CHAPTER 3

AFFECTED ENVIRONMENT

INTRODUCTION

This chapter describes the elements of the environment that could be significantly impacted by implementation of the alternatives under consideration. It describes the present environment and provides background data for the evaluation of environmental consequences presented in Chapter 4. Only those elements expected to be impacted or that have been identified as issues or management concerns are discussed.

RANGELAND RESOURCES

Soils

The soil resources in the Cascade RMP are extremely diverse. This diversity is a result of the variability in parent materials, slope, aspect, location on slope, elevation, climate, vegetative patterns, and time in place.

The soils in the RMP area may be separated into three main groups based on source of parent material and geology. The most extensive group are the soils formed in basalt residuum and colluvium. Many of these soils have been influenced by loess in the upper section of the profile. These soils dominate the north half of the RMP area (Washington, Adams and northern Gem counties). They are very shallow to deep, gently sloping to steep, well drained loam and clay loam soils. Many have greater than 35 percent rock fragments in the profile. They are typified by dark colored surface horizons and well developed subsurface horizons. They occur on old terraces, hills and mountains.

The next largest group consists of soils formed in mixed alluvium and lake laid deposits of the Idaho and Payette formations. These soils occur in the Black Canyon area and the hills and terraces extending north of the Emmett valley into the lower portion of Washington and Gem Counties and portions of Boise County. The soils in the Black Canyon area are moderately deep to deep, very gently sloping to moderately sloping, well-drained silt loams. Many are underlain by a hardpan at depths of 20 to 40 inches. They are typified by light colored surface horizons and moderate to well developed subsurface horizons. These soils are mildly to strongly alkaline. They occur on dissected terraces.

The soils north of the Emmett valley are moderately deep to deep, very gently sloping to steep, well-drained loams grading to coarse sandy loams. These soils are typified by light to dark surface horizons and subsurface horizons with weak to strong development. Alkalinity ranges from mild to strong. They occur on hilly dissected terraces.

The last major group consists of soils formed in residuum and colluvium derived from granitics of the Idaho Batholith. These soils occur on the mountains and foothills of the Boise Front and areas of Boise County. They are moderately deep to very deep, sloping to very steep, well-drained coarse textured soils. They are typified by having light to dark colored surface horizons and weak or no development in the subsurface horizons. The soils in the mountain areas of Boise County (particularly the forested areas) have colder temperatures and receive more moisture than those on the Boise Front.

Soils information for the RMP area was obtained from Soil Conservation Service (SCS) published soil surveys for Gem County Area (1965), Canyon County Area (1972), Payette County Area (1976), Ada County Area (1980), and the Valley Area (1981). Information for Washington and Adams County was obtained from an on-going survey by the SCS in those counties. Publication date for that survey is scheduled for 1989. Boise County soil information was obtained through field work conducted by the BLM in 1984.

Additional soil information and detailed soil maps for the RMP area are on file with the Boise District Office or can be obtained from the SCS.

Of the 487,466 acres in the RMP area, 311,952 acres or 64 percent have been classified as having a high or very high erosion hazard rating1/ (see Appendix A for a breakdown by allotment). The analysis was done on a map unit bases with each map unit assigned an erosion hazard rating. If over 30 percent of the map unit had a high or very high erosion hazard rating, the entire map unit was rated respectively. These ratings were based on the erosion susceptibility factor (k)2/ and slope. Soils on slopes exceeding 30 percent were considered to have a high erosion potential. Soils steeper than 60 percent were rated very high. The rationale behind this is in the event the vegetative cover or soil surface is disturbed, these soils would be highly susceptible to water/wind erosion. Most areas designated with a high or very high erosion hazard are due primarily to the slope factor and not the (k) factor.

Wind erosion is not significant in the RMP area. Some soils developed from sediments are in a moderate or high wind erodability group but these areas are small in extent and are not subject to prolonged high velocity surface winds.

The present erosion situation over the majority of the RMP area where ground cover is sufficient is within the tolerance limits acceptable for rangeland. These are between 1 to 3 tons/acre/year depending on soil characteristics and environmental conditions. The RMP area averages approximately two tons/acre/year soil loss. The current estimated soil loss

1/ The erosion hazard rating is the susceptibility of a soil to erosion when bare of vegetation.

