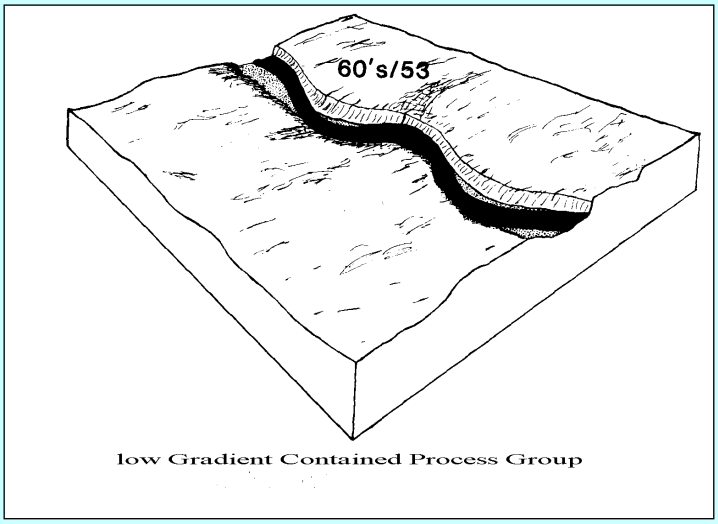
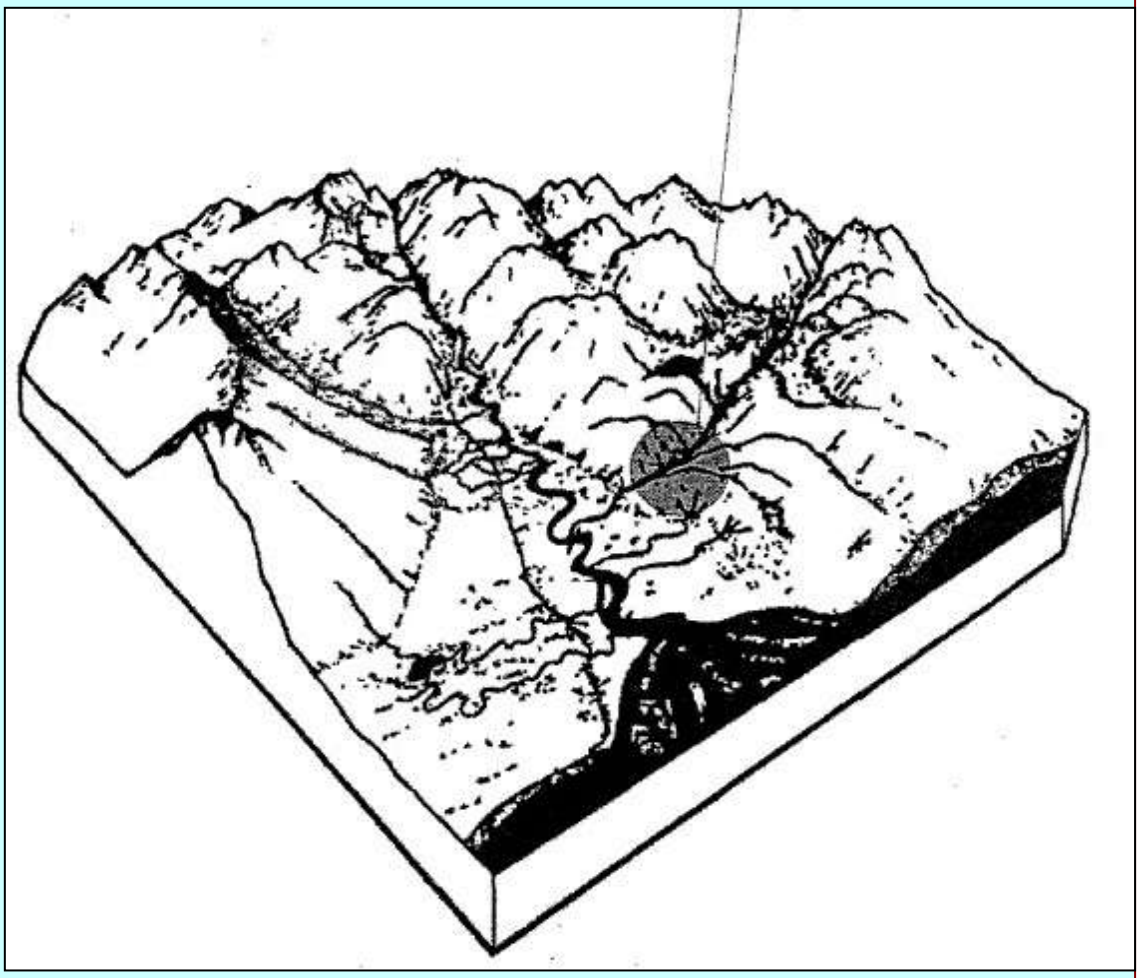
Low Gradient Contained Process Group



