

To: Rafael
From: Ray Anderson
12 pages.

III G124s - Gb124s

STEEP CANYONLAND IN GRANITE & BORDER ZONE

HOT AND DRY SITES

Landtype Characteristics

Landform - These steep, grass and sage covered, canyonlands lie immediately adjacent to minor drainages and tributaries to the Salmon River. Dissections are shallow, parallel and dominantly first order. Gaps of two to three stream orders exist between these drainages and the streams at the base of the unit. Faulting and undercutting at the base of this unit by the river are the primary reasons for oversteepening. The slope range is 60 to 80 percent. Talus is common, often covering 25 percent of the unit. The granitic and border zone rock suites form the bedrock.

January, 1979

III G124s - Gb124s

Soils - The more common soils derived from granitic (G124) parent material on the hot-dry aspect are soils IUXE-6 and IUXL-6. Soil IUXE-6 is moderately deep, brown in color, has loamy sand textures, 15 to 35 percent gravel and 15 to 30 percent cobble and stone. Soil IUXL-6 is shallow, brown in color, has loamy sand textures, 15 to 35 percent gravel and 15 to 30 percent cobble and stone. These soils are poorly covered by vegetation and litter; surface rock, bare ground, pavement and rock outcrop may occupy up to 60 percent of the area.

The more common soils derived from border zone (Gb124) parent material on the hot-dry aspect are soils MXHE-12 and MXHL-12. Soil MXHE-12 is moderately deep, brown in color, has sandy loam textures, 15 to 25 percent gravel and 10 to 20 percent cobble and stone. Soil MXHL-12 is shallow, brown in color, has sandy loam textures, 15 to 25 percent gravel and 10 to 20 percent cobble and stone. Soil MXHL-12 is shallow, brown in color, has sandy loam textures, 15 to 25 percent gravel and 10 to 20 percent cobble and stone. These soils are poorly covered by vegetation and litter; surface rock, pavement, bare ground and rock outcrop may occupy up to 40 percent of the area.

Hydrology - This landtype receives less than 20 to 25 inches of precipitation during the average year. Snowfall accounts for approximately 50 to 55 percent of the total annual precipitation. An average of less than 10 inches of water is yielded annually. The hydrologic response is very rapid in the G124 and rapid to very rapid in the Gb124. This landtype can be considered flashy, especially during high intensity summer storms. Although overland flow does occur, normal runoff usually occurs as shallow to moderately deep subsurface flow above bedrock. The parallel drainage pattern, which is a characteristic of the landtype, leads to the collection and delivery of subsurface flow and overland flow in an unconcentrated form.

Vegetation - The steep topography in this landtype combined with aspect create the major vegetation distribution controls. The habitat types and communities in this landtype are: various sagebrush/bluebunch wheatgrass, bluebunch wheatgrass/Idaho fescue, mountain mahogany/bluebunch wheatgrass, Douglas fir/bluebunch wheatgrass, Douglas fir/elksedge, Douglas fir/mountain mahogany, Douglas fir/pinegrass, ponderosa pine/bluebunch wheatgrass, and Douglas fir/ninebark.

The south and west aspects of this landtype have rapid water movement off the steep slope, high E.T. potentials, and long day periods which create a hot-dry habitat. This habitat is primarily occupied by bunchgrasses, various low brush species such as sagebrush and greenbush and widely scattered trees. The trees are usually located where there is some water retention or concentration through subsurface flow. The timber stands are often producing less than 20 cubic feet per acre per year with some areas having site index 60 or more and having a productivity potential of Class VI (very poor). These areas are very small.

III G124s - Gb124s

In the rockier areas of this landtype mountain mahogany is common with the plants widely scattered. Where sagebrush is abundant the species varies by elevation and soil character. Three tip sagebrush is associated with rocky thin soils; mountain big sagebrush occurs above 5,000 feet and Wyoming big sagebrush below 5,000 feet.

The bunch grass and low brush seldom occupy the soil surface more than 80 percent with the average about 50 to 60 percent. Occasional other low riparian brush may occur in ephemeral stream bottoms.

Wildlife - These lands are deer, elk, bighorn sheep and mountain goat winter range, due mainly to the presence of large quantities of palatable mountain big sagebrush, threetip sagebrush, scattered mountain mahogany and bluebunch wheatgrass. Scattered trees provide some escape cover. Cougars, bobcats and coyotes are common during the winter. They also provide yearlong range for chukars. Some peregrine falcon nesting habitat is also found here. The open slopes are important feeding areas for raptorial birds.

