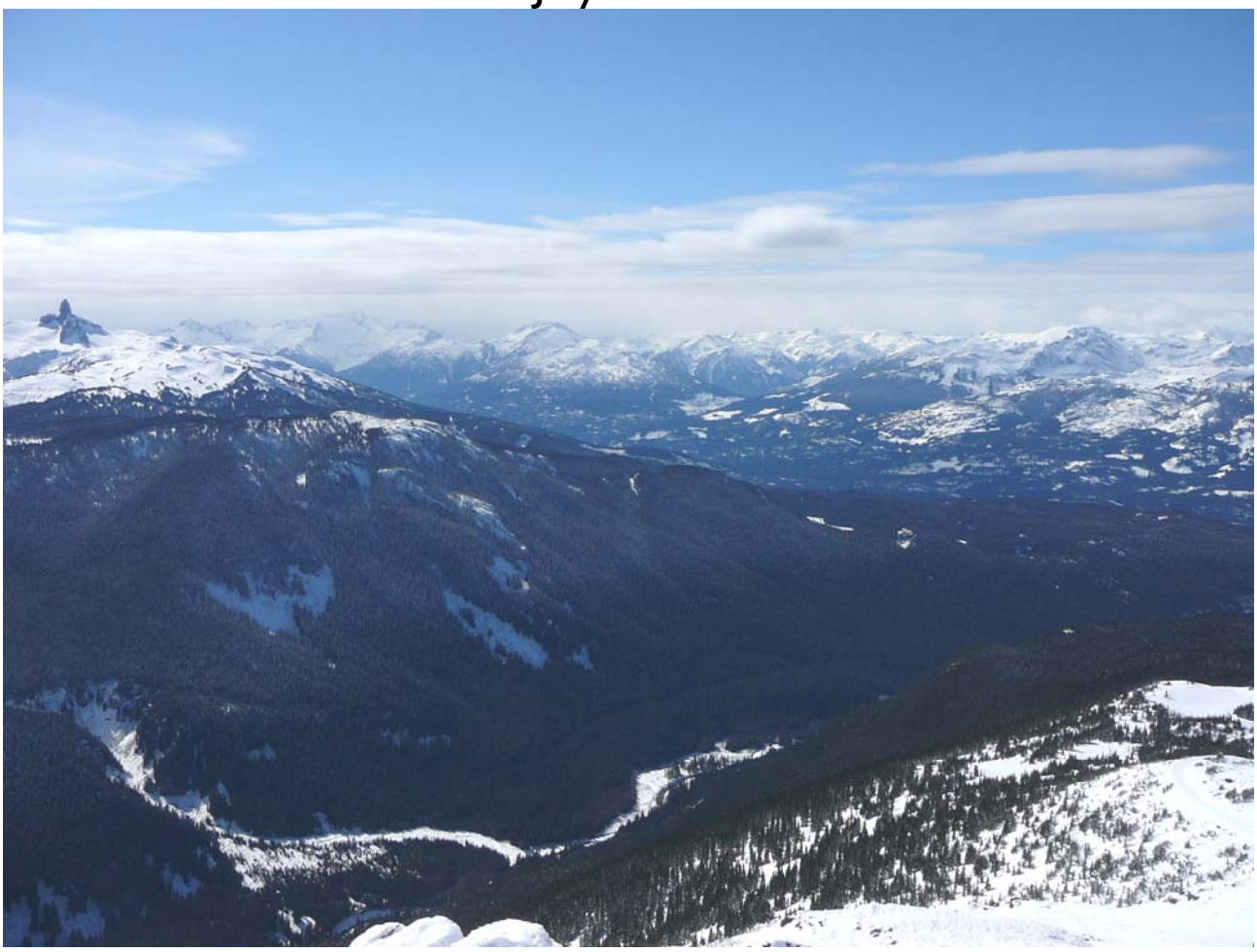
Cheakamus Community Forest

K3V

Forest Stewardship Plan

July 26th 2010



Black Tusk and Cheakamus River

Authorizations

Forest Stewardship Plan Holder Authorization Signature

This plan was prepared by: Thomas R. Cole RPF

The undersigned has determined that the content of this plan meets Section 5 of FRPA. The signature and seal applies to section 22.1 of the FPP Regulation 14/2004.

Signed this day of July 2010

_____

Thomas R. Cole, RPF #2574

The undersigned, having signing authority for Cheakamus Community Forest, hereby provide authorization of this plan under the Forest Act for Tenure Community Forest Licence K3V and the Timber Licence #830 in the Squamish Forest District.

_____

Director - Cheakamus Community Forest Society *(Society #54591)*

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Interpretation: Definitions and Abbreviations in this FSP

Note: these definitions are meant to assist the reader. In the event of an interpretation those specified in Forest and Range Practices Act and the Forest Planning and Practice Regulation 14/2004 apply.

FDU(s)	means forest development unit(s)
FPPR	means the Forest Planning and Practices Regulation of FRPA
FRPA	means the Forest and Range Practices Act
FSP	means Forest Stewardship Plan
CP	means cutting permit
RP	means road permit
K3V	means community forest tenure held by the Cheakamus Community Forest Society
Silviculture Site Plan	means a plan prepared by a registered professional to describe the amounts, areas and obligations from primary forest activities and reforestation of the Openings within a Compartment.
CCF	means the Cheakamus Community Forest Society
RMOW	Resort Municipality of Whistler
reasonable efforts	means pursuing a fair, rational approach that a sensible person in similar circumstances would logically employ
qualified person	means a person who by experience and/or education is considered knowledgeable and able to provide advice on a given subject in a given situation
qualified professional	means a person who by education, experience and professional credentials is considered knowledgeable and able to provide expert advice on a given subject in a given situation and is licensed or regulated by a governing body or association in the province of BC
evaluation	means an assessment conducted by a Qualified Registered Professional that examines, on a site specific basis, the social, economic and environmental factors as well as relevant factors as described in FPPR Schedule 1
MAMU	means Marbled Murrelet
OGMA(s)	means old growth management area(s)
RMZ	means riparian management zone where activities are permitted under a Silviculture Site Plan in consideration of the adjacent stream
RRZ	means riparian reserve zone, adjacent to a stream where no planned harvesting will occur unless exempted
RMA	means riparian management area where defined practices are carried out to protect stream banks or RRZ
HLP	means – Higher Level Plan with established objectives by government
LU	means landscape unit
WTP	means wildlife tree patch: designated and reserved from harvesting
WT	means wildlife tree: individual or groups of trees, either standing or naturally fallen, having attributes that can be used by wildlife species for various stages of their life cycle
CWD	means Coarse Woody Debris: normally logs of various decay stages which may provide habitat for certain species.

IWMS	means Identified Wildlife Management Strategy as defined in version 2004
GWM	means General Wildlife Measures specified within established ministerial orders
WHA	means Wildlife Habitat Area that has been formally designated through GAR or grandparented for a particular wildlife species of concern in the region
UWR	means Ungulate Winter Range: identified habitats for critical winter survival
VQO	means Visual Quality Objective
biodiversity	is the plethora of biotic individuals and communities that are poorly known and understood and are best managed through retaining legacies of the original forest structures, soils and associated plant communities
definable recreation element	means a physical feature documented in a **Silviculture Site Plan** that has not been declared by government as a Resource Feature but requires consideration and measures during harvesting and road construction which may or may not constrain timber in the short or long term.
notice criteria	refers to the indicators, amount, distribution and attributes that form habitat for identified wildlife referred to in Ministerial Notices in effect
Intent to Develop Notice	is the process of providing First Nations and other Stakeholders, initial notification regarding the area of interest for primary forest activities (timber harvesting, road development and modifications other forest management activities). These notices generally are the Compartment area and are sent in advance of substantial field investment planning and assessments.
definable wetland	means an easily identifiable change in terrestrial to aquatic vegetation that is wholly surrounded by merchantable trees and does not transition into a larger complex, mosaic or a non-forested feature. It does not mean a forest growing on periodically flooded or ponded soils
major stream	means a S5 or S6 stream that has been selected for retention of streamside trees because those trees provide either stream bank stability or that the retention is for biodiversity and/ or wildlife function and is defined in a Silviculture Site Plan
minor stream	means a S5 or S6 stream that because of its location and characteristics has been determined to not require tree retention for stream bank stability or channel integrity.
recreation riparian corridor	means a specified area defined on the FSP Map for the main valley bottom creek and rivers (blue highlight). Is the area contained from the river bank edge upslope to the first existing road, trail or rail line or to a maximum of 200m slope distance.
target retention	means the planned number of trees retained within a riparian management zone by using the prorated management zone depth for streams defined under FPPR S. 47.
compartment	means a subset of a FDU (Management Unit) that forms the basis of referrals and a four year cutting authority for primary forest activities (including the authorization to construct, modify and deactivate roads, logging trails, landings and borrow pits and not limited to including recreation trails and sites). Analogous to a cutblock for the purposes of FPPR 14/2004
harvest unit	means an administrative opening or group of openings planned for tree removal within a calendar year or contract period. There may be more than one Silviculture system within a harvest unit. A Harvest Unit may be comprised of Openings derived from more that one Compartment.
opening	means an area within a compartment planned and prescribed for tree removal under a *Net Area to be Reforested.*
roads	means a constructed and ballasted haul road for wheeled traffic and as defined under the FPPR.
logging trail	means a temporary access structure used to simply forward logs or process timber.
retention system	a silviculture system where >50% of the harvest unit is influenced by standing trees by being within one tree height distance from standing trees.

Net Area to be Reforested (NAR)	means the area specified in a silviculture site plan with the obligation of a stocking standard reforestation.
access partial harvest	means and intermediate stand treatment of removing trees adjacent to an existing or planned road system, which is generally limited to one-and-a-half tree lengths depending on terrain; (e.g., cedar poling, day-lighting, fuel reduction treatment)
immature forests	forests with average stand age <100 years in the sub-maritime variants
Mature forests	forest with average stand age >100 and <250 year in the sub-maritime variants
old forests	forests greater than 1 ha in area with >50% of the standing tree volume comprised of trees with estimated ages over 250 years
non-forest elements	means land clearing, transmission lines, building and other manmade infrastructure and disturbances with no obligations to reforest.
forest elements	means the trees, in all orders of growth or decay, and associated flora which make up forested ecosystems
hazardous fuel types	are generally considered second growth stands that have the potential for extreme fire behavior with active crown fire. These included C2, C3 and C4 fuel types identified in the RMOW Community Wildfire Protection Plan 2005.
target fuel types	are hazardous fuels in close proximity to significant values (high consequence in risk analysis) as part of the RMOW Community Wildfire Protection Plan 2005.
fuel modification area	means the area of a FDU identified for commercial harvesting and other associated stand treatments containing permanent resource road access. The priority objectives in these areas will be to reduce above ground biomass, altering fuel orientation, density and composition to both standing timber and regeneration.
community fuel break	means the portion within a **fuel modification area** that has been identified or treated with the specific intent on changing wildfire behavior.

1 Plan Structure

Objectives set by government are either specifically identified in legislation or have been enacted by executive order through enabling legislation or higher level plans. Legislated objectives are rewritten into this plan. Executive orders are found within the appendices of the plan.

A written **context** (preamble) is provided for the readers information and is not part of the legal obligations of this plan.

Measures, undertakings and commitments have been assigned a unique identifier reference label which is meant to facilitate review and comment, track amendments and provide references in silviculture site plans. Each identifying reference label is identified by: CCF (Cheakamus Community Forest; WLD (acronym for Wildlife Resource for example); 02 (numeric reference). Therefore CCF-WLD-01 is the first measure for wildlife resources. Once approved, the original reference label stands unless amended, in which case the original label is deleted.

Each FDU represent a distinct management unit area and is described by place name. Commitments and Undertakings are defined by FDU Name (ie: Wedge FDU = WED; ALL = all FDUs)

TABLE 1 LIST OF FOREST DEVELOPMENT UNITS WITHIN THIS PLAN:

Management Unit	Forest Develop Unit	ID REF	HLP Management Considerations	Comment
Interface 11,487 Ha	INTERFACE	**INT**	Scenic Area Community Watershed RMOW_PAN	CCF_K3V 2,718 Ha Urban Area 3,027 Ha CRA Intrawest 5,742 Ha
Wedge 1,175 Ha	WEDGE	**WED**	SRMZ Scenic Area	Includes 270 ha of Fuel Modification Area
Showh 2,651 Ha	SHOWH	**SHO**	Community Watershed Scenic Area	Includes 185 Ha of Fuel Modification Area
Rainbow 2,492 Ha	RAINBOW	**RAI**	Scenic Area	Includes 225 Ha of Fuel Modification Area
Cheakamus 2,651 Ha	CHEAK	**CHE**	Cultural Mgmt Area Whistler Inter Forest	Includes 465 Ha of Fuel Modification Area
Callaghan 2,172 Ha	CALLAGHAN	**CAL**	Cultural Mgmt Area	
Fee 3,571 Ha	FEE	**FEE**		TL Overlap
Powder 1,570 Ha	POWDER	**POW**	Scenic Area	TL Overlap
Tusk 2,867 Ha	TUSK	**TUS**	Scenic Area SRMZ	
Brew 1,616 Ha	BREW	**BRE**	Community Watershed Scenic Area	

All undertakings and measures (results or strategies) form the basis of CCF commitments under this plan and are contained in a format outlined below:

EXAMPLE:

Ref #	Forest Development Unit Area	Measure	Operational and Planning Commitment

The plan contains one FSP map outlining the arrangement of the FDU and other planning elements in effect at least 4 month prior. Figure 1 is an overview map for reference only. Silviculture Stocking Standards are enhanced using the Fuel Management Standards and Single Entry Dispersed Retention Stocking Standards. They are designed to be used under the web-based "RESULTS" tracking system and referenced within Silviculture Site Plans.

2 Application of the FSP

This FSP has been prepared as required under section 3(1) of FRPA, in order to plan and implement forest management activities related to the CCF K3V in its primary road and harvest development and other intended forest management obligations pursued under that agreement.

The FSP contains the following components:

- Maps illustrating the FDU's that direct objectives for harvest and road opportunities subject to the following:
  - The extent of the Area Based Tenure K3V
  - the influence of other features as described in section 14 of the FPPR that obligate CCF K3V to modify or prohibit its forest management activity
  - The extent of Urban Lands of the Resort Municipality of Whistler (RMOW) and the Commercial Recreation Area-Intrawest
  - In addition remnant Timber Licence areas and fee simple private land are shown on the FSP map. The area of RMOW Urban and Intrawest_Commerical Recreation Area are also shown due to their proximity and influence within the K3V tenure.

- Results and/or Strategies to address objectives set by government for the following:
  - Higher Level Plans
  - Soils Resources
  - Timber Resources
  - Wildlife Resources
  - Biodiversity and Wildlife Resources: Landscape Level and Stand Level
  - Riparian Areas Resources: Water, Fish, Wildlife and Biodiversity
  - Fish Sensitive Watersheds
  - Community Watershed Resources
  - Visual Quality Resources
  - Cultural Heritage Resources

- Stocking Standards for Silviculture Reforestation

- Measures to address natural range barriers and invasive plants

3 Area to Which this FSP Applies

This FSP applies to all primary forest activities, including salvage, forest fuel reduction treatments, road management and forest ecosystem restoration within the area of CCF_K3V and Timber Licence area #830. This plan does not apply to any Land Act *(1996)* designations, leases or reserves, or areas shown as urban on the FSP map. Ten separate **Forest Development Units** comprise this plan.

4 Term of Plan

The term of this plan is five years, with the understanding that amendments both voluntary and mandatory will be required from time to time over its life. The maximum term that this plan will be in effect is 10 years from the approval date, as long as no changes in operating areas are required.

5 Maps

Overview Map	Figure 1	1: 200,000
FSP MAPs (FDU)	Figure 2	1: 40,000

FRPA S. 5(1)(A) & FPPR S. 14 identifies required land use elements and declared areas that are shown on the Forest Stewardship Plan map. The FSP map is Figures 2 of this plan and outlines the Forest Development Units covering the K3V Operating area.

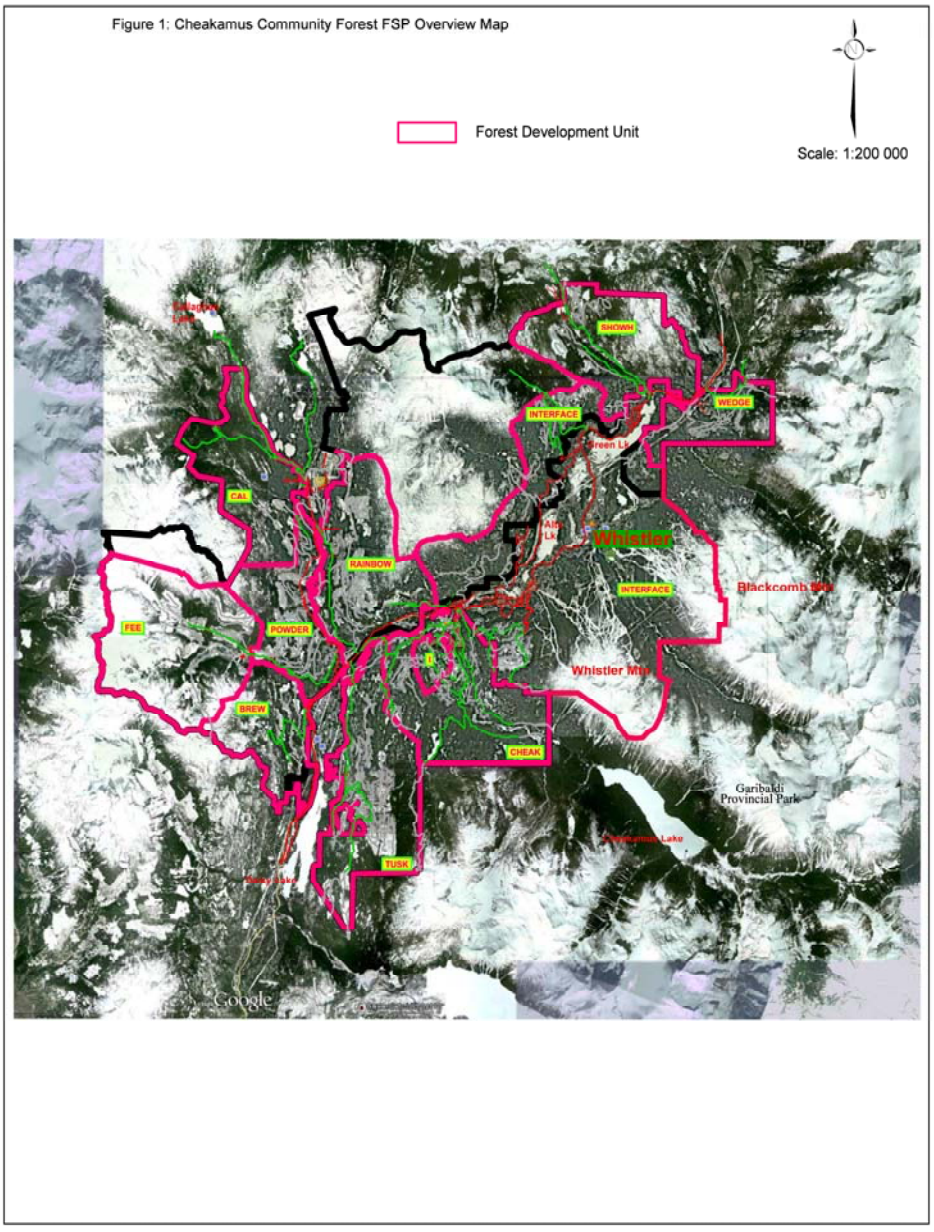


Figure 1. Overview Map of the Higher Level Plan Designations of the K3V Forest 1: 200,000

This page is intentionally blank and refers to the FSP 1:40,000 scale Map for inclusion into this document. (File: ***Map_FSP_RPL_CCF_Final_Ver2010-09-22)***

Figure 2: FSP Map 1: 40,000 CCF_K3V

6 Areas to Which this FSP Will Not Apply S.197(7)

There are no areas or cutting authorities that require grand-parenting.

7 Areas to Which S.196(1) (2) of FRPA Apply

There are no areas for S. 196 (1) and (2) Apply

8 Designations and Objectives in Effect

The following land use designations, objectives and notices apply to the FSP and the details are found in the appendix of this plan:

FRPA S. 5

Sea to Sky Land and Resource Management Plan and Map (April 2008) have been published, areas for which commercial timber harvesting is prohibited have been made under the Land Act.

FPPR S.14

TABLE 2 DESIGNATIONS AND OBJECTIVES IN EFFECT

Land Use Designations	Legally Established	Date Designated
s.14(3)(a) Ungulate Winter Range		
Ungulate Winter Range #U2-002 (Mountain Goat) Soo Timber Supply Area (TSA)	Yes	October 6, 2003
Ungulate Winter Range #U2-005, (Deer and Moose Winter Range) Soo TSA	Yes	February 28, 2005
s.14(3)(b) Wildlife Habitat Areas		
Grizzly Bear Previously Draft Grizzly Bear	Yes Yes	May 23, 2006 Aug 25, 2010
Marbled Murrelet	No	-
Tailed Frog	No	Proposed 2006
s.14(3)(c) Fisheries Sensitive Watersheds	-	-
s.14(3)(d) Lakeshore Management Zone	-	-
s.14(3)(e) Scenic area		
Sea to Sky Scenic Area and Visual Quality Objectives for Hwy 99 Corridor	Yes	Established December 1995
s.14(3)(f) Lake identified as an L1 lake	-	-
s.14(3)(g)Community Watersheds		
Alpha Community Watershed Blackcomb Community Watershed Brew Community Watershed Twenty one mile Community Watershed Whistler Creek Community Watershed Rideau Brook (Emerald) Agnew Creek (Alpine)	Yes (code 900.003) Yes (code 119.002) Yes (code 900.074) Yes (code 119.007) Yes (code 900.068) Yes (code119.006) Yes (code 119.001)	June 15, 1995 June 15, 1995 June 15, 1995 June 15, 1995 June 15, 1995 June 15, 1995 June 15, 1995
s.14(3)(h) Old Growth Management Areas		
Callaghan and Whistler LUP(s)	No	Draft Only
Soo LUP	Yes	September 6, 2004
s.14(3)(i) Harvesting Prohibited		
Private Land, BC Parks and others	Yes	Various
Conservancies	Yes	2009
STS-LRMP - Wildlands	Part 13 Forest Act	April 2008
Other		
Cultural Management Areas	No	April 2008

9 Other Grand-parented Designations

Under Section 180 and 181 of FRPA the following grand parented designations are known.

As of the submission date of this FSP, the established recreation sites, trails, and interpretive forests applicable to FDU's within the FSP are listed as follows:

TABLE 3 OTHER LEGAL DESIGNATIONS

Recreation Trails	Recreation Sites	Interpretive Forests
❑ Comfortably Numb - Sec. 57 2002 ❑ Flank Trail – Sec. 56 2001 ❑ Int. For Riverside – Pre-2000 ❑ West Ridge Trail – Pre-2000 ❑ Ric's Roost – Pre-2000 ❑ Trash – Pre-2000 ❑ Highline Trail –Pre-2000	❑ Showh Lakes Rec Area ❑ Alexander Falls Viewing ❑ Cal-Cheak Rec Site	❑ Whistler IF *

*** denotes legal objectives have been established**

10 Higher Level Planning Measures

The Whistler Interpretive Forest has legal objectives established in 1999 under the Forest Practice Code Act of BC. "*The objective of the Whistler Interpretive Forest Site is to provide forest interpretation and education opportunities, while demonstrating integrated resource management".*

10.1 Context for existing legal objective

The Whistler Interpretive Forest legal objectives apply specifically to the Cheakamus FDU. However integrated resource management, specifically oriented to recreation resources are considered throughout the K3V forest.

10.2 Measures, Undertakings, and Commitments

REF. #	Forest Development Unit Area	Measure	Operational and Planning Commitment
CCF-WIF-01	CHE	STRATEGY	*The **CCF** will design and implement various forest management interpretation opportunities on all primary forest activities, and use those activities to demonstrate integrated resource management with a primary focus on cultural heritage resources and FRPA S.149 Forest Objectives subject to available provincial funding for Interpretive Forests. All implemented primary forest activities will consider options to enhance the recreation infrastructure and maintain public access to the Interpretive Forest.*

10.3 Context for non-legal objectives

The *Sea to Sky Land and Resource Management Plan* April 2008 specified two objectives for a Front Country Zone 1) *To maintain a level of visual quality in the Front-country Area consistent with the high scenic value of the area for local communities and visitors;* 2) *To undertake resource uses and activities in a manner consistent with the high quality of recreational experience sought by public and commercial users of the Front-country Area*.

The plan also references those watersheds bordering Highway 99 within the immediate vicinity of the Resort Municipality of Whistler as the ***"Whistler Corridor"*** . The specific objectives for the ***"Whistler Corridor"*** are:

1. *To recognize and conserve the integrity of First Nation's cultural and heritage resources and values;*

2. *To maintain high visual quality from Whistler and Blackcomb Mountains and other viewpoints along the Whistler Corridor;*
3. *To maintain a diverse range of opportunities for high quality backcountry recreational activities.*
4. *To conserve ecosystem integrity and biological diversity, including the structure and functional characteristics of critical wildlife habitat, and rare and unique ecosystems.*
5. *To maintain opportunities for economic activities where these are consistent with other objectives.*

Finally two areas are defined as **Cultural Management Areas**. Objectives for these are:
1) Conserve the integrity of the First Nations cultural and heritage resources, including cultural sites;
2) Ensure that economic development activities are undertaken in a manner that is sensitive to First Nation's social, ceremonial and cultural uses.

Until Legal Orders become effective, the result or strategy CCF-STS-01; CCF-STS-03 and CCF-STS-06 are voluntary measures in this plan.

10.4 Voluntary Measures, Undertakings, and Commitments

REF. #	Forest Development Unit Area	Measure	Operational and Planning Commitment
CCF-STS-01	All	STRATEGY	*The **CCF** will provide an annual forum to engage, communicate and identify issues from the general public and commercial recreation interests regarding all primary forest management activities under this plan.*
CCF-STS-02	All	RESULT	***CCF** will carry out all primary forest activities in consideration of the scale and design necessary to meet established the established scenic objectives (high visual quality of retention or partial retention Visual Quality Objectives) from the paved public roads and from the prominent viewshed positions from the major congregation areas atop Whistler and Blackcomb Mountains as shown of the FSP map.*
CCF-STS-03	All	RESULT	***CCF** will identify and reserve from harvest or disturbance by road development all rare old forest ecosystems and all unique old forests specified in **Appendix F** of this plan at the **Compartment** level.*
CCF-STS-04	CHE, CAL	STRATEGY	***CCF** will not propose primary forest activities until such time as both First Nations (Squamish and Lil'Wat) have either;* *1) developed a joint strategy, vision or plan that provides specific direction for a process of identifying **cultural heritage resources** that maintain opportunities to continue traditional harvesting for food, social, ceremonial and spiritual purposes, or;* *2) have otherwise agreed in advance that the **CCF's** planned primary forest activity have adequately considered and respected their cultural heritage resource interests within the **Compartment** area.*
CCF-STS-05	All	RESULT	***CCF** will ensure that greater than 19% of the crown forested portion within the K3V forest contains mature and old forest. Further, the **CCF** will spatially identify greater than 30% of the total forested area within all FDUs by March 1st 2012 containing **Old Forest**, **Mature Forest** or suitable areas of recruitment forest. (includes forested areas within the **RMOW** Urban and Intrawest Commercial Recreation Area).*
CCF-STS-06	All	RESULT	*In recognition of the extensive recreation mountain bike network of trails in the K3V Forest, the **CCF** will ensure a no net loss of trails occur as a result of primary forest activity by;* *1) documenting all trails in a **Silviculture Site Plan** as a **Defined Recreation Element;** and* *2) within 1 year after completion of primary forest activity re-establish, re-route or repair the trail.*

11 Objectives Prescribed under FRPA Section 149

Objectives set by Government are outlined in Section 149 (1) of FRPA. The following identifies each of those objectives and provides the licensee commitment to meeting those objectives within the specific operating area of CCF_K3V comprising this plan.

