Order to Establish the Lakes South Landscape Units and Objectives

Pursuant to section 4 (1) of the *Forest Practices Code of British Columbia. Act* (the Act), the Landscape Units in the Lakes South Sustainable Resource Management Plan (Skeena MSRM Region), as indicated on Map 1, are established as landscape units.

Objectives for the Lakes South SRMP

Pursuant to section 4 (2) of the *Forest Practices Code of British Columbia Act*, Objectives one to eight contained in the Lakes South Sustainable Resource Management Plan are established as landscape unit objectives.

Transition

Pursuant to Section 10 (1) (d) (ii) of the *Forest Practices Code of British Columbia Act*, for forest development plans and section 16(2) of the *Forest and Range Practices Act for Forest Stewardship Plans*, any of these type of operational plans submitted for approval on or following the effective date of the order are to be consistent with the objectives of this order.

Effective Date of Order

This Order takes effect on September 1, 2003.

Future Planning

Because of the current epidemic of Mountain Pine Beetles in the Lakes South area, I understand that this plan will need to be reviewed, and potentially amended when the infestation has ended. I also recognize that the Morice/Lakes Innovative Forest Practices Agreement is developing a Sustainable Forest Management Plan for the area which may provide additional information. As a result, MSRM will review the SRMP, Landscape Units and Objectives in five years, or upon completion of the Sustainable Forest Management Plan.

03/07/17

Kevin Kriese, R.P.F., MRM
Regional Director
Skeena Region
Ministry of Sustainable Resource Management

Date

Ministry of Agriculture and Lands

Ministerial Order

Lakes South

ORDER TO AMEND OBJECTIVES 2 AND 3 (OLD GROWTH FOREST RETENTION OBJECTIVES)

LAKES SOUTH SUSTAINABLE RESOURCE MANAGEMENT PLAN 2003

Pursuant to Section 93.4 (1) of the *Land Act*, objectives 2 and 3 listed in the Lakes South Sustainable Resource Management Plan, June 2003, are cancelled and replaced with the following objective. The objective applies to the area shown on the attached Map 1 dated March 20, 2007.

Old Growth Forest Objective:
Manage for old growth forests by retaining Old Growth Management Areas (OGMAs), as identified on Map 1, and subject to the following:

Timber harvesting and boundary adjustments are not allowed in OGMAs, except as necessary under a) or b) and only where these activities will not diminish the overall effectiveness of old forest conservation.

a) Timber harvesting may be allowed for one or more of the following purposes, provided that a similar alternate area or areas is identified and reserved from harvesting in the same Landscape Unit/BEC variant unit as in the original OGMA, and provided that interior forest conditions are met:

    i. New road development and maintenance where no practicable alternatives exist, and subject to these roads being deactivated once operational activities are complete; or

    ii. To address a substantiated forest health factor within an OGMA, where this poses a significant and substantiated forest health risk to forests outside the OGMA and where harvesting constitutes an appropriate and effective control action; or,

    iii. To address a public or industrial safety concern, or an environmental hazard where no practicable alternative exists.

b) Boundary adjustments to the OGMAs may be allowed, provided that a similar alternate area or areas is identified and reserved from harvesting in the same Landscape Unit/BEC variant unit as in the original OGMA, and provided that interior forest conditions are met.

Application of this order

This order and the land use objective in this order take effect on the date that notice of this order is published in the Gazette.

Pursuant to section 16(2) of the *Forest and Range Practices Act,* the objectives amended by this order apply despite this subsection.

Pursuant to section 8(2) (b) of the *Forest and Range Practices Act* the holder of a Forest Stewardship Plan (FSP) must propose and submit for approval amendments to the FSP within four months of the date that the order takes effect.

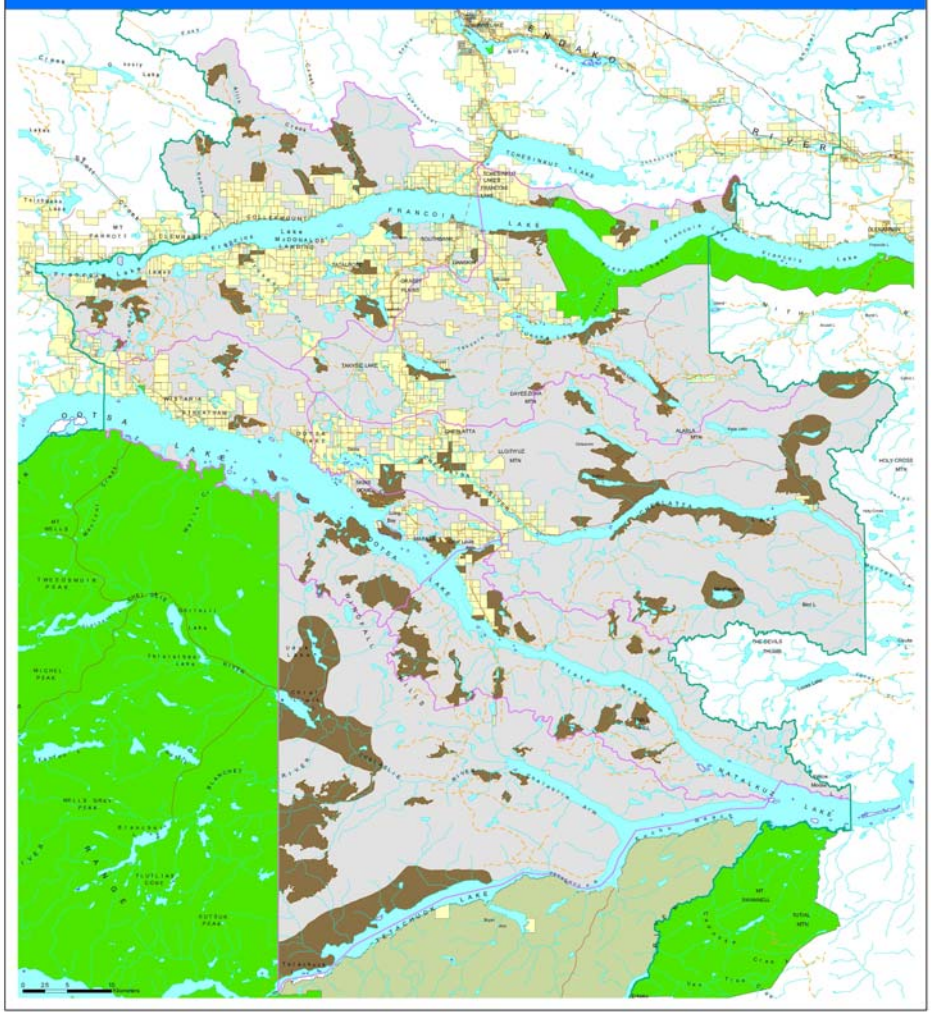
Map 1 attached to this order provides the general geographic location to which the objective applies. The actual location of operational activities in the immediate vicinity of these boundaries may vary from the boundaries shown on the map in order to adjust for inaccuracies in the boundaries, or to reflect better information on the presence or absence of old growth values, provided that the overall intent of the objective is achieved.

Objectives for old growth may be amended in the future to incorporate new information arising from issues identified by the Implementation and Monitoring Committee, Morice and Lakes Innovative Forest Practices Agreement holders, monitoring results, Timber Supply Review or other relevant information.

04 May 2007
Date

Tom Kearns
Regional Executive Director
Northern Region
Integrated Land Management Bureau
Ministry of Agriculture and Lands

Map1: Old Growth Management Areas - Lakes South SRMP



LEGEND

- Old Growth Management Area
- Provincial Park
- Protected Area
- Private Land, Indian Reserve or Woodlot
- Lakes South SRMP Area
- Lakes South Landscape Unit Boundary
- Lakes TSA Boundary

Integrated Land Management Bureau

Lakes South SRMP OGMAs

Produced by:

Regional Client Service - Smithers

Projection/Datum: ALBERS/NAD83
Date Created: March 20, 2007
Created by: rjholmes
Filepath: W:\srm\mof\Workarea\Regional_Planning_Projects\LakesSouth_SRMP\mxd\Lakes_South_OGMAs_Mar07.mxd

Lakes South Sustainable Resource Management Plan

Prepared by

Ministry of Sustainable Resource Management
Skeena Region
June 2003

BRITISH COLUMBIA

Lakes South Sustainable Resource Management Plan

Table of Contents

PART 1. INTRODUCTION AND OVERVIEW

The Lakes South Sustainable Resource Management Plan (SRMP) outlines objectives and strategies for resource management in the southern half of the Lakes Timber Supply Area (TSA) in the Nadina Forest District. The plan area includes six landscape units (Francois East, Francois West, Cheslatta, Ootsa, Intata, and Chelaslie - see Map 1) encompassing 461,000 ha, of which approximately 373,000 ha is Crown forest land.

This plan is consistent with the provisions of the Lakes Land and Resource Management Plan (LRMP), January 2000 and the Lakes Higher Level Plan Order (HLP) established on July 26, 2000 for Resource Management Zones in the Lakes District.

The catastrophic Mountain Pine Beetle infestation currently sweeping through the Lakes TSA has necessitated the need to temporarily deviate from the seral stage objectives of the HLP. This deviation is consistent with the mutual agreement and public consultation components of objective 1(1) and 3(1) of the HLP.

1.1 Plan Scope

The Lakes South SRMP objectives apply to Crown forest land outside of protected areas and relate to management of biodiversity values in forested ecosystems. The biodiversity values addressed in this plan relate to landscape level or "coarse filter" biodiversity objectives. These objectives include:

- Seral stages
- Old growth
- Wildlife tree retention
- Connectivity
- Patch size distribution
- Species composition

These biodiversity objectives are complementary to, and consistent with, Lakes District Land and Resource Management Plan (LRMP) direction.

The Lakes South SRMP does not directly address the following issues:

- Species specific, or fine filter, management objectives. The Lakes District LRMP provides objectives for caribou and other ungulates. The Lakes South SRMP considered these objectives in the drafting of spatial old-growth management areas (OGMA) and Landscape Corridor objectives and is therefore consistent with the LRMP.
- Non-biodiversity related objectives such as wilderness tourism, enhanced forestry, and settlement/agriculture.
- Management within provincial parks. BC Parks is in the process of producing a plan for the Uncha Mountain-Red Hills Provincial Park, called the "Park Management Direction Statement." It should be noted that Crown forest land within protected areas is included when assessing the status of current and future seral stage, patch size distribution, and species composition.

Lakes LRMP objectives, which have not been given the weight of government legislation, still reflect social choices that have been approved by government for consideration in plans.

Accountability for the implementation of these "non-legal" components rests with resource professionals and their professional accounting bodies. If this accountability mechanism fails in this task, then appropriate objectives will be considered for establishment in legislation.

This plan is created to provide management direction during the current mountain pine beetle infestation and will need to be revised once the current infestation ends and the inventory of forest resources are updated. Therefore, the Lakes South SRMP is a time-limited plan.

1.2 Purpose of this Plan

Implement Lakes District LRMP:
The Lakes South SRMP is needed to provide more operationally clear direction to implement objectives in the Lakes District LRMP. The LRMP provides the direction of how the local residents and stakeholders in the Lakes District want the land and resources used and managed. The LRMP, however, is a strategic level plan and requires more specific watershed scale interpretation before resource planners can understand what its objectives mean to the management of resources in the area. The Lakes South SRMP provides this specific watershed scale direction.

Manage mountain pine beetle infestation:
The very large infestation of mountain pine beetle in the central interior of the province is now the driving force behind both ecological processes and forest management in the area. Most of the mature and old pine trees in the Lakes South plan area are expected to be killed by this infestation in the next few years. Harvesting is now almost entirely driven by mountain pine beetle control and salvage objectives.

The Lakes South SRMP is needed to ensure that LRMP objectives to protect forest and biodiversity values are implemented in a way that also considers the effects and needs created by the mountain pine beetle infestation.

Increase in the Annual Allowable Cut:
The annual allowable cut in the Lakes TSA was almost doubled to allow for mountain pine beetle management operations. This increase in cut, along with much of the previous harvest, is now concentrated in the southern half of the Lakes TSA where the mountain pine beetle infestation is greatest. The number of forest licencees operating in the district is increasing as the Ministry of Forests awards new Non-Replaceable Forest Licences, Community Forests Licences, and allows other Forest Licencees to harvest in existing tenures. This has resulted in a great increase in the number of forest development plans and amendments submitted to Ministry of Forests for approval. Planning for the management of non-timber values has also been complicated by the fact that individual landscape units and watersheds may have multiple forest licencees operating in them.

The Lakes South SRMP is required to provide clear direction to forest licencees and the Ministry of Forests on how to manage for biodiversity values at the landscape scale.

1.3 Benefits of this Plan

Conserve Biodiversity:
This plan provides clear objectives to ensure that a diversity of forest habitats are retained on the landscape. The plan does this by:

- Maintaining a range of age classes, including old-growth forest, appropriately distributed across the landscape.
- Providing connectivity, to allow for the movement of organisms across the landscape.
- Maintaining species diversity and wildlife trees through time.

All these objectives contribute to providing a range of habitat types that will support a wide diversity of animals and plants.

Create Certainty:
The clear measurable objectives, some of them spatially located on maps, removes uncertainty on how management for biodiversity will affect timber management objectives. This plan:

- Provides Ministry of Forests with the information it needs to allocate new forest licences to manage/salvage mountain pine beetle infested stands.
- Permits calculation of available timber volumes in any area of interest to determine levels of investment in infrastructure required for forest management objectives.
- Provides the framework necessary for Ministry of Forests and industry to create a comprehensive bark beetle management strategy.

Speed Operational Planning:
This plan will speed the process of creating and approving operational plans by:

- providing forest licencees with clear direction on what the expectations are for their operations before they submit operational plans to the Ministry of Forests;
- providing the Ministry of Forests District Manager with clear direction on what constitutes "adequate management and conservation of forest resources". Operational plans consistent with this SRMP adequately manage for most landscape biodiversity values.

Provide Flexibility:
Forest managers require flexibility to respond quickly to the mountain pine beetle infestation as it progresses. Flexibility is also required to meet biodiversity objectives as the post-beetle forest characteristics become known. This plan provides flexibility by:

- creating candidate old-growth management areas (OGMAs) instead of formally designating legal OGMAs at this time. The candidate OGMAs are located to meet biodiversity objectives while minimizing timber supply impacts. However, flexibility remains to manage these areas and to replace them if necessary;
- allowing for beetle control management in Landscape Corridors that exceeds connectivity objectives. Mitigation and recruitment strategies are provided.

