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R E V I S E D   D R A F T

SOIL-HYDROLOGIC RECONNAISSANCE SURVEY

Boise Ranger District

Boise National Forest

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PURPOSE

The purpose of the Soil-Hydrologic Reconnaissance Survey is to provide an information base for use in revision of Multiple Use Plans and broad Resource Management and Activity planning.

The land system inventory used in this report provides an information base from which the land manager can make technically sound and defensible land management decisions for definitive and manageable units of land.

Although the above were the primary reasons for initiating the survey, other uses can be made of the report. General information about capabilities and hazards can be extracted for early planning stages. Kinds of soils can be identified for development of a statewide general soils map with other agencies. Benchmark soils can be identified for more detailed study. Soils are being identified and named to fit in the National Cooperative Soil Survey.

DEVELOPMENT

A land system inventory has been developed in the context that land is the basic medium of management. Land as we use it in management, encompasses both the living and non-living portion of the earth that can be owned as property. In this sense, land can be equated to the ecosystem concept with both biotic and abiotic elements. Using natural and visual units to stratify land, the concept of the land system inventory has been developed. This concept can be divided into four sections: (1) land stratification, (2) inventory procedures, (3) evaluation, and (4) application.

Land Stratification

All disciplines need a nomenclature system or language to describe the universe covered by that discipline. In order to do this, each discipline needs a classification system. In simple terms, classification is an orderly arrangement of objects. In the effort to map natural units of land, the land system inventory is stratified from the general to the specific. The initial unit is the planet and the system ends with the individual site. The stepdown units in the system are: (1) planet, (2) continent or island, (3) province, (4) section, (5) subsection, (6) landtype association, (7) landtype, (8) landtype phase, and (9) site.

This system is described in detail in Land Systems Inventory by Wertz and Arnold.1/

1/ Wertz, William A. and Arnold, John F., 1972, Land Systems Inventory, USDA, USFS, Intermountain Region.

For planning purposes, we are primarily interested in units at the section level or lower. Sections are large areas such as the Southern

Idaho Batholith section of the Northern Rocky Mountain Province. Subsections are geographic areas within a section which are separated primarily on climatic or structural differences. A further separation for management purposes occurs at the landtype association level. The landtype association level would be separated on differences in geomorphic processes, geology, vegetation and soils. This level would be useful for planning at a forest-wide level.

The unit most suited for broad planning needs is the landtype. Landtype is the basic unit of the land system inventory. Landtypes are natural portions of the landscape resulting from geomorphic and climatic processes that have predictable behavior patterns.
It should be emphasized that units at the landtype level are suited to broad level planning purposes on ranger districts. Project planning and special projects require a more detailed level of survey in the system such as a landtype phase or taxonomic unit level.

Inventory Procedures

Inventory procedure relates to the mechanics of making the survey and gathering the basic data. This includes: (1) assembling available data pertaining to the survey area, such as geology and topographic maps, climatic data, research data, and other related information;(2) pre-mapping the landtypes on aerial photos prior to field work. Using the previously assembled information and with the aid of a stereoscope, the survey area is stratified into natural units of land or landtypes; (3) the stratified units are sampled in the field in order to gain additional information about characteristics, performance, or behavior of the individual areas of land. Information on similar landtypes is checked against one another for field correlation purposes.

Evaluation

After the information has been collected by the above described procedure, the results are evaluated and assembled into the Soil-Hydrologic Reconnaissance Report. Landtype characteristics, previous experience, and results of activities and research data are used in developing criteria, descriptions and behavior predictions for each area of land. This provides the information base for management planning.

Application

This report is designed initially for use at the Multiple Use Planning level. It is a working tool to help the land manager make management decisions about specific areas of land. Other uses of the report are for broad resource and activity planning, such as transportation and timber management planning.

This is a reconnaissance survey. It should not be used for specific project planning, except in a very general way. As an example, this report should not be used to determine the suitability of a particular site for a campground, building site or recreation area. Areas such as these require information beyond the scope of this survey. The report can be used to select potential areas for more intensive investigation for projects such as these. Following are some suggestions for the best use of this report:

1. Read and study the report thoroughly. Get help if any part of the report is not clear or is not understood.

2. Check the report in the field. Become familiar with the landtypes and the soils that are described. Call attention to any apparent errors in mapping. Add your own comments and observations about how the various landtypes perform under certain management practices. The management evaluation section in the landtype description is provided for this use.

3. Correlate the report with the Multiple Use Plan.

a. Use the Land Type Soil Association Map as an overlay for the Multiple Use Map.

b. Use the landtype and landtype association descriptions to more clearly define existing management areas and management units.

c. Use the Land Type Soil Association Map to adjust the management area boundaries, where appropriate.

d. Use report as a basis for additional management direction for management areas and units.

e. List functional management considerations for each land-type.

f. Identify, describe, and write management decisions for landtypes or groups of landtypes which qualify as new management units.

4. With help from Hydrology and Soils personnel, develop interpretive maps for erosion and stability hazards for use in transportation and timber management plans. Develop other interpretive maps as needed.

5. Use report for broad resource and activity planning.

6. Use the report as a basic document for continuing training program of District and Forest personnel.

7. Make additions or corrections as new data becomes available.

GENERAL DESCRIPTION OF THE DISTRICT

Location and Extent

The Boise Ranger District is located north and east of Boise in Elmore and Boise Counties, with a small portion on the southwest corner extending into Ada County. It encompasses about 361,630 acres of National Forest land and has within its boundaries about 66,000 acres of lands with other ownerships. The entire District lies within the Boise Mountain Range and is predominantly drained by the Boise River Watershed System.

General Characteristics

The District is predominantly a mountainous area and has a wide range in conditions. Processes such as glaciation, cryoplanation, faulting, uplift, mass wasting, fluvial action and deposition have contributed to the shape of the landscape.

With the exception of remnants of volcanic flows along Mores Creek and the Boise River tributaries, most of the District is underlain and influenced by granitic materials of the Idaho Batholith.

Most of the areas adjacent to the Middle and South Forks of the Boise River and larger streams have been influenced by faulting, uplift and fluvial action. These areas are deeply incised by tributary drainages of these streams. Slopes are generally long and have gradients of 40 to 70 percent. Many of these slopes are very fragile and are high sediment producing areas.

At lower elevations and drier exposures, the vegetation is dominantly grass and shrubs. Contrasting with this are well timbered slopes on all aspects at higher elevations and more moisture.

In general, the District contains contrasting areas of steep and gentle topography, forest and non-forest communities, high and low precipitation, and elevations that range from 3,500 to nearly 10,000 feet.

Vegetation

There is a wide variety of vegetation on the District. Some species have a wide range throughout the survey area; however, many species occur in definable communities. These communities, or habitat types, have strong associations with climate, soils and landtypes. For this reason, habitat types were identified for the dominant soils on individual land-types. Identification was made possible with the help of personnel from the Intermountain Forest and Range Experiment Station. This classification is still in the development stages and some changes may occur as more information becomes available. The habitat types listed in this report will give a variety of management implications including relative productivity, suitability for specific seral species and broad climatic and micro-climatic conditions in a landtype.

In general, the lower elevations or southern portion of the District is dominated by brush/grass communities and limited areas with dry ponderosa pine and Douglas-fir habitat types. Mid elevations are dominated by Douglas-fir habitat types with ponderosa pine a major productive seral component. Higher elevations are mostly subalpine fir habitat types with Douglas-fir and some Engelmann spruce as the dominant seral components.

Generally, productivity portentials over the District are low to moderate for timber producing areas and moderate to high for range land areas.

Climate

The Boise Ranger District has extremely variable climatic conditions. This is the result of the considerable variation in elevation, aspect and configuration of the lands. These local conditions greatly influence the general climate for the South Central Idaho area to produce many different local near-the-ground climates.

The general climate for the South Central Idaho area is characterized by winters that are moderately cold to cold with abundant moisture predominantly as snow; springs that are alternately rainy and cool, then sunny and warm; summers that are warm to hot and clear except for occasional thunderstorms; and falls are alternately clear and warm, then cold and moist. Nighttime temperatures are considerably cooler than daytime temperatures for all seasons.

This general climate results from seasonal movement of two major opposing weather systems -- the Aleutian Low and the Pacific High. The Aleutian Low is an extensive moisture-laden air mass that reaches its southernmost position in winter. It brings a strong flow of generally cool, moist air into the Central Idaho region from the west and northwest. As summer approaches, the Pacific High begins to dominate the weather, greatly reducing available moisture. Other factors influencing the general climate include occasional winter intrusions of dry cold continental air masses from the north and northeast; late summer movement of moist warm air from the Gulf of Mexico into the Southern Idaho area; and periodic warm subtropical Pacific storm extensions into this area during November through January.

Temperature. The warmest locations are the south-facing slopes near Lucky Peak and Arrowrock Reservoirs where annual maximum temperatures reach approximately 103°F. with record highs approximately 112°F. Coldest locations are the high elevation basins in the headwaters of the Middle Fork Boise River and Yuba River. Atlanta has annual minimum temperatures of approximately -15°F. and record lows of approximately -35°F

Table 1 lists mean, maximum, and minimum temperatures for January, July, and annual of stations on or adjacent to the District.

Average daily fluctuation in temperature is about 35 degrees in July and August at Arrowrock Dam; however, in January the average daily fluctuation is only 16 degrees. For Atlanta Ranger Station, the daily fluctuation is nearly 50 degrees in July and August and about 26 degrees in January.

	Temperature						Precipitation	
January				July		Mean		
Station	Elev.	Max.	Min.	Max.	Min.	Annual	Annual	May-Oct.
Arrowrock Dam	3275	32.2	16.7	91.7	56.4	48.9	18.8	4.7
Atlanta R.S.	5390	34.0	8.2	86.8	38.8	41.1		
Atlanta 1E	6000	31.8	12.2	81.3	46.6	42.3	25.2	7.4
Deer Point	7150	25.5	15.0	73.3	55.8	39.9	21.5	8.5
Idaho City	3965	35.6	10.1	89.9	43.9	44.8	23.2	6.1

Table 1. Temperature and Precipitation Data for Stations on or Adjacent to Boise Ranger District. (1931-60)

Precipitation. The annual amount of precipitation is well correlated with elevation. It also appears, for areas of equal elevation, that annual precipitation decreases moving from west to east across the District. As an example, Trinity Guard Station, elevation 7,400 feet, receives approximately 54 inches of precipitation while Atlanta Summit, elevation 7,500 feet, receives only about 47 inches of precipitation. This may be due to the initial lifting and extraction of some of the moisture from the air masses moving from the west as they reach the Boise Ridge and Trinity Mountain areas.

Figure 1 is an isohyetal map showing the generalized mean annual precipitation for the District. Seasonal precipitation distribution is shown by Figure 2, monthly mean precipitation for Arrowrock Dam and Atlanta.

Approximately 50 percent of the annual precipitation at the 5,000 foot level, and 70 percent at the 7,000 foot level, falls as snow and is stored until spring snowmelt begins. The release of moisture stored in snowpacks varies greatly with elevation and aspect.

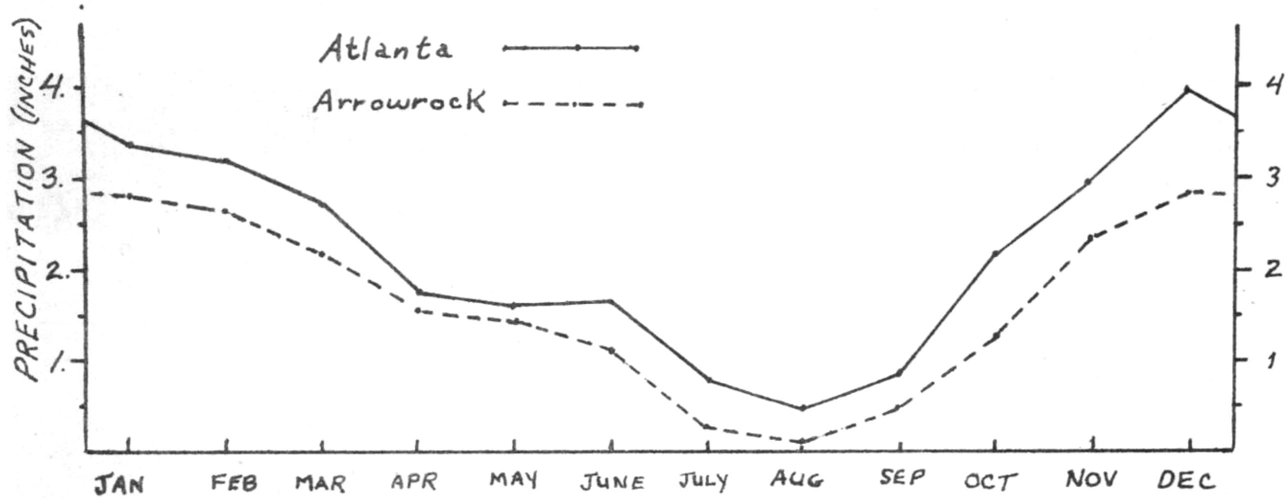


Figure 2. Monthly Mean Precipitation for Arrowrock Dam and Atlanta. (1931-60)

<u>Storm Types.</u> The rain and snow producing storms in this area can be separated into three groupings: summer thunderstorms, normal frontal rain and snow storms, and tropical Pacific warm rainstorms.

Summer Thunderstorms: These storms occur over the District from about May through October and are caused by relatively small cells of moist air, cooled from vertical lifting and circulation by heated convection currents. Many of these storms have very little moisture and produce little or no rain or hail. Others drop rain and hail at very high intensities on local areas for periods of one hour or less. In this area, thunderstorm precipitation records are scarce and the probability of storms of given intensities and durations is not well established. A storm of one inch of precipitation in one hour is believed to have about a 4 percent chance of occurring in any given year at a given location.

Normal Frontal Storms: These are widespread storms that produce rather steady rain or snowfall for periods of a few hours to a few days. In normal years they produce by far the greatest part of the annual precipitation of Central Idaho. In spring and fall they produce rain. In winter they produce snow at all but the lowest elevations. Air accompanying these storms is not unusually warm since it comes from the northern Pacific area (Aleutian Low). Chance of 3.5 inches of precipitation in 24 hours from this type storm is about 4 percent in a given year (25-year storm) on elevations over about 7,000 feet, and slightly less on lower portions of the District.

Subtropical Pacific Storms: These storms originate south of the Pacific High and, under abnormal conditions, slip past a weakened Pacific High to move into the Northwestern United States. This storm type has extremely high moisture content, and very warm, unstable air. Two recent occurrences of such storms were in December 1955 and December 1964. For five days in December 1965, Atlanta received 7.3 inches of rain and for three days temperatures did not reach below 30˚F. Arrowrock Dam received 3.7 inches of rain in the same five days. Probability of occurrences of this warm type of winter storm is not nown.

<u>The climatic conditions most limiting to management on the Boise Ranger District are:</u>

1. Summer drought period, June through September.
2. Deep snowpack accumulation on higher elevations.
3. Periodic heavy, warm, winter rainstorms.
4. Frequent high intensity summer thunderstorms.
5. Cold air entrapment and storage in upland basins.

<u>Geomorphology</u>

Geomorphology deals with the forms of the earth, the general configuration of its surface and the changes and processes that take place in the evolution of landforms. The geomorphic processes most active on this District are of two distinct kinds, internal and external.

Internal processes include all movements or faulting of any part of the earth's crust (diastrophism). Volcanism is also an internal process where heated rock material or gasses move to or toward the earth's surface, resulting in lava flows, intrusive dikes, cinder cones, etc.

External processes may include any agency or activity of any sort that operates directly on the surface of the earth. The four major processes in this area involve glaciation, cryoplanation;* fluvial action and mass wasting.

Alpine glaciation was a major formative process at the highest elevations. Glaciers originated under heavy snowpacks in the heads of V-shaped stream cut canyons. As the climate became more severe, snow and ice packs increased in magnitude. Glaciers began moving downstream. Heavy ice packs combined with freezing and thawing have resulted in "ice plucking," rock quarrying and scouring; the end result has been the cirques, rocky ridges and steep, rocky headlands at the heads of glaciated valleys.

As glaciers gained in mass, downstream scouring, polishing and truncation altered the stream cut, V-shaped valleys to U-shape. Common landforms are truncated spur ridges, over-steepened slopes with parallel dissection, hanging valleys, ice deposited morainal materials, water-worked outwash, and stream-laid sediments.

*See Glossary Cryoplanated

Cryoplanation is the reduction of the land surfaces by processes associated with climatic changes brought about by alpine glaciation. The effects of nivation, freezing, thawing, ice and permanent snow field action were mainly localized. Snow and rock materials were not carried by major ice currents, nor was the bedrock deeply stripped. The resultant landforms have weakly expressed drainage patterns, rounded and subdued topography over deeply weathered granite bedrock.

Fluvial action is characterized by steep V-shaped valleys, sharp ridges and strongly expressed drainage patterns. The dominant factor is the erosive force of running water. Other processes, including mass wasting, are commonly associated with the fluvial processes.

The materials and sediment generated by all of these processes are generally transported by gravity, streams, or ice to a lower position in drainage where depositional accumulations result. These areas of deposition occupy bottoms of glacial troughs, streams, basins, toe slopes and terraces adjacent to major streams.

Early day sediments covered the western portion of the District prior to uplifting, faulting and subsequent erosion. As a result, scattered patches of materials having moderately fine textured soils remain on the existing landscape. Evidence of past slumping exists on the landscapes. Landtypes with this characteristic are located in the western portion of the District and comprise a Landtype Association.

Although glaciation, cryoplanation, fluvial action, mass wasting, faulting, volcanism and other processes are often independently responsible for the dominant appearance of an individual landtype, several or all processes are generally inter-related. Many areas of cryoplanation have been modified by rejuvenation or faulting and subsequent acceleration of the fluvial processes. Other areas that were highly eroded to a mature stage by fluvial processes have been hurried by extruded volcanics and moved back into the earliest stages of the fluvial cycle. This varied inter-relationship is the dominant factor responsible for segregating areas of land into landtypes or landtype associations. A knowledge of these inter-relationships also becomes significant when understanding or interpreting the management qualities of a landtype.

Soils

The soils of the District have been classified and described according to the criteria established in Soil Taxonomy of the National Cooperative Soil Survey (Dec. 1970). Soils have been classified to the soil family level. Soil families are differentiated primarily on the basis of properties which are important to the growth of plants. Differentiating criteria are not the same for all categories in the classification system, but primarily include texture, mineralogy, reaction, soil temperature, and depth. Table V in Appendix B gives the classification of the soil to the family level.

Factors which affect the appearance of soils on the District are vegetation, animal activity, climate, and parent material. The thickness of the surface horizon is generally related to the amount and type of organic matter deposited by the vegetation growing in the soil. Soils which have the thickest surface horizon generally support dense stands of brush and herbaceous vegetation. Soils under conifer stands generally have thinner surface horizons. Thin surface horizons are also found on very warm slopes where oxidation of organic matter is rapid. Vegetation also retards surface erosion resulting in the formation of thicker surface horizons.

Climate is one of the most important formative processes in the development of soil. No soil development would be possible without the effects of moisture and temperature. The fluctuations of temperature, with the resultant freezing and thawing, are the basic processes by which parent rocks are broken down into smaller particles. The major soil profile characteristics attributable to climate, is the color of the subsoil. In the glaciated and cryoplanated areas, the color of the

subsoil is brighter (higher in chroma) than the soil color on the warmer sites of fluvial or depositional landtypes.

Parent material refers to the nature of the underlying bedrock or other material giving origin to the surface soils. Coarse textured parent materials like granite or glacial outwash from granite generally produce coarse textured soils that develop very slowly. Fine textured basalt, however, weathers rapidly, developing soils with more horizonation and fine loamy textures.

Landtype has strongly influenced the development of soils on the District. Slopes generally have three segments:

(1) Areas of soil loss (ridgetops and upper one-third of side slope),

(2) The transitory part of the slope where gains in soil materials equals losses (straight mid-slopes), and

(3) The part of the slope where materials accumulate (lower one-third, concave toe slopes and swales).

Slope shape, therefore, controls two important features of the soil: soil depth and soil moisture. Shallow droughty soils are more common on convex positions and deep, moist soils are more common on concave positions such as swales. The most strongly developed soils are in the accumulative, concave positions.

The soils formed on the different types of granite rock on the District are quite similar; however, some minor differences were noted. The soils from granodiorite and quartz diorite have slightly finer textures, finer sands, and micas are more conspicuous than in the soils from

The shallow, coarse-textured soils on steep, strongly dissected landscapes result in fragile slopes with high impacts from soil disturbance.

Soil profiles are described and separated into horizons on the basis of color, soils content, texture, and other significant characteristics.

Revegetation success is often related to favorable soil characteristics.

Mass failures can many times be related to soil and/or bedrock characteristics.

quartz monzonite, which generally have loamy, coarse sand textures. The reason for the differences lie in the amount of quartz and the amount of mica present in the parent material. Granodiorite and quartz diorite are low in quartz and high in the micas as compared to the gray, high quartz and low mica content of quartz monzonite. Quartz monzonite is the dominant mineralogy for the District, with granodiorite and quartz diorite being mostly confined to the glaciated areas.

Soils formed over different types of volcanics are similar to one another by sharply contrasting to those of granitic origin. These soils are dominantly deeper and high in percent clay content. The basalts appear to have weathered faster and have found deeper soils.

A common characteristic of soils on the District is their youthful appearance. This is expressed by weak horizon development and coarse textures. These soils are very young in terms of geologic age.

Soils on the south end of the District are quite variable. Scattered remnants on a number of landtypes have been influenced by lacustrine deposits. Textures are much finer; i.e., sandy clay loamy and clay looms. These soils are intermingled with the coarser textured soils that are common on other landtypes on the District.

Hydrology

About 98% of the district is included within the Boise River drainage. The Boise River drainage from its mouth encompasses 2,645,700 acres: roughly 493,000 acres or 18% fall within the boundaries of the Boise Ranger District. The major subdivisions or units of the Boise drainage include (1) Boise Front tributaries, (2) Mores Creek, (3) Arrowrock, (4)Middle Fork, (5) North Fork, and (6) South Fork. These units are outlined on the Boise drainage subdivision map on the following page.

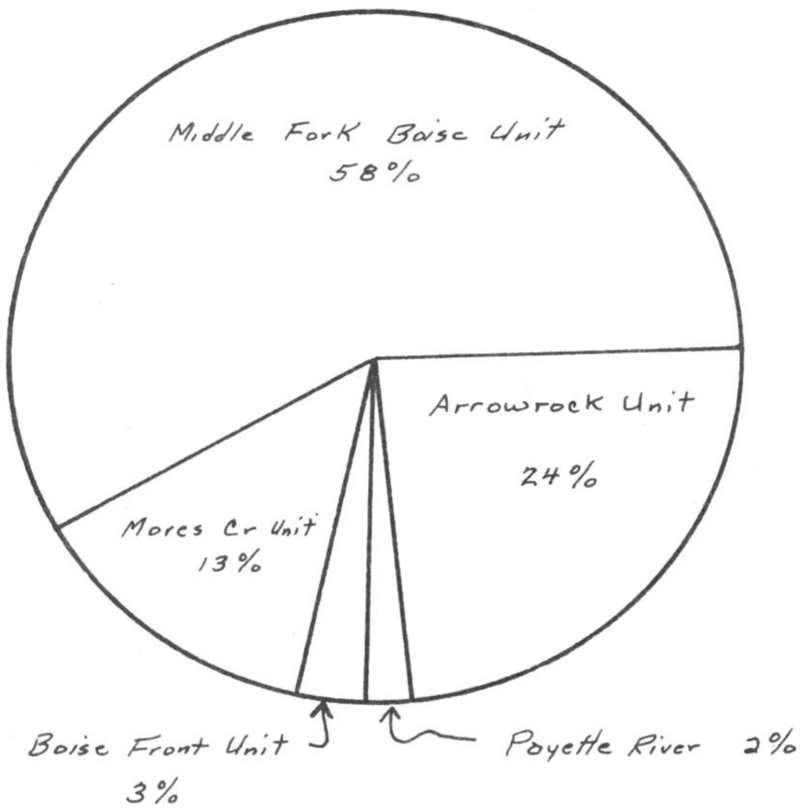


Figure No. 1
Boise Ranger District
Percent Area in
Each Boise River
Drainage Subdivision

Water Yield

The mean annual water yield for the area within the boundaries of the Boise Ranger District is approximately 600,000 acre feet. This is equivalent to 14.5 inches or 1.2 acre feet of water from each acre. This represents 30% of the total Boise River runoff above Boise, Idaho. Of this 600,000 acre feet produced annually, 80% comes from above the Twin Springs stream gage, from the Middle Fork and North Fork Boise unit.

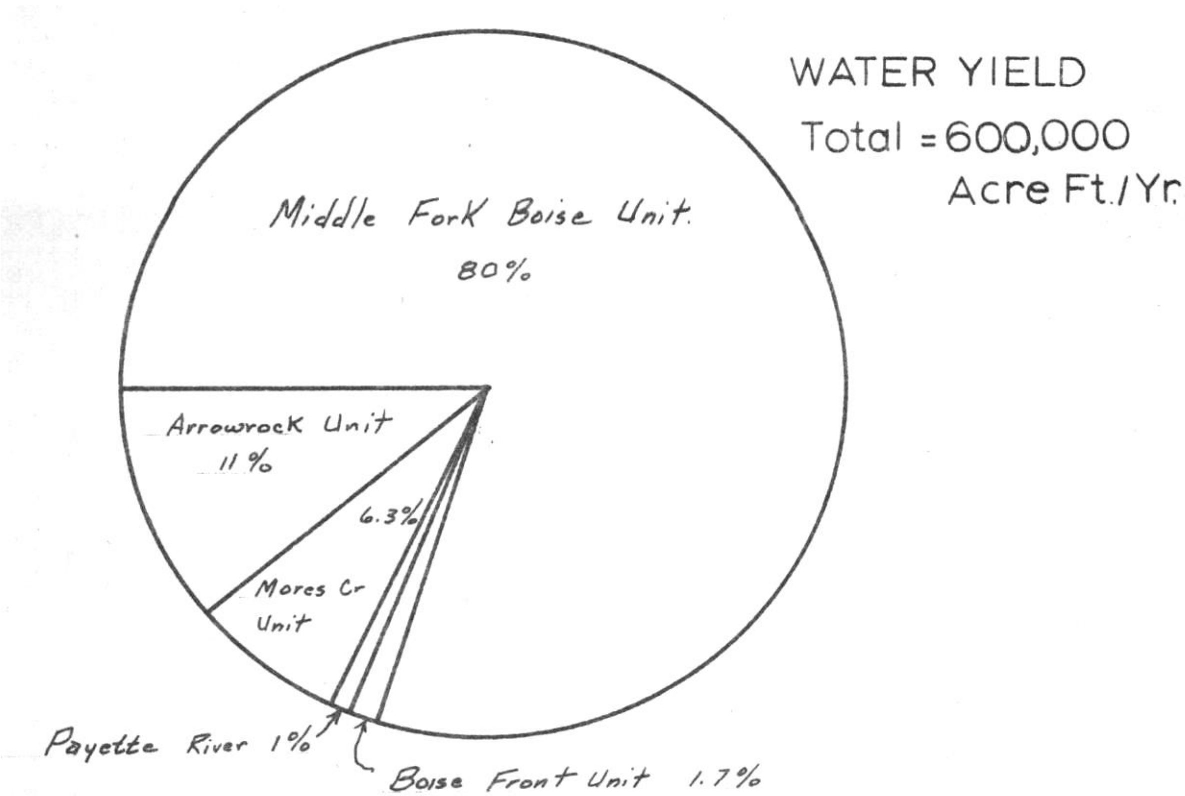


Figure No. 2 - Boise Ranger District Water Yield Distribution.

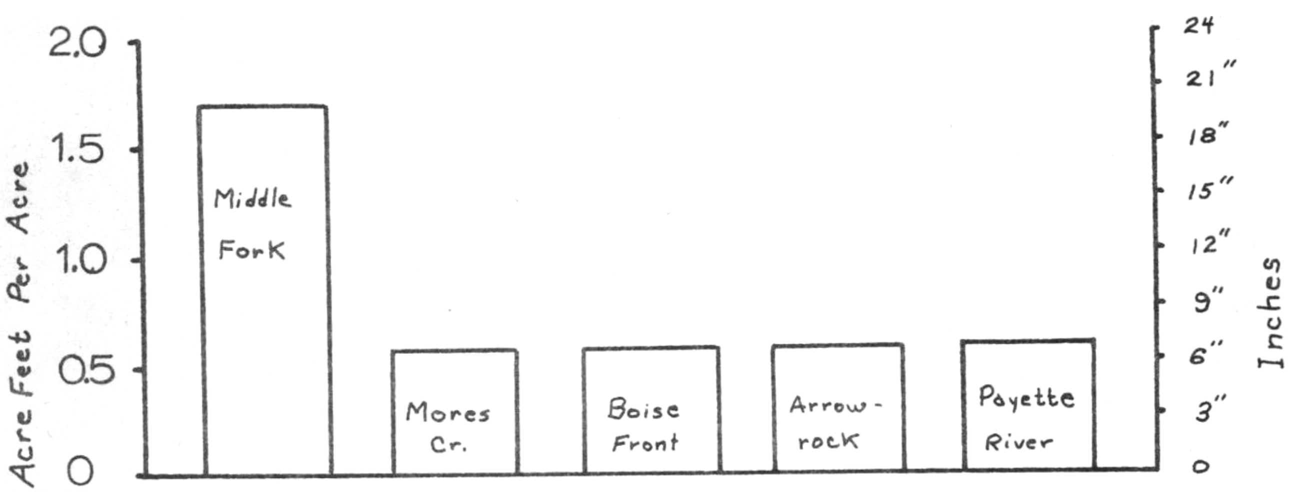


Figure No. 3 - Estimated Mean Annual Water Yield in Acre Feet per Acre and Inches for Boise Ranger District by Boise Drainage **Subdivision.**

Timing of Runoff

The Boise River flow is regulated by Arrowrock Dam, Anderson Ranch Dam, and Lucky Peak Dam, a combined total storage capacity of 1,057,840 acre feet. Therefore, the measured river flow below Lucky Peak Dam does not give a good indication of natural runoff timing.

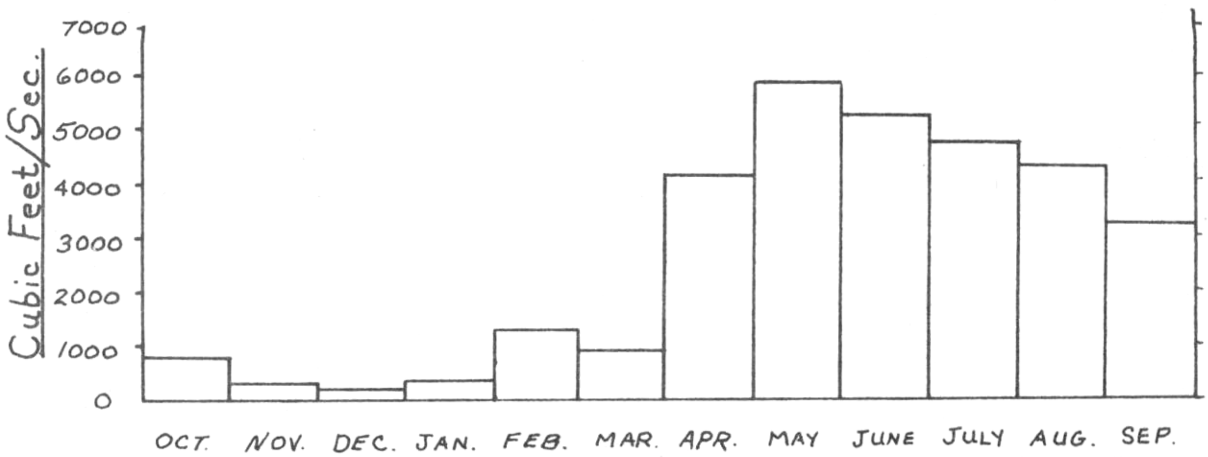


Figure No. 4 - Mean Monthly Flow - Boise River near Boise, 1951-65. (Regulated)

North Fork and Middle Fork Units. Runoff from the North Fork and Middle Fork Boise River has been gaged near Twin Springs since 1911. It gives excellent information on natural runoff timing.

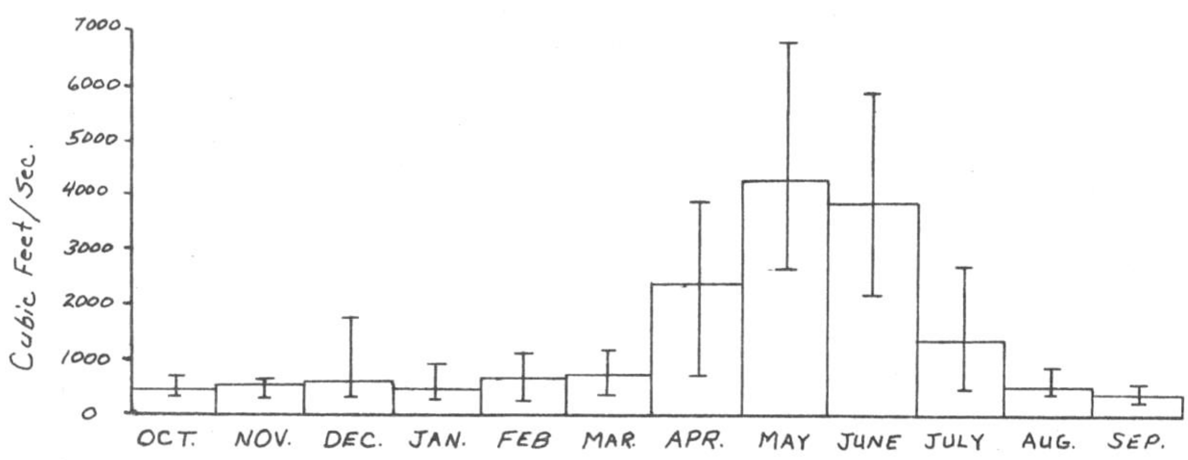


Figure No. 5 - Mean Monthly Flow and Range, Middle Fork Boise near Twin Springs, 1951-65.

Yearly peak flows at the Twin Springs gage normally occur in May and June. These peak flows range from approximately 3,000 to 11,000 cubic feet per second. One major exception is the peak flow of 18,800 cubic feet per second on December 23, 1964, which is the highest recorded. This was the result of a warm rainstorm falling on a heavy snowpack. Such a flood event is estimated to have less than 2% chance of occurring in any given year. It is rated as at least a 50-year flood.

Yearly minimum flow normally ranges from 125 to 340 cubic feet per second and occurs in late fall or early winter.

Arrowrock and Lower Mores Creek Units. Runoff from snow melt with little or no rainfall typically reaches a peak in March or April. Runoff from heavy rainfall on a snowpack has caused major peak flows in the tributary streams as early as Christmas and as late as March. These events cause the highest flows in the larger streams draining this area, such as Cottonwood, Rattlesnake, and Wood Creeks.

Summer thunderstorms have caused extreme flows of sediment and water in small drainages. The small drainages most severely affected usually have depleted soil cover or extreme rockiness. These flash flows from thunderstorms generally occur on very small drainages of less than 10 square mile area. The flow in larger drainages, over about 15 square miles, does not reach extremes from thunderstorms since thunderstorms cover only part of the drainage. South facing draws adjacent to Arrowrock Reservoir are examples of areas experiencing thunderstorm flash runoff.

Boise Front Unit. The greatest quantity of runoff from National Forest areas within this unit comes as late winter and early spring snow melt. However, winter rain-on-snow storms have moved the heavy runoff up as early as late December. The exposure of this front area to warm frontal type storms moving eastward makes it more subject to winter snow melt and rainfall than most other areas on the district.

Flash flooding runoff is most extreme during summer thunderstorms. During 1959, following fires over depleted over-grazed foothill range, thunderstorms caused flash runoff in the magnitude of 2,000 to 5,000 cubic feet per square mile of watershed for drainages of two square miles or less. As a comparison, runoff from heavy rain-on-snow type storms, has generally been in the neighborhood of 20 to 100 cubic feet per square mile for similar sized watersheds.

Water Quality

Water quality includes chemical, pathogen, temperature, oxygen, and sediment conditions of the water.

Chemical, Pathogen, Temperature, and Oxygen Conditions - The available data indicates generally excellent conditions on the Middle Fork Boise River. There is a possibility that local areas of higher than desirable pathogen conditions exist for a short distance below Atlanta and the Swanholm-Dutch Creek areas of human habitation. Bacteriological tests are needed to determine if a problem exists.

Daily water temperature data for the lower Mores Creek shows a maximum water temperature problem in July and August. Several days in July and August 1969 had maximum water temperatures of 27° centigrade (80,6° Fahrenheit) which is excessive for many species of fish. Chemical, pathogen, and oxygen data is not available for Mores Creek.

Boise Front and Arrowrock tributaries lack chemical, pathogen, temperature and oxygen data.

Sediment - In 1939 and 1940, sedimentation measurements were taken on the following streams on the district: Boise River near Twin Springs; Cottonwood Creek at Arrowrock Reservoir; Grouse Creek near Arrowrock; and Cottonwood Gulch at Boise. In 1947, a sedimentation survey of Arrowrock Reservoir was done. Rosa and Tigerman made estimates of mean annual sedimentation for the North Fork-Middle Fork unit, the South Fork unit, and the Arrowrock unit in 1951.

Estimates of present mean annual sedimentation are based on the sedimentation measurements and estimates mentioned above plus an evaluation of conditions since 1940.

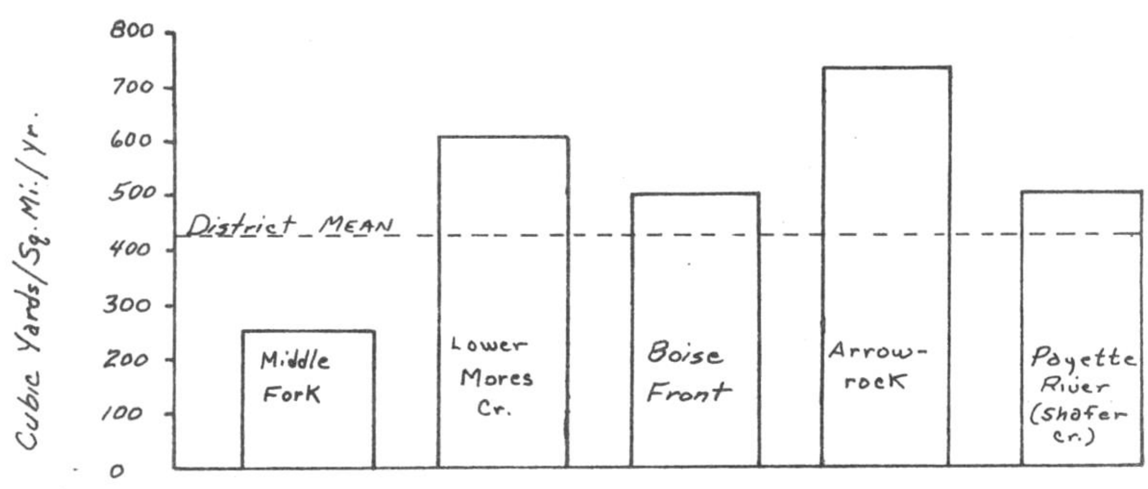


Figure No. 6 - Estimated Mean Annual Sedimentation Rates for Subdivisions of Boise Ranger District.

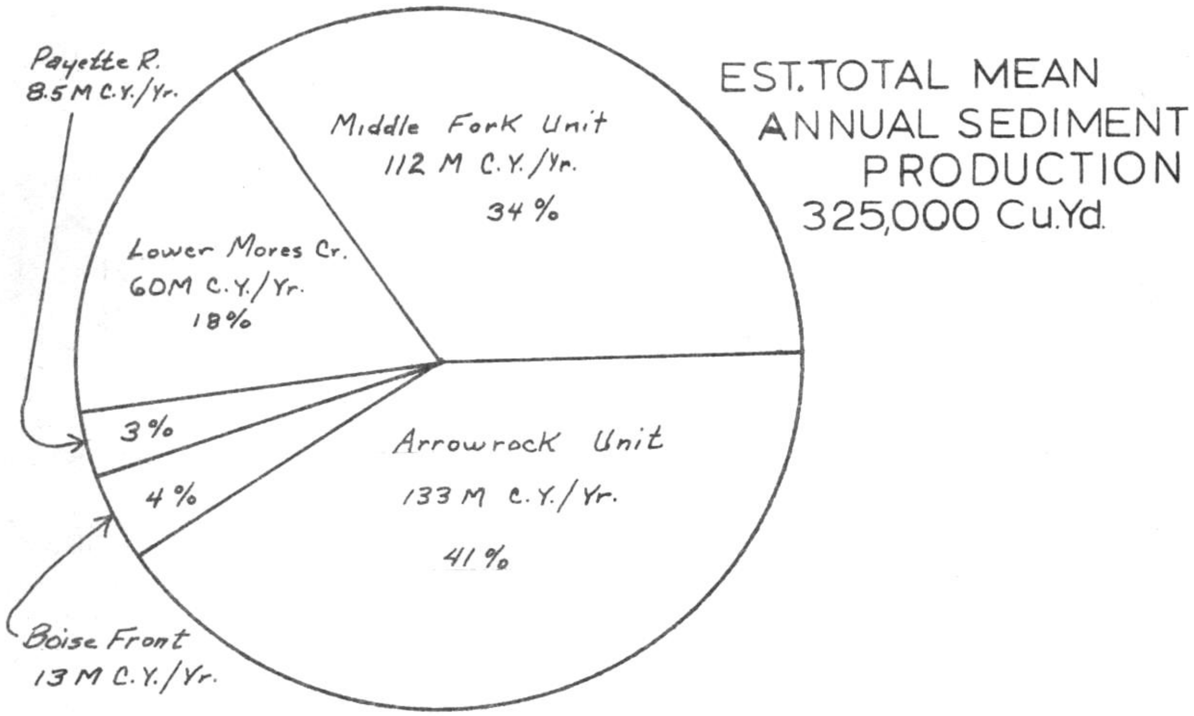


Figure No. 7 - Estimated Boise Ranger District Sediment Production Distribution.

Hydrologic Information Needs

Water quality inventories are urgently needed to determine the natural water quality conditions for the Middle and North Forks of the Boise River for two purposes. First, to provide a basis for determining future changes in water quality, and second, to provide inventory information from which a general understanding of the aquatic ecosystems and their needs can be achieved.

Benchmark quantitative studies are needed on small areas or watersheds that represent a common use and landtype combination. Quantitative runoff, erosion, and sedimentation data from these benchmark studies are needed now as a basis for estimating reaction of similar lands to proposed uses. Such studies need to be planned in context with overall Idaho Batholith mapping and studies.

Major Watershed Problems or Hazards

Sedimentation is the major watershed problem on the Boise Ranger District. Loss of storage capacity of Arrowrock and Lucky Peak Reservoirs is one symptom of the problem. Sand accumulation in cobble and gravel stream bottoms degrades the aquatic environment and affects trout fisheries. The total monetary and intangible damage from sedimentation in the Boise River system is not known and needs study.

Major causes of sedimentation are inter-related. Basically, the natural topographic, soils, and climatic conditions on the Boise District combine to create a high inherent erosion hazard for both mass movement and surface erosion. Pristine vegetation conditions apparently controlled surface erosion and sedimentation to very low rates except on riverbreak and other shallow soil landtypes. Mass movement by soil slumps and debris slides probably was quite common on steep, grassy, mid-elevation slopes during extreme saturated soil conditions even during pre whiteman days.

Annual season-long grazing of sheep has degraded the vegetative cover. The degradation ranges from slight on once over grazed moderate terrain to severe on driveways, steep slopes, and areas used more than once per season. Summer storms on these depleted areas cause accelerated soil movement by raindrop splash, and by sheet and rill erosion due to overland flow. Sheep trampling on steep slopes also moves much sandy soil downslope and into draws. Periodic flushing of draws by flash flows and heavy runoff carries large amounts of soil to stream channels. Presently, vegetative cover and soil productivity are very depleted on much of the steeper and more heavily used areas and very high sedimentation rates exist.

Road construction, usually for timber harvest, creates conditions for high erosion and sedimentation rates on the steeper landtypes. Interception of shallow subsurface runoff and denudation and compaction of road surfaces create abnormal surface flow on roads and in road ditches. This is often concentrated to erodible volume and deposited on highly erodible fill material or steep slopes. Often road excavation material is placed where mass movement hazard is high. Sometimes small streams are inadvertently diverted down a roadway and onto erodible slopes. Sedimentation rates from steep areas affected by these conditions typically jump to very high rates for a short period after road construction, and then gradually decline to a sustained rate dependent upon road location standard, drainage, and subsequent disturbance by use and maintenance. When the first extremely wet conditions occur after road construction on steep slopes the sedimentation rate typically jumps back up to a high rate due to mass movement of unstable excavation material and/or drainage failures.

MANAGEMENT RELATIONSHIPS

This section discusses management relationship of the significant features of the landscape to water, timber, road construction, recreation, range, and wildlife. These various functional resource activities are related to soils, landtype, character of bedrock and other significant landscape features.

Water

Many of the soils on the District have very high infiltration and percolation rates. They also have, because of their coarse textures, low water-holding capacities. They readily take in and transmit water. Unless the soils are disturbed, surface runoff is rare on much of the District, except when very high intensity storms occur. Thus, much of the moisture that falls on the slopes is delivered to the stream as subsurface flow rather than surface flow. This is true on most of the lands in the District with the exception of rocky areas where surface flow is dominant.

The character of the bedrock is an important factor in the transmitting of moisture. Well weathered and/or well fractured bedrock has the capacity to store and transmit water as does the soil. In areas of land where the bedrock is well fractured, deep subsurface flow is dominant.

In areas of massive bedrock, subsurface flow is still a factor. Water that has percolated down through the soil flows over the surface of the massive or slightly fractured bedrock. This is known as the subsurface flow interface. When roads or contour trenches are built on these lands, the subsurface flow interface may be intersected and the subsurface flow is converted to surface flow. This increases soil loss by erosion of the road surface and may weaken fill slopes by saturation. The danger of intersecting the subsurface flow line is quite high on the warm south-facing slopes in the Fluvial Lands, due to the dip of the jointing plane. Landtypes where this condition is most prevalent are Oversteepened Canyon Lands, Rocky Headlands, and Dissected Mountain Slope Lands.

Bedrock that is deeply weathered, as in some fluvial lands, and/or highly fractured, as in glaciated lands, permits moisture to penetrate deep into the bedrock. The chance of intercepting large amounts of subsurface flow in lands with these types of bedrock is therefore much less.

The shape of the land and the drainage pattern also tells something about how it handles the moisture that falls on it. Lands which have weakly expressed drainage systems as in the Cryoplanated Uplands and in most areas of the Strongly Glaciated Lands indicate that there is very little surface flow. These lands percolate water quite deeply and release the water slowly. They are responsible for maintaining stream flow through dry periods of the year. Lands which are deeply incised with a dendritic stream pattern indicate that the bedrock is impermeable and that water is moving mostly as surface flow. These lands store very little water for sustained stream flow. Much of the area in the Fluvial Land is of this type.

It is important to understand how a slope transmits water. Relationships that exist between the shape of the land and the way it transmits water are very strong, but also very delicate. The balance is easily disrupted by engineering practices, such as road construction, contour trenching, and ditching. As nearly as possible we should not interfere with the natural way a slope transmits water. If, as a result of engineering practices, we increase the infiltration of water into the soil mantle, we increase the potentials for mass failure and decrease the surface erosion potentials. If we concentrate the surface runoff and intercepted subsurface flow into drainageways, we decrease the potentials for mass failure but increase the potentials for surface erosion.

On the steep granitic fluvial lands, a cyclic erosion-sedimentation pattern has been observed. The cycle begins with the downslope movement of materials to steep minor draws and drainageways by erosive agents such as creep, raindrop splash, wind and animal disturbance. The materials accumulate in these minor drainageways for variable periods, up to 50 or more years, until a runoff event occurs that flushes it to lower streams. Management of these slopes can affect this cycle in two ways - (1) increase the rate of material movement to drainageways, and (2) increase the runoff rate from the watershed and thus cause more frequent flushing of drainageways.

Timber

Soil depth and texture are two of the most important characteristics which influence tree growth. Soils that have sandy loam or loamy subsoil textures are usually more productive than soils with coarse textured subsoils. Likewise, deeper soils are usually more productive than the shallow soils. Certain soil characteristics also affect the composition of the regenerating vegetation after fires or logging activities. Soils that are very gravelly or cobbly and that are underlain by well fractured bedrock many times are regenerated by dense brush stands. Soils with these characteristics are common on the District. Natural regeneration of conifer species is quite slow in these areas.

The character of the bedrock influences tree growth several ways. The well weathered and/or highly fractured bedrock is a major source of moisture to the tree on many sites. This explains why some very shallow soils on the District have moderate to high timber productivity potentials. The bedrock also restricts the downward movement of moisture, thus holding it in the subsoil and within reach of the tree roots. The character of the bedrock influences stocking rates on many sites. Areas having highly weathered and/or highly fractured bedrock will support heavier stocking than similar areas which have massive unweathered bedrock.

Landform also influences tree growth. This relationship is generally connected with soil moisture. Areas such as basins, stream terraces, and north or east slopes receive and hold additional moisture and have higher timber productivity potentials than convex slopes or areas of moisture loss. The effect of landform on timber growth is amplified by the soil and bedrock characteristics. Benches and terraces generally have finer textured soils and are usually underlain by more deeply weathered bedrock than convex slopes and thus are more productive. Air drainage is also affected by landform. This will affect species, distribution, and growth rates.

The impact of timber harvesting on the Idaho Batholith and adjacent areas to the Idaho Batholith recently has been given much attention. Studies indicate that sedimentation from logging roads is the single largest impact of the timber harvesting operation. The cause of the sedimentation is surface erosion of the cut slopes, fill slope, and road surface. Other sources of sediment are debris slides above the cut slope and mass failure of the fill slopes. Interpretation of the erosion hazard and the mass stability hazard for each of the landtypes is given in Table 1, Appendix A.

Removal of vegetation and disturbance of the top soil by the logging operation increases the chances for surface erosion and thereby increases sediment production. The degree of this impact is influenced by the landform and the logging method used. The type of logging method used is therefore controlled by the slope gradient. Tractor skidding can be used without damage to the watershed on the more gentle slopes. As the slopes become steeper, skyline, high lead, or other systems must be used. Some areas of the District that have very steep slopes and high mass movement hazards will require helicopter or balloon logging for control of soil movement.

Road Construction

From past experience we know that road construction on steep mountainous lands with fragile granitic soils is a very difficult and costly job. In terms of impact to the watershed, it has in many cases been very damaging. In some cases, this damage can be avoided. However, on many of the lands and slopes where roads have been constructed, it would be almost impossible from a practical cost standpoint to construct logging roads without damaging the watershed. In other less hazardous areas, the damage to the watershed resulting in sedimentation can be reduced substantially with a full understanding of the hazards involved in building roads on these particular kinds of lands. A reconnaissance survey does not predict the particular kind and degree of hazard involved in road construction at any given point or on a station to station basis. However, we are able to predict the general hazards and the degree of hazards which will be encountered in road construction on a certain type of mountain slope or landtype. On most of the landtypes in the District the landform, the character of the bedrock, and soils determine the impact that construction of a road will have on the hydrologic function or stability of a given slope. The impact of any road construction is determined by the degree or extent with which the natural water transmitting properties of the slope have been altered.

Following is a brief discussion of the relationships of the landform, character of the bedrock, land soils with road construction:

Road construction and other engineering practices are much more hazardous on some landtypes than on others. Landtypes in the Fluvial Lands such as Moderately and Strongly Dissected Mountain Slope Land are more hazardous to road construction than the Cryoplanated Uplands which have a very weakly developed drainage pattern. The slope forming processes on the Cryoplanated Uplands produce slopes which have well graded soils, unconsolidated subsurfaces, and well weathered bedrock. Most of the moisture that falls on these slopes is percolated deeply into the soil mantle and bedrock and flows off as subsurface flow. The slope forming processes that are active in the Fluvial Lands concentrate moving surface water into draws which endanger road fills which may cross these draws. Soil materials on these lands are more uniform and usually have poor gradation, resulting in less stable fill slopes.

2/Clayton, James L. and Arnold John F., 1972, Practical Grain Size, Fracturing Density, and Weathering Classification of Intrusive Rocks of the Idaho Batholith. USDA, Forest Service General Technical Report INT.-2, 1972.

Landtypes such as Oversteepened Canyon Lands, which have been subjected to faulting and subsequent uplift, have oversteepened slopes which tend to be unstable. Debris slide hazards and surface erosion hazards are quite high on these lands. On north-facing slopes adjacent to the larger streams, slope gradients in excess of the angle of repose of the soil materials are made possible on these slopes by the dense vegetative cover. The possibility of cutbank failures on roads built on these kinds of slopes is very high.

The character of the bedrock is an important factor in road construction. Some of the characteristics of the bedrock which are important to engineering practices are the method and degree of weathering, degree of fracturing, mineralogy, and structure.

Roads constructed through bedrock that is highly fractured will generally cause less impact on the land than roads built through massive bedrock. Coarse fragments from the fractured bedrock provide strength to fills and subbases. However, there is the hazard of intercepting subsurface flow in bedrock of this type.

Granular exfoliation is a common form of weathering in granitic rocks. This is a mechanical weathering process caused by the fluctuation of temperature and moisture. In nature this process gradually rounds

and reduces the rock outcrops. When the bedrock is exposed by a road cut, the rock, which appears to be hard and unweathered, is weakened by this process. This is referred to as spalling or air slaking and produces coarse sands and fine gravels which accumulate at the foot of the cut slopes. This causes maintenance problems. This material

must be removed from the inside of the drainage ditch to prevent clogging of culverts and subsequent saturation of the road fill. Another type of weathering is chemical weathering. Some bedrock has been weathered to great depths and is weakly consolidated. Colors range from almost white to bright brown. Road cuts are easily made in these materials. Because of the somewhat finer materials, fills produced from this material are relatively stable and vegetation is easier to establish. However, there is a hazard of mass failures on steep cut slopes on this material.

Most of the bedrock in the District is moderate to well fractured. The spalling type granite occurs primarily in the lower lying Fluvial Lands along the South Fork of the Boise River.

Bedrock structure is also an important consideration in road construction. Slopes with the dominant jointing planes into the slope are more stable than slopes with the dominant jointing plane parallel to the slope.

Competent bedrock with fracturing perpendicular to the slope gradient leads to the stability of the slope with disturbance.

Soft granitic bedrock of a spalling nature causes road maintenance costs after a road is built.

Poorly sorted fill materials and inadequate drainage result in failures as shown above.

Competent rock fragments as shown in the above exposed profile aid the stability of cut slopes caused by road construction.

A characteristic common to most of the soils on the District is the high content of coarse fragments in the subsoil. This characteristic adds stability to road fills and subbase. Some of the soils have a narrow range of soil particle size distribution. These kinds of textures are highly susceptible to surface erosion and mass stability hazards.

Soils which have formed from granitic material generally are quite low in clay content. Few of the soils of the District have clay contents higher than 20 percent. Many of them have clay contents in the 5 to 10 percent range. Because of this, the soil aggregates are very weak, especially when disturbed, and the soils are highly erosive. These soils also lack cohesive strength and have very low moisture-holding capacities which makes stabilization with vegetation on south slopes quite difficult. However, there are also several advantages to soils having low clay content. These soils are quite stable unless they become saturated. They have high infiltration and percolation rates, good drainage, and have a low shrink swell potential. Because of their good drainage and coarse texture, they are not affected by frost action and also provide a durable wearing surface.

As stated previously, some of the soils have clay contents of more than 20 percent. These usually run between 20 and 35 percent. These soils were formed on areas of structural alteration or areas with a mixture of underlying rock. These soils usually contain significant amounts of competent rock fragments in the profile. The finer textures and the competent rock fragments result in more stable soils in regard to surface erosion and mass stability hazards. These soils also have good water-holding capacities and reseeding potentials of cut and fill slopes are high. Bearing strength is considerably lower on these soils than on the sandy soils especially where the surface is relatively free of coarse fragments. The frost hazard potential is moderate for these soils.

The surface erosion and mass stability hazards for road construction are given for each landtype in Table Nos. 1 and 2, Appendix A.

Recreation

Strong relationships exist between soils and landform and the suitability of any given site for a campground, playgounds, or picnic area. Because of time limitations specific interpretations for campground suitability have not yet been made. Many of the soils on the District are generally satisfactory for campground development. These soils have high bearing strength, high infiltration rates and are well drained.

Some of the landtypes are more suitable for campsites and campgrounds than others. This is due to soil characteristics and topographic limitations of the landtypes. Campgrounds will generally have to be located on low relief areas of Cirque Basin Lands, Cryoplanated Uplands, Basin Lands, and Depositional Lands. These are generally the landtypes which have slope gradients and relief which is consistently low enough to develop a campsite on. Areas with stony or cobbly surfaces, wet spots, steep slopes, or that are subject to flooding should be avoided.

Some of the landtypes offer better opportunities for hiking, trail bikes, and horseback riding than do others. Some of the landtypes in the Strongly Glaciated and Cryoplanated Uplands are easily traversed by foot or horseback and provide many viewpoints and scenic views which are aesthetically pleasing. Valley Train Lands, for example, are easily traversed by either foot or horseback and lead to areas such as Cirque Basins which provide excellent camping and fishing sites. Other landtypes, such as Rocky Ridge Land have severe restrictions, due to rock outcrops and rough terrain, for hiking, trail bikes, or horseback riding.

Range and Wildlife

The landtypes in the District have been rated for range productivity potential for livestock grazing. Only productivity potentials of useable forage were used in these ratings. Information was extracted from the range allotment analysis information for development of the ratings. The ratings are listed by landtype in Table No. 4, Appendix A. Other factors, such as erodibility hazards and steep slopes, need to be considered in evaluating the landtype for use.

Ratings for wildlife were not made, but the range productivity potential ratings made for livestock and habitat types should serve as broad guidelines for wildlife habitat ratings.

BASIC INVENTORY DATA

This portion of the report has to do with the basic information compiled during the course of the survey. The information is divided into three sections: (1) Landtype Associations, (2) Landtypes, and (3) Valley Types. Descriptions of each unit in the three sections are described and interpretations concerning various resources and activity are discussed.

Landtype associations are important in gaining an overall picture of the planning unit and the relationship of one landtype or area to another. Certain characteristics in each landtype in an association are similar, and performance and predictions can be made from these relationships.

Landtypes are subdivisions of Landtype Associations and are the basic unit of this report. A landtype is the information base used for making management decisions at the multiple use and broad resource and activity planning level.

Valley types are similar to landtypes but are confined to major stream valley bottoms and their immediate, adjacent slopes. They differ slightly from landtypes by being influenced primarily by stream dynamics. Segments of valleys with similar conditions are grouped within one valley type. Valley types are useful for general land use planning including broad transportation and recreational development plans.

Landtype Associations

The relationships of one landtype to another is important in the evaluation of an area for management planning. The level of stratification in the Land System Inventory broader than landtype is the Landtype Association. These are landtypes that have been grouped according to geographic association and certain key formative characteristics. Criteria considered for grouping geographically associated landtypes are geomorphic process, geology, lithology, climate, and in some cases, topographic or behavior features.

Landtype associations as well as landtypes usually occur in more than one subsection. Variations within a landtype association that occurs in different geographic locations can be explained at the subsection level.

Lithology and geomorphic processes are basic criteria used in determining landtype associations. Certain performance characteristics and behavior patterns are common to landtypes at this level. The Landtype Associations in this report have been grouped by lithology and the broad geomorphic process primarily responsible for the development of the topographic features.

General descriptions of characteristics, performance, and behavior of each Landtype Association are given. A colored photograph representing the association and a listing of landtypes in the association are in the description. (Note: A landtype may occur in more than one association.) In addition, landtypes that occur as common inclusions are listed. Detailed descriptions of each major landtype or inclusion in the association can be found in the landtype description section of this report.

Landtype Association Descriptions.

Glaciated Granitic Lands. These are lands formed on granitic materials that have been shaped primarily by alpine glacial action. These lands include the Glaciated Granitic Headlands and Glaciated Granitic Trough Lands Associations.

Glaciated Granitic Headlands (G-1)

This association includes Landtypes 110x, Scoured Cirque Basin Land and 113, Rocky Ridge Land.

Steep, high elevation, rocky peaks and ridges with widely dispersed basins, shaped by alpine glaciation, characterize these lands. Slopes are frequently in excess of 60 percent, cliff areas are common and rock outcrops are exposed on more than 40 percent of the landscape. The granite bedrock is hard and moderate to well fractured. Cirque Basins and Scoured Cirque Basins are the only landtype with gentle slopes. Elevations range from 7,000 to 9,000 feet.

Soils in this landtype association are characterized by shallow depths (less than 10 inches deep), lack of horizon development, sandy textures, high inherent erosion hazards and low fertility. The soils on the Cirque Basin Lands, however, are deeper (more than 30 inches to bedrock), have sandy loam textures, well expressed horizons, are relatively fertile and have low to moderate erosion hazards.

These headlands are important as water producers and return as stream flow up to 70 percent of the moisture received. Surface runoff and avalanche potential is high on the steep landtypes in the association. Cirque Basins, containing small lakes, act as reservoirs and are a highly effective buffer between the steep rocky headlands and adjacent depositional lands. Sediment production is high from the steep rocky landtypes and accumulates in drainageways of lower lying lands. Disturbance of these downstream alluvial channels during high runoff periods causes high sediment yields. In some cases, dissection of mountain slopes can be traced to the runoff from higher lying rocky lands.

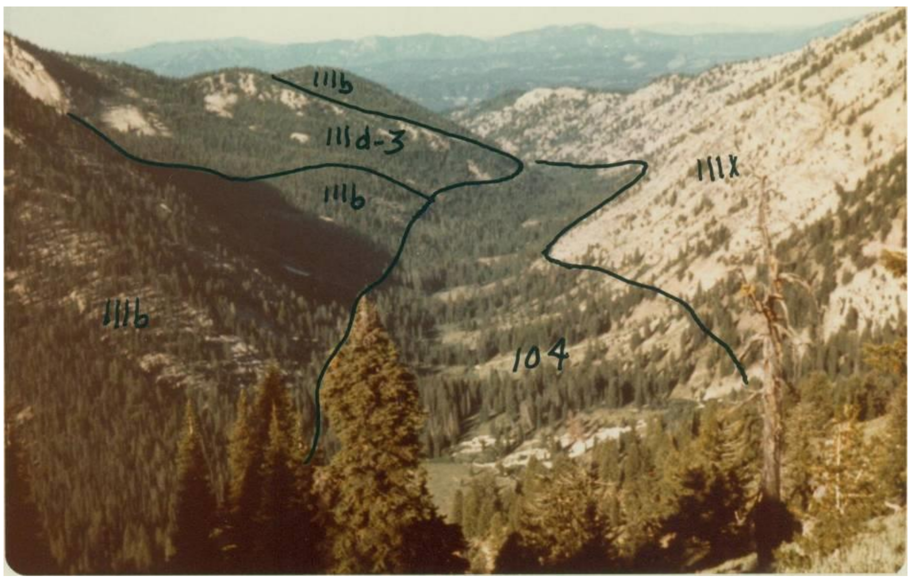
Herbage and timber production is generally low due to the sparse cover and limiting climatic and soil factors. White bark pine, subalpine fir and high elevation grass and brush vegetative types dominate this area. Exceptions to this are localized wet areas in Cirque Basins, which have a moderate to high productive capacity. Adverse soil and climatic factors limit the revegetation potential of these lands.

These lands have a high scenic and recreational value and produce moderate amounts of grass and brush type forage. Many of the Cirque lakes and streams provide habitat for fisheries. The heavy rapid runoff is a major management consideration.

Landtypes	Inclusions
110	
110x	
111d	
111x	
113	

Glaciated Granitic Trough Lands (G-2)

This landtype association is composed of lands that have been carved and shaped by moving glaciers, resulting in U-shaped valleys with steep sideslopes and gently sloping alluvial valley train lands in the valley bottoms. These lands are usually adjacent to and below the high peaks, rocky ridges, and cirque basins in the Glaciated Granitic Headland landtype association. Elevations range from 6,000 to 8,000 feet. The underlying granitic bedrock is variable, ranging from slightly to well weathered and well fractured or masked.



The relationship of Glacial Trough (111b, 111d-3, 111x) and Valley Train (104) landtypes is shown in this picture.

Soils in this landtype association are characterized by sandy or loamy textures with more than 35 percent rock fragments. Depths vary from shallow to deep and are generally related to the amount of slope dissection and scouring action of the glacier. Lack of horizon development and low fertility levels are characteristic of the shallow soils. Inherent erosion hazard is moderate to high on the sideslopes and low on the alluvial valley train land.