11.1 Soils Resources

11.1.1 Objective for Soils Resources

The objective set by government for soils is to conserve the productivity and hydrologic function of soils without unduly reducing the supply of timber from BC forests.

11.1.2 Context

Implementing multiple entry harvest system will require access structures to remain; this is also considered a benefit in some portion of the forest to expand recreational and First Nations cultural uses. Permanent site occupation from roads and landings must be balanced with the need to meet statutory limits. Therefore, permanent occupancy will be determined at the Compartment Unit level.

11.1.3 Measures, Undertakings, and Commitments

REF. #	Forest Development Unit Area	Measure	Operational and Planning Commitment
CCF-SO-01	All	RESULT	***CCF*** *will achieve the soil disturbance and permanent access structure limits stated in Sections 35 and 36 of the FPPR as of the date of this submission when assessed at the* ***Compartment*** *level within a* ***Silviculture Site Plan****.*

11.2 Timber Resources

11.2.1 Objectives for Timber Resources

- *Maintain or enhance an economically valuable supply of commercial timber from British Columbia's forests;*
- *Ensure that delivered wood costs, generally, after taking into account the effect on them of the relevant provisions of this regulations and of the Forest Act, are competitive in relation to equivalent costs in relation to regulated primary forest activities in other jurisdictions, and*
- *Ensure that the provisions of this regulation and of the Act that pertain to primary forest activities do not unduly constrain the ability of a holder of an agreement under the Forest Act to exercise the holder's rights under the agreement.*

11.2.2 Context

The current Management Plan for the K3V Forest and pending ministerial orders under the LRMP is anticipated to provide direction for balancing the Timber Resources Objectives with that of the stated priority for Recreation Management in this forest (ref MWP 2009).

The Resort Municipality of Whistler through the Federal FIRESMART funding has prepared Community Wildfire Protection Plan (CWPP2005) which identifies priority stands for fuel treatment and options for landscape level fuel breaks.

Four Fuel Modification Areas are also shown on the FSP map. These areas indicate a first approximation based on landscape orientation and feasibility for permanent resource road access (chance). Future refinements are anticipated based on Fire Behavior Prediction modeling yet to be implemented. The intent will be to identify areas within these FMAs as a

defensible Community Fuel Break to reduce the potential impact of wildfire conflagrations. Fuels reduction and stand modifications will be carried out through a combination of commercial harvesting and utilization, interim stand management treatments and modified regeneration stocking.

11.2.3 Measures, Undertakings, and Commitments

REF. #	Forest Development Unit Area	Measure	Operational and Planning Commitment
CCF-TIM-01	INT	STRATEGY	***CCF*** *will only apply for cutting authorities and road permits in order to implement the RMOW-Community Wildfire Protection Plan.* *All tree removal will be restricted to only those hazardous fuel types identified in the RMOW Community Wildfire Protection Plan 2005 and to areas identified for* ***access partial harvest,*** *where needed, to offset the costs of road and trail construction and road modification improvements.*
CCF-TIM-02	ALL FDU	RESULT	*The* ***CCF*** *will have performed an initial Timber Supply Forecast no later than 5 years from the initial date this plan takes affect. This forecast will be based upon the actual performance of the annual timber harvest flows from each of the FDU's unless;* *1) the Regional Manager or Designate exempts the CCF from this requirement in advance, or* *2) an alternate means of determining an annual harvest volume are provided to the Regional Manager or Designate in the interim.*

11.3 Wildlife Resources

The FSP Map (Figure 2) outlines areas that have been established for wildlife under the Wildlife Act.

11.3.1 Species at Risk – Identified Wildlife Section 7 Notices

Specific notices are found as ***Appendix C*** of this plan and were obtained from the following FTP site:
ftp://ribftp.env.gov.bc.ca/pub/outgoing/cdc_data/Approved_FRPR_sec7_WLPPR_sec9_Notices_and_Supporting_Info/Species_at_Risk/Squamish_FD/Notice/

11.3.2 Objective for Wildlife Resources (FPPR 14/2004)

The objective set by government for wildlife is, without unduly reducing the supply of timber from BC forests, to conserve sufficient wildlife habitat in terms of amount of area, distribution of areas and attributes of those areas, for (a) the survival of the species at risk; (b) the survival of regionally important wildlife; and (c) the winter survival of specified ungulate species.

A person required to prepare a forest stewardship plan must specify a result or strategy in respect of the objective stated under subsection (1) only if the Minister of Environment, or a designated official, notifies the person of the applicable (a) species referred to in subsection 1), and (b) indicators of the amount, distribution and attributes of wildlife habitat described in subsection (1).

11.3.2.1 Ungulate Winter Range FPPR S. 149(1)

11.3.2.2 Context: Ungulate Winter Range Plan Orders

An Ungulate Winter Range plan U2-002 (Order) was established on October 6, 2003 for Mountain Goat. Likewise Order U2-005 was declared for Deer and Moose on February 28, 2005. These plans spatially define winter ranges with attributes suitable for ungulate survival during a potentially critical winter. These ministerial orders normally restrict or

prohibit forest management unless they are management activities thought to restore or enhance habitat, stand structure, or forage. General Wildlife Measures are therefore in place and the minister responsible for the Wildlife Act exempt the CCF from the obligation to specify a result or strategy for the above objective. The orders are found as *Appendix A and B* of this plan.

REF. #	Forest Development Unit Area	Measure	Operational and Planning Commitment
CCF-WILD-01	ALL	RESULT	***CCF*** *will undertake and comply by not conducting primary forestry activities within an* ***FDU*** *in an area that is spatially defined on the* ***FSP*** *map as a* ***UWR*** *management area – for Goats (Order U-2-002 dated 2003) unless variances specified in Objective 1 or 2 are followed to permit activities and the timing of those specified activities*
CCF-WILD-02	ALL	RESULT	***CCF*** *will not conduct primary forestry activities within an* ***FDU*** *in an area that is spatially defined on the* ***FSP*** *map as a* ***UWR*** *management area (Order U-2-005 dated 2005) – for Deer or Moose, unless:* *a. the area is a rotation winter range for deer or a forage management zone for moose and the* ***GWMs*** *pertaining to that area are met.* *b. the* ***GWM****s specified are followed to authorize exemptions for permitted primary forest activities.*

11.3.2.3 Context: Grizzly Bear *(Ursus arctos horribilis)*

Grizzly bears are known to inhabit the Callaghan and Soo Landscape Unit on its outer periphery. WHAs have been established or made known based upon species presence and occupation. The proximity to urban areas and the recreational use of outlying forest lands is believed to have the biggest impact on their current distribution. A ministerial order establishing Grizzly Bear WHA's were declared on Aug 2006 and Sept 2010 (Appendix D). An additional group of proposed WHAs have been prepared and referred to tenure holders November 2009. Both declared and draft Grizzly Bear WHAs are recognized in this plan..

REF. #	Forest Development Unit Area	Measure	Operational and Planning Commitment
CCF-WILD-03	ALL	RESULT	***CCF*** *will not carry out primary forest activities from within an FDU in an area that is;* *1. subject to a Notice;* *2. meets the Notice Criteria; and* *3. is spatially defined on the* ***FSP*** *map as a* ***WHA****–or draft* ***WHA*** *for Grizzly Bear, unless:* a. *the* ***GWMs*** *specified in schedule 1 dated Aug. 25, 2010 are met, including authorized exemptions, boundary amendment and permitted activities.*

11.3.2.4 Context: Coastal Tailed Frog *(Ascaphus truei)*

Tailed frogs are thought to be endemic in all FDU's covered under this plan. The species accounts required at the TSA level (25ha from the THLB within the entire Soo TSA) are now identified. Generally tailed frog habitats are protected by increased retention in riparian management areas. Two geographically known areas have already been accepted by the District Manager as sufficient to meet the Notice Requirement.

REF. #	Forest Development Unit Area	Measure	Operational and Planning Commitment
CCF-WILD-04	ALL	RESULT	*CCF will identify streams known to contain or that are recommended by a **Qualified Person** may contain Tailed Frogs for any part of their lifecycle and will consider them as a "**MAJOR**" identifier in their classification in order to increase the required riparian tree retention based on CCF-RIP-02 (2010) strategy of this plan.*

11.3.2.5 Context: Marbled Murrelet *(Brachyramphus marmortus)*

A **nesting habitat inventory assessment,** was completed and a report filed: Soo TSA Marbled Murrelet Low Level Aerial Assessment – January 25, 2006 (B. Smart) Excerpts.

Callaghan

Very little suitable MAMU habitat was found within the Callaghan LU and hence no potential WHAs were designed. Much of the forest is at high elevation and the lower forest is much drier than the six LUs above. Although there are extensive stands of contiguous forest in the Callaghan valley most of it is high in elevation and consists of small trees with small branches with very few suitable platforms. **This landscape unit should not be managed for marbled murrelets.**

Whistler

No suitable MAMU habitat was found within the entire Whistler LU. None of the stands surveyed (point surveys only) had mossy platforms despite suitable stand structure. **This landscape unit should not be managed for marbled murrelets.**

Soo

No suitable MAMU habitat was found within the entire Soo LU. None of the stands surveyed (point surveys only) had mossy platforms despite suitable stand structure. **This landscape unit should not be managed for marbled murrelets.**

11.3.2.7 Context: Spotted Owl *(Strix occidentalisi)*

The CCF_K3V Forest incorporates two Special Resource Management Zones, even though no spotted owls are currently known to inhabit this area. The area is under increasing pressure from urban expansion through new settlements, light industry, aggregate mineral tenures, transportation, utilities and commercial recreation. Until government identifies further management direction, current Spotted Owl Management is intended to maintain structural forest attributes in all harvesting units planned within the SRMZs.

11.3.2.8 Measures, Undertakings, and Commitments

REF. #	Forest Development Unit Area	Measure	Operational and Planning Commitment
CCF-WILD-05	TUS, CHE, INT and WED	STRATEGY	*Prior to carrying out primary forest activities in areas of Special Resource Management Zone #19 and #20, the **CCF** will engage a **Qualified Professional** who will be guided by the Spotted Owl Management Plan **(Appendix H)** to determine;* *1. the quantity and quality of current habitat suited for spotted owls in the planned **Compartment**, and* *2. a suitable level of tree retention, their species, diameter class and distribution within each **Opening**.* *Upon completion of this assessment, **CCF** will implement all the recommendations into its primary forest activities or defer planned development if it is not economically feasible or safe to proceed.*

11.4 Biodiversity and Wildlife Resources

11.4.1 Landscape Level Plan Objectives

11.4.1.1 Objective for Biodiversity and Wildlife Resources – Landscape Level

The objective set by government for wildlife and biodiversity at the landscape level is, without unduly reducing the supply of timber from BC forests and to the extent practicable, to design areas in which timber harvesting is to be carried out that resemble, both spatially and temporally, the patterns of natural disturbance that occur within the landscape.

11.4.1.2 Context: Landscape Level Planning

A guiding document Silviculture Strategy was incorporated in the CCF Management Plan. Implementation of this plan will meet and generally exceed the default practice requirements of FPPR S. 64 and 65.

Landscape level biodiversity and wildlife habitat objectives are also met through the Provincial Old Growth Order June 30, 2004. The CCF's operating area encompasses portions of three Landscape Units. The **Sustainable Resource Management Plan (SRMP) Biodiversity Chapter** for the **SOO Landscape Unit** on July 30, 2004. The FSP Map indicates the OGMAs that have been made effective. **Appendix E** contains the Legal Objectives enabled for the Soo Landscape Unit.

Rationalizing the Landscape Units is a new direction of Government. In view of the "Protected Area Network" identified under RMOW bylaws, the need to incorporate formalized protection on the remaining Old Forests under 800m in elevation is a planning priority issue for the CCF Forest.

11.4.1.3 Measures, Undertakings, and Commitments

Ref #	Forest Development Unit Area	Measure	Operational and Planning Commitment
CCF-LU-01	ALL	STRATEGY	*The **CCF**, when planning and implementing primary forest activities, will meet S. 64 and S. 65 of the FPPR, in limiting the **Opening** size and adjacency with respect to existing harvested areas for which the stocking and height specified in **FPPR S.65(3)** have not been met.*
CCF LU-02	ALL	RESULT	***CCF** will not plan or carry out timber harvest of **old forests** >2.0ha in size that are located under 800m in elevation and within the **Riparian Recreation Corridor** as shown on the FSP Map.*
CCF-LU-03	SHO	RESULT	***CCF** will undertake to comply with the objectives of the Soo (July 30, 2004) **Landscape Unit Plan** and will prohibit primary forest activities within the **OGMAs** shown on the FSP Map unless;* 1. *the development of roads and harvesting is subject to the boundary adjustment and replacement area requirements and;* 2. *the amendment is documented and to the satisfaction of the delegated decision maker.*

11.4.2 Stand Level Plan Objectives

11.4.2.1 Objective for Biodiversity and Wildlife Resources – Stand Level

The objective set by government for wildlife and biodiversity at the stand level is, without unduly reducing the supply of timber from BC forests, to retain wildlife trees.

11.4.2.2 Context: Stand Level Planning

At the compartment, harvest unit or opening- level there are a number of options for the retention of trees suitable for wildlife and biodiversity.

Designated green reserve trees, tree patches which contain dead and dying trees but also shield forest workers from overhead hazards when combined with riparian and gully retention form the basis of meeting the stand level objective above.

Biodiversity and Wildlife Resources at the stand level are also addressed by the following measures listed in this plan:

- **CCF-WILD-01, 02, 03, 04 and 05**
- **CCF-LU-01, 02**
- **CCF-WT-01, 02**
- **CCF-RIP-01,02**
- **CCF-VIS-02**

Appendices E contain the legal objectives enabled for the retention of Wildlife Trees and Patches within the SOO LU plans. The Whistler and Callaghan Landscape Units will use the same WTP retention until formally revised.

11.4.2.3 Measures, Undertakings, and Commitments

REF. #	Forest Development Unit Area	Measure	Operational and Planning Commitment
CCF-WT-01	ALL	RESULT	***CCF*** *will, through its planning and implementation of primary forest activities, identify within a* ***Silviculture Site Plan*** *and retain after completion of harvest the minimum amount of area as a Wildlife Tree Patch, reserved from cutting as specified below.* *The* ***CCF*** *will derive the location of these patches from known or identified constrained areas and/or rare or unique forested ecosystems as listed in* ***Appendix F*** *and/or areas of semi-open forests and forested rock outcrops.* *-* ***CWHds WTP****% minimum required 8%* *-* ***CWHms WTP****% minimum required 7%* *-* ***MHmm WTP****% minimum required 7%* *The percentages above by variant, will be based upon the* ***Opening*** *area actual harvested and shall also consider the actual basal area proportion of any dispersed permanently retained trees in the determination.* *For compliance the Terrestrial Ecosystem Mapping completed as of March 2010 will form the basis of Biogeoclimatic subzone and variant determination.*
CCF-WT-02	All	RESULT	***CCF*** *will undertake to comply with the legislated requirements of FPPR S.67 in the restriction for removal of timber from within a Wildlife Tree Retention Area.*

11.4.3 Riparian Areas – Water, Fish, Wildlife and Biodiversity

11.4.3.1 Objective for Riparian Resources

The objective set by government for water, fish, wildlife and biodiversity within riparian areas is, without unduly reducing the supply of timber from BC forests, to conserve, at the

landscape level, the water quality, fish habitat, wildlife habitat and biodiversity associated with those riparian areas.

11.4.3.2 Context: Riparian Resources

Forest management strategies of assigning tree retention levels and specifying permitted activities adjacent to rivers, streams, creeks, and watercourses, including Wetlands and Lakeshores, form the basis of meeting multiple objectives set by government for water, fish and wildlife habitats, and biodiversity.

11.4.3.3 Measures, Undertakings, and Commitments

<table>
<tr><th>REF. #</th><th>Forest Development Unit Area</th><th>Measure</th><th>Operational and Planning Commitment</th></tr>
<tr><td>CCF-RIP-01</td><td>All FDU's</td><td>RESULT</td><td>CCF will undertake and comply with the legislated requirements of the FPPR S.47, 48, 49 and 50 (effective December 2004), in setting stream, wetland and lake riparian classes and riparian management zone widths. For interpretation and compliance, no commercial timber removal will occur within the RESERVE ZONE except for right of way clearing that occurs at designated stream crossings as part of road development.</td></tr>
<tr><td>CCF-RIP-02</td><td>All FDU's</td><td>STRATEGY</td><td>Tree retention within the Riparian Management zone will be based on the total trees per ha > 3m in height located within the entire management zone of the watercourse reach or waterbody or wetland edge, within or directly adjacent to an Opening, as follows:
<table>
<tr><th>FPPR s12.2</th><th colspan="2">Tree within the RMZ</th></tr>
<tr><th>Classification</th><th>Target Retention</th><th>Range</th></tr>
<tr><td>S1B, S2</td><td>80%</td><td>100-0%</td></tr>
<tr><td>S3, S5 major</td><td>50%</td><td>100-0%</td></tr>
<tr><td>S4, S5 minor, S6 major</td><td>20%</td><td>100-0%</td></tr>
<tr><td>S6 minor</td><td>0%</td><td>100-0%</td></tr>
<tr><td>Wetland Classification</td><td></td><td></td></tr>
<tr><td>W1</td><td>50%</td><td>100-0%</td></tr>
<tr><td>W2</td><td>50%</td><td>100-0%</td></tr>
<tr><td>W3</td><td>30%</td><td>100-0%</td></tr>
<tr><td>W4</td><td>30%</td><td>100-0%</td></tr>
<tr><td>W5</td><td>30%</td><td>100-0%</td></tr>
<tr><td>Lake Classification</td><td></td><td></td></tr>
<tr><td>L1</td><td>30%</td><td>100-0%</td></tr>
<tr><td>L2</td><td>30%</td><td>100-0%</td></tr>
<tr><td>L3</td><td>50%</td><td>100-0%</td></tr>
<tr><td>L4</td><td>50%</td><td>100-0%</td></tr>
</table>
Subject to:
1. S5 and S6 streams within the SSP will be classified with modifiers of Major or Minor systems.
2. Special conditions are identified within a Silviculture SSP which may reduce or increase Target Retention indicated above.
3. The SSP is used to determine the variant for Wetland classification (W2, W3 or W4) and Lake Classification (L2, L3 and L4).

and according to the;

Special Conditions for varying from the Target Retention:
a) There is no reasonable expectation that the adjacent side of the watercourse, wetland or lake will ever be harvested.
b) The watercourse reach is entirely dominated by bedrock, so that stream-bank stability is not a function of adjacent tree influence.</td></tr>
</table>

REF. #	Forest Development Unit Area	Measure	Operational and Planning Commitment
			c) The watercourse is not directly tributary to a fish bearing stream or the reach being prescribed is greater than 50m upstream from the point of entry into a fish bearing reach. *d) The **RMZ i**s assessed for wind throw and the decision to alter the number of trees in the **RMZ** is prescribed because of planned topping and limbing treatment to the remaining trees in the **RMZ** in order that fewer trees will reduce the windthrow impact and lower the cost of the topping and pruning treatment.*
CCF-RIP-03	**ALL FDU's**	**RESULT**	***CCF** may carry out spacing or thinning silviculture practices in areas of historically harvested **riparian reserve zones** for the purposes of either;* 1. *enhancing wildlife values;* 2. *enhancing fisheries values;* 3. *promoting "old growth" characteristics;* 4. *reducing the future windthrow potential;* 5. *creating or maintaining recreation access;* *In order to be consistent with CCF-RIP-01 all merchantable timber will be left onsite and not removed for commercial purposes.*
CCF RIP-04	**All FDU's**	**RESULT**	***CCF** will ensure that when carrying out harvesting activity that machines will be kept >5m away from all non-classified wetlands or open bodies of standing water >0.1Ha in size, and ensure that the centre line of all roads and temporary skid trails are located a minimum of 30m from the margin edge of the wetland or pond feature, unless there is no other practicable alternative in locating the road or trail and the following is implemented:* *1. overland road or trail construction using coarse rock is used to reduce hydrologic impacts to the water body; or* *2. the trail or road is fully removed and rehabilitated as part of the NAR; or* *3. the trail or road is an existing feature which is used for recreation or required for future forest management access.*

11.4.4 Fish Sensitive Watersheds

11.4.4.1 Context

There are no "fisheries sensitive watersheds" established for any area under this plan.

11.4.5 Community Watershed Resources

11.4.5.1 Objectives for Water Resources in a Community Watershed

The objective set by government for water being diverted for human consumption through a licensed waterworks in a community watershed is to prevent to the extent described in subsection (3) the cumulative hydrological effects of primary forest activities within the community watershed from resulting in (a) a material adverse impact on the quantity of water or the timing of the flow of the water from the waterworks, or (b) the water from the waterworks having a material adverse impact on human health that cannot be addressed by water treatment required under (i) an enactment, or (ii) the licence pertaining to the waterworks.

11.4.5.2 Context:

Brew Creek Community Watershed has been the focus of industrial harvesting since the mid- 1990's. The most recent Hydrologic Assessment observed and documented no issues relating to peak flow or sedimentation source concerns from existing development. Implementing previous recommendations of the assessments, limiting the future rate of cut

to 1% per year of the watershed area, and applying non-clearcut or small opening type silviculture systems is a prudent and cautious approach to Watershed Management.

The remaining other Community Watersheds are located within the Interface FDU, Fuel Modification Areas, Commercial Recreation Area-Intrawest or within a Wildland Zone.

11.4.5.3 Measures, Undertakings, and Commitments

REF. #	Forest Development Unit Area	Measure	Operational and Planning Commitment
CCF-CW-01	BRE	STRATEGY	*If the total planned harvest area including all previous harvested area is greater than 70 ha (1% of total watershed area per year) over any consecutive five-year period the **CCF** will* *a) Instigate a watershed assessment, using a qualified professional who will review the current state of the watershed, consider the potential cumulative effects of the primary forest activities, and provide recommendations and/or modifications to those activities.* *b) implement all recommendations and apply all modifications to the harvest plan* *c) provide the Water Purveyor a copy of the watershed assessment and in writing, a summary of changes that have been implemented to the harvest plans.* *Unless the harvesting is limited to removing over-story retained trees, blowdown or salvage of post harvest material with previously harvested areas and no new roads are required.*
CCF-CW-02	SHO INT	RESULT	*In the event that primary forest activities occur within the Agnew Creek (Alpine) or Rideau Brook (Emerald) Watersheds as mapped, the **CCF** will;* *a) implement a water sampling plan prior to any planned activity if the watershed is currently used for residential use;* *b) carry out excavated road-trail construction and deactivation only during the July-October time period;* *c) ensure that >40% crown closure remains evenly distributed as practicable through-out all **Openings**.* *d) have all primary forest activities reviewed prior to their implementation by a Qualified Registered Professional in order to determine any unforeseen hydrologic effects or material adverse impact.*

11.4.6 Visual Quality

11.4.6.1 Objectives for Visual Quality

The objectives set by government under the Scenic Area designated as part of the Sea to Sky LRUP made known to the holder of this plan in December 1995 are:

i. *to prepare a landscape inventory and identify visual sensitivity*
ii. *to establish acceptable VQO's*
iii. *to prepare landscape management principles*
iv. *to establish a mechanism for implementation of these principles in the preparation, review, approval, and monitoring of forest management actives; and*
v. *to consider and recommend secondary corridors in the Soo TSA which require future analysis.*

11.4.6.2 Context: Sea to Sky Scenic Area

The Sea to Sky LRUP has been in place since December 9, 1991. Under section 180 of FRPA the plan was grand-parented in 1995. Covering Hwy #99 from Horseshoe Bay to Pemberton, the existing VQO's and viewpoints have limitations. Currently a new Visual Landscape Inventory is underway.

Prudent to this plan would be to consider viewing from atop Whistler-Blackcomb including the Peak to Peak Gondola to meet pending LRMP Ministerial Orders. However by implementing the Silviculture Strategy as part of the K3V Management Plan and considering the scale, distance and viewing angle, Partial Retention VQOs will be achieved under almost all circumstances and from all considered viewpoints.

In addition, the immediate foreground will be considered in visual design when in proximity to a Defined Recreation Element or adjacent to HWY #99 and Callaghan Public Road. This consideration will needs to recognize the reality of upgrades and modification to existing access (trail, intersections, old road grades) in order to provide safe access for forestry operations. Immediate foreground will primarily be managed by varying the amount of tree retention within a "linear zone" defined in a Silviculture Site Plan.

11.4.6.3 Measures, Undertakings, and Commitments

REF. #	Forest Development Unit Area	Measure	Operational and Planning Commitment
CCF-VIS-01	**All FDUs**	**RESULT**	***CCF*** *will achieve the Visual Quality Objectives (VQO) for each visual design polygon within the scenic area shown on the* ***FSP*** *Map by applying visual design principles to all primary forest activities subject to the following;* 1. *consider the most restrictive vantage points as viewed along paved highway #99 and Callaghan (paved) Public Road in the design of each* ***Opening;*** 2. *identify* ***significant public viewpoint(s)*** *which are:* a. *a location where a large number of the public traditionally congregate; and/or* b. *a viewpoint location identified on the* ***FSP*** *Map.* *The outcome of all primary forest activities will achieve the VQO when incorporating all existing visual conditions, the affect of winter contrast and the adjacent* ***non-forest elements.****.*
CCF-VIS-02	**All FDUs**	**STRATEGY**	***CCF*** *will incorporate the following green tree retention strategy to a foreground zone on all* ***Openings*** *that are;* *1. directly adjacent to HWY #99 or the Callaghan Public Road or;* *2. within or is directly adjacent to a* ***Defined Recreation Element;*** *A strategy of retaining within the foreground zone, as a minimum >1/3 of total trees uniformly as practicable on at least 1/3 of the linear distance when directly adjacent to a public roadway or Defined Recreation Element.* *The foreground zone will extend 50m from the edge of a paved roadway and 30m in all directions from any* ***Defined Recreational Element****.* *The strategy will incorporate all existing natural open features and* ***non-forested elements*** *that occur in the foreground zone.* *Retained trees in the foreground zone are for all practical consideration permanently reserved.*

11.4.7 Cultural Heritage Resources

11.4.7.1 Objective for Cultural Heritage Resources

The objective set by government for cultural heritage resources is to conserve, or if necessary, protect cultural heritage resources that are (a) the focus of a traditional use by an aboriginal people that is of continuing importance to that people, and (b) not regulated under the heritage Conservation Act.

11.4.7.2 Context: First Nations Partners

The CCF partnership has recognized the opportunity for both participating First Nations to explore commercial non-timber forest products and botanicals. In addition specific "old seral" site series are to be protected when rare or poorly represented in the forest.

