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**Ministry of Agriculture and Lands: Integrated Land Management  
Agency - Coast Region**

**Sustainable Resource Management Plan  
Biodiversity Chapter for  
Sproat Lake Landscape Unit**



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Prepared by:

<p>Mike Davis, RPF, West Island Timberlands Glen Dunsworth, MSc, RPBio, Nanaimo Timberlands Weyerhaeuser Company Limited</p>	<p>Dave Woodgate, RPF; Anette Thingsted, MA; Rudi Mayser, RPF; Ministry of Agriculture and Lands, Integrated Land Management Agency Coast Region – Nanaimo Office</p>
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## 1.0 Introduction

This report provides background information used during the preparation of the biodiversity chapter for the Sproat Lake Landscape Unit (LU), and associated proposed legal objectives. The Sproat Lake LU is one of nine landscape units that form the Central Sustainable Resource Management Plan (SRMP) area. The other LUs in the Central SRMP area are: Ash, Cameron, China, Corrigan, Cous, Great Central, Nahmint and Somass. A description of the Sproat Lake LU, discussion of significant resource values, and a summary of proposed Old Growth Management Areas (OGMAs) with rationales are provided in this report.

Planning for OGMAs and Wildlife Tree Retention (WTR) biodiversity values is a high priority for the Province, as it is an important component of the Forest Practices Code of BC Act (FPC) and the Strategic Planning Regulation which enables legal establishment of objectives to address landscape level biodiversity. Biological diversity is defined in the *Biodiversity Guidebook* (MoF, 1995), as: “the diversity of plants, animals and other living organisms in all their forms and levels of organization, and includes the diversity of genes, species and ecosystems as well as the evolutionary and functional processes that link them”. British Columbia is the most biologically diverse province in Canada. Over 150 taxa of known mammals, birds, reptiles, and amphibians and over 600 vascular plants are listed for legal designation as threatened or endangered in British Columbia. Landscape level planning is directed at reducing threats to biological diversity and major impacts on the health and functioning of ecosystems (Resources Inventory Committee, 1998).

Conservation of biodiversity through landscape level planning is important for sustenance of wildlife, but can also provide important elements of ecosystem-based management, protection of water quality and preservation of other natural resources. At the same time, the final placement of OGMAs is intended to balance long-term ecological requirements for late successional forest whilst minimizing the impact on timber harvesting opportunities in the Sproat Lake LU.

The Ministry of Sustainable Resource Management (MSRM) and Ministry of Forests’ South Island Forest District (District #16) have completed LU boundaries and assigned Biodiversity Emphasis Options (BEOs). There are 41 LUs within the South Island Forest District. Through a Government ranking process of Landscape Units for biodiversity conservation, the Sproat Lake LU was rated as an Intermediate BEO. Current government direction (Landscape Unit Planning Guidebook, 1999) requires that priority biodiversity provisions, specifically the delineation of OGMAs and wildlife tree retention, be undertaken immediately.

All landscape unit objectives on Vancouver Island must be consistent with the Vancouver Island Land Use Plan Order, which came into effect on December 1, 2000. For landscape units in Tree Farm Licenses 44 and 46, the Chief Forester has provided additional policy direction that Forest Ecosystem Networks (FENs) be considered non-contributing to timber supply for the purposes of OGMA designation. He has also suggested that a “draft” objective for connectivity be considered, that Licensees cooperation in this is voluntary and that the “draft” objective will have no impact on Timber Supply.

Co-ordination of landscape unit planning is the responsibility of the MSRM, with statutory decision-making responsibility delegated to the Regional Director. Most of the work for the Sproat Lake LU was completed by Weyerhaeuser Company Limited, in partnership with MSRM. Other agencies such as the Ministry of Forests (MoF) and Ministry of Water, Land and Air Protection (MWLAP) were also involved. Input was solicited during the process from the public and First Nations.

This document should be read in conjunction with the “*Landscape Unit Planning Guide*” (MoF/MoELP, 1999) (LUPG), the “*Vancouver Regional Landscape Unit Planning Strategy*” (MoF, 1999), the “*Vancouver Island Land Use Plan*” (Land Use Coordination Office, 2000), and “*Sustainable Resource Management Planning: A Landscape-level Strategy for Resource Development*” (MSRM, 2002), for an understanding of government policy, planning processes and biodiversity concepts which are employed in landscape unit planning.

The distribution of OGMA's will have to be reviewed periodically to ensure their ecological suitability through time. For example, wildfires and other natural disturbances may occur within old seral forests with varying effects on their ecological attributes. Each instance will have to be considered separately. In some cases, disturbed old seral forests may retain or enhance ecological attributes and remain valuable for conservation (e.g., following a low intensity fire that serves to create more large snags). However, some specific old seral habitat features may be lost due to natural disturbance, resulting in a requirement for replacement OGMA's to be identified.

## **2.0 Landscape Unit Description**

### **2.1 Biophysical**

The Sproat Lake LU is located within TFL 44 managed by Weyerhaeuser Company Limited. It is located in the center of Vancouver Island (see Figure 1). The LU is comprised of the Sproat Lake and Taylor River watersheds. Smaller watersheds include Gracie Creek, Antler Creek, and Snow Creek. Highway 4 from Parksville to Ucluelet runs through a portion of the LU.

The Sproat Lake LU covers a total area of 35 453 ha. This figure includes the surface area of lakes within the LU, with Sproat Lake covering an area of approximately 4 232 ha. Other smaller lakes include Ward Lake, Brigade Lake and Wisemiller Lake. Table 1 classifies the landbase by its status.

Rolling terrain at the eastern end and steep, mountainous terrain at the western end dominate the topography of the LU. The elevation ranges from a low of 40 m at the western end where the Sproat River joins the Stamp River (to become the Somass River) to a high of 1 500 m (Adder Mountain).

The Sproat Lake LU lies within the Coast and Mountains Ecoprovince, Western Vancouver Island Ecoregion, Windward Island Mountains Ecoregion. The LU is comprised of the following 8 Biogeoclimatic (BEC) subzones/variants:

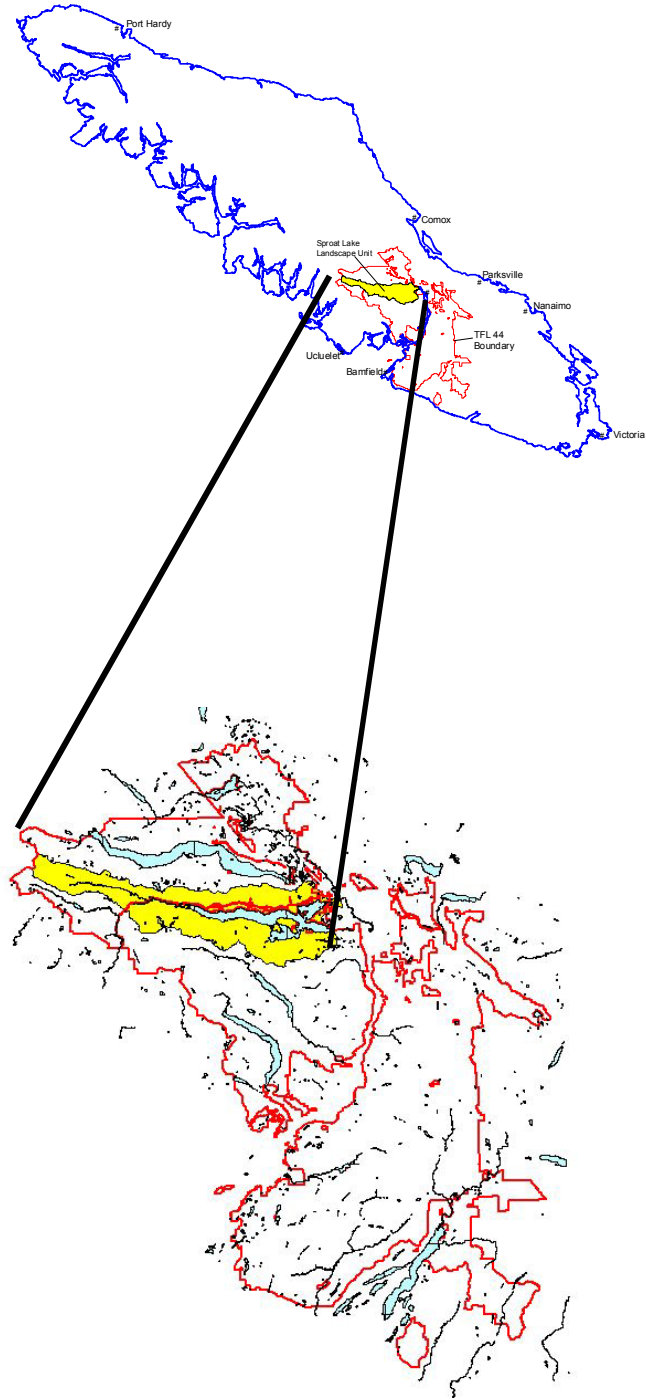
- Coastal Western Hemlock very dry maritime, eastern (CWHxm1)
- Coastal Western Hemlock very dry maritime, western (CWHxm2)
- Coastal Western Hemlock submontane very wet maritime (CWHvm1)
- Coastal Western Hemlock montane very wet maritime (CWHvm2)
- Coastal Western Hemlock submontane moist maritime (CWHmm1)
- Coastal Western Hemlock montane moist maritime (CWHmm2)
- Mountain Hemlock windward moist maritime (MHmm1)
- Alpine Tundra (AT p)

These 8 BEC subzones/variants represent 3 different Natural Disturbance Types (NDTs), with CWHvm1, CWHvm2 and MHmm1 in NDT 1 (rare stand initiating events); CWHxm1,

CWHxm2, CWHmm1, and CWHmm2 in NDT 2 (infrequent stand initiating events); and ATp in NDT 5 (alpine tundra and subalpine parkland) (Figure 2).

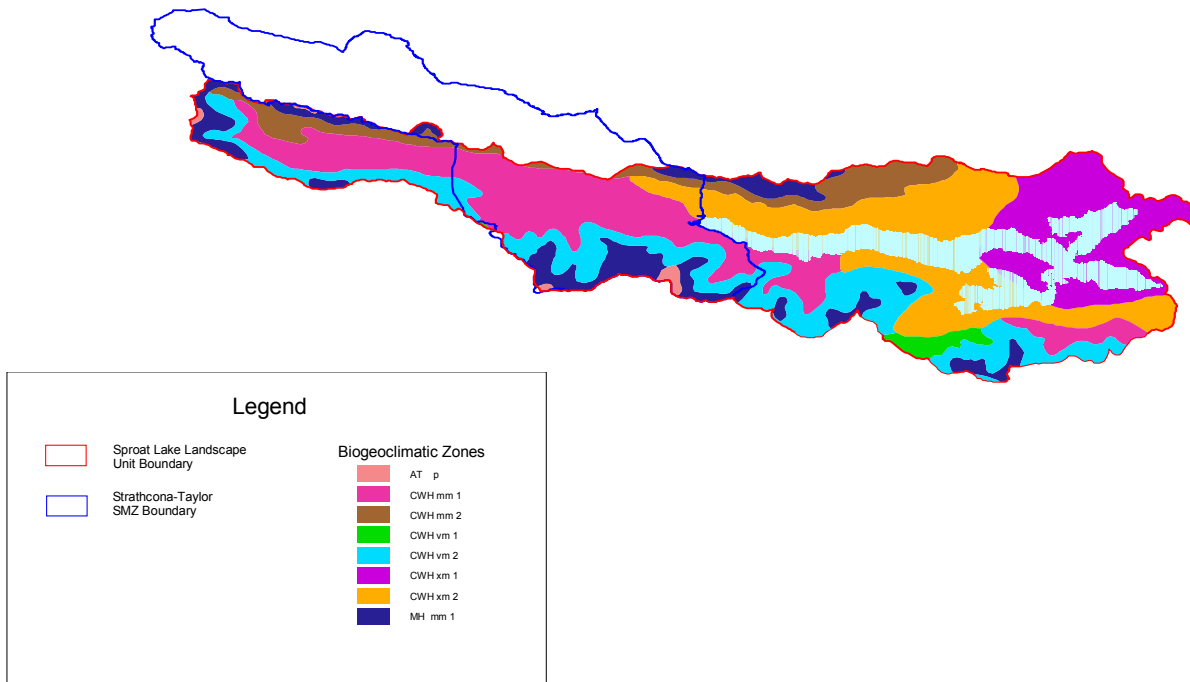
Forest ecosystems in NDT 1 were influenced historically by rare stand-initiating events and were generally uneven-aged or multi-storied uneven aged, with regeneration occurring in gaps created by the death of individual trees or small patches of trees. Historically, NDT 2 forest ecosystems were usually even-aged, but extended post-fire regeneration periods produced some stands with uneven-aged characteristics. Ecosystems in NDT 5 are not considered productive forest since they occur above or immediately below the alpine treeline and are characterized by short and harsh growing seasons.

Within the CWHxm variants, the Sproat Lake LU has sustained significant levels of disturbance. Forested stands on lower elevation productive sites (typically on slopes with low to moderate gradients) have been disturbed by past timber harvesting, fire, urbanization and other factors. The relatively low levels of old seral forest remaining, within the very dry BEC variants in the Sproat Lake LU, reflect this disturbance history.



**Figure 1:** Location Map of Sproat Lake LU within TFL 44 and on Vancouver Island





**Figure 2: Map of LU showing BEC zones and SMZ**

## 2.2 Land Status

Land status within the Sproat Lake Landscape Unit is summarized in Table 1. Recently, Weyerhaeuser’s private land was removed from TFL 44, thereby reducing the landbase available for landscape unit planning within the Sproat Lake LU, by approximately 2299 hectares.

**Table 1: Land Status in the Sproat Lake Landscape Unit**

Code	Ownership Class	Area (ha)
40-N	Private and Crown Grants	3212
52-N	Indian Reserve	79
62-C	Crown Contributing (including Woodlot License)	61
69	Recreation Sites and Reserves	14
72-B	Tree Farm License, Schedule B	27 638
60, 63	Park, Ecological Reserves	176
<b>Total</b>		<b>31 197</b>

There are numerous private properties along the shores of Sproat Lake that are permanent residences and a few summer cabins.

Table 2 shows the breakdown of the Sproat Landscape Unit by contribution class. It indicates that of the 21 696 ha of productive forest area, 39% is fully constrained (FENs included), 7.8% is partially constrained and 53.1% is unconstrained or timber harvesting landbase.

**Table 2: Landbase Breakdown by Constrained and Unconstrained (Based on Productive Forest)**

Variant	Total Productive	Productive Area		Fully Constrained Area <sup>1</sup> (N)		Partially Constrained Area <sup>2</sup> (P)		Unconstrained Area <sup>3</sup> (C)	
	Area (ha)	OG	2nd	OG	2nd	OG	2nd	OG	2nd
CWHmm1	6 659.5	3 044.9	3 614.7	1 599.5	896.0	284.3	306.1	1 161.1	2 412.6
CWHmm2	2 106.8	1028.9	1078.0	613.9	187.3	73.4	88.6	341.5	802.0
CWHvm1	444.0	284.3	159.8	145.0	39.6	17.9	11.9	121.3	108.3
CWHvm2	4858.3	3615.2	1243.1	2251.1	172.5	311.7	103.1	1052.4	967.5
CWHxm1	1058.0	151.8	906.2	31.8	94.0	23.7	69.2	96.3	742.9
CWHxm2	5349.4	764.0	4585.5	415.7	988.6	51.6	316.4	296.7	3280.5
MHmm1	1220.0	1116.9	103.0	982.1	52.9	37.1	5.3	97.7	44.8
<b>Totals</b>	<b>21696.0</b>	<b>10005.8</b>	<b>11690.2</b>	<b>6039.2</b>	<b>2431.0</b>	<b>799.7</b>	<b>900.8</b>	<b>3167.0</b>	<b>8358.5</b>

### 2.3 Wildlife and Biodiversity

The LU has a wide range of ecosystem types including eight Biogeoclimatic variants and up to 70+ potential site series. Table 3 and Figure 3 outline the seral stage distribution of the productive forest area by variant and for the total LU. There are also a variety of provincially designated rare and endangered species and ecosystems in the LU (Appendix 3). Habitat needs for the listed species and for all known vertebrates within the LU have been collated and are included in Appendices 3 and 4. Where government policy has resulted in specific conservation measures through Wildlife Habitat Areas (WHAs), e.g., marbled murrelet, these elements have been used in OGMA selection. Marbled murrelet habitat option areas (MAMU) were also used as part of the non-contributing landbase. No Northern Goshawk WHAs were present in this landscape unit. Red- and blue-listed vascular plants will be protected through OGMA and ongoing application of variable retention. The extent to which red- and blue-listed ecosystems are captured in OGMA is detailed in Appendix 2.

