Chapter 3

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Chapter 3: Affected Environment

Introduction

This chapter describes the existing condition of resources within the Rimrock Project Area. These conditions can be used to compare the consequences of the alternatives (which are described in Chapter 4). This information is generally organized in the same order as the issues listed in Chapter 1:

- Forest Vegetation
- Soil Productivity
- Recreation
- Areas Without Roads
- Visual Quality
- Fish and Aquatic Habitat
- Water Resources
- Aspen
- Fuels/Air Quality
- Heritage Resources
- Transportation
- Non-Forest Vegetation (includes noxious weeds and threatened, endangered, and sensitive species)
- Wildlife Habitat (includes threatened, endangered, and sensitive species, management indicator species, and species of interest)
- Economics and Social
- Range

Forest Vegetation

Specialist Report

This FEIS hereby incorporates by reference the Silviculture Specialist Report in the Project Record (40 CFR 1502.21). The Silviculture Specialist Report is located in section 4 of the Project Record and contains the detailed data, methodologies, analyses, conclusions, maps, references, and technical documentation that the silviculture specialist relied upon to reach the conclusions in this FEIS.

Historical Conditions

The forested areas within the Rimrock planning area are predominantly dry forest sites. Figure 3.1 shows that approximately 89% of the forested sites within the planning area are classified as either warm, dry or hot, dry plant association groups. These stands are predominately comprised of naturally regenerated, second growth ponderosa pine and Douglas-fir of middle structure (around 14-16 inches), with smaller amounts of western larch and grand fir included. Typically, major disturbances in these plant associations are infrequent. The fire regime associated with these groups is one of low intensity and short return interval (Hall 1991). Historically, bark beetles were probably the initial agents of disturbance, creating small openings and adding to surface fuel accumulation as the infected trees break down and fall. When surface fires encounter these patches of heavier fuels, the resulting fire is more intense and creates a seedbed consisting of bare mineral soil with reduced grass competition. On these warmer grand fir, Douglas-fir and ponderosa pine sites, seral forest vegetation during historical disturbance regimes was principally ponderosa pine.

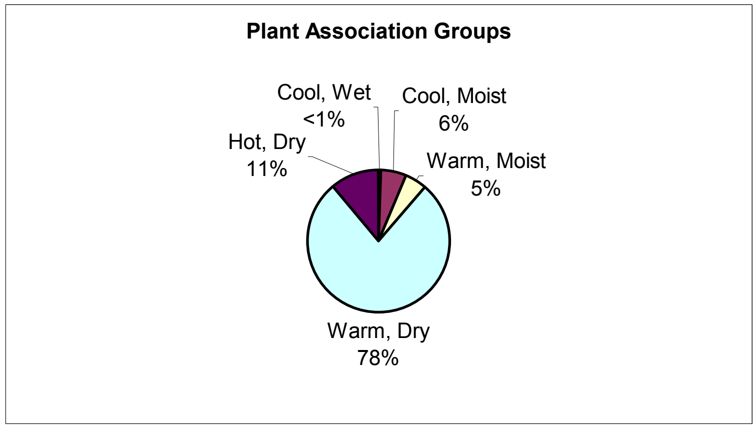

Figure 3.1 Percent by Plant Association

Periodic low intensity surface fires thin the established regeneration and maintain an open forest structure. Douglas-fir and other fire intolerant species may be able to occupy the cooler, moister northerly sites but are usually unable to tolerate the frequent fire intervals. Within the Rimrock project area, the consequences of past fire exclusion has resulted in fir establishment and invasion outside of its historical range. Additionally, with the removal of fire as a thinning agent, ponderosa pine regeneration has accelerated to an overstocked condition over much of the project area.

Change is an integral part of Eastside forest ecosystems. Disturbance events (e.g. fire, insect, disease, and floods) create and maintain a shifting mosaic of landscape patterns (Eastside Forest Health Assessment 1993). In this report, also known as the Everett Report, sustainability of ecological systems is defined by the historical range in variability (HRV) of ecosystem patterns and processes at multiple hierarchical scales.

Multiple hierarchical scales means that the development and organization of landscape patterns, such as vegetative communities, operate over differing scales of time and space. All land and water ecosystems vary across time and space, even without human influence. Knowledge of this variability is extremely useful in determining whether the current condition of a landscape is sustainable, based on historical patterns and processes. Accordingly, knowledge of variability can be useful in determining historical ecosystem restoration goals such as tree species composition and structural stage distribution patterns across the landscape.

The foundation of the ecosystem and wildlife standard direction is the concept of HRV. This concept compares the relative abundance of existing species and structural stages of forested stands in a watershed to what would have been sustained if natural disturbances had been the dominant factor that had shaped the landscape. For each plant association group, the HRV of structural stages is determined and expressed as a range of acreages. Historically, if natural disturbance regimes had continued in the Rimrock project area, the majority of the acreage would have been in the Late/Old structural stage. The Rimrock Historical Range of Variability Analysis (2000) compares the existing structural stages within the planning area with the historical ranges that would have been expected to occur in the plant association groups found in the planning area. A comparison of the existing and historic conditions within the two major subdrainages in the Rimrock project area (Lower Wall and Upper Wall) indicates that the planning area is well below the historic range in the percentage of dry site, single-story LOS. The amount of dry site, multi-story LOS is well above the historic range within the planning area (Tables 3.1 and 3.2).

Table 3-1. Historical range of variability (HRV) analysis for forest structural classes in the Lower Wall drainage.

		FOREST STRUCTURAL CLASSES							NFS
PAG		**SI**	**SEOC**	**SECC**	**UR**	**YFMS**	**OFMS**	**OFSS**	**ACRES**
Cool Moist	H%	1-10	0-5	5-25	5-25	40-60	10-30	0-5	667
	C%	3	36	**1**	**0**	**9**	**4**	47	
Warm Moist	H%	1-15	0-5	5-20	5-20	20-50	10-30	0-5	378
	C%	8	49	11	**0**	**7**	**0**	25	
Warm Dry	H%	5-15	5-20	1-10	1-10	5-25	5-20	15-55	7,986
	C%	6	14	15	2	**2**	56	**6**	
Hot Dry	H%	5-15	5-20	0-5	0-5	5-10	5-15	20-70	793
	C%	9	20	6	0	7	48	**9**	

Table 3 –2 Historical range of variability (HRV) analysis for forest structural classes in Upper Wall drainage.

		FOREST STRUCTURAL CLASSES							NFS
PAG		**SI**	**SEOC**	**SECC**	**UR**	**YFMS**	**OFMS**	**OFSS**	**ACRES**
Cool Moist	H%	1-10	0-5	5-25	5-25	40-60	10-30	0-5	1,762
	C%	7	**12**	**3**	**0**	**26**	20	**31**	
Warm Moist	H%	1-15	0-5	5-20	5-20	20-50	10-30	0-5	1,455
	C%	6	**9**	**0**	**0**	35	22	**28**	
Warm Dry	H%	5-15	5-20	1-10	1-10	5-25	5-20	15-55	21,047
	C%	15	11	11	2	7	**49**	**5**	
Hot Dry	H%	5-15	5-20	0-5	0-5	5-10	5-15	20-70	3,422
	C%	15	17	**9**	3	5	**44**	**7**	

Sources/Notes: Plant association groups (PAG) are described in Powell(1998), and in Table 2. Historical percentages (H%) were derived from Hall (1993), Johnson (1993, and USDA Forest Service (1995), as summarized in Blackwood (1998). Current percentages (C%) were based on National Forest System lands only. Structural class codes are described in the Rimrock HRV Analysis (2000), Table 1. Gray cells show instances where the current percentage (C%) is above the historical percentage (H%) for a structural class. Black cells show instances where the current percentage is below the historical percentage. Since an HRV analysis is somewhat imprecise, deviations (whether above or below the H% range) were only noted when the current percentage differed from the historical range by 2 percent or more.

Interim direction for stands outside Late/Old structure (LOS) is to maintain or enhance LOS components in stands subject to timber harvest. Vegetative structure that does not meet LOS conditions (as described in Table 1 of the Ecosystem Standard of Amend. # 8) is to be manipulated in a manner that moves toward these conditions. Open, park-like conditions are to be maintained where they occurred historically and the development of large diameter, open canopy structure is to be encouraged. Encroachment of the fire intolerant species such as Douglas-fir and grand fir combined with the overstocked condition of the ponderosa pine component are indicators that the project is outside of its HRV with respect to species composition and structure. Those conditions are reflected in the relative over abundance of multi-story late/old structure and the relative scarcity of single-story late/old structure stands.

The preferred stand density management strategy is one that precludes the development of a suppressed tree class and associated significant insect and diseased induced mortality. This strategy is characterized by defining the upper limit of a management zone (ULMZ) and a lower limit of a management zone (LLMZ) using the stand density index (SDI) for the desired trees species in that plant association. Stand density index is a widely used index in the western United States that is based on the relationship between tree size and the number of trees per acre (Daniel and others 1979, Reineke 1933). More specifically, it is the number of trees per acre that a stand would have at a quadratic mean diameter of 10 inches (Cochran and others 1994). Stand density index is used extensively because it has the advantage of being independent of site quality and stand age and allows silviculturists the luxury to compare levels of growing stock, competitive stress, degree of site occupancy and relative growth among stands, regardless of differences in site quality and age. For ponderosa pine in the warm grand fir/Douglas-fir pinegrass/elk sedge plant associations, the LLMZ is approximately 50 sq.ft. basal area per acre (for Douglas-fir in the same plant associations the LLMZ is about 80 sq.ft/ac.) (Cochran 1994, Powell 1999). The current average stand density for Rimrock project area is approximately 150 sq.ft. basal area per acre, with some units having large pockets where the density is in excess of 200+ sq.ft. basal area per acre. Thus, the majority of the project area is overstocked by more than three times the recommended levels.

A detailed insect and disease field examination of specific Rimrock proposed units is completed and available in the analysis file. Within the stands examined, 64% had a high risk for severe future spruce budworm defoliation (not all of the units examined contained host budworm species), 64% had a high risk for significant damage from fir engraver beetle, and 50% of the units (those with the highest amounts of host species) displayed moderate to high risk of significant mortality from mountain pine beetle (Schmitt 1998). Virtually all of the proposed units displayed moderate or high levels of Douglas-fir dwarf mistletoe, with moderate to high levels of western dwarf mistletoe in the ponderosa pine component and western larch dwarf mistletoe in the larch component within all of the units examined. Some individual units displayed high levels of root diseases including *Armillaria* and *Phellinus*, with some units having high occurrences of Indian paint fungus (Schmitt 1998).

Douglas-fir tussock moth outbreak

An outbreak of the Douglas-fir tussock moth that began in 2000 on the Heppner Ranger District, Umatilla National Forest, caused heavy defoliation with potential host tree (Douglas-fir and grand fir) mortality within the southern portion of the District, primarily within the Rimrock planning area. During the first year of the outbreak, tussock moth larvae defoliated an area of approximately 1,000 acres: roughly 95% of the area received light defoliation, and the remainder received moderate defoliation. In 2001, the second year of the outbreak, an area of between 4,000 and 5,000 acres, plus additional scattered variable-sized patches of tussock moth host trees, were defoliated over a range of defoliation classes. Within defoliated stands, an area of approximately 500 contiguous acres of host trees was nearly 100% defoliated within the Indian Creek subwatershed (24G) (Scott 2002).

Multi-storied mixed conifer stands dominated by the favored tussock moth hosts (Douglas-fir and grand fir or white fir) have come to replace the largely ponderosa pine domination in these plant communities. These altered stands have developed to become ideal habitat conditions for breeding and feeding by defoliators like tussock moth and western spruce budworm, *Choristoneura occidentalis*. A number of factors combine to make stands at increased risk of defoliation by these insects, including species composition, multi-storied structures, stand density, and others (Gast and others 1991). During periods of drought, increased stress from overstocking and low moisture may make stands more susceptible or vulnerable to damage (Gast and others 1991).

Wickman (1979) observed that trees defoliated 90% or more and concentrated in patches have the highest probability of dying from defoliation. In the Indian Creek subwatershed, there were large areas where virtually every Douglas-fir and grand fir had been completely defoliated in 2001. The outbreak in the Indian Creek area was so severe, that many of the large ponderosa pines were defoliated, even though that species is not normally considered host to the Douglas-fir tussock moth.

Harvest Activities

Records show that harvest activity likely began in the Rimrock project area in the mid-late 1940's. Harvesting activities escalated in the following decades with the construction and improvement of a more comprehensive road system. In these early harvest entries, the larger, higher valued ponderosa pine and Douglas-fir were typically the preferred species removed using primarily ground based harvest methods. Consequently, the majority of the project area has experienced some form of harvest activity and associated ground disturbance (a number of old skid trail networks exists within the project area). A variety of harvest methods was utilized including overstory removal, partial cutting, shelterwood cutting, clearcutting, seed tree cutting, and commercial thinning. The majority of these harvest practices did not result in created openings or understocked stands and did not necessitate the need for artificial regeneration. This can be demonstrated by the fact that more acres are recorded as having some sort of harvest activity than exist within the entire project area. This evidence reflects the multiple entries made within the same stands. In most harvest, overstory trees were removed over large acreages leaving a residual understory of adequately stocked smaller diameter trees (many of these overstory trees were heavily infested with dwarf mistletoe or some other insect or disease agent or were considered overmature).

For the purpose of this analysis, harvest activities that resulted in the need for artificial regeneration (see Table 3.3) or produced a created opening within the last fifteen years would be specifically considered in the analysis.

Table 3.3 Regeneration Harvest in Rimrock

Silvicultural Prescription	Acres
Clearcut	180
Seed Tree Cut	316
Shelterwood Cut	230
Shelterwood Removed	376
Overstory Removed	129
Individual Selection Cut	92
TOTAL	1,323

Soil Productivity

General description

Soil types in harvest units in the Rimrock area are predominantly deep to moderately deep, silt loams developed in volcanic ash and residual soils from volcanic surface flow and pyroclastics. Ash depth varies considerably depending on slope position. Mazama ash has been extensively reworked with material redeposited in shoulder slope and footslope positions, with some remaining on plateaus in hummocky patterns. Slope is gently sloping to moderately steep.

Residual soils have higher clay content, especially in the subsoil, in this area. The older volcanic ash flow and pyroclastics materials in the area weather into finer textures providing soils ranging from silty clay loam to clay loam commonly with high gravel content. Most of these soils that have developed with bunchgrass or pinegrass and Ponderosa pine and Douglas-fir have deeper organic surfaces. Forest soils that support mixed conifer (dry Grand fir groups and moister) have rather thin topsoils but much greater moisture holding capacity and plant availability than the shallower soils.

Table 3.4: Typical physical characteristics for common soil types

Umatilla NF Soil Resource Inventory (SRI) primary soil unit	Total soil depth (units)	Ash depth (units)	Surface soil thickness (units)
21	40	22	4
22	44	24	2
23	49	14	7
24	26	0	5
4	18	0	4

Soil type within each unit is included in detail in Appendix H.

Management Considerations

Figures 3.2 through 3.5 summarize the acres within each subwatershed according to risk of compaction, displacement, erosion, and mass wasting. The totals for each subwatershed are for the acres of National Forest land only.

The residual soils are most susceptible to rutting or displacement when wet. When dry, they gain considerable soil strength and are not at risk from compaction or rutting. Surface organics are still at risk of removal during skidding operations from dragging of limbs if whole-tree yarding is employed. This can be limited by designated skid trail design, and mitigated in some cases by replacing slash back onto trails. This technique must be balanced with the objective of fine fuel reduction for fire hazard purposes. Use of full-suspension systems limits or eliminates surface soil loss risk.

Ash soils are susceptible to compaction in all moisture states though they do increase somewhat in strength upon drying. They are susceptible to displacement from 'dusting up' if surface duff is removed and continual traffic occurs when they are very dry. Retention of protective surface materials reduces or eliminates this risk. Soils are quite stable in the area and would not be expected to experience mass wasting events with proposed actions.

Table 3.5: Management Interpretations For Common Soil Units

SRI map unit	Compaction risk	Displacement risk	Erosion risk	Stability/ mass wasting risk
21	High	LOW	Moderate	Stable
22	High	Moderate	High	Stable
23	Moderate	Low	Moderate	Very stable
24	Low	High	High	Stable
4	Low	Low	High	Very stable

Choice of logging/yarding systems can be tailored to the specific soil/site characteristics. Typically, systems are chosen for best results and to deal with the more susceptible soil types and conditions, thereby reducing risk of undesirable impacts. Close control of operating conditions by the contractor (and through contract administration control) ensures compliance with desired and anticipated results.