1.4 Development of this Plan

The following process was followed to create this plan:

- in autumn 2001 a work plan outlining the intent and process of the Lakes South SRMP was drafted and sent out to all affected licencees and First Nations. They were invited to participate in this process (in the Technical Working Group – see below);
- an "expert panel" of ecologists from northern BC was convened in December 2001 to provide the biodiversity management principles that should underlie this SRMP given that the plan area is heavily infested with mountain pine beetle. The panel specifically looked at the principles in the Biodiversity Guidebook and provided direction on how they should be applied in landscapes dominated by mountain pine beetle disturbance. The report produced by this panel is found in Appendix 6;
- a "Technical Working Group" was created, made up of forest licencee representatives, which included First Nation representation, and Ministry of Sustainable Resource Management (MSRM) planning staff. This working group provided operational direction to the government team (MSRM) on objectives, strategies and spatial locations of old-growth management areas (OGMAs) and landscape corridors;
- the government team drafted objectives and strategies which were reviewed on an ongoing basis by the Technical Working Group;
- the final SRMP document was advertised for public comment for 60 days in February to April 2003;
- one submission was received during the public review and comment period. Appendix 7 summarizes the comments received and the responses from MSRM;
- the regional director of MSRM approved the Sustainable Resource Management Plan on July 17th, 2003. The regional director concurrently established Landscape Units and Objectives contained in the plan under the Forest Practices Code of BC Act.

PART 2. OBJECTIVES AND STRATEGIES

The Lakes South SRMP objectives and strategies listed in this section provide clear management direction on maintaining biodiversity values while retaining flexibility to manage the current mountain pine beetle infestation.

Three different types of objectives occur in this plan:
1. Current management objectives: Most of the objectives in this plan provide clear current management direction with measurable targets and indicators.
2. Future management objectives: Old growth management areas (OGMAs) will be designated at a future date when certain conditions are met. Therefore the objectives related to establishing and managing OGMAs are future objectives.
3. Monitoring objectives: Candidate OGMAs and wild young forest objectives do not have targets applied at this time in consideration of uncertainties created by the mountain pine beetle infestation. These objectives provide guidance to current management so as to retain good options for the revision of this plan when the infestation ends.

The objectives provide the desired outcome of management and are the legal component of this plan. Strategies are provided for most objectives to indicate the intent of how the objective is best achieved. The strategies provided are not legal direction and are not intended to limit options on achieving objectives.

2.1 Seral Stage Distribution

The goal of the following seral stage distribution objective is to maintain the diversity of seral stages and disturbance regimes found within the various biogeoclimatic subzones and variants within the Lakes South SRMP Area.

The Mountain Pine Beetle infestation in the south half of the Lakes TSA has the potential to significantly change the current age structure of the forest. Such changes do not affect the long term seral stage targets set out in the HLP order and restated in Tables 1 and 2. The infestation has also resulted in increases in the level of harvesting for beetle management purposes (harvesting of infested and dying trees aimed at reducing beetle spread). In the short term this harvesting will result in deviation from seral stage targets in some areas. It is recognized that over the next ten years research needs to be undertaken to better understand the effects of these changes on the environment, the economy and on society. This research will provide the knowledge needed for local resource planning groups to chart new directions.

Estimated, long term, target hectares and current state hectares for the seral stages referred to in objective 1 are provided in appendix 1.

Objective 1: Maintain early, mature plus old, and old seral stages by:

a) Using Table 1 to determine seral stage targets for each landscape unit within the Lakes South SRMP area, outside the Caribou Migration Corridor, including recruitment strategies where necessary;
b) Using Table 2 to determine seral stage targets for each caribou migration corridor seral stage management zone (see map 1) including recruitment strategies where necessary.

Table 1: Seral Stage Distribution for the Lakes South SRMP outside the Caribou Migration Corridor

Landscape Unit/ BEC Zone/ Biodiversity Emphasis Option[d]	Early[a]		Mature plus Old[b]	Old[c]
	Short Term	Long Term	Short and Long Term	Short and Long Term
Francois West / Int. BEO				
SBS	NA	<54%	>23%	>11%
ESSF	NA	<36%	>28%	>9%
Francois East / Low BEO				
SBS	NA	NA	>11%	>11%
ESSF	NA	NA	>14%	>9%
Cheslatta / Int. BEO				
SBS	NA	<54%	>23%	>11%
ESSF	NA	<36%	>28%	>9%
Ootsa and Intata North / Int. BEO				
SBS	NA	<54%	>23%	>11%
ESSF	NA	<36%	>28%	>9%

[a] The early seral stage objective will not be implemented in the short term. Early forest is <40 years for SBS and ESSF

[b] Mature forest is >100 years for SBS and >120 years for ESSF

[c] Old forest is >140 years for SBS and >250 years for ESSF

[d] Biodiversity Emphasis Options (BEOs) assigned to Landscape Units as per the Prince Rupert Region Landscape Unit Planning Strategy. Low BEO targets apply to the Francois East Landscape Unit, Intermediate BEO targets apply to the Cheslatta, Intata, and Ootsa Landscape Units. The Intata and Ootsa Landscape Units are both divided by the Nechako Reservoir with the southern portions of both units falling within the "Low Use" Caribou Management Zone (see Table 2). The northern portions of both units will be treated as a single unit for the purposes of seral stage distribution in which the Intermediate BEO targets will apply. High biodiversity emphasis option targets are included in this table for reference only as the High BEO landscape unit (Chelaslie) is located in the caribou migration corridor and the targets listed in Table 2 therefore apply to this landscape unit.
SBS is Sub-Boreal Spruce, its subzones and variants.
ESSF is Engelmann Spruce Subalpine Fir, its subzones and variants.

Table 2: Seral Stage Distribution for the Caribou Migration Corridor

Seral Stage Management Zone*	Seral Stages			
	> 140 Years	> 80 Years	Early[a] < 40 Years	
			Short Term	Long Term
High Use (LRMP CMC zone B,C, and D)	> 40%	> 60%	< 25%	< 25% <32%
Moderate Use (LRMP CMC zone A)	> 30%	> 45%	NA	<54%
Low Use (LRMP CMC zone E)	> 20%	> 30%	NA	

* See attached Map 1.

[a] The early seral stage objective will not be implemented in the caribou Moderate Use and Low Use zones for the short term.

2.2 Old growth Forest Retention Through OGMA Establishment

The goal of the following OGMA objectives is to manage for the retention or recruitment of appropriately sized areas of old growth forest by:

- managing for old growth (OG) within areas referred to as "Candidate OGMAs" during the mountain pine beetle infestation. These areas are not legally implemented in this plan to allow for flexibility in mountain pine beetle operations;
- establish OGMAs following the mountain pine beetle infestation that are appropriately sized, contain or could be managed to recruit, specific structural old growth forest attributes and represent the range of ecosystem types found across the Lakes South planning area.

The flexibility or option to harvest in candidate OGMAs is guided by the following principles:

- harvesting within candidate OGMAs should only be undertaken where it will likely have a significant impact on reducing MPB spread;
- candidate OGMAs that lose old growth attributes due to MPB harvesting operations will be replaced by OG stands that survive the MPB infestation;
- candidate OGMAs that do not lose OG attributes due to MPB harvesting operations will be legally established (designated) as OGMAs once the current mountain pine beetle control operations have been completed and updated forest cover information is available.

The candidate areas are intended to provide guidance on those areas best meeting old seral criteria and have been selected to minimize impacts on timber supply.

Appendix 2 provides a breakdown of candidate OGMAs with respect to the old target, old establishment target and old captured in candidate OGMAs.

Objective 2: Manage for old growth forest that is representative of the range of ecosystem types and which provides for interior forest conditions by:

a) Considering Candidate OGMAs as indicated on map 2 when planning forest development during the current mountain pine beetle epidemic.
b) Establishing OGMAs following current mountain pine beetle epidemic that:

- provide for a minimum percentage of old forest for each LU as noted in Table 3 (Old forest establishment target). Old that dies during the infestation within candidate OGMAs will be counted as contributing to the old establishment target;
- provide for interior forest conditions in Old Growth Management Areas (OGMAs) by ensuring that OGMAs are a minimum of 600 metres wide. The minimum area of interior forest condition to be retained within old seral will be based on the percentages in Table 4.

Strategies

1) Refer to OGMA selection priorities provided in appendix 3.
    - Include the range of ecosystem types present in each landscape unit when establishing OGMAs. Ecosystem types consist of site series grouped into subhygric,

mesic and xeric classes for each variant as per Table 5. This strategy will need to be tested over time and adjusted as better information on ecosystem site series becomes available.

Table 3. Old Forest Establishment Target [a]

Landscape Unit (biodiversity emphasis option)	*BEC Variant*	*Old age yrs*	*BGB Old Seral target*	*Old Establishment Target (% of old seral target)*
FRANCOIS WEST	SBS dk	>140	11%	75%
Intermediate	SBS mc 2	>140	11%	75%
	ESSFmc	>250	9%	75%
	ESSFmcp	>250	9%	75%
	ESSFmv 1	>250	9%	75%
FRANCOIS EAST	SBS dk	>140	11%	50%
Low	SBS mc 2	>140	11%	50%
	ESSFmc	>250	9%	50%
CHESLATTA	ESSFmc	>250	9%	75%
Intermediate	SBS mc 2	>140	11%	75%
	SBS dk	>140	9%	75%
OOTSA NORTH	SBS mc 2	>140	11%	75%
Intermediate	SBS dk	>140	11%	75%
OOTSA CMZ	LOW (E)	>140	20%	50%
INTATA NORTH	SBS dk	>140	11%	75%
Intermediate	SBS mc 2	>140	11%	75%
	ESSFmc	>250	9%	75%
INTATA CMZ	LOW (E)	>140	20%	50%
CHELASLIE CMZ	HIGH (B,C,D)	>140	40%	75%
	MODERATE (A)	>140	30%	20%
	LOW (E)	>140	20%	30%

[a] Old Seral Target is consistent with the Biodiversity Guidebook and Old Forest Establishment Target is a percentage of the Old Seral Target specific to OGMA establishment. This distinction allows for old forest in riparian zones and WTP, greater than 2 hectares, to potentially contribute to the total old seral target. Note: Appendix 2 provides approximate hectare targets for OGMA establishment using the above percentages.

Table 4. Interior Forest Condition Targets [b]

NDT	Low BEO	Intermediate and High BEO
NDT 2	>10%	>25%
NDT 3	>10%	>25%

[b] Guidance for analyzing interior forest found in appendix 4

Table 5. Lakes TSA Ecosystem Types

Ecosystem Type	**SBSdk**	**SBSmc2[a]**	**ESSF[b]**
Subhygric	* 09, 10, some 08	12, some 10	10, some 08, some 09
Mesic	01, 03, 04, 05, 06, 07, some 08	01, 03, 05, 06, 07, 09, some 10	01, 03, 04, 05, 06, 07, some 08, some 09
Xeric	02	02	02

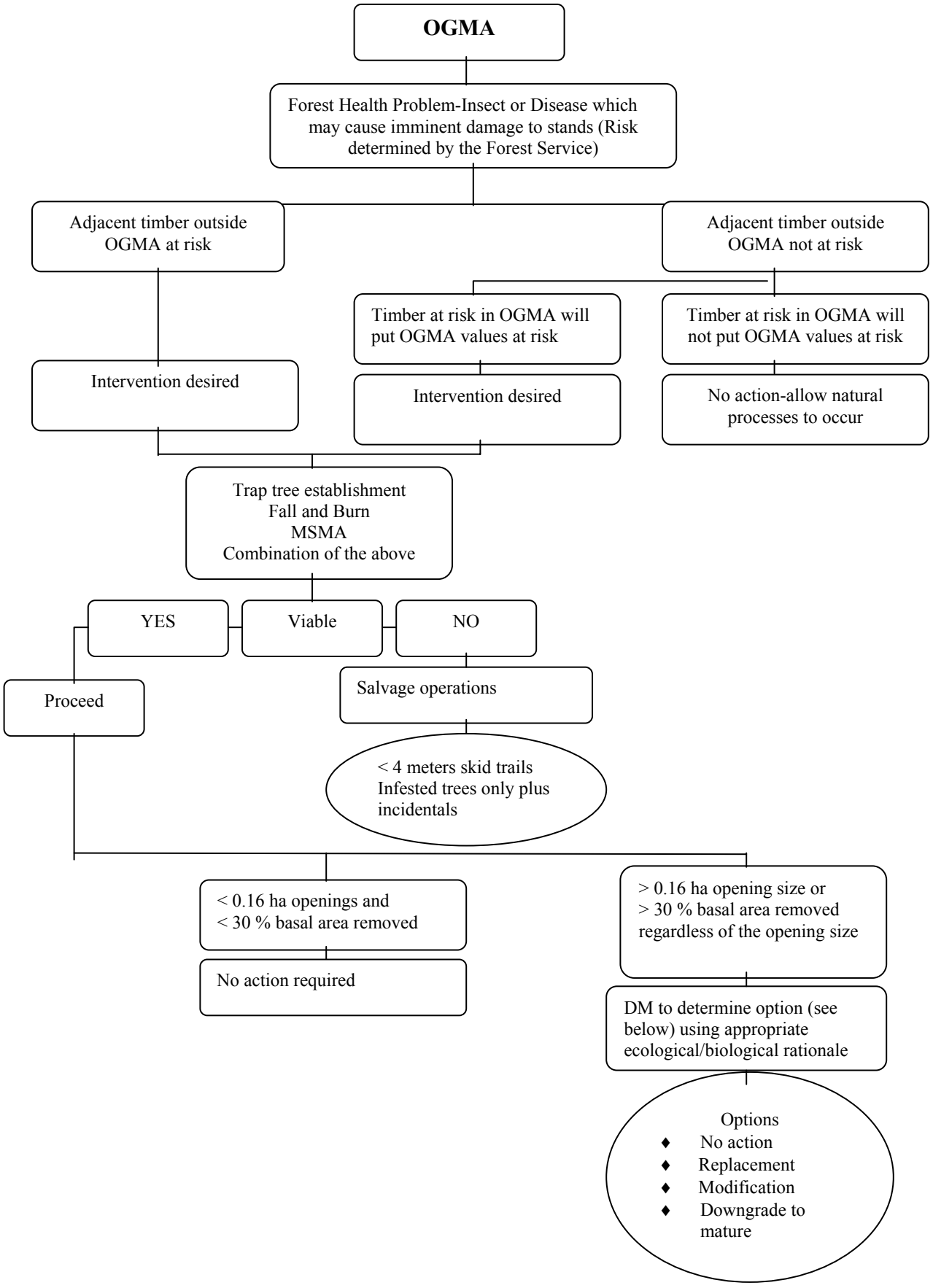
[a] SBSwk3 is included within the SBSmc2 for representation purposes.
[b] All ESSF subzones and variants are combined for representation purposes.
* Numbers 01-12 refer to site series as identified in *A Field Guide to Site Identification and Interpretation for the Prince Rupert Forest Region*, updated 1993.