Scenics - This landtype is the side slope of a focal stream cut valley. It is generally dry and the vegetation only moderately diverse. The variety class for this landtype is moderate. The soils are light in color and contrast with their surroundings when disturbed.

Fire - Fire incidence in this landtype is low with most fires being lightning caused. The grass and brush ground cover with occasional trees is flammable from late May through September but only has a high fire occurrence when associated with a storm path. There is no fire ladder potential in this landtype except that convective runs are common. The steep slopes allow rapid heating ahead of any fire allowing rapid spread. This rapid spread makes the chance of a large fire high.

The steep terrain creates many problems. Lateral spread caused by burning debris roll and rapid lateral burn creates a broad fire front. The terrain also has many "chutes" that cause extremely rapid runs. Associated as this landtype is with large streams there are gradient winds and local effects that cause odd weather patterns with winds often achieving some low velocities on nearly calm days.

Wet weather quickly diminishes spread problems in most of the landtype so that "wet" lightning storms cause only minor problems.

The volume of heavy down fuels is negligible. Man's activity is very light with timber harvest uncommon on this terrain.

Barriers such as cliffs are common in this landtype. These cliffs have long talus slopes that play a significant part in controlling the spread of a large fire.

III G124s - Gb124s

Management Implications

Soils The granitic (G124) soils have a high to very high inherent erosion hazard, a high debris slide hazard, a very low slump hazard, and a high surface creep hazard.

The border zone (Gb124) soils have a high inherent erosion hazard, a moderate debris slide hazard, a very low slump hazard, and a moderate to high surface creep hazard.

The potential for creating a sediment source by soil disturbing activities is high to very high on the granitic soils and high on the border zone soils. The potential to revegetate disturbed areas is poor for granitic soils and poor to fair for border zone soils. Soil disturbance should be avoided. The limiting factors are the steep slopes, the hot-dry microclimate, and the proximity to live streams.

Hydrology - This landtype lies within a low to moderate precipitation zone and has a low water yield characteristic. The natural erosion buffer potential is low to very low on the G124 and low on the Gb124. Periodic melting of the snowpack does occur throughout the winter with the snowpack disappearing by early spring. The snow avalanche hazard is very low. The hazard of subsurface flow interception is low to very low in the G124 and low to very low in the Gb124. Slope steepness and juxtaposition to live streams are characteristic of the landtype that can lead to serious watershed problems under improper management. A large portion of accelerated erosion will be realized as sediment. This landtype can be flashy with high intensity summer storms being the greatest threat to erosion control and slope stability. This is a hazardous landtype and should be avoided when possible with surface disturbing activities.

Roads and Trails - These lands are unsuitable for road locations. Road construction costs will be very high due to the steep slopes and amount of rock present. The erosion potential of exposed cut and fill slopes is high and the response to revegetation is poor which will result in much material being eroded from bared soils for several years. The mass stability of cut and fill slopes will be moderate and occasional mass failures will occur.

Timber - The very steep terrain of this landtype coupled with the isolated nature of the timber stands makes this landtype unsuitable for management. The habitat types below indicate other management situations. (Scarification, brush disposal, etc., should be coordinated with watershed considerations.).

III G124s - Gb124s

Douglas-fir/bluebunch wheatgrass (DF/Agsp) habitat type produces minor amounts of Douglas fir with some rare ponderosa pine production below 6,000 feet elevation. The low production levels coupled with a variable stocking density on hot and dry landtypes causes this habitat type to be non-productive on approximately 50 percent of the areas. On the better sites, an extremely selective system of harvesting should be used. Natural regeneration success is very weather and seed dependent. This habitat type is a very low priority area for timber management. Timber management, wildlife, or livestock often conflict on this habitat type. When livestock pressure is heavy this habitat will not produce timber because of regeneration difficulty.

Douglas-fir/mountain mahogany (DF/Cele) habitat type produces browse for wildlife best. The extremely low stockability level and nature of the timber makes this habitat type a nonproductive forest land. Only trees that must be removed for other purposes (roads, etc.) should be removed. Regeneration of timber in this habitat type is extremely difficult. Management activities can seriously alter the vegetative character of the area. This area has no priority for timber management.

