Chilliwack Forest District – Sustainable Resource Management Plan

Cascades Landscape Units Plan
Background Report for:
Silverhope, Manning and Yale Landscape Units

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Prepared by:

Keystone Wildlife Research Ltd.
#52, 1480 Foster St.,
White Rock, BC V1M 3K4

With assistance from:

Lucy Stad, RPF
Planning Forester
Ministry of Sustainable
Resource Management
Chilliwack District Office

Greg George, RP Bio
Forest Ecosystem Specialist
Ministry of Sustainable
Resource Management
Chilliwack District Office

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BACKGROUND REPORT – CASCADES LANDSCAPE UNITS

1 Introduction

This report provides background information used during the preparation of the Sustainable Resource Management Plan and associated legal objectives for the Cascades Landscape Units (LU). Specifically, this report will form the biodiversity conservation chapter of the plan, which is an aggregate of three LUs, including Silverhope, Yale and Manning. Descriptions of each landscape unit, discussions on significant resource values, and an Old Growth Management Area (OGMA) summary and rationale are provided in Appendices 1-3. This report also explains the rationale used during the planning stage and OGMA selection methodology used.

Biological diversity or biodiversity is defined as: *'the diversity of plants, animals and other living organisms in all their forms and levels of organisation, and includes the diversity of genes, species and ecosystems as well as the evolutionary and functional processes that link them'*[1]. British Columbia is the most biologically diverse province in Canada. In British Columbia, 115 species or subspecies of known vertebrates and 364 vascular plants are listed for legal designation as threatened or endangered[2]. The continuing loss of biological diversity will have a major impact on the health and functions of ecosystems and the quality of life in the province (Resources Inventory Committee, 1998).

Planning for OGMA and Wildlife Tree Patch (WTP) biodiversity values is recognized as a high priority for the province. LU planning is an important component of the *Forest Practices Code of British Columbia Act* (FPC) which allows legal establishment of objectives to address landscape level biodiversity values. Implementation of this initiative is intended to help sustain certain biodiversity values. Managing for biodiversity through retention of old growth forests is not only important for wildlife, but can also provide important benefits to ecosystem management, protection of water quality and preservation of other natural resources. Although not all elements of biodiversity can be, or need to be, maintained on every hectare, a broad geographic distribution of old growth ecosystems is intended to help sustain the genetic and functional diversity of native species across their historic ranges.

The Chilliwack Forest District has completed draft LU boundaries and assigned draft Biodiversity Emphasis Options (BEO) in accordance with the direction provided by government. There are 24 LUs within the forest district, which have been combined into five aggregate landscape unit planning areas. Approval of this plan will allow legal establishment of the Yale, Manning and Silverhope LUs and their legal objectives; this plan will be a Higher Level Plan under the FPC. Through a ranking process, each LU was rated as either Low, Intermediate or High BEO. Designation as either Intermediate or High requires that priority biodiversity provisions, such as old growth retention be achieved immediately. Designation as Low BEO requires that one-third of the total old growth retention requirements be achieved immediately. The remaining two-thirds are established through a recruitment plan and must be in place within three rotations or 240 years. However, if non-contributing land base is used for recruitment then

[1] FPC Biodiversity Guidebook definition. September 1995.
[2] BC Species and Ecosystems Explorer. 2003. Victoria, British Columbia. Available at: http://srmapps.gov.bc.ca/apps/eswp/

the full old growth retention targets can be achieved now; this latter method was used for the Yale LU.

Delineation of old growth management areas and wildlife tree retention levels (WTR), was undertaken by International Forest Products Ltd. (Interfor) and Keystone Wildlife Research in partnership with and under the direction of Ministry of Sustainable Resource Management (MSRM). Keystone was contracted by Interfor and funds were provided via Interfor's (Hope) Innovative Forest Practices Agreement. Information was also provided by Ministry of Forests (MOF) and Ministry of Water, Land and Air Protection (MWLAP) staff. Input was also solicited from other forest licensees.

Input from First Nations was gathered during consultation (prior to going public) between MSRM and individual First Nations. A summary of public comments received during the 60 day public review and comment period is provided in Appendix 5. Refer to the attached maps for the location of OGMAs and old growth representation from protected areas.

Supporting documentation regarding government policy, planning processes and biodiversity concepts are provided in the 1995 *Biodiversity Guidebook*, the 1999 *Landscape Unit Planning Guide* (LUPG), the *Vancouver Forest Region Landscape Unit Planning Strategy (1999),* as well as *Sustainable Resource Management Planning Framework: A Landscape-level Strategy for Resource Development*.

2 Landscape Unit Objectives

Landscape Unit objectives are legally established within the framework of the FPC and as such are Higher Level Plan objectives. Other Operational Plans must be consistent with these objectives.

OGMA and WTR Landscape Unit objectives apply only to provincial forest lands. While park and Crown forest lands outside of provincial forest may contribute to old seral representation, LU objectives do not apply to these areas (e.g. E. C. Manning Park). Throughout this report, old forest representation in protected areas is referred to as OGMAs, however the maps differentiate between the two land bases.

OGMAs were established in each BEC variant throughout each LU to the full target as shown by the attached maps. This follows the coarse filter approach to biodiversity management whereby representative old growth stands are protected to maintain ecosystem processes and wildlife habitat requirements that may be poorly understood.

3 OGMA Planning Considerations and Rationale

This section is intended to provide information regarding LU planning considerations and to explain the rationale used during OGMA delineation.

3.1 Methodology

Appendix 4 describes the methodology used for compilation and preparation of the data in the Landscape Unit OGMA selection process. Included in that section is a description of how the

MSRM land base classification was updated. The use of ecosystem mapping, wildlife habitat themes, and Environmental Resource Values is described, including the classification of the land base into forested and non-forested units using current ecosystem mapping, and other input data sources.

3.2 Ecosystem Management

The procedure for OGMA identification described in the *Landscape Unit Planning Guide* (LUPG) uses land ownership codes and age class to determine which forest-cover polygons to choose for inclusion in OGMAs. In the Cascades landscape units, ecosystem maps were used as the base for OGMA identification. Resource values, such as wildlife suitability and rare ecosystems, were also included in the criteria for OGMA choice, so that forests with higher biodiversity and wildlife habitat values were given higher priority for inclusion in OGMAs. This approach is consistent with the LUPG, which states that '*once OGMA targets are calculated using the variant-only rule, the area must be located to maximise conservation of biodiversity'*. The Biodiversity Guidebook also states that '*Rare site series should be retained in this* (old) *condition in greater proportion than is their occurrence in the landscape unit.*

In addition, each LU contains varying amounts of mature forested habitat provided by existing processes (e.g. spotted owl Special Resource Management Zone) from which to build on for ecosystem management. The FPC (or equivalent) ungulate winter range process, once completed, will also help provide a better foundation for ecosystem management. Wildlife Habitat Areas that may be established in future will also improve connectivity; and in the long-term, re-establishment of riparian reserve zones to old forest will improve upon ecosystem integrity. The habitat provided by these various processes together with OGMAs provides the fundamental components to achieve a functioning ecosystem.

An important part of the OGMA planning exercise was to ensure that these separate processes complemented each other. For example, OGMAs, where practical, were placed to create larger habitat patches in areas of high resource values. In other cases, OGMAs were chosen within or adjacent to ungulate winter range to overlap constraints and to increase patch size. These larger patches then provide core areas and allow greater opportunity to improve connectivity between adjacent patches. The intent is to maintain a series of old forest habitat patches across probable movement corridors to allow wildlife dispersal and gene flow. Using this approach with stand level biodiversity measures will increase the likelihood of sustaining viable wildlife populations well distributed across their natural range.

3.3 Timber Supply and Mitigation

During delineation of OGMAs for priority biodiversity provisions an attempt was made to mitigate the short and long-term impacts on timber supply. For example, OGMAs were delineated first in the non-contributing forest land base. As representation must be at the variant level, the non-contributing land base could not always satisfy old forest requirements. Where this occurred, portions of the timber harvesting land base from most constrained to least constrained were assessed and included as OGMAs. Generally, more THLB was required in lower elevation variants due to a longer disturbance history and lesser amounts of non-contributing forest land.

OGMAs were chosen in the oldest available age class first, however, old forest stands that were approved or proposed for harvesting on Forest Development Plans (FDP) were excluded from candidate OGMAs. Interfor also met with other forest licensees to review the maps and identify future harvesting opportunities so that timber supply impacts could be reduced wherever possible.

3.4 OGMA Age Classes

In all three Landscape Units in the Cascades area there was insufficient old forest (250+ years) in most BEC variants to meet OGMA targets. Therefore, it was necessary to designate younger aged mature stands (mostly age 160-250 years, with some age 140-160 years, and small amounts of age 61-80 years) as recruitment OGMAs. Where possible, mature stands with high resource values were chosen as recruitment OGMAs.

3.5 OGMA Assessment and Review

MSRM assessed draft OGMAs via polygon descriptor labels, aerial photograph interpretation and aerial reconnaissance in an attempt to evaluate stand attributes and biodiversity values/attributes. During helicopter reconnaissance physical parameters such as stocking density, tree size, presence of snags and multi-layered canopies were used to assess the suitability of a given site as OGMA. For example, forest stands labelled as height class 2 (i.e. tree heights <20 m) were not usually considered eligible for OGMA because they were not viewed as representative. Stands with low stocking were also excluded. More hectares than were needed to meet OGMA targets were originally assessed so that unsuitable candidate areas could be deleted from draft maps. Following the helicopter flight and after discussions with licensees and First Nations, candidate areas were adjusted to the approximate OGMA target by variant. See Table 3 in Appendices 1-3 for a more detailed description of OGMA attributes specific to each LU.

Desired criteria used to select the OGMAs and ensure that they meet biodiversity objectives into the future included:

- **ecosystem representation** – OGMAs should contain the full suite of ecological units present on the land base with selection biased towards forested site series that represent less than 2% of the area within a subzone (rare site series were given higher priority for OGMA ranking)
- **wildlife habitat** – OGMAs should be placed in areas where they can provide the required old forest habitat components for priority species identified in local and provincial planning processes
- **rare red and blue listed plant communities and elements** – OGMAs should provide protection or sustainable management for rare old forest communities (e.g. red-listed CWHds1 *Western red cedar – Devil's club* community) or rare elements (e.g. mature deciduous/cottonwood stands)
- **specific high-value areas** from local knowledge.

This approach provides some certainty that candidate forest stands include suitable ecological attributes for OGMA purposes, thereby reducing the risk to biodiversity from having to establish substantial amounts of mature stands as recruitment OGMAs.

Some non-contributing forest land such as riparian reserve zones could not be assessed or included in OGMAs at this time. Prior to 1995 riparian reserve zones were not required, and as a result many harvested riparian areas do not provide old growth attributes in the shortest possible time frame (as per direction for Higher BEO LUs in the *Higher Level Plans: Policy and Procedures*). In addition, some forested riparian areas are too small, narrow or fragmented to function for landscape level biodiversity values. As stand succession proceeds, these stands may be assessed for OGMA inclusion based on stand structure and biodiversity attributes.

3.6 OGMA Amendment Procedures

An MSRM Coast Region amendment policy has been developed and approved to guide proponents (forest tenure holders) when applying for amendments to OGMA legal objectives. Amendment procedures cover such things as minor or major amendments for resource development (e.g. roads, bridges, boundary issues, rock quarries & gravel pits) or relocation of OGMAs. The policy also discusses acceptable management activities and review procedures. The procedure has been approved by the Director of the Coast Region and forms an integral part of this landscape unit plan.

3.7 OGMA Boundary Mapping

OGMA boundaries used natural features wherever possible to ensure they could be located on the ground. OGMAs were also delineated to include complete forest stands wherever possible to reduce operational uncertainty and increase ease of OGMA mapping. OGMAs were mapped using a 1:20000 scale TRIM base which forms the legal standard for measurement.

4 Other Biodiversity Provisions

The *Landscape Unit Planning Guide* makes reference to comprehensive biodiversity planning that includes elements such as: seral stage distribution, landscape connectivity, species composition, and temporal and spatial distribution of cutblocks (patch size). These other elements can be considered during establishment of priority biodiversity provisions only if doing so does not delay the establishment of priority biodiversity objectives and does not impact regional timber supply. Further, these additional provisions should first be tested as draft objectives. In the Chilliwack Forest District, earlier timber supply analysis indicated that there would be an impact to timber supply to implement comprehensive priority provisions. Given that scenario, this phase of LU planning concentrated on priority biodiversity provisions.

Biodiversity elements, such as forest interior habitat and stand structure are to be met within the framework provided for priority biodiversity provisions.

4.1 Wildlife Tree Retention

The percent required for wildlife tree retention described in Table A of the *Legal Objectives* for each Landscape Unit does not have to be fully implemented on a cutblock-by-cutblock basis. Instead, the retention objective can apply over a larger area (e.g. FDP or equivalent), so long as the retention target is met each 3 year period. The intent is to provide limited flexibility for retention at the cutblock level provided that the legally required percentage is met across the subzone. Since wildlife tree retention is a stand level biodiversity provision, wildlife tree patches are also to be distributed across each subzone and LU.

5 Summary

Within the three Cascades landscape units a total of 12,516 ha of OGMAs are being established. The majority (11,722 ha) comes from the Non-contributing land base, which includes 4157 ha from Parks or Protected Areas. The remainder comes from the Contributing land base (225 ha), and another 498 ha from the Partial Contributing land base. The total amount within the timber harvesting land base is 723 ha which represents 1.7 % of the overall THLB (43,529 ha). This should be considered the maximum since mitigation efforts that occurred during licensee meetings are not easily reported (e.g. some THLB area was considered inoperable or uneconomical for harvesting by licensees; or some THLB areas show as riparian reserve zones).

6 References

Biodiversity Guidebook. 1995. BC Ministry of Forests, Forest Practices Code of BC Act.

Forest Practices Code. 1999. Managing identified wildlife: Procedures and measures. Volume 1. Co-published by BC Environment, Victoria, BC.

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Landscape Unit Planning Guide. 1999. BC Ministry of Forests and BC Ministry of Environment, Lands, and Parks. Forest Practices Code of BC. Victoria, BC.

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Vancouver Regional Landscape unit Planning Strategy. 1999. BC Ministry of Forests (Vancouver Forest Region) and BC Ministry of Environment, Lands and Parks (Lower Mainland Region).

APPENDICES

APPENDIX 1 – SILVERHOPE LANDSCAPE UNIT
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Appendix 1 – Silverhope Landscape Unit

1 Silverhope Landscape Unit Description

Silverhope Creek together with all its tributary streams is a medium to large-sized watershed flowing into the Fraser River just southwest of Hope (Figure 1). The Silverhope LU encompasses a total of 56,820 ha. Of the total area, 33,010 ha (58%) is within the Crown forest land base, and 18,950 ha (33%) of Crown forest land is included in the Timber Harvesting Land Base (THLB). The remaining 23,810 ha (42%) is non-forested and/or non-Crown (e.g. rock, alpine tundra, wetlands, water, private land) and has been excluded from any OGMA contributions and calculations.

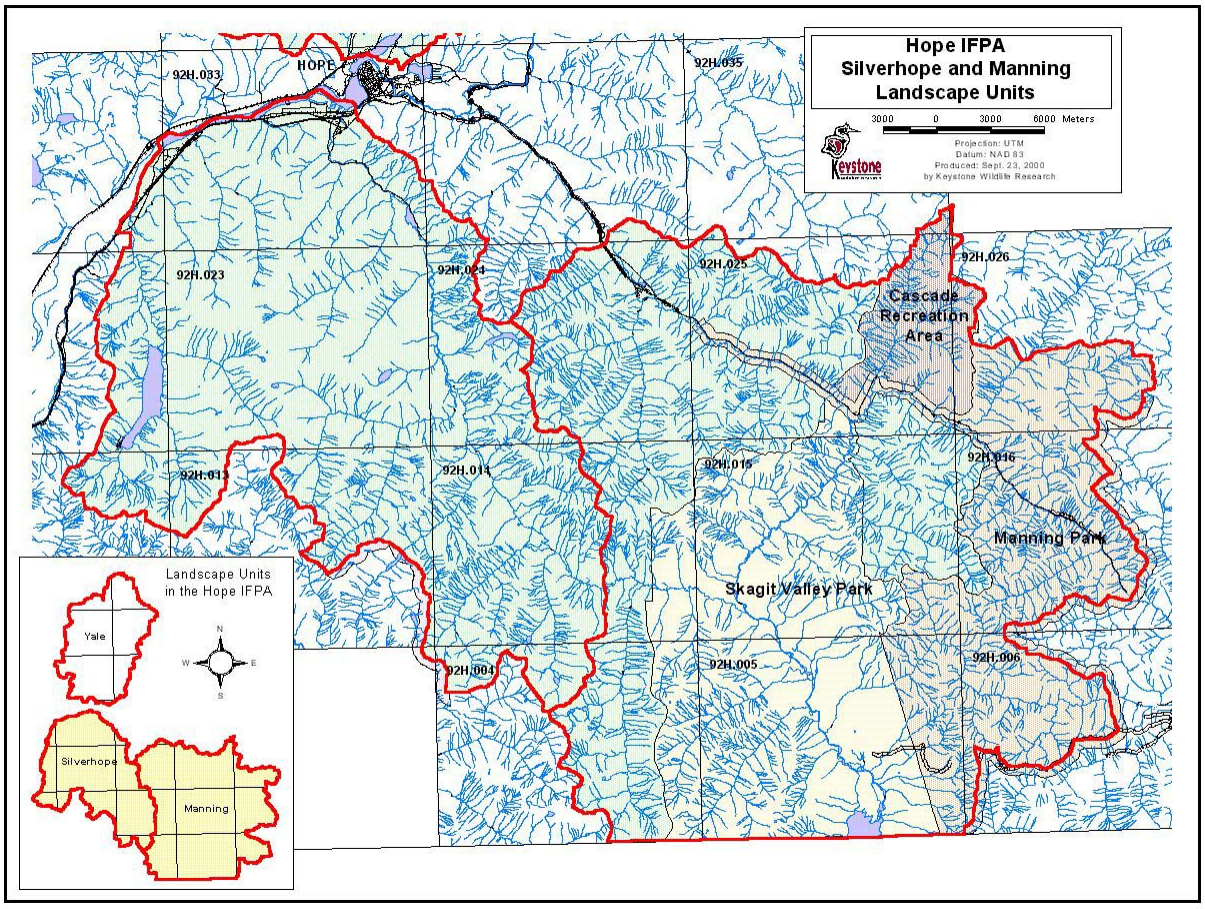

Figure 1. Location of the Silverhope LU.

The majority of the Silverhope LU is comprised of 3 Coastal Western Hemlock (CWH) BEC subzones/variants, including the southern Moist Submaritime variant (CWHms1), the southern Dry Submaritime (CWHds1), and the Dry Maritime (CWHdm), which total approximately 34,209 ha (60%) of the area. The leeward Moist Maritime Mountain Hemlock variant (MHmm2) is also fairly widespread in the LU, totalling approximately 14,007 ha (25% of the

LU). The remainder of the LU is composed of Alpine Tundra and parkland, which are not considered forested.