These lands are important as water producers and return as stream flow much of the moisture received. Most of the runoff is by shallow and moderately deep subsurface flow, except on strongly dissected areas with shallow soils where water leaves as surface flow. The valley train lands in the bottoms of the troughs act as regulators for the water by receiving it from the above slopes and discharging it to streams in a sustained flow. Avalanche hazards on the sideslopes are high.

Herbage and timber productivity is generally low to moderate with the dominant limitations for revegetation and growth being cold

climate and in some landtypes, shallow coarse-textured soils. Subalpine fir and high elevation grass-brush habitat types dominate these areas.

These lands provide a major access route to the mountain peaks and scenic Glaciated Granitic Headlands association. Activities that remove vegetation or disturb large areas of soil will significantly increase surface erosion, especially on the landtypes with numerous dissections and shallow soils. The large quantity of runoff is a major management consideration.

Landtypes	Inclusions
111a	108
111a-1	110
111b	111d
111b-1	115
111c	113
111x	
104	

Cryoplanated Lands. These lands were formed under a climate influenced by the adjacent glaciers. These lands include the Cryoplanated Granitic Uplands and Rejuvenated Cryoplanated Mountain Slope Lands associations.

Rejuvenated Cryoplanated Slopes (C-2)

These mountain slope lands are located adjacent to or intermingled with glaciated lands and cryoplanated uplands. In addition to the local effect of ice and permanent snow fields in shaping the landscape, these lands have been or are being

rejuvenated by fluvial processes. Slopes are moderately steep and steep and are weakly to strongly dissected. The granitic bedrock is usually well weathered and fracturing is often masked. Elevations range from 6,000 to 8,000 feet.

Soils are dominantly shallow and moderately deep with skeletal sandy or loamy textures. Coarse fragments are commonly more than

35 percent by volume. The soils have weak or no horizon development and have a moderate to high inherent erosion and surface

creep hazard. Silt and fine sand size fractions are common in the surface soils because of the relatively imperviable bedrock.

Infiltration and percolation rates are high but most of the precipitation that falls leaves the slope as shallow and moderately deep sustained subsurface flows. The strongly dissected landtypes have fragile slopes and surface erosion is greatly accelerated upon disturbance or removal of vegetative cover.

Drainageways in these Cryoplanated Mountain Slope Lands (109c and 109-2) are evidence of some fluvial influence.

The vegetative cover on these lands varies from open grass-brush south-facing slopes to dense stands of subalpine fir and lodgepole pine. At lower elevations Douglas-fir habitat types are common. Herbage and timber productivity and revegetation potential is low to moderate and is restricted primarily by cold climate.

These lands are valuable for the production of wood, forage and water. The fine fraction of surface soils may result in dust problems on disturbed areas. Roads located on the upper one-third portion of the slope will reduce the possibility of intercepting subsurface water.

Landtypes	Inclusions
109-2	
109a-1	
109b	
109c	
109d-1	
109g	

Fluvial Lands. These mountainous lands have been shaped primarily by the action of water or stream cutting. The six landtype associations making up these landtypes are: (1) Fluvial Granitic Lands, (2) Mature Relief Fluvial Lands, (3) Structurally Controlled Granitic Fluvial Lands, (4) Strongly Dissected Granitic Fluvial Lands, (5) Steep Granitic Canyon Slopes, (6) Mass Wasting Fluvial Lands, and (7) Xeric Granitic Fluvial Lands.

Fluvial Granitic Lands (F-1)

A high producing timber landtype 120b-4 represents part of the lands in this association.

These are mountain slope lands that have been formed primarily by fluvial or stream cutting action. Slopes are steep (commonly over 60 percent) and have strongly expressed V-shaped drainage-ways that dissect the slope at moderate to wide intervals. The

underlying quartz-monzonite or granitic type bedrock is moderately well to well weathered and fracturing is often masked. The bedrock commonly tends to spall when exposed to the atmosphere.

These lands usually occur at elevations less than 6,000 feet.

Soils are quite variable as to depth, but generally have sandy or loamy textures which may or may not be skeletal (more than 35 percent coarse fragments). For the most part, the soils in these lands have little profile development other than dark colored "A" horizons and have moderately low or low fertility levels. Erosion hazards range from low on the low gradient loamy soils to high on the steep, coarse-textured sandy soils.

Infiltration and percolation rates are generally high and a good portion of the moisture that falls leaves as moderately deep and deep subsurface water. The steep slopes with sandy soils are very fragile and disturbance of the soils or removal of vegetative cover will accelerate the sediment production.

Vegetative cover ranges from open grass-brush on droughty south-facing slopes to dense stands of Douglas-fir and ponderosa pine habitat types. Herbage productivity and revegetation potential is low to high, and timber productivity and revegetation potentials are low to moderate. Principle limitations are droughty

soils, vegetative competition and high evapotranspiration ratios.

These lands are valuable as timber producing areas. They are also important for the production of forage and seasonal water yields. However, the access needed for livestock grazing and timber harvest often results in serious acceleration of erosion and sedimentation.

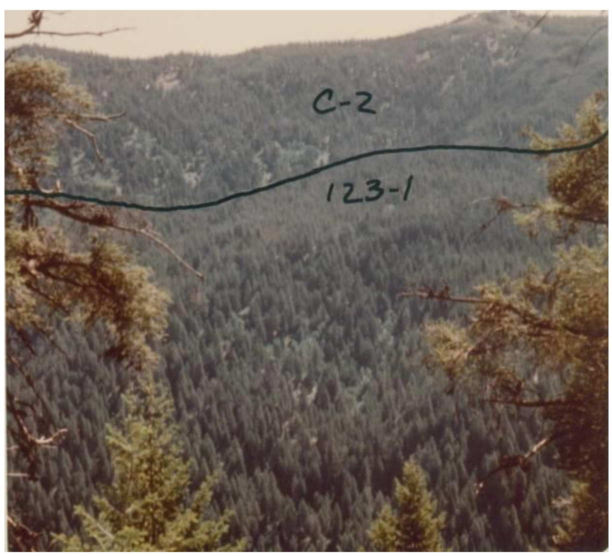
Landtypes	Inclusions
120a-2	120b -3
120b-4	
120b-6	

Structurally Controlled Granitic Fluvial Lands (F-3)

These are mountain lands that have been altered by faulting action. Upon faulting these lands exhibited a bench or basin-like appearance. In some cases subsequent fluvial or stream cutting action has incised the lands with moderately deep and deep drainageways. The resulting topography of ridge tops with a common base level and steep sideslopes in the drainageways is characteristic.

Soils range from shallow to deep and generally have coarse loamy or loamy skeletal (more than 35 percent coarse fragments) textures. Little profile development occurs in the soils on the sideslopes, but those on the more level ridge tops or areas exhibit moderate horizon development. The underlying bedrock is generally well weathered with masked fracturing and spalls upon exposure to the atmosphere.

Infiltration and percolation rates are high; but, due to the shallow depth of soils over bedrock on the sideslopes, excess water leaves as shallow subsurface flow. Erosion hazards are low on the ridge tops, but disturbance on the sideslopes tend to
greatly increase the hazard of sediment production from both surface erosion and mass failures.



The Faulted Benchland Landtype (123-1) representing this association is adjacent to Cryoplanated Lands (C-2) at this location.

Vegetation is dominantly ponderosa pine and Douglas-fir habitat types. Revegetation potential is low to moderate and is restricted primarily by soils with low water-holding capacity. Timber productivity potential is moderate to high.

The erosion hazard on these lands is generally low to moderate with the exception of the steep fragile sideslopes in drainageways, which is high. Safe access across the drainageways is often the limiting factor to development of these lands.

Landtypes	Inclusions
121e	
123-1	
123-3	

Strongly Dissected Granitic Fluvial Lands (F-4)

Landtype 120c-3 shows typical dissection pattern of the lands in this association.

These are mountain slope lands that have been formed by fluvial or stream cutting action. Slopes are steep (commonly over 60 percent) and have relatively narrow sharp ridge tops and V-shaped drainages that dissect the slope at close intervals. Characteristically the drainages form a strongly expressed dendritic pattern. The underlying-quartz-monzonite, or granitic type bedrock, is moderate to well weathered and tends to spall when exposed to the atmosphere.

These lands are generally located between 4,500 and 6,000 feet in elevation.

Soils are shallow and moderately deep and have sandy or coarse loamy textures for the most part. Some subsoils are skeletal (have more then 35 percent coarse fragments). These soils exhibit little or no profile development because of the removal of materials from the slope by natural causes. Both surface erosion and mass failure hazards are high on these lands.

Infiltration and percolation rates are generally high in the soil profile, but the well weathered bedrock restricts downward movement of water. Therefore, most of the excess moisture that falls on the slope leaves as subsurface water. Disturbance of the surface, removal of vegetative cover, or change of the hydrologic function will tend to accelerate the sediment production from these fragile slopes.

Vegetative cover ranges from open grass-brush on droughty south slopes to moderate to dense stands of Douglas-fir, grand fir or ponderosa pine habitat types on moist sites. Revegetation and productivity potentials for herbage and timber are low to moderate.

These lands are rather extensive and used primarily for grazing and timber production. Erosion hazards are high due to the critical nature of the coarse-textured soils, hydrologic function of the steep fragile slopes, and the presence of moist oversteepened slopes immediately adjacent to drainageways.

Landtypes	Inclusions
120c-3	120d-4
120c-11	120d-3

Steep Granitic Canyon Slopes (F-5)

These are mountain slope lands that have been oversteepened by stream cutting action. They are adjacent to deep canyons, which have live streams in many cases. Characteristically, slopes are very steep (over 70 percent) and are dissected by shallow parallel drainage systems. The drainages vary considerably in spacing due to the variable underlying parent rock, which ranges from hard, massive to well weathered, masked fractured, granitic bedrock. Steep headland units located at the upper ends of the drainageways are also included in this landtype association. These lands are located adjacent to deep canyons at all elevations on the Forest.

Soils are shallow to moderately deep and generally have coarse loamy or sandy textures, which may or may not be skeletal (have more than 35 percent coarse fragments). Soils exhibit little or no profile development because of the natural removal of materials from the oversteepened slopes. Surface erosion and mass failure hazards are very high on these lands.

Infiltration and permeability rates of the soil mantle are high, but due to the somewhat impervious underlying bedrock most of the excess water leaves the slope as rapid, shallow subsurface flow. Disturbance of the surface soil, removal of vegetation, or change of the hydrologic function of these slopes tends to greatly accelerate the sediment production of these lands.

The steep slopes and fragile soils on 122 are characteristic of landtypes in this association.

Vegetation cover ranges from open sparsely covered grass and brush types to dense stands of ponderosa pine or Douglas-fir timber habitat types. Revegetation and productivity potential for these lands is low to moderate.

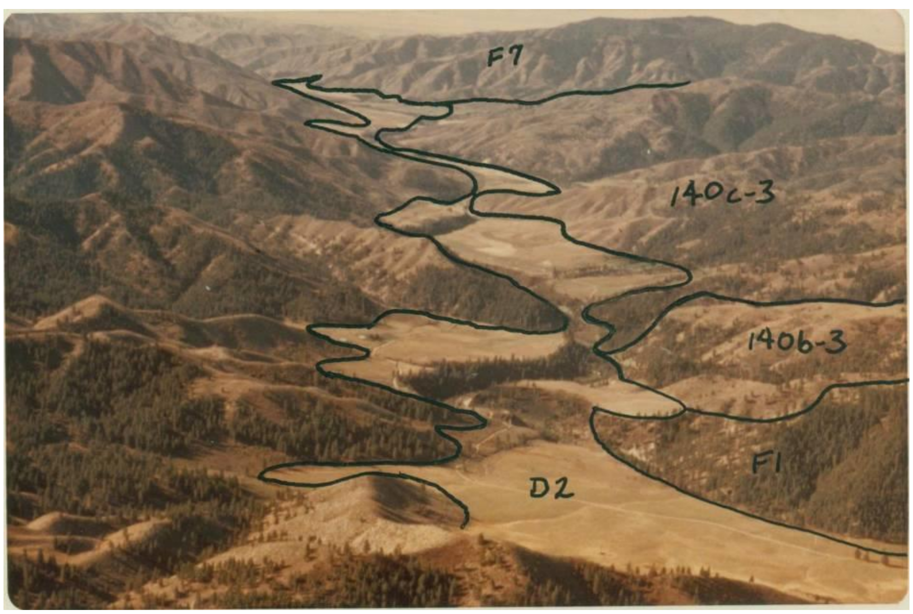
These lands are some of the most fragile lands on the forest and high impacts from disturbance can be expected on the adjacent streams.

Landtypes	Inclusions
122	120d-2
122-1	120d-3
122-4	120d-4

Mass Wasting Fluvial Lands (F-6)

This association includes fluvial landtypes that show evidence of past mass wasting such as slumps and slides. These activities are thought to be associated scattered pockets of moderately fine textured soils that are remnant landscape influences by lacustrine deposits. These areas are located mainly south of Idaho City along the west side of Mores Creek to the Boise National Forest boundary. These lands are underlain by highly weathered, well fractured, "soft" granitic bedrock. Slopes are moderately steep and steep with gradients ranging from 35 to 70 percent. Elevations are dominantly between 4,000 and 5,500 feet. All fluvial landtypes with the characteristic fine-textured remnant soils are in this landtype.

Soils are quite variable but generally are similar to those in corresponding landtypes in other associations. These soils for the most part are shallow and moderately deep, coarse-textured, gravelly, and moderately to highly erosive. The scattered remnant soils are similar in depth and gravel content but differ in having moderately fine textures. Natural slumping in these areas has been common, and the potential hazard for mass failures is high.



The slumping appearance of the 140b-3 and 140c-3 landtypes is typical of this association.

Infiltration and percolation rates are high for the coarse-textured soils but are moderately slow for the finer-textured areas. However, most of the excess water leaves the slopes as subsurface water. This creates a mass failure hazard for fill slopes if the subsurface water is intercepted or saturates the fill.

Vegetative cover ranges from open grass-brush cover types at lower elevations and on south slopes to moderately well stocked timber stands on north slopes and at higher elevations. Productivity potentials range from low to high, depending on the landtype. The principal limitations for reforestation are high evapotranspiration, vegetative competition, and adverse climatic conditions.

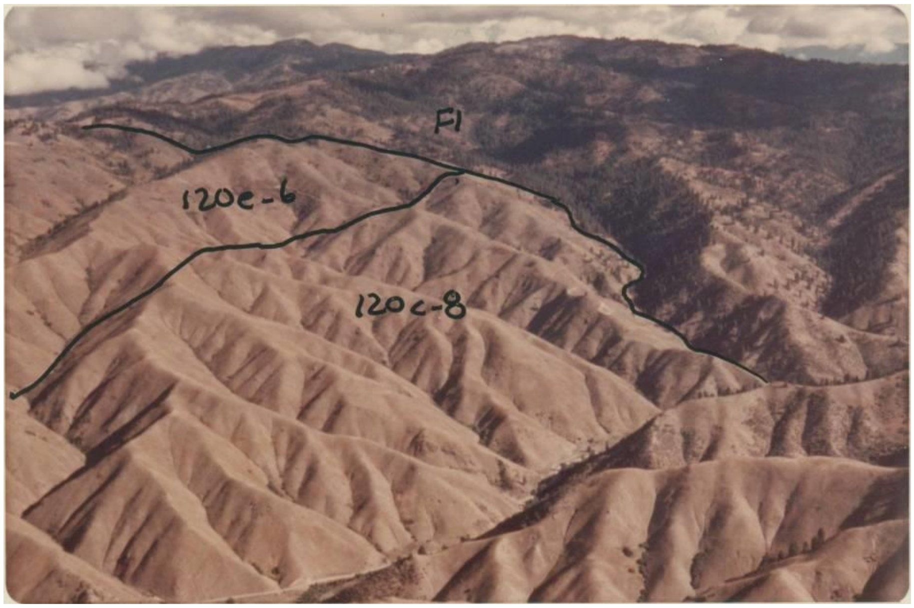
These lands are valuable as timber-producing areas at higher elevations. They are also important for the production of forage and seasonal water yields. However, access needed for livestock grazing and timber harvest often results in acceleration of mass failures, surface erosion, and sedimentation.

Landtypes	Inclusions
140b-2	120b-4
140b-3	120c-8
140c-1	
140c-2	
140c-3	
140e-1	
141	
143	

Xeric Granitic Fluvial Lands (F-7)

These dissected Xeric slopes have been incised by fluvial processes. Drainages on slopes range from few to many with patterns varying from parallel to dendritic. Most units are non-timbered or contain isolated stands of timber having less than 20 percent forest crown densities. Slopes are both short and long with gradients ranging from less than 20 percent to more than 50 percent. The underlying granitic bedrock is dominantly moderately to well weathered with masked fracturing.

Soils in this landtype association are dominantly of granitic origin with coarse loamy and loamy skeletal textures. Some soils with fine loamy textures have developed over very well weathered granite in maturely dissected landtypes. Depths to bedrock are less than 40 inches on steeper slopes and 20 to 60 inches on slopes with gradients less than 40 percent.



The vegetation on these xeric landtypes 120c-8, 120e-5, and 120e-6 is similar to those on the Idaho City Ranger District.

Snowpack is light and intermittent. Slopes are normally bare by mid-April. Runoff predominantly as subsurface flow occurs periodically throughout the winter. Rain-on-snow events produce the heaviest short-term runoff from these lands. Stream channels flow only during wet conditions. Water leaves these lands at a moderate to rapid rate and overland flow is uncommon on undisturbed areas. Overland flow from spring and summer thunder storms is common on steep areas that have been heavily grazed. Debris-laden peak flows occasionally originate from such events. The underlying soft bedrock also contributes to this situation because of slow penetration during these conditions.

These lands are dominated by brush-grass vegetative communities with moderate to very high forage production potentials. Commercial timber species are generally lacking or represented as isolated trees or small stands. Timber productivity potential is low or non-commercial.

These xeric slopes are dominated by moderate to high hazards. Surface erosion, debris slides, and natural slumps are common problems. Natural sedimentation and sedimentation related to construction and grazing will present the most significant impacts.

Landtypes	Inclusions
120b-3	120d-3
120c-8	120d-4
120e-5	
120e-7	
123-2	

Depositional Lands. These lands have been formed as a result of material being removed from higher lying slopes and deposited in lower areas. These lands include Moraine and Outwash Lands and Alluvial Lands Associations.

Moraine and Outwash Lands (D-1)

These depositional lands are formed from materials that have been moved and deposited by glacial action. The topography ranges from nearly level, smooth, micro-relief to moderately steep, hummocky appearance. These lands are generally at elevations higher than 6,000 feet and are located in or at the lower end of glacial troughs.

The soils are deep with skeletal (more than 35 percent coarse fragments), sandy or coarse loamy textures. Little to moderate horizon development is characteristic of these soils. The underlying gravelly or cobbly material is dominantly granitic in nature, but may have mixtures of other kinds of rock such as basalt, andesite, or rhyolite.

Infiltration and percolation rates are rapid and most of the excess water leaves the slopes as deep subsurface and ground water at moderately slow rates. This water may be intercepted in the drainageways and where bedrock is within shallow depths. Soil disturbances on the moderately steep slopes tend to increase production from these areas.

Vegetative cover ranges from dense stands of lodgepole pine, Douglas-fir, and subalpine fir on the higher lying areas to a willow-sedge type of cover in the wet areas. Timber and herbage revegetation and productivity potentials are low to moderate being restricted by cold climate. Forage productivity potential is high on the wet areas.

Moraine materials have been moved from higher lying areas by glaciers and deposited at lower elevations.

These lands are relatively stable with surface erosion, cold climate, and wet areas being the dominant problems associated with the unit.

Landtype	Inclusions
106	
106-2	

Alluvial Lands (D-2)

These lands are the gently sloping accumulations of previously transported materials common to major and minor drainages at mid and lower elevations. Slope gradients seldom exceed 20 percent and are generally less than 10 percent. Depth to bedrock is extremely variable and may range from less than 10 feet to over 100 feet. The geology of the underlying bedrock is also varied and will include granitics, rhyolites, silicic volcanics, basalts and others. The accumulated sediments over this bedrock will also be of varied origins.

Landtypes 101 and 105-5 in this association are bounded by Fluvial (F-7) and Volcanic (V-1) Landtype Associations.

These lands are the gently sloping accumulations of previously transported materials common to major and minor drainages at mid and low elevations. Slope gradients seldom exceed 20 percent and are generally less than 10 percent. Depth to bedrock is extremely variable and may range from less than 10 feet to over 100 feet. The geology of the underlying bedrock is also varied and will include granitics, rhyolites, silicic volcanics, basalts and others. The accumulated sediments over this bedrock will also be of varied origins.

Soils in this landtype association contain both stratified and non-stratified layers of extremely varied textures. Sandy and skeletal soils are dominant adjacent to or below the more moist granitic fluvial lands. Clay and sandy clay loams are more common adjacent to or below xeric fluvial lands or volcanic landtype associations. Soils are deep in all cases.

Infiltration and percolation rates are dominantly moderate to rapid and some overland flow does occur during periods of rapid snow melt, during high intensity storms, and locally in unregulated drainages where flooding occurs. At most times, however, these lands are conducive to buffering subsurface and overland flow from adjacent lands, yielding water dominantly in the form of slow lateral flow of saturated ground water.

Forage production is generally high within this association while timber productivity is extremely variable. Forage production is dominated by riparian communities in the wetter segments of this association, while drier areas are dominated by brush and grass communities. Timbered areas are extremely variable, confined to narrow drainages and protected areas with a water table below two feet. Species composition is dominated by ponderosa pine and Douglas-fir at lower elevations and subalpine fir and Engelmann spruce at higher elevations.

These lands are very significant because of their suitability for many competitive uses contrasted with their limited extent. Most hazards have external origins and include flash floods, mud flows, debris slides and seasonal high water or flooding. The presence of a high water table combined with poor trafficability is also a limitation in some areas.

Landtypes	Inclusions
101	
102	
105-4	
107-1	

Volcanic Lands. These lands are the result of volcanic action such as ejections of cinders, bombs, or flows. The volcanic landtype association on the District is Basalt Canyon Lands.

Basalt Canyon Lands (V-1)

These lands are the steep and/or benchy volcanic escarpments that have been formed subsequent to the Quaternary Period when the Snake River basalt flowed into the Boise River drainage. All major drainages below an elevation of approximately 5,500 feet were filled with basalt. The streams that were already present immediately began seeking new channels, generally following fractures or the weak basalt-granite contact zone. The processes of stream cutting and deposition developed the resultant canyon association. Slope gradients range from 10 to 50 percent in the benchy areas to nearly vertical in areas bounded by basalt canyon walls. The bedrock is variable consisting of well fractured basalt over granite, basalt talus and exposed granite faces.

Mesa Scarp Slopes 135-1 is the dominant landtype in this association.

Soils are dominated by skeletal sandy clay loams, both shallow and very deep. Some stream deposits of sands, gravels and cobbles are also common.

Most water enters and leaves these lands as subsurface flow and deep seepage. These lands receive considerable subsurface water from the soil-bedrock (basalt) interface of adjoining basalt plains. This moisture is delivered well into late spring and early summer. Excess subsurface water within this association moves uniformly downslope until it reaches adjacent streams or drainageways where it accumulates and often surfaces.

These lands have extremely varied vegetative conditions. Brush-grass and aspen communities are common to wet meadows, benches, some wet slopes and southerly aspects. Timber production potential is mostly moderate for the timbered sites. Forage production potential is moderate to high.

This association has one of the highest natural slump hazards of any area on the District. Mass stability hazards for road cut and fill slopes are also moderate to very high. Surface erosion hazards are moderate to high for particular soils.

Landtypes	Inclusions
135-1	136-1

Basalt Plain (V-2)

This association of landtypes is on the relatively flat surface remnants of the major Snake River basalt flow that occurred during the Quaternary Period. Many of the lower lying areas on the Forest, especially along the Boise River drainage, were filled with basalt to an elevation of approximately 5,500 feet. Subsequent entrenchment by major drainages has resulted in steep escarpments (135-1 landtypes) on at least one edge of the units in this association. The flatter surfaces of this plain-like association have been resistant to fluvial processes. These areas are dominantly non-timbered, and major segments are in private ownership. Surface drainage is poor and dissections are weakly developed with low gradients. The underlying bedrock is basalt over granite.

Soils are xeric and both shallow and deep with textures dominated by clay loamy. Some areas are dominated by rock outcrop and shallow loamy skeletal soils.

This picture shows relationship of Landtypes in this association to Basalt Canyon Lands (V-1) and Xeric Granitic Fluvial Lands (F-7).

Penetration of excess subsurface water into bedrock is inhibited by restrictive clayey layers in the subsoil and bedrock. Dissections which have cut down to bedrock intercept a moderate volume of subsurface water. Natural springs and seeps are active during late spring and early summer and are manifested as subsurface water escaping at escarpments. Perched water tables are evident during spring snowmelt. High intensity summer storms will produce overland flow in areas devoid of protective cover.

Most hazards within this association are rated low although surface erosion will be a moderate problem on freshly exposed soils. The high clay content of soils results in fair to poor traffic-ability ratings due to the low bearing strength of these soils when wet.

Landtypes	Inclusions
136-1	

Landtypes

The landtype is the basic unit of this report. This is the unit of land that has been described and interpreted. Landtypes are natural portions of the landscape, resulting from geomorphic and climatic processes with definable characteristics and soils that have predictable hydrologic, engineering, productivity, and other behavior patterns. Landtypes have strong life zone connotations. They have soil and vegetative associations that are unique to a particular landtype. This section includes a description of each landtype. Landtypes are listed in numerical order and contain the following information:

1. Map symbol and name of unit.

2. Landtype characteristics. (Key features are underlined.)

3. Soils - brief description, percentage, and location of each.

4. Vegetation - present vegetation and habitat types.

5. Hydrology.

6. Management Qualities - relationships between landtype characteristics and management activities expressed as hazards or potentials. Management activities considered are roads, wood, water, forage, and recreation.

7. Management Evaluation - space for notes, observations, and decisions about the performance of the landtypes.

List of Landtypes

Landtype Descriptions

Pages 54 through 175 contain all of the landtype descriptions for the District. To locate individual landtypes, the reader's attention is directed to the above listed preceding section, List of Landtypes.

Map Symbol 101
Alluvial Land
Undifferentiated Soils

Location: This landtype is adjacent to most streams on the District.

Landtype Characteristics: These alluvial lands are relatively flat, immediately adjacent to streams, and include river-wash, bottom lands, and first-terrace positions. Stream meandering and channel cutting are very common. Forest crown densities are extremely variable, influenced most by the presence of a high water table or aspect. Soils are deep and have sandy skeletal and loamy skeletal textures with the percent coarse fragment increasing to as much as 80 percent with depth. Depth to bedrock will vary from 10 to over 100 feet, depending on the width and shape of the valley that has accumulated these materials. The underlying bedrock is granite with varied weathering and fracturing. The river-wash material is dominantly of granitic origin.

Soils: The dominant soils in this unit (40%--JECA-2 and 40% JECA-5) have dark grayish brown sandy loam or gravelly sandy loam surfaces that are four to eight inches thick. Subsoils are brown, have more than 35 percent rounded gravels and cobbles and have sandy loam or loamy sand textures. A minor soil (20%--JCFA-l) has a dark grayish brown sandy loam or loamy sand surface four to 10 inches thick over a yellowish brown sand subsoil. This soil lacks the gravel content of the other soils. Included are small areas of shallow loamy soils over gravelly subsoils and small wet areas. Texture stratification and variation of gravel content is common in the subsoils of all the soils.

Vegetation: This landtype is both timbered and non-timbered, depending upon the presence of a water table or exposure. The protected, more well drained areas often are dominated by ponderosa pine habitat types with inclusions of aspen and cottonwood communities. In the larger units adjacent to major streams, the more moist soil is dominated by willows, alders, sedges and other riparian vegetation. In the smaller narrow units at higher elevations, subalpine fir and Engelmann spruce communities become more dominant. Most areas, however, are quite brushy, with brush crown densities ranging from 10 to 50 percent.

Hydrology: These lands receive approximately 20 to 30 inches of precipitation annually. Precipitation that occurs in the form of snow, melts throughout the winter months, and is gone by early spring. Between five and 10 inches of water is yielded annually from these units. Infiltration and percolation of released precipitation is rapid for the most part and the landtype is highly conducive to buffering runoff from adjacent first and second order drainages. Almost all water yielded by these landtypes is percolated to the ground water table. Overland flow is rare. These landtypes, which are average flow regulators, act as a good buffer for water yielded as subsurface and overland flow from higher adjacent landtypes.

Management Qualities: This landtype is very significant on the District because of its suitability for many competitive uses, contrasted with its limited extent. Most hazards on the landtype have external origins. These hazards include flash floods, mud flows, debris slides, and seasonal high water. The probability of these hazards occurring in a specific area can best be evaluated by examining the specific area and the adjacent landtypes.

Roads. Construction problems involve handling water and debris generated on higher adjacent landtypes, and encroachment of road prisms on streams. Particular attention must be given to points where drainages from adjacent landtypes enter these units. Such areas are sources of unseasonally high water, flash floods, debris slides, and varied sediments requiring special structures, large culverts, or bridging. Natural road surfaces in some areas are poor for trafficability, requiring that surfacing materials be hauled in.

Wood. Timber productivity for this landtype is dominantly low with 20 to 40 percent of the land surface in tree-producing habitat types. The ponderosa pine/beardless wheatgrass habitat type occupies lower, well drained flats exposed to the sun most of the day. Although individual trees appear to grow fairly well, productivity is rated low because of comparative low density. In the ponderosa pine/snowberry type, productivity is moderate, increasing somewhat in the cooler more moist areas adjacent to northern slopes. Along stream channels and low wet areas, cottonwoods and other riparian vegetation of non-commercial type are common. Site limitations to reforestation of commercial timber producing habitat types are rated moderate to severe, depending upon exposure of the site and vegetative competition. Many narrow or small units at mid elevations having a subalpine fir, Engelmann spruce vegetation associations, have somewhat higher productivity potentials with more severe limitations to reforestation.

Water: The hazard of flooding by adjacent streams is often high. This depends on the characteristics and conditions of upstream watersheds as well as the height of the land surface above stream channels. These lands are also subject to flashy, debris-laden flows from adjacent slopes. The rapid percolation rate, high water table, and proximity to streams make this landtype especially important to water flow regulation and water quality.

Forage. Some of these landtypes are among the most productive on the District. Species composition is dominated by grasses with production generally in excess of 700 pounds per acre of useable dry forage annually under present conditions. Potentials, however, are rated in excess of 1,000 pounds per acre per year. In most areas, good response can be expected from management practices designed to bring actual production near potentials.

Recreation. Due to flat topography and stream proximity, alluvial lands are the most utilized and sought after as sites for outdoor recreation and development. Consequently, these areas are subjected to considerable use and impact. Good response can be expected from attempts to revegetate overused areas, while vegetation manipulation is also practical on the more moist sites. Since trafficability of natural surfaces is often poor, artificial surfaces are desirable where improved traction, durability, and reduced site impact are necessary. The potential hazard of water pollution from human habitation is a major problem. Rapid permeability rates of the underlying river-wash combined with the high water tables are poor conditions for sewage treatment within the soil mantle. Currently, pit toilets, leaking vaults, and indiscriminate disposal of self-contained camping units are a major pollution source. Flood hazard analysis is needed for most proposed developments on this landtype.

Management Evaluation:

Map Symbol 102
Terrace Land
Deep Sandy and Loamy Skeletal Soils

Location: This landtype is depositional and is found along the Boise River above Troutdale.

Landtype Characteristics: Terrace lands are flat to gently sloping lands deposited adjacent to major streams. Some terraces were deposited as glacial outwash during the Pleistocene Epoch and are left in their presently elevated position by stream entrenchment. The slopes of this landtype are moderately timbered with a neutral aspect, and 0 to 15 percent gradients. The deep sandy and loamy skeletal soils are underlain by granite which is variably fractured and weathered.

Soils: The dominant soil found throughout the unit (50%--HBDA-5) is deep and has a 0 to 2 inch organic layer over a dark brown gravelly loam with up to 20 percent gravel. The subsoil textures range from a gravelly sandy loam to gravelly sandy clay loam with 50 to 70 percent gravel and rock in the subsoil. Another soil (30%--HBDA-4) has similar profile characteristics but has less than 30% gravel and rock in the subsoil. This soil occurs on nearly level or depressional areas. A minor soil (20%--JEAA-2) has loamy sand textures with 25 to 26 percent gravel and rock in the subsoil. This soil usually occurs adjacent to streambanks or drainageways.

Vegetation: The slopes of this landtype are moderately well vegetated. The units are dominated by brush-grass communities, and timbered habitat types, including ponderosa pine/bitterbrush, ponderosa pine/Idaho fescue, Douglas-fir/pinegrass and Douglas-fir/ninebark. Forest crown density ranges from 0 to 60 percent and brush crown density is 10 to 60 percent.

Hydrology: These lands receive between 20 and 30 inches of precipitation annually. Precipitation in the form of snow melts throughout the winter months and is gone by early spring. Approximately 5 to 10 inches of water is yielded annually from these landtypes. Almost all water leaves these units as percolation to water table or into bedrock. Drainage is rapid, for the most part. Due to rapid infiltration, percolation, and law relief, overland flow on these landtypes is rare. These terraces act as a sediment buffer and regulator of overland and subsurface flow from adjacent landtypes.

Management Qualities: This landtype has major significance as a buffer to overland flow and sediment generated on adjacent landtypes. Some portions are important building sites, or gravel and mineral sources.

Roads. Engineering problems involve handling water and debris generated from higher adjacent landtypes and stream encroachment on the bearing capacity of the road prisms. Otherwise, terrace lands provide little hazard to road building. Because of their favorable topography, they are ideal as administrative sites, air strips and campgrounds. Trafficability is fair to good over most of the landtype. Mass stability hazards originating on this landtype are not a consideration; however, mass stability hazards which originate on adjacent landtypes must be given serious consideration.

Wood. This is a moderately well forested landtype and timber productivity potentials range from low to high. The major habitat types are dominated by ponderosa pine.

Water. Concentration of surface water will lead to gullying and accelerated erosion but this hazard is relatively low compared to steeper landtypes. These units can become flooded, but their elevated position makes this very uncommon and in some places, impossible. Water related hazards are generally low.

Forage. Brush/grass communities are common to this landtype. Potential production is rated moderate to high with current levels at about one-half this level. The amount of annual precipitation and the coarse nature of the soils combine to limit the ability of these units to recover from adverse use.

Recreation. Terrace lands are well suited for a variety of recreational activities and summer home development because of the topography. Special attention must be given to the hazards generated on adjacent landtypes, and their possible impact to development on lower lying units. Potential flash floods, debris slides, mud flows, and some avalanche hazards from above may significantly influence placement of structures, roads or other developments. Because of its river-wash base, coarse textured soils and proximity to streams, this landtype is not suitable for extensive leach fields or sanitary landfills.

Management Evaluation:

Valley Train Lands
Deep Skeletal and Coarse Loamy Soils

Location: These units are located in the bottoms of glacial valleys. Typical locations on the Boise Ranger District are Upper Roaring River and Upper Hot Creek areas.

Landtype Characteristics: Valley Train Lands comprise the bottoms and lower sideslopes of U-shaped glaciated valleys. The units are composed of depositional materials which may include alluvial lands, glacial outwash, terrace remnants, lateral and ground moraine remnants, small alluvial fans, and colluvial toe slopes. These units are located at high elevations (above 6,000 feet) and are found on all aspects. Slopes are partially timbered, short, and have gradients from 0 to 15 percent. Soils are deep skeletal and coarse loamy. There is no rock outcrop; depth to bedrock is generally greater than 10 feet.

Soils: The dominant soils on this landtype (50%--HBDA-5) have a thin patchy organic layer 0 to 3 inches thick over a dark brown gravelly sandy loam surface, 5 to 15 inches thick. The subsoil is a brown gravelly or cobbly sandy loam or gravelly sandy clay loam with 50 to 70 percent gravel and cobble. Similar soils (30%--IFBA-3) having less than 30 percent fine gravels in the profile are found in the unit. A minor soil (20%--JEAA-2) has a dark brown gravelly surface over a brown gravelly loamy sand subsoil with 35 to 55 percent gravel and cobble. The above soils may be found in all positions.

Vegetation: This unit has scattered timber with some small are as of heavier timber along stream beds. Habitat types found on this landtype are subalpine fir/grouse whortleberry on the more densely forested sections and subalpine fir/elk sedge and subalpine fir/pinegrass on the areas with scattered timber. Ground cover for the landtype is vegetation plus litter - 30 to 90 percent, forest crown density - 0 to 70 percent, and brush crown density - 10 to 25 percent.

Hydrology: Between 40 and 55 inches of precipitation is received on these landtypes annually. Of this amount, approximately 20 to 40 inches is yielded annually as stream flow. Most of the water yielded from these units percolates to bedrock or water table and thence to streams. Overland flow occurs only during rapid spring snowmelt and high intensity spring rain storms when the water table is at or near the soil surface. Perched water tables and bogs are common during the spring snowmelt period on approximately 15 to 20 percent of the landtype. These landtypes receive a high amount of surface and subsurface water from adjacent glacial trough landtypes. Most of this water accumulates in the deep soil reservoir and slowly drains into channels that incise the water table. These units are important regulators for sustained stream flow throughout the summer and outflow is slow compared to water input. Deep snow deposits accumulate at the base of avalanche paths and melt slowly through the summer.

Management Qualities: This landtype is an important buffer for sediment, debris, and overland and subsurface flows coming from surrounding landtypes. Little runoff is delivered to adjacent streams as surface flow.

Roads. Engineering problems involve highly variable materials, numerous wet spots, avalanche hazards from above, stream encroachment, and probability of interception of subsurface flow by road cuts. End haul of materials is often necessary to get adequate bearing strength across depressions and wet spots.

Wood. Growth is variable on the timber producing habitat types and climate is the limiting factor to the production of commercial sawtimber. These trees, however, serve two important functions; one from an esthetic standpoint, the other as a buffer to sediment produced on adjacent landtypes. They may also be important to wildlife habitat. Site limitations are moderate to severe, with the cold climate, vegetative competition, and flooding hazards the most limiting factors to reforestation.

Water. Interception of ground water flow is a serious hazard during snowmelt runoff. Diversion, interception and concentration of surface water will lead to gullying and accelerated erosion, but stony soils and gentle gradient makes the hazard only moderate. Deposition of snow from bordering avalanche paths presents a hazardous situation for structures. Sewage disposal via soil intake will be poor and hazard of contamination of ground water and streamflow is high. The tremendous amount of snowmelt water handled by the soils and channels is a major consideration for land use planning.

Forage. Forage production is extremely variable, high on open, well drained sites and low under dense stands of timber. Overall, the landtype has a wide mixture of shrubs, forbs, and grass species. The various communities or associations, however, are patchy or scattered. This situation is suited to wildlife habitat as well as livestock grazing.

Recreation. Due to their proximity to quality streams and the glaciated landscape, Valley Train Lands are esthetically desirable for outdoor recreation activities. Because of hazards generated on adjacent landtypes, caution is needed when making recreation development plans for this landtype. Trails can be expected to hold up quite well although seasonal maintenance will be necessary at the narrower portions of the unit. Trafficability is best on the higher well drained sites.

Management Evaluation:

Map Symbol 105-4
Alluvial Fan Land
Deep Fine Loamy Xeric Soils

Location: This landtype is common along Mores Creek and the Middle and South Forks of the Boise River.

Landtype Characteristics: During the Quaternary Period when basalt flowed into the lower portions of this area, surface erosional processes were active on the surrounding landtypes. The alluvial material generated on these landtypes accumulated on the lower slopes and on adjacent basalt flats. The end product was numerous, extensive, somewhat coned or fan-shaped landtypes composed of granite alluvium and some basalt residium over granite and basalt bedrock. These units are extremely variable in size and may range from five acres to areas as much as three miles wide and a mile long. These depositional units occur on lower elevations in the District, on all aspects, and are dominated by grass-brush communities. Fans are long to moderate in length with weakly developed parallel drainage systems. Gradients range from 0 to 20 percent. The deep fine loamy soils are over extremely well fractured to masked, well weathered granitic or basalt bedrock.

Soils: The dominant soils (40%--GDEA-4 and 20%--GDEA-6) have thin patchy organic layers over a dark brown loam or clay loam surface. The subsoils are dark brown or dark yellowish brown clay loam or silty clay and have less than 15 percent coarse fragments. Other soils are similar (40%--GDEL-5) but are underlain by basalt bedrock at shallow depths. These soils are generally near the edge of the unit, adjacent to basalt canyons on incised drainageways.

Vegetation: This landtype contains dominantly brush-grass communities with areas of scattered timber, usually in ponderosa pine/bitterbrush or ponderosa pine/Agropyrun spicatum habitat types. Ground cover for this landtype is: vegetation and litter - 60 to 80 percent; forest crown density - 0 to 20 percent; brush crown density - 10 to 20 percent.

Hydrology: These landtypes receive approximately 20 to 30 inches of precipitation annually. Snowpack is light to moderate and melts periodically through the winter and is gone by early spring. A total of one to five inches of water is yielded annually. Infiltration capacity is moderate and permeability is slow to moderate. The relatively low gradient of the unit allows most precipitation received to enter the soil. Bedrock permeability is variable. Most outflow is yielded slowly at springs on lower slopes or at streams. Significant subsurface water moves to these landtypes from upper adjacent slopes and accumulates within the lower portions. Overland flow may occur from high intensity rainfall during saturated soil conditions.

Management Qualities: Revegetation potentials are very low to moderate and trafficability is good to poor. Saturated soil conditions and high water tables in localized areas are major problems during the spring.

Roads. These units, because of their shape, general topography, and size, are often thought of as ideal locations for roads. A major problem develops, however, when compacted road surfaces interrupt and intercept the lateral and downslope movement of water in the subsoil. The end result is an accumulation of water above the road resulting in saturation of fills and decreased trafficability. This intercepted water also creates a mass stability problem with cutslopes causing slumping into ditches and requiring seasonal maintenance to maintain drainage. Trafficability problems associated with fine textured soils can also be anticipated such as dust when the road is dry and poor traction when the road is wet.

Wood. This is a scattered timber landtype, with large areas of brush-grass habitat. High evapotranspiration losses, high temperatures, and exposure are the most limiting factors to timber production. Overall timber productivity potential for the landtype is very low to low.

Water. Hazard of gullying from artificial concentration of water is moderate to low. Deep cuts or ditches will have moderate to high hazard of intercepting significant quantities of subsurface water during snowmelt. Deep cuts will not normally be necessary however. Flooding hazard is variable with location on the landtype. Locations adjacent to the stream that formed the fan are most subject to flooding, especially if the watershed of that stream has flashy runoff. Dominant overall hazard for serious alteration of hydrology is moderately low.

Forage. The overall suitability of this landtype for forage production and grazing is good. Production potentials are moderate and topography is gentle. Less impact can be expected

if grazing is restricted while the soil is wet and subject to compaction.

Recreation. These units receive little recreational use on the Boise Ranger District. Soils are sticky and muddy when wet. In the summer this unit becomes very hot and dry due to exposure and low timber crown cover.

Management Evaluation:

Map Symbol 105-5
Alluvial Fan Lands
Deep Skeletal, Sandy and Loamy, Xeric Soils

Location: Alluvial fan lands along the Middle and South Forks of the Boise River.

Landtype Characteristics: Alluvial fans are deposits of coarse sands and gravels transported by streams and concentrated surface flow. The sediments are deposited as cone-shaped landforms at the mouths of drainageways. The slopes of this landtype are dominantly south-facing and poorly vegetated, with slope gradients less than 20 percent. The soils have deep skeletal, sandy and loamy textures and are underlain by river-wash and/or, at greater depths, by granite.

Soils: The dominant soil (80%--JECA-5) has a scattered organic layer over a gravelly sandy loam with 45 to 80 percent well graded coarse fragments. A minor soil (20%--JCFA-1), confined to areas of recent deposition, has a trace of an organic layer over a gravelly loamy coarse sand or sand with 0 to 10 percent fine gravel.

Vegetation: The slopes of this landtype are well vegetated with brush-grass communities. Brush crown density is 0 to 60 percent.

Hydrology: These landtypes receive between 18 and 25 inches of precipitation annually. Snowpack melts slowly throughout the winter and is complete by early spring. Approximately 5 to 10 inches of water is yielded annually from the units. Most of the precipitation received on these landtypes infiltrates and percolates rapidly to very rapidly. Most of the non-channelized water yielded to and from these landtypes is subsurface flow and slow lateral saturated ground water flow. Overland flow is rare. Invariably these units will be dissected by a relatively large order stream that is hydrologically flashy. These lands act somewhat as a sediment storage site in that the channel gradient through the units is significantly less than the gradient above the units. The overall response (yield) of these landtypes to water input is moderate or average.

Management Qualities: Surface erosion is a moderate problem on this landtype and is accentuated on those areas where grazing and trailing are common. Most other hazards originate on adjacent landtypes and are manifest as localized flash floods, mud flows, or debris slides.

Roads. Mass stability hazards and construction hazards are rated low to moderate. Most problems will relate to the coarse and loose nature of materials which will continually sluff. Subsurface flow is generally too deep to present a problem. Revegetation potential for cut banks is low and for fills moderate. Trafficability is good.

Wood. Timber productivity potential for the landtype is very low. The dominant vegetation is brush-grass communities.

Water. Concentration of water will lead to gullying and accelerated erosion. Roads located over stream channels through the unit will be subjected to flashy stream flow during and immediately following high intensity rain storms.

Forage. Production potential for this landtype is 600 to 1,500 pounds of usable dry forage per acre per year. Presently poor range conditions are related to the coarse texture of the soil that has been severely depleted by historic grazing practices. Recovery rates will be moderate to rapid.

Recreation. These units are hot and dry during the summer and

the topography is often ideal for recreation development. Sewage treatment within the soil mantle is marginal because of the coarse texture of the soils and the proximity of streams and rivers. Potential hazards originating on adjacent units will be of concern in evaluating locations for developments.

Management Evaluation:

Map Symbol 106
Moraine Land, Undifferentiated
Deep Skeletal, Sandy and Loamy Soils

Location: Common around Atlanta and the Queens River areas.

Landtype Characteristics: This depositional landtype is represented by low glacial moraine hills that have convex slopes with gradients of 5 to 30 percent. These hills are dissected by numerous shallow drainages and have a forest crown cover of from 20 to 70 percent. Slopes have all aspects and are generally between 100 and 700 feet long. Soils are dominantly deep and skeletal in glacial moraine materials composed of gravel, cobbles, stones, and boulders. This material will exceed 10 feet in depth. The underlying bedrock is granite, and highly variable as to fracturing and weathering.

Soils: The dominant soil (40%--IECA-5), on most sideslope positions, has a 0 to 4 inch organic layer over a dark grayish brown gravelly sandy loam surface 5 to 10 inches thick. The subsoil is a dark yellowish brown gravelly sandy loam with 50 to 80 percent gravel and rock fragments. A similar soil (20%--HBDA-5) with a loam surface and a gravelly sandy clay loam subsoil is on ridgetops and gentle sideslopes. A coarse textured soil with gravelly loamy sand subsoils (20%--JEAA-2) has 40 to 60 percent coarse fragments and is on steeper sideslopes. A finer textured soil with sandy clay loam textures (20%--HBDA-4) occurs on ridgetops and in swale positions.

Vegetation: This landtype is dominantly forested type unit with 20 to 70 percent forest crown cover. Subalpine fir/grouse whortleberry and Douglas-fir habitat types are most common. Understory brush crown density ranges from 5 to 40 percent.

Hydrology: Mean annual precipitation is 30 to 40 inches and mean water yield is 15 to 25 inches. Snow packs are moderately deep and melt rapidly during April and May. Nearly all of the water yield takes place from snowmelt as deep percolation. Most of these deposits are in low lying positions through which subsurface water from higher areas must pass en-route to streams. Water flow through and outflow from this landtype is moderate to slow, thus helping to extend the flows into summer. Water tables exist at moderate depths in spring and recede to moderately deep in fall and winter.

Management Qualities: These are relatively stable lands under natural undisturbed conditions. Surface erosion has the greatest impact on disturbed soil areas.

Roads. Problems to construction relate to the moderate inherent erosion hazard of natural slopes and of disturbed soil material. The erosion hazard of cut and fill slopes is expected to be low to moderate and trafficability is generally good to very good. A high percentage of well graded coarse fragments contribute to the stability of this unit.

Wood. This landtype is rated as having low to moderate productivity potential for timber growing species. Lodgepole pine is currently the dominant component of the subalpine fir/grouse whortleberry habitat type. Densities are generally moderate and growth is expected to be slow because of the climate. Revegetation potentials are expected to be moderate to severe because of vegetative competition and climatic conditions.

Water. Water handling characteristics are dominantly good and pose few hazards to improvements or activities. A few low lying areas have high water tables and are subject to flooding or channel erosion from streams. Hazards of serious disruption of hydrology is moderately low.

Forage. Forage production on this landtype is dominantly rated low to moderate because of the timbered understory and an elk sedge and grouse whortleberry understory. Much of the production potential is also low because of numerous stones over the surface of the soil. Little grazing impact has been noted on these units.

Recreation. Due to their relatively low relief and proximity to quality streams and the glaciated landscape, moraine lands are often well suited for outdoor recreation activities. Trails are expected to hold up quite well, although some maintenance will be required at the more narrow portions due to erosion. Traffic-ability will be very good.

Management Evaluation:

Map Symbol 106-2
Lateral Moraine Land
Deep Skeletal, Sandy and Loamy Soils

Location: Typical examples of this landtype are located in the Trinity Lakes area and Queens River Drainage near the NRA boundary.

Landtype Characteristics: Lateral moraines are associated with the major alpine glaciated valleys. These lands were deposited above and on the lateral margin of the valley glaciers. Most of these lands have a total relief of about 150 feet and slope gradients ranging from 10 to 40 percent. The convex slopes are 100 to 400 feet long, occur on most aspects and have a 20 to 60 percent forest crown cover. Soils are deep skeletal, sandy and loamy over glacial moraine materials composed of gravel, cobble, stones, and boulders. These materials may be greater than 10 feet deep. The underlying bedrock is dominantly granitic but variable as to fracturing and weathering.

Soils: The dominant soil (50%--JEAA-2), on most slope positions, has a 0 to 1 inch organic layer over a dark brown gravelly loamy sand to gravelly sandy loam, 20 to 50 inches deep, with 40 to 60 percent well graded coarse fragments. Another soil (50%--IFBA-5), on more gentle sideslopes, has a 0 to 4 inch organic layer over a very dark brown gravelly sandy loam, 20 to 60 inches deep, with 30 to 60 percent well graded coarse fragments.

Vegetation: This landtype is timbered with a 20 to 60 percent forest crown cover. A subalpine fir/pinegrass habitat type is dominant with subalpine fir/elk sedge and brush/grass communities limited to the elongated ridges and steeper sideslopes. Brush crown densities are generally less than 40 percent. Some minor inclusions of subalpine fir, Engelmann spruce communities have been noted in the more moist wet inclusions.

Hydrology: Mean annual precipitation ranges from 30 to 40 inches and mean water yield ranges from 15 to 25 inches. Snow packs are moderately deep and melt rapidly during April and May. Nearly all the water yield takes place as deep percolation from snowmelt. Outflow from these moraines is moderate to slow and extends into summer.

Management Qualities: Under natural conditions these lands are relatively stable. Soil disturbance or exposure may create a moderate impact from surface erosion.

Roads. The dominant impact from construction on this landtype will be a moderate erosion hazard of the natural surfaces and the road prisms. A moderate hazard does exist from subsurface water interception, but the probability of this occurrence is minimal. Trafficability will generally be good to very good because of a high percentage of well graded coarse fragments contained within the moraine materials.

Wood. This is a dominantly well timbered landtype with low to moderate timber productivity potentials. The subalpine fir/pinegrass ranks low to moderate with severe limitations for reforestation. Vegetative competition and climate are the most limiting factors. Lodgepole pine currently makes up most of the volume in the subalpine fir habitat types and currently occurs as dense pole stands in most areas. Minor inclusions of subalpine fir/elk sedge and brush/grass communities have very low to low productivity potentials with somewhat more severe limitations to reforestation.

Water. Water handling characteristics are dominantly good and pose few hazards to improvements or activities. Hazards of serious disruption of hydrology are moderately low.

Forage. Forage production is rated low to very low within these units because of the timbered overstory and the lack of highly palatable forage species in the understory. The subalpine fir/pinegrass may produce in excess of 800 pounds of usable dry forage per acre per year but under most circumstances this forage is not utilized by livestock. Impact from most grazing is negligible.

Recreation. These units do provide some of the scenic backdrops along major travel routes in the glaciated country. Individual units are generally too small and steep to be well suited to development of recreational facilities. The highly permeable nature of the moraine material again is not conducive to treatment of sewage. Contamination of the adjacent streams and ground water can be expected from such activity. In most areas, trails across and along these units can be expected to hold up quite well and trafficability will be good to very good.

Management Evaluation:

Map Symbol 107-1
Toe Slope Land, Deep Fine Loamy Soils

Location: Along the Boise River below Troutdale.

Landtype Characteristics: Toe slope lands are dominantly colluvial deposits at the base of higher adjacent slopes. Some alluvial action is present however, in the form of water borne materials deposited over those resulting from gravity. The slopes of this landtype are straight to concave, 10 to 25 percent gradient, 50 to 1,000 feet long, and are mapped at elevations of 3,300 to 4,000 feet. The soils have dark colored surfaces with fine loamy or loamy skeletal textures, 20 to 60 inches deep. The soils are mixed with colluvial basalt rock of various sizes which can be at various stages of weathering or fracturing. (See Management Qualities section under Roads).

Soils: The dominant soils on this landtype (50%--GDFA-4) are deep and have an organic layer 0 to 1 inch thick. The surface soil is a dark brown, sandy clay loam, with 0 to 5 percent fine gravel. The subsoil is a brown sandy clay loam, with 20 to 30 percent fine gravel. These soils are found on smooth positions in concave swale and toe slope positions. The other soils (50%--JECA-5) have gravelly sandy loam textures with 40 to 80 percent gravel and rock in the subsoil. These soils have less influence from basaltic materials and are found on all slope positions throughout the unit.

Vegetation: The slopes of this landtype are dominantly brush/grass communities, not identified by habitat type. Vegetative ground cover for the landtype ranges from 20 to 60 percent with density of 0 to 40 percent.

Hydrology: Mean annual precipitation is approximately 20 to 25 inches and mean water yield approximately 5 inches. Snowpack depth is moderate and normally melts in a few weeks in March and April. These toe slopes are wet during and for a few weeks after this snowmelt period. Overland flow is rare except on denuded or compacted areas. Runoff is dominantly as moderately slow lateral flow of saturated ground water. Considerable snowmelt from higher slopes moves into this landtype as moderately rapid subsurface flow and leaves it as moderately slow ground water flow. Rapid runoff from thunderstorms on higher slopes is partially dissipated on these more gentle toe slopes.

Management Qualities: These lands are relatively stable if not disturbed. However, because the soils may be at saturation, consideration of the possible consequences should be weighed before deep cuts are made.

Roads. The major areas of consideration for roads on this land-type are related to water movement and parent material. The units are dissected by ephemeral streams originating on the adjacent landtypes. This condition will produce water during spring snowmelt and would have to be handled where they cross proposed roads. The basalt rock involved is highly variable from a fracturing and weathering standpoint. There is the possibility that well weathered rock would be exposed which is highly unstable for cut banks, fill materials, or surfacing materials. The nature of basalt materials to weather to clay combined with the possibility of highly weathered rock produce conditions which restrict the downward movement of water. Shallow subsurface flow can then become concentrated in minor drainageways or intercepted by cut slopes. Trafficability is poor.

Wood. This landtype is mostly a brush/grass vegetative type. Limitations to reforestation are climatic conditions, high evapotranspiration, and vegetative competition.

Water. Water related hazards to improvements or activities are low except at steep draws draining upper slopes. A moderate hazard of flashy debris laden flows exists at these locations. Overall hazard of serious disruption of hydrology from management activities is moderate.

Forage. The potential production for this landtype is 400 to 1,500 pounds per acre per year of usable dry forage. These ratings reflect the good water-holding capacity of the soils.

Recreation. This landtype lies adjacent to a travel and water influence area, and access for recreation purposes is excellent. Although the area involved is small, it could be considered for a variety of recreational uses.

Management Evaluation:

Map Symbol 108
Glacial Plastered Mountain Slope Land
Deep Skeletal, Sandy and Loamy Soils

Location: These units are not common but are present in the Glacial Trough Lands of Decker Creek and Corbus Creek.

Landtype Characteristics: These lands are the glacially modified slopes that have had glacial material deposited on them rather than stripped away by the scouring action of glaciers. These lands are generally benchy with 20 to 60 percent slopes and have very dense forest crown cover ranging from 60 to 80 percent. Dissections are minimal and seeps are very common to the lower one-third of slopes. These lands contain considerable lateral moraine material with typically sub-rounded glacial worked rock fragments. Soils are deep and dominantly loamy skeletal over granite bedrock with variable fracturing and weathering.

Soils. The dominant soils (40%--IFBA-5 and 30%--JEAA-5) occur on most slope positions throughout the unit. These soils have 0 to 4 inch organic layers over dark colored gravelly sandy loam or sandy clay loam surfaces. The subsoils are gravelly sandy loam or gravelly loamy with 40 to 80 percent well graded gravels and stones. Other soils (30%--IFBA-3) are moderately deep, and have gravelly sandy loam textures with 15 to 30 percent fine gravels. These soils occur in depressional or relatively smooth areas.

Vegetation: This landtype is heavily timbered with 40 to 70 percent forest crown cover dominated by subalpine fir/grouse whortleberry and subalpine fir/elk sedge habitat types. The understory is dominated by grouse whortleberry and brush crown densities range from 10 to 30 percent.

Hydrology: Mean annual precipitation is 30 to 40 inches and mean water yield is 15 to 25 inches. Snow pack is heavy and often persists through May. Snowmelt releases 20 to 30 inches of water to the soil in a few weeks in May and June. Runoff is dominantly by deep subsurface flow and deep percolation and extends well into the summer. Overland flow is rare. Surface and subsurface water flows across this landtype from more rocky, shallow landtypes above. Water table is near the surface on lower slopes during May, June, and July.

Management Qualities: The major problems on this landtype relate to a high probability of intercepting subsurface flow on lower slopes and a high mass stability hazard for cutslopes on lower slopes. Timber productivity is expected to be low to moderate with moderate limitations to reforestation.

Roads. These lands, because their favorable gradation and benchy slopes, do present favorable road locations at some mid and upper slope positions. Lower slopes have a moderate to high hazard for the interception of subsurface flow which will subsequently cause mass failures of road cuts and some fills. A moderate to high surface erosion hazard for the landtype will also be aggravated by construction activities on individual units.

Wood. The subalpine fir/grouse whortleberry habitat type that dominates these landtypes has a moderate productivity potential. The moderate rating is held to the seral species, lodgepole pine, and moderate limitations for reforestation will be reflected in vegetative competition and a severe climate. The very high rate of stocking on these units also contributes to this rating.

<u>Water.</u> Water handling characteristics will cause moderate overall hazard to improvements and activities on this landtype. First and second order streams crossing some units of this land-type are steep and peak flows are very high per unit area drained. The greatest hazard to the hydrology is the disturbance of runoff patterns in channels and through the soil mantle by road construction, especially on lower and steeper slopes.

<u>Forage.</u> Forage production on these units varies from very low to moderate because of variability in the concentration of coarse fragments within the soil profile and on the soil surface. Also, a reduction in production is expected where forest crown densities exceed 40 percent. The more open stands of subalpine fir or of lodgepole pine are expected to have a moderate range productivity potential dominated by grouse whortleberry, elk sedge, and pinegrass.

<u>Recreation.</u> Although limited in extent, these lands are an important part of the high value dispersed recreation areas associated with glaciated lands. Trail construction problems will be similar to roads with the greatest limitations associated with wet soils on lower slopes. Some maintenance will be required to remove rocks, debris, and sediment. Where surface flow or seeps are intercepted, erosion and sediment hazards will result. Trafficability will be fair to good.

<u>Management Evaluation:</u>

Map Symbol 109-2
Cryoplanated Ridge Land
Shallow and Moderately Deep Skeletal, Sandy and Loamy Soils

Location: These units are confined to relatively long, narrow high elevation cryoplanated ridges. Typical locations on the Boise Ranger District are Lava Mountain and Thorn Butte area.

Landtype Characteristics: These Cryoplanated landtypes lie on long narrow ridges adjacent to glaciated areas. These lands have been formed by the effects of permanent snow and ice field action as a result of climatic changes accompanying glaciation. The chief slope forming processes are those resulting from nivation, freezing and thawing, and wetting and drying which make mass wasting the dominant process by which materials are moved downslope. This process keeps replacing materials that have been removed by the limited overland flow that has occurred. Slopes range from 5 to 30 percent and dissections are shallow or weakly expressed. The vegetative picture is one of scattered dense pockets of subalpine fir surrounded by extensive areas of brush-grass communities. The shallow and moderately deep skeletal, sandy and loamy soils are over masked granite bedrock which is moderately to well weathered.

Soils: The dominant soils (40%--IECA-2) have a thin patchy organic layer 0 to 2 inches thick over a dark yellowish brown sandy loam surface about 5 to 8 inches thick. The subsoil is light yellowish brown gravelly coarse sand with 30 to 60 percent gravel that is more than 20 inches thick. Other soils (30%--IFBA-3) have thick dark colored surface soils and gravelly sandy loam textures throughout the profile with less than 30 percent gravel. The above soils are formed on broader ridges and sideslopes. A shallow soil (30%--IFBD-3) has dark colored surfaces and sandy loam textures with about 10 percent fine gravels. This soil occurs on the narrow ridgetops and ridge spurs and near rock outcrops.

Vegetation: This landtype is dominated by open grown brush-grass communities with scattered dense patches of subalpine fir/elk sedge and scattered stands of subalpine fir/whitebark pine. Forest crown cover ranges from 0 to 15 percent while brush crown densities range from 0 to 40 percent. Some minor areas of subalpine fir/Stipa have been noted.

Hydrology: These lands receive between 35 and 45 inches of precipitation annually. Snowpack is deep and remains into June. Approximately 20 to 30 inches of water is yielded annually from these ridge lands. Almost all precipitation becomes subsurface moisture. Approximately one-third to one-half excess subsurface water enters the fractured bedrock. Subsurface flow which accounts for the balance of the water yielded from the units moves downslope above bedrock. Overland flow is common on areas where disturbance by animals or machines has taken place. These landtypes are slow in response (yield) to water input.

Management Qualities: This landtype is important because of its water production capabilities and its range production potential. The units are not particularly steep and landtype hazards are dominantly rated low to moderate. Surface erosion hazards and a high probability of intercepting subsurface flow on lower steeper slopes are the major limitations. These units do, however, have a fragile ecosystem. Disturbance that adversely affects vegetative cover will require considerable time to correct and will result in increased mass wasting and sediment production.

Roads. This landtype will not be as hazardous as other landscapes for road location. As indicated previously, the dominant slopes are not overly steep. Slope dissection is weak, deep water percolation is the rule. While the profile textures are uniformly gravelly sandy loams, bedrock fracturing under the shallow soils does provide a well graded selection of coarse fragment sizes for roadbed and fill slopes. In addition, the soil textures plus the coarse fragments exhibit good trafficability. Dust will be a problem during the drier periods of the year. Revegetation of cutslopes and the possibility of some loose material sloughing from cutslopes may present a minor problem. Road locations restricted to upper slopes and the top of ridges will significantly reduce the possibility of intercepting subsurface flow.

Wood. More than one-half of this landtype is non-forested. On those areas or units where timber stands are located, the production potential is very low. The very severe to severe limitations to reforestation are related to the competition of elk sedge and the high evapotranspiration losses and cold climate associated with this elevation.

Water. One of the most important qualities of this landtype is its water storage capability. High elevation snowpack and deep percolation of most of the spring snowmelt makes these units excellent water producers for sustained streamflow. These units are fragile and highly susceptible to gullying and accelerated erosion from reduction of infiltration capacity and/or water concentration by mechanical and animal disturbances. Deep road cuts on the lower one-half of units will intercept significant subsurface water. Alteration of runoff conditions on this landtype will likely cause gullying or channel erosion on lower areas.

Forage. This landtype has a high value for range use. Most of the area is open. Vegetation is grass and forbs and the landscape is not very steep. The landtype is, however, producing at about one-half its potential mainly because of earlier overuse. Dry weight forage production is currently between 400 and 700 pounds per acre per year. The potential for these units is from 400 to 1,300 pounds per acre per year. Past grazing use has not only reduced the quantity of forage plants, but has advanced the hazard of surface creep and surface erosion. Many areas within this landtype have currently a gravel pavement on the surface which is not conducive to the establishment of forage plants.