2/ Soils with a (k) factor greater than .45 were considered to have a high erosion potential.

using the Universal Soil Loss Equation (USLE) for the three main soil groups discussed in the physical profile are as follows:

Soils on basalt	- 1.5 to 2.0 tons/acre/year
Soils on sediments	- 2.0 to 2.5 tons/acre/year
Soils on granitics	- 2.0 to 2.5 tons/acre/year
Average for entire RMP area	- 2.0 tons/acre/year

Erosion rates as calculated by the USLE are a function of many factors, most importantly, soil erodability (K factor), slope length and steepness, amount of cover, and rainfall intensity. It is important to note that the above figures are estimates and do not indicate absolute values. No actual measurements have been made and the calculations have been applied over a very broad and diverse landscape. It is also important to note that the USLE calculates long term average rainstorm caused erosion and will not necessarily reflect erosion caused by snowmelt runoff. Spring runoff may contribute significantly to the amount of soil erosion, especially at higher elevations in the RMP area. The USLE is used to measure soil loss from both sheet and rill erosion and does not take into account gully erosion.

Most of the current specific erosion problems are on soils derived from sedimentary and/or granitic parent materials. These are portions of the Boise Front, Black Canyon, and the southern portion of the Crane Creek planning unit. These soils are on steep, poorly vegetated slopes. Past damage has been caused by excessive livestock concentrations in certain areas, fire and fire suppression activities, vehicle use on unpaved roads, on two track trails, and ORV activity. Rill and gully erosion due to ORV use is a serious problem on the Boise Front area.

Another area of concern is along the Snake River canyon and its associated drainages in Washington and Adams counties. These soils, formed in basalt, occur on steep and very steep slopes. Past grazing practices and wildfires have altered or reduced much of the native vegetation. The combination of steep slopes and poor vegetative condition has led to an increase in soil loss and decreased soil productivity.

Many soils in the RMP area with a high or very high erosion hazard are associated with a poor ecological vegetative condition, approximately 65 percent, particularly the sedimentary soils and the lower elevation gently sloping soils on basalt. These areas are characterized by an increase in annual grass species (cheatgrass and/or medusahead wildrye[1/]) and a decrease in perennial species. These areas also include sites that are sparsely vegetated compared to their potential due to some past actions or event. Areas that have a poor ecological vegetative condition have proven less effective in protecting the soil resource. Both plant composition and density are important in their effect on water infiltration rates. Plant density provides a protective vegetative and litter cover for the soil

1/ This is most prominent on the sedimentary areas. Medusahead wildrye seems to prefer soils with heavy textured surface and/or subsurface layers.

surface. This cover intercepts rain drops and dissipates impact velocity. Rain drop impact has a two fold effect on soils. First it causes particle detachment and displacement, and second it causes compaction of the soil surface by sealing pores. Both these actions affect infiltration and runoff. Pearse and Wooley (1936) found that fibrous rooted species (grasses) had greater infiltration rates than tap rooted species (shrubs and forbs). Perennial grass species are more effective than annual grass species. Annual species would provide basically the same surface protection, but are more susceptible to elimination by fire thereby exposing the soil. Perennial species have a much more substantial root system to bind the soil. Also perennial bunchgrasses catch more snow than annuals because of their upright nature, while annuals tend to lie flatter to the soil surface and bend over.

When infiltration rates are decreased the result is an increase in runoff and subsequent soil loss. Eventually this detached soil material enters streams, rivers and other bodies of water degrading these systems.

Also affecting infiltration is the amount of compaction and the resulting increase in bulk density of the soil surface. Trampling by livestock, ORV use, and road building are direct causes of compaction. Under moist soil conditions (spring and early summer) even light trampling can effectively compact the soils. This is especially critical on soils with heavy textured surface horizons. Soil compaction can also reduce vegetative productivity and vigor.

These impacts may be mitigated through identification of compaction prone soils and by appropriate management techniques such as season of use and location of livestock concentration areas. Rauzi and Hansen (1966) observed that concentrations of livestock led to the overuse of vegetation and soil compaction in areas such as floodplains, streamsides, reservoirs, and water facilities. Livestock concentrations around water facilities can lead to long term disturbance of soils and removal of vegetative ground cover. This is already evident in the RMP area.

Another form of erosion similar to water erosion in effect is trampling displacement. Like water erosion, trampling displacement is more evident as slopes increase. The RMP area is very prone to this form of erosion due to the many steep sideslopes utilized by livestock. This form occurs most readily when soils are very wet or very dry.

Implementation of grazing systems may have long-term beneficial effects on soils. Grazing systems that incorporate rest are more effective than annual season long use in most cases. Rest from livestock grazing during critical growing periods would improve plant vigor, reproduction, and litter accumulation thereby increasing the effective ground cover and adding beneficial organic matter to the soil. This would reduce amounts of bare ground and cause beneficial changes in soil structure, permeability and productivity. Demand for vegetative production for livestock and wildlife objectives result in an increased emphasis on soil productivity.

Mechanical treatments and rangeland burning expose large areas of bare soil to erosion initially, but an increase in vegetative cover after the first year lowers the potential for runoff and erosion.