Objective 3: Manage for old growth attributes in established OGMAs. This objective will come into effect following the establishment of OGMAs (Objective 2b).

Strategies

1) Harvesting will not be permitted in OGMAs unless allowed for under strategies 2, 3 and 4.
2) Within OGMAs the following activities will be permitted:
   - cone gathering and tree topping;
   - fire suppression;
   - range use;
   - hunting, fishing, trapping;
   - recreation;
   - mining and exploration including incidental tree cutting for mining and exploration purposes;
   - collection of botanical forest products.
3) Allow natural processes to occur within OGMAs unless infestations or infections threaten to put OGMA values at risk or threaten to spread into areas outside OGMAs. Aim at retaining structural features of old growth where intervention is required (Figure 1).
4) New roads will not be permitted in OGMAs unless no other reasonable and cost effective options exist. When roads have been constructed within OGMAs, road deactivation will occur once operational activities are complete.
5) Within OGMAs new grazing tenures will not be issued or boundary of existing tenures changed.
6) Replace or modify OGMAs where their attributes have been significantly compromised due to: exploration and mining activities, natural processes, or harvesting as per strategies 2, 3, and 4. Forest stands within OGMAs that have been impacted by mountain pine beetle disturbance may still contribute to old seral targets. Mountain pine beetle disturbance, on its own, does not necessarily require OGMA replacement or modification.

Figure 1. Decision Matrix for harvesting in OGMAs



2.3 Connectivity

The goal of the following connectivity objective is to facilitate the flow of energy and organisms across the landscape. The rate of harvest disturbance permitted by the seral stage objectives will result in a reduced old forest component embedded in a matrix of younger forests. Thus connectivity in this plan focuses on linking old seral ecosystems. Connectivity networks contain natural vegetation, usually mature to older forests, that serve to connect distinct patches on the landscape thereby allowing easier movement of plant and animal species between, what would otherwise be isolated patches.

Objective 4: Maintain within a managed forest setting, landscape corridors (map 3) dominated by mature tree cover and containing most of the structure and function associated with old forest by:

a) providing habitat connectivity within the landscape;
b) permitting movement and dispersal of plant and animal species.

Appendix 5 summarizes the distribution of landscape corridors within and between landscape units.

Strategies

1) Maintain over 70% of the Crown forest land within a landscape corridor segment1 consistent with any of the attributes contained in Table 6.

Table 6. Minimum criteria for forests providing connectivity in landscape corridors.

Forest Type	Criteria
SBS coniferous forest	≥ 70 years old
ESSF coniferous forest	≥ 100 years old
Deciduous leading forest	≥ 40 years old
Stands with mature/old characteristics	height > 15m and Crown closure > 25%
Managed stand with single tree selection or group selection	Meets mature age criteria (seral stage objective) with no more than 30% of the basal area removed on a per hectare basis

2) Maintain connectivity of cover within a landscape corridor by restricting the size of harvest units to an average of 2 hectares with maximum opening size not exceeding 3 hectares. A 4 hectare average and maximum opening size will apply when a corridor is heavily impacted by insect disturbance and beetle control or salvage are the primary management objectives.
3) Avoid new permanent access in landscape corridors.
4) Orient development in landscape corridors to minimize impacts on connectivity.
5) Where beetle control activities require harvest strategies that exceed strategies 1 to 3 in the short term, mitigation strategy includes:

[1] Corridor segments as shown on the corridor coverage - map 3.

- maximizing retention of non-infected mature and old trees (non-target species) and advanced regeneration;
- rehabilitation of new access structures created for beetle control activities. This may include planting of coniferous and/or deciduous species.

6) Outside of landscape corridors, strong linkages (map 3) provide additional opportunities to manage for connectivity. No objectives/management requirements are set for strong linkages, however focusing wildlife tree retention and small patch openings in strong linkages will contribute to greater landscape connectivity.

2.4 Patch Size Distribution

The purpose of the following objective is to create and maintain a pattern of seral stages distributed across the landscape reflecting the pattern created by a natural disturbance regime. The objective and its strategies focus on the pattern of harvest development.

Objective 5: Attain a pattern of development, over time, across the Lakes South planning area that represents the natural disturbance pattern. Table 7 provides guidance as to the range of patch sizes that are considered representative of natural patterns for the planning area.

Strategies

1) Provide a range of opening sizes at the end of a rotation as per Table 7. This range will be achieved across the Lakes South Planning area, with attempts made to approach this range in each Landscape Unit.

Table 7. Percent of forested area by NDT

NDT	BEC Subzone	Patch Size	Patch Size	Patch Size
		<40 ha	40-80 ha	80+ ha
2	ESSFmc	30-40%	30-40%	20-40%
		<40 ha	40-250 ha	250+ ha
3	SBSdk SBSmc2	10-30%	10-30%	40-80%

2) Target smaller (<40 ha) early seral patches in Ungulate Winter Habitat Resource Management Zones.
3) The preferred order for achieving large cutblocks (>60 ha) is:
   - to amalgamate existing blocks;
   - to enlarge existing cutblocks;
   - to create new cutblocks greater than 60 ha.
4) Retain structural attributes in or adjacent to cutblocks by retaining wildlife tree patches and leave areas. Give consideration to increased retention in larger openings.

5) Methodology for calculating patch sizes has not been finalized. See options proposed in expert panel report in Appendix 6. Calculation methodology selected should ensure that blocks are not inappropriately grouped and considered as larger patches.
6) Ensure that patterning of harvest also results in a similar range in leave area sizes.

2.5 Stand Structure through Wildlife Tree Retention

The goal of Wildlife Tree Retention (WTR) is to maintain the structural attributes[2] (standing dead and dying trees, coarse woody debris of suitable size left on the ground, tree species diversity, and understory vegetation diversity) of natural forests within managed forests over the rotation of a managed stand. The importance of maintaining this material can not be underestimated with respect to providing on site habitat diversity and nutrient cycling. Providing for structural attributes within managed forests will be achieved by retaining wildlife tree patches[3] consistent with the objectives outlined below. For more background concerning the intent of these objectives and suggestions that could support rationales for varying from these objectives refer to page 60 through 67 of the Biodiversity Guidebook.

Discussion: *Because of the rapid changes occurring on the landscape in response to the current beetle infestation it is understood that final harvesting and administrative amendments to cutting authorities (e.g. Cutting Permits, Silviculture Prescriptions, site plans) may take several years. For this reason it is not reasonable to expect WTP requirements be accounted for (reconciled) until after beetle spread reduction harvesting, within a harvest unit[4], is completed.*

Objective 6: Maintain structural diversity in managed stands by retaining Wildlife Tree Patches in each cutblock to the targets in Table 8. Shifting or varying targets among cutblocks within a harvest unit may be considered when risks to biodiversity are low or when based on a sound biological rationale. Cutblocks that are smaller than 2 hectares, or harvest units where there are no cutblocks less than 2 hectares are exempted from this objective.

Strategies

1) Provide structure in riparian management areas but limit the contribution of riparian areas to wildlife tree patches to less than 50% of the total wildlife tree patch area of a harvest unit.
2) Attempt to visibly and physically "break up" the area to be logged.

[2] Structural attributes: components of a forest stand (including living and dead standing trees, canopy architecture, and fallen dead trees) which together determine stand structure.

[3] Wildlife Tree Patch: an area specifically identified for the retention and recruitment of suitable wildlife trees. It can contain a single wildlife tree or a group reserve.

[4] Harvest Unit: an individual block or group of blocks which are within a 4 kilometer radius of each other and where the silviculture prescription or cutting permit (or site plan) for these blocks refer to the fact that they are a harvest unit.

3) Distribute patches throughout the block with distances between patches (or to other suitable leave areas outside the block) not normally exceeding 500 metres. Attempt to distribute these "internal wildlife tree patches" to provide connectivity within the logged area.
4) Examples of rationales to shift or vary targets between blocks within a harvest unit include:
   - small individual blocks in a patchwork of mature timber present lower risks to biodiversity thus reducing the need for WTP associated with each individual opening;
   - grouping of individual opening WTP targets within the harvest unit allow for the protection of important habitat areas.

Table 8. Wildlife Tree Patch Retention Targets for the period an accelerated AAC for beetle harvesting is in effect.

	% of cutblock to be retained as WTP					
BEC Subzone	**Chelaslie**	**Ootsa**	**Intata**	**Cheslatta**	**FL West**	**FL East**
SBS dk	>12	>12	>16	>12	>13	>14
SBS mc2	>12	>12	>16	>12	>13	>14
ESSFmc, ESSFmcp	>9	>9	>9	>9	>12	>9

Objective 7: Ensure representation of pre-harvest stand wildlife tree values by:

a) designating wildlife tree patches containing predominantly coniferous trees having an average age that is generally consistent with the age of the stand harvested and;
b) designating wildlife tree patches with a forested crown closure of not less than 25%. Harvested areas containing WTP with less than 25% Crown closure or scattered wildlife trees will contribute to WTP requirements equivalent to the basal area left behind (WTP equivalent area calculated using the average BA of the block harvested).

Discussion: The intent of part a) is to ensure coniferous representation (live and dead) within wildlife tree patches and allow for the removal of infested trees that pose a threat to surrounding forests. The intent of part b) of Objective 8 is to provide more flexibility in choosing WTP and meeting WTP requirements on individual or groups of blocks that were harvested for the purpose of beetle spread management. The intent is not to skeletonize WTP to their minimum crown closure levels.

Strategies

1) Deciduous patches are acceptable but should not exceed 30% of the total WTR target outlined in Table 8.
2) Select wildlife tree patches that are representative of the stand harvested and have an average age that is within + or – 20% of the average age of the stand harvested.
3) Wildlife tree patches should be selected based on the characteristics of individual trees found within the wildlife tree patch as per table 9:
4) Locate wildlife tree patches to provide a range of old forest stand attributes such as standing dead trees, large standing live trees, coarse woody debris, tree species diversity and structural diversity.

Table 9. Wildlife Tree Characteristics [5]

Wildlife Tree Value	Characteristics
HIGH A high-value wildlife tree has at least two of the characteristics listed in the adjacent column (some of these characteristics may need to be balanced with forest health priorities).	• Internal decay (heartrot or natural/excavated cavities present) • Crevices present (loose bark or cracks suitable for bats) • Large brooms present • Active or recent wildlife use • Current insect infestation • Tree structure suitable for wildlife use (e.g., large nest, hunting perch, bear den, etc.) • Large, old trees including trees within the upper 10% of the diameter class • Locally important wildlife tree species
MEDIUM	• Large, stable trees that will likely develop two or more of the above attributes for High
LOW	• Trees not covered by High or Medium categories

Objective 8: Maintain old growth and wildlife tree values within wildlife tree patches by allowing natural processes to occur within wildlife tree patches unless infestations or infections in the wildlife tree patch threaten to spread to the adjacent forested areas. Where intervention is required, treatment will retain a diversity of structural attributes consistent with Objectives 7 and 8 or a suitable replacement wildlife tree patch will be located.

Strategies

1) No harvesting within WTP except for forest health purposes and mineral exploration and development.

[5] Table taken from Provincial Wildlife Tree Recommendations - http://www.for.gov.bc.ca/hfp/pubs/wildlife_trees/WLTpolicyfinalMay15-00.pdf

2.6 Retention of Wild Young Forest

Wild young forest refers to naturally created young seral forests such as young unmanaged post-fire stands and beetle-killed stands. These forests, while classified as young seral forests, have significantly different characteristics than young plantations and have become increasingly rare in our forests due to fire suppression, salvage harvesting, and widespread spacing and thinning of naturally regenerated young stands.

The goal of the following wild young forest objective is to ensure retention of representative naturally created young seral forest types across the Lakes South planning area. It is assumed that due to the extent of the mountain pine beetle infestation large areas of wild young forest are being created and that therefore there is little risk in the short term of not designating specific wild young forest stands for retention.

Discussion:

- WYF recognized as important in expert panel report
- Need to test the effectiveness of this objective over the next 5 years. The strategies below provide for the identification and testing of specific areas (WYF attributes and representation)
- Need to recognize that as new areas are created by disturbance other areas may benefit from silvicultural treatments

Objective 9: Ensure retention of naturally created wild young forest by monitoring establishment of stands with wild young forest attributes[6] and assessing options to ensure retention of up to one percent of the Crown forested land-base across the Lakes South planning area in representative[7] wild young forest stands.

Strategies

1) Identify unmanaged age class one and two stands from the forest cover inventory or other sources. Assess risk of these stands losing wild young forest attributes through forest management activities. If forest management threatens to reduce area of these stands to less than one percent of the Crown forested land-base across the plan area, consider selecting a representative cross-section of these stands, not less than one percent of the Crown forested landbase in the planning area, and designating them as Wild Young Forest reserves. Where less than one percent of the Crown forested land-base in the planning area is identified, all the available stands meeting the above criteria should be considered for designation as Wild Young Forest reserves.

[6] Wild young forests are unmanaged stands created by natural disturbance events such as fire, beetle infestations and catastrophic windthrow and in which dominant tree species are less than 40 years old.

[7] Retained wild young forest stands should represent the range of BEC variants and tree species inventory type groups in which wild young forests occur.

2) Minimize timber impacts by locating suitable and representative Wild Young Forest reserves in areas that are constrained or non-contributing to timber supply before locating reserves in the timber harvesting land base.
3) No harvesting, salvage operations, silvicultural activities, or any other forest management activities are permitted in Wild Young Forest reserves unless necessary to protect resource values in adjacent areas.
4) Once a stand in a Wild Young Forest reserve exceeds age forty years, it will be removed from the reserve and management constraints removed. However, these areas should be considered for their potential as recruitment Old growth Management Areas.
5) A review of the available wild young forest stands (as per strategy 1) will be conducted every 5 years or following significant new natural disturbance events.