11.4.7.3 Measures, Undertakings, and Commitments

REF. #	Forest Development Unit Area	Measure	Operational and Planning Commitment
CCF-CULT-01	All FDU's	RESULT	***CCF*** *will manage plantations and roadside vegetation without the use of chemical herbicides so that either respective First Nations have unfettered ability to access early seral plant communities within the harvested areas for traditional use or botanical products throughout the area covered by this plan.*
CCF-CULT-02	All FDU's	RESULT	***CCF*** *will provide each respective First Nation an* ***Intent to Develop Notice****, showing the geographical location, forest cover attributes and physical features outlining the total area of the* ***Compartment*** *that may be subject to primary forest activities in advance of submitting a road or cutting permit to the Ministry of Forests and Range.* *If Cultural Heritage Resource information is then shared or provided to the* ***CCF*** *as a result of this notice, that information will be documented within* ***CP*** *or* ***RP*** *application.* *Included in that documentation will be a summary of any accommodations made, including specific deferred areas and/or measures to be implemented which conserve or protect* ***Cultural Heritage Resources*** *that are of continuing importance to the First Nations people.*
CCF-CULT-03	All FDU's	STRATEGY	***CCF****, during its planning and field layout practices in a* ***Compartment,*** *will continue to observe and document historical and ongoing traditional uses and if any are identified will;* *1. document the activity or feature within the Silviculture Site Plan;* *and* *2. notify the respective FN and seek their advice on what measures should be implemented prior to continuing any further forest management activity.*

12 Regeneration Stocking Standard Obligations

Pursuant to the Forest Planning and Practices Regulation S.16, the following tables and standards are to be applied to harvested areas under this Forest Stewardship Plan (FSP). These standards are appropriate across the range of forest ecosystems within the K3V.

Standards are developed for specific fuel management purposes where stocking levels are intended to be permanently reduced with the inherent knowledge of the potential of reducing future timber yields.

Standards are also provided to describe the stocking condition of retained trees when those trees are retained permanently. These standards are to be used in conjunction with silviculture site plans where required under the Forest and Range Practices Act. These standards recognize the full range of silviculture systems and regeneration conditions that may occur as a result of harvesting and/or other disturbances.

12.1 Even-Aged Management

12.1.1 Low Levels of Overstory Tree Retention

CONTEXT: The following standards in TABLES S1-S3 apply to harvest units and/or standard units where even-aged management is practiced. Generally applicable to the following silviculture systems:

- Clear-cut or Patch-Cut with reserves or with very low levels or dispersed tree retention (Reserves <5m2);
- Grouped or Strip Shelter-wood (with dispersed reserves <5m2);
- Retention, where regeneration is not significantly influenced by residual trees (Retained Basal Area<5m2).

TABLE S1			**Normal Regeneration Standards**						
ID # Assigned	BGC Classification		Species		Stocking			Min Inter-tree Spacing (m)	Regen. Delay (Max yrs)
			Species/Minimum FG Height (m)		Target	Min p&a	Min p		
	Zone/SZ	Series	Preferred (p)	Acceptable (a)	(well-spaced/ha)				
	CWH ds1	01	Fd/2.25	Cw/1.5 Hw/1.0 Pw/2.5	900	500	400	2.0	6
		01	Fd/2.25 Cw/1.5	Ba/0.75 Hw/1.0	900	500	400	2.0	6
		01R	Cw/1.5	Pw/2.5 Sxs/1.0 Lw/1.5	900	500	400	2.0	6
		02	Pl/1.25 Fd/1.5		400	200	200	2.0	6
		02R	Pl/1.25		400	200	200	2.0	6
		02C	Pl/1.25 Fd/1.5		400	200	200	1.5	6
		03	Fd/1.5 Pl/1.25	Cw/1.0	800	400	400	2.0	6
		03R	Pl/1.25	Cw/1.0	800	400	400	2.0	6
		03C	Fd/1.5 Pl/1.25	Cw/1.0	400	400	400	1.5	6
		04	Fd/2.25 Cw/1.5	Pw/2.5 Hw/1.0	800	400	400	2.0	6
		04	Fd/2.25	Pw/2.5.5 Hw/1.0 Cw/1.5	800	400	400	2.0	6
		05	Fd/2.25 Sxs/1.0 Cw/1.5	Hw/1.0 Pw/2.5	900	500	400	2.0	6
		06	Hw/1.0 Fd/2.25	Cw/1.5	900	500	400	2.0	6
		07	Cw/2.0 Fd/3.0	Bg/2.0 Hw/1.25 Sxs/3.0	900	500	400	2.0	6
		08	Cw/2.0	Sxs/3.0 Bg/2.0	900	500	400	2.0	6
		09	Cw[1]/2.0	Bg/2.0 Sxs/2.0	900	500	400	2.0	6
		11	Pl/1.25	Cw/1.0	400	200	200	2.0	6
		12	Cw/1.0	Pl/1.25	800	400	400	2.0	6

TABLE S2			Normal Regeneration Standards						
ID # Assigned	BGC Classification		Species		Stocking			Min Inter-tree Spacing (m)	Regen. Delay (Max yrs)
			Species/Minimum FG Height (m)		Target	Min p&a	Min p		
	Zone/SZ	Series	Preferred (p)	Acceptable (a)	(well-spaced/ha)				
	CWH ms1	01	Cw/1.5 Fd/2.25 Sxs/1.0 Hw1.5 Ba/0.75	Yc/1.5	900	500	400	2.0	6
		01	Cw/1.5 Fd/2.25 Sxs/1.0	Hw/1.5 Yc/1.5 Ba/0.75	900	500	400	2.0	6
		01R	Cw/1.5 Sxs/1.0	Pw/2.5 Lw/1.5	900	500	400	2.0	6
		01C	Cw/1.5 Fd/2.25 Sxs/1.0 Hw1.5 Ba/0.75	Yc/1.5	400	400	200	1.5	6
		01T	Yc/1.5 Ba/1.0	Cw/1.5 Hm/0.75 Hw/1.5	900	500	400	2.0	6
		01E	Fd/1.5 Sxs/1.0	Hw/1.0 Yc/1.0 Ba/1.0 Bl/1.0 Cw/1.0	900	500	400	2.0	6
		02	Pl/1.25 Fd/1.5		400	200	200	2.0	6
		02R	Pl/1.25	Sxs/1.0 Cw/1.0	400	200	200	2.0	6
		02C	Pl/1.25 Fd/1.5		400	200	200	1.5	6
		03	Cw/1.5 Fd/2.25 Sxs/1.0	Hw/1.0	800	400	400	2.0	6
		03R	Cw/1.5 Sxs/1.0	Hw/1.0 Pw/2.5 Lw/1.5	800	400	400	2.0	6
		03C	Cw/1.5 Fd/2.25 Sx/1.0	Hw/1.0	400	400	400	1.5	6
		04	Cw/2.0 Fd/3.0 Sxs/1.25 Ba/1.0 Hw/2.0 Yc/2.0	Pw/2.5	900	500	400	2.0	6
		04	Cw/2.0 Fd/3.0	Sxs/1.25 Hw/2.0 Pw/2.5 Ba/1.0 Yc/2.0	900	500	400	2.0	6
		05	Cw/1.5 Hw/1.5	Yc/1.5 Ba/0.75	900	500	400	2.0	6
		05	Cw/1.5 Hw/1.5 Yc/1.5 Ba/0.75		900	500	400	2.0	6
		06	Cw/2.0 Fd/3.0 Sxs/1.25	Hw/2.0 Ba/1.0 Yc/2.0	900	500	400	2.0	6
		06	Cw/2.0 Fd/3.0 Yc/2.0 Sxs/1.25 Ba[3]/1.0	Hw/2.0	900	500	400	2.0	6
		07	Ba/1.0 Cw/2.0 Ss/4.0 Sxs/1.25	Fd[1]/3.0	900	500	400	2.0	6
		07	Ba/1.0 Cw/2.0 Sxs/4.0	Fd/3.0 Sxs/1.25	900	500	400	2.0	6
		08	Cw/2.0 Ba/1.0 Sxs/1.25		900	500	400	2.0	6
		10	Pl/1.25	Cw/1.0	400	200	200	2.0	6
		11	Cw/1.0 Yc/1.0	Pw/2.5 Sxs/0.75	800	400	400	2.0	6

TABLE S3			Normal Regeneration Standards						
ID # Assigned	BGC Classification		Species		Stocking			Min Inter-tree Spacing (m)	Regen. Delay (Max yrs)
			Species/Minimum FG Height (m)		Target	Min p&a	Min p		
	Zone/SZ	Series	Preferred (p)	Acceptable (a)	(well-spaced/ha)				
	MHmm2	01	Ba/0.6 Hm/1.0 Yc/1.0 Sx/1.0	Hw/1.0	900	500	400	2.0	6
		02	Hm/0.75 Yc/0.75 Sx/0.75	Ba/0.6 Bl/1.0	400	400	400	2.0	6
		03	Ba/0.6 Hm/1.0 Sx/1.0Yc/1.0		900	500	400	2.0	6
		04	Ba/0.6 Hm/1.0 Yc/1.0		900	500	400	2.0	6
		05	Ba/0.6 Yc/1.0 Sx/1.0	Hm/1.0	900	500	400	2.0	6
		06	Hm/0.75 Yc/0.75	Ba/0.6	800	400	400	2.0	6
		07	Ba/0.6 Sx/0.75 Yc/0.75	Hm/0.75	900	500	400	2.0	6
		08	Hm/0.75 Yc/0.75		400	200	200	2.0	6
		09	Hm/0.75 Yc/0.75	Sx/0.75	800	400	400	2.0	6

TABLE S4			Regeneration Standards for Fuel Modification Areas and Interface FDU						
ID # Assigned	BGC Classification		Species		Stocking			Min Inter-tree Spacing (m)	Regen. Delay (Max yrs)
			Species/Minimum FG Height (m)		Target	Min p&a	Min p		
	Zone/SZ	Series	Preferred (p)	Acceptable (a)	(well-spaced/ha)				
	CWHms1	01	Fd/2.25 Cw/1.5 Hw/1.5 Ba/0.75	Pw/2.5 Ep/1.5 Act/2.5	450	300	200	2.0	6
		02	Pl/1.25 Fd/1.5	Ep/1.5	400	200	200	2.0	6
		03	Cw/1.5 Fd/2.25 Sxs/1.0	Hw/1.0	400	200	200	2.0	6
		04	Fd/3.0 Cw/2.0 Pw /2.5	Ba/1.0 Hw/2.0 Ep/1.5 Act/2.5	400	300	200	2.0	6
		05	Fd/2.25 Cw/1.5 Pw/2.5 Hw/1.5	Ba/0.75 Act/2.5 Yc/1.5 Ep/1.5	450	300	200	2.0	6
		06	Fd/3.0 Cw/2.0 Hw/2.0 Sxs 1.25	Ba//1.0 Yc/1.0 Act/2.5	450	300	200	2.0	6
		07	Ba/1.0 Cw/2.0 Sxs1.25	Act/2.5 Fd3.0	450	300	200	2.0	6
		10	Pl/1.25 Pw/1.5	Cw/1.0 Yc/1.0	400	200	200	2.0	6
		11	Pl/1.25 Hw/1.25 Cw/1.0 Yc/1.0	Ep/1.5	400	200	200	2.0	6

12.1.2 Moderate to High Levels of Overstory Tree Retention

CONTEXT: The following standards are applied to harvest units and/or standard units where even-aged management is practiced but overstory trees are dispersed and permanently retained for other forest management objectives. Generally applicable to the following silviculture systems:

- Retention, where regeneration is significantly influenced by residual trees;
  Moderate Retention 5m2 to 20m2 Retained Basal Area (RBA).
  High Retention 20m2 to 40m2 Retained Basal Area (RBA).
- Shaded Fuel Breaks within the Fuel Modification Areas or INTERFACE FDU.

Stocking Obligations Method 1 for monitoring Post Harvest Stand Condition

- For stands with an SI_{50} = < 30 m
- Must meet all values (as a minimum) in the following table S5.
- Using 40 m2/ha as a maximum per plot (M-value) when tallying plot survey data.
- Meeting all values outlined previously for ecologically suitable species and minimum height as indicated in Table S1-S4 of this document.
- Apply to all understory regeneration (trees with a DBH less than 12.5cm)
- Minimum heights (trees with a DBH less than 12.5cm) will be reduced to 75% of the height listed in Tables S1 through S4, as per recommended in CRIT-SWG (2009).

NOTE: To be considered as meeting the stocking obligation the plots must achieve the values as provided for in the table below for the identified circumstance. DFP Table below is the derived table for stands with Site Index less than 30. The SWG CRIT (2009) discussion paper recommends use in stands with a SI<30, because it has been adapted from the interior of the province.

TABLE S5 DFP STOCKING CLASS – METHOD 1 FOR MONITORING POST HARVEST STAND CONDITION

Stocking Parameter	Minimum criteria to be met
Average Deviation From Potential	0.2 or less, and
Proportion of plots in the "stocked" class is:	≥ 60%, and
Proportion of plots in the "partially stocked" class is:	≤ 40%, and
Proportion of plots in the "open" class is:	≤ 20%

TABLE S6 DFP METHOD 1 FOR MONITORING POST HARVEST STAND CONDITION
(Deviation from Potential), table – from CRIT SWG (2009)[1]

Basal area of overstory crop trees: ≥ 12.5 cm dbh	Understory density – unimpeded well spaced sph					
	0	200	400	600	800	1000
0	1.00	0.76	0.52	0.00	0.00	0.00
5	0.86	0.65	0.45	0.00	0.00	0.00
10	0.62	0.47	0.32	0.00	0.00	0.00
15	0.38	0.28	0.20	0.00	0.00	0.00
20	0.19	0.14	0.10	0.00	0.00	0.00
25	0.07	0.05	0.04	0.00	0.00	0.00
30	0.00	0.00	0.00	0.00	0.00	0.00
35	0.00	0.00	0.00	0.00	0.00	0.00
40	0.00	0.00	0.00	0.00	0.00	0.00
45	0.00	0.00	0.00	0.00	0.00	0.00
60	0.00	0.00	0.00	0.00	0.00	0.00
65	0.00	0.00	0.00	0.00	0.00	0.00
65+	0.00	0.00	0.00	0.00	0.00	0.00

Red => "Open", DFP > 0.40, Yellow => "Partially Stocked", DFP > 0.15 and ≤ 0.40, Green => "Stocked", DFP < 0.15

Stocking Obligations Method 2 for Free Growing Declaration

This alternative stocking standard option integrates overstory and understory trees using the DFP concepts, and presents them in a tabular format similar to the even-aged stocking standard format. The regeneration layer stocking density corresponds to the residual basal areas category. The M value used is the target SPH divided by 200 (e.g. If Ba = 10 m2/ha, ∴ M = 3.5spp for understory trees).

TABLE S7 DFP METHOD 2 FOR FREE GROWING DECLARATION

Layer	Moderate Dispersed Retention (m2/ha for overstory / sph for understory – target over minimum)			High Dispersed Retention (m2/ha) (m2/ha for overstory / sph for understory – target over minimum)	
Overstory L1 (>12.5 cm dbh)	5-10 m2/ha	11-15 m2/ha	16-20 m2/ha	21-25 m2/ha	26-40 m2/ha
UWS / ha	700 sph	550 sph	400 sph	300 sph	200 sph
Understory L2 to L4 - Target over Min.	300 sph	250 sph	200 sph	100 sph	75 sph

[1] CRIT-SWG (2009) = Single Entry Dispersed Retention System Stocking Standard Discussion Paper by the Silviculture Working Group, Coast Region FRPA Implementation Team, November 2, 2009. This paper was produced by the SWG and approved by CRIT on November 5, 2009.

Tree Species Abbreviations for stocking standard tables S1-S4

Conifer Tree Species	Broadleaf Tree Species
	"Act" means black cottonwood;
"Ba" means amabilis fir;	"Dr" means red alder;
"Bl" means subalpine fir;	"Ep" means common paper birch;
"Cw" means western red cedar;	
"Fd" means Douglas-fir;	
"Hm" means mountain hemlock;	
"Hw" means western hemlock;	
"Lw" means western larch;	
"Py" means ponderosa pine;	
"Pa" means whitebark pine;	
"Pl" means lodgepole pine;	
"Pw" means white pine;	
"Py" means ponderosa pine;	
Sxs" means hybrid Sitka spruce;	
"Se" means Engelmann spruce;	
"Sx" means hybrid spruce or interior spruce;	
"Yc" means yellow cedar.	

Footnotes (modifiers for site series)

"xx**R**" – Standards for root rot areas
"xx**C**" – Standards for colluvial areas (<400 Plantable Spots/Ha) – extend RG date to 6 years, and reduce MITD to 1.5 metres .
"xx**E**" – transition to ESSF South Facing Slopes
"xx**T**" – transition to MHmm2

REF. #	Forest Development Unit Area	Measure	Operational and Planning Commitment
CCF-STO-01	All FDU's	RESULT	***CCF*** *will only accept regeneration and residual trees in the determination of the stocking obligation if those trees meet the standard specifications outlined in* ***Tables S1 through S7*** *and where no single species makes up >75% of the Inventory Label for an* ***Opening.***
CCF-STO-02	All FDU's	STRATEGY	***CCF*** *will not apply stocking standards* ***Table S1-S7*** *or report denudation activities in the application of salvage logging, when <500m3 of timber has already been damaged, if the contiguous opening created from the practice occurs on isolated and dispersed openings of <0.25ha.*
CCF-STO-03	All FDU's	RESULT	***CCF*** *will use >1.0 Ha contiguous area as the minimum strata size within a Silviculture Site Plans to assign separate management regimes and stocking standards.*
CCF-STO-04	All FDU's	STRATEGY	***CCF*** *will only design and implement forest harvesting practices, using silviculture systems with very high uniform levels of permanent dispersed retention (>40m2/ha), which may impact timber supply due to reduced regeneration growth rates and losses of accessible merchantable timber within highly constrained areas, such as, but not limited to:* *1. Unstable Terrain;* *2. Retention VQO's;* *3. Declared Resource Features; Defined Recreation Elements and Recreation Riparian Corridors.* *4. Rotation Winter Ranges or other areas specifically managed for Identified Wildlife;* *5. Riparian Management Areas:* *6. Shallow rapidly drained soils and colluvium;* *7. Areas determined to be outside the Timber Harvesting Land Base by a* ***qualified professional*** *using current Timber Supply analysis.*
CCF-STO-05	All FDU's	STRATEGY	***CCF*** *will only apply multi* ***Opening*** *stocking standards within a single* ***Compartment.***

12.2 Single Stem Harvesting Standards

Context: Single stem harvest is the one time removal of individual stems (trees) or small groups of trees using either "standing stem" harvest by helicopter or conventional falling and yarding by helicopter or other equipment or may involve the use **access partial harvesting** to remove timber adjacent to roadways while maintaining a fully stocked stand. This Single Stem harvesting is considered an intermediate cut. The residual stand that remains following an intermediate cut (even-aged management) does not have free growing requirements. There are no reforestation requirements for this type of intermediate cutting, subject to the following standards:

12.2.1 Stocking Standards for Single Stem Harvesting

Regeneration stocking standards are not required for harvest units or standard units where the following apply:

- The openings created by single tree or small group harvest of less than 0.1 Ha in size; and
- the species composition of all retained trees within the harvest unit are similar in percentage (within variation +/15%) to the pre-harvest species composition; and
- the quantity and distribution of trees retained within the harvest unit must be at a level that will ensure the area remains adequately stocked for a period of 12 months after completion of harvest (FPPR s.44(4)) .

12.2.2 Standards for Retained Trees in Single Stem Harvesting

The ecological suitable tree species listed in Tables S1-S4 stocking standards are to be considered "preferred" when assessing the **Opening**. The residual tree form, health, and vigor will be representative of the original stand condition.

REF. #	Forest Development Unit Area	Measure	Operational and Planning Commitment
CCF-STO-06	All FDU's	Strategy	***CCF*** *will only implement Single Stem Harvesting in areas that are outlined in* ***CCF-STO-04*** *above.*

12.3 Fuel Modification Stocking Standards

Context: Normally regeneration method, species selection and tree retention are focused on maximizing timber productivity in consideration of the ecological site conditions. Fuel modification objectives are at times at odds with default Timber Objective. Therefore, Table S4 will only be applied to those areas of the **Fuel Modification Area** or within the **INTERFACE FDU** if applicable.

Interface areas in close proximity to communities or specific values at risk (transmission lines, infrastructure and other resource values) require modified standards. Fuel management planning and fire risk assessments have been prepared for the RMOW_CWPP 2005.

Reduction in tree density alters fire behavior by slowing the rate of spread, laddering and crowning in the event of wildfire. Altering species selection can achieve desired conditions in early and late seral forest fuel types and modify vertical fuel orientation.

REF. #	Forest Development Unit Area	Measure	Operational and Planning Commitment
CCF-ST-07	INT and FMA portions of SHO, WED, RAI, CHE	RESULT	***CCF*** *will only apply Table S4 standards to the* ***NAR*** *of the portions of the FDU that are shown within the* ***Fuel Modification Area*** *or within the* ***INT FDU****.*

12.4 Intermediate Harvest Stocking Standards

Context: Commercial harvest opportunities into immature stands between 40-100 years in the sub-maritime variants may be partially harvested, with plans to re-enter the stand within 50 years. The application of uniform residual standards are appropriate. The following standards will apply to intermediate harvest units:

12.4.1 Standards for Retained Trees

Regeneration stocking standards are not required or applied to intermediate Openings where;

- the reduction of pre-harvest stand basal area is < 60%, and;
- a minimum of 150 SPH are somewhat uniformly retained on the sub-maritime portion that meet the following criteria;
    - Preferred and Acceptable tree species follow the assessment criteria applicable in **Table S1 through Table S4**.
    - Trees assessed will have adequate crown form and depth, exhibit health and vigour commensurate with the associated site productivity and can be reasonably expected to release and/or continue to occupy the site.
    - Scars and physical damage to Layer 1 trees are minor and there should be no concern for stem infections caused by either the damage or potential pathogens. Layer 2 and 3 trees will be free from open injuries (scars). Stem defect and scars are acceptable for layer 1,2 & 3 western red cedar,

yellow cedar and Douglas fir leave trees (basal scars will be <25% of circumference at that point).

- The full live crown is greater than 20% for layers 1 and 2 and 30% for layer 3 trees.

And

- if any area of the NAR > 0.25 ha which, as a result of thinning, exceeds more than 60% of the pre-stand Basal Area or reduces stocking to below the minimum SPH requires regeneration stocking standards as applicable from **Table S1 through to Table S4** of this document.

REF. #	Forest Development Unit Area	Measure	Operational and Planning Commitment
CCF-STO-08	**All FDU's**	**RESULT**	*In carrying out intermediate commercial harvest activities (thinning) on **immature forests** the **CCF** will meet the Standards for Retained Trees and exceptions specified in **Section 12.4.1** above.*

12.5 Uneven Aged Forest Management

Context: An uneven aged forest management regime requires the scheduling of repeatable stand entries to alter stand and regeneration stocking. For selection systems these entries are in perpetuity and applicable to the following silviculture systems:

- Small Group or Individual Tree Selection Systems Openings <0.25 Ha;

REF. #	Forest Development Unit Area	Measure	Operational and Planning Commitment
CCF-STO-09	**All FDU's**	**RESULT**	*CCF will ensure that prior to carrying out forest harvesting practices under uneven aged forest management that site specific stocking standards are developed based on the site ecology and stand dynamics. Such standards will be developed in a **Silviculture Site Plan** and amended into **Section 12** of this plan.*

13 Measures to Prevent the Introduction and Spread of Invasive Plants

Objective: *Section 17 FPPR "...a person who prepares a Forest Stewardship Plan must specify measures in the plan to prevent the introduction or spread of species of plants that are invasive plants under the Invasive Plants Regulation, if the introduction or spread is likely to be the result of the person's forest practice.*

Context: Coordinated detection and eradication efforts are best done on a sub-regional scale. To date there are no species which affect or impede the area to be reforested. Potential invasion is limited to exposed road cuts, landslides and rehabilitated soils and human caused dumping of garden waste material or movement of soils.

REF. #	Forest Development Unit Area	Measure	Operational and Planning Commitment
CCF-INV-01	**All FDU's**	**STRATEGY**	***CCF** will ensure all exposed soils requiring re-vegetation as defined by **FPPR** S.40 are reseeded using only Canadian registered commercial seed mixtures void of any species listed in **Appendix G**.*

CCF-INV-02	**All FDU's**	**STRATEGY**	***CCF*** *will post prior to February 15th of each year on the* ***RMOW*** *community forest website any updates to the list of invasive plant species known to occur within the K3V Forest.*
CCF-INV-03	**All FDU's**	**RESULT**	*At the milestone reporting of regeneration delay or free growing,* ***CCF*** *will report online* **(IAPP database)** *any occurrence or not, of any invasive species listed in* ***Appendix G****.*

14 Measures Related to Natural Range Barriers

There are no known range resources within the area of this plan.

Appendices

Appendix A) TSA UWR Plan – Order #U2-002-Goat

BRITISH COLUMBIA

ORDER – UNGULATE WINTER RANGE #U2-002

On being satisfied that the establishment of the ungulate winter range dealt with in this order is necessary to meet the habitat requirements of the ungulate species, and that the management objectives dealt with in this order are necessary to maintain the ungulate species within those areas, and under the authority of section 69 (1) (a) and (b) of the Operational and Site Planning Regulation, B.C. Reg. 107/98, the Deputy Minister of Water, Land and Air Protection orders that

1. the ungulate winter range shown in the map set out in the attached Schedule A (#U2-002) is established;

2. the ungulate winter range referred to in section 1 is approved for mountain goat (*Oreamnos americanus*)*;* and

3. the following practices are established as management objectives inside the ungulate winter range referred to in section 1:

Maintain mountain goat winter ranges to provide high suitability habitat. Habitat attributes include snow interception, foraging opportunities, escape terrain, steep south and west-facing windswept ridges/slopes, conifer bluffs, shrub/grass communities, and security cover. This will be accomplished by applying the following specific management objectives to the proposed UWRs:

Objective 1

Road and trail construction and timber harvesting, including but not limited to, single tree selection and salvage topping for cone harvesting, will not be permitted within the GWRs, except as specified in section 1 and 2 below:

1. The MWLAP Statutory Decision Maker or designate, through the approval of a variance, may allow operations to occur within a GWR for reasons such as but not limited to the following:
a. Construction of roads and/or yarding corridors if no other practicable option exists.
b. Treatments to restore or enhance degraded habitats.

2. The following activities will be allowed to occur within a GWR subject to objective 2:
a. Maintenance and deactivation of existing roads.
b.Brushing or clearing along existing roads under active tenure within right of way for safety purposes.
c.Falling of guyline clearance, tailhold anchor trees or danger trees along right of way and cutblock boundaries, where the tree has been determined as a danger tree by a qualified Wildlife/Danger Tree Assessor, and the establishment of a No-work Safety Zone as per Worker's Compensation Board requirements is not practicable. Any trees that must be felled within a GWR will be left onsite to provide coarse woody debris.
d.Existing access agreements that were previously negotiated between industry and MWLAP will continue to be honoured.

ORDER – UNGULATE WINTER RANGE #U2-002

Objective 2

Where activities within a GWR have been approved by the MWLAP Statutory Decision Maker or designate or where exempted activities must occur, consistent with Objective 1, they shall be undertaken during a period extending from May 1 to October 31 of a calendar year, except as specified below:

1. The MWLAP Statutory Decision Maker or designate may permit industrial operations to occur within a GWR boundary for a period extending up to 4 weeks prior to May 1 and 4 weeks past October 31, where relevant site inspection data indicates that no impacts to Mountain Goats using the GWR will result from the extended operations; or
2. The MWLAP Statutory Decision Maker or designate may permit industrial operations to occur within a GWR boundary during some other specified period, where relevant site inspection data indicates that negative impacts to Mountain Goats using the GWR may result from operations occurring between May 1 and October 31 of a calendar year.

ORIGINAL SIGNED BY

Signed this 6th day of Oct., 2003 Gordon Macatee, Deputy Minister Ministry of Water, Land and Air Protection

Appendix B) TSA UWR Plan – Order U2-005 Deer – Moose

ORDER – UNGULATE WINTER RANGE #U2-005

The following order applies to the area identified within the attached Schedule A and takes effect on the 28 day of February, 2005.

This order is given under the authority of sections 9(2) and 12(1) of the *Government Actions Regulation* (B.C. Reg. 17/04).