The Silverhope LU has sustained significant levels of disturbance. Much of the lower elevation productive and gentle terrain sites have been disturbed by past forest harvesting, fire or other events. Major habitat types present in the Silverhope LU include upland forest, riparian forest, small lakes, steep, partly-forested rocky slopes, sub-alpine forest, and alpine; all of which contribute to the area's complexity. The wildlife and biodiversity values of the Silverhope LU are significant in a District context.

The main travel corridors are the Trans-Canada Highway and the Silver-Skagit Road. The main waterways are the Fraser River, Silverhope Creek, and Jones (Wahleach) Lake.

2 Significant Resource Values

The Silverhope's biodiversity values, the various First Nations, the main transportation corridors and associated communities affect the relative values of the LUs resources and corresponding management strategies. The Landscape Unit supports a wide range of significant natural resource values and features, as well as a diversity of social and cultural values and influences. These factors, in combination with an extensive forest road network, add complexity to resource management in this area.

2.1 Fish, Wildlife and Biodiversity

Wildlife resources of primary management concern in the Silverhope LU include: grizzly bear, Northern Spotted Owl, deer, mountain goats, fish and some species at risk that are considered "Identified Wildlife"[3]. Many other species occur, including forest birds, raptors, small mammals, amphibians and furbearers but their habitat requirements are generally managed within habitat provisions provided for primary species. For example, habitat for spotted owls in the Silverhope LU is maintained within a Special Resource Management Zone (SRMZ), which includes 2 Long-Term Habitat Areas and covers approximately 7047 ha of gross forested area. At present, about 64% of this is suitable owl habitat (>100 years old forest) with a requirement to recruit another 216 ha (3%) of suitable owl habitat to reach a total of 67% suitable owl habitat in the SRMZ. This owl habitat will also support other species using old forests.

The Silverhope LU is also an important area for black-tailed and mule deer and mountain goats. Some of the identified winter ranges overlap with a spotted owl SRMZ and some of each species' habitats have been captured in OGMAs. The forested winter range habitat maintained for deer or goats would also benefit other species.

Most of Silverhope Creek and its major tributaries support resident salmonid populations. Riparian reserve zones established (as per the FPC) adjacent to these fish streams will help maintain fish and wildlife habitat. In many instances, riparian areas supply habitat for other

[3] Volume 1 of the *Identified Wildlife Management Strategy* includes a list of 36 wildlife species and 4 plant communities that are considered to be at risk. These species or plant communities require special management of critical habitat to maintain or restore populations or distributions. Critical habitat is protected within Wildlife Habitat Areas. See the *Identified Wildlife Management Strategy Volume 1 February 1999* for more information.

species, and where riparian areas were previously logged, habitat will be provided in the future as it re-grows.

Grizzly bears in the Silverhope LU are within the threatened North Cascades Grizzly Bear Population Unit, for which a Recovery Plan has been drafted. Implementation is expected to occur following public consultation, plan revisions and subsequent approval by government. The grizzly bear is also considered an Identified Wildlife species. Provisions exist to protect some critical foraging or security habitat within Wildlife Habitat Areas (WHA); designation of WHAs may occur as part of the Recovery Plan (grizzly bear WHAs are in prep.). Other species of Identified Wildlife (e.g. Northern Goshawk, mountain goat, tailed frog) are known to inhabit the study area and may receive habitat protection with WHAs as well. In turn, these WHAs will also provide habitat for species not actively managed.

Ecosystem mapping has been completed for the entire Silverhope LU under the Hope Innovative Forest Practices Agreement co-ordinated by International Forest Products Ltd. Resources Inventory Committee (RIC) standard wildlife models and ratings tables have been used to generate themed habitat maps for a number of species of concern within the LU, including black-tailed deer, mountain goat, tailed frog, Northern Spotted Owl and Northern Goshawk. This habitat information was also considered during OGMA selection.

Ministry of Environment, Lands and Parks district staff (now MWLAP) conducted a mountain goat winter range inventory during March 1998 and March 1999 (Jex, 2002), and also participated in developing a forest cover-based Deer Winter Range Management Plan (Freeman 2001). Finally, spotted owl inventory efforts have occurred periodically since 1993. All of the inventory efforts have helped to identify critical wildlife habitats that have been considered during OGMA delineation.

2.2 Timber Resources

The presence of a substantial timber harvesting land base establishes the importance of timber resource values. Continued access to commercially valuable timber, including future second growth, is a significant concern. First pass harvesting of accessible old growth timber is nearing completion.

Commercially valuable tree species in the Silverhope LU include Douglas-fir, western redcedar, and western hemlock at low to mid elevations, and mountain hemlock and true fir species at mid to higher elevations. Scattered deciduous stands occur throughout the Silverhope drainage and along the Fraser River. Table 1 shows the age composition of forests in the Silverhope LU based on Vegetation Resources Inventory information.

Table 1. Age distribution of forests within the Silverhope Landscape Unit.

Age	% of Crown Forested Land base
0-60	41%
61-140	16%
141-250	15%
251+	26%

Currently five licensees have forest tenures in this landscape unit. International Forest Products operates along the eastern half of the LU, along Eureka Creek and around Wahleach (Jones) Lake. Tamihi Logging Ltd. operates in the Maimen Creek and Swanee Lake area, and in the upper Silverhope drainage. North West Hardwoods targets alder and maple along Wahleach Creek. Joe Johnson Ltd. has a small chart area near Mt. Ling. The BC Timber Sales Program managed by the Ministry of Forests harvests in the north and central areas of the Silverhope drainage.

Forest management activities occur throughout all phases of forest development. Operational work includes pre-harvest planning, harvesting and stand regeneration. Post harvest activities include planting, brushing, juvenile spacing, pruning and thinning.

2.3 Private Land

Private lands within the Silverhope LU mainly occur adjacent to the northern boundary along the Trans-Canada Highway, with a few small parcels along Silverhope Creek. Some of the private land has been altered from its natural state and this change may influence the ecology of adjacent Crown forest lands. Where private and Crown land interfaced, these factors were considered during OGMA delineation.

2.4 First Nations

The Silverhope LU is located within the traditional territory of various First Nations. The Sto:lo and Cheam First Nations, and the Peters Band have interests in the entire landscape unit. The Nlaka'pamux Nation has traditional territory in the south-eastern half of the landscape unit. Several First Nations Reserves are situated near or along the Fraser River.

Between 1997 and 1999, an Archaeological Overview Assessment model was developed by MOF to indicate where First Nations archaeological sites are most likely located. This was done to minimise potential impacts by forestry operations on culturally important areas. The model was useful in predicting the location of habitation sites at all elevations and high elevation campsites in the sub-alpine. Travel routes were also identified.

The maps produced from the model were reviewed to determine if archaeological potential sites and travel routes were captured in OGMAs. In the Silverhope LU, sections of travel routes were captured in OGMAs when they overlapped with areas of old forest usually along lower and mid slopes. Potential archaeological sites located near riparian or lake/wetland areas were also included in OGMAs when old or mature forests were present in the same locations. Examples of overlap in areas occurred along Clerf Lake, Silverhope River, Cantelon Creek and other areas.

2.5 Archaeological Sites

The Provincial Heritage Register provided data on known sites of archaeological and heritage importance. This information was incorporated into the resource value map as a positive resource value increasing a polygon’s value as an OGMA candidate.

2.6 Mining and Mineral Exploration

Subsurface resources (minerals, coal, oil, gas and geothermal) and aggregate resources are significant to the province. There are 38 mineral tenures in the LU and one placer tenure on the Fraser River. OGMAs have been located to avoid existing tenures wherever possible. Most of the LU has high to moderately high potential for metals.

It is important to note that establishment of old growth management areas will not affect the status of existing mineral and gas permits or tenures; exploration and development activities are permitted. The preference is to proceed with exploration and development in a way that is sensitive to the old growth values of the OGMA; however if exploration and development proceeds to the point of having significant impacts on old growth values, then the OGMA will be relocated.

2.7 Recreation

The extensive forest road network has increased recreational opportunities for the public. Recreational hunting in the Silverhope LU is an important annual activity enjoyed by many outdoor enthusiasts; most hunters would target deer or black bear. Winter recreational activity is normally restricted by seasonal road deactivation and snow accumulation, although snowmobiling could occur on road systems or alpine areas. Angling opportunities are provided in Silver Lake (resident trout), Jones Lake (trout and kokanee) and Silverhope Creek (steelhead) as well as tributaries of the Skagit River system. A few other small lakes such as Eaton provide recreational fisheries for small resident fish. ATV, motorcycle and four-wheel drive use of roads for recreation occurs to varying degrees. Trail hiking, berry and mushroom picking and wildlife viewing/sight-seeing also occur. There is presently one Forest Service Recreation Site in the Silverhope LU, the Eaton Creek site. A recreational trail is also present at Eaton Lake. The Trans-Canada Trail is under construction along Silverhope Creek. Silver Lake Park is the only provincial park within the Silverhope LU; it remains a popular camping and day use area.

3 Silverhope Landscape Unit Objectives

Landscape Unit objectives are legally established within the framework of the FPC and as such are Higher Level Plan objectives. Other Operational Plans must be consistent with these objectives. The Spotted Owl Management Plan has been approved and is being considered for Higher Level Plan status with legal objectives; it will apply to portions of the Silverhope LU. Objectives from both processes are intended to be compatible to the greatest extent possible.

The Silverhope LU was ranked as an Intermediate BEO through the biodiversity value ranking process completed earlier (see the *Vancouver Forest Region Landscape Unit Planning Strategy*, 1999). This Intermediate designation, along with the BEC variant, determines the percentage of the Crown forest land base that will be designated as OGMA. Table 2 outlines the total amount of OGMA required in each variant and from which Crown forest category (i.e. Non-Contributing-NC; Timber Harvesting Land Base)[4]. The old growth target figures in Table 2 are derived from Appendix 2 in the *Landscape Unit Planning Guide*.

[4] Non Contributing (N) forest land does not contribute to the Allowable Annual Cut. The Timber Harvesting Land Base (THLB) is made up of Contributing (C) forests and a portion of the Partially Contributing (P) forests. Partially Contributing forests are "constrained" due to one of

Landscape unit objectives apply only to provincial forest lands. While park outside of provincial forest may contribute to old seral representation, LU objectives do not apply to these areas.

OGMAs were established to the target in each BEC variant to ensure that landscape level biodiversity values are represented across the landscape. This follows the coarse filter approach to biodiversity management whereby representative old growth stands are protected to maintain ecosystem processes and wildlife habitat requirements that may be poorly understood.

Table 2. Old growth management area (OGMA) requirements, Silverhope Landscape Unit.

BEC Variant	NDT	Old Growth Target Required		Total OGMA Established	Amount of OGMA Target Met Within							
					Non-Contributing Outside of Parks (N)		Non-Contributing Inside of Parks (N)		Partially Contributing (P)**		Contributing (C)	
		% of CFL	Ha	Ha	Ha	%	Ha	%	Ha	%	Ha	%
CWHds1	2	>9	123	124	92	75%	12	10%	2	2%	18	15%
CWHms1	2	>9	2,085	2,093	1,596	77%	0	0%	395	19%	102	5%
CWHdm	2	>9	65	66	60	89%	0	0%	5	8%	2	3%
MHmm2	1	>19	1,220	1,220	1,190	98%	0	0%	20	2%	10	1%
		Totals	**3,493**	**3,503**	**2,938**		**12**		**422**		**132**	

Any differences in totals are due to rounding
CWHds1: Coastal Western Hemlock, dry submaritime, southern variant. NDT 2
CWHms1: Coastal Western Hemlock, moist submaritime, southern variant. NDT 2
CWHdm: Coastal Western Hemlock, dry maritime. NDT 2
MHmm2: Mountain Hemlock, moist maritime, leeward variant. NDT 1
**Usually a portion of P and all of C form the Timber Harvesting Land Base (THLB). In this case most of the 422 ha in PC are considered part of the THLB because most is within Spotted Owl SRMZ. SRMZ areas do not have a netdown constraint applied in TSR.

4 Silverhope OGMA Planning Results

4.1 Timber Harvesting Land Base Impact

After considering the existing constraints to the land base and their contribution to OGMAs, a total of 554 ha from the THLB were identified as OGMA to achieve old growth retention targets. Of this total, 132 ha are from the Contributing land base, while the remainder are from the Partially Contributing. Licensee concerns were addressed whenever possible and an attempt was made to balance the impacts between the current charts. Some of the selected areas within the THLB are RRZ or remnants after harvest, or agreed to by the licensee.

several factors such as unstable soils or wildlife habitat, but are still partially available for harvest. Contributing forest is unconstrained and available for timber harvest.

4.2 OGMA Age Classes

In the Silverhope LU, the majority of OGMA requirements were met from old forest (age 250+ years). Approximately 73% of the overall OGMA total was delineated in Structural Stage 7 stands (equivalent to old). However, due to the LUs disturbance history, approximately 26% of the OGMA total had to be established within Structural Stage 6 forest (mature stands 160-250 years old). OGMA selections were prioritised based on stand attributes and the resource values present, as described in Table 3.

The distinction between old and mature forests varies by BEC variant. For CWHdm, ds and ms variants, mature forests must be greater than 80 years of age, and old forests greater than 250 years. Old forests in the MHmm must also be greater than 250 years, but mature forests must be older than 120 years.

4.3 OGMA Summary

OGMA attributes together with a rationale for selection of OGMAs is described in Table 3 on the following pages.

Table 3. Silverhope Landscape Unit: OGMA Summary and Rationale.

OGMA #	BEC UNIT	LANDBASE CLASS	OGMA AREA (ha)	THLB AREA (ha)	COMMENTS	FOREST DEVELOPMENT PLAN	WILDLIFE
1	CWHms1	N	4.19	0.00	Riparian		Grizzly, Marten, Tailed frog, Goshawk
	MHmm2	N	1.92	0.00			
2	MHmm2	N	15.68	0.00			Grizzly, Marten, Tailed frog, Rare ecosystems
3	CWHms1	N	7.63	0.00			Grizzly, Marten, Tailed frog, Goshawk, Rare ecosystems
	MHmm2	N	2.96	0.00			
4	MHmm2	N	7.69	0.00			Marten, Tailed frog
5	CWHms1	N	5.41	0.00			Marten, Tailed frog, Goshawk, Rare ecosystems
	MHmm2	N	0.11	0.00			
6	MHmm2	N	2.11	0.00			Grizzly, Marten, Tailed frog, Rare ecosystems
7	MHmm2	N	3.69	0.00	Mature forest		Grizzly, Marten, Tailed frog
8	MHmm2	N	3.45	0.00	Mature forest		Grizzly, Marten, Tailed frog
9	CWHms1	N	5.71	0.00			Marten, Tailed frog, Spotted owl SRMZ, Goshawk
	CWHms1	P	1.25	1.25			
10	CWHms1	N	2.09	0.00			Grizzly, Marten, Spotted owl SRMZ, Mtn Goat winter range, Goshawk, Rare ecosystems
11	MHmm2	N	6.00	0.00	Adjacent to #34		Grizzly
12	MHmm2	N	3.12	0.00			Marten, Tailed frog,
13	CWHms1	N	6.31	0.00			Grizzly, Marten, Tailed frog, Goshawk
14	CWHms1	N	4.25	0.00	Upland forest		Marten, Tailed frog, Spotted owl SRMZ, Goshawk
	MHmm2	N	18.01	0.00			
15	CWHms1	N	2.94	0.00			Marten, Tailed frog,
16	MHmm2	N	12.91	0.00			Grizzly, Marten, Tailed frog, Goshawk
17	CWHms1	C	0.17	0.17			Grizzly, Marten, Tailed frog, Goshawk, Rare ecosystems
	CWHms1	N	11.25	0.00			
	MHmm2	N	4.86	0.00			
18	CWHms1	N	26.21	0.00	Large patch, riparian		Grizzly, Marten, Tailed frog, Spotted owl SRMZ, Goshawk, Deer winter range, Rare ecosystems
	CWHms1	P	14.50	14.50			
	MHmm2	N	57.69	0.00			
	MHmm2	P	2.44	2.44			
19	CWHms1	N	13.61	0.00			Grizzly, Marten, Tailed frog, Goshawk

OGMA #	BEC UNIT	LANDBASE CLASS	OGMA AREA (ha)	THLB AREA (ha)	COMMENTS	FOREST DEVELOPMENT PLAN	WILDLIFE
	CWHms1	P	0.02	0.02			
	MHmm2	N	0.18	0.00			
20	MHmm2	N	9.09	0.00	Adjacent to #21		Grizzly, Marten, Tailed frog, Rare ecosystems
21	CWHms1	N	7.41	0.00	Adjacent to #20		Grizzly, Marten, Tailed frog, Goshawk, Rare ecosystems
	CWHms1	P	0.13	0.13			
	MHmm2	N	25.63	0.00			
22	MHmm2	N	7.64	0.00			Tailed frog, Rare ecosystems
23	CWHms1	N	5.53	0.00			Grizzly, Marten, Tailed frog, Goshawk
24	CWHms1	N	12.68	0.00			Grizzly, Marten, Tailed frog, Spotted owl SRMZ, Mtn Goat winter range, Goshawk, Deer winter range, Rare ecosystems
25	CWHms1	N	4.77	0.00	Mature forest		Marten, Tailed frog, Spotted owl SRMZ, Goshawk
26	CWHms1	N	1.27	0.00			Grizzly, Rare ecosystems
	CWHms1	P	0.18	0.18			
	MHmm2	N	14.23	0.00			
	MHmm2	P	1.15	1.15			
27	CWHms1	N	12.87	0.00			Marten, Tailed frog, Goshawk
28	CWHms1	N	29.07	0.00			Marten, Tailed frog, Spotted owl SRMZ, Mtn Goat winter range, Goshawk, Deer winter range
	CWHms1	P	0.38	0.38			
29	MHmm2	N	4.30	0.00			Grizzly, Marten, Rare ecosystems
30	CWHms1	N	4.17	0.00			Marten, Mtn Goat winter range, Goshawk, Deer winter range
31	CWHms1	C	3.39	3.39	Riparian		Grizzly, Marten, Tailed frog, Goshawk, Rare ecosystems
	CWHms1	N	4.23	0.00			
	CWHms1	P	2.92	2.92			
	MHmm2	N	5.98	0.00			
32	CWHms1	N	2.78	0.00	Mature forest		Marten, Tailed frog, Spotted owl SRMZ, Goshawk
33	CWHms1	N	3.94	0.00			Marten, Goshawk
34	CWHms1	C	1.10	1.10	Large patch, subzone connectivity, riparian		Grizzly, Marten, Tailed frog, Spotted owl SRMZ, Goshawk, Deer winter range, Rare ecosystems
	CWHms1	N	67.68	0.00			
	CWHms1	P	1.23	1.23			
	MHmm2	N	61.60	0.00			
	MHmm2	P	0.05	0.05			

