SOILS REPORT - CHOMLY MANAGEMENT UNIT

This soils report is based on aerial photo interpretation with limited field checking with the use of a helicopter. It was not feasible or necessary to visit every delineation on the ground. Each mapping unit was observed at close range from the air, however. The maps are presently on aerial photos in the Planning Office. They will be transferred to a base map as soon as possible.

Mapping Process. The landscapes were stratified into similar units (ecosystems) which are based on soil, vegetation and landform characteristics. Vegetation, being the most observable from photo and the air, was the key mapping unit indicator. Geomorphology also weigh heavily in identifying units. Actual on-the-ground checking was done where there was much uncertainty.

Ecoystem Classification. This was done according to "families", "types", and "subtypes". Families are landscape segments with broad vegetation - soil - environmental similarities such as Forest, Muskeg, or Alpine. Each family is divided into "types" with the differentiating characteristics being such things as drainage, productivity and depth to bedrock. The subtype indicates behavioral response to management and is used in this report only to indicate landslide susceptibility. The objective in this classification system is to make the map symbol define itself as much as possible. For instance, the symbol F4r indicates the natural vegetation is forest (F), drainage is somewhat restricted (4) and bedrock occurs within 10 inches or less from the ground surface. The underline indicates landslide susceptibility. A double underline indicates severe landslide susceptibility. The family letters used in the system are as follows:

F - Forest
M - Muskeg
B - Brushy Slope (usually a snow avalanche track or zone of persistent snow accumulation.
A - Alpine
E - Estuarine (tide influenced meadow)
V - V-notched drain

The number and sometimes lower case letter indicates the following on "F" ecoystems:

1 - Well drained with more than 20 inches of mineral soil.
2 - Well drained with 10 to 20 inches of mineral soil.
2r - Well drained with 0 to 10 inches of mineral soil.
4 - Somewhat poorly drained with 10 to 20 inches of mineral soil.
4r - Somewhat poorly drained with 0 to 10 inches of mineral soil.
5 - Poorly drained organic soils
6 - Somewhat poorly drained soils transitional to alpine.
___ - Landslide prone
___ - Severe landslide problems

All the other ecosystems were not differentiated beyond the "family" level.

Symbol	Name
F12	Well drained forested soils, 20 inches to several feet of minerals soils.
Ft	Undifferentiated alluvial soils
F2	Well drained forested soils, 10 to 20 inches of mineral soils.
F2	Well drained forested soils, 10 to 20 inches of mineral soils, slide prone.
F2	Well drained forested soils, 10 to 20 inches of mineral soils, severely slide prone.
F2r	Well drained forested soils, 0 to 10 inches of mineral soil, slide prone.
F2r	Well drained forested soils, 0 to 10 inches of mineral soil, severly slide prone.
F4	Somewhat poorly drained forested soils, 10 to 20 inches of mineral soil.
F4r	Somewhat poorly drained forested soils, 0 to 10 inches of mineral soil.
F4r	Somewhat poorly drained forested soils, 0 to 10 inches of mineral soil, slide prone.
F4r	Somewhat poorly drained forested soils, 0 to 10 inches of mineral soil, severely slide prone.
F45	Somewhat poorly drained mineral and poorly drained organic soils, generally less than 2 feet thick.
F5	Poorly drained scrubby timbered soil, 10 to 30 inches of organic soil.
F6	Somewhat poorly drained forested soils, 10 to 20 inches thick, transitional to alpine, slide prone.
F6	Somewhat poorly drained forested soils, 10 to 20 inches thick, transitional to alpine, severely slide prone.

MF5	Muskeg and scrub timbered soils.
A	Alpine soils
B	Snow slide tracks and persistent snow patches.
V	V-notched drainges
E	Tide influenced meadows

Management Interpretations

Soil suitability, productivity and management [redacted] information is listed in the attached table. The interpretations in this table are not intended to dictate the use of the land, but to evaluate its potential for various uses. From this table, overlays can be made rating the soils for various uses and hazards. For example, green could be used for the best rating, yellow or orange for intermediate ratings, and red for the worst rating. One overlay has already been prepared at the Planning Office showing the severely landslide prone soils of the Chomly area. The same could be done for site index, soil compactibility, deer forage production, etc.

The figures given in the column "tallest Sitka spruce site index" are averages as determined in the soil-site index administrative study. A few figures are estimated and so indicated by footnotes. The dash indicates that the ecosystem is not suited for timber production and "VAR" indicates highly variable site indexes.

