



cc M. LISA -
C. Lawson

File: 13390-02/47

August 9, 1993

Alan Chatterton, R.P.F., P. Geo.
Assistant Manager, Forest Pedologist
Integrated Resource Analysis Section
Fletcher Challenge Canada Limited
PO Box 130
Crofton, British Columbia
V0R 1R0

Dear Alan Chatterton:

The Regional Planning/Inventory Section has reviewed the environmentally sensitive area (ESA) mapping terms of reference for Tree Farm License (TFL) 47 submitted on February 1, 1993.

I am prepared to approve the terms of reference subject to the following:

1. Soils (Es)

The Vancouver Regional ESA guidelines for description of coastal Es units should be used, not the *Forest Inventory Manual*.

Both terrain class and slope class symbols are to appear on all Es mapping units.

Clarification on the type and amount of ground truthing to be conducted for terrain classification and terrain stability mapping.

2. Avalanche (Ea)

In addition to avalanche buffers, identify potential snow avalanche trigger zones that could be created by logging and designate as Ea1.

Indicate the type and amount of field work to be conducted for ground truthing, e.g. ground traverse or helicopter overview and percentage of units to be checked.

.../2

3. Plantation (Ep)

A definition of criteria for the most common Ep units to avoid subjective judgment.

4. Recreation (Er)

The recreation inventory identifies not only present recreation activity areas, but also potential recreation activity areas must be identified.

For ESA recreation equivalents, use the following matrix:

Feature Significance	Management Class	ESA Designation	% Net Down
A, B, C	0	Er1	100
A & B	1	Er2	50
C	1	will be reviewed	

5. Fisheries (Ef)

Fisheries sensitive zones (FSZ) must be mapped out as Ef2 areas. These are critical fisheries production areas that consist of small braided streams, ponds and seasonal flood plains. Ideally these areas should be identified through air photo interpretation, followed by ground truthing. In the absence of a complete FSZ inventory, it is possible to sample representative watersheds to develop a ratio of FSZ area to stream length and extrapolate this ratio to the entire TFL for timber supply analysis purposes. A netdown of 90% will apply to these areas. It will be the responsibility of the licensee to complete this inventory within the time frame as deemed by the Department of Fisheries and Oceans.

All class I, II, and major III and IV shall have a streamside management zone of 40m. These correspond to the Ef1 ESA class and will have a netdown of 90%.

6. Watershed (Eh)

Category I community watersheds (less than 6 square miles) should be designated as Eh1 and delineated from height of land to height of land unless recommended otherwise by the Ministry of Environment, Water Management Branch.

Alan Chatterton, R.P.F., P. Geo.
Page 3

7. Wildlife (Ew)

This section is acceptable as is, however, with regards to the linkages used in the forest ecosystem mapping, ensure that they are designated as Ew2 when ever possible.

For further clarification, contact John Markila, TFL Inventory Forester at 660-0122.

Yours truly,



Ken J. Ingram, R.P.F.
Regional Manager
Vancouver Forest Region

cc: John Markila, TFL Inventory Forester
Vancouver Forest Region



FLETCHER CHALLENGE CANADA

February 1, 1993

MINISTRY OF FORESTS
Vancouver Forest Region
4595 Canada Way
Burnaby, British Columbia
V5G 4L9

Attention: Mr. John Markila, R.P.F.
TFL Inventory Forester

Dear John:

Re: Tree Farm Licence No. 47

Attached are proposed Terms of Reference and Methodology to complete Environmentally Sensitive Area Mapping for TFL 47.

The mapping will be carried out under my direction and will be submitted to the Ministry of Forests within a timeframe which will allow approval by December 31, 1993.

If you have any questions, please call me at 246-9332 or 246-9933.

Yours truly,

FLETCHER CHALLENGE CANADA LIMITED

Alan N. Chatterton, R.P.F., P.Geo.
Asst. Manager, Forest Pedologist
Integrated Resource Analysis Section

ANC/km

Attachment

cc: F. Leslie - FCCL, Woodlands Services
R. Hill - FCCL, Wood Products, North Island
D. Jones - FCCL, Wood Products, South Island
J. Kay - FCCL, Wood Products, Sandspit
G. Lawson - FCCL, Wood Products, Beaver Cove
R. P. Willington - FCCL Wood Products, I.R.A.S.

TERMS OF REFERENCE
AND METHODOLOGY FOR
E.S.A. MAPPING

FLETCHER CHALLENGE CANADA LIMITED
INTEGRATED RESOURCE ANALYSIS SECTION
JANUARY 18, 1993

The following outlines the terms of reference and methodology proposed by Fletcher Challenge Canada Limited (FCCL) for mapping the Environmentally Sensitive Areas (ESAs) in Tree Farm Licence 47 (TFL 47).

