Field Assessment of Old Growth Management Areas
– Morice LRMP –

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Front Cover.

Owen Fire Lookout Hill COGMA 187. This is a 326 ha Candidate Old Growth Management Area (COGMA), The COGMA contains mixed species, 266ha are greater than 140 years old. The area consists of SBSdk on lower slopes and upper slopes in the SBSmc2. It also straddles the administrative boundaries of the Morice River High Biodiversity Emphasis Area (HBEA; lower slopes) and General Forest Area (GFA; upper slopes). This COGMA is recommended for retention as a result of its relatively large size, high proportion of late successional forest species, age, and landscape connectivity and diversity. It is also recommended that the boundaries be revised to remove an area that has been partially harvested.

Executive Summary

The Morice Land and Resource Management Plan provides approaches for maintaining old growth in the landscape, by spatially designating Old Growth Management Areas (OGMAs), and by using aspatial targets to meet total target percentages for old forest through time.

The Integrated Land Management Bureau (ILMB) identified Candidate OGMAs (COGMAs) using a rule set outlined by the Landscape Unit Planning Guide (Province of BC 1999). A total of 562 candidate OGMAs were identified, covering 119,388 ha and which met 130% of the target outlined in the LRMP. This project was contracted by ILMB to assess which of the COGMAs provide the best biological suite of OGMAs.

In order to determine which OGMAs might provide the best biological suite, conservation biology principles were employed which considered for each COGMA a) stand level attributes, b) landscape level attributes and c) long-term goals and threats for the stand and landscape.

In order to assess the large number of COGMAs in the Morice District, existing data were used to rank COGMAs based on their apparent attributes. Available data used in this ranking procedure included size, core area, road density, percent old forest, a productivity score based on site index, percent pine and percent aspen. This initial ranking was used to identify which COGMAs should be field or aerially checked. In addition, it was determined that field / aerial effort should be prioritised to the lowest elevation forests of the SBSdk where older forests were historically less extensive, and where harvesting, land clearing and cumulative effects on older forests are highest. Field effort was also focused within the High Biodiversity Emphasis Areas identified in the LRMP, since conservation values were considered high hence the old forest conservation targets there were highest.

Field days were used by the team to verify the approach and to calibrate individual members with the local ecosystem diversity.

Aerial surveys, in combination with orthophoto and landsat image reconnaissance were then used to a) verify the available data, b) check for additional values not reflected in the data (e.g. stand structure, adjacency and inclusion of lakes, wetlands, meadow and riparian), and c) to consider landscape context and the ensure that the diversity of forests in the LRMP are represented in the recommended candidates.

This report provides recommendations on which COGMAs may provide the best conservation values within the LUPG approach and conservation budget (Table 1 shows the actual spatial targets for each biogeoclimatic variant) within the High Biodiversity Areas (HBEA) and General Forest Areas (GFA) of the Morice LRMP. Our recommendations come close to the total area allowed and it is our understanding that the working group's final OGMA selection will be subject to a timber supply analysis limiting volume impacts to an 8% AAC reduction over the LRMP timber base case.

Summary of COGMAs by LRMP zone

The General Forest Area is the largest zone, and is where most of the 91,019 hectare spatial old growth budget is distributed, though some zones have low percentage retention requirements. The five HBEAs are a minor portion of the LRMP (approximately 10%) but have higher percentage targets for OGMAs. Landscape unit maps showing landsat and Resource Management Zones (RMZs) are included in Appendix 3 to show the location of the all COGMAs. These landscape unit maps also

show the location of areas exempted from OGMAs such as woodlots, private land and Indian reservations to provide areas that will remain absent of old forest

Within the General Forest Area:

The Sub-Boreal Spruce zone and the dry cool variant (SBSdk) has a relatively high level of natural disturbance, a long history of forest and agriculture development and the highest percentage of private land and an absence of protected forest areas. The growing season is the longest in the zone, resulting in some of the most biologically productive areas and high biodiversity values. However, selection of the best 2644 ha from the available candidates meant accepting some areas that had a moderate to high level of pine and aspen that are considered early seral species such but that qualified as old greater than 140 years.

The Sub Boreal Spruce Zone moist cool variant (SBSmc2) is the most extensive within the Morice LRMP area and consists of a rolling landscape with many small wetlands and lakes. It similarly has a high level of forest harvesting and few Protected Areas. The recommended COGMAs favour larger older productive forests, however small units located adjacent to lakes, wetlands or riparian areas or that contained these attributes were included. Selection of the best 45,000 ha of forest from the available candidates meant accepting some areas with a moderate to high level of pine and aspen, that will likely have poor short to mid-term old forest stand structure attributes.

The Engelmann Spruce Subalpine fir Zone, moist cool variant (ESSFmc) is located at upper elevations of the rolling plateau and adjacent to alpine tundra zone in some areas. Here there are naturally higher levels of old forest, and harvesting has been relatively limited due to lower productivity and accessibility. In this zone, larger patches of old forest were available and the location of the best 25,876 ha of forest comes from candidates most in excess of 500 ha and some as large as 6,000 ha. The Engelmann Spruce subalpine moist cool variants (ESSFmk) is restricted to the north-eastern portion of the LRMP and larger candidates were available and the best of the 5,573 ha comes candidates most in excess of 350 ha and some as large as 3,027 ha.

The Coastal Western Hemlock and the Mountain Hemlock zones are present in the LRMP but due to the placement of Parks and Protected Areas and No harvest zones no OGMAs are allocated to these zones (ILMB direction to the team).

Within High Biodiversity Areas:

The HBEAs tend to be smaller localised areas with highest retention targets. Placing OGMAs in the restricted area means that it is necessary to accept candidate from the forests in the area, some of which may not have yet developed old growth characteristics. This is particularly true of the Nanika HBEA, the Morrison HBEA and to lesser extent the Friday HBEA and Morice River HBEAs. Forest in Gosnel/Thautil HBEA provided more options as the most of landscape qualifies as old growth.

In Summary

As a result of this process we recommend acceptance of the best candidates that received a “Yes” recommendation as a result of this assessment. We also provide the working group with a list of “Potentials” that could be considered for inclusion if budget / timber impact allow. The candidates marked as “No” are the least suitable based on our ranking and field assessment. The total area included within the recommended list is close to that outlined by LRMP area targets, however we did not do a precise area accounting since we expect some boundaries to be modified, and because we expect a timber supply

impact analysis will be used to ensure the final set of candidates are within the stated allowed volume timber impacts.

The initial candidate areas were chosen with the LUPG rules, but with great care to identify large and undisturbed areas where possible. As a result overall, within the rules, we think the recommended 'best' OGMAs will result in a good suite of areas to manage for long-term old forest values. However, we note a couple of recommendations that may improve the biological outcome including:

a) Confirming the status of mining claims or independent power projects before final selection. Mining and IPPs are exempt from forest land use policies, and permitting on top of OGMAs can significantly undermine long term forest conservation goals.

b) Considering flexibility in applying the aspatial and spatial budgets. We noted during our surveys that there is significant variability in forest attributes that strictly meet the 'old forest' definition of greater than 140 years. This variability includes areas which are classified as old, contain disturbances, consist of primarily early seral tree species (pine / aspen), or are in a poor location for landscape connectivity. In some areas, 'good' OGMAs are not recommended for retention within our report because there is insufficient spatial target. In key areas, especially HBEAs, identifying additional 'aspatial' budget from these known high quality OGMAs would significantly improve the conservation outcome, and should have little additional timber supply impact compared with meeting the target randomly through aspatial guidelines. In addition, this may be easier to administer in the long run especially in the context of small HBEAs, since it would reduce the need for constant 'checking' that aspatial targets are met within these small areas.

c) Some OGMAs cross administrative boundaries (GFA / HBEA or RMZs such as No Harvest Zones). Consider administering these OGMAs as though they were within a single zone (most likely the HBEA due to higher targets) to ensure they are retained as a full unit. This would result in an effective 'adjustment' to the HBEA boundary, but would have little practical impact to the unit. Similarly, where units are adjacent to No Harvest Zones or Parks and Protected areas inclusion into the No Harvest Zone or the Parks and Protected such as is the case for a new of recommended COGMAs in the Gosnel/Thautil may also simplify future administration.

In addition, we did look for alternate candidates that may have been missed in the set supplied and a few of these are suggested. We have also noted potential minor shifts in boundaries based on orthophoto interpretation and field visits. We commend the selection of units so that the COGMAs had an absence of roads.

We also noted some areas of higher quality old forest that were not included in the preliminary set of COGMAs outlined by the LUPG rule set. As a result of this policy, and a longer more intensive harvest history, the SBSdk has relatively little old forest outside the THLB and so the COGMAs tend to be of lower quality (up to 60% pine) and small size (minimum 29ha). Biologically, these areas have poor long-term old forest values, and are likely not the best available areas, but are included as a result of the LUPG policy to reduce timber impacts. A representation analysis, not undertaken as part of this project, may help to shed light on potential ecosystems that are not well represented as part of the current old forest strategy.

Climate change impacts are also expected to be a significant factor influencing long-term forest values. The ranking procedure used to identify the currently most effective OGMAs favours larger units with least disturbance. Managing for climate change and 'maintaining' biodiversity across the landscape involves management for resiliency in ecosystems in order to slow the rate of change and give species the best chance to adapt and move where possible. We propose that the COGMAs may be the most likely (given the whole approach) to best withstand the immediate impacts of climate changes because we predict factors such as wind speed, relative humidity and temperatures will be less subject to fluctuation in large compared to small OGMAs. The selection of smaller units associated with non-climatically driven older forests (edaphic sites such as floodplain sites), or wetter sites which are less subject to high severity disturbance such as fires and drought effects, may also serve to reduce the rate of climate change impacts. We conclude that the recommended OGMAs are a reasonable starting point from which to manage potential changes associated with climate change impacts such as increasing temperatures.

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Citation

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1. Introduction

1.1 Purpose and audience for this report

The Morice Land and Resources Management Plan (LRMP) has been approved by government and announced on July 18th 2007[1].

The LRMP outlines how old forest will be retained over the Morice landscape into the future, setting targets for old forest retention with biogeoclimatic zones, and within administrative zones. Integrated Land Management Branch (ILMB) identified a preliminary set of areas of old forest, to approximately 130% of the target (Table 1).

The objective of this report is to provide ILMB and members of the Morice LRMP Biodiversity Technical Working Group with recommendations of which of the pre-identified Candidate OGMAs best meet long-term old forest requirements. The report also provides opportunity to staff and the public to review the information and rationale used to support the recommendations made.

1.2 LRMP direction on biodiversity

Retention of old growth forest is a key element of biodiversity planning however the establishment of OGMAs is not the only part of the strategy to manage forest biodiversity. As part of Morice LRMP Implementation, ILMB will be establishing legal biodiversity objectives for the following:

- OGMAs
- No Timber Harvesting Areas
- Seral Stage Distribution
- Patch Size Distribution
- Wildlife Tree Retention

ILMB is currently finalizing these objectives with the Biodiversity Technical Working Group, and an Order legally establishing these objectives is expected by September 2008. For more on direction refer to Appendix 5 of the Morice LRMP Forest Ecosystem Management Strategy.

The LRMP states that 50% of the old growth target is to be spatially identified and delineated in Old Growth Management Areas (spatial OGMAs) and the remaining targets are to be retained aspatially through reporting requirements based on inventory up-dates supplied by licensees as part of Forest Stewardship plans approvals. The aspatial OGMA requirements are inventory-based and harvest plans are to ensure that the aspatial conservation objectives will be met (Morice IFPA 2007).

1.2 Delineating Spatial OGMAs

The ILMB, on behalf of the Working Group, delineated 562 candidate OGMAs to meet the targets outlined in Table 1, and following the method included in Appendix 2 (Ryan Holmes pers. comm.). These COGMAs were delineated consistently with provincial policy (Landscape Unit Planning Guidebook 1999), which outlines an approach to identify areas outside the timber harvesting land base where possible, in order to

[1] See press release at http://www2.news.gov.bc.ca/news_releases_2005-2009/2007AL0034-000921.htm . See LRMP and other documents at http://ilmbwww.gov.bc.ca/lup/lrmp/northern/morice/index.html

minimise timber impacts. In addition, efforts were made to identify large areas where possible, to avoid roads and trails and private land and to distribute COGMAs across the whole landscape (Ryan Holmes pers. comm.).

Different zones on the landscape are allotted different old forest targets:

- High Biodiversity Emphasis Areas (HBEA). HBEAs are spatially explicit portions of the forested landscape managed for high biodiversity values, particularly structural integrity. HBEAs are distributed throughout the plan area and are related to, but not limited by, landscape unit boundaries. HBEAs are restricted to 10% of the forested land base.
- General Forest Area (GFA): GFAs have seral targets set by a modified Range of Natural Variability (RNV) where the limits of the natural range are doubled and used to set targets based on, but not within RNV:.
    - The target for old seral is set by 2 x RNV by BEC variant (Section 3.4.1, Biodiversity GMD[1]) and is achieved through existing spatial reserves, spatial OGMAs and aspatial old growth management.
    - The target for mature plus old seral is set by 2 x RNV by BEC variant (Section 3.4.1, Biodiversity GMD[1]) and is achieved through aspatial management.

Table 1. Spatial Old Growth Targets and original Candidate OGMAs, organised by land use zone.

Resource Management Zone	BEC Variant	Old Growth Spatial Target (50%) (ha)	COGMAs (ha)	% of Establishment Spatial Target
1.Friday/Nakinilerak/Hautete Lakes HBEA	SBSmc2, SBSwk3 and ESSFmv3	965	1,587	Approximately 165% (this is old+near-old)
2. Morice River HBEA	SBSdk	668	754	113%
3. Morice River HBEA	SBSmc2	1,459	2,152	147%
4. Morrison Lake HBEA	SBSmc2	764	936	123%
5. Nanika River HBEA	SBSmc2	153	221	144%
6. Thautil/Gosnel HBEA	SBSmc2	2,355	3,245	138%
7. Thautil/Gosnel HBEA	ESSFmc	2,479	3,470	140%
8. Thautil/Gosnel HBEA	ESSFmk	467	646	138%
9. General Forested Area	SBSdk	2,644	3,102	117%
10. General Forested Area	SBSmc2 & SBSwk3	45,247	60,210	133%
11. General Forested Area	ESSFmc	25,876	34,111	132%
12. General Forested Area	ESSFmv3	5,573	6,028	108%

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Table 2. Number and Area of COGMAs (total and forested area), organised by Biogeoclimatic variant.

Primary BEC variant	Total Area	Forested Area	Number
ESSFmc2	37,330	35,101	75
ESSFmc & SBSmc	3,449	3,325	7
ESSFmk	703	677	5
ESSFmv3	9,122	8,802	20
SBSmc2 & SBSwk3	373	344	2
SBSdk	4,721	4,552	52
SBSdk & SBSmc2	455	446	3
SBSmc2	60,561	58,856	383
SBSwk3	2,689	2,684	15
Grand Total	119,402	114,788	562

The wide discrepancy in the number and area of COGMAs reflects the area of BEC variants within the LRMP, but more primarily the distribution of the HBEAs over the land base and the highly variable old growth targets by BEC variant.

2. Applying Conservation Biology Principles

Determining a suite of draft OGMAs which will be most effective at meeting conservation goals requires consideration of factors acting at both spatial and temporal scales. Key elements to consider include:

- Stand level attributes. Does the COGMA contain the ecosystem representation, species composition and structural elements likely to maintain old forest values into the future (e.g. Holt 2003; MacKillop and Holt 2004; Kneeshaw and Burton 1988; Clark 1994)
- Landscape level attributes. Does the COGMA contribute to landscape attributes such as patch size, core habitat, landscape connectivity (Holt 2007; Holt 2003)
- Temporal elements – is the COGMA likely to be maintained into the future, in light of the current natural disturbance regime and climate change?

The following section outlines a number of elements or attributes that were used in this analysis to rank potential COGMAs.

2.1 Biogeoclimatic variants

Forest ecosystems are classified according to Biogeoclimatic Ecosystem Classification system. This system provides an overview of climatic zones known as BEC variants within which vegetation communities can be predicted based on moisture and nutrient

conditions. MOFR 1991 Land management handbook provides the details of variants in the LRMP and the site types[2].

Table 3. BEC zones/variants and Natural Disturbance Types in the Morice LRMP

BEC Zone and variants	Area in 000 of ha (1)	Natural Disturbance types (2)
Coastal Western Hemlock (CWH)**	45	NDT 2
Engelmann Spruce Sub-Alpine Fir (ESSF)***	456	NDT 2
Mountain Hemlock (MH)	13	NDT 2
Sub-Boreal Spruce dry cool SBSdk	128	NDT 3
Sub-Boreal Spruce moist cold (SBSmc2)	707	NDT 3
Sub-Boreal Spruce wet cool (SBSwk)	41	NDT 2

(1) Data from: 2004 Environmental Risk Assessment: Base case Projection

Prepared for: Ministry of Sustainable Resource Management Skeena Region by A. Edie and Associates, 2004.

(2) NDT types to be confirmed. Classified based on footnotes Table 12 and Table 13 of the LRMP. This states that: Early = <40 years; Mature = 100-140 years; Old = >140 years.

** CWHws2 and MHmm2 are combined due to small area present and similarity of RNVs.

*** ESSF mv3 is included under ESSFmc criteria and SBSwk3 under SBSmc2 due to small area present in the LRMP plan area.

2.1 Tree species distributions as surrogates of ecosystem diversity.

Relative tree species abundance (distribute and frequency) varies by BEC variants (Land Management Handbook 26). In some cases tree species are typically naturally rare across the zone, in others tree species may be approaching the edge of their range and so found only rarely. Capturing these elements is one element of a conservation planning strategy that aims to capture the diversity of ecosystems present.

For example, there is a relatively low abundance of some tree species in the Coastal Western Hemlock and Mountain Hemlock Zones[3].

Douglas fir is noted as being present in the SBSmc2 (MOFR 1991) but the Working Group members did not know of any Douglas fir stands present in the LRMP. It was noted there may be Douglas fir present near Francois Lake (Jim McCormack pers comm.) – but we could not locate them. There are also reports of Douglas fir logs coming from Fulton Lake area (A. Banner pers comm.). If there is old growth Douglas fir in the LRMP then it is rare and would be an excellent as a candidate OGMA.

Table 4 summarises relatively rare tree species by zone, and was used to highlight potential rare trees in COGMA data set. The relative rarity/abundance is based on sample plots the results of which are shown in MOF 1991 Land management Handbook 26.

[2] Site series information would have provided a more fine-scaled base for examining ecosystem representation, and is theoretically, a more appropriate level for this level of planning. However, due to the large number of COGMAs to assess, and the range of old forest attributes within these, we focused this work at the variant scale of analysis.

[3] At this time, no OGMAs were proposed in the CWH and MH zones as these zones receive complete protection within new protected areas and No Harvest zones.

Table 4. COGMA BEC zone check list for tree species/hybrids that are rare.

SBS:	Douglas fir, western hemlock, black spruce
ESSF:	amabalis fir, western hemlock, Roche spruce, whitebark pine
CWH:	Roche spruce, Douglas fir, lodgepole pine, mountain hemlock, trembling aspen
MH:	amabalis fir, western hemlock, Sitka spruce, Roche spruce , hybrid white spruce, subalpine fir, lodgepole pine, whitebark pine

2.3 Rare Ecosystems

A table of rare ecosystems is included in Appendix 2. There are 8 forested listed ecosystems but we were unable during this work to undertake a site series overlay to check their distribution with respect to potential OGMAs. Additionally, there is a whitebark pine site that is within the Non Harvest zone near Morice Lake (S. Haeussler pers comm[4].) There are three lodgepole pine ecosystems listed and two Douglas fir ecosystems which we could not locate. Additional work to ensure these are maintained in the final COGMA set should be contemplated.