Recreation. This landtype often acts as an access route to some highly desirable areas associated with the high elevation landscape. Esthetic qualities generally relate to the unit's position and association with adjacent landscapes. Scenic qualities from these units are often very good. Vistas and suitable areas for recreational development are common within these units. Access is variable. Surface water is generally lacking except during the spring. Dusty roads with good trafficability will be the rule.

Management Evaluation:

Map Symbol 109a-1

Weakly Dissected Cryoplanated Mountain Slopes

Shallow and Moderately Deep Skeletal, Sandy and Loamy Soils

Location: These are the weakly dissected sideslopes of high cryoplanated ridges. Typical locations on the Boise Ranger District are Sheep Mountain and Bear Gulch areas.

Landtype Characteristics: These lands have been formed by the effects of permanent snow and ice field action as a result of climatic changes accompanying glaciers; however, they have not been subjected to the scouring action of the glaciated lands. This landtype is usually adjacent to or near glaciated areas. The chief slope forming processes are those resulting from nivation, freezing and thawing, and wetting and drying which make mass wasting the dominant manner by which materials move downslope. These units have been uplifted or rejuvenated through the mountain building processes. These units are located at high elevations (above 6,000 feet) and are found on dominantly south and west aspects. Slopes are sparsely timbered, and have gradients from 30 to 70 percent. Soils are shallow and moderately deep loamy skeletal and coarse loamy. There is only a trace of rock outcrop; bedrock is moderately and well fractured and masked, and moderately to well weathered.

Soils: The dominant soils on this landtype (40%--JEAA-5) are moderately deep and have an organic layer 0 to 3 inches thick. The surface soilis a very dark grayish brown gravelly sandy loam with 30 percent fine gravel and up to 20 percent rock. The subsoil is a brown gravelly sandy loam with 25 to 50 percent fine gravel and 0 to 20 percent rock. Another soil on this landtype (30%--JEAE-5) is similar to the dominant soils except they are shallow. The other soils on this landtype (30%-- JEAA-3) are moderately deep and have a thin organic layer about one inch thick. The surface soil is a dark brown coarse loam with 5 to 10 percent gravel. The subsoil is a yellowish brown coarse sandy loam to loamy sand with 5 to 15 percent gravel and 0 to 15 percent rock.

Vegetation: This landtype is dominated by open brush/grass communities. There are also areas of subalpine fir/elk sedge, and Douglas-fir/elk sedge near the base of the unit and in protected positions. Ground cover for the landtype is: vegetation plus litter - 10 to 60 percent; forest crown density - 15 to 60 percent; brush crown density - 15 to 30 percent.

Hydrology: These landtypes receive between 35 and 45 inches of precipitation annually. Snowpack is deep and melts rapidly in April and May. Approximately 20 to 30 inches of water is yielded annually from these slopes. Overland flow is uncommon and only from abnormally heavy thunderstorms. Most of the released snow and rainfall quickly enters and percolates into the soils to become subsurface water. The penetration of subsurface water into the bedrock accounts for a portion of the total water yield. The parallel drainage pattern does not greatly concentrate surface and subsurface flows within this landtype. However, subsurface water does tend to accumulate within the lower slopes.

Management Qualities: From a land management point of view, this land-type is important because of its water producing capability and range production potential. The units are moderately steep and most landtype hazards are rated low to moderate. The landtype has, however, a relatively fragile ecosystem. Disturbance that adversely affects vegetative cover will require considerable time to correct and will result in increased surface erosion, mass wasting and sediment production.

Roads. This landtype will not be as hazardous as some landscapes for road location. Slope dissection is weak. Soil consistency plus the coarse fragments in the profile combine to yield good trafficability. Revegetation of cut slopes and the possibility of some loose material sluffing off the cut slopes may present a problem. Road locations on the upper slopes will significantly reduce the possibility of intercepting subsurface flow.

Wood. More than one-half of the landtype is non-forest. On those areas where timber is located the production potential is very low to low. Climate is the dominant limitation for reforestation.

Water. Deep road cuts on the lower slopes near dissections and swales will intercept considerable subsurface water. Concentration of this water can result in serious erosion and sedimentation if insufficient buffer exists at water disposal sites.

Forage. This landtype has moderate potential for range use. Most of the area is open, vegetation is dominantly grass and forbs, and the slopes are moderately steep. The forage production potential for this landtype is from 200 to 800 pounds per acre per year.

Recreation. This landtype is often associated with other high elevation landtypes and often serves as a scenic backdrop. Access is variable. Surface water is lacking. These units are often used as access routes to more favorable areas and as hunting grounds. Trafficability is good but trails will have a high surface erosion hazard.

Management Evaluation:

Map Symbol 109b
Moderately Dissected Cryoplanated Mountain Slopes
Deep Skeletal, Sandy and Loamy Soils

Location: Typical locations of this unit on the Boise Ranger District are along the eastern part of Roaring River drainage.

Landtype Characteristics: These units are located near areas of glaciation but were not subjected to the scouring action of glacial ice. Climatic influences accompanying glaciers resulted in permanent ice and snow fields where movement of any material was essentially local. Through the processes of wetting and drying, nivation, freezing and thawing, and mass wasting of materials, somewhat smooth and rounded slopes have developed. Subsequent rejuvenation followed by weak fluvial processes have resulted in these dominantly smooth, moderately dissected cryoplanated slopes. Dissections are somewhat infrequent, broadly concaved and somewhat parallel. These units are dominantly well-timbered with crown covers ranging from 40 to 80 percent and slope gradients ranging from 20 to 60 percent. The deep skeletal, sandy and loamy soils are over masked or well to extremely well fractured, weakly to well weathered granite bedrock.

Soils: The dominant soil (40%--IECA-5) has a 0 to 4 inch organic layer over a thin dark grayish brown gravelly sandy loam surface. The subsoil is a dark yellowish brown gravelly sandy loam with 50 to 60 percent gravel and rock fragments. This soil is on most sideslopes. Another soil on the sideslopes (30%--JEAA-2) resembles the above soil except the subsoil is a gravelly loamy sand with 35 to 55 percent gravel and rock fragments. Shallow soils (30%--JEAE-5) are similar to the above soils in texture and rock content are found on steeper sideslopes and near rock outcrops.

Vegetation: This is one of the better timbered of the cyroplanated land-types, with 30 to 70 percent forest crown densities. The subalpine fir/ grouse whortleberry and subalpine fir/elk sedge habitat types are common over entire unit. Some minor inclusions of a subalpine fir/dwarf blueberry are present on some sideslopes. Understories are generally very brushy with brush crown densities ranging from 20 to 50 percent.

Hydrology: This landtype receives between 35 and 45 inches of precipitation each year. Snow, which makes up the majority of the precipitation total, melts at slow rates and remains into June. Approximately 20 to 30 inches of water is yielded annually from the slopes. Overland flow is rare. However, stream flow is generated from the natural interception of subsurface water by the first order channels. Water is yielded by moderately deep subsurface flow and by deep percolation through bedrock. The subsurface flow is heavy during May and June but the deep percolation extends through much of the year. Many draws without developed surface channels flow concentrated subsurface flow. Accumulations of ground water occur within the lower portion of slopes and along stream bottoms.

These landtypes, which produce a considerable amount of water, are important flow regulators and release much water slowly to streams.

Management Qualities: These lands are relatively stable with the major limitations being a moderate to high inherent surface erosion hazard, a moderate natural slump hazard on steeper lower slopes, and a moderate to high mass stability hazard for road cuts and fills. Most of these problems relate to the moderate to high probability of intercepting subsurface water.

Roads. Construction problems are dominantly associated with the moderate to high probability of intercepting subsurface flow on steeper portions of mid and lower slopes. Mass stability hazards of road cuts and fills will be moderate to high and erosion hazard of cuts and fills will also be moderate to high. Trafficability is expected to be good. A moderate slump hazard does occur but may not be significant to most construction activities except on steeper slopes.

Wood. These are the most heavily timbered of the Cryoplanated landtypes, with 30 to 70 percent forest crown densities. Timber productivity is dominantly low with some areas rated moderate because moisture and temperature relationships are better suited to timber growth. Limitations to reforestation are severe because of climate and the vegetative competition associated with elk sedge and grouse whortleberry understory.

Water. Deep road cuts on the lower one-half of slopes will intercept subsurface flow. With narrow roads, however, most slopes will require only cuts of moderate depths. Concentration of this water and normal road surface drainage water to non-buffered locations can result in increased sedimentation and reduction in streamflow regulation. Overall hazards are moderate.

Forage. Forage production on this landtype is dominantly rated low for livestock because of the heavy timber cover and the predominance of grouse whortleberry and elk sedge in the understory. The severity of climate and short growing season also reduce the productive potential of these sites. Some minor areas where grazing does occur have accelerated surface erosion to a limited extent, especially in the more open subalpine fir/elk sedge habitat types. Most areas throughout the District, however, have not been subjected to much domestic grazing.

Recreation. These landtypes occur at mid and high elevation and act often as a timbered scenic backdrop of heavily timbered slopes when looking north to south across the District. Current levels of recreation activity on these lands are dominated by hunting during the big game season.

Management Evaluation:

Map Symbol 109c
Strongly Dissected Cryoplanated Mountain Slopes
Shallow and Moderately Deep Skeletal, Sandy and Loam Soils

Location: A typical location on the Boise Ranger District is the slopes southeast of Rattlesnake Mountain.

Landtype Characteristics: These lands like other cryoplanated lands are located near areas of glaciation but were not subjected to the scouring action of glacial ice. Climatic influences from glaciers resulted in permanent ice and snow fields where any movement of material was essentially local. Through the processes of wetting and drying, nivation, freezing and thawing, and mass-wasting, materials were moved and accumulated on the slopes, forming the somewhat smooth and rounded appearance. Rejuvenation and subsequent fluvial processes have altered these lands and resulted in strongly dissected slopes. The dissections are dendritic and of moderate density but deep. The resulting slopes are convexed, occur on dominantly south and west aspects, and have slope gradients that range from 35 to 65 percent. Forest crown densities are extremely variable and patchy, with 10 to 60 percent forest crown density. The dominantly shallow and moderately deep skeletal, sandy and loamy soils occur over well to extremely well fractured or masked, moderate to well weathered granite bedrock.

Soils: The dominant soils (50%--IFBA-3) have a 0 to 3 inch organic layer over a very dark grayish brown sandy loam 8 to 20 inches thick. The subsoil is a yellowish brown gravelly sandy loam 20 to 40 inches thick with less than 30 percent gravel. These soils are generally found under the timber. Shallow soils having a gravelly sandy loam profile with 30 to 50 percent gravel in the subsoil occur on ridgetops, spurs and steeper areas. A moderately deep soil with a thin sandy loam surface and a gravelly loamy sand subsoil (45 to 55 percent gravel) occurs on the more open areas and southerly facing slopes.

Vegetation: These units have dominantly open or patchy stands of timber, with 10 to 60 percent forest crown densities. Douglas-fir/elk sedge and subalpine fir/elk sedge habitat types are common over these units. Minor habitat types on some of the drier or exposed areas include Douglas-fir/ pinegrass, subalpine fir/Idaho fescue, and subalpine fir/whitebark pine at higher elevations. Brush crown density varies from 10 to 40 percent.

Hydrology: These slopes receive between 30 and 40 inches of precipitation annually. Snowpack is deep and melts at moderate rates in April, May and June. Approximately 15 to 25 inches of water is yielded annually by these slopes. Overland flow is common. Natural interception of subsurface water by the numerous drainage channels converts a large volume of the water yielded to streamflow. The dendritic drainage pattern of the landtype tends to accumulate surface and subsurface flow and concentrate it at focal points at lower slopes. Deep seepage of water is significant but variable depending upon bedrock fracturing and weathering. The moderate to rapid response of runoff of water delivered makes these landtypes moderately flashy.

Management Qualities: Most problems on this landtype are related to a high to very high hazard of disrupting natural runoff patterns by roads and an overall high erosion hazard.

Roads. Major problems to construction will involve a high hazard on mid and lower slopes of intercepting large quantities of subsurface water and its subsequent impact on road cut and fill slopes. Drainage in many areas will be difficult and the concentration of water on road surfaces and in inside ditches will produce considerable potential sediment. Poorly graded coarse fragments contribute to this problem. Some difficult stream crossing situations will be encountered. Although roads may be somewhat dusty, trafficability is expected to be good.

Wood. Overall timber productivity for this landtype is rated very low to low although some areas of moderate may be included. The severity of the climate and the generally low to moderate stand densities are not conducive to higher timber productivity potentials. Limitations to reforestation are dominantly severe to very severe with the dominant limitations being the severity of climate, heavy snowpack, low water holding capacity of the soils, and vegetative competition in some habitat types.

Water. The high drainage density will make sedimentation hazard from disturbance very high. Roads crossing major dissections on the lower slopes will be subjected to rapid discharge conditions during and immediately following high intensity rainfall and spring snowmelt. Road cuts over four feet deep on lower slopes will intercept significant quantities of subsurface water.

Forage. Forage production potential for domestic livestock within this landtype is rated very low to low because of the predominance of elk sedge and grouse whortleberry in the understory of the partially forested canopy. Climate and low water holding capacities of the soils are limiting factors to vegetative growth. Many units have been grazed severely in the past accelerating surface erosion and significantly reducing productivity potential in localized areas. Recovery rates are expected to be extremely slow. Grazing on steeper sideslopes significantly contributes to accelerated surface creep, and results in a reduction in productivity potential.

Recreation. Some units are used as access to high elevation backcountry or wilderness experience areas. Access is variable. These units do, however, contribute to the scenic backdrop when observed from such vantage points as lookouts and ridges. Hunting is a major recreational use of these units. Most of this activity, however, is restricted to the big game season during the late summer and early autumn months.

Management Evaluation:

Map Symbol 109d-1
Cryoplanated Headlands
Shallow and Moderately Deep Skeletal Sandy and Loamy Soils

Location: Typical location on the Boise Ranger District is near the Shafer Butte area.

Landtype Characteristics: This landtype comprises the headlands of minor drainages in the Cryoplanated Lands. The formative process on this landtype has been the effect of water concentrated on very steep slopes. The result is a broad, very steep, fan-shaped dissection at the head of some drainages. The combination of steep slopes, poorly permeable bedrock, and rapid snowmelt has produced more intense dissection than on other cryoplanated lands. The slopes of this landtype are timbered and non-timbered, straight to concave, 55 to 75 percent gradients, 1,000 to 2,000 feet long, and are mapped at elevations of 6,500 to 7,500 feet on all aspects. The sandy and loamy skeletal soils are shallow and moderately deep, and are underlain by relatively hard, slightly weathered to soft, well weathered granite, which is moderately to well fractured or masked.

Soils: The dominant soils on this landtype (70%--JEAA-5) are deep and have a 0 to 3 inch organic layer on the surface. The surface soil is a very dark grayish brown, gravelly sandy loam, with 30 to 40 percent gravel and 0 to 5 percent rock. The subsoil is a brown gravelly sandy loam with 25 to 50 percent fine gravel and 0 to 15 percent rock. These soils are found on mid and toe slope positions of the headland and the tops of minor, weakly expressed spur ridges. The remaining soils (JEAE-5) are similar to the dominant soils except they are less than 20 inches deep. These soils are found on upper slopes, ridge crests and near rock outcrops.

Vegetation: The slopes of this landtype have scattered stands of timber and brush cover. The following habitat types are represented: Douglas-fir/ninebark, Douglas-fir/mountain maple, Douglas-fir/elk sedge, and chokecherry/bittercherry. Vegetative ground cover for the landtype ranges from 45 to 60 percent. Forest crown density ranges from 30 to 40 percent and a brush crown density of 20 to 70 percent.

Hydrology: These headlands receive between 30 and 40 inches of precipitation of which most is in the form of snow. Snowmelt is moderately rapid during May on these slopes. An average of 15 to 25 inches of water is yielded each year. Overland flow occurs near ridges of rock outcrop and shallow soils. Percolation and downslope movement of subsurface water is rapid to very rapid. Subsurface water quickly finds its way to dissections, where it becomes stream flow. The total amount of water yielded by deep percolation into bedrock is probably low. The dissections within these lands rapidly collect both overland and subsurface flows and bring it together at points of convergence, often on a lower bordering landtype.

Response to high intensity summer storms is very rapid. This landtype is one of the flashiest units on the District.

Management Qualities: The important features of this landtype for management are related to its watershed value, and esthetics. These are high hazard units because water movement becomes concentrated and disturbances to the landscape will cause disruption of a sensitive water handling system.

Roads. The units of this landtype are among the most hazardous for roads on the District. The dominant slope is steep and water movement is concentrated on or near the soil surface. Road cuts will be deep and interception of subsurface flow by such cuts will be the rule. The likelihood of losing both cuts and fills on these units, as well as the increased amount of sediment produced, combine to create serious problems. Problems will be encountered when crossing drainages, especially at the lower end of the unit and on lower landtypes.

Wood. Cryoplanated Headlands have a very low to low timber productivity potential. In addition, the high mass stability hazard presents limitations. Limitations to reforestation are severe and are related to the climatic conditions and low water holding capacity of the soils.

Water. The flashy debris-laden runoff in the many steep drainageways, presents serious hazards to any structure crossing them. The hazard of serious acceleration of sedimentation is very high from any soil disturbance.

Forage. The potential production for this landtype ranges from less than 400 pounds per acre per year of usable dry forage. Higher ratings may be associated with upper ridge positions. Historic grazing use reduced important vegetative cover which will accelerate surface creep, mass wasting, and sediment production.

Recreation. These lands are often an important part of the high value dispersed recreation areas associated with high elevations. They function as a scenic backdrop at the head of minor drainages, and as vistas to the lower elevations.

Management Evaluation:

Map Symbol 109g
Rejuvenated Cryoplanated Mountain Slopes
Moderately Deep and Deep Loamy Skeletal Soils

Location: Typical examples of this unit occur in the Steel Mountain and Lava Mountain areas.

Landtype Characteristics: The character of this landtype is the result of two major formative processes, rejuvenation associated with mountain building or faulting, and cryoplanation. The effect of cryoplanation, working over a long period of time, has developed deep soils with a high content of rounded rock fragments. The more recent faulting activity has uplifted, displaced and oversteepened the slopes. The resultant landtype has a patchy forested appearance, with 0 to 40 percent forest crown cover. Slopes are of moderate length with shallow, straight, parallel drainages. Gradients range from 25 to 70 percent with steeper slopes dominant on the upper one-third of units. The moderately deep and deep loamy skeletal soils are over extremely well fractured, weakly to moderately well weathered granite bedrock. Traces of rock outcrop are confined to upper slopes and ridges.

Soils: The dominant soil (80%--IFBA-5), on all sideslopes and over colluvial materials, has a 0 to 4 inch organic layer over a very dark brown gravelly sandy loam, 20 to 60 inches deep, with 40 to 60 percent moderately well graded coarse fragments. A less extensive shallow soil (20%--JEAE-2) has a 0 to 1 inch organic layer over a brown to dark yellowish brown, gravelly sandy loam, 5 to 20 inches deep, with 50 to 70 percent gravel and rock fragments. This soil is dominant on ridgetops and upper slopes in the unit.

Vegetation: The dominant vegetative cover on this landtype is an open grown Douglas-fir/wheatgrass habitat type with 0 to 20 percent forest crown density. Douglas-fir/spirea, Douglas-fir/elk sedge, and sub-alpine fir/whortleberry habitat types do occur but are limited in extent and often patchy. Forest crown densities in these habitat types will generally range from 10 to 30 percent. Brush crown density over the unit will range from 10 to 50 percent.

Hydrology: Annual precipitation received on these units ranges between 35 and 45 inches. Approximately 20 to 30 inches of this amount is yielded annually. Overland flow is restricted to the upper one-third of the unit which is characterized by shallower soils and traces of rock outcrop. Subsurface flow and deep seepage are the dominant means of water yield delivery. Bedrock penetration is sufficiently high to allow deep seepage on the moderately steep slopes. Subsurface flow moves downslope uniformly and will accumulate to some extent within swales and dissections. The parallel drainage pattern tends to intercept water from overland and subsurface flow and deliver it moderately rapidly to lower bordering lands. These landtypes are moderate to moderately rapid in response (yield) to water input.

Management Qualities: Many hazards on this landtype are rated moderate to high. Most problems are associated with interception of subsurface water, surface erosion, and mass stability. A significant debris slide hazard does exist in the shallow parallel dissections.

Roads. Most construction problems will involve interception of subsurface flow and handling of debris and sediment generated from adjacent soils, road cuts and fills, and road surfaces. Most construction hazards are rated moderate to high although trafficability is expected to be good for road prisms. Hazards of fill slope failures are expected to increase to very high as slopes approach 60 and 65 percent. The moderate to high debris slide hazard will result in increased maintenance associated with culvert installations.

Wood. Timber productivity on this landtype is rated very low to moderate but the very low and low rates predominate. Moderate ratings are limited in extent and generally associated with the lower fringes of this landtype with Douglas-fir/spirea and Douglas-fir/elk sedge habitat types. Limitations to reforestation are moderate to very severe with vegetative competition, low water-holding capacity and high evapotranspiration losses the major limiting factors.

Water. Very high flows in the drainageways during rapid snowmelt and major summer storms periodically put severe stress on road crossings. Fills across these steep channels have a high risk of failure from culvert plugging. The efficient slope drainage system makes the percent of eroded material delivered to streams quite high, and any significant disturbance will be reflected by a quick jump in sedimentation.

Forage. Range use is another important quality of these cryoplanated lands. Most of the landtype is open; the vegetation is dominantly of brush, grass and forbs. Dry weight forage production is now less than 700 pounds per acre per year, while potentials for these units range from 100 to 1,000 pounds per acre per year. Adverse use in the past has reduced the quality and quantity of forage plants and has advanced the hazard of surface creep. Most of these units, however, are expected to respond well to a grazing system.

Recreation. Generally speaking, these units are used for dispersed types of recreation such as hunting and hiking. Each unit, however, must be examined individually in light of associated landtypes and proximity to roads and trails. As with other human activity, this landtype will respond with accelerated erosion if soil disturbances are excessive. Sediment production will be significantly increased if trails and roads are not adequately drained or properly constructed.

Management Evaluation:

Map Symbol 110
Cirque Basin Lands
Deep Sandy and Loamy Skeletal Soils

Location: Typical locations on the Boise Ranger District are the upper portions of the Trail Creek and Grouse Creek drainages.

Landtype Characteristics: This landtype consists of weakly developed glaciated basins at the head of some glaciated valleys. On these units, glacial scouring was the dominant formative process. Common inclusions in this landtype are narrow strips of Valley Train Lands and wet Alluvial Lands. The slopes of this landtype have all aspects, are not heavily timbered, concave, 0 to 30 percent gradient, 50 to 200 feet long, and are mapped at elevations above 7,500 feet. The soils have coarse loamy, sandy skeletal, and loamy skeletal textures. They are 20 to 50 inches deep and underlain by very weakly to well weathered granite which is moderately to well fractured or masked.

Soils: The dominant soils on this landtype (50%--JEAA-2) are moderately deep and have an organic layer two inches thick. The surface soil is a black to brown, loamy sand, with 15 to 35 percent gravel and 5 to 10 percent rock. The subsoil is a brown gravelly sand to gravelly loamy sand, with 40 to 55 percent gravel and 10 to 30 percent rock. Another soil (IECA-5) has a similar profile description with the exception that it has gravelly sandy loam textures. A minor soil which is usually wet and has finer textures is found in lower lying areas adjacent to lakes.

Vegetation: The slopes of this landtype have scattered timber stands and brush/grass cover. The timber is composed of several subalpine fir habitat types. Vegetative ground cover for the landtype ranges from 45 to 65 percent. Forest crown density is from 0 to 40 percent and brush crown density ranges from 15 to 30 percent.

Hydrology: Mean annual precipitation is between 40 and 55 inches mostly as snowfall. Deep snowpacks remain well into the summer and in some instances, occur year-round. Approximately 25 to 40 inches is yielded annually. Subsurface flow and deep seepage are the primary modes of water yield. Much water is naturally stored in the cirque basins found within these units. Overland flow is limited to the spring snowmelt period when water tables are at or near the soil surface. These lands serve as depository sites for snow avalanches from the ridges and headwalls. These landtypes are excellent regulators of stream flow. Streams flow throughout the summer from these basins.

Management Qualities: These lands are major regulators of stream flow and, as such, serve an important function on the District. Climates are quite severe with cold harsh winters and very cool summers.

Roads. Engineering characteristics of these lands are generally favorable to road construction. Bedrock is mostly competent and slopes are not steep. Trafficability, however, is fair to good except on the wet soils in low lying positions.

Wood. Timber productivity potential on these lands is rated very low to low . Harsh weather, severe revegetation problems and short growing season are responsible for this low production. Forest crown densities average above 25 percent for the unit. Snow and wind deformation are common.

Water. The natural water quality from these areas is excellent. Snowpack remains well into the summer months and may require considerable expense for spring access. The extremely high runoff from these lands is a significant consideration for management.

Forage. Production potential for forage is 400 to 1,500 pounds per acre per year. The current levels are very close to potentials and are subject to little change if not overused.

Recreation. Cirque Basin Lands are an important part of the high value dispersed recreation areas associated with Glaciated Lands. Because they are easily traversed on foot or horseback, they are fundamental access routes to adjacent areas. Trails should be stable with limited maintenance required.

Management Evaluation:

Map Symbol 110x
Scoured Cirque Basin Land
Shallow Skeletal, Sandy and Loamy Soils

Location: Typical locations on the Boise Ranger District is the Trinity Lakes area.

Landtype Characteristics: These lands consist of both shallow and deep glacial scoured amphitheater-like basins. They are formed at the heads and on upper sidewalls of most glaciated valleys on the District. These units often have steep, rocky headwalls (Landtype 113) with much exposed bedrock and talus. Glacial scouring and ice plucking of headwalls were the major formative processes. Perched water tables over impermeable bedrock results in numerous alpine lakes. Forest crown cover is dominantly scattered or patchy with forest crown densities ranging from 0 to 40 percent. Slopes are short and have gradients ranging from 5 to 40 percent. The dominantly shallow skeletal, sandy and loamy soils occur over well fractured, very weakly to weakly weathered granite bedrock. The percent rock outcrop ranges from 30 to 50 percent.

Soils: The dominant soil (50%--JEAE-5) has a thin 2-inch organic layer over a very dark grayish brown to dark brown gravelly sandy loam, less than 20 inches deep, with 40 percent well graded coarse fragments. This soil is somewhat deeper in localized depressions but not extensive. A minor soil (JEAE-2) is similar to the dominant soil except it has loamy sand textures. Small pockets of finer textured wet soils also occur on this landtype. Rock outcrop is common and associated with the shallow soil.

Vegetation: This landtype is sparsely vegetated with open stands of timber. Forest crown densities range from 0 to 20 percent. Subalpine fir/grouse whortleberry, subalpine fir/whitebark pine, subalpine fir/juncus parryi, and subalpine fir/elk sedge habitat types occur in varying positions. A subalpine fir/marsh marigold habitat type is common to the wet areas and adjacent to cirque lakes. Brush crown densities range from 0 to 20 percent.

Hydrology: Mean annual precipitation is between 40 to 60 inches. Most of this amount is received as snow. Approximately 25 to 40 inches of water is yielded annually. Overland flow, which occurs during spring snowmelt and high intensity summer storms, takes place over rock outcrop and near cirque lakes. Most water yield is accumulated in alpine lakes and basins usually associated with this landtype. These basins then feed streams and bedrock aquifers supplying springs. The long duration of snowmelt and very slow release of water makes these landtypes one of the best sustained water yield producers on the District.

Management Qualities: These lands are major regulators of streamflow and as such serve a very important function on the District. Climates are quite severe with cold harsh winters and cool summers. An avalanche hazard does exist in association with the adjacent 113 Landtype. Most hazards are rated low to moderate.

Roads. Construction characteristics of these lands are generally favorable to road construction. Bedrock is competent and soils are shallow, but construction cost will be high. Trafficability in this area will also be poor. Sediment production associated with construction activities will be of major concern in these high quality water producing areas.

Wood. This is basically a non-commercial timber producing land-type with overall productivity potential rated very low. Sub-alpine fir/juncus parryi is dominant with isolated areas of sub-alpine fir/elk sedge in pockets on lower slopes. Except for isolated patches, most forest crown densities are less than 20 percent. Snow and wind deformation are common. Limitations to reforestation are very severe because of the harsh climate and localized high water tables.

Water. These units are probably the highest water producers on the District. Overland flow and sediment are seldom problems under natural conditions. Snowpack from snowfall and avalanches remains well into the summer and may require considerable expense for spring or early summer access. The basin configuration presents construction problems in the lowest portions of the landtype where perched water tables occur. Maintenance of the favorable water handling characteristics should be a major management consideration.

Forage. Production potential for forage is rated low with current production levels of 100 to 600 pounds per acre per year of usable dry forage. These levels are very close to potentials and subject to little change if left alone. In general, these lands may be better suited to game use than livestock use. Livestock use may also contribute to sedimentation and pollution of the quality water generated on these lands.

Recreation. Cirque Basin Lands are an important part of the high value dispersed recreation areas associated with glaciated lands. Because they are easily traversed on foot or horseback, they are fundamental access routes to adjacent areas. Because of the quality fishing in many of these units, they also become destination points for many recreationists throughout the mid and late summer. Trails should be quite stable and require limited maintenance. Trafficability is good for the dominant soils but very poor to poor for the wet soil associated with lakes and wet spots. Because of their rocky, steep, very im-pressive nature, these units are often scenic attractions.

Management Evaluation:

Map Symbol 111a
Weakly Dissected Glacial Trough Land
Moderately Deep and Deep Skeletal, Sandy and Loamy Soils

Location: These are smooth sideslopes of glacial troughs. Typical locations on the Boise Ranger District are near the heads of Roaring River and Trail Creek.

Landtype Characteristics: These lands occupy the sideslopes of U-shaped troughs typical of alpine glaciated mountains. Slopes have been over-steepened and the V-shaped alluvial canyons have been altered to U-shaped valleys by the ice action of glaciers. Drainage patterns are typically parallel compared to the dendritic pattern of the fluvial lands. Slopes are well timbered, long, and have gradients from 30 to 60 percent. Soils are moderately deep and loamy skeletal. There is 5 percent rock outcrop; bedrock is well to extremely well fractured and hard unweathered to weakly weathered.

Soils: The dominant soils found on mid and lower slopes on this landtype (50%--IECA-5) are moderately deep and have an organic layer 0 to 3 inches thick. The surface soil is a very dark grayish brown gravelly sandy loam with 30 percent fine gravel. The subsoil is a brown gravelly sandy loam with 40 to 60 percent gravel and 10 to 40 percent rock. Other soils (30%--JEAA-3) are similar to the dominant soils except they have less than 15 percent gravel in the surface soil and subsoil and up to 15 percent rock in the subsoil. Other soils (20%--JEAA-2) are similar to the dominant soils except they have sand textures with more than 35 percent coarse fragments in the subsoil. These soils are on steep slopes and on ridgetops and spurs.

Vegetation: This landtype is dominated by subalpine fir/elk sedge and subalpine fir/grouse whortleberry habitat types which have crown cover densities from 50 to 75 percent. Timber production potential for these habitat types is low to moderate. Subalpine fir/whitebark pine and sagebrush/elk sedge habitat types occupy the more open portions of the landtype. Timber production potential is very low for the subalpine fir/whitebark pine habitat type. The sagebrush/elk sedge is a non-forested habitat type. Ground cover for the landtype is: vegetation plus litter - 80 to 90 percent; forest crown density - 40 to 75 percent; brush crown density - 10 to 60 percent.

Hydrology: Annual precipitation received on these slopes ranges between 40 and 50 inches. Most of this amount occurs as snowfall. Snowpack remains into early summer. Deep seepage and subsurface flow are the dominant means of water yield, which is approximately 20 to 35 inches annually. Subsurface water moves down the long straight slopes in a uniform manner with highest accumulation found at the base of the slopes where soils are deepest and slope gradient moderate. The numerous parallel drainageways naturally intercept subsurface flow and deliver it as stream flow to the lower bordering landtype (usually 104). The slow regulation of water characteristic of these lands is due primarily to the long period of snowmelt, excellent transmission of water through the soil horizon, and good bedrock penetration. Water is also delivered from these slopes in the form of snow from avalanches.

Management Qualities: These lands are hazardous units because of the shallow and moderately deep subsurface flow. Avalanche hazard is high.

Roads. Interception of subsurface flow is a major problem, especially on mid and lower slopes. Handling this water will be very difficult and the hazards to cut and fill slope stability are high. Debris slides and slump hazards can also be expected under these conditions.

Wood. These lands are generally well timbered with subalpine fir/ lodgepole pine and some Douglas-fir. Productivity potentials are generally low to moderate and snow and avalanche damage are common. The climate is quite severe. The timber cover is very important to maintaining slope and snowpack stability.

Water. Snowpack remains well into the summer months and may require considerable expense for spring access. Deep road cuts on the lower one-half of the slopes will alter the normal movement of subsurface flow by intercepting and returning it to the surface. The snow avalanche hazard is high from these slopes and may present a threat to roads or other structures, both within and below the landtype.

Forage. Production on these units is rated low with current levels of 200 pounds per acre per year of usable dry forage. Low production combined with high inherent erosion hazard and high slope creep hazard makes these units poorly suited to livestock grazing.

Recreation. These lands are an important part of the high value dispersed recreation areas associated with Glaciated Lands. They function as a scenic backdrop to the glaciated landscape. Trail construction problems are hazards from avalanches and debris slides. Considerable maintenance would be required to remove rock, debris, and sediment. Trafficability is fair to good.

Management Evaluation:

Map Symbol 111a-1
Weakly Dissected Glacial Trough Land
Shallow and Moderately Deep Skeletal Sandy and Loamy Soils

Location: Typical locations on the Boise Ranger District are the Bald Mountain area and east fork of Corbus Creek.

Landtype Characteristics: These lands occupy the sideslopes of U-shaped troughs, typical of alpine glaciated valleys. Slopes have been over-steepened and the V-shaped fluvial canyons have been altered to U-shaped valleys by the ice action of glaciers. Drainages are typically parallel compared to the dendritic pattern of the Fluvial Lands. Slopes are smooth and weakly dissected. The slopes of this landtype are southerly, mostly non-timbered or scattered small stands, convex to straight, have a 30 to 70 percent gradient, 500 to 2,000 feet long, and are mapped at elevations above 7,500 feet. The shallow and moderately deep sandy and loamy skeletal soils are underlain by unweathered to very weakly weathered granite, which is moderately to extremely well fractured. Rock outcrop may cover up to 10 percent of the surface.

Soils: The dominant soil on this landtype (65%--JEAE-3) are shallow and have an organic layer 0 to 2 inches thick. The surface soil is a dark brown, gravelly loam to a gravelly sandy loam with 10 to 20 percent gravel. The subsoil is a dark grayish brown, gravelly coarse sandy loam with 10 to 20 percent gravel. These soils are found on mid and upper sideslope positions. A moderately deep soil (25%--JEAA-5) on lower and mid slope positions is associated with lower gradients. These soils have an organic layer 0 to 3 inches thick. The surface soil is a dark brown gravelly sandy loam with 30 to 50 percent gravel. The subsoil is a brown coarse sandy loam with 25 to 50 percent gravel and 0 to 40 percent rock.

Vegetation: The slopes of this landtype are not heavily vegetated. Timber production is rated very low with the following habitat types represented: subalpine fir/whitebark pine, subalpine fir/elk sedge, and brush/grass communities not identified as to habitat type. Vegetative ground cover for the landtype ranges from 25 to 40 percent. Forest crown density is less than 5 to 20 percent and brush crown density ranges from 40 to 60 percent.

Hydrology: Average annual precipitation received on these landtypes, which is predominantly in the form of snow, ranges between 35 and 50 inches. Approximately 20 to 35 inches of this amount is yielded annually. Overland flow is rare on undisturbed slopes. However, on those slopes heavily impacted by stock animals, overland flow and accelerated erosion is present. Deep seepage and subsurface flow are the prime modes of water yield from the slopes. Subsurface flow moves uniformly downslope to accumulate in greatest quantity within the lower, deeper soils. Natural interception of subsurface water by the parallel first order drainageways speeds up delivery to the lower bordering landtype (usually 104). The moderate to rapid response to water input is due primarily to the moderately rapid snowmelt and rapid transmission of moisture through the soil horizon and numerous drainageways.

Management Qualities: Surface erosion, debris slide hazards and interception of subsurface flow on lower slopes are the major problems on this landtype.

Roads. Construction materials in these lands are slightly weathered and moderately well graded. Mass stability hazards, however, tend to offset this benefit. Surface erosion hazard for natural slopes as well as cut and fill slopes is moderate to high. Mass stability hazards for cut and fill slopes are high. These factors combined with the possibility of intercepting large quantities of runoff, makes water and sediment handling definite management problems. Trafficability is good to very good.

Wood: Timber productivity potential is very low. The slopes dominantly have a brush/grass cover and elk sedge communities. There are small scattered pockets of subalpine fir/elk sedge in semi-protected areas on sideslopes, and subalpine fir/whitebark pine on the higher more exposed positions. Limitations to reforestation are severe and are related to climatic conditions and low water-holding capacity.

Water. These slopes are very sensitive to soil disturbance and reduction in vegetal cover by excess grazing or other means. Even a small increase in overland flow will greatly accelerate erosion and sedimentation. Deep road cuts into the toes of these slopes will intercept a moderate volume of subsurface flew during spring snowmelt. The steep drainageways flush out regularly and this presents hazards to road and trail crossings.

Forage. The potential production for this landtype is 100 to 1,000 pounds per acre per year of usable dry forage. Present reduced yields are associated with historic overgrazing. The low yields are related to the shallow, coarse textured soils and their low water holding capacity. The higher yields are associated with deeper soils and a somewhat more moist microclimate and a higher water holding capacity. Recovery rates from adverse use will be slow.

Recreation. These lands are an important part of the high value dispersed recreation areas associated with glaciated lands. They function as a scenic backdrop at the upper ends of glacial troughs. Trail construction will have problems similar to roads. Seasonal maintenance will be required to remove rocks, debris, and sediment. Trafficability is good to very good.

Management Evaluation:

Map Symbol 111b
Moderately Dissected Glacial Trough Land
Moderately Deep and Deep Skeletal, Sandy and Loamy Soils

Location: These are moderately dissected sideslopes of glacial troughs. Typical locations on the Boise Ranger District are near the heads of Trail Creek and Yuba River.

Landtype Characteristics: These landtypes are generally formed as a sidewall on the inside curve of glaciated valleys. These areas were less scoured, leaving a high percentage of well weathered granite bedrock on upper slopes as compared to the 111a landtype. This softer bedrock, combined with the high rate of water discharge during spring snowmelt, has resulted in many more and deeper dissections than the 111a landtype. Drainages are typically parallel as compared to the dendritic patterns on the Fluvial Lands. Slopes are timbered, long, and have gradients from 30 to 70 percent. Soils are mostly moderately deep, and are loamy skeletal. There is 5 percent rock outcrop; bedrock is extremely well fractured and weakly to moderately well weathered.

Soils: The dominant soils on this landtype (60%--JEAA-5) are moderately deep and have an organic layer 0 to 3 inches thick. The surface soil is a very dark grayish brown gravelly sandy loam with 30 percent fine gravel and 20 percent rock. The subsoil is a brown gravelly sandy loam with 25 to 50 percent gravel and 0 to 40 percent rock. Other soils (30%--JEAE-2) are similar to the dominant soils except they have loamy sand textures are shallow, and are found on ridgetops and spurs and near rock outcrops.

Vegetation: The dominant habitat types on this landtype are subalpine fir/elk sedge, subalpine fir/pinegrass, and Douglas-fir/elk sedge. The subalpine fir habitat types are found in all positions while the Douglas-fir types are limited in extent. Ground cover for this landtype is: vegetation plus litter - 30 to 60 percent; forest crown density - 30 to 80 percent; brush crown density - 20 to 50 percent.

Hydrology: Mean annual precipitation is 40 to 50 inches and mean water yield is 20 to 30 inches. Snowpacks are heavy and persist well into June. Rapid snowmelt occurs in May and June and peak runoff occurs in June. Overland flow is rare. Major runoff is by moderately deep subsurface flow and deep percolation. Parallel first order streams intercept much of this subsurface flow and drain it rapidly from the slopes. Ground water drains more slowly and provides late season flow. These slopes are extremely wet into July.

Management Qualities: Erosion avalanche and mass stability hazards are moderate to high. Trafficability is good to very good. Subsurface flows are often very close to the surface on lower slopes.

Roads. Bedrock characteristics on lower and mid slopes are well suited as construction materials while upper slopes are moderately well weathered granite. The probability of interception subsurface flow with road cuts is very high on mid and lower slopes. Handling this water will be very difficult. Hazards to cut and fill slope stability are moderate to high. Debris slides and slumps can also be expected on this landtype.

Wood. These landtypes are well timbered with subalpine fir, Douglas-fir, and some lodgepole pine. Productive potentials are generally low to moderate and snow and avalanche damage is common. The climate is quite severe. Timber cover is very important in maintaining slope and snowpack stability.

Water. These lands yield large quantities of high quality, well regulated water. Cuts into the mantle and/or alteration or obstruction of drainageways will seriously degrade the quality and regulation of this water. Activities and improvements will be severely tested by the heavy spring runoff in drainageways and through saturated slopes. Cost of installing major improvements on these slopes, while adequately protecting their water handling characteristics, will be high.

Forage. Production on these units is rated low to moderate. Low production combined with high inherent erosion hazard and high slope creep hazard makes these units poorly suited to livestock grazing.

Recreation. These lands are an important part of the high value dispersed recreation areas associated with glaciated lands. They function as a scenic backdrop to the glaciated landscape. Trail construction problems are similar to roads. Considerable maintenance will be required to remove rock, debris, and sediment. Trafficability is fair to good.

Management Evaluation:

Map Symbol 111b-1
Moderately Dissected Glacial Trough Land
Shallow and Moderately Deep Skeletal, Sandy and Loamy Soils

Location: A typical location for this landtype on the Boise Rangel. District is on the east side of Phifer Creek.

Landtype Characteristics: This landtype is the open or sparsely timbered sideslope of U-shaped glacial troughs typical of the alpine glaciated landscape. The aspect is dominantly south to southwest and forest crown density ranges from 0 to 20 percent. Slopes are generally long with a well developed parallel drainage system. Slope gradients range from 30 to 70 percent with the steeper portions restricted to dissections and upper slopes and spur ridges.

Soils: The dominant soil (70%--JEAE-2), on steep upper slopes and in dissections, has a 0 to 1 inch organic layer over a very dark grayish brown to yellowish brown gravelly sandy loam, less than 20 inches deep, with 80 to 90 percent well graded coarse fragments. This soil is commonly associated with rock outcrop. Less extensive soils (15%--IFBA-5, 15%--JEAA-2), on mid and upper slopes, have 0 to 4 inch organic layers over a very dark grayish brown to yellowish brown gravelly sandy loam textures, 20 to 40 inches deep, with 40 to 70 percent well graded coarse fragments.

Vegetation: This landtype is dominated by brush-grass/elk sedge communities with scattered stands of subalpine fir/elk sedge and subalpine fir/pinegrass habitat types. Forest crown densities will range from 0 to 20 percent, brush crown densities will range from 10 to 40 percent.

Hydrology: Mean annual precipitation is 35 to 45 inches and mean water yield is 20 to 30 inches. Snowpack is heavy and starts melting in late March and early April. Rapid snowmelt occurs in May and is generally over by early June. Overland flow occurs locally from rocky situations. Major runoff is by heavy subsurface flow at shallow to moderate depths. Deep percolation into bedrock is also significant. Parallel first order channels intercept much of the subsurface flow. Peak runoff is generally in May, one or two weeks before peak runoff from Landtype 111b.

Management Qualities: The moderate to high inherent erosion hazard of these lands is a definite problem. This hazard combined with a moderate to very high surface creep hazard and rapid runoff rates in the spring generate numerous debris slides, resulting in a moderate to high debris slide hazard. Avalanche hazard is also very high.

Roads. Construction materials in these lands are of good quality, well graded granite, especially on the upper slopes. Other hazards, however, tend to offset this benefit. The high inherent erosion hazard of cutslopes, debris slides, and the possibility of intercepting subsurface water at dissections makes water and sediment handling definite construction problems. The most stable position with the least expected impact from these hazards would be the upper one-third of slopes. Lower south slopes will prove extremely hazardous. Trafficability, however, is expected to be good to very good.

Wood. This is dominantly a non-commercial timber producing landtype with productivity rated as low and very low. Upper slopes are generally occupied by a subalpine fir/stipa habitat type and brush-grass/elk sedge communities. Subalpine fir/elk sedge is common as dense small stands on lower north slopes and drainages. Deep snow, avalanche and wind deformation are common. Limitations to reforestation are very severe with climate and the low water-holding capacity of the soils the limiting factors.

Water. The heavy spring runoff both through the soil mantle and in channels must be given major consideration in any management of this landtype. Cuts into the mantle and/or alteration or obstruction of the many water channels are the greatest hazard to the hydrology of this landtype. Avalanches may occur on these slopes in heavy snow years.

Forage. In general, forage production on these units is low with some areas rated moderate on mid and lower slopes. Current production on many of these slopes is less than half of potential. This reduction can be related to the combined effects of excessive grazing and subsequent soil loss from the slopes. When these soils are disturbed by grazing or other activities, the fine soil materials erode sufficiently to severely damage the productive capacity of this landtype and yield high volumes of fine sediments. The resultant soils have been left with very rocky or gravelly pavemented surfaces which are basically unsuited to the reestablishment of certain vegetation. Recovery is expected to be slow even under good management practices.

Recreation. These lands are an important part of the high value dispersed recreation areas associated with glaciated lands. They function as a scenic backdrop at the upper ends of the glacial troughs. Trail construction would have problems similar to roads. Seasonal maintenance will be required to remove rocks, debris, and sediment. Trafficability will be very good.

Management Evaluation:

Map Symbol 111c
Strongly Dissected Glacial Trough Land
Shallow and Moderately Deep Skeletal, Sandy and Loamy Soils

Location: This landtype is common in the upper Grouse Creek and Sheep Creek drainages.

Landtype Characteristics: This landtype is the strongly dissected side-slope of U-shaped glacial troughs occurring in the lower reaches of alpine glaciation. They differ from other trough lands in having long steep sideslopes entrenched by numerous deep parallel dissections. Aspects are dominantly south or west with forest crown densities highly variable, ranging from 0 to 80 percent. Slope gradients range from 30 to 70 percent. The shallow and moderately deep skeletal, sandy and loamy soils occur over masked or slightly to extremely well fractured, moderately to well weathered granite bedrock. Rock outcrop is common on upper slopes and along dissections.

Soils: The dominant soils (40%--IFBD-3) are found on mid and lower slope positions. These soils are shallow and have a thin organic layer over a brown gravelly sandy loam surface. The subsoil is a brown gravelly or cobbly sandy loam with about 30 percent coarse fragments. Other soils (30%--JEAA-2 and 30%--JEAE-2) have loamy sand textures with more than 35 percent gravel and rock fragments. These soils range from shallow to moderately deep in depth with the shallow soils occurring on steeper and upper portions of the slope.

Vegetation: This landtype has two contrasting vegetative situations; upper slopes are dominated by open grown stands of subalpine fir and/or brush-grass/elk sedge communities. Lower slopes are densely timbered with a subalpine fir/elk sedge habitat type with 50 percent forest crown density. Brush crown densities for the entire unit range from 0 to 20 percent,

Hydrology: Mean annual precipitation is 30 to 50 inches and mean water yield is 20 to 35 inches. Snowpack is very heavy and avalanches are common. Snowmelt reaches a peak in May and extends into June. Overland flow occurs on the rockier portions from summer storms but is rare from snowmelt. The many parallel first order drainages intercept much of the heavy subsurface snowmelt runoff and drain it off as stream flow. Peak runoff is in May or June. Regulation of runoff is less than Landtypes 111a and 111b but better than 111x.

Management Qualities: These lands are relatively unstable as exhibited by their strongly dissected topography. The erosion and mass stability hazards are moderate to high with major problems associated with interception of subsurface water, basin inherent surface erosion, debris slides, surface creep, and mass stability of road fills on steeper sideslopes.

Roads. Major problems to construction involve handling water generated in road cuts by intercepted subsurface flow and water and debris encountered in dissections. Construction activities and subsequent erosion of cut and fill slopes and the road prisms will contribute significantly to sedimentation of adjacent streams. The high frequency of debris slides will also necessitate additional maintenance of culvert installations or installation of oversized structures to permit passage of debris. Revegetation of cut and fill slopes will be generally difficult. Trafficability will be good to very good.

Wood. The timber productivity of this landtype is dominantly low with areas of Douglas-fir/pinegrass and subalpine fir/pinegrass rated moderate on lower slopes. Limitations to reforestation will be severe to very severe with low water holding capacity the limiting factor on upper slopes and vegetative competition most limiting on lower slopes.

Water. The heavy and rapid snowmelt runoff from these steep slopes is the factor most limiting to management. Cuts, fills and drainageway alteration are the greatest hazards to the water handling characteristics of this landtype. It will be extremely difficult and costly to build improvements on this landtype that do not seriously alter the hydrology and are not subject to serious damage from runoff and avalanches.

Forage. This landtype is rated very low for forage production on the upper slopes with shallow soils and low to moderate on mid and lower slopes with deeper soils. Grazing impact has been somewhat severe in localized areas especially along the North Fork of the Boise River. Sediment production and surface creep have been significantly accelerated. The resultant soils have highly pavemented surfaces especially on mid and upper slopes and soils have eroded sufficiently to severely damage productive capacity. Recovery is expected to be very slow even under good management practices.

Recreation. These lands are an important part of the high value dispersed recreation areas associated with glaciated lands. They function as an introductory portion of the scenic backdrop at the lower ends of glacial troughs. Trails will have similar problems to roads and considerable seasonal maintenance will be required at drainage crossings. Trafficability will generally be good to very good.

Management Evaluation:

Map Symbol 111d
Steep Rocky Glacial Headland
Shallow and Moderately Deep Skeletal, Sandy and Loamy Soils

Location: Mapping units located in upper drainages of Sawmill Creek and Sheep Creek are typical of this landtype.

Landtype Characteristics: These units are steep, rocky ice plucked cirque headlands at the head of drainages in the glacial trough lands. These lands give the impression of weakly developed cirques but fail to exhibit the typical cirque basin characteristics. Numerous drainages dissect the slopes in a well developed dendritic pattern. Forest crown cover is variable and patchy with forest crown densities ranging from 0 to 20 percent. Slope gradients are broken and benchy, ranging from 50 to 80 percent, with the steeper portions restricted to the upper weak headwalls of individual units. The shallow and moderately deep skeletal, sandy and loamy soils have developed over well to extremely well fractured, very weakly to moderately well weathered granite bedrock. Rock outcrop is common to the fringes and as rocky talus areas throughout individual units.

Soils: The dominant soils (40%--JEAE-2) have a 0 to 1 inch organic layer over a very dark brown gravelly sandy loam and contain 50 to 80 percent well graded coarse fragments. The moderately deep soil, on benchy areas and slopes less than 60 percent, contains 10 to 30 percent well graded coarse fragments. Rock outcrop is commonly associated with the shallow soil (JEAE-2) and covers 15 to 30 percent of the surface.

Vegetation: This landtype contains patchy dense stands of subalpine fir/pinegrass and subalpine fir/elk sedge habitat types on benches and on slopes less than 60 percent. Steeper slopes have more open stands of subalpine fir/whitebark pine and subalpine fir/juncus parryi. Forest crown densities range from 0 to 20 percent and brush crown densities range from 0 to 30 percent.

Hydrology: Mean annual precipitation is 35 to 50 inches and mean water yield is 20 to 35 inches. Snowpack is extremely heavy and persists into July. Snowmelt starts later and ends later on 111d landtypes than on all but cirque basin lands. Peak runoff is in June but heavy runoff extends through July. Springs draining ground water from fractured bed-rock flow well all year. The major spring runoff moves by subsurface flow to the first order streams where most of it is intercepted and drained away as stream flow. Overall outflow rate is moderate. Lower slopes are saturated into July.

Management Qualities: This landtype has moderate to high hazards with major limitations associated with a high inherent surface erosion hazard on natural and disturbed surfaces, and a high mass stability hazard associated with road cutslopes and fillslopes. Heavy snowpacks and other climatic factors associated with high elevations are the major limitations to activities within this unit.

Roads. Major problems to construction within this landtype involve a moderate to high surface erosion hazard of exposed surfaces and a low to high hazard for mass failures of cut-slopes and fillslopes. Cutslope failures will not be the typical bow-shaped slumps but will be dominated by extensive areas of rock fall. A moderate surface creep hazard and a moderate debris slide hazard will create hazards from accumulations of sediment and other materials in drainages resulting in seasonal maintenance at culvert installations.

Wood. The productivity potential for this landtype is rated very low. The scattered stands of subalpine fir habitat types exhibit very slow growth and considerable deformation as a result of the climate. Limitations to reforestation are rated very severe because of climate and the low water-holding capacity of the very stony soils.

Water. These are some of the highest water yielding lands on the Forest. The dominant factors influencing management on these lands are the rapid, heavy runoff and the short snow-free season. Cuts into the mantle will intercept and concentrate some runoff and cause new channels to be formed. Fills and obstructions to drainageways will cause short term channel erosion and sedimentation. Structures and facilities on these areas will be severely tested by snowpacks and debris generated in runoff.

Forage. Potential forage production is rated very low with current levels near this potential. The plant communities and soils on these units at such elevations are very fragile and do not respond favorably to disturbance. The rate of recovery on disturbed areas is expected to be very slow.

Recreation. These steep benchy glacial headlands are a significant feature of the high value dispersed recreation areas associated with glaciated landtypes. Because of their steep rocky and impressive character, they are excellent complements to the surrounding scenic attractions. Trails will be relatively stable on upper slopes, requiring only seasonal maintenance. Trafficability will be very good.

Management Evaluation:

Map Symbol 111x
Scoured Glacial Trough Land
Shallow and Moderately Deep Skeletal, Sandy and Loamy Soils

Location: Typical locations on the Boise Ranger District are the upper portions of Corbus Creek and Grays Creek drainages.

Landtype Characteristics: These units are the steep rocky sidewalls of glaciated valleys. They have been ice plucked and scoured, and lie adjacent to and below the larger scoured cirque basin lands. These units occur on all aspects with patchy forest crown densities ranging from 0 to 30 percent. Slopes are long and steep with gradients ranging from 40 to 80 percent. Dissections are numerous, parallel and shallow. The dominantly shallow skeletal, sandy and loamy soils have developed over well to extremely well fractured, weakly to moderately weathered granite bedrock. Rock outcrop ranges from 30 to 70 percent of individual units.

Soils: The dominant soil (30% to 70%--JEAE-2) is restricted to mid and lower slopes, is a dark brown gravelly loamy sand, less than 20 inches deep, with 80 percent well graded coarse fragments. Rock outcrop is the other major component of this landtype.

Vegetation: This is dominantly a sparsely timbered landtype with sub-alpine fir/whitebark pine the dominant habitat type. Forest crown densities are generally less than 10 percent with isolated patches approaching 30 percent. Brush crown densities are less than 30 percent.

Hydrology: The mean annual precipitation is 35 to 55 inches and mean water yield is 25 to 45 inches. Snowpacks are heavy and avalanching is severe. Northerly aspects retain deposits of snow until July but southerly aspects become bare in May. Much of the snow moves to valleys by avalanching. Surface runoff is dominant due to the rockiness, steep-ness and frequency of dissections. Summer storms create flashy runoff in small first and second order streams. Only small amounts of water are detained for later runoff.

Management Qualities: The soil accumulated between rocks on this land-type has a high to very high inherent erosion hazard. Disturbed areas tend to erode severely because water concentrates rapidly from areas of rock outcrop. Most activities will result in high hazards and increased sediment production.

> Roads. Most construction hazards within this landtype are rated high to very high. Sediment generated on natural slopes, on exposed surfaces resulting from construction, and from debris slides will be a continual problem requiring considerable maintenance. Rock fall from cut slopes will continue to close roads. Full benching will be the rule with extremely high construction costs. Trafficability will be very good.

Wood. This is not a well timbered landtype. Individual units have very open stands of subalpine fir/whitebark pine with overall crown densities dominantly less than 10 percent. Lower slopes and protected cold pockets support isolated dense stands of subalpine fir/elk sedge. Productivity potential in all cases will be very low. Wind, snow, and avalanche deformation are very common.

Water. This landtype has severe hazards to management activities and improvements. The heavy and sometimes flashy runoff together with avalanching will damage most facilities or structures. The hazard of disruption of hydrology is low to moderate due to the extreme rockiness. Even minor soil disturbance causes much soil and rock materials to enter steep drainages to be flushed to lower streams.

Forage. Potential forage production is rated very low with current levels near this potential. Surface creep is the major problem and aggravated by grazing activity. Much of this poised material has a very high potential of reaching lower adjacent streams as sediment. The plant communities and soils on these units are very fragile when subjected to grazing disturbance. Rates of recovery following disturbance are expected to be very slow.

Recreation. Scoured glacial trough lands are a significant feature of the high value dispersed recreation areas associated with glaciated landtypes. Because of their steep, rocky, very impressive character, they are excellent complements to the surrounding scenic attractions. Trails will be most stable on upper slopes and will require seasonal maintenance. Trails on lower slopes will be difficult to stabilize and maintain at drainage crossings. Trafficability for all positions will be very good.

Management Evaluation:

Map Symbol 113
Rocky Ridge Land
Shallow Skeletal Sandy and Loamy Soils

Location: These are the highest rocky ridges of the Glaciated Lands. Typical locations on the Boise Ranger District are near Bald Mountain and Cayuse Point on the southeast boundary of the District.

Landtype Characteristics: These lands have been formed by the scouring action of glaciers and consist of the highest ridges, upper slopes, and extremely rocky spur ridges in the Glaciated Lands. These units are above 7,500 feet and are found on all aspects. Slopes are sparsely timbered to non-timbered, short, and have gradients from 40 to 80 percent. The shallow skeletal sandy and loamy soils are over moderately to extremely well fractured, and hard unweathered to moderately weathered granite bedrock. There is over 50 percent outcrop.

Soils: The dominant soils on this landtype (30%-JEAE-2) are shallow and have virtually no organic layer. The surface soil is a dark brown gravelly sandy loam with 30 to 50 percent gravel and 10 to 20 percent rock. The subsoil is pale brown gravelly coarse sand with 40 percent gravel and 15 to 35 percent rock. Other soils (20%--JEAE-3) are shallow and have an organic layer 0 to 1 inch thick. The surface soil is a dark brown gravelly sandy loam with 10 to 20 percent gravel. The subsoil is a dark yellowish brown gravelly coarse sandy loam with 10 to 20 percent gravel.

Vegetation: This landtype is mostly non-timbered brush-grass communities with some small areas of subalpine fir/elk sedge and subalpine fir/whitebark pine. Ground cover for the landtype is: vegetation plus litter - 25 to 35 percent; forest crown density - 0 to 10 percent; brush crown density - 15 to 20 percent.

Hydrology: These landtypes receive between 45 to 65 inches of precipitation annually. Most of this amount is deposited as snow. Water yielded from the units averages 35 to 50 inches per year. Transpirational utilization of water is very low. As a result, losses from the landtype are mostly by sublimation and evaporation. Considerable water leaves these ridgelands by blow-off of loose snow to lower, more protected slopes and by snow avalanches. Major water yield is by surface runoff, but some subsurface flow and percolation through bedrock occurs. The slow period of snowmelt is the primary reason for the extended runoff into August. The response to high intensity summer storms is rapid.

Management Qualities: These lands are relatively stable. They are mostly rock and, because of their position, water related hazards are a hazard on lower slopes only.

Roads. There are no units above Rocky Ridge Lands to accumulate water. Bedrock is competent. Construction through this land-type will be difficult and expensive to build because in most cases, the road will have to be cut directly into the bedrock.

Wood. About 90 percent of this landtype is non-forested. The remaining 10 percent has a very low timber production potential. Due to severe climatic conditions and low water-holding capacity, reforestation site limitations are severe.

Water. On north facing slopes the snowpack remains well into the summer months and will hinder access. The high snow avalanche hazard for these landtypes present threats to any winter and spring activities. Water production is an extremely significant function of these lands, but hazards of alteration are low.

Forage. Due to the low percentage of soil on the landtype, the severe climatic conditions, and the low water holding capacity of the soils, this unit has very low range productivity potential and is not well suited to grazing. Also, revegetation of grazed areas will be difficult.

Recreation. These lands are a part of the high value dispersed recreation areas associated with Glaciated Lands. There are excellent vantage points for scenic vistas. There are also opportunities for hunting and naturalist activities; i.e., hiking, bird watching, nature photography, etc. Trails are difficult to construct.

Management Evaluation:

Map Symbol 120a-2
Weakly Dissected Mountain Slope Lands
Moderately Deep and Deep Loamy Skeletal Soils

Location: Typical locations on the Boise Ranger District are adjacent to Fall Creek and along the west boundary of the District.

Landtype Characteristics: Fluvial action is the dominant slope forming process of these lands. The landtype consists of mountain slopes that are incised by drainages greater than 1,500 feet apart. The slopes of this landtype are north-facing, well vegetated (dominantly timber), convex, have a 20 to 55 percent gradient, 300 to 600 feet long and are mapped at elevations of 3,200 to 6,000 feet. The moderately deep loamy skeletal soils are underlain by weakly to very well weathered granite, which is moderately to well fractured or masked.

Soils: The dominant soils occurring on most slopes on this landtype (60%--IECA-5) are moderately deep and deep and have an organic layer 0 to 4 inches thick. The surface soil is a very dark grayish brown, gravelly sandy loam with 20 to 40 percent gravel. The subsoil is a dark yellowish gravel and 10 to 40 percent rock. Similar moderately deep soils with dark colored loam surfaces and gravelly sandy clay loam subsoils with 50 to percent coarse fragments occur on mid and lower slopes. Shallow soils with sandy loam textures with 20 percent fine gravels are near ridgetops and adjacent to drainageways.

Vegetation: The slopes of this landtype are well timbered, with the following habitat types represented: Douglas-fir/elk sedge, Douglas-fir/ninebark, and Douglas-fir/spirea. Vegetative ground cover for the landtype ranges from 50 to 80 percent. Forest crown density has a 20 to 70 percent range and a brush crown density of 20 to 40 percent.

Hydrology: Annual precipitation is between 20 and 30 inches. Due to the dominantly northern aspect, these units maintain a snowpack into late spring. Approximately 5 to 10 inches of water is yielded each year. Most precipitation received is readily infiltrated into the soil. Water is yielded through subsurface flow and deep seepage. Excess subsurface water moves downslope uniformly and tends to accumulate within the deeper toe slope soils, swales, and dissections. Interception of subsurface water by dissections is minimal and, as a result, little surface runoff occurs on the slopes. The slow period of snowmelt and relatively slow movement of subsurface flow and deep seepage make these landtypes good regulators of sustained flow.

Management Qualities: Major areas of consideration on this landtype are moist micro-climate, the potential for intercepting subsurface flow on the lower two-thirds of slopes, and the occurrence of well and very well weathered granite bedrock.

Roads. Surface erosion and mass stability hazards for road locations are rated moderate to high. Where well and very well weathered bedrock occurs, there is likely to be shallow subsurface flow which will increase the possibility of fill slope failures.

Wood. These units are well timbered and some of the most productive on the District. Limitations to reforestation are slight to moderate and are related to vegetative competition.

Water. The probability of intercepting spring subsurface flow on lower slopes and swales is moderately high with deep road cuts. Hazard of sedimentation is moderate to high, depending on degree of water concentration and distance from streams. Most hazards to hydrology are moderate.

Forage. The potential production for this landtype is 400 to over 1,000 pounds per acre per year of usable dry forage. The higher ratings are related to the more moist micro-climate and the finer soil textures on the surface.

Recreation. The units of this landtype are important for recreation on the District. The potential is mainly related to esthetics and a "forest experience," however. The landtype is not suitable for campgrounds, but interpretive trails, backpacking, and other forms of recreation can be managed for.

Management Evaluation:

Map Symbol 120b-3
Moderately Dissected Mountain Slope Land
Shallow and Moderately Deep Skeletal, Sandy and Loamy, Xeric Soils

Location: Typical locations on the Boise Ranger District are along Buck Creek and along Brown's Creek near Twin Springs.

Landtype Characteristics: These moderately dissected xeric south slopes have been moderately incised by the fluvial process. Dissections are weakly dendritic and widely spaced. These units are dominantly non-timbered with isolated stands of timber having up to 80 percent forest crown density. Slopes are generally long and steep with gradients ranging from 30 to 65 percent. The moderately deep sandy skeletal xeric soils have developed over masked or well to extremely well fractured, moderately to well weathered granite bedrock.