low Gradient Contained Process Group



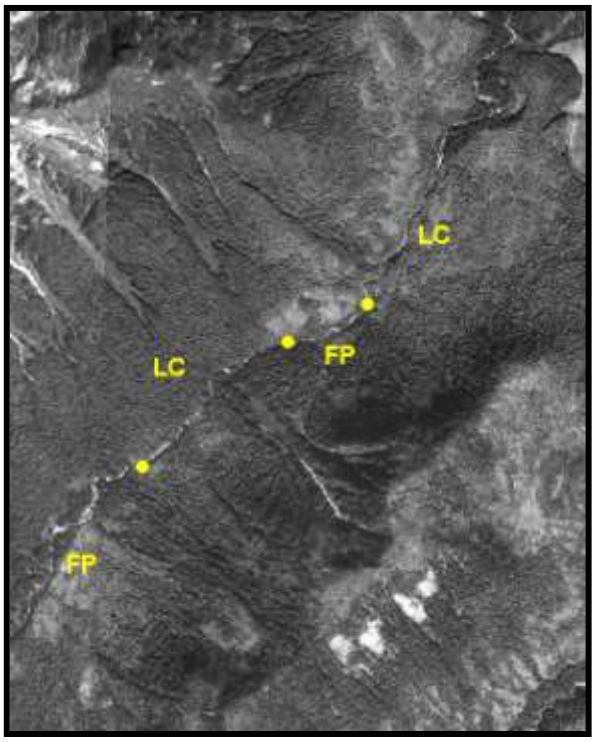
Stream Gradient: 0 to 2%
Hydrologic Function: Store and transport sediment (transitional)
Stream Class: I or II

Channel Types: LCS - Small Low Gradient Contained
LCM - Medium Low Gradient Contained
LCL – Large Low Gradient Contained

Situated in large valleys or lowlands, these low gradient channels are moderately incised and well contained due to the structural control. Flow depth increases with higher flow volume as lateral adjustment is very limited. Sediment function is mixed as these channels provide temporary storage in pockets associated with bedrock knickpoints or large woody debris.
Riparian areas are discontinuous, not always discernible and generally less than 46 meters (150 ft) wide.
The LC process group fits the bedrock type in the Montgomery and Buffington classification, with plane-bed morphology also significant.

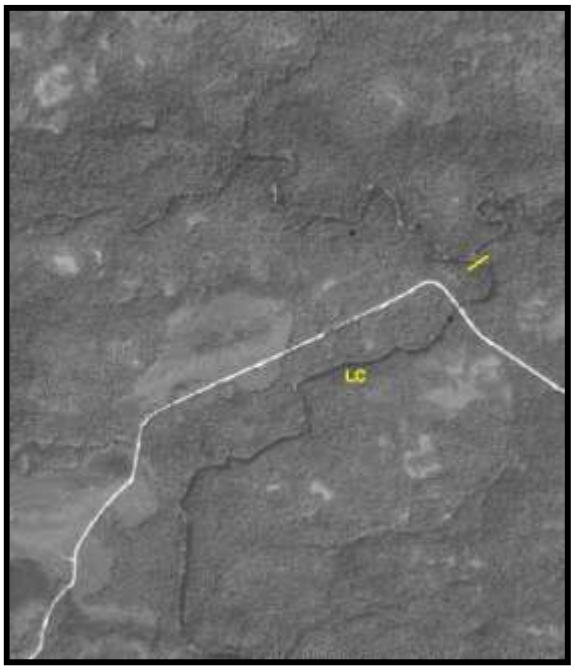
Table 1. Habitat Variables for the LC Process Grpup