The Deputy Minister of Water, Land and Air Protection orders that:

1. the ungulate winter range shown in the map set out in the attached Schedule A (#U2-005) is established;
2. the ungulate winter range in the attached Schedule A is established for black-tailed deer (*Odocoileus hemionus*) and moose (*Alces alces*)*;* and
3. the general wildlife measures outlined in Schedule 1 and 2 are established for the ungulate winter range in the attached Schedule A:

Schedule 1 – General Wildlife Measures for Black-tailed deer

A. Retention Winter Range

1. Road construction is not to occur within the designated ungulate winter ranges unless there is no other practicable option and an exemption is approved by the MWLAP designated authority.
2. An exemption is not required for road maintenance, road deactivation, felling of danger trees or brushing and clearing on existing roads within the UWR. These activities will be conducted in a manner that does not result in a material adverse impact on the ungulate winter range habitat within the designated ungulate winter range.
3. Harvesting is not to occur within the designated ungulate winter ranges unless an exemption is approved by the MWLAP designated authority. An exemption would be considered for the purposes of enhancing the quality of the winter range.
4. An exemption is not required for harvesting within the designated ungulate winter ranges when it is required to address worker safety: felling of danger trees, felling for guy line anchors, felling of tail hold anchor trees within an UWR along adjacent cutblock boundaries. Harvesting will be conducted in a manner that does not result in a material adverse impact on the ungulate winter range habitat within the designated ungulate winter ranges.
5. Trees that must be felled within an UWR will be left onsite to provide coarse woody debris, unless the felled tree lies outside the UWR.
6. Salvage harvesting is not to occur within the designated ungulate winter ranges unless an exemption is approved by the MWLAP designated authority.

B. Rotation Winter Range

1. Maintain a minimum of 20% of the total rotation polygon area as *functional winter range* at any one time. The functional winter range (minimum 20%) must be spatially arranged to provide optimum ready access to food and shelter and must be spatially identified prior to commencing harvesting.
2. Up to 20% of the total polygon area can be harvested every 20 years **without restrictions** as long as general wildlife measure 1 has been met. Any harvesting that could occur over the 20% every 20 years should be for mitigating or enhancing the remaining winter habitat within the rotation winter range polygon.
3. Harvesting, Intermediate commercial thinning, and silviculture treatments (in addition to the 20% harvest) that enhance, create or expedite the production of functional winter range are permitted and encouraged (see operational guidelines).

Schedule 2 – General Wildlife Measures for Moose

A. Core Winter Range

1. Road construction is not to occur within the designated ungulate winter ranges unless there is no other practicable option and an exemption is approved by the MWLAP designated authority.
2. An exemption is not required for road maintenance, road deactivation, felling of danger trees or brushing and clearing on existing roads within the CMWR. These activities will be conducted in a manner that does not result in a material adverse impact on the ungulate winter range habitat within the designated ungulate winter range.

3. Harvesting is not to occur within the designated ungulate winter ranges unless an exemption is approved by the MWLAP designated authority. An exemption would be considered for the purposes of enhancing the quality of the winter range.
4. An exemption is not required for harvesting within the designated ungulate winter ranges when it is required to address worker safety: felling of danger trees, felling for guy line anchors, felling of tail hold anchor trees within a CMWR along adjacent cutblock boundaries. Harvesting will be conducted in a manner that does not result in a material adverse impact on the ungulate winter range habitat within the designated ungulate winter ranges.
5. Trees that must be felled within a CMWR will be left onsite to provide coarse woody debris, unless the felled tree lies outside the CMWR.
6. Salvage harvesting is not to occur within the designated ungulate winter ranges unless an exemption is approved by the MWLAP designated authority.

B. Forage Management Zone

1. Timber harvesting, reforestation and stand tending operations in Moose Winter Forage Management Zone will not cause a material, adverse impact on the production of moose winter forage.
2. Any wildlife tree retention, or retention of trees for other purposes, that is planned for an area of timber harvesting in the Moose Winter Forage Management Zone, will be designed to provide patches of snow interception and security cover in tree groups or patches up to 0.2 hectares.
3. Road construction is permitted in the portion of the Moose Winter Forage Management Zone that is in the Timber Harvesting Land Base.
4. ~~Cut block size and adjacency is not limited in the Moose Winter Forage Management Zone.~~ Timber harvesting will result in cut blocks where areas of forage production are not more than 200 meters from a group of retained trees, an area of wildlife tree retention, or the cut block boundary.

_____

Signed this 28 day of Feb, 2005
Gordon Macatee, Deputy Minister
Ministry of Water, Land and Air Protection

APPENDIX

1. Deer winter range

A. Definitions:

1) Retention Winter Range: forested habitat, usually stands of mature or old-growth conifers, which provide deer with resources critical to survival during severe winters (Nyberg and Janz 1990).
2) Rotation Winter Range: Habitats in various stages of succession placed on the landscape to provide winter habitat attributes when the distance between retention winter ranges is usually > 4km or in areas where there is a lower snow pack and known deer winter use.

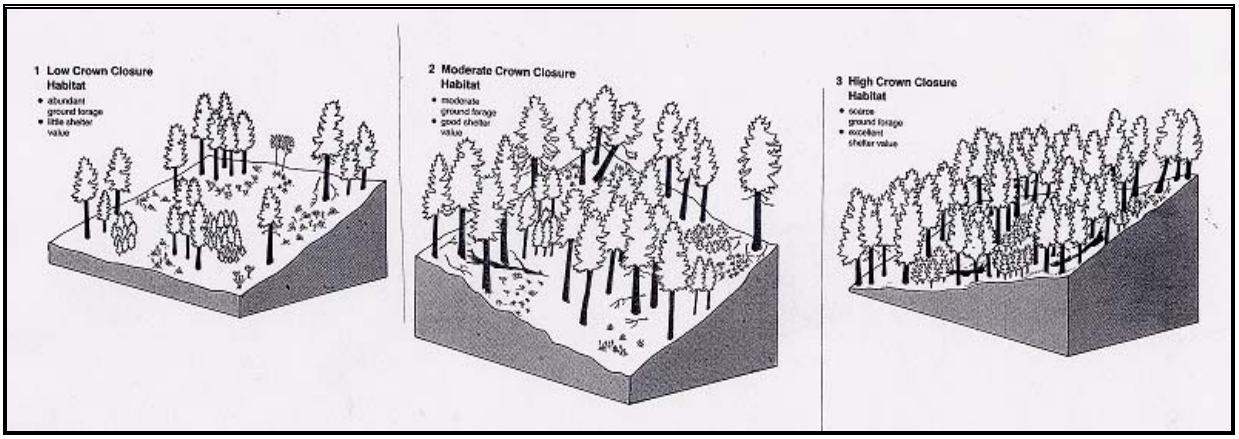
B. Functional Winter Range

During periods where snow can persist occasionally over extended periods of time, retention of critical deer winter range habitat features is more important. A narrow range of habitats sustain deer over these extended periods of stressful conditions. The critical features of *functional winter range* that will help to sustain deer during these periods are (Bunnell 1990; Nyberg and Janz, 1990; Armleder et al 1986):

- Well-developed crowns that intercept snow (allowing foraging and movement),
- Warm aspects (SE, S, SW, or W),
- Moderate to steep slopes (40-100%),
- Elevations below 1500m (in the interior ecosystems on the shallow snowpack zones and 1000m on the coastal ecosystems and the moderate to deep snowpack zones),
- Small openings (< .5 ha) in a variable canopy permitting growth of key forage species,
- Multiple canopy layers with an understory of Douglas fir or cedar-hemlock thickets providing additional thermal cover, security cover and food,
- The intense solar radiation provided by small rock outcrops provides foraging areas and thermal sites,
- Minimal shading from adjacent hillsides,
- Older forests (>100 years) with arboreal lichen (*Alectoria, Bryoria* and *Usnea spp.*) which is a key winter food source (Stevenson, 1985), especially when snow depths restrict the availability of other forage species.
- Proportions of crown closure habitat within functional deer winter range (Figure 1) within the Moderate Snowpack Zone:

Crown closure habitat types within functional deer winter range in Low, Moderate and Deep Snowpack Zones (Armleder 1986)					
Crown Closure Habitat	*Crown Closure Percentage*	*Crown Closure Class Code*	*Recommended Proportion (%) of Crown Closures within the Shallow Snowpack Zone (100 cm mean annual snowfall)*	*Recommended Proportion (%) of Crown Closures within the Moderate Snowpack Zone (100 –150 cm mean annual snowfall)*	*Recommended Proportion (%) of Crown Closures within the Deep Snowpack Zone (150-200 cm mean annual snowfall)*
Low	16-35%	2,3	~40	~33	~33
Moderate	36-65%	4,5,6	~40	~33	0
High	>65%	>6	~20	~33	~66

Figure 1: Proportions of crown closure habitat within functional deer winter range



C. Suggested operational guidelines for planning harvesting, planting, stand tending and road building within a Rotation Winter Range

The following guidelines have been divided into two; recommendations when harvesting an area within a rotation winter range that meets Objective 2 and when harvesting a portion of the winter range for the purpose of mitigating or enhancing a portion of the winter range.

Harvesting	
Guidelines to consider when harvesting the unrestricted 20% of the winter range as to Objective 2	*Guidelines to apply when creating winter range attributes through mitigation or enhancement*
• Consider smaller openings as opposed to one large one.	• Maintain the crown closure proportions recommended for the specific snowpack zone
• Consider lower volume selective harvesting.	• Openings should be 0.5 to 1.0 tree height wide (Nyberg and Janz 1990).
• Maintain micro-habitats important to deer (ridges, rock-outcrops and knolls with conifer cover, topographic breaks or edges that show travel use by deer, dense thickets that provide security and thermal cover)	• Maintain a significant component of old-growth trees; cover must be 100m wide to provide cover and gain thermal shelter
	• Maintain micro-habitats important to deer (ridges, rock-outcrops and knolls with conifer cover, topographic breaks or edges that show travel use by deer, dense thickets that provide security and thermal cover)
	• Control debris depths
	• Minimize damage to residuals and regeneration

- If **road building** must occur in or adjacent to a winter range, road layout should be designed to minimize the amount of road required. By reducing the amount of road, avoiding routes through the winter range or along an edge, and by maintaining, where possible a cover buffer along the road edge, harassment pressures to the deer can be reduced.
- **Reforestation (tree species selection) and stand density management** that produce an optimum mix of large crowns for cover and thermal shelter should be considered when preparing a site plan or enhancement plan in a rotation winter range.
- Consulting a professional in wildlife/forest management is recommended when preparing site plan or enhancement plan for a rotation winter range.

2. Moose winter range

A. Definitions

1) Core Moose Winter Range (CMWR): forested habitat, usually stands of mature or old-growth conifers, having very high winter forage values and/or good snow interception properties and are close to good forage values.
2) Moose Winter Range Forage Management Zone (MWRFMZ): Management of the Timber Harvesting Landbase (THLB) outside the Core Moose Winter Range for the production of winter moose forage.

B. Guidance for operating in Moose Winter Range Forage Management Zone

1: Harvesting Operating Guidelines (Interfor 2002)

- Harvesting may utilize a suite of harvesting/silviculture systems including clear cutting, variable retention, selective logging and commercial thinning.
- Special attention is to be paid to including to the retention of larger limbed tree species (specific to individual ecosystems) that provide better snow interception than other species.
- Early harvesting [ie. before culmination age is achieved] is permitted as a technique to put a closed canopy stand back into the high forage value status associated with a recently logged [ie. early seral] vegetative community.
- Commercial thinning can be used to reduce crown closure and stimulate the production of herbaceous forage species. Commercial thinning may be done uniformly across a stand or involve removal of small groups to target a mosaic of mature trees and forage areas on the floodplain in the future.
- Commercial thinning in combination with delayed or extended rotation final harvest may also be considered. Multiple entry commercial thinning may be considered as apart of this strategy.

2: Reforestation Operating Guidelines

- Generally, reforestation strategies, which optimize timber production and forage production are to be used within the THLB portion of the MWRMZ.
- Reforestation prescriptions should include options such as cluster planting or lower density stocking so that crown closure is delayed and forage production is maintained further into the rotation.
- Tree species that provide for better snow interception characteristics should be considered for reforestation.
- Brush control prescriptions should focus only on control of brush that is directly competing with crop trees and should specifically avoid incidental or broadcast brushing of high value forage species such as red-osier dogwood, black cottonwood and willow.

3: Stand Tending Operating Guidelines

- Juvenile spacing may be used to reduce crop tree density and thereby increase light to the forest floor and stimulate forage production.
- Pruning prior to crown closure may be used to increase light penetration and maintain forage production longer into the rotation.
- In stands where stand establishment has been achieved, consider manual brushing to promote sprouting to increase the forage supply.

3. References:

Armleder, H.M., M.J. Waterhouse, R.J. Dawson, and K.E. Iverson. 1998. Mule Deer Response to Low-volume Partial Cutting on Winter Ranges in Central Interior British Columbia. Ministry of Forests, Research Program. B.C.

Green, R.N. and K. Klinka. 1994. A Field Guide to Site Identification and Interpretation for the Vancouver Forest Region. Ministry of Forests, Research Branch, BC.

International Forest Products Ltd (Interfor). 2002. *TFL 38 Moose Winter Range Management Strategy.* June 2002. Squamish,

Nyberg, J.B. and D.W. Janz, technical eds. 1990. *Deer and Elk habitats in coastal forests of southern British Columbia.* Ministry of Forests, Special Report Series 5, Research Branch, Victoria, British Columbia.

Resources Inventory Committee. 1997. *Standardized inventory methodologies for components of British Columbia's biodiversity: Ground based census techniques for selected cervids - Moose, Elk, Mule/Black-tailed Deer, White-tailed Deer and Fallow Deer.* Wildlife Branch, Ministry of Environment, Lands and Parks, Victoria, B.C.

St-Louis, Antoine, Jean-Pierre Ouellet, Michel Crête, Jean Maltais, and Jean Huot. 2000. Effects of partial cutting in winter on white-tailed deer. Can. J. For. Res. **3**0: 655–661 (2000) © 2000 NRC Canada

Appendix C) Wildlife Notice Order

BRITISH COLUMBIA

December 30, 2004

NOTICE – INDICATORS OF THE AMOUNT, DISTRIBUTION AND ATTRIBUTES OF WILDLIFE HABITAT REQUIRED FOR THE SURVIVAL OF SPECIES AT RISK IN THE SQUAMISH FOREST DISTRICT

This Notice is given under the authority of section 7(2) of the *Forest Planning and Practices Regulation* (B.C. Reg. 14/04*)* and 9(3) of the *Woodlot Licence Planning and Practices Regulation* (B.C. Reg. 21/04).

The following Notice includes indicators of the amount, distribution and attributes of wildlife habitat required for the survival of the species at risk outlined in Schedule 1.

Approved Wildlife Habitat Areas are not included in the indicators of amount, distribution and attributes for each of the species outlined in Schedule 1. As per section 7(3) of the *Forest Planning and Practices Regulation*, forest tenure holders are exempt from the obligation to specify a result or strategy in relation to the objective set out in section 7(1) of the *Forest Planning and Practices Regulation*, for approved Wildlife Habitat Areas.

This Notice applies to the Squamish Forest District.

Schedule 1

1) Marbled Murrelet *(Brachyramphus marmoratus)*

Amount:

1. An amount equal to the total amount of currently suitable nesting habitat in the non-contributing landbase. Government policy for determining the amount of suitable nesting habitat is provided in the species account for Marbled Murrelet in the *Accounts and Measures for Managing Identified Wildlife* (Identified Wildlife Management Strategy Version 2004);
2. An amount of suitable Marbled Murrelet nesting habitat within Old Growth Management Areas consistent with the direction from landscape unit planning; and
3. An amount of suitable nesting habitat to a maximum net mature timber harvesting landbase impact of 415 ha.

Distribution:

1. The amount of habitat referenced above must be distributed to provide:
   -areas of suitable nesting habitat of the size and spatial distribution identified in the species account for Marbled Murrelet in the *Accounts and Measures for Managing Identified Wildlife* (Identified Wildlife Management Strategy Version 2004).
2. The areas described above are located within the biogeoclimatic units and preferred elevations identified in the species account for Marbled Murrelet in the *Accounts and Measures for Managing Identified Wildlife* in the Identified Wildlife Management Strategy Version 2004.

Attributes:

Species: Marbled murrelet

Attribute	Characteristics
Size	Maintain a balanced range of patch sizes including a mix of large (>200 ha), medium (50-200 ha) and small (<50 ha) patches within managed forests. The area should include vertical canopy complexity,

Tree Features	Large branches or branches with deformities, and presence of mossy platforms
Tree Species	It is unlikely that Marbled murrelets select particular tree species, however certain species are more likely to provide large horizontal platforms suitable for nesting. This includes yellow cedar, western hemlock, Sitka spruce, Douglas-fir and western red cedar. Less likely species include mountain hemlock and amabilis fir.
Nesting Habitat Features	Suitable nesting habitat includes old seral stage coniferous forests, providing large trees with platforms (limbs or deformities >15cm diameter) with variable canopy structure and small gaps in the canopy. Readily nest on steep slopes but is not essential if forest canopies are non-uniform.
Tree Size	Most nesting trees in BC are >200 yr. Nest trees are typically >40 m tall and nest heights are typically >30 m. Nest limbs range in size from 15-74 cm diameter.
Structural Stage	7: old forest (>250 yr - age class 9, but 8 is acceptable if older forest is not present and the age class 8 provides platform limbs and other nest attributes).
Additional information	Table 3 of the IWMS Version 2004 species account for Marbled Murrelet provides detailed information about the habitat features that are associated with most likely, moderately likely and least likely habitat within each of the Marbled Murrelet Conservation regions.

2) Grizzly Bear *(Ursus arctos)*

Amount:

1. 7280 ha with an impact to the mature timber harvesting landbase of approximately 385 ha.

Distribution:

1. The amount of habitat referenced above must be distributed in the Soo Timber Supply Area to provide:
    - areas of suitable foraging and security habitat of the size and spatial distribution identified in the species account for Grizzly Bear in the *Accounts and Measures for Managing Identified Wildlife* (Identified Wildlife Management Strategy Version 2004).
2. The areas described above are located within the biogeoclimatic units and preferred elevations identified in the species account for Grizzly Bear in the *Accounts and Measures for Managing Identified Wildlife* (Identified Wildlife Management Strategy Version 2004).

Attributes:

Species: Grizzly Bear

Attribute	Characteristics
Size	1-500 ha, depending on the area of use, extent of seasonal habitat and buffer size required.
Critical patch habitats	Critical patch habitats include, estuaries, rich non-forested fens, the edges of forested and non-forested bogs, herb-dominated patches on avalanche chutes with adjacent forest (particularly south-facing ones), herb-dominated subalpine parkland meadows, skunk cabbage swamps, floodplain ecosystems, white bark pine forage areas, and areas where bears fish for spawning salmon. Den cavities and surrounding stands are also considered critical. Non-forested critical habitats include a core area and buffer of forested cover. Forested critical habitats are not buffered.

Denning Habitat Features	Hibernating habitats tend to be high elevation areas that are sloped with dry, stable soil conditions that remain frozen throughout the winter. Dens are typically located on steep north-facing slopes, areas where vegetation will stabilize the den roof and where snow will accumulate for insulation. Dens are rarely re-used but Grizzly bears will often return to the same vicinity to dig new dens.
Foraging Habitat Features	Habitat selection is strongly influenced by meeting nutritional requirements, access to mates, thermal cover (i.e., dens), social interactions and the presence and activities of people. Habitat requirement vary greatly as some bears are more transient while others are more resident. Both residents and transients select patches or complexes of habitats within landscapes.
Structural Stage	Generally, foraging is more abundant in non-forested sites, sites with partial forest or sites with many tree gaps in older forest. Closed forest sites near quality habitat may be used for security and day bedding areas. Many or all structural stages can be used seasonally or for specific needs and as such, forage type is not necessarily tied to one particular structural stage.
Elevation	All elevations from sea level estuaries to high alpine meadows and talus slopes.

3) Coastal Tailed Frog *(Ascaphus truei)*

Amount:

1. 40 ha not exceeding an impact to the mature timber harvesting landbase of 25 ha.

Distribution:

1. The amount of habitat referenced above must be distributed to provide:
   - areas of suitable habitat of the size and spatial distribution identified in the species account for Coastal Tailed Frog in the *Accounts and Measures for Managing Identified Wildlife* (Identified Wildlife Management Strategy Version 2004).
2. The areas described above are located within occupied streams in the biogeoclimatic units and preferred elevations identified in the species account for Coastal Tailed Frog in the *Accounts and Measures for Managing Identified Wildlife* in the Identified Wildlife Management Strategy Version 2004.

Attributes:

Species: Coastal Tailed Frog

Attribute	Characteristics
Size	Approximately 20 ha (depending on number and length of suitable stream reaches). Larger areas may be appropriate in watersheds with unstable terrain (class 4-5). Areas should include at least two streams or stream reaches (i.e., S4 to S6) with previous detections of tailed frogs. The area should include a 30 m core area buffered by a 20m management zone on both sides of occupied stream reaches.

Habitat Attributes	Tailed frog aquatic habitats are generally characterised by year round flow, non fish bearing (S4-S6), intermediate gradient (>2.5%), coarse substrates (>6.4 cm), stable channel beds and forest cover (generally associated with structural stage S6 or S7). Retain 100% of forest cover within the core area. Within the management zone maintain 70% basal area with appropriate structure to maintain riparian forest, important structural elements (e.g., coarse wood debris,) water quality and temperature (5 to 18 degrees), and naturally dispersed water flows.
Elevation	From sea level to 2140 m.

4) Spotted Owl *(Strix occidentalis)*

Amount:
An amount of area consistent with the area contained within Special Resource Management Zone and Matrix Activity Centre boundaries in the Squamish Forest District as identified in the 1997 *Spotted Owl Management Plan* (see appendix

Distribution:
The amount referenced above must be distributed consistent with Special Resource Management Zones and Matrix Activity Centres boundaries in the Squamish Forest District as identified in the 1997 *Spotted Owl Management Plan.*

Attributes:
Attributes consistent with those identified for Long Term Activity Centres (LTACs) in the 1999 *Spotted Owl Management Plan – Resource Management Plans* and attributes consistent with those identified for Matrix Activity Centres in the 1997 *Spotted Owl Management Plan* for the Squamish Forest District.

Appendix D) Established Wildlife Habitat Areas

BRITISH COLUMBIA
The Best Place on Earth

ORDER – Wildlife Habitat Areas
2-272 to 2-297, 2-381 to 2-386, 2-388, 2-390 to 2-406, 2-436 to 2-443
Grizzly Bear – Squamish Forest District

This order is given under the authority of sections 9(2) and 10(1) of the *Government Actions Regulation* (B.C. Reg. 582/2004) (GAR).

1. The Deputy Minister of Environment, being satisfied that
   i. the following area contains habitat that is necessary to meet the habitat requirements for Grizzly Bear (*Ursus arctos*);

   orders that
   a) the areas shown in the map set out in the attached Schedule A (2-272 to 2-297, 2-381 to 2-386, 2-388, 2-390 to 2-406, 2-436 to 2-443) and contained in the wildlife habitat area (WHA) spatial layer stored in the Geographic Warehouse (*twha_bc)* are established as wildlife habitat areas 2-272 to 2-297, 2-381 to 2-386, 2-388, 2-390 to 2-406, 2-436 to 2-443 for Grizzly Bear. The centre point of the line on the attached Schedule A is what establishes the WHA boundary;
   b) if there is a discrepancy between the areas shown in the map set out in the attached Schedule As and the WHA spatial layer stored in the Geographic Warehouse (*twha_bc*), the areas as detailed in the WHA spatial layer will take precedent; and
   c) pursuant to section 7(3) of the *Forest Planning and Practices Regulation* the person(s) required to prepare a forest stewardship plan are hereby exempted from the obligation to prepare results or strategies in relation to the objective set out in section 7(1) of the *Forest Planning and Practices Regulation* for Coastal Tailed Frog in the Squamish Forest District.

2. The Deputy Minister of Environment, being satisfied that
   i. the general wildlife measures (GWMs) described below are necessary to protect or conserve the habitat of Grizzly Bear ; and
   ii. GAR or another enactment does not otherwise provide for that protection or conservation;

   orders that
   a) the GWMs outlined in Schedule 1 are established for WHAs 2-272 to 2-297, 2-381 to 2-386, 2-388, 2-390 to 2-406, 2-436 to 2-443.

Definitions

Words and expressions not defined in this order have the meaning given to them in the *Forest and Range Practices Act* (FRPA) and the regulations made under it, unless context indicates otherwise.

incursion means timber harvesting or road construction that is located within a wildlife habitat area boundary where no harvesting or road building is otherwise permitted to occur.

productive forest area means forest included as either contributing, partial contributing and non-contributing as per Timber Supply Review 2 planning

regional manager means the Ministry of Environment Regional Manager Environmental Stewardship, South Coast

traditional and cultural activities is as defined in the *Free Use Permit Regulation.*

Schedule 1 – General Wildlife Measures:

Access, harvesting and silviculture

1. Do not harvest timber or construct roads in the WHA.

2. Provided the Regional Manager is notified prior to the commencement of activities, GWM 1 does not apply if:
   a) future road reconstruction is required through WHA 2-438, 2-439 or 2-440 to access timber beyond the WHA; or
   b) future road reconstruction or relocation of the Lillooet South FSR is required through WHA 2-399 or 2-400, as a result of flooding, debris torrent or similar natural event, associated with the Lillooet River.

3. GWM 1 does not apply if:
   a) timber harvesting within the WHA is necessary to create guyline tiebacks for timber harvesting provided trees that fall within the WHA boundary are retained on site to function as coarse woody debris;
   b) cutting of trees is for the purposes of traditional and cultural activities, as authorized under a Free Use Permit;
   c) timber harvesting occurs in Block 18-6 within WHA 2-382, with an area not to exceed that shown on the field map dated May 1, 2009; or
   d) timber harvesting and temporary road construction occurs in Block 156 in WHA 2-397, with an area of overlap not to exceed that shown on the map dated August 9, 2010.

4. Where timber harvesting or road construction are planned immediately adjacent to any WHA with >30 ha productive forest area, GWM 1 or GWM 3 do not apply to the area of an incursion along the WHA boundary if:

    a) the incursion is required to provide for a logical harvesting boundary or a logical road or trail location that utilizes a physical feature or administrative boundary;

    b) the area of the incursion, or multiple incursions cumulatively, do not exceed:

        i. 1 ha of productive forest area in WHAs with >30 ha and ≤50 ha productive forest area; or

        ii. 2 ha of productive forest area in WHAs with >50 ha to ≤100 ha productive forest area; or

        iii. 3 ha or 1% of productive forest area, whichever is greater, in WHAs with >100 ha productive forest area;

    c) the incursion exceeds 0.5 ha, and the area of the incursion is replaced with an equivalent or greater area of equal or better habitat contiguous to the WHA such that there is no net loss; and the incursion does not affect the intent or integrity of the WHA; and

    d) the incursion as per GWM 4 a) or b), and any replacement habitat as per GWM 4 c) are provided to the Regional Manager (via ESRI shapefiles) prior to the commencement of primary forest activities associated with the incursion.

Pesticides

5. Do not use pesticides in the WHA, except for:

    a) the use of *Bacillus thuringiensis* var *kurstaki* for the control of western spruce budworm;

    b) the use of beetle pheromones for the control of bark beetles; and

    c) the application of herbicides to control invasive plants or noxious weeds.

Recreation

6. Wherever practicable, do not develop recreational structures, trails, or facilities.

Signed this 25 day of August 2010
Doug Konkin, Deputy Minister
Ministry of Environment

Appendix 1:

The following information is provided by the Ministry of Environment as background information and support to the order establishing WHAs 2-272 to 2-297; 2-381 to 2-386; 2-388 to 2-406; 2-436 to 2-443. This appendix is not part of the order.