Soils: A major soil in the unit occurring on all sideslope positions (30%--GDFA-3) has a very dark grayish brown gravelly sandy loam surface with 10 to 20 percent fine gravels. The subsoil is a dark yellowish brown gravelly sandy clay loam with 20 to 30 percent gravel. This soil is generally 30 to 40 inches deep. Another major component is a moderately deep to deep clay loam soil (30%--GDEA-4) mainly on mid and lower slope positions. Two shallow soils (20%--GDFQ-5 and 20%--JECB-2) occur on upper slopes, steeper areas and near rock outcrops. The GDFQ-5 soil has gravelly sandy loam or sandy clay loam subsoils and the JECB-2 soil has gravelly loamy sand subsoils. Both soils have more than 35 percent coarse fragments in the subsoil.

Vegetation: These units are south slopes dominated by brush/grass communities, with some ponderosa pine/wheatgrass and ponderosa pine/bitterbrush habitat types. Douglas-fir/spirea, Douglas-fir/elk sedge and Douglas-fir/ ninebark habitat types are common inclusions on north slopes. Forest crown densities are dominantly less than 10 percent while dominant brush crown densities range from 10 to 35 percent.

Hydrology: Mean annual precipitation is 20 to 35 inches and mean water yield is 10 to 15 inches. Snowpack is moderate. Slopes are normally bare by mid-April. Runoff is predominantly as subsurface flow and occurs periodically throughout the winter. Rain-on-snow events produce the heaviest short term runoff from these slopes. Water channels flow only during very wet conditions. Water delivered to these slopes flows off at a moderate to rapid rate. Overland flow is uncommon on undisturbed areas but common from summer or spring thunder showers on grazed areas. Debris-laden peak flows occasionally originate on these slopes from thunderstorm and rain-on-snow events.

Management Qualities: These moderately dissected, south-facing slopes are dominated by moderate to high hazards. Soil creep and debris slides will be common problems. Roads will require considerable maintenance to maintain trafficability. Natural sedimentation and sedimentation related to construction will be major problems.

Roads. Major construction problems are related to sediment production associated with water generated during storms and intercepted subsurface flow. Dissections will present the major problem with moderate to high mass stability hazard for cutslopes. The dominant soils and bedrock contain a poor gradation of coarse fragments dominated by fine gravels.

Wood. This landtype occurs on warm, dry exposed slopes and is dominantly non-forested. Isolated stands of Douglas-fir and ponderosa pine habitat types are on north slopes. These areas have low to moderate productivity potentials. Limitations to reforestation on these areas will be very severe because of high evapotranspiration losses, low water holding capacity, and climatic limitations.

Water. Drainageways on lower slopes present hazards from flashy debris-laden runoff during thunderstorms and rain-on-snow events. Cut and fill slopes at mid and lower slope positions and heavy grazing on all slopes will increase the frequency and severity of debris-laden runoff events.

Forage. This landtype is dominated by brush/grass communities with forage productivity potentials ranging from 100 to 1,000 pounds of usable dry forage per acre per year. Major problems resulting from grazing are increased debris slide hazards, surface creep, and disturbance to plant communities. Increased sedimentation can be expected from any activity that disturbs the soil surfaces.

Recreation. This landtype currently has little recreation appeal. Esthetics are questionable and water is limiting. Hunting of small game birds (chukar) is probably the major recreation potential associated with these units at the present time. It should be noted, however, that any disturbance on these units, because of their open, exposed southerly aspects, will be visible from many miles.

Management Evaluation:

Map Symbol 120b-4
Moderately Dissected Mountain Slope Land
Moderately Deep and Deep Coarse Loamy and Loamy Skeletal Soils

Location: Typical locations on the Boise Ranger District are Lost Man Creek and Buck Creek areas.

Landtype Characteristics: The slope forming process on Moderately Dissected Mountain Slope Land is the action of running water. Slopes have been moderately incised by stream cutting and intermittent concentrations of overland flow. The slopes of this landtype are north-facing, heavily timbered, convex, 30 to 60 percent gradient, 500 to 2,000 feet long, and are mapped at elevations of 3,500 to 6,500 feet. The moderately deep, loamy skeletal soils are underlain by relatively soft, moderately well to well weathered granite with masked fracturing.

Soils: A major soil (30%--IECA-5) on mid and upper sideslope positions has a 0 to 4 inch organic layer over a dark grayish brown gravelly sandy loaf: surface. Subsoils are dark yellowish brown, gravelly sandy loams with 50 to 80 percent gravel and rock fragments. These soils are moderately deep. Another dominant soil (30%--HBDA-5) occurs on mid and lower slopes and differs mainly in being deeper and in having a gravelly sandy clay loam subsoil. A deep clay loam soil (25%--HBDA-4) is associated with the soils on the lower slopes. A shallow soil (l5%--IFBD-3) with gravelly sandy loam textures having less than 30 percent coarse fragments is on ridgetops and spur ridges.

Vegetation: The slopes of this landtype are well vegetated, with the following habitat types dominant: Douglas-fir/elk sedge, ninebark and Douglas-fir/spirea on all positions, and Douglas-fir/mountain maple on some mid and upper slopes. Vegetative ground cover for the landtype ranges from 80 to 100 percent. Forest crown density is 40 to 70 percent and brush crown density is 15 to 40 percent.

Hydrology: Mean annual precipitation is 25 to 40 inches and mean water yield is 10 to 15 inches. Snowpacks are moderate and persist well into May. Major runoff is from snowmelt and occurs in a few weeks in April and May. Overland flow is extremely rare and runoff is about evenly divided between moderately deep subsurface flow above bedrock, and percolation through bedrock. Outflow rate of water delivered to the landtype is moderate to slow. Lower slopes and concave incipient draws have greater quantities of subsurface flow than upper slopes and convex ridges.

Management Qualities: These Moderately Dissected Mountain Slope Lands are north-facing and well vegetated. The moist micro-climate contributes to the high productivity of this landtype.

Roads. This landtype will not be as hazardous as many other lands for road locations. However, specific hazards do exist that must be considered. Where bedrock is fractured, deep percolation of the water will be the rule. The likelihood of cut slopes intercepting subsurface flow is reduced except on the steepest slopes and at the base of major draws where fracturing is masked and the bedrock is well weathered, deep percolation of water will be restricted and the hazard of cut and fill failures will be increased. Well weathered bedrock is also a poorly graded source of fill material.

The degree of hazard associated with the moist micro-climate and bedrock will be reduced by confining locations to upper slopes. Revegetation potential for cut slopes is moderate to high. Trafficability is good to fair.

Wood. These units are among the most productive on the District. Relative ratings for the habitat types are moderate to high.

Limitations to reforestation are slight to moderate and are related to vegetative competition.

Water. A high hazard for serious alteration of the hydrology of landtype exists on the mid and lower slopes from cuts and fills. Subsurface flow is heavy and subject to interception during spring runoff. Fills and their sub-base, and some cuts, are subject to saturation and loss of strength. The hazard for serious increase in sedimentation is correspondingly high on lower slopes. Hazards to hydrology are moderate on upper slopes, convex slopes and ridges, and on lower slopes under 45 percent.

Forage. The potential production for this landtype is 200 to 800 pounds per acre per year of usable dry forage. Impact from overgrazing is accelerated surface erosion.

Recreation. Recreation potential is mainly related to esthetics and a forested appearance. The landtype is not suitable for campgrounds, but other forms of recreation such as interpretive trails, backpacking, hiking, hunting and fishing can be managed for.

Management Evaluation:

Map Symbol 120b-6
Moderately Dissected Mountain Slope Land
Shallow and Moderately Deep Coarse Loamy and Loamy Skeletal Soils

Location: This landtype is represented by areas along Grape Creek and the area west of Tipton Flat.

Landtype Characteristics: These moderately dissected fluvial lands have a southerly aspect with 5 to 45 percent forest crown density. Slopes are of moderate length with a weakly developed dendritic drainage pattern. Gradients range from 30 to 60 percent. The moderately deep skeletal sandy and loamy soils have developed over masked or moderately to extremely well fractured, very weakly to well weathered granite bedrock.

Soils: One of the dominant soils (40%--JEAA-2) on most sideslope positions, has a 0 to 1 inch organic layer over a thin dark brown fine gravelly sandy loam surface. The subsoil is a brown gravelly sandy loam with 40 to 65 percent gravel and rock fragments. This soil is 20 to 50 inches deep. A similar soil (20%--JEAA-3) has less than 30 percent coarse fragments in the subsoil and mostly occurs in lower slope positions and draws. A shallow soil (40%--GDFQ-5) is on ridgetops and the upper one-third of the side-slopes. This soil has a gravelly sandy loam or sandy clay loam subsoil with 40 to 60 percent gravel and rock fragments, and a dark colored surface.

Vegetation: This landtype is a timbered unit with 20 to 40 percent forest crown cover. Douglas-fir/chokecherry and Douglas-fir/elk sedge habitat types are most common on lower slopes. Douglas-fir/spirea, Douglas-fir/ ninebark, and brush/grass communities become dominant on drier mid and upper slopes. Understories are very brushy, with 15 to 70 percent crown cover.

Hydrology: Average annual precipitation ranges between 25 and 35 inches. Snowmelt begins early on these southerly slopes and is gone by mid May. The units are typically dry throughout the summer months except for periods of occasional storms. Annual water yield averages 10 to 15 inches. The major water yield is complete by late May. Overland flow is uncommon on undisturbed areas. Disturbed areas exhibit overland flows during high intensity rainfall. Most of the water is yielded by subsurface flow and deep seepage. The short slopes and moderate dissections create only moderate concentrations of water on the landtype.

Management Qualities: These units are very brushy with moderate to high surface erosion and debris slide hazards. Timber productivity is low to moderate.

Roads. Major problems to construction are moderate to high erosion hazards for road surfaces and a moderate to high probability of intercepting subsurface water. This interception results in a moderate to high mass stability hazard for cut and fill slopes.

Debris slide hazard is moderate to high. Poorly graded coarse fragments and the soft bedrock also contribute to the significance of these hazards. These mass stability hazards, however, will be most strongly expressed during wet years.

Wood. This landtype is dominated by Douglas-fir habitat types with low to moderate productivity potentials. Understories are very brushy and vegetative competition is a major problem to reforestation. Overall limitations to reforestation are rated severe to moderate. Excessively high evapotranspiration losses will be a major problem on clearcut areas.

Water. Any significant concentration of water will cause increased erosion and sedimentation from these slopes. The probability of intercepting subsurface flow on lower slopes during the spring by deep road cuts is moderate. However, the actual quantity will be much lower than that expected from 120b-4 or 120c-11 landtypes under the same conditions.

Forage. Forage production on this landtype is rated low to moderate with understories dominated by 30 to 80 percent brush crown densities. Major limitation to grazing will be soil disturbance accelerating the already high surface erosion hazard for these soils. Debris slide and surface creep hazards may also be aggravated by excessive grazing.

Recreation. This landtype currently has some recreation significance. The most popular activity associated with this unit is hunting. In localized areas, the esthetic qualities of this unit will be more significant.

Management Evaluation:

Map Symbol 120c-3
Strongly Dissected Mountain Slope Land
Shallow and Moderately Deep Skeletal, Sandy and Loamy Soils

Location: This landtype is common in the Eagle Creek and Black Warrior Creek areas.

Landtype Characteristics: These lands are steep southerly slopes that have been deeply incised by fluvial action. They are dominated by open stands of timber with forest crown densities ranging from 20 to 40 percent. North slope inclusions have forest crown densities of 40 to 60 percent. Sideslopes are long with numerous dissections. Slope gradients range from 40 to 70 percent. Ridges are sharp and often rocky; dissections are V-shaped and have steep gradients. The erosional processes associated with fluvial action are very active on this landtype. The shallow and moderately deep skeletal, sandy and loamy soils have developed over masked or moderately to well fractured, weakly to very well weathered granitic bedrock. Rock outcrop may cover 10 percent of the area is some locations.

Soils: The dominant soils (40%--JEAE-5) have a 0 to 3 inch organic layer over a thin, very dark grayish brown gravelly sandy loam. The subsoil is a brown gravelly sandy loam with 35 to 60 percent fine gravel and rock fragments. These shallow soils are on most sideslope positions. A similar soil (30%--JEAE-3) with less than 30 percent coarse fragments, is found mainly on the upper slopes. A shallow soil (15%--IFBD-1) with sandy textures and a dark colored surface is on north-facing slopes and swale areas. Moderately deep soils (15%--JEAA-2) with gravelly sandy loam profiles having 40 to 60 percent coarse fragments occur on lower slopes.

Vegetation: The vegetative associations on this landtype are highly variable and complex. Common habitat types include Douglas-fir/spirea and brush/grass communities on south slopes, and Douglas-fir/elk sedge, Douglas-fir/pinegrass, and subalpine fir/elk sedge. Forest crown densities are dominantly 0 to 30 percent on southerly and westerly aspects and 40 to 50 percent on north slopes. Brush crown density ranges from 0 to 50 percent.

Hydrology: Mean annual precipitation is 30 to 40 inches and mean water yield is 10 to 20 inches. Snowpacks are light on lower portions and moderate on upper slopes. Snowmelt on exposed areas is sporadic through winter and spring and is over by May. Less winter snowmelt takes place on sheltered areas and snow remains well into May. Runoff on upper slopes above major dissection is by shallow to moderately deep subsurface flow, deep percolation and localized surface runoff from rock outcrops. On mid and lower slopes, where dissection is well expressed, much subsurface flow is intercepted and concentrated as streamflow. Runoff peaks can occur in winter or spring, depending on the occurrence of rain-on-snow events. Small streams originating on this landtype have a cycle of sediment and debris buildup and periodic flushing during major runoff events. Outflow rate of water delivered to this type is moderate to rapid. Summer storms can cause periodic flashy runoff of sediment-laden overland flow.

Management Qualities: This landtype is among the most hazardous on the District. Most hazards are rated high to very high and major problems will occur from erosion, mass stability, and sediment production. Extreme caution is urged when planning management activities on these units.

Roads. Bedrock conditions are extremely variable on this landtype. Many areas of well weathered, spalling granite will create problems in the stability of cutslopes and sediment production. The shallow subsurface flow and the numerous dissections will present water handling problems at drainage crossings. Most construction hazards are rated high to very high and many slopes are too steep to support stable fills. Some of the road locations through more competent granite will have fewer stability problems but surface erosion and subsequent sediment production will be major hazards. In many areas, avalanche hazards will be very high and a high frequency of debris slides will plug culverts and contribute to road damage. Trafficability, however, is expected to be good over most areas.

Wood. Like the vegetation, this landtype is extremely variable as to productivity potential for commercial timber species. Southerly aspects with more open grown stands of timber have very low to low productivity potentials. Although individual trees may grow quite well, the stand density is very low. North slopes in Douglas-fir and subalpine fir habitat types have a low to moderate productivity potential. Limitations to reforestation are rated very severe on southerly aspects because of the low water holding capacity and high evapotranspiration losses of these positions. Northerly aspects and lower, more moist slopes are rated severe for similar reasons plus vegetative competition.

Water. The water quality of major streams is greatly affected by the sediment produced on this landtype. Natural sediment is a constant problem during periods of peak flow when channels in minor drainages are cleansed of accumulated debris. Activity on these slopes can greatly accelerate the problem through disturbance and acceleration of surface erosion and surface creep. The characteristic most controlling to land use on this landtype is the periodic rapid debris-laden runoff in the stream channels. It will be extremely difficult to construct crossings at these channels that will not be destroyed by the heavy debris-laden flows which occur on the average of once in 10 years. Any grazing, road construction, or major vegetation manipulation will increase the amount of sediment accumulating in the channels and decrease the interval between flushing events.

Forage. This landtype is currently producing 200 to 700 pounds per acre per year of usable dry forage. This level is about half of potentials that are rated as 200 to 1,000 pounds per acre per year. The high inherent erosion hazard coupled with the moderate surface creep hazard make these units respond poorly to grazing activity. The vegetation present is necessary to reduce the amount of sediment leaving the landtype and entering the drainage system from natural erosion processes.

Recreation. The open, expansive character of these units makes them likely candidates as scenic areas. Trail construction is best on upper slopes although hazards will be similar to those encountered with road construction. Trafficability will generally be good.

Management Evaluation:

Map Symbol 120c-8
Strongly Dissected Mountain Slope Land
Shallow and Moderately Deep Skeletal, Sandy and Loamy, Xeric Soils

Location: Typical areas on the Boise Ranger District are along Devils Creek and Deer Creek drainages.

Landtype Characteristics: These fluvial lands have moderately steep to steep non-timbered south slopes that have been deeply incised by fluvial action. Sideslopes are relatively short with numerous, shallow parallel dissections. Major dissections are both parallel and dendritic. Ridges are somewhat rounded. Slope gradients range from 40 to 70 percent. All of these elements are indications that the erosional processes are very active and water leaves this unit rapidly. The shallow and moderately deep skeletal, sandy and loamy, xeric soils have developed over masked or well to extremely well fractured, moderately to well weathered granite bedrock.

Soils: The dominant soils (30%--JECA-5) have a 0 to 1 inch organic layer over thin, very dark gray gravelly sandy loam surfaces. Subsoils are dark yellowish brown gravelly sandy loams with 40 to 60 percent coarse fragments. These soils are on most side slope positions and are moderately deep. Associated on the side slope positions are moderately deep, sandy soils (20%--IFBA-l) and (20%—JCFA-l). The IFBA-1 soil differs in having a dark colored surface and occurring on lower slopes. A shallow sandy soil with a dark colored surface (30%--GDFQ-l) is on ridgetops and the upper one-third of the slope.

Vegetation: Brush/brass communities dominate this landtype with brush the major component. A few scattered ponderosa pine and Douglas-fir trees are found on individual units. Brush crown densities range from 10 to 50 percent.

Hydrology: Mean annual precipitation is 18 to 30 inches and mean water yield is 5 to 10 inches. Snowpack is light and intermittent on most of this landtype; however, some higher elevation portions have sheltered aspects with moderate and persistent snowpack. These slopes bare up very early and seldom have snow cover through April. Runoff from snowmelt seldom generates overland flow; therefore, shallow to moderately deep subsurface flow is a major means of snowmelt runoff. Summer storms commonly produce overland flow and flashy runoff in small watersheds. These areas are very subject to heavy winter runoff from rain-on-snow events. Past events have released 6 to 10 inches of water in a few days on a frequency of about once in 10 years. These lands are very heavy sediment producers. Drainageways accumulate sediment and debris during high precipitation and runoff years or during short high intensity summer storms. Outflows of water delivered to these slopes is rapid.

Management Qualities: This landtype is among the highest sediment producing units on the District. Most hazards are rated high to very high.

Roads. Generally, high erosion hazards and mass stability hazards combine with poorly graded spalling bedrock, high to very high debris slide hazards and flashy runoff, making these units hazardous for construction activities. Some road locations that have been established on upper slopes and ridges avoid most of these problems and appear fairly stable. The hazards, however, significantly increase on the lower slopes.

Wood. There are few if any trees on most delineations of this landtype. The climate is too hot and dry in the summer for good tree growth and seedling survival.

Water. These lands are extremely sensitive to changes in runoff conditions. Depletion of vegetative cover, interception and/or concentration of runoff, soil disturbance and trampling will all be reflected in a significant increase in sedimentation from these lands. The rate of accumulation of sediment in drainages will accelerate and the frequency of debris slides will increase. Roads or other improvements will be difficult to maintain because of erosion and runoff conditions.

Forage. Production potentials for desirable and intermediate range plants are ranked low to moderate. Because of accelerated erosion from past and present grazing activity, a highly pavemented surface has developed in many areas. Because many of these units have been severely eroded, recovery rates are expected to be very slow under the best management. Opportunities for revegetation are severely restricted because of the high evapotranspiration and low water holding capacity and climatic limitations.

Recreation. This landtype may be of little significance to recreational activities, except as a scenic backdrop. Trail development is possible although considerable seasonal maintenance will be required. Any activity engaged in that disturbs vegetative cover or soil surfaces will accelerate the erosional processes. The major recreational activity to date is probably late fall and early winter hunting.

Management Evaluation:

Map Symbol 120c-11
Strongly Dissected Mountain Slope Land
Moderately Deep and Deep Fine Loamy and Loamy Skeletal Soils

Location: This landtype occurs along Little Rattlesnake Creek and Shafer Creek on the west side of the District.

Landtype Characteristics: These fluvial lands are the steep north slopes that have been deeply incised by stream cutting, intermittent concentrations of overland flow and the rapid concentration of shallow and moderately deep subsurface flow. Sideslopes are of moderate length and steep with numerous parallel dissections. Ridges are relatively sharp with little exposed bedrock. Slope gradients range from 25 to 60 percent. The moderately deep and deep fine loamy and loamy skeletal soils have developed over masked or extremely well fractured, moderately to very well weathered granite bedrock.

Soils: The dominant soil (60%--IFBA-5) has a 0 to 4 inch organic layer over a very dark brown to yellowish brown gravelly sandy loam to gravelly sandy clay loam profile, 40 to 60 inches deep with 50 percent coarse fragments dominated by fine gravels. This soil is most common on mid and upper slopes. A less extensive soil (20%--GDFA-3) on more exposed slopes and areas of highly weathered granite, has fine gravelly sandy loam textures, a dark colored surface and is 20 to 40 inches deep. Shallow soils (20%--IFBD-3) adjacent to drainageways and on spurs have a dark surface and gravelly sandy loam textures.

Vegetation: This landtype is one of the better timber producing units on the District with forest crown densities ranging from 30 to 80 percent. Common habitat types are Douglas-fir/pinegrass, Douglas-fir/snowberry and Douglas-fir/ninebark. Brush crown densities range from 30 to 80 percent.

Hydrology: Mean annual precipitation is 25 to 40 inches and mean water yield is 10 to 20 inches. Snowpack is moderate to heavy and persists into June on the highest areas and into May on the lower areas. Major runoff is in April and May when heavy discharge of subsurface flow occurs. Overland flow runoff from summer storms is rare on undisturbed areas. Runoff is about evenly divided between moderately deep subsurface flow above bedrock and percolation through the weathered and fractured bedrock. The accumulation of this runoff increases going downslope and moving from convex to concave shaped slopes. Greatest concentration of subsurface flow is in the concave drainageways on the lower two-thirds of the slope. Ground water is most concentrated and nearest the surface on deep soiled slopes and deposits adjacent to the more deeply entrenched streams. Debris-laden flash flows seldom occur in drainageways in this landtype. Outflow rate of water delivered to these slopes is slow to moderate.

Management Qualities: Most hazards for this landtype are rated moderate to very high. High surface erosion hazards and mass stability problems associated with interception of subsurface flow will be major limitations. Spalling bedrock will be common in most exposed road cuts. This landtype, however, is one of the most productive for commercial timber species.

Roads. The qualities of this landtype present many hazards to road construction. Very poorly graded, spalling bedrock combined with probable interception of subsurface flow will result in very unstable road cuts and fills. These problems combine with a high surface erosion hazard to greatly increase the probability that sediment will reach adjacent drainages. The least impact has been observed where roads have been restricted to the upper one-quarter of slopes, although surface erosion and interception of subsurface water are still problems in some areas. Areas of very well weathered granite bedrock, clay pockets, are of limited extent but very significant because of the problems they create in construction. These heavy textured soils are restricted to the more moist northerly aspects that are heavily vegetated. Where possible, these areas should be avoided.

Wood. This landtype is one of the better commercial timber producing units on the District. Timber productivity ratings range dominantly from moderate to high for the major habitat types, Douglas-fir/spirea and Douglas-fir/ninebark. Reforestation site limitations are moderate to severe with high evapotranspiration losses on south slopes and vegetative competition on all slopes the major limiting factors.

Water. Hazard of intercepting large quantities of subsurface flow is moderately high at concave swales and incipient draws. Hazard of ground water interception is high on steep slopes adjacent to streams. Sedimentation hazard is high to very high for roads crossing the deeply entrenched streams on the lower one-half of these slopes and moderate to moderately high on the upper one-half. The combination of hazards presents an overall hazard to hydrologic characteristics of moderately high to high on lower slopes and moderate on upper slopes.

Forage. Forage production potential on this landtype is rated low to moderate with the vegetation dominated by browse species. Grasses and forbs are limited, and most common under the ponderosa pine habitat types on southerly aspects. Grazing, however, will greatly accelerate the erosional processes by removing the protective vegetation and litter. Surface creep will also be accelerated increasing the frequency of debris slides.

Recreation. This landtype is responsible for much of the timbered appearance of some north slopes on this District. As such, these lands provide a timbered scenic backdrop for many vistas looking from the north end of the District to the south.

Trails are not expected to hold up without considerable maintenance because of the highly erosive nature of these soils. Trafficability will be fair to good.

Management Evaluation:

Map Symbol 120d-2
Steep Rocky Headland
Moderately Deep and Shallow Sandy Skeletal Xeric Soils

Location: Representative units of this landtype are in the Sheep Creek drainage.

Landtype Characteristics: This landtype comprises the headlands of several minor south slope drainages in the fluvial lands. These units have been formed by the rapid concentration of surface and shallow sub-surface flows. These concentrations acting on weak, highly fractured bedrock, have resulted in the formation of over-steepened, fan-shaped headlands with dendritic drainage patterns that concentrate water very rapidly to a focal point at the base of the unit. This focal point major area of sediment accumulation and sediment discharge. These units are very rocky (40 percent), have slope gradients ranging from 50 to 90 percent, and are non-timbered. The moderately deep and shallow sandy skeletal xeric soils have developed over well to extremely well fractured very weakly to moderately weathered granite bedrock.

Soils: The dominant soils (30%--JEAA-2 and 10%--IECA-2) are found on most sideslope positions in this unit. These soils have a thin, 0 to 2 inch, organic layer over dark brownish colored gravelly sandy loam surface with 0 to 30 percent fine gravels. The subsoils have gravelly sand or gravelly loamy sand textures with 35 to 60 percent gravel and rock fragments. A shallow soil (20%--JEAE-2) has similar profile characteristics except depth is found on the steeper slopes and adjacent to rock outcrops.

Vegetation: This landtype is non-timbered and is dominated by brush/grass communities and rock outcrop. Brush crown densities range from 0 to 30 percent. Soil surfaces are dominated by 10 to 20 percent rock pavement greater than 3/4 inch in diameter.

Hydrology: Annual precipitation received on this landtype averages 25 to 35 inches. Snowmelt on these southerly exposed units occurs throughout the winter months and is complete by early spring. Approximately 10 to 20 inches of water is yielded annually. Overland flow is the predominant means of water transport during high intensity summer storms. During the snowmelt period, which accounts for most of the total water yield, overland flow is minor except in rock outcrop areas. Excess soil moisture moves through the mantle rapidly downslope and is typically intercepted by the numerous dissections within the headland. Bedrock penetration is potentially high but the steep slopes limit the time of exposure and hydraulic head. The headland configuration and dissection pattern tend to heavily concentrate channel flow at downslope focal points. These landtypes are the flashiest units on the Forest. Consequently, their response to water input is very rapid.

Management Qualities: This landtype has some of the highest natural hazards of any landtype on the District. Surface erosion, debris slides, and surface creep hazards are rated very high. Most construction hazards are rated somewhat less because of the basic competence of the hard underlying bedrock.

Roads. The bedrock is competent, well graded and generally well suited as stable construction material. However, the very high natural hazards (surface erosion, debris slides, and surface creep) will severely offset these advantages. Gradients on upper slopes are too steep to maintain fills and lower slopes are too hazardous because of debris slides to permit most construction activities.

Wood. This landtype is hot, dry, very rocky, and generally non-timbered.

Water. Due to the characteristically flashy nature of these landtypes during spring melt and high intensity summer storms, access routes located on lower slopes will be subjected to high runoff at major channels. The hazard of accelerated erosion and sedimentation is very high.

Forage. The forage production potential for this landtype is rated low on upper slopes and moderate on lower colluvial slopes. Soil surfaces are highly pavemented and the soils are highly erosive when subjected to disturbance. Natural erosion and historic grazing on this landtype has severely limited the productive capacity of the soils. Recovery rates are expected to be *slow.*

Recreation. This unit can be extremely hazardous to developments crossing or adjacent to the major drainage leaving the unit. Flash floods, rock slides and individual falling rocks will be a constant hazard. Soils have rapid to very rapid infiltration and percolation rates contributing to pollution of ground water from sewage treatment or sanitary landfills developed within or adjacent to these units.

Management Evaluation:

Map Symbol 120d-3
Steep Headlands
Moderately Deep Skeletal Sandy and Loamy Soils

Location: Common as north and east slope headlands on Phifer Creek and Swanholm Creek Drainages.

Landtype Characteristics: This landtype comprises the headlands of minor drainages in the fluvial lands. The formative processes have been the rapid concentration of surface and shallow subsurface flow. These concentrations, acting on well weathered bedrock, resulted in the development of over-steepened, fan-shaped headlands. The dendritic drainage patterns concentrate water very rapidly to a focal point at the base of the unit. This focal point is a major area of sediment accumulation and sediment discharge. The slopes are north facing and well timbered with slope gradients ranging from 60 to 70 percent. The moderately deep skeletal, sandy and loamy soils have developed over extremely well fractured, very weakly to moderately well weathered granite bedrock.

Soils: The dominant soil (60%--IECA-5) has a 0 to 3 inch organic layer over a dark grayish brown gravelly sandy loam, 20 to 60 inches deep, with 40 percent coarse fragments dominated by fine gravels. A less extensive soil (40%--JEAE-2), on dry exposed westerly slopes, is a dark brown to pale brown gravelly loamy coarse sand, less than 20 inches deep, with 50 percent coarse fragments.

Vegetation: The slopes of this landtype are well vegetated by timber and brush. Timbered habitat types represented are as follows: Douglas-fir/ninebark, Douglas-fir/spirea, and subalpine fir/elk sedge. The non-timbered portion of the units has a brush/grass cover not identified as to habitat types. Forest crown cover ranges from 5 to 60 percent and brush crown density is 10 to 40 percent.

Hydrology: These landtypes receive an average of 25 to 35 inches of precipitation annually. Rapid release of water in snow packs is delayed until late spring on these predominantly northerly protected units. Annual water yield from the landtypes ranges between 10 and 20 inches. Overland flow is minimal and restricted to ridge areas of shallow soils and rock outcrop. Most surface water readily infiltrates into the soil horizon. Total water yielded by deep seepage is probably moderately low due to the low-moderate bedrock penetration potential and rapid transmission of subsurface water down the steep slopes. The numerous dissections within these headlands intercept subsurface flow for yield as channel flow. Subsurface water tends to accumulate in greatest volume in concave slopes. The headland configuration of these landtypes tends to heavily concentrate surface runoff during spring snowmelt at down-slope focal point(s). These units are moderately rapid in response to summer storms and spring snowmelt.

Management Qualities: This landtype has high to very high erosion and mass stability hazards. Subsurface flow and rapid concentration of surface flow will be major considerations.

Roads. Cut slopes will not be stable, because of the deep, coarse textured soils and the likelihood of intercepting subsurface flow. Mass wasting and slumps associated with cuts will not be uncommon. Water concentrated by interception of subsurface flow and at drainage crossings will be a major problem. Roads located in the bottoms of drainages, near the focal point of water concentration, will be washed out regularly.

Wood. This landtype is dominantly well timbered; brush/grass communities are a minor cover type. Timber productivity potential is rated low to moderate with limitations to reforestation rated moderate to severe. Vegetative competition is the major problem.

Water. Special consideration will be necessary for access routes crossing major drainages as these dissections handle large volumes of water and debris slides during the snowmelt period. The probability of intercepting subsurface flow on mid and lower slopes during the spring is high. Overall hazards for serious alteration of hydrology is moderately high..

Forage. The potential production for this landtype is 100 to 1,000 pounds per acre per year of usable dry forage. Grazing will significantly accelerate surface erosion and creep. Recovery from disturbance will be rapid.

Recreation. In localized areas, these units offer excellent vistas to the landscapes below. They are, however, too steep and too unstable for most development. Trafficability will be good. Trails will be difficult to maintain at crossings.

Management Evaluation:

Map Symbol 120d-4
Steep Headlands
Shallow and Moderately Deep Skeletal, Sandy and Loamy, Xeric Soils

Location: This unit is common steep dry slopes along the Middle Fork of the Boise River, below Troutdale.

Landtype Characteristics: This landtype comprises the dry headlands of minor drainages in the Fluvial Lands. The formative processes have been the rapid concentration of surface and shallow subsurface flow. These concentrations, acting on well weathered bedrock, resulted in the development of over-steepened, fan-shaped headlands with dendritic drainage patterns that concentrate water very rapidly to a focal point at the base of the unit. This focal point is a major area of sediment accumulation and sediment discharge. The slopes are south and west facing and non-timbered. Slope gradients range from 50 to 70 percent. The shallow and moderately deep skeletal, sandy and loamy, xeric soils have developed over masked or extremely well fractured, weakly to well weathered granite bedrock.

Soils: The dominant soil (50%--GDFA-5), on most slopes, has a thin organic layer over a dark brown gravelly sandy loam, 20 to 40 inches deep, with 40 percent gravel. A similar soil (40%--GDFQ-5), on upper slopes, is less than 20 inches deep with 45 percent coarse fragments dominated by gravels. This soil occurs on upper slopes and is associated with rock outcrop.

Vegetation: This landtype is dominated by brush/grass communities with brush crown densities ranging from 10 to 40 percent.

Hydrology: Annual precipitation received on these landtypes averages 18 to 25 inches. Snowmelt proceeds sporadically throughout winter and is completed by early spring. This slow relatively uniform release of water is readily infiltrated into the soil horizon. Approximately 5 to 10 inches of water is yielded annually from these headlands. Excess subsurface water, which moves rapidly downslope, is quickly intercepted by the numerous dissections to become streamflow. Total water yield by deep seepage is moderate due to low-moderate bedrock penetration potential and rapid transmission of subsurface water down the steep slopes. The headland configuration of these landtypes tends to heavily concentrate runoff during spring snowmelt at downslope focal point(s). These units exhibit a rapid response to water input, especially summer storms. Small draws periodically flush out from major wet periods.

Management Qualities: This landtype has high to very high erosion, debris slide, and mass stability hazards. Subsurface flow and rapid concentration of subsurface flow will be major considerations.

Roads. The bedrock is poorly graded and spalling. Sediment production will be a significant problem. Mass wasting and slumps associated with cuts will not be uncommon. Some subsurface flow will be encountered during periods of peak runoff and following high intensity summer storms. Roads located in the bottoms of the drainages, near the focal point of water concentration, will be washed out regularly.

Wood. This landtype has a brush/grass cover type and is not rated for timber productivity.

Water. Major dissections handle high runoff during spring snow-melt and high intensity rainfall. Consequently, roads crossing these locations will incur high construction costs to insure adequate protection for the roads and channels. The hazard of sedimentation is high on all positions within the landtype.

Forage. The potential production for this landtype is 200 to over 900 pounds per acre per year of usable dry forage. The higher yields are associated with lower slopes and lower yields with shallow upper slope soils. Present levels are well below potentials because soils have been severely eroded by historic grazing practices. Recovery is expected to be slow.

Recreation. These units are presently of very limited significance to recreation. Slopes are steep and highly erosive. Because a high debris slide hazard exists, structural developments on lower slopes or across drainages would be a high risk.

Management Evaluation:

Map Symbol 120e-6

Maturely Dissected Mountain Slope Land, High Relief

Shallow and Moderately Deep Loamy and Loamy Skeletal, Xeric Soils

Location: This landtype is common to the dry, southern portion of the District south of the Boise River.

Landtype Characteristics: This landtype is dry and non-timbered with a well developed, finely meshed dendritic drainage pattern. Ridges are somewhat rounded and drainage bottoms are concaved on the lower portions of the units. Upper slopes are steeper and more actively eroding, with slope gradients ranging from 30 to 70 percent. The shallow and moderately deep loamy and loamy skeletal, xeric soils have developed over moderately to very well weathered granite bedrock with masked fractures.

Soils: The dominant soil (50%--GDFA-3) is on most sideslope positions, has a very dark grayish brown surface and dark yellowish brown subsoils with gravelly sandy loam textures with about 20 percent fine gravels. This soil is 20 to 40 inches deep. A shallow soil (30%--JECB-5) with up to 50 percent gravel in the subsoil and lacking the dark colored surface, occurs on ridgetops and eroded areas. A moderately deep and deep clay loam soil (20%--GDEA-4) is located on lower slopes and in concave positions.

Vegetation: This landtype is dominated by brush/grass communities with brush crown densities ranging from 25 to 70 percent.

Hydrology: Annual precipitation averages 18 to 25 inches. Snowmelt takes place sporadically throughout the winter and is completed by early spring. Most precipitation is infiltrated into the soil horizon. Water yield accounts for 5 to 10 inches of the annual precipitation. Very little water is yielded as overland flow. Subsurface flow and deep seepage are the primary means of water yielded from the landtype. Timing of major runoff is during spring snowmelt and warm winter rains. During abnormally wet periods, slumps and debris flows are common. The dissections within the units carry runoff during spring and high intensity summer storm periods only. Water reaches dissections by subsurface flow. Water yielded as deep seepage appears as perennial springs. Total water yielded is proportionately much lower than the annual precipitation due to the high evapotranspirational requirements.

Management Qualities: Many hazards on this landtype are rated as moderate to very high. Surface erosion and natural stability hazards are the major limitations. There is a moderate to high probability of intercepting subsurface flow on northerly aspects.

Roads. Bedrock materials are poorly graded, generally fine gravels, and the bedrock is spalling. Cut and fill slope hazards are moderate to high. Considerable sediment will be produced by most construction activities or other activities that disturb natural surfaces. The probability that this sediment will reach active streams is variable, depending on the proximity of live streams. Lower slopes are often best suited to low standard roads because slope gradients are much less in these areas. Stability and maintenance will still be a problem, however, because of sediment generated by natural hazards on upper slopes.

Wood. This is a hot, dry landtype with isolated patches of aspen and some commercial timber species.

Water. Concentration of water on these soils is hazardous and will lead to serious gullying and accelerated erosion. Although overland flow is minimal in the natural state, excessive soil and vegetative disturbance could cause a significant increase. The probability that potential sediment will reach live streams is high.

Forage. Current production levels on this landtype are 100 to 1,300 pounds of usable dry forage per acre per year. Potentials are rated from 100 to 2,000 pounds per acre per year. Upper slope, shallow soils, are generally rated low and not subject to much improvement. Deeper soils have been subjected to considerable disturbance in the past. This removal of protective vegetation, the acceleration of surface creep hazard and the removal of surface fines has resulted in a moderate reduction of this potential. Recovery rates will be variable depending on the individual unit and its history of use. The more moist north slope soils and toe slope soils are expected to recover more rapidly while shallow soils on upper slopes and ridges will recover very slowly.

Recreation. Many of these units lie along some of the major travel routes on the District. Much of the sediment and debris slides generated on these units have temporarily closed roads in localized areas. Trails with steep gradients will be highly erosive although trafficability is dominantly fair to good.

Management Evaluation:

Map Symbol 120e-7
Maturely Dissected Mountain Slope Land, Moderate Relief
Shallow and Moderately Deep Loamy and Loamy Skeletal, Xeric Soils

Location: Representative units of this landtype are on the southern portion of the District, south of the Boise River.

Landtype Characteristics: This landtype has a well developed, finely, meshed dendritic drainage pattern which resulted from the fluvial process. Ridges are rounded and drainage bottoms are concaved. Relief between ridge tops and bottoms is between 100 and 500 feet. Upper slopes are steeper and more actively eroding, with slope gradients ranging from 20 to 60 percent. The shallow to moderately deep loamy and loamy skeletal soils have developed over moderately to well fractured or masked, moderately to well weathered granite bedrock.

Soils: The dominant soils on most sideslope positions (40%--GDFA-5) are 30 to 40 inches deep and have a trace of an organic layer overlying a dark brown gravelly loamy sand or sandy loam surface. The subsoil is a yellowish brown, gravelly sandy loam with 40 to 70 percent gravel. On smooth sideslopes and concave areas, a 30 to 40 inch deep clay loam soil (30%-- GDEA-4) occurs. Ridgetops and eroded areas have a shallow soil (30%-- JECB-5) with gravelly sandy loam textures having 50 percent fine and medium gravels.

Vegetation: This landtype is dominated by brush/grass communities not identified as to habitat type. Vegetative ground cover amounts range from 15 to 45 percent. Brush crown density ranges from 5 to 40 percent.

Hydrology: Annual precipitation received on these units averages 20 to 25 inches. Snowmelt takes place throughout the winter and is completed by early spring. Most precipitation is infiltrated into the soils. Water yield accounts for 5 to 10 inches of the annual precipitation. Very little water is yielded as overland flow. Subsurface flow and deep seepage are the primary means of water yield, of which the majority is delivered during spring melt. The dissections within the units carry runoff during abnormally wet periods and high intensity summer storm periods only. Slumps and debris flow hazard is high during abnormally wet winter and spring periods. Water reaches dissections as subsurface flow. Water yielded as deep seepage appears as springs at lower areas. Total water yielded is low due to the high evapotranspirational requirements.

Management Qualities: Many hazards on this landtype are rated as moderate to high. Surface erosion and natural stability hazards are the major limitations. There is a moderate to high probability of intercepting subsurface flow on northerly aspects.

Roads. Bedrock materials are poorly graded, generally fine gravels and the bedrock is spelling. Cut and fill slope hazards are moderate to high. Considerable sediment will be produced by most construction activities or other activities that disturb natural Surfaces. The probability that this sediment will reach active streams is variable, depending on the proximity of live streams. Considerable maintenance will be required following periods of high intensity storms. Lower slopes are often best suited to low standard roads because slope gradients are much less in these areas. Stability and maintenance will still be a problem, however, because of sediment generated by natural hazards on upper slopes.

Wood. This landtype has been burned and is not rated as to timber productivity.

Water. Concentration of water on these soils is hazardous and will lead to serious gullying and accelerated erosion. Although overland flow is minimal in the undisturbed state, any significant soil and vegetative disturbance will cause a serious increase. Sediment production is high from these landtypes.

Forage. Production potentials for this landtype are 100 to 1,000 pounds per acre per year of usable dry forage. The lower yields are associated with more exposed slopes where water holding capacity and high evapotranspiration of the surface soil cause water to be limiting. The higher yields are those from more protected slopes.

Recreation. These units serve as backdrops for some of the travel routes associated with Garden Valley and Alder Creek. They are, however, relatively dry and at the present burned over. Recreation potential is limited.

Management Evaluation:

Map Symbol 121e
Maturely Dissected Basin Land
Deep Sandy and Coarse Loamy Soils

Location: A typical location is east of the East Fork of Roaring River.

Landtype Characteristics: This unit consists of land that has been modified or displaced from its original position by faulting activities and presently occupies a lower position than it did at one time. These units because of their low position following faulting, have subsequently been modified by fluvial processes. The resultant unit is a moderately to well timbered basin containing a mature topography of low relief, rolling hills. Slope gradients range from 5 to 60 percent. The shallow to deep fine loamy and coarse loamy soils have developed over moderately to well fractured or masked, well weathered granite bedrock. Deep colluvial and alluvial soils have accumulated in the drainages and broader lower gradient portions of these basins.

Soils: The dominant soils found on most sideslope positions (40%--IFBA-1 and 40%--IFBA-3), are deep and have dark colored surfaces. The IFBA-1 soil has loamy sand textures with about 10 percent coarse fragments. The IFBA-3 soil has sandy loam textures that may have up to 30 percent fine gravel in the subsoil. A shallow soil (20%--JEAE-2) on ridgetops and upper slope positions has gravelly loamy sand textures with 40 to 60 percent gravels and rock fragments.

Vegetation: This landtype is moderately to well timbered and dominated by Douglas-fir/snowberry, Douglas-fir/elk sedge, and Douglas-fir/ninebark habitat types. More moist meadow land type inclusions are common to some dissections and flatter basin-like areas. Vegetative cover is 50 to 80 percent. Forest crown density is 40 to 60 percent and brush crown density ranges from 5 to 40 percent.

Hydrology: Mean annual precipitation is 25 to 40 inches and mean water yield is 10 to 20 inches. Snowpack is moderate and persists well into May. In addition to precipitation, this landtype receives and accumulates water by surface, subsurface and ground-water flow from higher surrounding slopes. As a result, this terrain handles large quantities of water during April, May and June. Overall outflow rate of water delivered to the unit is slow to moderate. Overland flow from undisturbed areas is rare. Predominant manner of runoff is as moderately deep subsurface flow and ground-water flow. Water table is near the surface on low lying toe slopes and narrow stream bottoms during spring and recedes to moderately deep in summer, fall and winter.

Management Qualities: Most hazards on this landtype are rated low to moderate. The major areas of consideration will be the possibility of intercepting subsurface flow and the wet soils that have developed in drainages and meadow-like areas.

Roads. These units contain poorly graded materials both in the bedrock and the soils. Surface erosion on disturbed areas as well as on road surfaces, cutslopes and fillslopes, will be problems. The probability that sediment will reach live streams will vary from location to location within the landtype. Because the slopes of these units are long, and form basins, considerable water will be concentrated near toe slope positions. If disturbed, these areas are likely to intercept subsurface flow, which will result in cut and fill failures.

Wood. Timber productivity potential for this landtype is rated low to high. The highest ratings are associated with grand fir habitat types. Limitations to reforestation are rated moderate to slight. Vegetative competition is the major limiting factor.

Water. Low lying portions have saturated soils during spring and this will restrict improvements and sanitary facilities to the better drained areas. Deep cuts will intercept large quantities of subsurface flow or ground water that can easily be concentrated to erodible quantities. Numerous streams are present and roads will require numerous bridges or large culverts and fills.

Forage. Forage production potential in this landtype is rated moderate. Many low-lying areas, especially along wet meadows, have a moderate to high productivity potential. A good ground cover of vegetation and litter appears very important to the maintenance of soils on slopes greater than 30 percent. The basin-like areas with deep soils and less gradient will withstand the impact of grazing to a much greater degree. Sedimentation of the adjacent live streams will be the most significant problem associated with grazing.

Recreation. These units have many features highly suited to recreational and administrative site developments. Many areas have slope gradients less than 10 percent, are forested, and are in close proximity to live streams.

Management Evaluation:

Map Symbol 122
Oversteepened Canyon Land
Shallow Sandy and Sandy Skeletal Soils

Location: This landtype is located along most major drainages on the District.

Landtype Characteristics: These oversteepened canyon lands are steep to extremely steep, weakly to moderately dissected, sparsely timbered south slopes immediately adjacent to major drainages. The dissections in these units are dominantly parallel and of first order and are generally in contact with main drainages of third to fourth order. Overall slope gradients range from 60 to 100 percent. The shallow and moderately deep sandy skeletal soils have developed over moderately to extremely well fractured, weakly to moderately well weathered granite bedrock.

Soils: The dominant soil (70%--JECB-5) is shallow and has an organic layer 0 to 1 inch thick. These soils have dark brown gravelly sandy loam textures with 30 to 50 percent gravel and 0 to 5 percent rock. These soils are on mid and upper slopes and near rock outcrops. Also found on midslope positions is a moderately deep soil (15%--JCFA-1) with sandy textures. A moderately deep soil (15%--GDFA-3) with a dark colored surface and sandy loam to sandy clay loam textures occurs on mid and lower slope positions.

Vegetation: This landtype is generally non-timbered on most slopes with forest crown densities ranging from 0 to 10 percent. Occurring on the landtype are Douglas-fir/spirea, Douglas-fir/mountain maple, Douglas-fir/elk sedge habitat types. North slope inclusions are more heavily timbered with forest crown densities ranging from 10 to 50 percent. Brush crown densities are variable and range from 5 to 40 percent. Vegetation plus litter covers 30 to 60 percent of the unit.

Hydrology: Mean annual precipitation is 15 to 30 inches and mean water yield is 5 to 15 inches. Snowpack is light to moderate and persists through winter only on the higher and more sheltered portions. Snowmelt and runoff can occur at any time during winter when warm temperatures or warm rainstorms occur. Rain-on-snow events have caused heavy natural runoff erosion and sedimentation at approximately a one in ten year frequency. At such times, 6 to 10 inches of water have been delivered to the soil in a few days, and the stress on the steeply sloping, non-cohesive soils causes many debris slides to stream channels. Winter and spring runoff is dominantly as shallow to moderately deep subsurface flow above bedrock. Outflow rate of water delivered to these slopes is rapid. Overland flow runoff from high intensity summer storms is common causing flash flows in small drainage channels.

Management Qualities: Many of the hazards on this landtype are rated moderate to very high with the major limitations associated with surface erosion, debris slides, surface creep, and mass stability hazards. Any activity that disturbs natural soil surfaces will greatly accelerate the erosional processes and significantly increase sedimentation to the adjacent drainages.

Roads. Although much of the bedrock in this landtype is of moderate competence, the many high to very high hazard ratings make construction difficult if not impractical. A high erosion hazard and high surface creep hazard combine to produce high debris slide hazards that will result in considerable hazard at culvert installations. Many sideslopes are too steep to maintain stable fills and road cuts will expose excessive amounts of spalling bedrock material. In these sandy soils over soft bedrock, subsurface water will be intercepted during high intensity storms.

Wood. The timbered portion of this landtype is dominated by open grown stands of Douglas-fir/spirea, Douglas-fir/elk sedge, and Douglas-fir/mountain maple habitat types, composed chiefly of ponderosa pine with very low timber productivity potentials. Brush and grass communities dominate the nontimbered slopes. Limitations to reforestation are very severe because of rapid runoff, high evapotranspiration losses, and low water holding capacity of the sandy soils. North slope inclusions have moderate to severe limitations because of vegetative competition, rapid runoff, and low water holding capacity.

Water. The flashy summer runoff, the periodic debris slides and debris-laden peak flows make these areas very hazardous to any major improvements. Livestock use, road construction and concentrated wildlife use results in serious increase in erosion and sedimentation from this landtype.

Forage. Forage production potentials on this landtype are rated low with current levels near or somewhat below this potential. Previous grazing practices have significantly accelerated surface erosion on these units, leaving a highly pavemented surface and subsequently reducing the productivity potential. Recovery rates are expected to be very slow. Any grazing activity will significantly accelerate the natural erosional processes on these very loose sandy slopes.

Recreation. These units lie adjacent to some of the roads along major drainages and access routes on the District. These units, therefore, may be significant as backdrops and do provide a canyon-like appearance. Mass wasting and debris slides will be a significant hazard to activities or developments constructed on or below this landtype.

Management Evaluation:

Map Symbol 122-1
Rocky Oversteepened Canyon Land
Shallow and Moderately Deep Skeletal, Sandy and Loamy, Xeric Soils

Location: Representative examples of this landtype are located along the Middle Fork of the Boise River below Atlanta.

Landtype Characteristics: These rocky oversteepened sparsely timbered mountain slopes lie immediately adjacent to several major drainages. Dissections are shallow and parallel and dominantly first order. A gap of two to four orders exists between these drainages and the main streams that they intersect. Faulting and undercutting at the base of these units by the adjacent streams are the primary reasons for oversteepening. The shallow and moderately deep skeletal, sandy and loamy, xeric soils have developed over well to extremely well fractured, weakly weathered granite bedrock. Rock outcrop is common to the upper slopes.

Soils: The dominant soil (20%--JEAE-2), on most slopes adjacent to rock outcrop, is a brown to pale brown gravelly loamy coarse sand, less than 20 inches deep, with 50 to 70 percent well graded coarse fragments. A somewhat less extensive soil (10%--JEAA-5), on mid and lower slopes, has a thin organic layer over a very dark grayish brown to brown gravelly sandy sand, 20 to 40 inches deep, with 40 to 60 percent well graded coarse fragments. Rock outcrop is common to the upper slopes and occupies up to 70 percent of the surface area.

Vegetation: This landtype is dominated by brush/grass communities and a few scattered ponderosa pine and Douglas-fir trees. Brush crown densities are dominantly less than 20 percent.

Hydrology: These lands receive an average of 20 to 30 inches of precipitation annually. Snowmelt occurs early and is completed by early spring. Approximately 10 to 15 inches of water are yielded annually. Overland flow is the dominant means of water movement on the upper one-half of these units where the percentage of rock outcrop is high and soils are shallow. Shallow subsurface flow and overland flow are about equal on the lower slopes. Deep seepage is minimal due to the rapid rate of water removal by overland flow and shallow subsurface flow. The first order drainageways are very flashy. In comparison to other landtypes, these units have high natural erosion rates.

Management Qualities: This unit is one of the more hazardous landtypes on the District. Erosion hazards are high to very high and debris slides are a major contributor to sediment production.

Roads. This landtype presents many severe hazards to road construction. Maintenance of stable cut and fill slopes will be extremely difficult. Although the bedrock is dominantly well graded and competent, slopes are extremely steep causing cuts and fills to be unstable. High volumes of water generated during high intensity storms will tend to weaken constructed facilities especially at drainage crossings. Culvert installation will be extremely difficult to maintain except on the upper one-quarter of the slope.

Wood. This landtype is dominantly non-timbered. The isolated ponderosa pine and Douglas-fir trees contribute more to slope stability than to production of usable wood. Evapotranspiration losses on these slopes are very high and water holding capacity is very low.

Water. The hard rock limits erosion somewhat. The extremely high energies of runoff from these slopes makes any disturbance or structure subject to extreme stress. Due to the proximity of these slopes to perennial streams, most of the eroded material will readily become sediment.

Forage. Current and potential production levels for this landtype are rated very low to low. Surface erosional processes are very active and subject to acceleration when disturbed. Consequently, rock and pavement now cover as much as 40 percent of the existing soil surfaces. The probability of improving this vegetative condition is very limited.

Recreation. This landtype plays a significant role in providing an impressive scenic backdrop to several roads and trails on the District. Mass wasting and subsequent debris slides or mud flows are significant dangers to activities on lower slopes or adjacent landtypes.

Management Evaluation:

Map Symbol 122-4
Oversteepened Canyon Lands
Moderately Deep Skeletal, Sandy and Loamy Soils

Location: Steep, heavily timbered slopes along major drainages and streams on the District.

Landtype Characteristics: The units of this landtype are very steep canyon lands generally associated with major streams. Side slope dissections are steep, shallow to moderately deep, parallel, and dominantly second or third order where they contact the main drainage. A gap of two to four orders exists between the drainages on the slope and the main stream. Erosional processes are extremely active; undercutting at the base of the units by the major streams and faulting are primary reasons for the oversteepened slopes. The slopes are north facing and well timbered, with slope gradients ranging from 60 to 80 percent. The moderately deep skeletal, sandy and loamy soils, have developed over extremely well fractured, very weakly and moderately well weathered granite bedrock.

Soils: The dominant soils (40%--IECA-5) are moderately deep over bedrock and have a 0 to 4 inch organic layer over a dark grayish brown or dark yellowish brown gravelly sandy loam with 50 to 80 percent well graded coarse fragments. These soils occur on mid and lower slope positions. Also on mid and lower slope positions is a similar soil (30%--IECA-3) that has lesser amounts (10 to 30 percent) of coarse fragments in the subsoil. A shallow soil (30%--UEAE-2) occurs on upper slopes and spur ridges. This soil has gravelly loamy sand textures with 50 to 80 percent gravel and rock size fragments.

Vegetation: The slopes of this landtype are well vegetated. Dominant habitat types are Douglas-fir/ninebark, Douglas-fir/snowberry, and Douglas-fir/elk sedge. Forest crown density ranges from 20 to 80 percent and a brush crown density is 5 to 40 percent.

Hydrology: Annual precipitation and water yield average 20 to 35 and 5 to 10 inches, respectively. Snowmelt is delayed until late spring due to the northerly aspect of the landtypes. Overland flow and subsurface flow are the prime means of water conveyance within and from the unit. During the spring snowmelt period, which releases a majority of the annual yield, most of the water leaves as subsurface flow. This water tends to move evenly downslope and accumulates within lower slopes. Overland flow is limited to rocky and shallow soil ridge areas during high intensity summer storms. These landtypes respond rapidly to water inputs (snowmelt, rain, etc.).

Management Qualities: This landtype is among the most hazardous on the District. Erosion hazards are moderate to very high when surface litter and vegetation are disturbed. Slope creep can be a problem. There is a high probability of intercepting subsurface flow on mid and lower slopes.

Roads. **Construction problems will be concerned with stability of cuts and fills, acceleration of surface erosion and handling** intercepted subsurface flow. Potential sedimentation to adjacent **streams will be a significant problem. Hazards will reduce slightly in magnitude on the upper one-fourth of slopes.**

Wood. This landtype is one of the better stocked timber sites on the District. Productivity potentials are dominantly moderate to high although some areas range from very low to high. Limitations to reforestation are severe to moderate and are related to vegetative competition and high evapotranspiration losses.

Water. These steep units are highly susceptible to accelerated erosion by concentration of water. Erosion rates of road prisms will be very high to extreme. Due to the proximity of these landtypes to perennial streams, sedimentation rates will approach erosion rates.

Forage. The potential production for this landtype is 100 to 400 pounds per acre per year of usable dry forage. However, trampling of these steep unstable slopes by grazing animals will greatly accentuate creep terracettes, making available more material for release into adjacent streams. Productivity will also be significantly disrupted.

Recreation. These units are some of the prime scenic portions along major travel routes. Some hiking and hunting do occur here. Trails pass through or originate at the base of these units, providing access to some of the back country. Trail construction and maintenance are generally difficult because of rock and erosion hazards. Trafficability is expected to be good.

Management Evaluation:

Map Symbol 123-1
Faulted Bench Land
Moderately Deep Skeletal, Sandy and Loamy Soils

Location: This landtype is limited in extent and somewhat variable. Typical units occur in the China Basin area and adjacent to Trail Creek.

Landtype Characteristics: These units are generally small remnants of block faulting activity that have not been dissected by the fluvial processes. All aspects are included and forest crown densities range from 10 to 70 percent. A drainage pattern is very weakly developed, shallow and somewhat dendritic to irregular. Slopes are very short and gentle, with gradients dominantly less than 20 percent. Unlike dissected fluvial landtypes, the overall relief has a very uniform base level. The moderately deep skeletal, sandy and loamy soils have developed over variably fractured and weathered granite bedrock.

Soils: The dominant soil (50%--IECA-3) has a 0 to 2 inch organic layer over dark yellowish brown sandy loam surface, 5 to 10 inches thick. The subsoil is a light yellowish brown gravelly sandy loam or sandy clay loam with 10 to 30 percent fine gravel. These soils are 40 to 60 inches deep over bedrock and occur on most slope positions. Another major soil (30%--GDEA-5) is somewhat similar but has dominantly loam and sandy clay loam textures with 50 to 70 percent gravel and rock in the subsoil. These soils are on the more level areas on the top of the benches. A shallow soil (20%--IFBD-l) is 6 to 13 inches over bedrock, has sand and loamy sand textures and occurs near the edge of the bench and on steeper sideslopes.

Vegetation: This landtype is well timbered with forest crown densities ranging from 10 to 70 percent. Wet meadow communities and Douglas-fir/pinegrass and Douglas-fir/ninebark habitat types dominate the lower wet areas while Douglas-fir/elk sedge and Douglas-fir/Idaho fescue habitat types are common to the more sloping portions of the units. Brush crown densities will range from 0 to 40 percent.

Hydrology: Mean annual precipitation is 30 to 40 inches and mean water yield is 15 to 20 inches. Snowpack is moderate to deep and persists through May. Runoff is dominantly as ground water. This area receives much water from higher and adjacent slopes and the water table is at or near the surface during the spring. Depressions stay wet well into the summer from ground water recharge generated on higher adjacent units. The deep soils store and slowly release this water to streams running through or adjacent to them.

Management Qualities: Most hazards on this landtype are rated low to moderate. The major limitations will be a high probability of intercepting subsurface water or ground water tables, locally poor traffic-ability and a moderate to high erosion hazard for extensive excavations.

Roads. Major limitation in localized areas will be a high water table that will reduce the bearing capacity of the road prisms. Trafficability in these areas will be poor. Surface erosion of cut and fill slopes will be a moderate problem where cuts exceed 5 to 6 feet in length; however, because of the low gradients, this may not be a significant problem. Revegetation potentials for cut and fill slopes will be good.

Wood. Timber productivity potential for this landtype is dominantly moderate with limitations to reforestation rated moderate to severe. The major limiting factors are vegetative competition and a seasonal high water table.

Water. The high water table in localized areas is a main hydrologic hazard to improvements and activities. Continuous cuts or ditches are the major hazard to the hydrology. These are likely to drain the area and reduce the regulation of water flow through the soil deposits. Soil erosion and sedimentation may accompany this artificial drainage. Streams through the landtype can easily be diverted from their natural channels at road crossings unless special care is taken. The low slope gradients moderate most of these hazards.

Forage. Forage production on this landtype is rated low to moderate with some localized areas around wet meadows being rated high. Although current levels are close to potentials, some units receive considerable grazing impact and some deterioration and subsequent sedimentation has resulted. Most areas, however, are expected to recover rapidly under good management practices.

Recreation. These units have many qualities similar to depositional landtypes and are basically well suited for a variety of recreational activities. Because of the gentle relief and availability of water, these units may be well suited for recreational development or administrative sites. Localized areas associated with wet meadows or high water tables may not be as well suited and may provide problems associated with poor trafficability and compactability of soils. Dust will be a moderate problem during the drier seasons of the year. Most soils, however, are poorly suited to development of leach fields or other facilities requiring purification of affluent within the soil profile.

Management Evaluation:

Map Symbol 123-2
Faulted Bench Land
Moderately Deep and Deep Sandy and Coarse Loamy Xeric Soils

Location: Macks Creek, Smiths Creek, and Minneha Creek areas.

Landtype Characteristics: This landtype comprises a special group of lands which are remnants of block faulting on the District. The remnants have to some extent been dissected by the fluvial process. The slopes have a dominantly south or west aspect, are mainly brush covered, convex, have a 40 to 70 percent gradient, 200 to 1,500 feet long, and are mapped at elevations between 3,200 and 6,000 feet. The soils have sandy skeletal and loamy skeletal features, are 12 to 60 inches deep, and are underlain by moderately to well-weathered granite, which is moderately to well fractured or masked.

Soils: The dominant soil (50%--JCFA-l) is deep and has a trace of an organic layer over a dark grayish brown sandy loam surface, 4 to 10 inches thick. The subsoil is a yellowish brown sand or loamy sand with up to 10 percent fine gravel. This soil occurs on bench-like areas and lower sideslope positions. Another soil (20%--JECA-3) occurring in similar positions, differs in being moderately deep to bedrock and in having sandy loam subsoil textures with 20 to 30 percent rock fragments. A shallow soil (30%--JECB-2) on the upper third of the slope and near outcrops has loamy sand texture with about 50 percent gravel.

Vegetation: The slopes of this landtype are mainly brush covered. Timbered habitat types represented are as follows: Douglas-fir/snow-berry and ponderosa pine/bitterbrush. The nontimbered portion has various brush/grass communities not identified as to habitat type. Vegetative ground cover for the landtype has a range of 10 to 60 percent. Forest crown density has a 0 to 30 percent range, and brush crown density is 10 to 30 percent.

Hydrology: These landtypes receive between 20 and 30 inches of precipitation annually. The rate of snowmelt is variable depending upon aspect. Approximately 5 to 10 inches of water is yielded annually. Overland flow is restricted to periods of rapid snowmelt and high intensity summer storms. Subsurface flow and deep seepage are the main means of water movement within the units. Deeply incised dissections will intercept subsurface water during spring melt. Channels are generally dry throughout summer. The units are typically moderate to rapid in response to water input (snowmelt and rain).

Management Qualities: The major area of consideration will be the high hazard ratings that occur on inclusions of steep drainage side slopes.

Roads. Mass stability hazards and construction hazards are rated moderate to high, the former associated with more gradual slopes and the latter with steep slopes. The degree of slope dissection will dictate the amount of water to be handled in the spring. There will be inclusions of steep, wet sideslopes where road cuts may intercept ground water flow. Granite bedrock is dominantly well weathered, which restricts the downward movement of water and is poorly graded for fill material. The Macks Creek unit has very high slump hazard.

Wood. The Douglas-fir/snowberry habitat type has a moderate productivity potential. Ponderosa pine/bitterbrush habitat type has a very low to low rating. Limitations to reforestation are moderate to severe and are related to climatic conditions, vegetative competition, and water-holding capacity.

Water. Ground water intercepting hazard is high only on the short steep drainage sideslopes. In fact, most hazards of disrupting the hydrology of these lands are on the small part of the landtype adjacent to the dissecting drainageways. Major disturbance of these short steep sideslopes will provide a major hazard of slumping into drainageways.

Forage. The potential production for this landtype is 400 to 1,500 pounds per acre per year of usable dry forage. The higher yields are related to more moist micro-climates where low water-holding capacities of the surface soil is not a problem. The opposite is true of the lower yields.