Variable	Percentiles	MC_LC Groups	Variable	Percentiles	MC_LC Groups
WD	25	9.2	RPD/CBW	25	0.04
	50	14.5		50	0.07
	75	21.0		75	0.08
TLWD/M	25	0.20	D50	25	38
	50	0.28		50	88
	75	0.42		75	158
TKWD/M	25	0.05	PLNGTH/M	25	0.20
	50	0.07		50	0.32
	75	0.09		75	0.51
POOLS/KM	25	30	REL_SUBMRG	25	4.2
	50	50		50	8.1
	75	60		75	20.7
POOL SPACE	25	2.2	POOL_SIZE	25	0.48
	50	3.7		50	0.72
	75	4.8		75	0.92



Landscape position within a valley bottom. Main stem alternates between FP and LC process group channels. ←

LC in a broad lowland plane. → Structural control is evident from the rectangular stream coarse pattern.



Small Low Gradient Contained Channel

Mapping Symbol: **LCS**

.

Channel Characteristics

Stream Gradient: 0 to 2%
Incision Depth: less than 10 m (33 ft)
Bankfull Width: less than10m (33ft)
Dominant Substrate: Coarse gravel to bedrock
Stream Bank Composition: Bedrock or mixed
Sideslope length: less than20 m (66 ft)
Sideslope angle: less than 50%
Associated Landforms: 30s, 40s, 50s, 60s
PlantAssociation:WesternHemlock/Blueberry,MixedConiferseries,SitkaSpruce/Blueberry

Management Considerations

See LCM section.

Medium Width Low Gradient Contained Channel

Mapping Symbol: **LCM**

(formerly LC1)

Channel Characteristics

Stream Gradient: 0 to 2%
Incision Depth: less than10 m (33 ft)
Channel Width: 10 to 20 m (33-66ft)
Dominant Substrate: Coarse gravel to bedrock
Stream Bank Composition: Bedrock or mixed
Sideslope length: less than 20 m (66 ft)
Sideslope Angle: less than 50%
Associated Landforms: 30s, 40s, 50s, 60s
PlantAssociation:WesternHemlock/Blueberry,Mixed Conifer series, Sitka Spruce/B.berry

Phases: LCMl (glide), LCMo (moraine).