1. **Activities to which the order does not apply:** Section 2(2) of the *Government Actions Regulation* states

   An order under any of sections 5 to 15 does not apply in respect of

   (a) any of the following entered into before the order takes effect:

   (i) a cutting permit;

   (ii) a road permit;

   (iii) a timber sale licence that does not provide for cutting permits;

   (iv) a forestry licence to cut issued by a timber sales manager under section 47.6 (3) of the *Forest Act*;

   (v) subject to subsection (3), a minor tenure,

   (b) a declared area,

   (c) areas described in section 196 (1) of the Act, and

   (d) areas referred to in section 110 of the *Forest Planning and Practices Regulation* (FPPR).

2. Authority to consider an exemption from these GWMs is provided in section 92(1) of the FPPR, and section 79(1) of the *Woodlot License Planning and Practices Regulation.* An exemption may be provided if the Minister's delegate is satisfied that the intent of the GWM will be achieved or that compliance with the provision is not practicable, given the circumstances or conditions applicable to a particular area.

   An exemption application should be submitted to the Minister's delegate (Regional Manager for the region in which the order applies) with a rationale describing the nature of the problem and options to integrate WHA conservation with proposed forest and/or range practices. This submission will assist in timely consideration of the matter, and will inform the conditions, if any, of the exemption that may be granted prior to commencement of activities. Upon receipt of a complete exemption application, a determination will normally be made within 14 calendar days of arrival. Incomplete packages will be returned to the proponent for re-submission. A template for exemption requests is available at: http://www.env.gov.bc.ca/wld/frpa/index.html

3. For GWM 1, exemptions would only normally be considered to restore or enhance degraded habitat, as determined by the Regional Manager, or for roads or trails where there are no other practicable options.

4. GWM 1 does not apply to road maintenance, road deactivation or brushing within the right-of-way on existing roads or trails in the WHA, provided these activities are carried out in a manner that will not affect the intent or integrity of the WHA.

5. For GWM 2 the intent of clause (b) is to allow reconstruction or relocation of the Lillooet South FSR (through 2-399 or 2-400) if future flooding or debris torrent (or similar event) on the Lillooet River result in the river channel migrating towards the Lillooet South FSR making such a relocation necessary. The Regional Manager should be provided with reconstruction/relocation engineering plans prior to the commencement of work.

6. For GWM 3 (d) the temporary road to access Block 156 should be deactivated to a non-driveable state as soon as possible after completion of harvesting and planting. This will minimize disturbance to grizzly bears while foraging in this WHA.

7. The intent of GWM 4 is to facilitate pre-authorized boundary exemptions for those WHAs with >30 ha productive forest area provided that MOE is notified prior to the incursion taking place. Examples of incursions include a cut-block, road, trail or landing that overlaps a WHA boundary and: a) that the intent of the WHA boundary was to follow a creek/road and in some areas the boundary extends slightly beyond the creek/road due to a GIS mapping error and creates the overlap; or b) unintentional overlap occurs with an engineered primary forest activity that becomes evident when comparing map scales (e.g. 1:20000 vs 1:5000 often at final design stage); or c) *Forest Act* agreement holders can demonstrate that the block, road, trail or landing are located in a logical location and the incursion does not exceed the amount allowed.

   In almost all instances the amount of incursion is anticipated to affect a small area. No replacement area is required when the discrepancy is: a) caused by GIS boundary mapping error since the intent of the WHA has not been altered; or b) the cumulative overlap is <0.5 ha. In other situations, the intended result is that where a boundary amendment is suggested by a *Forest Act* agreement holder and when the reduction is measurable (≥0.5 and ≤3 ha or <1% measured cumulatively in any WHA), it will result in no net loss to habitat in the WHA. Delineation of equal or better grizzly bear habitat, in quantity and quality, will be required contiguous to the WHA. Any biological assessment to replace habitat should be conducted by a qualified professional with appropriate training and experience for the work being completed. If replacement habitat is required and equal or better habitat is not available contiguous to the WHA in question then the incursion cannot proceed under this GWM.

   Boundary amendments meeting the conditions identified in GWM 4 will be periodically reviewed by MoE and the WHA boundary officially amended under the *Government Actions Regulation*. In any instances where the conditions in GWM 4 cannot be met, proposed primary forest activities will require an exemption as outlined under section 2 in this Appendix.

   WHAs with <30 ha of productive forest area (i.e. WHA 2-273, 2-276, 2-277, 2-281, 2-282, 2-284, 2-285, 2-286, 2-287, 2-289, 2-290, 2-292, 2-293, 2-294, 2-296, 2-390, 2-392, 2-395, 2-406, 2-437), are excluded from GWM 4 (b)(i) because of potential adverse impacts to the small amount of security cover from an incursion. An exemption request for any incursions in these WHAs should be submitted to the Regional Manager, as

outlined under section 2 in this Appendix.

In addition to reporting incursions to the Regional Manager prior to commencement of timber harvesting or road construction as per GWM 4 (d), it is the proponent's responsibility to keep accurate records of each occurrence. Records must also be made available to a MoE or Ministry of Forests and Range official upon request.

8. Where roads in the WHA are temporary and no longer required, they should be permanently deactivated. Proponents must notify the Regional Manager when deactivation of temporary roads is complete.

9. When reforesting areas within the WHA reduced stocking standards should be used as outlined in the document titled: *Grizzly Bear Habitat in Managed Forests - Silviculture Treatments to Meet Habitat and Timber Objectives.*

10. These GWMs do not apply to persons who must comply with the *Worker's Compensation Act* and the regulations under that Act (e.g. danger tree felling).

Appendix E) Landscape Unit – Objectives Soo

File: ORCS 17580-30/Soo

ORDER TO ESTABLISH A LANDSCAPE UNIT AND OBJECTIVES

SOO LANDSCAPE UNIT

Pursuant to Section 4 of the *Forest Practices Code of British Columbia Act*, I hereby establish the Soo Landscape Unit, an area located west of Pemberton, BC in the Squamish Forest District, effective September 6, 2004.

The boundaries of the Soo Landscape Unit are shown on the Soo Landscape Unit map, dated July 30, 2004, attached to this Order.

In addition, I hereby establish objectives for the Soo Landscape Unit, as attached to this Order, effective September 6, 2004.

(Original signed by) August 13, 2004

Regional Director, Coast Region, Date Ministry of Sustainable Resource Management

Preamble

The goal of these objectives is to sustain biological diversity at the landscape level; permissible activities are described to streamline administrative procedures and address operational safety concerns.

First Nations traditional use of forest resources, treaty negotiations or settlements will not be limited by the following objectives.

Legal Objectives - Soo Landscape Unit

Pursuant to Section 4 of the *Forest Practices Code of British Columbia Act*, the following are landscape unit objectives for the Soo Landscape Unit.

Objective 1

1. Maintain or recruit old growth forests in established old growth management areas (OGMAs), as shown on the attached Soo Landscape Unit map dated July 30, 2004 subject to timber harvesting and road construction in accordance with section 2, 3 and 4 below.

2. (1) Where sufficient suitable replacement forest is available in the variants listed below, timber harvesting or road construction may be undertaken in OGMAs that are >10 ha in size for operational reasons up to a cumulative maximum of:

i) 35 ha in variant CWHms1, and
ii) 35 ha in variant MHmm2,
provided that replacement OGMA of equivalent or better quality and quantity is identified in order of priority, 1) immediately adjacent to the existing OGMA, or 2) in the same variant and landscape unit as the existing OGMA.

(2)The criteria in 2 (1) is to apply to individual OGMAs within the categories below and must ensure that OGMA ecological attributes and spatial distribution are maintained or improved:
i) OGMAs >10 ha to <50 ha in size where the proposed activity affects the OGMA by <5 ha,
ii) OGMAs ≥50 ha to <100 ha in size where the proposed activity affects the OGMA by <10ha,
iii) OGMAs ≥100 ha in size where the proposed activity affects the OGMA by <10%.
iv) Construction of ≤500m of road or a bridge within an OGMA where there is no other practicable option. As an alternative to finding replacement area, the licensee may permanently deactivate and rehabilitate a temporary road or bridge site within four years after construction.

(3) Where OGMA boundary adjustments and replacement areas are required under section 2 (1) and (2) they must be documented, mapped and submitted to the satisfaction of the Delegated Decision Maker (DDM) at the end of each calendar year for his/her approval.
(4) The provisions in section 2 (1) and (2) do not apply to the following OGMAs #1, 7, 8, 11, 16, 18, 46, 104.

3. Permissible Activities:

(1) Timber harvest may occur to prevent the spread of insect infestations or diseases that pose a significant threat to forested areas outside of OGMAs. Salvage within OGMAs will be done in a manner that retains as many old growth forest attributes as possible.

(2) Construction of rock quarries and gravel pits under authority of forest tenure where the development will be located immediately adjacent to existing roads under tenure and will affect the OGMA by <0.5 ha.
(3) Intrusions, other than those specified, that affect an OGMA by less than 0.5 hectare in total.
(4) Where OGMA replacement forest is required as a result of activities under 3 (1) or (2), it must be of equivalent or better quality and quantity and be identified in order of priority, 1) immediately adjacent to the existing OGMA, or 2) in the same variant and landscape unit as the existing OGMA; such that OGMA ecological attributes and spatial distribution are maintained or improved. OGMA replacement areas must be documented, mapped and submitted to the satisfaction of the DDM at the end of each calendar year for his/her approval.

4. Permissible Activities for Safety Purposes:
(1) Maintenance, deactivation, removal of danger trees, or brushing and clearing on existing roads under active tenure within the right-of-way for safety purposes.
(2) Felling of guyline clearance, tailhold anchor trees, or danger trees (except high value wildlife trees) along cutblock boundaries or within the right of way on new road/bridge alignments to meet safety requirements.

19/08/2004

Objective 2
Maintain stand level structural diversity by retaining wildlife tree patches (WTP). Cutblocks for which harvesting has been completed by each licensee by tenure will retain adequate amounts of wildlife tree patches to ensure that over each 3 year period, commencing on the date the objectives are established, the target percentage as noted in Table A is achieved. In addition:

(1) WTPs must be well distributed across the BEC subzone and located within or immediately adjacent to a cutblock.
(2) Each cutblock >10 ha in size must have a minimum of 2% wildlife tree retention.
(3) No timber harvesting, including single tree selection, is to occur within WTPs for at least one rotation, except as noted in (4) below.
(4) Salvage of windthrown timber and harvesting of remaining standing stems is only permitted within WTPs where catastrophic windthrow exceeds 50% of the dominant or co-dominant stems; or where forest health issues pose a significant threat to areas outside the WTP. Where salvage/harvesting is planned and authorized, replacement WTP of equivalent or better quality and quantity must be identified immediately to achieve the retention target.
(5) WTPs must include, if present, remnant old growth patches and live or dead veteran trees (excluding danger trees).
(6) WTPs must include representative larger trees for the stand and any moderate to high value wildlife trees (excluding danger trees).
(7) Where differences exist between mapped and actual BEC subzones, subzones will be confirmed by site plan information.

Table A. Wildlife Tree Retention by BEC subzone in the Soo Landscape Unit.

BEC Subzone	% Wildlife Tree Retention
CWH ds (Coastal Western Hemlock, dry submaritime)	**8**
CWH ms (Coastal Western Hemlock, moist submaritime)	**7**
MH mm (Mountain Hemlock, moist maritime)	**3**

19/08/2004

Appendix F) Guide to Rare Forested Ecosystems for CCF K3V

Pink are CDC RedListed if OLD FOREST; Blue are CDC BlueListed if OLD FOREST - Green denotes Forest Site Units (series)
Rare Forested Ecosystems are those with <2% occurrence in the 3 existing Landscape Units
Site Series descriptors are based upon the ***Terrestrial Ecosystem Mapping: Whistler Landscape Unit*** *March 31st 2010.*

CWHms1 Code/SS	Area	% Occurrence	Forest Ecosy.
AM 01	20176.98	45.205%	Y
DF 03	7253.83	16.252%	Y
AD 06	3408.37	7.636%	Y
DK 02	2535.80	5.681%	Y
AO 04	1889.25	4.233%	Y
TA 00	1688.73	3.783%	N
AH 00	1144.14	2.563%	N
LA 00	997.91	2.236%	N
UR 00	854.60	1.915%	N
RC 11	548.62	1.229%	Y
RO 00	429.23	0.962%	N
GB 00	350.76	0.786%	N
OS 00	334.17	0.749%	N
NTA	294.33	0.659%	N
SS 07	281.05	0.630%	Y
PL 00	274.27	0.614%	N
HQ 05	251.81	0.564%	Y
RI 00	234.58	0.526%	N
CD 08	216.88	0.486%	Y
SK 00	206.02	0.462%	N
FE 00	186.03	0.417%	N
GC 00	161.25	0.361%	N
LU 00	132.41	0.297%	N
RZ 00	129.81	0.291%	N
GP 00	76.11	0.171%	N
ES 00	70.37	0.158%	N
PD 00	68.58	0.154%	N
CW 09	66.23	0.148%	Y
AA 00	63.31	0.142%	N
OW 00	51.56	0.116%	N
LS 10	43.98	0.099%	Y
GT 00	35.24	0.079%	N
EX 00	32.79	0.073%	N
RU 00	31.17	0.070%	N
LO 00	29.34	0.066%	N
OF 00	28.32	0.063%	N
BU 00	27.70	0.062%	N
RN 00	19.61	0.044%	N
AS 00	5.50	0.012%	N
RS 00	1.71	0.004%	N
CB 00	1.06	0.002%	N
SU 00	0.83	0.002%	N
Total	**44634.25**	100.000%	

MHmm2 Code/SS	Area	% Occurrence	Forest Ecosy.
MB 01	18809.58	46.664%	Y
MT 05	3757.63	9.322%	Y
MM 02	3714.62	9.215%	Y
AH 00	2090.40	5.186%	N
TA 00	1812.19	4.496%	N
YH 07	1395.39	3.462%	Y
RO 00	1018.39	2.526%	N
YB 00	881.87	2.188%	Y
AA 00	880.58	2.185%	N
FR 00	836.36	2.075%	Y
AS 00	781.00	1.938%	N
FH 00	537.46	1.333%	N
YC 09	488.25	1.211%	Y
MO 00	452.59	1.123%	N
SK 00	443.49	1.100%	N
MR 00	418.76	1.039%	N
AB 04	268.05	0.665%	Y
FE 00	247.40	0.614%	N
BV 00	170.81	0.424%	N
MD 06	168.30	0.418%	Y
AM 00	156.43	0.388%	N
RU 00	152.76	0.379%	N
BA 00	114.65	0.284%	N
SM 00	106.64	0.265%	N
YS 08	105.71	0.262%	Y
LA 00	83.96	0.208%	N
GB 00	66.64	0.165%	N
PD 00	62.00	0.154%	N
RI 00	57.57	0.143%	N
AK 00	54.51	0.135%	N
WP 00	38.75	0.096%	N
ES 00	38.06	0.094%	N
OS 00	36.41	0.090%	N
MN 00	30.07	0.075%	N
OW 00	13.31	0.033%	N
MP 00	8.55	0.021%	N
LU 00	5.36	0.013%	N
RZ 00	3.22	0.008%	N
CL 00	0.87	0.002%	N
Total	**40308.60**	100.000%	

(source Bob Green, M.Sc., R.P.F., R.P.Bio. April 12, 2010 by Landscape Units Soo, Callaghan, Whistler)

Appendix G) Invasive and Alien Plant Species List for CCF_K3V

GVIPC "s Invasive Non-Native Plant Species of Concern	
Hedera helix (English ivy)	
Rubus armeniacus/discolour/procerus (invasive blackberry spp.)	*
Cytisus scoparius (Scotch broom)	
Heracleum mantegazzianum (Giant hogweed)	*
Lythrum salicaria (Purple loosestrife)	
Polygonum spp. (Japanese knotweed)	
Ilex aquifolium (English or European holly)	*
Phalaris arundinacea (Reed canary grass)	
Impatiens glandulifera (Policeman's helmet)	
Circium arvense var. horridum (Canada thistle)	*
Vinca minor (Vinca; Common periwinkle)	*
Lamium maculatum (Lamium; Dead or spotted nettle)	
Convolvulus arvensis (Field bindweed; morning glory)	*
Tanacetun vulgare (Common tansy)	
Iris pseudacorus (Yellow flag iris)	
Crataegus monogyna (English hawthorn)	
Daphne laureola (Daphne)	
Lonicera taterica (Honeysuckle)	
Prunus laurocerasus (English laurel)	
Ranunculus repens (Creeping buttercup)	
Humulus spp. (Common hops; European hops)	
Celastrus orbiculatus (American bittersweet)	

***** Known species have been verified as having a presence within the planning area.

Appendix H) Whistler Interpretive Forest Legal Objective for CCF_K3V

Order to Establish Objectives
for the Whistler Interpretive Forest
in the Squamish Forest District

Notice is hereby given that, pursuant to Section 6(3) of the *Forest Practices Code of British Columbia Act*, objectives for the following Ministry of Forest's interpretive forest site are to be established effective *November 20,1999*:

Whistler Interpretive Forest Site, Project 16660-20-6264

The objective of the Whistler Interpretive Forest Site is *to provide forest interpretation and education opportunities*, while demonstrating integrated resource management. Forest resources, including public recreation, fish, wildlife, timber, forage, water, soil and landscape aesthetics will be managed using a comprehensive planning process. Ecosystem biodiversity will be managed at the landscape level with particular attention given to the conservation of riparian and meadow areas. Forest recreation will be managed for non-motorized and rural recreation experiences. Seasonal two wheel drive access, on designated roads, will be permitted. Opportunities for a wide variety of recreational activities will be available. Roads and day use facilities will be maintained. Forest stands will be managed for harvesting, utilizing various silvicultural systems. Forest interpretation activites and education on local ecosystems and forest practices will be provided through brochures, self guided interpretive trails and signage.

Dated November 25, 1999

Paul Kuster
District Manager, Squamish Forest District

MANAGING SPOTTED OWL HABITAT

Operational Guidelines Component of the Spotted Owl Management Plan

July 1997

Prepared by:

Spotted Owl Management Inter-agency Team

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No project like this comes to completion without exacting a toll on the participants' personal support group of families and friends. We appreciate the indulgence of those closest to us, who have put up with our frequent physical and mental absences during the preparation of this document.

Prepared by:

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Introduction

Within the context of a higher level plan under the Forest Practices Code, the Spotted Owl Management Plan was developed with the goal of "achieving a reasonable level of probability that owl populations will stabilize and possibly improve over the long term without significant short- and long-term impacts on timber supply and forestry employment."

The plan relies on a total land area of about 363 000 hectares of protected areas and Special Resource Management Zones (SRMZs) distributed throughout the Chilliwack and Squamish Forest Districts (Figure 1). Of this total, approximately 204 000 hectares of Crown forest land (including GVWD watersheds) are designated as SRMZs under the higher level plan. The long-term stabilization, and possible improvement, of the spotted owl population is dependent upon maintaining sufficient levels of suitable owl habitat within these areas. Forest practices within SRMZs will be oriented towards creating, enhancing or maintaining a sufficient quantity and quality of suitable owl habitat.

The plan is supported by two components. The strategic plan component describes the objectives and policies for spotted owl management in the province under the *Forest Practices Code of British Columbia Act* and provides the link between the higher level plan and forest management within spotted owl areas. The strategic plan component identifies how and where spotted owls will be managed, provides an assessment of population stabilization and timber supply impacts, and provides an implementation strategy. The second component, the operational guidelines component, provides an interpretation of the strategic plan component objectives and provides specific guidelines to achieve these objectives at the landscape and stand level within SRMZs. The primary goal within SRMZs is to integrate spotted owl management and forest management objectives with consideration for social and economic opportunities.

This document provides direction to resource managers for establishing long-term resource management plans for each SRMZ, silviculture guidelines for accelerating the development of suitable owl habitat, and timber harvesting guidelines for maintenance or enhancement of suitable owl habitat within the SRMZs.

Adaptive Management

Many recommendations within this document are based on spotted owl habitat research conducted in Washington State or are based on the best professional judgement. Over time, it is anticipated that these recommendations will change as new information becomes available. The goal of this adaptive process is to improve the protection of spotted owls while improving the methods and efficiencies of forest management within spotted owl areas. As part of this plan, a Spotted Owl Research and Inventory Advisory Committee will provide direction for research and inventories to verify the objectives and guidelines presented within this document. This committee will then provide advice on changes to operational procedures to the Spotted Owl Management Inter-agency Team (SOMIT) for consideration.

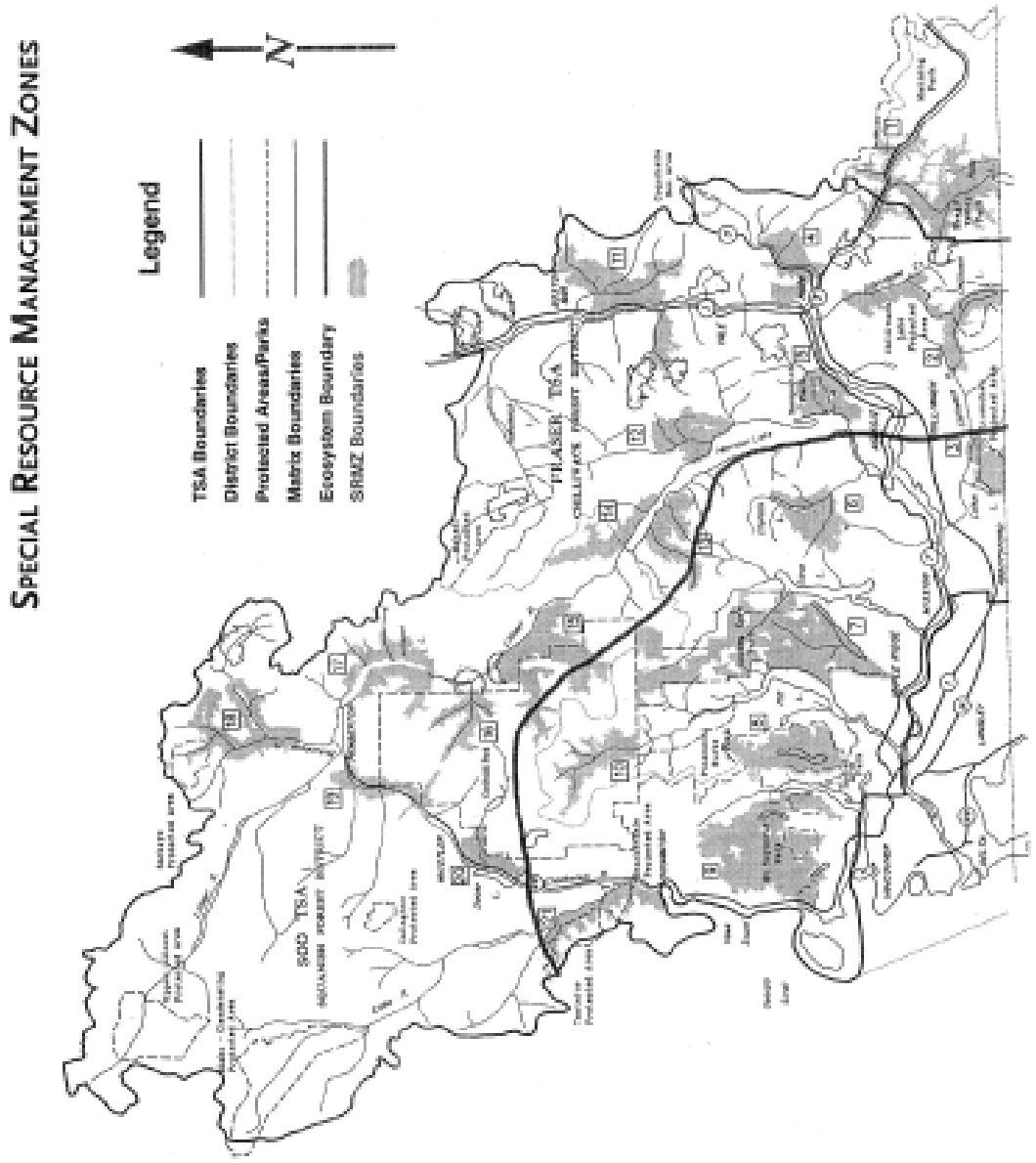


Figure 1. *Areas of spotted owl management within the Chilliwack and Squamish forest districts.*

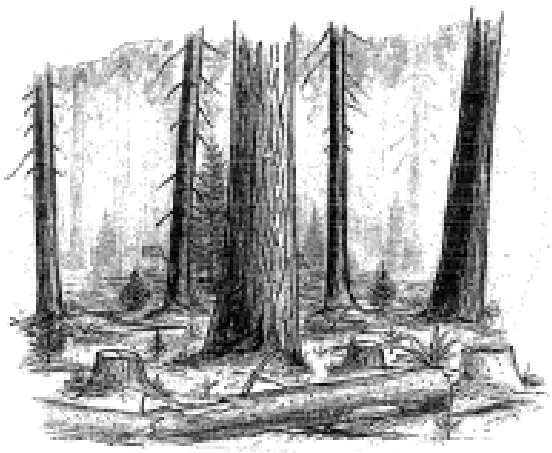
Resource Management Plans

Higher level plans established under the *Forest Practices Code of British Columbia Act* enable management objectives to be established for unique resource requirements in specific areas. The management of spotted owl habitat will be accomplished within the context of higher level plan objectives for SRMZs and by establishing resource management plans (RMP) which provide the overall goals and objectives that direct development at the operational level. Resource management plans must consider the objectives of other higher level plans such as land and resource management plans and landscape unit plans (Figure 2).

A RMP is required to outline how the management objectives of the Spotted Owl Management Plan will be integrated within each SRMZ over a long-term planning horizon of one or more forest rotations. This integration will be achieved by maintaining a minimum 67% of the gross forested land as suitable owl habitat in each activity centre within SRMZs to ensure that owl populations stabilize and possibly improve over the long term. As well, it will provide opportunities for silvicultural and harvesting systems to create, enhance and maintain owl habitat. Each RMP will identify landscape and stand level management strategies to manage suitable owl habitat and to provide forestry, economic and employment opportunities.

A RMP must be completed and approved by the district manager and designated environment official prior to long-term operations occurring within SRMZs (excluding Cheakamus and Wedge/Green SRMZs). A transition period of two years will be given for resource managers to develop each RMP. During this period, a transition strategy, which follows the intent of the Spotted Owl Management Plan, will be implemented to direct all forest development in SRMZs.

Table 1 summarizes the planning steps for the development of RMPs.