Recreation. These areas appear to be well suited for a variety of recreational activities that do not involve much soil disturbance. However, access to these areas is limited by their geographic location.

Management Evaluation:

Map Symbol 123-3
Faulted Bench Land
Shallow and Moderately Deep Skeletal Sandy and Loamy Soils

Location: A typical location on the Boise District is along Daggett Creek and Shafer Creek.

Landtype Characteristics: This landtype comprises a special group of lands which are remnants of block faulting. The remnants have, to some extent, been dissected by the fluvial process, but not to the extent of Moderately and Strongly Dissected Faulted Benches. This is a timbered landtype which has all aspects. It occurs at elevations between 3,000 and 6,500 feet. The slopes are convex, have 10 to 40 percent gradients, and are from 200 to 1,500 feet long. The shallow to moderately deep skeletal soils are underlain by very weakly to moderately well weathered granite, which is well to extremely well fractured or masked.

Soils: There are two dominant soils on this landtype. The first (50%--IFBA-5) is moderately deep and has an organic layer 0 to 4 inches deep. The surface soil is a very dark brown gravelly sandy loam to gravelly sandy clay loam with 20 to 55 percent gravel and 0 to 20 percent rock. The subsoil is a yellowish brown gravelly sandy loam to gravelly loam with 20 to 60 percent gravel and 0 to 60 percent rock. These soils are found on mid and lower slopes. The second dominant soil family (50%--IFBD-3) is shallow, with a 1/2 to 2 inch organic layer. The surface soil is a very dark grayish brown sandy loam. The subsoil is a gravelly sandy loam with less than 30 percent gravel. These soils are on mid and upper slopes and on ridgetops and spurs.

Vegetation: The slopes of this landtype are both timbered and brush covered. The timbered habitat types represented are Douglas-fir/elk sedge, Douglas-fir/tall huckleberry, Douglas-fir/spirea and ponderosa pine/bitter-brush. The non-timbered portions have various brush/grass communities not identified as to habitat type. Vegetative ground cover for the land-type has a range of 40 to 60 percent. Forest crown density has a 40 to 60 percent range and a brush crown density of 20 to 30 percent.

Hydrology: These landtypes receive between 20 and 30 inches of precipita-tion annually. The rate of snowmelt is variable depending upon aspect. Approximately 5 to 15 inches of water is yielded annually. Overland flow is rare on undisturbed areas. Subsurface flow and deep seepage are the main means of water movement within the units. Deeply incised dissections on lower slopes will intercept subsurface water during spring melt. Channels are generally dry in late summer. The units are moderate regulators of runoff.

Management Qualities: The major area of consideration will be the high hazard ratings that occur on inclusions of steep and very steep fluvial dissections. Aside from these factors and a past history of faulting activity, the units are relatively stable.

Roads. Mass stability hazards and construction hazards are rated moderate to high, the former associated with more gradual slopes and the latter with steep slopes. The degree of slope dissection will dictate the amount of water to be handled in the spring. There will be inclusions of steep, wet sideslopes where road cuts may intercept subsurface flow. Some of the bedrock is well weathered, which restricts the downward movement of water, and is poorly graded for fill material.

Wood. The habitat types have a low to moderate productivity potential. Limitations to reforestation are moderate to severe and are related to climatic conditions, vegetative competition and water holding capacity.

Water. Overall hazard of serious disruption of hydrology is moderately low. The probability of intercepting subsurface flow on steep lower slopes during spring melt is moderately high. However, slope lengths are short enough so that this volume is relatively small.

Forage. The potential production for this landtype is 100 to over 1,500 pounds per acre per year of usable dry forage. The higher yields are related to more moist micro-climates, where low water holding capacities of the surface soil is not a problem.

Recreation. These areas appear to be well suited for a variety of recreational activities that do not involve much soil disturbance.

Management Evaluation:

Map Symbol 135-1
Mesa Scarp Slopes
Deep Skeletal Loamy and Clayey Soils

Location: Examples of this landtype occur as the Steep Basalt slopes along the South Fork of the Boise River.

Landtype Characteristics: During the Quaternary Period, the Snake River basalt flowed into the lower portion of the South Fork of the Boise River. All areas, especially major drainages, were filled with basalt to an elevation of approximately 5,500 feet. The streams that were already present immediately began seeking new channels, generally following fractures or the weak basalt-granite contact zone. The subsequent undercutting of the basalt resulted in the oversteepening of sideslopes creating basalt escarpments. These landtypes had been over-steepened, resulting in sloughing of the well fractured basalt materials and creating basalt talus on some mid and lower slopes. Similar development in pure granite geology results in 122 landtypes. This landtype occurs on all aspects with north slopes having as much as 40 percent forest crown cover and south slopes dominated by open, brush-grass communities. Slopes are dominated by long straight parallel dissections with slope gradients dominantly ranging from 50 to 80 percent. Individual units dominated by rock are almost vertical. The deep skeletal, loamy and clayey soils have developed over basalt bedrock or basalt talus material. Some more highly eroded areas are over granite. The percent rock outcrop is extremely variable, ranging from 0 to 100 percent of an individual landtype. The dominant situation, however, ranges from 10 to 30 percent.

Soils: The dominant soils on this landtype (GDEA-5, GDFS-5, GDFA-5), have a thin organic layer over a very dark grayish brown gravelly sandy loam to gravelly sandy clay loam, greater than 60 inches deep, with 40 to 60 percent well graded basalt coarse fragments. A minor soil (JECB-2) over granite, is a very dark grayish brown to dark yellowish brown gravelly loamy coarse sand, less than 20 inches deep, with 60 percent well graded granitic coarse fragments. The percent soil composition is extremely variable from unit to unit and some units are almost entirely exposed bedrock.

Vegetation: South and west slopes have scattered individual Douglas-fir and ponderosa pine trees within brush-grass communities. North slopes are generally well timbered, especially around Anderson Ranch Reservoir where forest crown density may exceed 40 percent. Douglas-fir/chokecherry and Douglas-fir/ninebark habitat types dominate these timbered aspects. Most areas are very brushy with brush crown densities ranging from 10 to 50 percent.

Hydrology: These basalt escarpments receive an average of 15 to 20 inches of precipitation annually. Minor snowpack develops due to low elevations and steep slopes. Snowmelt proceeds at moderate to rapid rates, depending on aspect. Approximately 5 to 10 inches of water is yielded annually. On talus slopes, most excess water leaves as rapid subsurface flow. On slopes exhibiting distinct soil horizons, water delivery occurs as deep seepage and subsurface flow. Overland flow is minimal but can be significant on those units with a high percentage of rock outcrop and shallow soil. The majority of water yield is delivered during spring melt. Contact zones between overlying basalt and underlying granitic bedrock occur along the lower portions of this landtype. These zones are nearly always covered with soil and talus material. Surplus water from the upper terrain (often landtype 136-1, basalt plains), typically percolates down to this contact zone. Much of this water moves along the contact zone and emerges as spring flow or supplemental water to the soils at the base of the escarpments.

Management Qualities: This landtype is dominated by moderate to very high natural and construction hazards. Many of these hazards, however, manifest themselves only during unusually wet years, during high intensity storms, or during periods of rapid melt of accumulated snow on north slopes. Because of the extreme variability in soils and the proportion of these soils and rock outcrop, a detailed investigation will be required to tie particular hazards to specific locations.

Roads. Bedrock materials on this landtype will be extremely variable. Construction will be particularly difficult on upper slopes where greater stabilities exist. Lower slopes will be less stable because of poorly graded materials, unstable backslopes, and a high probability of intercepting subsurface water. Trafficability will be fair to good dominantly, and very dusty during the drier seasons. Mass stability hazards are a major problem to construction activities.

Wood. Forest crown cover on this landtype is extremely variable but generally restricted to north slopes. Forest crown densities on these areas may range from 20 to 40 percent with low to high timber productivity potential. The limitations to reforestation are rated severe because of vegetative competition and the high evapotranspiration losses associated with the surrounding arid climate.

Water. The hydrology on these areas is not easily altered because of the high rock and talus content. Cuts into the contact zone aquifer will expose and intercept ground water. The intercepted ground water will then run over new terrain and reach streams more quickly than before. It may also carry soil with it, depending on erodibility.

Forage. Production potential is moderate to high with current levels somewhat below potentials. Many of these units receive heavy grazing use by deer on winter range. Browse species dominate and recovery from disturbance will be moderate on south slopes and more rapid on north slopes.

Recreation. These units are prime scenic portions of the area around Arrowrock Reservoir and along the South Fork of the Boise River. Trail construction and durability will be highly variable depending on the soils, bedrock, and the position on the slope. Trafficability will be fair to very good and many surfaces will be sticky and slippery when wet and dusty when dry.

Management Evaluation:

Map Symbol 136-1
Basalt Plain
Deep Fine Loamy Xeric Soils

Location: Smaller units are common to both sides of the South Fork of the Boise River drainage.

Landtype Characteristics: This landtype is the weathered surface of the major Snake River basalt flow that occurred during the Quaternary Period. Much of the southern portion of the District, especially major drainages, was filled with basalt to an elevation of approximately 5,500 feet. Subsequent entrenchment by major drainages has resulted in steep escarpments (135-1 landtype) on at least one side of each unit delineation. Other fluvial processes have not been very active on the flatter surface of the resultant plain-like landtype. These units are generally dry, non-timbered and most of the larger units are currently in private ownership under agriculture use. The resultant landtype is dominantly flat with slope gradients less than 20 percent. Surface drainage is poor and dissections are weakly developed and have low gradients. The deep, fine loamy xeric soils have developed over extremely well fractured and hard basalt bedrock. Granite underlies the basalt at varying depths.

Soils: One soil (85%--GDEA-4) dominates this landtype. This soil has a thin scattered organic layer over a very dark brown loam to clay loam, is greater than 30 inches deep, with less than 15 percent gravels and rock fragments. A shallow soil (15%--GDEL-5) has similar profile characteristics except for depth and in having 50 to 70 percent gravel and rock fragments in the subsoil. This soil occurs near the edge of the unit or near rock outcrops or the edges of drainages.

Vegetation: This landtype is dominated by brush-grass communities or agricultural crops. Much of the gentle topography and deep soils are well suited to cultivation. Under natural conditions, brush crown densities range from 20 to 60 percent.

Hydrology: These lands receive between 15 and 20 inches of precipitation annually. Snowmelt proceeds throughout the winter and is completed by early spring. Approximately 5 to 10 inches of water is yielded annually. Most of this amount is delivered as slow lateral flow of saturated ground water and deep seepage. Penetration of excess subsurface water into bedrock is slowed by restrictive clay layers in the subsoil and bedrock. Dissections down to bedrock intercept a moderate volume of subsurface water. Considerable deep seepage water percolates to the underlying granitic bedrock contact zone and emerges as springs and seeps in lower basalt escarpments. Perched water tables are evident during the spring snowmelt. Overland flow is rare in undisturbed areas. High intensity summer storms will produce overland flow in areas devoid of protective cover. The slow response of water inputs (snowmelt and rain) makes this landtype a good regulator of sustained flow.

Management Qualities: The important features of this landtype are those related to roads and to forage production. Most landtype hazards are rated low but surface erosion will be a moderate problem on recently exposed soils. Trafficability will be poor to fair.

Roads. Construction on this landtype will not involve a great many problems. There will be no need for deep road cuts and long fills. Surface erosion of the natural surfaces, as well as the cut and fill slopes is low to moderate and mass stability hazards are dominantly low. Problems will originate with poor trafficability of the fine textured soils and the need to handle water concentrated on roads from high intensity storms. Local high water tables may also be a problem.

Wood. This landtype is a hot, dry exposed site and is non-forested.

Water. Most hazards to hydrology on the unit are low. These soils are subject to compaction and serious reduction in infiltration rates from heavy grazing when wet. Sewage disposal via soil intake will be poor, and percolation of waste water will be slow over most of the landtype. A major problem in some areas is associated with the lateral movement of waste water along the surface of the bedrock or through bedrock fractures and contact zones to subsequently become exposed in basalt escarpments (135-1 landtypes).

Forage. The forage productivity for this landtype is high to very high. Many areas, especially under cultivation, are producing near this potential. Other areas, however, especially those under natural conditions, have been adversely affected by overconcentration of livestock, especially during the winter months. The subsequent compaction of the clayey soils will lead to even poorer infiltration and permeability rates, as well as reduced forage production. Most areas will recover at a rapid rate under good management practices.

Recreation. Soil compaction, poor drainage, and dust are the most significant drawbacks to recreational development on this landtype. The soil and bedrock permeability are not well suited to sewage treatment within the soil mantle. Although opportunities for summer activities within these units may be limited because of the dust and heat, winter sports, especially snow-machining, may become increasingly important.

Management Evaluations:

Map Symbol 140b-2
Moderately Dissected Mountain Slope Land
Moderately Deep and Loamy Skeletal Soils

Location: Representative locations of this unit are along Davis Gulch and Clear Creek.

Landtype Characteristics: These moderately dissected fluvial lands have a southerly aspect with 5 to 45 percent forest crown density. Slopes are of moderate length with a weakly developed dendritic drainage pattern. Gradients range from 30 to 60 percent. The moderately deep, loamy skeletal soils have developed over masked or moderately to extremely well fractured, very weakly to well weathered granite bedrock. The finer textured soils have been influenced by the remnants of former lacustrine deposits in this area.

Soils: The dominant soils (50%--GDFA-5 and 30% JECA-5) have a thin organic layer over dark colored gravelly sandy loam or gravelly loamy sand surfaces that range from 5 to 15 inches in thickness. The subsoils are yellowish brown, gravelly sandy loans with 40 to 80 percent gravel and rock fragments. The JECA-5 soils are on most slope positions. The GDFA-5 soils have thicker dark colored surfaces and are generally on mid and lower slopes. A shallow soil (20%--IEEI-4) on bench-like positions has sandy clay loam textures with less than 10 percent gravel.

Vegetation: This landtype is a timbered unit with 20 to 60 percent forest crown cover. Douglas-fir/snowberry habitat types are most common on lower slopes. Douglas-fir/spirea and brush/grass communities become dominant on drier mid and upper slopes. Understories are very brushy, with 15 to 50 percent crown cover.

Hydrology: Average annual precipitation ranges between 20 and 30 inches. Snowmelt begins early on these southerly slopes and is gone by mid May. The units are typically dry throughout the summer months except for periods of occasional storms. Annual water yield averages 5 to 10 inches. The major water yield is complete by late May. Overland flow is uncommon on undisturbed areas. Disturbed areas exhibit overland flows during high intensity rainfall. Most of the water is yielded by subsurface flow and deep seepage. The short slopes and moderate dissection create only moderate concentrations of water on the landtype.

Management Qualities: These units are very brushy with moderate to high surface erosion and debris slide hazards. Timber productivity is low to moderate.

Roads. Major problems to construction are moderate to high erosion hazards for road surfaces and a moderate to high probability of intercepting subsurface water. This interception results in a moderate to high mass stability hazard for cut and fill slopes. Debris slide hazard is low to moderate. Poorly graded coarse fragments and the soft bedrock also contribute to the significance of these hazards. These mass stability hazards, however, will be most strongly expressed during wet years.

Wood. This landtype is dominated by Douglas-fir habitat types with low to moderate productivity potentials. Understories are very brushy and vegetative competition is a major problem to reforestation. Overall limitations to reforestation are rated severe to moderate. Excessively high evapotranspiration losses will be a major problem on clearcut areas.

Water. Any significant concentration of water will cause high erosion and sedimentation from these slopes. The probability of intercepting subsurface flow on lower slopes during the spring by deep road cuts is high. However, the actual quantity will be much lower than that expected from 140c-1 landtypes under the same conditions.

Forage. Forage production on this landtype is rated low to moderate with understories dominated by 30 to 80 percent brush crown densities. Major limitation to grazing will be soil disturbance accelerating the already high surface erosion hazard for these soils. Debris slide and surface creep hazards may also be aggravated by excessive grazing.

Recreation. This landtype currently has some recreation significance. The most popular activity associated with this unit is hunting. In localized areas, the esthetic qualities of this unit will be more significant.

Management Evaluation:

Map Symbol 140b-3
Moderately Dissected Mountain Slope Land
Moderately Deep and Deep Sandy and Fine Loamy Xeric Soils

Location: This unit is typical of the dry south slopes on Rush Creek drainage west of Mores Creek.

Landtype Characteristics: These moderately dissected Xeric south-facing mountain slopes have been weakly to moderately incised by the fluvial process. Dissections are weakly dendritic and widely spaced. These units are dominantly non-timbered with isolated stands of timber having less than 20 percent forest crown density. Slopes are generally long and steep with gradients ranging from 40 to 70 percent. The moderately deep and deep sandy and fine loamy, Xeric soils have developed over masked or extremely well fractured, weakly to well weathered granite bedrock. The fine loamy soils are related to lacustrine deposits that have not been removed by erosion.

Soils: The dominant soil (50%--GDFA-5) on open south facing sideslopes has a dark grayish brown gravelly sandy loam surface over a gravelly loamy coarse sand subsoil and is underlain by granitic bedrock at 24 to 40 inches. Another major soil (30%--IFBD-4) occurs on mid and lower slopes and in concave positions. This soil has a thin 1/2-inch organic layer over a gravelly sandy clay loam, 18 to 36 inches deep with 30 percent fine and medium gravels. The soil under timber inclusions (20%-- GDFS-1) has a thin 1-inch organic layer over a gravelly loamy sand that is 30 to 48 inches deep over granitic bedrock.

Vegetation: These units are south slopes dominated by brush-grass communities. Ponderosa pine/wheatgrass, Douglas-fir/elk sedge and ponderosa pine/bitterbrush habitat types are common inclusions on ridges, in dissections, and lower slopes. Forest crown densities are dominantly less than 10 percent while brush crown densities range from 0 to 40 percent.

Hydrology: Mean annual precipitation is 15 to 25 inches and mean water yield is less than 10 inches. Snowpack is light and intermittent. Slopes are normally bare by mid-April. Runoff is predominantly as subsurface flow and occurs periodically throughout the winter. Rain-on-snow events produce the heaviest short term runoff from these slopes. Water channels flow only during wet conditions. Water delivered to these slopes flows off at a moderate to rapid rate. Overland flow is uncommon on undisturbed areas but common from summer or spring thunder showers on grazed areas. Debris-laden peak flows occasionally originate on these slopes from thunderstorm and rain-on-snow events.

Management Qualities: These moderately dissected south facing slopes are dominated by moderate to high hazards. Surface erosion, debris slides and natural slumps will be common problems. Roads will require considerable maintenance to maintain passability and trafficability. Natural sedimentation and sedimentation related to construction will be major problems.

Roads. Major construction problems are related to sediment production associated with water generated during storms and intercepted subsurface flow and mass failures associated with fine textured soils. Dissections will present the major problem with moderate to high mass stability hazard for cutslopes. The dominant soils and bedrock contain a poor gradation of coarse fragments dominated by fine gravels.

Wood. This landtype occurs on warm, dry exposed slopes and is dominantly non-forested. Isolated stands of ponderosa pine/wheatgrass, ponderosa pine/bitterbrush and Douglas-fir/elk sedge habitat types have very low to moderate productivity potentials. Limitations to reforestation on these isolated areas will be severe to very severe because of high evapotranspiration losses and the low water-holding capacity of the dominant soils.

Water. Drainageways on lower slopes present hazards from flashy debris-laden runoff during thunderstorms and rain-on-snow events. Cut and fill slopes at mid and lower slope positions and heavy grazing on all slopes will increase the frequency and severity of debris-laden runoff events.

Forage. This landtype is dominated by brush-grass communities with forage productivity potentials ranging from 100 to 1,500 pounds of usable dry forage per acre per year. Present production is rated at two-thirds of potential. Major problems resulting from grazing are the aggravation of the moderate to high surface erosion hazards, natural slumps, debris slide hazards, and surface creep. For these reasons, these units may be suited to only limited grazing. Increased sedimentation can be expected from any activity that disturbs the soil surfaces.

Recreation. This landtype currently has little recreation appeal. Esthetics are questionable and water is limiting. Hunting of small game birds (chukar) is probably the major recreation potential associated with these units at the present time. It should be noted, however, that any disturbance on these units, because of their open, exposed southerly aspects, will be visible from many miles.

Management Evaluation:

Map Symbol 140c-1
Strongly Dissected Mountain Slope Land Moderately Deep Skeletal Sandy and Loamy Soils

Location: Representative units of this landtype are located along the Clear Creek drainage.

Landtype Characteristics: These fluvial lands are the steep north slopes that have been deeply incised by stream cutting, intermittent concentrations of overland flow and the rapid concentration of shallow and moderately deep subsurface flow. Sideslopes are of moderate length and steep with numerous parallel dissections. Ridges are relatively sharp with little exposed bedrock. Slope gradients range from 30 to 60 percent. The moderately deep skeletal soils have developed over masked or extremely well fractured, moderately to very well weathered granite bedrock. The finer textured soils have been influenced by remnants of former deposits of lacustrine materials.

Soils: The dominant soil (50%--GDEA-5) has a trace of organic layer over a very dark brown loam surface and a gravelly sandy clay loam subsoil, 30 to 60 inches deep, with 50 to 70 percent coarse fragments. This soil is most common on mid and lower slopes. A less extensive soil (30%--JEAA-2) on most sideslopes has a 0 to 1 inch organic layer over a thin dark grayish brown gravelly loamy sand, 30 to 50 inches deep, with 25 to 55 percent gravels and 0 to 20 percent rock. Other soils (20%--GDEA-4) are moderately deep and have a dark colored loam surface and a clay loam subsoil. These soils are generally on bench-like areas.

Vegetation: This landtype is one of the better timber producing units on the District with forest crown densities ranging from 50 to 70 percent. Common habitat types are Douglas-fir/spirea, Douglas-fir/snowberry, and Douglas-fir/ninebark. Brush crown densities range from 10 to 40 percent.

Hydrology: Mean annual precipitation is 25 to 35 inches and mean water yield is 10 to 15 inches. Snowpack is moderate to heavy and persists well into May on the highest areas and into April on the lower areas. Major runoff is in April and May when heavy discharge of subsurface flow occurs. Overland flow runoff from summer storms is rare on undisturbed areas. Runoff is about evenly divided between moderately deep subsurface flow above bedrock and percolation through the weathered and fractured bedrock. The accumulation of this runoff increases going downslope and moving from convex to concave shaped slopes. Greatest concentration of subsurface flow is in the incipient drainageways on the lower two-thirds of the slope. Ground water is most concentrated and nearest the surface on deep soiled slopes and deposits adjacent to the more deeply entrenched streams. Debris-laden flash flows seldom occur in drainageways in this landtype. Outflow rate of water delivered to these slopes is slow to moderate.

Management Qualities: Most hazards for this landtype are rated moderate to high. High surface erosion hazards and mass stability problems associated with interception of subsurface flow will be major limitations. Spalling bedrock will be common in most exposed road cuts. This landtype, however, is one of the most productive for commercial timber species.

Roads. The qualities of this landtype present many hazards to road construction. Very poorly graded, spalling bedrock combined with probable interception of subsurface flow will result in very unstable road cuts and fills. These problems combine with moderate to high surface erosion hazard to greatly increase the probability that sediment will reach adjacent drainages. The least impact has been observed where roads have been restricted to the upper one-quarter of slopes, although surface erosion and interception of subsurface water are still problems in some areas. Areas of very well weathered granite bedrock, clay pockets, are of limited extent but very significant because of the problems they create in construction. These heavy textured soils are restricted to the bench-like areas that are heavily vegetated. Where possible, these areas should be avoided.

Wood. This landtype is one of the better commercial timber producing units on the District. Timber productivity ratings range dominantly from moderate to high for the major habitat types, Douglas-fir/spirea and Douglas-fir/ninebark. Reforestation site limitations are moderate to severe with vegetative competition being the major limiting factor.

Water. Hazard of intercepting large quantities of subsurface flow is high at concave swales and incipient draws. Hazard of ground water interception is high on steep slopes adjacent to streams. Sedimentation hazard is high to very high for roads crossing the deeply entrenched streams on the lower one-half of these slopes and moderate to high on the upper one-half. The combination of hazards presents an overall hazard to hydrologic characteristics of high to very high on lower slopes and moderate to high on upper slopes.

Forage. Forage production potential on this landtype is rated low to moderate with the vegetation dominated by browse species. Grasses and forbs are limited, and most common under habitat types on southerly aspects. Grazing, however, will greatly accelerate the erosional processes by removing the protective vegetation and litter. Surface creep will also be accelerated increasing the frequency of debris slides.

Recreation. This landtype is responsible for much of the timbered appearance of some north slopes on this District. As such, these lands provide a timbered scenic backdrop for many vistas looking from the north end of the District to the south.

Trails are not expected to hold up without considerable maintenance because of the highly erosive nature of these soils. Trafficability will be fair to good.

Management Evaluation:

Map Symbol 140c-2
Strongly Dissected Mountain Slope Land
Shallow and Moderately Deep Skeletal, Sandy and Loamy Soils

Location: This landtype is common to the drainages of Daggett Creek and Avelene Creek.

Landtype Characteristics. These lands are steep southerly slopes that have been deeply incised by fluvial action. They are dominated by open stands of timber with forest crown densities ranging from 20 to 40 percent. North slope inclusions have forest crown densities of 40 to 60 percent. Sideslopes are short to medium in length with numerous dissections. Slope gradients range from 40 to 70 percent. Ridges are sharp and often rocky; dissections are V-shaped and have steep gradients. The erosional processes associated with fluvial action are very active on this landtype. The shallow and moderately deep skeletal, sandy and loamy soils have developed over masked or moderately to well fractured, moderately to very well weathered granitic bedrock. Fine textured soils in this unit have been influenced by remnants of former lacustrine deposits over this area. Rock outcrop may cover 10 percent of the area in some locations.

Soils: The dominant soils (50%--GDFQ-5) occur on most slope positions, are shallow and have a dark brown gravelly sandy loam surface and a dark yellowish brown gravelly sandy loam or gravelly sandy clay loam subsoil with 40 to 60 percent coarse fragments. Another soil on most sideslope positions (20%--JEAA-2) is moderately deep and has a gravelly sandy loam surface and a gravelly loamy sand subsoil with 40 to 60 percent gravel and rock fragments. A finer textured soil (20%--GDFA-4) on bench-like positions is moderately deep and has a sandy clay loam or clay loam surface and subsoil.

Vegetation: The vegetative associations on this landtype are highly variable and complex. Common habitat types include Douglas-fir/spirea, brush/grass communities, Douglas-fir/pinegrass, and ponderosa pine/wheatgrass. Forest crown densities are dominantly 0 to 30 percent on southerly and westerly aspects and 40 to 60 percent on north slopes. Brush crown density ranges from 0 to 40 percent.

Hydrology: Mean annual precipitation is 20 to 30 inches and mean water yield is 5 to 10 inches. Snowpacks are light on lower portions and moderate on upper slopes. Snowmelt on exposed areas is sporadic through winter and spring and is over by May. Less winter snowmelt takes place on sheltered areas where snow remains well into May. Runoff on upper slopes above major dissection is by shallow to moderately deep subsurface flow, deep percolation. On mid and lower slopes, where dissection is well expressed, much subsurface flow is intercepted and concentrated as stream flow. Runoff peaks can occur in winter or spring depending on the occurrence of rain-on-snow events. Small streams originating on this landtype have a cycle of sediment and debris buildup and periodic flushing during major runoff events. Outflow rate of water delivered to this type is moderate to rapid. Summer storms can cause periodic flashy runoff of sediment-laden overland flow.

Management Qualities: This landtype is among the most hazardous on the District. Most hazards are rated high to very high and major problems will occur from surface erosion, mass stability, and sediment production. Extreme caution is urged when planning management activities on these units.

Roads. Bedrock conditions are extremely variable on this land-type. Many areas of well weathered, spalling granite will create problems in the stability of cutslopes and sediment production. The shallow subsurface flow and the numerous dissections will present water handling problems at drainage crossings. Most construction hazards are rated high to very high and many slopes are too steep to support stable fills. Some of the road locations through more competent granite will have fewer stability problems but surface erosion and subsequent sediment production will be major hazards. Some debris slides will plug culverts and contribute to road damage. Trafficability is fair to good over most areas.

Wood. Like the vegetation, this landtype is extremely variable as to productivity potential for commercial timber species. Southerly aspects with more open grown stands of timber have low productivity potential. Although individual trees may grow quite well, the stand density is very low. North slopes in Douglas-fir habitat types have a low to moderate productivity potential. Limitations to reforestation are rated very severe on southerly aspects because of the low water holding capacity and high evapo-transpiration losses of these positions. Northerly aspects and lower more moist slopes are rated severe for similar reasons plus vegetative competition.

Water. The water quality of major streams is greatly affected by the sediment produced on this landtype. Natural sediment is a constant problem during periods of peak flow when channels in minor drainages are cleansed of accumulated debris. Activity on these slopes can greatly accelerate the problem through disturbance and acceleration of surface erosion and surface creep. The characteristic most controlling to land use on this landtype is the periodic rapid debris-laden runoff in the stream channels. It will be extremely difficult to construct crossings at these channels that will not be destroyed by the heavy debris-laden flows which occur on the average of once in 10 years. Any grazing, road construction, or major vegetation manipulation will increase the amount of sediment accumulating in the channels and decrease the interval between flushing events.

Forage. This landtype is currently producing 200 to 700 pounds per acre per year of usable dry forage. This level is about half of potentials that are rated as 200 to 1,000 pounds per acre per year. The high inherent erosion hazard coupled with the moderate surface creep hazard makes these units respond poorly to grazing activity. The vegetation present is necessary to reduce the amount of sediment leaving the landtype and entering the drainage system from natural erosion processes.

Recreation. The open, expansive character of these units makes them likely candidates as scenic areas. Trail construction is best on upper slopes although hazards will be similar to those encountered with road construction. Trafficability will generally be good.

Management Evaluation:

Map Symbol 140c-3
Strongly Dissected Mountain Slope Land
Shallow and Moderately Deep Skeletal, Sandy and Loamy, Xeric Soils

Location: This landtype is common to the west side of Mores Creek, north of Lucky Peak Reservoir.

Landtype Characteristics: These fluvial lands have moderately steep to steep non-timbered south slopes that have been deeply incised by intermittent concentrations of overland flow cutting into weathered granite bedrock. Sideslopes are relatively short with numerous, shallow parallel dissections. Major dissections are both parallel and dendritic. Ridges are somewhat rounded. Slope gradients range from 30 to 70 percent. All of these elements are indications that the erosional processes are very active and water leaves this unit rapidly. The shallow and moderately deep skeletal, sandy and loamy, Xeric soils have developed over masked or moderately to extremely well fractured, weakly to very well weathered granite bedrock. The loamy soils are related to lacustrine deposits that have not been removed by erosion.

Soils: The dominant soils (40%--JECA-5) have a scattered thin 1-inch organic layer over a dark grayish brown loam or gravelly sandy loam surface, 5 to 10 inches thick, and a gravelly sandy loam subsoil, 10 to 40 inches thick. Gravel in the subsoil is 30 to 50 percent and is mostly fine sized. Another major soil (35%--HBDA-5) has a 1 to 2-inch organic layer over a dark brown gravelly sandy loam with 0 to 20 percent gravel. The subsoil ranges from a gravelly sandy loam to a gravelly sandy clay loam with 30 to 40 percent gravel and up to 30 percent rock. The major soils are located on sideslopes and under inclusions of timber. (25%--JECB-2) is a shallow soil that has a scattered organic layer over a gravelly loamy sand or gravelly sand with about 40 percent gravel. This soil occurs on ridgetops, crests, and spurs.

Vegetation: Brush/grass communities dominate this landtype with brush the major component. A few scattered ponderosa pine and Douglas-fir trees are found on individual units. Brush crown densities range from 10 to 30 percent.

Hydrology: Mean annual precipitation is 15 to 30 inches and mean water yield is 5 to 10 inches. Snowpack is light and intermittent on most of this landtype, however, some higher elevation portions have sheltered aspects with moderate and persistent snowpack. These slopes bare up very early and seldom have snow cover past March. Runoff from snowmelt seldom generates overland flow; therefore, shallow to moderately deep subsurface flow is a major means of snowmelt runoff. Summer storms commonly produce overland flow and flashy runoff in small watersheds. These areas are very subject to heavy winter runoff from rain-on-snow events. Past events have released 6 to 10 inches of water in a few days on a frequency of about once in 10 years. These lands are very heavy sediment producers. Drainageways accumulate sediment and debris during years of moderate precipitation and runoff and flush out during high precipitation and runoff years or during short high intensity summer storms. Outflow of water delivered to these slopes is rapid.

Management Qualities: This landtype is among the highest sediment producing units on the District. Most hazards are rated high to very high.

Roads. Generally, high erosion hazards and mass stability hazards combine with poorly graded spalling bedrock, high to very high debris slide hazards and flashy runoff, making these units poorly suited to construction activities. Some road locations that have been established on upper slopes and ridges avoid most of these problems and appear fairly stable. The hazards, however, significantly increase on the sideslopes.

Wood. There are few if any trees on most delineations of this landtype. The climate is too hot and dry in the summer for good tree growth and seedling survival.

Water. These lands are extremely sensitive to changes in runoff conditions. Depletion of vegetative cover, interception and/or concentration of runoff, soil disturbance and trampling will all be reflected in a significant increase in sedimentation from these lands. The rate of accumulation of sediment in drainages will accelerate and the frequency of debris slides will increase. Roads or other improvements will be difficult to maintain because of erosion and runoff conditions.

Forage. Production potentials for desirable and intermediate range plants are ranked moderate to high. Because of accelerated erosion from past and present grazing activity, a highly pavemented surface has developed in many areas. For this reason, current production is less than half the potential. Because these units have been severely eroded, recovery rates are expected to be very slow under the best management. Opportunities for revegetation are severely restricted because of the highly pavemented surface.

Recreation. This landtype may be of little significance to recreational activities, except as a scenic backdrop. Trail development is possible although considerable seasonal maintenance will be required. Any activity engaged in that disturbs vegetative cover or soil surfaces will accelerate the erosional processes. The major recreational activity to date is probably late fall and early winter hunting.

Management Evaluation:

Map Symbol 140e-1
Maturely Dissected Mountain Slope Lands
Moderately Deep Sandy Skeletal and Coarse Loamy Soils

Location: Common to areas between Davis Gulch and Clear Creek.

Landtype Characteristics: The landtype has a finely meshed low relief dendritic drainage pattern with rounded ridges and broadly concave drainage bottoms. Such a pattern indicates a more maturely developed topography than the typically sharp ridges and V-shaped valleys of Fluvial Lands. Surface erosion has been active in reducing these areas of well weathered bedrock, to low relief, undulating ridge systems. The slopes have all aspects, are moderately timbered and have 10 to 50 percent slope gradients. The moderately deep sandy skeletal and coarse loamy soils have developed over masked or extremely well fractured, moderately well weathered granite bedrock. The soils with finer textures have been influenced by remnants of former lacustrine deposits in the area.

Soils: The dominant soil (50%--JEAA-2) on mid and upper slopes, has a 0 to 1 inch organic layer over a brown gravelly sand loam surface, a gravelly loamy sand subsoil, 20 to 40 inches deep, with 40 to 50 percent coarse fragments. Other soils (30%--IFBA-3), on lower slopes and in drainages, have a 0 to 3 inch organic layer over a very dark grayish brown gravelly sandy loam, greater than 40 inches deep, with 20 percent fine gravels. Shallow soils (20%--JEAE-5) with gravelly sandy loam textures with 50 to 80 percent coarse fragments, are on ridgetops and steep slopes.

Vegetation: The slopes of this landtype are timbered. The habitat types represented are as follows: Douglas-fir/tall huckleberry, Douglas-fir/elk sedge, and Douglas-fir/pinegrass. Forest crown density ranges from 10 to 60 percent and brush crown density is 0 to 30 percent.

Hydrology: Mean annual precipitation is 20 to 30 inches and mean water yield is 5 to 10 inches. Snowpack is moderate and lasts into May on most sites. Runoff is about evenly divided between moderately deep subsurface flow above bedrock, and percolation through the weathered bedrock. Overland flow is uncommon on undisturbed areas. Outflow rate of water delivered to this area is moderate to slow.

Management Qualities: Landtype erosion, stability and construction hazards are rated low to moderate. The major area of consideration is the amount of sediment generated from these short, low relief slopes.

Roads. Due to the high degree of bedrock weathering, road construction problems will be related to poorly graded material and the potential for large amounts of sediment to reach streams. Massive failures, either natural or from cuts and fills, should not be a major contributor to sediment production. Sediment generated by snowmelt or high intensity storms may be very significant.

Wood. These lands appear to be moderately productive. Aspect and a moist micro-climate are reflected in the low to moderate timber production potentials. The roots are able to penetrate the soft bedrock, a source of water during the normally dry growing season. Limitations to reforestation are severe to moderate, with vegetative competition and low water holding capacity major limiting factors.

Water. The hazard to roads or other improvements from runoff is moderate. The greatest hazard to the area's hydrologic characteristics is that of artificially intercepting subsurface flow, concentrating runoff or diverting channeled runoff water and depositing it on the very erodible soils. Very frequent water outlets and dispersion will be needed in road, parking lot or other drainage systems to keep gullies from forming at each outlet.

Forage. The potential production for this landtype is about 400 pounds per acre per year of usable dry forage. Many areas have been severely damaged by trailing, subsequently reducing productive potential by accelerating the erosional processes. Recovery will be moderately slow.

Recreation. Because of the gentle topography, these units have many areas well suited to recreational developments. Soils, however, are somewhat unstable and not suited to use as leach fields. Trafficability will be fair.

Management Evaluation:

Map Symbol 141
Basin Land
Moderately Deep and Deep Skeletal, Sandy and Loamy Soils

Location: West of Moores Creek along the Clear Creek Drainage.

Landtype Characteristics: Basin Land consists of land which has been modified or displaced from its original position by faulting activities and presently occupies a lower position than it did at one time. Most of these units have, after faulting because of their lower positions, accumulated materials from high elevations. Some of the units are still accumulating material. Finer textured soils have been influenced by the remnants of former lacustrine deposits in this area. The slopes of this landtype have all aspects, are well vegetated (timber), concave to straight, have a 20 to 60 percent gradient, 500 to 1,500 feet long and are mapped at elevations of 4,000 to 6,000 feet. The soils have very dark brown surfaces, with skeletal sandy and loamy families, 20 to 40 inches deep. The soils are underlain by moderately to well weathered granite, which is well fractured or masked.

Soils: The dominant soils on this landtype (40%--IFBA-5) are moderately deep and have an organic layer 0 to 4 inches thick. The surface soil is a very dark brown, gravelly sandy loam or sandy clay loam, with 20 to 50 percent gravel. The subsoil is a yellowish brown, gravelly sandy loam, with 35 to 70 percent gravel and rock. (40%--JEAA-2), a moderately deep sandy textured soil with 40 to 60 percent coarse fragments, occurs on all slope positions. A shallow soil (20%--JEAE-2) is similar but is less than 20 inches deep over bedrock. This soil is on ridgetops and upper portions of the slopes.

Vegetation: The slopes of this landtype are well vegetated. Timbered habitat types represented are as follows: Douglas-fir/ninebark, Douglas-fir/spirea, and Douglas-fir/snowberry. Vegetative ground cover for the landtype ranges from 30 to 80 percent. Forest crown density has a 10 to 70 percent range and a brush crown density of 5 to 40 percent.

Hydrology: The average annual precipitation averages 20 to 30 inches. Of this amount, between 5 and 10 inches is yielded as runoff. Runoff derived from overland flow is rare on undisturbed areas. As a result, subsurface flow and deep seepage are the dominant means of yield delivery. Most of the water yielded occurs during spring and early summer. However, major dissections intercept slow lateral flow of ground-water well into the summer months. These units are good regulators of sustained stream flow.

Management Qualities: The number of units in the landtype are limited, but their size and location make them important from a management point of view. The potential to intercept ground water during wet periods is an important consideration. Local mass stability hazards are also significant.

Roads. Mid and toe slope positions on this landtype have a moderately high potential for cut and fill failures due to the interception of ground water.

Wood. These units are protected and with the exception of exposed ridge top positions, are well timbered. The habitat types and their relative productivity are as follows: Douglas-fir/ninebark and Douglas-fir/snowberry, moderate; Douglas-fir/spirea, low to moderate. Limitations to reforestation are moderate with vegetative competition the dominant factor.

Water. The hazards for seriously disrupting the hydrology of these lands are dominantly moderate. The only high hazard of intercepting accumulated ground water is where roads might cut into steep slopes adjacent to larger streams. Stability of road cuts and fills at these locations will be poor. Hazard of stream sedimentation in such conditions is correspondingly high.

Forage. The potential production for this landtype is 100 to 1,000 pounds per acre per year of usable dry forage. Water relations in the surface soil are good and only on the exposed ridge positions are the yields likely to be low.

Recreation. These basins are suited for campgrounds, interpretive trails, hiking, etc.

Management Evaluation:

Map Symbol 143
Faulted Bench Land
Shallow and Moderately Deep Loamy Skeletal Soils

Location: This landtype is limited in extent and somewhat variable. Typical units occur along the upper end of Daggett Creek near Crooked Summit.

Landtype Characteristics: These units are generally small remnants of block faulting activity that have not been strongly dissected by the fluvial processes. All aspects are included and forest crown densities range from 10 to 70 percent. A drainage pattern is very weakly developed, shallow and somewhat dendritic to parallel. Slopes are very short but have gradients of 35 to 60 percent. Unlike dissected fluvial landtypes, the overall relief has a uniform base level. The moderately deep skeletal, sandy and loamy soils have developed over variably fractured and weathered granite bedrock. The finer textured loamy soils are influenced by remnants of lacustrine deposits that have not been removed by erosional processes.

Soils: The dominant soils (40%--GDFA-5 and JECA-5) have a trace of an organic layer over dark brown gravelly sandy loam profiles with 40 to 70 percent gravel. The GDFA-5 soils are generally on bench-like areas or upper slopes and have thicker dark colored surfaces. A minor soil (25%--JECB-5) is shallow with gravelly loamy sand textures having 40 to 60 percent gravel and rock fragments. This soil occurs near the steeper slope breaks in the unit.

Vegetation: This landtype is well timbered with forest crown densities ranging from 30 to 60 percent. Douglas-fir/pinegrass, Douglas-fir/elk sedge and Douglas-fir/spirea habitat types are common to the more sloping portions of the units. Ponderosa pine/bitterbrush is common on the drier areas. Brush crown densities will range from 20 to 60 percent.

Hydrology: Mean annual precipitation is 25 to 35 inches and mean water yield is 10 to 15 inches. Snowpack is light to moderate and variable with aspect. Runoff is dominantly as ground water. This area receives water from higher adjacent slopes. The moderately deep soils store much of the precipitation and stream flow is light. Runoff response to precipitation and snowmelt is moderate to slow.

Management Qualities: Most hazards on this landtype are rated moderate to high. The major limitations will be a high probability of intercepting subsurface water, locally poor trafficability and a moderate to high surface erosion hazard and mass failures.

Roads. Major limitation in localized areas will be interception of subsurface flow that will reduce the bearing capacity of finer textured soil material in the road prisms. Trafficability in these areas will be poor. Surface erosion of cut and fill slopes will be a moderate problem where cuts exceed 5 to 6 feet in length; however, because of the low gradients, this may not be a significant problem. Revegetation potentials for cut and fill slopes will be good to very good.

Wood. Timber productivity potential for this landtype is dominantly moderate with limitations to reforestation rated moderate. The major limiting factors are vegetative competition.

Water. Overall hazard to the hydrology of this landtype is moderate. Small areas do have high hazards and they are normally the short steep slopes adjacent to streams.

Forage. Forage production on this landtype is rated low to high. Although current levels are close to potentials, most units are in areas closed to grazing or because of their heavy timber cover and windthrow, receive little grazing impact. Most areas, however, are expected to recover rapidly under good management practices.

Recreation. These units have many qualities similar to depositional landtypes and are basically well suited for a variety of recreational activities. Because of the gentle relief and availability of water, these units may be well suited for recreational development or administrative sites.

Management Evaluation:

Valley Types

Valley types include valley bottoms and the lower 200 to 500 feet of their immediately adjacent sideslopes. Valley types have similar geo-morphic and morphometric characteristics. They are natural portions of the valley landscape resulting from the interaction of climate,

available relief, rock type (lithology), geologic structure, and stream dynamics. Valley types have predictable hydrologic, engineering, and environmental characteristics. Valley types can be a basic part of an interdisciplinary reconnaissance of streams and valleys from which many useful management interpretations can be made and kept in context of the land systems inventory.

Landtype descriptions provide good information for mountain slopes, depositional lands, and other land areas large enough to be mapped at the reconnaissance level. However, stream valleys are often too narrow to be delineated as separate landtypes, yet their characteristics are often significantly different from the adjacent landtypes. This is due to the additional influence of the occupying streams.

Stream valleys are strategic areas from the standpoint of recreation and access planning and maintenance of desired stream conditions. Knowledge of characteristics of the major stream valleys is very useful in broad land *use* planning. Streamflow, quantity, quality, and timing are not direct considerations of this stratification of stream valleys.

The approach used to stratify and describe valley types is very similar to that approach used with landtypes. In a sense, valley types are special landtypes, too narrow to be delineated. The natural population of fourth order and larger stream valleys was studied to determine the most logical system for stratification. Upstream watershed size and complexity, physiographic subsections, valley forming processes, local modifying influences appear to be useful considerations in stratifying valleys for inventory.

Valley types contain the following information:

1. Designative Information
   a. Name
   b. Number
   c. Map Symbol
2. Illustrative Photograph
3. Geomorphic Characteristics - The Significant Geologic, Morphologic, and Stream Energy Characteristics
   a. Valley Forming Process or Evolution
   b. Shape or Configuration
   c. Stream Energies or Dynamics
   d. Parent Material or Rock Type
   e. Other Distinguishing Features

4. Morphometric Characteristics - The Dominant Range of Dimensions of Significant Physical or Tangible Properties

a. Valley Bottom Width
b. Sideslope Gradient
c. Channel Gradient
d. Channel Materials
e. Other Physical Properties

5. Management Qualities - The Relationships Between Valley Type Characteristics and Management Activities Expressed as Hazards or Potentials (Management Qualities Criteria for Valley Types may be noted in Appendix A)

a. Channel Overflow Flooding Hazard
b. Sediment Buffering Quality
c. Sedimentation Hazard from a Valley Bottom Road
d. Stream Shade Reduction Hazard
e. Channel Erosion Hazard with Channel Alteration

List of Valley Types

Description of Valley Types

Pages 180 through 221 contain the descriptions of valley types classified on the District. To locate an individual valley type description, the reader is referred to the preceding section, List of Valley Types.

Valley Type: D01-2 Map Symbol:

Depositional River Valleys with Major Base Level Control - Very Steep-Sided, Moderately Wide, Low Gradient

Representative Valley: Forks of Boise River at Alexander Flat and Barber Flat.

Geomorphic Characteristics: These valley types were once stream cut V-shaped valleys. Downcutting has been restricted by a major base level control of hard resistant granitic bedrock located at the lower extremity of the valley. Upon meeting this resistant material, **the occupying stream has cut laterally into the sideslopes to form a moderately wide valley. The occupying stream channel is typically braided, low gradient, and highly susceptible to sedimentation of sand size material and larger. Long-term sedimentation can be expected. Sands and fine gravels tend to accumulate during low flow but are flushed out periodically during high flow events. Stream energies are moderately low. With heavy sediment loads the channel becomes clogged and water flows over much of the valley bottom.**

Morphometric Characteristics: The width of the valley bottom is dominantly between 200 and 1000 feet wider than the occupying valley channel. **Channel width can be quite variable due to braiding and sedimentation.** Sideslopes are typical of steep granitic canyon slopes and are characteristically 60 to 70 percent. **Channel materials are predominantly gravels and cobble during high runoff periods, and gravels and sand during seasonally low flow periods. Channel gradient is generally below 2 percent and dominantly 1 percent.**

Management Qualities: **The channels within these valley types serve as collection points for sediment derived from upstream sources. A reduction in aquatic habitat is easily realized by sediment delivery to these valley channels. Also, accelerated sedimentation reduces the capacity of the valley channel and, therefore, increases the potential for channel bank damage and channel overflow.**

The hazard of water overflowing the defined stream channel and inundating the adjacent terrain is moderately high to high. The capacity of the valley area for stopping and storing soil material eroded from sources above the valley bottom is good to excellent. **The hazard for sedimentation of water courses from a valley bottom road is low to moderate. The hazard of reducing stream surface shading by vegetation due to valley bottom road construction is low to moderately low. The hazard for erosion of the stream channel as a result of channel constriction, encroachment, or other alterations of the channel materials or dimensions that control flow direction or velocities, is moderately high.**

Roads: **Low level roads will be very subject to flooding. They also may inadvertently provide an alternate stream channel during flooding. Roads built on "turn pike" fills of imported coarse material or slightly elevated on stable toe slopes will not have the high flooding hazard. Fills and bridge approaches composed of gravel and sand will be periodically eroded by flood events.**

Wood: The flood plain areas support willow, aspen and cottonwood primarily. Other parts of the valley have moderate to high timber productivity and moderate hazards from harvest. Selective harvest provides only moderately low hazards to hydrology and stream stability.

Water: The flooding hazard is moderately high to high and most other hazards relate to this. **Any waste disposal sites on these flood plains will provide a high hazard of water pollution**. Sediment buffering qualities are good to excellent**. Stream channel alteration will provide a moderately high hazard of channel erosion. Dikes, bridge approaches, or other constrictions of the flood plain will accelerate the scouring of the stream channel immediately below the constriction. These valleys provide moderate forage production of shrubs and grasses.**

Forage: They are usually short lengths of wider valley bottoms adjacent to very narrow valleys.

Recreation: Flooding hazard on much of the valley is high. Planning of improvements will require detailed site and flood hazard analysis. Potential sites are present.

Valley Type: D02-1 Map Symbol:

Dredged Depositional Valleys - Moderately Wide to Wide, Moderately Low Gradient, Variable Sideslopes.

Representative Valley: Mores Creek near Idaho City.

Geomorphic Characteristics: These valleys have been filled with varying depths of alluvial materials. They are typically quite wide and low gradient. **These are reaches of various depositional valley types that have been severely disturbed by gold dredging.** This process digs up, washes and redeposits the alluvial materials to a depth of approximately 15 feet. This leaves piles of highly permeable mixed gravels, cobble, and stones with no fine soil or organic layer. **These reaches have characteristics of valley types D01-1, D01-3, and D03-1 but the overwhelming similarity is the severe disturbance by dredging. Streams have moderately low energies and are readjusting their profile and alignment to reach a balance with the post-dredging conditions. Some channels have become quite stable but others have a long period of bank cutting and channel lengthening ahead before stability is likely.**

Morphometric Characteristics: Valleys are typically 200 to 1000 feet wide and have gradients between 11 and 3 percent. Side slopes vary from 30 percent to 70 percent. **Conditions vary through the range included in valley types D01-1, D01-3, and D03-1 described elsewhere in this report. Channel materials are gravel, cobble and stone.**

Management Qualities: These moderately wide to wide valleys have **relatively low overall hazards due to the very stony materials and the dominantly good sediment buffer qualities. The only high hazards are for channel erosion if channels are altered and for pollution from waste or toxic material disposal on these very permeable materials**.

Roads. **Hazards are low if locations take advantage of the potential buffer zone. The materials are typically very stable and have good bearing strength and drainage. Dredge piles may be good sources of material for crushed gravel.**

Wood. Commercial forests were removed prior to dredging. Growing conditions for trees are typically very poor.

Water. The permeable materials together with water tables near the surface provide high hazard for pollution if pit toilets, septic tanks, dumps, landfills or other waste disposal facilities are located here.
Flooding hazards are moderately low but stream bank erosion during high flows is often serious. Alterations of stream channels have a moderate hazard for increasing channel erosion.

Forage. Only sparse vegetation has returned after dredging, and forage production and availability is very low. Willow forage for deer and elk may be significant on low elevation reaches.

Recreation. The aesthetics are poor due to the disturbance. Areas dredged over 30 years ago may have adequate cover to provide suitable camping space. Care must be taken to dispose of waste materials in a manner to avoid pollution to the ground water and streams.

Valley Type: D10-2 Map Symbol:

Rejuvenated Valley Steps - Steep-Sided, Wide, Moderately Steep to Steep Gradient.

Representative Valley: Johnson Creek at Deadhorse Rapids.

Geomorphic Characteristics: These valleys are the result of deposition of glacial outwash or alluvial material in a valley previously widened by stream side cutting, faulting, or glaciation. The stream has been rejuvenated since the deposition and this portion of the valley includes the transition area between well entrenched stream channels downstream, and poorly entrenched channels upstream. These valleys typically occur where stream downcutting meets a resistant rock barrier in its headward cutting. They are often near the transition between glaciated and streamcut portions of the valley. Some may be at the lip of hanging glaciated valleys. Streams are moderately steep to steep, typically with rapids, and have high energies. Terraces, remnants of the old valley bottom, are present on one or both sides of the channel. Channels are nearly straight.

Morphometric Characteristics: Valley sideslopes typically range from 40 to 70 percent. Major valley width is over 400 feet. The bottom of the new entrenched valley is typically less than 25 feet wider than the stream. Entrenchment sides are 6 to 50 feet high and 60 to 80 percent gradient. Dominant stream gradient ranges from 3 to 8 percent but short drops up to 15 percent are present. Channels are in large stones, boulders, and bedrock.

Management Qualities: These rather steep "steps" in the stream and valley have quite variable management qualities. In some cases, the stream and the valley abruptly increase in gradient as compared to downstream areas, but in other cases, only the stream gradient increases while the valley gradient stays consistent with downstream valleys. In the former case, road locations up and down the valley will have steep grades in this valley type and possibly require switchbacks.

The hazard of flooding of adjacent terrain is low due to the entrenchment of the stream. The quality of the valley bottom as a sediment buffer is dominantly excellent. Sedimentation hazard from a valley bottom road is dominantly low, however some situations may exist where terraces are either not present or are too high for road locations. In these cases, sedimentation hazard is high.

Stream shade reduction hazard from road construction is low. The hazard of channel erosion, if stream channel's dimensions or materials are altered, is moderately low.

Roads. Hazards from roading are variable from moderate to high depending on the ability of the road location to take advantage of the buffer zone.

Wood. Timber productivity is quite variable, from low to moderate. Stability hazards from controlled harvest is generally moderate to moderately high. Constraints on harvest for streambank protection and stream shading will likely be only moderate. Constraints for esthetics will likely be more severe.

Water. Hazard to water values from intense management activities is moderate overall, but activities on entrenchment sides have a high hazard.

Forage. Forage production is moderately low to moderate. Stability hazard from livestock use is moderately high due to the difficulty of keeping livestock off of oversteepened stream entrenchment sides.

Recreation. The rapids included in this valley type provide an out of the ordinary point of interest for recreationists. Some suitable camping areas are present on the terraces or benches. These valleys have the qualities needed for very high quality dispersed recreation experiences.

Valley Type: D10-10 Map Symbol:

Rejuvenated Depositional River Valleys - Steep to Very Steep-Sided, Wide, Moderate Gradient.

Representative Valley: South Fork Payette River near Lowman Ranger Station and Garden Valley Ranger Station.

Geomorphic Characteristics: These river valleys were shaped by combinations of faulting, streamcutting and alluvial deposition in granite materials. At one time these valleys were wide and flat-bottomed; however, due to subsequent rejuvenation or headcutting, the river has cut sharply into the old valley bottom, leaving terraces on one or both sides. The new entrenchment is 15 to 50 feet deep and has very steep sides. The river has cut down through the old river deposits in most places and into hard granitic bedrock. This has produced a valley within a valley. The new valley is very narrow and no flood plain has developed. Stream energies are dominantly moderate but major runoff periods produce high energies for short periods. No long term deposits are present but some transitory sand and gravel deposits exist at pools and eddies. Channel alignment is straight to slightly winding.

Morphometric Characteristics: The major valley bottom, including terraces, is 300 to 800 feet wide. The bottom of the newer entrenched valley is less than 50 feet wider than the river channel. Occasionally the major valley narrows to the point that terraces are absent on one or both sides.

The terraces are typical 102 landtypes. The entrenchment sideslopes are short and very steep, 70 to 100 percent. The upper 5 to 10 feet are typically mixed coarse alluvial river deposits, and the lower 5 to 30 feet are granitic bedrock. Slopes confining the major valley are typically riverbreak or highly dissected fluvial mountain slopes (landtypes 122 and 120). Gradients range from 50 to 80 percent. Alluvial fans and colluvial toe slopes are sometimes present where the major slopes merge with the terraces. Channel materials are dominantly boulders and large stone over bedrock. Channel gradient is between 1 and 3 percent.

Management Qualities: The canyon-like entrenched troughs and broad terraces are scenic formations. Both valley sides may not have continuous terraces. Consequently, valley bottom roads will encounter some steep unbuffered terrain. Roads will need to cross the river occasionally to stay on favorable terrace locations. The hazard of water overflowing the defined stream channel and inundating the adjacent terrain is low. The capacity of the valley area for stopping and storing soil material eroded from sources above the valley bottom is very poor within those sections lacking terraces and excellent within terraced portions. The hazard for sedimentation of water courses from a valley bottom road is high within untraced sections (5 to 10 percent of valley length) and low within those sections with terraces. The hazard of reducing stream surface shading by vegetation due to valley bottom road construction is low. The hazard for erosion of the stream channel as a result of channel constriction, encroachment, or other alterations of the channel materials or dimensions that control flow direction or velocities, is low.

Roads. Significant hazard from roads is restricted to the 5 to 10 percent of the valley length that has no terrace present.

Wood. These are moderately productive timber sites with minor stability hazards from controlled harvest so long as activities are restricted to terraces.

Water. Hazards to water values from intensive activities are moderately low for the terraces but high for the steep entrenchment sides.

Forage. Terraces have moderate forage production potential and stability hazards from livestock use are low so long as use is kept off of entrenchment sideslopes and riverbanks. Many of these areas provide winter forage for wildlife.

Recreation. The terraces are very suitable for recreation and administrative sites.

Valley Type: D13-1 Map Symbol:

Wide Depositional Valleys with Streams Entrenched Into Outwash Deposits - Moderate Gradient.

Representative Valleys: Middle Fork Boise River at Atlanta; **Johnson Creek below Deadhorse Rapids.**

Geomorphic Characteristics: These valleys were formed by faulting and subsequent deposition of glacial outwash. A few of these valleys were affected by the lower reaches of valley glaciation. After the recession of glaciers and major deposition of outwash, the main streams cut downward. The streams are now in a smaller entrenched valley within the major valley. Broad continuous benches on both sides of the stream are the rule. Occasionally the stream flows at the extreme edge of the valley, against the sideslopes of the major valley. The entrenched stream has widened its flood plain slightly by sidecutting into outwash benches or valley sideslopes and is continuing to do so very slowly. Stream energies are moderately low to moderate and movement of sand and gravel sediment is common during heavy runoffs. Occasional short reaches of moderately high capacity are found where upward movement of headcutting has been arrested by resistant materials.

Morphometric Characteristics: The major valley is wide, dominantly 300 to 1,000 feet. The bottom of the smaller entrenched valley is dominantly less than 50 feet wider than the included stream channel. The entrenchment sideslopes are from 10 to 50 feet high and 50 to 80 percent gradient. Major valley sideslopes range from 20 to 70 percent. Stream and valley gradient is typically between 2 and 4 percent but a few included "steps" are as steep as 7 percent. Channel materials are dominantly derived from glacial outwash and are mixed gravel, cobble, rubble and a few boulders.

Management Qualities: Since two different valleys exist, the major wide valley and the included entrenched valley, it will be simpler to rate their management qualities separately.

Major Valley: Stream overflow flooding hazard is low to moderately low. Sediment buffer quality is excellent. Sedimentation hazard from a valley bottom road (on bench) is low. Channel erosion hazard with stream alteration is moderate. Stream shade reduction hazard is low.

Entrenchment Valley: Stream overflow flooding hazard is moderate. Sediment buffer quality is poor. Sedimentation hazard from a valley bottom road is high. Stream shade reduction hazard is moderately high.

Roads. Overall hazard from roading is low. Roads can be kept on the continuous broad benches and have minor effect on water or soil values. Bearing strength of materials is good.

Wood. Productivity for timber is moderately low to moderate due to the droughty nature of the valley bottom soils. Stability hazards from controlled harvest on the bench areas are low.

Water. Overall hazards to water values from intensive management activities are moderately low. There are moderate hazards of leachate from waste disposal reaching the ground water and eventually the streams draining the valley. Activities on the short, steep entrenchment sides will create serious stability problems.

Forage. Forage productivity is moderately low. Stability hazards from livestock use are low on the broad benches but high on the short steep entrenchment sides.

Recreation. The broad benches or terraces provide good sites for recreation or administrative developments. Waste disposal proposals will require very intensive investigations to determine water pollution hazard.

Valley Type: V11-1 Map Symbol:

Valleys on Basalt Flows with Shallowly Entrenched Valleys into a Basalt Plain - Gentle (Plain-Like) to Steep-Sided, Narrow to Moderately Wide, Low Gradient.

Representative Valley: Smith Creek through Smiths Prairie.

Geomorphic Characteristics: During the Quaternary Period, the Snake River basalt flowed into the lower portion of the South Fork Boise River. All areas, especially major drainages, were filled with basalt to an elevation of approximately 5,500 feet. Streams already present began seeking new courses by cutting into the basalt at fracture or contact zones. These shallowly entrenched valleys have yet to cut appreciably into the basalt plain. The valley stream has cut vertically and laterally into the basalt plain to form a relatively flat valley bottom surface several feet below the basalt plain surface. The entrenched sides of the valley are basalt talus or basaltically derived soils. Occasionally the stream course strayed away from the basalt plain to flow against granitic slopes, at the basalt-granite contact zone, to form reaches that lack a basalt bench or terrace on both sides of the valley. Valley bottom materials are a combination of granitic alluvium and basalt colluvium. Granitic alluvial materials have been deposited throughout the flat valley bottom area in the recent past. Channel stability has been severely degraded as a result of the accelerated sediment loads produced from upstream watersheds. Stream energy is sufficient to move gravels and smaller materials without permanent long-term deposition. Gravel and sand materials are stored temporarily during low flow periods.

Morphometric Characteristics: The width of the valley bottom is usually 30 to 200 feet wider than the stream channel. Channel width can be variable due to low velocities and sedimentation. Valley and stream entrenchment into the basalt plain is typically 10 to 20 vertical feet. Consequently, no real distinct valley sideslopes are present except where the stream flows against granitic slopes. Granitic sideslopes, where evident, are predominantly well weathered and range in gradient from 40 to 60 percent. The basalt plain, which is usually found on both sides of the valley, is typical of 136-1 landtypes. Channel gradient is generally below 2 percent and dominantly 1 percent. Channel materials are dominantly cobbles, gravels, and sands.

Management Qualities: The adjacent basalt plains provide favorable conditions for route access. The basalt plain bordering the valley bottom is characteristically flat and provides good road location and construction qualities. Management activities within the narrower valley bottom itself, however, will encounter high hazards.

The hazard of water overflowing the defined stream channel and inundating the alluvial terrain is moderate to high. The capacity of the valley area for stopping and storing soil material eroded from sources above the valley bottom is poor. The hazard for sedimentation of water courses from a road on the alluvial bottom is moderately high to high. The hazard for erosion of the stream channel as a result of channel constriction, encroachment, or other alterations of the channel materials or dimensions that control flow direction or velocities, is moderately high.

Roads. Roads can easily avoid the narrow alluvial stream bottom lands by traversing the 136-1 basalt plain landtype. Locations on the alluvial stream bottom will encounter poor bearing strength materials, high water tables, and will likely create serious streambank stability and sedimentation problems.

Wood. Commercial timber is scarce or absent.

Water. Hazards to water values from heavy use or development on the narrow alluvial bottom land are high due to the high water table, fragile streambanks and susceptibility of the wet soil to rut and compact.

Forage. Forage productivity is high. Heavy livestock use during wet periods will likely cause serious soil compaction and streambank instability. Light use during dry periods will likely cause only minor stability and soil problems.

Recreation. Valley bottom areas are too soft and wet during spring and early summer for heavy recreation use. These valleys are very pleasing highlights in the general scene.

Valley Type: G06-1 Map Symbol:

Moderately Wide Glaciated Valleys - Low to Moderate Gradient and Steep-Sided.

Representative Valleys: Fir Creek, Lowman Ranger District.

Geomorphic Characteristics: The valleys have been formed by alpine glaciation. These portions are typically in the mid or lower reaches of the glaciated valley where gradients are moderate to low. Mixtures of glacial till, glacial outwash, alluvium and colluvium have collected in the valley bottom and toe slopes. Streams have not entrenched appreciably into the valley bottom, and are typically straight with stretches of winding and meandering alignment. The streams have dominantly moderate energies for transporting sediment and are capable of transporting natural sediment loads. Channel materials are highly variable due to the variability of character of the valley deposits. Large boulders from glacial till or talus are sometimes present as well as local deposits of gravelly alluvium. Lateral bankcutting and downcutting are fairly well controlled by channel materials.