OGMA #	BEC UNIT	LANDBASE CLASS	OGMA AREA (ha)	THLB AREA (ha)	COMMENTS	FOREST DEVELOPMENT PLAN	WILDLIFE
35	CWHms1	N	5.25	0.00			Marten, Mtn Goat winter range, Goshawk, Deer winter range
	CWHms1	P	0.06	0.06			
36	CWHms1	N	8.19	0.00			Marten, Goshawk
37	CWHms1	N	1.42	0.00	Large patch, riparian		Grizzly, Marten, Tailed frog, Rare ecosystems,
	MHmm2	N	59.91	0.00			
38	CWHms1	N	31.47	0.00			Marten, Tailed frog, Mtn Goat winter range, Goshawk, Deer winter range, Rare ecosystems
	CWHms1	P	0.10	0.10			
39	CWHms1	C	0.18	0.18			Marten, Goshawk, Rare ecosystems
	CWHms1	N	0.89	0.00			
	MHmm2	C	0.29	0.29			
	MHmm2	N	6.43	0.00			
40	CWHms1	N	7.13	0.00			Marten, Tailed frog, Goshawk
	MHmm2	N	1.88	0.00			
41	CWHms1	P	48.23	48.23			Marten, Spotted owl SRMZ, Goshawk
42	CWHms1	N	0.08	0.00	Large patch		Grizzly, Marten, Tailed frog, Goshawk, Rare ecosystems
	MHmm2	N	67.52	0.00			
43	CWHms1	N	19.62	0.00		FDP block to north	Grizzly, Marten, Tailed frog, Goshawk
	MHmm2	C	0.05	0.05			
	MHmm2	N	25.73	0.00			
44	CWHms1	C	2.44	2.44	Large patch, riparian		Grizzly, Marten, Tailed frog, Goshawk
	CWHms1	N	40.07	0.00			
	CWHms1	P	1.17	1.17			
	MHmm2	N	5.25	0.00			
45	MHmm2	N	11.72	0.00			Grizzly, Marten, Tailed frog
46	CWHms1	N	5.19	0.00	Riparian		Grizzly, Marten, Tailed frog, Goshawk, Rare ecosystems
	CWHms1	P	0.02	0.02			
47	MHmm2	N	2.23	0.00			Grizzly, Marten, Tailed frog
48	CWHms1	N	8.46	0.00			Grizzly, Marten, Tailed frog, Goshawk, Rare ecosystems
49	CWHms1	P	1.76	1.76			Marten, Tailed frog, Goshawk
	MHmm2	N	2.53	0.00			
	MHmm2	P	1.50	1.50			
50	CWHms1	N	2.17	0.00			Marten, Tailed frog, Goshawk
51	CWHms1	N	9.30	0.00	Riparian		Grizzly, Marten, Tailed frog, Goshawk, Rare ecosystems
52	CWHms1	C	0.02	0.02	Riparian		Marten, Tailed frog, Goshawk

OGMA #	BEC UNIT	LANDBASE CLASS	OGMA AREA (ha)	THLB AREA (ha)	COMMENTS	FOREST DEVELOPMENT PLAN	WILDLIFE
	CWHms1	N	8.62	0.00			
	CWHms1	P	1.11	1.11			
53	CWHms1	N	5.86	0.00			Grizzly, Marten, Tailed frog, Goshawk
	MHmm2	N	2.92	0.00			
54	CWHms1	N	1.49	0.00			Grizzly, Marten, Tailed frog, Goshawk
	MHmm2	N	0.98	0.00			
55	CWHms1	N	4.97	0.00			Grizzly, Marten, Tailed frog, Goshawk
	MHmm2	N	4.23	0.00			
56	CWHms1	C	0.05	0.05			Grizzly, Marten, Tailed frog, Goshawk
	CWHms1	N	1.17	0.00			
	CWHms1	P	0.00	0.00			
	MHmm2	C	0.22	0.22			
	MHmm2	N	10.72	0.00			
	MHmm2	P	0.04	0.04			
57	MHmm2	C	0.10	0.10	Mature forest		Grizzly, Marten, Tailed frog
	MHmm2	N	4.70	0.00			
58	CWHms1	C	7.80	7.80	Riparian-upland		Grizzly, Marten, Tailed frog, Goshawk, Rare ecosystems
	CWHms1	N	0.63	0.00			
	CWHms1	P	0.64	0.64			
	MHmm2	C	5.82	5.82			
	MHmm2	N	7.46	0.00			
	MHmm2	P	1.44	1.44			
59	CWHms1	N	1.60	0.00			Marten, Tailed frog, Goshawk, Rare ecosystems
	MHmm2	N	0.68	0.00			
60	CWHms1	N	2.95	0.00	Adjacent to #86		Marten, Tailed frog, Goshawk
61	CWHms1	N	4.67	0.00	Mature forest		Grizzly, Marten, Tailed frog, Mtn Goat winter range, Goshawk, Rare ecosystems
62	CWHms1	N	6.91	0.00			Marten, Tailed frog, Goshawk
	CWHms1	P	0.03	0.03			
63	CWHds1	N	6.47	0.00	Mature forest		Marten, Tailed frog, Mtn Goat winter range, Goshawk, Deer winter range, Rare ecosystems
	CWHms1	N	6.89	0.00			
64	CWHms1	N	2.85	0.00			Grizzly, Marten, Tailed frog, Spotted owl SRMZ, Goshawk, Rare ecosystems
	CWHms1	P	5.87	5.87			
65	MHmm2	N	4.05	0.00			
66	CWHms1	N	2.52	0.00			Grizzly, Marten, Goshawk

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67	MHmm2	N	2.61	0.00	Mature forest		Grizzly, Marten, Tailed frog,
68	CWHms1	N	2.01	0.00	Mature forest		Grizzly, Marten, Tailed frog, Goshawk
	MHmm2	N	0.18	0.00			
69	MHmm2	N	4.87	0.00	Riparian, mostly mature, natural patch		Grizzly, Marten, Tailed frog, Goshawk
70	CWHms1	N	3.42	0.00	Mature forest		Marten, Tailed frog, Spotted owl SRMZ, Goshawk
71	CWHms1	N	14.72	0.00	Mature forest		Marten, Tailed frog, Spotted owl SRMZ, Goshawk
72	CWHms1	N	40.83	0.00	Mostly mature forest		Marten, Tailed frog, Spotted owl SRMZ, Mtn Goat winter range, Goshawk, Rare ecosystems
	CWHms1	P	10.42	10.42			
73	CWHms1	C	0.00	0.00	Mature forest		Grizzly, Marten, Tailed frog, Goshawk
	CWHms1	N	1.28	0.00			
74	CWHms1	N	5.22	0.00			Marten, Tailed frog, Goshawk, Rare ecosystems
75	CWHms1	N	0.73	0.00			Marten, Tailed frog, Spotted owl SRMZ, Goshawk
	CWHms1	P	3.99	3.99			
76	CWHms1	C	13.08	13.08			Grizzly, Marten, Tailed frog, PGS, Spotted owl SRMZ, Goshawk, Rare ecosystems
	CWHms1	N	7.89	0.00			
	CWHms1	P	1.09	1.09			
77	CWHms1	N	2.29	0.00			Grizzly, Marten, Tailed frog, Spotted owl SRMZ, Goshawk
	CWHms1	P	6.46	6.46			
	MHmm2	N	0.00	0.00			
78	MHmm2	N	14.71	0.00			Grizzly, Marten, Tailed frog, Spotted owl, Goshawk, Rare ecosystems
79	CWHms1	N	5.71	0.00			Grizzly, Marten, Tailed frog, Spotted owl SRMZ, Goshawk
	CWHms1	P	20.31	20.31			
	MHmm2	N	0.61	0.00			
80	CWHms1	N	16.37	0.00	Mature forest, riparian		Marten, Tailed frog, Spotted owl SRMZ, Mtn Goat winter range, Goshawk
81	CWHms1	N	17.52	0.00	Large patch, riparian		Marten, Tailed frog, Spotted owl SRMZ, Goshawk, Rare ecosystems
	CWHms1	P	65.32	65.32			
	MHmm2	N	0.28	0.00			

OGMA #	BEC UNIT	LANDBASE CLASS	OGMA AREA (ha)	THLB AREA (ha)	COMMENTS	FOREST DEVELOPMENT PLAN	WILDLIFE
82	CWHms1	N	4.19	0.00			Grizzly, Marten, Tailed frog, Spotted owl SRMZ, Goshawk
	MHmm2	N	1.44	0.00			
83	CWHms1	C	0.29	0.29	Mature forest, riparian		Marten, Tailed frog, Mtn Goat winter range, Goshawk, Rare ecosystems
	CWHms1	N	6.15	0.00			
	CWHms1	P	0.06	0.06			
84	CWHms1	C	1.33	1.33	Mature forest		Marten, Tailed frog, Goshawk
	CWHms1	N	24.16	0.00			
	CWHms1	P	4.21	4.21			
	MHmm2	N	25.00	0.00			
85	CWHms1	C	2.31	2.31	Riparian		Grizzly, Marten, Tailed frog, Goshawk
	CWHms1	N	23.97	0.00			
	CWHms1	P	1.71	1.71			
	MHmm2	N	8.67	0.00			
	MHmm2	P	0.01	0.01			
86	CWHms1	C	6.87	6.87	Large patch, some recruitment, valley-uplands connectivity	FDP block to northeast	Grizzly, Marten, Tailed frog, Goshawk, Rare ecosystems
	CWHms1	N	80.88	0.00			
	CWHms1	P	3.66	3.66			
	MHmm2	C	0.02	0.02			
	MHmm2	N	88.60	0.00			
87	CWHms1	N	7.72	0.00	Riparian		Grizzly, Marten, Tailed frog, Goshawk
	CWHms1	P	0.14	0.14			
	MHmm2	N	5.54	0.00			
88	CWHms1	C	0.18	0.18	Large patch, riparian	FDP block to south	Grizzly, Marten, Tailed frog, Goshawk, Rare ecosystems
	CWHms1	N	2.98	0.00			
	CWHms1	P	0.52	0.52			
	MHmm2	C	0.77	0.77			
	MHmm2	N	15.75	0.00			
	MHmm2	P	1.06	1.06			
89	MHmm2	N	2.73	0.00			Marten, Tailed frog, Rare ecosystems
90	CWHms1	N	3.80	0.00	Upland forest		Marten, Tailed frog, Goshawk,
91	CWHms1	N	2.32	0.00			Grizzly, Marten, Tailed frog, Goshawk
	CWHms1	P	0.38	0.38			
	MHmm2	N	5.00	0.00			
92	CWHms1	N	0.33	0.00			Grizzly, Marten, Tailed frog, Rare ecosystems

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	MHmm2	N	7.55	0.00			
93	CWHms1	N	2.27	0.00	Mature forest, riparian		Grizzly, Marten, Tailed frog, Spotted owl SRMZ, Goshawk, Rare ecosystems
94	CWHms1	N	7.02	0.00			Marten, Tailed frog
95	CWHms1	N	0.25	0.00			Grizzly, Marten, Goshawk
	MHmm2	N	3.40	0.00			
96	CWHms1	N	4.01	0.00			Marten, Mtn Goat winter range, Goshawk, Rare ecosystems
97	CWHms1	N	13.01	0.00	Upland forest		Marten, Mtn Goat winter range, Goshawk, Rare ecosystems
98	CWHms1	C	3.55	3.55	Riparian		Grizzly, Marten, Tailed frog, Goshawk,
	CWHms1	N	2.71	0.00			
	CWHms1	P	1.85	1.85			
99	CWHms1	N	6.03	0.00	Mature forest, riparian	FDP block adjacent to south	Grizzly, Marten, Tailed frog, Spotted owl SRMZ, Goshawk, Deer winter range
100	CWHms1	N	2.97	0.00	Upland forest		Marten, Mtn Goat winter range, Goshawk
101	CWHds1	N	0.27	0.00	Mature forest		Marten, Tailed frog, Mtn Goat winter range, Goshawk, Deer winter range
	CWHms1	N	9.21	0.00			
102	CWHdm	C	1.67	1.67	Mature forest, riparian		Marten, Tailed frog, Goshawk, Rare ecosystems
	CWHdm	N	2.96	0.00			
	CWHdm	P	3.50	3.50			
103	CWHms1	N	3.73	0.00	Mature forest		Marten, Goshawk, Deer winter range, Rare ecosystems
104	CWHms1	C	0.13	0.13	Mature forest		Marten, Deer winter range, Rare ecosystems
	CWHms1	N	3.79	0.00			
	CWHms1	P	0.12	0.12			
105	CWHms1	N	10.69	0.00			Marten, Tailed frog, Goshawk, Rare ecosystems
106	CWHms1	N	1.56	0.00			Marten, Goshawk
	MHmm2	N	0.73	0.00			
107	MHmm2	N	21.01	0.00			Grizzly, Tailed frog, Rare ecosystems
108	CWHms1	N	2.05	0.00			Marten, Goshawk
109	CWHds1	N	11.18	0.00	Mature forest		Grizzly, Marten, Goshawk, Deer winter range, Rare ecosystems
	CWHds1	P	0.01	0.01			
110	CWHdm	N	37.64	0.00	Mature forest		Marten, Tailed frog
	CWHds1	N	0.01	0.00			

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111	CWHds1	C	17.56	17.56			Grizzly, Marten, Tailed frog, Goshawk, Deer winter range, Rare ecosystems
	CWHds1	N	5.99	0.00			
	CWHds1	P	0.32	0.32			
112	CWHds1	N	19.85	0.00	Mature forest, riparian		Grizzly, Marten, Tailed frog, Mtn Goat winter range, Goshawk, Deer winter range, Rare ecosystems
	CWHms1	N	13.66	0.00			
113	CWHds1	N	1.13	0.00	Mature forest, riparian		Marten, Tailed frog, Mtn Goat winter range, Goshawk, Deer winter range, Rare ecosystems
	CWHms1	N	17.94	0.00			
114	CWHms1	N	11.81	0.00			Marten, Tailed frog, Goshawk, Deer winter range
115	CWHms1	N	17.17	0.00			Grizzly, Tailed frog, Goshawk, Marten
	CWHms1	P	0.16	0.16			
116	CWHds1	N	6.92	0.00			Marten, Tailed frog, Goshawk, Rare ecosystems
	CWHms1	N	0.80	0.00			
117	CWHms1	N	9.16	0.00			Marten, Goshawk, Deer winter range
118	CWHds1	N	4.53	0.00	Mature forest		Marten, Tailed frog, Goshawk, Deer winter range, Rare ecosystems
	CWHms1	N	21.90	0.00			
119	CWHms1	N	36.73	0.00			Grizzly, Marten, Tailed frog, Goshawk, Rare ecosystems
	MHmm2	N	65.13	0.00			
120	CWHdm	N	8.79	0.00	Riparian, partly mature forest		Marten, Tailed frog
	CWHdm	N	2.34	0.00	Shown as CWHms1	Field verified as CWHdm	
121	CWHds1	C	0.01	0.01	Large patch, some riparian, partly mature forest		Grizzly, Marten, Tailed frog, Goshawk, Rare ecosystems
	CWHds1	N	7.87	0.00			
	CWHds1	P	0.03	0.03			
	CWHms1	N	103.12	0.00			
	MHmm2	N	9.52	0.00			
122	CWHms1	C	2.20	2.20	Mature forest	FDP block above	Marten, Mtn Goat winter range, Goshawk, Deer winter range, Rare ecosystems
	CWHms1	N	14.60	0.00			
	CWHms1	P	0.07	0.07			

OGMA #	BEC UNIT	LANDBASE CLASS	OGMA AREA (ha)	THLB AREA (ha)	COMMENTS	FOREST DEVELOPMENT PLAN	WILDLIFE
123	CWHms1	C	2.53	2.53	Riparian		Marten, Tailed frog, Goshawk
	CWHms1	N	1.10	0.00			
	CWHms1	P	1.14	1.14			
124	CWHds1	N	4.72	0.00	Mature forest		Grizzly, Marten, Tailed frog, Goshawk, Deer winter range
	CWHms1	N	0.90	0.00			
125	CWHds1	C	0.52	0.52			Marten, Tailed frog, Goshawk, Rare ecosystems
	CWHds1	N	4.05	0.00			
	CWHds1	P	1.77	1.77			
	CWHms1	C	10.76	10.76			
	CWHms1	N	0.83	0.00			
	CWHms1	P	1.20	1.20			
126	CWHms1	N	0.02	0.00			
	MHmm2	N	22.98	0.00			
127	CWHms1	C	5.69	5.69	Partly mature forest		Grizzly, Marten, Tailed frog, Goshawk
	CWHms1	N	40.83	0.00			
	MHmm2	N	1.50	0.00			
128	CWHds1	N	12.08	0.00	Riparian, Silver Lake Park		Marten, Tailed frog, Goshawk, Deer winter range
129	CWHms1	N	20.41	0.00			Marten, Goshawk, Rare ecosystems
	CWHms1	P	0.00	0.00			
130	CWHds1	N	12.78	0.00	Mature forest, adjacent to Silver Lake Park		Grizzly, Marten, Mtn Goat winter range, Deer winter range, Rare ecosystems
	CWHms1	N	17.15	0.00			
131	CWHms1	N	39.17	0.00	Partly mature forest		Marten, Tailed frog, Goshawk, Rare ecosystems
	CWHms1	P	0.85	0.85			
132	CWHms1	N	24.46	0.00			Grizzly, Marten, Tailed frog, Spotted owl SRMZ, Goshawk, Rare ecosystems
	MHmm2	N	5.92	0.00			
133	CWHms1	N	13.61	0.00			Marten, Goshawk, Rare ecosystems
134	CWHms1	N	4.90	0.00			Marten, Mtn Goat winter range, Goshawk
135	CWHms1	N	8.84	0.00			Marten, Tailed frog, Spotted owl SRMZ, Goshawk
	MHmm2	N	0.71	0.00			
136	CWHms1	N	12.43	0.00			Marten, Goshawk, Rare ecosystems

OGMA #	BEC UNIT	LANDBASE CLASS	OGMA AREA (ha)	THLB AREA (ha)	COMMENTS	FOREST DEVELOPMENT PLAN	WILDLIFE
137	CWHms1	N	3.46	0.00	Mature forest, riparian		Grizzly, Marten, Tailed frog, Spotted owl SRMZ, Goshawk, Deer winter range, Rare ecosystems
138	CWHms1	N	6.21	0.00			Marten, Mtn Goat winter range, Goshawk, Rare ecosystems
139	CWHms1	C	8.12	8.12	Riparian, upland-lowland connectivity	FDP blocks below	Grizzly, Marten, Tailed frog, Goshawk
	CWHms1	N	13.71	0.00			
	CWHms1	P	1.04	1.04			
	MHmm2	C	2.32	2.32			
	MHmm2	N	31.16	0.00			
140	CWHdm	C	0.40	0.40	Riparian		Marten, Tailed frog, Goshawk
	CWHdm	N	7.72	0.00			
	CWHdm	P	1.10	1.10			
141	CWHms1	N	6.17	0.00			Grizzly, Marten, Tailed frog, Spotted owl SRMZ, Goshawk, Rare ecosystems
142	CWHms1	C	1.13	1.13			Grizzly, Marten, Tailed frog, Goshawk
	CWHms1	N	2.35	0.00			
	CWHms1	P	0.44	0.44			
143	CWHms1	C	1.47	1.47			Grizzly, Marten, Tailed frog, Goshawk
	CWHms1	N	5.97	0.00			
	CWHms1	P	15.24	15.24			
	MHmm2	N	1.82	0.00			
144	CWHms1	N	11.32	0.00			Marten, Tailed frog, Goshawk, Rare ecosystems
	MHmm2	N	11.66	0.00			
145	CWHms1	N	43.36	0.00	Riparian		Marten, Tailed frog, Spotted owl SRMZ, Goshawk, Rare ecosystems
	CWHms1	P	24.28	24.28			
146	CWHms1	N	5.24	0.00			Grizzly, Marten, Tailed frog, Goshawk, Rare ecosystems
147	CWHms1	N	5.50	0.00			Grizzly, Tailed frog, Goshawk
	CWHms1	P	0.02	0.02			
	MHmm2	N	8.10	0.00			
148	CWHms1	N	13.67	0.00	Riparian	FDP block adjacent to south	Grizzly, Marten, Tailed frog, Spotted owl SRMZ, Goshawk, Rare ecosystems
	CWHms1	P	32.74	32.74			
149	CWHms1	N	30.35	0.00			Grizzly, Marten, Goshawk, Rare ecosystems, Tailed frog