I. ESA Mapping Objectives

The primary objective of ESA mapping is to identify areas that are environmentally sensitive and/or significantly valuable to other resource users. Specifically, ESAs may be areas having actual or potential unstable or sensitive soils, having actual or potential severe regeneration problems, providing protection to man-made structures and valuable natural resources from snow avalanches, having significant value for recreation, wildlife and/or fisheries, and/or having special requirements to maintain water quality in domestic water supply areas.

As outlined in Chapter 2 of the Forest Inventory Manual (Ministry of Forests, 1984), "ESAs are considered only when there is evidence that the contribution of the area to the timber harvest may be severely limited, or where special management and harvesting prescriptions and/or constraints are required. The application of appropriate management, harvesting and other prescriptions that ensure protection of both the land base and other resource values may result in areas designated as ESAs being made available for harvesting".

II. FCCL Approach to ESA Mapping

Non-timber resource inventories are used in the Five Year Development planning process to highlight specific agency and public concerns for proposed development areas. FCCL routinely conducts many of these more detailed and specific resource inventories as part of our Five Year Development planning process. Where specific resource data exists or where time constraints permit capture of this data, it is our intent to adapt this data to meet the objectives and standards of ESA mapping for TFL 47.

Wherever and whenever possible, non-timber resource inventories are conducted utilizing procedures and standards established by Federal and Provincial Government agencies. These inventories and hence, the resultant ESA mapping, reflect the environmental, technological, social and economic constraints in force at the time of the inventory.

III. ESA Categories

A. Soils

1. Terms of Reference

Terrain mapping typically identifies the distribution and character of surficial materials and the processes acting upon them in a landscape. In British Columbia, terrain mapping of forested land most frequently utilizes the Terrain Classification System for British Columbia (Howes and Kenk, 1988 - Revised Edition MoE Manual 10).

Terrain stability maps are interpretive maps derived from terrain maps. The Coastal Terrain Stability Classification developed by the Ministry of Forests, Vancouver Forest Region (March 1992) outlines a 5 Class stability rating system. The 5 Classes are a relative assessment of the potential for instability following road construction and forest harvesting.

As suggested in the Environmentally Sensitive Areas (ESA) Mapping Guidelines in the Vancouver Forest Region (April, 1992), ESA categories Es1 and Es2 are tentatively equated to Stability Classes V and IV respectively. Class V areas show evidence of frequent and recurrent mass wasting throughout the unit. Generally, these areas have a very high potential for accelerated instability associated with road construction or forest harvesting. Class IV areas show evidence of scattered, infrequent, natural instability and/or features associated with potential instability such as high drainage density, gullying and steep slopes. The potential for accelerated instability associated with road construction or forest harvesting may exist in Class IV areas.

ESA mapping in TFL 46 indicates that the 5 Class terrain stability mapping results in a more detailed and operational Es1 and Es2 mapping than MoF standards. Terrain Class V correlates very well with

Es1. Terrain Class IV units, however, are far more numerous and extensive than the MoF Es2 units as described in Chapter 2 of the Forest Inventory Manual. As such, an AAC netdown factor of 20% has been proposed by the Ministry of Forests Inventory Branch for the Es2 areas in the Walbran operating area. Net downs for the remainder of TFL 46 are presently under review by the MoF.

Terrain Classes III, II and I warrant no special considerations over and above those already outlined in the British Columbia Forest Service Forest Road & Logging Trail Engineering Practices (Interim) (1992).

<u>Terrain Stability Class</u>	<u>ESA Class</u>
5	Es1
4	Es2
3	
2	
1	

Soils susceptible to erosion other than mass wasting will be identified and rated as Es1 and Es2 based on the potential loss to site productivity which could result from forest development. Again, mapping utilizes the Terrain Classification System for British Columbia in combination with local experience.

2. Methodology

Terrain Mapping will be undertaken by interpreting landforms from 1:20,000 scale air photos, characterizing each landform unit and assigning a relative stability rating to each of these units. The more critical units will be ground checked to verify ratings.

B. Forest Regeneration

1. Terms of Reference

Potential regeneration problems are dependent on local biotic, climatic and geographic conditions,

harvest techniques, silvicultural treatments, and reforestation methods and procedures. Identifying areas of concern depends heavily on local experience and expertise.

Areas where geoclimatic conditions severely limit successful regeneration will be identified as Ep1. Areas where geoclimatic conditions delay or limit regeneration to a lesser extent will be identified as Ep2. For areas where brush competition or wild-life browsing may cause forest regeneration problems, re-establishment can usually be dealt with on an operational level.

2. Methodology

Interpretation of 1:20,000 scale orthophotos, topographic maps and accumulated local expertise will be used to identify areas of actual or potential regeneration problems.