Morphometric Characteristics: Valley bottom width varies from 200 to 500 feet. This width includes the gentle toe slopes of depositional material normally present at the base of the steeper glacier-shaped sideslopes. The gradient of the scoured sideslopes varies from 45 to 70 percent.

Stream channel gradients range from 1 percent to 4 percent. Valley bottom and channel materials are variable from boulders to gravelly alluvium. Coinciding landtype is 104, valley train land.

Management Qualities: Channel overflow flooding hazard is moderately low. Sediment buffer quality is good to excellent. Sedimentation hazard from a valley bottom road is moderately low to moderate. Stream shade reduction hazard from roading is low. Channel erosion hazard with channel alteration is variable from moderately high to moderately low but is dominantly moderate.

Roads. Overall hazard to soil and water values from roading is moderate. Most significant hazards are those concerning crossings of tributary drainageways which have very high flows of water per acre drained.

Wood. Timber productivity is generally moderate and species include spruce, alpine fir, lodgepole pine and Douglas-fir. Stability hazards from timber harvest are moderate. Moderate constraints on harvest methods within 50 to 100 feet of streams will be needed to maintain streambank stability and stream shading.

Water. Hazards of damage to water values from intensive management activities such as roading, campgrounds, and grazing are generally moderate. Stream channels are the most sensitive areas and their relative sensitivity to damage is moderately high. The water flowing into and through these valleys as streamflow and avalanches provide a significant hazard to roads and campgrounds.

Forage. Forage productivity is variable from moderately high in small alluvial meadows to low in dense timber stands. Overall it is moderately low. Hazard to soil and water values from controlled grazing is generally moderate.

Recreation. There are some suitable campground sites but careful consideration of avalanche hazard and flooding hazard is necessary for each site proposal. These valleys are outstanding dispersed recreation areas. Winter recreation hazards are locally high due to avalanching.

Valley Type: G06-2 Map Symbol:

Moderately Wide Glaciated Valleys - Moderate to Moderately Steep Gradient with Steep Sideslopes.

Representative Valleys: **Upper Sand Creek and headwaters of Deadwood River.**

Geomorphic Characteristics: Valley glaciers shaped these valleys into the typical "U" shaped cross-section. Mixed deposits of glacial till, alluvial fans from side tributaries, rock slides, and coarse alluvium moved by the main stream have accumulated in the valley bottom and along the margins. These portions of the valley are typically in the upper reaches of the glaciated valleys. Scoured sideslopes are oversteepened and concave in profile. At the base of the scoured slopes, less steep deposits have accumulated as more gentle toe slopes. The streams are typically straight to broadly winding and occupy the central part of the valley bottom. The capability of the streams to transport sediments up to gravel size is moderately high except for a few local low gradient reaches where it is moderately low. Channels are not well entrenched in the valley bottom except locally. The coarse channel materials have adequately controlled bank cutting with a few exceptions where channels have been obstructed by fallen trees and log jams.

Morphometric Characteristics: Valley toe slopes below the scoured, over-steepened sideslopes range from 15 to 35 percent gradient. The sideslope gradients range from 45 to 75 percent. The valley bottom, including gentle toe slopes and alluvial fans, varies from 150 to 500 feet wide. Gradient of the stream and valley bottom is dominantly between 3 and 8 percent with short inclusions of low gradients near 1 percent and very steep gradients to 15 percent. Stream entrenchment into valley bottom is dominantly less than 6 feet but locally up to 15 feet. Channel materials are dominantly mixed boulders, rubble, stone, gravel and sand but a few deposits of mixed gravel and sand exist. Coinciding landtype is 104.

Management Qualities: Channel overflow flooding hazard is dominantly moderately low but local areas may rate moderately high due to inclusions of low gradient meandering reaches similar to valley types D01-3 and D03-1. The gentle toe slope deposits have low flood hazard. These valleys are very subject to avalanching from upper slopes. Sediment buffer qualities are dominantly good with some areas being excellent. Sedimentation hazard from a valley bottom road is moderately low but short reaches of moderately high exist. This valley type has steeper gradient and slightly narrower valley than valley type G06-1.

Roads. Overall hazard to soil and water values from roading is moderate. Drainage structure design and maintenance is probably the most important factor in keeping impacts to water values and impacts to the road at low levels. Materials have good bearing strength.

Wood. Timber productivity is generally moderate. Stability hazards from harvest are moderate. Moderate constraints on harvest methods will be needed within 50 to 100 feet of streams to maintain streambank stability and shading.

Water. Overall hazard to water values from intensive management activities is moderate. Provision for the safe conveyance of the high water flows into and through these valleys is the key requirement for low impact activities. Avalanches and high water flow provide high hazards to structures and improvements.

Forage. Overall forage productivity is moderately low due to predominance of dense timber stands. Small alluvial soil pockets covering approximately 20 percent of the valley have moderately high forage productivity. Hazard to soil and water values from controlled grazing is generally moderate.

Recreation. These areas have very high quality for dispersed recreation and as mountain scenery. Local hazards of flooding and avalanching seriously restrict the suitability of the areas for campgrounds and for winter recreation.

Valley Type: G16-1 Map Symbol:

Moderately Rejuvenated Glaciated Valleys - Moderate Gradients with Steep Sideslopes and Minor Flood Plain.

Representative Valleys: North Fork Boise River near Ballantyne Creek.

Geomorphic Characteristics: These valleys have been shaped by valley glaciation and have accumulated glacial till and outwash to moderate depths. The occupying streams have entrenched moderately since glaciation but now downcutting is very slow. This has left moderately wide benches of old glacial till deposits usually on each side of the stream. Streams have slightly widened their flood plain by moderate sidecutting into glacial till and outwash. Channels are broadly winding to nearly straight. Stream energies for transporting gravel and sand sediments are moderate to moderately high. These valleys are similar to those of valley type G06-1 except that these streams have been slightly rejuvenated and have moderately entrenched since glaciation.

Morphometric Characteristics: Valley bottom widths, including benches on each side of stream, range from 200 to 800 feet. The bottom of the entrenched valley and new flood plain ranges from 25 to 75 feet. Major valley sideslope steepness is 40 to 70 percent and entrenchment sides are 60 to 70 percent. Valley bottom gradient is dominantly 3 to 5 percent. Channel materials are boulders, rubble, and cobble with minor occurrence of gravel and bedrock.

Management Qualities: Hazard of streams overflowing their channel and inundating adjacent terrain is moderately low overall but benches rate low and the narrow flood plains rate high. Sediment buffer quality is good to excellent for the overall valley bottom including benches, but poor to fair if only the narrow flood plain area is considered. Sedimentation hazard from a valley bottom road is low for roads on the benches but high for roads on the narrow flood plain area. Stream shade reduction hazard is low for bench locations but moderate for flood plain locations. Channel erosion hazard with channel alteration is moderate to moderately low.

Roads. **Overall hazard of damage to soil and water values from roading on benches is moderately low. Hazard from roading below benches is high. Bearing strength of bench materials is good.**

Wood. Timber productivity is moderately low. Stability hazard from harvest activities on benches is low. Hazard below benches is moderately high.

Water. Overall hazard of intensive management activities significantly affecting water values is **low on benches and moderately high below benches. Heavy runoff and avalanching**

provides a moderate hazard to activities and structures in the valley.

Forage. Forage production is moderately low due to heavy tree cover. Overall hazard of damage to soil and water values from controlled grazing is moderately low.

Recreation. These valleys provide high quality dispersed recreation areas and esthetics. Benches provide sites for recreation improvements but local avalanche hazards need investigation for each proposed development.

Valley Type: G16-2 Map Symbol:

Moderately Wide Glaciated Valleys with Entrenched Streams - Moderately Steep Gradient, Discontinuous Benches, Steep Sideslopes.

Representative Valley:

Geomorphic Characteristics: These are glacially formed valleys which have accumulated mixed deposits of alluvium from main streams and tributary streams; glacial till and outwash from the receding glaciers; and colluvium from rock, land and snowslides from oversteepened sideslopes. Streams have cut down into these deposits since glaciation but now down-cutting is well controlled by large materials and bedrock. Stream energies for transport of medium and fine sediments are moderately high. Channels are fairly straight. The streams are typically confined to very narrow "V" shaped and steep-sided entrenchments into the older deposits. Discontinuous benches are present where the old deposit surfaces remain. These valleys correspond to valley types G06-2 except for the entrenched streams.

Morphometric Characteristics: Width of the major valley, including benches and gentle toe slopes, is 100 to 300 feet. The entrenched valley bottom width ranges from 0 to 50 feet wider than the occupying stream. The major valley sideslopes, oversteepened by glaciation, are 55 to 75 percent gradient. Bench and toe slope areas range from 5 to 35 percent, while entrenchment sideslopes range from 50 to 75 percent. Stream gradients are dominantly between 4 and 10 percent. Channel materials are mixed boulders, rubble, cobble and occasional bedrock. Benches are discontinuous and are vertically 10 to 50 feet above the stream. They are present on a given side of the stream approximately 80 percent of the valley length.

Management Qualities: Because the benches of old depositional material are discontinuous, the management qualities are variable within the valley and have a wide range. Where activities can be confined to benches, the hazards are generally low. However, where activities or structures must cross areas where benches are absent, or areas of the entrenchment trough, hazards are moderately high to high.

Channel overflow flooding hazard is low due to the confinement of the stream in the entrenchment trough. Quality of the valley bottom to catch and store sediment from soil disturbance on slopes above is good where benches exist, but poor to fair where benches are absent. Sedimentation hazard from a valley bottom road is moderate where benches are present, but high where benches are absent. Stream shade reduction hazard is moderately low to low. Channel erosion hazard with channel alteration is moderately low.

Roads. Overall hazard to soil and water values from roading is moderately high to high because of the necessity to traverse steep areas between benches and because road gradients will be 4 to 10 percent.

Wood. Timber productivity is moderately low. Overall hazard to soil and water values from timber harvest activities exclusive of roads is low on benches but high below benches. With roads, the overall hazard is moderately high to high.

Water. Hazard to water values from intensive management activities is moderately high. This is due to the absence of a continuous buffer along the stream. Moderate avalanche hazards exist. Flooding is minor due to the confinement of the streams in the narrow entrenched valleys.

Forage. Forage productivity is moderately low. Overall hazard to soil and water values from livestock grazing is moderately high due to need for crossing unbuffered steep slopes between benches.

Recreation. These areas are highly suited to low density recreation use. Benches provide good primitive campsites. Campground development is limited by road access problems. Avalanche hazard is moderately high.

Valley Type: S09-1 Map Symbol:

Streamcut Valleys - Moderately Steep to Steep-Sided, Narrow, Moderate Gradient.

Representative Valley: Lower Scriver Creek, Emmett Ranger District

Geomorphic Characteristics: The occupying streams have cut these narrow valleys deeply into granitic bedrock. Downcutting may still be occurring but at an imperceptible rate which is controlled by bedrock. The valley stream is generally capable of carrying its normal sediment load through without appreciable long-term deposition. Those valleys receiving runoff from high sediment producing lands can, however, exhibit sediment laden channels in low gradient sections. Very little valley widening has occurred and stream channels are dominantly straight with minor bends. A valley floor is nearly absent. Sideslopes are steep and contribute much debris to the valley floor by slumps, slides, creep, and washing of weathered loose material.

Morphometric Characteristics: The width of the valley bottom is dominantly 20 to 75 feet wider than the occupying channel. Sideslopes adjacent to the valley bottom are typical of strongly dissected mountain slopes. Sideslope gradients average 45 to 60 percent within the valley bottom vicinity. The occupying stream channel has a dominant gradient of 3 percent with occasional stretches of slightly lower or higher. Channel materials are composed of an equal mixture of boulders, stones, cobbles, gravels, and sands. A few sections of the valley channel are in bedrock.

Management Qualities: Most limitations to management activities in these valleys will be due to the narrowness of the valley bottom. The buffering potential of the valley bottom is inadequate to keep sedimentation of the valley stream to low levels with road construction.

The hazard of water overflowing the defined stream channel and inundating the adjacent terrain is moderate. The capacity of the valley area for stopping and storing soil material eroded from sources above the valley bottom is poor. The hazard for sedimentation of water courses from a valley bottom road is high. The hazard of reducing stream surface shading by vegetation due to valley bottom road construction is moderately high. The hazard for erosion of the stream channel as a result of channel constriction, encroachment, or other alterations of the channel materials or dimensions that control flow direction or velocities, is moderately low.

Roads. Overall hazard to soil and water values from roading is moderately high. Hazard to roads from soil stability and water runoff conditions is moderately high.

Wood. The adjacent sideslopes have moderate productivity for timber. Hazard to soil and water values from all but light selective, overhead harvest methods is high.

Water. These valleys are not capable of sustaining intense use without serious damage to water values. The small tributary streams and draws periodically produce debris flows from thunderstorms and rain-on-snow events that present a serious risk to activities or structures in the valley at the mouths of these tributaries.

Forage. These valleys have low to moderate forage productivity. Any concentrated livestock use can be expected to significantly degrade soil and water values in the valley.

Recreation. Sites suitable for recreation development are extremely limited. These valleys have a definite quality for dispersed recreation.

Valley Type: S09-2 Map Symbol:

Streamcut Valleys - Very Steep to Precipitous-Sided, Very Narrow, Moderate to Steep Gradient.

Representative Valley: Lower Queens River, Boise Ranger District.

Geomorphic Characteristics: These valleys have been formed by the cutting action of the occupying stream into granitic bedrock. They are typified by being distinctly V-shaped. Stream energy is high and has effectively transported and moved all previous sediment loads. Localized sediment pockets can, however, occur but are flushed out periodically by high runoff events. Sideslopes are very steep to precipitous and are situated adjacent to the valley stream channel. Rock outcrops are a common occurrence along the sideslopes and within the very narrow valley bottom. A valley floor is absent.

Morphometric Characteristics: The width of the valley bottom is dominantly less than 15 feet wider than the occupying stream. Sideslopes adjacent to the valley bottom are typical of steep granitic canyon slopes. Slope gradients are 65 percent to near vertical. The gradient of the valley stream averages 4 to 5 percent with some short sections reaching as high as 10 to 15 percent. Channel materials are predominantly bedrock, boulders, stones, and cobbles. Gravels and sands are readily flushed out during high runoff events.

Management Qualities: These valleys are one of the most hazardous areas for roading on the District. The width of the valley bottom and steepness of the sideslopes do not provide even token erosion buffering. Culvert outlets will often be situated directly above the valley stream. In many cases, road fill slopes will encroach directly upon the valley stream and will require structures to reduce failure from encroachment by the stream.

The hazard of water overflowing the defined stream channel and inundating the adjacent terrain is moderately low to low. The capacity of the valley area for stopping and storing soil material eroded from sources above the valley bottom is poor to very poor. The hazard for sedimentation of water courses from a valley bottom road is high. The hazard of reducing stream surface shading by vegetation due to valley bottom road construction is high. The hazard for erosion of the stream channel as a result of channel constriction, encroachment, or other alterations of the channel materials or dimensions that control flow direction or velocities, is moderately low.

Roads. Overall hazard to soil and water values from roading is high. Overall hazard to roads from soil stability and water runoff conditions is high.

Wood. These valleys have very minor amounts of commercial timber. The steep rocky toe slopes have low productivity and the valley bottom is too narrow to produce commercially significant amounts of timber. Hazard to soil and water values is high from any type of timber harvest except very light selective removal by roadless overhead methods.

Water. The narrow valley together with steep channel gradients produce very high velocities during peak flows. Any road fill, culvert, or structure is susceptible to being washed out. The hazard from intensive activity in the valley to water values is high.

Forage. These valleys have low forage productivity and high hazard to soil and water values from livestock use.

Recreation. There are no areas suitable for recreation sites. High velocity streamflow and unstable slopes make overnight occupancy hazardous on much of the area during winter, spring, and early summer. These valleys have a rugged beauty.

Valley Type: S09-3 Map Symbol:

Streamcut Valleys - Moderately Steep to Steep-Sided, Very Narrow, Moderate to Steep Gradient.

Representative Valley: Lower Riordan Creek, Cascade Ranger District.
{Note: 416W road}

Geomorphic Characteristics: The major valley forming process has been downcutting by streams into granitic bedrock. Stream energies have been high enough to effectively transport past sediment loads. Only a few small localized alluvial deposits occur but are slowly removed by periodic high runoff. Geologic downcutting is controlled to very low rates by bedrock**. Sideslopes are less rocky and less steep than those of valley type S09-2. Stream alignment is straight. No valley widening has occurred from sidecutting by the stream. Sideslopes are typically strongly dissected fluvial mountain slopes and contribute much material to the stream due to slumps, slides, creep and runoff.**

Morphometric Characteristics: Valley bottoms are dominantly less than 25 feet wide, excluding stream channel width. Valley sideslopes immediately adjacent range from 40 to 65 percent. Stream gradients range from 3 to 6 percent. Channel materials are dominantly boulders, large stones and cobble with frequent bedrock control. These valleys are similar to valley types S09-1 and S09-2. The major differentiating factors are valley width and steepness of adjacent sideslopes. Type S09-2 has steeper sideslopes, similar valley widths and steeper stream gradients. Type S09-1 has slightly wider valleys, slightly lower stream gradients and similar side-slope gradients.

Management Qualities: **These valleys are one of the most hazardous for roading. They are slightly wider than valley type S09-2, but the steep sideslopes have less competent rock and backslopes will be less stable. Fillslopes will encroach on streams at many places and require structures to protect fills and streams.**

Hazard of overbank flooding is moderately low to low. The capacity of the valley area for stopping and storing eroded soil material is poor to very poor. The hazard for sedimentation of water courses from a valley bottom road is high. The hazard for reducing stream shading by vegetation due to valley bottom road construction is high. Stream channel erosion hazard from alteration of the channel is moderately low.

Roads. **Overall hazard to soil and water values from roading is high. Hazard to roads from soil stability and water runoff conditions is high. Slumps, slides, and flashy small tributaries can be expected to cause frequent road damage**.

Wood. These sites have low to moderate timber productivity. The only harvesting methods that can be expected to keep soil and water impacts low are skyline or roadless methods with a very light selective cut.

Water. **Intense use or activity in the valley can be expected to cause serious degradation of water values. This is most likely to be in the form of sedimentation from adjacent sideslopes. The runoff conditions in the valley stream and into the valley from adjacent slopes and tributaries will likely put a moderately high stress on roads or other developments in the valley. The stress will be greatest on drainage facilities at stream and tributary crossings.**

Forage. Low to moderate forage productivity exists but livestock use is likely to significantly increase sedimentation of the streams.

Recreation. Sites for recreation development are extremely limited. Most wider areas are at mouths of flashy tributary streams and are subject to periodic debris flows. The streams make these areas attractive for dispersed recreation uses such as hiking and fishing.

Valley Type: S09-11 Map Symbol:

Narrow Streamcut River Valleys - Very Steep-Sided and Moderate Valley Gradient.

Representative Valleys: North Fork Boise River near Crooked River, North Fork Payette River near Railroad Bridge.

Geomorphic Characteristics: Valleys were formed primarily by downcutting by their rivers. Faulting may have had some effect on the valley alignment and depth. Downcutting is presently arrested and sidecutting is occurring locally and undercutting valley sideslopes. Rivers are relatively straight with an occasional broad bend. Very narrow gravel bars have developed on the inside of these occasional bends. Stream energies are moderately high to high and sand and gravel sediments are readily moved through these reaches except for a few moderately low energy pool areas. Bedrock controls the channel gradient and erosion at numerous locations. Mass movement of material from sideslopes and draws is common. All but the large rocks and boulders are gradually removed by the river.

Morphometric Characteristics: These valleys are dominantly 50 to 100 feet wider than their river channels. The river is actively undercutting a few sideslopes and there is absolutely no valley bottom on one side of the river at these locations. Valley sideslopes adjacent to the valley bottom are dominantly 55 to 70 percent gradient but can vary from 45 to 90 percent. River gradient ranges from 2 to 5 percent. Major sideslopes are typically oversteepened canyon lands. Channel materials are boulders, rubble and cobble with occasional bedrock.

Management Qualities: Channel overflow flooding hazard is moderately low, primarily because the river is confined by the narrow valley. Any valley bottom structures such as bridges, road fills, or dikes will be subject to severe stress during major peak flows. The quality of the valley bottom for catching and storing sediment from disturbances on the slopes is poor to very poor. Sedimentation hazard from a valley bottom road is high. Stream shade reduction hazard is moderately high to high. Channel erosion hazard with channel alteration is moderately low.

Roads. Roads in these valleys create significant slope stability and sedimentation problems. The oversteepened sideslopes and flashy small tributaries and draws can be expected to frequently damage valley bottom roads. The river will put extreme stress on any structures or materials placed in or near the channel.

Wood. These areas are low timber producers. Only light selective harvest by overhead methods can be expected to maintain soil and water values.

Water. These valleys are very sensitive as to the types and intensity of activities that can be sustained without serious impact on water values. Intense land and vegetation disturbing activities can be expected to cause significant increase in sedimentation. Structures and improvements in the valley can be expected to sustain frequent damage from runoff and water related mass movement events, especially from small, steep tributary areas.

Forage. Forage productivity is low to moderate but steep slopes and narrow valleys make these valleys very sensitive to animal use and significant increase in sedimentation can be expected from any concentration of animals.

Recreation. These are very scenic areas due to the rivers and rugged setting. Sites suitable for recreation development are extremely limited or lacking.

Valley Type: S09-12 Map Symbol:

Streamcut River Valleys - Very Steep to Precipitous Sided, Very Narrow to Narrow, Moderate to Moderately Steep Gradient.

Representative Valleys: South Fork Payette River, Deadwood River to Long Gulch.

Geomorphic Characteristics: These river valleys have been formed primarily from the cutting of the occupying river into granitic bedrock. They are typically V-shaped with rock outcrop and cliffs along the sideslopes. Stream energies are very high and accumulations of material from tributaries or upstream are essentially absent. Occasional deep pools occur where gravels and sands are temporarily stored until peak flows move them further downstream. Valley and stream alignment is usually nearly straight to broadly winding. Some exceptions occur such as along the lower North Fork Boise River where alignment is unusually winding.

Morphometric Characteristics: The width of the valley bottom is dominantly less than 50 feet wider than the stream channel, but locally may be up to 100 feet wider. Areas where valley bottom is absent are common. Side-slopes are dominantly steeper than 70 percent and are typical of over-steepened canyons. Vertical cliffs above the stream are common. Stream gradients are dominantly within the 2 to 6 percent range; however, short drops with 10 percent gradient may occur. Dominant channel materials are bedrock, boulders and rubble.

Management Qualities: Hazard of flooding of adjacent low lying terrain is moderately low due to the absence of an extensive valley bottom. The sediment buffering quality of the valley bottom is poor to very poor. The hazard of sedimentation of streams from a valley bottom road is high for approximately 50 percent of the valley length and moderately high for approximately 25 percent and moderate for approximately 25 percent. The moderate and moderately high hazard areas coincide with those portions of the valley with hard rock outcrop. Stream shade reduction hazard is moderately high. Channel erosion hazard with channel alteration is dominantly low due to the high occurrence of boulder and bedrock.

Roads. The sensitivity of these valleys to disturbance is moderately high to high. The hard rock areas of the sideslopes are much less sensitive than the less rocky slopes of valley type S09-ll. These are difficult areas for road construction; however, once the road is constructed backslopes will have good stability on the road length through hard bedrock. Drainageways from the steep canyon sides will have frequent debris flows for which adequate drainage facilities will be very difficult to design. Any material or structures in or near the river channel will be severely scoured by peak flows.

Wood. Only scattered commercial trees are present and they are difficult to reach. Aerial harvest and salvage cutting are the only methods that can be expected to maintain soil and water values.

Water. Intensive activities can be expected to significantly increase sedimentation. Water runoff conditions in the river channel and the tributary canyon slopes will put severe stress on any structures or developments in the valley.

Forage. Forage productivity is low. These areas are inaccessible to domestic livestock.

Recreation. These are very ruggedly beautiful areas. Sites suitable for recreation improvements are lacking. Hazards to recreationists are high.

Valley Type: S09-14 Map Symbol:

Streamcut River Valleys - Steep-Sided, Moderately Narrow to Moderately Wide, Low to Moderate Gradient.

Representative Valley:

Geomorphic Characteristics: These river valleys have been formed primarily from the cutting of the occupying river into granitic bedrock. Downcutting appears to be greatly diminished from past rates and some lateral valley widening and deposition has begun. Concave toe slopes of colluvial deposits are often present on one or both sides of the stream. Old and new bars of river deposited gravels are intermittently present. The river alignment is broadly winding and can be found in the center or extreme sides of the valley bottom. River energies are moderate but locally variable. Energies in the lower gradient pools and eddies commonly allow accumulation of sand and gravel deposits. The short riffles between pools have energies adequate to carry most sand and fine gravels through. Short lengths of narrow valleys are included.

Morphometric Characteristics: The width of the valley bottom is dominantly 75 to 200 feet wider than the river channel. A few short lengths may have less than 50 feet of bottom width. Often the valley bottom terrain is divided in two by the river so that only 35 to 100 feet of gentle terrain is present between the river and steep sideslopes. At other locations, all 75 to 200 feet of bottom is on one side of the river and none is present on the opposite side. Valley sideslopes range from 50 to 70 percent.

The river gradient is dominantly 2 to 3 percent but may range from I to 5 percent. Channel materials are mixed and dominantly boulders, rubble, and cobble.

Management Qualities: These valleys have considerable range in characteristics and therefore considerable range in management qualities. The hazard of the river overflowing its defined channel and inundating adjacent terrain is moderately low. Quality of the valley bottom as a sediment buffer is dominantly fair with inclusions of poor and very poor. Sedimentation hazard from a single lane valley bottom road is moderately high. Stream shade reduction hazard from a valley bottom road is moderately high. Channel erosion hazard with channel alteration is moderate to moderately low.

Roads. Approximately one-half of the length of a given site of the valley has moderate hazards to soil and water qualities from roading and the other one-half of the same valley side has moderately high to high hazards. Frequent bridging will reduce the overall hazard to moderately high. Soil stability and runoff conditions present an overall moderately high risk of road damage. This risk is especially high for short areas where the river is undercutting the sideslope.

Wood. Timber productivity is variable from low to moderate. Harvest methods required to maintain soil and water values vary from aerial methods with light salvage cutting to ground methods and selective cutting on small areas with wider valley bottom terrain.

Water. On about one-half of the valley area, sensitivity of water values to intense activities is very high; on the remaining one-half the sensitivity is moderate to moderately high. Runoff related hazards to valley structures and activities is moderately high overall.

Forage. Forage productivity varies from low to moderate. Soil and water conditions can be expected to deteriorate from concentrated use by livestock.

Recreation. Suitable sites for recreation development are very limited and need detailed investigation to determine flooding hazard.

Valley Type: S18-2 Map Symbol:

Entrenched Head-Cut Canyons in Basalt - Precipitous-Sided, Very Narrow, Moderate to Very Steep Gradient.

Representative Valley: Mouths of Rock Creek and Fall Creek, Mountain Home Ranger District.

Geomorphic Characteristics: These valleys have been formed by the head-ward cutting of the occupying stream through a basalt plain. Consequently, valley sideslopes are predominantly basalt with occasional granite outcroppings. Typically, remnants of the basalt plain are evident and continuous on one or both sideslopes. These basalt benches or terraces, when evident on both sideslopes, are accordant, are situated directly across from each other. Stream energy is sufficient to carry small cobbles, gravels, and sand without permanent deposition. Therefore, alluvial deposits are essentially absent and valley widening has not yet begun. A valley floor does not exist. Stream channels are quite straight.

Morphometric Characteristics: The width of the valley bottom is dominantly less than 15 feet wider than the occupying stream channel. Sideslopes adjacent to the valley bottom are typical of 135-1 landtypes and exhibit a dominant slope range of 70 percent to near vertical. Channel entrenchment varies from inches at the start of the head cut to as much as 300 feet at the mouth of the cut area. Consequently, sideslope length is variable and increases from the start of the head cut to the downstream end of the valley. The channel gradients ranges from 3 to 15 percent.

Channel materials are predominantly basalt boulders, stones, and cobbles. Gravels, sands, and silt, which are typically granitic, are only stored temporarily.

Management Qualities: These valley types present some of the most esthetically appealing terrain on the District. They are also some of the most rugged for road construction.

The hazard of water overflowing the defined stream channel and inundating the adjacent terrain is low. The capacity of the valley area for stopping and storing soil material eroded from surfaces above the valley bottom is poor. The hazard for sedimentation of water courses from a valley bottom road is high. The hazard of reducing stream surface shading by vegetation due to valley bottom road construction is high. The hazard for erosion of the stream channel as a result of channel constriction, encroachment, or any other alterations of the channel materials or dimensions that control flow direction or velocities, is moderately low.

Roads. Roading of the valley bottom or entrenchment sideslopes will require extreme investments. Rock fall from cliffs will be very hazardous to travelers and construction workers. Hazards to soil and water values are moderately high. Valley gradients are often too steep for road gradients.

Wood. Little or no commercial timber land exists within these valleys.

Water. Hazard to water values from intense use within the valley is moderately high. Runoff characteristics of streams and adjacent terrain presents a moderate to moderately high hazard to valley developments.

Forage. Forage productivity is low. Most of these areas are inaccessible to livestock.

Recreation. Rapids, waterfalls and basalt cliffs make these valleys outstanding for viewing. No recreation sites are present and the terrain is very hazardous for recreationists.

Valley Type: S20-1 Map Symbol:

Streamcut Granitic Valleys - Moderately Narrow, Steep-Sided, Moderate Gradient.

Representative Valley: Swanholm Creek, Boise Ranger District.

Geomorphic Characteristics: Downcutting by streams has been the major valley shaping process. The steep valley sideslopes are typically moderately and strongly dissected mountain slopes. In the recent centuries, minor to moderate valley bottom deposits have accumulated. The valley has widened itself more from increased deposition than from sideward cutting into sideslopes. Stream energies have apparently decreased to allow the accumulation of alluvial fan material from tributaries, colluvium from sideslopes, and alluvium from main stream deposits. Stream alignment is slightly winding. Present stream capacity and competence is moderately low. Fine sands and silts move through fairly rapidly during annual high runoff periods but coarse sands and fine gravels accumulate in eddies and pools. Some of these valleys have coarse glacial outwash which provides more stable channels than is typical of non-outwash reaches.

Morphometric Characteristics: Valley bottom width is fairly uniform within a given valley. Width ranges from 75 to 200 feet wider than the stream. Sideslopes range from 50 to 80 percent gradient. Stream gradients are dominantly 2 to 5 percent. Channel materials are dominantly rubble, cobble and gravels; however, boulders are common on certain reaches near glaciated headwaters.

Management Qualities: The width of these valleys is generally not adequate for major recreational developments, administrative sites or wide, well aligned roads. They are well suited for trail locations. One lane, winding roads may sometimes be fitted into the valley with moderate impacts if special care is taken. Moderate hazard from flash runoff events from small tributaries exists.

Channel overflow flooding hazard is moderately low. Sediment buffer quality is fair. Sedimentation hazard from a valley bottom road is moderate to moderately high. Stream shade reduction hazard from valley bottom road construction is moderately low. Channel erosion hazard with any alteration of the natural channel is dominantly moderate but those reaches with glacial outwash are moderately low.

Roads. Overall hazard to soil and water values from roading is moderate. Hazard to roads from soil stability and runoff conditions is moderate.

Wood. Timber productivity is moderate. Harvest by selective cutting and cable systems are expected to maintain soil and water values.

Water. Hazard of intensive activities to water values is dominantly moderate. Runoff conditions present a moderate hazard to valley structures and activities.

Forage. Moderate forage is produced in these valleys. Controlled dispersed livestock use can be expected to have minor impact on water and soil values. However, any concentrated livestock use, especially trailing, will likely cause significant increase in sedimentation.

Recreation. A few small sites suitable for recreation development are present. These valleys are not outstanding attractions but are pleasant environments for outdoor activities and viewing.

Valley Type: S21-1 Map Symbol:

Streamcut Valleys with Active Flood Plain - Steep-Sided, Moderately Narrow to Moderately Wide, Moderate Gradient.

Representative Valley: Thorn Creek near North Fork.

Geomorphic Characteristics: Streamcutting has been the dominant process in the forming of these valleys. Presently downcutting is not occurring, and alluvial fan and stream wash alluvium have accumulated. Evidently stream energies are not adequate to move all sediments delivered from the upstream watershed and side tributaries through the reach. Channel capacity is typically inadequate to handle above average runoffs without bank overflow. Major runoffs rearrange the channel sediments and leave fresh gravel and sand surfaces. Often the downstream end of these reaches is marked by a resistant bedrock control which restricts downcutting. Stream energies are moderately low. Side slopes are typically steep fluvial land types which contribute considerable sediment directly to the valley. Stream alignment is winding.

Morphometric Characteristics: The width of the valley bottom is dominantly 75 to 200 feet wider than the stream channel. Side slopes are dominantly 50 to 80 percent gradient and are typically strongly dissected granitic fluvial lands or steep granitic canyon slopes. Channel gradient is 2 to 3 percent with extremes of 1 to 6 percent. Channel materials are mixed alluvium, dominantly cobble and gravel size, but individual reaches vary from dominantly large stones to dominantly gravels and sands.

Management Qualities: Major limitations are related to frequent flooding of a significant portion of the valley bottom. Tributaries also present a hazard from flashy debris laden flows.

Roads. Road locations in the valley bottom will be subject to moderately high to high hazard of sediment deposition on the road and in drainage structures by debris laden flows from the main stream and tributaries. Stream bank erosion may threaten roads that cross or closely parallel streams. Bearing strength of materials will be good. Hazard of sedimentation from valley bottom roads is moderate to moderately high. Shade reduction hazard is moderately low.

Wood. Commercial timber is sparse or absent. The few trees present within 50 feet either side of the stream are important for stream shade and bank stability. Undertaker policy of harvest is appropriate so long as ground skidding across streams can be avoided.

Water. The hazard of significant increase in channel erosion as a result of channel alteration is moderately high. The quality of the valley bottom to stop and store sediment originating from side slopes is fair to good. The hazard of water pollution from waste disposal sites in the stream bottom is high. Overbank flooding hazard is moderately high to high.

Forage. Productivity of forage is low on most valleys because of the sediment deposition in the valley bottom. Some valleys have moderately high forage production where deposition is minor. Stream banks are very vulnerable to serious damage from livestock grazing or trailing. The adjacent slopes confine livestock use to the valley bottom.

Recreation. Very few locations in these valleys have adequate width and protection from flooding and bank erosion to provide satisfactory recreation sites. Sanitation facilities will be subject to flooding and rapid leaching of effluent to the water table. Proposed sites need intensive investigation to determine if they are safe from these hazards before firm plans are made.

Valley Type: S30-1 Map Symbol:

Streamcut Valleys with Alternating Widths - Moderately Steep to Steep-Sided, Narrow to Moderately Wide, Low to Moderate Gradient.

Representative Valley: Lower Anderson Creek, Emmett Ranger District.

Geomorphic Characteristics: These valleys have been formed by the down-cutting of the occupying stream. Vertical and horizontal cutting is restricted at sporadic locations by hard resistant bedrock. Those areas between resistant locations have been widened by lateral sidecutting into valley sideslopes. Consequently, narrow and wider valley bottom widths recur within the valley type. Stream energy is high within the steeper gradient, narrow areas. The wider, lower gradient areas are sedimentation points for materials as small as fine gravels. Rock outcrops are common along valley sideslopes and stream channels within the narrow areas.

Morphometric Characteristics: The width of the valley bottom is usually less than 30 feet wider than the occupying channel within the narrow, bedrock defended sections. Within the wider reaches, the valley bottom width is commonly 50 to 150 feet wider than the valley channel. Side-slope gradient generally ranges between 40 and 65 percent. Sideslopes can be steeper at bedrock exposed sections. Channel gradient is lowest (approximately 1 to 2 percent) within the wider sections. Channel gradient within the narrower sections averages 3 to 4 percent. Channel materials are composed of rock outcrop, boulders, stones, and cobbles within the narrow sections. Cobbles and gravels predominate in the wider sections.

Management Qualities: The variability of valley bottom width within these valley types is of significance to management. The wider sections present more favorable qualities for erosion buffering. Narrow sections, on the other hand, are characterized by better channel stability. The most limiting factor for either the narrow or wider sections will often determine management limitations for the total valley type.

The hazard of water overflowing the defined stream channel and inundating the adjacent terrain is low within the narrow sections and moderately high to high within the wider sections. The capacity of the valley area for stopping and storing soil material eroded from sources above the valley bottom is poor to very poor and good within the narrow and wider sections, respectively. The hazard for sedimentation of water courses from a valley bottom road is high and moderate for the narrow and wider sections, respectively. The hazard of reducing stream surface shading by vegetation due to valley bottom road construction is high for the narrow sections and low for the wider sections. The hazard for erosion of the stream channel as a result of channel constriction, encroachment, or other alterations of the channel materials or dimensions that control flow direction or velocities, is moderately low to low within narrow sections and moderately high within wider sections.

Roads. Overall hazard to soil and water values from roading is moderately high. Overall hazard to roads from water runoff and soil stability is moderately high.

Wood. Timber productivity is variable from low to moderate. Harvest methods that maintain at least one-half of the stems within 50 feet of streams and do not cause logs to be ground skidded across stream, are not expected to degrade water values. Tractor skidding in these valleys will be difficult to carry out while maintaining soil stability and water quality.

Water. Overall hazard to water values from intensive valley uses and activities is moderately high. Overall hazard to activities and structures in the valley is moderate.

Forage. General forage productivity is moderately low. Sensitivity to livestock use is moderately high.

Recreation. Sites suitable for recreation development are rare. Where valley width is adequate, flooding potential are present. These areas are well suited to dispersed recreation use.

Valley Type: S30-12 Map Symbol:

Streamcut River Valleys with Alternating Conditions of Width and Gradient -Steep-Sided, Narrow to Moderately Wide, Moderate Gradients.

Representative Valley:

Geomorphic Characteristics: Stream cutting into granitic lands is the dominant process that shaped these valleys. The gradient and width of the valleys is quite variable and indicates some recurrent internal controls to downcutting and valley widening. These controls are probably areas of hard, resistant bedrock which coincide with the narrower, steeper portions of the valleys and make up about 20 percent of the valley length. In these portions, the valley and stream alignment is fairly straight with minor alluvial deposition and moderately high energies.

On about 80 percent of the valley length, the stream alignment is winding and moderate to heavy alluvial deposition has occurred. Evidence of recent channel downcutting is absent and the previously mentioned resistant rock barrier provide controls to downcutting in these less resistant reaches. The river is cutting sidewards into old alluvial deposits and toe slopes. Deposits are present on one side or the other of the river but seldom on both sides. Stream energies are low to moderate.

Morphometric Characteristics: The valley bottom of the included narrow reaches (about 20 percent of valley type) is 10 to 50 feet wider than the river channel. Gradient varies from 2 to 4 percent. Channel materials are predominantly bedrock, boulders, and rubble. Sideslopes are predominantly over 60 percent gradient.

The more dominant reaches (80 percent of valley type) have valley bottom widths from 50 to 400 feet wider than the river channel. However, this width is often only on one side of the river. The river gradient varies from 1 to 3 percent and sideslopes range from 50 to 70 percent. Channel materials are dominantly rubble and cobble with some boulders and gravel.

Management Qualities: These qualities vary with the narrow reaches (20 percent) and the moderately wide reaches (80 percent).

For the narrow reaches, channel overflow flooding hazard is low. Sediment buffer quality is poor. Sedimentation hazard from a valley bottom road is moderately high to high. Stream shade reduction hazard is high. Channel erosion hazard with alteration is moderately low.

For moderately wide reaches, ratings are for the wider side of the river. Channel overflow flooding hazard is moderate. Sediment buffer quality is fair to excellent. Sedimentation hazard from a valley bottom road is moderately low. Stream shade reduction hazard is low. Channel erosion hazard with alteration is moderate to moderately high.

Roads. Overall hazard to soil and water values from roading is moderate. Hazard of water and soil conditions to roads is moderate. Occasional bridging will be necessary to use best road locations.

Wood. Timber productivity is generally moderately low. Sensitivity to harvest activities is moderate. Maintenance of water and soil values will require very light selective cutting within 50 to 100 feet of streams and this essentially covers the valley. Cable or overhead skidding methods that do not disturb streambanks or bottoms are not expected to affect water values.

Water. These areas are moderately sensitive to intensive uses and activities. Water values are not expected to be significantly degraded by light use such as light dispersed forage use by livestock or wildlife, trail construction, dispersed recreation, and selective tree removal. Water runoff hazard to activities and structures is moderate.

Forage. Forage productivity is highly variable but moderately low overall. Overall sensitivity to livestock use is moderate.

Recreation. A few suitable sites for recreation development are present. However, not all areas with adequate valley width are safe from flooding hazard. These valleys are very scenic and attract many recreationists.

APPENDIX A - INTERPRETIVE TABLES AND CRITERIA

Landtype Characteristics, Relationships and Hazards

Table 1 – Landtype Erosion and Stability Hazards

Table 2 – Construction Hazards

Table 3 – Soil-Hydrologic Characteristics

Table 4 – Soil-Vegetative Relationships

Table 5 – Soil Profile Characteristics

Management Qualities Criteria for Valley Types

Channel Overflow and Flood Hazard

Sediment Buffer Quality

Sedimentation Hazard from a Valley Bottom Road

Stream Shade Reduction Hazard

Channel Erosion Hazard with Channel Alteration

Modifying Nomenclature for Valley Type Names

Stream Channel Condition Classification

Sedimentation Problem Areas Map Explanation

Explanation of Table No. 1
Landtype Erosion and Stability Hazards

General Characteristics

Map Symbol - Mapping symbol representing each landtype.

Soil Unit - Lists the number assigned to individual soils and percentage of each in the landtype.

Dominant Slope Range - Gives the dominant slope range for each mapping unit. When individual soils slope gradients vary from dominant range, these are listed separately after the individual unit.

Bedrock Characteristics - The following key was used to describe the granitic bedrock characteristics:

Class No.	Fracturing	Distance Between Fractures
1	Massive	6' or more
2	Slightly Fractured	4' to 6'
3	Moderately Fractured	1.5' to 4'
4	Well Fractured	0.5' to 1.5'
5	Extremely Well Fractured	0.5'

Class	Weathering
1	Unweathered Rock - Unweathered rock will ring from a hammer blow; cannot be dug by the point of a rock hammer; joint sets are the only visible fractures; no iron stains emanate from biotites; joint sets are distinct and angular; biotites are black and compact; feldspars appear to be clear and fresh.
2	Very Weakly Weathered Rock - Very weakly weathered rock is similar to Class 1, except for visible iron stains that emanate from biotites; biotites may also appear "expanded" when viewed through a hand lens; feldspars may show some opacity; joint sets are distinct and angular.
3	Weakly Weathered Rock - Weakly weathered rock gives a dull ring from a hammer blow; can be broken into "hand-sized" rocks with moderate difficulty using a hammer; feldspars are opaque and milky; no root penetration; joint sets are subangular.

4 Moderately Weathered Rock - Moderately weathered rock may be weakly spalling. Except for the spall rind, if present, rock cannot be broken by hand; no ring or dull ring from hammer blow; feldspars are opaque and milky; biotites usually have a golden yellow sheen; joint sets indistinct and rounded to subangular.

5 Moderately Well Weathered Rock - Moderately well weathered rock will break into small fragments or sheets under moderate pressure from bare hands; usually spalling; root penetration limited to fractures, unlike Class 6 rock where roots penetrate through the rock matrix; joint sets are weakly visible and rounded; feldspars are powdery; biotites have a light golden sheen.

6 Well Weathered Rock - Well weathered rock can be broken by hand into sand-sized particles (grus); usually so weathered that it is difficult to determine if rock is spalling, roots can penetrate between grains; only major joints are preserved and filled with grus; feldspars are powdery; biotites may appear silver or white in thin flakes.

7 Very Well Weathered Rock - Very well weathered rock has feldspars that have weathered to clay minerals and rock is plastic when wet, no resistance to roots.

Surface Erosion Hazards

Inherent Erosion Hazard. Rated for bare soil conditions according to five qualitative classes. These classes are based on the ability of the soils to take in water, resistance of the soil surface to dispersion under the impact of rainfall and surface water movement,

effect of coarse fragments that reduce surface detachment, and effect of topography. Climate was considered a constant.

5 - Very High - Unprotected bare soil will erode sufficiently to severely and permanently damage the productive capacity of the soil or will yield excessively high volumes of sediment.

4 - High - Unprotected bare soil will erode sufficiently to severely damage productive capacity or will yield high volumes of sediment.

3 - Moderate - Sufficiently resistant to erosion to permit limited and temporary exposure of bare soil during development or use.

2 - Low - Sufficiently resistant to erosion to permit exposure of bare soil under minimal precautionary restrictions.

1 - Very Low - No appreciable hazard of erosion.

The following method was used to determine the above classes:

Inherent Erosion Hazard Classes.

$$\text{Inherent Erosion Hazard Class} = \frac{\text{Soil Erodibility + Topographic Hazard}}{2}$$

Soil erodibility was taken as an average of soil erodibility adjusted for protective coarse fragments of the dominant soils in each land type. Five class values were used for soil erodibility and topographic hazard. They are:

Soil Erodibility Index

Permeability X Detachability each on a 0 - 10 Scale	Class Rating
0 - 66	1
7 - 20	2
21 - 40	3
41 - 70	4
71 - 100	5

The topographic hazard estimate was based on slope gradient only. Slope class values to be added to soil erodibility are shown below.

Slope Classes

Slope Gradient	Class Rating
0 - 66	1
7 - 20	2
21 - 45	3
46 - 65	4
66+	5

Mass Stability Hazards

These erosion hazards are related to mass movement of soil and materials. The movement may happen within a short period or take place over a relatively long period of time.

Debris Slides. This column gives the relative hazards for the failure of accumulations of materials in (draws) confined drainages. Three numerical qualitative ratings are given based on soil and slope characteristics, surface erosion and surface creep activity combined with the estimated period of frequency of climatic conditions which cause such slides to occur. Amounts of debris considered to be significant will vary with the resource affected. The classes are:

5 Very High - Combinations of the above factors result in frequent movement of large amounts of material as debris slides.

3 Moderate - Combinations of the above factors result in conditions that vary from frequent movement of small amounts of material to infrequent movement of large amounts of material.

1 Very Low - Combinations of the above factors result in small amounts of materials being moved at infrequent intervals of time.

Slump. This column gives the relative hazard for lineal of bow-shaped failures of slopes to occur in any given year under natural conditions. The area as a whole has a relatively low hazard for these kinds of failures. Most of them will occur on finer-textured soils that are in seeps, low spots or at the toes of slopes. A few have occurred as a structural failure in weathered bedrock or slippage along joining planes in the bedrock.

Five qualitative classes were used. They are 5 - very high, 4 - high, 3 - moderate, 2 - low, and 1 - very low. The very high and high classes are probably the only classes which would be a significant hazard to land management.

Surface Creep. This column gives three numerical qualitative rating classes for surface creep. Surface creep is considered to be the down-slope movement of the surface soil which eventually accumulates in draws. This material thus accumulated in draws is subject to movement as debris slides. The materials move primarily in mass through the gravitational force which may be accelerated by the effect of water, wind, freezing and thawing. Surface creep includes individual soil or rock particles that move only a short distance at one time. The three classes are 5 - very high, 3 - moderate, and 1 - very low. Moderate ratings are considered to be for lands where creep averages about 25 cubic yards per square mile per year.

TABLE 1

LANDTYPE EROSION AND STABILITY HAZARDS

Map Symbol	Soil Unit No.		Dominant Slope Range Percent	Bedrock Characteristics		Inherent Surface Erosion Hazard	Mass Stability hazards		
				Fracturing Class	Weathering Class		Debris Slides	Slump	Surface Creep
101	JECA-2	40	0-5	-	-	2-3	-	-	-
	JECA-5	40	0-5	-	-	2-3	-	-	-
	JCFA-1	20	0-5	-	-	2-3	-	-	_
102	HBDA-4	30	0-5	-	-	1	-	-	-
	HBDA-5	50	0-15	-	-	1	-	-	-
	JEAA-2	20	5-15	-	-	1	_	-	-
104	JEAA-2	70	2-15	-	-	2	-	-	-
	IFBA-3	30	2-5	-	-	2	-	-	-
105-4	GDEA-4	40	10-20	-	-	3	-	3	-
	GDEA-6	20	0-15	-	-	3	-	3-4	-
	GDEL-5	40	0-5	-	-	2	-	1-2	-
105-5	JCFA-1	20	5-15	-	-	2-3	-	-	-
	JECA-2	80	5-20	-	-	2-3	-	-	-
106	HBDA-4	20	5-15	-	-	2-3	-	3	-
	HBDA-5	20	5-20	-	-	2	-	2	-
	IECA-5	40	5-30	-	-	2	-	2	-
	JEAA-2	20	5-30	-	-	3	-	2	-
106-2	JEAA-2	50	10-40	-	-	2-3	-	2	3
	IFBA-5	50	10-40	-	-	2	-	3	2
107-1	GDFA-4	50	10-25	3	3-5	3	2-3	3	2
	JECA-5	50	10-25	3-5	3-5	3	2-3	2-3	2
108	JEAA-5	30	20-60	4-5	1-3	2	2	2	2
	IFBA-3	30	20-50	5	3-4	2	2	2	3
	IFBA-5	40	20-60	5	2-4	2	2	2	2

TABLE 1

LANDTYPE EROSION AND STABILITY HAZARDS

Map Symbol	Soil Unit No.	Soil Unit %	Dominant Slope Range Percent	Bedrock Characteristics: Fracturing Class	Bedrock Characteristics: Weathering Class	Inherent Surface Erosion Hazard	Mass Stability Hazards: Debris Slides	Mass Stability Hazards: Slump	Mass Stability Hazards: Surface Creep
109-2	IFBD-3	30	10-30	3	5	2-3	1	1	2
	IECA-2	40	5-20	4-5	3-6	2	1	1	2
	IFBA-3	30	5-20	4-5	3-6	3	1	1	3
109a-1	JEAA-3	30	30-60	3-4/M	4-6	3	2	1	2-3
	JEAA-5	30	30-60	5/M	3	2	2	2	2
	JEAE-	40	40-70	3-4	3-4	3	2	1	2-3
109b	JEAA-2	30	20-60	4/M	5-6	3	2	2	2-3
	IECA-5	40	20-60	3-4	2-6	3	2	3	2
	JEAE-5	30	30-60	4/M	4-6	3	2	2	3
109c	IFBA-3	50	25-50	4-5	3-5	4	3-4	4	4
	JEAE-5	30	25-65	4-5	3-5	4	3-4	3	4
	JECA-5	20	25-65	4/M	5-6	3-4	3-4	4	4
109d-1	JEAA-5	70	40-60	3-5/M	2-6	4-5	3	2-3	3
	JEAE-5	25	40-70	5/M	5-6	4	3	2	3
	RO	5	-	-	-	-	-	-	-
109g	IFBA-5	80	25-60	5	3 - 5	3-4	3-4	2	3
	JEAE-2	20	40-70	3-5	1-5	4	3	2	3-4
110	JEAD-3	20	0-5	3-4/M	3-6	1	1	1	1
	JEAA-	30	2-30	2-4	2-3	2	1	1	1
	IECA-5	20	2-30	4-5/M	3-5	2	1	2	1
	RO	30	-	-	-	-	-	-	-
110x	JEAA-2	10	5-50	4	2-3	2-3	2	2	3
	JEAE-	50	0-15	2-4	2-3	2	2	2	1

	RO	40	-	-	-	-	-	-	-

TABLE 1

LANDTYPE EROSION AND STABILITY HAZARDS

Map Symbol	Soil Unit	N	Dominant Slope Range Percent	Bedrock Characteristics Fracturing Class	Bedrock Characteristics Weathering Class	Inherent Surface Erosion Hazard	Mass Stability Hazards: Debris Slides	Mass Stability Hazards: Slump	Mass Stability Hazards: Surface Creep
111a	JEAA-3	30	30-60	3-5	1-3	3-4	2-3	2	1-3
	IECA-5	40	30-60	4-5	1-3	3-4	2-3	2	1-3
	JEAA-2	30	30-60	4	2-4	4	3	2	1-3
111a-1	JEAA-5	40	30-60	3-5	1-4	3	3	2	3
	JEAE-3	60	30-70	4-5		3	3-4	2	3-4
111b	JEAA-5	60	30-70	4-5	2 - 4	3	3	2	3
	JEAA-2	30	30-70	2-4	3-6	4	4	2	4
	JEAA-3	10	30-60	3-5	1-3	3	3	2	3-4
111b-1	JEAE-2	70	40-70	4-5	1-3	4	4	2	4
	JEAA-5	15	30-60	4-5	1-3	3	3	2	3
	IFBA-5	15	30-60	4 - 5 / M	3-4	3	3	2	3
111c	IFBD6-3	40	30-60	3-5	2-3	3-4	3	3	3
	JEAA-2	30	30-70	2-4	3-6	4	4	2	4
	JEAE-2	30	40-70	4-5	1-3	4	4	2	4
111d	JEAA-3	20	50-70	4-5	1-3	4	4	3	3-4
	JEAE-2	60	50-80	2-4	1-3	4	4	2	4
	R. O.	20	-	-	-	-	-	-	-
111x	JEAE-2	30	40-80	2-4	1-3	4	4	2	4
	RO	70	-	-	-	-	-	-	-
113	JEAE-2	30	40-80	1-3	1-2	4	4	2	4
	JEAE-3	20	40-80	1-3	1-3	4	4	3	4

	RO	50	-	-	-	-	-	-	-

TABLE 1

LANDTYPE EROSION AND STABILITY HAZARDS

Boise District

Map Symbol	Soil Unit No.	Soil Unit %	Dominant Slope Range Percent	Bedrock Characteristics: Fracturing Class	Bedrock Characteristics: Weathering Class	Inherent Surface Erosion Hazard	Mass Stability Hazards: Debris Slides	Mass Stability Hazards: Slump	Mass Stability Hazards: Surface Creep
120a-2	HBDA-5	20	20-40	3-5/M	4-6	2-3	2	3	2-3
	IECA-5	60	20-60	5/M	3-6	3	2	2-3	2-3
	IFBD-3	20	30-60	3-5	3-6	2-3	2	2	2-3
120b-3	GDEA-4	30	30-50	3-5	2-5	3	2-3	2	2
	GDFA-3	30	40-60	5/M	3-5	3-4	2-3	2	2-3
	GDFQ-5	20	30-65	5/M	3-5	3	2-3	2	2-3
	JECB-2	20	40-65	4-5	2-4	4	3-4	2	4
120b-4	HBDA-4	25	30-50	4	1-6	2	2	3-4	2
	IFBD-3	15	40-60	3-5/M	3-6	3	2	2	3
	IECA-5	30	30-60	5/M	3-6	3	2	3	2
	HBDA-5	30	30-50	4	1-6	3	2	3	2
120b-6	JEAA-3	20	30-60	5/M	3-5	3-4	3	3	3
	JEAA-2	40	30-60	3-5	3-6	3-4	3-4	2	4
	GDFQ-5	40	30-60	5/M	4-6	3	3	3	2-3
120c-3	JEAA-2	15	40-60	3-4/M	2-5	4	4	2	4
	IFBD-1	15	40-70	3-5/M	3-6	4-5	4	2	4
	JEAE-5	40	40-70	5/m	3-5	3	3	3	2-3
	JEAE-3	30	40-70	4	3-6	3-4	3-4	3	3
120c-8	GDFQ-1	30	40-70	3-5	4-6	4	4	2	3-5
	JECA-5	30	35-60	5/M	4-6	3	3	3-4	3
	IFBA-1	20	40-60	4	3	4	4	2	3-4
	JCFA-1	20	35-60	3-5	3-6	4	4	2	3-4
120c-11	IFBA-5	60	25-50	5/M	2-5	3	2	2	2
	IFBD-3	20	25-60	3-4	5	3-4	3	2	3
	GDFA-3	20	25-50	5/M	4-6	3-4	3	2	2-3

TABLE 1

LANDTYPE EROSION AND STABILITY HAZARDS

Boise District

Map Symbol	Soil Unit No	Soil Unit %	Dominant Slope Range Percent	Bedrock Characteristics: Fracturing Class	Bedrock Characteristics: Weathering Class	Inherent Surface Erosion Hazard	Mass Stability Hazards: Debris Slides	Mass Stability Hazards: Slump	Mass Stability Hazards: Surface Creep
120d-2	JEAA-2	30	50-70	3-5	3-6	3-5	4	2	4
	IECA-2	10	50-70	5/M	4-5	3-5	4	2	4
	JEAE-2	20	60-100	4-5	3-6	3-5	4	1	4-5
	RO	40	-	-	-	-	-	-	-
120d-3	IECA-5	60	50-70	5	3-5	3-4	3	4	3-4
	JEAE-2	30	60-70	4-5	2-5	4	4	2	4
	RO	10	-	-	-	-	-	-	-
120d-4	GDFA-5	50	50-70	5/M	4-6	4	3-4	3-4	3-4
	GDFQ-5	40	50-70	5/M	3-6	4	3-4	2	3-4
	RO	10	-	-	-	-	-	-	-
120e-6	JECB-5	30	30-70	M	5-7	4	3	3-4	2-3
	GDEA-4	20	30-60	3-5/M	3-6	4	3	4	2-3
	GDFA-3	50-	30-60	M	5-6	4	3-4	3	3-4
120e-7	JECB-5	30	30-60	2/M	5-6	3	2	1-3	2-3
	GDEA-4	30	10-50	3-5/M	3-6	3	2	2-4	2-3
	GDFA-5	40	20-60	5/M	3-6	3	2	1-3	2-3
121e	IFBA-1	40	10-30	4	3-4	3-4	2-3	2	3
	IFBA-3	40	10-30	4/M	3-6	2-3	2	2	2
	JEAE-2	20	10-30	4/M	3-6	3	3	1	3
122	JCFA-1	15	60-100	3-5	3-6	5	4	3	4
	GDFA-3	15	60-100	4-5/M	6	4-5	4	4	3
	JECB-5	70	60-100	3-5	3-5	4-5	4	4	3
122-1	JEAE-2	20	60-100	5/M	2-4	5	4	2	3-4
	JEAA-5	10	60-100	3-5	2-4	4	3-4	2	3
	RO	70	-	-	-	-	-	-	-
122-4	JEAE-2	30	50-80	5/M	2-5	4	4	2	3-4
	IECA-3	30	50-80	5	4-5		3-4	3-4	3
	IECA-5	40	50-80	5/M	3-6	3-4	3	4	2-3
123-1	IECA-3	50	5-40	8-5/M	4-5	3	2	3	2-3
	IFBD-1	20	5-50	4-5	3-4	4	3	1	3
	GDEA-5	30	5-50	3-5	3-6	2	2	3	2

TABLE 1

LANDTYPE EROSION AND STABILITY HAZARDS

Boise District

Map Symbol	Soil Unit		Dominant Slope Range Percent	Bedrock Characteristics		Inherent Surface Erosion Hazard	Mass Stability Hazards		
	No.	%		Fracturing Class	Weathering Class		Debris Slides	Slump	Surface Creep
123-2	JECB-2	30	30-50	5	2-4	3	3	1	3
	JECA-3	20	20-50	3/M	4-6	3	2	3	2
	JCFA-1	50	20-50	3-5	3-6	3-4	3-4	1	3-4
123-3	IFBA-5	50	40-60	5/M	5-7	3-4	2	3	2
	IFBD-3	50	40-60	4-5	2-5	3	2	3	2
135-1	GDEA-5	0-5	50-70	5	1	3	2	3-4	1
	GDFS-5	0-20	50-80	5	1	3-4	2	4	2
	GDFA-5	0-30	50-70	5	1	3	2	3-4	1
	JECB-2	0-20	50-80	3-5	4	4	3-4	2	3
	RO	0-~~70~~25	-	-	-	-	-	-	-
136-1	GDEA-4	85	0-20	5	1-2	2-3	1	1	1
	GDEL-5	15	0-20	5	1	-	-	-	-
140b-2	GDFA-5	50	30-60	5	3-4	3	2-3	3-4	2
	IEEI-4	20	30-60	3-5	3	3-4	2	4	2
	JECA-5	30	30-60	3-5	3 - 5	3	2	3-4	2
140b-3	IFBA-1	60	30-60	4-5	3	4	4	2	4
	IFBD-3	10	10-60	3-5	3-4	3	2-3	4	2
	HBDA-4	80	30-60	8-5	3-6	3	2-3	4	2
140c-1	GDEA-5	50	25-60	3-5	8-6	3	2	3	2
	JEAA-2	30	25-60	3 - 4	4-6	3-4	3 - 4	2	4
	GDEA-4	20	25-60	3-5	3-6	3	2	3-4	2
140c-2	GDFA-4	20	40-70	3	4-6	4	2-3	4	2-3
	GDFQ-5	10	40-70	5	3-6	4	2-3	3-4	2-3
	JEAA-2	20	40-70	3-5	3-6	4	4	3	4
	RO	10	-	-	-	-	-	-	-

TABLE 1

LANDTYPE EROSION AND STABILITY HAZARDS

Map Symbol	Soil Unit		Dominant Slope Range Percent	Bedrock Characteristics		Inherent Surface Erosion Hazard	Mass Stability Hazards		
	No.	%		Fracturing Class	Weathering Class		Debris Slides	Slump	Surface Creep
140c-3	JECA-5	40	30-60	4-5	3-6	3	3	3-4	3
	JECB-2	25	40-70	4-5	3-6	4	4	2	4
	HBDA-5	35	30-60	3-5	3-6	3	3	4	3
140e-1	JEAA-2	50	20-50	3-5	3-6	3	3	2	3
	IFBA-3	30	10-50	4-5/M	3-6	3	3	2	2
	JEAE-5	20	30-50	3-5	3-6	2	2	3	2
141	JEAA-2	40	5-40	3-5	3-6	3	3	2	3
	IFBA-5	40	5-40	5/M	2-5	2	2	3	2
	JEAE-5	20	10-40	3-5	3-6	2	2	2-3	2
143	GDFA-5	40	5-50	5/M	3-6	2-3	2	3	2
	JECA-5	35	5-50	3-5	4-6	2-3	2	3	2
	JECB-5	25	20-50	4-5	4-6	3	2	2	2

Explanation of Table No. 2
Construction Hazards

This table lists the soil characteristics and interpretations that are important primarily to road construction. Characteristics and interpretations given in Table No. 1 should also be considered in an evaluation of each landtype with regard to construction hazard.
Map Symbol. Mapping symbol representing each landtype.

Soil Unit. Lists the number assigned to individual soils and percentage of each in the landtype. Dominant Slope. Gives the dominant slope range for each soil unit.

Percent of Rock Outcrop. Gives the percentage of rock outcrop (attached bedrock) in each soil unit. Coarse Fragments. This column gives an estimate of the percentage of coarse fragments in three size ranges which correspond to fine gravel (2 mm to 1/2"), medium and coarse gravel (1 to 3"), cobble or stones (>3"). Estimates are made from sieved samples using a 2 mm screen.

Surface Erosion

Cut and Fill Slopes. This column gives five numerical qualitative classes for erosion hazard of cut and fill slopes. Ratings are based on exposed materials according to the same criteria as inherent erosion (Table No. 1). Ratings are based on (a) cut ratios of 3/4:1 on roads 24 feet wide on the dominant slope gradient for the landtype and (b) uncompacted fills with ratios and heights infered from 24 foot wide roads and dominant slope gradient with balance cut and fill design; bare of vegetal cover, bermed and with an outslope grade.

The classes are:

5 - Very High - Unprotected cuts and fills yield excessively high volumes of sediment.

4 - High - Unprotected cuts and fills will yield excessively high volumes of sediment during periods of flashy or long duration runoff.

3 - Moderate - Sufficiently resistant to erosion to permit temporary exposure of bare soil after construction.

2 - Low - Sufficiently resistant to erosion to permit exposure of bare soil under minimal precautionary restrictions.

1 - Very Low - No appreciable erosion hazard.

Road Surface. Three numerical qualitative class ratings are made for the erodibility of the road surface. Ratings are based on road surfaces with tread ruts, compacted by traffic, without wearing or base coarse, having a 6% grade sustained for 500 feet, with minimal lateral sloping or crowning. Only erosion from water generated on the road surface is considered. Composition of roadbed materials are based on depth and texture of soil, amount and size of coarse fragments and kind of fracturing and weathering of underlying bedrock. Classes are:

5 - Very High - Roadbed will yield high amounts of sediment and require constant or extensive repair for maintenance of trafficability.