2.4 Natural Disturbance Types

Natural disturbance regimes are important to forest management decisions, and in understanding potential shifts associated with climate changes. Natural disturbance regimes differ in the frequency, severity and extent of forest fires, insect activity and forestry diseases that shape the forests. There are two broad classes of natural disturbance regime in this LRMP area: NDT2 and NDT3 (Province of BC 1995).

Natural disturbance type 2: ecosystems with infrequent stand-initiating events located at the higher elevations and wetter variants in the LRMP. Historically, these forest ecosystems were typically even-aged, but extended post-fire regeneration periods produced stands with uneven-aged tendencies, notably in the ESSF biogeoclimatic zones where multi-storied forest canopies result. Wildfires were often of moderate size (20 to 1000 ha), with unburned areas resulting from sheltering terrain features, higher site moisture or chance. Many larger fires occurred after periods of extended drought, but the landscape was dominated by extensive areas of mature forest surrounding patches of younger forest.

Natural disturbance type 3: ecosystems have frequent stand-initiating events, and this is typical for drier variants within the LRMP area. Historically, these forest ecosystems experienced frequent wildfires that ranged in size from small spot fires to conflagrations covering tens of thousands of hectares. Average fire size was likely 300 ha in some parts of the BWBS biogeoclimatic zone, but went as high as 6000 ha in other parts of the zone where topographic features did not limit fire spread. The largest fires in the province occur in this NDT, often exceeding 100 000 ha and sometimes even 200 000 ha.

Natural burns usually contained unburned patches of mature forest that were missed by fire. Consequently, these forests produced a landscape mosaic of even-aged regenerating stands ranging in size from a few to thousands of hectares and usually containing mature forest remnants. There were also frequent outbreaks of defoliating insects and an extensive presence of root diseases caused by *Armillaria* and *Phellinus* (especially in the ICH biogeoclimatic subzones). The impact of these infections on tree survival and stand

[4] http://wlapwww.gov.bc.ca/wld/documents/ce24haeussler2.pdf

structure ranged from low to severe. Tree mortality within mature forest remnants and regenerating stands resulted in dead trees, decaying logs, and canopy gaps. Riparian areas within the forest landscape provided special habitat characteristics not found in the upland areas.

2.5 Additional Old Forest Values on the landscape

To be most effective, the OGMAs should complement other areas that manage for, or result in, extensive old forest on the landscape: these are primarily Protected Areas, No Harvest Areas and the inoperable landbase.

There are seven new protected areas, in addition to previously existing Provincial Parks and Ecological Reserves established as Part of the LRMP[5]. These are not used to meet OGMA targets, but will contribute additional old forest values to the landscape through time.

Additionally, there are areas outside Protected Areas that are identified in the LRMP as No Harvest Areas. Similarly to Parks, these areas do not have OGMAs delineated within them, but will contribute to long-term old forest values. Five Area Specific RMZs have been designated as no timber harvesting areas[6]. Commercial timber harvesting is not permitted in these areas.

The inoperable landbase consists of the area which is currently uneconomic to harvest, and although these have no legal protection, they significantly add to the area of older forest values in the short-term at least. This is particularly the case in the higher elevation units which have more inoperable forest. These areas are shown on the landscape unit maps and are part of the current old forest retention strategy.

No analysis was completed to show whether representation of old forests in these alternate zones complement the suit of COGMAs assessed, however, the distribution of all these zones (Protected Areas, No Harvest Zones and inoperable forest) tends to well represent higher elevation biogeoclimatic variants, and tend to under-represent the lower elevation variants (particularly the SBSdk).

2.6 Landscape Units and Spatial OGMAs

Landscape Units together with BEC variants were used in the Landscape Unit Planning Guide (Province of BC 1999) to ensure the distribution of OGMAs across the landscape. The conservation budgets in the LRMP were calculated using BEC variants and Landscape Units but are to be deployed by BEC variants and GFAs and HBEAs. However, it is noted within the LRMP that general distribution is still expected across LUs.

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[5] Kidprice Lake Chain; Tazdii Wiyez Bin (Burnie-Shea Lakes); Nadina Mountain; Old Man Lake; Babine Lake Marine Parks; Morice Lake; Atna River

[6] Morice Ranges – Nanika Lake; Herd Dome; Starr Creek; Swan Lake-China Nose; Tahtsa-Troitsa

3. Methods

A multi-layered process was used to rank COGMAs, and included:

Step 1: An initial ranking of patches using existing and GIS-generated information. This provided an efficient way to rank all the patches relative to one another, and was used as a starting point for determining which OGMAs required field-checking.

Step 2: Map and Orthophoto checking. COGMAs were then checked on maps and on orthophotos in order to a) do a preliminary check of the ranks based on datasets (e.g. to check whether there were obvious inconsistencies), b) to gain additional information on the landscape context of different patches and c) to determine whether any patches could be obviously removed from the aerial checklist. Patches which were obviously excellent were not always checked, and patches with little or no value were similarly not checked in the field.

Step 3: Field checking. Time was spent on the ground at the beginning of the project to ground-truth the data-based ranking approach, and to calibrate the team members to the variability in old growth structures in these forests.

Step 4: Aerial checking. After the initial 2 hour flight was made focusing on the SBSdk, the study area was divided into south (Nanika HBEA), middle, and north which included (Friday and Morrison HBEAs) and the Thautil/Gosnel HBEA. The centroids of the COGMAs were transferred to the pilots GPS and the centroid and the boundaries kept on the team GPS. A review of the information and the ratings was made prior to flying. Most COGMAs were previewed on orthophotos and landsat to check adjacency and interior. Other old growth areas not selected but potentially of interest were also identified using maps of 200 and 250 years plus. Field checking was restricted to areas that remained as being available based on the ILMB selection criteria. If there were older forest areas available these were checked against the closest COGMA and a judgment made in the field on whether the potential alternate was better than the selected candidate.

Details of each step are provided below:

Step 1: Preliminary GIS based ranking based on existing data

Data used in the preliminary ranking came from two sources – Vegetation Resources Inventory (VRI), and GIS-generated statistics based on VRI, BEC variants, HBEAs and GFA information.

This ranking tool was created, in order to 'sift' through the large amount of potential data on COGMAs, and to provide a means to give a rank to patches based on VRI and generated statistics. Because targets are applied by BEC variant, COGMAs were assigned to whichever BEC variant was predominant, in order to facilitate the ranking process.

Rationale used in the ranking process included:

Area of old forest within the patch. Size of patch is a key variable within conservation planning. Size is known to increase the number and likely longevity of populations remaining within a patch, and so is more likely to result in functional old growth areas through time. Larger patches are also potentially less vulnerable to disturbance from adjacent activities.

Core area. Core area was identified based all forest polygons that were adjacent to both hard and soft edges. Hard edges were where forest met anthropogenic clearings, water, or natural areas with no trees. Soft edges were areas where forest met non-productive forest below 2m in height. The VRI coded for "non-productive" was used as the definition in selecting for edge types. The non-forest or non-productive forest polygons were removed to identify EDGES. The core area was based on area that was 150m from any forest edge (hard or soft). Administrative boundaries were not used as input in the analysis of forest edges. Administrative boundaries therefore are not mistakenly identified as "forest edge". This 150m cut-out produces a series of forest polygons that are all 150m from a real forest edge, and area within these boundaries used to calculate 'core'.

Productivity score. This variable was to differentiate between patches which were generally low productivity, those with some areas of higher productivity and overall higher productivity patches, within each BEC variant. A site index score was generated which captured the variability of site index within a patch, giving an increasingly high score for patches with the presence of higher productivity forests. The intention was to ensure that a range of productivity types was captured within the COGMAs since typically more lower productivity patches are chosen than random from the landscape because of the LUPG direction which identifies draft COGMAs from the non-contributing land base first.

Percent Pine: lodgepole pine is a vigorous species that thrives after major disturbances. It is considered a successional species which means that without a major stand initiating disturbance spruce and balsam will become dominant over time and pine will drop out of the stand. Therefore most stands with a high percentage of pine are not good old growth candidates in the short-term. This is however not true on poor sites with low nutrients and severe summer moisture deficits which prevent spruce and balsam from surviving allowing pine to dominate a site in perpetuity without a stand replacing disturbance. COGMA 167 is such an example of an edaphic pine climax system which is recommended as part of the OGMA network. Pine can be a relatively long lived species and recent sampling found a pine of 400 years on an edaphic climax sites in the Morice LRMP (S. Haeussler pers com). This pine was dead from mountain pine beetle but indicates that this old pine had survived endemic levels and other beetle outbreaks for the last 400 years.

See photos of COGMA 167, under the Morice HBEA SBSmc2 Results Section.

Percent Aspen: similarly to the pine ranking, stands with higher percentages of aspen in the dataset were discounted points in the ranking scheme. Aspen, like pine is considered successional and it requires a long timeframe before spruce and balsam will dominate (in the absence of a disturbance). They are therefore not good candidates for old growth attributes in the short to moderate term. Alternatively, aspen can reproduce through suckers and clones can persist for centuries, making them arguably the oldest living organisms in the Morice LRMP. Though the ranking system discounts aspen some COGMA where aspen was dominant are included in strategy. Old aspen does contribute an element of diversity that is a good to capture to a small extent.

COGMA 193. The stand age is determined in the COGMA to be 125 years. The aspen present are nearing the end of life span and have significant defects and heart rot as indicated by this aspen conk. Older aspen such as this add to the diversity of many COGMAs.

The ranking scheme was used to generate a 'total score' for the whole COGMA set and within each primary BEC variant. This allows patches to be ranked highest to lowest within their target group, and was used as the starting point for field / aerial overviews. The ranking procedure tended to highlight the largest patches, because it used 'size' as a criteria, and because large patches automatically have higher chance of having more core area, and some higher productivity areas. However, the ranking approach was also very useful in discerning between smaller patches.

The dataset was also used to highlight a number of additional factors which could then be used to highlight potential values in different patches. However, these were not used in the ranking process:

- unusual species (e.g. whitebark pine) (see Table 4), and species that are relatively rare (e.g. black spruce) were used to highlight potentially interesting patches;
- high percentages of certain species, Clark 1994 notes that the high percentage balsam stands are indicators of infrequent disturbance as balsam tends to replace spruce over time.
- road density statistics were generated for each patch, however the preliminary COGMA layout avoided roads where possible so this statistic tended not to differentiate patches.

Step 2: Orthophoto Review and Landsat Image review.

Orthophotos were reviewed for the HBEAs and most of the SBSdk to look at units prior to field visits as well as to classify adjacent and interior COGMA features. Orthos provide information at a resolution of approximately 1:5,000. The extreme southern portion of the LRMP area does not have orthophoto coverage and landsat images were used in these sections. Landsat images were also used as a final check on patterns and adjacency.

Step 3: Field Checking and Calibration

Preliminary datasheets were produced, based on those used by Holt (2000) and Roberts and Turney (2007). These field sheets were then modified after two days in the Morice River and Thautil/ Gosnel HBEAs, and a two hour fixed wing aerial survey of the SBSdk.

Two days were spent driving roads primarily to check field data collection method and become familiar with types of older stand structures in the study area. The road work was carried out in the Morice and Thautil/Gosnel HBEAs only. A member of the working group from MOE (Rick Heinrick) spent a day with the field team of Holt, Inselberg and Fenger.

The initial forms were found to be too detailed and onerous on stand level information and it was considered better to assess the quality of internal and external COGMA features as means to separate candidates. The stand level information was simplified to a single assessment from the proposed multi-stand attribute that required assessment on present/absence and relative abundance of: 1) understory recruits, 2) large trees for site, 3) old canopy present, 4) dead tops, 5) snags, 6) large sized woody debris. Data collection was changed so data could be recorded directly into tabular format with multiple COGMAs on a single data collection form so it was not necessary to have single field sheet per COGMA (Table 5 below).

Step 4: Aerial survey

Available data were summarised to be used in the field, as per Table 5 and information collected and decisions were recorded during flights as per Table 6 and the description of each column below.

Together these two tables describe the information for variants in the Results section.

Table 5. Prefield information and rankings – columns 1 to 12.

					RANKINGS						
1	2	3	4	5	6	7	8	9	10	11	12
OGMA_NUM	Total Area	Landscape Unit	Area_OLD	Primary BEC	AREA_OLD	CORE HABITAT	Sire Index	Pine_%	Trembling Aspen %	New Rank	Realtive Rank-class

1. OGMA Number Each COGMA has a unique number. The numbering begins at 2 and ends a 562. The COGMA numbering was done by ILMB and the sequence is systematic with the lowest numbers in the south and the highest the north.

2. Total Area. This is the size of the COGMA in hectares and includes forest and non forest.

3. Landscape Unit. These are included so that the general context of the unit is more apparent. There are 22 landscape units in the LRMP. See Map for general location.

4. Area OLD. This is hectares of forest greater than 140 based on ages in the vegetation resource inventory data base.

5. Primary BEC. The Biogeoclimatic Ecosystem Classification (BEC) variants are listed by their abbreviations.

RANKINGS

6 – 10: ranking criteria. As outlined above in the methods. This results in a final score for the patch, within the variant, (column 11), and a relative rank class showing how the patch scored in relation to other patches in the variant from highest quality (H) to Moderate (M) and Lowest (L). (Column 12).

Summary of data collected

While flying, data were summarised in the format shown in Table 6.

Table 6. Data collection and recommendations.

13.	14.	15.	16.	17.	18.	19.	20
Adjacency	Interior	Structure	Boundary Review	Alternative	Recommendation	Visited? Ortho Field GIS	Comments

The first three columns represent NON GIS field information that advise on a COGMA's relative biological value, and are summarised by column below.

13. Adjacent to COGMA: The value of the COGMA can be enhanced by its location in the landscape relative to other habitats. The adjacent landscape context was qualitatively evaluated from overview flights and orthophotos as well as other mapped information showing lakes and rivers slope and aspect for example. Adjacent habitat features considered beneficial included lakes, wetlands, floodplain riparian, riparian, wet meadows, grassland, deciduous, avalanche tracks and alpine areas. We excluded adjacent seral forest condition because forests are dynamic and change through natural disturbance and harvest. This qualitative assessment is based on enduring features of the landscape.

E = Excellent	One of more of semi permanent features present and has a significant increase in value of the COGMA.
G = Good	A feature present which increases the value of a COGMA in this location
M = Moderate	There is some diverse habitat present but the affect on the unit is minimal
N = None	COGMA is surrounded by forest

COGMA 289 (right). This COGMA forms an excellent transect from ridge top to a small lake. It is one of the best of candidates in the SBSdk. This COGMA also includes south aspects with some grassy openings and has 38% pine.

COGMA 315. This 216 ha COGMA is in the ESFFmc is rated as N for no adjacent contrasting enduring features. It was not recommended based on budget constraints.

14. Interior COGMA features**: The value of a candidate**

E = Excellent	One or more semi permanent features present and has a significant increase in value of the COGMA.
G = Good	A feature present which increases the value of a COGMA in this location
M = Moderate	There is some diverse habitat present but the affect on the unit is minimal
N = None	COGMA is surrounded by forest

COGMA 204. This 316 ha COGMA is situated on the confluence of Thautil, Gosnel and Morice River. It is classified as excellent for internal enduring features that enhance it's value as an OGMA.

COGMA 525. This 199 ha lake-centred COGMA in the Friday/Nakinilerak/Hautete Lakes HBEA has 133 ha of old forest. This COGMA is classified as excellent for enduring internal features. Though it has no core habitat due to the influence of forest edges it is recommended as are many similar COGMAs with wetlands, lakes and riparian habitat within their boundaries. Based on these features many smaller COGMAs that ranked lower on GIS vegetation data were elevated to recommended candidates.

15. Stand structure: The abundance of older stand structures are an indicator of the old forest biodiversity. The greater the abundance of indicators the greater the complexity of the stands and potential biological diversity, and the greater the probability of potential older forest obligate species. Features used to confirm old forest structural complexity

include presence of understory trees species (layers), well developed older live canopies with dead trees (late successional large snags), dead tops, large fallen trees (coarse woody debris). Young and mature forests lack many of these features.

E = Excellent abundance of older stand structure features present
M = Moderate abundance of older features
L = Low older features
N = None

16. Boundary review recommendations: In a few cases, based on orthophoto and/or aerial survey, we suggest a boundary review of the COGMA. Recommendations to revisit boundaries range from inclusion of partial harvesting to extension of OGAMS to natural boundaries such as roads or wetlands that will make it easier to recognize and manage these in the future. Where boundary recommendations are made then comments are provide on where and how it may be possible to re-draft a boundary. It is expected that ortho photos will be adequate for redrafting and the minor changes called for. To our knowledge, no areas were recommended that include cutblocks or areas that have been previously removed from the selection list.

17. Alternate OGMAs**.** Alternative OGMAs are suggested where an old forest area that is in close proximity to the identified COGMA may have higher conservation values. Alternate areas were found by comparing the available old forest (within the constrained landbase) with that selected and reviewing maps highlighting forest greater than 2oo and greater than 250 years (140 years was used as the old forest threshold in the original procedure). Note that few alternate COGMAS are suggested. We found that the selection process applied by ILMB (Ryan Holmes) was well conceived and consistently provided a list of good candidates. Conventions such as exclusion and buffering of most roads provided very good set of COGMAs from those available.

18. Recommendations for retention of candidates. Selecting a suite of final OGMAs is a complex problem, since each decision requires a number of factors to be considered simultaneously. The decision to recommend retention was based on understanding of the spatial budget, the quality of candidates, internal and external features, as well as the contribution of that individual patch to the overall retention of older forests. The budget surplus was considered and decisions adjusted for each variant table. The stronger candidates were recommended as Y indicating yes for retention. Possible candidates (P) are in a midrange with little biological information available for differentiation. Weaker candidates are marked No (N) are not recommended.

19. Visited**.** Orthophoto, field, and GIS. This column indicates the sources that support the recommendation.

20. Comments. This allows direction on alternates and sometimes the comparison to another COGMA which represents similar ecosystems. If there is an image of the COGMA this image or images are noted.

Step 4b: Organization of aerial surveys.

It was not possible to visit each of the 562 COGMAs. The order of priority was highest in SBSdk > HBEAs > SBSmc2 > ESSF .

Five days of fixed wing flying were conducted (16 hours) between Nov 7th and Nov 18th. Figure 1 shows the GPS routes taken on each of the five days.

Sampling in the SBSdk was given priority because amount of old available is naturally low due to disturbance frequency. This was also given priority because of the cumulative effects of forest development, grazing leases and private land alienation which also result in fewer COGMA choices. Poor choices for COGMAs in the SBSdk may have greater consequences biologically in the longterm compared with higher elevation zones where there is greater protection and higher levels of old forest. In addition, biological activity in the SBSdk begins earlier and ends later than in other BEC variants so this zone biologically active for longer periods and has diversity and productivity linked to this that is absent elsewhere in the LRMP.

Field emphasis was next placed on checking COGMAs within the HBEAs as these have been assigned conservation targets linked to their higher biodiversity values. HBEAs are also a small percentage of the entire land base and easier to consider COGMAs as a group within these smaller areas.

Least field effort would be placed at higher elevations and in areas where there was significant portions of variants in Protected Areas and non harvest land zone designations. Finally, despite the priority scheme, COGMAs 'enroute' to priority areas were sampled when on the flight path to provide a random set of additional information.

Flight paths were organized and located on Landsat maps. The general route was laid out on the landsat map to help locate COGMA boundaries from the air through presence of visible features, roads, cutblocks and lakes. The actual location of the COGMA was done through communications between the pilot and one observer each with a Global Positioning (GPS) unit. When in the air internal features external features and stand structure were classified and recorded as were the photo points. Observations were made from a height of approximately 200 to 400 meters above the ground.