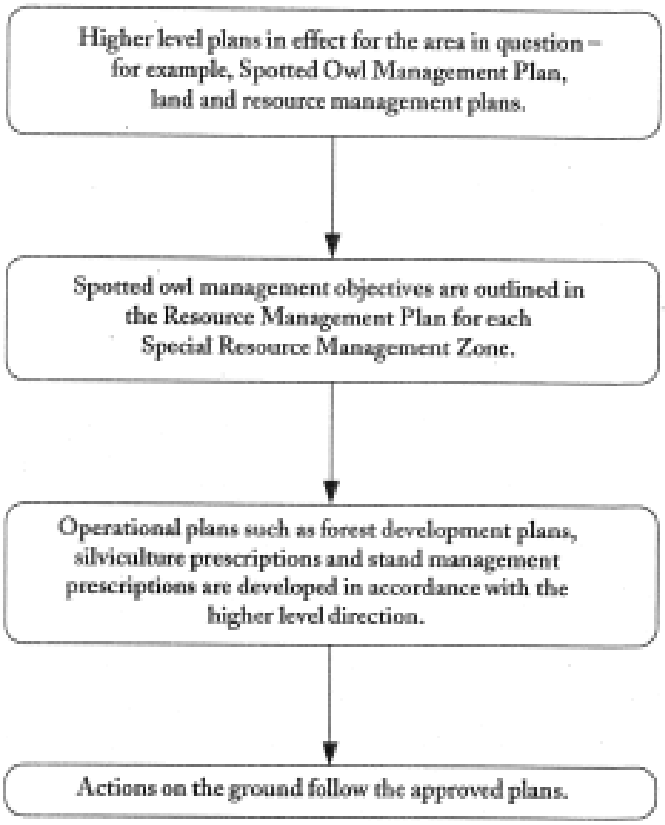


Figure 2. *The hierarchy of planning as it relates to spotted owl management in BC.*

Table 1. *Summary of resource management plan requirements and responsibilities*

	Resource management plan requirement	Responsibility
Step I: Spotted Owl Inventory	• Owl inventories to identify critical owl habitats • In the RMP, include a detailed owl inventory plan to monitor resident owls	MELP
Step II: Long-term Activity Centre Establishment	• Each long-term activity centre should average about 3200 ha to reflect the median annual home range size of a breeding spotted owl pair	MELP, MoF, and licensees
Step III: Forest Stand Inventory	• Habitat inventories are required to assess the amount of Type A and B suitable habitat • Determine what forest practices may occur and/or are needed to promote the development of suitable owl habitat	Licensee and MELP
Step IV: Identify the Initial 67% Owl Habitat Area	Ideally, each long-term activity centre should maintain: • a minimum target of 50% of the gross forested land within activity centres as Type A owl habitat • large patches greater than 500 ha of suitable owl habitat to minimize the effects of forest fragmentation • corridors of suitable habitat greater than 1 km wide to provide interior forest conditions for owl movement between large patches • a minimum 500 m radius reserve zone around known nest sites and critical roost sites The 67% owl habitat area should consider: • inoperable forests • visual quality objectives (VQO) • low productive sites • environmentally sensitive areas 1 • Forest Practices Code requirements • other Red-/Blue-listed species habitat requirements • other regionally important wildlife habitat requirements	MELP, MoF and licensees
Step V: Identify Harvesting and Silviculture Priorities	1. Prioritize salvage of catastrophic damage 2. Clearcut or clearcut with reserves is permitted if the remaining stands will provide 67% suitable habitat 3. Partial harvest of 80- to 100-year-old stands to accelerate the development of suitable owl habitat characteristics 4. Commercial thin immature stands (30 to 80 years old) to promote owl habitat characteristics 5. Partial harvest suitable owl habitat (100 years and older) to enhance owl habitat characteristics	Licensees
Step VI: Detailed Resource Management Plan	• Joint approval by the Ministry of Forests district manager and a Ministry of Environment, Lands and Parks designated environment official	MELP, MoF and licensees
Step VII: Adaptability of Resource Management Plans	• Make changes as needed to the RMP in response to new information, natural disturbances and other unforeseen factors that may influence the success or failure of the plan	MELP, MoF and licensees
Step VIII: Monitoring and Review	• Annually with FDP submission • Every five years, re-submission for approval	MELP, MoF and licensees

Step I: Spotted Owl Inventory Requirements

Spotted owl inventories should be completed for each SRMZ to identify critical nesting and roosting habitats to prevent the displacement or loss of owls from the current population in the SRMZ. This information will identify critical habitats within the 67% habitat target, which is important for planning silviculture and harvesting activities. Currently, spotted owl inventories are conducted by the Ministry of Environment, Lands and Parks and follows the Ministry of Environment, Lands and Parks' Spotted Owl Inventory Protocol. Inventory information will be made available to assist in the development of RMPs.

Critical habitats will change over time due to habitat modifications or spotted owls dying or vacating their territories and new owls occupying vacant territories. Therefore, as part of the RMP, a detailed owl inventory plan should be developed to monitor resident owls and to confirm the location of critical nesting habitat prior to forest development. The inventory plan will also help monitor the owl population to ensure that the population stabilizes and the management plan is achieving its goals.

Step II: Long-term Activity Centre Establishment

All long-term activity centres must be identified and established within each SRMZ prior to forest development. These activity centres may not be currently occupied by owls, but will be managed for owls over the long term. Each long-term activity centre should average about 3200 hectares to reflect the size of the median annual home range of a breeding spotted owl pair. To the greatest extent possible, each activity centre should be circular in shape to minimize the amount of edge. Ideally, these long-term activity centres should be based around currently known nesting or roosting sites. However, due to the size and structure of the SRMZ, long-term activity centres established in the RMP will likely be more evenly distributed, edge to edge, throughout the SRMZs. This may result in a currently known activity centre overlapping two or more of these long-term activity centres. If this occurs, the RMP must address and manage the currently known activity centre, and gradually phase it out over time as the overlapping long-term activity centres achieve sufficient suitable owl habitat.

Step III: Forest Stand Inventory Requirements

Habitat inventories within SRMZs are required in order to determine the amount of Type A and B suitable habitat (see Table 2 for a definition). This will determine what forest practices may occur and/or are needed to promote the development of suitable owl habitat. Until information is collected on spotted owl habitat attributes, it is recommended that current information gathered from timber cruises, silviculture prescriptions, forest cover maps or other available data be

Table 2. *Suitable owl habitat*

Spotted owls require habitat with specific forest stand attributes to provide for foraging, roosting, dispersal and nesting. The quality of habitats used by owls is variable and can be graded from superior to poor, and likely varies from ecosystem to ecosystem, and site to site. This document defines the quality of suitable owl habitat as either Type A (superior quality) or Type B (moderate quality) based on quantitative stand characteristics. Variation in habitat structure exists between coastal and interior forest types. The use of "suitable owl habitat" or "suitable habitat" in this document will include both Type A and B habitats.

Habitat type	Seral stage Mature and old Type B – Moderate quality (Foraging, dispersal, and roosting)	Old Type A – Superior quality (Nesting, roosting, foraging and dispersal)
	Wetter maritime ecosystems (CWHdm, CWHvm1, MHmm1) (NDT 1, 2; Rare to infrequent stand initiating events)	
Suitable habitat characteristics	• few canopy layers, multi-species canopy dominated by large (51 cm dbh) overstorey trees (typically 247–457 stems/ha, although densities as low as 86 stems/ha are possible where large diameter trees are present). • moderate to high (60–80%) canopy closure • some large trees (51 cm) with various deformities (e.g., large cavities, broken tops, dwarf mistletoe infections). • large (51 cm dbh) snags present. • accumulations of fallen trees and other woody debris on the ground.	• a multi-layered, multi-species canopy dominated by large (76 cm dbh) overstorey trees (typically 37 to 185 stems/ha). • moderate to high (60–80%) canopy closure. • a high incidence of large trees with various deformities (e.g., large cavities, broken tops, dwarf mistletoe infections). • numerous large (76 cm dbh) snags (typically 5 stems/ha). • large accumulations of fallen trees and other woody debris on the ground.
	Dryer submaritime ecosystems (CWHds1, CWHms1, CWHms2, MHmm2, ESSFmw and IDFww) (NDT 2,4; Infrequent stand initiating events to frequent stand maintaining fires)	
Suitable habitat characteristics	• a multi-layered, multi-species canopy dominated by overstorey trees approximately 30 cm dbh. • stands must contain 20% Df and/or Hw in the overstorey. • approximately 50% canopy closure. • dominant live trees with various deformities (e.g., large cavities, broken tops, dwarf mistletoe infections). • snags and down logs, at least some of which are of similar dbh to dominant live trees.	• a multi-layered, multi-species canopy dominated by large (51 cm dbh) overstorey trees (typically 173–247 stems/ha, although tree densities as low as 86 stems/ha are possible where large diameter trees are present). • moderate to high (>70%) canopy closure. • some large trees with various deformities (e.g., large cavities, broken tops, dwarf mistletoe infections). • large (51 cm dbh) snags present (typically 7 stems/ha). • accumulations of large (51 cm dbh) fallen trees and woody debris on the ground.

Note: The stand characteristics listed above for suitable and superior owl habitats are based on inventory information from Washington state. Until specific spotted owl research and forest attribute inventory information is collated and quantified, the definition of suitable owl habitat, for the purposes of developing and approving operational plans, will be forested lands that are older than 100 years. Habitat surveys are required to determine the stand attributes described above before being considered as suitable owl habitat.

used to evaluate stands for habitat type. In general, Type B habitats will be characterized by forests aged between 100 and 140 years (age class 6 and 7) and heights greater than height class 2. Type A habitat will generally be forests older than 140 years (age class 8 and 9) with heights greater than height class 2.

Step IV: Identification of the Initial 67% Owl Habitat Area

The objective in SRMZs is to maintain a minimum 67% of the gross forested land base as suitable owl habitat within each long-term activity centre. To achieve this, it is recommended that forests be identified that will be managed initially to achieve this target and that will develop into or be maintained as Type A or B habitat. Ideally, the 67% owl habitat areas should consist of:

- a minimum target of 50% of the gross forested land within activity centres as Type A owl habitat
- large patches greater than 500 hectares of suitable owl habitat to minimize the effects of forest fragmentation
- corridors of suitable habitat greater than one kilometre wide to provide interior forest conditions for owl movement and forage between large patches
- a minimum 500-m radius reserve zone around known nest sites and critical roost sites.

To reduce overall timber supply impacts, the 67% owl habitat area should overlap, as much as possible, heavily constrained features of the land base, including:

- inoperable forests
- visual quality objectives (VQO) for retention and partial retention
- low productive sites (i.e., site class less than 15)
- environmentally sensitive areas 1 (e.g., terrain stability, hydrology)
- Forest Practices Code requirements (e.g., biodiversity and riparian guidebooks)
- other Red-/Blue-listed species habitat requirements (i.e., those identified under the Code)
- other regionally important wildlife habitat requirements (e.g., deer winter range).

Step V: Identification of Harvesting and Silviculture Priorities

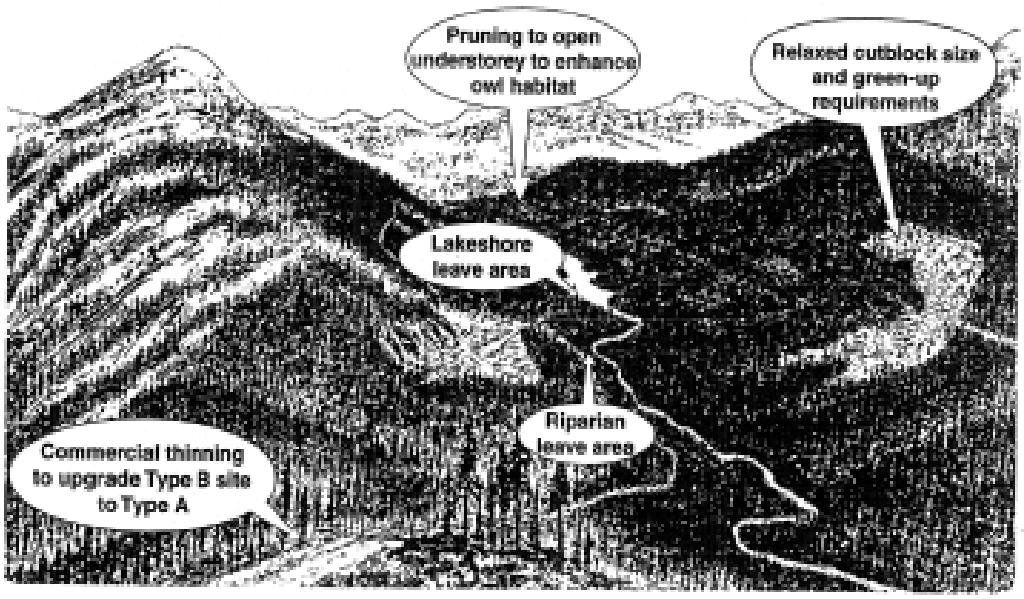
1. Salvage of catastrophic damage in stands may be carried out where removal of the damaged forest would reduce the risk of further damage to the remaining stand and maintain or improve the habitat suitable for owls. Salvage may benefit both the owl and the health of the forests by promoting the restoration of suitable owl habitat and by preventing further potential disturbance to the forests (e.g., spread of pests). Opportunities for salvage should be monitored on an annual basis and the RMP modified to accommodate any catastrophic damage.

2. If the activity centre contains over 67% suitable owl habitat, look for opportunities to harvest the excess mature forest. Forest managers are encouraged to locate forest development in younger stands to create or enhance suitable owl habitat versus the older stands that are functioning already as suitable owl habitat. The harvest should be designed to promote silviculture opportunities that accelerate the restoration of suitable owl habitat so that additional mature and/or old forests may be harvested.

Cutblock Size

To minimize forest fragmentation and maintain large patches of suitable owl habitat, the current pattern of cut and leave strips may be altered. Larger blocks of partial harvest or clearcuts with reserves are more desirable than a patchwork system of smaller, widely dispersed cutblocks that creates forest fragmentation. To accommodate larger cutblocks, the higher level plan:

- will provide flexibility to the 40-hectare cutblock requirement (Operational Planning Regulation part 3.21) to allow for larger cutblock sizes to reduce forest fragmentation in adjacent stands.
- will provide flexibility to the green-up requirement of adjacent blocks (Operational Planning Regulation part 3.23) to allow for larger cutblock sizes to reduce forest fragmentation in adjacent stands.



3. If the activity centre does not contain 67% suitable owl habitat, look for enhancement opportunities in non-suitable habitat to increase the amount of suitable owl habitat. Generally this would include commercial thinning (30–80 years), and partial harvest (80–100 years) to produce future habitat. This will accelerate the achievement of the 67% target and thereby allow for the harvest or further enhancement of other mature forests.

4. Look for enhancement opportunities within existing suitable owl habitat. When considering the level of volume extraction, several factors, over and above the required habitat characteristics, should be considered, including the degree of enhancement and the importance of the stand for current owl needs. For example, a forest manager may propose a prescription that removes greater than 30% stand volume to enhance suitable owl habitat to superior conditions. As a result, it may take 30 years or more for the canopy and stand in the treatment area to recover back to suitable habitat conditions following the stand treatment. However, if there is less than 67% suitable owl habitat within the activity centre, the existing owls require the treated stand to remain suitable over the short term. In this case, alternative options may be required that could include harvesting a smaller volume (i.e., less than 30%) from the stand to maintain the canopy and stand attributes as suitable habitat, or the enhancement may be delayed until additional suitable habitat has been established in another stand.

Step VI: Completion of the Detailed Resource Management Plan

Joint approval by the Ministry of Forests district manager and a designated environment official is required for each RMP prior to approval of other operational plans in the SRMZs. The objectives of the RMP must be addressed in the operational plans.

Step VII: Adaptability of Resource Management Plans

Catastrophic events such as fire, windthrow, insects and disease could affect the objectives of the RMPs and reduce the probability of stabilizing the owl population. As well, research and inventories will provide new information on habitat requirements and/or improve methods of forest management within spotted owl areas. Therefore, resource management plans must be adaptive and may require change in response to new information, natural disturbances or other unforeseen factors that alter the ability of the plan to meet its objectives. Any significant changes to the RMP require the approval of the Ministry of Forests district manager and the Ministry of Environment, Lands and Parks designated environment official.

Step VIII: Monitoring and Review of the Resource Management Plan

The objectives stated in each RMP will be considered during the development of operational plans. The RMPs will be reviewed with forest managers annually during the forest development plan submission. Every five years the RMP must be re-submitted to the district manager and designated environment official for approval.

Stand Level Planning within the Resource Management Plan

Spotted owls require specific forest stand attributes to provide for foraging, roosting, nesting and movement. These attributes have been found primarily in old-growth forests. Occasionally, they occur in younger forests that exhibit old-growth forest like conditions created from earlier disturbances (e.g., fire, wind, selective logging) which left behind large trees, snags and downed logs. The maintenance and creation of these old-growth structural attributes in younger forests may lead to greater utilization by spotted owls.

A goal of the Spotted Owl Management Plan is to achieve suitable owl habitat at an earlier age than through natural succession (Figure 3). This will require both intensive silviculture and partial harvesting of young and mature forests, as well as the retention of structural forest attributes at the time of final harvest. It is expected that intensively managed forests will, on average, attain suitable owl habitat conditions at 100 years of age (likely range between 80 and 120 years).

Silviculture prescriptions will outline how the stands will be harvested and regenerated until they are free growing (about 10 to 20 years after harvest depending on site conditions and environmental factors). Silviculture prescriptions should be designed to promote the rapid restoration of suitable owl habitat and the retention of old forest stand structures that occur within the stand. They should also prescribe forest practices that minimize the risk of large scale natural disturbances (i.e., windthrow, disease, insect and fire).

Harvest objectives must be clearly defined. Multiple-entry and variable-density treatments may be required to produce the desired stand attributes or to retain stand attributes for creating future suitable owl habitat at final stand entry. Stand level planning objectives for achieving or maintaining suitable owl habitat conditions over a planning horizon of one or more forest rotations must be incorporated into all operational plans (i.e., forest development plans, silviculture prescriptions, logging plans). This long-term planning will be achieved largely through silviculture prescriptions and the RMP.

Stand management prescriptions for immature stands provide the basis for the longer-term planning commitment to achieve the objectives of the RMP. No single entry into the stand should be proposed without consideration of subsequent entries. Prescriptions should be developed on a site-by-site basis and should be designed to optimize the natural features within the stand. Forest managers are encouraged to work closely with regional fish and wildlife staff to develop the long-term strategies for specific blocks.

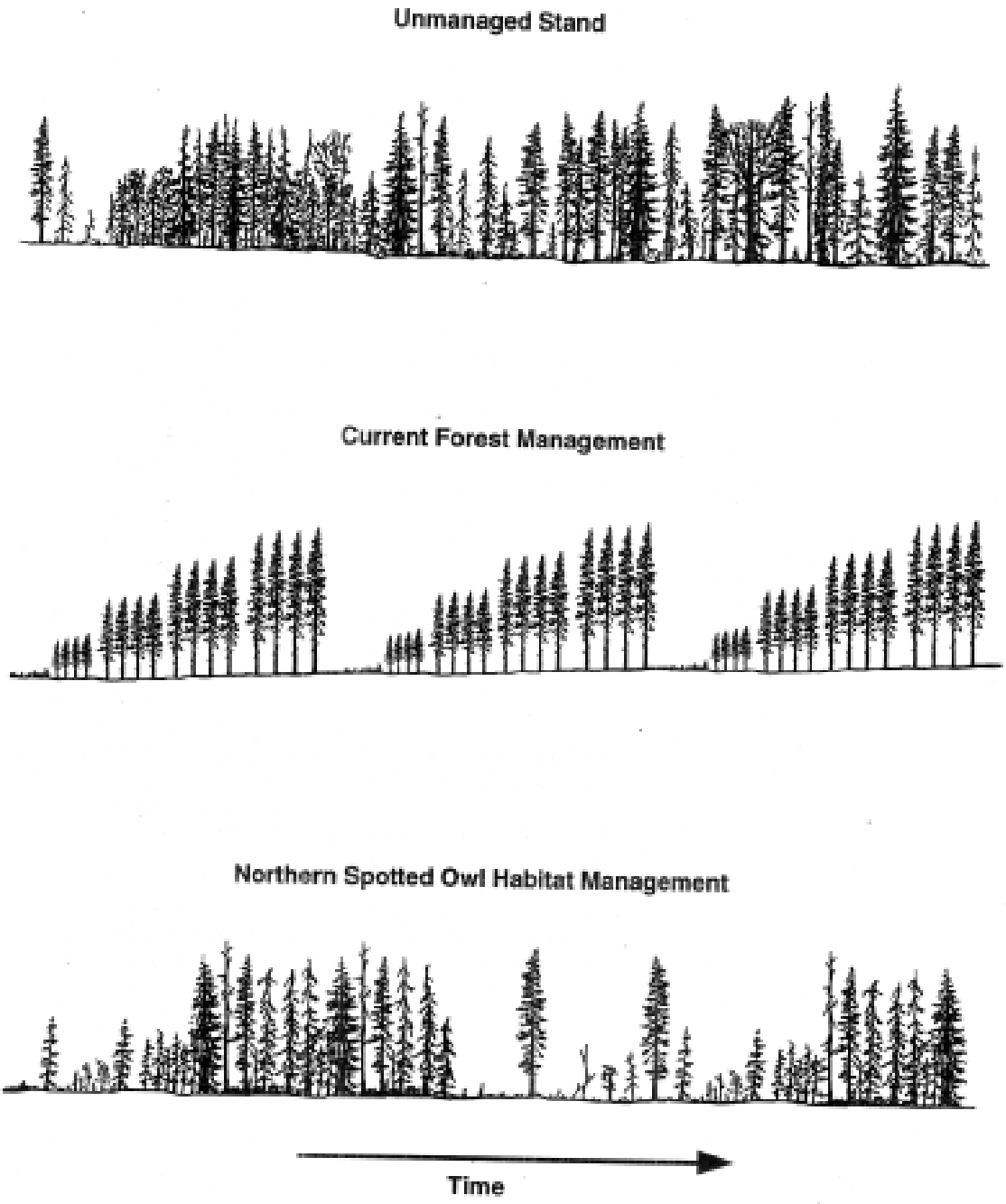


Figure 3. *Comparative forest development of spotted owl habitat with other systems.*

Ecological Considerations

The Chilliwack and Squamish Forest Districts have been divided naturally into two broad ecosystems for the purposes of owl habitat development. The *Biodiversity Guidebook* was used to key into the natural disturbance types (NDT) and the associated biogeoclimatic subzones. The two ecosystems addressed within this document are the wetter maritime and dryer submaritime ecosystems (Figure 1, page 2).

The wetter maritime ecosystem is distinguished by NDT 1 and 2, which are characterized as rare to infrequent stand initiating events such as fire, windthrow, insect and disease or other catastrophic occurrences. The landscape is distinguished by many small areas of regenerated forests surrounded by older mature forests. Biogeoclimatic subzones exhibiting these characteristics in the two forest districts are CWHdm, CWHvm1 and MHmm1. It is recognized that interior Douglas-fir and ponderosa pine biogeoclimatic zones rarely have stand initiating events but are not included in NDT 1 because the stand maintaining surface fires are the dominant ecological influence.

Transitional Ecosystem

Between the wetter maritime and dryer submaritime ecosystems occurs a transitional ecosystem, which exhibits forest characteristics of both ecosystems. There is, however, limited information on spotted owl habitat in these transitional areas. Resource managers should consider the stand characteristics and ecosystem type when prescribing stand treatments in these transitional areas. Table 2 should be used as a guide for ranges of the attributes for the transition zone.

The dryer submaritime ecosystem is distinguished by NDT 2 and 4, which are characterized by infrequent to frequent stand initiating events, usually through fire. The landscape in NDT 2 would consist of extensive areas of even-aged stands with snags and vets that have survived previous fires. NDT 4 is characterized by a mosaic of uneven-aged forest interspersed with grass and shrub openings. Biogeoclimatic subzones exhibiting these characteristics in the two TSAs are CWHds1, CWHms1, MHmm2, ESSFmw and IDFww.

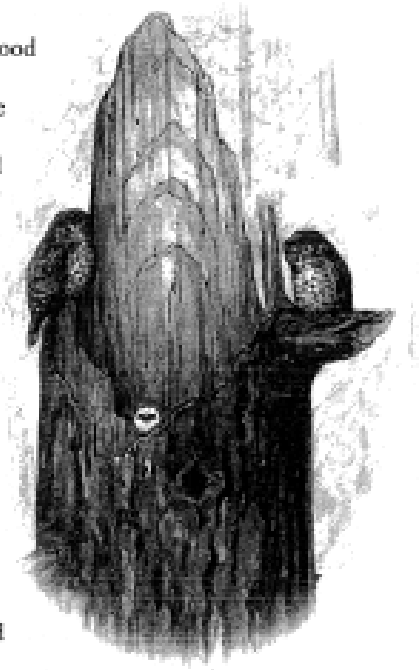
The habitat requirements for spotted owls have been divided into the wetter maritime and dryer submaritime ecosystems (Table 2, page 7). Forest managers and agencies should recognize the distinct habitat requirements of these ecosystems when prescribing stand treatments.

Specific Spotted Owl Habitat Requirements

Spotted owls require forests with structural characteristics that provide protection from predators and the environment, structures for nesting and roosting, relatively high prey availability and are open enough to allow easy movement within and beneath the canopy. At least seven important stand level habitat objectives have been identified to promote the use of stands by spotted owls.

Forest community

In wetter ecosystems, spotted owls most often use conifer-dominated forest types, but also may use mixed conifer-hardwood stands. Pure stands of hardwoods may be used by spotted owls for foraging and roosting in the summer, but they provide little protection from weather in winter. In general, landscapes with greater than a 30% composition of conifers are used by spotted owls. In dryer ecosystems, spotted owls use pure fir, mixtures of pine and fir, and mixed conifer forests. Generally, greater than a 20% composition of firs (Douglas-fir or grand fir) is required to support owls. *Therefore, one objective is to maintain no less than these minimum composition levels of fir within both ecosystems.*



One of the most important species is Douglas-fir. The ectomycorrhizal fungi associated with Douglas-fir provides an important food source for northern flying squirrels, the primary prey species of the spotted owl. Increasing the composition and number of conifers, particularly Douglas-fir, within both ecosystems will increase the suitability and use of the forest stand. It is also important to maintain a diversity of conifer and hardwood species within a stand. This will provide structural complexity and support a wide diversity of plants and animals, particularly prey, that are associated with specific tree species.

Canopy closure

Canopy closure includes the overhead coverage of dominant, co-dominant and intermediate trees, and generally excludes suppressed understorey trees and shrubs. Canopy closure contributes to maintaining thermal cover and regulation, and provides protection from predators. Stands used by spotted owls, and particularly around nest sites, generally exhibit canopy closures greater than 70% in both ecosystems. Canopy closures of less than 60%, and 50% in the wetter and dryer ecosystems respectively, are rarely used by spotted owls for foraging and roosting. *Therefore, one important objective is to maintain canopy closures greater than 60% and 50% in the wetter and dryer ecosystems respectively, to provide suitable owl habitat conditions, and closures greater than 70% to provide nesting habitat.*

Tree density and height

Spotted owls require a canopy that is open enough to allow the owl to fly within and beneath it. Young stands are often too dense for owls to fly through, and often may have many limbs near the forest floor which can impede the capture of prey. *The objectives for tree density and height, when evaluated simultaneously, should describe forests open enough, both within and below live trees, to provide suitable conditions for owl use.* In the wetter ecosystem, suitable habitat (Type B) is achieved when the overstorey attains between 247–457 stems per hectare greater than 50 cm dbh and taller than 25 m. Superior habitat (Type A) is achieved when the overstorey attains between 37–185 stems per hectare greater than 75 cm dbh and taller than 25 m. In the dryer ecosystem, suitable habitat (Type B) is achieved when the overstorey attains between 247–457 stems per hectare greater than 30 cm dbh and taller than 27 m. Superior habitat (Type A) is achieved when the overstorey attains between 173–247 stems per hectare greater than 51 cm dbh and taller than 27 m.

Vertical diversity

Stand level habitats used by spotted owls typically include a multi-layered canopy with a high degree of structural diversity. This allows the owl to fly within and beneath the canopy, and provides roosting and foraging perches at a variety of heights throughout the canopy and forest floor. *The stand level objective is to achieve or maintain two, or preferably more, canopy layers.* This can be achieved by opening stands to induce the growth of suppressed stems, thereby establishing an additional canopy layer. As well, opening the stand may provide a shrub and/or hardwood layer in the understorey. This will also establish an additional layer, but may not meet spotted owl needs if the only two layers are overstorey and shrub cover.