Fire control measures such as dozer built firelines create drainage ways that concentrate overland flow and increase the velocity of water, leading to an increase in erosion. Surface disturbance associated with fire control may be mitigated by such practices as water barring and reseeding. This is especially important on the steep sedimentary and granitic soils. There generally will be a short-term soil loss before fire lines are revegetated.

Road construction can be a major source of erosion. Improper design, poor maintenance, soil compaction, road use, weather, and runoff can result at times in severe erosion problems. Sediment transported from these areas can impact the quality of streams and the associated aquatic community. Roads should be designed and constructed to prevent such damage. Areas with a high probability of road failure should be avoided.

ORV closures and limited use designations protect the watershed by decreasing disturbance and maintaining soil stability. ORV use outside of limited areas results in areas of compacted and displaced soil along with unnatural drainage channels that lead to increased runoff and erosion. This problem is very evident on the Boise Front and in the sedimentary soils in Gem and Payette counties. ORV use of public lands would result in significant impacts to the soils and watershed. Adverse impacts that may occur are reduction of forage production and loss of the hydrological function of the soils. The most obvious accelerated erosion and topsoil losses are caused by this land use. ORV limitations over the entire RMP area have a high probability of reducing such damage.

Activities that may cause an increase in runoff, soil compaction, and erosion or a decrease in water quality or soil productivity may be designed to avoid or mitigate long term impacts to an environmentally acceptable level. Soil resources are evaluated case-by-case as part of activity and project planning. See Appendices A and B and Map 3-3 for additional soils information.

As a result of wildfires during the summer of 1986 and the subsequent alteration of vegetative cover, erosion rates for those areas affected will be increased. Due to quick regrowth in the months following the fires and emergency reseeding efforts on critical erosion areas these increases will be on the order of 1 to 2 tons/acre/year above the normal average. The areas should stabilize in 2 to 3 years.

Air Quality

Under the Clean Air Act (as amended, 1977), BLM-administered lands were given Class II air quality classification, which allows moderate deterioration associated with moderate, well-controlled industrial and population growth. BLM will manage all public lands as Class II unless they are reclassified by the State as a result of the procedures prescribed in the Clean Air Act (as amended , 1977). Administrative actions on the public lands will comply with the air quality classifications for that specific area.

Water Quality

Surface water quality of the perennial streams of the Cascade Resource Area fluctuates widely due to many natural and man caused factors. Because of the many factors involved such as snowmelt runoff, storm events, hydroelectric projects, irrigation returns, road building, mining and livestock grazing, water quality may vary from year to year. Two seasons of "point in time" sampling are only an indication of the low flow quality of these perennial streams on those dates sampled. All samples were taken on BLM land and due to the nature of land ownership patterns, upstream activities impacting water quality will be reflected in these results. Twenty-one perennial streams were sampled during the summer of 1983 and 1984 during low streamflows. Sites and parameters sampled are available at the Boise District Office.

Overall, water quality of these perennial streams sampled was good. However, values for ammonia (4 sites), mercury (2 sites), iron (2 sites), total inorganic nitrogen (12 sites), ortho-phosphate (4 sites), turbidity (2 sites), total dissolved solids (1 site), and fecal coliform bacteria (11 sites) approached or exceeded standards used by the Idaho Department of Health and Welfare (1984).

Sedimentation was unacceptable (more than 25% of stream bottom substrate covered by fine sediments) on eight of the 21 sites evaluated. Streambed sedimentation was evaluated by an ocular method for substrate size percentage on the major perennial streams throughout the area. Most streams had sufficient gradient and flow volume to flush sediment downstream and prevent the covering of gravel and rubble by fine particles. Low gradient areas of the North Fork Payette River and the Weiser River are covered by fine sediments with the North Fork being almost totally a sand substrate. Agriculture is a major contributor to this problem.

Elsewhere poor watershed conditions due to range fires and livestock grazing, and eroding streambanks caused by loss of vegetative cover in riparian areas are the major causes of sedimentation. Best management practices for riparian ecosystems described in the resource management guidelines can substantially reduce sediment reaching streambeds.

Activities associated with agriculture, grazing, mining, timber harvest, road construction, and ORV use and natural events such as snowmelt, storm events, and fire are factors that influence water quality regardless of land ownership. When these factors occur on non-BLM lands upstream from BLM lands, water quality parameters will continue to fluctuate and water quality will continue to change on BLM lands.

The boundaries of the Cascade Resource Area encompasses 2.77 million acres. The BLM manages 487,466 acres of public lands within this boundary which is 18% of the total land. Upstream land ownership and management entities outside of the Cascade Resource Area boundary include the U.S. Forest Service, State of Idaho, and the private sector. Because of BLM's scattered land ownership pattern, limited percentage of land ownership, and lack of control on upstream land management practices and their subsequent influence on downstream water quality parameters, different BLM land use