OGMA #	BEC UNIT	LANDBASE CLASS	OGMA AREA (ha)	THLB AREA (ha)	COMMENTS	FOREST DEVELOPMENT PLAN	WILDLIFE
	MHmm2	N	11.24	0.00			
150	CWHms1	N	13.21	0.00	Riparian, adjacent to #152		Grizzly, Marten, Tailed frog, Goshawk, Rare ecosystems
	MHmm2	N	14.86	0.00			
151	CWHms1	N	16.37	0.00			Grizzly, Marten, Tailed frog, Spotted owl SRMZ, Goshawk, Rare ecosystems
152	CWHms1	N	0.90	0.00	Riparian, adjacent to #150		Grizzly, Marten, Tailed frog, Goshawk
	MHmm2	N	7.00	0.00			
153	CWHms1	C	0.87	0.87	Riparian		Grizzly, Marten, Tailed frog, Goshawk
	CWHms1	P	3.44	3.44			
154	CWHms1	C	4.32	4.32		FDP block to north	Marten, Tailed frog, Goshawk, Rare ecosystems
	CWHms1	N	5.66	0.00			
	CWHms1	P	1.32	1.32			
	MHmm2	C	0.01	0.01			
	MHmm2	N	8.14	0.00			
	MHmm2	P	0.07	0.07			
155	CWHms1	N	0.38	0.00			Marten, Goshawk
	MHmm2	N	3.67	0.00			
156	MHmm2	N	5.15	0.00			Marten, Tailed frog
157	CWHms1	N	1.92	0.00			Grizzly, Marten, Tailed frog, Goshawk, Rare ecosystems
	CWHms1	P	0.30	0.30			
	MHmm2	N	19.92	0.00			
	MHmm2	P	0.00	0.00			
158	MHmm2	N	3.56	0.00			Marten, Tailed frog,
159	CWHms1	N	2.03	0.00			Grizzly, Marten, Tailed frog, Goshawk
	MHmm2	N	5.76	0.00			
160	CWHms1	N	1.57	0.00			Marten, Tailed frog, Goshawk, Rare ecosystems
	MHmm2	N	0.00	0.00			
161	CWHms1	N	1.77	0.00			Marten, Tailed frog, Goshawk, Rare ecosystems
	MHmm2	N	3.66	0.00			
162	CWHms1	N	6.05	0.00			Marten, Goshawk
	MHmm2	N	1.41	0.00			
163	CWHms1	N	0.00	0.00	Adjacent to #175		Grizzly, Marten, Tailed frog, Goshawk
	MHmm2	N	2.82	0.00			
164	CWHms1	N	2.02	0.00			Marten, Tailed frog, Goshawk
	MHmm2	N	14.19	0.00			

OGMA #	BEC UNIT	LANDBASE CLASS	OGMA AREA (ha)	THLB AREA (ha)	COMMENTS	FOREST DEVELOPMENT PLAN	WILDLIFE
165	CWHds1	N	6.20	0.00	Mature forest		Grizzly, Marten, Tailed frog, Goshawk, Rare ecosystems
166	CWHms1	C	0.05	0.05	Large patch, riparian, mostly mature forest		Grizzly, Marten, Tailed frog, Spotted owl SRMZ, Goshawk, Deer winter range, Rare ecosystems
	CWHms1	N	47.57	0.00			
	CWHms1	P	79.49	79.49			
	MHmm2	C	0.57	0.57			
	MHmm2	N	18.56	0.00			
	MHmm2	P	0.53	0.53			
167	MHmm2	N	11.51	0.00	Riparian		Marten, Tailed frog
168	CWHms1	N	23.93	0.00			Marten, Tailed frog, Goshawk
	MHmm2	N	4.92	0.00			
169	CWHms1	C	22.24	22.24	Riparian		Marten, Tailed frog, Goshawk
	CWHms1	P	6.93	6.93			
170	CWHms1	N	41.23	0.00	Riparian, partly mature forest		Grizzly, Marten, Tailed frog, Goshawk
	MHmm2	N	0.40	0.00			
171	CWHms1	N	3.37	0.00	Riparian		Grizzly, Marten, Tailed frog, Rare ecosystems
	CWHms1	P	3.33	3.33			
	MHmm2	N	1.42	0.00			
	MHmm2	P	1.52	1.52			
172	CWHms1	N	2.32	0.00	Riparian-upland		Grizzly, Tailed frog, Spotted owl SRMZ, Goshawk, Rare ecosystems, Marten,
	CWHms1	P	21.26	21.26			
	MHmm2	N	5.99	0.00			
	MHmm2	P	10.37	10.37			
173	CWHms1	N	4.33	0.00	Riparian-upland		Grizzly, Marten, Tailed frog, Goshawk, Rare ecosystems
	MHmm2	N	23.22	0.00			
174	CWHms1	C	0.03	0.03			Grizzly, Marten, Tailed frog, Goshawk
	CWHms1	N	30.34	0.00			
	CWHms1	P	0.43	0.43			
	MHmm2	C	0.00	0.00			
	MHmm2	N	41.11	0.00			
	MHmm2	P	0.05	0.05			
175	CWHms1	N	18.18	0.00			Marten, Tailed frog, Goshawk, Mtn Goat winter range
	MHmm2	N	6.43	0.00			
176	CWHms1	N	8.48	0.00			Grizzly, Marten, Tailed frog, Goshawk, Rare ecosystems
	CWHms1	P	0.38	0.38			

OGMA #	BEC UNIT	LANDBASE CLASS	OGMA AREA (ha)	THLB AREA (ha)	COMMENTS	FOREST DEVELOPMENT PLAN	WILDLIFE
	MHmm2	C	0.01	0.01			
	MHmm2	N	118.34	0.00			
177	CWHms1	N	6.12	0.00			Grizzly, Marten, Tailed frog, Goshawk
	MHmm2	N	1.59	0.00			
Grand Total			**3,502.36**	**553.47**			

APPENDIX 2 – YALE LANDSCAPE UNIT

1 Yale Landscape Unit Description

The total area of the Yale LU is approximately 48,401 ha. The LU is divided into two portions by the Fraser River, which runs north-south through the area (Figure 2). Of the total area, 32,243 ha (67%) is within the Crown forest land base, of which 19,425 ha (60% of Crown forest land) is included in the Timber Harvesting Land Base (THLB). The remaining 16,159 ha (33% of the LU) is non-forested and/or non-Crown (e.g. rock, alpine tundra, wetlands, water, private land) and has been excluded from any OGMA contributions and calculations.

Subzone variants present in the Yale LU include 2 Coastal Western Hemlock (CWH) variants, including the Southern Moist Submaritime variant (CWHms1), and the Southern Dry Submaritime (CWHds1), which total approximately 26,228 ha (54 % of the LU). The Leeward Moist Maritime Mountain Hemlock variant (MHmm2) is also present and totals approximately 4815 ha (10% of the LU). The remainder of the LU is composed of Alpine Tundra and parkland, which are not considered forested.

The entire LU is situated within the Coast and Mountains Ecoprovince in the Eastern Pacific Ranges Ecosection. Major habitat types present in the Yale LU include: upland forest, riparian forest, small lakes and wetlands, steep partly forested rocky slopes, sub-alpine forest, and alpine; all of which contribute to the area's complexity.

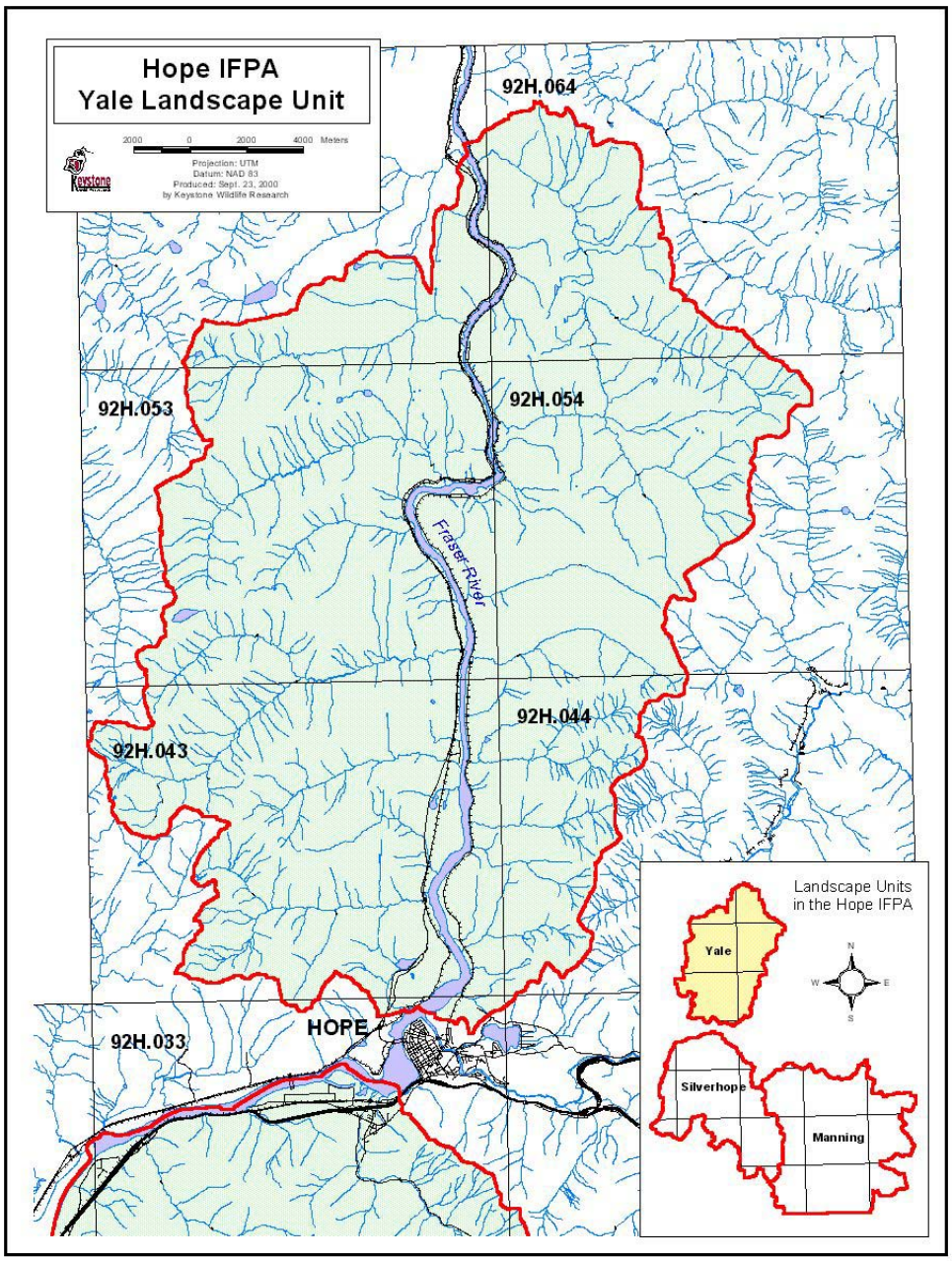

Figure 2. Location of the Yale LU.

2 Significant Resource Values

The proximity of the Yale LU to the Nlaka'pamux First Nation, the Trans-Canada highway and associated communities affects the relative values of the LUs resources and corresponding management strategies. The Landscape Unit supports a wide range of significant natural resource values and features, as well as a diversity of social and cultural values and influences.

This combination together with an extensive forest road network adds complexity to resource management in this area.

2.1 Fish, Wildlife and Biodiversity

Wildlife resources of primary management concern in the Yale LU include: grizzly bear, Northern Spotted Owl, black-tailed deer, mountain goats, fish and some species at risk that are considered "Identified Wildlife"[1]. Many other species occur including forest birds, raptors, small mammals, amphibians and furbearers but their habitat requirements are generally managed within habitat provisions provided for primary species. For example, habitat for spotted owls in the Yale LU is maintained within Special Resource Management Zones (SRMZ). Part of the Sowaqua SRMZ and a small portion of the Anderson SRMZ are in the Yale LU. About 56% of this is suitable owl habitat (>100 years old forest) with a requirement to recruit another 274 ha (11%) of suitable owl habitat to reach a total of 67% suitable owl habitat in the SRMZ. This owl habitat would support other species.

The Yale LU is also an important area for black-tailed deer (Columbian black-tailed and mule). Some of the identified winter ranges overlap with a spotted owl SRMZ and some of both species' habitats has been captured in OGMAs. The forested winter range habitat maintained for deer would also benefit other species.

Mountain goat winter range habitat has already been mapped (623 ha of Crown forest) and a similar process will be used to protect it under the FPC. Some of the UWR overlaps with Spotted Owl SRMZ and some of each species' habitats has been captured in OGMA. The habitat maintained for ungulates would also benefit other species.

Further, the Fraser River and several creeks within the LU support salmonid populations. Riparian reserve zones established (as per the FPC) adjacent to these fish streams will help maintain fish habitat. Where riparian areas have been logged, habitat will be provided in the future as it re-grows.

Grizzly bears in the Yale LU are separated into two population units, divided by the Fraser River. West of the Fraser, grizzly bears are within the threatened Stein-Nahatlatch grizzly bear population unit for which a Recovery Plan has yet to be developed. East of the Fraser, grizzly bears are within the threatened North cascades grizzly bear population unit, for which a recovery plan has been drafted. In general, the two Recovery Plans (one when completed, the other when approved) will include objectives and strategies to protect and/or enhance grizzly bear habitat values. Grizzly bears are also an Identified Wildlife species. Provisions exist to protect some critical foraging or security habitat within Wildlife Habitat Areas (WHA). Designation of WHAs will occur as necessary or as part of the Recovery Plan to protect additional grizzly bear habitat in the Yale LU. Other species of Identified Wildlife (e.g. Northern Goshawk, tailed frog) that may be discovered later may receive habitat protection with WHAs as well. In turn, these WHAs will help provide habitat for species not actively managed for.

[1] Volume 1 of the *Identified Wildlife Management Strategy* includes a list of 36 wildlife species and 4 plant communities that are considered to be at risk. These species or plant communities require special management of critical habitat to maintain or restore populations or distributions. Critical habitat is protected within Wildlife Habitat Areas. See the *Identified Wildlife Management Strategy Volume 1 February 1999* for more information.

Ecosystem mapping has been completed for the entire Yale LU under the Hope Innovative Forest Practices Agreement co-ordinated by International Forest Products Ltd. Resources Inventory Committee (RIC) standard wildlife models and ratings tables have been used to generate themed habitat maps for a number of species of concern within the LU, including black-tailed deer, mountain goat, tailed frog, Northern Spotted Owl and Northern Goshawk. This habitat information was also considered during OGMA selection.

Ministry of Environment, Lands and Parks district staff (now MWLAP) conducted mountain goat winter range inventory during winter 1998 (Jex, 2002), and also participated in developing a forest-cover based Deer Winter Range Management Plan (Freeman 2001). Finally, spotted owl inventory efforts have occurred periodically since 1993. All of the inventory efforts have helped to identify critical wildlife habitats that have been considered during OGMA delineation.

2.2 Timber Resources

The presence of a substantial timber harvesting land base establishes the importance of timber resource values. Continued access to commercially valuable timber, including future second growth, is a significant concern. First pass harvesting of old growth timber is nearing completion.

Commercially valuable tree species in the Yale LU are Douglas-fir with some sub-alpine fir and hemlock at lower elevations. Hemlock, sub-alpine fir, Engelmann spruce and western redcedar are the most common species at mid to higher elevations.

Table 1 shows the age composition of forests in the Yale LU based on Vegetation Resources Inventory information.

Table 1. Age distribution of forests within the Yale Landscape Unit.

Age	% of Crown Forested Landbase
0-60	49
61-140	15
141-250	25
251+	11

Most of the forests have medium site productivity. A number of different licensees harvest in the Yale LU. Lineham Logging has a small Timber License on the west side of the Fraser River. BC Timber Sales Program areas, managed by the Ministry of Forests, lie along American and Yale Creeks west of the Fraser River. Cattermole Timber operates in the Siwash Creek drainage in the north-eastern part of the LU. Teal Cedar Products Ltd. has a small operating area in the southeast corner of the LU. Allison Pass Sawmills Ltd. has a small chart near Suko Creek. International Forest Products operates throughout the LU. Interfor processes most of the harvested timber in their own facilities, however, some is sold to other companies.

Forest management activities occur throughout all phases of forest development. Operational work includes pre-harvest planning, harvesting and stand regeneration. Post-harvest activities include planting, brushing, juvenile spacing, pruning and thinning.

2.3 Private Land

Only small parcels of private land occur within the Yale LU, mainly along the Trans-Canada highway. Much of the private land has been altered from its natural state for housing and major travel corridors. At this time, Crown forest adjacent to the private land is not considered suitable for OGMAs because of its younger age class and its contribution to the timber harvesting land base.

2.4 First Nations

The Yale LU is located within the traditional territory of the Yale, Union Bar, Sto:lo and Nlaka'pamux First Nations.

There is evidence of traditional use in several areas along the Fraser River and other main side drainages in the Yale LU. Trail systems also extend into some of the side tributaries that run into the Fraser River. Culturally modified trees have been identified in some forested areas. Several Indian Reserves are situated along the Fraser River.

Between 1997 and 1999, an Archaeological Overview Assessment model was developed by MOF to indicate where First Nations archaeological sites are most likely located. This was done to minimize potential impacts by forestry operations on culturally important areas. The model was useful in predicting the location of habitation sites at all elevations and high elevation campsites in the sub-alpine. Travel routes were also identified.

The maps produced from the model were reviewed to determine the amount of overlap between potential archaeological sites, travel routes and OGMAs. In the Yale LU, sections of travel routes were captured in OGMAs when they overlapped with areas of old forest usually along lower and mid slopes. Potential archaeological sites located near riparian or lake/wetland areas were also included in OGMAs when old or mature forests were present in the same locations. These potential sites are located along Emory, Yale, or Suka Creeks and other smaller tributaries.

2.5 Archaeological Sites

The Provincial Heritage Register provided data on known sites of archaeological and heritage importance. This information was incorporated into the resource value map as a positive resource value increasing a polygon's OGMA value.