Snags and cavity trees

Spotted owls use a wide variety of natural or pre-formed structures for nests. These are comprised of large cavities, abandoned goshawk nests, or large platforms created by snags, broken tops of trees or trees affected by mistletoe. Since spotted owls do not create their own nests and given their large body size, natural formed nest structures must be large in order to support nesting females and their young. In addition to owls, flying squirrels use cavities in snags and live trees as den sites. In young stands, cavities in live trees are likely absent and less abundant than in older stands. *The stand level objective is to achieve or maintain a minimum number of snags and cavity trees to provide nest sites for owls and dens for flying squirrels.*

Dead and coarse woody debris

A number of mammalian prey of the spotted owl, such as flying squirrels, voles, shrews, and mice, inhabit the forest floor. Fallen trees and large limbs are especially important for these animals, and provide moist microclimates, protective cover for movement, sites for nests and burrows, and food in the form of fungi, plants and invertebrates. *The stand level objective is to contribute to the existing coarse woody debris at each entry into the stand.*

Shrubs

Understorey vegetation provides cover and food in the form of fungi, foliage, seeds, fruit and insects for a number of mammalian prey of the spotted owl, such as flying squirrels, voles, shrews and mice. Fungi associated with shrubs are an important food source for the flying squirrel. *The stand level objective will be to achieve or maintain a patchy distribution of shrubs over at least 40% of a stand with patches averaging at least 24% ground cover of shrubs.*

Silviculture Guidelines

The goal of silviculture is to achieve stand level forest attributes that provide for the needs of spotted owls and other old forest associated species while providing economic and employment opportunities. The objective is to accelerate the development of old-growth like conditions by regularly manipulating (up to four entries) the forest stand to ensure that adequate levels of cavities, snags, species composition, vertical diversity, tree density and height, coarse wood debris, and light are maintained.

The following guidelines will help forest managers develop specific stand level plans for enhancing young forests to create spotted owl habitat. Prior to any forest development, a detailed silviculture prescription is required describing the management activities to be performed to maintain the inherent productivity of the site, accommodate all resource values including biological diversity, and produce a free growing forest stand capable of meeting stated management objectives.

Site preparation

Three types of site preparation may be used to prepare the site for planting or to enhance regeneration of natural stands.

Broadcast burning should be avoided if it will eliminate or reduce the coarse woody debris requirements for habitat development. Burning of roadside and landing accumulations will be restricted between April 1 and August 30 within a 1-km radius of known nest sites, and should only be conducted as part of the overall SRMZ fuel management plan. If possible, large debris should be evenly scattered back into the cutblock to add to the coarse woody debris requirements provided it does not meet utilization standards. Burning may also be required to reduce or eliminate insect or disease from spreading to adjacent stands. If burning is required, any prescribed snags or green trees retained from harvesting on the block should be maintained.

Mechanical site preparation can be used to improve planting opportunities and will enhance the accumulation of woody debris piles or windrows for prey species habitat. Mechanical site preparation may however create exposed mineral soil that could promote the invasion of pioneer species of vegetation.

Chemical site preparation using herbicides to reduce the competition from undesirable vegetation could be used prior to planting to ensure the establishment of the plantation. Prior to the application of herbicides, the treatment should be assessed for any potential impact on habitats and prey in adjacent stands. If the use of aerial application is considered, design the block considering which snags and green trees will be retained, as they could pose a safety hazard to the aircraft.

Planting or natural regeneration

To create the elements of future stand diversity and provide stand structure, planning for regeneration of stands should include a strategy to create mixed species stands. Planting objectives should include a mix of desirable species as indicated in the *Establishment to Free Growing Guidebook – Vancouver Forest Region*. Species selection should also consider tree species important to the development of prey habitat (e.g., Douglas-fir).

In areas where natural regeneration is the objective, consideration should be given to interplanting of an alternate species such as Douglas-fir, western redcedar or hemlock to provide a more desirable mix for future owl habitat. Although these species may be the alternate species for the biogeoclimatic subzone and may not perform as well as the desired species, they are important as a seed source for prey species and owl habitat development. Variable density planting (cluster planting) may be practised to promote habitat diversity.

Brushing and weeding – vegetation control

The control of competing vegetation in the first 15 years of a plantation or naturally regenerated stands may be required to meet the legal obligation of free growing stands. Competing vegetation consists of

herbs, grasses, shrubs and various deciduous species. Although important to the future stand diversity, prey source and owl habitat needs, early seral stages of stand development may require control of vegetation for the survival of conifer regeneration. Ecosystems will benefit from retaining nitrogen-fixing species in the stand. Therefore, site prescriptions should ensure that only target species are controlled, and those trees identified for retention are clearly marked.

Manual vegetation control usually provides a control of vegetation for a limited time. On good sites the control may only last for one growing season and, therefore, would require repeated treatments over several years. This results in very high costs and should be considered only in sensitive areas where herbicides are restricted, such as riparian areas and deer winter ranges.

Chemical vegetation control is the most cost effective control of competing vegetation. Herbicide application alters the early successional vegetation of the young stand, and re-invasion of many species will occur a few years following application. Herbicides can be applied using broadcast, spot or aerial treatment methods. Strict control of application must be maintained at all times to ensure that only the desired vegetation is treated, that habitat and prey populations in adjacent stands are not affected, and to meet all the requirements of the permit.

Precommercial thinning – juvenile spacing

Precommercial thinning is the first entry into the forest stand. It is recommended that precommercial thinning be used to enhance the stand for future owl habitat and to prepare the stand for future commercial thinning opportunities. As such, it is important that the objectives of the stand be clearly defined in the RMP. Reference should be made to Tables 3 (page 26) and Table 4 (page 29) to ensure that the prescription will reflect the preferred stand attributes of the wetter maritime or dryer submaritime ecosystems.

Prescription for precommercial thinning:

- space to vary densities within the stand
- leave a species mix with preference to Douglas-fir, western hemlock, western redcedar, and some deciduous species on suitable sites
- where possible, create a layered stand by leaving understorey western redcedar and western hemlock to establish another canopy layer on suitable sites
- leave all large snags (unless determined unsafe) and other retained stand attributes to provide for the development of suitable habitat.

Pruning

Pruning involves the removal of live branches from the bole of trees. This results in improved wood quality by increasing the amount of clear wood available from a tree. Pruning may also enhance owl habitat by opening the understorey canopy to provide easier movement by owls through the stand and by increasing light levels to benefit the herb and shrub layers that support owl prey. However, the owl also requires roosting perches from the canopy to the forest floor. Therefore, maintaining some lower branches is required to provide potential roosting structures.

Pruning is usually restricted to those species that do not exhibit epicormic branching characteristics, such as western redcedar, and should occur as early as possible following juvenile spacing of the stand. Generally pruning occurs where Douglas-fir exists at 300–600 stems per hectare. Multiple treatments could remove up to three lifts (a lift is about 2.8 m) over a period of time. To enhance owl habitat it is recommended that one-third of trees maintain their branches to within three metres above the ground.

Commercial thinning

Commercial thinning is the first entry into an immature stand that provides timber with an economic return. Commercial thinning also plays an essential role in producing stand conditions that will accelerate the development of suitable owl habitat. The goal of commercial thinning is to achieve Type B or A suitable owl habitat. Commercial thinning to create spotted owl habitat may remove more volume than is generally practised and it may leave behind greater structural diversity (e.g., deformed trees, snags, deciduous trees). The greater volume removal will provide more light to the forest floor to stimulate vegetative growth.

To maintain sufficient levels of light reaching the forest floor, several entries may be required. Therefore, harvest objectives must be clearly defined in the silvicultural prescription as it may involve a multiple-entry and variable-density treatment to produce the desired stand attributes. No single entry should be proposed without consideration for any subsequent entry. Prescriptions should be developed on a site-by-site basis, and should be designed to optimize the natural features within the block. Forest managers are encouraged to work closely with regional fish and wildlife staff to develop the long-term strategy for the specific block.

Prescriptions for commercial thinning:

- create a two- or three-canopy layered stand
- create a variable-density, multi-species stand structure

- create small openings (0.1 to 0.5 hectares in size over no more than 5% of the block) and replant with a shade tolerant species; these openings should be centred around pockets of stands affected by disease (i.e., root rot, mistletoe)
- retain some structurally deformed trees; this may include hemlock infected with mistletoe
- retain all snags and vets, unless determined unsafe by a wildlife danger tree assessor. A wildlife tree patch should be considered for high quality wildlife trees.
- retain existing coarse woody debris, and leave an additional 25 m^3 per hectare composed of tops and non-merchantable logs for coarse woody debris requirements, provided it does not meet utilization standards
- maintain or increase the Douglas-fir component in the stand.

The following is an example of how a stand could be thinned up to three times before final harvest or retained for Type A or B habitat in the wetter maritime ecosystem.

First commercial thinning at age 30 on good and medium sites:

- variable density thinning of all crown classes to an average of 220 stems per hectare, varying stand densities from 170 stems per hectare to 275 stems per hectare
- retain non-merchantable trees, deciduous trees and shrubs
- retain or create two snags per hectare >50 cm.

Second commercial thinning at age 60:

- variable density thinning of all crown classes to an average of 170 stems per hectare, varying stand densities from 110 stems per hectare to 220 stems per hectare
- maintain the natural levels of coarse woody debris on the site. Retain coarse woody debris from harvesting, especially logs >50 cm in diameter that do not meet utilization standards
- create potential cavities in three live trees per hectare >50 cm dbh by removing the upper crown to develop a candelabra effect
- retain or create two snags per hectare >50 cm
- retain non-merchantable trees, deciduous trees and shrubs.

Third commercial thinning at age 90:

- variable density thinning of co-dominant and intermediate to an average of 100 stems per hectare, varying stand densities from 80 stems per hectare to 170 stems per hectare to produce a multi-layered stand
- retain or create four cavity trees per hectare
- retain or create five snags per hectare >50 cm dbh
- retain non-merchantable trees, deciduous trees and shrubs
- maintain the natural levels of coarse woody debris on the site. Retain coarse woody debris from harvesting, especially logs >50 cm in diameter that do not meet utilization standards
- underplanting may be required to ensure species diversity and multi-layered stands.

Fertilization

Fertilizer is generally applied to stands that exhibit nutrient deficiencies or to stands following treatment. It can be re-applied every nine years thereafter. Fertilizer treatments can increase volume returns as much as 5% and provide for enhancement of wildlife habitat by increasing the understorey vigour, seed abundance and quality, decomposition and biomass production. Chemical fertilizers have been commonly used for additional forest nutrients, however the forest manager should consider the benefits of managing nitrogen-fixing species within the stand. These species could provide additional stand diversity.

Conifer release

This term usually refers to forest stands aged 20 to 40 years old where there is competition between conifers and deciduous species. Conifer release can be carried out by either mechanical or chemical methods. Strict control of any chemical application must be maintained at all times to ensure that only the desired vegetation is treated, and that habitat and prey populations within the stand and in adjacent stands are not impacted. If chemical application is required, it is recommended that spot treatments be used.

Prescriptions for conifer release:

- Retain all single deciduous trees or small patches <0.5 hectare to provide stand diversity.
- Groups of deciduous trees >0.5 hectare can be removed or retained. If removal is the desired treatment, it should be followed with planting of shade tolerant conifer species.
- Create snags from deciduous or coniferous trees by girdling or chemical injection.

Stand conversion

Some sites are occupied by competing tree species, such as mixed deciduous-conifer stands, that are a result of not sufficiently restocking the site after a harvest or a natural disturbance. This can lead to poor conifer forest production. To convert the site to produce a more desirable crop of conifer, the site may be harvested to remove specific tree species. In most cases, stand conversion has been used to convert very high growing sites from pure deciduous stands or mixed conifer-deciduous stands to conifers.

Prescriptions for stand conversion:

- Pure deciduous stands can be clearcut, with the intent to convert to Douglas-fir, western redcedar, western hemlock and grand fir, and should follow the guidelines outlined in this document for clearcutting in the various ecosystems.
- Sites with mixed deciduous and conifer trees should attempt to retain all standing live conifer trees, aside from safety and operational concerns, as these trees will accelerate the development of suitable habitat on the site.
- Retain all snags and vets, unless determined unsafe by a wildlife danger tree assessor. A wildlife tree patch should be considered for high quality wildlife trees.
- Retain existing coarse woody debris, and leave an additional 25 m^3 per hectare of tops and non-merchantable logs for coarse woody debris requirements.

Timber Harvesting Guidelines

Timber harvesting entries into a mature forest stand (stand maturity begins between 80 and 110 years) provide a source of timber volume with an economic return. Harvesting plays an essential role in producing stand conditions that will accelerate the development of suitable owl habitat, and maintaining or improving stand conditions for the owl. The goal of harvesting within the 67% owl habitat area is to achieve or maintain Type B or A suitable owl habitat, with the emphasis on improving stand conditions. Harvesting also plays an essential role in retaining stand attributes that have been shown to accelerate regenerating stands into a condition that will provide suitable owl habitat. The RMP should identify the specific management goals for the stand.

The following guidelines will help forest managers develop specific stand level plans for harvesting. There are four basic types of silvicultural systems used in harvesting. Clearcutting, seed tree retention, and shelterwood systems produce even-aged stands while the selection system will produce an uneven-aged stand (Figure 4). In most cases, a combination of these systems will be used over the life of the stand. For

example, the partial harvest system could be used to enhance a stand from Type B to Type A habitat. Once the objective of 67% owl habitat is reached, the stand could be clearcut, leaving some old forest elements for the next stand.

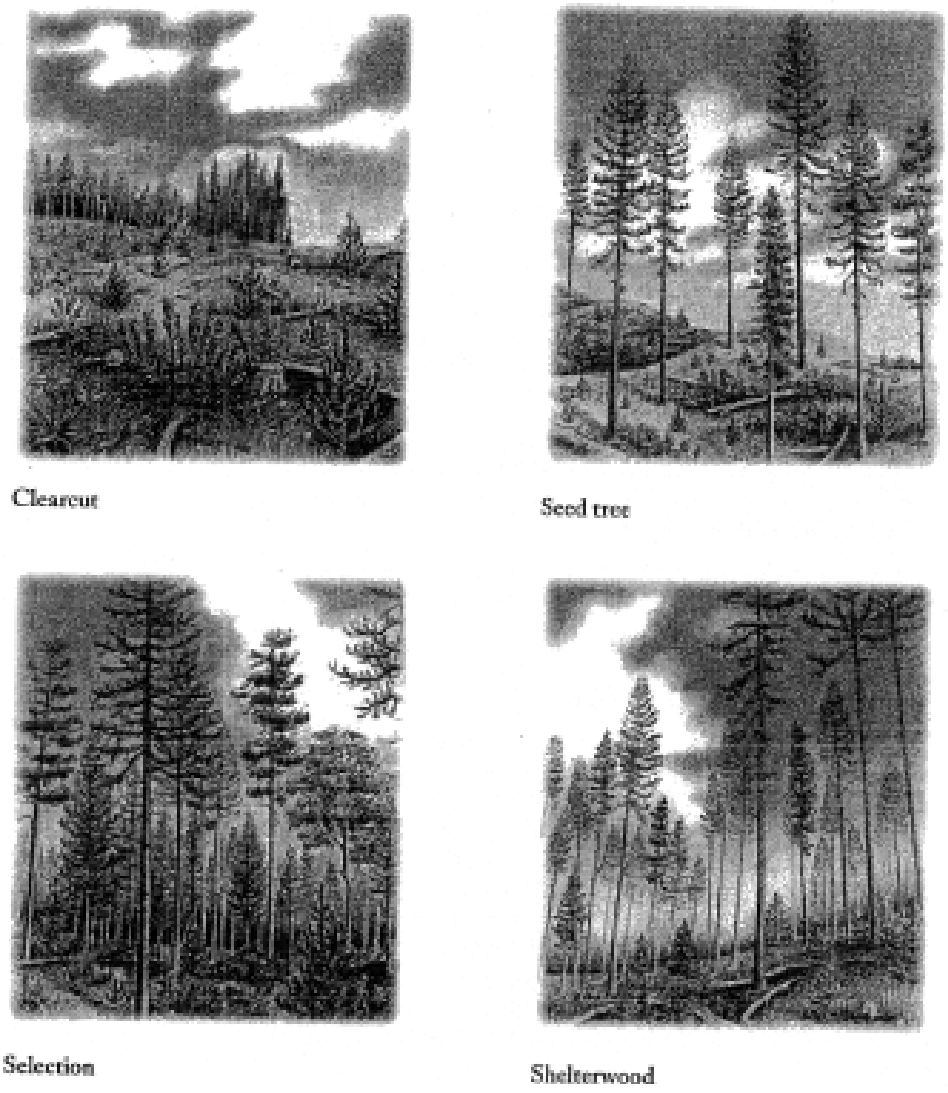


Figure 4. *Examples of the four basic silvicultural systems used in harvesting.*

Partial harvests in wetter maritime ecosystems

Partial harvests, which include shelterwood and selection systems, provide an opportunity to maintain or improve habitat suitability while providing a source of timber and economic return. Partial harvest systems allow for the creation or retention of trees of multiple ages, multiple species and structural diversity, canopy closure and multi-layered canopy, all characteristics that are required by the spotted owl. Partial harvests can achieve these through either single-tree selection or group selection and may require regular re-entries (15–50 years) into the stand. Table 3 describes what attributes should be enhanced in the development of suitable owl habitat from Type B to A.

Where partial harvest systems in wetter maritime ecosystems could be applied:

- Partial harvest systems will generally be used to harvest forests that fall within the 67% suitable owl habitat within SRMZs and activity centres with the goal of maintaining or improving, but not degrading, the quality of the habitat.
- Partial harvest systems will be used where site conditions warrant special harvesting or regeneration considerations such as high elevation sites, retention or partial retention visual quality objectives, sensitive sites or community watersheds.
- Partial harvests may be used for stand conversion where the retention of standing live trees is operationally feasible.
- Partial harvests may be used to salvage timber that has been damaged by insects, disease, fire, windthrow or other natural disturbance, where the retention of standing live trees is operationally feasible.
- Partial harvest may be used to harvest a larger area without concern for cutblock size, green-up requirements or adjacency rules of the Code.

Prescription for partial harvest in wetter maritime ecosystems:

- Stands should be designed to be windfirm after harvest.
- Prescriptions should be designed to meet regeneration objectives.
- Maintain a minimum of 60% crown closure, if the management prescription is to retain habitat suitability soon after harvest.
- Create or maintain a multi-layered canopy.
- Maintain a range of large and small diameter trees.
- Create or maintain five snags >50 cm dbh per hectare if possible or prescribe the creation of suitable snags.
- Maintain at least one-third of the number of stems per hectare from each of the dominant, co-dominant and intermediate layers.

Table 3. *Management guidelines for wetter maritime ecosystems*[a, b]

The guidelines in the following table provide the criteria for classification of habitat as suitable or superior. The shaded columns indicate the preferred stand parameters to be retained in stand harvest operations. The intent is to cycle forest stands through the habitat classes indicated. Note that large trees, broken tops, and deformed limb requirements may be addressed in the same trees. Distribution of the noted characteristics need not be uniform, but may be in patches or corridors. For example, the 10% uncut patches and riparian reserve may provide adequate numbers of snags and large trees. Currently, an inventory attribute collection methodology is under development.

Owl habitat characteristic	Characteristics of suitable owl habitat (Type B)	Guidelines for partial cutting to enhance to superior habitat	Characteristics of superior owl habitat (Type A)	Guidelines for retention of old forest elements when clearcutting	Purpose
Crown closure	60–80% 5 m of open canopy above ground	Maintain minimum 60% crown closure	60–80% 5 m of open canopy above ground	Maintain 10–15% of stand in uncut patches	Thermal cover, predator protection
Canopy layers	≥2	Maintain or develop at least 3 canopy layers	≥3	Maintain or develop at least 3 canopy layers	Foraging, perches
Limb height	Limbs to within 3 m of ground	Allow branch retention to within 3 m of ground on at least 1/3 of stand	Limbs to within 3 m of ground	Allow branch retention to within 3 m of ground on at least 1/3 of stand	Perches, foraging
Tree species	≥2 tree species	Maintain 2–3 conifer species with 6–10 deciduous trees/ha interspersed	≥2 tree species	Maintain 2–3 conifer species with 6–10 deciduous trees/ha interspersed	Forage for prey, nesting, perches
Large trees	>50 cm dbh overstorey of 247–457 stems/ha (down to 86 if trees are large)	Retain at least 40 of the largest trees/ha	>75 cm dbh overstorey of 37–185 stems/ha	Retain at least 15 of the largest trees/ha	Abundant, prey, nesting, roosting
Dead or broken tops or large deformed limbs	n/a	Retain 2 trees/ha >50 cm dbh with broken tops	≥5 trees/ha with dead or broken tops	Retain 2 trees/ha >50 cm dbh with broken tops	Nesting and foraging, perches
Snags	≥5 snags/ha >51 cm dbh	Retain ≥5 snags and/ or dying trees >50 cm dbh/ha	≥5 snags/ha >76 cm dbh	Retain ≥5 snags and/ or dying trees >76 cm dbh/ha	Foraging, perches
Coarse woody debris	≥100 m^3/ha of large woody debris >10 cm dbh at various stages of decomposition	Maintain existing coarse woody debris, and add 25 m^3/ha of unmerchantable logs >50 cm diameter	≥268 m^3/ha of large woody debris >10 cm dbh at various stages of decomposition	Maintain existing coarse coarse woody debris, and add 25 m^3/ha of unmerchantable logs >50 cm diameter	Nesting, abundant, prey
Understorey vegetation	≥40% patches with at least 24% ground cover in patches		≥40% patches with at least 24% ground cover in patches		Forage for prey

[a] The stand characteristics listed above for suitable and superior owl habitats are based on inventory information from western Washington state. When information from spotted owl research and inventories is compiled in BC, this table may be revised.

[b] CWHdm, CWHvm1, MHmm1. NDT 1, 2; rare to infrequent stand initiating events.

- Maintain existing coarse woody debris, and add 25 m^3 per hectare of additional unmerchantable coarse woody debris scattered over the cutblock by falling trees, dangerous snags or by leaving all tops in the stand.
- Design and lay out roads considering additional future entries into the stand.

Clearcut or clearcut with reserves in wetter maritime ecosystems

Clearcuts or clearcuts with reserves can provide stand attributes for the development of future suitable owl habitat. The retention of old forest attributes will provide some of the diverse structure necessary to accelerate the re-establishment of suitable owl habitat. Table 3 provides guidelines for stand attribute retention.

Where the application of clearcuts and clearcut with reserves in wetter maritime ecosystems could be applied:

- Clearcuts with reserves will generally be used to harvest forests that exceed the 67% suitable owl habitat target within SRMZs and activity centres.
- Clearcuts with reserves may be used for stand conversion where partial harvest is not operationally feasible.
- Clearcuts with reserves may be used to salvage timber that has been damaged by insects, disease, fire, windthrow or other natural disturbance, where partial harvest is not operationally feasible.
- Clearcuts with reserves may be used as part of the overall fuel management plan in the SRMZ.

Fuel Management Objectives

The primary fuel management objective is to reduce the risk of large scale wildfire. Requirements for leaving higher levels of coarse woody debris, snags and green trees for owl habitat will increase the fuel loading and fire risk in the SRMZs. To reduce the risk of large areas of habitat being affected, fuel management corridors should be identified in the RMP as per the *Fuel Management Guidebook*.

Prescription for clearcut or clearcut with reserves in wetter maritime ecosystems:

- Regeneration objectives must be identified in the silviculture prescription.
- Reserve areas should consist of:
  - 10–15% of the total forest area of the harvesting prescription
  - multi-aged, multi-species and multi-layered stands
  - concentration of large snags (over 76 cm) or old Douglas-fir or grand fir vets
  - windfirm or enhanced windfirm green trees
  - large broken tops or deformed trees (e.g., large cavities, dwarf mistletoe infection)

- Clearcut areas should consist of:
  - existing coarse woody debris with 25 m^3 per hectare of additional unmerchantable coarse woody debris scattered over the cutblock. This should include logs >50 cm in diameter. Retention of the natural levels of coarse woody debris should be maintained on the site. Introduction of woody debris caused from harvesting will be encouraged to remain on the site, especially logs >50 cm in diameter that do not meet utilization standards.
  - a minimum 15 of the largest healthy, windfirm trees per hectare that do not interfere with the regeneration of the stand
  - deciduous trees for stand diversity, whenever possible
- Avoid burning large debris in roadside or landing accumulations if possible; rather, scatter the debris back into the cutblock for added coarse woody debris.

Partial harvests in dryer submaritime ecosystems

Partial harvests, which include shelterwood and selection systems, provide an opportunity to maintain or improve habitat suitability while providing a source of timber and economic return. Partial harvest systems allow for the creation or retention of trees of multiple ages, multiple species and structural diversity, canopy closure and multi-layered canopy, all characteristics that are required by the spotted owl. Partial harvests can achieve these through either single-tree selection or group selection and may require regular re-entries (15–50 years apart) into the stand. Table 4 describes what attributes should be enhanced in converting suitable owl habitat from Type B to A.

Where partial harvest in dryer submaritime ecosystems could be applied:

- Partial harvest systems will generally be used to harvest forests that fall within the 67% suitable owl habitat within SRMZs and activity centres with the goal of maintaining or improving, but not degrading, the quality of the habitat.
- Partial harvest systems will be used where site conditions warrant special harvesting or regeneration considerations such as high elevation sites, retention or partial retention visual quality objectives, sensitive sites or community watersheds.
- Partial harvests may be used for stand conversion where the retention of standing live trees is operationally feasible.
- Partial harvests may be used to salvage timber that has been damaged by insects, disease, fire, windthrow or other natural disturbance, where the retention of standing live trees is operationally feasible.

Table 4. *Management guidelines for dryer submaritime ecosystems*[a, b]

The guidelines in the following table provide the minimum criteria for classification of habitat as suitable or superior. The shaded columns indicate the minimum stand parameters required to be retained in harvest operations. The intent is to cycle forest stands through the habitat classes indicated. Note that large trees, broken tops, and deformed limb requirements may be addressed in the same trees. Distribution of the noted characteristics need not be uniform, but may be in patches or corridors. For example, the 10% uncut patches and riparian reserve may provide adequate numbers of snags and large trees. Currently, an inventory attribute collection methodology is under development.

Owl habitat characteristic	Characteristics of suitable owl habitat (Type B)	Guidelines for partial cutting to enhance to superior habitat	Characteristics of superior owl habitat (Type A)	Guidelines for retention of old forest elements when clearcutting	Purpose
Crown closure	≥50% 5 m of open canopy above ground	Maintain minimum 50% crown closure	60–85% 5 m of open canopy above ground	Maintain 10–15% of stand in uncut patches	Thermal cover, predator protection
Canopy layers	≥2	Maintain or develop at least 3 canopy layers	≥3	Maintain or develop at least 3 canopy layers	Foraging, perches
Limb height	Limbs to within 3 m of ground	Allow branch retention to within 3 m of ground on at least 1/3 of stand	Limbs to within 3 m of ground	Allow branch retention to within 3 m of ground on at least 1/3 of stand	Perches, foraging
Tree species	≥2 tree species	Maintain 2–3 conifer species with 6–10 deciduous trees/ha interspersed	≥2 tree species	Maintain 2–3 conifer species with 6–10 deciduous trees/ha interspersed	Forage for prey, nesting, perches
Large trees	≥30 cm dbh overstorey	Retain at least 200 of the largest trees/ha	≥51 cm dbh overstorey of 173–247 stems/ha	Retain at least 40 of the largest trees/ha	Abundant prey, nesting, roosting
Dead or broken tops or large deformed limbs	n/a	Retain 2 trees/ha >30 cm dbh with broken tops	≥5 trees/ha with dead or broken tops	Retain 2 trees/ha >50 cm dbh with broken tops	Nesting, foraging, perches
Snags	≥5 snags/ha >30 cm dbh	Retain ≥5 snags and/or dying trees >30 cm dbh/ha	≥7 snags/ha >51 cm dbh	Retain ≥7 snags and/or dying trees >51 cm dbh/ha	Foraging, perches
Coarse woody debris	≥100 m^3/ha of large woody debris >10 cm dbh at various stages of decomposition	Maintain existing coarse woody debris, and add 20 m^3/ha of unmerchantable logs >30 cm diameter	≥268 m^3/ha of large woody debris >10 cm dbh at various stages of decomposition	Maintain existing coarse woody debris, and add 20 m^3/ha of unmerchantable logs >30 cm diameter	Nesting, abundant prey
Understorey vegetation	≥40% patches with at least 24% ground cover in patches		≥40% patches with at least 24% ground cover in patches		Forage for prey

[a] The stand characteristics listed above for suitable and superior owl habitats are based on inventory information from western Washington state. When information from spotted owl research and inventories is compiled in BC, this table may be revised.