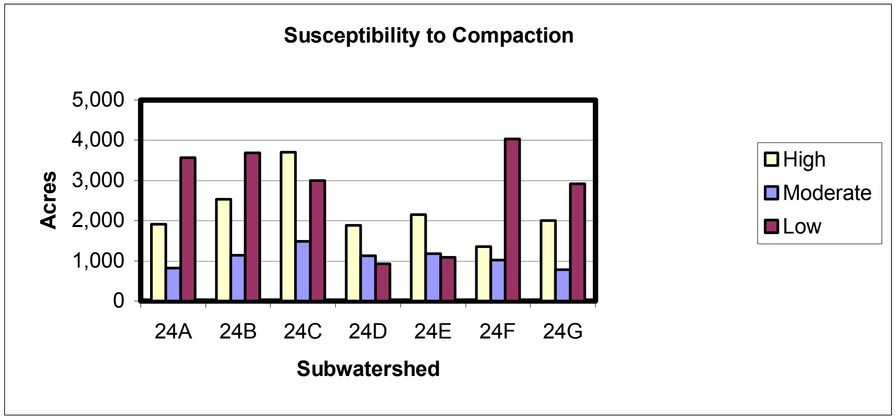

Figure 3.2. Susceptibility to compaction

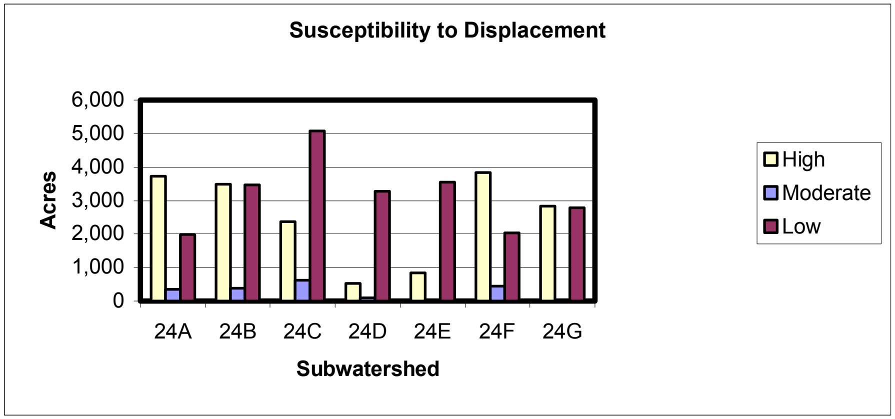

Figure 3.3. Susceptibility to displacement

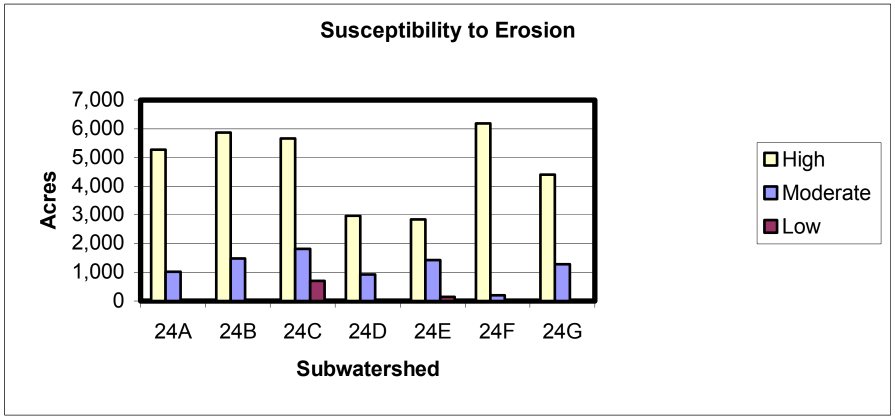

Figure 3.4. Susceptibility to erosion

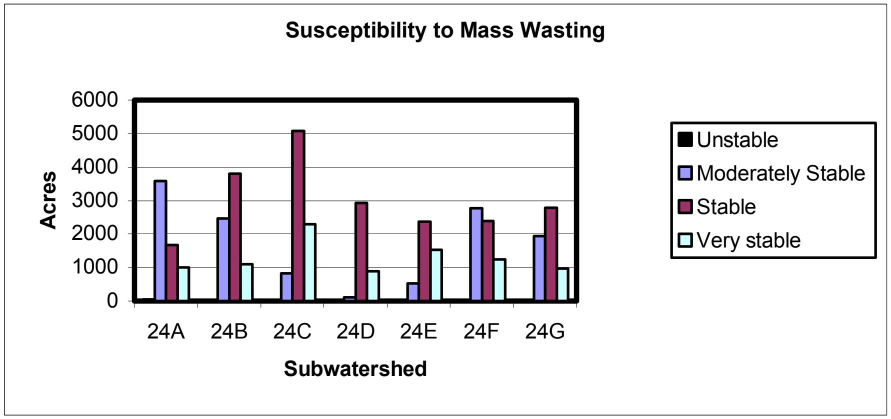

Figure 3.5. Susceptibility to mass wasting

Past management activities

Timber harvest and associated road building, and prescribed burning have the potential to damage soil productivity. Subsoiling is a soil restoration treatment that can be used in some soil types and conditions to restore much of the soil productivity by loosening soils compacted by logging and road building equipment (Froelich, et.al. 1984).

Timber Harvest

Timber harvest and associated road construction can affect soil productivity by several means. Heavy equipment used in logging and road construction can cause soil compaction. The risk and effects of compaction are greatest on soils derived from volcanic ash. Compaction can cause increased surface runoff of water, increased erosion, and reduced plant growth. Skidding of logs can cause displacement of the topsoil. The risk of soil displacement is also greatest in volcanic ash derived soils. Displacement of the topsoil can reduce soil productivity by removing the nutrient rich upper layers of the soil profile and by increasing the risk of erosion. As shown in Figure 3.5, the risk of mass wasting is very small in the Rimrock area. Only a few acres in Subwatershed 24A are described as unstable.

According to Umatilla National Forest records, timber harvest within the Rimrock area first occurred in 1946 and most recently occurred in 1997[1]. Figure 3.6 shows the number of timber harvest entries in the Rimrock area. The potential area where detrimental compaction, displacement, or erosion can occur would generally be expected to increase as the number of timber harvest entries increases. Approximately two-thirds of the planning area has been included in only one past timber sale, 13% has been included in two past timber sales, and 2% has been included in three past timber sales[2]. Forest records show no timber sales in the remaining 19% of the planning area.

Many of the effects of timber harvest on soils are reduced over time as areas of soil disturbance are revegetated and duff and litter layers redevelop. Figure 3.7 shows the chronology of timber harvest entries. Most of the first harvest entries had occurred by 1972. Of the 33,867 acres showing one or more harvest entries, 31,335 acres (93%) had occurred by 1972. Most of those acres have not had a subsequent timber harvest entry in the 30 years since 1972. Most of the second and third timber harvest entries have occurred since 1975. Second and third entries indicate a higher risk of having a higher percentage of the soils in a disturbed condition. The risk can be reduced by the selection, design, and controls placed on the harvest system. Logging systems in the Rimrock planning area during the last 10 to 15 years have included a greater reliance on lower impact logging systems such as skyline logging and restrictions on the locations where ground based skidding equipment can operate.

Prescribed Burning

Fire can affect soil productivity by exposing the soil surface, thereby increasing the risk of erosion. Loss of soil organic matter consumed by the fire can reduce nutrient availability, although there can also be a short-term increase in nutrient availability from the ash created by the fire. Intense fire can change the mineral characteristics of the soil, reducing the ability of the soil to absorb and hold water. The prescribed fires in the Rimrock planning area have been of three types: landscape level fires that treated large areas with a relatively low intensity fire; smaller, moderately intense fires that burned logging slash from timber harvest units; and relatively high intensity fires over very small areas where large piles of landing slash were burned.

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[1] The most recent timber sale designed to achieve a silvicultural objective was the Tamarack Commercial Thin in 1997. Roadside hazard trees have been removed through small timber sales since 1997. Hazard tree sales involve the removal of occasional, isolated dead trees along open roads and have a negligible effect on soil productivity.

[2] Most of the data for timber sales since 1980 show specific harvest units and silvicultural prescriptions. Timber sale records prior to 1980 show general timber sale area boundaries without specific harvest units or silvicultural prescriptions.

Approximately 15,500 acres within the planning area have been treated with landscape level prescribed fire. The first landscape level fire within the Rimrock area happened in 1987, and the most recent was in 1997. Burning of logging slash and landing piles generally occurred within a year or two of the timber sales discussed in the previous section.

Subsoiling

Subsoiling has been used as a soil restoration activity on in the Rimrock planning area since 1989. Compacted skid trails and landings were subsoiled within those units totaling 682 acres. The total acreage subsoiled is less than the total unit size, since the subsoiling treatments focused on the compacted areas within the units. Most of the subsoiling treatments were in units with volcanic ash derived soils where the benefits of the treatment are the greatest and the soil depth allows for an effective treatment.

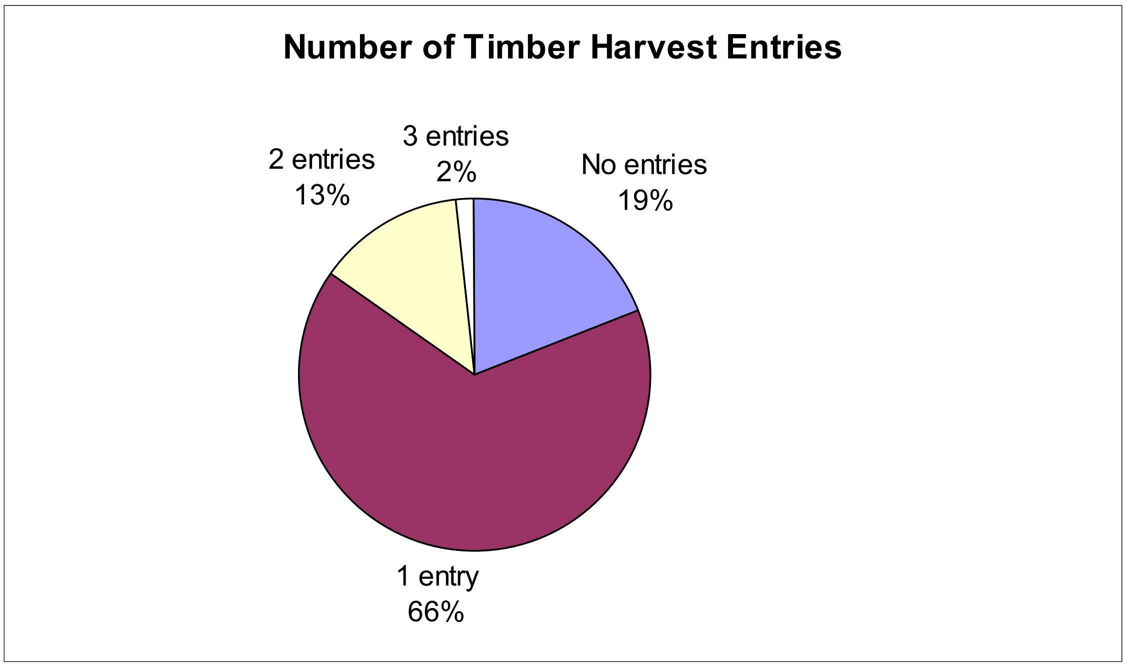

Figure 3.6. Number of timber harvest entries

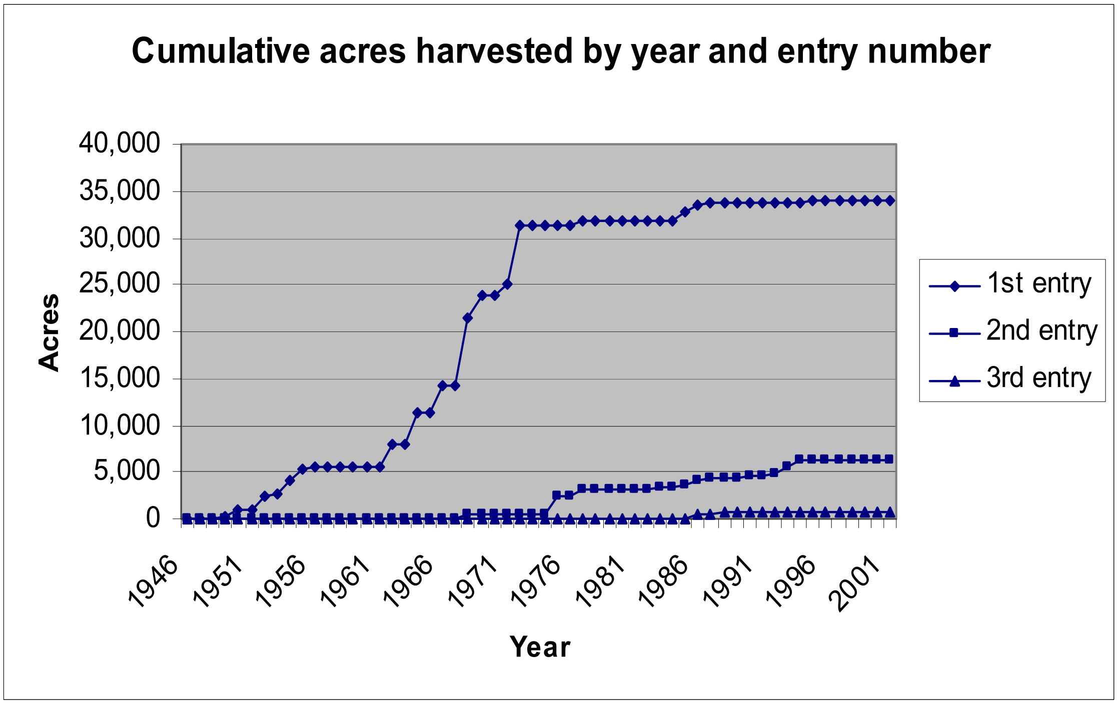

Figure 3.7. Cumulative acres harvested by year and entry number

Site specific soil surveys

To more closely evaluate the existing condition of the soils in the area, units proposed for timber harvest were surveyed to assess the current level of detrimental soil conditions. Detrimental soil conditions are described in the Forest Plan (page 4-80) as:

1. Increase in soil bulk density in volcanic-ash derived soils of 20 percent or more; or increase in soil bulk density in other forest soils of 15 percent or more
2. Soil displacement of more than 50 percent of the topsoil or humus enriched A1 and/or AC horizons from an area of 100 square feet or more which is at least 5 feet in width
3. Molding of soil in vehicle tracks and rutting to a 6-inch depth or more
4. Severely burned soils that have the top layer of mineral soil significantly changed in color (usually to red) and the next one-half inch blackened from organic matter charring.

The Umatilla National Forest has established protocols for assessing existing soil conditions where management actions are proposed that could affect the soil resource (Busskohl 2002). Using those protocols, individual units were visited, and estimates, based upon visual evidence, were made of the degree of soil disturbance. Each unit was categorized as high, moderate, or low level of concern based on the amount of disturbance. Figure 3.8 displays the percentage of the area surveyed by disturbance class. Individual unit summaries are included in Appendix H. Approximately 98% of the units were rated as a low level of concern based upon the existing evidence of soil disturbance. The units surveyed were those where a timber harvest prescription is proposed. Most of those units have had only one previous entry that took place 30 or more years ago, or had no previous entries. Units harvested 30 or more years ago show many signs of recovery from the effects of the past logging. Litter and duff layers have redeveloped, and many of the skid trails and landing have revegetated. Compaction and displacement from old temporary roads and some skid trails, particularly in volcanic ash soils, are still apparent.

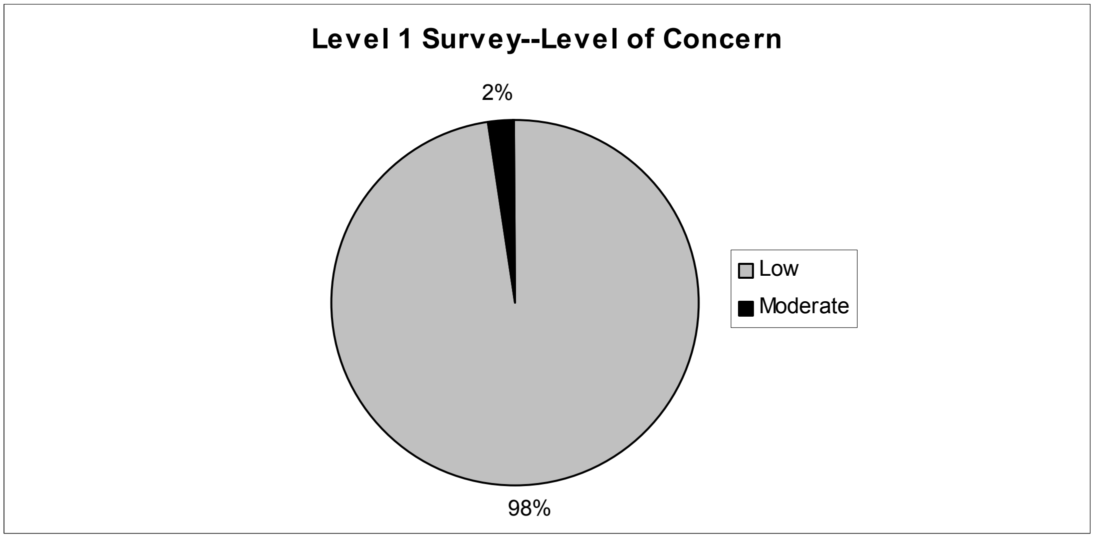

Figure 3.8. Level 1 Survey—Level of Concern

Recreation

Developed Recreation

Bull Prairie Campground is a 35 acre recreation complex consisting of an overnight camping area, day use area, a 28.6 acre man-made reservoir, and a 1.14 mile handicap accessible trail around the lake. The overnight area consists of 28 tent/trailer sites, five of which are handicap accessible. Running water is provided to the campground and the quality is good, however, the system is old and develops leaks frequently. Ten sealed vault outhouses are scattered throughout the campground and all are structurally sound. However, three vaults fill with ground water in the fall, and then drain in the spring. The day use area consists of 16 sites. In the past, more were present but not consistently used; therefore, these have been abandoned. Through out the area the vegetation consists of stands of mixed conifer, with grand fir, Douglas-fir, ponderosa pine, and western larch. There is a problem with tree health south of the campsites in the grand fir, which show indicators of Indian paint fungus. Dwarf mistletoe in western larch and Douglas-fir has been observed and spruce budworm has killed some understory firs. Tree regeneration is rather dense, which may pose future health problems because of the stands susceptibility to spruce budworm attack. The south side of the lake is a popular fishing area. Due to heavy foot travel and public activity in the area, no ground vegetation is present. A drainage problem exists in the boat ramp parking lot and is causing a build up of water during snowmelt and heavy rainfall. The entrance road to the campground, Forest Road 2039, has been sloughing off in places and needs to be reinforced.

Dispersed Recreation

Dispersed camping is a popular recreational activity in the Rimrock area. Only 38 sites have been mapped but there are many other dispersed sites used for camping. These sites are scattered throughout the analysis area, however, there are several sites/areas that are very heavily used, these include: the access roads to Bull Prairie (Rd 2039 and Rd 2000-350), Tamarack Springs (Jct. Rd 24 and 2407), Happy Jack (Jct. Rd 24 and 2400156), Blue Spruce Camp (Jct. Rd 23 and Rd 2402), Grassy Butte Creek (Rd 23), Government Springs (Jct. Rd 22 and 2200020) and Sunflower Flats (Rd 2202).

Fishing activities occur in streams throughout the Rimrock area. Most use occurs in Big Wall, Wilson, and Indian Creeks, which provide trout for angling. A total of 36 miles of Class I and II streams are available for fishing within the analysis area.

Hunting is the district's most popular recreational activity. Upland bird seasons take place in the spring and fall and big game hunting seasons occur from September thru November. The entire Rimrock analysis area is within the Heppner Wildlife Unit as defined by Oregon Department of Fish and Wildlife (ODFW). Approximately 7,000 tags are sold for big game hunting on the Heppner Unit with and estimated 10-20% of the hunting occurring in the Rimrock area. Approximately 350 bird hunters hunt on the Heppner Unit and an estimated 10-20% of those hunters hunt in the Rimrock area.

Off-Highway Vehicle (OHV) use occurs throughout the Rimrock area. The district's Motorized Access and Travel Management Plan (March, 1993) identified the West End Off-Highway Vehicle Area (West of Rd 22). This area contains over 91,000 acres open to Class I and III all terrain vehicles. Of the 91,000 acres, approximately 41,800 acres occur within the Rimrock analysis area.

Areas Without Roads

No inventoried Roadless areas (as identified in the Roadless EIS) or "contiguous unroaded areas" (areas defined as being at least 1,000 acres adjacent to a wilderness, inventoried roadless area, wild river segment, or a roadless area greater than 5,000 acres in another federal ownership) are located within the Rimrock project area. There is one irregularly shaped area over 1,000 acres in size that contains no classified roads and several irregularly shaped smaller areas without classified roads.

Undeveloped character can be defined as the sense of remoteness and isolation a person may feel by the absence of people and their associated activities. There are areas within the Rimrock planning area without roads and are generally undeveloped. Indicators of undeveloped character are demonstrated by the presence or absence of motorized access network densities (roads and trails), past and current harvest activities, improvements associated with cattle and sheep allotments and their use, and developed and dispersed recreation sites.