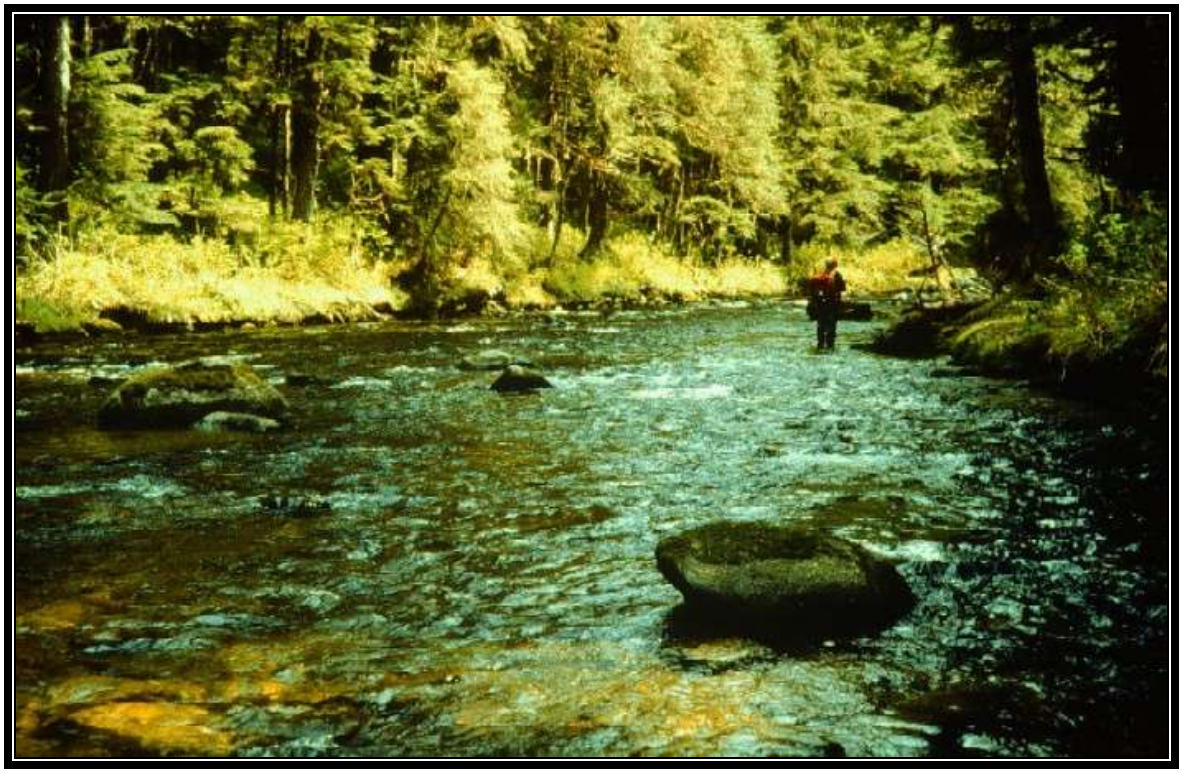
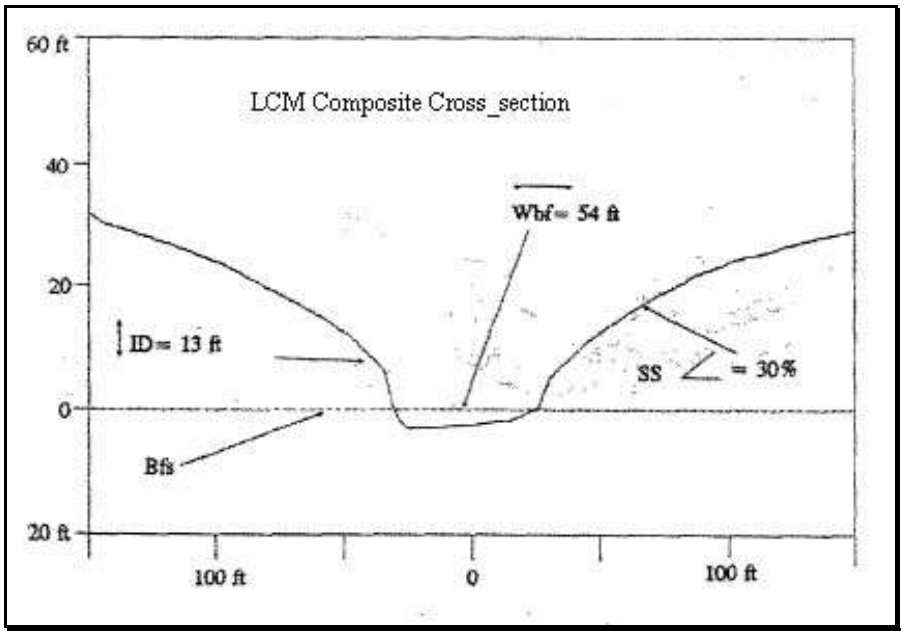


Figure 1. Plane-bed morphology in an LCM .

Composite LCM cross-section and sideslope profiles.



Wbf – 54ft (16.5m), ID – 13ft (4m)

Plant Association Series	% Cover	
	LCM	LCMg
Western Hemlock	43%	15%
Mixed Conifer	15%	23%
Sitka Spruce	12%	19%
Western Hemlock-Red Cedar	12%	31%
Shore Pine	9%	---
Western Hemlock-Alaska Cedar	2%	---
Non-forest	4%	5%
Mountain Hemlock	---	6%

Riparian Vegetation: The riparian plant communities are dominantly western hemlock series, with the Sitka Spruce series and mixed conifer series also being significant. The LCMl phase is dominated by the Sitka spruce and western hemlock-red cedar series. Non-forest riparian plant communities are dominated by red alder, willow and salmonberry shrub communities.

Channel Type phases:
LCMl – Glide Phase tends to occur where channel base level is controlled by a downstream feature such as resistant bedrock outcrops or a lake inlet or outlet.
LCMo- Moraine Phase has bank control from glacial moraine deposits. Stream substrate has a larger boulder component, and sideslope stability may be lower than is typical for LCM channels.