[b] CWHds1, CWHms1, CWHms2, MHmm2, ESSFmw and IDFww. NDT 2, 4; infrequent stand initiating events to frequent stand maintaining fires.

- Partial harvest may be used to harvest a larger area without concern for cutblock size, green-up requirements or adjacency rules of the Code.

Prescription for partial harvest in dryer submaritime ecosystems:

- Stands should be designed to be windfirm after harvest.
- Prescriptions should be designed to meet regeneration objectives.
- Maintain a minimum of 50% crown closure, if the management prescription is to retain habitat suitability soon after harvest.
- Create or maintain a multi-layered canopy.
- Maintain a range of large and small diameter trees.
- Create or maintain snags >30 cm dbh per hectare or prescribe the creation of suitable snags.

Forest Health Objectives

Long-term health of the forest is important for owl habitat, timber production and other forest values. Low levels of pest activity can be tolerated and may contribute to the maintenance or enhancement of owl habitat characteristics. High levels of pests can reduce habitat suitability for owls, reduce timber values and increase risk of wildfire. Landscape level and stand level forest health guidelines found in the Forest Practices Code *Forest Health Guidebook* should be implemented.

- Maintain at least one-third of the number of stems per hectare from each of the dominant, co-dominant and intermediate layers.
- Maintain existing coarse woody debris, and add 25 m^3 per hectare of additional unmerchantable coarse woody debris scattered over the cutblock by falling trees, dangerous snags or by leaving all tops in the stand.
- Lay out roads considering additional future entries into the stand.

Clearcut or clearcut with reserves in dryer submaritime ecosystems

Clearcuts or clearcuts with reserves can provide the attributes for stand development for future suitable owl habitat. The retention of old forest elements provides the diverse structure necessary for the development of suitable owl habitat. Table 4 (page 29) provides the guidelines for what to leave on a block to help accelerate the process of habitat development and describes the attributes of Type B and A owl habitat.

Where clearcut or clearcut with reserves in dryer submaritime ecosystems could be applied:

- Clearcuts with reserves will generally be used to harvest forests that exceed the 67% suitable owl habitat target within SRMZs and activity centres.
- Clearcuts with reserves may be used for stand conversion where partial harvest is not operationally feasible.

- Clearcuts with reserves may be used to salvage timber that has been damaged by insects, disease, fire, windthrow or other natural disturbance, where partial harvest is not operationally feasible.
- Clearcuts with reserves may be used as part of the overall fuel management plan in the SRMZ.

Prescription for clearcut or clearcut with reserves in dryer mbmaritime ecosystems:

- Regeneration objectives must be identified in the silviculture prescription.
- Reserve areas should consist of:
  - 10–15% of the total area of the harvesting prescription
  - multi-aged, multi-species and multi-layered stands
  - concentration of large snags (>51 cm dbh) or old Douglas-fir and/or grand fir vets
  - windfirm or enhanced windfirm green trees
  - large broken tops or deformed trees (e.g., large cavities, dwarf mistletoe infection)
- Clearcuts should consist of:
  - existing coarse woody debris with 20 m^3 per hectare of additional unmerchantable coarse woody debris scattered over the cutblock. This should include logs >30 cm in diameter. Maintain the natural levels of coarse woody debris on the site. Introduction of woody debris created from harvesting will be encouraged, especially logs >30 cm in diameter that do not meet utilization standards.
  - a minimum of 40 of the largest healthy, windfirm trees per hectare that minimizes interference with the regeneration of the stand
  - deciduous trees for stand diversity
- Avoid burning large debris in roadside or landing accumulations if possible; rather, scatter the debris that does not meet utilization standards back into the cutblock for added coarse woody debris.

Salvage Logging Guidelines

Natural disturbances caused by insect, disease, wildfire, windthrow or other catastrophic events can lead to poor timber quality and forest degradation within adjacent forest stands. The primary salvage objectives are to reduce the risk of further forest degradation and to accelerate the recovery to suitable owl habitat conditions. On a site-specific basis, the forest manager and agencies should consider the extent of the disturbance, its effect on the remaining stands, its impact on spotted

owl management, and the potential economic and employment opportunities. Salvage may be approved where damage exceeds approximately 30% of the stand volume, or where retaining the damaged timber may result in further damage to the remaining stand and is jointly approved by the district manager and designated environment official. Road construction to remove salvage timber should be minimized and consideration should be made for alternate harvesting methods such as helicopter logging.

Road Construction Guidelines

Forest roads are required for harvesting, forest management, fire and recreation access. Strategic access design and management should be incorporated into the RMP for each SRMZ. Road construction can reduce habitat quality and harass owls during nesting periods. Keeping roads out of or away from critical owl habitat and nest sites is encouraged. Roads required through suitable owl habitat should be designed to keep right-of-way width to between 15 to 20 m. Operation of road construction machinery should not occur within 200 m and blasting within 400 m of nest sites during the period March 1 to July 31.

An Example of Forest Development Opportunities within a Resource Management Plan

In the following example three maps are shown of SRMZ #12 located in the Clear/Hornet Creek area. Figure 5a depicts the current constraints on forest management. Figure 5b shows the 67% suitable owl habitat and the age class distribution that will be targeted for the long-term habitat requirements. Figure 5c shows the areas of opportunities for short- and long-term forest management and harvesting opportunities.

Developing the Resource Management Plan – Constraint Map

This map is used to help prevent excessive impacts to current timber supplies. Planners use a variety of constraint codes when determining areas to be included in the 67% spotted owl habitat. These include: inoperable; low site less than 15; ESA1 (not used for timber supply calculations); VQO retention; partial retention; and deer winter range (highly constrained).

Process

Forest cover constraints were used to develop the map in Figure 5a as follows:

- inoperable
- environmentally sensitive areas 1
- visual quality objectives for retention and partial retention
- low site below site class 15
- environmentally sensitive areas identified as deer winter range.

Analysis

Table 5a shows the results of the amount of area within the total SRMZ and by individual activity centre that is heavily constrained for forest development and the moderate to low constrained areas (unconstrained). It should be noted that the areas shown as unconstrained will still be subject to a number of Code restrictions (i.e., riparian area restriction).

The results of this mapping process will provide the basis for locating the areas to be identified as the 67% suitable owl habitat.

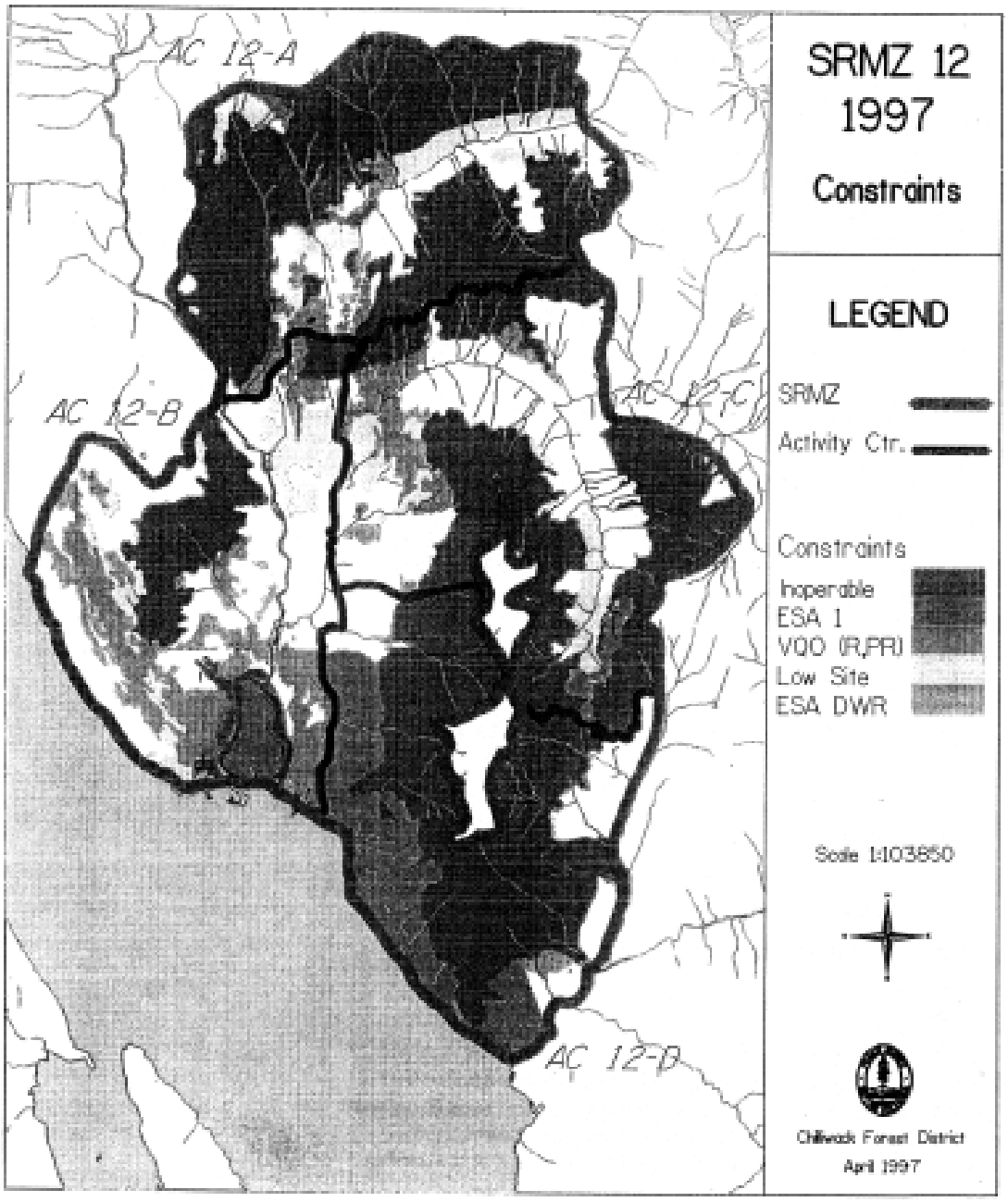


Figure 5a. *Constraints on forest management in SRMZ #12 – the Clear/Hornet Creek area.*

Table 5a. *Constrained area*

Activity centre	Area total (ha)	Constrained forest (ha)	Unconstrained forest (ha)
12-A	3 200	2 457	526
12-B	3 078	1 722	1 198
12-C	3 457	2 039	1 205
12-D	2 977	2 286	470
Total SRMZ	12 712	8 504	3 399

Developing the Resource Management Plan – Activity Centre Boundaries and Suitable Owl Habitat Map

Figure 5b shows the area of present and future 67% suitable owl habitat within each of the activity centres for SRMZ #12 Clear/Hornet Creek.

The internal boundaries of the activity centres are drawn and the short- and long-term spotted owl habitat required is identified in conjunction with the licensee and agencies.

Process

- Forest cover age classes projected to 1996 and the constraints map in Figure 5a were used as the basis for the development of the map in Figure 5b.
- The criteria used to determine the boundaries of the 67% suitable owl habitat and the internal activity centres are as follows:
  - The internal activity centre boundaries were established with the intent of having approximately 3200 hectares in each of the activity centres. The internal boundaries should be established by regional Fish and Wildlife staff and in close consultation with the licensees and the Ministry of Forests.
  - Stands over 100 years (age class 6–9) were used as suitable owl habitat.
  - Use the heavily constrained areas as much as possible.
  - The total 67% current and future suitable habitat areas were identified. Not all of this area is of suitable owl habitat at present.
  - Maintain larger patches of suitable owl habitat greater than 500 hectares.
  - Maintain corridors of suitable habitat greater than 1 km wide to provide interior forest conditions for spotted owl movement between large patches of habitat.
  - Consideration for current and future forest development planning locations.

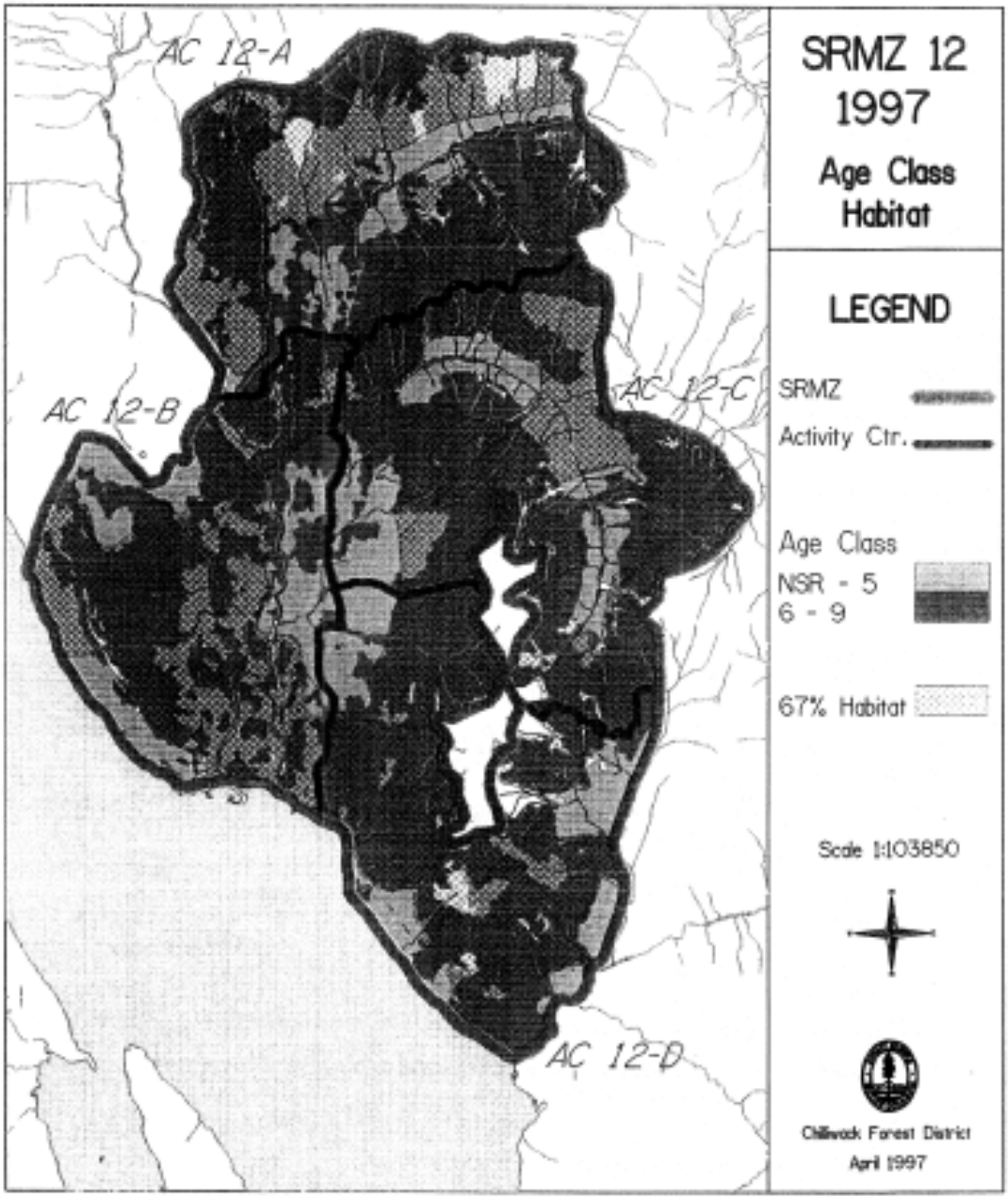


Figure 5b. *Age class distribution and current 67% suitable owl habitat in SRMZ #12 – the Clear/Hornet Creek area.*

Analysis

Table 5b shows the amount of area that is required to meet the requirement of 67% within each of the activity centres. The overall total for the SRMZ indicates only 66% suitable owl habitat (age classes 6–9) over the 100 years, while the activity centres vary from 56% to 75%.

The forest management implications are that, in activity centres 12-A and 12-B, it will be some time before areas will be approved for clearcut harvesting. In these areas, forest managers will be encouraged to practice owl habitat enhancement techniques.

Table 5b. *Spotted owl habitat*

Activity centre	Total area (hectares)	Suitable owl habitat area (hectares)	Suitable habitat (%)
12-A	3 200	1 830	65
12-B	3 078	1 621	56
12-C	3 457	2 030	68
12-D	2 977	2 257	75
Total SRMZ	12 712	7 838	66

Developing Resource Management Plans – Opportunities Map

This map shows the opportunities that exist for commercial thinning, partial harvesting and clearcutting. The map only shows what is available at the present time. When complete, the RMP will provide one or more rotations of planning projections.

Process

- An analysis was completed to develop Figure 5c map with the following assumptions:
  - all stands 30–80 years would be commercial thinned
  - all stands 80–120 years would be partial harvested
  - clearcuts would be approved in activity centres where the suitable owl habitat was greater than the 67%.
- Once the areas are identified, a joint planning team consisting of licensees and regional Fish and Wildlife and Forest Service district staff should review the projections in the context of forest development and owl habitat enhancement opportunities.
- Five-year projections with up to one rotation should be made.

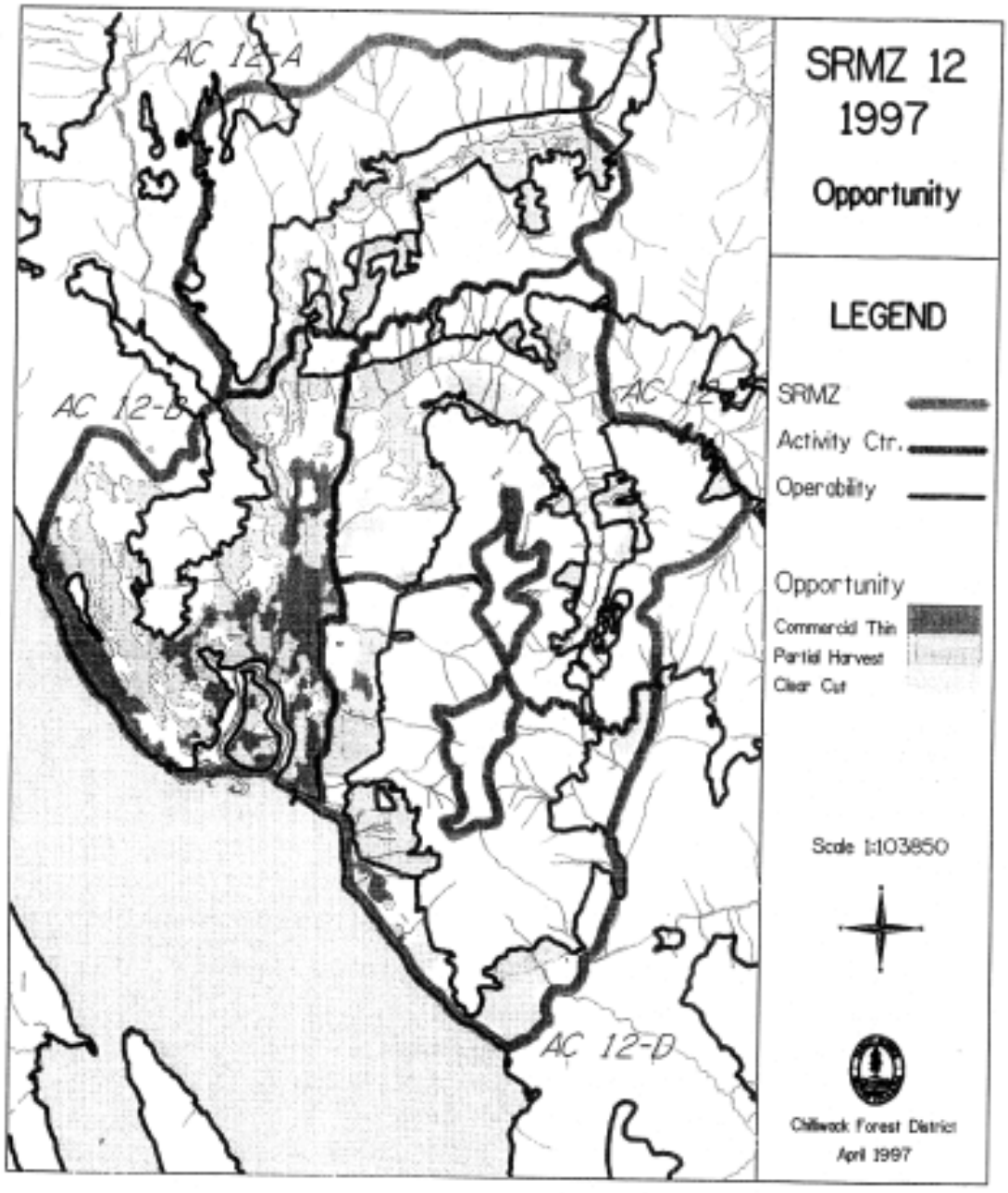


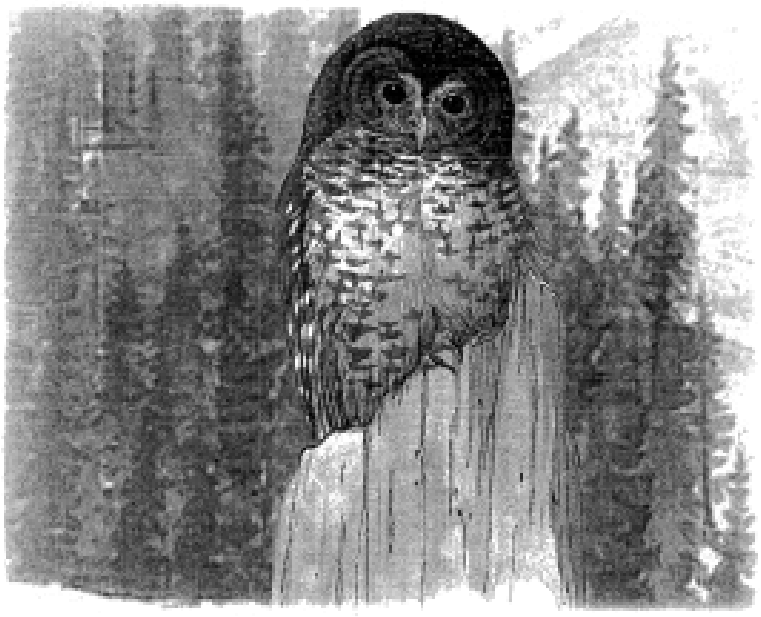
Figure 5c. *Areas with opportunities for short- and long-term forest management and harvesting opportunities in SRMZ #12 – the Clear/Hornet Creek area.*

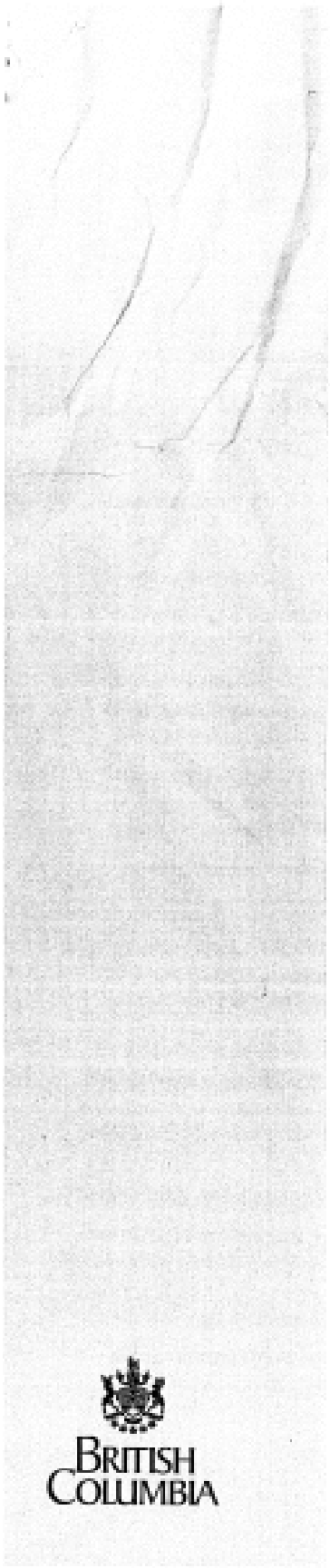
Analysis of opportunities within the SRMZ

In this example of the RMP, development opportunities exist for commercial thinning, partial harvesting and clearcuts when the SRMZ is subdivided into activity centres. In activity centres 12-C and 12-D there is more than the required 67% spotted owl habitat requirements. Opportunities for clearcuts are available but may be subject to other constraints such as deer winter range, visual quality or other Code constraints. Many of these constraints could be compatible with the objectives of spotted owl habitat management. Table 5c shows the area available in each of the activity centres.

Table 5c. *Development opportunity*

Activity centre	Commercial thinning areas (hectares)	Partial harvest area (hectares)	Clearcut area (hectares)
12-A	0	120	0
12-B	206	270	0
12-C	0	104	268
12-D	17	109	255
Total SRMZ	223	603	523





SPOTTED OWL MANAGEMENT PLAN

Strategic Component

November 1997

BRITISH COLUMBIA

Spotted Owl Management in the Squamish and Whistler Corridor

SRMZs within the Squamish and Whistler corridor are proposed for long-term management to provide an opportunity to restore the owl population in this area and provide one of two important north-south linkages to help stabilize spotted owls in the Pemberton area. Although historic records (as recent as 1979) indicate that spotted owls occur in the Squamish and Whistler area, inventories to date have been unsuccessful at locating owl presence in this area (see Appendix B). As a result of this information, and to reduce short-term timber supply impacts in the Squamish Forest District, the Squamish, Cheakamus and Wedge/Green SRMZs will not be managed to meet the 67% suitable habitat target over the short term. Management will adhere to Forest Practices Code requirements and some application of the operational guidelines component to retain key stand elements (i.e., large snags, green tree retention). Before substantial harvesting occurs within the second-growth stands (within 20 years), the value of these SRMZs as potential future owl habitat will be reassessed and a decision made at that time whether or not to implement long-term management for spotted owls. A resource management plan will not be required for these SRMZs.

Each resource management plan *must*:

- consider and incorporate, where appropriate, other higher level plans.
- demonstrate how the objectives for spotted owl management and forest management will be achieved in each spotted owl activity centre within SRMZs over one or more forest rotations.
- receive joint sign-off by the Ministry of Forests district manager and a designated Ministry of Environment, Lands and Parks official prior to approval of long-term forestry operations within SRMZs.
- be adaptive and make changes as needed in response to new information, natural disturbances and other unforeseen factors that may influence the success or failure of the plan. Any significant changes to the RMP requires joint sign-off by the Ministry of Forests district manager and a designated Ministry of Environment, Lands and Parks official.

The following summarizes the key spotted owl management and forest management objectives that are to be considered in the development of the resource management plan. Further clarification of these objectives is provided in Appendix C.

Spotted owl management objectives

The primary spotted owl management objective is to provide a reasonable probability that the spotted owl population will stabilize, and possibly improve its status, over the long term in the Chilliwack and Squamish forest districts. This will be achieved by:

- maintaining a minimum 67% of the gross forested land as suitable owl habitat in each spotted owl activity centre within SRMZs.