This LU has been assigned an Intermediate Biodiversity Emphasis Option (BEO) which means that relative to other LUs on Vancouver Island, biodiversity planning should strive for a trade-off between biodiversity conservation and timber production.

<sup>1</sup> Areas with 100% netdowns include FEN links as 100% netdown. Other examples are UWR or MAMU.

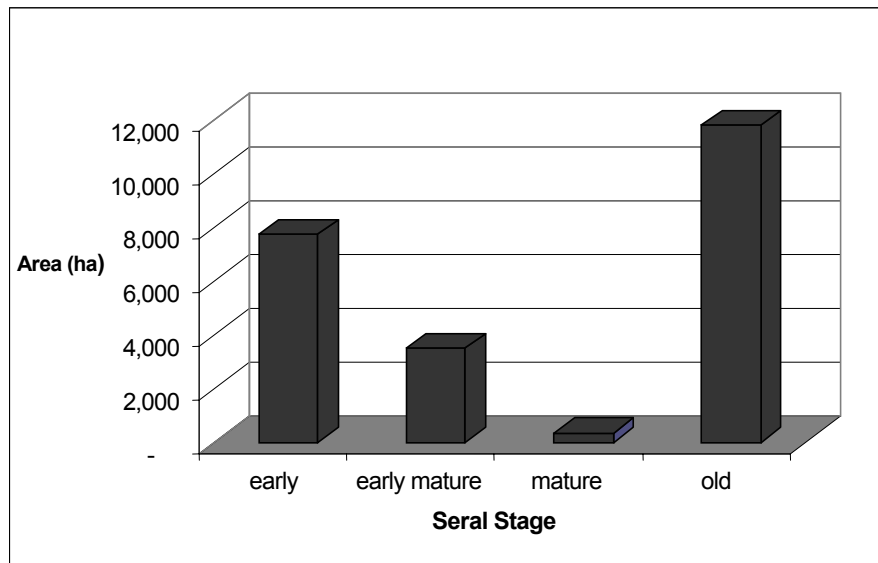
<sup>2</sup> Fully constrained area within partially constrained.

<sup>3</sup> THLB areas – some area comes from partial netdown areas, see Note above.

**Table 3: Age Class Distribution**

Variant	Inventoried Age Class <sup>4</sup>	Total Productive Forest Area (ha)	% of Total Productive Forest
CWHmm1	Early	3344.2	15.4
CWHmm1	Early Mature	226.6	1.0
CWHmm1	Mature	43.9	0.2
CWHmm1	Old	3044.9	14.0
	<b>Sub Total</b>	<b>6659.5</b>	
CWHmm2	Early	631.8	2.9
CWHmm2	Early Mature	383.0	1.8
CWHmm2	Mature	63.2	0.3
CWHmm2	Old	1028.9	4.7
	<b>Sub Total</b>	<b>2106.8</b>	
CWHvm1	Early	141.9	0.7
CWHvm1	Early Mature	0.8	0.0
CWHvm1	Mature	17.0	0.1
CWHvm1	Old	284.3	1.3
	<b>Sub Total</b>	<b>444.0</b>	
CWHvm2	Early	1096.8	5.1
CWHvm2	Early Mature	81.0	0.4
CWHvm2	Mature	65.3	0.3
CWHvm2	Old	3615.2	16.7
	<b>Sub Total</b>	<b>4858.3</b>	
CWHxm1	Early	408.5	1.9
CWHxm1	Early Mature	413.7	1.9
CWHxm1	Mature	84.0	0.4
CWHxm1	Old	151.8	0.7
	<b>Sub Total</b>	<b>1058.0</b>	
CWHxm2	Early	2061.2	9.5
CWHxm2	Early Mature	2456.1	11.3
CWHxm2	Mature	68.2	0.3
CWHxm2	Old	764.0	3.5
	<b>Sub Total</b>	<b>5349.4</b>	
MHmm1	Early	53.4	0.2
MHmm1	Early Mature	0.0	0.0
MHmm1	Mature	49.8	0.2
MHmm1	Old	1116.6	5.1
	<b>Sub Total</b>	<b>1 219.7</b>	
	<b>Total</b>	<b>21695.9</b>	<b>100.0</b>

**Figure 3: Productive Forest Area by Seral Stage within the Sproat Lake Landscape Unit**



<sup>4</sup> Early (<40 years), Early Mature (40 to 80 years), Mature (81 to 225 years) and Old (225+ years)

## **3.0 Key Resource Tenure Holders**

The planning process began by identifying key resource(s) tenure holdings. This assessment included identification of tenures that are administered by agencies such as the Ministry of Forests, BC Timber Sales Program, Ministry of Energy and Mines and Crown Corporations such as Land and Water B.C. Where possible the intent is to avoid placement of OGMA within conflicting tenures. Most of the Sproat Lake LU falls within TFL 44 and this process was guided to avoid placement of OGMA over approved cutblocks and roads.

### **3.1 Forest Tenure Holders**

Almost eighty-seven percent of the landbase within the Sproat Lake LU falls within TFL 44, managed by Weyerhaeuser Company Limited. TFL 44 is located in west-central Vancouver Island in the vicinity of the communities of Port Alberni, Ucluelet and Bamfield (see Figure 2). It extends from Strathcona Park in the north to Walbran Creek in the south, including land from the Pacific Ocean to the Beaufort Range and Mount Arrowsmith. TFL 44 covers over 240 000 ha, approximately five-sixths of which is productive forestland.

OGMA have been selected so as not to impact any known approved cutblocks or roads as approved under a TFL 44 Forest Development Plan (FDP); wherever possible, they have been located in old forest that does not contribute (NC) to the allowable annual cut. However, where the NC could not meet targets, old forest from the timber harvesting landbase (THLB) has been used.

Approximately 40 ha of the landbase fall within Woodlot Licence W1479, managed by Greenmax Resources. No OGMA were placed within this Woodlot.

### **3.2 Mineral Tenure Holders**

The selection of OGMA was guided to avoid placement over existing mineral tenures as well as known mineral showings and prospects.

The establishment of an OGMA will not have an impact on the status of existing mineral and gas permits or tenures. Exploration and development activities are permitted in OGMA. 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 significantly impacting old growth values, then the OGMA will be considered for amendment by MSRM.

### **3.3 Others**

There are 3 different registered trapping areas and two different guiding areas located within the Sproat Lake LU. There is one existing small-scale, hydro-electric generation project and two more are proposed. The existing generating project directs water from Doran Lake down a penstock to a generator along the north side of Highway 4. The two proposed projects are located along the south side of the Taylor River near the western end of Sproat Lake.

## **4.0 Significant Resource Values**

### **4.1 Fish**

Sproat Lake and associated fish-bearing streams are high value fish habitat. These waters are known to contain Coho salmon, Sockeye salmon, Chinook salmon, Cutthroat trout, Dolly Varden, Kokanee, Prickly Sculpin, Rainbow trout, Steelhead, and Threespine Stickleback. The lake is frequently stocked with Cutthroat trout.

All forest operations adjacent to fish-bearing creeks are conducted according to the Forest Practices Code, which requires riparian reserve zones and riparian management zones based upon the classification of the creeks. OGMAs expand riparian protection for fish-bearing streams in old forests where these are coincident. The Vancouver Island Land Use Plan (VILUP) recognizes the Taylor River system as having special non-anadromous cutthroat stock and Sproat Lake with high non-anadromous values.

### **4.2 Minerals**

There are 15 known mineral occurrences in the Sproat Lake watershed. These include 4 prospects and 1 developed prospect (with an indicated resource of 132,255 tonnes at 2.15 grams per tonne gold and 0.68 grams per tonne silver; MINFILE, 1990). These are primarily vein deposits with copper, gold and silver and associated lead and zinc. The area has very high potential for metallic mineral deposits (vein and porphyry style) and very high to moderate potential for industrial mineral deposits. The area has seen about 2.7 million dollars in documented mineral exploration work from 1958 to 2000. This work includes mapping, rock and soil sampling, geophysical surveys, geochemical surveys and diamond drilling. It is likely that mineral exploration activities will continue in the area. The goal was to establish OGMAs in areas that do not overlap with mineral tenures and every attempt has been made to do so, however, establishment of OGMAs does not affect these activities as OGMAs are in the Mineral Zone under the province's Two-Zone system.

### **4.3 Recreation**

Due to the proximity of Port Alberni and the fact that Highway 4 runs through a portion of the LU, a significant number of recreational activities take place within the Sproat Lake LU. Highway 4 is a known scenic area; therefore, harvesting is managed to mitigate its visual impact from Highway 4.

There are 3 provincial parks (Sproat Lake, Taylor Arm and Fossli). Sproat Lake and Taylor Arm parks each have campsites. Sproat Lake Park also has a boat launch, swimming beach, and picnic areas. Fossli Park is undeveloped. There is a MoF recreation site at Snow Creek and informal sites have been developed over time along the shores of Sproat Lake and along the Taylor River.

Boaters, canoeists and kayakers heavily use Sproat Lake during the summer. A houseboat rental business operates on the lake as well. Fishing, camping, picnicing and swimming are other activities that occur in abundance and are usually associated with the lake.

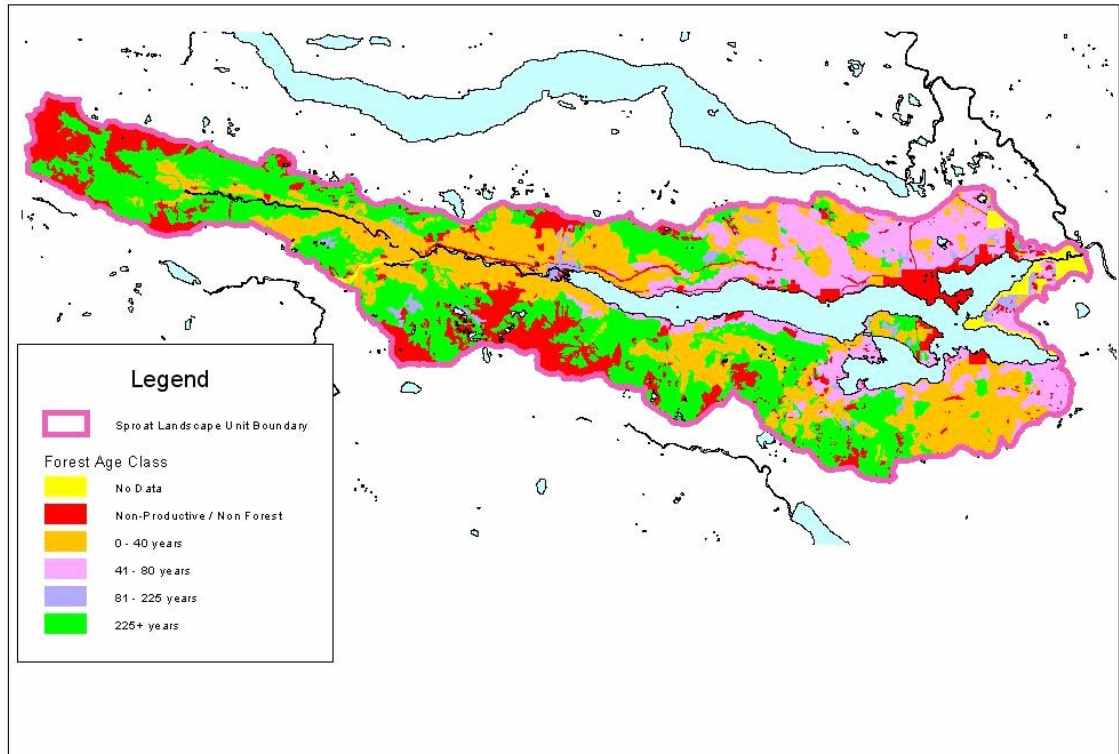
There are several popular hiking trails located within the Sproat Lake LU. These include the Brigade Lake trail that connects Highway 4 to the Gibson-Klitsa Plateau, the Fossli trail

(connects Stirling Arm Main to trails with the Fossli Provincial Park), the Ward Lake trail, the Mount Porter trail, and the Mount Klitsa trail. The Gibson-Klitsa plateau is a popular area to view alpine ecosystems.

#### 4.4 Timber

Commercially valuable tree species in the Sproat Lake LU include Douglas-fir, Western redcedar, and Western hemlock at the lower to mid elevations and Mountain hemlock and Amabilis fir mostly in higher elevation areas.

Commercial harvesting began in the eastern portion of the LU in the 1910s, progressing outwards from the eastern end of Sproat Lake throughout the 1920s and 1930s. The history of harvesting within the Sproat Lake LU has resulted in the current age-class distribution as indicated in Table 3 and shown in Figure 4. For the purposes of OGMA selection, old growth (250+ years) was defined using inventoried age classes greater than 225 years to account for the approximate 25-year-old Weyerhaeuser inventory. Table 2 describes the current distribution of constrained and unconstrained forest within the Landscape Unit.



**Figure 4: Forest Age Class Distribution within Sproat Lake Landscape Unit**

Timber harvested in this landscape unit, mainly by Weyerhaeuser, is transported to the Weyerhaeuser mills in Port Alberni, the Norske Canada paper mill in Port Alberni, and Coastland Wood Industries mill in Nanaimo.

## **4.5 Water**

The Sproat Lake watershed is designated a community watershed under the FPC. The water purveyor is the Hupacasath First Nation. The water intake is located on the Sproat River, approximately 1 km downstream from the lake outlet. Residences around Sproat Lake also draw water from the lake.

As a result of the community watershed designation, all streams within the Sproat Lake LU are classified as S1 to S4 as per Section 59, of the Operational and Site Planning Regulation (OSPR), regardless of fish presence or not. The OSPR also requires that for community watersheds a Coastal Watershed Assessment Procedure (CWAP) must be undertaken at least every three years. The CWAP makes recommendations for managing the hydrologic impacts of forest harvesting activities within the watershed. These recommendations usually relate to managing water and terrain stability concerns associated with road construction and maintenance and sometimes to limiting the amount of harvesting within a certain basin or sub-basin.

## **5.0 Existing Higher Level Plan**

### **5.1 Vancouver Island Land Use Plan Order**

Higher Level Plan (HLP) objectives are a provision that enables specific forest resource management objectives that provide legally binding direction to operational planning. Hierarchically, landscape unit objectives must be consistent with resource management zone objectives.

In the case of Vancouver Island, the Vancouver Island Summary Land Use Plan (VISLUP) was endorsed by Cabinet in February 2000, and the Vancouver Island Land Use Plan (VILUP) Order, establishing Resource Management Zones and objectives for Vancouver Island, came into effect December 1, 2000.

The Higher Level Plan for Vancouver Island makes some components of the VILUP enforceable under the Forest Practices Code. These components designate areas as Special Management Zones and Enhanced Forestry Zones, and specify variances from the general provisions of the Code for these zones. Other parts of VILUP either refer to areas of Vancouver Island not covered by the Code or to areas where the general provisions of the Code are sufficient.