C. Snow Avalanche

1. Terms of Reference

Areas identified requiring avalanche protection will be based on evidence of previous avalanche activity as described in the Terrain Classification System for British Columbia. Leave strips and/or buffer zones will be left for areas threatened in potential avalanche runout zones and will be mapped as Ea.

2. Methodology

Avalanche hazard areas will be identified using 1:20,000 scale air photos in concert with the terrain and terrain stability inventory. Ground checking of critical areas will be conducted as part of the terrain and terrain stability field work.

D. Recreation

1. Terms of Reference

Forest recreation resources are inventoried according to standards and procedures outlined in the Recreation Manual (BC Ministry of Forests, 1988 plus revisions). In general, forest recreation resource

inventories consist of two components; the Recreation Features Inventory and the Landscape Inventory. The Recreation Features Inventory identifies specific recreational features of the landscape together with their associated recreational activities. In addition, recreation features are evaluated as to their significance and sensitivity to forest harvesting. Feature Significance, based on quality, uniqueness and availability, ranges from A (very high) being of Provincial significance, to D (low) being of limited capability to attract recreational use. Feature sensitivity is rated by Management Class which ranges from 0, areas most appropriately managed exclusively for recreation values, to 2, areas where normal forest management practices are adequate to maintain recreation values.

Areas will be designated Er1 or Er2 relative to their Feature Significance (A, B, C or D) and Management Class (0, 1 or 2) as outlined in Sections 6.4.3 and 6.4.4 of the Recreation Manual (revised 1991).

Table 1. ESA Recreation Equivalents

<u>MC\FS</u>	<u>A</u>	<u>B</u>	<u>C</u>	<u>D</u>
0	Er1	Er1	-	-
1	Er2	Er2	-	-
2	-	-	-	-

Visual resources identified in the Landscape Inventory are not included in the ESA inventory program at this time. Restrictions associated with visual resources most frequently influence the location, extent and scheduling of forest operations. (Forest Landscape Management Guidelines for the Vancouver Forest Region, 1990). In some situations, however, visual resources may preclude operations. In these situations, visual resources are accommodated at the 5 Year Development Plan.

2. Methodology

The Recreation Inventory for Blocks 17 and 18 of TFL 47 has been completed by J.B. Webb, an independent recreation consultant, and submitted to the MoF for review. Mr. Webb is also scheduled to complete the remaining TFL 47 Blocks 1 to 16 in 1993 using 1:20,000 scale air photos in combination with ground checks and local knowledge.

E. Wildlife

1. Terms of Reference

ESA classes for wildlife identify areas of significant value to wildlife in terms of food, shelter or reproduction. The Environmentally Sensitive Areas (ESA) Mapping Guidelines in the Vancouver Forest Region describe Ew1 areas as areas of critical importance to wildlife where important habitat attributes would be seriously degraded or destroyed by forest harvesting. Ew2 areas are areas where special forest management practices may be necessary to preserve important wildlife habitat values.

Designation of wildlife ESAs will vary by species and area within British Columbia. As such, standardized procedures for inventorying habitat values have been developed for only a limited number of wildlife species. In TFL 46 on southern Vancouver Island, FCCL, in cooperation with the BC Ministry of Environment, Lands and Parks, is in the process of completing the TFL 46 Deer Management Plan, a land classification system for evaluating critical wintering habitat for coastal black-tailed deer. When completed, this system will evaluate an area on the basis of slope, aspect, terrain, snow zonation, forest cover and biogeoclimatic subzone variant to determine areas critical for wintering.

The BC Ministry of Forests and BC Ministry of Environment, Lands and Parks have cooperated in publishing Deer and Elk Habitats in Coastal Forests of Southern British Columbia (Nyberg and Janz, 1990). Significant habitat values for coastal black-tailed deer and Roosevelt elk will be identified and assigned an Ew rating in accordance with the criteria developed in the TFL 46 Deer Management Plan and this publication.

Criteria for the establishment of Ew units in TFL 47 for species other than coastal black-tailed deer and Roosevelt elk are determined on the basis of the experience of biologists familiar with the different species and the range of habitats found in the TFL.

Marbled murrelet nesting corridors that are deferred pending additional data on nesting habitat requirements will not be included as Ew units at this time.

Eagle nest trees are identified at the Five Year Development Plan stage of forest planning and, as such, are also not included as Ew units.

FCCL is presently in the process of defining the Forest Ecosystem Networks (FENs) of TFL 47 as part of the TFL biodiversity plan as per Landscape Guidelines to Maintain Biological Diversity in Coastal British Columbia (BC Ministry of Forests, 1992). The methodology employed by FCCL uses the ESA mapping program as a key building block in the establishment of FENs. As such, FENs themselves will not be designated as Ew units.