Ratings under "susceptibility to induce sediment production" are relative within Southeast Alaska. They are not comparable to other areas. For instance, an ecosystem that rates high in Southeast Alaska would rate low in California in terms of tons per acre of sediment reaching the stream after soil disturbance. The definitions used are listed below with descriptive statements:

High	A.	Soils on very steep slopes
	B.	Certain to slide or erode when disturbed
	C.	Contribute large quantities of sediment to streams under natural conditions
Moderate	A.	Soils on moderately steep slopes but are less likely to produce damaging stream sediments due to lack of much erodable soil material.
	B.	Soils on moderate or short fairly steep slopes or terraces with pockets of relatively deep soil.
	C.	Soils quite stable until disturbed. Some erosion and small slides or slumps may occur following ground disturbance.

Low	A. Very shallow mineral soils
	B. Soils on gentle slopes
	C. Organic soils regardless of slope

Landslide hazard gives relative ratings for potential landslide problems of the various soils. Characteristics considered include soil depth, water saturation, landform, permability of the profile and especially steepness of slope. Soils occurring on long, smooth, steep slopes with impermeable substrata have the highest landslide hazards.

"Depth to seasonal saturation level" is given in feet to the normal fall water table. The water table may be a perched or the regional ground water table.

Relative ease of soil disturbance from compactive forces is given under compactibility. Again these ratings are relative for ecosystems on National Forest areas in Southeast Alaska. For instance, many of the soils rated low might be rated moderate or high in other areas of the United States. This rating is based on soil coarse fragment (gravel and stone) content, colloid content, and drainage. This rating is especially pertinent to soil suitability for tractor logging, trail location or heavy use. Only those with low ratings are suitable for tractor logging or for trail location without overlays.

"Deer forage productivity" is given in relative ratings under forbs and shrubs as found under mature vegetation. Forested ecosystems generally go through a period of high forage productivity after timber removal. However, after 20 to 25 years productivity becomes almost nil as the young conifer canopy closes.

The last two columns "usual depth to bedrock" and "usual road construction problems" are primarily for engineering use.

Soil and Watershed Evaluation Summary

The Chomly area has an abundance of high quality water, and because of extensive alpine, stream temperature should be cool and the sustenance of flow should be good throughout the summer months. Stream flow is sure to be generally unstable with wide ranges in discharge even though surface runoff occurs only on the poorly drained soils. This is because the mineral soils are highly porous and generally shallow to impermeable bedrock. Water seeps rapidly through the soils over slowly permeable layers and into streams. There is evidence that muskeg contributes even more to unstable stream flow, as they are saturated to the surface during periods of high rain fall and consequently have much surface runoff. Alpine (A) and (F5) soils also operate in this manner. The dominantly muskeg soils of the Sunny Creek watershed may contribute to warmer summer stream temperatures as water movement is dominantly in the upper profile which is largely exposed to sunshine. However, this may be offset by prevalence

of alpine and semi-high country. Muskeg (MF5) and (F5) ecosystems contribute large quantities of organic sediments to streams and much disturbance on these kinds of soils will result in lots of organic sediment in the streams. These organic sediments are easily transported large distances, even during normal flow conditions.

All mineral soils except those carrying single or double line symbols on the soil map are resistant to accelerated erosion. No deep till or clay deposits were found on steep slopes or on any area where seriously induced soil erosion could be foreseen. As long as the forested duff layers remain relatively intact, surface soil erosion will not occur. Like most Southeast Alaska soils, these mineral soils are high in organic matter and iron and aluminum oxides, factors which contribute to resistance to soil particle detachment. Surface runoff, or indications of surface runoff, have not been observed on the better drained mineral soils, except those low lying soils which are sometimes flooded. Roads or other permanent facilities would be subject to flooding damage if placed on the first bottom of soils with symbol Ft. The mineral soils are all permeable, at least down to impermeable or slowly permeable layers that may occur in the substrata. Therefore, most soils do not saturate to the surface. Without surface runoff, surface erosion cannot occur.

Experience from past logging indicates few problems with natural regeneration except on areas of exposed mineral soil that is lacking in organic matter. Salmonberry brush competition will be a problem on soils carrying the symbol (Ft) and in or adjacent to soils with map symbol "B". Bare mineral soil, because of frost heave and malnutrition problems, has been proven to be a poor seed bed on all soils except those carrying the symbol "Ft" and "B". The dominant natural vegetation on these soils is often salmonberry and devils club that persist for years in competition with conifers. Red alder, if a seed source is available, does an effective job of invading these sites, shading out the brush in only a few years and maintaining a high level of conifer productivity. On other mineral soils where the duff layers are removed in one way or another, spruce and hemlock growth will be greatly retarded. This is best corrected by establishing alder on these sites, but another alternative is to grass seed and fertilize. This has been shown to promote spruce regeneration and growth and reduce erosion as well. Surface soil erosion from logging operations will be only a minor problem except on those soils having a single or double line symbol. Some erosion will occur on swing roads, tractor roads, or other places where mineral soil is exposed. Aerial cable logging systems, well constructed water bars and immediate revegetation of exposed mineral soil is necessary to reduce this hazard.