#### **5.1.1. Special Management Zone 17**

Most of the Sproat Lake Landscape Unit is designated as Resource Management Zone (RMZ) 35 in VILUP. It is classified as a General Resource Management Zone, meaning that the Crown landbase is managed under the standard integrated resource management strategies of the Forest Practices Code. There are no Higher Level Plan legally established objectives for RMZ 35, but the Vancouver Island Summary Land Use Plan does provide overall management direction for forest values within RMZ 35.

A portion of the Sproat Lake landscape unit (approximately 25% of the Sproat LU productive forest), west of Sproat Lake, is designated under the HLP as Special Management Zone 17. SMZ 17 extends into the adjacent Great Central LU. In these landscape units, the higher level plan objectives have been addressed proportionately based on the amount of SMZ 17 within each landscape unit. The section below outlines the HLP Order for SMZ 17.

The Higher Level Plan Order for SMZ 17 reads as follows:

- 1) Sustain forest ecosystem structure and function in SMZs, by:
  - (a) creating or maintaining stand structures and forest attributes associated with mature<sup>5</sup> and old<sup>6</sup> forests, subject to the following:
    - i. the target for mature seral forest should range between one-quarter to one-third of the forested area of each SMZ<sup>7</sup>; and
    - ii. in SMZs where the area of mature forest is currently less than the mature target range referred to in (i) above, the target amount of mature forest must be in place within 50 years;
  - (b) retaining, within cutblocks, structural forest attributes and elements with important biodiversity functions; and
  - (c) applying a variety of silvicultural systems, patch sizes and patch shapes across the zone, subject to a maximum cutblock size of 5 ha if clearcut, clearcut with reserves or seed tree silvicultural systems are applied, and 40 ha if shelterwood, selection or retention silvicultural systems are applied.
  
- 2) Despite subsection 1(c) above, cutblocks larger than 5 ha or 40 ha, as the case may be, may be approved if harvesting is being carried out to recover timber that was damaged by fire, insects, wind or other similar events and wherever possible, the cutblock incorporates structural characteristics of natural disturbances.

To address objective 1(a) of the HLP, preference was given to locating OGMA within SMZ 17 for the BEC variants occurring there. Table 4 indicates variant level breakdown of mature (greater than 80 years forest) within Sproat Lake portion of SMZ 17. The target mature seral forest for Sproat LU portion of SMZ 17 is 25% (see LU objectives, Section 10).

**Table 4: SMZ 17 Sproat LU Area Breakdown by Variant**

Variant	Sproat LU within SMZ 17	Productive	Based on Productive Forest (ha)				Total Constrained
			Old & Mature Forest		OGMA	Other NC <sup>8</sup> within SMZ 17	
			Old Growth	80 to 225 Year			
ATp	144.5	0.0	0.0	0.0	0.0	0.0	0.0
CWHmm1	4148.3	3655.6	1378.4	27.7	565.8	627.1	1192.9
CWHmm2	378.8	211.5	153.2	5.2	62.0	8.7	70.7
CWHvm1	0.8	0.0	0.0	0.0	0.0	0.0	0.0
CWHvm2	1893.9	1437.2	1242.3	58.4	509.0	275.5	784.5
CWHxm2	319.6	280.0	12.4	25.2	0.0	28.3	28.3
MHmm1	1474.8	413.4	363.7	49.7	127.5	198.1	325.6
<b>Totals</b>	<b>8360.7</b>	<b>5997.8</b>	<b>3150.0</b>	<b>166.2</b>	<b>1264.2</b>	<b>1137.7</b>	<b>2401.9</b>
<b>Percentage of Productive Forest</b>			<b>52.5%</b>	<b>2.8%</b>	<b>21.1%</b>	<b>19.0%</b>	<b>40.0%</b>

<sup>5</sup> The mature seral forest is defined as generally 80 to 120 years old or older, depending on species and site conditions. The structure of mature seral forests generally includes canopy that vary vertically or horizontally, or both. The age and structure of the mature seral stage will vary significantly by forest type and from one biogeoclimatic zone to another.

<sup>6</sup> The old seral forest is defined as generally greater than 250 years old, containing live and dead (downed and standing) trees of various sizes, including large diameter trees, and of various tree species, including broad-leaved trees. The structure of old seral forest varies significantly by forest type and from one biogeoclimatic zone to another.

<sup>7</sup> Mature seral targets will be established through landscape unit planning.

<sup>8</sup> Non-contributing (100% netdown) exclusive of OGMA and FEN THLB



## **6.0 First Nations**

The Sproat Lake LU is located within the traditional territories of the Tseshaht and Hupacasath First Nations. The Hupacasath First Nation's Territory Land Use Plan identifies the Sproat and Taylor Use areas as requiring Special Management, where special cultural and environmental features take precedence over development. Their two use areas specific to the Sproat LU are the Sproat and Taylor use areas. Their values are highlighted in Appendix 5. The Tseshaht First Nation is currently developing a territory land use plan, with completion anticipated for 2005.

The landscape unit contains important cultural or archeological sites. There are 19 archaeological sites currently registered within the Sproat Lake LU. These sites are protected under the Heritage Conservation Act. Although none of these sites occur within OGMA's two are captured in forest constrained for other values and nine sites are along the shoreline of Sproat Lake or the banks of the Sproat River. Archaeology sites are often detected during site level planning and incorporated into retention or wildlife tree patches.

It is important to note that this plan will be subject to the outcomes of treaty negotiations.

## **7.0 OGMA Methodology**

### **7.1 Assessment and Review**

In general, OGMA's were selected based on a review of stand attributes in an effort to maximize their value for biodiversity while minimizing timber supply impact. Preference was given to locating within SMZ 17 for the BEC variants occurring there. Wildlife in SMZ 17 are listed in VILUP as being regionally significant. Elsewhere, OGMA's were selected to achieve as broad an ecological representation as possible throughout the landscape unit. The specific rationale for the selection of each proposed OGMA is presented in Appendix 1. In general, larger patches were favoured over smaller patches in order to provide for forest interior conditions as much as possible.

The step-wise process of selecting OGMA's outlined in the LUPG was used. OGMA targets were evaluated using the Non-Contributing (NC) landbase first with FENs included as non-contributing. Beyond that no precedence was given to particular NC elements (see Section 8.0). An effort was extended to capture large patches and minimize the impact on the timber supply by combining areas in the non-contributing (parks, unstable terrain, etc.) with areas within the timber harvesting landbase. Provincial Parks were not used to contribute toward old-growth targets.

For all except three of the BEC variants, there was sufficient old-growth forest to meet the required OGMA targets (see Table 6). In addition, most of the targets could be met within the non-contributing (NC) landbase. Within the CWHxm1 and xm2 variants, the lack of suitable old forest meant that some of the OGMA's were designated within younger age classes as recruitment OGMA's within the THLB.

### **7.2 Strategy for Replacing Forest Ecosystem Networks (FENs) with OGMA's**

Forest Ecosystem Networks (FENs) are a conservation mechanism used to provide reserves for late seral forest conditions and connectivity across the landscape unit. Forest connectivity

and fragmentation is an issue that has developed from the application of Island Biogeography Theory to terrestrial forest ecosystems. The theory (MacArthur and Wilson 1963, MacArthur 1967, Quammen 1999) was developed from observations of oceanic islands. It assumes islands are isolated by hostile ocean and predicts consequences to species and population sustenance resulting from isolation. Its extension to terrestrial ecosystems must necessarily assume habitat fragments (islands) and a forest matrix that is a barrier for old-growth dependent organisms. The test of that assumption in western coniferous forests has been equivocal.

FENs were located when the status quo management regime in TFL 44 was clearcutting. The early years following clearcutting were assumed to impede movement of old-growth reliant organisms. FENs were located to provide a reserve structure at the landscape level that would ensure connectivity for old-growth dependent species. Networks similar to FENs have been used globally as conservation vehicles to address species-specific isolation problems.

In 1999, MacMillan Bloedel adopted variable retention and zoning as their new forest management strategy to address social license issues focused on old-growth conservation. Part of that concern was old-growth connectivity and variable retention was a tool to provide for improved connectivity in the matrix. Clearcut logging was to be phased out and the retention silviculture system (VR) would be employed at the various retention levels throughout Weyerhaeuser's coastal tenures.

The Clayoquot Sound Science Panel uses the following specific ecological objectives in recommending the new VR approach for harvesting old-growth forests while providing habitat for forest biota:

*To provide, immediately after harvest, habitat (e.g., large trees, snags, and logs) important to survival of organisms and processes that would otherwise be lost from the harvested area either temporarily or permanently;*

*To enrich current and future forests by maintaining some remnant structural features and organisms from the previous stands. These features might otherwise be absent from the cutting unit for decades after logging; and*

*To improve "connectivity" between cutting units and forest areas by facilitating the movement of organisms through the cutover areas.*

Clayoquot Sound Scientific Panel (1995, p. 238)

MacMillan Bloedel's Ecological Rationale for the Forest Project evaluates the connectivity controversy and states:

*Data are sufficient to advocate either corridors or matrix management as the better approach to promoting connectivity.*

*Conservation benefits have not been documented for either approach; dangers have been documented for corridors. The danger in relying on the matrix is its presumed hostility, which is not strongly expressed. Advantages and difficulties of relying on the matrix should be examined.*

An Ecological Rational for Changing Forest Management on MacMillan Bloedel’s Forest Tenure (1999, pp. 172-182)

Part of the process of designating OGMA involves replacing FENs with OGMA up to the targets allowed by variant representation (see Table 5). A complete discussion of Weyerhaeuser’s approach to replacing FENs with OGMA is provided in Appendix 6.

Table 5 describes the THLB components of the FEN. In addition the table shows how the area encompassed by the FENs has been used to meet OGMA targets. The OGMA capture 185.4 ha of FEN links. Removal of the FEN following establishment of OGMA would increase THLB by 1151.4 ha, consistent with MP4 Timber Supply Analysis.

In recognition of the fragmentation controversy, the current state of the science and existing knowledge gaps (Appendix 6), retention silvicultural systems will be used throughout the landscape unit with a minimum retention level of 15%. Future landscape condition will be forecasted using spatial harvest scheduling and connectivity modeling. Emerging connectivity issues will be addressed with modifications in retention systems.

**Table 5: FEN Area Breakdown with Partial Netdowns Removed from FEN Links**

Variant	Total Productive Area (ha)	Based on Productive Forest					
		FEN Links (ha)			OGMA (ha) <sup>(4)</sup>		
		OG	2nd	Total	Constrained <sup>(1)</sup>	FEN Links <sup>(2)</sup>	Total <sup>(3)</sup>
CWHmm1	6659.5	301.8	182.6	484.5	505.5	82.5	588.0
CWHmm2	2106.8	95.7	48.2	143.9	214.9	19.9	234.8
CWHvm1	444.0	13.2	5.1	18.3	63.4	0.0	63.4
CWHvm2	4858.3	294.6	11.6	306.1	577.6	53.7	631.4
CWHxm1	1058.0	10.5	14.0	24.5	29.7	9.3	39.0
CWHxm2	5349.4	26.6	265.5	292.1	349.6	12.7	362.3
MHmm1	1220.0	67.0	0.4	67.5	248.4	7.2	255.6
<b>Totals</b>	<b>21696.0</b>	<b>809.4</b>	<b>527.3</b>	<b>1336.8</b>	<b>1989.0</b>	<b>185.4</b>	<b>2174.4</b>

Notes:

1. Constrained are all netdowns except FEN.
2. Links are the THLB portion of the FEN.
3. Total does not include THLB that falls within an OGMA. Only sum of constrained and FEN links.
4. Columns have not been updated to include data for OGMA SPR-062 to 071.

### 7.3 Boundary Mapping

OGMA boundaries used natural features, wherever possible, to ensure they could be located on the ground. OGMA were also mostly delineated to include complete forest stands (forest cover polygons) wherever possible to reduce operational uncertainty and increase ease of OGMA mapping.

OGMA boundaries do not have to be legally surveyed. Potential trespass across OGMA boundaries will be enforced to a reasonable standard of measurement. This means that a licensee’s proposed harvest area can only be expected to be in or outside of an OGMA as it is shown on the map. Therefore if a licensee submitted a plan showing proposed development outside the mapped OGMA boundary that would be taken as correct. However, the licensee is

responsible for ensuring due diligence in locating their cutblock boundaries to the accuracy shown on the map. OGMA's will be mapped at 1:20 000 scale to minimize possible errors.

## **7.4 Amendment Policy**

An MSRM Coast Region policy has been developed to give direction to proponents (forest tenure holders) when applying for amendments to OGMA legal objectives. Amendment procedures will cover minor or major amendments for resource development (e.g., roads, bridges, boundary issues, rock quarries & gravel pits) or relocation of OGMA's. The policy also discusses acceptable management activities and review procedures. The amendment policy is included in this report as Appendix 7.

## **7.5 Rare and Endangered Species and Ecosystems**

The provincial government through the Conservation Data Center (CDC) provides a listing of species and plant communities considered under threat from human activity or natural events. These are categorized as Vulnerable (Special Concern), Extirpated, Endangered, or Threatened. CDC plant communities are based on the Ministry of Forests Vegetation classification (plant associations). The data used in the ecosystem classification describes climax plant associations and subsequently the late seral stages (old growth) are the focal point of the listing. When a plant community is listed, one of the ranking factors is the known or expected number of occurrences with good to excellent viability. Viability is related to ecological integrity of communities and is determined by the size, condition, and landscape context of each species or community occurrence. The importance of these three factors to a specific occurrence of a community is based on the type of ecosystem, specifically how it occurs within the landscape.

The following describes the categories included in the red and blue lists and the purpose of those listings.

### **Red List**

Includes any indigenous species, subspecies or plant community that is Extirpated, Endangered, or Threatened in British Columbia. Extirpated elements no longer exist in the wild in British Columbia, but do occur elsewhere. Endangered elements are facing imminent extirpation or extinction. Threatened elements are likely to become endangered if limiting factors are not reversed.

### **Blue List**

Includes any indigenous species, subspecies or community considered to be Vulnerable (Special Concern) in British Columbia. Vulnerable elements are of special concern because of characteristics that make them particularly sensitive to human activities or natural events. Blue-listed elements are at risk, but are not Extirpated, Endangered or Threatened.

The Red and Blue lists serve two purposes:

1. To provide a list of species for consideration for more formal designation as Endangered or Threatened, either provincially under the British Columbia Wildlife Act, or nationally by the Committee on the Status of Endangered Wildlife in Canada (COSEWIC).
2. Help inform setting conservation priorities for species/communities considered at risk in British Columbia.

Table 7 and Appendix 2 describe the Red- and Blue-listed ecosystems (both all seral and old seral stages) captured in the OGMA selections and their occurrence across the landscape.

This was done using Weyerhaeuser's Terrestrial Ecosystem Mapping and forest cover data. Also included are the locally rare ecosystems determined as those ecosystems in the Landscape Unit whose cumulative area summed to 2% of the landscape (Table 7). In addition Wildlife Habitat Area reserves for red-listed species Marbled Murrelets captured in the OGMAs are listed.