Douglas-fir/pinegrass habitat type/pinegrass phase (DF/Caru/Caru) produces a low to moderate volume of Douglas-fir above 6,100 feet elevation. Below the 6,100 foot elevation level ponderosa pine is usually the best producer when it is seral. In each case a three-stage shelterwood or group selection system will favor the most productive species. When only Douglas-fir is adapted to the site, afternoon shade should be provided. When there is a stockability limitation indicated with an unevenaged structure a group selection harvest system would aid in natural regeneration success. Scarification with some brush disposal is needed to obtain any natural regeneration. Success in natural regeneration is low with less than 50 percent stocking at the end of five years. The need for artificial regeneration as underplanting will vary with the length of regeneration period allowed. The best first thinning age is prior to 40 years of age. Timing should be such that a good bole to crown ratio is maintained.

Ponderosa pine/bluebunch wheatgrass habitat type (PP/Agsp) is the driest habitat type producing ponderosa pine. It normally occurs below 6,000 feet elevation. Rarely Douglas-fir may be present. The extremely low production levels coupled with a variable occurrence throughout many landtypes causes this habitat type to be nonproductive on approximately 50 percent of the type. This type usually has a stockability of 50 percent. On the best sites an extremely selective harvest system should be used. Natural regeneration success is extremely low. Natural regeneration may require 15 to 20 years to fully stock a site. In areas cut heavily up to 50 years may be required for regeneration. Some minor scarification may be necessary with some

III G124s - Gb124s

very light brush disposal work to aid in the natural regeneration process. The difficulty in regeneration and the low level of production should place this habitat type in a very low priority. Natural regeneration success is variable ranging from 0 to 50 percent in five years. Regeneration success is very weather and seed dependent. This habitat type will seldom require any thinning. A conflict with wildlife and livestock is often common on this type.

Douglas-fir/ninebark habitat type (DF/Phma) produces Douglas-fir above 5,700 to 6,700 feet elevation, depending on exposure. Ponderosa pine produces higher volumes than Douglas-fir when it is the major seral species. A shelterwood system that removes a variable amount of over-story shade will favor both ponderosa pine and Douglas-fir. The shading should vary with exposure at midday and the species favored. Group selection systems will favor Douglas-fir on most slopes. Scarification and brush disposal are necessary to obtain any natural regeneration with success in five years approximately 50 percent. The need for artificial regeneration will vary with length of regeneration period allowed. The best first thinning age is prior to 40 years of age while a good bole to crown ratio is still retained.

Douglas fir/elksedge habitat type (DF/Cage) has an elksedge phase (DF/Cage/Cage), a sagebrush phase (DF/Cage/Artr), and a mountain snowberry phase (DF/Cage/Syor), all of which have very low production level of Douglas-fir with stockability limitations common. Ponderosa pine may be produced at very low levels on elevations below 6,100 feet elevation. The dry nature of this site makes selection (group or single tree) the best harvest system with shade for moisture retention very essential. Reliance should be placed on natural regeneration with scarification of small areas essential. On higher elevation areas artificial regeneration is very unsuccessful especially the Artr phases. Where ponderosa pine is a seral artificial regeneration is slightly more productive. Natural regeneration success will be very low with adequate natural stocking requiring as much as 15 to 20 years. This habitat type is a very low management priority.

Range - Not available.

Wildlife - These lands now contain a good mixture of shrubs palatable to big game. Any activity that reduces the quantity or quality of these shrubs will be highly detrimental.

Roads across these oversteepened faces will create barriers which are virtually impassable by deer or elk.

Fire will be detrimental on big game winter range where mountain mahogany and mountain big sagebrush are key species. Where threetip sagebrush is key, fire may be beneficial.

III G124s - Gb124s

Recreation - The gradient of this land limits the use of the land. Off-road vehicles of all kinds cannot maneuver over it and hiking is difficult without trails. However, some game bird hunting takes place. The occasional rock outcropping makes this land a highly scenic area. The light colored soils make roads and trails on this land a noticeable visual impact.

Fire Management - Recovery from any fire is rapid in this landtype with perennial grasses occupying the site (about 60 to 90 percent) by the next year. There is considerable alteration in composition through fire; browse species are mostly lost and occasionally downy brome volumes are increased. The slopes of most of this landtype are big game winter range; alteration of current habitat in this type would, in general, adversely affect wildlife conditions.

Fires allowed to burn in this land will often cause immediate impacts on streams by sediment and ash pollutants reaching the stream.