2.7 Coniferous and Deciduous Tree Species Diversity

Objective 10: Maintain a diversity of coniferous and deciduous species across each Landscape Unit and throughout the rotation that represents the natural species composition[8] of each biogeoclimatic subzone.

Strategies

1) Where spruce and subalpine fir are not planted but are a primary or secondary species, as per the Establishment to Free Growing Guidebook for the Prince Rupert Forest Region, facilitate natural regeneration by ensuring these species are a component of wildlife tree patches scattered throughout larger openings.
2) Incremental silviculture activities should ensure that all existing ecologically acceptable species on site will be represented.
3) Where the preharvest stand has a major component (greater than 20%) of deciduous species, retain a portion of these species as either wildlife tree patches and/or reserve patches (wildlife tree patches can include the retention of single trees).
4) Where the preharvest stand had little or no deciduous component, but deciduous species have invaded naturally, design control measures so the presence of deciduous species will not be eliminated from the site while also recognizing that free-growing requirements must be achieved. Preferably, retain deciduous in a clumpy distribution.
5) Do not assist conversion of natural deciduous stands to coniferous species.
6) Rare forest stand types within the landscape unit (that is, those accounting for less than 2% of the area, such as birch, cottonwood, and Douglas fir) should be maintained over the rotation.

[8] Natural species composition for the purposes of this plan are the species present, in their relative proportions on the landscape, in 2002.

PART 3. IMPLEMENTATION AND MONITORING

Changes in government organization over the past year in addition to recent changes to Forest Practices Code and introduction of the Forest and Range Practices Act and other legislation, have introduced some uncertainty with respect to the implementation and monitoring of strategic planning within the province. The Prince Rupert Forest Region is developing a regional monitoring strategy intended to integrate SRMP and LRMP monitoring. Until the current round of new legislation is enacted and understood this section of the Lakes South SRMP will remain draft. The information presented below represents current understanding regarding the roles and responsibilities for the Implementation and Monitoring of SRMPs.

3.1 Roles and Responsibilities

AGENCIES

Ministry of Sustainable Resource Management

The Ministry of Sustainable Resource Management (MSRM) is responsible for leading strategic planning to balance social, economic and environmental interests in land use, and will be establishing landscape level zones and objectives. MSRM will be capitalizing on initiatives in communities and within the forest industry to deliver these products. MSRM will not be directly involved in plan implementation but will:

- interpret plan objectives and resolve issues as required;
- advise Government of specific problems with the plan, and;
- co-ordinate and oversee amendments to the plan.

MSRM will assemble information on the monitoring of SRMPs supplied by MoF for the purpose of incorporating this information into existing Land and Resource Management Plan (LRMP) monitoring reports.

Ministry of Forests

The Ministry of Forests will retain responsibility for approval of Forest Stewardship Plans (FSP) and Resource Development Permits that are consistent with the legislation and objectives set by government, and compliance and enforcement. MOF will also monitor the effectiveness of the legislation in achieving stated objectives and will report on indicators of Sustainable Forest Management.

Interagency Management Committee

IAMC has been established to provide overall coordination of the implementation and monitoring of LRMPs. The Lakes South SRMP is one means of implementing operational components of the Lakes LRMP. To avoid duplication implementation and monitoring of the Lakes South SRMP will be coordinated with the Lakes LRMP monitoring report.

Licensees (includes BC Timber Sales)

The responsibility for Forest Stewardship Planning rests with the forest licensee. A forest licensee who expects approval of a FSP will have to provide evidence to demonstrate that the FSP will achieve objectives set by government for zones located in the area encompassed by the plan. In some cases licensees will need to collaborate (example – Morice and Lakes

IFPA partnership) to ensure that broad biodiversity objectives for specific zones or landscape units are achieved. Monitoring actions taken by licensees will also provide some assurance that licensees are minimizing their exposure to risk and associated liability.

PUBLIC

Public involvement in Lakes South SRMP implementation is through review and comment on FSP and through the Lakes LRMP monitoring committee. The monitoring committee may make recommendation to the Prince Rupert Interagency Management Committee (IAMC) with respect to plan implementation, monitoring and amendment.

3.2 Implementation

As previously stated licensees are responsible for the implementation of the Lakes South SRMP. Alternative methods of implementing the plan's objectives may be used if it can be demonstrated that they clearly achieve or surpass plan objectives.

3.3 Monitoring

Monitoring of this plan will be embedded in the procedures and monitoring reports used for the Lakes LRMP. Monitoring is hierarchical such that SRMP monitoring is directly linked to LRMP monitoring through linked or similar indicators. At the time of plan production a Lakes LRMP Monitoring report had been completed in the fall of 2001, and a second is scheduled for the fall of 2003. MSRM is piloting procedures for monitoring and hopes to apply these to future strategic plan objectives.

3.4 Adaptive Management

This plan was developed using the best available information and knowledge. Associated with this is uncertainty both in the information and knowledge used and in the effectiveness of management recommendations. To address this uncertainty an adaptive management process is recommended to allow continual improvement of management policies and practices. By monitoring key responsive indicators over time and incorporating new information and knowledge licensees will be able to analyze and report on the outcomes of their management practices with respect to base line conditions and incorporate this knowledge into future management approaches. An adaptive management framework could be an effective way of structuring the monitoring of the plan.

PART 4. APPENDICES

Appendix 1. Seral stage analysis – long term target hectares and current state [a].

Seral Stage Management Unit (CMC or LU)	BEC Variant	Total CF (ha.)	Early Seral			Mature Plus Old Seral			Old Seral		
			age/ %target	Max target (ha.)	current state (ha.)	age/ %target	Min target (ha.)	current state (ha.)	age/ %target	Min target (ha.)	current state (ha.)
CMC – High		60,753	<40/<25%	15,188	11,724	>80/>60%	36,452	41,855	>140/>40%	24,301	27,138
CMC – Moderate		21,627	<40/<32%	6,921	7,157	>80/>45%	9,732	13,434	>140/>30%	14,204	10,941
CMC - Low		47,342	<40/<54%	25,567	16,346	>80/>30%	14,204	27,453	>140/>20%	9,469	15,474
Ootsa North	SBS mc 2	5,391	<40/<54%	2,911	701	>100/>23%	1,240	2,731	>140/>11%	593	1,618
(BEO - Interm.)	SBS dk	11,228	<40/<54%	6,063	1,172	>100/>23%	2,582	5,451	>140/>11%	1,235	2,448
Ootsa LU subtotal		16,619		8,974	1,873		3,822	8,182		1,828	4,066
Intata North	SBS dk	13,605	<40/<54%	7,347	4,500	>100/>23%	3,129	5,077	>140/>11%	1,497	2,517
(BEO - Interm.)	SBS mc 2	5,626	<40/<54%	3,038	1,999	>100/>23%	1,294	2,155	>140/>11%	619	1,430
	ESSFmc	368	<40/<36%	132	132	>120/>28%	103	171	>250/>9%	33	155
Intata LU subtotal		19,599		10,517	6,631		4,526	7,403		2,149	4,102
Cheslatta	SBS dk	50,221	<40/<54%	27,119	8,485	>100/>23%	11,551	27,955	>140/>11%	5,524	16,604
(BEO - Interm.)	SBS mc 2	35,541	<40/<54%	19,192	6,088	>100/>23%	8,174	18,492	>140/>11%	3,910	12,060
	ESSFmc	8,389	<40/<36%	3,020	1,902	>120/>28%	2,349	3,015	>250/>9%	755	2,537
Cheslatta LU subtotal		94,151		49,332	16,475		22,074	49,462		10,189	31,201
Francois West	SBS dk	25,800	<40/<54%	13,932	5,577	>100/>23%	5,934	13,572	>140/>11%	2,838	9,145
(BEO - Interm.)	SBS mc 2	21,515	<40/<54%	11,618	4,624	>100/>23%	4,948	9,856	>140/>11%	2,367	7,272
	ESSFmc	3,668	<40/<36%	1,320	275	>120/>28%	1,027	1,986	>250/>9%	330	1,923
	ESSFmcp	15	<40/<36%	5		>120/>28%	4	-	>250/>9%	1	-
	ESSFmv 1	-	<40/<36%	-		>120/>28%	-	-	>250/>9%	-	
Francois W subtotal		50,998		26,876	10,476		11,914	25,414		5,536	18,340
Francois East	SBS dk	46,054	<40/NA	46,054	9,265	>120/>11%	5,066	23,140	>140/>11%	5,066	15,302
(BEO – Low)	SBS mc 2	12,395	<40/NA	12,395	3,008	>120/>11%	1,363	6,514	>140/>11%	1,363	4,175
	ESSFmc	3,853	<40/NA	3,853	484	>120/>14%	539	2,459	>250/>9%	347	1,946
Francois E subtotal		62,302		62,302	12,757		6,969	32,113		6,776	21,423
Lakes South TOTAL		373,391									

[a] Current state as of end of June 2002 - All harvesting and approved blocks to the end of June have been accounted for (these areas have been included in the early seral category). Forest cover file used for analysis was year 2000 projected to 2002.

Appendix 2. Candidate OGMA area analysis (Feb. 27, 2003 version)

Landscape Unit (biodiversity emphasis option)	BEC Variant	Crown Forested	Old age	Old target		Old establishment target)		Candidate OGMAs				Uncha Red Hills Park	
								Crown Forest in COGMAs		*Old in COGMAs*		*Crown Forest*	*Old*
		Ha.	*yrs*	*%*	*Ha*	*%*	*Ha.*	*%of est. target*	*Ha.*	*%of est. target*	*Ha.*	*Ha.*	*Ha.*
FRANCOIS WEST	SBS dk	25800	>140	11	2838	75%	2129	170%	3615	91%	1936		
Intermediate	SBS mc 2	21515	>140	11	2367	75%	1775	141%	2494	102%	1807		
	ESSFmc	3668	>250	9	330	75%	248	141%	348	91%	226		
	ESSFmcp	15	>250	9	1	75%	1	198%	2	0%	0		
	ESSFmv 1		>250	9		75%			0		0		
L.U. TOTAL		**50998**			**5536**		**4152**	**156%**	**6459**	**96%**	**3969**	**0**	**0**
FRANCOIS EAST	SBS dk	46054	>140	11	5066	50%	2533	122%	3096	79%	1995	6129	1534
Low	SBS mc 2	12395	>140	11	1363	50%	682	53%	363	47%	318	829	207
	ESSFmc	3853	>250	9	347	50%	173	0%	0	0%	0	1011	0
L.U. TOTAL		**62302**			**6776**		**3388**	**102%**	**3459**	**68%**	**2313**	**7969**	**1741**
CHESLATTA	ESSFmc	8389	>250	9	755	75%	566	212%	1203	0%	0		
Intermediate	SBS mc 2	35541	>140	11	3910	75%	2932	117%	3442	63%	1861		
	SBS dk	50221	>140	9	4520	75%	3390	214%	7239	115%	3914		
L.U. TOTAL		**94151**			**9184**		**6888**	**173%**	**11884**	**84%**	**5775**	**0**	**0**
OOTSA NORTH	SBS mc 2	5391	>140	11	593	75%	445	126%	561	105%	468		
Intermediate	SBS dk	11228	>140	11	1235	75%	926	169%	1570	99%	915		
LU TOTAL		**16619**			**1828**		**1371**	**155%**	**2131**	**101%**	**1383**	**0**	**0**
OOTSA CMZ													
(E)	LOW (E)	11278	>140	20	2256	50%	1128	285%	3212	128%	1445		
L.U. TOTAL		**11278**			**2256**		**1128**	**285%**	**3212**	**128%**	**1445**	**0**	**0**
INTATA NORTH	SBS dk	13605	>140	11	1497	75%	1122	83%	936	34%	377		
Intermediate	SBS mc 2	5622	>140	11	619	75%	464	170%	791	117%	541		
	ESSFmc	368	>250	9	33	75%	25	0%	0	0%	0		
LU TOTAL		**19599**			**2149**		**1611**	**107%**	**1727**	**57%**	**918**	**0**	**0**
INTATA CMZ													
	LOW (E)	25880	>140	20	5176	50%	2588	161%	4171	117%	3031		
L.U. TOTAL		**25880**			**5176**		**2588**	**161%**	**4171**	**117%**	**3031**	**0**	**0**
CHELASLIE CMZ	HIGH (B,C,D)	60753	>140	40	24301	75%	18226	116%	21184	76%	13776		
	MODERATE (A)	21627	>140	30	6488	20%	1298	23%	297	20%	257		
	LOW (E)	10188	>140	20	2038	30%	611	13%	77	12%	74		
L.U. TOTAL		**92568**			**32827**		**20135**	**107%**	**21558**	**70%**	**14107**	**0**	**0**
GRAND TOTAL		**373391**			**65732**		**41262**	**132%**	**54601**	**80%**	**32941**	**7969**	**1741**

Notes for Appendix 2

Crown Forested = sum of N + T + P (taken from TSR 2 DBF file - using field THLB - 1st. char. in this field can be an O,X, N,PorT)

Where O = Ownerships excluded from biodiversity consideration (as per landscape unit planning guide)

Where X = Exclusions - non forested areas (I.e., non-productive, non-commercial cover)

Where **N** = Non-contributing forest - complete removals from the THLB that still contribute to landscape level biodiversity

Where **P** = partial removals from the THLB - stand specific (eg. ESAs, Sutherland planning cells for operability)

Where **T** = THLB with no stand specific partial removals

Note: All Ha. values run against Crown Forested

Old Age = Minimum old age as per Biodiversity Guidebook for BEC NDT
Old Target = Crown Forest Ha. times the Biodiversity Guidebook old target %
Old Growth Establishment Target = Target % derived from Lakes South Landscape Level Plan (fall 2002)
OGMA Candidate Areas = Hectares of old and less than old captured in OGMA Candidate areas. Also expressed as a % of the OGMA establishment target.

