0.00	0.26	PRR	14'	6"	BLM	BP	2	BLM	LOC
40S-7W- 18.00__	ALTHOUSE CK SP	IMP	2.16	0.00	0.00	2.16	PRR	14'	6"	BLM	BP	2	BLM	LOC
40S-7W- 18.01__	ALTHOUSE CK SP	IMP	1.00	0.00	0.00	1.00	NAT	14'		BLM	BP	2	BLM	LOC
40S-8W- 23.03__	LITTLE ELDER SP	CFD	0.12	0.00	0.00	0.12	NAT	14'		BLM	BP	2	BLM	LOC
40S-8W- 24.00B	LITTLE ELDER SP	UCG	0.00	0.00	0.77	0.77	NAT	14'		PVT	PVT	2	NKN	LOC
40S-8W- 24.00C	LITTLE ELDER SP	UCG	0.11	0.00	0.30	0.41	NAT	14'		BLM	BA	2	BLM	LOC

Table C-2: Supplemental Data Report

Road Number	Road Grade				Road Drainage							Brush	Comments
	0-10%	***10-20%***	***20+%***	for 20+% Adv/Fav	18" CMP	24" CMP	36" CMP	48" CMP	60" CMP	Water Dips	Condition G/F/P/U	Yes/No	
39S-7W- 27.00a	0.51	0.12			5		1				F	Y	Shallow ruts
39S-7W- 27.00b	0.39	0.12			3	1					F	Y	Shallow ruts
39S-7W- 27.00c	0.25	0.51			8	1					F	Y	Shallow ruts
39S-7W- 27.00d	0.05*	1.13*									F	Y	Shallow ruts
39S-7W- 27.00e	0.64	0.15			12			1			F	Y	Few cut bank slides, rocks in road from cut bank
39S-7W- 27.01a		0.55			5	1					F	Y	Shallow ruts and some washboard
39S-7W- 27.01b		0.28		9	3	1					F	Y	
39S-7W- 27.01c													Closed by overgrowth not inventoried
39S-7W- 27.02a	0.94	0.15			9						F	Y	Shallow ruts, some wheel troughs and washboard
39S-7W- 27.04__	0.20	0.05								(wb)3	F	Y	Shallow ruts, waterbars eroded thru
39S-7W- 27.05__	0.04	0.20			3						F	Y	
39S-7W- 27.07__	0.11										F	Y	Shallow to deep ruts first 50'
39S-7W- 27.08__	0.32	0.28			5					(wb)2	P	N	Deep ruts at start, clogged culverts, tire ruts in mud, cut bank slides
39S-7W- 27.09a		0.23			4						F	Y	
39S-7W- 27.09b	0.13	0.08			2						F	Y	
39S-7W- 27.09c	0.04	0.10								(wb)1	F	Y	
39S-7W- 27.10a	0.05	0.13								2	F	Y	
39S-7W- 27.10b	0.01										F	N	
39S-7W- 35.00a	1.35				7		1	1	(42")1		F	Y	Rock from cut bank in ditch and road
39S-7W- 35.00b	0.21	0.02			1		1				F	Y	Rock from cut bank in ditch and road
39S-7W- 35.01__	0.29				1						F	Y	Entirely blocked by slide at mp 0.16
39S-7W- 35.02__	0.21									1	F	Y	
39S-7W- 35.03__	0.96*	0.62*			16						F	Y	
39S-7W- 35.04__	0.58	0.09								(wb)1	P	Y	Shallow to deep ruts narrow, brushy nearly impassible in spots, water down road
39S-7W- 35.05__	1.08	0.43			12						F	Y	Rocks from cut bank in ditch and on road shoulder
40S-7W- 03.00__													Not inventoried, blocked by a trench and an earth and debris barricade
40S-7W- 03.01a	0.01	0.02									F	Y	Blocked by berm and trench barricade
40S-7W- 03.01b					1								Validate road drainage is functioning correctly
40S-7W- 03.02__	0.61	0.06			4		1				F	Y	Cut bank slide into ditch, grass and small trees starting to grow in centerline
40S-7W- 04.00a	1.20	0.80			21				(42")1		F	N	Oiled surface, some potholes, shotgun culverts