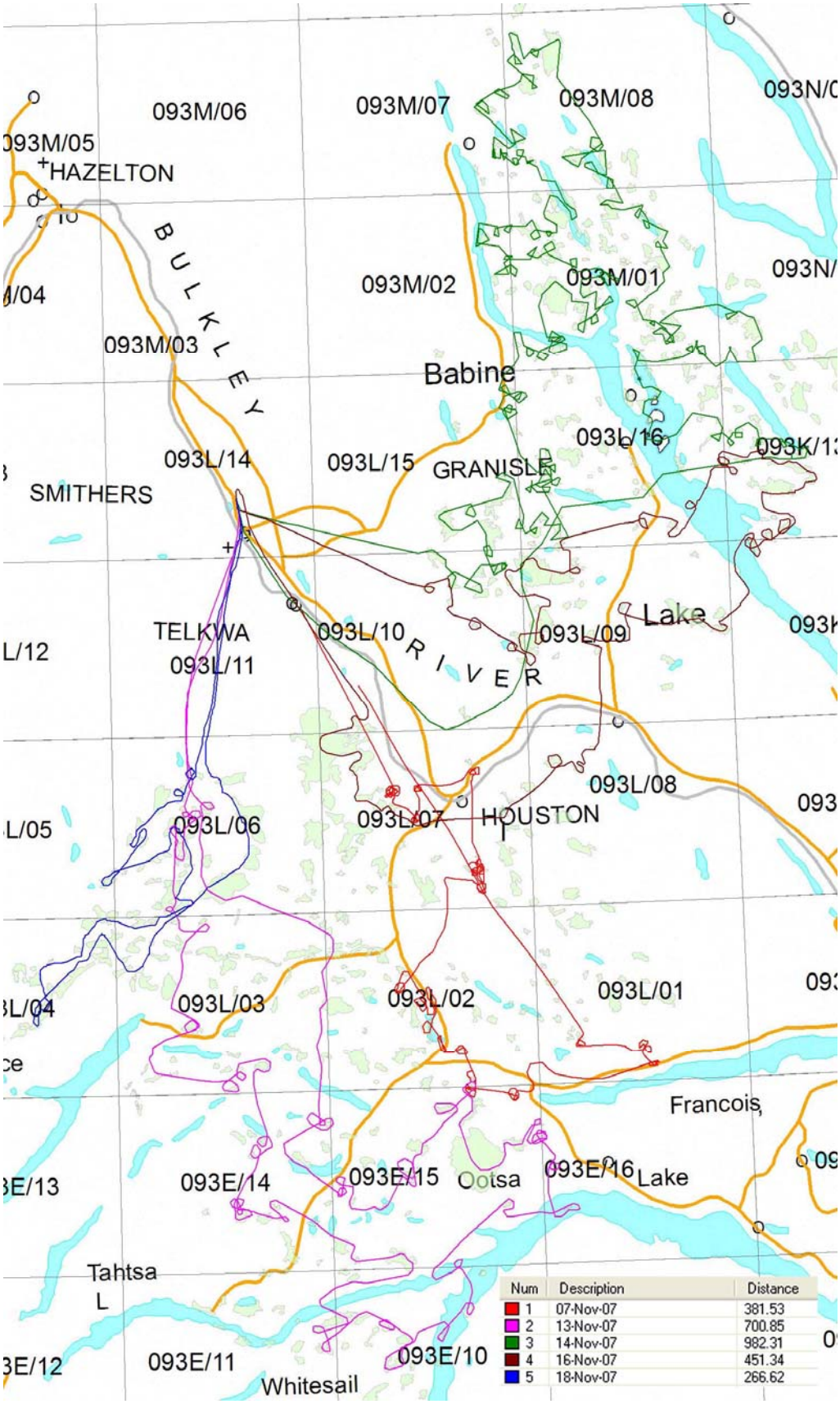


Figure 1. Flights paths for the aerial surveys.

Final Rankings

After each flight the field data was transferred to excel spreadsheets and the photo images of COGMAs when available were added. The field rankings were then reviewed against the budget for the BEC variants and recommendations iteratively adjusted to be close to target. Where necessary orthophotos were consulted to obtain adjacency and internal features for those units. The quality of stand structure could be assessed to some extent based on species composition and predicted age from VRI. Direct observations of stand structure were seldom used as the deciding criteria for final ranking.

For the larger GFA variants with hundreds of COGMAs, decisions were made primarily on the GIS rankings combined with review of the database for rare species or inclusions of areas representative of higher productivity. Thus small units, with low productivity were the first to be dropped. Some of the large units with high ranks were also reviewed, since recommending a single very large unit meant losing many smaller units.

4. Climate Change considerations for OGMA selection.

Climate change is a significantly factor likely to impact long-term maintenance of biodiversity and old forest values on the landscape. Here, we briefly review some elements of climate change and assess whether there are measures that can be taken that better support old growth forest management decisions and selection OGMAs today. This section first examines what to expect from climate change predictions and uncertainty, and is followed by a discussion of OGMA characteristics that we suggest may be most resilient to climate changes. We also provide a brief review of whether the COGMAs recommended could be improved to withstand climate change.

Climate change is a recent consideration in forest management and land use planning. The mountain pine beetle outbreaks affecting much of Morice LRMP pine forests may be in part linked to warmer temperatures that improve beetle winter survival. This warming trend is predicted to continue.

There is a growing body of work that deals with both understanding, predicting and adapting to global climate change[7]. The BC government has developed a BC plan on weather, climate and the future[8] with specific action points for forests. Ministry of Forest and Range have established a climate change task force[9]. Ministry of Environment has an agency leading a number of climate change initiatives[10].

The 2002 State of Environment Report indicates that we have already experienced a 1.1 degree Celsius temperature increase over the last 100 years in the central interior where the Morice LRMP is located (State of Environment Reporting 2002[11]).

Forest management, from tree species selection for reforestation to conservation measures in the Morice LRMP, uses the provincial Biogeoclimatic Ecosystem Classification as a planning and management framework. The BEC system is based on a forests associated with prevailing climate: zonation and zone names are built on the old forest species that will grow on mesic sites and which occupy the regional climate niche.

[7] International Panel of Climate Change web site. http://www.ipcc.ch/
[8] http://www.env.gov.bc.ca/air/climate/cc_plan/pdfs/bc_climatechange_plan.pdf
[9] http://www.for.gov.bc.ca/mof/Climate_Change/
[10] http://www.env.gov.bc.ca/air/climate/
[11] http://www.env.gov.bc.ca/soerpt/997climate/temperatureglance.html

The BEC system itself, as an approach to defining ecosystems is therefore expected to shift as climate shifts. We also know that the old forests in the Morice were established when temperatures were (at least) 1.1 degrees C colder than today, and that older stands (> than 250 years) were established under even cooler climate situations.

Knowing that temperature are increasing and knowing the climate parameters of our current zones Hamann and Wang 2006 forecast the climate envelopes of our current zones. Their provincial forecast (Figure 2) is included here for discussion purposes and is one possible outcome based on temperature. All climate models indicate migration of warmer temperatures towards the poles and a migration of the semi-arid zones northward from the equator. At a local scale this means an expansion of forests into the alpine, and a potential expansion of grassland into currently forested zones. Based on this temperature forecast the forests of Morice LRMP are trending towards climates that today support the Interior Douglas fir zone. The forecast shows the warmer zone expanding northward in the rain shadow of the Coast Mountains. The scenario shows IDF-like climate for lower elevation forests in the LRMP over the next 10 to 15 years and by 2055 this IDF-like climate would be equivalent in area to the current SBS zone. Above this IDF-like zone the warming will provide conditions similar to today's Interior Cedar Hemlock zone in what is now the ESSF zone. By 2085 the model predicts the IDF-like climate to expand into the current ESSF which will then be entirely absent from the Morice LRMP and that ICH temperature-like zone will occupy the area that is currently ESSF and a portion of Alpine tundra zone.

It must also be stressed that this forecast is one scenario and looks at one variable, temperature. In the climate modelling community there is more confidence in temperature forecasts than in moisture trends (Del Meidinger pers comm.). It is thought that the drier SBS zones will become drier and tend towards IDF and that the wetter SBS variants will tend towards Interior Cedar Hemlock. Where the wetter warmer and drier warmer transition occurs is less certain.

How to interpret the "flying BEC zones" forecasts is unclear with regard to significant improvements in the suite of COGMA recommended in this report. It does seem likely that the familiar plant associations may not migrate in step with the climate changes. There may be a disintegration of plant communities as we know them. This is predicted as some plants as well as wildlife and fish species have different ecological niches and some are tied to a narrow ecological range. This is what we see today for some rare and endangered ecosystems that occupy a very limited area in the LRMP. Species also vary widely in their ability to disperse across the landscape even when there may be suitable sites elsewhere.

Weather events are additionally predicted to become more variable and severe than in the recent past and forests will experience more severe droughts, ice storms etc. Extremes in weather when linked to increased frequency of occurrence can trigger natural disturbance agents such as wildfire, insects and disease pathogens. Prolonged and frequent droughts leave forest trees stressed and more susceptible fire and insect mortality. Older trees are also less vigorous and so may be particularly susceptible. Although diseased and dying trees are central elements of old forest conservation the relative extent of these trees can affect long term survival of older forest on the landscape. Balsam and Spruce are also susceptible to insects and diseases although it is unknown whether new outbreaks would rival the impacts similar to that currently impacting pine forest mortality. Spruce and balsam are the climatic climax trees in the current SBS and ESSF zones and these are the

trees that are dominant in most COGMAs. Whatever the specific changes will be, it seems likely that climate change will be reflected in a change in natural disturbances at multiple scales over the landscape.

A drier warmer scenario means a longer fire season, a longer period of insect activity and more exposure to stand initiating events. Older forest in OGMAs will be at greater risk. If temperatures increase and moisture also increases then the fire season may not be extended and summer moisture deficits may be reduced and the loss of OGMA also reduced.

Factors which maintain the resiliency of ecosystems on the landscape (i.e. keep them stable for longer periods) will slow the rate of change, and (presumably) give species most time to adapt. The ability of reserves such as OGMAs to withstand predicted events may to some extent be mitigated by factors such as size, slope position and soil moisture:

OGMA size**.** Wind speed, relative humidity and soil temperature have greater variability and are more extreme along forest edges than in interior forest habitat. Small OGMAs will have a microclimate less suited to some older seral species. Thus larger OGMAs with a high percentage of interior habitat and are expected to better ameliorate against increasing temperatures than smaller edge dominated OGMAs.

Site moisture. Soil moisture on mesic sites is determined by regional climate. Soil moisture on drier and wetter sites is determined by slope position, soil depth, aspect and evapotranspiration and the exposure of the site to sun light. Seepage receiving sites in a time of temperature increases are likely to be less affected than shedding sites so changes can be expected first on xeric and subxeric sites. The current COGMAs in the SBSdk, which attempt to highlight older forests, are a reflection to some extent of existing soil moisture differences which have reduced stand replacing fires on these sites allowing old forest to exist. The effects of soil moisture linked with slope and aspect and seepage receiving is most pronounced in the SBSdk where there is an absence of older forests on most south aspects. This is reflected in the current suite of COGMAs as there were few warm dry SBSdk sites that met the 140 year COGMA criteria, although some older aspen stands have been recommended as COGMAs on some south aspects. Thus at lower elevations the north aspect OGMAs will likely be more persistent and COGMAs associated with seepage receiving sites and wetlands even more persistent to prolonged droughts. Similarly, these patterns for cooler wetter aspects may also be observed at mid elevation with a warming trend. OGMAs on spruce stands at mid elevation will experience prolonged moisture stress in the SBS and those most adversely affected are expected to be on south aspects and shedding sites. This presumes that moisture will remain in the same pattern as we now know and as mentioned is uncertain. If summer moisture increases then the current suit of conifers will persist on south aspects where they are now mostly controlled due to drought and fire disturbance.

Edaphically controlled COGMAs such as floodplain forests are considered the most stable in the long term since their distribution isn't primarily defined by climate. However both the wetter warmer and drier warmer have different snow melt and runoff pattern and there may also be some shift on receiving sites or in the hydro-riparian zone.

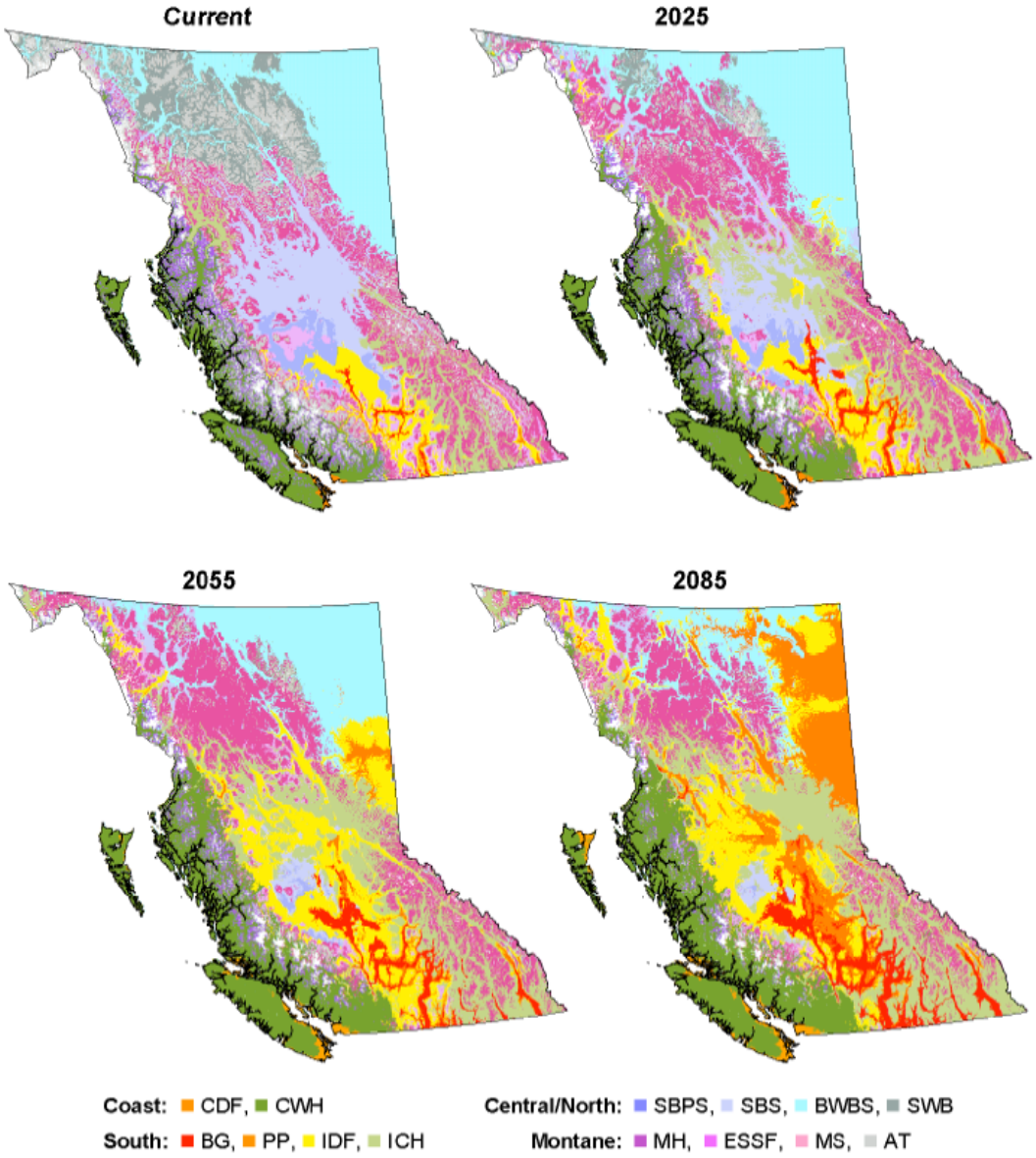


FIG. 2. Shift of the climatic envelope of ecological zones based on the ensemble simulation CGCM1gax for the normal periods 2011–2040 (2025), 2041–2070 (2055), and 2071–2100 (2085). The ecological zones are: CDF, Coastal Douglas-fir; CWH, Coastal Western Hemlock; BG, Bunchgrass; PP, Ponderosa Pine; IDF, Interior Douglas-fir; ICH, Interior Cedar–Hemlock; SBPS, Sub-boreal Pine and Spruce; SBS, Sub-boreal Spruce; BWBS, Boreal White and Back Spruce; MH, Mountain Hemlock; ESSF, Engelmann Spruce–Subapline Fir; MS, Montane Spruce; SWB, Spruce–Willow–Birch; AT, Alpine Tundra.

Figure 2. Shift of ecological zones and climate change.

Climate change conclusions.

The current set of COGMA has been selected so that larger size and core habitat was given preference. In light of climate change and an array of potential impacts, we suggest this approach is most likely to result in increased resilience of patches as climate shifts, since they are less exposed to external effects.

An alternate approach could have been to give preference to smaller COGMAs and have more of these dispersed through the LRMP area. This could theoretically aid in allowing species to 'move' between patches, but whether 'ecosystems' will move is disputed.

The selection criteria did favour small COGMAs but only when these had internal or external enduring features such as lakeshore, riparian, meadows. This also seems prudent as the wetter sites also a hedge in the event of a drier future. In the event of a warmer wetter future these sites may also not be as adversely affected in the mid-term. Small COGMAs were also given greater weight when they had tree species that were rare (though this was based on relatively poor VRI data at this scale. Including species on the edges of their range may be a strategy to aid dispersal of ecosystems across the landscape by promoting maintenance of genetic diversity.

Finally the diversity of the older forests is reflected in the COGMAs which includes some older aspen and cottonwood stands. In part these species were included since there was insufficient old seral conifer stands in the pool of potential COGMAs. However, old pine and cottonwood are also considered good for representation of forest diversity and they are edaphic climate species in some units.

5. Results and Recommendations.

Results are provided in Tables 7 to 18 organised by biogeoclimate variant for each HBEA and GFA. Each table is arranged to show COGMAs that are recommended (Yes, Potential, and No). The recommendation categories are sorted by the 'rank' column (column 11 in the Methods) and then by core habitat (column 12 in the Methods). The recommended COGMAs appear at the bottom of each table and have been highlighted as a group. At the top of each table are COGMAs not recommended. Due to the ranking system these tend to be smaller and have lower productivity. In the middle section of each table are the 'Potential' OGMAs if there is sufficient budget or timber impact allowing these to be included.

The budget provided by ILMB is in Table 1, and is included in the discussions at the beginning of each section. The area summary of Recommended patches is also included at the bottom of the table. The area is always close to, but not exactly equal to the conservation budget because some COGMAs straddle BEC variants or HBEA boundaries or both but are considered only in one of the tables. In addition, there are areas of non-forest within some OGMAs which don't count towards the total budget, and we recommend some boundary reviews which will alter the final size of some OGMAs.

Where photos were taken in the field these are included in the table. Selected photos are used to show the character of an area and a specific example of a feature.

FRIDAY/ NAKINILERAK/ HAUTETE LAKES HBEA

		Spatial Target	COGMAs ha	% of establishment target
1. Friday/Nakinilerak/Hautete Lakes HBEA	SBSmc2, SBSwk3 and ESSFmv3	965	1,587	165% Total selected 1045 ha

This HBEA has considerably more COGMAs than allowed within the spatial target.

Five of the best COGMA are recommended to be chosen, summing a total of 881 ha. This is less area than the target number but the next best candidate COGMA 547 is too large at 600 ha to be included. There are two approaches possible 1) consider moving some aspatial target to spatial to include more of the potential COGMAs. 2) reduce the size of COGMA 547 to include the stretch of Friday Lake shoreline and the 77 ha of old forest. COGMA 533 is small and though it ranked poorly it is recommended as it is situated on a peninsula on Friday L. COGMA 535 is lakeshore and high in aspen with only 7 ha classified as old. COGMA 539 is also lakeshore with higher conifer content. When old forest conservation is concentrated into smaller units such as this HBEA it means that there may be fewer options available and a higher proportion of the OGMAs will need to come from younger stands as that is all that is available within the rules. Unit 526 straddles from ESSFmv3 into the unit. There were 9 hectares of ESSFmv3 allocated that would be met if this unit were included.