Overall, the Rimrock project area has been impacted and influenced by people and their associated activities and it is difficult to find any area not disturbed to some extent by past activities. Records show that harvest activity began in the project area in the mid to late 1940's. Construction and improvement of a comprehensive road system was one result of this activity. In the early harvest entries, the larger, higher valued ponderosa pine and Douglas-fir were removed using primarily ground based harvest methods. Often later harvest entries were made in the same stands and some areas have been entered three or more times. Consequently, the majority of the project area has experienced some form of harvest activity.

There are approximately 212 miles of system roads on National Forest System lands within the Rimrock Analysis Area. Of this total, 114 are open to the public and 98 miles are closed to public but maintained for administrative access. In addition, Off-highway vehicle use occurs throughout the Rimrock area. The district's Motorized Access and Travel management Plan identified the West End Off-highway vehicle area. This area contains over 91,000 acres open to class I and III all terrain vehicles. Of the 91,000 acres, approximately 41,800 acres occur within the project area.

Grazing has occurred in the Rimrock area since the late 1800's. Currently the area lies within portions of the Hardman, Little Wall and Tamarack-Monument grazing allotments. Livestock grazing is permitted on each of these allotments and allotments include unroaded areas. Normal season of use runs from May through September; however the exact dates and locations vary from year-to-year according to environmental conditions and permittee preference.

There is one developed recreation site located in the project area. Bull Prairie Campground is a 35 acres recreation complex consisting of an overnight camping area, day use area, a 28.6 acre man-made reservoir, and a 1.14 handicap accessible trail around the lake. Dispersed camping is a popular recreation activity in the Rimrock area. Although only 38 sites have been mapped, many other sites are used for dispersed camping. The sites are scattered throughout the analysis area.

Visual Quality

People see virtually all national forest lands from somewhere at some time, therefore, all national forest landscapes have value as scenery (USDA 1995). In a majority of the Rimrock area the emphasis is on maintaining or creating character of large trees, having adequate replacement trees of different ages to maintain this character over time.

The Forest Plan has designated management areas within the Rimrock project where viewsheds will be managed primarily to meet visual quality objectives of retention and partial retention. These management areas are along Highway 207, Forest Road 2039, and 247 acres east of Bull Prairie Recreation Area (See figure 3.9).

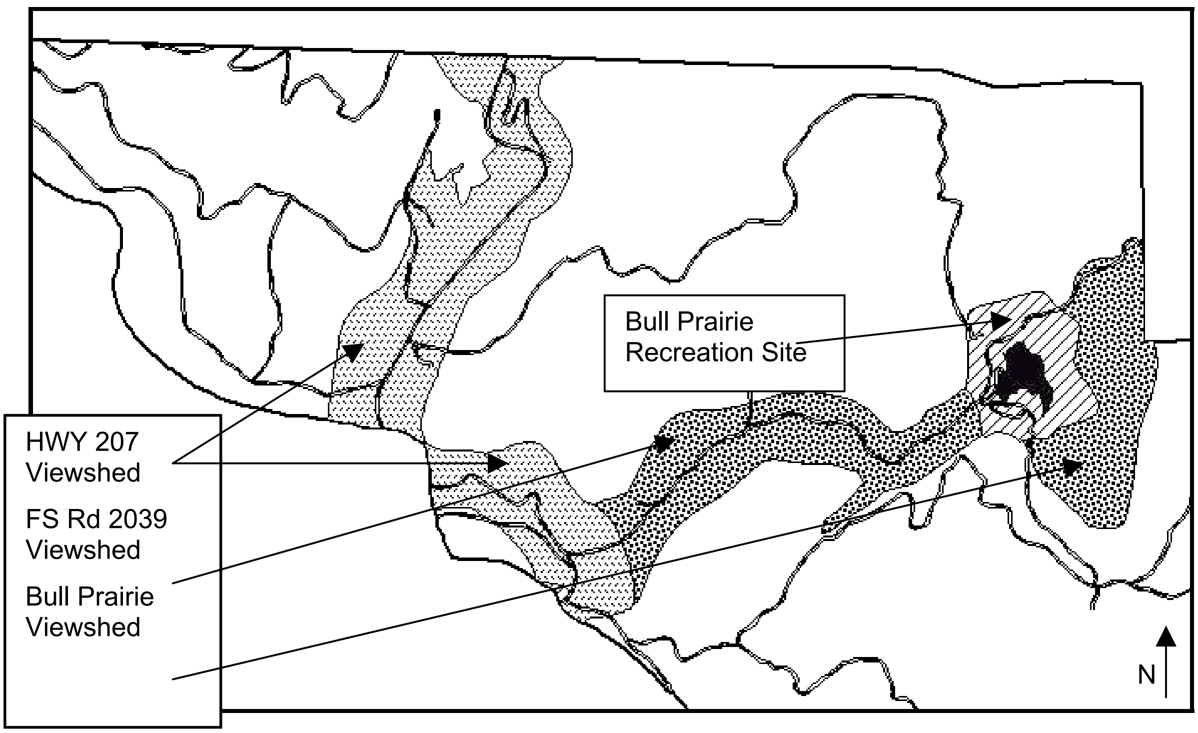

Figure 3.9 Viewshed Management Areas within Rimrock Project

The Forest Plan also identifies Visual Quality Objectives for each management area (see Table 3.6). Within these management areas, many forest have become dense with vegetation resulting in decadent forest conditions. Visually these stands loose scenic integrity.

Table 3.6 Visual Quality Objectives by Management Area Type

Management Area	Retention	Partial Retention	Modification	Maximum Modification
A3-Viewshed 1	(in foreground)	(in middleground)		
A4-Viewshed 2		(in foreground)	(in middleground)	
A6-Developed Recreation	X	X		
C1-Dedicated Old Growth	X			
C3-Big Game Winter Range	X	X	X	X
C5-Riparian	X	X	X	
E1-Timber and Forage				X

Forest Plan guidelines state that within A3-Viewshed 1 and A4-Viewshed 2: "*Landscapes will be enhanced by opening views to distant peaks, unique rock forms…*" (Forest Plan 4-100). The viewshed along Highway 207 is lacking in line and form, increased vegetation density has reduced the open park-like quality of the forest and obscured unique views to the south. Juniper encroachment has filled openings throughout the area with Douglas-fir, grand fir, and ponderosa pine saplings further increasing stand density.

Along the visual corridor of Forest Road 2039 stand density has increased to a nearly uniform partition of green, with very little visibility beyond the roadside itself. The color and texture are homogeneous with few openings or variation in vegetation. Forest floor vegetation has been out-competed by the larger trees and closed canopy. Form is reduced to the immediate foreground with no visual depth into the forest. This area also lacks visual diversity.

The viewshed area east of Bull Prairie Reservoir is important to recreation users of the reservoir and adjoining campground. The panoramic view of uniform, natural appearing vegetation provides visitors a sense of unity, intactness and coherence. However, at the south end of this viewshed, stand density has increased to unhealthy levels, and as a result is more susceptible to damage by insects and disease

Within the developed recreation site around Bull Prairie a portion of the characteristic landscape of open large ponderosa pine stands are being replaced by dense stands of mixed conifer including: Douglas-fir, grand fir, western larch and ponderosa pine. Other areas provide open-ponderosa pine stands that provide a visually pleasing change in texture and color. Beaver activity around the reservoir is providing a natural disturbance within the landscape increasing form and texture along the waters edge.

Fish and Aquatic Habitat

This FEIS hereby incorporates by reference the Fisheries Specialist Report in the Project Record (40 CFR 1502.21). The Fisheries Specialist Report is located in section 4 of the Project Record and contains the detailed data, methodologies, analyses, conclusions, maps, references, and technical documentation that the fisheries specialist relied upon to reach the conclusions in this FEIS.

The area encompassed by the Rimrock planning area is within the North Fork of the John Day River drainage. The Rimrock planning area includes the Lower Big Wall (24A), Middle Big Wall

(24B), Upper Big Wall (24C), Porter (24D), Upper Wilson (24E), Lower Wilson (24F), and Indian (24G) subwatersheds. Within these subwatersheds are the following streams: Big Wall, Big Willow Spring, Colvin, Dark Canyon, Dark Canyon Fork, Lost Canyon, East Fork Indian, Grassy Butte, Happy Jack, Indian, Keating, Little Wilson, Porter, South Fork Big Wall, Willow Springs, and Wilson creeks, along with some unnamed tributaries. The planning area contains 365 miles of streams, of which 33 miles are class 1 (anadromous fish bearing), 3 miles are class 2 (resident fish bearing), 47 miles are class 3 (perennial, non-fish bearing), and 282 miles are class 4 (seasonally intermittent). Fish species present in these streams include: Middle Columbia steelhead (*Oncorhynchus mykiss*); Columbia redband trout (*Oncorhynchus mykiss gibbsi*); speckled dace (*Rhinichthys osculus*)*;* torrent sculpin (*Cottus rhotheus*and); Piute sculpin (*Cottus beldingi)*; and sucker (*Catostomus spp.*). Fish are found in 36 miles (10% of the total stream miles) of the 83 miles of perennial streams (class 1 & 2) in the Rimrock planning area. Class 1 stream designation is based upon expected/known steelhead distribution derived from stream surveys.

Threatened, Endangered, Proposed, and Region 6 Sensitive Species (Aquatic)

Middle Columbia Steelhead Trout

Middle Columbia steelhead trout, a forest management indicator species, are listed as threatened by the National Marine Fisheries Service. They occupy an evolutionarily significant unit (ESU) within the Columbia River Basin from above the Wind River in Washington and the Hood River in Oregon, upstream to include the Yakima River in Washington. "Total steelhead abundance in this ESU appears to have been increasing recently, but the majority of natural stocks for which we have data within this ESU have been declining, including those in the John Day River, which is the largest producer of wild, natural steelhead" (Busby et. al. 1996). Oregon Department of Fish and Wildlife has completed annual steelhead spawning surveys in the John Day River and its tributaries for the past 40 years. Steelhead redds numbers showed a declining trend in the 1990's; however redd counts per mile (5.1) for 2001 are up from those numbers. They are still below the ODF&W District goal of 5.8 redds per mile (Unterwegner and Neal 2001). Middle Columbia steelhead trout occur within the Rimrock planning area. They are specifically known to spawn within Big Wall, Colvin, Dark Canyon, Indian, Lost Canyon, Little Wall, Porter, South Fork Wall, and Wilson Creeks.

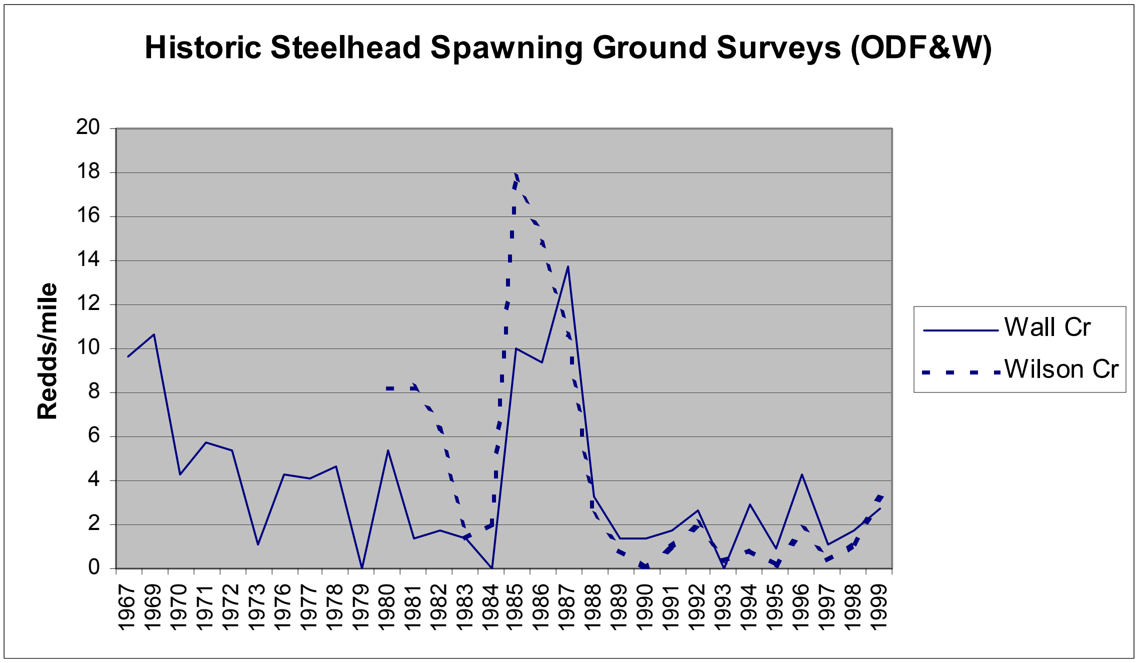

Figure 3.10 Steelhead Spawning Survey Results

Columbia River Redband Trout

The U.S. Fish and Wildlife Service list the Columbia River redband trout as a species of concern. Columbia River redband trout are on the Regional Forester's list of sensitive species and are a forest management indicator species. Fisheries scientists (Jordan and Everman 1896, Behnke 1992) define the distribution of Columbia River redband trout to include the Columbia River Basin east of the Cascades to barrier falls on the Kootenay, Pend Oreille, Spokane and Snake Rivers; the upper Fraser Basin above Hell's Gate; and Athabasca headwaters of the Mackenzie River Basin. All native resident rainbow trout in the Columbia River Basin east of the Cascades are classified as redband trout. Oregon Department of Fish and Wildlife and Umatilla National Forest fisheries biologists classify native resident rainbow trout in the Blue Mountains as redband trout. Class 1 and Class 2 streams, within the Rimrock planning area support populations of redband trout.

Spring Chinook Salmon

The Regional Forester lists spring Chinook salmon as sensitive. The John Day River sub-basin supports the largest remaining wild stock of Spring Chinook salmon in the Columbia Basin. The North Fork of the John Day River and its tributaries (Wall Ecosystem Analysis 1995) provide 70 percent of the production in the sub-basin. Juvenile Chinook have been observed in lower Wall Creek below the Forest boundary, however Chinook salmon are not known to spawn in Wall Creek or any of its tributaries (Lindsay et al. 1985). Spring Chinook salmon have not been documented within the Rimrock planning area or the Heppner Ranger District.

Columbia River Bull

Columbia River bull trout are listed as threatened by the U.S. Fish and Wildlife Service, and included on the Regional Forester's sensitive species list. Bull trout distribution includes the headwaters of the Yukon River, Puget Sound, coastal rivers of British Columbia and southeastern Alaska, the Columbia system from the Willamette River to the headwaters in Montana and Canada, the Wood River of Idaho, and the Jarbridge River in Nevada. The bull trout is a fish of cold waters. Loss of habitat and barriers to migration (both physical and thermal) are fragmenting the population (Bond 1992). Bull trout have been observed in the North Fork of the John Day

River, downstream through the middle canyon section, near the mouths of Potamus, Mallory, Wall, and Ditch creeks (M. Gray, personal communication 1997). There is no record of bull trout within the Rimrock planning area, or within the Heppner Ranger District.

Pacific Lamprey

The U.S. Fish and Wildlife Service list the Pacific lamprey as a species of concern. The Confederated Tribes of the Umatilla Indian Reservation surveyed the John Day River system for Pacific lamprey in 1999 (David Close, personal communication 2000) and spawning habitat was found in Wall Creek. No past fish or fish habitat surveys in the planning area have detected or documented Pacific lamprey.

Margined Sculpin

The Regional Forester listed the margined sculpin (*Cottus marginatus*) as a sensitive species in 2000. The margined sculpin requires cool, deep pool habitat for rearing, with a temperature preference of 54°F - 61°F. It can tolerate up to 68°F temperatures. It is usually found over a small gravel/silt substrate. Habitat exists within the Rimrock Analysis Area, however available surveys have not documented the presence of the margined sculpin on the Heppner Ranger District. The margined sculpin has only been documented in the Umatilla, Walla Walla, and Tucannon River drainages.

Fish Habitat

Fish habitat condition was measured using a matrix of important habitat indicators. The habitat indicators used to measure baseline conditions are: Water temperature, sediment, chemical contamination/nutrients, physical barriers, substrate embeddedness, large woody debris, pool frequency/quality, large pools, off-channel, habitat, refugia, width/depth ratio, streambank condition, floodplain conductivity, change in peak/base flows, increase in drainage network, road density/location, disturbance history and riparian conservation areas.

There are three condition levels used in the matrix; “functioning appropriately”, “functioning at risk”, and “functioning at unacceptable risk”. The three categories of function are defined for each indicator in the matrix. Indicators in the watershed are “functioning appropriately” when they maintain strong and significant populations that are interconnected and promote recovery of a proposed or listed species or its critical habitat to a status that will provide self-sustaining and self regulating populations. When the indicators are “functioning at risk”, they provide for persistence of the species but in more isolated populations and may not promote recovery of a proposed or listed species or its habitat without active or passive restoration efforts. “Functioning at unacceptable risk” suggests the proposed or listed species continues to be absent from historical habitat, or is rare or being maintained at a low population level; although the habitat may maintain the species at this low persistence level, active restoration is needed to begin recovery of the species.

The majority of the indicators within the watershed are either “functioning at risk” or “functioning at unacceptable risk”. Using existing data, it was determined that within the Big Wall Creek Watershed, water temperature, sediment, large woody debris, pool frequency/quality, off-channel habitat, refugia, and road density/location are functioning at “unacceptable risk”. Tables 3.7 and 3.8 show data for the seven-day maximum water temperature and for large woody debris, pool frequency, and large pools. Figures 3.11-3.15 display a comparison of the condition of the creeks in the Rimrock Area to the standard for each condition. Substrate embeddedness, large pools, width/depth ratio, streambank condition, physical barriers, and riparian conservation areas were found to be “functioning at risk”. Indicator’s “functioning appropriately” are chemical contamination/nutrients and disturbance history. When all indicators are considered, the Big Wall Creek Watershed’s environmental baseline condition was classified as “functioning at risk”. The aquatic habitat within the Rimrock analysis area could provide for persistence of the Endangered Species Act listed Mid-Columbia steelhead but may not promote recovery of the listed species without active or passive fish habitat restoration.

Table 3.7 Summary of seven day maximum water temperature data* for streams within the Rimrock area

Stream Name & Site	Highest Recorded 7-day Max
Big Wall Creek @ forest boundary	80
Big Wall Creek @ FS road 2402	74
Little Wilson Creek	73
Porter Creek	73
Colvin Creek @ cabin	69
Colvin Creek @ forest boundary	73
Wilson Creek @ above Bull Prairie Lake	64
Wilson Creek @ below Bull Prairie Lake	74
Wilson Creek @ above Wall Creek	79
Wilson Creek @ forest boundary	72
Indian Creek @ forest boundary	72

*Seven-day moving average of daily maximum temperature measured as the average of the maximum daily temperature of the warmest consecutive seven-day period. Data from 1993 - 1998. Data for some years was not available for some stations.