3 - Moderate - Sufficiently resistant to erosion to require only intermittent or seasonal repair for maintenance of trafficability.

1 - Very Low - Little or no appreciable erosion hazard.

Mass Stability

Cut Slope. This column gives five numerical qualitative classes for mass failure of cut slopes. The hazards are dependent essentially on the same factors as natural slope stability. Generally speaking, a road cut will be less stable than a natural slope. The chief variable is the height and angle of cut. Landtypes with the highest cut slope failure hazards generally have an accumulation of fine-textured homogenous materials, steep slopes, unstable bedrock conditions or a subsurface moisture source. The classes are based on probability of failure and relative volumes of materials that could be expected from mass failures of the cut slopes. The classes are:

5 - Very High - Mass failures of cut slopes yield excessively high volumes of material and constant removal is required to keep sediment from reaching streams and in some cases to maintain trafficability.

4 - High - Mass failures of cut slopes yield high volumes of materials that require removal of materials from the roadbed several times each year.

3 - Moderate - Cut slopes fail each year but yield only such volumes of material that require removal of material on a seasonal basis.

2 - Low - Cut slopes may not fail each year and when they do, only occasional removal of material is required.

1 - Very Low - Cut slopes seldom fail or produce very low amounts of material.

Fill Slopes. This column gives five numerical qualitative classes for mass failure of fill slopes. The classes are rated on probability of failure and the strength properties of the materials used in the construction of fills. The mass failure of fills is highest when materials are poorly graded, fine-textured, and subject to saturation at the base. The classes are:

5 - Very High - The probability of failure is high and failure of fill slopes will yield excessively high volumes of sediment to stream channels and/or roadbed will require frequent extensive repair to maintain trafficability.

4 - High - The probability of failure is high even with intensive prevention treatment. Failure of fill slopes will yield moderate to high amounts of sediment to stream channels and/or the roadbed will require frequent repair to maintain trafficability.

3 - Moderate - The probability of failure is high unless intensive prevention treatments are used. Failure of fill slopes will yield moderate to high amounts of sediment to stream channels and/or the roadbed will require repair to maintain trafficability.

2 - Low - Some failures can be expected with normal precautionary measures. Failures of fill slopes will yield moderate to high amounts of sediment to stream channels and/or the roadbed will require repair to maintain trafficability.

1 - Very Low - Probability of mass failure is small or sediment yields are low and/or roads require only occasional repair.

Revegetation Potential

Cut and Fill Slopes. This column gives five numerical qualitative classes for potential of revegetation of cut and fill slopes to establish a protective cover. Criteria used to arrive at the classes are soil texture, water holding capacity, depth of soil, and climatic limitations. This rating does not consider possibility of specialized revegetation practices such as hydro-seeding or use of mats. The classes are:

5 - Very High - Excellent response to revegetation can be expected the first year with normal accepted practices.

4 - High - Good response to revegetation can be expected the first year with normal accepted practices.

3 - Moderate - Fair response to revegetation can be expected the first year with normal practices. More than one year may be necessary to establish a protective vegetated cover. Limitations are soil profiles with limited water-holding capacity or somewhat adverse climatic conditions.

2 - Low - Poor response can be expected by using normal revegetation practices. Limitations are coarse textured or shallow soils with low water-holding capacity, low fertility level or adverse climatic conditions.

1 - Very Low - Little or no response can be expected by using normal revegetation practices. Limitations are very coarse extured or shallow soils with very low water-holding capacity and low fertility level or adverse climatic conditions.

Trafficability. The trafficability interpretation is composed of several factors. Bearing strength as reflected by soil texture of the surface horizons and control section combined with the amount of rutting and the traction problems associated with fine textured soils are the main factors. A "weighted" soil texture is used depending on the expected depth of cut. Surfaces of roads on gentle slopes generally contain more surface material than do those road surfaces constructed on steep slopes where considerable amounts of the control section material, and possibly bedrock, are used. This interpretation rates road surfaces that have no surfacing such as work roads and other low standard roads. Classes are:

5 - Very Good - Fragmental and loamy skeletal families with coarse fragments 3/4" diameter and larger and roads built in hard, well fractured bedrock. Road surfaces are resistant to erosion, and there are few rutting and traction problems. Intermittent maintenance is needed.

4 - Good - Coarse loamy, coarse silty, and loamy skeletal families with coarse fragments less than 3/4" diameter. Road surfaces need only seasonal maintenance to insure trafficability. Ruts are not usually formed in wet weather and there are few traction problems.

3 - Fair - Fine loamy, fine silty, sandy, and clayey skeletal families. Road surfaces need maintenance several times during a season to reduce ruts. Some traction problems exist when clayey surfaces are wet and with sandy surfaces.

2 - Poor - Fine clayey, very fine clayey families, and surfaces from organic soils. Road surfaces need constant maintenance during wet weather. Rutting is severe and traction problems indicate the use of 4-wheel drive which is not always successful.

1 - Very Poor - Permanently wet soils with a water table at,or near the surface. Soils are for the most part impossible to traffic.

TABLE 2
CONSTRUCTION HAZARDS

Boise District

Map Symbol	Soil Unit No.	Soil Unit %	% Dominant Slope	rock outcrop %	% Coarse Fragment 2mm-1/2"	% Coarse Fragment 1/2-3"	% Coarse Fragment >3"	Surface Erosion Slope Cut	Surface Erosion Slope Fill	Surface Erosion Road surface	Mass Stability Slone Cut	Mass Stability Slone Fill	Revegetation Potential Slope Cut	Revegetation Potential Slope Fill	Trafficability
101	JECA-2	40	0-5	0	15	15	20	-	-	3	-	-	2	3	4
	JECA-S	40	0-5	0	10	15	30	-	-	1	-	-	3	4	4-5
	JCFA-1	20	0-5	0	10	5	5	-	-	3	-	-	2	3	3
102	HBDA-4	30	0-5	0	0	0	10	-	-	3	0	0	3	4	
	HBDA-5	50	0-15	0	20	10	30	-	-	1	1	2	3	4	4
	JEAA-2	20	5-15	0	30	10	20	-	-	3	1	2	2	3	
104	JEAA-2	70	2-15	0	10	20	30		-	3	2	2	2	3	4
	IFBA-3	30	2-15	0	10	10	10	-	-	3	3	3	3	4	4
105-4	GDEA-4	40	10-20	0	5	0	0	3-4	2-3	3	4-5	1-3	3	4	3
	GDEA-6	20	10-1	0	5	0	0	3	3	3	3-4	3-4	3	3	2
	GDEL-5	40	0-5	<5	10	20	20	3	2-3	1	2	2	2	4	4
105-5	JCFA-1	20	5-15	0	10	5	0	3	4	5	2	3	2	3	3
	JECA-2	80	5-20	0	35	5	0	3	3	5	2	2	2	3	4
106	HBDA-4	20	5-15	0	10	10	5	2	2	3	3	3	3	4	3
	HBDA-5	20	5-20	0	15	5	10	3	3	3	2	2	3	4	3
	IECA-5	40	5-30	0	25	20	10	2	2	1	2	2	3	4	5
	JEAA-2	20	5-30	0	30	10	20	3	3	3	2	2	2	3	4
106-2	JEAA-2	50	10-40	0	10	20	20	3	3	3	2	2	2	3	4
	IFBA-5	50	10-40	0	25	20	10	2	2	1	2	2	3	3	4-5
107-1	GDFA-4	50	10-25	0	5	0	10	2	2	3	3-4	3-4	3	4	3
	JECA-5	50	10-25	0	20	10	15	2	2	1	3-4	3-4	3	4	4-5

TABLE 2

CONSTRUCTION HAZARDS

Boise District

Map Symbol	Soil Unit No.	Soil Unit %	% Dominant Slope	Rock Outcrop %	% Coarse Fragment 2mm-1/2"	% Coarse Fragment 1/2--3"	% Coarse Fragment >3"	Surface Erosion slope Cut	Surface Erosion slope Fill	Surface Erosion Road surface	Mass Stability Slope Cut	Mass Stability Slope Fill	Revegetation Potential Slope Cut	Revegetation Potential Slope Fill	Trafficability
108	JEAA-5	3	20-60	0	25	10	20	2	2	1	3	3	9	3	5
	IFBA-3	30	20-50	0	10	5	5	2	2	3	3	9	3	3	4
	IFBA-5	40	20-60	0	15	10	10	2	2	1-3	3	3	3	3	4-5
109-2	IFBD-3	30	10-30	<5	10	0	0	2	3	3	3	3	2	3	3
	IECA-2	40	5-20	0	20	10	15	3	3	3	2	2	2	3	4
	IFBA-3	30	5-20	0	20	0	0	2	3	3	2	3	8	3	4
109a-1	JEAA-3	30	30-60	0	5	2	2	3	4	3	3	3	2	3	4
	JEAA-5	30	30-60	0	30	5	20	3	3	1	3	3	2	3	5
	JEAE-5	40	40-70	<5	25	10	2	3	3	1	2	3	1	3	4-5
109b	JEAA-2	30	20-60	0	35	5	10	4	4	5	2	2	2	3	4
	IECA-5	40	20-60	0	30	0	30	3	3	1	3	3	2	3	5
	JEAE-5	30	30-60	<5	25	10	2	3	3	1-3	3	3	1	4	4
109c	IFBA-3	50	25-50	0	20	5	5	4	4	3	3	3	3	3	4
	JEAE-5	30	25-65	<5	25	10	10	4	2	1	2	3	1	3	4-5
	JECA-5	20	25-65	0	30	5	0	3	2	3	3	3	3	3	4
109d-1	JEAA-5	65	60-70	0	30	10	5	3	2	3	3	3	2	3	4
	JEAE-5	25	55-75	0	25	10	2	3	2	3	3	4	1	3	4
	RO	-	-	10	-	-	-	-	-	-	-	-	-	-	-
109g	IFBA-5	80	25-60	0	30	15	10	3	3	1	3	3	2	3	5
	JEAE-2	20	40-70	<5	25	10	10	4	3	3	2	2	1	3	4
110	JEAD-3	20	0-5	0	15	0	5	4	3	3	1	2	1	3	4
	JEAA-2	30	2-30	0	23	15	20	4	3	3	1	2	3	4	4
	IECA-5	20	2-30	0	35	5	20	3	2	1	2	3	3	3	5
	RO	-	-	30	-	-	-	-	-	-	-	-	-	-	-

TABLE 2

CONSTRUCTION HAZARDS

Page 3

Boise District

Map Symbol	Soil Unit		Dominant Slope	Rock Outcrop %	% Coarse Fragment			Surface Erosion			Mass Stability		Ravagetation Potential		Trafficability
								Slope		Road surface	Slope		Slope		
	No.	%			2mm-1/2"	1/2-3"	>3"	Cut	Fill		Cut	Fill	Cut	Fill	
110x	JEAA-2	10	5-40	0	25	15	20	4	3	3	2	2	2	3	4
	JEAE-5	50	50-15	<5	15	5	20	4	3	1-3	2	3	1	3	4-5
	RO	-	-	40	-	-	-	-	-	-	-	-	-	-	-
111a	JEAA-3	30	30-60	0	10	5	10	4	3	3	3	3	2	3	4
	IECA-5	40	30-60	0	15	0	25	3	2	1	3	3	2		4
	JEAA-2	30	30-60	0	25	15	20	4	3	3	2	2	2	3	4
111a-1	JEAA-5	40	30-60	0	30	10	5	4	2	1	3	3	2	3	4-5
	JEAE-3	60	30-70	<5	15	5	5	4	4	1-3	3	4	1	3	4
111b	JEAA-5	60	30-70	0	30	20	15	3	2	1	3	4	2	3	5
	JEAA-2	30	30-70	0	25	15	15	4	3	3	2	3	2		4
	JEAA-3	10	30-60	0	20	5	5	4	3	3	3	3	2	3	4
111b-1	JEAE-2	70	40-70	<5	35	15	35	4	3	1-3	2	3	1		4
	JEAA-5	15	30-60	0	30	10	5	3	2	1	3	3	2	3	4
	IFBA-5	15	30-60	0	15	15	10	3	2	1	3	3	2	3	4
111c	IFBD-3	40	30-60	<5	20	0	5	4	3	1-3	3	4	1	3	4
	JEAA-2	30	30-70	0	25	15	5	4	3	3	2	3	2	3	4
	JEAE-2	30	40-70	<5	35	15	10	4	3	1-3	2	3	1	3	4
111d	JEAA-3	20	50-70	0	15	10	5	4	3	3	3	4	2	3	4
	JEAE-2	75	50-80	0	20	20	40	4	3	3	2	2	1		
	R0	-	-	70	-	-	-	-	-	-	-	-	-	-	-
111x	JEAE-2	30	40-80	0	20	20	40	4	3	3	3	2	1	3	4
	R0	-	-	70	-	-	-	-	-	-	-	-	-	-	-

TABLE 2

CONSTRUCTION HAZARDS

Boise District

Map Symbol	Soil Unit No.	Soil Unit %	% Deminant Slope	Rock Outcrop %	% Coarse Fragment 2mm-1/2"	% Coarse Fragment 1/2-3"	% Coarse Fragment >3"	Surface Erosion Slope Cut	Surface Erosion Slope Fill	Surface Erosion Road surface	Mass Stability Slope Cut	Mass Stability Slope Fill	Ravagetation Potential Slope Cut	Ravagetation Potential Slope Fill	Trafficability
113	JEAE-2	30	40-80	0	20	10	90	4	3	3	2	3	1	3	4
	JEAE-3	20	40-80	0	20	5	10	4	3	3	3	3	1	3	4
	RO-	-	50	-	-	-	-	-	-	-	-	-	-	-	-
120a-2	HBDA-5	20	20-40	0	10	30	20	3	2	1	3	3	3	4	4
	IECA-5	60	20-60	0	30	15	10	3	2	1	3	3	3	4	5
	IFBD-3	20	30-60	0	10	0	0	3	3	3	4	4	2	4	4-5
120b-3	GDEA-4	30	30-50	0	5	0	Tr	3	3	3	4	4	3	3	3
	GDFA-3	30	40-60	0	15	0	0	3	3	3	3	4	3	3	4
	GDFO-5	20	30-65	<5	20	20	20	3	2	1	3	3	1	3	4
	JECB-2	20	40-65	<5	20	15	5	4	3	3	2	2	1	3	4
120b-4	HBDA-4	25	30-50	0	10	0	0	3	3	3	4	4	3	4	3
	IFED-3	15	40-60	<5	20	0	5	4	3	3	3	3	2	4	4
	IECA-5	30	30-60	0	20	20	20	3	2	1	3	3	3	4	5
	HBDA-5	30	30-50	0	10	30	20	3	2	1	3	3	3	4	4
120b-6	JEAA-3	20	30-60	0	15	0	5	3	3	3	3	4	3	4	4
	JEAA-2	40	30-60	0	25	15	5	4	3	3	2	3	3	4	4
	GDFO-5	40	30-60	<5	20	20	20	3	2	1	2	2	2	4	4-5
120c-3	JEAA-2	15	40-60	0	20	10	20	4	3	3	2	2	2	3	4
	IFBD-1	15	40-70	<5	20	10	0	5	4	3-5	3	4	1	3	3 - 4
	JEAE-5	40	40-70	<5	30	10	20	3	2	1	3	3	2	4	5
	JEAE-3	30	40-70	<5	15	0	0	4	3	3	3	4	2	4	4

TABLE 2

CONSTRUCTION HAZARDS

Map Symbol	Soil Unit No.	Soil Unit %	% Dominant Slope	Rock Outcrop %	% Coarse Fragment 2mm-1/2"	% Coarse Fragment 1/2-3"	% Coarse Fragment >3"	Surface Erosion Slope Cut	Surface Erosion Slope Fill	Surface Erosion Road surface	Mass Stability Slope Cut	Mass Stability Slope Fill	Revegetation Potential Slope Cut	Revegetation Potential Slope Fill	Trafficability
120c-8	GDFQ-1	30	40-70	<5	15	0	5	5	5	5	3	4	1	9	3-4
	JECA-5	30	35-60	0	25	5	5	3	2	3	3	3	3	3	4
	IFBA-1	20	40-60	0	10	0	0	5	5	3-5	3	4	2	3	3
	JCFA-1	20	33-60	0	5	0	0	5	5	5	3	4	2	3	3
120c-11	IFBA-5	60	25-50	0	35	10	5	3	2	1	3	3	3	4	4
	IFBD-3	20	25-60	<5	20	5	10	4	3	3	3	3	2	4	4
	GDFA-3	20	25-50	0	15	0	0	3	3	3	3	4	3	4	4
120d-2	JEAA-2	30	50-70	0	30	10	10	4	3	3	2	2	1	3	4
	IECA-2	10	50-70	0	20	10	10	4	3	3	2	2	1	3	4
	JEAE-2	20	60-100	0	30	10	20	4	3	3	3	3	1	3	4
	RO	-	-	40	-	-	-	-	-	-	-	-	-	-	
120d-3	IECA-5	60	50-70	0	25	15	10	3	2	1	3	3	3	4	4
	JEAE-2	30	60-70	0	25	10	15	4	3	3	3	3	1	3	4-5
	RO	-	-	10	-	-	-	-	-	-	-		-	-	
120d-4	GDFA-5	50	50-70	0	30	10	Tr	3	3	3	3	3	2	3	4
	GDEQ-5	40	50-70	0	20	20	5	4	2	1	3	3	1	3	4
	RO	-	-	10	-	-	-	-	-	-	-	-	-	-	
120e-6	JECB-5	30	30-70	<5	30	0	Tr	3	3	3	3	3	1	3	4
	GDEA-4	20	30-60	0	10	0	0	3	3	3	4	4	3	3	3
	CDEA-3	50	30-60	0	20	0	0	3	3	3	3	4	3	3	4
120e-7	JECB-5	30	30-60	<5	30	15	5	4	2	1-3	3	3	1	3	4
	GDEA-4	30	10-50	0	5	0	0	3	3	3	4	4	3	3	3
	GDFA-3	40	20-60	0	25	0	0	3	3	3	3	4	3	3	4

TABLE 2

CONSTRUCTION HAZARDS

Boise District

Map Symbol	Soil Unit		% Dominant Slope	Rock Outcrop %	% Coarse Fragment			Surface Erosion			Mass Stability		Revegetation Potential		Trafficability
								Slope		Road surface	Slope		Slope		
	No.	%			2mm-1/2"	1/2-3"	>3"	Cut	Fill		Cut	Fill	Cut	Fill	
121e	IFBA-1	40	10-30	0	20	0	0	5	5	5	2	3	2	3	3
	IFbA-3	40	10-30	0	15	5	0	3	3	3	2	3	3	4	4
	JEAE-2	20	10-30	5	30	0	15	5	4	3	2	2	2	3	4
122	JCFA-1	15	60-100	0	20	0	0	5	5	5	3	3	1	2	3
	GDFA-3	15	60-100	0	20	0	0	3	3	3	4	4	2	3	4
	JECB-5	70	60-100	<5	25	20	20	3	2	1	4	4	1	3	4
122-1	JEAE-2	20	60-100	0	25	15	10	5	4	3	3	3	1	3	4
	JEAA-5	10	60-100	0	35	0	15	3	3	3	4	4	2	3	4
	RO	-	-	70	-	-	-	-	-	-	-	-	-	-	-
122-4	JEAE-2	30	50-80	0	25	10	15	4	3	3	3	3	1	3	4
	IECA-3	40	50-80	0	30	0	0	4	4	3	4	4	3	3	4
	IECA-5	30	50-80	0	20	30	20	3	2	1	4	4	3	4	5
123-1	IECA-3	50	5-40	0	20	0	0	4	4	3	2	3	3	3	4
	IFBD-1	20	5-50	<5	20	0	0	5	5	3-5	2	3	1	3	3
	GDEA-5	30	5-50	0	15	5	30	3	2	1	3	3	3	4	4 - 5
123-2	JECB-2	30	30-50	<5	20	10	15	5	4	3-5	3	3	1	3	4
	JECA-3	20	20-50	0	15	5	5	3	3	3	3	3	3	3	4
	JCFA-1	50	20-50	0	10	0	0	5	5	5	2	3	2	3	3
123-3	IFBA-5	50	40-60	0	30	5	5	3	3	3	3	3	3	4	4
	IFBD-3	50	40-60	<5	20	0	0	3	3	3	4	4	1	3	3
135-1	GDEA-5	0-5	50-70	0	10	5	30	3	2	1	3	4	2	4	4
	GDFS-5	0-20	50-80	0	15	10	30	3	2	1	3	4	2	4	4
	GDFA-5	0-30	50-70	0	10	15	20	3	2	1	4	4	2	4	4
	JECB-2	0-20	50-80	0	15	15	30	4	4	3	2	2	1	3	4

TABLE 2
CONSTRUCTION HAZARDS

Map Symbol	Soil Unit No.	Soil Unit %	% Dominant Slope	Rock Outcrop %	% Coarse Fragment 2mm-1/2"	% Coarse Fragment 1/2-3"	% Coarse Fragment >3"	Surface Erosion Slope Cut	Surface Erosion Slope Fill	Surface Erosion Road surface	Mass Stability Slope Cut	Mass Stability Slope Fill	Revegetation Potential Slope Cut	Revegetation Potential Slope Fill	Trafficability
136-1	GDEA-4	85	0-20	0	5	0	0	3	2	3	3	4	2	3	3
	GDEL-5	15	0-20	<5	10	10	20	3	2	1	3	4	2	4	4
140b-2	GDFA-5	50	30-60	0	30	10	0	3	3	3	3	3	3	4	4
	IEEI-4	20	30-60	<5	8	0	0	3	3	3	3	4	1	4	4
	JECA-5	30	30-60	0	25	15	5	3	2	1	3	3	3	4	4
140b-3	IFBA-1	60	30-60	0	10	0	0	5	5	5	3	3	2	3	3
	IFBD-3	10	30-60	<5	10	0	0	3	3	3	3	4	2	3	3
	HBDA-4	40	30-60	0	15	0	0	3	3	3	4	4	3	3	3
140c-1	GDEA-5	50	25-60	0	15	5	0	3	3	3	3	4	3	4	4
	JEAA-2	30	25-60	0	25	15	5	5	4	3	2	3	2	3	4
	GDEA-4	20	25-60	0	5	0	0	3	3	3	4	4	3	4	3
140c-2	GDFA-4	20	40-70	0	15	0	0	3	3	3	4	4	3	3	3
	GDFQ-5	50	40-70	0	20	20	10	3	2	1	3	3	2	3	4
	JEAA-2	20	40-70	0	20	10	20	5	4	3	2	2	2	3	4
	RO	-	-	10	-	-	-	-	-	-	-	-	-	-	-
140c-3	JECA-5	40	30-60	0	30	10	15	3	2	1	3	3	3	3	5
	JECB-2	25	40-70	<5	20	15	25	5	4	3	2	2	1	3	4
	HBDA-5	35	30-40	0	30	10	30	3	3	3	4	4	3	3	3
140e-1	JEAA-2	50	20-50	0	30	10	10	5	4	3	2	2	2	3	4
	IFBA-3	30	10-50	0	15	5	0	3	3	3	4	4	3	3	4
	JEAE-5	20	30-50	<5	30	10	20	3	2	1-3	3	3	2	4	5

TABLE 2

CONSTRUCTION HAZARDS

Map Symbol	Soil Unit No.	Soil Unit %	% Dominant Slope	Rock Outcrop %	% Coarse Fragment 2mm-1/2"	% Coarse Fragment 1/2-3"	% Coarse Fragment >3"	Surface Erosion Slope Cut	Surface Erosion Slope Fill	Surface Erosion Road surface	Mass Stability Slope Cut	Mass Stability Slope Fill	Ravagetation Potential Slope Cut	Ravagetation Potential Slope Fill	**Traffi-**cability
141	JEAA-2	40	5-40	0	25	15	10	5	4	3	2	2	2	3	4
	IFBA-5	40	5-40	0	25	20	10 10	3	2	1	3	3	3	4	5
	JEAE-5	20	10-40	<5	30	10	10	3	2	1-3	3	3	2	4	4-5
143	GDFA-5	40	5-50	0	30	20	0	3	2	1	3	3	3	4	4
	JECA-5	35	5-50	0	25	10	10	3	2	1	2	3	3	4	4
	JECB-5	25	20-50	<5	25	20	5	3	2	1-3	3	3	2	4	4

Explanation of Table No. 3
Soil Hydrologic Characteristics

This table lists the soil characteristics and related interpretations that are important in determining soil hydrologic functions. Where soils occur in more than one landtype, the interpretations or vegetative cover may differ.

Map Symbol. Mapping Symbol representing each landtype.

Soil Unit. Lists the number assigned to individual soils and percentage of each in the landtype.

Depth to Bedrock. This column gives the dominant range in depth to the underlying bedrock.

Infiltration. Infiltration is the rate at which water enters the soil. The infiltration rate of a soil is controlled by the structure, porosity and texture of the surface layers. Five qualitative classes are used and they have the following quantitative ranges expressed in inches of water per hour.

Class	Rate (Inches/hr.)
1. Very Slow	Less than 0.20
2. Slow	0.20 - 0.63
3. Moderate	0.63 - 2.0
4. Rapid	2.0 - 6.3
5. Very Rapid	More than 6.3

Permeability. Permeability is the rate at which water moves through the soil. The permeability of a soil is determined primarily by structure and texture of the soil profile below the surface layers. The same five classes are used for permeability as were used for infiltration.

Available Water-holding Capacity. This column gives the water retention capacity of the soil profile and is expressed in inches of water. Available water, as used in this report, is the water in the soil profile that is available to plant roots. The figures in this column are net figures because hydroscopic and gravitational water have been subtracted. These figures are based on the mineral portion of the soil profile. The retention figures were calculated by using average water-holding capacities of specified soil textures. These figures were obtained from the FSH 2509.15 (Handbook on Soils), Figure 6.5 in Chapter 6. Contrasting textures in a soil profile were calculated separately and totaled to arrive at the retention capacity of the profile and reductions were made when significant amounts of gravel and/or rock occurred in the profile.

The amount of water which a soil can hold depends primarily upon its texture. The amount of organic matter in the soil also is an important factor in determining the water-holding capacity of the soil. In soils, water is held in soil pores. Forces holding the water are primarily those of surface tension or surface attraction. Large pore spaces in sandy soils will not hold water very tightly and hence much of the water is lost through gravity and carried away as deep soil drainage. Smaller pores found in finer-textured soils hold the water much more tightly. A larger portion of the soil water is retained by these soils and this accounts for the finer textured soils retaining more water which represents the available and hydroscopic (unavailable) water in the soil.

Bedrock Penetration. This column gives three qualitative classes for penetration of the bedrock by moisture. There are no quantitative figures available and little is actually known concerning the degree and rate of penetration of the bedrock by moisture. These classes are purely relative and are based on characteristics of the bedrock such as fracturing and weathering. The three classes are as follows:

High - The bedrock is well to extremely well fractured weakly weathered to hard unweathered.

Moderate - The bedrock is moderately fractured, moderately hard to moderately weathered.

Low - The bedrock is massive, hard and unweathered, or soft moderately well to very well weathered with masked fracturing.

The definitions for the degrees of fracturing and weathering are the same as found under Bedrock Characteristics, Table 1.

Channel Armoring Quality. Road drainage systems, water diversion ditches and trails often divert water from natural drainageways or concentrate water and deposit it onto slopes. This interpretation gives a numerical qualitative rating of the relative ability of a soil to develop a stable channel for the artificially concentrated or diverted water. These ratings assume similar conditions of all external variables such as slope gradient, water concentration, etc. Ratings are based primarily on size and amounts of coarse fragments greater than 1/2" in diameter on subsurface horizons. The three ratings are as follows:

5 Good - All soil horizons below 8" of the surface contain over 35 percent by volume competent coarse fragments over inch diameter of which at least 1/3 exceeds 3" diameter.

3 Fair - All soil horizons below 8" of the surface contain 20 to 35 percent by volume competent coarse fragments over 1/2 inch diameter of which at least 1/10 exceeds 3" diameter.

1 Poor - All soil horizons below 8" of the surface contain less than 20 percent by volumn of competent coarse fragments over 1/2" in size.

Vegetation Plus Litter. This column gives the percentage of ground cover which includes the basal area of the plants plus litter older than one year.

Surface Rock ->3/4 Inch Diameter. This column gives the percentage of the surface covered by rock fragments that are larger than 3/4 inch in diameter.

Forest Crown Cover. This column gives the range in percent forest crown cover for tree species greater than 10 feet tall.

Brush Crown Density. This column gives the range in percent for the understory crown cover which includes brush, shrubs, and trees less than 10 feet tall.

TABLE 3

SOIL HYDROLOGIC CHARACTERISTICS

Boise District

Map Symbol	Soil Unit No.	Soil Unit %	Depth to Bedrock	Infil-tration	Permea-bility	Available Water Capacity	Bedrock Penetra-tion	Channel Amoring Quality	Vege-tation Plus Litter	% Surface Rock >3/4"	% Forest Crown Density	% Brush Crown Density
101	JECA-2	40	60+	4	4	2.8	-	3	20-60	5-20	0-15	0-30
	JECA-5	40	60+	4	4	4.0	-	3	75	10-40	0-40	15
	JCFA-1	20	60+	4-5	4-5	5.0	-	1	20-70	0-15	0-20	0-40
102	HBDA-4	30	60+	3	2	5.1	-	1	50-90	5-30	50-70	5-20
	HBDA-5	50	60+	3	3	6.4	-	2	60-80	10-35	5-60	0-60
	JEAA-2	20	60+	4	4	4.5	-	2	30-60	15-55	0-45	5-25
104	JEAA-2	70	60+	4	4	4.5	-	3	30-60	15-55	0-45	5-25
	IFBA-3	30	60+	4	4	4.8	-	2	75-90	0-20	40-70	5-25
105-4	GDEA-4	40	60+	3	2	10.0	-	1	70	5	0	0-10
	GDEA-6	20	60+	2	2	10.0	-	1	80	5	0	20
	GDEL-5	40	<20	2	2	2.5	-	3	70	0-5	0	10
105-5	JCFA-1	20	60+	4-5	4-5	5.0	-	1	5-20	30	0	0-5
	JECA-2	80	60+	4	4	2.8	-	1	5-40	20-40	0	0-60
106	HBDA-4	20	60+	3	2	5.1	-	1	50-90	5-30	50-70	5-20
	HBDA-5		60+	3	3	6.4	-	1	60-80	10-35	5-60	0-40
	IECA-5		60+	4	4	3.2	-	2	50-70	5-20	20-70	20-40
	JEAA-2	20	60+	4	4	4.5	-	2	30-60	15-55	0-45	5-25
106-2	JEAA-2	50	60+	4	4	4.5	-	3	30-60	15-55	0-45	5-25
	IFBA-5	50	60+	3-4	3-4	3.6	-	2	50-80	5-30	10-70	10-40
107-1	GDFA-4	50	30-60	3	2-3	7.2	3	1	20-65	10-20	0-5	10-40
	JECA-5	50	20-40	4	4	5.2	3	2	30-60	5-25	0	5-20

TABLE 3

SOIL HYDROLOGIC CHARACTERISTICS Boise District

Map Symbol	Soil Unit No.	Soil Unit %	Depth to Bedrock	Infil-tration	Permea-bility	Availabl e Water Capacity	Bedrock Penetra-tion	Channel Amoring Quality	Vege-tation Plus Litter	% Surface Rock >3/4"	% Forest Crown Density	% Brush Crown Density
108	JEAA-5	30	20-40	4	4	3.6	5	2	30-60	5-50	15-60	5-30
	IFBA-3	30	20-60	4	4	3.6	3-5	1	50-80	5-30	10-70	10-40
	IFBA-5	40	20-60	3-4	3-4	4.8	3-5	2	75-90	0-20	40-70	5-25
109-2	IFBD-3	30	13-18	4	4	1.2	3	1	10-40	0-5	0-10	0-30
	IECA-2	40	20-60	3-4	5	4.6	3-5	2	85	0-5	0-10	0-30
	IFBA-3	30	20-60	4	4	3.4	3-5	1	25	0-30	10-15	10-40
109a-1	JEAA-3	30	20-60	4	4	3.6	3-5	1	25-40	5-30	10-15	20-30
	JEAA-5	30	20-40	4	4	3.6	3	2	30-60	5-50	15-30	5-30
	JEAE-5	40	5-20	4	4	1.6	3	1	10-25	10-60	10-35	0-30
109b	JEAA-2	30	20-50	4	4	3.0	3	1	30-60	15-55	0-45	5-35
	IECA-5	40	20-60	4	4	2.4	1-3	2	10-40	0-30	5-40	20-50
	JEAE-5	30	5-20	4	4	1.2	3	1	10-25	10-40	10-35	10-30
109c	IFBA-3	50	20-60	4	4	3.6	3-5	1	35-80	30	15-60	40
	JEAE-5	30	5-20	4	4	1.6	3-5	2	30	50	5	60
	JECA-5	20	20-40	4	4	2.0	1-3	1	40	20	5-30	0-25
109d-1	JEAA-5	70	20-40	4	4	3.0-3.4	3	1	50-60	0-5	35	20-70
	JEAE-5	25	5-20	4	4	1.6	1-3	1	45	Tr	30	70
	RO	5	-	-	-	-	-	-	-	-	-	-
109g	IFBA-5	80	20-60	3-4	3-4	4.8	3-5	2	70	5	20-30	30
	JEAE-2	20	5-20	4	4	1.2	3-5	2	5-50	30-60	5-20	5-40
110	JEAD-3	20	20-60	4	4	4.0	1-3	1	70-85	5-20	70	10
	JEAA-2	30	20-50	4	4	3.0	3-5	3	30-50	30-50	10-50	5-20
	IECA-5	20	20-60	4	4	3.2	3-5	2	50-70	5-20	20-70	20-40
	RO	30	-	-	-	-	-	-	-	-	-	-

TABLE 3

SOIL HYDROLOGIC CHARACTERISTICS

Boise District

Map Symbol	Soil Unit No.	Soil Unit %	Depth to Bedrock	Infil-tration	Permea-bility	Available Water Capacity	Bedrock Penetra-tion	Channel Amoring Quality	Vege-tation Plus Litter	% Surface Rock >3/4"	% Forest Crown Density	% Brush Crown Density
110x	JEAA-2	10	20-50	4	4	3.0	5	3	20-50	15-55	0-45	5-25
	JEAE-3	50	5-20	4	4	1.6	3-5	2	35	45	10	0-20
	RO	40	-	-	-	-	-	-	-	-	-	-
111a	JEAA-3	30	20-60	4	4	2.7	5	1	25-40	5-30	10-15	10-30
	IECA-5	40	20-60	4	4	3.2	5	2	30-80	5-20	20-70	20-40
	JEAA-2	30	20-50	4	4	3.0	3-5	3	30-70	20-55	10-50	5-20
111a-1	JEAA-5	40	20-40	4	4	3.6	3-5	1	40-70	15-30	0-20	0-50
	JEAE-3	60	5-20	3-4	3-4	1.4	3-5	1	5-50	30-60	5-20	5-40
111b	JEAA-5	60	20-40	4	4	3.6	3-5	3	30-60	5-50	15-60	5-30
	JEAE-2	30	20-50	4	4	3.0	1-3	2	30-50	30-55	10-70	5-20
	JEAA-3	10	20-60	4	4	2.7	5	1	25-40	5-30	10-75	30-50
111b-1	JEAE-2	70	5-20	4	5	1.2	5	3	5-50	30-60	5-20	5-40
	JEAA-5	15	20-40	4	4	3.6	3-5	1	30-60	5-50	15-40	5-30
	IFBA-5	15	20-60	3-4	3-4	3.6	1-3	2	50-80	5-30	10-50	10-40
111c	IFBD -3	40	13-18	4	4	1.6	3-5	1	20-90	5-40	20-50	10-30
	JEAA-2	30	20-50	4	4	3.0	1-3	2	30-60	15-45	0-45	5-25
	JEAE-2	30	5-20	4	5	1.2	3-5	2	5-50	30-40	5-20	5-40
111d	JEAA-3	20	20-60	4	4	2.7	5	1	25-40	5-30	10-15	30
	JEAE-2	60	5-20	4	5	1.2	3	3	5-50			5-40
	RO	20	-	-	-	-	-	-	-	-	-	-
111x	JEAE-2	30-70	5-20	4	5	1.2	1-3	3	5-50	30-60	5-20	5-30
	RO	30-70	-	-	-	-	-	-	-	-	-	-

TABLE 3

SOIL HYDROLOGIC CHARACTERISTICS

Boise District

Map Symbol	Soil Unit No.	Soil Unit %	Depth to Bedrock	Infil-tration	Permea-bility	Available Water Capacity	Bedrock Penetra-tion	Channel Amoring Quality	Vege-tation Plus Litter	% Surface Rock >3/4"	% Forest Crown Density	% Brush Crown Density
113	JEAE-2	30	5-20	4	5	1.2	1	3	5-50	30-60	0-20	5-40
	JEAE-3	20	5-20	3-4	3-4	1.2	1-3	1	10-40	10-60	5-10	10-30
	RO	50	-	-	-	-	-	-	-	-	-	-
120a-2	HBDA-5	20	40-60	3	3	6.4	1-3	3	60-80	10-35	15-70	0-40
	IECA-5	60	20-60	4	4	3.2	3-5	2	50-70	5-20	20-70	20-40
	IFBD-3	20	13-18	4	4	1.5	3	1	60-80	5-20	40-70	20-30
120b-3	GDEA-4	30	30+	3	2	10.0	3	1	50	20	0-5	35
	GDFA-3	30	20-60	4	3-4	4.8	3	1	60	10	0	30
	GDFQ-5	20	<20	4	4	1.5	1-3	3	60	10	0	30
	JECB-2	20	8-18	5	5	0.9	1-3	2	40	2-10	0	5-10
120b-4	HBDA-4	25	30-60	3	2	5.1	1-5	1	50-100	5-30	50-70	5-50
	IFBD-3	15	13-18	4	4	1.4	3	1	60-80	5-20	10-30	20-30
	IECA-5	30	20-60	4	4	6.0	3	3	65-85	5-15	40-70	20-30
	HBDA-5	30	40-60	3	3	6.4	1-5	3	60-80	10-35	15-60	10-40
120b-6	JEAA-3	20	20-40	4	4	2.7	3	1	25-40	5-30	10-15	20-30
	JEAA-2	40	20-50	4	4	3.0	3	2	30-50	30-50	10-50	5-20
	GDFQ-5	40	<20	4	4	1.5	1-3	3	60	10	0-15	30-70
120c-3	JEAA-2	15	20-50	4	4	3.0	3-5	3	30-50	30-55	10-50	5-20
	IFBD-1	15	6-13	4-5	4-5	1.2	3	1	20-50	20-40	20-40	25-60
	JEAE-5	40	5-20	4	4	1.6	3	2	10-25	10-60	10-35	0-30
	JEAE-3	30	5-20	3	3-4	1.2	3	1	10-40	10-60	5-10	10-30
120c-8	GDFQ-1	30	12-20	3-4	3-4	1.0-3.0	3	1	80	10	0	50
	JECA-5	30	20-40	4	4	3.0-6.0	1-3	1	45	15	0	25
	IFBA-1	20	40-60	4	4	1.0-3.0	5	1	65	5	10	45
	JCFA-1	20	25-60	4-5	4-5	2.0-5.0	3	1	40	10	5	30

TABLE 3

SOIL HYDROLOGIC CHARACTERISTICS

Boise District

Map Symbol	Soil Unit No.	Soil Unit %	Depth to Bedrock	Infil-tration	Permea-bility	Available Water Capacity	Bedrock Penetra-tion	Channel Amoring Quality	Vege-tation Plus Litter	% Surface Rock	% Forest Crown Density	% Brush Crown Density
120c-11	IFBA-5	60	20-60	3-4	3-4	3.6	1-3	1	50-80	5-30	10-70	10-40
	IFBD-3	20	13-12	4	4	1.6	3	1	20-90	5-40	30-80	10-30
	GDFA-3	20	20-60	4	3-4	4.8	3	1	20-50	5-20	10-40	15-30
120d-2	JEAA-2	30	20-50	4	4	3.0	3	2	30-50	30-55	0-10	5-20
	IECA-2	10	20-60	3-4	5	4.4	1-3	2	60-80	5-30	0-15	0-30
	JEAE-2	20	5-20	4	4	1.2	3	2	5-50	30-60	0-5	5-30
	RO	40	-	-	-	-	-	-	-	-	-	-
120d-3	IECA-5	60	20-50	4	4	4.2	3	2	80-100	Tr	40-60	10-40
	JEAE-2	30	5-20	4	5	1.2	1-3	2	5-50	30-60	5-40	5-40
	RO	10	-	-	-	-	-	-	-	-	-	-
120d-4	GDFA-5	50	20+	4	4	3.2	1-3	1	30-50	10-30	0-15	20-40
	GDFQ-5	40	<20	4	4	1.0	1-3	2	10-40	10-30	Tr	10-40
	RO	10	-	-	-	-	-	-	-	-	-	-
120e-6	JECB-5	30	8-20	4	4	1.0-2.0	1	1	50	10	2-5	35
	GDEA-4	20	30+	3	2	10.0	1-3	1	40	30	0	40
	GDFA-3	50	20-60	4	3-4	4.0-9.0	1	1	45	15	0	25
120e-7	JECB-5	30	8-20	3-4	3-4	1.0-2.0	1-3	2-3	15-40	30-50	0-10	5-36
	GDEA-4	30	30+	3	2	10.0	1-3	1	40	30	0	40
	GDFA-5	40	20+	4	4	4.0-6.0	1-3	1	45	15	0	25
121e	IFBA-1	40	40-60	4	4	4.0-6.0	3-5	1	60	10	40-60	20
	IFBA-3	40	20-60	4	4	3.0-4.0	1-3	1	80	10	40	20
	JEAE-2	20	5-20	4	5	1.2	1-3	1	50	30-60	20-40	5-40

SOIL HYDROLOGIC CHARACTERISTICS Boise District

Map Symbol	Soil Unit No.	Soil Unit %	Depth to Bedrock	Infil-tration	Permea-bility	Available Water Capacity	Bedrock Penetra-tion	Channel Amoring Quality	Vege-tation Plus Litter	% Surf ace Rock >3/4"	% Forest Crown Density	% Brush Crown Densit,
122	JCFA-1	15	25-60	4-5	4-5	2.0-5.0	3	1	50	10	0	5-20
	GDFA-3	15	20-60	4	3-4	4-9	3	1	60	10	10	40
	JECB-5	70	8-20	4	4	1-2	3	3	30	35	0	5-25
122-1	JEAE-2	20	5-20	4	5	1.2	3-5	2	5-50	30-60	5-20	5-20
	JEAA-5	10	20-40	4	4	3.0	3	1	30-60	5-50	15-60	5-20
	RO	70	-	-	-	-	-	-	-	-	-	-
122-4	JEAE-2	30	5-20	4	4-5	1.2	1-3	2	5-50	5-30	20-15	5-40
	IECA-3	30	40-60	3-4	3-4	5.2	3	1	30-85	5-25	20-80	5-40
	IECA-5	40	20-50	4	4	3.2	1-3	3	50-70	5-20	20-70	20-40
123-1	IECA-3	50	40-60	3-4	3-4	5.2	1-3	1	30-85	5-25	10-75	5-40
	IFBD-1	20	6-13	4-5	4-5	1.2	3-5	1	20-50	20-40	0-20	25-70
	GDEA-5	30	30-60	3	3	4.0	3	3	70-85	5-20	70	10
123-2	JECB-2	30	8-18	5	5	2.5	3-5	2	10	25	0	10
	JECA-3	20	20-40	3-4	4	4.0-5.0	3	1	60	10	0	25
	JCFA-1	50	25-60	4-5	4-5	2.0-5.0	3	1	60	10	0	30
123-3	IFBA-5	50	20-60	3-4	3-4	2.9	1-3	1	60	5	60	30
	IFBD-3	50	13-18	4	4	3.4	3	1	40	15	40	20
135-1	GDEA-5	0-5	30-60	3	3	4.1	5	3	60-80	Tr	0	20-50
	GDFS-5	0-20	30+	4	3-4	5.2	5	3	20-40	5-25	0	10-30
	GDFA-5	0-30	20+	4	4	5.3	5	3	70-100	0-10	20-40	10-30
	JECB-2	0-20	8-18	5	5	0.7	3-5	3	30-50	10-20	0	10-30
	RO	0-70	-	-	-	-	-	-	-	-	-	-
136-1	GDEA-4	85	30+	3	2	10.0	5	1	40-80	0-10	0	20-40
	GDEL-5	15	<20	3	2	1.3	5	2	10-30	20-40	0	10-40

TABLE 3

SOIL HYDROLOGIC CHARACTERISTICS

Boise District

Map Symbol	Soil Unit No.	Soil Unit %	Depth to Bedrock	Infil-tration	Permea-bility	Available Water Capacity	Bedrock Penetra-tion	Channel Amoring Quality	% Vege-tation Plus Litter	% Surface Rock >3/4"	% Forest Crown Density	% Brush Crown Density
140b-2	GDFA-5	50	20+	4	4	4.0-6.0	3-5	1	100	0	20-60	50
	IEEI-4	20	5-15	3	3	2.0	3-5	1	60	10	0-10	45
	JECA-5	30	20-40	4	4	4.0	3	2	15-40	20-40	0-10	5-15
140b-3	IFBA-1	60	40-60	4	4	3.6	3-5	1	50-80	5-30	0-5	10-40
	IFBD-3	10	13-18	4	4	1.4	3-5	1	40-60	5-20	0	5-20
	HBDA-4	30	30-60	3	2	5.1	3	1	50-90	5-30	-0	5-20
140c-1	GDEA-5	50	30-60	3	3	2.3	3	1	60-85	10-30	50-70	10-40
	JEAA-2	30	20-50	4	4	3.0	1-3	2	30-50	30-55	10-50	5-20
	GDEA-4	20	30+	3	2	6.0	1-3	1	70-90	5-20	50-70	10-40
140c-2	GDFA-4	20	30-60	3	2-3	10.0	1-3	1	70-90	5-20	30-50	10-40
	GDFQ-5	50	20	4	4	1.5	3	2	60	10	0-15	30
	JEAA-2	20	20-50	4	4	3.0	3	2	30-50	30-55	10-50	5-20
	RO	10	-	-	-	-	-	-	-	-	-	-
140c-3	JECA-5	40	20-40	4	4	2.9	3	2	50	5	0-20	15
	JECB-2	25	8-18	5	5	2.5	3	3	25	Tr	0	30
	HBDA-5	35	30+	3	2	10.0	3	1	40-80	0-10	0	20-40
140e-1	JEAA-2	50	20-50	4	4	3.0	3	2	30-50	30-55	10-50	5-20
	IFBA-3	30	20-60	4	4	4.8	1-3	1	75-90	0-20	40-70	5-25
	JEAE-5	20	5-20	4	4	1.6	3	2	10-25	10-60	10-35	0-30
141	JEAA-2	40	20-50	4	4	3.0	3	2	30-50	30-55	10-50	5-20
	IFBA-5	40	20-60	3-4	3-4	3.6	1-3	2	50-80	5-30	10-70	10-40
	JEAE-5	20	5-20	4	4	1.6	3	2	10-25	10-60	10-35	0-30
143	GDFA-5	40	20+	4	4	4.0-6.0	1-3	1	100	0	65	50-60
	JECA-5	35	20-40	4	4	2.9	1-3	1	50	5	60	15-30
	JECB-2	25	8-20	4	4	2.5	3	1	25	Tr	10	30

Explanation of Table No. 4
Soil Vegetative Relationships and
Productivity Potentials

Map Symbol. Mapping Symbol representing each landtype.

Soil Unit. Lists the number assigned to individual soils and the precentage of each in the landtype.

Position on Landscape. Location of each soil on the landtype.

Habitat Type. Although similar landtypes have developed under similar climatic conditions, micro-climates vary considerably within the landtype boundaries. These variations are most often related to variations with aspect and position on the slope. Soil classification to the family level does not always reflect these variations; therefore, to refine productivity interpretations and to give a better picture of how soils and vegetation are related over the landtype, the recognized habitat types which occur on each soil on each landtype have been identified.

Habitat type identification was based on guides developed by R. Daubenmire in Forest Vegetation of Eastern Washington and Northern Idaho (December 1968) 1/, and further refined by R. Pfister and R. Ryker of the Intermountain Forest and Range Experiment Station. Further refinements will still be made over the next few years; consequently, this column should be reviewed and kept current.

At present most of the research on the Boise National Forest has been restricted to timber producing habitat types. For this reason non-timber producing types are referred to by plant community names. Primarily the non-timbered types are located at high elevations, on dry south slopes, at low elevations or in wet areas.

Productivity Potential

Range Productivity Potential. Each landtype has been rated for range productivity potential. Five qualitative classes were used based on inherent erosion characteristics, soil properties, vegetative type and limited range analysis data. The productivity classes are as follows:

5 Very High - More than 1,500 pounds per acre of usable forage.

4 High - 1,000 to 1,500 pounds per acre of usable forage.

1/Note: For additional information on habitat types see Forest Vegetation of Eastern Washington and Northern Idaho, Daubenmire, R. and Jean B., Wash. Ag. Exp. Sta. Tech. Bull. 60.

3 Moderate - 400 to 1,000 pounds per acre of usable forage.

2 Low - 100 to 400 pounds per acre of usable forage.

1 Very Low - Less than 100 pounds per acre of usable forage.

Landtypes were placed into one of these five classes by the use of available range analysis data. Where data was lacking, the ratings were projected from similar kinds of land. Classes were adjusted where vegetative type, inherent erosion, or other soil features were significant. The above ratings were based on the potential of the range for sheep grazing only.

Timber Productivity Potential. This column places the soil unit into five qualitative class ratings for timber productive potential. These classes correlate with the site classes developed from the Forest Timber Inventory Plots. The site classes are rated on productivity and use as a basis, cubic foot increment per acre per year. Of the seven site classes established, only five were found on the Boise National Forest. These have been given the following qualitative class names.

Very High	- Class 5	120 to 160 Cu.F./acre/year
High	- Class 4	85 to 120 Cu.F./acre/year
Moderate	- Class 3	50 to 85 Cu.F./acre/year
Low	- Class 2	20 to 50 Cu.F./acre/year
Very Low	- Class 1	Non-commercial

The soil units were placed into these classes with limited timber inventory data and projected to adjacent or similar landtypes. Few of the soil units were placed in Class 5.

Limitations for Reforestation. Four qualitative classes were developed for limitations to reforestation. Criteria considered in the development of these classes were vegetative competition, climate, water-holding capacity of the soil and evapotranspiration loss. The four classes are slight, moderate, severe, and very severe. The degree and/or a number of limiting factors were considered in making the class ratings.

TABLE 4

SOIL-VEGETATIVE RELATIONSHIPS AND PRODUCTIVE POTENTIALS

Map Symbol	Soil Unit No.	%	Position on Landscape	Habitat Type	Productivity Potential Range	Timber	Limitations for Reforestation
101	JECA-2	40	Throughout the unit	Variable-Ponderosa pine, sagebrush, Cottonwoods & Aspen communities	3	1-2	Severe; low water holding capacity.High evapotranspiration rates
	JECA-5	40	Lower lying and somewhat poorly drained areas	Brush/grass, Wet meadow, D.F./Elk sedge	3-5	1-2	Moderate to very severe; low water holding capacity; high evapotranspiration rate, high water table
	JCFA-1	20	Higher lying areas adjacent to major stream and on fringes of unit	Brush/grass communities	2-3	1	Very severe - vary low water holding capacity, low fertility, high evapotranspiration rate.
102	HBDA-4	30	Nearly level or depressional areas	D.F./ninebark	3-4	2-4	Slight - vegetative competition
	HBDA-5	50	Throughout the unit	D.F./snowberry; D.F./pinegrass	3-4	3-4	Slight - vegetative competition
	JEAA-2	20	Adjacent to streambanks or side drainages	P.P./Idaho fescue; P.P./Bitierbrush	3	2-3	Moderate to severe - high evapotranspiration rate; low water holding capacity
104	JEAA-2	70	Throughout the unit	SAF/Elk sedge; SAF/Grouse, whortleberry	2-3	2-3	Moderate - cold climate
	IFBA-3	30	Lower lying or wetter	SAF/Elk sedge; SAF/Pinegrass	3	2-3	Moderate - cold climate
105-4	GDEA-4	40	All slopes in unit	Brush/grass communities	3-4	NA	
	GDEA-6	20	Nearly level or swale areas	Brush/grass communities	3-4	NA	
	GDEL-5	40	Near edges and near rock outcrops	Brush/grass communities	3	NA	
105-5	JCFA-1	20	Most positions in the unit	Brush/grass	2	NA	
	JECA-2	80	Most positions in the unit	Brush/grass	2	NA	
106	HBDA-4	20	Ridge tops and swales	D.F./ninebark	3	3	Moderate - cold climate
	HBDA-5	20	Ridge tops and gentle side slopes	D.F./ninebark	3	3	Moderate - cold climate, vegetative competition
	IECA-5	40	Most side slope positions	P.P./Idaho fescue, D.F./snowberry SAF - Grouse whortleberry	2-3	3	Moderate - cold climate, vegetative competition
	JEAA-2	20	Steeper side slopes	D.F./ninebark	2	1-2	Moderate to severe - cold climate, low water holding capacity
106-2	JEAA-2	50	All slopes	SAF/whortleberry D.F./ninebark	2-3	2-3	Moderate to severe - cold climate, low water holding capacity
	IFBA-5	50	More gentle slopes	SAF/Elk sedge, SAF/Pinegrass	3	2-3	Moderate - cold climate, vegetative competition

TABLE 4

SOIL-VEGETATIVE RELATIONSHIPS AND PRODUCTIVE POTENTIALS Boise District

Map Symbol	Soil Unit No.	%	Position on Landscape	Habitat Type	Productivity Potential Range	Timber	Limitations for Reforestation
107-1	GDFA-4	50	Smoother slopes	Brush/grass communities	3-4	NA	
	JECA-5	50	All other slopes	Brush Grass communities	3-4	NA	
108	JEAA-5	30	All slopes	Subalpine fir/Elk sedge	2-3	3	Moderate - cold climate, vegetative competition
	IFBA-3	30	Depressional or smoother areas	Subalpine fir/Elk sedge	2-3	3	Moderate - cold climate
	IFBA-5	40	All slopes	Subalpine fir/Elk sedge	2-3	3	Moderate - cold climate, vegetative competition
109-2	IFBD-3	30	Ridgetops, spurs and near rock outcrop	Brush/grass	3	NA	Very severe - cold climate, vegetative competition; low
	IECA-2	40	All slopes	Brush/grass SAF/WBP	3	1	Very severe - cold climate, vegetative competition; low water holding capacity
	IFBA-3	30	All slopes	SAF/Elk sedge	3-4	1	Very severe - cold climate, low water holding capacity
109a-1	JEAA-3	30	All slopes	SAF/Elk sedge, Brush/grass	1-3	1-2	Severe - cold climate
	JEAA-5	30	All slopes	SAF/Elk sedge, Brush/grass	1-3	1-2	Severe - cold climate, vegetative competition
	JEAE-5	40	Near ridge tops and rock outcrops	Brush/grass	2	NA	Very severe - cold climate, vegetative competition; low water holding capacity
109b	JEAA-2	30	All slopes	SAF/Grouse whortleberry SAF/Elk sedge	2-3	2-3	Severe - cold climate, vegetative competition
	IECA-5	40	Mid and lower side slopes	SAF/Elk sedge D.F./snowberry	2-3	2-3	Severe - cold climate, vegetative competition
	JEAE-5	30	Near rock outcrops and on steeper	SAF/Elk sedge, D.F./Pinegrass	2-3	2	Severe - cold climate, vegetative competition
109c	IFBA-3	50	All sloes	SAF/Elk sedge	1-2	1-2	Very severe - cold climate
	JEAE-5	30	Ridge tops, steeper slopes & near rock outcrops	SAF/grouse Whortleberry	1-2	1-2	Very severe - cold climate, low water holding
	JECA-5	20	Steeper south slopes and ridges	DF/Elk sedge, SAF/Elk sedge	1-2	1-2	Very severe - cold climate

SOIL-VEGETATIVE RELATIONSHIPS AND PRODUCTIVE POTENTIALS Boise District

Map Symbol	Soil Unit No.	Soil Unit %	Position on Landscape	Habitat Type	Productivity Potential Range	Productivity Potential Timber	Limitations for Reforestation
109d-1	JEAA-5	70	Mid and lower side slopes	DF/ninebark, DF/elk sedge	2-3	2	Severe - cold climate
	JEAE-5	25	Upper slopes, ridge tops and near rock outcrops	DF/Elk sedge	2	1-2	Severe - cold climate, low water holding capacity
109g	IFBA-5	80	All side slopes	SAF/Grouse whortleberry, DF/Elk sedge	2-3	1	Moderate to severe - cold climate vegetative competition
	JEAE-2	20	Ridgetops and upper slopes	DF/Spirea	2	1-2	Very severe - cold climate, low water holding capacity, high evapotranspiration rates
110	JEAD-3	20	Adjacent to lakes or wet areas	SAF/Elk sedge	3-4	1-2	Very severe - cold climate, vegetative competition, high water table
	JEAA-2	30	All slopes	SAF/Elk sedge	2-3	1-2	Severe - cold climate, low water holding capacity
	IECA-5	20	All slopes	SAF/WBP	2-3	1-2	Severe - cold climate
110x	JEAA-2	10	All	SAF/Elk sedge	2-3	1	Very severe - cold climate, low water holding capacity
	JEAE-5	50	Lower slope gradients	SAF/Grouse whortleberry SAF/WBP	1	1	Very severe - cold climate, low water. holding. capacity
111a	JEAA-3	30	Mid and lower side slopes	SAF/Elk sedge, Brush/grass	2	2-3	Moderate to severe - cold climate
	IECA-5	40	All side slopes	SAF/Elk sedge, SAF/Grouse, whortleberry	2	2-3	Moderate to severe - cold climate, vegetative
	JEAA-2	30	Adjacent to dissecting drainageways	SAF/WBP, SAF/Elk sedge, Brush/grass	2	1-2	Moderate to severe - cold climate
111a-1	JEAA-5	40	All side slopes	SAF/Elk sedge; SAF/WBP	2-3	1	Very severe - cold climate
	JEAE-3	60	Upper slopes and ridge tops	SAF/WBP, Brush/grass	2-3	1	Very severe - cold climate, low water holding capacity
111b	JEAA-5	60	All side slopes	SAF/Elk sedge; SAF/pine	3	3	Moderate to severe - cold
	JEAE-2	30	Side slopes adjacent to drainageways	SAF/pine grass	2-3	2-3	Moderate to severe - cold climate
	JEAA-3	10	Mid and lower side slopes	DF/Elk sedge	2-3	2-3	Moderate to severe - cold climate
111b-1	JEAE-2	70	All side slopes	SAF/pinegrass	2-3	1	Very severe - cold climate, low water holding capacity
	JEAA-5	15	Mid and lower side slopes	SAF/pinegrass	2-3	1-2	Severe - cold climate
	IFBA-5	15	Lower sided slopes	SAF/Elk sedge	2-3	1-2	Severe - cold climate

Map Symbol	Soil Unit No.	Soil Unit %	Position on Landscape	Habitat Type	Productivity Potential Range	Productivity Potential Timber	Limitations for Reforestation
111c	IFBD-3	40	Mid and lower slopes	SAF/WBP SAF/pinegrass	2-3	2	Very severe - cold climate, low waterholding capacity
	JEAA-2	30	Mid and lower sideslopes	SAF/Elk sedge	2-3	2	Severe - cold climate
	JEAE-2	30	All slopes	SAF/Idaho fescue DF/Idaho fescue	1-2	1	Very severe - cold climate, low
111d	JEAA-3	20	All slopes	SAF/Pinegrass; SAF/Elk sedge	1-2	1-2	Very severe - cold climate
	JEAE-2	60	Steeper slopes and near rock	SAF/Elk sedge SAF/WBP	1-2	1-2	Very severe - cold climate, low waterholding capacity
111x	JEAE-2	30	All slopes	SAF/Elk sedge; SAF/WBP	1	1	Very severe - cold climate, low waterholding capacity
113	JEAE-2	30	All slopes	SAF/Elk sedge SAF/ WBP	1	1	Very severe - cold climate, low waterholding capacity
	JEAE-3	20	All slopes	SAF/Elk sedge Brush/grass	1	1	Very severe - cold climate, low waterholding capacity
120a-2	HBDA-5	20	Mid and lower side slopes	SAF/Elk sedge DF/Elk sedge DF/snowberry	2-3	3-4	Slight to moderate - vegetative competition
	IECA-5	60	Most side slopes	DF/ninebark SAF/Elk sedge	2-3	3-4	Slight to moderate vegetative competition
	IFBD-3	20	Near ridge tops and adjacent to drainageways	DF/snowberry PP/pinegrass	2-3	3	Moderate - low waterholding capacity
120b-3	GDEA-4	30	Mid and lower side slopes	Brush/grass communities	2-3	NA	-
	GDFA-3	30	All slopes	Brush/grass communities	2-3	NA	-
	GDFQ-5	20	Upper slopes	Brush/grass communities	2	NA	-
	JECB-2	20	Steeper slopes and near rock outcrops	Brush/grass communities	1-2	NA	-
120b-4	HBDA-4	25	Mid and lower side slopes	DF/ninebark, DF/Elk sedge, DF/spirea	2-3	3-4	Moderate - vegetative competition
	IFBD-3	15	Ridge tops and spurs	DF/ninebark	2	2-3	Moderate-vegetative competition, low waterholding
	IECA-5	30	Mid and upper side slopes	DF/snowberry, DF/spirea	2-3	3	Moderate - vegetative competition
	HBDA-5	30	Mid and lower side slopes	DF/Elk sedge, SAF/Elk sedge	2-3	3-4	Moderate - vegetative competition

SOIL-VEGETATIVE RELATIONSHIPS AND PRODUCTIVE POTENTIALS

Boise District

Map Symbol	Soil Unit		Position on Landscape	Habitat Type	Productivity Potential		Limitations for Reforestation
	No.	%			Range	Timber	
120b-6	JEAA-3	20	Lower slopes and draws	DF/snowberry, DF/Elk sedge DF/chokecherry	3	2-3	Moderate to severe - climatic conditions
	JEAA-2	40	Most side slopes	DF/spirea, DF/ninebark	3	2-3	Moderate to severe - climatic conditions
	GDFQ-5	40	Ridge tops and upper 1/3 of side sloes	DF/spirea, Brush/grass	2-3	2	Moderate to severe - climatic conditions low
120c-3	JEAA-2	15	Mid and lower side slopes.	DF/Elk sedge	2-3	2	Severe - low waterholding capacity
	IFBD-1	15	North facing slopes and swale areas	Brush/grass SAF/Elk sedge	2	1-2	Very severe-low waterholding capacity
	JEAE-5	40	Most side slopes	DF/pinegrass, DF/spirea,	2-3	2-3	Moderate to severe - vegetative competition
	JEAE-3	30	Upper and mid side slopes	DF/pinegrass	2-3	2	Severe - low waterholding capacity
120c-8	GDFQ-1	30	Ridge tops and upper 1/3 of side slopes	Brush/grass communities	2	NA	-
	JECA-5	30	All side slopes	Brush/grass	3	NA	-
	IFBA-1	20	Mid and lower side slopes	Brush/grass	2-3	NA	-
	JCFA-1	20	Mid and upper side slopes	Brush/grass	2-3	NA	-
120c-11	IFBA-5	60	Most mid and lower slopes	SAF/Elk sedge DF/spirea DF/ninebark	2-3	3-4	Severe - vegetative competition
	IFBD-3	20	Adjacent to drainageways and ridge spurs	SAF/pinegrass DF/spirea	2	3	Severe - vegetative competition low
	GDFA-3	20	More exposed slopes and areas underlain by highly weathered granite	DF/snowberry DF/ninebark	2-3	2-4	Moderate to severe - vegetative competition
120d-2	JEAA-2	30	Most side slopes	Brush/grass	2-3	NA	-
	IECA-2	10	Most side slopes	Brush/grass	2-3	NA	-
	JEAE-2	20	Steeper slopes & near rock outcrops	Brush/grass	2-3	NA	-
120d-3	IECA-5	60	Most side slopes	DF/ninebark DF/spirea	2-3	3	Moderate-climate conditions vegetative
	JEAE-2	30	Near rock outcrops and on steeper spur ridges	DF/Elk sedge	2	2-3	Moderate to severe - low waterholding
120d-4	GDFA-5	50	All slopes	Brush/grass	2-3	NA	-
	GDFQ-5	40	Upperslopes	Brush/grass	2-3	NA	-

TABLE 4

SOIL-VEGETATIVE RELATIONSHIPS AND PRODUCTIVE POTENTIALS

Boise District

Map Symbol	Soil Unit No.	%	Position on Landscape	Habitat Type	Productivity Potential Range	Productivity Potential Timber	Limitations for Reforestation
120e-6	JECB-5	30	Ridge tops and eroded areas	Brush/grass communities	3	NA	-
	GDEA-4	20	Lower slopes and concave positions	Brush/grass communities	3-5	NA	-
	GDFA-3	50	Most side slopes	Brush/grass communities	3-4	NA	_
120e-7	JECB-5	30	Ridge tops and eroded areas	Brush/grass communities	2-3	NA	-
	GDEA-4	30	Smooth side slopes and concave areas	Brush/grass communities	3	NA	-
	GDFA-5	40	Most side slopes	Brush/grass communities	3	NA	-
121e	IFBA-1	40	Most side slopes	DF/snowberry	2-3	2	Severe - low water holding capacity
	IFBA-3	40	Most side slopes	DF/snowberry, DF/ninebark	3	3-4	Moderate - vegetative competition
	JEAE-2	20	Ridge tops and upper 2/3 of slopes	DF/Elk sedge	2-3	2	Severe - low water holding capacity
122	JCFA-1	15	All slope positions	Brush/grass	2	NA	-
	GDFA-3	15	Mid and lower slopes	Brush/grass	3	NA	-
	JECB-5	70	Upper 2/3 of slope and near rock outcrops	Brush/grass	2	NA	-
122-1	JEAE-2	20	Pockets between rock outcrops	DF/snowberry Brush/grass	2	1	Very severe - low water holding capacity.
	JEAA-5	10	Mid and lower slopes	DF/snowberry, PP/Idaho fescue Brush/grass	2	1	Severe - vegetative competition
122-4	JEAE-2	30	Upper slopes and spur ridges	DF/ninebark DF/snowberry	2	3	Moderate - climatic limitations vegetative
	IECA-3	30	Mid and lower slope positions	DF/ninebark DF/Elk sedge	2	3-4	Moderate vegetative competition climatic
	IECA-5	40	Mid and lower slope positions	SAF/blue huckleberry DF ninebark	2	3-4	Moderate - climatic limitations vegetative
123-1	IECA-3	50	Most slope positions	PP/wheatgrass, DF/Idaho fescue	3-4	3	Moderate - vegetative competition
	IFBD-1	20	Near edge of benches 6 steeper slopes	DF/pinegrass	3	2-3	Moderate - vegetative competition
	GDEA-5	30	Top of bench on more level areas	DF/ninebark	3-4	3	Moderate - vegetative competition
123-2	JECB-2	30	Upper 1/3 of slope, near rock outcrops and on steeper slopes	Brush/grass	3	NA	-
	JECA-3	20	Benchlike positions and lower side slopes	Brush/grass	3-4	NA	-
	JCFA-1	50	Benchlike positions and lower side slopes	Brush/grass PP/Bitterbrush	3	1	Very severe - climatic limitations

TABLE 4
SOIL-VEGETATIVE RELATIONSHIPS AND PRODUCTIVE POTENTIALS

Map Symbol	Soil Unit No.	Soil Unit %	Position on Landscape	Habitat Type	Productivity Potential Range	Productivity Potential Timber	Limitations for Reforestation
123-3	IFBA-5	50	Mid and lower slopes and under timber	DF/Elk sedge, DF/spirea DF/blue Huckleberry	3-4	2-3	Severe - climatic limitations vegetative competition
	IFBD-3	50	Open mid and upper slopes and tops of minor spur ridges	PP/Bitterbrush	2-3	2	Severe - climatic limitations, low water holding capacity
135-1	GDEA-5	0-5	Exposed slopes	Brush/grass	3	NA	-
	GDFS-5	0-20	Lower 1/3 of slope	Brush/grass	4	NA	-
	GDFA-5	0-30	Timbered N slopes	DF/ninebark, DF/chokecherry	3	2-4	Severe - vegetative competition high evapotranspiration rate
	JECB-2	0-70	Exposed eroding granite slopes	Brush/grass	1-2	NA	-
136-1	GDEA-4	85	Most positions	Brush/grass	4-5	NA	-
	GDEL-5	15	Edge of unit near slope breaks and near rock outcrops	Brush/grass	3	NA	-
140b-2	GDFA-5	50	Mainly mid and lower slopes	DF/snowberry	3	2-3	Moderate to severe - climatic limitations vegetative competition
	IEEI-4	20	Bench like or smoother slopes	DF/spirea, Brush/grass	2-3	2	Moderate to severe - climatic limitations low water holding capacity
	JECA-5	30	Most slope positions	DF/snowberry	3	3	Moderate - vegetative competition climatic limitation
140b-3	IFBA-1	60	Most side slope positions	Brush/grass	1-2	NA	-
	IFBD-4	10	Smooth mid side slopes	Brush/grass	3-4	NA	-
	HBDA-4	30	Bench like areas	Brush/grass	3-4	NA	-
140c-1	GDEA-5	50	Mid and lower side slopes	DF/Elk sedge, DF/ninebark DF/spirea Brush/grass	2	3-4	Severe - vegetative competition
	JEAA-2	30	Most side slope positions 0	DF/ninebark	2	3	Severe - vegetative competition
	GDEA-4	20	Bench like areas	DF/snowberry, DF/ninebark	3	3	
140c-2	GDFA-4	20	Bench like positions	DF/pinegrass	2-3	2-3	Moderate to severe - vegetative competition
	GDFQ-5	50	Most side slope positions and near rock outcrops and ridge	PP/wheatgrass Brush/grass	2	1-2	Very severe - low waterholding capacity
	JEAA-2	20	Most side slope positions	DF/spirea	2-3	2	Moderate to severe - low waterholding capacity

SOIL-VEGETATIVE RELATIONSHIPS AND PRODUCTIVE POTENTIALS Boise District

Map Symbol	Soil Unit No.	Soil Unit %	Position on Landscape	Habitat Type	Productivity Potential Range	Productivity Potential Timber	Limitations for Reforestation
140c-3	JECA-5	40	Most side slope positions	Brush/grass	3	NA	-
	JECB-2	25	Upper 1/2 of slopes & ridge tops	Brush/grass	2	NA	-
	HBDA-5	35	Smooth beachy areas	Brush/grass	3-4	NA	-
140e-1	JEAA-2	50	Most side slope positions	DF/spirea DF/snowberry	2-3	2-3	Moderate to severe - climatic limitations low water holding capacity
	IFBA-3	30	Mid and lower side slopes and in swales	DF/ninebark DF/spirea	3	3	Moderate - climatic limitations vegetative competion
	JEAE-5	20	Ridge tops and steeper slopes	PP/snowberry	2	2	Moderate - vegetative competition low water holding capacity
141	JEAA-2	40	All side slope positions	DF/snowberry	2-3	3	Moderate - vegetative competition
	IFBA-5	40	Mid and lower side slopes	DF/ninebark, DF/snowberry	3	3	Moderate - vegetative competition
	JEAE-5	20	Ridge tops and upper 2/3 of slopes	DF/spirea	2-3	2-3	Moderate to severe - low waterholding capacity - vegetative competition
143	GDFA-5	40	Upper slopes and bench like areas	DF/pinegrass DF/spirea	4	2-3	Moderate - vegetative competition
	JECA-5	35	Most side slope positions	DF/Elk sedge, DF/spirea DF/blue Huckleberry	2	2-3	Moderate - low waterholding capacity
	JECB-5	25	Near steep slope breaks	PP/Bitterbrush	2	2	Moderate - vegetative competition

Explanation of Table No. 5
Soil Profile Characteristics

Soil Number. This column lists the soil identification symbol in alphabetical and numerical order. The 4-letter portion of this symbol corresponds to the alphabetical outline for classification of soils

in Soils Taxonomy of the National Cooperative Soil Survey (December 1970). The fifth element of this symbol is a number ranging from

1 to 7. These numbers correlate to the following soil family textural names:

Number	Name
– 1	Sandy
- 2	Sandy skeletal
– 3	Coarse loamy
– 4	Fine loamy
– 5	Loamy skeletal
– 6	Clayey
– 7	Shallow sandy skeletal

Soil Classification. This column gives the classification of the soil unit to the family level according to Soils Taxonomy of the National Cooperative Soil Survey, U.S.D.A.