Appendix 3 lists all the red-listed species on Weyerhaeuser tenure with comments on their occurrence and listing (Bunnell et al. 1999) and Appendix 4 lists all native forest dwelling vertebrates and their habitat needs. The Landscape Unit specific, provincially-listed species and suggestions for conservation are highlighted below:

- **Band-tailed Pigeon**—Nests should be protected as found. Arbutus with berry food patches will be protected in some of dry site series, CWHmm OGMAs.
- **Coastal Cutthroat Trout**—Protected by riparian buffers and riparian retention patches.
- **VI Ermine (anguinae subspecies)**—stand level protection of root boles of large stumps (>50 cm dbh) in retention patches and harvested matrix.
- **Great Blue Heron**—if nesting colonies or nests located use the MWLAP Identified Wildlife Management Strategy (IWMS) 2004 provisions.
- **Keene's Long-eared Myotis**—protect hibernacula and roosts as required in IWMS 2004.
- **Marbled Murrelet**—2 Wildlife Habitat Areas.
- **Northern Pygmy Owl**—if nest located, it will be protected by IWMS 2004 provisions.
- **Roosevelt Elk**—Ungulate Winter Ranges.
- **Vancouver Island Wolverine**—a wide ranging species, habitat and forage species needs partially addressed by OGMA management and retention patches.
- **Red-legged Frog**—protecting buffers around breeding ponds as per provisions of IWMS 2004.
- **Vancouver Island Water Shrew**—addressed through riparian protection, and if located, protected by provisions of IWMS 2004.
- **Northern Goshawk**—survey conducted and no nest sites found in Sproat. If located nests sites will be protected as per provisions of IWMS 2004 or Wildlife Habitat Features.

Red- and Blue-listed ecosystems (all seral stages) constitute 67.6% of the landscape unit productive forest and 53.1% in a late seral condition. They also constitute approximately 56.9% of the OGMAs selected (all seral stages) and 24.4% of the total available late seral listed ecosystems in the landscape unit captured in OGMAs. OGMAs captured all of the available WHA component. The combined area of listed ecosystems and species and locally rare ecosystems was 1754.7 ha or approximately 74% of the OGMA area.

**Table 6: Available Old Growth and OGMA Targets by Variant**

Variant	Productive Forest Area (ha) <sup>(5)</sup>	OG Target (% of forested area)	TFL 44 and TSA 38			OG Captured within OGMA (ha) <sup>(6)</sup>				2 <sup>nd</sup> Growth Captured within OGMA (ha) <sup>(6)</sup>			
			Target OGMA Weyerhaeuser Data (ha)	NC Old from whole variant <sup>(7)</sup>	OGMA Area Final Version (ha)	Non-Contributing <sup>(2)</sup>	Partial NC <sup>(3)</sup>	THLB <sup>(4)</sup>	Total OG <sup>(6)</sup>	Non-Contributing	Partial NC	THLB	Total 2nd
CWHmm1	6 659.5	9	599.4	1832.1	599.4	577.0	2.1	11.2	590.2	8.9	0.1	0.2	9.2
CWHmm2	2106.8	9	189.6	583.7	260.1	233.2	1.1	4.4	238.6	0.4	0.1	2.2	2.7
CWHvm1	444.0	13	57.7	162.0	65.9	61.3	0.4	2.4	64.1	1.7	0.0	0.1	1.8
CWHvm2	4858.3	13	631.6	2000.0	632.9	630.1	0.5	1.2	631.8	0.6	0.1	0.4	1.1
CWHxm1	1058.0	9	95.2	82.9	139.5	19.9	15.8	48.9	84.6	1.1	1.6	7.8	10.5
CWHxm2	5349.4	9	481.4	933.7	433.2	324.1	20.8	103.8	448.7	18.2	2.4	12.0	32.6
MHmm1	1220.0	19	231.8	919.0	258.3	254.6	0.7	2.7	258.0	0.2	0.1	0.1	0.3
<b>Totals</b>	<b>21696.0</b>		<b>2286.7</b>	<b>6513.3</b>	<b>2389.3</b>	<b>2100.2</b>	<b>41.3</b>	<b>174.5</b>	<b>2316.0</b>	<b>31.2</b>	<b>4.6</b>	<b>22.8</b>	<b>58.3</b>

Notes: Includes TFL 44 and TSA 38 data for all fields. TSA 38 area is completely within CWHxm1.

1. Total productive forest area differs from the RLUPs database. This difference is consistent with the differences between MP3 data (RLUPs) and MP 4 data.
2. Non-contributing landbase equals productive old-growth forest within OGMA 100% constrained, i.e. Proposed UWR, MAMU, Riparian Reserve, Recreation ER 1, FEN, Inoperable, Uneconomic.
3. Partial non-contributing landbase equals productive old-growth forest within OGMA with some constraint on it, i.e., Terrain Classes V, IV, ES1, ES2, Riparian Management and Recreation.
4. Timber Harvesting Landbase equals productive old-growth forest within OGMA not under harvest constraints listed above. It however could have factor constraints like VR and WTP.
5. Productive Forest area includes all age classes from Weyerhaeuser MP4 and TSA 38 data sets.
6. Total OG equals total old-growth productive forest within OGMA. The sum of non-contributing, partial NC and THLB.
7. Excludes FENs on 100% netdowns only. Includes 100% netdown areas only.
8. Columns have not been updated to include data for OGMA SPR-062 to SPR-071

**Table 7: Rare Ecosystems in Sproat Lake Landscape Unit**

BEC Zone	Locally Rare Site Series <sup>(1)</sup>	Blue Listed	Red Listed
CWHmm1	09, 10, 11, 12	01, 02, 04, 09, 12	03, 05, 06, 07
CWHmm2	07, 09	01, 02, 03, 04, 07, 08, 10	06
CWHvm1	01, 02, 04, 05, 06, 07	04, 08, 10, 14	09
CWHvm2	02, 08, 10, 11, 12	04, 08, 11	
CWHxm1	06, 11,	03, 05, 09, 10, 11, 12, 15	01, 02, 04, 06, 07, 08, 13, 14
CWHxm2	09, 11, 12	03, 05, 09, 10, 11, 12, 15	01, 02, 04, 06, 07, 08, 13, 14
MHmm1	07, 08		

Note: (1) Locally rare defined as cumulative total area of the rarest BEC zone/Site Series units that occupy 2% of total in landscape unit.

**Table 8: Summary of Red and Blue Listed Ecosystems captured by OGMAs**

	OGMA <sup>(2)</sup> Area (ha)		Red Listed Area (ha)		Blue Listed Area (ha)		WHA Area (ha)		Locally Rare (ha) <sup>(1)</sup>		% of total locally rare old in total LU
	Old (225+)	2nd (0-225) <sup>(3)</sup>	Old (225+)	2nd (0-225) <sup>(3)</sup>	Old (225+)	2nd (0-225) <sup>(3)</sup>	Old (225+)	2nd (0-225) <sup>(3)</sup>	Old (225+)	2nd (0-225) <sup>(3)</sup>	
Totals within OGMAs <sup>(5)</sup>	2338.7	48.8	520.3	16.7	717.8	28.4	354.0	13.7	38.8	0.1	13.6%
% in OGMA from Total LU			22.7%	0.4%	23.7%	0.7%	100.0%	100.0%	13.6%	0.1%	
Totals within Landscape Unit			2288.8	4411.5	3020.7	4953.5	354.0	13.7	286.1	116.7	

**Notes:**

- 1 - Locally rare defined as cumulative total area of the rarest BEC zone/Site Series units that occupy 2% of total in landscape unit.
- 2 - OGMA area in this table represents only productive forest land within OGMAs.
- 3 - Second growth areas include only productive forest land from the MP4 inventory.
- 4 - "Totals within Landscape Unit" includes only land potentially available for OGMA's placement, i.e. Private land excluded.
- 5 - Totals for Red Listed, Blue Listed, WHA and Locally Rare Areas do not include data for OGMA areas SPR-062 to SPR-071

## 8.0 OGMA Analysis

### 8.1 Available Old Growth and OGMA Targets

The Sproat Lake LU consists of 2 biogeoclimatic zones, differentiated by 7 variants upon which old-growth targets are based. The Coastal Western Hemlock (CWH) Zone comprises almost 95% of the productive forest in the LU and is subdivided into 6 variants. In total, the CWH zone contains 8888.9 ha of old forest. The Mountain Hemlock (MH) Zone covers only 5.6% of the productive forest, and is found above the CWH Zone, up to 1 500 m in elevation. The Alpine Tundra (AT) Zone, found immediately above the MH Zone, is not included in OGMA designation, as it does not usually support productive forest.

Table 6 outlines the forested area targets for OGMA designation by variant; and the amount of OG currently available in the non-contributing, partially contributing and contributing (timber harvesting) landbase. There are a total of 2316 ha of age class 250+ required for designation as OGMAs.

NC and THLB are defined as follows:

- **Non-contributing landbase (NC):** This is the forested landbase that does not contribute to the AAC, but that does contribute to seral stage and old-growth targets. It includes parks, riparian reserves, inoperable forest, environmentally sensitive areas (ESAs) and any other area 100% removed, or area that is partially removed from the THLB, as defined by current practice for each area<sup>9</sup> (Timber Supply Review documents may be a good source for this information). Non-contributing landbase must be used to the fullest extent possible to meet seral stage, old growth and wildlife tree objectives and targets, prior to using the timber harvesting landbase.
- **Timber harvesting landbase (THLB):** This is the forested landbase that contributes to the AAC, as defined in the Timber Supply Review, for a Timber Supply Area (TSA) or Tree Farm License (TFL). While all of the THLB is subject to management requirements such as green-up, some portions are subject to management requirements that are more restrictive, and thus allow less timber to be harvested over time. For example, the management prescription for a retention visual quality area often significantly limits the amount of timber that may be harvested. This may result in the maintenance of significant areas of older forest that can contribute to meeting old-growth requirements. In another area, the minimum harvest age may exceed old-growth age, which will also result in the THLB remaining in an older state. It is important to map these types of areas so that they are considered when it is necessary to delineate OGMAs in the THLB.

### 8.2 OGMA Placement

In the first iteration of this process, OGMAs were selected to meet targets and provide broad representation across variants. There was no precedence given to any single element within the NC. The scrub forest was not included in the NC (defined within Weyerhaeuser's forest inventory as

<sup>9</sup>Where HLPs declared by Cabinet, or the Ministers define the NC landbase vs. the THLB, these must be used to refine the definitions presented in this chapter. Database assembly and analysis would then need to be adjusted accordingly.



productive forest with less than 211 m<sup>3</sup>/ha). Although these higher elevation, low volume forests can provide significant biodiversity benefits, the planning team determined it would require significant field checking to establish viable scrub contributions to OGMA targets.

OGMAs were specifically selected based on a review of potential stand attributes in an effort to maximize their value from a biodiversity standpoint while minimizing timber supply impact. Once these steps were completed and preliminary OGMAs were established, all OGMAs were then evaluated for their feasibility and their operational impact. During this reconciliation phase, boundaries were redesigned to avoid isolating THLB and ortho-photography was used to enhance the inventory and show the most current disturbances. Boundaries were fine-tuned to align with physical and operational features and to avoid operational impacts.

Consideration was given to creating an opportunity for marbled murrelet nesting habitat recruitment. Marbled murrelet wildlife habitat areas (WHA) were also captured where they exist. Where they were not wholly captured as a function of capturing forest >250 years, mature forest within the WHA was considered for inclusion in the OGMA in order to provide for forest interior conditions and future marbled murrelet habitat. Where WHAs did include some THLB, they were also designated as OGMA on the basis that their timber supply impact would be within the allowable impact of IWMS. Specific rationale for the selection of each OGMA is shown in Appendix 1.

OGMAs were delineated first in the non-contributing forested landbase and approximately 92% (Table 6) of the final OGMAs are located in the NC landbase. Where NC was inadequate, portions of the timber harvesting landbase were assessed and included as OGMAs. The THLB contribution was required in lower elevation variants (CWHxm1 and xm2) due to a longer disturbance history (lower abundance of old forests), concentration of agricultural and residential land and lesser amounts of non-contributing forest.

The OGMA summary table (Table 6), shows approximately 98% of the required OGMAs are located in the Non-Contributing landbase for the CWHmm1, mm2, vm1, vm2, and MHmm1 units (due to boundary fine-tuning explained above). When evaluating NC forests for inclusion no preference was given to particular NC elements. Selection was guided first by location within the SMZ and then by how the selection could contribute to representation across the variant.

### **8.3 Mitigation of Timber Supply Impacts**

During delineation of OGMAs an attempt was made to mitigate the short- and long-term impacts on timber. Since representation targets must be met at the variant level, the non-contributing landbase could not always satisfy old forest requirements 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 following direction outlined in the Landscape Unit Planning Guide.

During the de-selection of OGMAs due to removal of private land from TFL 44, an attempt was made to de-select OGMAs that were constrained only because they occurred within FENs. That landbase, therefore, becomes available for harvest.

The total OGMA area exceeds the target by 102.6 ha (4.4%). This did not result in a significant THLB impact and is primarily due to operability reconciliation with natural features in the CWHmm2 and MHmm1 variants. THLB contributions required in the CWHxm1 and 2 were balanced to meet the CWHxm combined target. Overall, the effect on timber supply will be low. The impact may be magnified by the fact that this is a relatively small landscape unit, the drainage is designated as intermediate BEO, and there has been significant harvesting history in the drainage.

**Table 9: Feature Areas Captured in OGMA**

<b>Constrained Feature</b>	<b>Area in OGMA <sup>(1)</sup> (ha)</b>	<b>Total Area in LU <sup>(1)</sup> (ha)</b>	<b>Percentage Captured in OGMA</b>
Old Growth Forest <sup>(2)</sup>	2343.8	11792.9	19.9%
Old Growth Productive Forest	2331.2	10012.9	23.3%
SMZ 17 <sup>(3)</sup>	1295.6	8360.7	15.5%
Locally Rare Ecosystems <sup>(3)</sup>	42.1	493.4	8.5%
Red Listed Ecosystems <sup>(3)</sup>	572.5	8193.5	7.0%
FEN <sup>(3)</sup>	1405.6	9837.7	14.3%
FEN Link (unconstrained) <sup>(3)</sup>	214.1	2617.1	8.2%
MAMU <sup>(3)</sup>	591.0	658.3	89.8%
WHA <sup>(3)</sup>	382.0	431.7	88.5%
Proposed UWR <sup>(3)</sup>	533.2	672.3	79.3%

**Notes:**

(1) Area represents total area and may include second growth and non-productive where applicable. Includes only areas within Sproat Landscape Unit that are also within TFL 44.

(2) Includes old forest that is not productive.

(3) May include non-productive areas - thus areas may be slightly higher than tables using productive forest only.

## 9.0 Wildlife Tree Retention

Wildlife tree retention is managed at the stand level and is used to maintain structural diversity within managed stands by retaining wildlife trees adjacent to or within cutblocks. Retention percents currently meet district policy that states that for all CWH variants the target is 9% and for all other variants the target is 1%.

## 10.0 Proposed Landscape Unit Objectives

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

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

### Objectives – Sproat Lake Landscape Unit

#### 10.1 Objective 1 – Old Growth Management Areas

1) Maintenance or recruitment of old growth forests

Maintain or recruit old growth forests in established old growth management areas (OGMAs), as shown on the attached Sproat Lake Landscape Unit map dated May 2005, subject to section 2 below.

2) Permissible Activities

a) Minor OGMA boundary adjustments for operational reasons:

To accommodate operational requirements for timber harvesting and road or bridge construction, boundaries of OGMAs that are 10 ha or greater in size may be adjusted, provided that:

- i) the boundary adjustment does not affect more than 10 per cent of the area of the OGMA,
- ii) road or bridge construction is required to access resource values beyond or adjacent to the OGMA and no other practicable option for road or bridge location exists,
- iii) suitable OGMA replacement forest of at least equivalent quantity is identified either (in order of priority) directly adjacent to, or in the same variant and landscape unit as the adjusted OGMA, and
- iv) boundary adjustments and OGMA replacements areas are documented, mapped and submitted to the delegated decision maker at the end of each calendar year.

In the case of ii) above, as an alternative to finding replacement area the licensee may permanently deactivate and rehabilitate a temporary road or bridge site within four years after construction.