Control methods must be adjusted because of watershed constraints; mechanical control (tractor) is extremely difficult and causes severe watershed impacts. Another control problem is safety; debris roll is heavy with both burning material and other inert material detached. Firefighters have a real problem of control in this landtype. Chimneys or chutes cause extremely rapid and erratic spreads when they are aided by the erratic winds. The chances for being overrun by fire in this landtype are moderate to high if all precautions are not followed.

Aerial attack is extremely difficult with fixed-wing aircraft. Chemical retardant is very effective because of the fuel character. The barriers in this landtype, while providing a slight safety problem, allow anchor points and reduce the lateral spread capability.

LANDTYPE NO. III G124s

EROSION AND STABILITY HAZARDS

DOMINANT CLIMATE	UNIT %	SOIL NO.	DOMINANT SLOPE RANGE	BEDROCK FRACTURING CLASS	INHERENT EROSION HAZARD	MASS STABILITY HAZARD		
						DEBRIS SLIDE	SLUMP	SURFACE CREEP
Hot-dry	90	TUXE-6 TUXL-6	60-80	3-4	4-5	4	1	4

HYDROLOGIC INTERPRETATIONS

DOMINANT CLIMATE	PERCENT OF LANDTYPE	DEPTH TO BEDROCK (INCHES)	PERCENT GROUND COVER	PERCENT ROCK OUT CROP			PERCENT BARE GROUND	INFILTRATION	PERCOLATION	DEBRIS SLIDE HAZARD	EROSION FILTER POTENTIAL	CHANNEL STABILITY HAZARD	SNOW AVALANCHE HAZARD	SUBSURFACE FLOW INTERCEPTION HAZARD	PRECIPITATION	WATER YIELD	WATER BALANCE	HYDROLOGIC RESPONSE	SNOWPACK DURATION	
				VEGETATION & LITTER	FINE GRAVEL (2 MM - 18.75 MM)	COBBLE & STONE (76 MM)														
Hot-dry	90	60-80	15-30	60-80	5-15	10-20	0-5	4	4	4	3-4	1-2	--	1	1-2	2-3	1-2	1	5	1-2

ROAD CONSTRUCTION AND MAINTENANCE DATA

DOMINANT CLIMATE	PERCENT OF LANDTYPE	DOMINANT SLOPE RANGE	PERCENT ROCK OUT CROP	DEPTH TO BEDROCK (INCHES)	BEDROCK FRACTURING CLASS	PERCENT RIPPLE ROCK	PERCENT ROCK ENCOUNTERED	EXCAVATION TYPE	ROAD CONSTRUCTION COST CLASSIFICATION	TERRAIN CLASSIFICATION	MASS FAILURE HAZARD	EROSION HAZARD	LOADING IMPACTS	
Hot-dry	90	60-80	0-5	15-30	3	50	75-100		3	5	4	3	4-5	4

NOTE: See Appendix Material for Explanation of Tables.

Form Date 7/7/77

GRAPHICS

Sec. VII

1-1

Hydrologic Interpretations

Landtype - Mapping symbol representing each landtype.

Dominant Climate - This is a series of descriptive terms and is completely subjective and relative to the Salmon National Forest. At some point in time this series of terms may be standardized and related to habitat type, soil temperature, etc. Now, however, it should be viewed as merely descriptive.

Percent of Landtype - The percentage of each dominant climate found in a given landtype.

Dominant Slope Range - Gives the dominant slope range for each landtype component.

Depth to Bedrock - The dominant range in depth to the underlying bedrock.

Percent Ground Cover:

Vegetation and Litter - The percentage of ground cover which includes the basal area of the plants plus litter older than one year.

Fine Gravel - The percentage of the surface covered with gravel size particles greater than 2mm. and less than 18.75 mm (3/4 in) in diameter.

Cobble and Stone - The percentage of the surface covered with rock fragments greater than 76 mm (3 in) in diameter.

Percent Rock Outcrop - The percentage of rock outcrop that is attached to bedrock.

Percent Bare Ground - The percentage of exposed bare ground surface.

Infiltration and Permeability Infiltration is the rate at which water enters the soil. The infiltration rate of a soil is controlled by structure, porosity, and texture of the surface layers.

Permeability is the rate at which water moves through the soil. The permeability of a soil is determined primarily by the structure and texture of the soil profile below the surface layers.