Table C-2: Supplemental Data Report

Road Number	Road Grade				Road Drainage							Brush	Comments
	0-10%	***10-20%***	***20+%***	for 20+% Adv/Fav	18" CMP	24" CMP	36" CMP	48" CMP	60" CMP	Water Dips	Condition G/F/P/U	Yes/No	
40S-7W- 04.00b1		0.48			3						F	N	Oiled surface, some potholes
40S-7W- 04.00b2	0.10	0.23			3				(30")1		F	N	Oiled surface breaking up
40S-7W- 04.01_											F	N	Berm and trench barricade, no drainage structures
40S-7W- 10.00__	2.44	0.86			24	1		1			F	Y	Potholes
40S-7W- 10.01__	0.05	0.32			6						F	Y	Cut bank slide
40S-7W- 11.00__	0.60	0.06			4	1					F	Y	Potholes
40S-7W- 11.01__	1.22	0.44	0.02	Fav	19	1					F	Y	Potholes, wheel path troughs
40S-7W- 14.00__	0.80	0.13			1					6	F	Y	Wheel path troughs
40S-7W- 15.00a	0.30	0.40			2	1	1			1	P	Y	Puddles from spring, shallow and deep ruts, heavy erosion in ditch, water down road
40S-7W- 17.00__	0.06	0.20			3		1				P	Y	Shallow to deep ruts, mud hole, log across road
40S-7W- 18.00__	0.51	1.65			24	2					P	Y	Small cut bank slide, shallow to deep ruts, clogged culverts
40S-7W- 18.01__	0.50	0.50			5		1				P	Y	Shallow to deep ruts, rocky, plugged culverts
40S 08 w 23.03__	0.07	0.05									F	Y	Shallow to deep ruts
40S 08 w 24.00a	0.03	0.32			2						F	Y	
40S 08 w 24.00b	0.97	0.15			1					2	F	Y	Shallow to deep ruts
40S 08 w 24.00c	0.34	0.07								3	F	N	Springs; soft subgrade, improve dips