2.6 Mining and Mineral Exploration

Subsurface resources (minerals, aggregate, coal, oil, gas and geothermal) are significant to the province. The Yale LU has a high potential for mineral resources. Approximately one third of the LU is covered by mineral tenures. It is important to note that establishment of old growth management areas will not affect the status of existing mineral and gas permits or tenures;

exploration and development activities are permitted. The preference is to proceed with exploration and development in a way that is sensitive to the old growth values of the OGMA; however, if exploration and development proceeds to the point of having significant impacts upon old growth values, then the OGMA will be relocated.

2.7 Recreation

The extensive forest road network has increased recreational opportunities for the public. Recreational hunting in the Yale LU is an important annual activity enjoyed by many outdoor enthusiasts; hunters primarily target black bears and deer. This area is also an important traditional hunting area for the Nlaka'pamux First Nation (NNTC). Winter recreational activity is normally restricted by seasonal road deactivation and snow accumulation, although snowmobiling could occur on road systems or alpine areas. Stream angling opportunities are also limited since stream resident fish are quite small. ATV, motorcycle and four wheel drive use of roads for recreation occurs to varying degrees. Trail hiking, berry and mushroom picking and wildlife viewing/sightseeing also occur. There are no BC Forest Service recreation sites presently in the Yale LU. Two small Protected Areas occur in the Yale LU, the Yale Garry Oak and Emory Creek.

3 Yale Landscape Unit Objectives

Landscape Unit objectives are legally established within the framework of the FPC and as such are Higher Level Plan objectives. Other Operational Plans must be consistent with these objectives. The Spotted Owl Management Plan has been approved and is being considered for Higher Level Plan status with legal objectives; it will apply to part of the Yale LU. To the greatest extent possible, objectives from both processes are intended to be compatible.

The Yale LU was ranked as a Low biodiversity emphasis option through the biodiversity value ranking process completed earlier (see the *Vancouver Forest Region Landscape Unit Planning Strategy*, 1999). This Low designation along with the BEC variant determines the percentage of the Crown forest land base that will be designated as OGMA. The most significant difference between a Low and Higher designation is that only one-third of OGMA requirements must be established immediately in the Lower BEO (one-third must be in old forest, 2/3s can be recruitment). Table 3 outlines the total amount of OGMA required in each variant and from which Crown forest category (i.e. Non-contributing-N; Timber Harvesting Land Base)[5]. The old growth target figures in Table 2 are derived from Appendix 2 of the *Landscape Unit Planning Guide*.

To ensure that landscape level biodiversity values were fairly represented, OGMAs were established in each BEC variant across the Yale Landscape Unit. This follows the coarse filter approach to biodiversity management whereby representative old growth stands are protected to maintain ecosystem processes and wildlife habitat requirements that may be poorly understood.

Table 2. Old Growth Management Area (OGMA) requirements, Yale Landscape Unit.

BEC Variant	NDT	One-third of Old Growth Target Required*		Old Growth Target Required		Total OGMA Established	Amount of OGMA Target Met Within							
							Non-Contributing Outside of Parks (N)		Non-Contributing Inside of Parks (N)		Partially Contributing (P)**		Contributing (C)	
		% of CFL	Ha	% of CFL	Ha	Ha	Ha	%	Ha	%	Ha	%	Ha	%
CWHds1	2	3	224	>9	671	679.5	591	87	0	0	62.4	9.2	26.1	3.8
CWHms1	2	3	563	>9	1,689	1,691.4	1,660.7	98.2	0	0%	23.7	1.4	7.0	.4
MHmm2	1	6	305	>19	915	920.9	916.4	99.5	0	0%	0.4	.04	4.0	.4
Totals			**1,092**		**3,275**	**3,291.8**	**3168.1**	**96.2**	**0**	**0**	**86.5**	**2.6**	**37.1**	**1.1**

[5] Non Contributing (N) forest land does not contribute to the Allowable Annual Cut. The Timber Harvesting Land Base (THLB) is made up of Contributing (C) forests and a portion of the Partially Contributing (P) forests. Partially Contributing forests are "constrained" due to one of several factors such as unstable soils or wildlife habitat, but are still partially available for harvest. Contributing forest is unconstrained and available for timber harvest.

* 1/3 of the target must be old forest, 2/3s can be recruitment areas from younger non-contributing forest
CWHds1: Coastal Western Hemlock, dry submaritime, southern variant. NDT 2
CWHms1: Coastal Western Hemlock, moist submaritime, southern variant. NDT 2
MHmm2: Mountain Hemlock, moist maritime, leeward variant. NDT 1
** 14 ha in P are considered part of the THLB, the remaining 73 ha are considered N

4 Yale OGMA Planning Results

4.1 Timber Harvesting Land Base Impact

After considering the existing constraints to the land base and their contribution to OGMAs, a total of 49 ha from the THLB was identified as OGMA to achieve old growth retention targets. Of this total, 35 ha are from the Contributing land base, while the remaining 14 ha are from the Partially Contributing. Licensee concerns were addressed whenever possible, and an attempt was made to balance the impacts between the current charts. Some of the selected areas within the THLB are RRZ or remnants after harvest, or agreed to by the licensee.

4.2 OGMA Age Classes

Due to the disturbance history of the Yale LU and as allowed by the Low BEO designation, approximately 65% of the OGMA total were established within Structural Stage 6 forest (mature stands 140-250 years old). Approximately 34% of the overall OGMA total was delineated in Structural Stage 7 stands (equivalent to age 250+ years). However, the 1/3 old rule by BEC variant was not met in the CWHds1 variant (137 ha old vs. 224 ha required) due to timber impact and availability, the shortfall was made up from Structural Stage 6 forest (140-250 years) which reduces possible biodiversity concerns. OGMA selections were prioritised based on stand attributes and the resource values present, as described in Table 3.

The distinction between old and mature forests varies by BEC variant. For CWHds and ms variants, mature forests must be greater than 80 years of age, and old forests greater than 250 years. Old forests in the MHmm must also be greater than 250 years, but mature forests must be older than 120 years.

4.3 OGMA Summary

OGMA attributes together with a rationale for selection of OGMAs is described in Table 3 on the following pages.

Table 3. Yale Landscape Unit: OGMA Summary and Rationale.

OGMA #	BEC UNIT	LANDBASE CLASS	OGMA AREA (ha)	THLB AREA (ha)	COMMENTS	FOREST DEVELOPMENT PLAN	WILDLIFE
1	CWHms1	N	2.59	0.00			Tailed frog, Goshawk, Grizzly, Marten, Mtn Goat winter range
2	CWHms1	N	7.77	0.00			Goshawk, Grizzly, Marten
4	CWHms1	N	9.96	0.00	Riparian; near #5 and #6		Tailed frog, Goshawk, Marten
5	CWHms1	N	3.27	0.00	Riparian; near #4 and #6		Tailed frog, Goshawk, Marten
6	CWHms1	N	2.01	0.00	Riparian; near #5 and #4		Tailed frog, Goshawk, Marten
7	CWHms1	N	3.51	0.00			Tailed frog, Goshawk, Marten
	CWHms1	C	0.07	0.01			
	MHmm2	N	7.96	0.00			
8	CWHms1	N	3.18	0.00	Near # 10, #12	FDP block to northwest	Tailed frog, Goshawk, Grizzly, Marten
	MHmm2	N	10.73	0.00			
9	CWHms1	C	0.06	0.06	Riparian		Tailed frog, Goshawk, Grizzly, Marten, Rare ecosystems
	CWHms1	N	14.12	0.00			
	CWHms1	P	0.13	0.13			
10	CWHms1	N	10.40	0.00	Near #8, #110	FDP block to northeast	Tailed frog, Goshawk, Marten
	MHmm2	N	0.19	0.00			
11	CWHds1	C	14.02	14.02			Deer winter range, Tailed frog, Goshawk, Marten
	CWHds1	N	15.01	0.00			
	CWHds1	P	5.41	0.65			
	CWHms1	C	1.21	1.21			
	CWHms1	N	6.78	0.00			
	CWHms1	P	0.68	0.07			
13	CWHds1	C	3.86	3.86			Tailed frog, Goshawk, Marten, Deer winter range
	CWHds1	N	9.82	0.00			
	CWHds1	P	3.58	0.40			
16	CWHms1	N	18.68	0.00			Goshawk, Marten
17	CWHds1	C	0.09	0.09			Deer winter range, Tailed frog, Goshawk, Grizzly, Marten, Rare ecosystems
	CWHds1	N	40.7	0.00			
18	CWHms1	C	0.12	0.12		FDP block to south	Tailed frog, Grizzly, Marten
	CWHms1	N	5.40	0.00			
	MHmm2	N	14.64	0.00			
19	CWHds1	N	2.03	0.00			Goshawk, Marten, Rare ecosystems
	CWHms1	N	19.33	0.00			

OGMA #	BEC UNIT	LANDBASE CLASS	OGMA AREA (ha)	THLB AREA (ha)	COMMENTS	FOREST DEVELOPMENT PLAN	WILDLIFE
20	CWHds1	N	12.6				Deer winter range, Goshawk, Grizzly, Marten, Mtn Goat winter range
	CWHms1	N	51.13	0.00			
22	CWHms1	N	14.93	0.00			Tailed frog, Goshawk, Grizzly, Marten
	MHmm2	N	3.43	0.00			
23	CWHms1	N	19.82	0.00			Goshawk, Marten
25	CWHds1	C	1.27	1.27	Riparian	FDP block to north	Deer winter range, Tailed frog, Goshawk, Marten, Rare ecosystems
	CWHds1	N	7.33	0.00			
	CWHds1	P	5.07	0.75			
26	CWHds1	C	0.09	0.09	Riparian	FDP blocks to north and south	Tailed frog, Marten
	CWHds1	N	4.67	0.00			
	CWHds1	P	4.34	0.54			
27	CWHms1	N	69.44	0.00	Riparian; near #30		Tailed frog, Goshawk, Grizzly, Marten, Mtn Goat winter range
28	CWHms1	N	35.4	0.00			Deer winter range, Goshawk, Marten, Rare ecosystems
29	CWHds1	N	5.85	0.00	Riparian	FDP blocks to south	Deer winter range, Tailed frog, Goshawk, Grizzly, Marten
	CWHds1	P	8.99	3.31			
30	CWHms1	N	6.08	0.00	Near #27		Tailed frog, Goshawk, Marten
31	CWHms1	N	21.62	0.00	Riparian		Tailed frog, Goshawk, Grizzly, Marten
	MHmm2	N	17.03	0.00			
32	CWHms1	N	25.26	0.00			Tailed frog, Goshawk, Grizzly, Marten, Rare ecosystems
33	CWHms1	N	11.37	0.00	Riparian		Tailed frog, Goshawk, Grizzly, Marten, Mtn Goat winter range
	MHmm2	N	0.99	0.00			
35	CWHms1	N	12.74	0.00	Riparian; adjacent to #48, #47		Tailed frog, Goshawk, Marten
36	CWHms1	N	4.76	0.00			Spotted owl SRMZ, Goshawk, Marten
	CWHms1	P	0.04	0.00			
37	CWHms1	C	1.15	1.15			Tailed frog, Goshawk, Marten, Rare ecosystems
	CWHms1	N	9.15	0.00			
	CWHms1	P	1.03	1.03			
38	CWHds1	N	15.77	0.00			Goshawk, Marten, Rare ecosystems
	CWHms1	N	14.30	0.00			
39	CWHms1	N	6.30	0.00			Tailed frog, Goshawk, Grizzly, Marten

OGMA #	BEC UNIT	LANDBASE CLASS	OGMA AREA (ha)	THLB AREA (ha)	COMMENTS	FOREST DEVELOPMENT PLAN	WILDLIFE
40	CWHms1	N	4.36	0.00			Spotted owl SRMZ, Goshawk, Grizzly, Marten
	CWHms1	P	0.29	0.03			
	MHmm2	N	17.96	0.00			
41	CWHms1	N	12.8	0.00			Tailed frog, Goshawk, Grizzly, Marten
	MHmm2	N	13.7	0.00			
42	CWHds1	N	5.76	0.00	Adjacent to #43	FDP blocks to east	Deer winter range, Tailed frog, Goshawk, Marten
43	CWHds1	C	2.42	2.42		Small FDP blocks within	Deer winter range, Tailed frog, Goshawk, Marten
	CWHds1	N	61.4	0.00			
	CWHds1	P	3.12	0.31			
	CWHms1	N	4.2	0.00			
44	CWHms1	N	21.14	0.00			Goshawk, Marten
45	CWHms1	N	16.35	0.00	Riparian		Spotted owl SRMZ, Tailed frog, Goshawk, Grizzly, Marten
	MHmm2	N	57.40	0.00			
	MHmm2	P	0.03	0.03			
46	MHmm2	N	68.04	0.00	Riparian		Tailed frog, Goshawk, Grizzly, Marten
47	CWHds1	N	24.09	0.00	Riparian; adjacent to #35, #48	FDP blocks within	Deer winter range, Tailed frog, Goshawk, Grizzly, Marten, Rare ecosystems
	CWHms1	N	92.10	0.00			
48	CWHds1	N	20.54	0.00	Riparian; adjacent to #35		Tailed frog, Goshawk, Marten
	CWHms1	N	31.93	0.00			
49	MHmm2	N	26.65	0.00	Riparian		Tailed frog, Grizzly, Marten
50	CWHms1	N	25.7	0.00			Deer winter range, Tailed frog, Goshawk, Marten
51	CWHms1	N	0.56	0.00			Tailed frog, Goshawk, Grizzly, Marten, Rare ecosystems
	MHmm2	C	0.03	0.03			
	MHmm2	N	19.81	0.00			
52	CWHms1	N	6.54	0.00	Adjacent to #56		Goshawk, Marten
53	CWHms1	N	10.5	0.00	Riparian		Tailed frog, Goshawk, Grizzly, Marten, Rare ecosystems
54	CWHms1	N	4.41	0.00			Tailed frog, Goshawk, Marten, Rare ecosystems
	MHmm2	N	15.70	0.00			
55	CWHms1	N	0.16	0.00			Tailed frog, Goshawk, Grizzly, Marten
	MHmm2	N	30.01	0.00			

OGMA #	BEC UNIT	LANDBASE CLASS	OGMA AREA (ha)	THLB AREA (ha)	COMMENTS	FOREST DEVELOPMENT PLAN	WILDLIFE
56	CWHds1	N	68.59	0.00	Riparian; large block; adjacent to #52		Deer winter range, Tailed frog, Goshawk, Grizzly, Marten, Rare ecosystems
	CWHms1	N	112.1	0.00			
57	CWHms1	N	3.98	0.00			Tailed frog, Goshawk, Grizzly, Marten
58	CWHds1	N	33.72	0.00	Riparian		Tailed frog, Goshawk, Grizzly, Marten
	CWHds1	P	0.05	0.00			
60	CWHms1	N	3.88	0.00	Adjacent to #61, #65	FDP block to northeast	
61	CWHms1	N	6.00	0.00	Adjacent to #65, #60		Goshawk, Grizzly, Marten
62	CWHms1	N	16.85	0.00	Adjacent to #63, #64	FDP block to northwest	Tailed frog, Goshawk, Marten
	MHmm2	N	1.09	0.00			
63	CWHms1	N	1.92	0.00	Adjacent to #62, #64		Tailed frog, Marten
64	CWHms1	N	2.01	0.00	Adjacent to #63, #62		Tailed frog, Marten
65	CWHms1	N	2.54	0.00	Adjacent to # 60, #61	FDP block to northeast	Goshawk, Grizzly, Marten
	MHmm2	N	11.6	0.00			
66	CWHds1	N	5.01	0.00	Riparian	FDP block to north	Tailed frog, Goshawk, Marten
	CWHds1	P	5.99	0.60			
67	CWHms1	N	11.18	0.00			Tailed frog, Goshawk, Marten
	MHmm2	N	15.20	0.00			
	MHmm2	P	0.03	0.00			
68	MHmm2	N	16.28	0.00			Tailed frog, Grizzly, Marten
69	CWHds1	C	0.72	0.72			Deer winter range, Tailed frog, Goshawk, Marten
	CWHds1	P	9.6	0.96			
71	CWHms1	C	0.85	0.85			Tailed frog, Goshawk, Grizzly, Marten, Rare ecosystems
	CWHms1	N	7.75	0.00			
	MHmm2	N	0.26	0.00			
72	CWHms1	N	4.41	0.00		FDP blocks to northwest	Tailed frog, Goshawk, Marten
73	CWHms1	C	0.61	0.61	Adjacent to #81		Goshawk, Marten
	CWHms1	N	0.60	0.00			
74	CWHms1	N	9.16	0.00		FDP blocks to northwest	Tailed frog, Goshawk, Grizzly, Marten
	MHmm2	N	6.61	0.00			
75	CWHms1	N	4.27	0.00			Tailed frog, Goshawk, Grizzly, Marten
76	CWHms1	N	20.45	0.00	Adjacent to #80		Tailed frog, Goshawk, Grizzly, Marten

OGMA #	BEC UNIT	LANDBASE CLASS	OGMA AREA (ha)	THLB AREA (ha)	COMMENTS	FOREST DEVELOPMENT PLAN	WILDLIFE
	MHmm2	N	8.84	0.00			
78	CWHms1	N	15.71	0.00	Adjacent to #80		Tailed frog, Goshawk, Grizzly, Marten
79	CWHms1	N	22.80	0.00		FDP blocks to northwest	Tailed frog, Goshawk, Grizzly, Marten
	MHmm2	N	9.03	0.00			
80	CWHms1	N	11.54	0.00	Adjacent to #76, #78		Tailed frog, Goshawk, Grizzly, Marten
	MHmm2	N	8.67	0.00			
81	CWHms1	C	0.27	0.27	Adjacent to #73		Tailed frog, Goshawk, Grizzly, Marten
	CWHms1	N	6.46	0.00			
	MHmm2	C	0.86	0.86			
	MHmm2	N	15.13	0.00			
82	CWHms1	N	10.95	0.00	Riparian		Tailed frog, Goshawk, Grizzly, Marten, Deer winter range
	MHmm2	N	28.03	0.00			
83	CWHms1	N	38.37	0.00	Riparian		Deer winter range, Tailed frog, Goshawk, Grizzly, Marten, Rare ecosystems
	MHmm2	N	23.33	0.00			
84	CWHms1	N	5.9	0.00			Tailed frog, Goshawk, Marten
	MHmm2	N	10.9	0.00			
86	MHmm2	N	11.42	0.00			Grizzly, Marten
87	CWHds1	C	3.96	3.96	Riparian; adjacent to #85	FDP blocks to southwest and northwest	Deer winter range, Spotted owl SRMZ, Tailed frog, Goshawk, Grizzly, Rare ecosystems, Marten
	CWHds1	N	22.40	0.00			
	CWHds1	P	9.47	1.67			
	CWHms1	N	52.40	0.00			
88	MHmm2	N	12.41	0.00			Tailed frog, Goshawk, Marten
	MHmm2	P	0.31	0.03			
90	CWHms1	N	15.92	0.00			Tailed frog, Goshawk, Grizzly, Marten
	MHmm2	N	16.4	0.00			
92	CWHms1	N	14.85	0.00			Tailed frog, Goshawk, Grizzly, Marten
93	CWHms1	N	89.40	0.00	Large patch	FDP block to south	Deer winter range, Spotted owl SRMZ, Tailed frog, Goshawk, Grizzly, Marten
	CWHms1	P	21.47	2.28			
	MHmm2	N	0.92	0.00			
	MHmm2	P	0.05	0.01			
94	MHmm2	C	0.27	0.27			Tailed frog, Goshawk, Grizzly, Marten
	MHmm2	N	15.93	0.00			
	MHmm2	P	0.12	0.08			