Management Considerations

Hydrologic Function: LCM channels store and transport sediment. Stream substrate is predominantly bedrock and larger boulder and cobble material intermingled with pockets of gravel or cobble sized material. Silt, sand and fine gravels are typically flushed through LCM channels. During high flow events, which are well contained by stable upper banks, fines to cobble size material are mobilized and transported downstream.

Large woody debris volumes are relatively low in these channels. Where large woody debris accumulations do occur, significant amounts of coarse to fine gravels and sand can be retained.

Aquatic Habitat Capability

Large wood……2000 ft^3 / 1000 linear feet
Available Spawning Area (ASA)…….. Average = 6% for 25 sites
Available Rearing Area (ARA)…..... Average = 18% for 25 sites

Indicator Species Ratings		
MIS	**ASA**	**ARA**
Coho	Moderate	Moderate
Pink	Moderate	Negligible
Chum	Moderate	Negligible
Sockeye	Low	Negligible
Chinook	Negligible	Negligible
Dolly Varden	High	High
Steelhead	Moderate	High

LCM channels are frequently accessible to anadromous species, however, partial or complete barriers can occur at bedrock knickpoints. These channels are frequently used by spawning pink, chum, and steelhead species, and occasionally by coho. Spawning areas are limited due to the predominately large substrates. LCM channels may have limited rearing potential, except in areas of large wood accumulations. Steelhead and resident Dolly Varden frequently use boulder-pool habitat in these channels for rearing. LCM channels provide extensive over-wintering habitat for steelhead trout.

Riparian Management Considerations

In-channel wood accumulations have limited influence on channel form and habitat capability due to the large degree of bedrock control. Large wood enters the channel primarily form stream sideslopes. High flows in these well contained channels tend to move all but the most stable wood accumulations downstream or push debris to channel margins.

Concern for Management of:	
Large Wood	Low
Sediment Retention	Low
Stream Bank Stability	Low
Sideslope Sensitvity	Moderate
Flood Plain Protection	N/A
Culvert/Fish Passage	Low

Stream banks are generally stable due to bedrock influence. Sideslopes can be susceptible to mass wasting erosion in areas with higher than average sideslope angles or in channel segments with weathered bedrock, glacial till, or volcanic ash parent materials. Road construction near LCM channels should emphasize maintenance of channel sideslopes stability (BMPs 14.2, 14.3, 14.7, 14.8)

Stream Class: These are classified as **Class I or II** streams. A minimum 100 foot timber harvest buffer is required along both banks of these streams (Tongass Timber Reform Act, 1991). Control of in-channel operations is another important riparian management concern (BMP 14.14)

Riparian Management Opportunities:

Sport Fish Potential …….Moderate
Enhancement Opportunities…….Large wood placement and barrier modification

Sport fishing opportunities are generally limited to bedrock scour pools and pools below waterfalls. Primary species of interest include steelhead, Dolly Varden and pink salmon.

Opportunities exist for increasing limited rearing and spawning area by anchoring large pieces of wood in LCM channels. Bedrock falls and cascades can be obstructions to upstream fish migration. Barrier modification may also be an enhancement opportunity.

Adjustment of Existing LC1 in the GIS database

LC1	total samples	**60**
	Re-map as LCS	7
	Re-map as LCM	42
	Re-map as LCL	11

From a review of the Channel Type Verification data, 68% of the presently mapped LC1 channels should fit into the LCM channel type based on bankfull width measurements. Of the remaining, 18% fit LCL criteria and 11% would be reclassified as LCS.

Large Low Gradient Contained Channel

Mapping Symbol: **LCL**

Channel Characteristics

Stream Gradient: 0 to 2%
Incision Depth: less than 10 m (33 ft)
Channel Width: greater than 20 m (66ft)
Dominant Substrate: Coarse gravel to bedrock
Stream Bank Composition: Bedrock or mixed
Sideslope length: less than 20 m (66 ft)
Sideslope Angle: less than 50%
Associated Landforms: 30s, 40s, 50s, 60s
PlantAssociation:WesternHemlock/Blueberry,MixedConiferseries,SitkaSpruce/Blueberry

Figure 2. Bedrock banks, plane bed form with pockets of sediment.

Management Considerations: See LCM section.