Table C-3: Transportation Management Objectives Althouse Watershed

Road Number	TMO Decision	Maint.Level	Road Length	Surface Type	Closure Information		
					Closure status	Closure reason	Closure device
39S-7W- 27.00A	CSC	3	0.63	PRR	OP		
39S-7W- 27.00B	CSC	3	0.51	ASC	OP		
39S-7W- 27.00C	CSC	3	0.80	ASC	OP		
39S-7W- 27.00D	CSC	3	1.18	ASC	OP		
39S-7W- 27.00E	CSC	3	0.79	ASC	OP		
39S-7W- 27.01A	CSC	3	0.55	ASC	OP		
39S-7W- 27.01B	CSC	3	0.30	ASC	OP		
39S-7W- 27.01C	UCG	2	0.19	NAT	ST	MNT	INA
39S-7W- 27.02A	CSC	3	1.09	GRR	OP		
39S-7W- 27.04__	CDR	2	0.25	NAT	OP		
39S-7W- 27.05__	CDR	2	0.23	GRR	OP		
39S-7W- 27.07__	CDR	2	0.11	NAT	OP		
39S-7W- 27.08__	NULL	2	0.60	NAT	OP		
39S-7W- 27.09A	CSC	3	0.23	ASC	OP		
39S-7W- 27.09B	CST	2	0.21	GRR	OP		
39S-7W- 27.09C	CST	2	0.14	NAT	OP		
39S-7W- 27.10A	CSC	2	0.18	ASC	OP		
39S-7W- 27.10B	CSC	2	0.01	NAT	OP		
39S-7W- 35.00A	CSC	3	1.35	PRR	OP		
39S-7W- 35.00B	CSC	3	0.30	PRR	OP		
39S-7W- 35.01__	CDR	2	0.29	NAT	OP		
39S-7W- 35.02__	CDR	2	0.21	ASC	OP		
39S-7W- 35.03__	CSC	3	1.58	ASC	OP		
39S-7W- 35.04__	CFD	2	0.66	NAT	OP		
39S-7W- 35.05__	CSC	3	1.51	ASC	OP		
40S-7W- 03.00__	UCG	1	0.36	NAT	ST	ADM	EBM
40S-7W- 03.01A	UCG	1	0.03	GRR	ST	ADM	EBM
40S-7W- 03.01B	UCG	1	0.87	NAT	ST	ADM	EBM
40S-7W- 03.02__	UCG	2	0.67	NAT	OP		
40S-7W- 04.00A	UCG	3	1.94	ASC	OP		
40S-7W- 04.00B1	UCG	3	0.59	ASC	OP		
40S-7W- 04.00B2	UCG	3	0.35	ASC	OP		GT (TO BE REMOVED)
40S-7W- 04.01_	UCG	1	0.11	NAT	ST	ADM	EBM
40S-7W- 10.00__	UCG	3	3.30	ASC	OP		
40S-7W- 10.01__	CFD	3	0.37	GRR	OP		
40S-7W- 11.00__	UCG	2	0.66	ASC	OP		
40S-7W- 11.01__	UCG	3	1.78	ASC	OP		
40S-7W- 14.00__	CST	2	0.93	ASC	OP		
40S-7W- 15.00A	IMP	2	0.70	NAT	ST	ADM	GT (PVT)
40S-7W- 17.00__	IMP	2	0.26	PRR	SC	ADM	GT (40-7-18)
40S-7W- 18.00__	IMP	2	2.16	PRR	SC	POC/WLD	GT
40S-7W- 18.01__	IMP	2	1.00	NAT	ST	MNT	EBM
40S-8W- 23.03__	CFD	2	0.12	NAT	OP		
40S-8W- 24.00B	UCG	2	0.77	NAT	ST	ADM	GT (PVT)
40S-8W- 24.00C	UCG	2	0.41	NAT	ST	ADM	GT (40-8-24B)

Appendix D: Wildlife Information

Table D-1: Spotted Owl Sites whose Provincial Home Ranges include BLM Lands.

Site Name	Level of Protection
Althouse Creek	Approximately 100 acre core
Golconda	Approximately 100 acre core
Blind Sam	Approximately 100 acre core
Number 7 Gulch	Approximately 100 acre core
Seven & ¾ Gulch	Approximately 100 acre core

Special Status Species

Special status species are animals that are recognized by the federal or state government as needing particular consideration in the planning process, due to low populations (natural and human caused), restricted range, threats to habitat and for a variety of other reasons. This list includes species officially listed, proposed for listing. State Listed Species are those species identified as threatened, endangered, or pursuant to ORS 496.004, ORS 498.026, or ORS 546.040. Also included are Bureau Assessment Species which are plant and animal species that are found on List 2 of the Oregon Natural Heritage Data Base and those species on the Oregon List of Sensitive Wildlife Species (ORS 635-100-040) and are identified in BLM Instruction Memo No. OR-91-57. Bureau Sensitive species are those species eligible for federal listed, state listed, or on List 1 in the Oregon Natural Heritage Data Base, or approved by the BLM state director.