Table 3.8. Summary of Sediment Data[1], Large Woody Debris Data[2], Pool Frequency/Quality[3], and Large Pool Data[4] for Streams Within the Rimrock Area

Stream Name & Reach	Percent Fines < 6mm	Large Woody Debris/mile	Pools/mile	Large Pools/mile
Big Wall Creek, Reach 1	23	1	18.9	0.7
Big Wall Creek, Reach 2	8	8	19.4	4.5
Big Wall Creek, Reach 3	15	13	28.2	3.1
Little Wilson Creek, Reach 1	65	16	4.4	0
Dark Canyon Creek, Reach 1		4	4.8	0
Dark Canyon Creek, Reach 2		2	5.3	0
Dark Canyon Creek, Reach 3		5		
Dark Canyon Fork Creek, Reach 1		1	2.5	0
Happy Jack Creek, Reach 1	69	2	15.4	0
Happy Jack Creek, Reach 2	100	18	0	0
Happy Jack Creek, Reach 3			18.2	0
Happy Jack Creek, Reach 4			3.2	0
Happy Jack Creek, Reach 5			1	0
Willow Springs Creek, Reach 1	51	6	2.4	0
Grassy Butte Creek, Reach 1	100	3	5.5	0
Keating Creek, Reach 1	81	1	11.7	0
Keating Creek, Reach 2	96	5	1.4	0
South Fork Big Wall Creek, Reach 1	28	13	10.9	0
South Fork Big Wall Creek, Reach 2	27	8	5	0
Colvin Creek, Reach 1	79	11	6.7	0
Colvin Creek, Reach 2	86	35		
Porter Creek, Reach 1	29	1	26.7	17.7
Porter Tributary 1, Reach 1		5	36.7	0
Porter Tributary 1, Reach 2		9	8.8	0
Porter Tributary 2, Reach 1		7	10.1	0
Porter Tributary 3, Reach 1		4	9.7	0
Wilson Creek above Bull Prairie, Reach 1	76	10	1.2	0.3
Wilson Creek above Bull Prairie, Reach 2	67	19		
Bull Tributary, Reach 1	100	12	1	0
Wilson Creek, Reach 1	22	57	28.2	13.3
Wilson Creek, Reach 2	18	10	29.9	11.7

Stream Name & Reach	Percent Fines < 6mm	Large Woody Debris/mile	Pools/mile	Large Pools/mile
Big Willow Spring Creek, Reach 1	21	8	4.7	0
East Fork Indian Creek, Reach 1	50	8	3.3	0
Indian Creek, Reach 1	70	9	16	0
Indian Creek, Reach 2	67	15	14.1	0
Indian Creek, Reach 3	100	1		

1 Sediment data was collected using the Wolman (1954) pebble count in riffles. In addition to the wetted area, the Wolman pebble count also assesses substrate distribution on the floodplain. Substrate distribution on floodplains tend to contain more fines than the wetted channel, therefore these measurements may overestimate the percent surface fines in the wetted channel. Data from 1997 - 1999.
2 Large Woody Debris data was collected from 1994 - 1999.
3 Pool Frequency and Quality data was collected from 1989 - 1998. For the few reaches that show a high number of pools/mile, they are mostly based on man-made instream structures.
4 Most of the large pools are man-made instream structures to provide for the pool depth of greater than one meter.

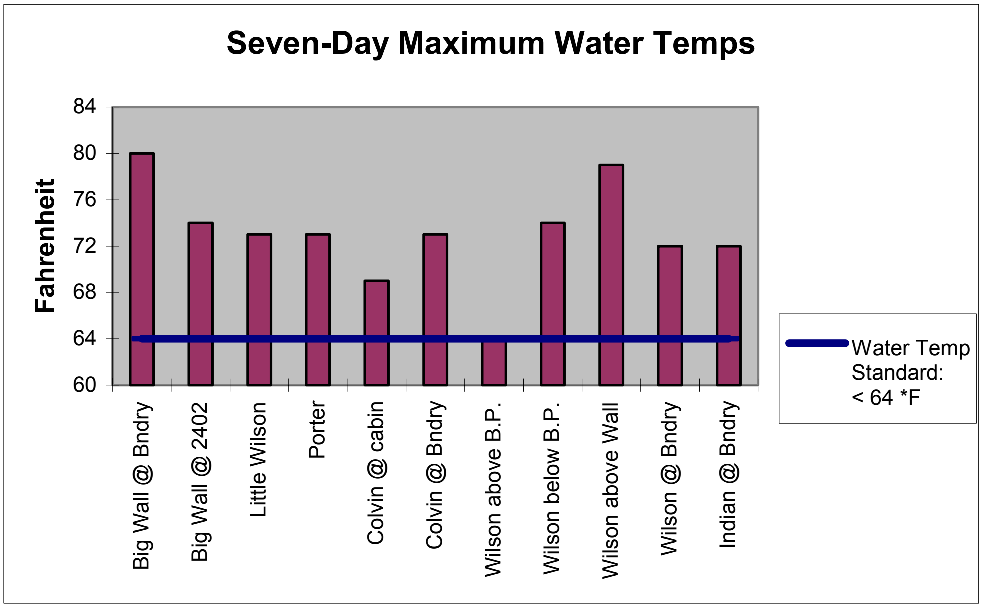

Figure 3.11 Water Temperature

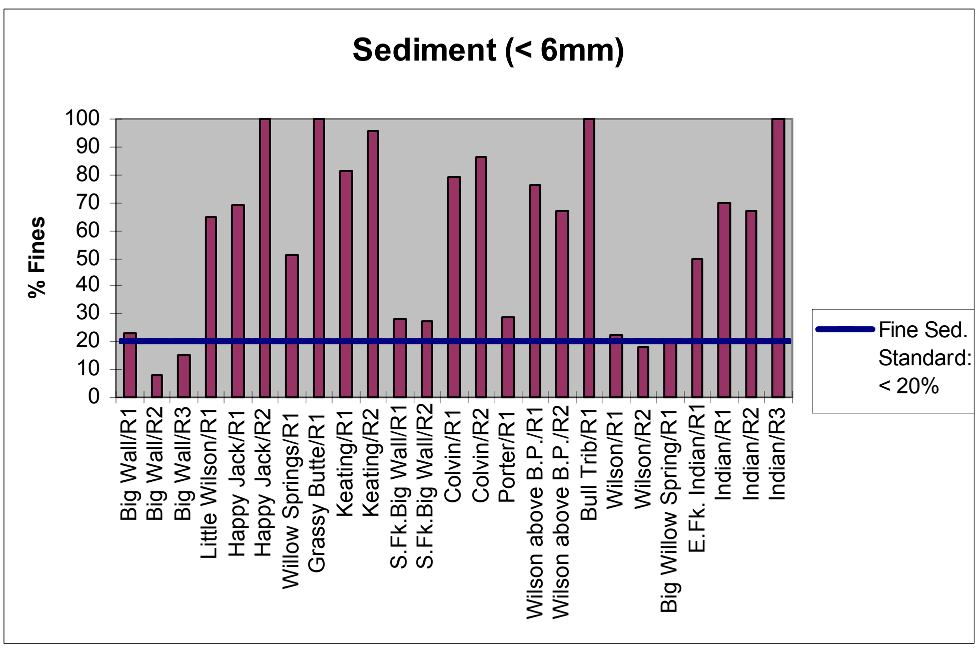

Figure 3.12 Sediment

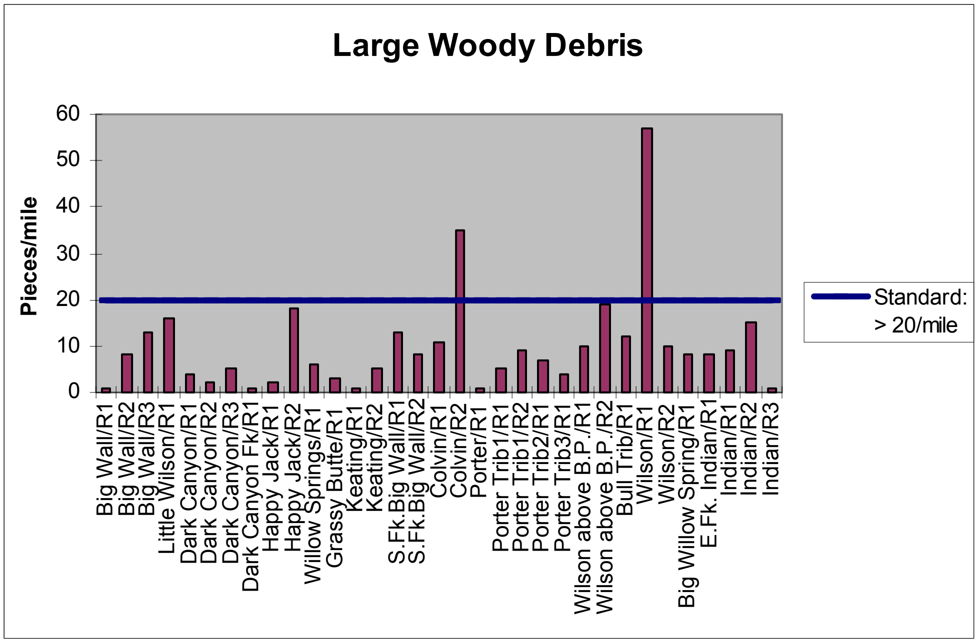

Figure 3.13 Large Wood

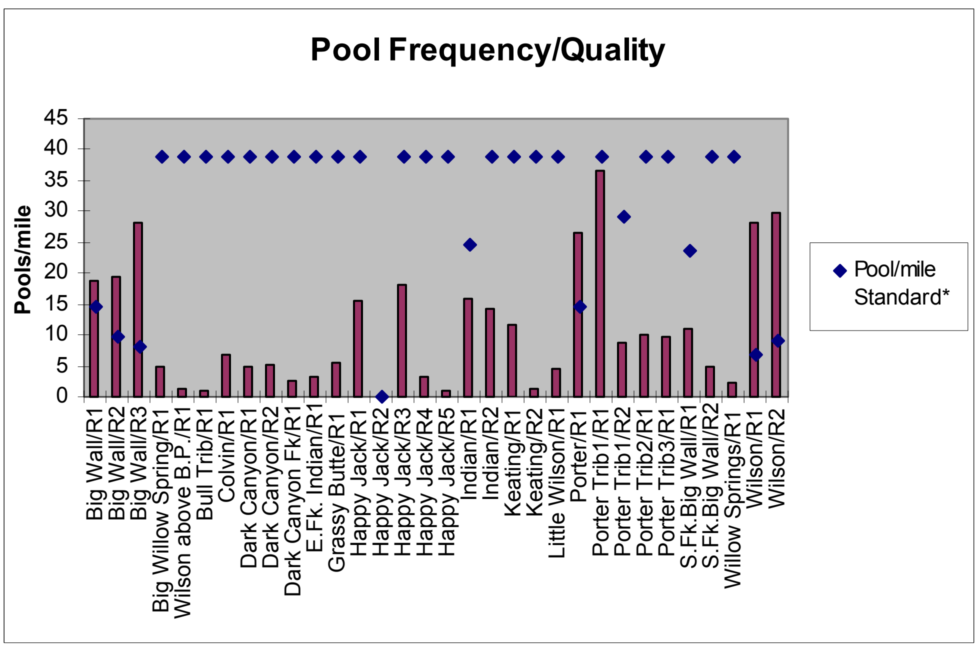

Figure 3.14 Pool Frequency and Quality

The pool frequency/quality standards differ by stream width and could be different per stream reach.

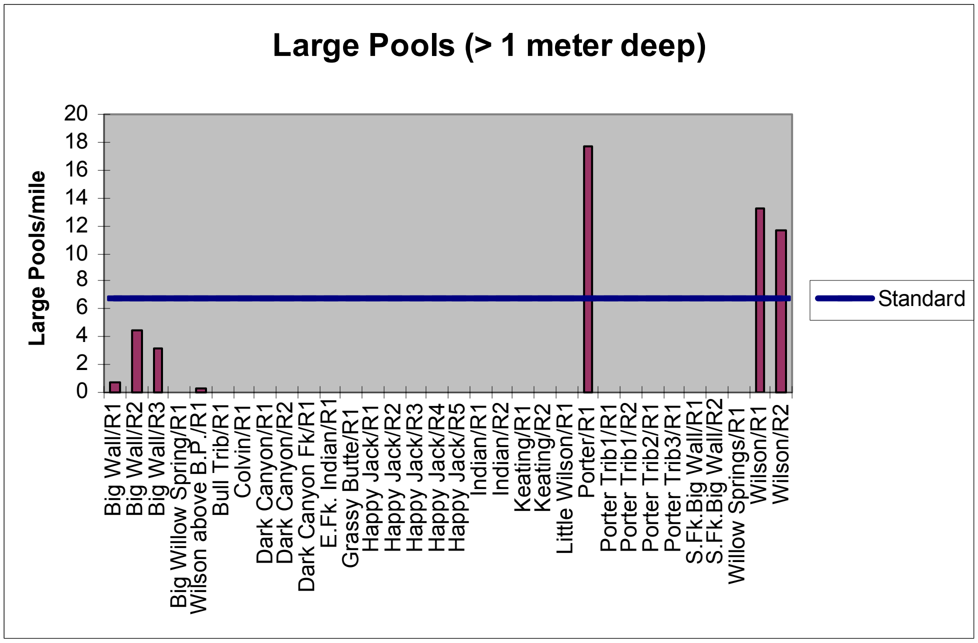

Figure 3.15 Large Pools

Water Resources

Specialist Report

This FEIS hereby incorporates by reference the Water Resource Specialist Report in the Project Record (40 CFR 1502.21). The Water Resource Specialist Report is located in section 4 of the Project Record and contains the detailed data, methodologies, analyses, conclusions, maps, references, and technical documentation that the Water Resource specialist relied upon to reach the conclusions in this FEIS.

Description of Analysis Area

The analysis area of 62,272 acres encompasses all subwatersheds within the Wall Creek Watershed (24). This includes the Lower Big Wall (24A), Middle Big Wall (24B), Upper Big Wall (24C), Porter (24D), Upper Wilson (24E), Lower Wilson (24F) and Indian (24G) subwatersheds. Sixty-seven percent of the analysis area is composed of Federal lands that are managed by the Forest Service (see Table 3.9).

Table 3.9 Land Ownership within the Analysis Area

Subwatershed No.	Name	Total Area **Acres**	Natl. Forest **Acres**	Private **Acres**
24A	Lower Big Wall	13,644	5,988	7,656
24B	Middle Big Wall	7,366	7,082	284
24C	Upper Big Wall	8,186	8,186	0
24D	Porter	8,973	3,928	5,045
24E	Upper Wilson	9,336	4,439	4,897
24F	Lower Wilson	8,257	6,396	1,861
24G	Indian	6,510	5,695	815
TOTAL	Analysis Area	62,272	41,714	20,558

The entire analysis is within the North Fork John Day Sub-Basin. Analysis of effects was done at the watershed and subwatershed scale (fifth and sixth level HUC). Elevation ranges from 2225 feet to 4,678 feet and generally has a southeast aspect. Primary factors that affect watershed hydrology include climate, geology, soils, vegetation and recent watershed disturbances.

Climate

The analysis area is within a transition between maritime and continental climatic zones. Mean annual precipitation ranges from 20 inches in the lower elevation portions of the analysis area to 26 inches at Bull Prairie Lake. Most of the precipitation falls between November and June (fig. 3.16). Precipitation usually falls as snow during the months of December, January, February and March, though rain-on-snow events frequently occur during December and January as indicated by the small secondary peaks in the hydrograph (see Figure 3.16). During July, August and September, precipitation typically originates as isolated thunderstorms. Though the probabilistic distribution of rainfall intensity is low, isolated high intensity thundershowers do occur.

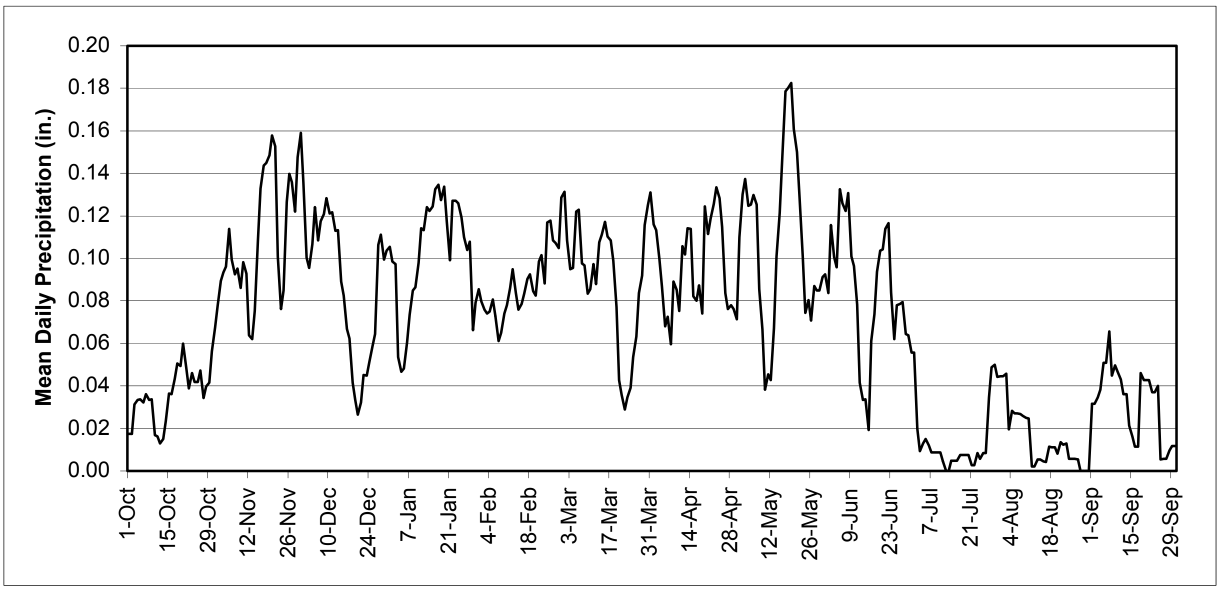

Figure 3.16 Annual distribution of mean daily precipitation for Madison Butte, OR.

Geology

Ninety-three percent of the analysis area is composed of the Picture Gorge Formation of the Columbia River Basalt Group (Tcp). The basalt is Miocene aged. The remainder of the area consists of "thick soils atop ash beds" (Orr and Orr, 1996) of the John Day Formation (Tsfj), 4 percent, and clastic rocks and andesite flows (Tca), 3 percent. The John Day Formation and Tca are from the older Oligocene epoch (Walker and MacLeod, 1991). The basalt and andesite are fairly competent rocks and form a landscape of relatively flat plateaus dissected by steep canyons. The John Day Formation rocks are soft and form a landscape of rolling hills.

Hydrology

The nearest stream gaging station with watershed characteristics similar to Wall Creek is on Camas Creek, approximately 25 miles east of the analysis area. The annual hydrograph of Wall Creek is similar to the Camas Creek hydrograph (Figure 3.17), but Wall Creek has lower discharge and the peak flow occurs earlier in the spring because it has a lower elevation than Camas. Based upon stream flow measurements collected between 1914 and 1990, the mean annual water yield at the Camas station is equal to 10.77 inches of water distributed over the entire watershed (USGS, 1991). Approximately one-third of the precipitation leaves the watershed as stream flow, and the remainder leaves as either evapotranspiration into the atmosphere or percolation into the groundwater aquifer. The mean annual peak discharge occurs during the first week of April, and a smaller peak occurs in December as a result of rain-on-snow events.