Mineralization is high in this area and it is recommended that before the final set is selected there be a check on potential mining activity in the short term based on active claims and if exploration roads and tree cutting are deemed highly likely then those OGMAs not be included in final set. .

COGMA 525. Recommended as this is an excellent example high value lake-centred internal feature with good older stand structure.

COGMA 533 (right). Recommended based on structure and adjacency.

COGMA 535 (below). Not recommended even though it lakeshore on the west side of Nakinilerak Lake it is high in young aspen content.

COGMA 539a . Forest between lake and road. Potential based on lake adjacency and good older stand structure.

COGMA 547c. Despite good size and productivity this is not recommended due to absence of old stand structure and high early seral species content aspen.

COGMA 550 Not recommended based on lack of older stand structure and high early seral species (pine).

Table 7. Friday/Nakinilerak/Hautete Lakes HBEA. (SBSmc2, SBSwk3 and ESSFmv3)

Friday.

OGMA_NUM	Total Area	Landscape Unit	Area_OLD	Primary BEC	AREA_OLD	CORE	SI	Pine_%	At%	New Rank	R-class	Adj	Interior	Struct	B'ry Review	Alternative	Recommendation	Visited? Ortho Field GIS	Comments
535	113	Tochcha_Natowite	7	SBSmc2	0	1	0	0	-3	-2	L	E	N	N	N	N	N	F,O,G	Photo 535; Friday L lakeshore
539	51	Tochcha_Natowite	40	SBSmc2	0	0	0	0	0	0	L	E	N	M	N	N	P	F,O,G	Photos 539A, B, C
550	227	Tochcha_Natowite	0	SBSmc2	0	2	5	-2	0	5	M	L	L	L	N	N	P	F,O,G	Photo 550; Straddles HBEA boundary; low bedrock-controlled ridges
526	645	Tochcha_Natowite	192	ESSFmv3	3	3	3	0	0	9	H	N	M	M	N	N	P	F,O,G	Hilltop slide alder; Straddles HBEA , dominantly in ESSFmv3 & minor in SBSmc2
544	254	Tochcha_Natowite	17	SBSmc2	0	4	5	0	0	9	H	N	L	M	N	N	P	F,O,G	Photo 544; upper slope shedding
547	559	Tochcha_Natowite	77	SBSmc2	1	5	10	0	-1	15	H	E	M	L	Y	N	P	F,O,G	Photos 547 A,B,C; Multiple aspects, upper slope shedding; review to reduce young content?
533	37	Tochcha_Natowite	36	SBSmc2	0	0	-1	0	0	-1	L	E	N	E	N	N	Y	F,O,G	Photo 533; Friday L penninsula
528	131	Tochcha_Natowite	86	SBSmc2	2	0	3	-1	0	4	M	E	E	E	N	N	Y	F,O,G	
525	199	Tochcha_Natowite	131	SBSmc2	3	0	3	0	0	6	H	M	E	E	N	N	Y	F,O,G	Large Lake in centre
515	294	Tochcha_Natowite	251	SBSmc_wk	5	2	3	0	0	10	H	E	E	E	Y	N	Y	F,O,G	Straddles BEC units SBSmc2+SBSwk3; adjust HBEA boundary to include entire OGMA polygon
522	221	Tochcha_Natowite	208	SBSmc2	5	2	5	0	0	12	H	L	M	E	N	N	Y	F,O,G	
	881		713																

MORICE RIVER HBEA (SBSdk and SBSmc2)

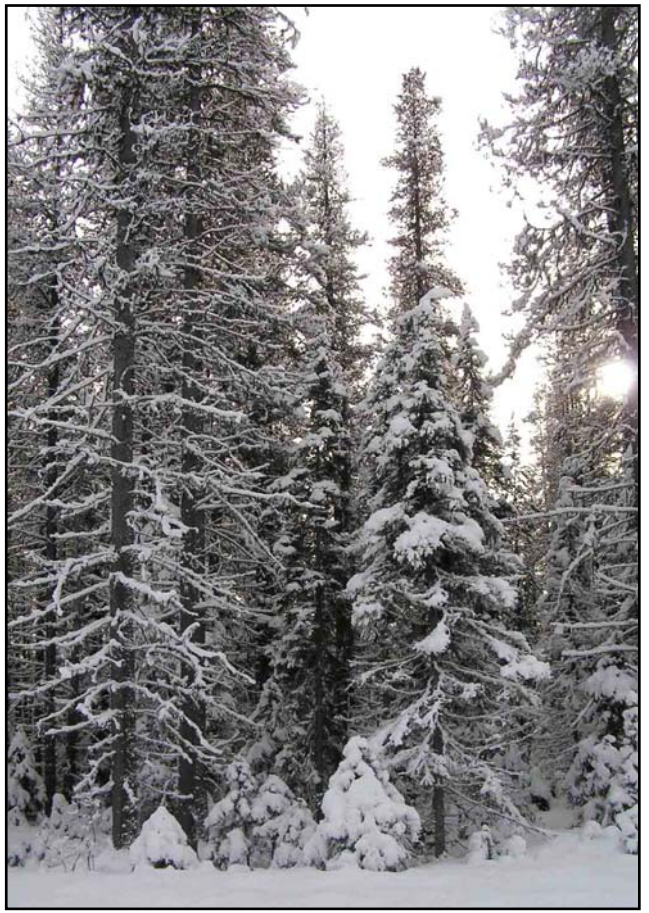
There are two BEC variants in this HBEA and these are presented in the following two tables. The budgets from Table 1 are reproduced here for convenience.

		Spatial Target	COGMAs ha	% of establishment target
2 . Morice River HBEA	SBSdk	668	754	113%
3 . Morice River HBEA	SBSmc2	1,459	2,152	147%

In selecting COGMAs ILMB had very little old available to choose from and therefore very little could be delineated spatially over the budget in the SBSdk. It is likely that removal of a single COGMA will achieve the target. COGMA 234 is considered the poorest candidate. The cover photo is of COGMA 187 which is partly in the SBSdk portion of this HBEA.

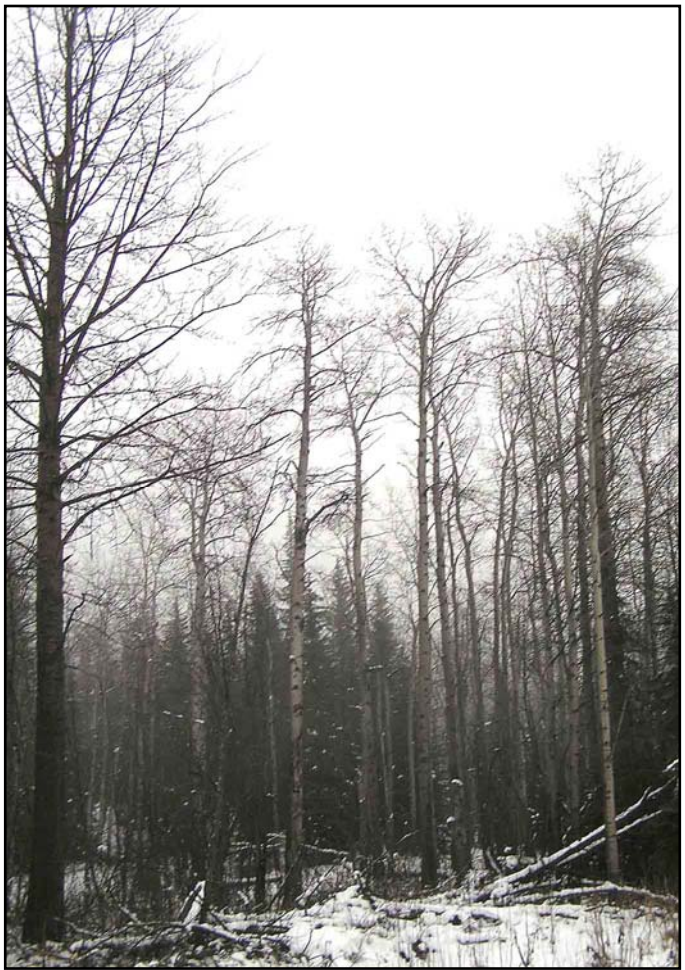
COGMA 182. This 70 ha COGMA is a narrow north aspect strip above Morice Mainline straddling the SBSmc2 and SBSdk boundary. 58 hectares are classified as old. It is bisected by a skid trail. It is not recommended.

COGMA 193. This stand does not meet the age definition of 140 years or greater. It is however a good example of old stand structure. A pine and a spruce were cored and each determined to be 125 years. There appears to have been a major disturbance responsible for stand



establishment in the Owen Creek Morice River confluence area so all stands in COGMAs are likely from this event.

93 Northerly aspects above the Morice Road. This COGMA recommended for retention.



COGMA 1

COGMA 234. This COGMA is the first COGMA on the main road south of Houston. It is on east of Morice Road unit and is bisected by the

powerline. Not recommended due to lack of older seral species and no older structural elements. Spruce regeneration is beginning to show as a minor component.

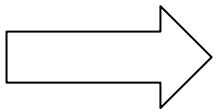


Table 8. Morice River HBEA SBSdk

OGMA_NUM	Total Area	Landscape Unit	Area_OLD	Primary BEC	AREA_OLD	CORE	SI	Pine_%	At%	New Rank	R_Class	Adj	Interior	Struct	B'ry Review	Alternative	Recommendation	Visited? Ortho Field GIS	Comments
234	91	Owen	35	SBSdk	0	0	1	0	-1	0	L	N	N	N	N	N	N	F,O,G	Photos 234 A,B; mid-seral deciduous dominant, deciduous below powerline
182	70	Owen	58	SBSdk	1	0	1	-1	0	1	M	N	N	L	Y	N	N	F,O,G	Photo 182; skid trail, bissected by partial cut, and narrow
188	84	Owen	70	SBSdk	1	0	0	0	0	1	M	N	L	L	N	N	P	O,G	straddles
272	90	Owen	11	SBSdk	0	0	1	0	-1	0	L	E	E	L	N	N	Y	F,O,G	Photos A,B
233	93	Houston_Tommy	58	SBSdk	1	0	1	0	-1	1	M	N	E	L	N	N	Y	O,G	North/south aspects, incised, steep into Morice R; some 200+ on N aspect
276	56	Houston_Tommy	15	SBSdk	0	0	1	0	0	1	M	E	M	L	N	N	Y	F,O,G	Photo 276; Morice R floodplain
198	141	Houston_Tommy	44	SBSdk	1	0	3	0	-1	3	M	E	M	N	N	N	Y	O,G	< 1/3 old
196	121	Houston_Tommy	30	SBSdk	0	2	1	0	0	3	M	E	E	L	N	N	Y	O,G	
263	91	Owen	88	SBSmc2_SBSdk	2	2	-1	0	0	3	M	N	N	E	N	N	Y	O,G	some 200-250+, oldest stand in this HBEA; straddles SBSmc2&SBSdk and HBEA boundary
193	127	Owen	73	SBSdk	1	2	1	0	0	4	H	N	N	M	N	N	Y	F,O,G	Photos 193 A,B, C,D,E,F,G,H,I,J,K,,M; narrow unit above Morice mainline
184	208	Owen	125	SBSdk	3	3	3	0	0	9	H	N	N	L	N	N	Y	F,O,G	Photo 184
252	385	Houston_Tommy	199	SBSdk	3	5	7	-1	-1	13	H	E	N	M	N	N	Y	O,G	some 200+ yrs. On N aspect
187	326	Owen	266	SBSdk_mc2	5	2	10	-1	0	16	H	N	N	L	Y	N	Y	O,G	Photo 187; straddles; boundary review to remove partial cuts
Ysum =	1,456		841																

Morice HBEA SBSmc2

The SBSmc2 portion of this HBEA includes the Morice River valley from below the Lamprey Creek confluence to the No Harvest zone near Morice Lake. It is a narrow HBEA with a significant number of COGMAs on the floodplain and adjacent areas. Many of the COGMAs scored highly. COGMAs 167 and 179 contain mostly upland forest. 167 are pine dominated and is recommended because this is an edaphic climax pine stand.

It is recommended that the riparian mainstem COGMAs be reviewed to determine whether these are central to the COGMA budget. Will these areas receive sufficient protection through forest practices standards for riparian forests without the added COGMA status? If they are accepted, units such as 167 which is a unique pine unit may need to be excluded. The alternate suggested HBEAs is to accept a high percentage of spatial OGMAs and move some of the aspatial budget to the spatial budget to ensure unique values are captured.

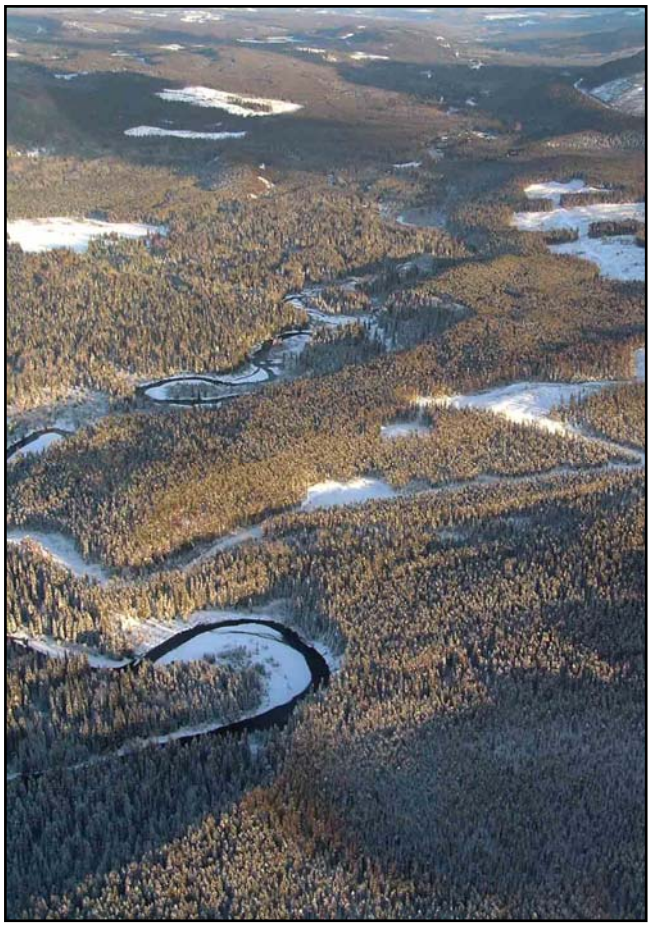
COGMA 195 (left) Morice River Floodplain north side of the river. Should the COGMA conservation budget be used to protect the Morice River floodplain or are there other provisions for riparian that will adequately conserve these ecosystems?

COGMA 194 (right); Western hemlock has a low presence in understory; COGMA straddles Morice - Thautil Gosnel HBEA boundary. High pine content and low degree of older stand structure present. This COGMA is not recommended.

COGMA 204 (far right) is at the confluence of the Thautil, Gosnel & Morice Rivers; some 200+; floodplain.

COGMA 167 shows an edaphic climax old-growth pine stand where pine trees are uneveraged stand, some pine are greater than 200 years. This is a pine climax which means pine regenerates under pine because the site is very dry and nutrient poor so other species do not establish and survive.

COGMA 179 Straddles HBEA and GFA boundary, some 200-250+.
Note the devils club in the understory.



COGMA 197 This 503 ha COGMA is located on Morice River in this downstream aerial view. 424 ha are classified as old It includes the floodplain and adjacent areas. It is recommended.

Table 9. Morice River HBEA SBSmc2

		Spatial Target	COGMAs ha	% of establishment target
3 . Morice River HBEA	**SBSmc2**	**1,459**	**2,152**	**147%**

OGMA_NUM	Total Area	Landscape Unit	Area_OLD	Primary BEC	AREA_OLD	CORE	SI	Pine_%	At%	New Rank	R-class	Adj	Interior	Struct	B'ry Review	Alternative	Recommendation	Visited? Ortho Field GIS	Comments
185	94	Thautil	74	SBSmc2	1	0	3	0	0	4	M	E	M	M	N	N	N	O,G	floodplain
180	90	Kidprice	83	SBSmc2	2	0	3	0	0	5	M	E	N	M	N	N	N	O,G	floodplain
190	105	Thautil	96	SBSmc2	2	0	3	0	0	5	M	E	M	M	N	N	N	O,G	floodplain
194	162	Morice_Lake	135	SBSmc2	3	3	1	-2	0	5	M	N	N	L	N	N	N	F,O,G	Photo 194; Hw low pres understory; straddling Thautil HBEA
204	361	Gosnel	288	SBSmc2	5	1	5	0	0	11	H	M	E	M	N	N	Y	O,G	Photo 204 A; confluence Thautil, Gosnell & Morice; some 200+; floodplain
167	645	Morice_Lake	553	SBSmc2	10	4	10	-3	0	21	H	N	E	L	N	N	Y	O,G	Photos 167 A,B,C, +D,E two similar site ground photos; edaphic climax old-growth pine, some 200+
263	91	Owen	88	SBSmc2_SBSdk	2	2	-1	0	0	3	M	N	N		N	N	Y	O,G	some 200-250+, oldest stand in this HBEA; straddles SBSmc2&SBSdk and HBEA boundary
179	356	Kidprice	350	SBSmc2	5	4	3	0	0	12	H	N	N	E	N	N	Y	F,O,G	Photos 179 A,B; Stradles, some 200-250+
195	514	Owen	345	SBSmc2	5	3	10	0	0	18	H	E	M	M	N	N	Y	O,G	Photos 195 A,B,C; floodplain
197	503	Kidprice	424	SBSmc2	8	3	10	0	0	21	H	E	E	M	N	N	Y	F,O,G	Photo 197; some 200+; straddling HBEA boundary to GFA
Y sum	2,469		2,048																

MORRISON LAKE HBEA (SBSmc2 only)

		Spatial Target	COGMAs ha	% of establishment target
4. Morrison Lake HBEA	SBSmc2	764	936	123%

Six COGMAs are recommended from an original set of 9. 536 is a potential lakeshore candidates.. 524 is a large unit that straddles the HBEA.

Mineralization is high in this area and it is recommended that before the final set is selected there be a check on potential mining activity in the short term based on active claims and if exploration roads and tree cutting are deemed highly likely then those OGMAs not be included in final set

adjacency.

COGMA 530 This is the second highest ranked unit based on size (219 ha) and productivity but lacks older stand structure (102 ha classified as old) but was classified as having excellent lakeside

COGMA 524. This candidate straddles the HBEA/GFA boundary and is the highest ranked unit due to size. However it is only recommended as a potential candidate because if selected it takes a significant portion of the budget in this HBEA.

COGMA 531 The 264 ha COGMA is situated on the eastside of Morrison Lake had good older stand structure. It was the highest ranked OGMA in the HBEA and is recommended.

COGMA 536 images B shows the northern portion of the unit bounded by partial harvesting and although it has significant lakeshore adjacency dominated by aspen and pine species and lacks older forest structure. Not recommended.

The choices are to add more smaller lakeshore COGMAs complete the HBEA versus a single larger unit such as 524 which straddles the HBEA boundary.