Appendix 3. Matrix for OGMA selection after end of beetle infestation

When establishing OGMAs, post beetle, the following matrix will be used to guide selection of OGMAs required to meet the OGMA target

OGMA Selection Matrix - Post MPB OGMA Selection priorities for establishing OGMAs

	Non-Contributing	**Highly Constrained**	**Mod. Constrained and THLB**
Old in Candidate OGMA Areas (dead or alive)	**1**	**2**	**3**
Old alive outside Candidate Areas	**4**	**5**	**6**
Old dead outside Candidate Areas	**10**	**11**	**12**
X of old alive outside Candidate Areas	**7**	**8**	**9**
X of old dead outside Candidate Areas			
Less than X of Old alive outside Candidate Areas			

Definitions:

- Old Forest – as per the biodiversity guidebook - ESSF > 250 years old for SBS >140 years old
- Non-Contributing Forest – complete removals from the timber harvesting land base (THLB) that still contribute to landscape level biodiversity (as defined in TSR 2) and include new parks established after approval of the Lakes LRMP
- Highly Constrained – includes backcountry lakes, ESA 70% and 90%, Deer and Goat winter ranges, Caribou migration corridor zones B and D, Grizzly and significant Visual retention
- Moderately Constrained – includes ESA 60%, Significant visual zone partial retention, Visual zone retention and partial retention
- "alive" – Post infestation stands qualifying as alive
  - Stands with greater than 40% live stems of the dominant and subdominant tree species (age based on the age of the dominant trees whether dead or alive)
- Post Beetle – when the AAC returns to a long term sustainable level

Appendix 4. Guidance for analyzing Interior Forest

For the purposes of the Lakes South Sustainable Resource Management Plan Interior forest refers to forest within the old seral category not influenced by forest edge effects.

Analysis of interior forest should include an analysis of total interior forest and interior forest within OGMAs.

Total Interior Forest – includes the total amount of Interior Forest within the old seral category present within a landscape unit. Buffer distances into the old seral to account for edge influences are provided in Table A-1

Interior Forest Within OGMAs (critical Interior Forest) - includes the total amount of Interior Forest within the old seral category within OGMAs within a landscape unit. Buffer distances into the old seral to account for edge influences are provided in Table A-1. For the purposes of this analysis assume that anything outside the OGMA boundary is less than 40 years old (200 m buffer).

Table A-1. Buffer distances into old seral to be used when determining the amount of interior forest.

BEC Subzone	Lakes, Wetlands, Rivers (double line), Roads (>10 m wide)	Forest Cover Age			
		0 to 40	41 to 80	81 to 100	101 to 140
SBS	100 m	200 m	100 m	50 m	0 m
		Forest Cover Age			
	Lakes, Wetlands, Rivers (double line), Roads (>10 m wide)	0 to 60	61 to 100	101 to 140	140 to 250
ESSF	100 m	200 m	100 m	50 m	0 m

Appendix 5. Landscape Corridor area summary

(Feb. 27,2003 version)

Landscape Unit	BEO	Total CF	Total CF in Corridors		Non-Contributing, Priority A and Priority B in corridors	
		Ha.	%	Ha.	%	Ha.
FRANCOIS WEST	Int	50,998	7%	3,393	57%	1,947
FRANCOIS EAST	Low	62,302	7%	4,224	71%	3,007
CHESLATTA	Int	94,151	14%	12,945	77%	9,956
OOTSA NORTH	Int	16,619	9%	1,522	51%	774
OOTSA CMZ(L)	Int	11,278	14%	1,524	86%	1,307
INTATA	Int	19,595	18%	3,583	63%	2,252
INTATA CMZ(L)	Int	25,879	7%	1,725	13%	217
CHELASLIE(E)	Low *CMC	10,188	26%	2,689	64%	1,725
CHELASLIE(A)	Medium *CMC	21,627	10%	2,167	29%	627
CHELASLIE CMZ(B,C,D)	High *CMC	60,753	4%	2,192	57%	1,253
GRAND TOTAL		**373,390**	**10%**	**35,964**	**64%**	**23,065**

*CMC – Caribou migration corridor management zone

Appendix 5 Notes

Crown Forested = sum of N + T + P

taken from TSR 2 DBF file - using field THLB - 1st. char. in this field can be an O,X, N,PorT where T = THLB with no stand specific partial removals

Where O = Ownerships excluded from biodiversity consideration (as per landscape unit planning guide)

Where X = Exclusions - non forested areas (I.e., non-productive, non-commercial cover)

Where N = Non-contributing forest - complete removals from the THLB that still contribute to landscape level biodiversity

Where P = partial removals from the THLB - stand specific (eg. ESAs, Sutherland planning cells for operability)

Where T = THLB with no stand specific partial removals

Non-Contributing - includes that part of the Crown Forested land base that does not contribute to the Timber Harvesting Land Base (see N above)

Priority A = Areas highly constrained for timber harvesting and include: Backcountry Lakes, ESA 70 and 90, Recreation Areas, Deer and Goat ranges,

Caribou Migration Corridor zones (B and D), Grizzly and Significant Visual Retention

Priority B = Areas moderately constrained for timber harvesting and include: ESA 60, Significant Visual Partial Retention, Visual Retention and Partial Retention

Appendix 6. Landscape Unit Planning Principles in the Lakes Forest District: Does the Mountain Pine Beetle Change Things?

Edited by

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Executive Summary

A panel of ecologists reviewed the appropriateness of existing ecosystem objectives in the Lakes Forest District in the face of intensive forest harvesting directed at a large infestation of mountain pine beetle. This review included consideration local biodiversity planning processes. The following recommendations were made to guide landscape level planning in the Lakes Forest District.

- The current mountain pine beetle infestation does not fundamentally change the principles underlying the direction provided by the Biodiversity Guidebook or the Lakes District Higher Level Plan.
- Existing seral stage and old growth objectives should be seen as minimum standards and not targets as they fall at the high end of the natural range of variability for disturbance.
- Management strategies should not create a disturbance impact additive to the beetle disturbance.
- Old growth and seral stage objectives should be established and implemented for each landscape unit. Patch size distribution objectives should be met at the TSA scale.
- The full range of live and beetle-killed forest types should be represented in unmanaged areas.
- Young unmanaged forests ("wild young forests") should be considered a separate seral stage and a proportion left unmanaged.
- Recommended minimum ages for old growth forest are 140 years in the SBSdk, 180 years in the SBSmc, and between 250 to 300 years in the ESSFmc.
- Old growth management areas (OGMA) should be spatially delineated. In the SBS some OGMAs could "float" spatially across the landscape over time with recruitment areas designated in advance of OGMA replacement. In the ESSF a greater use of spatially fixed OGMAs is recommended.
- Allocate a proportion of stands surviving beetle infestation to biodiversity objectives – i.e. recruitment areas for old growth and mature forest objectives. Stands with abundant live spruce and fir should also be targeted for inclusion in old growth recruitment areas.
- Maintenance of connectivity objectives may require spatially explicit management due to rate of harvesting. Identified high value habitats (associated with wetlands, riparian areas, winter ranges) should receive priority for retention during this period of rapid harvesting and retention reassessed in 3-5 years.
- Opportunities should be pursued to introduce fire disturbance in some beetle-killed stands.
- Intensive Timber Management Areas (ITMAs) should be preferentially located along permanent access structures.
- Identified research, monitoring, and inventories required to fill critical knowledge gaps and allow proper implementation of biodiversity objectives.

Introduction

This document discusses some principles of ecosystem management for landscape level planning in the Lakes Forest District. The objective of these landscape level planning principles is to maintain ecosystem integrity in the face of intensive forest harvesting directed at a large infestation of mountain pine beetle.

A panel of ecologists with expertise in Lakes Forest District ecosystems, disturbance ecology, and forest management was established to derive ecosystem management principles appropriate to the context of the infestation. In deriving these principles, the panel also reviewed the appropriateness of existing ecosystem objectives of the Lakes District Land and Resource Management Plan (LRMP) and its associated Higher Level Plan (HLP).

These principles will be used to derive criteria and rules for the process of creating landscape level plans in the Lakes Forest District which are more appropriate to the present context than those provided by the Landscape Unit Planning Guide or other current policy documents. The derivation of these criteria and rules will be made in future workshops in consultation with industry and government foresters and is beyond the scope of this document. For more details on the process of landscape planning in the Lakes Forest District see the "Lakes South Landscape Level Planning Project" outline (December 2001).

Background

Landscape level planning in the Lakes Forest District is required to implement the Lakes District LRMP and its associated Higher Level Plan. This direction can be summarized as follows:

- endorsed the division of the district into 14 landscape units ranging in size from 47,000 ha to 112,000 ha. One landscape unit was designated a protected area, one as a high biodiversity emphasis unit, seven as intermediate biodiversity emphasis units, and five as low biodiversity emphasis units;
- adoption of old, old plus mature, and young seral stage targets as described in tables in the Biodiversity Guidebook. These targets are set by BEC variant within each landscape unit (representation for old seral discussed below);
- old growth retention to occur within old growth management areas (OGMAs) representing the range of "ecosystem types" found on the landscape, where "ecosystem types" are groupings of site series into wet, mesic, and dry forest types;
- OGMAs to be delineated in such a way that at least 25% of the old forest retained in Intermediate and High Biodiversity landscape units have interior forest characteristics. The interior forest target in Low Biodiversity landscape units is at least 10% of old forest;
- Seral stage targets were specified for 3 caribou management zones in the southern portion of the district. The seral targets for the High Caribou Zone was based on retaining 100% of the "natural" old and mature forest area ("natural" defined in Appendix 4 of the Biodiversity Guidebook). The seral targets for the Moderate and Low Caribou Zones were based on 75% and 50% respectively of the High Zone targets;
- objectives for connectivity and patch size distribution are also to be addressed in landscape unit planning. Patch size distribution objectives are to be set and achieved within each landscape unit;

- planning for connectivity to utilize the network of "strong linkages" as mapped in the "Biological Ecosystem Network" (BEN). Prior to landscape planning these strong linkages are to be managed to preserve connectivity (70% retention of mature/old forest cover and patch sizes below 2-4 ha). LRMP strategy to achieve connectivity directs landscape level planning to establish a network of landscape connectivity corridors based on this BEN template, providing opportunities for the distribution of species, populations and genetic material, as well as flow of nutrients and energy.

Current Context

A large outbreak of mountain pine beetle has impacted a significant portion of the district and is spreading quickly. The infestation is the heaviest in the southern third of the district and seems to be spreading in a north-easterly direction. The current volume of mountain pine beetle infested trees is estimated at 15,000,000 m3. The annual allowable cut was raised in the summer of 2001 from 1,500,000 m3/yr to 3,000,000 m3/yr in an attempt to reduce both the rate of spread and unsalvaged losses of timber. About 2,000,000 m3 will be harvested this year (markets a big factor). It is therefore clear that the majority of the infested trees will not be harvested before the next beetle flight and that, in the absence of a natural climatic brake, the infestation will probably continue spreading.

The Ministry of Forests has divided the Lakes Forest District into 3 "beetle management" zones. The boundaries of these zones change yearly as the infestation spreads. While it is generally accepted that control of an infestation of this size is impossible, the Ministry of Forests operational planners believe that aggressive harvesting of infested trees could slow the rate of infestation expansion and thus "buy time" until a prolonged cold snap occurs and halts the expansion. Therefore, beetle control remains an objective in 2 of these 3 zones.

1) *"Epidemic" zone* – scale of infestation so great that 'control' is meaningless and harvesting will be focussed on reducing unsalvageable losses. Full range of resource objectives will be managed for. Wildlife Tree Patches, Riparian Reserve Zones, Strong Linkages, and caribou objectives all managed according to the Code and the LRMP. Fixed OGMAs are not an operational concern in this zone.
    - This zone is currently located primarily south of Ootsa Lake (east of Tweedsmuir Park). Recent probe information could result in the boundary being moved north of Cheslatta Lake.
2) *"Transition" zone* – advance front of infestation characterised by spot and patch infestations in a matrix of generally uninfected forest. Greater flexibility to harvest infested trees is desired by Ministry of Forests operational planners in this zone in an attempt to slow the rate of spread of the infestation. Concept of fixed OGMAs or any constraints to harvest are concerns to Ministry of Forests operational planners.
    - Located between Francois and Ootsa Lakes –towards the eastern half of the district.
3) *"Endemic" zone* – mountain pine beetle infestation levels closer to, but still above, ground state levels. Spruce Beetle is a more significant issue in this zone and is being aggressively managed through harvesting and trap tree strategies. Management follows standard Code and LRMP direction; however, outside of spruce beetle harvesting, little development is being planned in this zone.
    - Located mostly north of Francois Lake.

The rapid increase in the number and size of mountain pine beetle-related logging activities over the last three years has increased the risk to biodiversity in the Lakes Forest District.

Statutory decision-makers would benefit from clear ecological advice and recommendations to help them assess whether operational plans "adequately manage and conserve forest resources".

Principles developed in other related planning processes

This report is not the only or the first attempt to derive more locally appropriate or specific landscape planning principles than those found in the Biodiversity Guidebook or Landscape Unit Planning Guide.

Craig Delong has developed an ecosystem based management plan for the Prince George Forest Region and Doug Steventon has described the historic disturbance regimes for an ecosystem management scenario in the Morice and Lakes Innovative Forest Practices Agreement.

Principles developed for Prince George Forest Region

This ecosystem-based management approach uses the natural range of variability concept and is based on studies of natural disturbance patterns. The objective of this approach is to have forest management more closely approximate the natural disturbance regime and therefore maintain habitat diversity and ecosystem processes in managed landscapes. This management plan was also created in the context of mountain pine beetle outbreaks and is thus relevant to landscape planning in the Lakes Forest District.

The Prince George ecosystem based management plan is centred on the creation of nine Natural Disturbance Units (NDUs). These NDUs are very large; their sizes ranging in the millions of hectares. The units represent forests with different natural disturbance characteristics. The boundary lines for these units were partially driven by the present proportion of old growth forest in the landscape (human disturbance factored out) as this attribute provides an indication of the frequency of stand-replacing disturbances. Objectives for seral stage distribution, patch size distribution, and stand level retention are described for each unit.