- b) Other permissible activities:
- i) Boundary pruning of trees to improve wind firmness.
  - ii) Timber harvesting to prevent the spread of insect infestations or diseases that pose a significant threat to forested areas outside of OGMA. Salvage within OGMA will be done in a manner that retains as many old growth forest attributes as possible.
  - iii) Maintenance, deactivation, removal of danger trees, or brushing and clearing on existing roads under active tenure within the right-of-way for safety purposes.
  - iv) Felling of guyline clearance, tailhold anchor trees, or danger trees (except high value wildlife trees) along cutblock boundaries or within the right of way on new road/bridge alignments to meet safety requirements.
  - v) Construction of rock quarries and gravel pits under authority of forest tenure where the development will be located immediately adjacent to existing roads under tenure and will affect the OGMA by less than 0.5 ha in total.
  - vi) Intrusions, other than those specified that affect an OGMA by less than 0.5 hectare in total.

OGMA replacement forest is required as a result of activities under 2b) above, if the total net change to the OGMA exceeds 0.5 ha in size. Replacement forest must be biologically suitable, of at least equivalent quantity and situated (in order of priority), either immediately adjacent to the existing OGMA, or in the same variant and landscape unit as the existing OGMA. Boundary adjustments and OGMA replacement areas must be documented, mapped and submitted to the delegated decision maker at the end of each calendar year for approval.

## 10.2 Objective 2 – Wildlife Tree Retention

Maintain stand-level structural diversity, by retaining wildlife tree patches (WTPs).

Over each five year period, commencing on the date the objectives are established, the target percentage of the harvest area as noted in the table below must be achieved, by each licensee and tenure, through retention of adequate amounts of wildlife tree patches on cutblocks, except minor salvage cutblocks in which harvesting has been completed<sup>10</sup>.

In addition:

- (1) WTPs must be well distributed across the BEC subzone.
- (2) When designated at the operational site plan level, WTPs must be located within or immediately adjacent to a cutblock.
- (3) No timber harvesting, including single tree selection is to occur within WTPs, except as noted in (4) below
- (4) Salvage of windthrown timber is permitted within WTPs where windthrow impacts 25% to 50% of the dominant or co-dominant stems. Salvage of windthrown timber and harvesting of remaining standing stems is permitted within WTPs where windthrow exceeds 50% of the dominant or co-dominant stems; or where forest health issues pose a significant threat to areas outside the WTP. Where salvage/harvesting is planned and authorized, suitable

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<sup>10</sup> A minor salvage cutblock is defined as less than 2.0 ha of harvesting and/or less than a total volume of 2000 m<sup>3</sup> excluding volume harvested from any road clearing width, if the road is required to facilitate the removal of the timber within the minor salvage cutblock.

- replacement WTP of at least equivalent quantity must be identified concurrently to achieve the retention target.
- (5) WTPs should include, if present, remnant old-growth patches and live or dead veteran trees (excluding danger trees).
  - (6) WTPs must include representative larger trees for the stand (dbh>average operational cruise) and any moderate to high value wildlife trees if available (excluding danger trees).
  - (7) BEC subzones and variants will be determined by operational site plan information.
  - (8) In WTPs with a likelihood of windthrow, pruning and/or topping may be carried out to maintain the integrity of the WTP.

**Table 10: Wildlife Tree Retention by BEC subzone in the Sproat Lake Landscape Unit.**

<b>Biogeoclimatic Subzone</b>	<b>% WTP requirement</b>
CWH mm (Coastal Western Hemlock, moist maritime)	7
CWH vm (Coastal Western Hemlock, very wet maritime)	5
CWH xm (Coastal Western Hemlock, very dry maritime)	12
MH mm (Mountain Hemlock, moist maritime)	0

### **10.3 Objective 3 – Special Management Zone 17**

Sustain forest ecosystem structure and function within the portion of Special Management Zone 17 located in the Sproat Lake Landscape Unit, by retaining mature and old forests (i.e. >80 years of age) on an area covering at least 25 per cent of the total forested area of the SMZ portion located within the landscape unit.

### **10.4 Draft Objective 4 – Connectivity**

Plan forest harvesting operations to reduce fragmentation of late successional ecosystems by maintaining an interconnected landscape matrix of natural features and retention silviculture systems with a minimum retention level of 15%.

## 11.0 Citations

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## Appendices

- Appendix 1      OGMA Polygon Details
- Appendix 2      Red and Blue Listed Ecosystems Captured by OGMAs
- Appendix 3      Red and Blue-listed Species List and Comments
- Appendix 4      Native Terrestrial Forest-dwelling vertebrates potentially breeding on Weyerhaeuser's Forest Tenure
- Appendix 5      Hupacasath Territory Land Use Plan—Sproat and Taylor Use Areas
- Appendix 6      FEN Background
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**Appendix 1. OGMA Polygon Details**

OGMA Polygon Number <sup>(4)</sup>	Variant	Areas are productive Forest				Rationale	Leading Tree Species Present <sup>(3)</sup>
		OGMA Area (ha)	SMZ 17 Area (ha) <sup>(1)</sup>	Habitat Stewardship Zone Area (ha)	Old Stewardship Zone Area (ha)		
SPR-003	CWH mm 1	2.1	2.1	2.1	0.0	FEN	H, F
SPR-004	CWH xm 2	2.2	0.0	2.2	0.0	Old forest in xm2	H, F, C
SPR-005	CWH mm 1	2.3	2.3	2.3	0.0	FEN, UWR	H, F, C
SPR-008	CWH xm 2	2.7	0.0	2.7	0.0	Old forest in xm2	Hw, F, Cy, Ba
SPR-009	CWH mm 1	2.9	2.9	2.9	0.0	UWR	H, F, C
SPR-010	CWH vm 2	3.3	3.3	0.0	3.3	FEN	H, Cy
SPR-011	CWH vm 2	3.3	3.3	0.0	3.3	Economic	H, B
SPR-012	CWH mm 1	0.1	0.1	0.1	0.0		
SPR-012	CWH mm 2	2.8	2.8	2.8	0.0		
<b>SPR-012 Total</b>		<b>2.9</b>	<b>2.9</b>	<b>2.9</b>	<b>0.0</b>	FEN	H, B, F
SPR-014	CWH mm 1	3.7	3.7	3.7	0.0	FEN, Riparian	H, F, C
SPR-016	CWH mm 1	4.4	4.4	4.4	0.0	FEN, Riparian	H, F, C
SPR-017	CWH mm 1	4.4	4.4	4.4	0.0	UWR	H, F, C
SPR-018	CWH mm 2	4.7	0.0	4.7	0.0	FEN, Riparian	H, F
SPR-021	CWH mm 1	5.9	5.9	1.4	4.5	MaMu, WHA	H, F, C
SPR-022	MH mm 1	4.6	4.6	0.0	4.6	FEN, Riparian, Recreation	B, Cy
SPR-030	CWH vm 2	10.9	10.9	0.0	10.9	FEN, Riparian	H, Cy
SPR-032	CWH xm 1	4.2	0.0	4.2	0.0	FEN, Riparian, Recreation, old forest in xm1	H, F, C
SPR-036	CWH vm 2	1.0	1.0	0.0	1.0		
SPR-036	MH mm 1	17.9	17.9	0.0	17.9		
<b>SPR-036 Total</b>		<b>18.9</b>	<b>18.9</b>	<b>0.0</b>	<b>18.9</b>	FEN, Recreation	H, B
SPR-038	MH mm 1	21.5	21.5	0.0	21.5	<b>FEN, Recreation</b>	<b>H, B</b>
SPR-039	CWH mm 1	2.0	2.0	0.0	2.0		
SPR-039	CWH vm 2	17.0	17.0	0.0	17.0		
SPR-039	MH mm 1	0.3	0.3	0.0	0.3		
<b>SPR-039 Total</b>		<b>19.3</b>	<b>19.3</b>	<b>0.0</b>	<b>19.3</b>	FEN, MaMu WHA	H, Cy
SPR-041	CWH vm 2	4.7	4.7	0.0	4.7		
SPR-041	MH mm 1	21.5	21.5	0.0	21.5		
<b>SPR-041 Total</b>		<b>26.2</b>	<b>26.2</b>	<b>0.0</b>	<b>26.2</b>		
SPR-042	CWH mm 1	1.1	1.1	0.0	1.1		
SPR-042	CWH vm 2	29.6	29.6	0.0	29.6		
<b>SPR-042 Total</b>		<b>30.7</b>	<b>30.7</b>	<b>0.0</b>	<b>30.7</b>	FEN, Riparian	H, Cy
SPR-044	CWH mm 1	2.0	2.0	0.0	2.0		
SPR-044	CWH vm 2	25.0	25.0	0.0	25.0		
<b>SPR-044 Total</b>		<b>27.0</b>	<b>27.0</b>	<b>0.0</b>	<b>27.0</b>	FEN, MaMu WHA	H, F, Cy



OGMA Polygon Number <sup>(4)</sup>	Variant	Areas are productive Forest				Rationale	Leading Tree Species Present <sup>(3)</sup>
		OGMA Area (ha)	SMZ 17 Area (ha) <sup>(1)</sup>	Habitat Stewardship Zone Area (ha)	Old Stewardship Zone Area (ha)		
SPR-046	CWH vm 1	37.4	0.0	37.4	0.0		
SPR-046	CWH vm 2	0.6	0.0	0.6	0.0		
<b>SPR-046 Total</b>		<b>38.0</b>	<b>0.0</b>	<b>38.0</b>	<b>0.0</b>	Economic	F, Hw, Ba, C
SPR-047	CWH xm 1	8.9	0.0	8.9	0.0		
SPR-047	CWH xm 2	29.9	0.0	29.9	0.0		
<b>SPR-047 Total</b>		<b>38.8</b>	<b>0.0</b>	<b>38.8</b>	<b>0.0</b>	UWR	F, C, H, D
<b>SPR-048</b>	<b>CWH vm 2</b>	<b>38.5</b>	<b>38.5</b>	<b>0.0</b>	<b>38.5</b>	FEN, Recreation	Cy, H, B
SPR-049	CWH mm 1	27.6	22.8	27.6	0.0		
SPR-049	CWH mm 2	11.1	10.7	11.1	0.0		
<b>SPR-049 Total</b>		<b>38.7</b>	<b>33.5</b>	<b>38.7</b>	<b>0.0</b>	FEN	F, H, B
SPR-050	CWH mm 2	42.1	0.0	42.1	0.0		
SPR-050	MH mm 1	5.7	0.0	5.7	0.0		
<b>SPR-050 Total</b>		<b>47.8</b>	<b>0.0</b>	<b>47.8</b>	<b>0.0</b>	FEN, Riparian, Economic	Ba, Hw, Cy, C, F, Pw
<b>SPR-052</b>	<b>CWH xm 1</b>	<b>72.3</b>	<b>0.0</b>	<b>72.3</b>	<b>0.0</b>	Recreation, Old forest in xm1	F, C, Hw, Mb, Pw
<b>SPR-053</b>	<b>CWHxm2</b>	<b>77.2</b>	<b>0.0</b>	<b>77.2</b>	<b>0.0</b>	FEN, Riparian, Old forest in xm2	F, H, C, B
SPR-054	CWH mm 1	29.3	29.3	10.1	19.2		
SPR-054	CWH vm 2	123.8	123.1	26.7	97.1		
<b>SPR-054 Total</b>		<b>153.1</b>	<b>152.4</b>	<b>36.8</b>	<b>116.3</b>	FEN, Riparian, Economic, Recreation	H, B, F, C, Cy
SPR-055	CWH vm 2	76.0	0.0	76.0	0.0		
SPR-055	CWH xm 2	83.1	0.0	83.1	0.0		
<b>SPR-055 Total</b>		<b>159.1</b>	<b>0.0</b>	<b>159.1</b>	<b>0.0</b>	UWR	B, C, Hw, Hm, F, Mb
SPR-056	CWH mm 1	159.9	148.3	14.8	145.2		
SPR-056	CWH vm 2	64.6	64.6	0.0	64.6		
<b>SPR-056 Total</b>		<b>224.5</b>	<b>212.8</b>	<b>14.8</b>	<b>209.7</b>	UWR, MaMu WHA	B, H, C, F, Cy
SPR-057	CWH mm 1	17.2	0.0	17.2	0.0		
SPR-057	CWH vm 1	28.5	0.0	28.5	0.0		
SPR-057	CWH vm 2	42.3	0.0	42.3	0.0		
SPR-057	CWH xm 2	112.1	0.0	112.1	0.0		
<b>SPR-057 Total</b>		<b>200.1</b>	<b>0.0</b>	<b>200.1</b>	<b>0.0</b>	FEN, MaMu WHA	B, H, F, Hw, Mb, D
SPR-058	CWH mm 1	55.2	55.2	36.9	18.3		
SPR-058	CWH vm 2	188.2	188.2	0.0	188.2		
SPR-058	MH mm 1	61.7	61.7	0.0	61.7		
<b>SPR-058 Total</b>		<b>305.1</b>	<b>305.1</b>	<b>36.9</b>	<b>268.2</b>	FEN, Recreation	B, H, Cy, F, C
SPR-059	CWH mm 1	279.5	279.5	279.5	0.0		
SPR-059	CWH mm 2	48.5	48.5	48.5	0.0		
<b>SPR-059 Total</b>		<b>328.0</b>	<b>328.0</b>	<b>328.0</b>	<b>0.0</b>	UWR, FEN	B, Cy, H, Hw, F, B,

OGMA Polygon Number <sup>(4)</sup>	Variant	Areas are productive Forest				Rationale	Leading Tree Species Present <sup>(3)</sup>
		OGMA Area (ha)	SMZ 17 Area (ha) <sup>(1)</sup>	Habitat Stewardship Zone Area (ha)	Old Stewardship Zone Area (ha)		
							Pw
SPR-060	CWH mm 2	132.1	0.0	12.0	120.1		
SPR-060	CWH xm 2	110.2	0.0	5.6	104.6		
SPR-060	MH mm 1	77.9	0.0	3.9	74.0		
<b>SPR-060 Total</b>		<b>320.2</b>	<b>0.0</b>	<b>21.5</b>	<b>298.6</b>	UWR, FEN, Old forest in xm2	B, H, F, C, Cy, Hw, Mb
SPR-061	CWH vm 2	4.3	0.0	4.3	0.0		
SPR-061	MH mm 1	47.2	0.0	47.2	0.0		
<b>SPR-061</b>		<b>51.6</b>	<b>0.0</b>	<b>51.6</b>	<b>0.0</b>	FEN	B, H, Cy, F, Hw
<b>SPR 062</b>	<b>CWH mm 2</b>	<b>18.4</b>	<b>0.0</b>	<b>18.4</b>	<b>0.0</b>	Riparian, FEN	
<b>SPR 063</b>	<b>CWH xm 2</b>	<b>13.2</b>	<b>0.0</b>	<b>13.2</b>	<b>0.0</b>	FEN, Old forest in xm2	
<b>SPR 064</b>	<b>CWH xm 1</b>	<b>2.5</b>	<b>0.0</b>	<b>2.5</b>	<b>0.0</b>	Recreation, Old Forest in xm1	Hw, F, C
SPR 065	CWH xm1	1.8	0.0	1.8	0.0		Hw, F, C
SPR 065	CWH xm 2	1.8	0.0	1.8	0.0		Hw, F, C
<b>SPR 065</b>		<b>3.6</b>	<b>0.0</b>	<b>3.6</b>	<b>0.0</b>	Recreation, Old Forest in xm1	
<b>SPR 066</b>	<b>CWH xm 1</b>	<b>4.9</b>	<b>0.0</b>	<b>4.9</b>	<b>0.0</b>	Recreation, Old Forest in xm1	F, C, Hw, Mb, Pw
<b>SPR 067</b>	<b>CWH xm 1</b>	<b>3.6</b>	<b>0.0</b>	<b>3.6</b>	<b>0.0</b>	Recreation, Old Forest in xm1	F, C, Hw, Mb, Pw
<b>SPR 068</b>	<b>CWH xm 1</b>	<b>3.3</b>	<b>0.0</b>	<b>3.3</b>	<b>0.0</b>	Recreation, Old Forest in xm1	F, C, Hw, Hb, Pw
<b>SPR 069</b>	<b>CWH xm 1</b>	<b>5.9</b>	<b>0.0</b>	<b>5.9</b>	<b>0.0</b>	Recreation, Old Forest in xm1	F, C, H, Mb
<b>SPR 070</b>	<b>CWH xm 1</b>	<b>20.9</b>	<b>0.0</b>	<b>20.9</b>	<b>0.0</b>	Recreation, Old Forest in xm1	F, C, H, Mb
<b>SPR 071</b>	<b>CWH xm 1</b>	<b>11.6</b>	<b>0.0</b>	<b>11.6</b>	<b>0.0</b>	Old Forest in xm1	H, F, C
	<b>Totals<sup>(2)</sup></b>	<b>2389.3</b>	<b>1264.2</b>	<b>1272.8</b>	<b>1101.5</b>		
<b>OGMA percentage of total SMZ17 productive forest area -</b>			<b>21.1</b>				