Table D-2: Special Status Species Habitat Needs

SPECIES(COMMON NAME)	**HABITAT ASSOCIATION**	**SPECIAL HABITAT FEATURE**	**CONCERN**
Grey wolf	Generalists	Large blocks of unroaded habitat	Extirpated
White-footed vole	Riparian	Alder/mature riparian	Naturally rare, modification/loss of habitat from development
Red tree vole	Mature/old growth conifer	Mature Douglas-fir trees	Declining habitat quality/quantity from logging
California red tree vole	Mature/old growth conifer	Mature Douglas-fir trees	Declining habitat quality/quantity from logging
Fisher	Mature/old growth riparian	Down wood/snags	Declining habitat quality/quantity & fragmentation from logging
California wolverine	Generalists	Large blocks of unroaded habitat	Declining habitat quality/quantity & fragmentation from logging and road building, human disturbance
American martin	Mature/old growth	Down wood, living ground cover	Declining habitat quality/quantity & fragmentation
Ringtail	Generalists	Rocky terrain, caves, mine adits	Northern limit of range
Townsend's big-eared bat	Generalists	Mine adits, caves	Disturbance to nurseries, hibernacula & roosts, closing mine adits
Fringed myotis	Generalists	Rock crevices & snags	Disturbance to roosts and colonies
Yuma myotis	Generalists	Large live trees with crevices in the bark &	Limited mature tree recruitment
Long-eared myotis	Generalists	Large live trees with crevices in the bark	Limited mature tree recruitment
Long-legged myotis	Generalists	Large live trees with crevices in the bark	Limited mature tree recruitment
Silver-haired bat			

Brazilian free-tailed bat			
Yuma myotis			
California myotis			
Hoary bat			
Western Gray squirrel			
Pacific pallid bat	Generalists	Snags, rock crevices	General rarity/disturbance/snag loss
Peregrine falcon	Generalists	Cliff faces	Low numbers, prey species contaminated with pesticides
Bald eagle	Lacustrine/rivers	Large mature trees with large limbs near water	Populations increasing
Northern spotted owl	Mature/old growth	Late-successional mature forest with structure	Declining habitat quality/quantity & fragmentation
Marbled murrelet	Mature/old growth	Large limbed trees, high canopy closure	Declining habitat quality/quantity
Streaked horned lark	Meadows/open areas	Grasslands, savannahs	Declining habitat quality/quantity
Northern goshawk	Mature/old growth	High canopy closure forest for nest sites	Declining habitat quality/quantity & fragmentation, human disturbance
Mountain quail	Generalists		No concern in the watershed
Pileated woodpecker	Large trees	Large diameter snags	Snag and down log removal from logging, salvage & site prep
Lewis' woodpecker	Pine/oak woodlands	Large oaks, pines & cottonwoods adjacent to openings	Declining habitat quality/quantity fire suppression, rural & agriculture development, riparian modification
White-headed woodpecker	Pine/fir mountain forests	Large pines living and dead	Limited natural populations, logging of large pines and snags
Three-toed woodpecker	Mature/snags	Burned forests/large trees	Fire suppression/responds positively to fire killed trees and associated insects
Flammulated owl	Pine/oak woodlands	Pine stands & snags	Conversion of mixed-aged forest to even-aged forests
Purple martin	Generalists	Snags in burns with excavated cavities	Salvage logging after fire and fire suppression
Great grey owl	Pine/oak / true fir / Mixed Conifer	Mature forest with adjoining meadows	Declining quality/quantity of nesting and roosting habitat
Western bluebird	Meadows/ open areas	Snags in open areas	Snag loss/fire suppression competition with starlings for nest sites
Acorn woodpecker	Oak woodlands	Large oaks	Declining habitat quality/quantity
Tricolored blackbird	Riparian	Wetlands, cattail marshes	Limited & dispersed populations, habitat loss from development
Pygmy nuthatch	Pine forests	Large dead & decaying pine	Timber harvest of mature trees, salvage logging
Olive-sided flycatcher			
Black-backed woodpecker	Pine	Snags and pine	Removal of mature insect infested trees
Williamsons sapsucker	Montane conifer forest	Trees with advanced wood decay	Removal of heart rot trees, snag removal, conversion to managed stands
Northern pygmy owl	Mixed conifer	Snags	Snag removal, depend on woodpecker species to excavate nest cavities
White-tailed kite			
Ferruginous hawk			
Western meadowlark			
Willow flycatcher			
Yellow-breasted chat			
Band-tailed pigeon			
Black-throated sparrow			
Black tern			
Rufous hummingbird			
Common nighthawk			
Greater sandhill crane			