OGMA #	BEC UNIT	LANDBASE CLASS	OGMA AREA (ha)	THLB AREA (ha)	COMMENTS	FOREST DEVELOPMENT PLAN	WILDLIFE
95	CWHms1	N	8.29	0.00			Tailed frog, Goshawk, Grizzly, Marten
	MHmm2	N	32.62	0.00			
96	CWHds1	C	0.3	0.3	Riparian		Deer winter range, Spotted Owl SRMZ
	CWHds1	N	39.5	0.00	Riparian	FDP to northwest	Deer winter range, Spotted owl SRMZ, Tailed frog, Goshawk, Grizzly, Marten
	CWHds1	P	0.6	0.6	Riparian		Deer winter range, Spotted owl SRMZ
	CWHms1	N	1.6	0.00	Riparian		Deer winter range, spotted owl SRMZ
97	CWHms1	N	5.17	0.00			Goshawk, Marten
	MHmm2	N	0.85	0.00			
98	CWHds1	N	6.6	0.00	Riparian		Deer winter range, Spotted owl SRMZ, Goshawk, Marten
	CWHds1	P	6.3	6.2			Deer winter range, Spotted owl SRMZ
	CWHms1	N	11.40	0.00			
99	CWHms1	N	26.91	0.00	Adjacent to #34	FDP blocks to east	Tailed frog, Goshawk, Grizzly, Marten, Rare ecosystems
	MHmm2	N	4.3	0.00			
100	CWHms1	N	9.17	0.00	Adjacent to #102		Tailed frog, Goshawk, Grizzly, Marten, Rare ecosystems
	MHmm2	N	4.58	0.00			
101	CWHms1	N	4.92	0.00			Tailed frog, Marten, Rare ecosystems
102	CWHms1	N	8.65	0.00	Adjacent to #108		Tailed frog, Goshawk, Grizzly, Marten, Mtn Goat winter range
103	CWHms1	N	19.18	0.00			Tailed frog, Goshawk, Grizzly, Marten, Rare ecosystems
	MHmm2	N	2.15	0.00			
104	CWHds1	N	8.79	0.00			Deer winter range, Tailed frog, Grizzly, Marten
105	CWHds1	N	147.03	0.00	Riparian; large block		Deer winter range, Tailed frog, Goshawk, Grizzly, Marten, Rare ecosystems
	CWHds1	P	0.10	0.01			Mtn Goat winter range
	CWHms1	N	335.86	0.00			
	MHmm2	N	159.49	0.00			
106	CWHms1	N	14.60	0.00	Riparian		Tailed frog, Goshawk, Grizzly, Marten
	MHmm2	N	25.38	0.00			
107	CWHms1	N	49.48	0.00			Deer winter range, Tailed frog, Goshawk, Grizzly, Marten
108	CWHms1	N	9.26	0.00	Adjacent to #102		Tailed frog, Goshawk, Grizzly, Marten

OGMA #	BEC UNIT	LANDBASE CLASS	OGMA AREA (ha)	THLB AREA (ha)	COMMENTS	FOREST DEVELOPMENT PLAN	WILDLIFE
	MHmm2	N	3.97	0.00			
109	MHmm2	N	9.64	0.00			Tailed frog, Marten, Rare ecosystems
110	MHmm2	N	31.59	0.00			Tailed frog, Goshawk, Marten, Grizzly
112	MHmm2	N	17.77	0.00			Marten
113	MHmm2	N	27.83	0.00			Tailed frog, Goshawk, Mtn. beaver, Marten, Grizzly, Rare ecosystems
113	MHmm2	C	2.86	2.86			
114	MHmm2	N	12.69	0.00			Tailed frog, Marten
115	MHmm2	N	9.74	0.00			Tailed frog, Goshawk, Marten
116	MHmm2	N	8.47	0.00			Tailed frog, Marten
117	MHmm2	N	11.84	0.00			Tailed frog, Marten
119	CWHds1	C	0.21	0.21	Lake riparian		Mostly younger forest, recruitment OGMA
	CWHds1	N	31.64	0.00	Lake riparian		Mostly younger forest, recruitment
120	CWHms1	N	5.38	0.00	Bndy adjusted for FN interests		Lower slope is Deer winter range
	MHmm2	N	5.98	0.00			
121	CWHms1	N	5.65	0.00	Combines with #57		Slide track adjacent
	MHmm2	N	6.86	0.00	Combines with #57		Slide track adjacent
122	CWHms1	N	0.13	0.00	Added to replace FN interest area		
	MHmm2	N	12.01	0.00			
123	CWHms1	N	.17	0.00			
123	MHmm2	N	12.19	0.00			
Grand Total			**3291.8**	**49.3**			

APPENDIX 3. MANNING LANDSCAPE UNIT

1 Manning Landscape Unit Description

The Manning LU lies just north of the international boundary (Figure 1), and is about 89,197 ha in size. The main travel corridor is Highway 3. Major water bodies include the Sumallo, Klesilkwa and Skagit Rivers. There are three large Protected Areas within the LU, including Manning Park and the Cascades and Skagit Recreation Areas. These Protected Areas total 56,176 ha, 63% of the LU. Highway 3 runs east-west near the northern boundary of the LU. Subzone variants present within the Manning LU include CWHms1, CWHds1, IDFww, MHmm2, ESSFmw, MHmmp2, and AT. The latter two are not considered forested. Of the total area, 57,012 ha (64% of the LU) is within the Crown forest land base, of which 5154 ha (9% of Crown forest land) is included in the Timber Harvesting Land Base (THLB). The remaining 32,185 ha (36% of the LU) is non-forested and/or non-Crown (e.g. rock, alpine tundra, wetlands, water, private land) and has been excluded from any OGMA contributions and calculations.

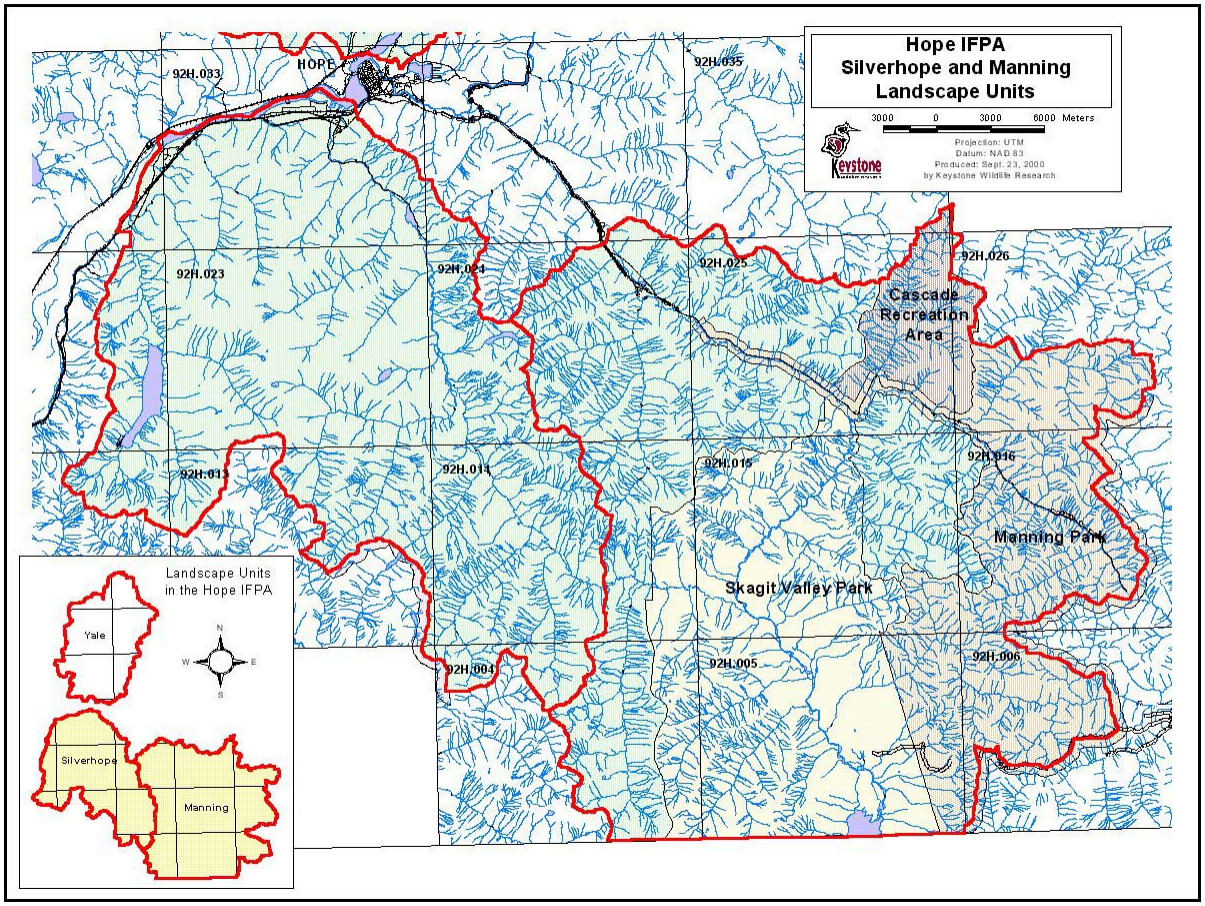

Figure 3. Location of the Manning LU.

Major habitat types present in the Manning LU include upland forest, riparian forest, small lakes, steep partly forested rocky slopes, sub-alpine forest, and alpine; all of which contribute to the area's complexity. The wildlife and biodiversity values of the Manning LU are significant in a District context.

2 Significant Resource Values

The Manning LU's biodiversity values, the Sto:lo First Nation and Nlaka'pamux Nation Tribal Council, E.C. Manning Park and Highway 3 have a substantial effect on the relative values of the LU's resources and corresponding management strategies. The Landscape Unit supports a wide range of significant natural resource values and features, as well as a diversity of social and cultural values and influences. These factors, in combination with an extensive forest road network, add complexity to resource management in this area.

2.1 Fish, Wildlife and Biodiversity

Wildlife resources of primary management concern in the Manning LU include: grizzly bear, Northern Spotted Owl, black-tailed deer, mountain goats, fish and some species at risk that are considered "Identified Wildlife"[6]. Many other species occur, including forest birds, raptors, small mammals, amphibians and furbearers but their habitat requirements are generally managed within habitat provisions provided for primary species. For example, habitat for spotted owls in the Manning LU is maintained within a Special Resource Management Zone (SRMZ), which includes 2 Long-Term Habitat Areas and covers approximately 31,681 ha of gross forested area. At present, about 77% of this is suitable owl habitat (>100 years old forest). This owl habitat will also support other species using old forests.

In addition, Mule deer winter range habitat in Manning LU encompasses 3239 ha (Classic, Crown forest area) as identified by Ministry of Environment, Lands and Parks (MELP, now called MWLAP). All or a portion of this area (outside of Protected Areas) is being considered for legal designation as Ungulate Winter Range under the FPC (or equivalent) according to a Deer Winter Range Management Plan (Freeman, 2001). Mountain goat winter range habitat has already been mapped (1136 ha of Crown forest) and a similar process will be used to protect it under the FPC. Some of the identified winter ranges overlap with a spotted owl SRMZ and some of both species' habitats has been captured in OGMAs. The forested winter range habitat maintained for deer would also benefit other species.

The Skagit, Klesilkwa and Sumallo Rivers and major tributaries support resident salmonid populations. Riparian reserve zones established (as per the FPC) adjacent to these fish streams will help maintain fish and wildlife habitat. In many instances, riparian areas supply habitat for other species, and where riparian areas were previously logged, habitat will be provided in the future as it re-grows.

[6] Volume 1 of the *Identified Wildlife Management Strategy* includes a list of 36 wildlife species and 4 plant communities that are considered to be at risk. These species or plant communities require special management of critical habitat to maintain or restore populations or distributions. Critical habitat is protected within Wildlife Habitat Areas. See the *Identified Wildlife Management Strategy Volume 1 February 1999* for more information.

Grizzly bears in the Manning LU are within the threatened North Cascades grizzly bear population unit, for which a Recovery Plan has been drafted. Implementation is expected to occur following public consultation, plan revisions and subsequent approval by government. The grizzly bear is also considered an Identified Wildlife species. Provisions exist to protect some critical foraging or security habitat within Wildlife Habitat Areas (WHA); designation of WHAs may occur as part of the Recovery Plan (grizzly bear WHAs are in prep.). Other species of Identified Wildlife (e.g. Northern Goshawk, mountain goat, tailed frog) are known to inhabit the study area and may receive habitat protection with WHAs as well. In turn, these WHAs will also provide habitat for species not actively managed.

Ecosystem mapping has been completed for the entire Manning LU under the Hope Innovative Forest Practices Agreement co-ordinated by International Forest Products Ltd. Resources Inventory Committee standard wildlife models and ratings tables have been used to generate themed habitat maps for a number of species of concern within the LU, including mule deer, mountain goat, tailed frog, Northern Spotted Owl and Northern Goshawk. This habitat information was also considered during OGMA selection.

Ministry of Environment, Lands and Parks district staff (now MWLAP) conducted mountain goat winter range inventory during winter 1998 (Jex, 2002), and also participated in developing a forest-cover based Deer Winter Range Management Plan (Freeman 2001). Finally, spotted owl inventory efforts have occurred periodically since 1993. All of the inventory efforts have helped to identify critical wildlife habitats that have been considered during OGMA delineation.

2.2 Timber Resources

Less than 10% of the LU is available for timber harvest. Commercially valuable tree species in the Manning LU include Douglas-fir, western red cedar, and western hemlock at low to mid elevations, and mountain hemlock and true fir species at mid to higher elevations. Scattered deciduous stands occur throughout the Manning LU, especially along the Sumallo, Klesilkwa and Skagit Rivers. Table 1 shows the age composition of forests in the Manning LU based on VRI information.

Table 1. Age distribution of forests within the Manning Landscape Unit.

Age	% of Crown Forested Land base
0-60	15.5
61-140	43.2
141-250	24.4
251+	16.9

Although much of the LU is composed of protected areas, International Forest Products, Tamihi Logging Ltd. and the BC Timber Sales Program (managed by the Ministry of Forests) harvest within the west and north portions of the Manning LU.

Forest management activities occur throughout all phases of forest development. Operational work includes pre-harvest planning, harvesting and stand regeneration. Post harvest activities include planting, brushing, juvenile spacing, pruning and thinning.

2.3 Private Land

Private lands within the Manning LU mainly occur at the north-western corner of the LU, along the Sumallo River. Some of the private land has been altered from its natural state and this change may influence the ecology of adjacent Crown forest lands. These factors were considered during OGMA delineation where private and Crown land interfaced.

2.4 First Nations

The Manning LU is located within the traditional territory of the Sto:lo and Nlaka'pamux First Nations.

Between 1997 and 1999, an Archaeological Overview Assessment model was developed by MOF to indicate where First Nations archaeological sites are most likely located. This was done to minimize potential impacts by forestry operations on culturally important areas. The model was useful in predicting the location of habitation sites at all elevations and high elevation campsites in the sub-alpine. Travel routes were also identified.

The maps produced from the model were reviewed to determine the amount of overlap between potential archaeological sites, travel routes and OGMAs. In the Manning LU, sections of travel routes were captured in OGMAs when they overlapped with areas of old forest usually along lower and mid slopes. Potential archaeological sites located near riparian or lake/wetland areas were also included in OGMAs when old or mature forests were present in the same locations. Examples of overlapping areas are in Laforge and Snass Creek and at Rhododendron Flats.

2.5 Archaeological Sites

The Provincial Heritage Register provided data on known sites of archaeological and heritage importance. This information was incorporated into the resource value map as a positive resource value increasing a polygon’s OGMA value.

2.6 Mining and Mineral Exploration

Subsurface resources (minerals, coal, oil, gas and geothermal) and aggregate resources are significant to the province. Over 150 mineral tenures exist in the Manning LU, most clustered along Silverdaisy and Norwegian Creeks. OGMAs have been located to avoid existing tenures wherever possible. Most of the LU has high to moderately high potential for metals.

It is important to note that establishment of old growth management areas will not affect the status of existing mineral and gas permits or tenures; exploration and development activities are permitted. The preference is to proceed with exploration and development in a way that is sensitive to the old growth values of the OGMA; however if exploration and development proceeds to the point of having significant impacts on old growth values, then the OGMA will be relocated.

2.7 Recreation

The provincial parks and recreation areas provide many recreational opportunities for the public. Winter recreational activity includes skiing, snowshoeing and snowmobiling, mostly within the parks and at the Silvertip Ski Area. Angling opportunities are provided in a number of small lakes as well as Ross Lake and tributaries of the Skagit River system. Canoeing, kayaking, camping, swimming, mountain-biking and horseback riding occur within the parks. ATV, motorcycle and four wheel drive use of roads for recreation occurs to varying degrees. Trail hiking, berry and mushroom picking and wildlife viewing/sightseeing also occur.

There are no Forest Service recreation sites in the Manning LU. Recreational hunting in the Manning LU is an important annual activity enjoyed by many outdoor enthusiasts; most hunters would target deer or black bear.

3 Manning Landscape Unit Objectives

Landscape Unit objectives are legally established within the framework of the FPC and as such are Higher Level Plan objectives. Other Operational Plans must be consistent with these objectives. The Spotted Owl Management Plan has been approved and is being considered for Higher Level Plan status with legal objectives; it will apply to portions of the Manning LU. Objectives from both processes are intended to be compatible to the greatest extent possible.

The Manning LU was ranked as Intermediate BEO through the biodiversity value ranking process completed earlier (see the *Vancouver Forest Region Landscape Unit Planning Strategy*, 1999). This Intermediate designation, along with the BEC variant, determines the percentage of the Crown forest land base that will be designated as OGMA. Table 2 outlines the total amount of OGMA required in each variant and from which Crown forest category (i.e. Non-Contributing-NC; Timber Harvesting Land Base)[7]. The old growth target figures in Table 2 are derived from Appendix 2 in the *Landscape Unit Planning Guide*.

OGMA and WTR Landscape Unit objectives apply only to provincial forest lands. While park forest lands outside of provincial forest may contribute to old seral representation, LU objectives do not apply to these areas.

OGMAs were established to the target in each BEC variant to ensure that landscape level biodiversity values are represented across the landscape. This follows the coarse filter approach to biodiversity management whereby representative old growth stands are protected to maintain ecosystem processes and wildlife habitat requirements that may be poorly understood.