2. Methodology

Important wintering habitat for coastal black-tailed deer and Roosevelt elk will be mapped by FCC biological staff according to the criteria identified in the TFL 46 Deer Management Plan and Deer and Elk Habitats in Coastal Forests of Southern British Columbia. Other areas of significant wildlife value will be mapped where identified by FCCL biological staff and BC Ministry of Environment, Lands and Parks, Fish and Wildlife Branch staff.

F. Watersheds

1. Terms of Reference

The Eh classification will be used to delineate watersheds or portions of watersheds that require protection or special management to maintain water supply quantity, quality and seasonal distribution. Buffer zones in community watersheds, domestic water supplies and areas where development or harvesting would have severely adverse effects on water quality, quantity or seasonal distribution will be designated Eh1. The Eh2 designation will be used where the maintenance of water quantity, quality or seasonal distribution is sensitive to forest harvesting, but less sensitive than Eh1 areas.

2. Methodology

The Ministry of Environment, Lands and Parks, Water Management Branch, will be consulted for records detailing the location, purpose and use of water licences or other potential domestic or commercial

supplies within or confluent to the planning units. Eh units will be delineated by FCCL staff on the basis of this information together with local terrain information which will determine zones of influence adjacent to these water supply areas.

G. Fisheries

1. Terms of Reference

Stream reaches will be classified as per the British Columbia Coastal Fisheries/Forestry Guidelines (BC Ministry of Forests et al, 1992, 3rd edition).

"Highest value fisheries habitats (Class I) require the highest level of management effort from both fisheries and forest managers, to maintain productive capabilities. Lowest value habitats (Class IV) require minimal protection, with fisheries protection measures limited to those required in consideration of downstream impacts on higher class reaches."

<u>ESA Class</u>	<u>CFFG Class</u>
Diamond	I
Circle	II
Square	III
Triangle	IV

Streamside Management Zone (SMZ) requirements are described in the British Columbia Coastal Fisheries/Forestry Guidelines. These zones vary by stream class and size, and within zone treatments, including timber deferrals, may vary with proximity to the stream. In most situations, fisheries ESA units or Ef units are not specifically mapped as these fall within the bounds of the SMZs and are managed on a site specific basis at the Cutting Permit level. Where specific fishery values are not accommodated by the SMZs, Ef units can be mapped beyond the bounds of the SMZ.

2. Methodology

Streams in the planning units have been classified as part of the Five Year Development Plan process. Fisheries values from the plan will be transcribed to the ESA maps and coloured according to standard

CFFG colour codes. Additional Ef units will be delineated as necessary by FCCL Biological staff, BC Ministry of Environment, Lands and Parks, Fish and Wildlife Branch staff, and Federal Department of Fisheries and Oceans staff.

IV. Nature of Product

The final ESA summary will include all of the above outlined ESA categories delineated and symbolled on a 1:20,000 scale topographic base map with support documentation outlining the criteria used in delineating the sensitive units. In order to conform with Ministry of Forests Inventory Map standards, ESA categories will be represented on the final maps in accordance with MoF Forest Cover Map legends.

ESA References

BC Ministry of Forests. 1984 plus revisions. Forest Inventory Manual, Chapter Two, Environmentally Sensitive Areas. Planning and Inventory Branch.

BC Ministry of Forests. 1988 plus revisions. Recreation Manual.

BC Ministry of Forests. 1990. Forest Landscape Management Guidelines for the Vancouver Forest Region. Vancouver Forest Region.

BC Ministry of Forests. 1992. Coastal Terrain Stability Classification. Vancouver Forest Region.

BC Ministry of Forests. 1992. Environmentally Sensitive Areas (ESA) Mapping Guidelines in the Vancouver Forest Region. Vancouver Forest Region.

BC Ministry of Forests. 1992. Forest Road & Logging Trail Engineering Practices (Interim).

BC Ministry of Forests. 1992. Landscape Guidelines to Maintain Biological Diversity in Coastal British Columbia. Integrated Resources Branch.

BC Ministry of Forests, BC Ministry of Environment, Lands and Parks, Federal Department of Fisheries and Oceans, and Council of Forest Industries. 1992. British Columbia Coastal Fisheries/Forestry Guidelines.

Howes, D.E. and E. Kenk. 1988 (ed.). Terrain Classification System for British Columbia (revised edition). BC Ministry of Environment, Recreational Fisheries Branch, and Ministry of Crown Lands, Surveys and Resource Mapping Branch.

Nyberg, J.B. and D.W. Janz. 1990. Deer and Elk Habitats in Coastal Forests of Southern British Columbia. BC Ministry of Forests and BC Ministry of Environment.