Trumpeter swan			
Grasshopper sparrow	Open savannah	Grasslands with limited shrubs	Limited habitat, fire suppression, conversion to agriculture
Bank swallow	Riparian	Sand banks near open ground or water	General rarity, declining habitat quality
Western pond turtle	Riparian/uplands	Marshes, sloughs ponds	Alteration of aquatic and terrestrial nesting habitat, exotic species introduction
Del Norte salamander	Mature/old growth	Talus	Declining habitat quality/quantity & fragmentation
Siskiyou mtn. Salamander	Closed canopy forest	Talus	Declining habitat quality/quantity & fragmentation
Foothills yellow-legged frog	Riparian	Permanent streams with gravel bottoms	Water diversions, impoundments, general declines in genus numbers
Red-legged frog	Riparian	Marshes, ponds & streams with limited flow	Exotic species introduction loss of habitat from development
Tailed frog	Riparian	Cold fast flowing streams in wooded area	Sedimentation and removal of riparian vegetation due to logging, grazing & road building
Oregon spotted frog			
Cascades Frog			
Western toad			
Clouded salamander	Mature	Snags & down logs	Loss of large decaying wood due to timber harvest and habitat fragmentation
Southern torrent salamander	Riparian	Cold, clear seeps & springs	Water diversions & sedimentation from roads & logging
Black salamander	Generalists	Down logs, talus	Limited range, lack of data
Sharptail snake	Valley bottoms low elevation	Moist rotting logs	Low elevation agricultural and development projects that remove/limit down wood
California mountain kingsnake	Habitat generalists	Habitat generalists	Edge of range, general rarity, collectors
Common kingsnake	Habitat generalists	Habitat generalists	Edge of range, general rarity, collectors
Northern sagebrush lizard	Open brush stands	Open forests or brush with open understory	Edge of range, fire suppression

Other Species and Habitats

In the watershed, species dependent upon snags and down wood are of special concern. Historically, snags were produced by various processes including drought, windthrow, fires, and insects. In response to these events, the amount of snags fluctuated through time. This natural process has largely been interrupted by fire suppression and demands for timber harvest. The potential recovery of snag dependent sensitive species such as the pileated woodpecker will depend on the ability of the federal agencies to manage this resource.

Silvicultural practices have historically focused on even-aged stands and have resulted in deficits of snags and down logs in harvested areas. Other activities that have depleted snags and down logs are site preparation for tree planting (particularly broadcast burning), fuel wood cutting, post fire salvage, and previous entries for mortality salvage. Managed stands that currently contain 10-12 (5 MBF) overstory trees per acres or less are also of concern from a wildlife tree/down log perspective. Stands with remaining overstory trees have the potential to provide for current and future snag/down log requirements throughout the next rotation if existing trees are not removed.

Snags and down logs provide essential nesting/denning, roosting, foraging, and hiding cover for at least 100 species of wildlife in western Oregon (Brown et al. 1985). For some species, the presence or absence of suitable snags will determine the existence or localized extinction of that species. In forested stands, cavity nesting birds may account for 30%-40% of the total bird population (Raphael and White 1984). The absence of suitable snags (snag decay stage, number and distribution) can be a major limiting factor for these snag dependent species.

The hardness (decay stage) of a snag is an important factor in determining its foraging, roosting and nesting use by individual species. Woodpeckers, like the pileated woodpecker (*Dryocous pileatus*) often choose hard snags (stage 1) for nesting where as wrens and chickadees use the softer stage 2 and 3 snags. The use of snags as a foraging substrate also changes with time and the decay stage of the snag. Evans and Conner (1979) identified three foraging substrates provided by snags: the external surface of the bark, the cambium layer and the heartwood of the tree. As a snag decomposes the insect communities found within it changes.

Snags are also used as food storage sites and as roosting/resting sites for many species. A variety of mammals, birds and some owls use snags to cache prey and other food items. Vacated nesting cavities are often used by wildlife for protection from inclement weather or on hot summer days. The marten (*Martes americana*) often uses snags as resting and hunting sites and a pileated woodpecker may use up to 40 different snags for roosting.