The Lakes TSA, although outside of this planning area, is consistent with the Moist Interior NDU – the gently rolling terrain and broad mountain peaks of the Fraser Plateau and Fraser Basin Ecoregions. Delong assigned fire disturbance cycles to the plateau and mountain portions of this NDU of 100 and 200 years respectively. The unit is characterised by large (>1000 ha) wildfires resulting in relatively even-aged forests.
Recommended practices for Moist Interior NDU include:

- old growth management through a system of rotating reserves retaining forests between the ages of 120 and 200 years. Fixed reserves augmented with floating reserves could be used in higher elevation portions of this NDU, because these areas tend to be wetter with a greater fire return interval. Recruitment or replacement forests should be selected from stands with significant natural forest characteristics;
- some proportion of disturbed forest (e.g., wildfires) should be left unsalvaged;
- patch size – as smaller patch sizes are continually created, the focus should be on creating larger patches (>100 ha, as opposed to medium sized patches of 50-100 ha) through design of large blocks or aggregation of recent blocks;

- silviculture system – approximate natural disturbance characteristics across landscape through appropriate application of different silviculture systems (i.e., proportion each system is used). Even-aged silviculture using clearcut with reserves is the dominant recommended silviculture system for this NDU.

Principles developed for the Morice and Lakes Innovative Forest Practices Agreement

Doug Steventon has described the natural range of variability of disturbance in the Biogeoclimatic (BEC) subzones in the Morice and Lakes Timber Supply Areas (TSAs) (Steventon 2001). A gradient in disturbance return interval is seen from the drier subzones, the SBPSmc, SBSdk, to the wetter SBSmc, ESSFmc and then the wettest subzone in the area, the ESSFwv. He also described variation among BEC subzones in patch size and connectivity. Forest management based on these historic disturbance dynamics in these TSAs would apply some of the following strategies:

- Utilization of a range of harvest regimes, with a mix of large, even-aged openings and smaller partial cuts in the SBPSmc and SBSdk, to dominantly single tree and group selection approaches in the ESSFwv.
- Temporal and spatial variability of disturbance (harvesting) at the landscape unit scale. Variation could occur at larger scales, but the TSAs are assumed to be sustained yield units for timber harvesting, which precludes variation at that scale.
- Age composition objectives set by BEC subzone at the TSA level with a narrow range of variability permitted over time. However, this range of variability could be much larger at the landscape unit level.
- Fixed-location linear connections of similarly aged forests would have rarely existed in the more disturbance prone variants under the natural range of disturbances in these TSAs. This conclusion is based on analysis of 100m pixels and thus linear connections below this scale would not be documented. Linear features such as flood plains and riparian vegetation communities do exist but they are characterised more by vegetation than by age. Degree of connectivity would have varied significantly over time, especially in more disturbance-prone forests such as the SBSdk and SBSmc. If harvest disturbance rates follow the range of variability of natural disturbances there would be no need for landscape level planning to focus on the delineation of fixed corridors to maintain connectivity. However, if higher rates of harvest disturbance rates are planned, other strategies to maintain connectivity may be required.

Recommended Ecosystem Management Principles for the Lakes Forest District

General Principles

The directions for management of old growth and of other seral stages set out in the Biodiversity Guidebook, result in disturbance rates at the high end of the natural range of variability. Therefore, the seral stage and old growth values in the Biodiversity Guidebook should not be seen as biodiversity targets, but as minimum standards below which biodiversity objectives could be unacceptably compromised.

The panel agrees that the current mountain pine beetle infestation does not fundamentally change the principles underlying direction provided by the Biodiversity Guidebook or the Lakes District Higher Level Plan.

The current mountain pine beetle infestation is likely providing disturbance rates towards the high end of the natural range of variability. Therefore mountain pine beetle management should avoid creating a disturbance impact additive to the infestation disturbance. The adopted management strategy should minimize the number of surviving trees that are removed/destroyed during salvage operations. This principle should drive the retention of surviving trees at both the landscape and stand scales.

It should be noted that this current large beetle infestation is occurring in a landscape heavily impacted by anthropogenic disturbances. Since c. 1850 significant changes in land-use and vegetation have been caused by settlement, agricultural clearing and conversion, grazing by domestic livestock, hydroelectric impoundments, forest harvesting and road building. Much of the Lakes Forest District is by no means pristine and has suffered losses to its ecological integrity. This context also needs to be considered in landscape level planning.

Management unit size

The size of the management unit for delivering biodiversity objectives should consider the natural patch size distribution over time. Conceptually then, considering the large natural fire disturbances characteristic of this area, this management could be at least the size of the Lakes TSA. The large size of the management unit would allow large patches of old-forest to be managed in different areas of the TSA through time. This is the general concept behind the natural disturbance pattern approaches to ecosystem-based plans described above.

In the Lakes Forest District, however, specific factors relating to the implementation of biodiversity objectives favour the use of smaller areas, more consistent with the current landscape units, as the unit of management. Spatial LRMP objectives (such as Resource Management Zones) and the tracking and monitoring of objectives are more easily achieved through management at the landscape unit scale. Examples of these spatial objectives include protected areas, the caribou migration corridor, backcountry lakes, and moose and deer winter ranges. Achievement of these spatially fixed objectives limits the flexibility of locating old growth management areas and the ability to distribute patch sizes across the landscape (especially large patches). Protection of rare ecosystems—typically small and very locally and specifically distributed—is also problematic in very large management units. Thus, the rationale and potential advantage of using very large management units is moderated by the reality of spatial considerations for conserving multiple forest values.

Another concern with the use of very large management units is the practical difficulty of tracking the implementation of biodiversity objectives. This is further complicated by the scale and rate of beetle management operations, leading to an increased risk of the assumption being made that biodiversity objectives will be met elsewhere in a large management unit. Statutory decision makers required to "adequately manage and conserve" all forest resources require clear spatially mapped direction to facilitate timely decisions. This clear direction can be more easily provided with units consistent in size with the current landscape units.

Seral stage distribution targets

The principle behind old, mature, and young seral stage objectives is to approximate the range of seral stages and their structural characteristics seen in an unmanaged landscape.

Minimum targets were set for old and mature seral stages as those stages typically are reduced in landscapes that are managed for timber values. A maximum percentage target is applied to young seral forests on the assumption that these forests are the result of logging, and would generally exceed the proportions expected over time in naturally disturbed landscapes. Note, however, that current mature and old seral stage objectives are well below estimated long-term historic averages (Steventon 2001), and already were modified for socio-economic reasons (see FPC Biodiversity Guidebook).

This principle of maintaining the range of forest structural characteristics across a landscape also applies to landscapes dominated by mountain pine beetle or fire disturbance. While live old and mature trees are typically killed in mountain pine beetle disturbances, the structural legacy of death in these stands can be very different from that in fire disturbed stands and also from that in managed stands. Even with high levels of beetle-caused mortality, old stands often have higher proportions of late seral species (e.g. spruce and subalpine fir) surviving in the understorey and overstorey strata than would be seen in younger forests. Different post-beetle successional pathways will be followed in these stands than in stands lacking the shade-tolerant tree species. The dead trees in these older stands will also tend to be greater in height and diameter and thus provide larger snags and larger pieces of coarse woody debris. Landscape planning should therefore retain the full range of these stand types where natural processes and successional pathways can proceed.

Many of the beetle-killed stands will have the characteristics of "wild young forests". These forests, while classified as young seral forests, have significantly different characteristics than young plantations and have become increasingly rare in our forests due to fire suppression, salvage harvesting, and widespread spacing and thinning of naturally regenerated young stands. Wild young forests should therefore be considered a separate seral stage and a proportion of these stands should be left unmanaged. The proportion left unmanaged could be on a sliding scale, with lower proportions retained when large disturbances occur and higher proportions retained when disturbance events are rare on the landscape.

Young unmanaged post-fire stands are now very rare in the Lakes Forest District due to harvesting, density management, stand "rehabilitation", fire control, and salvage operations. These stands have different successional and structural characteristics from managed young seral stands and from post-beetle disturbance stands. The opportunity currently exists to introduce fire to selected portions of the landscape and create some of this habitat type. Mountain pine beetle management operations could be spatially co-ordinated to establish fire breaks and allow some areas to be burned under controlled conditions. This strategy could have benefits to long term forest management (reducing wildfire risk and creating suitable conditions for re-establishment of even-aged pine stands) while at the same time recreating a habitat type rare in managed landscapes.

In landscape units where beetle disturbance has greatly reduced the amount of mature forests, it may be necessary to spatially designate mature forest recruitment areas. These areas could be combined with old forest recruitment areas with the precise designation of OGMAs (see below for criteria) being left to a future date.

Old growth management

The minimum age at which old growth characteristics appear differs for each BEC subzone in the Lakes Forest District due to differences in their disturbance return intervals (SBSdk=93 year return interval, SBSmc=133 years and ESSFmc=219 years; Steventon 2001). The Biodiversity Guidebook definition of 140 years as the minimum age for old growth in the SBSdk is probably appropriate. However, due to the longer disturbance return interval in the SBSmc, the minimum age for old growth in that subzone should be higher; at least 180 years (Kneeshaw and Burton 1998). The 250 year definition for old forest in the ESSFmc provided by the Biodiversity Guidebook is also too low. Based on the return interval, the minimum age for old growth should be closer to 300 years in the ESSFmc. The result of using the current under-estimates of minimum old growth ages in the SBSmc and ESSFmc is an increased risk to maintaining old growth values on the landscape.

Old growth management areas (OGMAs) should be delineated spatially to ensure representation and patch size distribution objectives are met. Spatial designation also should simplify operational planning.

In the SBS zone some of these OGMAs could move across the landscape over time ("floating OGMAs"). This strategy would require a recruitment OGMA to be designated well in advance to allow it to achieve the required age before the old OGMA is harvested. The minimum age criteria for old forest should not be seen as targets, because significant proportions of forest periodically got much older. Therefore an OGMA replacement strategy must ensure that the full range of stand ages, seen under natural disturbance regimes, is maintained.

The greater use of fixed OGMAs is recommended in the ESSF due to the higher minimum age for old growth (250-300 years) and the greater difference between managed stand rotations and the natural disturbance regime. Extended-rotation harvesting strategies that more closely approximate the natural disturbance regime would permit a greater use of rotating OGMA strategies (see Burton et al. 1999).

Long term forest management objectives should be to recruit back at least to the seral stage targets described in the Biodiversity Guidebook and Higher Level Plan. If live old growth forests are severely depleted following the beetle disturbance, strategies to enhance the recruitment of old growth forests should occur. This would include the designation of younger stands little affected by mountain pine beetle as old growth recruitment areas–the old growth stands of the future. Protection of the small areas of old growth that may survive the infestation is also important because these forests will act as refugia for species dependent on, or strongly associated with, old growth habitats. These strategies may conflict with timber supply objectives, as culmination age stands could be equally rare in the future. We recommend allocating a proportion of surviving stands to biodiversity objectives because of the importance of maintaining representative old forest habitats over time.

Patch size distribution

Traditional patterns of forest management in the central interior, if continued, could ultimately result in forests of different age classes being fragmented into 50-100 hectare patches. The Biodiversity Guidebook recommended patch size distribution targets more closely approximating the natural disturbance patterns in different forests. The LRMP and Higher Level Plan adopted these targets. The most significant impact of these targets on forest management is the need to plan for the creation/retention of large patches of forest in different seral stages. Due to the difference between harvest age and the age at which a stand can be considered old growth, large patches of old growth or recruitment old growth forests should be spatially mapped and designated for retention.

The opportunity to locate large patches of old growth forest can differ among landscape units, with some units so heavily roaded and fragmented by other land-uses that large patches of forest are rare. One recommendation is to allow flexibility in achieving patch size distribution targets in individual landscape units as long as the target is achieved at the TSA level over time. However, attempts should be made to achieve the range of distribution of patch sizes in each landscape unit. Increased concentration of large patches should occur in landscape units with lower road densities, high biodiversity values, or more opportunities for amalgamation of existing development - as long as this is consistent with other management objectives for these units.

Measurement of patch size distribution is a difficult issue and has not been completely or satisfactorily resolved yet. Several proposed methodologies include:

- Buffering rule – buffering each patch by 200m (or other measure) and if two buffers intersect consider the two patches as one patch. Advantage is that this is relatively simple to use once a rule for defining patches has been derived. Disadvantage is that it is not sensitive to differing patch sizes (i.e., small 1 ha patches receive equal sized buffers as do large 1000 ha patches).
- Relative patch width rule – if two patches are closer than half the width of the smallest opening the two patches are joined. Advantage is that it is sensitive to differing patch sizes. Disadvantage is that this rule has not yet been successfully implemented in GIS.
- Use a measure of connectivity instead of patch size distribution such as a “connectivity of centroids” metric. This is a different approach that focuses more on the ultimate objective of maintaining connectivity across a landscape. This approach is more useful for monitoring success of a landscape level plan than to direct operational plans.

Ecosystem Representation

In theory, representation should not be a significant problem if forests are managed more closely to a natural patch size distribution. Harvesting larger openings forces harvesting into a wider profile so that not only a select few stand types are targeted. However, the reality of established infrastructure and development patterns can skew the harvest profile. The Lakes Higher Level Plan requires representation of old forest by three site series groupings (wet, mesic, and dry forests). This concept is a good one though it may be difficult to track over time. One approach in implementing this strategy would be to locate the rarer wet and dry site series in fixed OGMAs while allowing the more common and more harvested mesic forests to be represented in spatially located floating reserves.

Connectivity

The expert panel discussed several approaches on the need for explicit management for connectivity. The Lakes District LRMP provides direction that has elements of the first two approaches.

1. The Prince George approach is based on the assumption that connectivity is a consequence of old growth management and spatial patterning (including patch size distribution) in association with appropriate within-block retention strategies. Thus, this approach assumes that as long as natural disturbance patterns and levels are followed at the landscape and stand scales, no separate planning needs to occur to manage for connectivity. The ecosystem management approach described in the Lakes LRMP is based on landscape level seral stage and patch size distribution objectives.

2. Another approach (as undertaken in the Bulkley LRMP, for example) is to spatially locate connectivity corridors or "forest ecosystem networks" to connect core habitats across the landscape. These corridors function in facilitating the flow of energy and organisms through the ecosystem and provide connectivity between late seral forest habitats. This approach focuses on stand level structural, topographical, and hydrological features to manage connectivity. The LRMP has endorsed a network of strong linkages to be used as a template for connectivity management in landscape level planning.

3. A third approach, not mutually exclusive of the other approaches, is to increase the connectivity value of the harvested "matrix" through greater structural retention. Increasing the pre-harvest structural legacy in young managed forests is an important stand level strategy for managing connectivity.

Difficulties could arise in attempting to combine the first two approaches in landscape unit planning. If the network of strong linkages was fully implemented and old growth forest were used to create these corridors, the old forest retained on the landscape would be fragmented into long linear strips at the expense of interior old forest habitat and patch size distribution objectives.