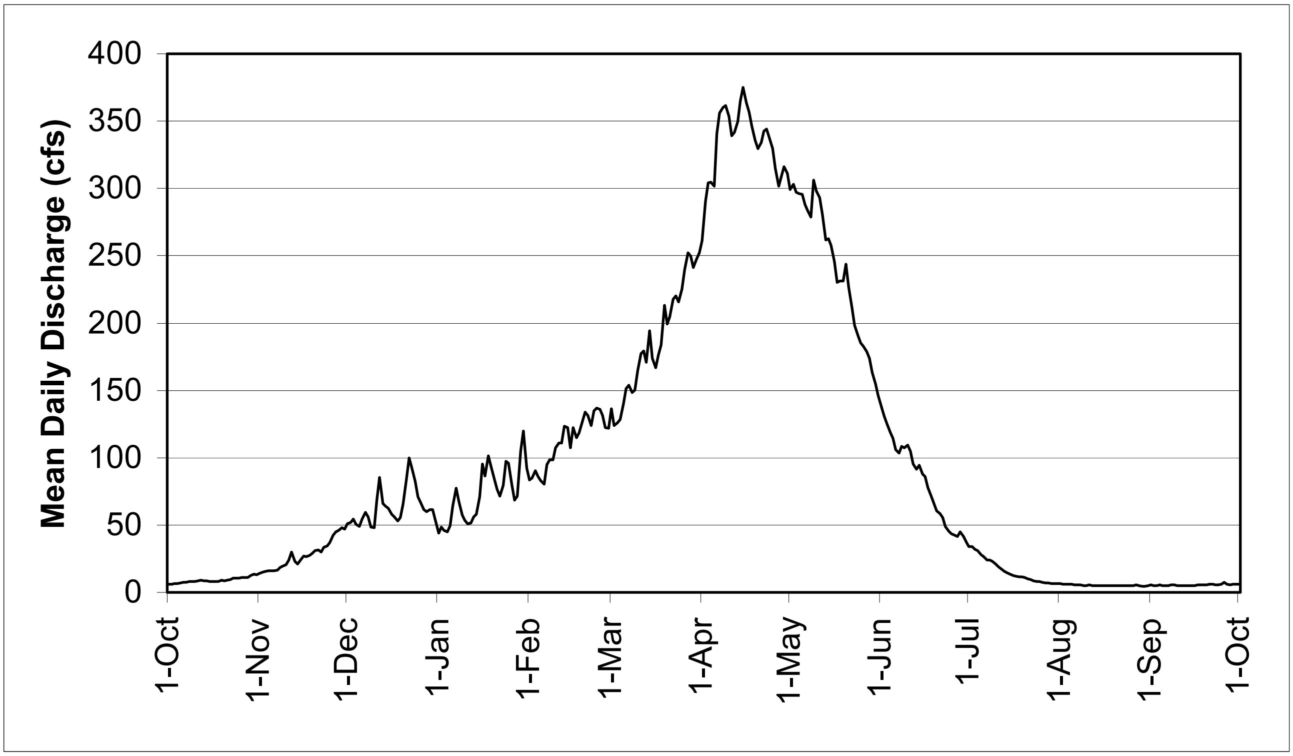

Figure 3.17 Mean annual hydrograph for Camas Creek 1914-1990 (USGS 14042500).

Streams

At the broad level, stream types in the Rimrock Area can be broken out by the longitudinal profile of the stream and the valley form. Stream profiles for Wall Creek and its tributaries are straight (e.g. Wilson Creek), convex (e.g. Little Wall), and stepped (all). The shape of the profile reflects geologic control, with layers of interbedded basalt which erode at different rates. Valley forms are generally V-shaped or trough, and narrow (<200' wide).

Common stream types are associated with landscape position. In the upper watershed, the gentle terrain of Porter Creek and Upper Wilson include Rosgen stream types C, E, and B. In headwater areas, geologic breaks, and steep tributaries are Rosgen type A channels, such as lower Porter Creek, Indian Creek, and lower Little Wall Creek. Lower Wilson Creek includes some reaches of entrenched, type G channels, with small terraces. A few low gradient meadows have type E channels.

Soils

Soils within the analysis area have been divided into two general classes based on the parent material. Residual soils formed from weathering of the underlying bedrock, while ash soils formed from wind borne ash deposited from volcanic eruptions in the Cascade Range, notably Mount Mazama. Ash soils are generally found on north facing slopes where the ash was originally deposited, and in draws and slope bottoms where it accumulated after initial erosion. Residual soils are generally found on south slopes and ridge tops, where the ash has eroded away. There are numerous soil types in the Rimrock area, composed of both ash and residual soils.

Water Quality

The water quality goal in the UNF Forest Plan is to:

Manage National Forest resources to protect all existing beneficial uses of water and to meet or exceed all applicable state and federal water quality standards. Within the Forest Service's capability, maintain or enhance water quantity, quality, and timing of streamflows to meet needs of downstream users and other resources (p. 4-77).

Sedimentation and temperature are the primary water quality parameters that have been affected by past management activities. These activities include road construction and use, timber harvest, burning, grazing, and in-stream structures. Wildfire can also affect water quality, but there have been no large wildfires in the area within the last several years.

Roads

Roads tend to be the largest anthropomorphic source of sediment in forested watersheds. They may affect hydrology and water quality in several ways. Road surfaces have low infiltration rates which cause them to generate higher overland flow rates than adjacent undisturbed soils. Overland flow has the ability to erode sediment and transport it to the stream network. Cut banks and inslope ditches tend to intercept subsurface flow and bring it to the surface. Both of these factors could affect stream flow quantity and hydrologic response. Eroded soil from road ditches and areas below ditch relief culverts could also be transported into the stream network and degrade water quality.

A review of literature showed that the effects of roads on annual water yield are variable and that no or very little increase occurred when less than 8 percent of the watershed area was in roads (King and Tennyson, 1984). There are 212 miles of system roads within the Forest Service portion of the analysis area (Table 3.10). The system database does not include all roads that were constructed within the National Forest, and an undetermined number of abandoned roads also exist.[3] Currently roads occupy 1.2 percent the analysis area, so based upon the published research it is unlikely that there is a measurable effect of the existing transportation system on annual water yield.

Several studies showed that there may not be a statistically significant increase in average peak flows until about 12 percent of the watershed area is composed of roads or other compacted area (Harr, 1975). But King and Tennyson (1984) measured a variable but statistically significant change in discharge rates after a smaller percentage of watersheds was affected by road construction. They showed a statistically significant increase of 30.5 percent in moderate discharge rates (25 percent exceedence flows) when 1.8 percent of one watershed was roaded and a statistically significant decrease of 29.4 percent in low discharge rates (5 percent exceedence flows) in small watersheds that had 4.1 percent of the area roaded. Four other watersheds that had 3.0 percent, 3.9 percent, 2.6 percent and 3.7 percent of the area roaded did not show statistical changes in the discharge rate. This study in north central Idaho only collected two years of post road construction data, so the data set was too small to make more statistically significant conclusions.

[3] The unrecorded roads include those which have previously been obliterated or were so insignificant that they were not recorded when roads were first inventoried. When roads are no longer used, they eventually lose the characteristics of a road, and begin to function as the surrounding terrain. That is, roads in forested areas return to forest type vegetation, while those in rough, scabby areas remain open. Because of frost heave, wind throw of trees, and burrowing, abandoned road surfaces lose their compaction. These are the unmanaged processes which road obliteration and decommissioning seeks to accelerate. The effects of these old roads are not substantial in this analysis area.

Table 3.10 National Forest Roads in the Rimrock Analysis Area.

Total System Roads **SWS**	**(Miles)**	**(Density)**	**(%)***
24A	12.1	1.3	0.5
24B	39.8	3.6	1.4
24C	44.8	3.5	1.3
24D	31.3	5.1	1.9
24E	26.8	3.9	1.5
24F	29.5	3.0	1.1
24G	28.2	3.2	1.2
AREA	212.3	3.3	1.2

* Density refers to miles of road per square mile of watershed. Assumes 20 foot road width.

Within the Rimrock analysis area the area occupied by roads ranges from 0.5 percent to 1.9 percent at the subwatershed scale, which indicates that roads alone are not likely to be causing a measurable change in the discharge rates.

Forest Service Road 23 fords Big Wall Creek twice and Wilson Creek once. The 2300-100 road fords Big Wall Creek once. Both streams are class 1. The approaches and crossings are hardened by gravel or concrete, but do contribute sediment to the stream when vehicles use them, and during periods of rain and snow melt.

Water yield and peak flows

In 2001, a tussock moth outbreak occurred on 2560 acres in the Rimrock Area. The moth's caterpillar normally feeds on needles of fir trees, but also attacked pine. Damage ranged from a few needles consumed to 100 percent of a tree's foliage removed. Defoliated areas ranged from single trees to patches of over a hundred acres.

Vegetation reduction, whether by road placement, timber harvest, or insect defoliation, can affect annual water yield and peak flows. Less precipitation is lost from interception by foliage and less water is transpired, so more flow is available to streams. These gains are partially offset by increased evaporation losses. Removal of all vegetation in a watershed is likely to increase water yield.

In 1972 and 1973, there was a large tussock moth outbreak in the northern Blue Mountains of Oregon. Thirteen percent of the South Fork Walla Walla River, 16 percent of the North Fork Walla Walla River, and 25 percent of the Upper Umatilla River were defoliated. Hydrology was studied for the years 1974-1976. There were no changes in water yield for the North and South Forks of the Walla Walla River. There appeared to be a change in 1974 for the Upper Umatilla, but this could not be statistically validated. Also, no changes in water yield were detected (Helvey and Tiedemann, 1978).

An **Equivalent Clear cut Acres** or ECA model (Ager and Clifton, 1995) was prepared in order to quantify the effects of past logging, roads, and defoliation in the analysis area. The ECA model allows the effects of different disturbances to be grouped together for comparison. This ECA model assumes that the effects of harvest recover in 20-33 years, depending on timber type, that active roads never recover, and that insect defoliation resembles harvest in its effect on shade. It is useful for comparing diverse activities, but is not meant to be an absolute predictor of the effects of management.

Prior to the Tussock moth outbreak in 2001, as a result of past logging and roads, the Wall Creek Watershed had 3 percent ECA. The moths defoliated an additional 2 percent, for a total of 5 percent ECA at the end of 2001. The subwatersheds range in ECA from 2.3 percent to 14.9 percent (Table 3.11, Figure 3.18).

Table 3.11. Acres of Equivalent Clear-cut Acres by Disturbance Type

Existing condition after moth outbreak in 2001					
SWS	Past Harvest	20' Roads	Insects	ECA acres	% SWS
24A	35	29	141	205	4.7
24B	50	97	43	190	2.9
24C	79	109		188	2.4
24D	128	76		204	6.4
24E	28	65		93	2.3
24F	89	72		161	3.8
24G	55	68	509	632	14.9
Totals	464 acres	516 acres	693 acres	1673 acres	4.9

SWS = subwatershed, unit used is acres

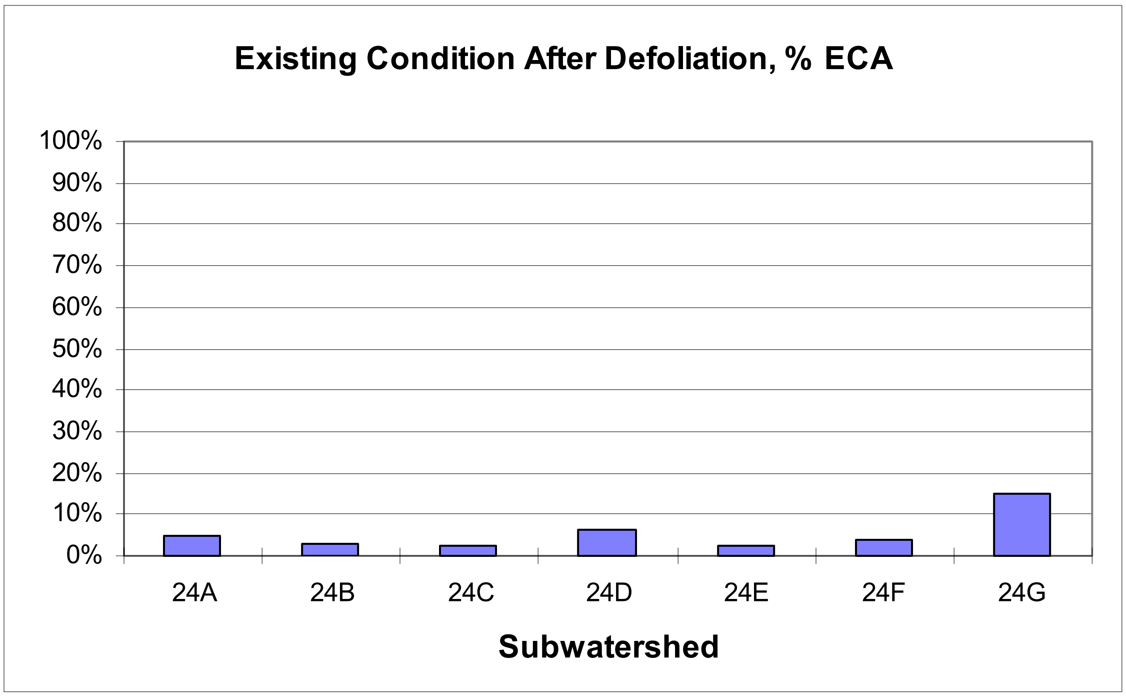

Figure 3.18 Equivalent Clearcut Acres after Defoliation

The effect of insect defoliation on forest shade is similar to the effects of logging, so impacts resulting from defoliation can be compared to impacts from harvest. Logging effects on hydrology and water quality were intensively monitored in the High Ridge Evaluation Area (High Ridge) on the Umatilla Nation Forest (UNF). In 1976, after a ten-year calibration period, timber was removed from 43 percent, 50 percent, and 22 percent of watersheds 1, 2 and 4, respectively. Watershed 3 was uncut and used as a control. Researchers did not find statistically significant changes in annual water yield following this treatment. In 1984 most of the remaining trees from watersheds 1 and 2, and an additional 38 percent of watershed 4 were removed. A small but statistically significant increase in the average annual water yield was detected on watershed 1 and 2 after the second entry. No change was detected on watershed 4. The authors concluded that forest removal had a minor influence on annual water yield from these watersheds (Helvey and Fowler, 1995).

In a larger area, annual water yield increased by 21 percent after lodge pole pine was clear-cut from approximately 30 percent of the 8373 acre Camp Creek watershed in south central British Columbia (Cheng, 1989). Precipitation at Camp Creek is similar to that in the Rimrock area.

Helvey and Tiedemann found a possible change in water yield when 25 percent of a watershed was defoliated, and no changes in peak flows when 13, 16, and 25 percent of watersheds were defoliated. In the case of Camp Creek, changes in annual yield were detected when 30 percent of a large water shed was clear-cut. In the small watersheds studied by Helvey and Fowler, small changes in yield were detected after 100 percent of the area was clear-cut. Since the percent ECA for the Rimrock area is 5, and the greatest percent ECA for a single subwatershed is 15, there is a low likelihood of detectable changes in water yield or peak flows from past harvest, roads, or defoliation in the analysis area.

Sediment

Existing roads, past timber harvest, instream structures, and impacts to stream banks by cattle, deer, and elk have increased the amount of sediment in streams in the analysis area over the pre-management level. In most streams, sand sized and smaller (< 6 mm) sediment cover larger areas of stream channels than the National Marine Fisheries Service (NMFS) Matrix allows for Properly Functioning Condition. These values are associated with an insufficiency of spawning gravel, which is believed to limit cold-water fish populations.

Sediment Variability

Upland erosion, transport, and deposition of sediment in streams are complex processes governed by the interaction of climate, soil, vegetation, bedrock geology, and topography. This bundle of processes comprises the generic term sedimentation. The quantities of sedimentation events range from a minute grain of clay that weathers off a rock to landscape sized movements of rock, soil, and ash.

The processes of sedimentation vary greatly over time and at different locations on the landscape. An example of this variability is in the concentration of suspended solids, which is a measure of the sedimentation process. The concentrations of suspended solids in streams "vary with depth and location across the stream cross section." They also vary "with discharge, timing of the sample within a storm hydrograph, and the interval between storm events" (McDonald, 1992).

Annual daily maximum discharge for Camas Creek, the gaged surrogate stream for Wall Creek, ranged from a low of 317 cfs in 1992 to a high of 3130 cfs in 1965. This is a range of one magnitude over the 80-year period of record. Daily discharge of Camas Creek in 1965 ranged from a low of 2.8 cfs on Dec. 23 to a high of 3130 cfs on Jan. 30 (OWRD, 2002). This is a range of three magnitudes over one year. High flows are a function of climate, and this variation in the high flows shows the large natural range of variation in one of the factors that contributes to concentration of suspended solids, which in turn is one measure of sediment processes. The compounding effect of the many variations in the factors which contribute to sedimentation means that a single parameter must be measured many times to produce valid results, and that it is unlikely that small, short term changes could be detected over large areas. However, small changes may be detected by monitoring single, previously measured sites downstream of forest management projects.

Sediment modeling

While the existing sediment data set is sufficient to detect changes at the scale of a stream reach, and in the short term, there is limited local data for predicting the effects of future forest management. The High Ridge area is approximately 70 miles NE of the Rimrock analysis area, and has the nearest intensively monitored forested watersheds. The High Ridge watersheds are all basalt, but receive half again as much precipitation as the Rimrock Area. Monitoring conducted at Watershed 3, the unharvested and unroaded control watershed, between 1984 and 1995, yielded 18.1 tons/square mile of sediment (Helvey and Fowler, 1997). This is roughly equivalent to a 5 gallon bucket of soil per acre per year, and is consistent with other published sediment yields from small watersheds (Parker and Osterkamp, 1995). This is assumed to be the baseline sediment yield which would occur with no management activities except fire suppression.

Temperature

Insolation and ambient air temperature are the most important factors in small, mountain stream maximum temperatures. Other important factors include basin elevation, riparian tree abundance, cattle density, watershed slope, valley constraint, and abundance of grass (Isaak and Huber, 2001). This study from the Salt River country on the Idaho-Wyoming border does not consider the effects of elk and deer, which are important in the Rimrock area. Of these factors, insolation/shade, riparian tree abundance, cattle density and the related grass abundance can be affected by national forest management. While elk and deer habitat is managed by the Forest Service, their populations are not.

As a result of past management, stream temperatures in the analysis area are likely to be elevated above pre-management levels. These past activities include roads, timber harvest, and grazing, and they act on temperature by causing a reduction in stream shade. Other disturbances such as wildfire, insect infestation, disease, and wildlife can also reduce shade. When shade is reduced, more radiant energy from the sun (insolation) can reach the water. This warms the stream faster than if shade were not reduced. The amount of this increase in temperature is not known, because precise, continuous records for the pre-management period do not exist.