Notes:

- 1 - Interior Area equals area greater than 50m from OGMA edge.
- 2 - Totals for the habitat and old stewardship zone do not equal total OGMA area due to fact "SPR-025" is in TSA 38.
- 3 - Leading Tree Species - from forest inventory. Not all species necessarily listed.
- 4 - OGMA "SPR-026" is not in this table because it contains no "inventory" productive forest

**Appendix 2. Red- and Blue-Listed Ecosystems Captured by OGMA**

OGMA Polygon Number	BEC Variant	Based on Productive Forest										% of total locally rare old in total LU
		OGMA <sup>(2)</sup> Area (ha)		Red Listed Area (ha)		Blue Listed Area (ha)		WHA Area (ha)		Locally Rare (ha) <sup>(1)</sup>		
		Old (225+)	2 <sup>nd</sup> (0-225) <sup>(3)</sup>	Old (225+)	2 <sup>nd</sup> (0-225) <sup>(3)</sup>	Old (225+)	2 <sup>nd</sup> (0-225) <sup>(3)</sup>	Old (225+)	2 <sup>nd</sup> (0-225) <sup>(3)</sup>	Old (225+)	2 <sup>nd</sup> (0-225) <sup>(3)</sup>	
SPR-003	CWHmm1	2.1		0.1						0.4		0.140%
SPR-004	CWHxm1	1.5	0.5	0.7	0.2	0.8	0.3					0.000%
SPR-004	CWHxm2	0.1	0.1			0.1						0.000%
SPR-005	CWHmm1	2.2		2.0								0.000%
SPR-008	CWHmm2	2.5	0.2			2.4	0.2					0.000%
SPR-009	CWHmm1	2.9		2.3								0.000%
SPR-010	CWHvm2	2.3				0.5				0.1		0.027%
SPR-010	MHmm1	1.0								0.1		0.029%
SPR-011	CWHvm2	3.3										0.000%
SPR-012	CWHmm2	2.5		0.2		2.0						0.000%
SPR-012	MHmm1	0.4										0.000%
SPR-014	CWHmm1	3.7				0.1				0.1		0.049%
SPR-016	CWHmm1	4.4		3.8		0.2				0.1		0.028%
SPR-017	CWHmm1	4.4		3.9								0.000%
SPR-018	CWHmm2	4.7				4.7						0.000%
SPR-021	CWHmm1	5.7	0.2	2.1	0.1	3.7	0.1	5.4	0.2			0.000%
SPR-022	MHmm1	4.6										0.000%
SPR-030	CWHmm1	3.6		1.8								0.000%
SPR-030	CWHvm2	7.2										0.000%
SPR-030	MHmm1	0.1										0.000%
SPR-032	CWHxm1	3.6	0.6	0.7	0.3	2.9	0.3					0.000%
SPR-036	MHmm1	18.8										0.000%
SPR-038	MHmm1	21.5										0.000%
SPR-039	CWHmm1	9.8		4.0		3.6		1.3		0.2		0.067%

OGMA Polygon Number	BEC Variant	Based on Productive Forest										
		OGMA <sup>(2)</sup> Area (ha)		Red Listed Area (ha)		Blue Listed Area (ha)		WHA Area (ha)		Locally Rare (ha) <sup>(1)</sup>		% of total locally rare old in total LU
		Old (225+)	2 <sup>nd</sup> (0-225) <sup>(3)</sup>	Old (225+)	2 <sup>nd</sup> (0-225) <sup>(3)</sup>	Old (225+)	2 <sup>nd</sup> (0-225) <sup>(3)</sup>	Old (225+)	2 <sup>nd</sup> (0-225) <sup>(3)</sup>	Old (225+)	2 <sup>nd</sup> (0-225) <sup>(3)</sup>	
SPR-039	CWHvm2	8.1				0.1				0.4		0.148%
SPR-039	MHmm1	1.5								0.1		0.040%
SPR-041	CWHvm2	0.2										0.000%
SPR-041	MHmm1	26.0										0.000%
SPR-042	CWHmm1	9.4		4.1				0.4				0.000%
SPR-042	CWHvm2	16.3										0.000%
SPR-042	MHmm1	4.9										0.000%
SPR-044	CWHmm1	3.7		2.4				1.1				0.000%
SPR-044	CWHvm2	10.2				7.2						0.000%
SPR-044	MHmm1	13.1										0.000%
SPR-046	CWHvm1	22.8	0.1			3.6				14.7	0.1	5.139%
SPR-046	CWHvm2	11.2				5.2						0.000%
SPR-046	CWHxm2	3.9		0.8		3.1						0.000%
SPR-047	CWHmm1	0.1	0.4	0.1	0.4							0.000%
SPR-047	CWHxm1		0.5		0.2		0.2					0.000%
SPR-047	CWHxm2	36.5	1.3	9.4	0.5	27.0	0.7					0.000%
SPR-048	CWHvm2	34.2				7.7						0.000%
SPR-048	MHmm1	4.3										0.000%
SPR-049	CWHmm1	11.6		9.1		0.1						0.000%
SPR-049	CWHmm2	23.3				19.0						0.000%
SPR-049	MHmm1	3.8										0.000%
SPR-050	CWHmm2	45.5	2.3	0.1		5.0	0.2			8.3		2.915%
SPR-052	CWHxm1	65.5	6.7	13.3	1.2	48.8	5.0					0.000%
SPR-053	CWHxm2	75.6	1.6	22.8	0.3	52.6	1.3					0.000%
SPR-054	CWHmm1	49.6		34.0		4.1						0.000%
SPR-054	CWHvm2	89.3										0.000%

OGMA Polygon Number	BEC Variant	Based on Productive Forest										% of total locally rare old in total LU
		OGMA <sup>(2)</sup> Area (ha)		Red Listed Area (ha)		Blue Listed Area (ha)		WHA Area (ha)		Locally Rare (ha) <sup>(1)</sup>		
		Old (225+)	2 <sup>nd</sup> (0-225) <sup>(3)</sup>	Old (225+)	2 <sup>nd</sup> (0-225) <sup>(3)</sup>	Old (225+)	2 <sup>nd</sup> (0-225) <sup>(3)</sup>	Old (225+)	2 <sup>nd</sup> (0-225) <sup>(3)</sup>	Old (225+)	2 <sup>nd</sup> (0-225) <sup>(3)</sup>	
SPR-054	MHmm1	13.4								1.6		0.559%
SPR-055	CWHvm2	75.2	0.4			41.3	0.3					0.000%
SPR-055	CWHxm2	79.8	3.8	53.2	2.7	23.4	1.0					0.000%
SPR-056	CWHmm1	179.7	4.6	135.3	3.7	33.4	0.7	162.5	4.5			0.000%
SPR-056	CWHvm2	34.9				8.8		20.8				0.000%
SPR-056	MHmm1	5.4						1.1				0.000%
SPR-057	CWHmm1	24.8	1.4	16.6	1.0	6.0	0.4	24.3	1.4			0.000%
SPR-057	CWHvm2	46.7				9.0		32.5		1.5		0.535%
SPR-057	CWHxm2	111.6	15.5	16.6	2.2	93.7	12.9	104.7	7.6			0.000%
SPR-058	CWHmm1	48.7	0.5	23.5	0.2	24.9	0.3					0.000%
SPR-058	CWHvm2	117.7				32.0				0.2		0.084%
SPR-058	MHmm1	138.3										0.000%
SPR-059	CWHmm1	192.5	0.1	83.4	0.1	66.9						0.000%
SPR-059	CWHmm2	98.4		12.2		63.5						0.000%
SPR-059	MHmm1	36.9										0.000%
SPR-060	CWHmm2	111.2				79.6						0.000%
SPR-060	CWHxm2	95.3	7.9	61.5	3.3	29.9	4.3					0.000%
SPR-060	MHmm1	102.9	0.1							10.9		3.795%
SPR-061	CWHvm2	20.2				0.2						0.000%
SPR-061	MHmm1	31.3										0.000%
SPR 062	CWH mm 2	18.4										0.000%
SPR 063	CWH xm 2	13.2										0.000%
SPR 064	CWH xm 1	2.5										0.000%
SPR 065	CWH xm1	1.8										0.000%
SPR 065	CWH xm 2	1.8										0.000%
SPR 066	CWH xm 1	4.9										0.000%

OGMA Polygon Number	BEC Variant	Based on Productive Forest										% of total locally rare old in total LU
		OGMA <sup>(2)</sup> Area (ha)		Red Listed Area (ha)		Blue Listed Area (ha)		WHA Area (ha)		Locally Rare (ha) <sup>(1)</sup>		
		Old (225+)	2 <sup>nd</sup> (0-225) <sup>(3)</sup>	Old (225+)	2 <sup>nd</sup> (0-225) <sup>(3)</sup>	Old (225+)	2 <sup>nd</sup> (0-225) <sup>(3)</sup>	Old (225+)	2 <sup>nd</sup> (0-225) <sup>(3)</sup>	Old (225+)	2 <sup>nd</sup> (0-225) <sup>(3)</sup>	
SPR 067	CWH xm 1	3.6										0.000%
SPR 068	CWH xm 1	3.3										0.000%
SPR 069	CWH xm 1	5.9										0.000%
SPR 070	CWH xm 1	20.9										0.000%
SPR 071	CWH xm 1	11.6										0.000%
	<b>Totals within OGMAs<sup>(5)</sup></b>	<b>2338.7</b>	<b>48.8</b>	<b>520.3</b>	<b>16.7</b>	<b>717.8</b>	<b>28.4</b>	<b>354.0</b>	<b>13.7</b>	<b>38.8</b>	<b>0.1</b>	<b>13.555%</b>
	<b>% in OGMA from Total LU<sup>(5)</sup></b>			<b>22.7%</b>	<b>0.4%</b>	<b>23.7%</b>	<b>0.6%</b>	<b>100.0%</b>	<b>99.9%</b>	<b>13.6%</b>	<b>0.1%</b>	
	<b>Totals within Landscape Unit</b>			<b>2288.8</b>	<b>4411.5</b>	<b>3020.7</b>	<b>4953.5</b>	<b>354.0</b>	<b>13.7</b>	<b>286.1</b>	<b>116.7</b>	

**Notes:**

- 1 - Locally rare defined as cumulative total area of the rarest BEC zone/Site Series units that occupy 2% of total in landscape unit.
- 2 - OGMA area in this table represents only productive forest land (as defined in Management Plan #4) within OGMAs.
- 3 - Second growth areas include only productive forest land from the MP4 inventory.
- 4 - OGMA "SPR-026" is not in this table because it contains no "inventory" productive forest
- 5 - Totals for Red Listed, Blue Listed, WHA and Locally Rare Areas do not include data for OGMA areas SPR-062 to SPR-071

**Appendix 3. Red- and Blue-listed Species and Comments (Bunnell et al. 1998)**

Scientific Name	English Name	BC Status	Comments
<i>Botaurus lentiginosus</i>	American Bittern	BLUE	Widely spread; status unknown; population elsewhere subject to habitat loss by draining, agriculture and urbanization.
<i>Columba fasciata</i>	Band-tailed Pigeon	BLUE	
<i>Tyto alba</i>	Barn Owl	BLUE	Moved north into BC as land cleared in early 1900s, first confirmed breeding 1941; largely restricted to extreme sw; vulnerable to urbanization, demise of old wooden structures; shift from cereal/hay crops to "bare ground" crops (soft fruits) has eliminated prey habitat. Currently about 150 to 275 pairs but will likely continue to decline.
<i>Epitheca canis</i>	Beaverpond Baskettail	BLUE	(Dragon Fly)
<i>Aeshna tuberculifera</i>	Black-tipped Darner	BLUE	(Dragon Fly)
<i>Pachydiplax longipennis</i>	Blue Dasher	BLUE	(Dragonfly)
<i>Icaricia icarioides blackmorei</i>	Boisduval's Blue, <i>blackmorei</i> subspecies	BLUE	(Butterfly)
<i>Phalacrocorax penicillatus</i>	Brandt's Cormorant	RED	West coast of Vancouver Island; numbers fluctuate greatly from year to year and colonies shift; decreased from a high of about 150 pairs (1970) to 95 pairs in 1982.
<i>Branta canadensis occidentalis</i>	Canada Goose, <i>occidentalis</i> subspecies	BLUE	
<i>Ptychoramphus aleuticus</i>	Cassin's Auklet	BLUE	65 colonies estimated at 2.7 million birds (80% of global population); some colonies abandoned due to mammalian depredation, other threatened. Disperse widely at seas so less vulnerable to oil spills.
<i>Hesperia colorado oregonia</i>	Common Branded Skipper, <i>oregonia</i> subspecies	BLUE	(Butterfly)
<i>Uria aalge</i>	Common Murre	RED	
<i>Coenonympha californica insulana</i>	Common Ringlet, <i>insulana</i> subspecies	RED	(Butterfly)
<i>Sorex palustris brooksi</i>	Common Water Shrew, <i>brooksi</i> subspecies	RED	
<i>Cercyonis pegala incana</i>	Common Woodnymph, <i>incana</i> subspecies	BLUE	
<i>Lampetra macrostoma</i>	Cowichan Lake Lamprey	RED	
<i>Oncorhynchus clarki clarki</i>	Cutthroat Trout, <i>clarki</i> subspecies	BLUE	
<i>Phalacrocorax auritus</i>	Double-crested Cormorant	RED	First report breeding in BC in 1927; gradually increasing (currently about 2,000 birds at >15 sites). Assumed at risk to colony disturbance and oil spills.
<i>Euphyes vestris</i>	Dun Skipper	BLUE	(Butterfly)
<i>Euphydryas editha taylori</i>	Edith's Checkerspot, <i>taylori</i> subspecies	RED	(Butterfly)
<i>Mustela erminea anguinae</i>	Ermine, <i>anguinae</i> subspecies	BLUE	Known from Vancouver, Saltspring, and North Pender Island; population status unknown.
<i>Pituophis catenifer catenifer</i>	Gopher Snake, <i>catenifer</i> subspecies	RED	2 records (Galiano Island & near Sumas); population in adjacent Washington is considered declining.
<i>Oeneis nevadensis</i>	Great Arctic	BLUE	(Butterfly)
<i>Ardea herodias fannini</i>	Great Blue Heron, <i>fannini</i> subspecies	BLUE	Widely spread; likely 4 to 5,000 breeding birds; disturbance at nest sites, environmental contamination, urbanization and industrialization.
<i>Butorides virescens</i>	Green Heron	BLUE	
<i>Plebejus saepiolus insulanus</i>	Greenish Blue, <i>insulanus</i> subspecies	RED	(Butterfly)
<i>Loranthomitoura johnsoni</i>	Johnson's Hairstreak	RED	(Butterfly)
<i>Myotis keenii</i>	Keen's Long-eared Myotis	RED	Coastal BC, not easily distinguished from other long-