Infiltration and permeability ratings are expressed in the same five classes as follows:

<u>Rating</u>	<u>Description</u>
	Pavement and bare ground will typically make up 35 to 55 percent.
3	This class exhibits <u>fair</u> erosion buffering potential. There are infrequent large obstructions spaced 10 to 20 feet apart. Vegetation and litter cover ranges from 50 to 75 percent. Slopes are generally less than 70 percent.
5	This class exhibits <u>excellent</u> erosion buffering potential. There are frequent large obstructions to water or sediment flow. These obstructions are generally spaced 5 feet or closer. Vegetation and litter cover ranges from 90 to 100 percent. Slopes are generally less than 60 to 65 percent. Pavement and bare ground is typically less than 5 percent.

Channel Stability Hazard - This is a rating of the hazard for erosion or alteration of the stream channel as a result of peak flow increases, 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.

	<u>Rating</u>		<u>Description</u>
	<u>Numerical</u>	<u>Subjective</u>	
1		Very Low	Channel materials are predominantly boulders and bedrock and will not erode significantly even with major alteration.
2		Low	Channel materials are predominantly cobbles, stones, and boulders and will erode only slightly with major alteration.
3		Moderate	Channel materials are predominantly gravels, cobbles, and stones and will erode moderately with major alteration.
4		High	Channel materials are predominantly sands, gravels, and cobbles and will erode moderately with moderate channel alteration and seriously with major alteration.
5		Very High	Channel materials are predominantly sands and gravels and will seriously erode with any channel alteration.

<u>Rating</u>	<u>Description</u>
3	The probability of intercepting subsurface flow is <u>moderate</u> . Road failures due to intercepted subsurface flow are common with minor damaging effect that can be rectified by normal annual maintenance practices.
4	The probability of intercepting subsurface flow is <u>high</u> . Road failures due to intercepted subsurface flow are frequent with damaging effects that will necessitate immediate maintenance consideration.
5	The probability of intercepting subsurface flow is <u>very high</u> . Road failures due to intercepted subsurface flow are massive with catastrophic effects which maintenance cannot correct.

Precipitation - This is a quantitative rating of the amount of precipitation received by a landtype. Precipitation is in terms of area-inches per year.

<u>Rating</u>		<u>Annual Precipitation</u>
<u>Numerical</u>	<u>Subjective</u>	<u>(Area-Inches)</u>
1	Very Low	7 - 10
2	Low	10 - 15
3	Moderate	15 - 25
4	High	25 - 35
5	Very High	> 35

Water Yield - This is a qualitative rating of the amount of water yielded by a landtype each year in terms of area-inches per year.

<u>Rating</u>		<u>Annual Water Yield</u>
<u>Numerical</u>	<u>Subjective</u>	<u>(Area-Inches)</u>
1	Very Low	0 - 1
2	Low	1 - 5
3	Moderate	5 - 10
4	High	10 - 20
5	Very High	> 20

Water Balance - This is a quantitative rating of the percent of total annual precipitation that is yielded from a landtype.

- 5 These lands are very rapid in the delivery of water to downslope lands or streams. Drainages within and immediately below these units are often ephemeral. The units are hydrologically flashy. The rapid concentration of overland flow and subsurface flow are characteristic of the lands.

Snowpack Duration - This is an evaluation of the longevity of snowpacks on the landtypes. The main factors utilized in establishing the ratings were aspect, vegetative characteristics, and slope configuration and gradient.

<u>Rating</u>	<u>Description</u>
1	These lands maintain <u>intermittent</u> snowpacks throughout the winter. Periodic winter melt occurs often enough to remove all or nearly all snowpack until the next snowfall. The units are the first to bare-up. Snowpack depletion occurs by early spring. Snowpack depth is typically less than 12 inches.
3	These lands are <u>average</u> in winter snowpack dynamics. Winter snowfall events are heavy and frequent enough to keep ahead of periodic melting. Complete snowpack depletion during the winter is rare. Snowpacks will usually persist until middle to late spring. Snowpack depth generally ranges between 2 and 4 feet.
5	These lands maintain <u>very long</u> duration snowpacks. Winter snowmelt periods are infrequent and limited to unusually warm climatic events. Winter snowfall events continually add to snowpack depth and density. Snowpacks will persist until late spring to early summer with isolated patches lasting until late summer. Snowpack depth is usually greater than 4 to 5 feet.