Table 10. Morrison Lake HBEA SBSmc2

OGMA_NUM	Total Area	Landscape Unit	Area_OLD	Primary BEC	AREA_OLD	CORE	SI	Pine_%	At%	New Rank	R-class	Adj	Interior	Struct	B'ry Review	Alternative	Recommendation	Visited? Ortho Field GIS	Comments
501	37	Morrison	36	SBSmc2	0	0	-1	-1	0	-2	L	N	N	L	N	N	N	O,G	
536	53	Morrison	49	SBSmc2	1	0	0	-1	-1	-1	L	E	N	N	N	N	N	F	Photos 536 A,B Lakeshore; aspen
542	60	Morrison	53	SBSmc2	1	0	0	0	0	1	L	N	L	L	N	N	N	F	
512	205	Morrison	84	SBSmc2	2	2	5	0	-1	8	H	E	M	N	N	N	Y	O,G	Mostly <140 yr aspen, spruce, pine; shoreline on 3 lakes, contains floodplain too
530	219	Morrison	102	SBSmc2	3	3	7	-1	0	12	H	E	L	L	N	N	Y	F,G	Photos 530 A, B; lakeshore
524	723	Morrison	419	SBSmc2	8	5	10	-1	0	22	H	E	M	L	N	N	Y	F	Photos 524 A, B; straddles HBEA boundary
511	55	Morrison	55	SBSmc2	1	0	0	0	0	1	L	E	N	L	N	N	Y	O,G	Old lakeshore stand
519	140	Morrison	108	SBSmc2	3	1	1	0	-1	4	M	E	N	L	N	N	Y	O,G	Lakeshore and broad peninsula
531	264	Morrison	223	SBSmc2	5	3	3	0	0	11	H	E	L	M	N	N	Y	F	Photo 531
	1182		806																

NANIKA RIVER HBEA (SBSmc2 only)

		Spatial Target	COGMAs ha	% of establishment target
5. Nanika River HBEA	SBSmc2	153	221	144%

The Nanika River HBEA is the smallest of the 5 HBEAs in the LRMP and forms a narrow strip of forested land on either side of a short section of the Nanika River. Pine (>140 years) is a present to some extent all six COGMAs and varies between 32 to 70%. These stands may have originated from a single disturbance event and all are similar in older forest stand structures. The River is incised into the land surface over most of length of HBEA and so the floodplain is restricted to a narrow strip. In some areas the HBEA boundary extends beyond the break of slope. Harvesting has occurred on both sides of the river. The limited options for placing OGMAs are reflected in the small size of the COGMAs ranging from 29 to 66 hectares. The small COGMA sizes are misleading as the river has been used as a boundary. It is recommended that for ease of administration and future monitoring COGMAs such as 84 and 87 become a single unit spanning the river. Number 80 and 99 were not recommended as they had the lowest ranks.

COGMA 99. This is one of 6 COGMA along the Nanika River in the Nanika HBEA. The river is. incised, and most of the COGMAs are from the break in slope to the river. This COGMA was one of two not recommended due their lower relative rank. There is a high presence of pine in all COGMAs and it is likely that the same stand initiating event affected this stretch of the Nanika River.

Table 11. Nanika River HBEA SBSmc2

OGMA_NUM	Total Area	Landscape Unit	Area_OLD	Primary BEC	AREA_OLD	CORE	SI	Pine_%	At%	New Rank	R-class	Adj	Interior	Struct	B'ry Review	Alternative	Recommendation	Visited? Ortho Field GIS	Comments
80	34	Kidprice	34	SBSmc2	0	0	-1	-2	0	-3	L	M	L	L	Y	N	N	O,G	Use road as back boundary, narrow & mostly steep
99	47	Kidprice	36	SBSmc2	0	0	-1	-1	0	-2	L	N	M	L	N	N	N	F,O,G	Photo 99 A,B; Nanika R. incised, narrow & steep
79	66	Kidprice	66	SBSmc2	1	0	1	-2	0	0	L	E	L	L	Y	N	Y	O,G	Use road as back boundary, narrow & mostly steep
84	29	Kidprice	29	SBSmc2	0	0	-1	-1	0	-2	L	E	L	L	Y	N	Y	O,G	Join 84 with 87 across Nanika R
90	31	Kidprice	31	SBSmc2	0	0	0	-2	0	-2	L	M	M	L	N	N	Y	O,G	Photo 90; Confluence of small cr and Nanika floodplain
87	43	Kidprice	43	SBSmc2	1	0	-1	-1	0	-1	L	E	L	L	Y	N	Y	O,G	Join 87 with 84 across Nanika R

THAUTIL - GOSNEL HBEA (SBSmc2, ESSFmc and ESSFmk)

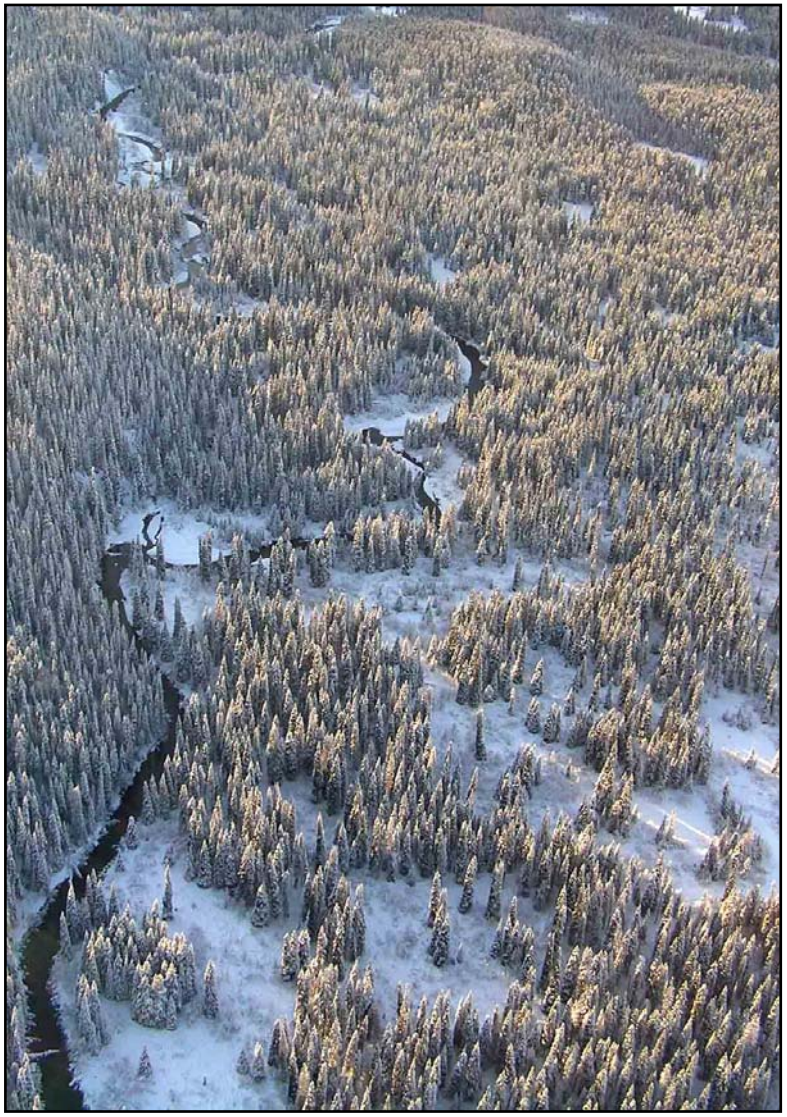
		Spatial Target	COGMAs ha	% of establishment target
6. Thautil/Gosnel HBEA	SBSmc2	2,355	3,245	138%
7. Thautil/Gosnel HBEA	ESSFmc	2,479	3,470	140%
8. Thautil/Gosnel HBEA	ESSFmk	467	646	138%

The HBEA is an area of forested land on either side of the Thautil and Gosnel Rivers which includes some of these valleys' lower slopes. This HBEA is adjacent to the Morice River HBEA and some COGMAs such as 194 and 202 straddle this boundary. The HBEA is adjacent to a large No Harvest zone that surrounds Morice Lake and extends to Burnie Lakes, representing forests of the CWHws2, ESSFmc, ESSF and alpine areas. Units 174, 176, 178, 181, 186, 189, 183, 126, 124 130, 161 and 294 all border this large No Harvest Zone. These on-the-border COGMAs , if selected, effectively form larger COGMAs than indicated by their inventory size. Some of the forests of these boundary candidates are however well represented in the No harvest zone reducing their benefit as their inclusion would mean forfeiting some other older forest areas in this HBEA.. It is recommended that boundary COGMAs which provide elevational connectivity such as 189 which link to other valley bottom units such as 199, and 208 be included as they provide older forest connected from alpine to valley floor. Even though these three units are fragmented by access roads they collectively represent a larger old forest area transect.

Seven COGAMs are recommended in the SBSmc2, 6 in the ESSFmc and 4 ESSFmk. Consider including more of the highly ranked candidates by changing the increasing the spatial and decreasing the aspatial budgets.

COGMA 189. This 147 ha COGMA has excellent older stand structure. It is recommended..

COGMA 194 has low level of older forest stand structure present; there is a minor presence of western hemlock in this stand. It was not recommended due to the poor stand structure.



COGMA 201 Gosnel Creek open riparian unit was not recommended as was in the lower ranked 1/3.

COGMA 208. This 508 ha valley bottom unit is recommended due in part to the excellent internal diversity provider by the riparian zone of the Gosnel River and close proximity to COGMA 199 and COGMA 189. This unit is balsam (43%), spruce (33%) and pine 16 with 3% cottonwood.

COGMA 237 This 851 ha is the mostly highly GIS -ranked unit in terms of size and productivity as well as having excellent internal floodplain features as it spans the Thautil River between two midslope roads, however less than half qualifies as old and 23% of the unit is in late seral pine. It is recommended.

Table 12. Thautil/Gosnel HBEA SBSmc2

OGMA_NUM	Total Area	Landscape Unit	Area_OLD	Primary BEC	AREA_OLD	CORE	SI	Pine_%	At%	New Rank	R-class	Adj	Interior	Struct	B'ry Review	Alternative	Recommendation	Visited? Ortho Field GIS	Comments
168	32	Gosnel	31	SBSmc2	0	0	-1	0	0	-1	L	N	L	L	N	N	N	O, G	
211	45	Thautil	28	SBSmc2	0	0	-1	0	0	-1	L	N	M		N	N	N	O, G	Inclusion of 2 small water centred wetlands
253	53	Thautil	53	SBSmc2	1	0	0	-1	0	0	L	N	L	L	N	N	N	O,G	
262	71	Thautil	67	SBSmc2	1	0	-1	0	0	0	L	L	M	L	N	N	N	O,G	
191	63	Gosnel	63	SBSmc2	1	0	0	0	0	1	L	L	N	L	N	N	N	O, G	
201	91	Gosnel	69	SBSmc2	1	0	1	-1	0	1	L	L	E	M	N	N	N	F,G	Photo 201; on Gosnel Cr, upstream from 208
218	83	Thautil	30	SBSmc2	0	1	1	-1	0	1	L	N	L	N	N	N	N	O,G	
246	74	Thautil	61	SBSmc2	1	1	0	-1	0	1	L	N	N		N	N	N	O,G	
177	72	Morice_Lake	71	SBSmc2	1	1	0	0	0	2	M	N	L	M	L	N	N	O, G	79% balsam
261	69	Thautil	69	SBSmc2	1	1	0	0	0	2	M	N	N	M	N	N	N	O,G	
227	120	Thautil	48	SBSmc2	1	2	1	0	0	4	M	N	L	L	N	N	N	O,G	
194	162	Morice_Lake	135	SBSmc2	3	3	1	-2	0	5	M	N	N	L	N	N	N	F,O,G	Hw low pres understory
217	208	Gosnel	71	SBSmc2	1	3	5	-2	0	7	H	M	E	M	N	N	N	O,G	
202	37	Gosnel	32	SBSmc2	0	0	1	0	0	1	L	M	E	M	N	N	P	O,G	Floodplain with backchannels
240	89	Thautil	56	SBSmc2	1	1	1	0	0	3	M	N	L	L	N	N	P	F,G	
199	234	Gosnel	170	SBSmc2	3	2	1	0	0	6	H	N	L	M	N	N	P	O, G	90% balsam
178	218	Gosnel	181	SBSmc2	3	3	0	0	0	6	H	N	L	M	N	N	P	O, G	adjacent to No Harvest
224	208	Gosnel	203	SBSmc2	5	3	1	0	0	9	H	N	L	M	N	N	P	F,O,G	Photo 224;Straddles to GFA
230	230	Thautil	182	SBSmc2	3	3	3	0	0	9	H	N	L	M	N	N	P	O,G	Photo 230
266	238	Thautil	180	SBSmc2	3	2	3	-1	0	7	H	N	M	M	N	N	Y	F,G	

189	147	Gosnel	147	SBSmc2	3	3	1	0	0	7	H	N	N	E	N	N	Y	F,G	Photos 189 A,B (road visited)
226	321	Gosnel	302	SBSmc2	5	4	3	0	0	12	H	N	L	M	N	N	Y	O,G	Photos 226 A,B; straddles GFA bdry
205	316	Gosnel	136	SBSmc2	3	3	7	0	0	13	H	M	M	M	N	N	Y	O,G	boundary on Gosnel R
208	538	Gosnel	341	SBSmc2	5	3	7	0	0	15	H	M	E	M	N	N	Y	F,O,G	Photos 208 A,B, C: Valley bottom, diverse
277	776	Thautil	506	SBSmc2	10	5	3	0	0	18	H	M	M	M	N	N	Y	F,G	Photos 277 A,B
237	851	Thautil	364	SBSmc2	5	5	10	0	0	20	H	L	E	M	N	N	Y	F,G	Photos 237 A,B
	3187		1,977																

Table 13. Thautil - Gosnel HBEA ESSFmc

OGMA_NUM	Total Area	Landscape Unit	Area_OLD	Primary BEC	AREA_OLD	CORE	SI	Pine_%	At%	New Rank	R-class	Adj	Interior	Struct	B'ry Review	Alternative	Recommendation	Visited? Ortho Field GIS	Comments
124	59	Gosnel	53	ESSFmc	1	0	0	0	0	1	L	M	M	E	N	N	N	F,O,G	
244	116	Thautil	94	ESSFmc	2	0	-1	0	0	1	L	M	M	M	N	N	N	O,G	
291	74	Thautil	46	ESSFmc	1	1	0	0	0	2	L	N	N		N	N	N	O,G	
130	98	Gosnel	86	ESSFmc	2	0	0	0	0	2	L	N	L	M	N	N	N	F,O,G	adjacent to 133, see Photo 133 A
164	132	Gosnel	102	ESSFmc	3	0	-1	0	0	2	L	N	M	M	N	N	N	F,O,G	Wetland inclusion.
126	188	Gosnel	167	ESSFmc	3	1	1	0	0	5	M	M	E	E	N	N	N	F,O,G	adjacent to to No Harvest Zone
293	94	Thautil	46	ESSFmc	1	1	0	0	0	2	L	N	L	M	N	M	P	F,O,G	Photos 293 A,B; GULLY
133	148	Gosnel	118	ESSFmc	3	0	0	0	0	3	M	L	E	E	N	N	P	F,O,G	Photo 133 A; adjacent to 130, and is better candidate due to riparian
300	272	Thautil	202	ESSFmc	5	2	-1	0	0	6	M	N	M	M	N	N	P	F,O,G	Photo 300 A
183	722	Gosnel	707	ESSFmc	10	5	7	0	0	22	H	L	L	M	N	N	Y	F,O,G	Photos 183 A,B,C,D; N-aspect;adjacent to no harvest zone
192	32	Gosnel	30	ESSFmc	0	0	-1	0	0	-1	L	M	E	E	N	N	Y	F,O,G	Photo 192 A; Small, valley bottom riparian

282	233	Thautil	125	ESSFmc	3	3	-1	0	0	5	M	N	M	M	N	N	Y	F,O,G	
169	373	Morice_Lake	362	ESSFmc_SBSmc	5	4	5	0	0	14	H	N	M	M	N	N	Y	F,O,G	
161	680	Gosnel	587	ESSFmc	10	4	3	0	0	17	H	L	E	E	N	N	Y	F,O,G	Photos 161 A,B,C; valley bottom to avalanche tracks
294	726	Thautil	677	ESSFmc	10	5	5	0	0	20	H	N	L	M	N	N	Y	F,O,G	Photos 294 A,B,C,D, E; good elevational connectivity
Y sum =	2,767		2,487																

Table 14. Thautil - Gosnel HBEA ESSFmk

OGMA_NUM	Total Area	Landscape Unit	Area_OLD	Primary BEC	AREA_OLD	CORE	SI	Pine_%	At%	New Rank	R-class	Adj	Interior	Struct	B'ry Review	Alternative	Recommendation	Visited? Ortho Field GIS	Comments
181	54	Gosnel	44	ESSFmk	1	0	-1	0	0	0	L	N	L	M	N	N	N	F,O,G	
173	54	Gosnel	53	ESSFmk	1	0	0	0	0	1	L	M	M	M	N	N	Y	F,O,G	
176	103	Burnie	92	ESSFmk	2	0	0	0	0	2	L	E	E	E	Y	N	Y	F,O,G	Join along Lake to 173
186	208	Gosnel	203	ESSFmk	5	3	1	0	0	9	H	N	L	L	N	N	Y	F,O,G	
174	285	Gosnel	253	ESSFmk	5	3	3	0	0	11	H	L	L	M	N	N	Y	F,O,G	Photo 174 A
Ysum =	650		601																

GENERAL FOREST AREA SBSdk

		Spatial Target	COGMAs ha	% of establishment target
9. General Forested Area	SBSdk	2,644	3,102	117%

The SBSdk is the lowest elevation variant and has the highest level of natural and man-made disturbance, and the least area remaining as older forests. It is also the area with the most private land, grazing leased land and the longest harvest/development history in the LRMP. Biologically it has high productivity with the longest growing season. It is therefore biologically important, yet there were therefore fewer good old forest areas to choose from.

We did note however three that provide biologically higher quality COGMAs (still within the rules constraints). The comments column indicates where these alternates are relative to COGMAs 115, 121, and 301. 121 is located on the west side of Owen Lake and it is recommended that the partial harvesting areas be removed from this unit. Potential additional COGMA may be located further south on Owen Lake in a small drainage emptying into a small bay.

Mature and old aspen and pine are included in a number of recommended COGMAs because there was a lack of spruce / balsam leading old forest stands. Inclusion of some OGMAs such as 142 though high in old aspen represent some of older forest diversity in this variant we suggest they contribute to older forest conservation. Unit 165 is recommended despite an 80% pine stand composition because this unit includes forests adjacent to and including the Owen Creek floodplain. The Morice River HBEA also contains the SBSdk variant.

COGMA 81 This COGMA is one of a group that provides some degree of old forest connectivity from Owen valley to Shelford Hills. The units follow creeks and are narrow and do habitat interior older forest habitat.

COGMA 284 (left)This 93 ha COGMA follows a small drainage and it contains 37% interior forest habitat. This COGMA contains 40% cottonwood, 40% spruce with minor aspen and pine. .It is recommended.