[7] Non Contributing (N) forest land does not contribute to the Allowable Annual Cut. The Timber Harvesting Land Base (THLB) is made up of Contributing (C) forests and a portion of the Partially Contributing (P) forests. Partially Contributing forests are "constrained" due to one of several factors such as unstable soils or wildlife habitat, but are still partially available for harvest. Contributing forest is unconstrained and available for timber harvest.

Table 2. Old Growth Management Area (OGMA) requirements in the Manning LU.

BEC Variant	NDT	Old Growth Target Required		Total OGMA Established	Amount of OGMA Target Met Within							
					Non-Contributing Outside of Parks (N)		Non-Contributing Inside of Parks (N)		Partially Contributing (P)**		Contributing (C)	
		% of CFL	Ha	Ha	Ha	%	Ha	%	Ha	%	Ha	%
CWHds1	2	>9	87	89	0	0%	89	102%	0	0%	0	0%
CWHms1	2	>9	2,152	2,153	839	39%	1,208	56%	55	3%	51	2%
IDFww	4	>13	1,064	1,069	0	0%	1,069	100%	0	0%	0	0%
ESSFmw	2	>9	1,516	1,530	231	15%	1,299	85%	0	0%	0	0%
MHmm2	1	>19	874	883	387	44%	480	54%	7	1%	9	1%
		Totals	**5,693**	**5,724**	**1,457**	**25%**	**4,145**	**72%**	**62**	**1%**	**60**	**1%**

CWHds1: Coastal Western Hemlock dry, submaritime, southern variant - NDT2
CWHms1: Coastal Western Hemlock, moist submaritime, southern variant – NDT 2
IDFww: Interior Douglas-fir, wet, warm – NDT 4 (entirely within parks)
ESSFmw: Engelmann spruce – Subalpine fir moist, warm variant – NDT 2
MHmm2: Mountain Hemlock, moist maritime, leeward variant – NDT 1
** all of the 62 ha total in PC are considered part of the THLB.

4 Manning OGMA Planning Results

4.1 Timber Harvesting Land Base Impact

After considering the existing constraints to the land base and their contribution to OGMAs, a total of 122 ha from the THLB was identified as OGMA to achieve old growth retention targets. Of this total, 60 ha are from the Contributing land base, while the remainder are from the Partial Contributing. Licensee concerns were addressed whenever possible, and an attempt was made to balance the impacts between the current charts. Some of the selected areas within the THLB are RRZ or remnants after harvest, or agreed to by the licensee.

4.2 OGMA Age Classes

Due to the disturbance history in the Manning LU, approximately 33% of the OGMA total had to be established within Structural Stage 6 forest (mature stands 160-250 years old). Approximately 67% of the overall OGMA total was delineated in Structural Stage 7 stands (equivalent to age 250+ years). OGMA selections were prioritised based on stand attributes and the resource values present, as described in Table 3.

The distinction between old and mature forests varies by BEC variant. For CWHds and ms variants, mature forests must be greater than 80 years of age, and old forests greater than 250 years. Old forests in the MHmm must also be greater than 250 years, but mature forests must be older than 120 years.

4.3 OGMA Summary

OGMA attributes, together with a rationale for selection of OGMAs, are described in Table 3 on the following pages.

Table 3. Manning Landscape Unit: OGMA Summary and Rationale.

OGMA #	BEC UNIT	LANDBASE CLASS	OGMA AREA (ha)	THLB AREA (ha)	COMMENTS	FOREST DEVELOPMENT PLAN	WILDLIFE
1	CWHms1	N	2.94	0.00		FDP block to east	Rare ecosystems, Grizzly, Marten, Tailed frog, Goshawk, Mtn. Beaver
2	CWHms1	N	0.08	0.00		FDP block to north	Marten, Tailed frog, Goshawk,
	MHmm2	N	2.25	0.00			
3	MHmm2	N	1.60	0.00	Riparian		Rare ecosystems, Grizzly, Marten, Tailed frog. Proposed Grizzly WHA (foraging)
4	CWHms1	C	2.77	2.77	Riparian	FDP block to southwest	Rare ecosystems, Grizzly, Marten, Tailed frog, Goshawk, Mtn. beaver
	CWHms1	N	15.47	0.00	Riparian		
	CWHms1	P	1.06	1.06	Riparian		
5	MHmm2	N	21.18	0.00	Riparian		Rare ecosystems, Grizzly, Marten, Tailed frog. Proposed Grizzly WHA (foraging)
6	IDFww	N	17.62	0.00	Skagit Valley PA		Marten, Spotted owl SRMZ, Tailed frog, Goshawk
7	IDFww	N	8.30	0.00	Skagit Valley PA		Marten, Spotted owl SRMZ, Goshawk
8	MHmm2	N	3.63	0.00	Upland forest		Marten
9	MHmm2	N	5.62	0.00	Riparian		Rare ecosystems, Marten, Tailed frog
10	CWHms1	N	0.03	0.00	Skagit Valley PA; large patch		Grizzly, Marten, Spotted owl SRMZ, Tailed frog, Goshawk
	MHmm2	N	135.83	0.00			
11	MHmm2	N	6.59	0.00	Skagit Valley PA; adjacent to #81, #77		Spotted owl SRMZ
12	CWHms1	N	6.71	0.00	Skagit Valley PA		Rare ecosystems, Marten, Spotted owl SRMZ, Tailed frog, Goshawk
	MHmm2	N	9.30	0.00			
13	CWHms1	C	0.45	0.45	Upland forest		Grizzly, Marten, Tailed frog, Goshawk
	CWHms1	N	2.97	0.00			
	CWHms1	P	0.22	0.22			
14	MHmm2	C	2.57	2.57	Upland forest		Rare ecosystems, Tailed frog
	MHmm2	N	4.11	0.00			
	MHmm2	P	2.75	2.75			
15	CWHms1	C	0.18	0.18	Riparian		Rare ecosystems, Grizzly, Marten, Tailed frog, Goshawk
	CWHms1	N	9.13	0.00			
	CWHms1	P	0.24	0.24			
	ESSFmw	N	1.06	0.00			
	MHmm2	N	9.31	0.00			
16	MHmm2	C	0.38	0.38	Riparian		Rare ecosystems, Grizzly, Marten, Tailed frog

OGMA #	BEC UNIT	LANDBASE CLASS	OGMA AREA (ha)	THLB AREA (ha)	COMMENTS	FOREST DEVELOPMENT PLAN	WILDLIFE
	MHmm2	N	4.91	0.00			
	MHmm2	P	1.57	1.57			
17	CWHms1	N	1.79	0.00	Upland forest		Marten, Spotted owl SRMZ, Tailed frog, Goshawk
	ESSFmw	N	7.03	0.00			
18	CWHms1	N	2.67	0.00	Adjacent to #19		Marten, Tailed frog
	MHmm2	N	0.01	0.00			
19	CWHms1	N	3.51	0.00	Adjacent to #18		Marten
20	ESSFmw	N	9.58	0.00	EC Manning Park		Grizzly, Tailed frog
21	CWHms1	N	9.44	0.00	EC Manning Park; riparian		Marten, Spotted owl SRMZ, Tailed frog, Goshawk, Mtn. Beaver
22	CWHms1	N	17.23	0.00	EC Manning Park; riparian		Marten, Tailed frog, Goshawk, Mtn. Beaver
23	ESSFmw	N	19.63	0.00	EC Manning Park		
24	CWHms1	N	10.87	0.00	EC Manning Park; riparian		Marten, Tailed frog, Goshawk, Mtn. Beaver
25	CWHms1	N	1.36	0.00			Marten, Tailed frog, Goshawk
26	CWHms1	N	1.59	0.00	EC Manning Park; adjacent to #27		Marten, Spotted owl SRMZ, Tailed frog, Goshawk, Mtn. Beaver
27	CWHms1	N	7.32	0.00	Adjacent to #26		Marten, Spotted owl SRMZ, Tailed frog, Goshawk, Mtn. Beaver
28	CWHms1	N	8.47	0.00	Upland forest		Marten, Goshawk
29	CWHms1	N	6.85	0.00			Marten, Tailed frog, Goshawk
30	CWHms1	N	1.89	0.00			Rare ecosystems, Marten, Spotted owl SRMZ, Tailed frog, Goshawk
	CWHms1	P	0.02	0.02			
	ESSFmw	N	0.26	0.00			
31	CWHms1	N	3.92	0.00			Marten, Tailed frog
	MHmm2	N	2.31	0.00			
32	CWHms1	N	2.51	0.00	Riparian		Marten, Tailed frog, Goshawk
	MHmm2	N	6.47	0.00			
33	CWHms1	N	2.31	0.00			Rare ecosystems, Grizzly, Marten, Tailed frog
	MHmm2	N	3.12	0.00			
34	IDFww	N	17.28	0.00	Ross Lake and Skagit Valley		Marten, Spotted owl SRMZ, Goshawk
	MHmm2	N	0.21	0.00			
35	MHmm2	N	17.81	0.00	Riparian		Rare ecosystems, Grizzly, Marten, Tailed frog, Mtn. beaver
36	CWHms1	C	0.00	0.00	Riparian		Rare ecosystems, Tailed frog, Goshawk, Marten, Mtn goat winter range, Deer winter range
	CWHms1	N	24.34	0.00			
	MHmm2	N	0.17	0.00			

OGMA #	BEC UNIT	LANDBASE CLASS	OGMA AREA (ha)	THLB AREA (ha)	COMMENTS	FOREST DEVELOPMENT PLAN	WILDLIFE
37	MHmm2	N	4.28	0.00			Rare ecosystems, Grizzly, Tailed frog
38	CWHms1	N	2.79	0.00			Grizzly, Marten
	MHmm2	N	0.17	0.00			
39	CWHms1	N	5.26	0.00			Grizzly, Marten, Tailed frog, Goshawk, Mtn. Beaver
40	CWHms1	C	0.45	0.45			Rare ecosystems, Grizzly, Marten, Tailed frog, Goshawk
	CWHms1	N	6.62	0.00			
	CWHms1	P	0.02	0.02			
	MHmm2	C	0.06	0.06			
	MHmm2	N	10.53	0.00			
	MHmm2	P	0.03	0.03			
41	CWHms1	C	0.42	0.42			Marten, Tailed frog, Goshawk
	CWHms1	N	6.93	0.00			
	CWHms1	P	0.12	0.12			
	MHmm2	C	0.16	0.16			
	MHmm2	N	10.79	0.00			
	MHmm2	P	0.00	0.00			
42	CWHms1	C	1.35	1.35			Rare ecosystems, Marten, Tailed frog, Goshawk, Mtn. beaver
	CWHms1	N	4.22	0.00			
43	CWHms1	C	0.84	0.84	Riparian		Marten, , Deer winter range, Tailed frog, Goshawk
	CWHms1	N	7.73	0.00			
	CWHms1	P	0.06	0.06			
44	CWHms1	N	21.80	0.00	Riparian; adjacent to #45		Marten, Spotted owl SRMZ, Tailed frog, Goshawk, Mtn. Beaver, Mtn goat winter range, Deer winter range
45	CWHms1	N	6.29	0.00	Riparian; adjacent to #44		Grizzly, Marten, Deer winter range, Spotted owl SRMZ, Tailed frog, Goshawk, Mtn. beaver, Mtn goat winter range
	CWHms1	P	20.50	20.50			
46	MHmm2	C	0.01	0.01	Upland forest		Rare ecosystems, Grizzly, Tailed frog
	MHmm2	N	10.92	0.00			
47	CWHms1	N	34.90	0.00	EC Manning Park		Grizzly, Marten, Deer winter range, Spotted owl SRMZ, Tailed frog, Goshawk
48	CWHms1	C	0.08	0.08	Upland forest		Marten, Spotted owl SRMZ, Tailed frog, Goshawk
	CWHms1	N	16.74	0.00			
	CWHms1	P	0.09	0.09			
49	CWHms1	N	29.61	0.00	Upland forest		Rare ecosystems, Marten, Deer winter range, Spotted owl SRMZ, Tailed frog, Goshawk

OGMA #	BEC UNIT	LANDBASE CLASS	OGMA AREA (ha)	THLB AREA (ha)	COMMENTS	FOREST DEVELOPMENT PLAN	WILDLIFE
50	CWHms1	C	4.34	4.34	Upland forest		Marten, Tailed frog, Goshawk
	CWHms1	N	18.54	0.00			
	CWHms1	P	0.18	0.18			
51	CWHms1	N	4.72	0.00			Grizzly, Marten, Spotted owl SRMZ, Tailed frog, Goshawk
	ESSFmw	N	9.40	0.00			
52	CWHms1	C	0.46	0.46	Riparian		Marten, Tailed frog, Goshawk, Mtn. Beaver
	CWHms1	N	17.53	0.00			
	CWHms1	P	0.20	0.20			
53	CWHms1	N	2.23	0.00	Riparian		Marten, Tailed frog, Goshawk
54	CWHms1	N	26.45	0.00	EC Manning Park; riparian		Rare plants, Marten, Deer winter range, Spotted owl SRMZ, Tailed frog, Goshawk
55	CWHms1	N	14.92	0.00	EC Manning Park		Marten, Tailed frog, Goshawk, Mtn. Beaver
56	ESSFmw	N	0.65	0.00	EC Manning Park; riparian		Rare ecosystems, Grizzly, Marten, Tailed frog, Goshawk
	MHmm2	C	2.05	2.05			
	MHmm2	N	13.77	0.00			
57	CWHms1	N	3.83	0.00			Rare ecosystems, Marten, Spotted owl SRMZ, Tailed frog, Goshawk, Mtn. Beaver
	MHmm2	N	46.38	0.00			
58	CWHms1	N	62.92	0.00	Riparian		Rare ecosystems, Grizzly, Marten, Spotted owl SRMZ, Tailed frog, Goshawk, Mtn. beaver
	MHmm2	N	5.68	0.00			
59	CWHms1	N	6.46	0.00			Rare ecosystems, Marten, Tailed frog, Goshawk. Immed adjacent to proposed Grizzly WHA (foraging)
60	CWHms1	N	27.96	0.00	EC Manning Park		Rare ecosystems, Grizzly, Marten, Goshawk
61	CWHms1	C	2.43	2.43			Marten, Spotted owl SRMZ, Tailed frog, Goshawk
	CWHms1	N	6.49	0.00			
	CWHms1	P	0.78	0.78			
	ESSFmw	N	0.19	0.00			
62	CWHms1	N	0.88	0.00	EC Manning Park; riparian		Marten, Tailed frog, Goshawk
	ESSFmw	N	57.78	0.00			
63	CWHms1	N	24.84	0.00	EC Manning Park		Rare ecosystems, Grizzly, Marten, Tailed frog, Goshawk
64	CWHms1	N	11.72	0.00			Rare ecosystems, Marten, Tailed frog, Goshawk
	ESSFmw	N	0.14	0.00			

OGMA #	BEC UNIT	LANDBASE CLASS	OGMA AREA (ha)	THLB AREA (ha)	COMMENTS	FOREST DEVELOPMENT PLAN	WILDLIFE
65	CWHms1	C	8.42	8.42			Rare ecosystems, Grizzly, Marten, Spotted owl SRMZ, Tailed frog, Goshawk, Mtn. beaver
	CWHms1	N	9.65	0.00			
	CWHms1	P	19.62	19.62			
	ESSFmw	C	0.07	0.07			
	ESSFmw	N	5.37	0.00			
66	CWHms1	N	25.30	0.00	EC Manning Park, Skagit Valley PA		Rare ecosystems, Grizzly, Marten, Spotted owl SRMZ, Tailed frog, Goshawk, Mtn. beaver
67	ESSFmw	N	75.42	0.00	EC Manning Park, Skagit Valley PA; riparian		
68	CWHms1	N	35.63	0.00	Riparian		Marten, Spotted owl SRMZ, Tailed frog, Goshawk, Mtn. Beaver
69	CWHms1	N	6.38	0.00			Marten, Tailed frog, Goshawk
70	CWHms1	N	67.73	0.00	Riparian		Rare ecosystems, Marten, Spotted owl SRMZ, Tailed frog, Goshawk, Mtn. Beaver
71	CWHms1	C	9.76	9.76	Riparian		Grizzly, Marten, Spotted owl SRMZ, Tailed frog, Goshawk, Mtn. Beaver
	CWHms1	N	6.99	0.00			
	CWHms1	P	8.42	8.42			
	MHmm2	C	1.24	1.24			
	MHmm2	N	2.13	0.00			
	MHmm2	P	2.41	2.41			
72	CWHms1	N	9.86	0.00	Skagit Valley PA; riparian		Rare ecosystems, Marten, Spotted owl SRMZ, Tailed frog, Goshawk, Mtn. Beaver
73	CWHms1	C	5.02	5.02	Upland forest		Rare ecosystems, Grizzly, Marten, Tailed frog, Goshawk. Part inside proposed Grizzly WHA (foraging)
	CWHms1	N	6.02	0.00			
	CWHms1	P	0.23	0.23			
	MHmm2	C	0.35	0.35			
	MHmm2	N	10.83	0.00			
	MHmm2	P	0.02	0.02			
74	CWHms1	N	15.00	0.00			Rare ecosystems, Marten, Spotted owl SRMZ, Tailed frog, Goshawk, Mtn. Beaver
	ESSFmw	N	13.99	0.00			
75	CWHms1	N	14.71	0.00	Skagit Valley PA		Rare ecosystems, Grizzly, Marten, Spotted owl SRMZ, Tailed frog, Goshawk
	MHmm2	C	0.40	0.40			
	MHmm2	N	29.35	0.00			

OGMA #	BEC UNIT	LANDBASE CLASS	OGMA AREA (ha)	THLB AREA (ha)	COMMENTS	FOREST DEVELOPMENT PLAN	WILDLIFE
76	ESSFmw	N	113.39	0.00	EC Manning Park		
77	MHmm2	N	8.27	0.00	Skagit Valley PA		
78	CWHms1	N	135.27	0.00	Skagit Valley PA; large patch; riparian		Grizzly, Marten, Spotted owl SRMZ, Tailed frog, Goshawk
	MHmm2	N	35.36	0.00			
79	CWHms1	N	23.70	0.00	EC Manning Park; riparian		Rare ecosystems, Grizzly, Mtn. Beaver
	ESSFmw	N	136.74	0.00			
80	CWHms1	N	7.07	0.00			Spotted owl SRMZ, Rare ecosystems, Marten, Tailed frog, Goshawk, Mtn. Beaver
	ESSFmw	N	0.05	0.00			
81	CWHms1	N	13.49	0.00	Skagit Valley PA; adjacent to #11		Grizzly, Marten, Spotted owl SRMZ, Tailed frog, Goshawk
	MHmm2	N	15.10	0.00			
82	CWHms1	N	11.54	0.00			Rare ecosystems, Grizzly, Marten, Tailed frog, Goshawk
	MHmm2	N	19.57	0.00			
83	CWHms1	N	8.76	0.00	Skagit Valley PA; riparian		Marten, Spotted owl SRMZ, Tailed frog, Goshawk
	IDFww	N	75.08	0.00			
	MHmm2	N	0.38	0.00			
84	MHmm2	N	83.87	0.00	Skagit Valley PA; large block		Rare ecosystems, Grizzly, Spotted owl SRMZ, Tailed frog
85	IDFww	N	1.49	0.00	EC Manning Park; adjacent to #143; riparian		Marten, Goshawk
86	MHmm2	N	3.44	0.00	Upland forest		Marten, Tailed frog. Proposed Grizzly Bear WHA (foraging)
87	MHmm2	N	1.03	0.00	Upland forest		Rare ecosystems, Marten, Tailed frog, Mtn. Beaver
88	CWHms1	N	4.47	0.00	Upland forest		Marten, Tailed frog, Goshawk
	MHmm2	N	3.36	0.00			
89	CWHms1	C	0.04	0.04	Upland forest	FDP block to west	Grizzly, Marten, Tailed frog, Goshawk
	CWHms1	N	1.09	0.00			
	MHmm2	N	1.94	0.00			
90	CWHms1	N	1.72	0.00	EC Manning Park; riparian		Rare ecosystems, Marten, Tailed frog, Grizzly, Goshawk
	ESSFmw	N	16.05	0.00			
91	IDFww	N	15.61	0.00	Skagit Valley PA		Marten, Deer winter range, Spotted owl SRMZ, Goshawk
92	MHmm2	N	4.55	0.00	Riparian		Grizzly, Marten, Tailed frog. Proposed Grizzly WHA (foraging)
93	IDFww	N	10.41	0.00	EC Manning Park		Marten, Tailed frog, Goshawk
94	CWHms1	N	2.23	0.00	Riparian		Rare ecosystems, Marten, Tailed frog, Goshawk
95	CWHms1	N	6.21	0.00	FDP block to west		Marten, Tailed frog, Goshawk