Snags continue their function as a key element of wildlife habitat when they fall to the ground. Once again, the use of down logs by individual species is dependent on the decay stage of the log. A log with greater diameter and longer length is more functional for wildlife. Depending upon the decay stage of the log, it will be used for lookout and feeding sites, nesting and thermal cover, for food storage or for foraging. For example, species like the clouded salamander (*Aneides ferreus*) require the micro-habitat provided by bark sloughing of the log where as small mammals such as red-backed voles (*Clethrionomys occidentalis*) burrow inside the softer logs.

As outlined in the RMP, the target is to maintain primary cavity nesting species at a minimum of 40% of their naturally occurring population levels (biological potential). Maintaining biological potential at 40% is considered to be the minimal viable population level for any given species. By managing for primary cavity nesters at 40% of the naturally occurring population level, it is may also be possible to manage for many other snag dependent species, such as flying squirrels (*Glaucomys sabrinus*), mountain bluebirds (*Sialia currucoides*) and Vaux's swift (*Chaetura vauxi*) at an unknown level.

Appendix E: Fire Management Planning - Hazard, Risk, and Value At Risk Rating Classification Method and Assumptions

A. HAZARD

Hazard rating is based on the summation of points assigned using the six elements as follows:

1) Slope:

Percent	Points
0-19	5
20-44	10
45+	25

2) Aspect (In Degrees):

	Points
316-360, 0-67	5
68-134, 294-315	10
135-293	15

3) Position On Slope:

	Points
Upper 1/3	5
Midslope	10
Lower 1/3	25

4) Fuel Model:

Model	Points
Grass 1, 2, 3	5
Timber 8	5
Shrub 5	10
Timber 9	15
Shrub 6	20
Timber 10	20
Slash 11	25
Shrub 4	30
Slash 12, 13	30

5) Ladder Fuel Presence:

(Use when forest vegetation has DBH of 5" or greater (vegetation condition class 6). Exceptions are possible based on stand conditions.)

	Points
Ladder fuel absent.	0
Present on less than one-third of area; vertical continuity > or < 50%.	5
Present on one-third to two-thirds of area; vertical continuity is <50%.	15
Present on one-third to two-thirds of area; vertical continuity is > 50%.	25
Present on greater than two-thirds of area; vertical continuity is <50%.	30
Present on greater than two-thirds of area; vertical continuity is > 50%.	40

6) Summary Rating:

POINTS	HAZARD RATING
0-45	LOW
50-70	MODERATE
75-135	HIGH

B. RISK

Assigned based on human presence and use, and on lightning occurrence.

High rating when human population areas are present on or within 1/4 mile of the area; area has good access with many roads; relatively higher incidence of lightning occurrence; area has high level of human use.

Moderate rating when area has human access and experiences informal use; area is used during summer and fall seasons as main travel route or for infrequent recreational activities. Lightning occurrence is typical for the area and not notably higher.

Low rating when area has limited human access and infrequent use. Baseline as standard risk, mainly from lightning occurrence with only rare risk of human caused fire.

C. VALUE AT RISK

Best assigned through interdisciplinary process. Based on human and resource values within planning areas. Can be based on land allocations, special use areas, human improvements/monetary investment, residential areas, agricultural use, structures present, soils, vegetative conditions, and habitat.

Examples:

> **High rating -** ACEC, RNA, LSR, Special Status species present, critical habitats, recreation area, residential areas, farming, vegetation condition and McKelvey ratings of 81, 82, 71, 72; vegetation condition of 4 and 5. Caves, cultural, or monetary investment present. Riparian areas.
>
> **Moderate rating -** Granitic soils, informal recreation areas and trails. Vegetation and McKelvey rating of 85, 75, 65.
>
> **Low rating -** Vegetation condition class 1, 2, 3; and vegetation 5, 6, 7 with McKelvey rating 4.