However, the above two approaches are not necessarily mutually exclusive and could be seen to reflect two spatial scales of management. If landscape level patch size and seral stage distribution objectives are established, the value of this mapped network may not be so much for managing connectivity alone, but as a means of spatially identifying the best locations for some of these patches.

If harvest disturbance rates do not mimic the natural range of variability of disturbances (as is almost certainly the case in the Lakes Forest District) management strategies that simply focus on old growth management and patch size distribution will result in a decline in connectivity over time. Therefore some degree of explicit spatial management for connectivity may be required.

Strong linkages in the Lakes Forest District are strongly associated with riparian and wetland features. These habitats have high value for biodiversity, are often more complex structurally than upland habitats and therefore have high value for retention in a post-beetle landscape. In the short term, at least during this period of rapid harvesting, these sensitive and ecologically valuable habitats should receive high priority for retention, and should be clearly and generously (erring on the side of caution) mapped. Following completion of these intensive management operations (say after 3-5 years), more detailed analyses of patch size, seral stage distribution, and ecosystem representation could be carried out, and this retention strategy can then be re-assessed.

Intensive Timber Management Areas

The Lakes LRMP directs landscape level planning to include the designation of Intensive Timber Management Areas (ITMA). Intensive Timber Management Areas require well maintained long-term access to allow the range of forestry practices needed to maximize timber value. As the presence of access structures reduces the quality of habitat for many wildlife species, biodiversity objectives for retention of old forest suggest locating OGMAs away from access structures. Therefore ITMAs can be preferentially located along permanent access structures with little impact on landscape biodiversity objectives. The principles of patch size distribution obviously do not apply to ITMA objectives and therefore they can be strung out across the landscape following access corridors on suitable sites. Some analysis may be required to ensure that ecosystem representation objectives are still achieved with this strategy of locating ITMAs.

Research/Monitoring/Inventory Needs

- Establishment of a network of permanent sample plots to monitor changes in forest successional dynamics with beetle, fire, and harvesting disturbance. The objective is to gain understanding on the varying successional pathways followed by stands in this area with different natural and anthropogenic disturbances. Plots should be established prior to or soon after disturbance.
- Monitoring should include regularly updated district and landscape unit budgets of stand areas by composition, age class, size class, and key habitat values (e.g., multilayered canopy, snag density). Patch size distribution for each landscape unit and for the whole TSA should also be updated regularly.
- Completion of a TSA wide inventory of ecosystem types (site series) to improve ability of planning to consider ecosystem representation. Suitable inventories would include Terrestrial Ecosystem Mapping (TEM), Predictive Ecosystem Mapping (PEM), and Vegetation Resource Inventory (VRI).

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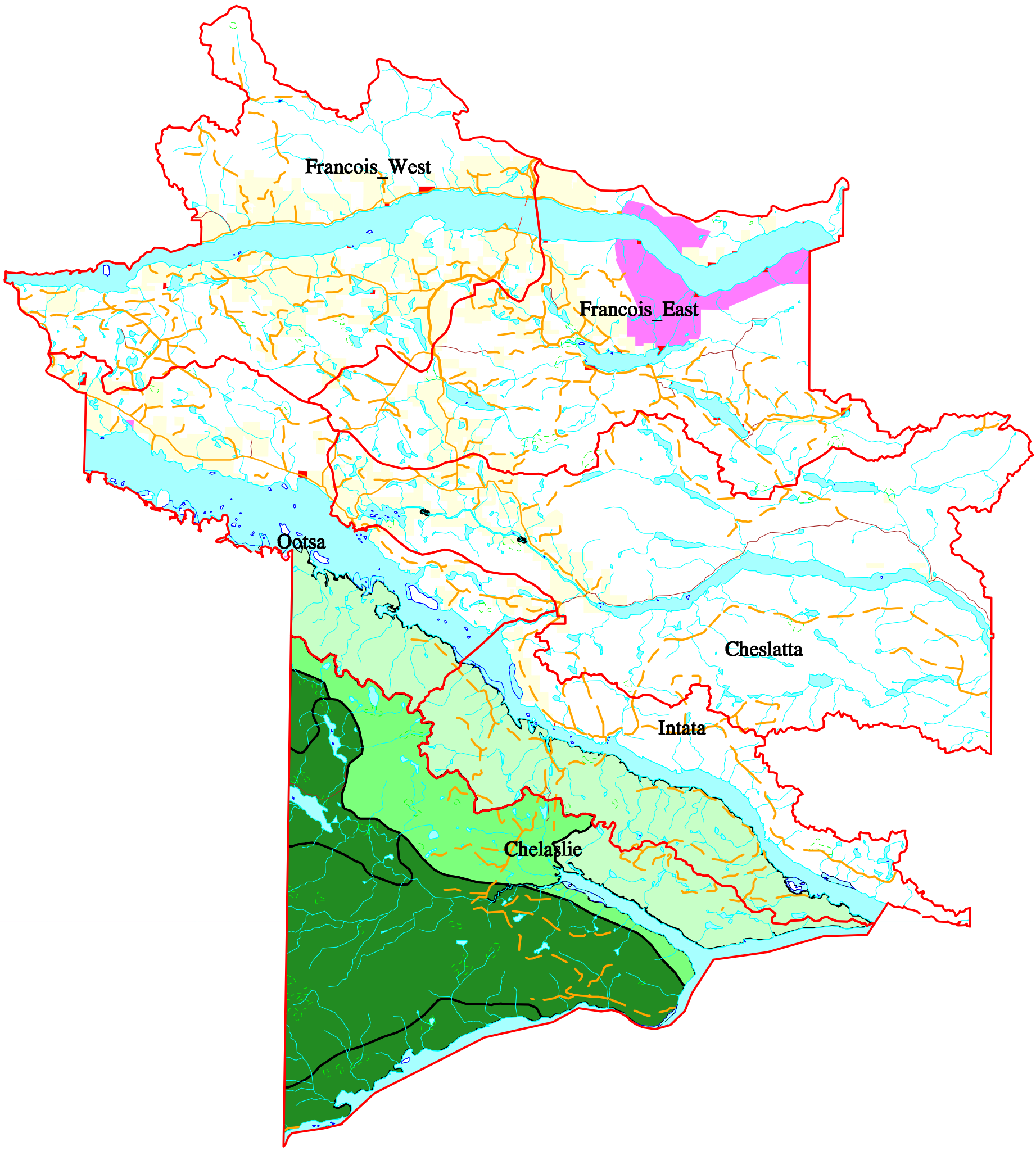
Appendix 7. Public Review Summary and Response

Input received during the 60 day review period and MSRM's response to the input.

INPUT	RATIONALE /RESPONSE
1. This document specifies that "SRM planning, as a landscape-level process, produces objectives that will be site specific, results based, set in an economic and ecosystem context and operationally relevant". In addition it specifies that a Socio-Economic and Environmental Impact Assessment (SEEA) will be done where necessary to inform the statutory decision making process. We recognize a "multiple accounts approach" was done during the Land and Resource Management Plan (LRMP), however, we suggest changes resulting from the beetle epidemic represent a "significant change trigger". We ask that an updated SEEA be completed for future SRMP's conducted in the Lakes TSA.	SRMP policy states that "an SEEA is not necessary where the SRM Plan is consistent with an SEEA that has been undertaken for the area's strategic land use plans." The SRMP also considers the social and economic information used by the Ministry of Forests when establishing the Allowable Annual Cut for the Lakes TSA. Because this SRMP is fully consistent with the Lakes LRMP, and with the SEEA conducted for that plan, further SEEA work is not necessary. However, if a future SRMP anticipates amending the direction from the Lakes LRMP, then an SEEA would be required.
2. This document also emphasizes the importance of establishing partnerships in the delivery of SRMP's. "The role of partners may include funding the process, gathering of information, conducting analysis, developing objectives and strategies, referrals, public consultation…" As you are aware, MSRM and all major licensees affected by the Draft SRMP are partners in the Morice/Lakes Innovative Forest Practices Agreement (IFPA). The IFPA has developed a Sustainable Forest Management Plan for the Lakes TSA containing a variety of social, economic and ecological objectives and indicators including biodiversity objective and indicators consistent with the LRMP. Although targets have not yet been established, objectives and indicators with interim targets established by MSRM could have served as the interim SRMP. The Regional Manager of the Ministry of Forests has approved the first version of the plan. The second version of the plan, containing a full suite of targets consistent with the LRMP will be completed later this year. The IFPA is serving to fulfil many if not all of the roles identified about, including the development of measurable objectives and more specifically, similar biodiversity objectives. Furthermore, given the desire of government and industry to eliminate duplication and redundancy, it seems inappropriate for MSRM to be developing two similar plans. We question the urgency in developing the SRMP and legally establishing objectives when District Manager direction would be adequate until the second version of the IFPA SRM plan is developed.	The provincial government wishes to establish legal objectives for biodiversity as quickly as possible, specifically to provide legal results for implementation of the Forest and Range Practices Act, which came into effect on April 1, 2003. Because of the accelerated harvest rate in the Lakes South area, there is an urgent need to provide more detailed direction than available in the LRMP. As part of the order establishing the Lakes South SRMP, the Regional Director has acknowledged that the Sustainable Forest Management Plan, when it is complete, may provide a basis for harmonizing or amending the Lakes South SRMP.

INPUT	RATIONALE /RESPONSE
3. On page 24, the Draft plan indicates licensees are responsible for FSP implementation and monitoring. We will have a very active role implementation, however we take exception with requirement to monitor and report performance towards achievement of poorly defined and not measurable objectives when a similar parallel process is clearly defining biodiversity objectives, indicators and targets consistent with the LRMP. As provided in the Implementation section of the document, we fully intend to utilize the second and subsequent versions of our SRMP to support Forest Stewardship Plan submissions.	Wording in final plan changed to delete reference to licensees monitoring Forest Stewardship Plans.
4. Both documents suggest avoiding mixing of the objectives and strategies in a statement that will become a higher-level plan. There should be a clear separation between the objectives and the strategies. The objective should outline "what" is the desired result specified in a temporal and spatial context, the strategies outline "how" the desired outcome is achieved. This recommendation was not followed for several of the objectives specified in the Draft SRMP. For example, specific to Objective 1, the SRMP should describe tables 1 and 2 as strategies to achieve the objective of "**Manage through time,** early, mature plus old and old seral stages **within the Lakes South DRMP are including the Caribou Migration Corridor as specified on maps x.** We recognize the existence of the higher-level plan but see this as an opportunity to modify the existing plan to be consistent with the approach suggested in the reference documents.	The tables are included within the actual objectives so that the objective can be measured.
5. Both documents suggest objectives should be achievable, measurable and linked to well-defined targets. The Draft SRMP acknowledges the monitoring and future management objectives contained in the plan on page 6 do not meet this expectation. In addition, we find no reference in the LRMP or existing higher-level plan order describing the requirement for wild young forest, objective 4. These objectives should not be included in the SRMP or legally established.	The objective for "Wild Young Forest" was added upon the recommendation of the expert panel, and is consistent with the general management intent of the Lakes LRMP to adopt an ecosystem approach to resource management, and "the adequate protection of rare or threatened ecosystems, species, or habitat types". Further, the Lakes LRMP Strategy 43.10 states, "Incorporate new knowledge concerning landscape level biodiversity management, appropriate to the ecology of the area, in managing for long-term biodiversity objectives." As noted above, the objective is appropriately included in the SRMP. However, because a measurable target was not developed for this plan, the objective is not established as a Landscape Unit Objective at this time.
6. In addition, related to future OGMA designation specified by objective 2b), we suggest the bulleted points on page 10 and the associated tables are actually strategies to achieve the old growth representation objective.	The objective was restructured to include only the portions that were required to make the objective measurable.

PART 5. MAPS



Caribou Migration Corridor
Lakes South SRMP

Map 1

Scale 1:400000
Albers Equal Area Conic Projection, NAD 83
Prepared by Skeena Information Management
Ministry of Sustainable Resource Management
July 17, 2003

0 2 4 6 8 10
Kilometers

jmgiesbr

caribou.aml

- Caribou Migration Corridor - High Use Zone
- Caribou Migration Corridor - Moderate Use Zone
- Caribou Migration Corridor - Low Use Zone
- Protected Areas
- Private Land, Woodlots, Indian Reservations
- UREPs

- Landscape Unit Boundary

Candidate OGMAs
Lakes South SRMP

Map 2

Scale 1:400000
Albers Equal Area Conic Projection, NAD 83
Prepared by Skeena Information Management
Ministry of Sustainable Resource Management
July 17, 2003