OGMA #	BEC UNIT	LANDBASE CLASS	OGMA AREA (ha)	THLB AREA (ha)	COMMENTS	FOREST DEVELOPMENT PLAN	WILDLIFE
96	CWHms1	N	5.49	0.00	Upland forest		Rare ecosystems, Marten, Tailed frog, Goshawk
97	MHmm2	N	5.67	0.00	Skagit Valley PA		Goshawk
98	IDFww	N	20.76	0.00	Skagit Valley PA		Marten, Spotted owl SRMZ, Tailed frog, Goshawk
99	IDFww	N	6.18	0.00	Skagit Valley PA		Marten, Spotted owl SRMZ, Goshawk
100	CWHms1	N	1.77	0.00			Marten, Goshawk
101	ESSFmw	N	11.05	0.00	EC Manning Park		Rare ecosystems, Marten, Tailed frog, Goshawk, Mtn. Beaver
102	ESSFmw	N	30.22	0.00	EC Manning Park		Rare ecosystems, Marten, Tailed frog
103	ESSFmw	N	1.24	0.00	EC Manning Park		Rare ecosystems, Marten, Tailed frog
104	ESSFmw	N	10.02	0.00	EC Manning Park		Rare ecosystems, Grizzly, Marten, Tailed frog, Mtn. Beaver
105	IDFww	N	7.36	0.00	Skagit Valley PA; upland forest		Rare ecosystems, Marten, Spotted owl SRMZ, Goshawk
106	CWHds1	N	9.11	0.00	Skagit Valley PA; riparian		Grizzly, Spotted owl SRMZ
107	CWHms1	N	15.42	0.00	Skagit River Cottonwoods; riparian		Rare ecosystems, Grizzly, Marten, Spotted owl SRMZ, Tailed frog, Goshawk
108	CWHms1	N	15.01	0.00	Skagit Valley PA; riparian		Marten, Spotted owl SRMZ, Tailed frog, Goshawk, Deer winter range
	IDFww	N	4.58	0.00			
109	ESSFmw	N	43.75	0.00	EC Manning Park		Rare ecosystems, Grizzly
110	ESSFmw	N	28.42	0.00	EC Manning Park		
111	CWHms1	N	248.75	0.00			Rare ecosystems, Grizzly, Marten, Spotted owl SRMZ, Tailed frog, Goshawk, Mtn. beaver
	ESSFmw	N	157.13	0.00			
112	ESSFmw	N	35.64	0.00			Rare ecosystems, Marten, Spotted owl SRMZ, Tailed frog, Mtn. beaver
113	ESSFmw	N	55.97	0.00	EC Manning Park		Rare ecosystems, Marten, Tailed frog
114	ESSFmw	N	163.26	0.00	EC Manning Park; large patch; riparian		Rare ecosystems, Marten, Tailed frog
115	IDFww	N	63.77	0.00	Skagit Valley PA		Rare ecosystems, Marten, Spotted owl SRMZ, Goshawk
116	IDFww	N	18.29	0.00	Skagit Valley PA		Marten, Spotted owl SRMZ, Goshawk
117	IDFww	N	84.46	0.00	Skagit River Forest, Skagit Valley PA		Marten, Spotted owl SRMZ, Tailed frog, Goshawk, Mtn. beaver

OGMA #	BEC UNIT	LANDBASE CLASS	OGMA AREA (ha)	THLB AREA (ha)	COMMENTS	FOREST DEVELOPMENT PLAN	WILDLIFE
118	CWHms1	C	0.01	0.01	Upland forest	FDP block to south	Rare ecosystems, Marten, Tailed frog, Goshawk
	CWHms1	N	34.96	0.00			
	CWHms1	P	0.59	0.59			
	MHmm2	N	27.88	0.00			
119	CWHms1	N	11.87	0.00	EC Manning Park		Grizzly, Marten, Tailed frog, Goshawk
120	CWHms1	N	16.36	0.00	Skagit Valley PA; riparian		Marten, Spotted owl SRMZ, Tailed frog, Goshawk
	MHmm2	N	7.18	0.00			
121	CWHms1	N	14.13	0.00	Skagit Valley PA		Grizzly, Marten, Spotted owl SRMZ, Tailed frog, Goshawk, Mtn. Beaver
	ESSFmw	N	11.83	0.00			
122	MHmm2	N	14.24	0.00	Skagit Valley PA		
123	CWHms1	N	19.60	0.00	Skagit Valley PA; riparian; adjacent to #125		Marten, Spotted owl SRMZ, Tailed frog, Goshawk
	ESSFmw	N	3.27	0.00			
124	IDFww	N	37.24	0.00	Skagit Valley PA; riparian		Marten, Spotted owl SRMZ, Tailed frog, Goshawk, Mtn. Beaver
125	CWHms1	N	37.72	0.00	Skagit Valley PA; riparian; adjacent to #123		Marten, Deer winter range, Tailed frog, Goshawk, Spotted owl SRMZ
	IDFww	N	27.11	0.00			
126	CWHms1	C	7.88	7.88	Riparian	FDP blocks to east, west, south	Rare ecosystems, Marten, Tailed frog, Goshawk, Mtn. Beaver
	CWHms1	N	8.87	0.00			
	CWHms1	P	3.08	3.08			
127	CWHms1	N	26.60	0.00	Skagit Valley PA; riparian		Marten, Deer winter range, Spotted owl SRMZ, Tailed frog, Goshawk
	IDFww	N	54.12	0.00			
128	CWHms1	N	5.96	0.00	Skagit Valley PA; upland forest		Marten, Deer winter range, Spotted owl SRMZ, Tailed frog, Goshawk, Spotted owl
	IDFww	N	15.59	0.00			
129	CWHms1	N	6.83	0.00			Rare ecosystems, Grizzly, Marten, Tailed frog, Goshawk, Mtn. Beaver. Proposed Grizzly WHA (foraging)
	MHmm2	N	8.09	0.00			
130	CWHms1	N	22.36	0.00	EC Manning Park; large patch; riparian		Rare ecosystems, Grizzly, Marten, Tailed frog, Goshawk
	ESSFmw	N	33.02	0.00			
131	CWHms1	C	6.01	6.01	Upland forest		Marten, Tailed frog
	CWHms1	N	4.18	0.00			

OGMA #	BEC UNIT	LANDBASE CLASS	OGMA AREA (ha)	THLB AREA (ha)	COMMENTS	FOREST DEVELOPMENT PLAN	WILDLIFE
	MHmm2	C	1.71	1.71			
	MHmm2	N	20.19	0.00			
132	IDFww	N	54.74	0.00	Skagit Valley PA		Marten, Deer winter range, Spotted owl SRMZ, Tailed frog, Goshawk, Mtn. Beaver
133	CWHds1	N	79.97	0.00	Skagit Valley PA; large patch; riparian to upland connectivity		Grizzly, Marten, Spotted owl SRMZ, Tailed frog, Goshawk, Deer winter range
	IDFww	N	99.37	0.00			
134	CWHms1	N	558.10	0.00	EC Manning Park; large patch		Rare ecosystems, Grizzly, Marten, Tailed frog, Goshawk, Mtn. beaver
	ESSFmw	N	478.27	0.00			
135	MHmm2	N	4.94	0.00	Riparian		Rare ecosystems, Grizzly, Marten, Tailed frog. Proposed Grizzly WHA (foraging)
136	CWHms1	N	0.94	0.00		FDP block to south	Tailed frog, Grizzly, Marten. Proposed Grizzly WHA (foraging)
	MHmm2	N	5.45	0.00			
137	MHmm2	N	3.88	0.00		FDP block to south	Rare ecosystems, Grizzly, Marten, Tailed frog, Mtn. beaver
138	MHmm2	N	9.31	0.00			Rare ecosystems, Marten, Tailed frog. Proposed Grizzly WHA (foraging)
139	CWHms1	N	0.33	0.00	Skagit Valley PA; large patch		Rare ecosystems, Marten, Spotted owl SRMZ, Tailed frog, Goshawk, Mtn. Beaver
	IDFww	N	104.54	0.00			
140	CWHms1	N	0.74	0.00	Skagit Valley PA; large patch; riparian		Rare ecosystems, Grizzly, Marten, Spotted owl SRMZ, Tailed frog, Goshawk, Mtn. Beaver
	MHmm2	N	132.36	0.00			
141	IDFww	N	87.74	0.00	EC Manning Park; riparian; adjacent to #143		Rare ecosystems, Marten, Tailed frog, Goshawk
142	CWHms1	C	0.14	0.14			Rare ecosystems, Grizzly, Marten, Tailed frog, Mtn. beaver
	CWHms1	N	2.60	0.00			
	MHmm2	C	0.01	0.01			
	MHmm2	N	58.78	0.00			
143	IDFww	N	234.89	0.00	Skagit Valley PA; large patch; riparian; adjacent to #85, #141		Marten, Deer winter range, Spotted owl SRMZ, Tailed frog, Goshawk
144	CWHms1	N	58.44	0.00	Skagit River Cottonwoods; riparian		Rare ecosystems, Grizzly, Marten, Spotted owl SRMZ, Tailed frog, Goshawk

OGMA #	BEC UNIT	LANDBASE CLASS	OGMA AREA (ha)	THLB AREA (ha)	COMMENTS	FOREST DEVELOPMENT PLAN	WILDLIFE
145	CWHms1	C	0.31	0.31			Marten, Tailed frog
	CWHms1	N	2.15	0.00			
	MHmm2	N	12.16	0.00			
Grand Total			**5724.0**	**122.58**			

APPENDIX 4. DETAILED METHODOLOGY

1 Land Base Classification Summary

The land base classification generally followed that used in the MOF Timber Supply Review 1998 (TSR2). Adjustments to the classification occurred primarily in Riparian Reserve and Management Zones following the overlay of the most recent stream class coverage onto the MSRM land base classification. Only those areas classified as contributing or partially contributing were re-classified into more appropriate categories where necessary. Areas in the excluded or non-contributing land base maintained their original classification. Table 4 summarises the differences in the two land base classifications for the Silverhope, Yale and Manning LUs.

Table 4. Land base area comparison for Silverhope, Manning and Yale LUs.

Land base	Original MSRM (ha)	Updated coverage (ha)
Silverhope LU		
Contributing (C)	16,401	14,140
Non-Contributing (N)	13,061	14,060
Partial Contributing (P)	3,564	4,810
Excluded (X)	23,822	23,811
Yale LU		
Contributing (C)	16,029	14,447
Non-Contributing (N)	12,137	12,818
Partial Contributing (P)	4,077	4,958
Excluded (X)	16,159	16,159
Manning LU		
Contributing (C)	5,399	4,202
Non-Contributing (N)	31,609	32,204
Partial Contributing (P)	351	952
Excluded (X)	51,839	51,839

1.1 Use of Ecosystem Mapping

The ecosystem mapping served as a base for many input data sources, including wildlife habitat ratings (WHR – this is a broad suitability mapping tool used to identify potential habitat for some wildlife species), forested/non-forested classification, and seral stages (structural stage). Structural stage was created as a separate coverage using a Vegetation Resource Inventory-based algorithm that was overlain onto the ecosystem mapping. This provided the basis for wildlife habitat ratings, which are assigned to each ecosystem unit and structural stage combination. The forested/non-forested classification was derived using a unique listing of all possible ecosystem units existing in the LU. Each unit was manually assigned a forested or non-forested status based on its ecosystem label.

1.2 Wildlife Habitat Themes

Wildlife habitat themes were created using the ecosystem mapping and species ratings tables with the Ministry's -Tool. The species included tailed frog, Northern Goshawk, Northern Spotted Owl, mountain beaver, marten, deer, mountain goat, and grizzly bear. Ecosystem polygons were rated for habitat suitability using the averaged values option on the WHR-Tool. The ratings percentages produced by the WHR-Tool were then converted to either a 4-class or 6-class rating scheme, depending on the species. The resulting coverage included ecosystem mapping information, wildlife habitat ratings, and the environmental resource values associated with them.

Polygon ratings were then adjusted using adjustment criteria outlined within each species model. Once the adjustments were completed, quality assurance of the maps was carried out to ensure they were correct. Keystone field biologists, Interfor staff and agency staff reviewed the maps and identified any areas that required edits.

MWLAP winter range coverages for deer and mountain goat were also used. The MWLAP winter range coverages were overlain with the results of the RIC standard procedure described above, and the areas of overlap between the two were used for OGMA selection.

1.3 Environmental Resource Values

The environmental resource values considered in all LUs includes:

- Wildlife species (tailed frog, Northern Goshawk, Northern Spotted Owl, marten, and grizzly bear)
- Site Index (productivity)
- RIC standard and WLAP mountain goat habitat (overlapping areas)
- RIC standard and WLAP deer habitat (overlapping areas)
- RIC standard and WLAP Mountain Beaver WHA (overlapping areas)
- Rare red and blue listed natural plant communities and rare plants, and site series that are <2% of the study area
- Archaeological sites
- Natural Site Disturbance (including fire and insect).

Assignment of resource values to wildlife species were based on habitat suitability ratings that followed either a 6-class or 4-class rating scheme (RIC 1999), depending on the wildlife species of interest. Areas rated as 1-3 (high-moderate) for habitat suitability following the 6-class system, or high-moderate following the 4-class system, were both given a resource value of "1".

A slightly different approach was taken when assigning resource values to mountain goat, deer, and mountain beaver, as additional data sources were considered. These differences are described in more detail below, along with a description of the treatment of other resource values.

1.3.1 Site Index (Productivity) on Contributing Land Base

Site index data was received from JS Thrower and Associates and was used as a resource value to help prioritise OGMA selections. Lower productivity sites in the contributing land base were given a resource value of "1" so they would be selected first. Sites with higher site indices in the contributing land base were given a negative resource value (-1) to restrict their chances of being selected, as these are the sites most valuable for timber harvest. Representation of higher site-index sites was assumed to be adequately provided by the non-contributing land base.

1.3.2 Mountain Goat Resource Values

Goat winter range as identified by the RIC habitat model and WLAP were used to generate a resource value. The winter range identified by the RIC habitat model included areas that received wildlife habitat suitability ratings of 1-3 (high-moderate). Areas of overlap between these ranges and those identified by WLAP were given a resource value of "1".

1.3.3 Deer Resource Values

A process similar to that used in the generation of a resource value for mountain goat was used for deer. Areas identified as winter range by both the RIC habitat model and WLAP were used as inputs. Again, only those areas in the RIC habitat model coverage rated 1-3 (high-moderate) for habitat suitability that overlapped with classic habitat from the WLAP deer winter range coverage was assigned a resource value of "1".

1.3.4 Mountain Beaver Resource Values

The WLAP mountain beaver WHA was incorporated into the resource value for this species. All polygons that intersected with the WHA as well as those areas identified by the RIC habitat model as high-moderate rated habitat were given a resource value of "1".

1.3.5 Rare Plants, Communities, and Site Series

Known locations of rare red and blue-listed vascular plants and natural plant communities were obtained from the BC Conservation Data Centre. Polygons containing a known location were assigned a resource value of "1". Site series mapped as less than 2% of the area within a subzone (rare site series) in the Silverhope LU were also given a resource value of "1".

1.3.6 Archaeological Sites

Point locations of archaeological/heritage sites were provided by the Provincial Heritage Register. Any polygon containing an archaeological site was given a resource value of "1".

1.3.7 Site Disturbance

Insect and fire disturbance data supplied by Interfor was also used as an environmental resource value to help prioritise the OGMA selections. Areas classified as having a high level of insect disturbance but still maintaining mature and old forest structural stages (6 and 7, respectively) were given a positive resource value of "1". These stands may contain a certain level of resistance to insect attack, and thus conservation of pertinent

stand characteristics is desired. All other insect disturbance areas were given a negative resource value of "-1".

Fire disturbance data was also used to create positive and negative resource values. Areas that were confirmed as being disturbed by fire yet retained a structural stage of 6 or 7 were given a positive resource value of "1" due to their apparent fire resistance. All other fire disturbance areas were given a negative resource value of "-1". Areas affected by windthrow also received a negative resource value of "-1".

1.3.8 Use of Draft Terrain Stability Mapping

Current terrain stability mapping for the Hope study area was received from Delta Aerial Surveys. The information was used as additional selection criteria to help prioritise OGMA locations, even though it was still in a draft stage. The terrain stability data classified environmentally sensitive areas that were potentially unstable (P), unstable for roads (R), and areas with clear evidence of instability (U). The potential unstable areas (P and R) were classified as partially contributing, while the unstable areas (U) were classified as non-contributing. These classifications did not change the MSRM approved land base classification.

The terrain stability information was used to prioritise selections within the contributing and partially contributing land base. Areas that were partially contributing and considered unstable were selected before other partially contributing areas, because the unstable nature gives partially contributing areas the potential to become non-contributing. Areas within the contributing land base that were classified as unstable and potentially unstable were selected before contributing areas that had no terrain stability classification.

APPENDIX 5. SUMMARY OF PUBLIC CONSULTATION

Summary of Public Comments

The Cascades LU plan was advertised for public review and comment for 60 days from November 28, 2003 to January 27, 2004. Only one response from one forest licensee was received.

In general, their comments requested changes to the Spotted Owl Management Plan to release equivalent areas of Long Term Owl Habitat for harvesting since other Spotted Owl Replacement Habitat Areas were captured in OGMAs. MSRM was not prepared to make these changes sicne the Spotted Owl Management Plan was approved by Cabinet. Replacement areas are not scheduled for release until 2018 at the earliest. In addition, the areas captured in OGMA were predominantly from the Non-contributing land base and according to the Timber Supply Review do not cause a timber impact. The licensee's letter was forwarded to MWLAP for their consideration.