COGMA 301 This small (29ha) COGMA is on a north aspect in the SBSdk. North aspects shows higher proportions of older forests as disturbance frequency is lower. The warmer south aspects remain in pine and aspen in many cases continually. It is bounded by the powerline at the base of the slope

Table 15. General Forested Area SBSdk

. General Forested Area SBSdk

OGMA_NUM	Total Area	Landscape Unit	Area_OLD	Primary BEC	AREA_OLD	CORE	SI	Pine_%	At%	New Rank	R_Class	Adj	Interior	Struct	B'ry Review	Alternative	Recommendation	Visited? Ortho Field GIS	Comments
83	37	Nadina	28	SBSdk	0	0	0	-2	0	-2	L	N	N	N	N	N	N	F,O,G	
100	35	Parrotts	30	SBSdk	0	0	0	-2	0	-2	L	N	N	N	N	N	N	F,O,G	
160	41	Buck	39	SBSdk	0	0	0	-2	0	-2	L	N	N	N	N	N	N	F,O,G	
89	27	Parrotts	27	SBSdk	0	0	0	-1	0	-1	L	N	N	N	N	N	N	F,O,G	
78	46	Nadina	46	SBSdk	1	1	0	-3	0	-1	L	N	N	L	N	N	N	F,O,G	
77	142	Nadina	141	SBSdk	3	1	1	-2	0	3	H	N	L	N	N	N	N	O,G	70% pine
148	123	Parrotts	121	SBSdk	3	1	3	-3	0	4	H	M	L	N	N	N	N	O,G	81% pine
41	31	Whitesail	27	SBSdk	0	0	0	-3	0	-3	L	E	M	L	Y	N	P	O,G	portion of island in reservoir
101	34	Parrotts	31	SBSdk	0	0	0	-2	0	-2	L	N	M	L	N	N	P	F,O,G	
134	38	Parrotts	36	SBSdk	0	0	0	-2	0	-2	L	M	M	L	N	N	P	O,G	
238	40	Buck	39	SBSdk	0	0	0	-2	0	-2	L	N	N	L	Y	N	P	F,O,G	Consider adding slope at NW corner
111	46	Parrotts	44	SBSdk	1	0	0	-2	0	-1	L	L	M	L	Y	N	P	O,G	Take bound to road N end, reduce on west
116	57	Parrotts	56	SBSdk	1	0	0	-2	0	-1	L	M	L	L	N	N	P	O,G	
118	32	Parrotts	32	SBSdk	0	0	0	-1	0	-1	L	M	M	N	Y	N	P	O,G	expand to wetland and road at S end
138	42	Owen	39	SBSdk	0	0	0	-1	0	-1	L	E	N	N	Y	N	P	F,O,G	extend to lakes at S & N ends; incl stands around Klate L.
295	41	Valley	30	SBSdk	0	0	-1	0	0	-1	L	M	N	L	N	N	P	F,O,G	NE & SE mod. to steep aspects
145	38	Owen	38	SBSdk	0	0	0	0	-2	-2	L	N	N	N	N	N	Y	F,O,G	aspen spruce minor balsam
104	40	Nadina	40	SBSdk	1	0	0	-2	0	-1	L	M	M	M	N	N	Y	F,O,G	receiving wetland
285	33	Valley	33	SBSdk	0	0	-1	0	0	-1	L	N	N	N		N	Y	F,O,G	
287	35	Valley	35	SBSdk	0	0	-1	0	0	-1	L	L	N	N	N	N	Y	F,O,G	Ep-S (birch-spruce)
113	49	Parrotts	47	SBSdk	1	0	1	-2	0	0	L	E	L	L	N	N	Y	O,G	adjacent to wetlands
131	41	Parrotts	40	SBSdk	1	0	1	-2	0	0	L	M	L	N	N	N	Y	O,G	Old aspen

142	107	Owen	75	SBSdk	1	0	1	0	-2	0	L	M	M	N		N	Y	F,O,G	aspen 51%, spruce 40%; pine 5%
149	53	Parrotts	49	SBSdk	1	0	0	-1	0	0	L	N	M	L	N	N	Y	O,G	
228	44	Buck	32	SBSdk	0	0	0	0	0	0	L	N	N	N	N	N	Y	F,O,G	
241	54	Buck	48	SBSdk	1	0	0	-1	0	0	L	N	M	N	Y	N	Y	F,O,G	exclude harvested at N end
288	60	Valley	39	SBSdk	0	0	1	0	-1	0	L	E	N		N	N	Y	F,O,G	lowest elevation unit on Morice River adjacent to floodplain
301	29	Valley	29	SBSdk	0	0	0	0	0	0	L	N	N	L	N	Y	Y	O,G	Photos 301 A,B; Consider 200+ yr stand at S end Gilmore L, 4.7 km NW
63	47	Nadina	40	SBSdk_mc2	1	0	0	0	0	1	M	N	N	M	Y	N	Y	O,G	expand to wetlands to E
69	73	Nadina	72	SBSdk	1	0	0	0	0	1	M	L	L	M	N	N	Y	O,G	
82	42	Nadina	41	SBSdk	1	0	1	-1	0	1	M	L	N	L	Y	N	Y	O,G	adjust boundary out of clearcut, remove partial harvest
115	44	Owen	41	SBSdk	1	0	0	0	0	1	M	N	N	L	Y	Y	Y	O,G	some partial harvest enclosed, see forest/wetland in bays to S
120	82	Parrotts	82	SBSdk_mc2	2	0	1	-2	0	1	M	M	L	L	N	N	Y	O,G	Old aspen
188	84	Owen	70	SBSdk	1	0	0	0	0	1	M	N	L	L	N	N	Y	O,G	straddles
248	51	Buck	46	SBSdk	1	0	0	0	0	1	M	M	M	L	N	N	Y	O,G	
175	84	Buck	80	SBSdk	2	0	0	0	0	2	M	E	E	L	N	N	Y	O,G	
165	133	Owen	117	SBSdk	3	0	3	-3	0	3	H	E	M	L	N	N	Y	O,G	Owen creek flooplain.
284	93	Buck	89	SBSdk	2	0	1	0	0	3	H	L	M	L	N	N	Y	O,G	Photo 284; 40% Act
275	128	Buck	117	SBSdk	3	1	1	0	0	5	H	N	M	L	N	N	Y	O,G	grassy inclusion
289	237	Buck	102	SBSdk	3	2	3	-1	0	7	H	N	L	L	N	N	Y	O,G	Photos 289 A,B,C,D; grassy inclusion, 38% pine
81	175	Nadina	155	SBSdk	3	2	5	-1	0	9	H	N	L	N	N	N	Y	F,O,G	Photo 81; elevational connectivity group
121	212	Owen	159	SBSdk	3	3	5	0	0	11	H	L	N	L	Y	Y	Y	F,O,G	remove part cut by lake; see forest/wetland in bays to S
88	269	Nadina	222	SBSdk	5	1	10	-1	0	15	H	N	L	L	N	N	Y	O,G	
136	319	Owen	243	SBSdk	5	4	7	-1	0	15	H	L	N	L	Y	N	Y	O,G	43% pine, extend to include pond at S end
187	326	Owen	266	SBSdk_mc2	5	2	10	-1	0	16	H	N	L	L	N	N	Y	O,G	Straddles SBSmc2 See Morice River HBEA for bdry changes
Y sum	2,983		2,448																

GENERAL FOREST AREA (SBSmc2 and SBSwk3)

This variant is the largest in the LRMP with the largest OGMA budget and the highest number of COGMAs delineated. COGMAs were well distributed through the entire variant. One third of the COGMA area had to be removed to reach the spatial target. The lowest ranked COGMAs were assigned a preliminary No based solely on GIS ranking. COGMAs not classified from the air were classified using Ortho or Landsat on adjacent and interior enduring features. Pine was used as a surrogate for older stand structure with the assumption that the less pine meant a greater time since the last stand initiating event and the better the older stand structure would be. Stand structure classes were not assigned to many areas when the decision could be made on GIS rank, size, species composition. Each COGMA location was reviewed and the proximity to other COGMAs and long term retention was reviewed. Whether the COGMAs were in or out of the Timber Harvest Land Base was not known. Preference for selection was given to larger COGMAs with some percentage of Core Habitat and a range of productivity classes. Since the new rank has a bias against smaller units all units reguardless of size were reviewed. Small units initially assigned No where considered for upgrade to Potential or Yes based on the quality of external and internal features. Small COGMAs on lakes and along streams and wetlands were reclassified to Y or P whenever possible. Small COGMAs that had high percentages of unusual trees such as balsam, black spruce and spruce hybrids when noted in the COGMA data base were also reclassified and notes added into the comments section on these features that influenced the decision. Some old aspen COGMAs are recommended as in some sites these may have had prolonged site occupation and represent an element of old forest diversity that is a characteristics of the forests of this LRMP. Larger COGMAs were also classified downward if they are in proximity of other similar or better quality COGMAs, adjacent to No harvest zones or Parks with a similar landscape position, internal and external features. The aim was reduce redundancy when possible.

The aim of this review of all units is based on the concept of complementarity and the understanding that the best conservation design includes all of the diversity available for the older forests in the LRMP.

		Spatial Target	COGMAs ha	% of establishment target
10. General Forested Area	SBSmc2 & SBSwk3	45,247	60,210	133%

COGMA 250 . This valley bottom COGMA is in the Gosnel Landscape Unit west of the Thautil/Gosnel HBEA. This 328 ha COGMA scored as an 11 in the overall new rank and is recommended.

COGMA 292. This 276 ha COGMA is situated west of Houston at the upper elevational range of the SBSmc2. The forest in the foreground is in the COGMA but it does not include the area between the clearcuts. The largest COGMA in the LRMP 307 (6553ha) begins above the clear cuts and extends through the ESSFmc to the alpine.

COGMA 329 This 90 ha COGMA is above the road in the Fulton LU and represents a mesic site with deep well drained soils.

COGMA 331. This 102 ha COGMA in the Fulton LU has a short section on the small lake as is recommended.

COGMA 342. This 97 ha COGMA is in a currently unroaded and unlogged section of the Fulton LU. The location of this COGMA was only possible with GPS when doing the aerial field work. The unit is rated as N for no adjacent contrasting habitat and N for no interior contrasting habitat. It is recommended

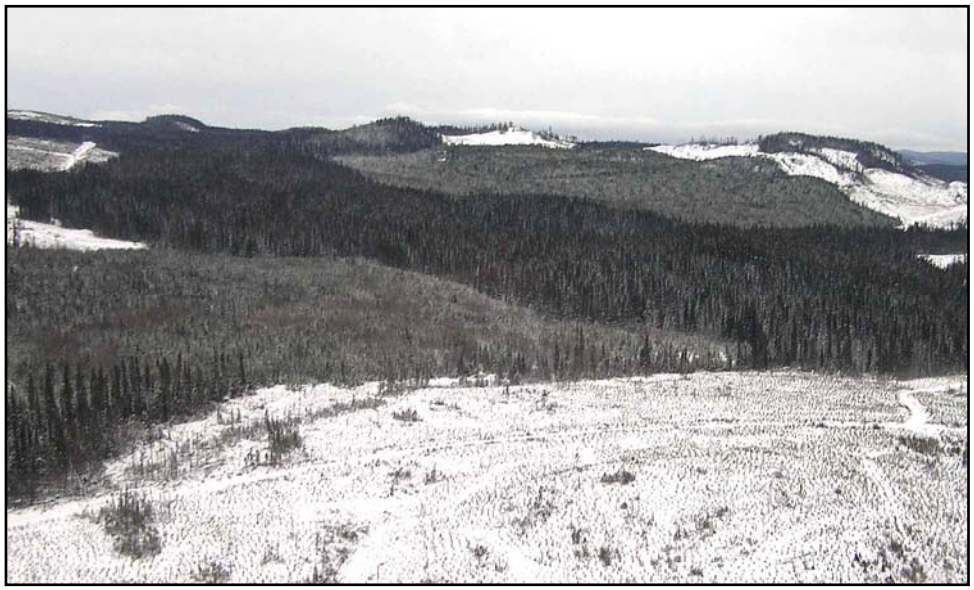
COGMA 350. This COGMA is the forest around the lake and is classified as having excellent interior habitat. This forest has 29% black spruce component which is one of the highest percentages of black spruce in all the COGMAs.

COGMA 353. Situated on Big Loon Lake this 69 ha COGMA has excellent adjacency but is noted as a potential candidate because it has a 36% aspen 14% pine a, 50% spruce and lacks older stand structure. All the potential candidates may depend on the outcome of timber supply analysis to be moved into the final selected OGMAs.

COGMA 369. This 46 ha alluvial fan in the foreground on the right is on Fulton Lake and is recommended despite it's small size. It is 2 of two COGMAs with lakeshore adjacency on Fulton Lake. It has 44% pine and 55% spruce components. It was noted as having excellent older structure.

COGMA 385 This COGAM is situated on the north side of Fulton Lake but does not extend to the lake due to past logging and roads. I is recommended unit with 39% pine component.

COGMA 381. This 103 ha COGMA is the second COGMA located on Fulton L is recommended although it has 58% pine it represents a moisture receiving site with low slope into the lake.



COGMA 414. This 69 ha COGMA is recommended as it represents middle slope in the North Babine LU. It has 30% core habitat.

Table 16. General Forested Area SBSmc2 and SBSwk3

OGMA_NUM	Total Area	Landscape Unit	Area_OLD	Primary BEC	AREA_OLD	CORE	SI	Pine_%	At%	New Rank	R-class	Adj	INTERIOR	Struct	B'ry Review	Alternative	Recommendation	Visited? Ortho Field GIS	Comments
232	39	Houston_Tommy	39	SBSmc2	0	0	-1	-3	0	-4	L	N	N				N	G.	
35	37	Tahtsa	34	SBSmc2	0	0	-1	-2	0	-3	L	N	N				N	G.	
56	28	Tahtsa	27	SBSmc2	0	0	-1	0	-2	-3	L	N	N		Y	N	N	F,G	move boundary to E lake
117	29	Nadina	29	SBSmc2	0	0	-1	-2	0	-3	L	N	N				N	G.	
330	38	Fulton	37	SBSmc2	0	0	-1	-2	0	-3	L	N	N				N	G.	
21	30	Whitesail	30	SBSmc2	0	0	0	-2	0	-2	L	N	N				N	G.	borders on reservioir
43	27	Nadina	27	SBSmc2	0	0	-1	-1	0	-2	L	N	N				N	G.	

49	79	Nadina	65	SBSmc2	1	0	-1	-2	0	-2	L	N	M	M	N	N	N	F,G	
85	40	Nadina	40	SBSmc2	0	0	-1	-1	0	-2	L	N	N				N	G.	
102	33	Nadina	32	SBSmc2	0	0	-1	-1	0	-2	L	N	N				N	G.	
337	41	Fulton	41	SBSmc2	1	0	-1	-2	0	-2	L	L	M	M	N	N	N	F,G	No photos; 1 of 3 (337, 340, 341, - road fragmented) Prefer 347
351	56	Fulton	56	SBSmc2	1	0	0	-3	0	-2	L	N	N				N	G.	
362	31	Fulton	30	SBSmc2	0	0	0	-2	0	-2	L	N	L	M	N	N	N	F,G	Too small, structure good
8	86	Whitesail	86	SBSmc2	2	0	0	-3	0	-1	L	E	N				N	G.	Borders on reservioir
30	68	Whitesail	60	SBSmc2	1	0	1	-3	0	-1	L	E	L	L	N	N	N	F,G	
36	53	Tahtsa	53	SBSmc2	1	0	-1	-1	0	-1	L	E	N				N	G.	
42	36	Tahtsa	34	SBSmc2	0	0	-1	0	0	-1	L	N	N				N	G.	
66	58	Nadina	58	SBSmc2	1	0	-1	-1	0	-1	L	N	L	L	N	N	N	F,G	Photo 66; 250+ yrs. Old
71	42	Nadina	42	SBSmc2	1	0	-1	-1	0	-1	L	N	N				N	G.	
96	100	Kidprice	86	SBSmc2	2	0	0	-3	0	-1	L	N	N				N	G.	
247	31	Gosnel	31	SBSmc2	0	0	-1	0	0	-1	L	N	L	M	N	N	N	F,G	Photo 247
303	32	Valley	31	SBSmc2	0	0	-1	0	0	-1	L	N	N				N	G.	
343	50	Topley	49	SBSmc2	1	0	0	-2	0	-1	L	N	N				N		
377	45	Fulton	45	SBSmc2	1	0	0	-2	0	-1	L	L	L	M	N	N	N	F,G	
379	31	Fulton	31	SBSmc2	0	0	-1	0	0	-1	L	N	N				N	G.	
383	32	Fulton	32	SBSmc2	0	0	0	-1	0	-1	L	N	N				N	G.	
384	33	Fulton	32	SBSmc2	0	0	-1	0	0	-1	L	N	N				N	G.	
441	42	North_Babine	42	SBSmc2	1	0	1	-1	-2	-1	L	N	L	N	N	N	N	F,G	Pl & At, no structure; small
447	36	North_Babine	36	SBSmc2	0	0	0	-1	0	-1	L	E	L	N	N	N	N	F,G	Photo 447;
454	44	Tochcha_Natowite	43	SBSmc2	1	0	-1	-1	0	-1	L	M	N	M	N	N	N	F,G	
495	39	North_Babine	39	SBSmc2	0	0	-1	0	0	-1	L	N	N				N	G	group of 3 with 497 and 500
497	38	North_Babine	38	SBSmc2	0	0	-1	0	0	-1	L	N	N				N	G	group of 3 with 495 and 500
502	41	Morrison	41	SBSmc2	1	0	-1	-1	0	-1	L	N	N	M	N	N	N	F,G	
546	51	Morrison	51	SBSmc2	1	0	0	-2	0	-1	L	N	N	E	N	N	N	F,G	
34	52	Tahtsa	52	SBSmc2	1	0	0	-1	0	0	L	N	N				N	G.	
50	51	Tahtsa	51	SBSmc2	1	0	0	-1	0	0	L	N	N				N	G.	
94	64	Kidprice	64	SBSmc2	1	0	-1	0	0	0	L	N	N				N	G.	
107	64	Kidprice	64	SBSmc2	1	0	-1	0	0	0	L	N	N				N	G.	
144	68	Buck	68	SBSmc2	1	0	0	-1	0	0	L	N	N				N	G.	
150	72	Buck	68	SBSmc2	1	0	0	-1	0	0	L	N	N				N	G.	

153	56	Kidprice	47	SBSmc2	1	0	-1	0	0	0	L	N	L				N	G.	
154	42	Parrotts	41	SBSmc2	1	0	-1	0	0	0	L	N	L				N	G.	
166	47	Parrotts	47	SBSmc2	1	0	-1	0	0	0	L	N	N				N	G.	
242	43	Buck	42	SBSmc2	1	0	1	-1	-1	0	L	N	N				N	G.	
243	52	Houston_Tommy	47	SBSmc2	1	0	-1	0	0	0	L	N	N				N	G.	
324	86	Fulton	79	SBSmc2	1	0	0	-1	0	0	L	N	N				N	G.	Photos 324 A,B
341	93	Fulton	76	SBSmc2	1	0	-1	0	0	0	L	M	L	N	N	N	N	F,G	No photos; 1 of 3 (337, 340, 341, - road fragmented) Prefer 347
344	53	North_Babine	53	SBSmc2	1	0	1	0	-2	0	L	E	N	L	N	N	N	F,G	Babine lakeshore, bissected by road
378	47	North_Babine	47	SBSmc2	1	0	-1	0	0	0	L	N	L	L	N	N	N	F,G	Photos 378 A,B; small, isolated, bedrock contolled
393	49	Tochcha_Natowite	48	SBSmc2	1	0	0	-1	0	0	L	N	N				N	G.	
408	42	Fulton	41	SBSmc2	1	0	-1	0	0	0	L	N	N				N	G.	
416	60	North_Babine	59	SBSmc2	1	0	1	-1	-1	0	L	E	L	N	N	N	N	G.	aspen; Newman Peninsula
537	47	Morrison	47	SBSmc2	1	0	0	-1	0	0	L	N	N				N	G	
541	52	Morrison	46	SBSmc2	1	0	0	-1	0	0	L	N	L	L	N	N	N	F,G	
98	61	Kidprice	61	SBSmc2	1	1	-1	-1	0	0	L	N	N				N	G.	
306	88	Valley	80	SBSmc2	2	0	1	-2	0	1	M	N	L				N	G.	
387	78	North_Babine	78	SBSmc2	1	0	1	-1	0	1	M	N	L	L	N	N	N	F,G	Photos 387 A,B; creek gully, narrow
398	79	Tochcha_Natowite	77	SBSmc_wk	1	0	1	-1	0	1	L	N	N				N	G.	
206	83	Houston_Tommy	83	SBSmc2	2	1	1	-3	0	1	M	N	N				N	G.	
209	76	Houston_Tommy	76	SBSmc2	1	1	1	-2	0	1	M	N	N				N	G.	
254	65	Buck	65	SBSmc2	1	1	0	-1	0	1	M	N	N				N	G.	
430	78	Fulton	74	SBSmc2	1	1	0	-1	0	1	M	N	L	M	Y	N	N	F,G	Photos 430 A,B
114	134	Kidprice	121	SBSmc2	3	0	1	-2	0	2	M	N	N				N	G.	
125	84	Parrotts	83	SBSmc2	2	0	1	-1	0	2	M	N	N				N	G.	49 % pine
70	91	Nadina	90	SBSmc2	2	1	1	-2	0	2	L	N	N				N	G.	
105	97	Nadina	93	SBSmc2	2	1	1	-2	0	2	L	N	N				N	G.	
215	74	Houston_Tommy	74	SBSmc2	1	1	1	-1	0	2	M	N	N				N	G.	
463	74	Granisle	74	SBSmc2	1	1	1	-1	0	2	M	N	N				N	G	29% pine
31	137	Tahtsa	126	SBSmc2	3	1	0	-1	0	3	M	N	M	M	N	N	N	F,G	
336	92	Fulton	90	SBSmc2	2	1	1	-1	0	3	M	N	L	E	N	N	N	F,G	Photo 336
29	112	Tahtsa	112	SBSmc2	3	2	1	-2	0	4	M	N	N				N	G.	
110	173	Nadina	163	SBSmc2	3	1	3	-2	0	5	M	N	N				N	G.	