Scientific Name	English Name	BC Status	Comments
			eared myotis species; population status and habitat requirements unknown; some believe it requires old growth <sup>11</sup> .
<i>Euchloe ausonides</i> ssp. 1	Large Marble, undescribed island subspecies	RED	(Butterfly)
<i>Melanerpes lewis</i>	Lewis's Woodpecker	BLUE	Widely spread but sparsely distributed through southern interior (700 to 1200 pairs); extirpated from extreme sw <sup>12</sup> . Requires large trees (deciduous of PP favoured) for nesting and open areas for foraging. Declining generally over its range due to urbanization, fire suppression, snag cutting, forest practices (salvage logging), and perhaps European starlings competing for nest sites.
<i>Melanerpes lewis</i> pop. 1	Lewis's Woodpecker (Georgia Depression population)	RED	
<i>Brachyramphus marmoratus</i>	Marbled Murrelet	RED	Widely spread but sparsely distributed over much of BC coast; total population estimated at 45,000 birds. Nests primarily in older or larger trees but may use scrubby forested swamps.
<i>Incisalia mossii mossii</i>	Moss' Elfin, <i>mossii</i> subspecies	BLUE	(Butterfly)
<i>Accipiter gentilis laingi</i>	Northern Goshawk, <i>laingi</i> subspecies	RED	Taxon restricted to Vancouver Island and QCI. On coast tends to nest in dense, mature coniferous forest. Unclear why it is listed; could be because tends to use larger, broken topped trees (or because US lists it).
<i>Glaucidium gnoma swarthi</i>	Northern Pygmy-Owl, <i>swarthi</i> subspecies	BLUE	Dubious subspecies on Vancouver Island; two other subspecies scattered through the province; the few nests found in woodpecker cavities were in conifers.
<i>Chrysemys picta</i>	Painted Turtle	BLUE	Southern interior; collection for pet trade; habitat loss to lakeshore development and urbanization. Coastal population believed to be introduced.
<i>Falco peregrinus anatum</i>	Peregrine Falcon, <i>anatum</i> subspecies	RED	Taxon of the southern third and possible NE of province (latter could be <i>F.p. tundrius</i> ); less common in BC than <i>F.p. pealei</i> . 93% of BC nests on cliffs (n=305); possibly red-listed because the species is designated Endangered in the US. Vulnerable to disturbance and poaching.
<i>Falco peregrinus pealei</i>	Peregrine Falcon, <i>pealei</i> subspecies	BLUE	Taxon on QCI; population appears small but stable (50 to 75 pairs)
<i>Pinicola enucleator carlottae</i>	Pine Grosbeak, <i>carlottae</i> subspecies	BLUE	Status of this taxon unknown; species widely spread, but sparsely distributed in coastal BC; prefers higher elevations thus less threatened by forest practices.
<i>Erynnis propertius</i>	Propertius Duskywing	BLUE	(Butterfly)
<i>Progne subis</i>	Purple Martin	RED	Extirpated from Fraser Valley; population of about 50 pairs now restricted to 4 sites on SE Vancouver Island through nest boxes; habitat loss to urbanization and fire suppression.
<i>Rana aurora</i>	Red-legged Frog	BLUE	
<i>Cervus elaphus roosevelti</i>	Roosevelt Elk	BLUE	In BC, about 2,500 animals on Vancouver Island; mainland populations extirpated through hunting, but reintroduction being attempted; primary threat is legal and illegal hunting.
<i>Contia tenuis</i>	Sharp-tailed Snake	RED	Southern Vancouver Island & Gulf Island; n = 12 records; impacted by urbanization and possibly

<sup>11</sup> The best studied population inhabits a thermally heated cave periodically on Hot Spring Island inundated by seawater; this is assumed atypical.

<sup>12</sup> From 1920 to 1940 was an abundant nesting species around Vancouver, North Vancouver and SE Vancouver Island where logging and fire had left an abundance of tall snags and vets. Cutting snags for firewood and safety, coupled with loss of Gary oak, and increasing numbers of starlings all helped eliminate it.



Scientific Name	English Name	BC Status	Comments
			forest practices.
<i>Asio flammeus</i>	Short-eared Owl	BLUE	Status unknown, but widely spread, generally sparse, locally abundant. Lower Fraser Valley populations particularly hard hit; hundreds were killed to reduce probability of airplane strikes but major factor is loss of old-field habitat to development and changing agricultural practices.
<i>Corynorhinus townsendii</i>	Townsend's Big-eared Bat	BLUE	Population status unknown but species believed uncommon in sw portion of province; <10 hibernating sites found; vulnerable to disturbance at those sites. Overwinters in caves or mine shafts. One colony cave known on coast (Thetis Island).
<i>Marmota vancouverensis</i>	Vancouver Island Marmot	RED	Entire population restricted to Vancouver Island; possibly vulnerable to forest practices during dispersal (through clearcuts); marginally compatible with ski runs.
<i>Poocetes gramineus affinis</i>	Vesper Sparrow, <i>affinis</i> subspecies	RED	Status of taxon uncertain; appears to be restricted to Cobble Hill and Cassidy on SE Vancouver Island; listed as "sensitive" in Oregon, the species generally appears to favour disturbed sites so may benefit from grazing provided weedy growth (for foraging) left near fence lines.
<i>Sialia mexicana</i> pop. 1	Western Bluebird (Georgia Depression population)	RED	
<i>Sturnella neglecta</i> pop. 1	Western Meadowlark (Georgia Depression population)	RED	
<i>Erythemis collocata</i>	Western Pondhawk	BLUE	
<i>Otus kennicottii kennicottii</i>	Western Screech-Owl, <i>kennicottii</i> subspecies	BLUE	Screech owl taxonomy is a mess (18 subspecies considered), unclear if this is a separate subspecies; widely but sparsely distributed in lowland forests of extreme sw; vulnerable to urbanization and forest practices.
<i>Colias occidentalis</i>	Western Sulphur	BLUE	
<i>Lagopus leucurus saxatilis</i>	White-tailed Ptarmigan, <i>saxatilis</i> subspecies	BLUE	Apparently listed because considered sparsely distributed. Subspecific status of this Vancouver Island race based on 11 specimens of immature birds; taxonomic status is unclear.
<i>Gulo gulo vancouverensis</i>	Wolverine, <i>vancouverensis</i> subspecies	RED	Taxon restricted to Vancouver Island; population status unknown, possibly less than 100 animals.
<i>Coccyzus americanus</i>	Yellow-billed cuckoo	RED	Once present in extreme SW BC. Extirpated, 1 sighting near Victoria since 1927. Declining throughout its range due to loss of appropriate riparian cover through urbanization, agriculture, drainage, grazing, and protection from spring flooding.
<i>Sympetrum vicinum</i>	Yellow-legged Meadowhawk	BLUE	
<i>Speyeria zerene bremnerii</i>	Zerene Fritillary, <i>bremnerii</i> subspecies	BLUE	

**Appendix 4. Habitat Needs for Listed Native Terrestrial forest-dwelling vertebrates potentially breeding on Weyerhaeuser’s forest tenure** (Bunnell et al. 1998)

Common Name <sup>1</sup>	CDF	CWH	MH	Neo <sup>13</sup>	Shr <sup>14</sup>	SS1 <sup>15</sup>	SS2	SS3	SS4	SS5	SS6	Cav <sup>16</sup>	DW	Dec <sup>17</sup>	Con	R <sup>18</sup>	Edg <sup>19</sup>
<b>Order Anura</b>																	
Red-legged Frog	X	X	X					L	M	H	H						Y
<b>REPTILES</b>																	
<b>Order Testudines</b>																	
Painted Turtle	X	X				H	H	L	L	L	M						Y
<b>Order Squamata</b>																	
Gopher Snake	X					H	H	M	M	L	L		Y			Y	?
Sharptail Snake	X					M	M	H	H	M	M		Y	Y		Y	?
<b>BIRDS</b>																	
<b>Order Ciconiiformes</b>																	
Great Blue Heron	X	X							L	M	H			?	?	Y	?
<b>Order Falconiformes</b>																	
Northern Goshawk	X	X		Y					M	H	H				Y	Y	?
Peregrine Falcon																	
<i>Falco peregrinus anatum</i>				Y		L	L	L	L	L	L						Y
<i>Falco peregrinus pealei</i>																	
<b>Order Galliformes</b>																	

<sup>13</sup> “Y” indicates species is a neotropical migrant; Carter and Barker (1993).

<sup>14</sup> Shrub nester, “H” indicates high requirement of shrubs for nesting; “M” indicates medium requirement of shrubs for nesting Ehrlich *et al.* (1988); Campbell *et al.* (1990, 1997).

<sup>15</sup> SS indicates seral stage

<sup>16</sup> Cav indicates cavity use; and DW indicates down wood use for reproduction and/or feeding.

<sup>17</sup> Strong associated with deciduous (Dec = Y) or coniferous (Con = Y).

<sup>18</sup> R represents riparian association. “Y” indicates habitat association. “?” indicates that habitat association is unknown or not strongly represented.

<sup>19</sup> Edg indicates use of edge environments. “S” indicates that the species is sensitive to changes in a given habitat component in a positive or negative direction depending on sign and absent from a portion of the gradient; “R” indicates the species is responsive to the gradient and may be present in all portions of the gradient.

Common Name <sup>1</sup>	CDF	CWH	MH	Neo <sup>13</sup>	Shr <sup>14</sup>	SS1 <sup>15</sup>	SS2	SS3	SS4	SS5	SS6	Cav <sup>16</sup>	DW	Dec <sup>17</sup>	Con	R <sup>18</sup>	Edg <sup>19</sup>
White-tailed Ptarmigan					M												
<i>Lagopus leucurus saxatilis</i>																	
<b>Order Alcidae</b>																	
Cassin's Auklet		X				L	M	L	L	M	M						
Marbled Murrelet		X								M	H				Y		?
<b>Order Columbidae</b>																	
Band-tailed Pigeon	X	X		Y					L	H	M			?	?		?
<b>Order Strigiformes</b>																	
Barn Owl	X	X				H	M	L	L	L	L	Y					
Northern Pygmy-Owl	X	X	X						L	M	H	Y		?	?	Y	?
<i>Glaucidium gnoma swarthi</i>																	
Western Screech-Owl	X	X						L	L	M	H	Y		Y		Y	R+
<i>Otus kennicottii saturatus</i>																	
<b>Order Passeriformes</b>																	
Purple Martin	X	X		Y		M	M	M	L	M	M	Y				Y	?
Western Bluebird	X			Y		M	M	H	L	M	M	Y		?	?	Y	?
Pine Grosbeak	X	X	X				L	L	M	M	M					Y	
<i>Pinicola enucleator carlottae</i>																	
<b>MAMMALS</b>																	
<b>Order Insectivora</b>																	
Water Shrew	X	X	X			L	M	M	M	H	H		Y				Y
<i>Sorex palustri brooksi</i>																	
<b>Order Chiroptera</b>																	
Keen's Long-eared Myotis	X	X	X							H	H	Y			Y	Y	?
Townsend's Big-eared Bat						L	M	H	M	L	L			?	?	Y	?
<b>Order Rodentia</b>																	
Vancouver Island Marmot			X			H	H	L	L	L	M						
<b>Order Carnivora</b>																	
Ermine	X	X	X			L	H	L	L	L	L		Y	?	?	Y	?

<b>Common Name<sup>1</sup></b>	<b>CDF</b>	<b>CWH</b>	<b>MH</b>	<b>Neo<sup>13</sup></b>	<b>Shr<sup>14</sup></b>	<b>SS1<sup>15</sup></b>	<b>SS2</b>	<b>SS3</b>	<b>SS4</b>	<b>SS5</b>	<b>SS6</b>	<b>Cav<sup>16</sup></b>	<b>DW</b>	<b>Dec<sup>17</sup></b>	<b>Con</b>	<b>R<sup>18</sup></b>	<b>Edg<sup>19</sup></b>
<i>Mustela erminea haidarum</i>																	
<i>Mustela erminea anguinae</i>																	
Wolverine	X	X	X				L	L	M	H	H			Y			
<i>Gulo gulo luscus</i>																	
<i>Gulo gulo vancouverensis</i>																	
<b>Order Artiodactyla</b>																	
Roosevelt Elk		X	X			L	H	L	L	M	M						Y

## Appendix 5. Hupacasath Land Use Plan - Sproat and Taylor Use Areas

### Sproat Lake

#### Area and Location

- Middle section of the territory, south of Great Central Lake
- Total Area: 23 405 ha
- % of Territory: 10.06

#### Land Tenure

- Hupacasath rights and title
- Provincial Tree Farm Licence 44
- Provincial Timber Supply Area 38
- Private lands

#### Cultural Values

- High cultural value
- Important hunting area—23 sites
- 9 gathering sites
- 10 temporary camps
- 3 legend sites
- 6 meeting sites
- 33 named places
- Petroglyphs
- Klehkoot reserve
- High fishery value
- Deer run
- 16 archaeological sites: 2 CMT, 6 lithic, 6 artifact, 1 rock art
- Lots of non-recorded CMTs
- 7 sacred sites
- 3 spiritual sites
- 4 trapping areas
- Hupacasath community picnic area

#### Resource Values

##### Fish

- High salmon values
- Important fish rearing area for trout, sockeye, coho

##### Forest

- High incidence of red and yellow cedar

##### Wildlife

- Marbled Murrelet habitat
- Deer

##### Tourism/Recreation—Very High values for:

- Lots of campsites, 4 provincial sites on north side and 2 on south side plus 20 or more unofficial sites

- Boating, fishing, swimming, high recreation in summer
- Hunting, off-roading

**Other**

- Mars bombers

**Management Objectives**

- Protect visual quality and recreation values
- Protect archaeological and cultural values
- Develop red and yellow cedar management strategy to include Hupacasath exclusive use
- Timber Harvesting and resource development after protecting other values.

**Land Use Designation**

- Special Management

## Taylor

**Area and Location**

- West end of Sproat Lake
- Total area: 12 044 ha
- % of Territory: 5.18

**Land Tenure**

- Hupacasath rights and title
- Provincial Tree Farm Licence 44

**Cultural Values**

- 3 name places
- 4 gathering sites
- 1 sacred site
- 1 trapping site
- Some CMTs
- 7 hunting sites
- 1 medicinal site
- 1 meeting site

**Resource Values**

**Fish**

- Major salmon spawning area

**Forest**

- Reasonable amount of old growth
- Tay fire

Source: Hupacasath Land Use Plan, 2003

**Tourism/Recreation**

- Medium value for camping, hiking and mountain biking

**Management Objectives**

- Protect salmon spawning areas along Taylor River
- Allocate old growth to Hupacasath

**Land Use Designation**

- Special Management

## Appendix 6. FEN Background

### Forest Policy and FEN History

Forest Ecosystem Networks in TFL 44 were created in the early 1990s, prior to the Forest Practices Code, as a method of maintaining biodiversity in accordance with the 1991 *Guidelines to Maintain Biological Diversity in TFL #44 and #46*. Since that time operational planning has ensured that the basic integrity of the FEN network has remained intact. With the advent of LU planning, the maintenance of grand-parented FENs was considered to be a temporary measure until landscape planning was completed, and FENs were set to expire on June 15, 2003.

Released on March 17, 1999, the Landscape Unit Planning Guide provided government direction to staff on the implementation of landscape unit planning. Old growth retention targets (OGMAs) were set and FENs were considered a means of retaining sufficient old forest to attain those targets until OGMAs had been finalized. Consequently, FENs were to be considered part of the non-contributing forest for the subsequent Timber Supply Review (TSR). On June 6, 2001 the Chief Forester directed staff and licensees that FENs be considered as non-contributing (NC) for landscape planning purposes and that they would be considered part of the timber harvesting landbase (THLB) for allowable cut (AAC) determinations. The TSR process also accounted for future OGMAs flowing from LUPs. On the completion of LU planning those portions of the FEN that did not become OGMAs became part of the THLB.