Landtypes. This column lists all the landtypes in which the soil unit is an important component.

Depth to Bedrock. This column gives the average depth to the underlying bedrock in inches.

Surface Layer. In this column the textures, coarse fragment percentage, thickness, moist colors, structure, color, reaction and organic horizons of the surface layers are described.

Subsoil Layers. This column describes the textures, thickness, coarse fragment percentage, moist colors, structure, and reaction of the subsoil layers.

Bedrock Characteristics. This column describes the characteristics of the bedrock which is generally associated with the individual soils. Definition of these terms are listed in the explanation of Table No. 1.

TABLE 5

SOIL PROFILE CHARACTERISTICS

BOISE District

Soil No.	Soil Classification	Land Types	Depth to Bedrock	Surface Layer	Subsoil Later	Bedrock Characteristics
GDEA-4	Typic Argixerolls, fine loamy mixed, frigid	105-4 120b-3 120e-6 120e-7 136-1 140c-3	30"+	0 to 1 inch organic layer over a dark brown, moderate medium and coarse granular loam to clay loam, 5 to 15 inches thick; neutral	Dark brown, moderate coarse subangular blocky clay loam, 20 inches thick; slightly acid to neutral; 0 to 5 percent fine gravel, less than 10 percent rock.	Variable; mixed granite and volcanics
GDEA-5	Typic Argixeralls, loamy- skeletal mixed, frigid	120e-7 135-1 140c-1	30-60"+	Trace of organic layer over a very dark brown, weak moderate subangular blocky gravelly loam, 10 to 15 inches thick; mildly alkaline; 20 percent gravel, 10 percent rock	Dark yellowish brown, moderate medium and coarse subangular blocky gravelly sandy clay loam, 50 inches thick; neutral to mildly alkaline; 10 to 20 percent gravel, 40 to 60 percent rock	Variable
GDEA-6	Typic Argixerolls, fine mixed frigid	105-4	60"+	Partially decomposed litter layer 0 to 1 inch, very dark grayish brown, moderately coarse, subangular blocky, gravelly clay loam 12" thick; medium acid, 15 percent fine gravels	Brown to yellowish brown, moderately coarse subangular blocky, silty clay loam to silty clay>60" thick, medium acid 10 percent fine gravels	Variable; undifferentiated granite or basalt.
GDEL-5	Lithic Argixerolls loamy- skeletal mixed, frigid	105-4 136-1	<20"	A dark brown, moderate medium subangular blocky clay loam, S to 10 inches thick; neutral; 10 percent gravel; 20 to 40 percent rock	Dark yellowish brown, moderate medium subangular blocky gravelly clay loam, 5 to 10 inches thick; neutral; 10 to 20 percent gravel, 40 to 60 percent rock	Moderately to well fractured volcanics over masked, moderately well to well weathered granite
GDFA-3	Typic Haploxeralls, coarse- loamy, mixed frigid	120b-3 120c-11 120e-6 122	20-60"	Very dark grayish brown, moderate medium granular gravelly sandy loam, 10 to 20 inches thick; slightly acid; 10 to 20 percent fine gravel percent fine gravel	Dark yellowish Drown, moderate medium granular gravelly sandy loam to gravelly sandy clay loam,10 to 60 inches tbick;slightly acid; 20 to 30 percent fine gravel	Well to extremely well fractured or masked transitional to well weathered granite. Some extremely well-fractured rhyolite in 120b-3's

SOIL PROFILE CHARACTERISTICS BOISE District

Soil No.	Soil Classification	Land Types	Depth to Bedrock	Surface Layer	Subsoil Layer	Bedrock Characteristics
GDFA-4	Typic Haploxeroll, fine- loamy mixed, mesic frigid	107-1 120c-2	30-60"+	Partially decomposed organic layer 0-1', dark brown weak medium and coarse subangular blocky sandy clay loam or clay loam, 12" thick, slightly acid, 5 percent fine gravels.	Brown, weak coarse or medium subangular blocky gravelly sandy clay loam or clay loam 18 to 50" thick, slightly acid, 10-15 percent fine gravels.	Light brown to white medium grained, moderately fractured, moderate to well weathered granite (some basalt influence)
GDFA-5	Typic Haploxeroll, loamy- skeletal, mixed frigid	120d-4 135-1 140b-2 143	30"+	Trace of organic layer over a dark brown, weak fine granular gravelly loamy sand to gravelly sandy loam, 5-15' thick; slightly acid; 30-60 percent fine and medium gravel	Yellowish brown, single grain gravelly coarse sandy loam, 20 to 60" thick; slightly acid; 40-70 percent gravel	Masked or extremely well fractured, moderately to well weathered granite
GDFQ-1	Lithic Haploxerolls, sandy mixed frigid	120c-8	12-20	Partially decomposed litter layer 0-trace, very dark gray or very dark grayish brown, weak fine granular, fine sandy loam to loam, 5-12" thick, strongly acid to slightly acid, 10 percent fine angular gravel	Dark brown to dark yellowish brown, weak fine granular to moderate fin subangular blocky loamy sand 6-10" thick, medium acid to neutral, 15% fine angular gravels, 5% cobbles	Yellowish brown, medium grained, massive fracturing, extremely well weathered granite
GDFQ-5	Lithic Haploxerolls, loamy- skeletal, mixed, frigid	120b-3 120b-6 120d-4 120c-2	<20"	Dark brown, weak fine and medium granular gravelly sandy loam, 4-10" thick; neutral; 20-40% fine and medium gravel, 10 to 30 percent rock	Dark yellowish brown, weak medium granular to massive gravelly sandy loam or graven:- sandy clay loam, 5-10" thick; 20-40% gravel and 20% rock.	Extremely well fractured, moderately to transitionally weathered granite (some extremely well fractured rhyolite in 120b-3 units)
GDFS-5	Pachic Haploxerolls loamy- skeletal mixed frigid	135-1	30"+	Trace of organic layer over a vary dark grayish brown, weak fine granular gravelly sandy loam, 15-30" thick; slightly acid; 15-30% fine and medium gravel, 0-20% rock.	Brown, moderate coarse granu- lar to single grain gravelly sandy loam or gravelly sandy clay loam, 10-60" thick; slight ly acid;30-60Z fine and medium gravel, 0-30Z rock.	Masked or extremely well fractured, transitional to well weathered granite.

TABLE 5 Page 3

Soil No.	Soil Classification	Land Types	Depth to Bedrock	Surface Layer	Subsoil Layer	Bedrock Characteristics
HBDA-4	Typic Cryaboralfs, fine- loamy mixed	102 106 120b-3 120b-4	30-60"+	0 to 3 inches of organic layer over a dark grayish brown, moderate medium subangular blocky very fine sandy loam, 4 to 12" thick; strongly aicd; 0 to 20 percent fine gravel	Brown, strong coarse subangular or blocky gravelly clay loam to clay loam; greater than 40 inches thick; strongly acid; 0 to 30 percent fine gravel	Deep alluvial and colluvial soils often over river-washed cobbles and/or highly variable granite
HBDA-5	Typic Cryoboralfs, loamy- skeletal, mixed.	102 106 120a-2 120b-4	40-60"+	0 to 2" of organic layer over a dark brown, moderate fine granular gravelly loam to loam, 5 to 15" thick; neutral to strongly acid; 0 - 20% medium and coarse gravel	Brown, single grain to massive gravelly or cobbly sandy loam to gravelly sandy clay loam, greater than 50" tbick; strongly acid; 30-40% medium medium and coarse gravel; 20 to 50 percent rock	Deep alluvial and colluvial soils often over riverwashed cobbles and/or highly variable granite
IECA-2	Typic Cryochrept, sandy skeletal, mixed	109-2 120d-2	20-60"+	0 to 2" organic layer over a dark yellowish brown weak fine granular coarse sandy loam to sandy clay loam, 5-8 inches thick; slightly acid; 0-15% fine and medium gravel.	Light yellowish brown, single grain gravelly coarse sand, greater than 20" thick; medium acid; 20-30% gravel; 10-30 per- cent rock	Masked or extremely well fractured, transitional to well weathered granite. Bedrock highly variable under depositional landtypes
IECA-3	Typic Cryochrept, coarse- loamy, mixed	122-4 123	40-60"+	0-2" organic layer over a dark yellowish brown, moderate fine granular sandy loam to loam, 5-10" thick; slightly acid; 0-15% fine gravel	Yellowish brown, single grain gravelly sandy loam to gravelly sandy clay loam, greater than 50 inches thick; medium acid; 10-30% fine gravel	Masked to extremely well fractured, transitional to well weathered granite; bedrock more variable beneath alluvial landtypes
IECA-5	Typic Cryochrept, loamy- skeletal, mixed	109b 106 110 111a 120a 120b-4 120d-3	20-50"+	0-4" organic layer over a dark grayish brown, weak fine 'granular gravelly sandy loam 5-10" thick; strongly acid; 20-40% fine and medium gravel.	nark yellowish brown, massive gravelly sandy loam, 15-30" thick; strongly acid; 40-60% gravel; 10-40 percent rock	Masked to extremely well fractured, weakly to well weathered granite

SOIL PROFILE CHARACTERISTICS

Soil No.	Soil Classification	Land Types	Depth to Bedrock	Surface Layer	Subsoil Layer	Bedrock Characteristics
IEEI-4	Lithic Xerochrept, loamy mixed frigid	120b-2 140b-2	5-15	Partially decomposed litter layer, 0-trace, dark brown, weak medium subangular blocky, sandy clay loam, 3-7' thick, slightly acid	Dark yellowish brown, weak medium subangular blocky, sandy clay loam, 2-12' thick, neutral, 3% gravels	Brown, medium grained, well to extremely well fractured, moderately weathered granite
IFBA-1	Typic Cryumbrept, sandy mixed	120c-8 121e 123 140b-3	40-60"	Partially decomposed litter layer, 1-2" thick, black to very dark gray, moderate fine granular to massive, sandy loam, 20" thick, medium acid	Dark yellowish brown, massive, loamy sand, 20-40" thick, medium acid, 10% gravels and cobbles	Gray, coarse grained, well fractured, slightly weathered, granite
IFBA-3	Typic Cryumbrept, coarse- loamy, mixed'	109-2 109c 121e 140e-1	20-60"	0-3" organic layer over a very dark grayish brown, weak medium and coarse granular sandy loam, 8-20" thick; slightly acid; 5-15% fine gravel.	Yellowish brown, single grain gravelly sandy loam, 20-40" thick; slightly acid; 15-30% fine gravel.	Masked to extremely well fractured, transitional to well weathered granite
IFBA-4	Typic Cryumbrept, fine- loamy mixed	104 108 140b-3	40"+	0-2" organic layer over a very dark gray, moderate medium granular loam; 5-10" thick; strongly acid to neutral; 0-15% fine gravel.	Yellowish brown, massive gravelly clay loam, greater than 30" thick; slightly acid to neutral; 10-20% fine gravel; 0-10% rock.	Variable
IFBA-5	Typic Cryumbrept, loamy- skeletal mixed	106-2 108, 109g 111b 120c-11 123 123-3 141	20-60"	0-4" partially decomposed organic layer, very dark brown weak fine granular, gravelly sandy loam to gravelly sandy clay loam, 10-25" thick; medium to very slightly acid; 20-55% gravel, 0-20% rock.	Yellowish brown, weak fine granular to single grain to massive, gravelly sandy loam to gravelly loam, 10-25" thick; medium to very slightly acid; 20-60% gravel; 0-60% rock.	Light brown to gray, medium grained, masked to well fractured, hard unweathered to well weathered granite.

TABLE 5

Soil No.	Soil Classification	Land Types	Depth to Bedrock	Surface Layer	Subsoil Layer	Bedrock Characteristics
IFBD-1	Lithic Cryumbrept, sandy mixed	120c-3	6-13"	Gravelly or cobbly sandy loan or loamy sands, 3-6" thick,dark brown, weak fine granular,brown, soft, non-sticky and non-plastic, sligbtly acid (20% fine gravel and cobble)	Fine gravelly loamy sand, 4 to 7 inches thick, dark yellowish massive, loose, non- sticky, and non-plastic, neutral (20% fine gravel)	Moderate to moderately well weatbered, well fractured, grayish to light brown.
IFBD-3	Lithic Cryumbrept, loamy, mixed	109-2 111c 120a-2 120b-4 120c-1 123-3 140b-3	13-18"	1/2 to 2" of partially decom- posed organic layer, gravelly sandy loam or loamy sand, 6 to 8 inches thick, brown,moder- ate fine granular, loose, non-plastic, and non-sticky, slightly acid to neutral (10 to 20% gravel.)	Gravelly or cobbly sandy loam, 7-12" thick, brown, massive, slightly bard, non-sticky, and non-plastic, slightly acid (30% coarse fragments).	Moderately weathered, well fractured, light brown
JCFA-1	Typic Xeropsamments mixed frigid	101 105-5 120c-8 122 123-2	30-60"+	Trace of litter over a very dark grayish brown, weak fine granular sandy loam to loamy sand, 4-10" thick; slightly acid; 0-10% gravel	Yellowish brown, single grain sand, greater than 60 inches thick; slightly acid; 0 to 10 percent gravel	Variable; very deep soil and alluvium over both granite and basalt
JEAA-2	Typic Cryorthents sandy- skeletal, mixed	102,111b 104,111c 106,106-2 107,109b 110,110x 111a 120b-6 120c-3 120d-3 140c-1 140e-1 141	20-50"	0-1" organic layer over a very dark grayish brown to dark brown, moderate fine granular, gravelly sandy loam, 6-8" thick; medium to slightly acid;strongly 20 to 30 pecent fine gravel.	Brown to yellowish brown, weak fine granular to single grain, gravelly loamy sand to gravelly sandy loam, 14-60" thick; to slightly acid; 25 to 45 percent gravel and 0 to 20 percent rock.	Variable

SOIL PROFILE CHARACTERISTICS

BOISE District

Soil No.	Soil Classification	Land Types	Depth to Bedrock	Surface Layer	Subsoil Layer	Bedrock Characteristics
JEAA-3	Typic Cryorthents, coarse- loamy, mixed	109a-1 111a 111b 111d 120b-6 122-4	20-60"	1" partially decomposed organic layer, dark brown, weak fine granular, coarse sandy loam, 10-15" thick; slightly acid; 5-10% gravel.	Yellowish brown, massive to weak medium granular coarse sandy loam to loamy sand, 15-45" thick; slightly acid; 5 to 15" gravel; 0 to 15 per- cent rock.	Gray to light brown, medium grained, masked to extremely well fractured, hard un-weathered to well weathered granite.
JEAA-5	Typic Cryorthents, loamy- skeletal mixed	108 109a-1 109b 109d-1 111a-1 111b 111b-1 122-1	20-40+	0-3" partially decomposed organic layer, very dark gray- ish brown, weak fine granular, gravelly sandy loam, 4-6" thick; medium to slightly acid; 30-50% gravel; 0-20% rock.	Brown massive to single grain to moderate medium granular, gravelly sandy loam, 15-30" thick; medium to slightly acid; 25-50% fine gravel, 0-40% rock.	Light brown to gray, medium grained masked to extremely well-fractured, hard un-weathered to well weathered granite
JEAD-3	Aquic Cryorthents, coarse- loamy, mixed	110	38+	1-2" partially decomposed organic layer, very dark gray- ish brown moderate fine granular, very fine sandy loam 3-10" thick; medium acid; 15% fine gravel.	Grayish brown to yellowish with brown matter, massive strati- fied layers of very fine sandy loam and loamy sand, 30-60" thick; medium acid, 30% cobbly, water table present at shallow depths most of the year.	Light brown to gray medium grained moderate to extremely well fractured weakly to moderately well weathered granite.
JEAE-2	Lithic Cryorthents, sandy- skeletal mixed	111a-1 111b-1 111c,111d 111x,113 120d-2 120d-3 121e,122-1	5-20"	0-1" partially decomposed organic layer, dark brown, weak fine granular, gravelly sandy loam, 2-5' thick; very slightly acid; 30-50 percent gravel; 0 to 15 percent rock.	Pale brown, single grain, gravelly coarse sand, 3-15" thick; slightly acid; 40 per- cent gravel; 10-35 percent rock.	Light brown to gray, medium grained, well to extremely well fractured, weakly to moderately well weathered granite.

SOIL PROFILE CHARACTERISTICS

BOISE District

Soil No.	Soil Classification	Land Types	Depth to Bedrock	Surface Layer	Subsoil Layer	Bedrock Characteristics
JEAE-3	Lithic Cryorthents, loamy mixed	109g 111d 113 120c-3	10-20"	0-1" partially decomposed organic layer, dark brown to brown, single grain to moderate medium subangular blocky loam to gravelly sandy loam, 4-6" thick, medium acid, 10-207 fine angular gravel.	Dark grayish brown to dark yellowish brown, massive to moderate medium subangular blocky sandy loam to gravelly sand, 6-12" thick, medium acid, 10-20% fine angular gravel.	White, medium and coarse grained, well fractured, moderately to well weathered granite.
JEAE-5	Lithic Cryorthents, loamy- skeletal, mixed	109a-1 109c 109d-1 110x 120c-3 120e-5 140e- 1,141	5-20"	0-2" partially decomposed organic layer, dark brown, weak fine granular, gravelly sandy loam, 2-20" thick; medium to slightly acid; 20-40% gravel, 0-20% rock.	Dark yellowish brown, weak fine granular to massive gravelly coarse sandy loam, 11-15" thick; slightly to strongly acid; 30-50% gravel; 20-50% rock,	Light brown to gray, medium grained moder- ately to extremely well fractured, hard unwea- thered to slightly wea- thered with some moder- ately well to well wea- thered granite.
JECA-2	Typic Xerorthents, sandy- skeletal, mixed frigid	101 105-5 140c-2	20-60"	0-1" organic layer over a very dark grayish brown, weak fine granular coarse sandy loam,4 to 6 incbes thick; neutral; 0 to 5% fine gravel.	Dark grayish brown to brown, single grain gravelly loamy coarse sand, 16-40" thick; neutral; 30-35% fine and medium gravel, 15-20% rock.	Extremely well fractured, well weathered granite.
JECA-3	Typic Xerorthents, coarse- loamy, mixed frigid	123-2	20-40"	0-1" partially decomposed organic layer, very dark gray- isb brown, weak fine granular loam to gravelly sandy loam, 5-10" thick; medium to very slightly acid; 5-20% gravel.	Brown, weak medium subangular blocky to massive, gravelly sandy loam, 10-30" thick; medium to very slightly acid; 20% gravel; 0-10% rock.	Light brown to gray, medium grained, masked to moderately fractured, transitional to well weathered granite.

TABLE 5

SOIL PROFILE CHARACTERISTICS

BOISE District

Soil No.	Soil Classification	Land Types	Depth to Bedrock	Surface Layer	Subsoil Layer	Bedrock Characteristics
JECA-5	Typic Xerorthents, loamy- skeletal, mixed frigid	101, 107-1 109c 120c-8 140b-2 140c-3 143	20-40"	0-1" partially decomposed organic layer, very dark gray, weak fine granular, gravelly sandy loam, 5-8" deep; slight acid; 20-30% gravel; 5 parcent rock.	Dark yellowish brown, weak fine granular to massive, gravelly coarse sandy loam, 15-30" thick; slightly acid; 30-50% gravel 15-60% rock.	Light brown to gray, medium grained; moderately to well fractured, weakly to moderately weathered granite.
JECB-2	Lithic Xerorthents, sandy- skeletal mixed frigid	120b-3 140c-3 143	8-18"	Very dark grayish brown, weak fine granular gravelly loamy coarse sand, 2-4" thick; medium acid; 30-35 percent gravel.	Dark brown to dark yellowish brown, weak and moderate. medium subangular blocky, gravelly loamy coarse sand, 15-25' thick; very slightly acid; 35%	Variable
JECB-5	Lithic Xerorthents, loamy- skeletal mixed frigid	120e-6 120e-7 122 123-2 135-1	8-20"	Partially decomposed litter layer, 0-trace, brown to dark yellowish brown, weak subangular blocky to single grained, sandy loam to gravelly sandy loam, 4-6" thick.	Brown to yellowish brown, fine weak sub-angular blocky to single grained, gravel-ly sandy loam, 4-18" thick,slightly acid, 50 percent fine and medium gravels.	Light brown to white, medium grained, slight fracturing, extremely well weathered granite.

MANAGEMENT QUALITIES CRITERIA FOR VALLEY **TYPES**

CHANNEL OVERFLOW FLOODING HAZARD: This is a qualitative rating of the hazard of water overflowing the defined stream channel and inundating the adjacent terrain. Major considerations of the rating are: (1) entrenchment of channel into valley bottom; (2) extent of valley bottom subject to overflow; and (3) evidence of past overflows.

RATING	CRITERIA
High	Streamside area subject to inundation averages over 100 feet wide. Much evidence of past inundation is present.
Moderately High	Streamside area subject to inundation averages 50 to 100 feet wide. Evidence of.past inundation is present.
Moderate	Streamside area subject to inundation averages 25 to 50 feet wide. Evidence of past inundation is present.
Moderately Low	Streamside area subject to inundation averages 15 to 25 feet wide. Evidence of past inundation is present.
Low	Streamside area subject to inundation averages less than 15 feet wide.

NOTE: Area is considered subject to inundation if it is less than 3 vertical feet above the distinguishable high water line for the adjacent stream channel.

If the area subject to inundation includes over 75 percent of the valley bottom area, raise rating one class.

SEDIMENT BUFFER QUALITY: This is a qualitative rating of the capacity of the valley area for stopping and storing soil material eroded from sources above the valley bottom.

RATING	SEDIMENT FLOW REDUCTION CLASS*	BUFFER ZONE WIDTH** (FEET)
Excellent	High	50 - 150
	Medium to High	> 150
Good	High	25 - 50
	Medium	50 - 150
	Low	> 150
Fair	High	10 - 25
	Medium	25 - 50
	Low	50 - 150
Poor	High	4 -10
	Medium	10 - 25
	Low	25 - 50
Very Poor	Low to Medium	< 10
	Low	10 - 25

* Sediment Flow Reduction Classes are categorized as follows:

CLASS	CHARACTERISTICS
High	This class has frequent large obstructions to water and sediment flow such as depressions, mounds, logs, rocks (greater than 10 inches in diameter), trees, and stumps. Obstructions are spaced 5 feet or closer.
Medium	This class has a few large obstructions or many small obstructions to water and sediment flow such as brush, slash, herbaceous plants, and cobble size rocks (3 to 10 inches in diameter). Obstructions are spaced 5 feet or closer.
Low	This class has few to no obstructions to water and sediment flow. Obstructions are spaced greater than 5 feet.

** Buffer Zone Width is that distance between the edge of the stream and the valley sideslope.

SEDIMENTATION HAZARD FROM A VALLEY BOTTOM ROAD: This is a qualitative rating of the hazard for sedimentation of water courses from the creation of or presence of a road generally located as far from the stream as valley bottom width allows while maintaining a valley bottom gradient. Actual rate of sedimentation is greatest during and immediately after construction. The rating is based on a SL-12 standard road (19 feet wide including ditch and shoulder) with routine past construction practices for timber operator built roads. Modal situation is with weathered (weathering classes 4 and 5) granitic sideslope materials.

RATING	SEDIMENT BUFFER QUALITY RATING*	DOMINANT SIDESLOPE GRADIENT (PERCENT)
High	Poor to Very Poor	Any Slope
Moderately High	Fair	Greater Than 55
Moderate	Fair	Less Than 55
	Good	Greater Than 55
Moderately Low	Good	Less Than 55
Low	Excellent	Any Slope

* Definitions of Sediment Buffer Quality Rating classes can be noted from the preceeding Valley Type Criteria.

NOTE: The above are modal conditions and the ratings can be modified as indicated below when conditions are significantly different from the above. The modifying conditions are:

Increase the hazard rating one class for each of the following that apply ---

1. Sideslopes undercut by the road are very wet during snowmelt and runoff conditions.
2. Sideslopes undercut by the road have bedrock sliding planes parallel with the slope.
3. Widest part of the valley bottom alternates from one side of the stream to the other.
4. Flashy debris-laden runoff is common from tributary drainages crossed by the road.
5. Sideslopes undercut by the road are dominantly (50 percent) well weathered to highly weathered (weathering classes 6 and 7) bedrock.

Decrease the hazard rating one class for each of the following that apply ---

1. Sideslopes undercut by the road are dominantly (50 percent) hard unweathered to moderately weathered (weathering classes 1, 2, and 3) bedrock.
2. Sideslopes undercut by the road include over 40 percent competent, angular, rock fragments.

STREAM SHADE REDUCTION HAZARD: This is a rating of the hazard of reducing stream surface shading by vegetation due to valley bottom road construction. The main factor considered is the degree of encroachment on and elimination of streamside vegetation required in valley bottom road locations.

RATING	CRITERIA
High	Less than 50 percent of the valley length has over 25 feet of gentle valley bottom terrain between streams and steep sideslopes.
Moderately High	Between 50 and 70 percent of the valley length has over 25 feet of gentle valley bottom terrain between streams and steep sideslopes.
Moderate	Between 70 and 85 percent of the valley length has over 25 feet of gentle valley bottom terrain between streams and steep sideslopes.
Moderately Low	Between 85 and 95 percent of the valley length has over 25 feet of gentle valley bottom terrain between streams and steep sideslopes.
Low	More than 95 percent of the valley length has over 25 feet of gentle valley bottom terrain between streams and steep sideslopes.

CHANNEL EROSION HAZARD WITH CHANNEL ALTERATION: This is a qualitative rating of the hazard for erosion of the stream channel as a result of channel constriction, encroachment, or other alterations of the channel materials or dimensions that control flow direction or velocities. The rating is based primarily on erodibility of channel materials without the aid of vegetation.

RATING	CRITERIA
High	Channel materials are predominantly sands and gravels and will seriously erode with any channel alteration.
Moderately High	Channel materials are predominantly sands, gravels, and cobbles and will erode moderately with moderate channel alteration and seriously with major alteration.
Moderate	Channel materials are predominantly gravels, cobbles, and stones and will erode moderately with major alteration.
Moderately Low	Channel materials are predominantly cobbles, stones, and boulders and will erode only slightly with major alteration.
Low	Channel materials are predominantly boulders and bed-rock and will not erode significantly even with major alteration.

MODIFYING NOMENCLATURE FOR VALLEY TYPE NAMES

SIDESLOPE GRADIENT: The dominant gradient of the sideslopes. Consideration is based on the lower 200 to 500 feet of the sideslopes.

MODIFIER	SLOPE CLASS (PERCENT)
Gentle-Sided	4 30
Moderately Steep-Sided	30 - 50
Steep-Sided	50 - 65
Very Steep-Sided	65 - 80
Precipitous-Sided	> 80

VALLEY BOTTOM WIDTH: The dominant width of valley bottom terrain exclusive of the width of the occupying stream channel.

MODIFIER	WIDTH CLASS (FEET)
Very Narrow	4. 15
Narrow	15 - 50
Moderately Narrow	50 -100
Moderately Wide	100 -300
Wide	>300

VALLEY GRADIENT: The dominant longitudinal gradient of the valley bottom. It is typically the gradient of the occupying stream.

MODIFIER	GRADIENT CLASS (PERCENT)
Low	4 2
Moderate	2 - 4
Moderately Steep	4 - 8
Steep	8 -12
Very Steep	>12

STREAM CHANNEL CONDITION MAP

Definitions

Stream channel condition is essentially a qualitative rating of a stream channel's reaction in terms of stability, to the peak flows it has experienced in the recent past (20-40 years). It is controlled by a complex interaction of factors, the most important of which are (1) the stability of channel materials, and (2) the magnitude of peak flows.

The channel condition does not necessarily indicate the hydrologic condition of the upstream watershed. A channel may be in good or excellent condition solely because of very stable channel materials -not because of well regulated streamflow. On the other hand, a channel may be in poor condition primarily because of highly unstable materials and/or change in base level rather than high peak flows from a poor condition watershed. Channel condition information is supplemental to, rather than a substitute for watershed condition information.

Reconnaissance Procedures

The major streams, generally fourth order and larger, were subdivided into "reaches" of similar conditions of materials, valley shape, vegetation, and apparent stability condition by aerial photo interpretation. The streams were then traveled in the field, reach corrections made, and channels rated as to condition. Field records and photographs are available in the Boise National Forest Supervisor's Office. The stream channel condition criteria used are presented below:

GUIDES FOR STREAM CHANNEL CONDITION CLASSIFICATION
(From Megahan)

Channel sides well vegetated. (2)	1.Channel sides partially vegetated. (4)	1.Very little vegetation on channel sides. (6)
No slumping of channel sides. (2)	2.Slumping of channel sides at constrictions and bends. (4)	2.Slumping of channel sides common. (6)
Very little or no cutting or deposition of channel bottom. (2)	3.Some cutting of channel bottom at constrictons, bends, and steep grades and depition in areas where the water velocity is less, e.g., pools. (4)	3.Cutting and deposition of channel bottom common, bottom obviously in a state of flux. (6)
Aquatic vegetation on channel sides and bottom. (1)	4.Aquatic vegetation scattered mostly i areas where stream velocities are low. (2)	4.No aquatic vegetation. (3)
Algae on rocks.(1)	5.Algae on rcks in places where th bottom is stable. (2)	5.No algae on rocks. (3)
Very little or no recent cutting or deposition along channel sides. (2)	6.Some cutting of stream banks at constricted areas or at outside of bends; deposition at the inside of bends and at the confluence with other streams. (4)	6. Large-scale cutting of stream banks common. (6)

Stream condition rating = total of above values.

Classification:

		Index
Excellent	- 10 - 13	1
Good	-14 - 17	2
Fair	- 18 - 22	3
Poor	- 23 - 26	4
Very Poor	- 27 - 30	5

Channels in Rock - In some instances, the channel cross-section may be carved in rock. Regardless of the above rating, to classify the condition of such channels on the basis of channel stabilit, they must be considered to be in the Good condition class or better.

ACCELERATED SEDIMENT SOURCE AREAS MAP

DEFINITION OF TERMS

Accelerated sediment source areas are those areas from which sedimentation rates have been increased over natural rates by man-controlled activities.

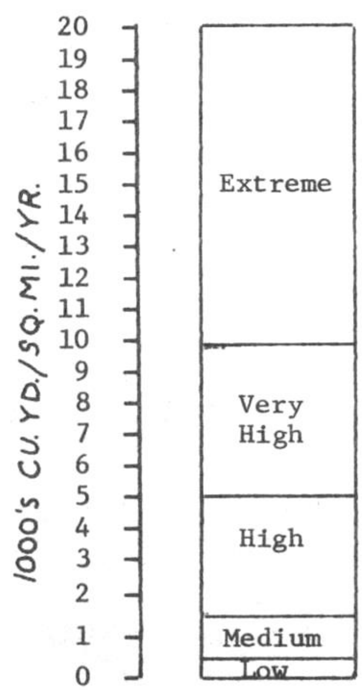
Sediment is the solid material transported to and deposited in a water body or water course. Soil and rock material eroded from the slopes of a watershed becomes sediment only if and when it is delivered to a water body or water course. Therefore, erosion is not the same as sedimentation.

Natural erosion is occurring on, and natural sedimentation is occurring from all lands. This is erosion and sedimentation which occurs when soils, climate, landform, and vegetation have not been altered directly or indirectly by man. Accelerated sedimentation is that additional sedimentation that results from alteration of natural conditions by man.

RECONNAISSANCE APPROACH AND PROCEDURES

The approach taken in this reconnaissance was to separate the accelerated sediment source areas into five qualitative classes - low, medium, high, very high, and extreme - by field observations, aerial photograph interpretation, and review of past survey information. Next, the quantitative limits of each class were estimated, based on benchmark data from quantiative studies. No quantitative measurements of sedimentation were taken during this reconnaissance.

The classes and their estimated quantitative limits are:



Class	Cubic Yards Per Square Mile Per Year
Low	50 - 500
Medium	500 - 1,500
High	1,500 - 5,000
Very High	5,000 - 10,000
Extreme	10,000 - 20,000

The rates above apply to specific areas from which sediment originates. Examples are disturbed areas of the road prism, sheep driveways and placer mined slopes. The rates do not apply to watershed-size areas. Rates for watersheds would be the weighted mean of all areas within

the watershed and would normally be much lower than the rates above.

Procedures followed during the reconnaissance are outlined below:

1. System and a few non-system roads were travelled and minimum segments of one-tenth of a mile were rated into extreme, very high, high, medium, or low accelerated sedimentation rates. This was done by observing: (a) erosion evidence on and adjacent to the road, and (b) buffer conditions and other evidence of eroded material delivery to water courses. Sedimentation ratings were recorded by color on a 2-inch per mile map.

2. The Boise River Condition Analysis Report of 1964 was reviewed and areas mapped as watershed condition Class 2 (Erosion Potential Moderate) and Class 3 (Erosion Potential Extreme) were transferred to a 2-inch per mile map.

3. Range condition information from allotment management folders was reviewed.

4. Resource-scale, color aerial photographs were systematically reviewed. During this review, watershed condition information from Step 2 was interpreted as to sediment delivery conditions and accelerated sedimentation classes were assigned. Other accelerated sediment source areas, such as mining disturbance, were located and rated. Information was recorded on a 2-inch per mile map.

The minimum area delineated was approximately one-tenth mile for roads and 30 acres for land areas. Whenever large mass failures due to disturbance were observed, they were delineated; however, this is an incomplete inventory of such failures. Sedimentation from stream channel erosion is not included in this mapping. Stream channel condition maps indicate channel erosion.

ANALYSIS OF INVENTORY INFORMATION

The inventory information is for one point in time, 1971, and will change with time. Proper evaluation of this information requires recognition of some basic relationships between sedimentation and other factors.

Sedimentation and Erosion. Eroded material is the source of sediment. The sedimentation rate for a given area is not necessarily the same as the erosion rate. Much of the material eroded is dropped when the runoff water carrying it slows down or enters the soil, or when a soil mass, moved by gravity, comes to rest before entering a water course. The percent of the total eroded material that enters a water course and becomes sediment is called the sediment-delivery percent.

The sediment-delivery percent varies greatly from one location to another and from one time to another. Slope shape, steepness, roughness, vegetation, length, as well as amount and timing of rainfall and snow-melt all influence sediment-delivery percent.

The term buffer zone refers to the characteristics of the land between an erosion source and the most accessible water course. A good buffer zone keeps the sediment-delivery percent very low.

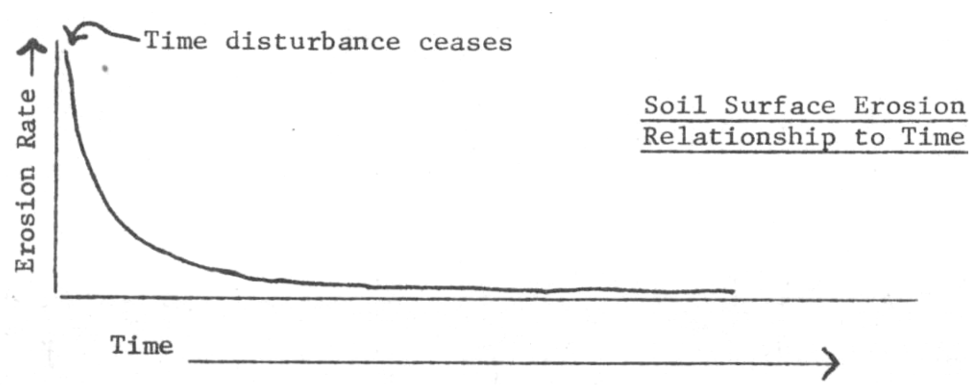
A good buffer zone has frequent large obstructions such as depressions, mounds, logs, rocks, trees and stumps. It is wide enough to catch and store large quantities of eroded material. A poor buffer zone lacks these characteristics.

The buffer zone also has a sediment storage function much like a reservoir. A delay occurs between the time of material inflow to the buffer zone and the time of outflow of material to water courses. The length of delay depends on the storage capacity of the buffer zone and the rate of inflow of eroded material. A good buffer zone has surplus storage capacity and can delay outflow of sediment to water courses indefinitely as long as erosion rates are not extreme for a long period. Once the storage capacity of a buffer zone is exhausted, the sediment-delivery percent jumps and remains high until erosion is reduced. Sedimentation rate often remains high for a time after the erosion rate drops until in-transit material, surplus to the storage capacity, passes through the buffer zone.

The storage capacity and efficiency of a buffer zone can often be improved or damaged by man.

EROSION RATE TO TIME RELATIONSHIP

For this discussion, erosion will be separated into (1) soil surface erosion by running water, and (2) soil erosion by mass movement, primarily by the force of gravity. Soil surface erosion by running water has been shown by many studies to reduce with time after a disturbance such as denudation, soil disturbance, water rechanneling, etc. The reduction in erosion rate is greatest during the first three to five years after the disturbance ceases. Then the erosion rate reduces more gradually until it reaches a more sustained, long-term rate. The quantitative scale varies with the type of disturbance but the general shape of the surface erosion rate curve with time is similar to the curve below:



The difference in the time and erosion rate scale from site to site is mostly controlled by the time required for the site to regain good ground cover and infiltration conditions and for new water channels to become armoured with stable materials. (Soils derived from well weathered granitic bedrock require many years to develop stable new water channels.)

Soil erosion by mass movement, primarily by the force of gravity is less related to time. After a major soil disturbance or major reduction in deep rooted plants, the mass movement hazard is likely at its highest. However, after this initial period, the hazard of mass movement erosion stays about the same and has no clear relationship with time.

RELATIONS OF EROSION TO CLIMATIC EVENTS

Soil surface erosion by running water is related to climatic events in that rainfall and snowmelt provide the main energy for detachment and transport of soil. And the more severe the event, the more soil is eroded. However, the same climatic event does not always cause the same amount of erosion. The erosion rate is also dependent on the time of the storm occurrence after a given soil disturbance. That is, the same rainstorm will cause more erosion if it occurs in an area one year after denudation by fire than if it occurs three years after the fire.

The relation of soil erosion by mass movement to time after disturbance and climatic events is not as well understood as that of soil surface erosion. There is strong evidence that soil erosion by mass movement, primarily by force of gravity, is more closely related to climatic events than to time. For example, in the Idaho Batholith there are indications that the same storm event will cause about the same amount of soil erosion by mass movement whether it occurs two years or seven years after road construction and timber harvest on a given area.

USES FOR ACCELERATED SEDIMENTATION INVENTORY INFORMATION

After the information is placed in perspective, it may be useful for the following purposes:

1. To get a general picture of the 1971 accelerated sedimentation situation for the Ranger District.
2. To get a general indication of effect of past man-controlled activities on sedimentation on different types of lands.
3. To help predict the sedimentation reaction of different types of lands to alternative future management activities. This fits into Ranger District multiple use planning.
4. To help set priorities for sedimentation control efforts. The information is broad and is not suitable for project level planning.

APPENDIX B - ADDITIONAL INFORMATION

Guide to Textural Classification
Glossary
References

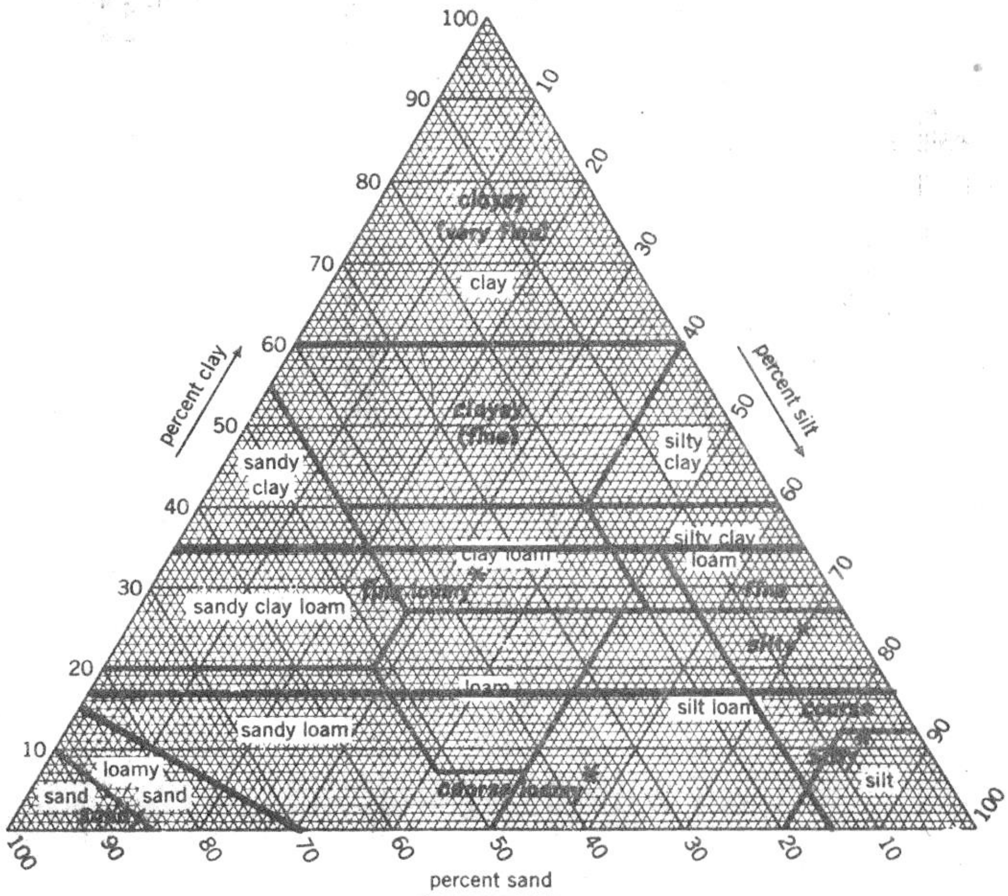
Maps

Landtype-Soil Association and Valley Types

Sedimentation Problem Areas

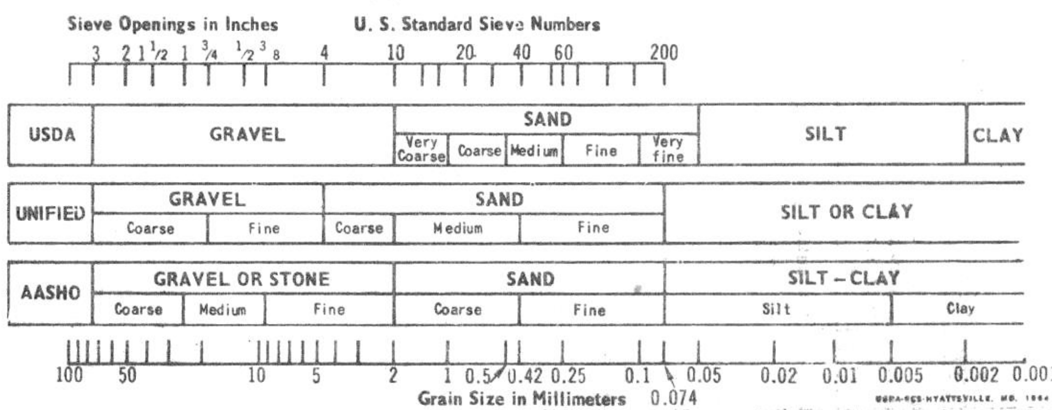
Stream Channel Stability Condition

GUIDE FOR TEXTURAL CLASSIFICATION IN SOIL FAMILIES



* Very fine sand (0.05 – 0.1) is treated as silt for family groupings; coarse fragments are considered the equivalent of coarse sand in the boundary between the silty and loamy classes.

COMPARISON OF PARTICLE SIZE SCALES



GLOSSARY

Aeolian - Wind deposited soil materials, generally called loess.

Alluvial fan - A cone-shaped deposit of alluvium made by a stream where it runs out onto a level plain or meets a slower stream.

Alluvial soil - Soil developing from recently deposited alluvium and exhibiting essentially no horizon development or modification of the recently deposited materials.

Alluvium - Soil materials such as gravel, sand, silt, or clay, deposited by a stream.

Alpine glaciation - Ice sheets moving only locally relative to a continental glacier, and producing at high mountainous elevations, alterations of the earth's solid surface through erosion and deposition by glacier ice.

Angle of repose - The maximum slope or angle at which a material such as soil or loose rock remains stable.

Available water holding capacity - The portion of water in a soil that can be readily absorbed by plant roots. Considered to be that water held in the soil against a pressure of up to approximately 15 bars.

Block fault - A body of rock bounded by one or more faults. It may be elevated or depressed relative to the adjoining region.

Blocky structure - Soil aggregates that are shaped like blocks. They may have flat or rounded surfaces that join at sharp angles.

Boulders - Rock fragments greater than 24 inches in diameter.

Clay - This term has two meanings: (1) soil consisting of inorganic materials, the grains of which have diameters smaller than .002 millimeters, (2) crystalline fragments of various minerals.

Cobbles - Rounded or partially rounded rock fragments ranging from 3 to 10 inches in diameter.

Colluvial - Gravity is the work force involved. Rock fragments and soil materials accumulating at the base of steep slopes.

Concave slope - A hollow, curved inclined surface of a hill, ridge or mountain.

Consistence - A combination of properties of soil material that determines its resistance to crushing and its ability to be molded or changed in shape. Such terms as loose, friable, firm, soft and sticky describe soil consistence.

Convex slope - Opposite of concave slope. A slope arched or curved outwardly.

CRB - Columbia River Basalt. Includes all flows and interstratified volcanic materials in Idaho that are associated with the Columbia River Basalt formation.

Crumb structure - Soil aggregates that are generally soft, small, porous, and irregular, tending toward a spherical shape.

Cryoplanated - Reduction of land surfaces mainly due to processes associated with frost action. The smooth slopes that characterize the surfaces are believed to be formed by frost accelerated erosion on altiplanation, induced by past and, in places, present alpine climatic regimes. These landscapes are often near other landscapes which have clearly been glaciated. Altiplanation and Cryoplanation are considered by some to be synonymous.

Deep percolation - Synonymous with deep seepage. That part of precipitation which enters the soil and percolates downward to the groundwater table or into pores, fractures, or joints of bedrock.

Deep seepage - See deep percolation.

Dendritic drainage pattern - Characterized by irregular branching in all directions with the tributaries joining the main stream at all angles.

Differential erosion - The more rapid erosion of one portion of the earth's surface as compared with another.

Dip slope - A slope of the land surface which conforms approximately to the angle at which a stratum of rock is inclined from the horizontal.

Elevated displacement - The higher of the two sides of a fault measured in the vertical.

Erosion - This includes processes of weathering, solution, corrosion, and transportation of earth and rock materials. Forces involved may be water, ice, wind, and gravity.

Escarpment - A more or less continuous line of cliffs or steep slopes facing in one general direction and due to erosion or faulting.

Extrusive - Those igneous rocks cooling above the earth's surface.

Faulting - The movement which produces relative displacement of adjacent rock masses along a fracture.

Fluvial - Produced by or pertaining to rivers and streams.

Geomorphology - The branch of physical geography which deals with the interpretative description of the relief features of the earth.

Glacial outwash - Boulders, till, gravel, sand or clay deposited by melt-water streams below active glaciers.

Granitic - Pertaining to relatively coarse-grained, light-colored rocks, composed chiefly of varying amounts of quartz and feldspar with relatively low amounts of dark colored minerals.

Granular structure - Aggregates are roughly spherical and small. They may be either hard or soft, but are generally more firm and less porous than crumb structure and are without the distinct faces of blocky structure.

Gravel - Rounded or angular rock fragments, not prominently flattened from 2 mm, to 3 inches in size. Fragments over 2 inches diameter - coarse gravelly; under [1]1 inch in diameter - fine gravelly.

Ground-water runoff - (In the context of a watershed.) That part of runoff that reaches surface streams of either perennial or intermittent form as flow beneath the soil surface. This includes, but is not limited to, subsurface flow and deep percolation.

Grus - An accumulation of fragmental products derived locally from the decomposition of granite.

Habitat type - See Habitat Type, Explanation of Table 4, Appendix A.

Igneous - Formed from a molten or partially molten material.

Infiltration - The passage of water through the soil surface into the soil.

Inherent erosion - See Inherent Erosion Hazard, Explanation of Table 1, Appendix A.

Intrusive - Molten material forming rocks before reaching the earth's surface. Cooling slowly.

Landtype - A portion of the landscape resulting from geomorphic and climatic processes with defined characteristics having predictable soil, hydrologic, engineering, productivity and other behavior patterns.

Landtype association - Represents the broadest level in the land stratification system at which the manifest (obvious) elements of soils, landform and vegetation become controlling.

Lithology - The physical character of a rock.

Massive structure - Characterized by large uniform masses of cohesive soil, sometimes with poorly defined and irregular breakage.

Mass stability - The susceptibility of soil masses to stress. Gravitational stresses, on slopes, changes of state (solution) and soil particle cohesion are the main factors involved.

Mass-wasting - The slow downslope movement of rock or soil debris. A general term for a vareity of processes by which large masses of earth materials are moved by gravity either slowly or quickly from one place to another.

Moderately dissected - Dissections or drainageways are spaced 500 to 1500 feet apart if shallow or moderately deep or if deep, more than 1500 feet apart.

Moraine - Soil materials, rocks, and gravel deposited chiefly by direct glacial action.

Nivation - Frost action and mass-wasting beneath a snowbank.

Overland flow - The part of precipitation that flows over the land surface toward water channels.

Parallel drainage pattern - Streams flowing nearly parallel to one another due to parallel topographic features.

Parent material - The unconsolidated mass of material from which the soil profile develops.

Percolation - The movement of water within the soil.

Plasticity - The property of a soil that enables it to undergo permanent deformation without appreciable volume change or rupture.

Relief - Difference in elevation between the high and low points of a land surface.

Low - 100 feet

Moderate - 100-500 feet

High - 500 feet

Response, Hydrologic - The relative time interval from water input (rainfall, snowmelt, etc.) to water outflow (water yield, runoff, etc.).

Lithology - The physical character of a rock.

Massive structure - Characterized by large uniform masses of cohesive soil, sometimes with poorly defined and irregular breakage.

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Percolation - The movement of water within the soil.

Plasticity - The property of a soil that enables it to undergo permanent deformation without appreciable volume change or rupture.

Relief - Difference in elevation between the high and low points of a land surface.

Low - <100 feet

Moderate - 100-500 feet

High - >500 feet

Response, Hydrologic - The relative time interval from water input (rainfall, snowmelt, etc.) to water outflow (water yield, runoff, etc.).

RO - Rock outcrop. Surface exposures of bedrock.

Runoff - (In the context of a landtype) Synonymous with landtype water yield. That part of precipitation received on a landtype that is yielded as free water to a lower bordering landtype or stream. The source of runoff (water yield) may be overland flow, subsurface flow, or deep percolation.

Runoff - (In the context of a watershed) That part of precipitation which appears in surface streams of either perennial or intermittent form. The source of runoff may be surface runoff or ground-water runoff.

RW - River-wash. A miscellaneous unit consisting of sandbars, gravel, cobbles, stones, boulders, wet areas, sands, and silting areas. Generally little vegetation is found on this soil.

Scarp slopes - Escarpment or steep slopes associated with faulting activity, usually opposite a dip slope.

Sediment - The solid material transported to and deposited in a water body or water course.

Sedimentary - Rocks composed of particles precipitated or deposited from suspension or solution in water.

Sedimentation - The process whereby sediment is transported to and deposited in a water body or water course.

Silt - Small mineral soil grains that range between 0.05 and 0.002 millimeters in diameter.

Single grain structure - No observable soil aggregates with the soil grains noncoherent.

Skeletal - A soil containing 35 percent or more rock fragments greater than 2.0 millimeters in diameter.

Slope hydrology - The manner in which a mountain slope disposes of the water it receives.

Slope length - Length of the incline surface of any part of the land.

Short - <500 feet

Moderate - 500 to 1500 feet

Long - <1500 feet

Slump - The downward slipping of a mass of soil or rock material, moving as a unit.

Soil - A dynamic natural body on the surface of the earth in which plants grow, composed of mineral and organic materials and living forms.

Soil aggregate - A single mass or cluster consisting of many primary soil particles held together in a form such as a clod, crumb, or granule.

Soil color - (Munsell color system). A color designation system that specifies the relative degrees of the three simple variables of color: hue, value, and chroma. For example: light yellowish brown, 10YR 6/4 is a color (of soil) with a hue = 10YR, value = 6, and chroma = 4.

Soil development - The formation of a soil (genesis) from its parent material; five major factors largely control the kind of soil that develops:

1. Climate (particularly temperature and precipitation)

2. Living organisms (especially the native vegetation)

3. Nature of parent material

4. Topography of area

5. Time that parent materials are subjected to soil formation

Soil horizon - A layer of soil, approximately parallel to the soil surface, with distinct characteristics produced by soil-forming processes.

Soil mottling - Contrasting color patches that vary in number and size.

Soil particle - An individual grain of soil, within a definite size group, as a clay, silt, or sand particle.

Soil profile - A vertical section of the soil through all its horizons and extending into the parent material.

Soil reaction - Sometimes referred to as pH. It is the common logarithm of the reciprocal of the hydrogen ion concentration of the soil solution. pH7 indicates a neutral soil; above 7, alkaline; below 7, acid.

Soil structure - The arrangement of the primary soil particles into lumps, granules, or other aggregates.

Soil texture - The relative amounts of the various size classes of soil particles, such as sand, silt, and clay. (See Chart, Appendix B.)

Stones. Rock fragments between 10 and 24 inches in diameter if rounded, and longer than 15 inches along the longer axis, if flat.

Strike - The direction or bearing of a horizontal line in the plane of an inclined stratum of rock. It is perpendicular to the direction of the dip.

Strongly Dissected - Dissections or drainageways are spaced less than 500 feet apart if shallow or moderately deep, or 500 to 1000 feet apart if deep.

Structural control - Topographic features pertaining to, part of, or consequent upon the geologic structure.

Subsoil - That part of the soil profile commonly below the surface horizon and above the parent material.

Subsurface flow - Synonymous with subsurface runoff, interflow, and subsurface storm flow. That part of precipitation which infiltrates the surface soil and moves laterally through the soil horizon toward streams as ephemeral, shallow, perched ground-water above the main ground-water level.

Surface layer - That part of the soil profile that includes the surface and first (A) horizon (generally 4 to 10 inches).

Surface runoff - (In the context of a watershed) That part of runoff that reaches surface streams of either perennial or intermittent form as overland flow.

Tectonic lands - Land raised by deformation of the earth's crust. Uplift, warping, fracture, faulting are some forms of tectonism. This is in contrast with land formed by volcanism or sedimentary deposition.

Terrace - The level or gently undulating land lying along a stream valley, intermediate in elevation between the flood plain and the upland. Terraces are remnants of an earlier flood plain of the stream.

Transported soils - Those soils not formed in place but moved by wind, water, or gravity.

Truncate - Terminate abruptly; truncated spur; the widening of a valley by a glacier results in the truncation of the ridges entering the sides of the valley.

Uplift - Elevation of any extensive part of the earth's surface relative to some other parts.

Vesicular - Filled with tiny air pockets and resembling a sponge or honeycomb in appearance.

Water table - The upper surface of the ground water.

Water yield, Landtype - See Runoff (in the context of a Landtype).

Weakly Dissected - Dissections or drainageways are generally 500 to 1500 feet apart if shallow, and more than 1500 feet apart if deep.

REFERENCES

Clayton, James L. and Arnold, John F., 1972, Practical Grain Size, Fracturing Density, and Weathering Classification of Intrusive Rocks of the Idaho Batholith, USDA, Forest Service, General Technical Report INT.-2, 1972.

Fairbridge, Rhodes W., Encyclopedia of Geomorphology, 1968, Reinhold Book Corporation.

Idaho Water Resource Board, 1968, Idaho Water Resources Inventory. Prepared by: Water Resources Research Institute, University of Idaho. 2 Vol.

Megahan, Walter F., 1965, Channel Condition Classification. Paper presented at a meeting of the Utah Chapter of the Soil Conservation Society of America, held in Salt Lake City, Utah.

Megahan, Walter F., Logging, Erosion, Sedimentation - Are They Dirty Words? Journal of Forestry, Volume 70, No. 7, July 1972.

Megahan, Walter F., Subsurface Flow Interception of a Logging Road in Mountains of Central Idaho, National Symposium on Watersheds in Transition, 1972.

Price, Larry W., 1972. The Periglacial Environment, Permafrost, and Man, Resource Paper No. 14, Association of American Geographers.

Rosa, M. J., 1968, Water-Yield Maps for Idaho. Agricultural Research Service. ARS 41-141. U. S. Department of Agriculture.

Rosa, M. J. and Tigerman, M. H., 1951, Some Methods for Relating Sediment Production to Watershed Conditions. Intermountain Forest & Range Experiment Station Paper 26, 19 pp.

Schmidt, Dwight L., and Mackin, Hoover J., Quaternary Geology of Long

and Bear Valleys, West Central Idaho, Geological Survey Bulletin 1311-A., U.S. Govt. Printing Office, 1970.

Wertz, William A., and Arnold, John F., 1972, Land Systems Inventory, USFS, Intermountain Region.