361	138	Fulton	130	SBSmc2	3	2	3	-2	0	6	M	N	M	N	N	N	N	F,G	
503	30	Tochcha_Natowite	30	SBSwk3	0	0	-1	0	0	-1	L	M	N				P	G	minor lake shore
123	72	Parrotts	71	SBSmc2	1	0	1	-2	0	0	L	E	N				P	G.	Lakeshore: 59% pine
221	59	Thautil	50	SBSmc2	1	0	-1	0	0	0	L	N	L				P	G.	
368	49	Fulton	47	SBSmc2	1	0	-1	0	0	0	L	N	N				P	G.	
397	32	Fulton	32	SBSmc2	0	0	0	0	0	0	L	N	N				P	G.	
500	44	North_Babine	44	SBSmc2	1	0	-1	0	0	0	L	N	N				P	G	group of 3 with 497 and 495
538	35	Morrison	35	SBSmc2	0	0	0	0	0	0	L	N	N				P	G	
7	67	Whitesail	64	SBSmc2	1	0	0	0	0	1	L	N	N				P	G.	
155	56	Buck	56	SBSmc2	1	0	1	-1	0	1	M	M	N				P	G.	joins two small lakes 36%pine: 64% spruce
346	86	North_Babine	76	SBSmc2	1	0	1	0	-1	1	M	E	N	L	M	N	P	F,G	Photos 346 A,B,C,D,E,F,G; Babine lakeshore, bissected by road
354	46	North_Babine	46	SBSmc2	1	0	0	0	0	1	M	N	N	L	N	N	P	G.	Photos 354 A,B,C,D; fragmented by roads; Big Loon L group (352,353,354)
358	41	North_Babine	41	SBSmc2	1	0	0	0	0	1	M	N	N				P	G.	
375	53	Fulton	44	SBSmc2	1	0	0	0	0	1	M	N	N				P	G.	
415	62	Fulton	62	SBSmc2	1	0	0	0	0	1	M	N	N				P	G.	
426	59	Granisle	57	SBSmc2	1	0	0	0	0	1	M	N	N				P	G.	
427	48	Tochcha_Natowite	48	SBSmc2	1	0	0	0	0	1	M	N	N				P	G.	
436	63	Tochcha_Natowite	62	SBSwk3	1	0	0	0	0	1	L	L	L				P	G	
498	67	Morrison	67	SBSmc2	1	0	0	0	0	1	M	N	L	M	N	N	P	F,G	Photo 498; On a creek; but small
517	51	Morrison	51	SBSmc2	1	0	0	0	0	1	M	N	L	M	N	N	P	F,G	
556	46	Morrison	45	SBSmc2	1	0	0	0	0	1	M	N	N				P	G	Small
562	63	Morrison	63	SBSmc2	1	0	0	0	0	1	M	N	N				P	G	
312	80	Valley	72	SBSmc2	1	1	1	-2	0	1	M	M	N	L	N	N	P	F,G	Photos 312 A,B; Granisle Rd boundary
340	51	Fulton	51	SBSmc2	1	1	-1	0	0	1	M	N	L	M	N	Y	P	F,G	No photos; 1 of 3 (337, 340, 341, - road fragmented)
353	69	North_Babine	69	SBSmc2	1	1	0	0	-1	1	M	E	N	L	N	N	P	F,G	Photos 353 A,B,C,D,E;Big Loon L group (352,353,354); aspen & pine
16	112	Whitesail	92	SBSmc2	2	0	1	-1	0	2	L	E	L	L	N	N	P	F,G	Photo 16; Reservoir Island "flat" (or take 30, not both)
112	97	Parrotts	90	SBSmc2	2	0	1	-1	0	2	M	M	N				P	G.	minor lake shore: 30% pine, 55 spruce; 13% balsam
172	87	Kidprice	87	SBSmc2	2	0	1	-1	0	2	M						P	G.	Mainstem of Lamprey Ck: 37% pine

433	93	North_Babine	89	SBSmc2	2	0	1	0	-1	2	M	E	L	L	N	N	P	F,G	Rocky Pennisula into Babine L, has old overgrown road
514	81	Morrison	80	SBSmc2	2	0	0	0	0	2	M	N	L	M	N	Y	P	F,G	
103	135	Nadina	134	SBSmc2	3	1	1	-2	0	3	M	N	N	M	N	N	P	F,G	
316	113	Valley	105	SBSmc2	3	1	1	-2	0	3	M	L	N	L	N	N	P	F,G	
333	100	Fulton	96	SBSmc2	2	1	1	-1	0	3	M	N	N				P	G.	
451	101	Tochcha_Natowite	95	SBSwk3	2	1	1	-1	0	3	L	N	N	M	N	N	P	F,G	25% pine
472	97	Morrison	97	SBSmc2	2	1	1	0	-1	3	M	N	N	L	N	N	P	F,G	471, 472, 479, 486 have similar landscape position / redundancy
494	74	Morrison	73	SBSmc2	1	1	1	0	0	3	M	N	L	M	Y	N	P	F,G	
57	175	Nadina	168	SBSmc2	3	1	1	-1	0	4	M	N	L	M	N	N	P	F,G	narrow unit
203	112	Buck	112	SBSmc2	3	1	1	-1	0	4	M	N	M				P	G.	
386	106	North_Babine	106	SBSmc2	3	1	1	-1	0	4	M	N	L	L	N	N	P	F,G	Photo 386
406	106	North_Babine	105	SBSmc2	3	1	1	-1	0	4	M	L	M	M	N	N	P	F,G	41% Pine
418	115	Fulton	102	SBSmc2	3	1	1	-1	0	4	M	N	N				P	G.	
459	132	Fulton	128	SBSmc2	3	1	1	-1	0	4	M	L	N				P	G	Pine 49%
349	125	Fulton	112	SBSmc2	3	2	1	-2	0	4	M	N	L	M	N	N	P	F,G	
223	162	Gosnel	154	SBSmc2	3	2	1	-1	0	5	M	N	N				P	G.	Adjacent to Thautil HBEA
395	130	Tochcha_Natowite	128	SBSmc2	3	2	1	-1	0	5	M	N	N	M	N	N	P	F,G	
423	189	Fulton	178	SBSmc2	3	2	1	-1	0	5	M	L	L	M	Y	N	P	F,G	Photos 423 A,B,C; Type out Pl?
490	116	Morrison	116	SBSmc2	3	2	1	-1	0	5	M	N	N				P	G	Similar to 492
210	152	Buck	147	SBSmc2	3	3	1	-1	0	6	H	N	L				P	G.	Pine 43%
216	146	Houston_Tommy	138	SBSmc2	3	3	1	-1	0	6	H	N	N				P	G.	
359	143	Fulton	124	SBSmc2	3	3	1	-1	0	6	M	N	L	L	N	N	P	F,G	Photos 359 A,B,C
446	192	North_Babine	190	SBSmc2	3	3	1	-1	0	6	M	N	N				P	G	27% pine
97	227	Kidprice	217	SBSmc2	5	2	1	-1	0	7	H	N	N	M	N	N	P	F,G	Some 250+ yrs.
364	118	Fulton	118	SBSmc2	3	2	5	-2	0	8	H	N	L	M	N	N	P	F,G	61% pine
106	406	Nadina	22	SBSmc2	0	5	7	-2	0	10	H	N	N				P	G.	65% pine, mostly young
47	33	Tahtsa	33	SBSmc2	0	0	-1	0	0	-1	L	E	N	E	N	N	Y	F,G	peninsula
109	78	Kidprice	77	SBSmc2	1	0	-1	-1	0	-1	L	E	N				Y	G.	Borders lake; consider just the portion adjacent to the lake, not thin extension
491	40	North_Babine	39	SBSmc2	0	0	-1	0	0	-1	L	E	N	M	N	N	Y	F,G	Photo 491 A,B ; Fan into Babine L; small unit
62	73	Nadina	69	SBSmc2	1	0	0	-1	0	0	L	N	N	E	G	N	Y	F,G	unit split by road
73	87	Nadina	73	SBSmc2	1	0	-1	0	0	0	L	E	N				Y	G.	Borders on Nadina Lake

132	40	Parrotts	40	SBSmc2	1	0	0	-1	0	0	L	E	N				Y	G.	Lakeshore middle Parrot L. Spruce 65%
170	31	Owen	31	SBSmc2	0	0	0	0	0	0	L	N	N				Y	G.	
200	48	Buck	42	SBSmc2	1	0	-1	0	0	0	L	N	N				Y	G.	
231	27	Houston_Tommy	25	SBSmc2	0	0	0	0	0	0	L	L	N				Y	G.	
399	42	Tochcha_Natowite	42	SBSmc2	1	0	0	-1	0	0	L	E	N	M	N	N	Y	F,G	
400	45	North_Babine	44	SBSmc2	1	0	-1	0	0	0	L	L	L	M	N	N	Y	F,G	
412	47	North_Babine	45	SBSmc2	1	0	-1	0	0	0	L	N	N	M	N	N	Y	F,G	
425	40	North_Babine	39	SBSmc2	0	0	0	0	0	0	L	E	L	N	N	N	Y	F,G	
438	53	Tochcha_Natowite	53	SBSmc2	1	0	0	-1	0	0	L	E	N				Y	G	Lakeshore
466	62	Tochcha_Natowite	62	SBSmc2	1	0	0	-1	0	0	L	E	N	M	N	N	Y	F,G	Photo 466; prefer 461, older & with core
19	79	Whitesail	79	SBSmc2	1	0	0	0	0	1	L	N	N	E	Y	N	Y	F,G	
45	72	Tahtsa	72	SBSmc2	1	0	0	0	0	1	L	L	N	L	N	N	Y	F,G	only available unit between Sheldon Hills and Ootsa
92	70	Nadina	61	SBSmc2	1	0	0	0	0	1	L	N	N				Y	G.	
156	69	Parrotts	69	SBSmc2	1	0	0	0	0	1	M	N	N				Y	G.	west of Parrotts L
299	60	Valley	59	SBSmc2	1	0	0	0	0	1	M	N	N				Y	G.	79% balsam
304	63	Valley	63	SBSmc2	1	0	0	0	0	1	M		E				Y	G.	Lakeshore south aspect
311	54	Valley	52	SBSmc2	1	0	0	0	0	1	M	N	N				Y	G.	
313	56	Valley	56	SBSmc2	1	0	0	0	0	1	M	N	L	E	N	N	Y	F,G	Photos 313 A,B,C,D
321	51	Topley	51	SBSmc2	1	0	0	0	0	1	M	N	N	M	N	N	Y	F,G	Photos 321 A,B; Isolated but good structure, mid elevation
352	58	North_Babine	58	SBSmc2	1	0	0	0	0	1	M	N	N	L	N	N	Y	F,G	fragmented by roads; Big Loon L group (352,353,354)
369	46	Fulton	45	SBSmc2	1	0	1	-1	0	1	M	E	N	E	N	N	Y	F,G	Photos 369 A,B,C,D; small
392	53	Tochcha_Natowite	53	SBSmc2	1	0	0	0	0	1	M	E	N	M	N	N	Y	G.	388, 392, 394 separated by roads; 392, 394 are lakeshore
414	69	North_Babine	68	SBSmc2	1	0	0	0	0	1	M	N	N	L	N	N	Y	F,G	Photo 414; only structure at mid-elevation; small
437	68	North_Babine	68	SBSmc2	1	0	0	0	0	1	M	N	N				Y	G	
442	85	North_Babine	85	SBSmc2	2	0	1	0	-2	1	M	E	N				Y	G	Babine lakeshore 52% aspen, 30% spruce 15% pine.
443	57	Granisle	53	SBSmc2	1	0	0	0	0	1	M	N	N				Y	G	76% balsam
444	65	Tochcha_Natowite	65	SBSmc2	1	0	0	0	0	1	M	E	N				Y	G	lakeshore
456	70	Tochcha_Natowite	70	SBSmc2	1	0	0	0	0	1	M	L	N	M	N	N	Y	F,G	

481	42	Tochcha_Natowite	42	SBSmc2	1	0	0	0	0	1	M	N	N				Y	G	
548	93	Morrison	81	SBSmc2	2	0	0	-1	0	1	M	M	L	M	N	N	Y	F,G	Lake on N end
440	68	Granisle	68	SBSmc2	1	1	-1	0	0	1	M	N	N				Y	G	76% balsam
461	67	Tochcha_Natowite	65	SBSmc2	1	1	-1	0	0	1	M	E	N	M	N	N	Y	F,G	Photos 461 A,B,C; 200 YRS+; see 466 as less desirable other option
534	49	Morrison	49	SBSmc2	1	1	-1	0	0	1	M	L	L				Y	G	
40	92	Tahtsa	91	SBSmc2	2	0	0	0	0	2	L	E	N	M	N	N	Y	F,G	wide peninsula
129	62	Owen	61	SBSmc2	1	0	1	0	0	2	M	N	N				Y	G.	63% spruce, 35% balsam
143	126	Kidprice	79	SBSmc2	1	0	1	0	0	2	M	N	E				Y	G.	mainstem of Lamprey Ck
213	69	Houston_Tommy	68	SBSmc2	1	0	1	0	0	2	M	N	N				Y	G.	Highest spruce (80%) in the area
257	86	Thautil	84	SBSmc2	2	0	0	0	0	2	M	N	N				Y	G.	
411	87	Fulton	86	SBSmc2	2	0	1	-1	0	2	M	N	N	M	N	N	Y	F,G	
518	86	Morrison	81	SBSmc2	2	0	1	-1	0	2	M	N	L	M	N	N	Y	F,G	Has some 200 yrs+
75	92	Nadina	92	SBSmc2	2	1	0	-1	0	2	L	N	L	M	N	N	Y	F,G	
119	87	Kidprice	72	SBSmc2	1	1	1	-1	0	2	M	E	N				Y	G.	lakeshore Collins Lake: balsam 43%, spruce31%: pine 25%
212	61	Thautil	58	SBSmc2	1	1	0	0	0	2	M	N	N				Y	G.	
235	79	Houston_Tommy	79	SBSmc2	1	1	0	0	0	2	M	L	N				Y	G.	
355	52	North_Babine	51	SBSmc2	1	1	0	0	0	2	M	E	N				Y	G.	Babine lakeshore; 80% spruce aspen and pine 10 % each
367	60	Fulton	60	SBSmc2	1	1	0	0	0	2	M	N	N				Y	G.	
374	51	Fulton	51	SBSmc2	1	1	0	0	0	2	M	L	M	M	N	N	Y	F,G	Photos 374 A,B; cannot be extended to Fulton L; small
457	71	Granisle	70	SBSmc2	1	1	0	0	0	2	M	N	N	L	N	N	Y	F,G	
476	70	Morrison	69	SBSmc2	1	1	0	0	0	2	M	L	N				Y	G	Photo 476 minor portion on Babine Lake
482	66	Morrison	66	SBSmc2	1	1	0	0	0	2	M	N	N				Y	G	
540	64	Morrison	64	SBSmc2	1	1	0	0	0	2	M	N	N				Y	G	
329	90	Fulton	78	SBSmc2	1	2	-1	0	0	2	M	N	N	E	N	M	Y	F,G	Photo 329
350	124	North_Babine	96	SBSmc2	2	0	1	0	0	3	M	N	E	L	N	N	Y	F,G	Photos 350 A,B; Black spruce wetland and forest fringe surrounding lake; poor structure
480	93	Morrison	93	SBSmc2	2	0	1	0	0	3	M	E	N	M	N	N	Y	F,G	Photo 480; Lakeshore
22	86	Sibola	85	SBSmc2	2	1	0	0	0	3	M	M	N				Y	G.	adjacent to No Harvest zone
86	99	Kidprice	96	SBSmc2	2	1	0	0	0	3	M	M	N	M	Y	N	Y	F,G	Photo 86; Extend to lake at N
327	93	Fulton	87	SBSmc2	2	1	0	0	0	3	M	N	N				Y	G.	