Livestock density on the National Forest has decreased steadily since the early 1900s, but elk are at relatively high populations (Irwin, et al, 1994). During the 1990s, fence was constructed along fish-bearing reaches of Wall, Wilson, Colvin, Porter, and Indian Creeks. Riparian shade within these fences is recovering. Use of intensely managed grazing systems since the early 1990s has allowed improvement in unfenced riparian areas. Periodic monitoring of occupied pastures allows managers to maintain vegetative consumption standards (Range Environment, p. 90 thru p. 95).

Timber harvest in the analysis area began in the 1940s. However, in 2002, the ECA for the area resulting from harvest was slightly more than one percent (464 acres of 34,304 acres = 0.0135). The ECA for roads was less than 2 percent (516 acres of 34,304 acres = 0.0150). These figures show that past harvest and roads affect a relatively small area. Even so, it is likely that shade has been decreased and temperatures have been increased by these activities.

Current Monitoring

Field observations of aquatic habitat were systematized during the late 1980s when Hankin/Reeves stream surveys began to be made on fish bearing streams. Continuous monitoring of stream temperatures at multiple sites began at the same time. In 1996, Wolman pebble counts were added to that protocol in order to measure channel surface particle size. Much of the data presented in the Fish Habitat section of Chapter 3 is derived from these stream surveys. Because of the stream surveys, a set of data exists which includes stream channel surface sampling at 25 sites. Some of this data is presented in Table 3.12. Pebble counts provide "a reasonably representative sample of an entire reach of the stream" (Wolman, p. 956, 1954). Because of this baseline data, it would be possible to monitor for management related changes in channel surface composition on the streams listed in Table 3.12.

Table 3.12 Summary of Sediment Data[1], Large Woody Debris Data[2], Pool Frequency/Quality[3], and Large Pool Data[4] for Streams Within the Rimrock Area

Stream Name & Reach	Percent Fines < 6mm	Large Woody Debris/mile	Pools/mile	Large Pools/mile
Big Wall Creek, Reach 1	23	1	18.9	0.7
Big Wall Creek, Reach 2	8	8	19.4	4.5
Big Wall Creek, Reach 3	15	13	28.2	3.1

Stream Name & Reach	Percent Fines < 6mm	Large Woody Debris/mile	Pools/mile	Large Pools/mile
Little Wilson Creek, Reach 1	65	16	4.4	0
Dark Canyon Creek, Reach 1		4	4.8	0
Dark Canyon Creek, Reach 2		2	5.3	0
Dark Canyon Creek, Reach 3		5		
Dark Canyon Fork Creek, Reach 1		1	2.5	0
Happy Jack Creek, Reach 1	69	2	15.4	0
Happy Jack Creek, Reach 2	100	18	0	0
Happy Jack Creek, Reach 3			18.2	0
Happy Jack Creek, Reach 4			3.2	0
Happy Jack Creek, Reach 5			1	0
Willow Springs Creek, Reach 1	51	6	2.4	0
Grassy Butte Creek, Reach 1	100	3	5.5	0
Keating Creek, Reach 1	81	1	11.7	0
Keating Creek, Reach 2	96	5	1.4	0
South Fork Big Wall Creek, Reach 1	28	13	10.9	0
South Fork Big Wall Creek, Reach 2	27	8	5	0
Colvin Creek, Reach 1	79	11	6.7	0
Colvin Creek, Reach 2	86	35		
Porter Creek, Reach 1	29	1	26.7	17.7
Porter Tributary 1, Reach 1		5	36.7	0
Porter Tributary 1, Reach 2		9	8.8	0
Porter Tributary 2, Reach 1		7	10.1	0
Porter Tributary 3, Reach 1		4	9.7	0
Wilson Creek above Bull Prairie, Reach 1	76	10	1.2	0.3
Wilson Creek above Bull Prairie, Reach 2	67	19		
Bull Tributary, Reach 1	100	12	1	0
Wilson Creek, Reach 1	22	57	28.2	13.3
Wilson Creek, Reach 2	18	10	29.9	11.7
Big Willow Spring Creek, Reach 1	21	8	4.7	0
East Fork Indian Creek, Reach 1	50	8	3.3	0
Indian Creek, Reach 1	70	9	16	0
Indian Creek, Reach 2	67	15	14.1	0
Indian Creek, Reach 3	100	1		

1 Sediment data was collected using the Wolman (1954) pebble count in riffles. In addition to the wetted area, the Wolman pebble count also assesses substrate distribution on the floodplain. Substrate distribution on floodplains tend to contain more fines than the wetted channel, therefore these measurements may overestimate the percent surface fines in the wetted channel. Data from 1997 - 1999 (From stream surveys?).

2 Large Woody Debris data was collected from 1994 - 1999.

3 Pool Frequency and Quality data was collected from 1989 - 1998. For the few reaches that show a high number of pools/mile, they are mostly based on man-made instream structures.

4 Most of the large pools are man-made instream structures to provide for the pool depth of greater than one meter.

MacDonald, 1992, suggests that measuring channel morphology can be an alternative to direct measurement of sediment. The purpose of measuring channel morphology is to detect changes in discharge and sediment yield from a watershed. There are 10 surveyed channel reference reach monitoring sites on the south half of the Umatilla National Forest, including one on lower Wall Creek. The channel reference reach on Wall Creek was installed in 1995 and resurveyed in 1999. This site would be resurveyed and the data analyzed during Rimrock activities to check for changes in channel morphology.

Stream temperature is continuously recorded during May-September with electronic hydro thermographs at 11 sites in the analysis area. The Oregon DEQ protocol is followed, and results are reported to DEQ biannually. This data has resulted in the listing of three streams for temperature. Table 3.13 shows this data. Other water quality monitoring in the area includes grab samples at four sites which are analyzed for pH, dissolved oxygen, nitrates, sediment, total suspended solids, conductivity, total dissolved solids, and turbidity. There are annual inspections of roads and trails for active erosion. See Appendix D for Rimrock specific monitoring.

Table 3.13 Seven-day maximum water temperature.

Subwatershed		1993	1994	1995	1996	1997	1998	1999	2000	2001
No.	Name	(F)	(F)	(F)	(F)	(F)	(F)	(F)	(F)	(F)
24A	Wall Creek at FS Boundary	76	80	77	68	68	77	76	74	75
24A	Wall Creek above 2402 Rd	68	69	74	68	65*	70	67	67	65
24A	Little Wilson @ mouth	---	---	60	73	---	63	63	62	62
24D	Porter Creek at FS Boundary	---	---	72	73	70	---	71	71	70
24D	Colvin Creek at Spring	---	---	68	61	64	64	67	62	63
24D	Colvin Creek at FS Boundary	---	---	68	---	65	73	71	70	63
24F	Wilson Ck above Bull Prairie Lake	64	---	62	63	---	64	---	61	61
24F	Wilson Ck below Bull Prairie Lake	73	81	74	72	75	---	72	75	75
24F	Wilson Creek above Wall Ck	74	79	78	79	80	77	---	73	78
24F	Wilson Creek at FS Boundary	66	---	72	70	---	---	72	69	70
24G	Indian Creek	---	72	70	70	---	---	71	71	70

* 7 day maximum temperature based on incomplete record, dashed lines indicate missing records.

CLEAN WATER ACT

The Clean Water Act of 1972 focuses on the restoration and maintenance of the chemical, physical, and biological integrity of the Nation's waters. This was amended in 1987 to protect waters against pollution from both point and non-point sources. Water quality standards include the general requirement to maintain and improve water quality. Land disturbing activities on Forest Service lands can result in non-point sources of pollution. With non-point sources the effect of each individual action may be small, but the cumulative effect of these activities can affect water quality. Timber management activities have been identified as contributing to non point sources of pollution in the analysis area. The strategy to protect water from non point source pollution includes implementation of best management practices (BMP's), watershed and riparian areas restoration and enhancement, and improved monitoring for detection and validation of water quality concerns. The Umatilla Forest Plan states (p.4-77) that the Forest would implement BMP's to meet water quality standards.

As part of the implementation of this act, the State of Oregon maintains an inventory of water quality limited streams, based on standards developed by the Oregon Department of Environmental Quality (DEQ). Identification of the Total Maximum Daily Load (TMDL) for the North Fork John Day Sub basin (which contains the Rimrock analysis area) is scheduled by the State of Oregon for late 2003.

Protocol for addressing 303(d) listed waters

Table 3.14 Rimrock streams on 2002 303(d) list

Stream Name & Site	Listed for:	listed because of:
Big Wall Creek	sedimentation, rearing and spawning temperature	USFS data
Indian Creek	rearing and spawning temperature	USFS data
Porter Creek	sedimentation	USFS data
Wilson Creek	sedimentation, rearing and spawning temperature	USFS data

Table 3.14 shows the Rimrock streams that are on the 2002 303(d) list, and the parameters for which they are listed. It also shows the source of data that caused them to be listed. The Forest Service reports its data biennially to the Oregon DEQ. Because it is unlikely that stream sediment and temperature will reach Clean Water Act standards within 2 years, a Water Quality Restoration Plan is required. The Water Quality Restoration Plan is complete and will become a part of the North Fork John Day Total Maximum Daily Load.

Table 3.15 lists the beneficial water uses for the Rimrock analysis area as defined by the State of Oregon for the John Day River Basin, as well as the water quality parameters associated with these beneficial uses. Land disturbing activities such as roads, timber harvest, and grazing can result in non-point sources of pollution. Beneficial uses most likely to be affected by the Rimrock proposed actions are: salmonid fish rearing, salmonid fish spawning, and resident fish and aquatic life. Water quality standards most likely to be affected by the proposed actions are temperature and sedimentation.

Table 3.15: Beneficial uses and associated water quality parameters for North Fork John Day Sub basin, which includes the Rimrock analysis area.

Beneficial Use	Associated Water Quality Parameter
Public Domestic Water Supply	Turbidity, Chlorophyll a
Private Domestic Water Supply	Turbidity, Chlorophyll a
Industrial Water Supply	Turbidity, Chlorophyll a
Irrigation	None
Livestock Watering	None
Anadromous Fish Passage	Biological Criteria, Dissolved Oxygen, Flow Modification, Habitat Modification, pH, Sedimentation, Temperature, Total Dissolved Gas, Toxics, Turbidity
Salmonid Fish Rearing	Dissolved Oxygen, Flow Modification, Habitat Modification, Sedimentation, Temperature
Salmonid Fish Spawning	Same as Salmonid Fish Rearing
Resident Fish and Aquatic Life	Same as Anadromous Fish Passage
Fishing	Aquatic Weeds or Algae, Chlorophyll a, Nutrients
Water Contact Recreation	Aquatic Weeds or Algae, Bacteria, Chlorophyll a, Nutrients, pH
Aesthetic Quality	Aquatic Weeds or Algae, Chlorophyll a, Nutrients, Turbidity

Standards for individual parameters are established by the State; the standard for water temperature is as follows:

“Water Quality Limited Determination (EPA Category 5): Moving seven (7) day average of the daily maximum exceeds the appropriate criterion listed below.

1) 64° F (17.8 °C) in basins for which salmonid rearing is a beneficial use;

2) 55° F (12.8 °C) during times and in waters that support salmon spawning, egg incubation and fry emergence from the egg and from the gravels;

3) 50° F (10 °C) in waters that support Oregon Bull Trout

{except when the air temperature during the warmest seven-day period of the year exceeds the 90^{th} percentile of the 7-day average daily maximum air temperature calculated in a yearly series over the historic record. }" (DEQ, 2003).

Water temperatures have been monitored on numerous streams within the Rimrock analysis area (see Table 3.13). Water temperatures in Big Wall, Indian, Wilson, and Porter creeks frequently failed to meet the Oregon water quality standard of 64°F during the summer months.

The Clean Water Act standard for sediment in the analysis area is:

The formation of appreciable bottom or sludge deposits or the formation of any organic or inorganic deposits deleterious to fish or other aquatic life or injurious to public health, recreation, or industry shall not be allowed (DEQ, 2003).

Big Wall Creek and Wilson Creek are included on the state's 2002 303(d) list for sedimentation and temperature. Indian Creek is listed for temperature. Porter Creek is listed for sedimentation (See Table 3.14).

Water Uses

Within the analysis areas, consumptive uses of surface water are: 1) livestock watering; 2) fire fighting; 3) road construction and maintenance; and 4) wildlife. Fish and other aquatic species are the primary non-consumptive users of surface water. The primary downstream consumptive uses are irrigation, municipal, livestock watering, and industrial.

Aspen

Aspen clones (genetically identical individuals) that once covered larger areas have been reduced to small, disconnected stands or individuals. Inventories on the Heppner Ranger District have identified aspen stands to be in decline and at risk of extirpation. The twelve identified stands are exhibiting 3 to 4 of the risk factors associated with serious aspen decline: conifer encroachment is moderate to severe, aspen canopy cover is less than 40 percent, and stands are at an advanced age (>100 years old) with little to no reproduction occurring. Viable aspen regeneration (5-15 feet tall) in these stands is commonly less than 10 stems per acre due primarily to grazing pressure from wild and domestic ungulates (e.g. deer, cattle, and elk).

Fuels

Specialist Report

This FEIS hereby incorporates by reference the Fuels Specialist Report in the Project Record (40 CFR 1502.21). The Fuels Specialist Report is located in section 4 of the Project Record and contains the detailed data, methodologies, analyses, conclusions, maps, references, and technical documentation that the Fuels specialist relied upon to reach the conclusions in this FEIS.

The Rimrock Analysis Area covers approximately 42,000 acres in the south central portion of the Heppner Ranger District, on the south half of the Umatilla National Forest. The planning area encompasses the Big Wall, Wilson, and Indian Creek subwatersheds. Elevations range from 2700 feet to 4900 feet.

The area affected by the Douglas fir Tussock moth accounts for about 5% of the Rimrock Analysis area. The heaviest concentration of tussock moth infestation is located in the southeast portion of the analysis area. The legal description for this area is Township 8 South, Range 27 East and the southern half of Township 7 South, Range 27 East.

Cover Types

There are essentially three cover types in the Rimrock Analysis Area; warm dry forest; cool dry forest; and grass/shrubs steppe. The warm dry forest type is the dominant type, covering 90% of the analysis area. This is a mixed conifer type, dominated by ponderosa pine and Douglas fir, with lesser amount of western larch and grand fir (Slaughter, 1999). The cool dry forest and grass/shrubs steppe cover types account for the remaining 10% in the analysis area.

The warm dry forest stands are currently characterized by a crowded understory of mixed conifers and brush. The current condition is the result of fire exclusion, past harvest practices, gazing, and disease and insect infestations. These stands will no longer support frequent light fires in the summer due to the buildup of fuels. Without treatment most fires in these stands will be of a high severity, resulting in the loss of the majority of the trees through root, cambium, and foliage scorching or burning (Slaughter, 1999).

Hot dry summers and cool dry winters characterize the area. This reduces the rate of organic matter decomposition such that natural fuels build up faster that the rate of decomposition. In the absence of fire this buildup of fuels may reach levels that support high intensity, severe fires, which damage the soil, water and plant resources of the area (Slaughter, 1999).

Shade-tolerant grand fir occurs in the understory and overstory of both the warm and cool dry forests. Its density was previously limited by fire, as it is easily damaged or killed by fire, especially when young (see Table 3.16). Grand fir has a relatively short life span compared to Ponderosa pine and Douglas-fir. This short life span combined with a susceptibility to insect and disease has resulted in the relatively rapid build-up of a heavy fuel load of grand fir since fire exclusion began. With fire exclusion and increasing canopy closure, grand fir has been able to expand and occupy more sites. This expansion has been to the detriment of shrubs and other ground cover as it has reduced available growing space and increased shading of the ground. The grand fir serves to increase ladder fuels as it is not self-pruning and grows rapidly in dense stands.

Table 3.16—Major tree species and their response to fire

Tree Species	Response to fire
Western juniper – Avoider	Easily killed at young or mature stages
Ponderosa pine – Resister	Has thick bark that develops at an early age
Douglas-fir – Resister	Has thick bark when mature but susceptible to fire when young
Western larch – Resister	Has thick bark that develops at an early age
Grand fir – Avoider	Thin bark when young but moderately resistant when mature
Quaking aspen – Endurer	Thin bark, easily top-killed, but sprouts readily after burning. (Agee, 1994)

Junipers were primarily limited to dry rocky areas prior to grazing and fire exclusion. In the dry rocky areas fire was effectively excluded due to the lack of fuel. As junipers developed the available fuel on a site increased, but the arrangement changed from horizontally continuous to a vertical arrangement with little horizontal continuity. For fire to impact junipers the fire must be wind-driven and spot into the juniper, or individual junipers must be treated by hand. Two areas of juniper expansion within the Rimrock Analysis Area were identified in the Wall Watershed Ecosystem Analysis. These sites of juniper expansion are the Sunflower Flats site and the Little Wilson Creek area.

Fire History

The Rimrock Analysis Area shows several large wildfires (greater than 10 acre) within the boundary during the last 41 years. The most recent large wildfire occurred in 1998 (East Indian Fire) and was 99 acres in size. Several large wildfires have also occurred to the east and west of the analysis area, the Wheeler Fire (1996) and the Ditch Creek Fire (1961).

Although large wildfire history is available, data for small fires (less than 10 acres) was limited. Umatilla Forest GIS coverage for small fires show areas where small fires have occurred, but no data could be found for size and dates of these fires. Therefore information on the number, size class and frequency of occurrence cannot be generated.

During summer months, lightning is the main cause of fire starts while man-caused ignitions are highest during and surrounding hunting season (Clark, 1993).

Past Treatment

The Rimrock analysis area shows signs of past treatment, primarily through timber sale activities, prescribed fire and fire suppression.

Prescribed fire has been used extensively in this watershed (Wall) compared to other watersheds on the forest. However, in comparison to the total number of acres in the watershed, the actual percentage of acres treated is low. Many of the critical subwatersheds have received little if any treatment by fire. Prescribed fire use has been focused on the ponderosa pine dominated stands and in closely associated juniper plant groupings. Most or all the burns to date have been conducted in the spring when the duff and soil moisture is high. Under these conditions only, the fine fuels are consumed and only minor damage to the trees and other vegetation occur. These stands generally have not had an excessive fuel loading prior to burning. Fires occurring in areas that have been prescribed burn are usually easier to control. Little if any fire has been used in the cool grand fir and in the ponderosa stands. It is in the cool grand fir and in the warm grand fir that the largest potential for a destructive wildfire presents itself. (Robertson 1996).

Current Condition of Area Infected by Douglas-fir Tussock Moth

An area inspected is located in Township 8 South, Range 27 East, sections 8 and 17, south of forest service road 24. This area is located at an elevation of 3,600 feet with west and northwest aspects. Slopes ranged from 20 to 100%.

The heaviest concentration of infestations is located on southern and western aspects where environmental conditions supported stress conditions for vegetation. On these western and southern slopes, temperatures are higher and moisture levels are lower due to solar radiation. Because of solar radiation and the inclined topography these aspects are reactive to changing weather conditions. It is also these aspects that experience more frequent fire activity than eastern or northern slopes.