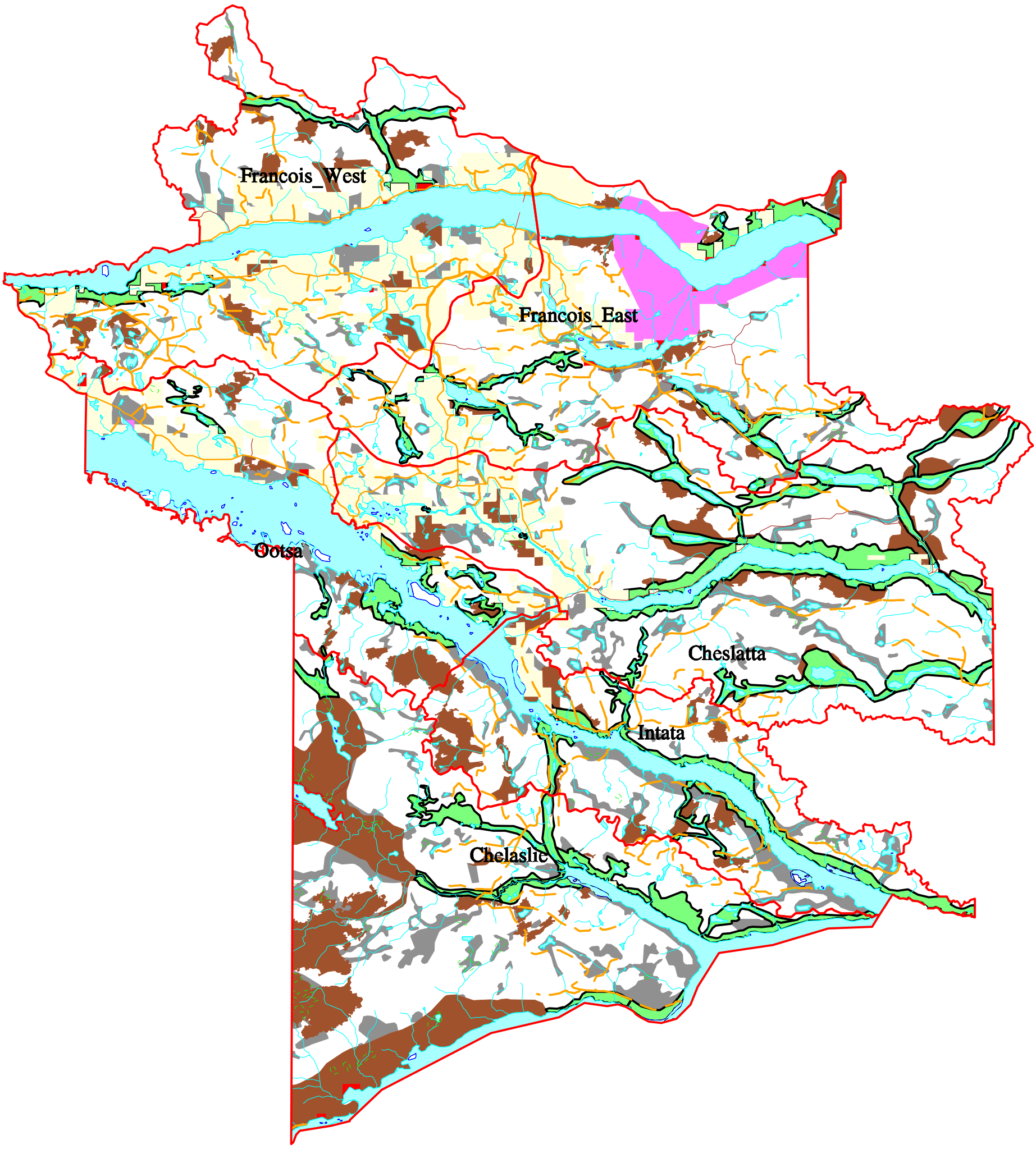
0 2 4 6 8 10
kilometers

jmgiesbr

ogma.aml

- Candidate Old Growth Management Areas
- Landscape Corridors (outside of OGMAs)
- BEN Inventory Strong Linkages (outside Landcape Corridors)
- Protected Areas
- Private Land, Woodlots, Indian Reservations
- UREPs

Landscape Unit Boundary



Landscape Corridors
Lakes South SRMP

Map 3

Scale 1:400000
Albers Equal Area Conic Projection, NAD 83
Prepared by Skeena Information Management
Ministry of Sustainable Resource Management
July 17, 2003

0 2 4 6 8 10
Kilometers

jmgiesbr

landscp.aml

- Landscape Corridors
- Candidate Old Growth Management Areas
- BEN Inventory Strong Linkages (outside Landcape Corridors)
- Protected Areas
- Private Land, Woodlots, Indian Reservations
- UREPs

Landscape Unit Boundary

Lakes South Sustainable Resource Management Plan

Old Growth Forest Objective Amendment

April 2007

Background

The Lakes South Sustainable Resource Management Plan (SRMP), June 2003 outlines objectives and strategies for resource management which include the management of representative old growth forests. Candidate old growth management areas (COGMAs) were identified and agreed to as part of the SRMP process, but were not legally established. This was done in order to allow forest licensees flexibility with regards to harvesting and road building activities in response to a mountain pine beetle infestation. Since the beetle infestation has now reached its peak in much of the SRMP area, and will soon reach its peak across the entire Lakes South area, the Integrated Land Management Bureau (ILMB) is legally designating the OGMAs, and as such, is cancelling objectives 2 and 3, and replacing them with a new objective.

An assessment of the candidate OGMAs was completed to:

- Determine whether timber harvesting activities had occurred within them;
- Determine whether timber harvesting had compromised the biodiversity values in affected OGMAs; and,
- Update the OGMA spatial coverage to reflect changes proposed by the forest industry or government agencies.

From this assessment, amendments were made to the candidate OGMAs, and are reflected in Map 1: Old Growth Management Areas – Lakes South SRMP. Table 1 provides summary statistics for the OGMAs shown on Map 1. It is important to recognize that the OGMAs reflect a package deal. There may be some instances where better areas could have been proposed as OGMAs, but were not selected due to the careful balancing of social, environmental and economic factors. To address the fact that the old forest establishment targets could not be met in all landscape units, the overall area of OGMAs was increased to allow the younger forest stands to grow into old growth over time (recruitment).

This assessment process was managed by ILMB through a partnership with the Morice and Lakes Innovative Forest Practices Agreement licensees, and in consultation with Cheslatta Forest Products, the Ministry of Forests and Range, and the Ministry of Environment.

Old Growth Forest Retention through OGMA Establishment

Old Growth Management Areas (OGMAs) are identified primarily for the purposes of retaining or restoring the ecological attributes associated with old forest, and maintaining areas that are subject to natural forest succession. They may also contribute to the retention of other features important for biodiversity or other values. OGMAs function to provide reserves for old growth forest-dependent species across the landscape. The areas were selected to meet old seral criteria over time, while minimizing impacts on timber supply.

The goal of the old growth forest objective is to manage for the retention of areas that are appropriately sized, contain, or can recruit specific structural old growth forest attributes, and represent the range of ecosystem types found across the Lakes South planning area. Limited operations within them are allowed to provide flexibility and minor improvements of locations, while assuring that the overall effectiveness of old forest conservation in the area is not diminished.

It is important to note that where other objectives overlap with Old Growth Management Areas, those objectives continue to apply.

The old growth forest objective in this document takes direction from the Lakes District Land and Resource Management Plan (LRMP). Specifically, Objective 43 from the LRMP states, "Maintain biodiversity at the ecosystem, species, and genetic levels through the application of ecosystem management principles". Relevant management strategies state:

- 43.7 Develop and implement an old growth management strategy which establishes, throughout the district, Old Growth Management Areas (OGMAs) dominated by old tree cover and containing most of the structure, function, microclimatic conditions and biota associated with old forest, including interior forest conditions. Within OGMAs, maintain old growth and interior forest conditions, and provide a representative cross-section of ecosystem types occurring in the District.
- 43.8 Generally, the old growth management strategy will take advantage of existing old forest within special resource management areas, habitat linkages, riparian and lakeshore reserves, and forest harvesting land base exclusions. Where sufficient old forest is not available, OGMAs may be recruited from other age-class and/or resource management categories.

In the event that there are future planning processes, the existing legal objectives will be re-examined to ensure the overall socio-economic balance anticipated by the Lakes District Land and Resource Management Plan (LRMP), or a subsequent process, is maintained.

The old forest establishment targets in Table 1 specify the proportion of the old seral target that must be met in spatial OGMAs. These establishment targets were identified by the expert panel involved in the original Lakes South SRMP process. The targets were modified from those found in the Biodiversity Guidebook by the expert panel so that they could be met both spatially and aspatially across the land base, and to recognize the contribution to biodiversity from wildlife tree patches and riparian zones.

Strategies

1) Ensure that over time, the old forest establishment target for each LU/BEC variant unit as noted in Table 1 is achieved;
2) Within OGMAs the following activities will be allowed:
   - First Nations traditional uses;
   - cone gathering and tree topping;
   - fire suppression;
   - existing grazing leases;
   - hunting, fishing, trapping;
   - commercial or non-commercial recreational use;
   - subsurface resource uses, including exploration for and development of oil and gas, mineral, and aggregate resources, and including incidental tree cutting for these purposes;
   - harvesting and collecting botanical forest products;
   - any other use for which an existing lease or licence has been issued under the *Land Act*.

Persons engaged in these uses are encouraged to avoid or minimize disturbance to OGMAs. Disturbance within OGMAs that occur as a result of these uses will be assessed on a landscape unit basis.

3) Within OGMAs, boundary adjustments will be allowed in order to:

   - adjust for mapping errors so that the functional boundaries of the OGMA better reflect the physical features (i.e. streams) intended as the boundaries;
   - improve harvest boundary alignment in a way that will contribute to the maintenance of the OGMA;
   - shift the location of the contiguous area of the OGMA to improve the retention of old forest attributes as identified through field assessment;

4) Allow natural processes (i.e. fire, insects, disease) to occur within OGMAs except where those processes threaten values within or outside the OGMAs. Aim at retaining structural features of old growth where intervention is required (see Figure 1 Decision Matrix for Harvesting in OGMAs, Lakes South Sustainable Resource Management Plan, June 2003). Note that the DM no longer has authority to decide which option will be used for the OGMA. That responsibility now lies with the Integrated Land Management Bureau;
5) OGMAs will be periodically reviewed. If they are severely compromised due to exploration or mining activities, natural processes or other allowable uses, ILMB may modify or replace them through a legal order amendment. Note that forest stands within OGMAs that have been impacted by mountain pine beetles may still contribute to old seral targets;
6) The extent and location of the disturbance in OGMAs and of the alternative area or areas reserved from harvesting should be reported in a digital format to the Integrated Land Management Bureau annually.

Table 1. Lakes South OGMA Area Analysis (March 26, 2007)

Landscape Unit (biodiversity emphasis option)	BEC Variant	Crown Forested	Old age	Old target		Old establishment target)		OGMAs				Uncha Red Hills Park		THLB in OGMAs		Old THLB in OGMAs	
								Crown Forest in OGMAs		Old in OGMAs		Crown Forest	Old				
		Ha.	yrs	%	Ha	%	Ha.	%of est. target	Ha.	%of est. target	Ha.	Ha.	Ha.	%of est. target	Ha.	%of est. target	Ha.
FRANCOIS WEST	SBS dk	25472	>140	11%	2802	75%	2101	177%	3711	96%	2020	0	0	129%	2709	79%	1669
Intermediate	SBS mc 2	21347	>140	11%	2348	75%	1761	144%	2529	106%	1870	0	0	121%	2125	89%	1573
	ESSF	3740	>250	9%	337	75%	252	149%	376	91%	230	0	0	118%	299	62%	157
L.U. TOTAL		**50559**			**5487**		**4115**	**161%**	**6616**	**100%**	**4120**	**0**	**0**	125%	**5133**	83%	**3399**
FRANCOIS EAST	SBS dk	45834	>140	11%	5042	50%	2521	122%	3076	80%	2014	6153	1561	87%	2199	59%	1484
Low	SBS mc 2	12321	>140	11%	1355	50%	678	54%	366	48%	327	828	194	50%	338	45%	303
	ESSF	3982	>250	9%	358	50%	179	0%	0	0%	0	1028	0	0%	0	0%	0
L.U. TOTAL		**62137**			**6755**		**3378**	**102%**	**3442**	**69%**	**2341**	**8009**	**1755**	75%	**2537**	53%	**1787**
CHESLATTA	ESSF	8653	>250	9%	779	75%	584	208%	1212	0%	0	0	0	0%	0	0%	0
Intermediate	SBS mc 2	35435	>140	11%	3898	75%	2923	129%	3771	63%	1848	0	0	56%	1636	15%	434
	SBS dk	48434	>140	9%	4359	75%	3269	203%	6652	114%	3733	0	0	39%	1289	18%	576
L.U. TOTAL		**92522**			**9036**		**6777**	**172%**	**11635**	**82%**	**5581**	**0**	**0**	43%	**2925**	15%	**1010**
OOTSA NORTH	SBS mc 2	5378	>140	11%	592	75%	444	120%	532	101%	447	0	0	107%	474	89%	395
Intermediate	SBS dk	11020	>140	11%	1212	75%	909	161%	1460	92%	837	0	0	97%	878	72%	651
LU TOTAL		**16398**			**1804**		**1353**	**147%**	**1992**	**95%**	**1284**	**0**	**0**	100%	**1352**	77%	**1046**
OOTSA CMZ																	
(E)	LOW (E)	11093	>140	20%	2219	50%	1109	287%	3189	91%	1011	0	0	162%	1794	81%	895
L.U. TOTAL		**11093**			**2219**		**1109**	**287%**	**3189**	**91%**	**1011**	**0**	**0**	162%	**1794**	81%	**895**
INTATA NORTH	SBS dk	13205	>140	11%	1453	75%	1089	83%	906	32%	351	0	0	52%	568	25%	277
Intermediate	SBS mc 2	5597	>140	11%	616	75%	462	162%	747	113%	523	0	0	135%	622	93%	429
	ESSF	386	>250	9%	35	75%	26	38%	10	0%	0	0	0	0%	0	0%	0
LU TOTAL		**19188**			**2103**		**1577**	**105%**	**1663**	**55%**	**874**	**0**	**0**	75%	**1190**	45%	**706**
INTATA CMZ																	
	LOW (E)	25313	>140	20%	5063	50%	2531	162%	4099	68%	1730	0	0	128%	3230	55%	1390
L.U. TOTAL		**25313**			**5063**		**4109**	**140%**	**5762**	**63%**	**2604**	**0**	**0**	79%	**3230**	34%	**1390**
CHELASLIE CMZ	HIGH (B,C,D)	59871	>140	40%	23948	75%	17961	114%	20506	47%	8461	0	0	80%	14383	37%	6718
	MODERATE (A)	21307	>140	30%	6392	20%	1278	31%	397	16%	207	0	0	26%	331	14%	174
	LOW (E)	9944	>140	20%	1989	30%	597	13%	75	12%	74	0	0	1%	7	1%	5
L.U. TOTAL		**91122**			**32329**		**19836**	**106%**	**20978**	**44%**	**8742**	**0**	**0**	74%	**14721**	35%	**6897**
GRAND TOTAL		**368332**			**64795**		**42254**	**131%**	**55277**	**63%**	**26557**	**8009**	**1755**	**78%**	**32882**	**41%**	**17130**

Primary Roles and Responsibilities of Agencies

Ministry of Forests and Range (MoFR)

- MoFR will undertake tenure administration and compliance and enforcement consistent with legal OGMA objectives.
- MoFR forest health specialist will provide advice on the forest health risks associated with infestations in OGMAs as a basis for determining whether an OGMA amendment to permit sanitation harvesting is warranted.
- MoFR will provide responses to referrals regarding changes to approved OGMAs.

Ministry of Environment (MoE)

- MoE will oversee government-wide strategies and initiatives for biodiversity management, including overall effectiveness monitoring in relation to that strategy.

Ministry of Agriculture and Lands - Integrated Land Management Bureau (ILMB)

- ILMB is responsible for identifying, establishing, monitoring, and amending OGMAs as required.