


Terrain Management Code of Practice

A Risk-Management Strategy for the
Management of Steep Coastal Terrain



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Purpose

- Provide definitions and strategies for the management of steep coastal terrain to protect soil and water resources
- Satisfy the various objectives set out in the Private Managed Forest Land Act (PMFLA).



Rationale

- Consistency in interpretation and application throughout all operations
- Greater consistency for all company and contractor professionals
- Opportunity to control costs, manage liability and improve predictions and outcomes



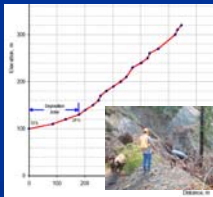
Objectives

- Standardizes terminology
- Defines corporate risk tolerance
- Clarifies roles and expectations of forest managers and terrain professionals



Quantitative Analysis

- Based on data compiled and analyzed on natural and forestry-related landslides in a number of watersheds, including correlations to:
 - Pre- and post-Code
 - Bedrock geology
 - Slopes steeper than 60%
 - Landslide run-out



Terrain Hazard Class Definitions

High	>5 failures per 100 ha <u>logged</u> on steep terrain
Moderate	3-5 failures per 100 ha <u>logged</u> on steep terrain
Low	1-<3 failures per 100 ha <u>logged</u> on steep terrain
Very Low	<1 failure per 100 ha <u>logged</u> on steep terrain

- Failure = ≥ 0.05 ha event (smallest inventoried & smallest visible on airphotos)
- Steep terrain = Class IV/V; Es1/Es2; P/U; >60%



Consequence Definitions

- Criteria developed for key public resources:
 - Domestic water quality
 - Fish and fish habitat
 - Public safety and infrastructure
- Considers other resources:
 - WHA, OGMA
 - CMT reserves and other areas of cultural significance
 - VQO
 - Soil productivity
 - Forest resources

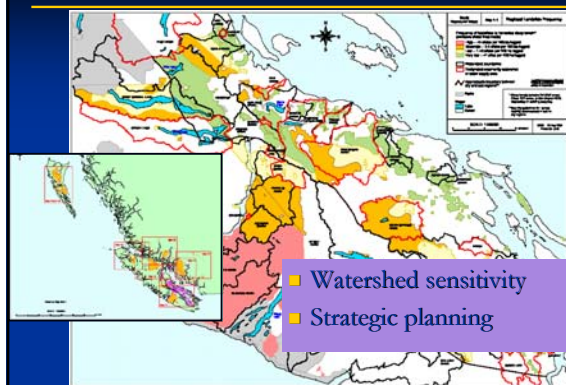


Tools

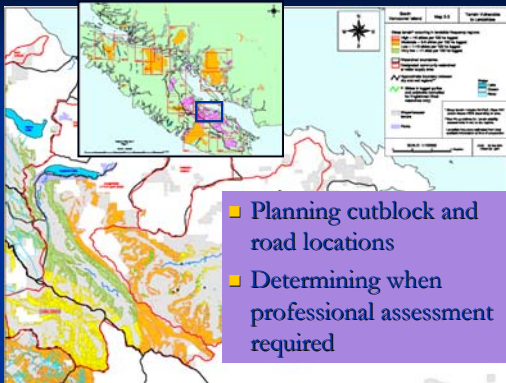
- Landslide inventories (updated/developed)
- Regional Landslide Frequency Maps
- Terrain Vulnerability Maps



Regional Landslide Frequency Map



Terrain Vulnerable to Landslides Map



Retaining a Terrain Professional

Criteria depend on:

- Watershed use
- Terrain mapping
- Climatic mapping
- Indicators of instability
- Consequence



Expectations of Terrain Professional

- Must meet specific professional qualifications
- Must have specific insurance requirements
- Report focuses on terrain hazard, size of probable event and geomorphic consequence.
- Recommendations are only provided where necessary, otherwise they are absent or options are provided.



Expectations of Forest Manager

- Use information provided by Terrain Professional to determine appropriate management strategy guided by Terrain Management Risk Matrices

		Consequence				Strategy
		High	M	L	VL	
Terrain Hazard	High	High	High	M	M	1
	M	High	M	M	L	2
	L	M	M	L	L	3
	VL	L	L	L	VL	4

- Limit to single stem or small patches—typically do not remove more than 5%-30% by basal area; patch size typically 0.1 ha-0.3 ha i.e. keep canopy density high
- Harvest when expected size of slide <1000 m² and is consistent with other planning processes
- Strategy depends on values at risk. RPF to apply professional expertise to area to define how to harvest (e.g. seasonal constraints, maximize lift)
- Conventional harvesting and silvicultural strategies unless constrained by other planning processes



Harvest Management Strategies

		Consequence				Risk	Strategy
		High	M	L	VL		
Terrain Hazard	High	High	High	M	M	High	1
	M	High	M	M	L	M-H	2
	L	M	M	L	L	M	3
	VL	L	L	L	VL	Low	4

- Limit to single stem or small patches—i.e. keep canopy density high
- Harvest when expected size of slide <1000 m² and is consistent with other planning processes; or apply Strategy (1)
- Strategy depends on values at risk. RPF to apply professional expertise to area to define how to harvest (e.g. silvicultural system, seasonal constraints, maximize lift); or apply Strategy (1) or (2).
- Conventional harvesting and silvicultural strategies (or any of Strategies (1), (2), or (3)) unless constrained by other planning processes



QA/QC Program

- Checklist for internal use to review Professional reports
- Periodic audits of Professional reports
- Periodic audits of cutblocks/roads in steep terrain to answer:
 - Whether terrain assessments were carried out where needed?
 - Whether appropriate management strategies implemented?
 - Whether Professional recommendations incorporated into the cutblock or road prescription?



Continual Improvement

- Hazard ratings, landslide frequency estimates, and consequence criteria are likely to be adjusted over time as additional landslide inventories and analyses become available.
- Terrain management strategies will be adapted accordingly.
- An Annual Terrain Management Workshop will be used as a vehicle to convey improvements between company and consulting professionals.



Key Messages

- Terrain mapping and assessment remain key tools in management of steep Coastal terrain
- Decision-making framework developed for managing steep terrain is according to landslide **risk** as opposed to landslide hazard
- Defines acceptable corporate risk
- Allows for limited harvesting on unstable terrain
- Supports environmental certification