The tree stands inspected displayed an area heavily defoliated by the tussock moth and exhibited a large component of "dead and standing" trees. It can be estimated that about 90% of the trees showed signs of defoliation, with about 80% showing complete mortality. Certain areas showed heavier impacts than others. The remaining 20% of the affected trees, showed signs of recovery in the form of new growth on branch tips, usually within 12 inches of branch ends. New growth amounted to less than 5% of the trees canopy. Although these trees displayed signs of life it is questionable whether these trees will survive over a period of time. Upon close inspection, defoliated tree canopies showed a large amount of dead, cured, small woody material with fine hair-like lichen within the canopy structure, which would easily support fire spread. Ladder fuels on smaller trees were also present and have the ability to support fire spread from ground level to canopies of larger trees. Canopies have the ability to emit embers and be receptive beds for embers.

Ground fuels consisted of grasses and brush, dead and down woody material averaging 6-8 tons/acre, consisting mainly of old unburned logging slash and dead and down trees ranging between 5 to 10 inches in diameter.

Heritage Resources

All of the public lands within the Rimrock Planning Area have been inventoried for heritage resources by several large planning area surveys (Grigsby 1992; Moody 1993; Jaehnig 1995a and b; and DeWitt 1999). As a result of these inventories, a total of 83 heritage properties have been identified within the current project area. Twenty-six of these sites are prehistoric, 16 are historic, and 41 are isolated occurrences. Of the 42 archaeological properties identified within the planning area none have been formally evaluated, so all are considered potentially eligible to the National Register of Historic Places and require protection from any ground disturbing activities until a determination of eligibility has been reached. Though no formal testing of any of the documented archaeological properties has occurred within the planning area, based upon diagnostic artifacts, it appears that human occupation in this portion of the forest initially occurred about 8,000 years ago.

The project area lies within the ceded lands of the Confederated Tribes of the Umatilla (CTUIR). In 1974, Robert J. Suphan compiled an ethnographic report pertaining to the sociopolitical organization and land use patterns of the Indians who occupied the Blue Mountains of northeast Oregon. Suphan utilized ethnographic material published by several ethnographers and information gathered from elderly Umatilla, Cayuse, and Walla Walla Indians who participated on oral interviews and field survey trips undertaken in 1941. The informants identified two subsistence areas that were used for fishing, hunting, and root digging near the “forks of Wall Creek”. It is unclear from the given description for each of these sites if they are indeed located on forest system lands. Currently, there are no known Native American religious sites within the project area.

Transportation

Specialist Report

This FEIS hereby incorporates by reference the Transportation Plan Specialist Report in the Project Record (40 CFR 1502.21). The Transportation Plan Specialist Report is located in section 4 of the Project Record and contains the detailed data, methodologies, analyses, conclusions, maps, references, and technical documentation that the transportation specialist relied upon to reach the conclusions in this FEIS.

There are approximately 212 miles of system roads on National Forest System lands within the Rimrock Analysis Area. Of this total, 114 are open to the public and 98 miles are closed to public but maintained for administrative access (such as fire suppression, fence maintenance, etc.). The District Motorized Access and Travel Management Plan (1992) discusses in detail management objectives and access needs for this area.

The roads in the Rimrock planning area are in place and no new roads would be constructed. The majority of the roads are adequate for timber haul with just road maintenance needed. The major haul routes are Forest Roads 2128, 2300 and 2400. Road 2200 (FS Rd 22) is a two-lane county road. These are high standard roads with wide running surfaces and many turnouts. The proposed action does not call for resurfacing but deposits from the timber sales would be required and used at a later date to resurface these roads with Roads 23 and 24 being the priority.

Road 23 is a major access point to the National Forest from the Monument area. A counter was installed in the fall of 1998 and left though the fall of 1999 and showed heavy use during the fall hunting seasons with moderate use in the summer. This road fords Wall Creek in two locations and is a source of sediment into the creek.

Non-Forest Vegetation

Specialist Report

This FEIS hereby incorporates by reference the Noxious Weed Specialist Report in the Project Record (40 CFR 1502.21). The Noxious Weed Specialist Report is located in section 4 of the Project Record and contains the detailed data, methodologies, analyses, conclusions, maps, references, and technical documentation that the noxious weed specialist relied upon to reach the conclusions in this FEIS.

Noxious Weeds

Transportation corridors and recreation sites appear to be the focal points of noxious weed infestations on the Heppner Ranger District. Scotch Thistle (*Onopordum acanthium*) is becoming increasingly abundant on the District, especially along main roads that enter the Forest from adjacent private agriculture lands. Diffuse Knapweed (*Centurea diffusa*) is the most abundant noxious weed on the District for which sighting forms are still maintained. The distribution of this species is positively correlated with well-traveled roads, particularly the Heppner-Monument Road (FS Road 22). Although Canada Thistle still appears in the Districts database of noxious weeds, the task of tracking this species has become too time-consuming and expensive for the District to pursue.

There are six inventoried, high priority weed species within the Rimrock Planning area (see map 7). Scotch Broom (*Cytis*us *scoparius*), diffuse knapweed (*Centaurea diffusa*), hounds tongue (*Cynoglossum officinale*), tansy ragwort (*Senecio jacobaea*), Klamath weed (*Hyupericum perforatum*) and scotch thistle (*Onopordum acanthium*) are the weed species represented within these infestations. These species are rated as high priority weeds because they are invasive, persistent, and prolific reproducers. They displace desirable vegetation, and presently occur in infestations at scales that are feasible to treat. It is anticipated that more infestations actually occur than are inventoried.

These high priority sites, treated on an annual basis, are either decreasing in area of occupation or are remaining static. Primary mechanisms of dispersal appear to be: road vehicles, bird excrement, recreationists, wind, logging equipment and water (see Table 3.17).

Table 3.17 Noxious weed occurrence with the Rimrock Analysis Area

Noxious Weed Species	Treatment Prioritization Category	Remarks
diffuse knapweed *Centaurea diffusa*	Established	Spread by animals, wind, vehicles
hound's tongue *Cynoglossum officinale*	New Invader/Established	Tolerates shade; spread by animals, clothing, water
tansy ragwort *Senecio jacobaea*	New Invader	Infestations usually coincide with hunter's camps; source contaminated straw or livestock feeds. Poisonous to livestock.
Klamath weed *Hyupericum perforatum*	Established	Spread by animals, wind, and vehicles. Poisonous to livestock.
Scotch Broom *Cytisus scopatius*	New Invader	Very few infestations found in East Cascade mountains.
Scotch thistle *Onopordum acanthium*	New Invader/Established	Plants can reach 7' in height.

Threatened, Endangered, Proposed and Region 6 Sensitive Species (Botanical)

This area was surveyed between 1988 and 1995. *Allium madidum, which was delistd in 1992, and Mimulus washingtonensis*, which was delisted in 1999, were both found in the project area. The Regional Forester's Sensitive Plant Species List was updated in May 1999, and includes two species that are or may be present. The newly added plants are *Carex crawfordii* and *Carex interior*, both sedges that grow in moist or wet areas. The potential habitat for these two sedges was surveyed in August 1999. Neither species was found in the project area.

There are three plant species listed as species of concern by the Fish and Wildlife Service. *Mimulus washingtonensis* var. *washingtonensis* is present in the project area, but is considered common enough that it was dropped from both the Oregon Natural Heritage Program and the Regional Forester's Lists. *Myosurus minimus* spp. *apus* is not on the Regional Forester's List because it has not been found on Forest Service holdings. It grows in the same habitat as *Mimulus washingtonensisi*, which has been surveyed for extensively and thoroughly, so if it was present it should have been found in the *Mimulus* surveys. *Thelypodium eucosum* is present approximately 3 miles south of the proposed project area, but after extensive searching has not been found in the proposed project area.

Silene spaldingii is proposed for federal listing and known to occur on the Umatilla National Forest. *Silene spaldingii* occurs primarily in open grasslands with deep Palousian soils. There are no populations in the vicinity of the Rimrock project area.

Wildlife Habitat

Specialist Report

This FEIS hereby incorporates by reference the Terrestrial Wildlife Specialist Report in the Project Record (40 CFR 1502.21). The Terrestrial Wildlife Specialist Report is located in section 4 of the Project Record and contains the detailed data, methodologies, analyses, conclusions, maps, references, and technical documentation that the terrestrial wildlife specialist relied upon to *reach the conclusions in this FEIS.*

Insect, disease, selective harvest and lack of natural fire have changed wildlife habitat structure in the analysis area. Forested habitats have been converted to mid/late seral stages that are dominated by mixed conifers.

Old growth ponderosa pine forests, riparian hardwood shrub corridors, and aspen stands have suffered substantial declines in the analysis area. The analysis shows that over 75% of the old growth ponderosa pine have been lost, mostly as a result of widespread selective harvest in this century, lack of fire and past management (Wall Ecosystem Analysis 1995). The majority of the analysis area is dominated by shade tolerant climax species like grand fir. This vegetation type accounts for about one third of the currently forested acreage. Because of previous selection harvesting much of the remaining old growth is highly fragmented and poor quality due to its open condition.

Snags and down logs were inventoried in 1994 (using 1992 stand exam data) on several plots within the analysis area. Based on the data compiled from those plots, snag densities currently meet both Forest Plan standards and guidelines and Forest Plan Amendment #11.

Management Indicator Species (MIS)

These are species selected by the Forest Plan to represent the welfare of a larger group of wildlife species presumed to share the same habitat requirements. Table 3.18 lists the seven management indicator species for the Umatilla National Forest and the habitat types they represent. Not all Forest Plan management indicator species occur in the analysis area because of the lack of suitable habitat.

Table 3.18 Management Indicator Species for the Umatilla National Forest

Species	Habitat Types
Steelhead (anadromous fish)	Streams/riparian habitats
Rainbow trout (resident)	Streams/riparian habitats
Rocky Mountain elk	General forest habitat and winter ranges
Pileated woodpecker	Dead/down tree habitat (mixed conifer) in mature and old growth stands
Northern three-toed woodpecker	Dead/down tree habitat (lodgepole pine) in mature and old growth stands
Pine marten	Mature and old growth stands at high elevations
Primary cavity excavators	Dead/down tree (snag) habitat

Rocky Mountain elk, northern three-toed woodpecker, and several primary cavity excavators inhabit the Rimrock Planning Area. The dry forest type on the south end of the analysis area is largely an open ponderosa pine type and not considered suitable for the pileated woodpecker. However, signs of pileated woodpecker foraging are found throughout the analysis area. **Pine marten** is not expected to occur in the analysis area. It prefers moist forest types greater than 4,000 feet elevation with developed riparian areas and high down wood densities. These habitat features do not occur in the analysis area. **Steelhead** and **Rainbow trout** are discussed on page 61, within the Fish and Aquatic Habitat section of this chapter.

Rocky Mountain Elk was traditionally not in the planning area until the late 1960's and early 1970's (R. Krein, ODFW, personal communication. 1995). Summer and winter foraging habitat for the elk consists of grasses and shrubs currently occupying the area. A large amount of marginal cover (21,608 acres) occurs in the analysis area. Stands defined as marginal cover will be no less than 10 feet in height with a canopy of at least 40 percent and capable of hiding 90 percent of a standing elk at a distance of 200 feet. These sites generally contain large trees with a canopy cover greater than 60 percent and a patchy understory component of small trees (greater than 10 feet in height). This composition provides some cover (hiding, thermal, escape, etc.) for elk using the area. There are 10,938 acres that meet Forest Plan guidelines for satisfactory cover. Stands defined as satisfactory cover are 40 feet or more in height with a canopy closure of at least 70 percent and are capable of hiding 90 percent of a standing elk at a distance of 200 feet.

The analysis area is important for elk calving and rearing. Ground cover concealment, often in the form of shrubs, down wood, or broken terrain, is important for elk calving. Calving occurs in areas where open forage is adjacent to good escape cover. This type of habitat is located throughout the analysis area.

Currently, open road densities are 1.57 miles per square mile in the analysis area. This is just above the recommended density of 1.5 by the Oregon Department of Fish and Wildlife (ODFW) and below the forest-wide average of 2.0 miles per square mile. The district's Access and Travel Management Plan objective was 1.51 miles per square mile.

The **pileated woodpecker** requires old growth habitat that includes snags and logs, high canopy closure, and a multi-layered forest. This type of habitat is not abundant in the analysis area. However, the pileated woodpecker has been observed foraging throughout the analysis area.

The **northern three-toed woodpecker** is believed to occur in the analysis area because of available habitat. However, no observation records of its presence exist. It is an indicator species for mature and old growth lodgepole pine forest habitat (C2). The northern three-toed woodpecker also inhabits older Douglas-fir forests. There are no old growth lodgepole pine areas, but the Dedicated Old Growth (C1) patches scattered within the planning area function as viable habitat.

Primary cavity excavators refer to several woodpecker species that use dead and down tree habitat. The following species occur in the analysis area: black-backed woodpecker, hairy woodpecker, downy woodpecker, red-naped sapsucker, Williamson's sapsucker, Lewis' woodpecker, white-headed woodpecker and the northern flicker. These species tend to prefer larger dead standing trees to construct cavities for nesting and roosting. In addition, they forage primarily on dead standing trees, on down logs, and or on the ground.

Neotropical Migratory Birds (NTMB)

Neotropical migrants account for nearly half of the avian species diversity in the watershed, and occupy a wide variety of habitats. Most birds in eastern Oregon ponderosa pine forest are "foliage-gleaners", which forage primarily by collecting insects or fruit from vegetation rather than from the ground (Sallabanks et al. 2001). Three habitat types are considered priority in the Northern Rocky Mountains Bird Conservation Strategy Plan (Altman 2000): Dry Forest, Mesic Mixed conifer, Riparian woodland and shrub. Additional unique habitats are also important.

Dry Forest

This habitat type is characterized as coniferous forest composed exclusively of ponderosa pine or dry stands codominated by ponderosa pine and Douglas-fir or grand fir, generally at lower elevations and mostly on xeric, upland sites with shallow soils. Greater than 90% of the Rimrock analysis area consists of this type of habitat. The desired condition is a large tree, single-layered canopy with an open, park-like understory dominated by herbaceous cover, scattered shrub cover, and pine regeneration. The conservation focus includes the following habitats conditions: large patches of old forest with large trees and snags; old forest with interspersed grassy openings and dense thickets; open understory with regenerating pines; and patches of burned old forest. Within the Rimrock area, patches of old forest are small and widely scattered. Patches of burned old ponderosa pine are not available. Areas with open understory and regenerating trees are scarce. There are small patches of old forest with interspersed grassy openings and dense thickets (e.g. Willow springs, Grassy Butte area, upper Little Wilson).

Mesic Mixed Conifer (Late-Successional)

These are primarily Douglas-fir and grand fir sites that are generally higher elevation, wetter, on northerly aspects, and in draws where soils are mesic. The desired condition is a multi-layered old forest with a diversity of structural elements (snags, sense shrub patches, high canopy closure). The conservation focus includes the following types of habitats: large snags; overstory canopy closure; structurally diverse and multi-layered; dense shrub layer in forest openings or understory; and edges and openings created by wildfire. The analysis area currently contains only 50 acres of cold late successional mesic mixed conifer stands; however there may be patches within other successional stage stands that did not map out.

Riparian Woodland and Shrub

The desired condition is a structurally diverse vegetative community of native species that occur in natural diversity relative to hydrological influences. The conservation focus includes the following habitat conditions: large snags; canopy foliage and structure; willow/alder shrub patches. Riparian vegetation is particularly important to Neotropical migratory songbirds (Sallabanks et al. 2001). Overall the riparian habitat for terrestrial wildlife in the Rimrock Watershed is in relatively good condition, although livestock grazing, road building, and dispersed camping has negatively impacted riparian habitat quality in some areas. Major streams include Wilson, Big Wall, South Fork Wall, Indian, Porter, and Lost Canyon creeks. Numerous seeps, springs, and wet meadows also occur in the analysis area. Happy Jack Spring and Willow Spring in particular provide a unique juxtaposition of riparian, forest openings, canopy cover, and old growth ponderosa pine. Twelve small stands of aspen are found within the watershed, and one three way exclosure occurs on upper Big Wall Creek.

Unique Habitats

The conservation focus includes the following types of habitats: subalpine forest; montane meadows; steppe shrublands; aspen; and alpine. Subalpine and alpine habitats are not found in the analysis area. Wilson Prairie and other small meadows provide montane meadow habitat. Aspen is discussed in riparian above. Some steppe shrubland occurs in the Sunflower and Rocky Flats area.

Threatened and Endangered Species

Threatened and endangered species are species that are managed under the Endangered Species Act to ensure that federal actions do not result in a downward population trend. The species addressed below are documented in the analysis area, or their habitat potentially occurs in the analysis area.

Suitable nesting and foraging habitat for the **northern bald eagle** is present in the analysis area (Anthony and Issaces, 1981). Bull Prairie Lake and the North Fork John Day River could provide feeding and nesting habitat for eagles (Anthony etal, 1982). Wintering bald eagles are observed within the analysis area; typically from December through mid-March each year.

An active bald eagle nest was found May 1994 south of the Ant Hill Lookout. This is approximately one mile outside the analysis area boundary. More information on the bald eagle and the nest site can be found in the Site-Specific Management Plan for the Dry Creek Bald Eagle Nest Site.

The United States Fish and Wildlife Service has listed the **Canada lynx** as threatened under the Endangered Species Act. Rare furbearer surveys, which target wolverine, fisher, American marten, and lynx, have been conducted on the District and within the analysis area since 1991. There have been no documented or reported sightings in the analysis area. The Lynx Conservation Strategy (January 2000) describes Lynx Analysis Units (LAUs) which include geographic extent, lynx population distribution, habitat, and risk factors specific to home range. Analysis done during the winter of 2000 shows no LAUs in the Rimrock analysis area.

Gray Wolf is listed as threatened in Oregon. Historically, wolves occupied all habitats on this Forest. Recently, a collared wolf (B-45) from the experimental, non-essential Idaho population traveled to the three Blue Mountain National Forests and stayed until she was captured and returned to Idaho (Cody 1999). A second gray wolf was found dead on I-84 near Baker City. The third gray wolf was shot in October 2000 north of Ukiah, Oregon on highway 395. This indicates the planning area is probably suitable habitat for wolves.

Region 6 Sensitive Species (Terrestrial)

The Regional Forester recognizes these species as needing special management to prevent their being placed on Federal or State threatened or endangered species lists.

The **California wolverine** has not been observed and is not known to occur in the analysis area. Surveys conducted since 1991, for wolverine, fisher, American marten and lynx have been conducted across the District, including the analysis area. Wolverine tracks were observed on 2/18/94 while running the Kelly Route near the 2105 road on Ellis Creek (about 25 miles east of the analysis area). Wolverine presence has been documented in surrounding areas. One wolverine was confirmed by a hair sample collected near Rock Creek Lake (Wheeler County) in 1985. A second animal was trapped in 1986 west of Fossil, Oregon, about 30 miles west, northwest from the analysis area. Natal denning habitat does not occur within the analysis area.

The **peregrine falcon** was not included in this analysis because eyrie habitat does not occur in the area. Potential nesting habitat is greater than 5 miles from the area and generally too far for foraging falcons. Peregrines have been observed foraging across the District and near the analysis area but not during the breeding season.