The most severe soil management problem seen on the Chomly unit is, of course, the severely landslide prone, deep shallow to bedrock soils that are so prevalent there. If these soils were clearcut, they would remain "eyesores" for many years to come unless they were intensively managed by planting and fertilizing, alder conversion, or something such as this. Even if revegetation is adequate and suitable growth attained, damaging landslides would be accelerated causing watershed, fishery, and visual problems that would require difficult and costly corrective measures. It should be noted that the existing forest plays a major role in giving these slopes what stability they do have.

Watershed Guides and Planning Direction

1. Avoid accelerating landslides on soils with double-lined symbols by requiring aerial logging systems and selective cutting. It may be feasible to highlead some of the lower parts of these units, but a detailed on-the-ground evaluation should be made in consultation with the soil scientist.

2. V-notched drainages shown on the soil map should be logged with aerial systems and cutting lines should be kept well away from the edge of V-notches.

3. Revegetate and stabilize landslide tracts and other bared grounds the first growing season after they occur. [on a demonstrated need]

4. Because of severe salmonberry brush competition on soils carrying the symbol "Ft and B", these soils, in all likelihood, will have to be planted to assure satisfactory regeneration. This factor should weigh heavily in the decision to cut these areas.

5. Logging methods should be carried out in such a way as to minimize duff layer disturbance. Tractor logging should not be permitted during the field season except on soils carrying the symbol "Ft". All other soils can be tractor logged only in the dead of winter when the snow is deep and/or ground frozen, assuming there are no other constraints.

6. Avoid timber harvesting that would cause stream temperatures to exceed critical high levels. Stream temperatures should not exceed 70°F for more than four hours in a 24-hour period.

7. Suspended sediment levels for all streams should not exceed 20 PPM under normal flow conditions or 200 PPM during peak flows.

8. Water quality and gravel sampling stations should be established on streams selected for monitoring by fish biologists and hydrologists. We can decide which ones at the consensus meeting.

Soil Use & Management Interpretations

Symbol	Tallest Sitka Spruce Site Index	Susceptibility to Induced Sediment Production	Landslide Hazard	Depth Seasonal Saturation Level (feet)	Compactibility	Deer Forage Productivity Forbes	Deer Forage Productivity Shrubs	Usual Depth to Bedrock (feet)	Usual Road Construction Problems
F12	150	L	L	1-2	M	L	M	1-2+	Few, some cutbank failure
Ft	150 1/	M	N/A	0	L	H	H	6-10+	Flooding
F2	150	L	L	1/2-1	M	L	M	1-2	Rock excavation
F2	130	M	M	1/2-1	L	L	M	1-2	Rock excavation
F2	100 1/	H	H	1/2-1	L	L	L	1-2	Rock excavation, landslides
F2r	80	L	L	<1/2	L	L	M	0-1	Rock excavation
F2r	60	H	H	<1/2	L	L	L	0-1	" " landslides
F4	120	L	L	<1/2	H	M	M	1-2	Extra drainage, rock excavation
F4r	120	L	L	<1/2	M	M	M	1-2	" " "
F4r	100	M	M	<1/2	M	M	L	0-1	" " "
F4r	60 1/	H	H	<1/2	L	L	L	0-1	rock excavation, landslides
F45	70-120	L	L	0-1/2	H	H	H	1-2	Extra drainage
F5	70	L	L	0	H	H	H	1-2	" " organic soils
F6	60 1/	M	M	0-1/2	M	H	M	0-1	" "
F6	50 1/	H	H	0-1/2	M	H	H	0-1	" " landslides
MF5	<50 1/	L	L	0	H	H	H	1-8	" " organic soils
A	N.S.	L	L	0-1/2	L	H	L	0-1	Few
B	VAR 2/	H	L 3/	4-10+	L	H	H	1-10+	Snowslides
V	60-80	H	H	0-1/2	L	L	H	0-1	Landslides, torrent flows
E	N.S.	L	N/A	0	L	H	L	5-10+	Tidal Inundation

1/ Estimates not verified by site plots.
2/ VARIABLE - probably 150 potential but natural VES. dominantly brush. Sustained yield would require planting.
3/ Landslide hazard is low, but snowslide hazard is very high.