Licensees were also admonished to be informed of the latest scientific information related to forest fragmentation and connectivity in coastal temperate forests. They were encouraged to explore options that would provide connectivity with limited impact on the Timber Supply.

Recently the *Operational and Site Planning Regulation* was amended to ensure that FENs remain in place until OGMAs become established.

### Ecological Issues and Rationale

One of the most thorough recent reviews of connectivity in forests is a new conservation biology text (Lindenmayer and Franklin 2002). They make the following observations on corridors and matrix management:

- **Most existing knowledge about connectivity and the matrix comes from theory and modeling.**
- **Assessments of effectiveness of wildlife corridors cannot be made without consideration of the matrix.**
- **Connectivity is species-specific.**
- **Actual dispersal pathways will not always conform to designated corridors.**



- **Connectivity via stepping-stones or dispersed islands of potentially suitable habitat may be the best way for migratory or nomadic species.**
- **The best general strategy to facilitate connectivity for some biota may be to improve structural conditions throughout the matrix.**

Forest Ecosystem Networks (FENs) are a conservation mechanism used to provide reserves for late seral forest conditions and habitat connectivity across the landscape unit. Forest connectivity and fragmentation is an issue developed from the application of Island Biogeography Theory to terrestrial forest ecosystems. The theory (MacArthur and Wilson 1963, MacArthur 1967, Quammen 1999) was developed from observation of oceanic islands. The theory looks at habitat patches as isolated by hostile ocean and predicts consequences to species and population sustenance resulting from isolation. Its extension to terrestrial ecosystems assumes habitat fragments (islands) and a hostile forest matrix for old growth dependent organisms. Networks similar to FENs have been used globally as conservation vehicles to address species-specific isolation problems.

However, the effectiveness of corridor strategies for maintaining connectivity for a wide range of organisms and for biodiversity conservation remains contentious (Rochelle 2002). The assumption of matrix hostility has also not been well documented for western coniferous forests or old growth species.

A more specific Regional review of biodiversity and forest management options for the Forest Project for MacMillan Bloedel (Bunnell et al. 1999) looked at connectivity issues and evidence. Below is an excerpt of conclusions related to connectivity in coastal temperate rainforests.

***Excerpt from Ecological Rationale (Bunnell et al. 1999)***

**Forest Practices and Connectivity**

Of all issues relevant to forest practices, that of promoting or sustaining connectivity is most devoid of empirical evidence. We offer the following generalizations from studies reviewed here and in preceding sections.

***Connection (interchange of individuals) among sub-populations is important.***

It is abundantly clear that truly isolated populations experience much higher rates of extinction than do those exchanging individuals. Isolated patches are vulnerable to all the threats to small populations.

***The degree of necessary interchange cannot be known.***

For some threats to small populations (e.g., inbreeding depression) the amount of necessary interchange can be estimated and is surprisingly low. The major threats to small populations, however, are chance events which cannot be known, although we can guess at their likelihood. The subject area appears doomed to debate until empirical evidence accumulates.

***There is no evidence from western forests that connectivity is lacking.***

The wealth of indirect evidence is to the contrary. Although some stand elements are critical, there appear to be few discrete habitat types to serve as isolates. Nor is there evidence of an effect of patch size, or of fragmentation.

***There is no evidence from western forests that early forest seral stages are an impediment to movement.***

Other than the continued presence of species (evidence that must merit some credence), there also is no evidence that early seral stages are an impediment to movement. Species whose life history attributes imply vulnerability, however, have not been studied (e.g., many amphibians). The decline in abundance of late-successional associates appears to result more from a reduction in total habitat, rather than from fragmentation.

***Where corridors consist of vegetation very different from the surrounding matrix they do facilitate movement.***

Evidence from agricultural and urban landscapes indicates that brushy or wooded hedgerows are used. The few data relevant have been collected primarily from small mammals which may seek overhead cover to evade predation; effects on survivorship are unknown but likely favour corridors. The spotted owl may be an exception.

***Data are insufficient to advocate either corridors or matrix management as the better approach to promoting connectivity.***

Conservation benefits have not been documented for either approach; dangers have been documented for corridors. The danger in relying on the matrix is its presumed hostility, which is not strongly expressed. Advantages and difficulties of relying on the matrix should be examined.

Fortunately, there is little evidence that lack of connectivity is a threat in forests of the Pacific Northwest.

## **Appendix 7. Amendment and Operational Policy for Old Growth Management Areas**

This Regional policy has been developed to:

- 1)** describe Old Growth Management Areas (OGMA) amendment procedures; and
- 2)** to guide operations when working in or adjacent to OGMAs.

The amendment portion is consistent with Section 4 of the *Forest Practices Code of British Columbia Act*, which allows for the Delegated Decision Maker (DDM) to vary a Landscape Unit objective (i.e., amending the location of an OGMA). This policy applies to the Coast Region, MSRM and may be updated from time to time.

This policy does not authorize violation of any other federal or provincial statute or higher level plan/resource management objective and does not constitute approval on behalf of any other agency with jurisdiction in this matter.

Where specified under a legal landscape unit objective, some commonly occurring forestry operations can be exempted from referral to MSRM. Major amendment requests, however, cannot be exempted.

### **Major and Minor Amendment General Procedures**

Criteria for determining minor or major amendments are provided below. It remains the DDM's discretion to determine if the amendment is minor or major and if the amendment requires advertising.

Normally minor amendments will not require advertising and major amendments will. However, since each Landscape Unit is different and each variant has different amounts of old growth representation, some minor amendments may still require advertising. For example, an amendment request within a variant where only a small amount of old forest remains may be considered a major amendment, while a variant with many opportunities for change that may not significantly affect the public may be processed as a minor amendment without advertising.

Proponents should submit their requests for amendments in a timely manner so that review/approval by the DDM can occur without delaying operations. Proponents should recognize that OGMAs may overlap with other legal entities and it is their responsibility to ensure compliance with all legal requirements. MSRM's authority is limited to establishing, varying, or canceling an objective. Authority for any operations is granted by other agencies.

If a replacement OGMA is necessary, it must be identified by the proponent and submitted with the amendment application. The replacement OGMA should be in the same biogeoclimatic variant and must have similar or more desirable ecological attributes for conserving biological diversity. These attributes may include: forest interior habitat, patch size, connectivity, suitable tree species, tree height and diameter, stand age, slope, aspect, elevation, stocking, or site index. The replacement area could also be critical habitat for species at risk. The presence of old forest attributes such as multi-layered canopy, vets and moderate to high value wildlife trees in the replacement area will further increase its suitability. Attributes of both the proposed replacement OGMA and original OGMA need to be clearly summarized and submitted with

the amendment application (attributes confirmed in the field by the proponent). Complete and accurate submissions will allow faster processing. Incomplete submissions will be returned to the proponent.

Replacement area proposals must be submitted in digital format consistent with MSRM OGMA data standards to expedite the review and approval process (e.g., ARC Export file [e00], 1:20 000 scale, TRIM base, ALBERS projection, and NAD 83 datum). The web site <http://srmwww.gov.bc.ca/gis/arcdata.html> outlines the MSRM standards for digital data. It is essential that the digital submissions are topologically clean.

No amendment is required for correcting mapping errors. For example, proposed development may show potential OGMA overlap or encroachment at 1:20 000 scale, but is deemed not to occur based on field engineering. The site or operating plan should clearly indicate that there is no overlap between proposed development and OGMA. In other instances, the intended OGMA boundary (e.g., along a stream) may be shown in the wrong location on the legal map as proven by field engineering. If this occurs the prescribing/planning forester should record the discrepancy. Corrections must be made available to MSRM upon request or summarized and submitted annually.

Major and minor amendments will be summarized periodically for auditing purposes and may become public information on the MSRM web site.

#### **Minor Amendments:**

Where not specified for exemption under a legal objective or where the exemption limit has been exhausted, requests for minor amendments must be submitted to the DDM for the following situations. MSRM will make every effort to process minor amendments within 10 working days and no greater than 30 days.

A minor amendment is required when proposing the following changes to an existing OGMA:

- a) In each of the following situations, replacement OGMA of equivalent or better quality and quantity must be identified (in order of priority)
  - immediately adjacent to the existing OGMA, or
  - in the same variant and landscape unit as the existing OGMA such that OGMA ecological attributes (as described in Section 1.0 above) and spatial distribution are maintained or improved:
    - i) OGMA <10 ha in size where the proposed development affects the OGMA by <2 ha,
    - ii) OGMA ≥10 ha to <50 ha in size where the proposed development affects the OGMA by <5 ha,
    - iii) OGMA ≥50 ha to <100 ha in size where the proposed development affects the OGMA by <10 ha,
    - iv) OGMA ≥100 ha in size where the proposed development affects the OGMA by <10%.
    - v) Construction of < 500 m of road or a bridge within an OGMA where there is no other practicable option. As an alternative to finding replacement area, the licensee may deactivate or rehabilitate a temporary road or bridge site within four years after construction.

- vi) Construction of rock quarries and gravel pits under authority of forest tenure where the development will be located immediately adjacent to existing roads under tenure and will affect the OGMA by <0.5 ha.
- b) Felling of danger trees that are high value wildlife trees within an OGMA.

### **Major Amendments:**

A major amendment is required for any situation that does not fit into the minor amendment category. MSRM will make every effort to review major amendments within 120 calendar days. A 60-day public review and comment period will normally be required for major amendments and is included in the 120-day time period.

### **OGMA Operational Procedures**

The following clarifies how OGMA's will be reviewed when certain events or activities occur. Operational procedures to guide activities adjacent to OGMA's are also described.

1. The distribution of OGMA's may be reviewed periodically to ensure their ecological suitability through time. This would occur:
  - a) at the DDM's discretion, or
  - b) as a result of a natural disturbance event that significantly altered the OGMA's contribution to old seral forest biodiversity conservation (e.g., fire, windthrow, disease), or
  - c) in the event that the natural disturbance is considered a threat to forested areas outside OGMA's (as determined by a qualified person and brought to the attention of the DDM).

If necessary, appropriate actions may be implemented to address disturbances and relocation of the OGMA may occur.

2. OGMA boundaries do not have to be legally surveyed; however, the legal standard of measurement for locating OGMA boundaries is 1:20 000 scale TRIM base map.
3. To deal with a discrepancy between an OGMA boundary and actual on-the-ground development, the following may be proposed to accommodate areas that may left between harvest boundaries and the OGMA. Where approved or proposed developments are located in close proximity (e.g., within 50 m) to established OGMA's, and the final development results in a forested leave area (suitable for OGMA) adjacent to the OGMA boundary, the leave area could be added to the OGMA. The proponent should notify the DDM regarding an opportunity to amend the OGMA boundary.
4. The cleared portion of the right-of-way for new road or new bridge construction within an OGMA must be as narrow as possible.
5. When a conflict arises between operational activities and high value wildlife trees in an OGMA, the preference is to retain high value wildlife trees by establishing no work zones or by altering the road/bridge alignment. Any danger trees that are felled as a result of exemptions from the legal objectives or amendments are to be left on the

ground to provide a source of coarse woody debris, unless safety dictates otherwise. A qualified faller or Wildlife/Danger Tree Assessor must assess potential danger trees.

6. OGMA modifications that occur as a result of exemptions must be reconciled on an annual basis to the satisfaction of the DDM.

Proponents should document the location and extent of modifications that occur within or adjacent to individual OGMA's. MSRM will periodically require a written summary of these minor changes for auditing purposes. Tracking is necessary to determine cumulative impacts within OGMA's and whether replacement areas will be considered.

## Appendix 8 – Consultation Summary

The Sproat Lake LU plan was advertised for public review and comment for 60 days from April 1 to May 30, 2004.

Prior to the public review process, the two First Nations with territorial claims in the Sproat Lake area – Hupacasath and Tseshaht - were advised by letters and meetings of the LU process. The Hupacasath First Nation (HFN) did not provide feedback prior to the public review period. However, the HFN had unveiled their Territory Land Use Plan in the fall of 2003 and the section relating to Sproat Lake was included in the LU report as an appendix. The Tseshaht First Nation (TFN) stated in writing prior to the public review period that they wished extra time to respond, could not support the OGMA and needed MSRM funding to hire a consultant to evaluate the OGMA plan. They were advised in writing that MSRM could not provide financial support and would continue to accept FN comments during the public review period.

During the public review period, very few comments were received. No input was received from the general public, local government, or from environmental and recreational organizations.

Comments were provided by government agencies. The Ministry of Forests, South Island Forest District, suggested that the LU objectives more clearly specify the particular purpose or rationale for each individual OGMA. MSRM responded pointing out that the LU report, Appendix 1 presents the polygon details for each OGMA, including a column indicating the rationale.

The Ministry of Forests is also currently planning to award a Community Forest License (CFL) in the area. MSRM responded to requests for digital files of the proposed OGMA to ensure consideration during the CFL planning process.

Ministry of Water, Land and Air Protection staff (VI region) commented that 50 hectares of one Wildlife Habitat Area for marbled murrelet were not overlapped by OGMA, and received the response that the 50 ha of WHA area not captured is non-productive/scrub forest that did not meet the OGMA criteria.

BC Timber Sales, who will be the main tenure holder in the Sproat Lake LU once the coast reallocation process has been completed, expressed concern with sections in the LU report which refer to a commitment to apply retention silvicultural systems with minimum retention of 15 percent. BCTS pointed out that this commitment is reflective of Weyerhaeuser's approach to forest management, but that BCTS are not in agreement with it. MSRM agrees that the commitment to retention systems as expressed in the LU plan is Weyerhaeuser's, and while it will inform other licensees who may operate in the Sproat Lake area in the future, it will not be binding on them. BCTS submitted a number of additional technical comments for consideration.

Subsequent to the public review period Weyerhaeuser's private land within the tree farm licence (TFL) was removed from the TFL. This prompted MSRM to recalculate the targets and allocation of OGMA in the affected variants within the Sproat Lake LU. As a result of the private land removal, approximately 200 ha of OGMA area had to be deselected to achieve the new, lower targets in the affected variants.

In December of 2004, MSRM met with both First Nations to explain the changes that were made to the OGMA due to the private land removal. Since then, no further comments or concerns have been expressed by the TFN. The HFN expressed concerns regarding the

private land removal and in March, 2005 submitted proposed changes to the revised OGMA to better address their values and concerns. MSRM evaluated the HFN proposal for compatibility with OGMA objectives and updated the OGMA plan accordingly.



**Appendix 9 List of Acronyms**

AAC	Allowable Annual Cut
AT	Alpine Tundra
BEC	Biogeoclimatic Ecosystem Classification
BEO	Biodiversity Emphasis Option
CWD	Coarse Woody Debris
CWH	Coastal Western Hemlock
DDM	Delegated Decision Maker
ESA	Environmentally Sensitive Area
FDP	Forest Development Plan
FEN	Forest Ecosystem Network
FPC	Forest Practices Code
HLP	Higher Level Plan
IWMS	Identified Wildlife Management Strategy
LU	Landscape Unit
LUPG	Landscape Unit Planning Guide
MAMU	Marbled Murrelet
MH	Mountain Hemlock
MoF	Ministry of Forests
MSRM	Ministry of Sustainable Resource Management
MWLAP	Ministry of Water, Land and Air Protection
NC	Non-contributing
OG	Old Growth
OGMA	Old Growth Management Area
OSPR	Operational and Site Planning Regulation
RLUPS	Regional Landscape Unit Planning Database
RMZ	Resource Management Zone
SMZ	Special Management Zone
SRMP	Sustainable Resource Management Plan
TFL	Timber Farm License
THLB	Timber harvesting land base
TSA	Timber Supply Area
TSR	Timber Supply Review
UWR	Ungulate winter range
VILUP	Vancouver Island Land Use Plan
VISLUP	Vancouver Island Summary Land Use Plan
VR	Variable Retention
WHA	Wildlife Habitat Area
WTP	Wildlife Tree Patch
WTR	Wildlife Tree Retention