Gray flycatcher The flycatcher has not been documented in the analysis area or on the Heppner Ranger District. Nesting habitat for this species is not abundant in the analysis area.

Species of Interest

The **northern goshawk** and the **white-headed woodpecker** are known to occur in the analysis area (Heppner Ranger District Wildlife Database) and the **spotted frog** is suspected to occur. Potential nesting and foraging habit for the goshawk and white-headed woodpecker is scattered throughout the analysis area. Suitable habitat for the frog occurs in wetlands along Indian Creek, Wilson Creek, Wall Creek, Bull Prairie and in the wet meadows and springs throughout the analysis area.

The **Pacific western big-eared bat** (Townsend's big-eared bat) has not been observed or is known to occur in the analysis area. Potential habitat in the analysis area would include hollow trees, snags, or rock crevices as temporary day or night roosting habitat for individuals. The analysis area has not been surveyed for bat presence (mist-net or bat detection devices)(Perkins and Schommer, 1992). However, ocular surveys have been conducted during unit recon in the area to evaluate habitat and potential roost sites. No roost colonies or hibernacula were found in the analysis area.

Past and Present Activities

Past (<20 years) and present (ongoing) actions in the Rimrock Project area include, timber harvest; fuelwood harvest; salvage harvest; reforestation; livestock grazing; installation of improvements (fences, water developments, etc.); road construction; road maintenance; dispersed recreation (camping, hunting, fishing, etc.); mushroom harvest; and prescribed burning. In general, these actions affect a small portion of the analysis area at any one point in time and limit the intensity and duration in the analysis area. However, changes to forest structure, vegetative composition, and access have occurred within and adjacent to the analysis area.

Economics/Social

Specialist Report

This FEIS hereby incorporates by reference the Socioeconomic Specialist Report in the Project Record (40 CFR 1502.21). The Socioeconomic Specialist Report is located in section 4 of the Project Record and contains the detailed data, methodologies, analyses, conclusions, maps, references, and technical documentation that the socioeconomic specialist relied upon to reach the conclusions in this FEIS.

Changes in levels of resource use associated with the Rimrock Project may affect the major social and economic characteristics of the surrounding geographic area. The affected area or impact zone for the Umatilla National Forest consists of Grant, Morrow, Umatilla, Union, Wallowa and Wheeler counties in Oregon and Asotin, Garfield, Columbia and Walla Walla counties in Washington. These counties are encompassed within the Pendleton and Spokane Bureau of Economic Analysis regions. Agriculture, manufacturing (particularly wood products), and food processing are important sources of employment and income in this region. Grant County, for example, has a low level of economic diversity, a high dependence on federal timber and forage, and a low resiliency for change. Reliance on timber and forage from federal lands is moderate to high in several counties in the impact zone (Haynes et al. 1997).

Many communities in the impact zone are closely tied to the Forest in both work activities and recreation. Several communities such as Heppner, Ukiah, Fossil, Canyon City, and Enterprise are geographically isolated from the closest larger cities such as Pendleton, Walla Walla, and La Grande (Reyna et al. 1998).

Refer to the Umatilla National Forest, Land and Resource Management Plan, Final Environmental Impact Statement, Appendix B, for further detailed description of the main social and economic characteristics of the area (USDA 1990).

Range

Specialist Report

This FEIS hereby incorporates by reference the Range Specialist Report in the Project Record (40 CFR 1502.21). The Range Specialist Report is located in section 4 of the Project Record and contains the detailed data, methodologies, analyses, conclusions, maps, references, and technical documentation that the range specialist relied upon to reach the conclusions in this FEIS.

The Rimrock analysis area lies within portions of the Hardman, Little Wall and Tamarack-Monument grazing allotments. Livestock grazing is permitted on each of these allotments within the sale area. The exact dates and locations at which grazing may occur vary from year-to-year according to the Terms and Conditions in the Term Grazing Permit and Annual Operating Instructions (AOI). Permitted season for the following allotments are:

Hardman Allotment - 6/1 through 9/30

Little Wall Allotment - 5/25 through 10/19

Tamarack-Monument Allotment - 5/1 through 09/15

The Term Grazing Permit that authorizes grazing on National Forest System Lands outlines the terms and conditions for each permittee on each allotment. The pasture rotation, number of livestock, season of use and grazing standards are implemented annually through Annual Operating Instructions (AOI).

Allotment management is implemented through the use of grazing systems that are designed to match livestock numbers, class, time, distribution and duration of grazing to the climate, precipitation, soil, topography, and vegetative conditions unique to each pasture. Grazing systems, once designed to maximize mid and late summer grazing capacity, have been changed to better match the cool temperatures and precipitation of late spring and early summer that exists on much of the District.

Since the early 1990s concern for riparian resource conditions has necessitated a dramatic increase in the intensity of allotment and livestock management. These concerns have led to much more intensive and thorough herding to keep livestock out of sensitive riparian areas. Monitoring results show that improved herding, salting and watering has contributed to improved resource conditions

Use of structural improvements (allotment & pasture fences, riparian exclosures, temporary electric fencing, and water ponds/troughs) to control livestock distribution and protect riparian areas has dramatically increased since the early 1990s. Numerous permanent fences have been constructed to better control livestock access to riparian areas. Temporary electric fencing has also been used effectively to control livestock. Although less effective than permanent fencing, electric fences can be constructed quickly, inexpensively and often with less ground disturbance than permanent fences. Electric fencing also provides permittees with a management tool that can be implemented and adapted quickly to site-specific needs. Permittees on the Hardman and Tamarack-Monument allotments are using water developments and salting to draw livestock to upland water sites. This is particularly important during the mid and late summer when air temperatures are at their highest and cattle congregate in the cooler riparian areas.

Monitoring

The range Goal and Riparian Forage Utilization standards found in the range section of the Forest Plan (4-63 & 64) are the principal standards used to determine the effectiveness of range management practices. Standards from the Forest Plan (as amended) are incorporated into all Annual Operating Plans (AOP's) to ensure that proper management occurs on the allotments. Utilization standards for forage and browse use are set at a level at which plants can be used without the vigor of the plant being diminished. Plants are grazed, but by having time to recover between year-to-year uses, they are able to maintain healthy root systems.

During the years 1992 through 1997 utilization monitoring for the Heppner Ranger District was based on the objective of maintaining or improving stream water conditions. The chosen monitoring method was browse utilization measured according to the incidence of use. In 1998 the monitoring methodology was changed across the Forest. Beginning with the 1998 grazing season, shrub monitoring was replaced with riparian forage (grass/forb) monitoring and grazing permittees were given responsibility for monitoring forage utilization on their allotments.

Forage utilization is monitored on designated key areas throughout the period of time that livestock are in each pasture. Key areas are those areas of suitable range upon which signs of excessive plant utilization or soil disturbance first become evident. They reflect adverse environmental conditions or trends much earlier than other portions of a grazing unit. When soil and forage conditions in these areas are satisfactory, the entire unit is considered satisfactory. Examples of potential key areas are narrow canyons, meadows, ridge tops, benches, and riparian areas. Small areas of unavoidable concentration such as salt grounds, water developments, and trails are not key areas. Measurements of residual stubble height are taken on key species (or groups of species) as designated within the AOP. Key species with utilization standards have been designated for monitoring in key areas of each allotment. Key species are those forage species whose use serves as an indicator to either the degree of use of associated species or the degree of impact on some environmental parameter. Monitoring is done using stubble height measurements as detailed in the Guide to Stubble Height Monitoring and Stubble Height Riparian Area Monitoring Protocol (Wallowa-Whitman and Umatilla National Forests).

Stubble height standards for the Heppner Ranger District have been set at a minimum of six inches for all anadromous streams and four inches for all other streams. When livestock first enter a pasture, monitoring is accomplished on that pastures' key areas at a maximum of two-week intervals unless otherwise directed. When actual use is within one inch of the allowable use standard established for any key area of the pasture, monitoring occurs at least weekly until the standard is reached and/or livestock are removed from the pasture. Measurements are reported to the Ranger District after livestock are removed from each pasture. To ensure consistency and accuracy of the data, the Forest Service spot checks permittee monitoring. Where permittee derived results are significantly different from the Forest Service monitoring (plus or minus a half inch), the permittee and Forest Service jointly conduct monitoring to ensure that proper procedures are being followed.

Little Wall Allotment

Physical Description

The Little Wall Allotment consists of 37,308 acres of which 556 is in the Rimrock analysis area. This entire area is within the Sunflower Flat pasture. This pasture consists of 6,609 acres. The number of acres of each subwatershed is shown in Table 3.19. Two Class I streams (Lovlett and Three Trough) flow through the pasture.

Table 3.19. Little Wall Allotment - acres of pasture and affected watersheds

SWS	Subwatershed	Acres
24A	Little Big Wall	67
24F	Lower Wilson	464
25A	Lower Little Wall	4,321
25B	Upper Little Wall	1,757

Vegetation types within the pasture include dry meadows, bluegrass scabs, south slopes with bluebunch wheatgrass and ponderosa stringers, open ponderosa pine with fescue and elk sedge, and transitory range in the fir/mixed conifer timber types.

Allotment Management

Currently 681 cow/calf pairs are permitted to graze on the Little Wall allotment each year from May 25 through October 19. Also, 90 yearling cattle are permitted from August 1 through September 15. Permitted grazing capacity of the allotment is 3,945 Animal Unit Months (AUM). Capacity of the Sunflower Flat pasture is 962 AUMs.

The current AMP for the Little Wall allotment was completed in 1984. Since this time, additions and modifications have been made in AOP's to bring current management into conformity with the Forest Plan as well as limitations and opportunities created by changes in resource conditions and values.

Vegetation monitoring in 1990 and 1991 indicated that browsing pressure from livestock and wildlife was hindering shrub growth and contributing to degradation of riparian habitat. In 1993 drought conditions prompted the permittees to request authorization to take non-use for resource protection and were authorized to graze 440 head of cattle. Since 1994 partial non-use of the permitted numbers has been required and has been granted to the permittees. As the drought conditions of the early 1990s ended, management efforts increased and riparian conditions improved. Since 1994 the number of authorized cattle has been raised to 450 head. Current allotment management uses a rotational grazing system. The Sunflower Flat pasture is grazed in June during odd years and July in even years.

Since early 1992 management on the Little Wall allotment has relied on low stocking rates (light grazing intensity of 13.4 acres per AUM) herding, salting, electric fencing and monitoring to maintain livestock distribution and protect riparian resources from livestock induced degradation. So far these management practices have proven very effective in improving riparian resource conditions on the allotment.

Monitoring

One upland Condition and Trend transect is located within the Sunflower Flat pasture. This transect was last read in 1983. At that time range condition was fair and trend was upward. Due to the heightened concern for riparian resource conditions, monitoring emphasis over the last decade has shifted from upland to riparian resources. As a result, this transect has not been read since the 1983.

In 1995 a "Greenline" monitoring transect was established on Three Trough Creek. This transect is scheduled to be re-read in the summer of 2000. Photopoints have also been established at other riparian locations in the Little Wall allotment. All areas show a maintenance or increase in vegetative cover along streambanks and gravel bars.

From 1992 through 1997 riparian shrub utilization was the preferred monitoring practice. However, beginning in 1996 and 1997 riparian grass utilization was also measured. In 1998 shrub utilization monitoring was discontinued and 3 riparian areas were monitored for grass utilization. Transects are located in Lower Little Wall subwatershed. Post-grazing stubble height in each of these areas met or exceeded the 6” minimum established standard.

Structural Improvements

Structural range improvements within the Sunflower Flat portion of the analysis area include 28 water developments and 8.3 miles of permanent fence. In 1998 the permittee installed 12 miles of electric fence to protect riparian areas and improve overall livestock control. This fencing was very effective in controlling livestock distribution and minimizing access to riparian areas that were commonly used by cattle in previous seasons.

Hardman Allotment

Physical Description

The Hardman allotment consists of 20,859 acres of which 20,468 is within the Rimrock Analysis area. The allotment is divided into six grazed pastures (Grassy, Whitetail, East Wildcat, West Wildcat, East Wilson and West Wilson) and three riparian exclosures (Porter, Upper Wilson and Lower Wilson) all of which are within the analysis area. The number of acres of each pasture and subwatershed are shown in Table 3.20. Three Class I streams (Big Wall, Porter and Wilson) flow through grazed and ungrazed areas of the allotment

Vegetation types within the allotment include dry meadows, bluegrass scabs, south slopes with bluebunch wheatgrass and ponderosa stringers, open ponderosa pine with fescue and elk sedge, and transitory range with some fir/mixed conifer timber types.

Table 3.20. Hardman Allotment - acres of pasture and affected watersheds

SWS	Subwatershed	E. Wildcat	W. Wildcat	E. Wilson	W. Wilson	Grassy	Whitetail
21A	Upper Kahler					78	
21B	Lower Kahler						11
24A	Lower Big Wall			2,395			
24B	Middle Big Wall		37		1,155		10
24C	Upper Big Wall				182	4,365	164
24D	Porter						1,781
24E	Upper Wilson		24			112	3,955
24F	Lower Wilson	1,650	732	1,546	1,585		4
25A	Lower Little Wall	14		350			
Total acres		1,664	793	4,291	2,922	4,555	5,925

Allotment Management

Currently two permittees are permitted to graze 322 cow/calf pairs each year from June 1 through September 30. Permitted grazing capacity of the allotment is 1,729 Animal Unit Months. Capacity of each pasture is as follows: East Wildcat (128 AUM), West Wildcat (255AUM), East Wilson (354 AUM), West Wilson (198 AUM), Grassy (354 AUM), Whitetail (439 AUM).

The current Allotment Management Plan (AMP) for the Hardman allotment was completed in 1981. Vegetation monitoring in the late 1980s indicated that browsing pressure from livestock and wildlife was hindering shrub growth and contributing to degradation of riparian habitat. Since early 1992, management on the Hardman allotment has relied on moderate stocking rates (average grazing intensity of 11.8 acres per AUM), herding, salting, fencing and monitoring to maintain livestock distribution and protect riparian resources from livestock induced degradation. Since this time additions and modifications have been included in the AOP's to bring current management into conformity with the Forest Plan as well as limitations and opportunities created by changes in resource conditions and values. So far these management practices have proven very effective in improving riparian resource conditions on the allotment

Monitoring

One upland Condition and Trend transect is located within the Hardman allotment. This transect is located in the Whitetail pasture. This transect was last read in 1992. At that time the area was in good range condition and the trend was stable.

From 1992 through 1997 riparian shrub utilization was the preferred monitoring standard. However, beginning in 1996 and 1997 riparian grass utilization was also measured. In 1998 shrub utilization monitoring was discontinued and 8 riparian areas were monitored for grass utilization. Transects are located in sub-watersheds 24B, 24C, 24E, 24F, and 25A. Post-grazing stubble height in each of these areas exceeded the minimum established standard.

Structural Improvements

Structural range improvements within the Hardman allotment include 61 water developments and 38 miles of permanent fence. In 1991, an exclosure was built to exclude cattle from approximately three miles of Wilson Creek. In 1997, the exclosure was extended to exclude livestock from the entire length of Wilson Creek that flows through the Hardman allotment. An exclosure was also built to exclude livestock from that segment of Porter Creek that runs through the National Forest. Approximately five miles of electric fencing is also used each year to limit livestock access to other riparian areas throughout the allotment. So far, this fencing has been effective in restricting livestock access to riparian areas.

Tamarack-Monument Allotment

Physical Description

The Tamarack-Monument allotment consists of 38,866 acres of which 18,579 are within the Rimrock analysis area. The allotment is divided into seven grazed pastures (Rail Canyon, Thorn Butte, Happyjack, Indian Creek, Little Tamarack, Wildhorse and Stalling Butte) and two riparian exclosures - Upper Wall (121 acres) and Lower Wall (278 acres). Portions of all seven pastures and the riparian exclosures are within the analysis area. The number of acres of each pasture within the analysis area is shown in Table 3.21. Three Class I streams (Cannon Creek, Indian and Big Wall) flow through the Tamarack-Monument portion of the analysis area. Of the 5 1/3 miles of Big Wall Creek that flows through the allotment, all but 1/2 mile has been fenced and is excluded from grazing.

Vegetation types within the allotment include dry meadows, bluegrass scabs, south slopes with bluebunch wheatgrass and ponderosa stringers, open ponderosa pine with fescue and elk sedge, and some transitory range in the fir/mixed conifer timber types.

Table 3.21 Tamarack-Monument Allotment - acres of pasture and affected watersheds

SWS	Subwatershed	Rail Canyon	Thorn Butte	Indian Creek	Happyjack	Little Tamarack	Wildhorse	Stalling Butte
21A	Upper Kahler							25
24A	Lower Big Wall		4	242	2,971			
24B	Middle Big Wall		7		578	75	5,093	
24C	Upper Big Wall						3,459	
24G	Indian Creek	121	23	5,538	45			
Total acres		121	34	5,780	3,594	75	8,552	25

Allotment Management

Currently, five permittees are permitted to graze 501 cow/calf pairs on the Tamarack- Monument allotment each year from May 1 through September 15. Permitted grazing capacity of the allotment is 3,372 Animal Unit Months. The permitted grazing capacity of each pasture is as follows: Rail Canyon (221 AUM), Thorn Butte (498 AUM), Indian Creek (725 AUM), Happyjack (521 AUM), Little Tamarack (331 AUM), and Wildhorse (625 AUM), Stalling Butte (451 AUM). Through changes in Annual Operating Plans, authorized capacity has been adjusted to the following: Rail Canyon (348 AUM), Thorn Butte (564 AUM), Indian Creek (389 AUM), Happyjack (279 AUM), Little Tamarack (331 AUM), and Wildhorse (478 AUM), Stalling (322 AUM).

The current AMP for the Tamarack-Monument allotment was completed in 1980. Vegetation monitoring in the late 1980s indicated that browsing pressure from livestock and wildlife was hindering shrub growth and contributing to degradation of riparian habitat. Since the mid 1990s management on the Tamarack-Monument allotment has relied on low stocking rates (average grazing intensity of 13.9 acres per AUM), changes is livestock class, intensive herding, watering, riparian fencing, and monitoring to maintain livestock distribution and protect riparian resources from livestock induced degradation. Since this time additions and modifications have been included in the AOP's to bring current management into conformity with the Forest Plan as well as limitations and opportunities created by changes in resource conditions and values. So far these management practices have proven very effective in improving and/or maintaining riparian resource conditions on the allotment.

Monitoring

Two upland Condition and Trend transects are located within the Tamarack-Monument portion of the analysis area. These transects are located in the Indian Creek Wildhorse pastures. Both of these transects were last read in 1991; at that time both areas were rated in good range condition with an upward trend.

Structural Improvements

Structural range improvements within the Tamarack-Monument portion of the analysis area include 58 water developments and approximately 18 miles of permanent fence. Temporary riparian fencing has been constructed to exclude livestock from steelhead spawning habitat on Indian Creek (Indian Creek pasture). The Wildhorse pasture will be rested from grazing until fences are constructed to exclude livestock from those portions of Dark Canyon and the South Fork of Wall Creek where spawning habitat for steelhead exists.