381	103	Fulton	101	SBSmc2	3	1	1	-2	0	3	M	E	N	M	N	N	Y	F,G	Photo 381; Fulton L shore; high Pl, good structure
389	74	Fulton	74	SBSmc2	1	1	1	0	0	3	M	M	L	M	N	N	Y	F,G	
467	142	Morrison	113	SBSmc2	3	1	1	0	-2	3	M	E	L	L	N	N	Y	F,G	Photo 467; aspen 67%, island
549	102	Morrison	102	SBSmc2	3	1	1	-2	0	3	M	M	N	M	Y	N	Y	F,G	Extend to wetland
559	83	Morrison	82	SBSmc2	2	1	0	0	0	3	M	N	N				Y	G	
296	126	Buck	113	SBSmc2	3	0	1	0	0	4	M	L	N				Y	G.	
325	168	Fulton	148	SBSmc2	3	0	1	0	0	4	M	N	N				Y	G.	
396	107	Granisle	106	SBSmc2	3	0	1	0	0	4	M	N	N				Y	G.	
55	118	Nadina	111	SBSmc2	3	1	0	0	0	4	M	N	N				Y	G.	
95	144	Kidprice	143	SBSmc2	3	1	1	-1	0	4	M	M	N	M	N	N	Y	F,G	appear to be a road in middle
331	102	Fulton	100	SBSmc2	2	1	1	0	0	4	M	E	M	M	N	N	Y	F,G	Photos 331 A,B
357	123	Topley	97	SBSmc2	2	1	1	0	0	4	M	L	L	L	N	N	Y	F,G	Photos 357 A,B,C
402	93	Fulton	89	SBSmc2	2	1	1	0	0	4	M	L	L	M	N	N	Y	F,G	
478	95	Tochcha_Natowite	94	SBSmc2	2	1	1	0	0	4	M	N	N				Y	G	
523	95	Morrison	92	SBSmc2	2	1	1	0	0	4	M	N	N				Y	G	
551	98	Morrison	97	SBSmc2	2	1	1	0	0	4	M	E	N	M	Y	N	Y	F,G	Photo 551; Haul L. shoreline, use powerline for rear boundary
60	97	Nadina	92	SBSmc2	2	2	0	0	0	4	M	M	N	E	Y	N	Y	F,G	250+ yrs. Old
249	86	Owen	85	SBSmc2	2	2	0	0	0	4	M	N	L				Y	G.	
342	97	Fulton	89	SBSmc2	2	2	0	0	0	4	M	L	L	M	N	N	Y	F,G	Photos 342 A,B,C
280	145	Houston_Tommy	96	SBSmc2	2	3	-1	0	0	4	M	N	N	N			Y	F,G	poor older structure: close to Houston;straddles SBSdk
281	228	Valley	156	SBSmc2	3	3	-1	0	-1	4	M	L	N	L			Y	F,G	lake edge
2	160	Whitesail	143	SBSmc2	3	1	1	0	0	5	M	N	M				Y	G.	close to no harvvest
4	120	Whitesail	120	SBSmc2	3	1	1	0	0	5	M	E	N				Y	G.	close to no harvvest
15	139	Sibola	132	SBSmc2	3	1	1	0	0	5	M	E	L				Y	G.	Borders on reservioir
91	136	Kidprice	134	SBSmc2	3	1	1	0	0	5	H	N	N				Y	G.	
305	143	Valley	137	SBSmc2	3	1	1	0	0	5	H	L	N	E	N	N	Y	F,G	Photos 305 A,B; adjacent to wetland, gentle midslope
310	131	Valley	130	SBSmc2	3	1	1	0	0	5	H	N	N	E	N	N	Y	F,G	Photos 310 A,B,C
334	120	Fulton	120	SBSmc2	3	1	1	0	0	5	M	N	L	E	N	N	Y	F,G	Photos 334 A,B
388	114	Tochcha_Natowite	113	SBSmc2	3	1	1	0	0	5	M	N	N	M	N	N	Y	F,G	388, 392, 394 separated by roads; 392, 394 are lakeshore
445	164	Tochcha_Natowite	143	SBSwk3	3	1	1	0	0	5	M	M	N				Y	G	minor lakshore

474	121	North_Babine	121	SBSmc2	3	1	1	0	0	5	M	N	N	E	N	Y	Y	F,G	has some 200 yrs+;
485	122	Morrison	122	SBSmc2	3	1	1	0	0	5	M	N	N				Y	G	
504	106	Tochcha_Natowite	106	SBSmc2	3	1	1	0	0	5	M	N	L	E	N	N	Y	F,G	
527	106	Tochcha_Natowite	102	SBSwk3	3	1	1	0	0	5	M	N	N				Y	G	;
554	127	Morrison	126	SBSmc2	3	1	1	0	0	5	M	E	L	E	Y	N	Y	F,G	Extend boundary to bog
32	112	Tahtsa	111	SBSmc2	3	2	0	0	0	5	M	N	N				Y	G.	
151	105	Owen	104	SBSmc2	3	2	1	-1	0	5	H	N	N				Y	G.	
424	145	North_Babine	117	SBSmc2	3	2	1	0	-1	5	M	E	N				Y	G.	Aspen 49%, spruce 28%, pine 22%: Babine Lakshore
93	136	Nadina	136	SBSmc2	3	3	-1	0	0	5	M	N	N				Y	G.	
267	117	Houston_Tommy	109	SBSmc2	3	3	-1	0	0	5	H	N	N				Y	G.	
339	176	Fulton	166	SBSmc2	3	1	3	-1	0	6	M	M	M	E	N	N	Y	F,G	
469	148	Tochcha_Natowite	140	SBSwk3	3	1	3	-1	0	6	M	M	M	M	M	N	Y	F,G	Photo 469
68	167	Nadina	166	SBSmc2	3	2	1	0	0	6	M	N	N				Y	G.	
146	110	Owen	110	SBSmc2	3	2	1	0	0	6	H	N	L				Y	G.	
394	144	Tochcha_Natowite	144	SBSmc2	3	2	1	0	0	6	M	E	E	M	N	N	Y	F,G	388, 392, 394 separated by roads; 392, 394 are lakeshore; Creak mouth
403	163	Tochcha_Natowite	162	SBSmc2	3	2	1	0	0	6	M	E	N	M	N	N	Y	F,G	
420	118	Granisle	117	SBSmc2	3	2	1	0	0	6	M	N	N				Y	G.	
428	148	Tochcha_Natowite	122	SBSwk3	3	2	1	0	0	6	M	N	L				Y	G.	
452	132	Tochcha_Natowite	129	SBSmc2	3	2	1	0	0	6	M	N	N	E	N	N	Y	F,G	
455	117	Granisle	116	SBSmc2	3	2	1	0	0	6	M	N	L	M	N	N	Y	F,G	Photo 455
505	176	Morrison	164	SBSmc2	3	2	1	0	0	6	M	M	M	M	N	N	Y	F,G	Photo 505, Shedding to receiving at lakeshore
529	141	Morrison	141	SBSmc2	3	2	1	0	0	6	M	N	N				Y	G	
20	152	Whitesail	148	SBSmc2	3	3	1	-1	0	6	M	N	M	E	Y	N	Y	F,G	
23	174	Whitesail	150	SBSmc2	3	3	1	-1	0	6	M	N	E	M	N	N	Y	F,G	
229	174	Houston_Tommy	134	SBSmc2	3	3	1	-1	0	6	H	N	N				Y	G.	38% pine
268	116	Buck	109	SBSmc2	3	3	1	-1	0	6	H	N	L				Y	G.	connects SBSdk to ESSFmc
391	182	North_Babine	166	SBSmc2	3	0	5	0	-1	7	H	E	L	N	N	N	Y	F,G	
404	227	Granisle	184	SBSmc2	3	1	3	0	0	7	H	L	E				Y	G.	contains a lake
477	137	North_Babine	128	SBSmc2	3	1	3	0	0	7	H	N	L	M	N	N	Y	F,G	Photo 477; slide alder, shedding slope
532	141	Tochcha_Natowite	136	SBSmc2	3	1	3	0	0	7	H	N	L				Y	G	
157	138	Owen	137	SBSmc2	3	2	3	-1	0	7	H	N	M				Y	G.	
552	157	Morrison	156	SBSmc2	3	2	3	-1	0	7	H	E	N				Y		Lakshore, 26% pine

122	137	Parrotts	136	SBSmc2	3	3	1	0	0	7	H	N	N				Y	G.	
135	331	Buck	329	SBSmc2	5	3	-1	0	0	7	H	N	M				Y	G.	similar to 137 and 140 with small lakes
140	212	Buck	197	SBSmc2	3	3	1	0	0	7	H	N	L				Y	G.	similar to 135 and 137 with small lakes
159	147	Kidprice	146	SBSmc2	3	3	1	0	0	7	H	N	N				Y	G.	
292	276	Valley	264	SBSmc2	5	3	-1	0	0	7	H	N	L	E	N	N	Y	F,G	Photos 292 A,B,C
347	140	Fulton	139	SBSmc2	3	3	1	0	0	7	H	N	N	M	N	N	Y	F,G	Photo 347; Prefer over 337, 340, 341; similar slope position to 366
366	209	Fulton	176	SBSmc2	3	3	1	0	0	7	H	N	L	M	N	N	Y	F,G	Photo 366; similar slope position to 347
372	199	Tochcha_Natowite	194	SBSmc2	3	3	1	0	0	7	H	N	N	E	N	N	Y	F,G	Photos 372 A,B,C; Mid-slope gentle
429	126	Tochcha_Natowite	126	SBSwk3	3	3	1	0	0	7	M	N	N				Y	G.	
435	120	Fulton	120	SBSmc2	3	3	1	0	0	7	H	N	L	M	N	N	Y	F,G	Photo 435; patchy multi-structured
450	139	North_Babine	139	SBSmc2	3	3	1	0	0	7	H	L	L	M	N	N	Y	F,G	
453	135	Tochcha_Natowite	135	SBSwk3	3	3	1	0	0	7	M	N	N				Y	G	
465	162	Tochcha_Natowite	161	SBSmc2	3	3	1	0	0	7	H	E	N	M	N	N	Y	F,G	
493	131	Morrison	131	SBSmc2	3	3	1	0	0	7	H	N	N		N	N	Y	G	Photo 493; Poor structure
557	187	Morrison	186	SBSmc2	3	3	1	0	0	7	H	N	L	E	N	N	Y	F,G	Between 557 & 558 prefer 558 with more old forest
558	159	Morrison	159	SBSmc2	3	3	1	0	0	7	H	N	L	E	N	N	Y	F,G	Has more old than 557
162	196	Owen	185	SBSmc2	3	2	3	0	0	8	H	N	M				Y	G.	
328	189	Fulton	160	SBSmc2	3	2	3	0	0	8	H	N	N				Y	G.	
464	204	North_Babine	191	SBSmc2	3	2	3	0	0	8	H	N	L				Y	G	
487	111	Tochcha_Natowite	111	SBSmc2	3	2	3	0	0	8	H	N	L				Y	G	
521	115	Morrison	115	SBSmc2	3	2	3	0	0	8	H	L	L				Y	G	straddles to a small lake in the Morrison HBEA
74	214	Nadina	205	SBSmc2	5	3	1	-1	0	8	H	M	L	L	N	N	Y	F,G	some lower slopes included
417	212	Tochcha_Natowite	212	SBSwk3	5	3	1	-1	0	8	H	N	N				Y	G.	
449	179	Tochcha_Natowite	161	SBSwk3	3	3	3	-1	0	8	H	M	L	M	N	N	Y	F,G	Has waterfront
318	391	Valley	361	SBSmc2	5	4	-1	0	0	8	H	N	L	E	N	N	Y	F,G	Photos 318; alternate to 317 (317, 318, 322 group)
13	213	Whitesail	211	SBSmc2	5	3	1	0	0	9	H	N	L				Y	G.	borders on reservioir
14	243	Whitesail	236	SBSmc2	5	3	1	0	0	9	H	N	N	E	N	N	Y	F,G	Good stocking - low crown closure
137	213	Buck	213	SBSmc2	5	3	1	0	0	9	H	N	M				Y	G.	similar to 140 and 135 with small lakes
338	272	Fulton	248	ESSFmc_SBSmc	5	3	1	0	0	9	H	E	M	M	N	N	Y	F,G	Straddles ESSFmc & SBSmc2; lower elev. Adjacent to 348; Photo 338

356	224	Fulton	164	SBSmc2	3	3	3	0	0	9	H	N	L	M	N	N	Y	F,G	
373	145	North_Babine	145	SBSmc2	3	3	3	0	0	9	H	N	N				Y	G.	
489	152	Morrison	137	SBSmc2	3	3	3	0	0	9	H	E	L	L	N	N	Y	F,G	Similar size & landscape position to 471, 472, 479, 486; Babine lakeshore, steep
553	366	Morrison	304	SBSmc2	5	3	1	0	0	9	H	M	E	E	N	N	Y	F,G	Photo 553; valley bottom
38	430	Tahtsa	379	SBSmc2	5	4	1	-1	0	9	H	N	M	E	N	N	Y	F,G	
251	445	Houston_Tommy	393	SBSmc2	5	4	0	0	0	9	H	N	L				Y	G.	
320	209	Topley	205	SBSmc2	5	4	1	-1	0	9	H	L	L	E	N	N	Y	F,G	Photos 320 A,B,C; Good stocking and height
6	285	Whitesail	261	SBSmc2	5	2	3	0	0	10	H	N	N				Y	G.	
76	266	Nadina	263	SBSmc2	5	3	3	-1	0	10	H	M	M	L	N	N	Y	F,G	Hilly with rock outcrops
405	210	North_Babine	208	SBSmc2	5	3	3	-1	0	10	H	L	L	L	N	N	Y	F,G	follows incised Cr; 26% Pine
17	265	Sibola	264	SBSmc2	5	4	1	0	0	10	H	M	N				Y	G.	
61	319	Nadina	304	SBSmc2	5	4	1	0	0	10	H	N	L	E	N	N	Y	F,G	
259	319	Houston_Tommy	308	SBSmc2	5	4	1	0	0	10	H	N	N				Y	G.	
278	278	Houston_Tommy	271	SBSmc2	5	4	1	0	0	10	H	N	N				Y	G.	6% hemlock considered rare for this zone and location; 89% balsam
479	238	Morrison	225	SBSmc2	5	4	1	0	0	10	H	N	L	M	N	N	Y	F,G	471, 472, 479, 486 have similar landscape position / redundancy
58	211	Nadina	210	SBSmc2	5	3	3	0	0	11	H	N	M				Y	G.	
250	328	Gosnel	320	SBSmc2	5	3	3	0	0	11	H	M	M	M	N	N	Y	F,G	Photos 250 A,B,C; creek to hilltop
484	207	Tochcha_Natowite	201	SBSwk3	5	3	3	0	0	11	H	N	N				Y	G	
486	265	Morrison	256	SBSmc2	5	3	3	0	0	11	H	M	L	E	N	N	Y	F,G	Photo 486; 471, 472, 479, 486 have similar landscape position / redundancy
507	177	Tochcha_Natowite	163	SBSwk3	3	3	5	0	0	11	H	M	N				Y	G	
560	262	Morrison	248	SBSmc2	5	3	3	0	0	11	H	N	L	M	N	N	Y	F,G	Photo 560; Shedding ridge & receiving lower slopes
458	238	North_Babine	209	SBSmc2	5	0	7	0	0	12	H	E	L	N	N	N	Y	F,G	Photo 458; no structure, lithic
413	206	Tochcha_Natowite	198	SBSmc2	3	2	7	0	0	12	H	N	N				Y	G.	
460	221	Granisle	200	SBSmc2	5	2	5	0	0	12	H	E	L	L	Y	N	Y	F,G	Photo 460; powerline bisects; lakeshore
360	229	Fulton	228	SBSmc2	5	3	5	-1	0	12	H	N	M	E	N	N	Y	F,G	Black spruce wetland inclusions
371	259	Granisle	257	SBSmc2	5	3	5	-1	0	12	H	N	L	L	N	N	Y	F,G	Stucture is not great (Low); 31% pine
385	226	Fulton	225	SBSmc2	5	3	5	-1	0	12	H	M	L	M	N	N	Y	F,G	Photo 385 A,B Fragmented from lake by mainline

470	272	Tochcha_Natowite	264	SBSmc2	5	3	5	-1	0	12	H	N	L	E	N	N	Y	F,G	
3	332	Whitesail	273	SBSmc2	5	4	3	0	0	12	H	N	M				Y	G.	
24	500	Whitesail	484	SBSmc2	8	4	0	0	0	12	H	N	M	M	N	N	Y	F,G	
59	288	Nadina	276	SBSmc2	5	4	5	-2	0	12	H	M	L	L	Y	N	Y	F,G	extend to Nadina L to E
419	285	Fulton	252	SBSmc2	5	4	3	0	0	12	H	L	N				Y	G.	65% balsam
488	263	Tochcha_Natowite	261	SBSwk3	5	4	3	0	0	12	H	N	N				Y	G	
298	228	Valley	209	SBSmc2	5	3	5	0	0	13	H	L	E	E	Y	N	Y	F,G	remove partial cutting blocks; lake to ridge good transect
407	226	Granisle	221	SBSmc2	5	3	5	0	0	13	H	M	N				Y	G.	
432	252	North_Babine	239	SBSmc2	5	3	5	0	0	13	H	L	L				Y	G.	road along Babine L.
496	234	Morrison	224	SBSmc2	5	3	5	0	0	13	H	N	M	M	N	N	Y	F,G	
506	213	Tochcha_Natowite	211	SBSmc2	5	3	5	0	0	13	H	N	N				Y	G	
28	260	Sibola	258	SBSmc2	5	4	5	-1	0	13	H	E	N				Y	G.	may be roaded for access to CWH: most easterly SBSmc2 south aspect
147	294	Owen	290	SBSmc2	5	4	5	-1	0	13	H	E	L				Y	G.	lakeshore north of Nadina Mtn
317	567	Valley	495	SBSmc2	8	4	1	0	0	13	H	N	M	M	N	N	Y	F,G	Photos 317 A,B,C,D; better than 318 (317, 318, 322 group); has desirable long wetland
382	382	Tochcha_Natowite	362	SBSmc2	5	4	5	0	0	14	H	N	L	E	N	N	Y	F,G	Photos 382 A,B; long & narrow
302	671	Valley	597	SBSmc2	10	5	-1	0	0	14	H	E	E	E	N	N	Y	F,G	large gully and lake
363	715	Fulton	659	SBSmc2	10	5	-1	0	0	14	H	L	L	M	N	N	Y	F,G	Photo 363
555	561	Morrison	556	SBSmc2	10	5	-1	0	0	14	H	N	N	E	N	N	Y	F,G	250+ yrs
127	343	Kidprice	336	SBSmc2	5	4	7	-1	0	15	H	M	N	M	N	N	Y	G.	Photo 127 A,B
25	227	Whitesail	227	SBSmc2	5	3	10	-2	0	16	H	E	L	M	N	N	Y	F,G	66%Pine
471	291	Morrison	282	SBSmc2	5	4	7	0	0	16	H	N	N	L	N	N	Y	F,G	Photo 471; Aspen 17%; 471, 472, 479, 486 have similar landscape position / redundancy
271	892	Houston_Tommy	867	SBSmc2	12	5	-1	0	0	16	H	N	L				Y	G.	82% balsam
322	888	Fulton	854	SBSmc2	12	5	-1	0	0	16	H	L	L	E	N	N	Y	F,G	similar to 317 & 318 (317, 318, 322 group)
545	443	Tochcha_Natowite	441	SBSwk_ESSFmv3	8	5	3	0	0	16	H	N	N				Y	G	
513	272	Morrison	264	SBSmc2	5	3	10	0	-1	17	H	E	N	E	N	N	Y	F,G	Cabin on Babine L
335	541	Fulton	430	SBSmc2	8	5	5	-1	0	17	H	N	L	E	N	N	Y	F,G	Photo 335; similar to adjacent larger 345; 26% pine
401	680	Fulton	628	SBSmc2	10	5	3	0	0	18	H						Y	G.	
499	463	Tochcha_Natowite	442	SBSmc2	8	4	7	0	0	19	H	N	M	E	N	N	Y	F,G	Photos 499 A,B

520	507	Morrison	452	SBSmc2	8	4	7	0	0	19	H	L	L	M	N	N	Y	F,G	Mostly shedding, high productivity
260	451	Buck	427	SBSmc2	8	5	7	-1	0	19	H	N	M				Y	G.	32% Pine
27	589	Tahtsa	505	SBSmc2	10	3	7	0	0	20	H	E	E				Y	G.	Borders on Sweeney lake;northerly aspect: contains small lakes
468	629	Tochcha_Natowite	581	SBSwk3	10	4	7	-1	0	20	H	N	L	M	N	N	Y	F,G	29% pine
434	542	Tochcha_Natowite	517	SBSmc2	10	5	5	0	0	20	H	L	L				Y	G.	
345	1863	Fulton	1,691	SBSmc2	12	5	7	-1	0	23	H	E	E	E	N	N	Y	F,G	Photos 345 A,B,C; Lake to ridge, includes small lake
376	611	Fulton	595	SBSmc2	10	5	10	-1	0	24	H	N	L	M	N	N	Y	F,G	Photos 376 A,B; elongated canyon unit with some flat upland; connects Fulton L to ESSF to the S
508	761	Morrison	729	SBSmc2	10	5	10	0	0	25	H	M	M	E	N	N	Y	F,G	Photo 508; centred on rocky knob
	42422		39,880																

GENERAL FOREST AREA (ESSFmc)

		Spatial Target	COGMAs ha	% of establishment target
11. General Forested Area	ESSFmc	25,876	34,111	132%

The ESSFmc is the second most extensive BEC varaint in the LRMP, located at higher elevations and forms the tops of some of the hills that do not have alpine areas above. The growing season is shorter than in the SBSmc and stand initiating disturbance more rare, hence this zone has less seral species such as pine and aspen. Stands are primarily spruce and balsam. There are fewer lakes and wetlands in this zone. The upper elevations do however include meadows such as those in Sheldon Hills.

Fifteen COGMAs are recommended. These are all larger COGMAs greater than 394 ha. The largest COGMAs are in this zone. COGMA 307 is 6,900 ha and is situated west of Houston and contains the highest proportion of forests over 250 years. Portion of this unit are steep and some unstable slopes were noted. The area is adjacent o alpine. The second largest unit (67) in the Shelford Hills is 5285 ha in size. This bedrock controlled undulating upland has many natural meadows. The third largest OGMA is Old Fort Mountain at 1836 ha, and includes lower slopes with presumed deeper soils. 323 is an area of 1069 which is E of Matzehtzel Mtn.

Larger units are ranked highly which means that smaller and medium sized units could not be considered within the target. All of the major areas of ESFFmc and those with alpine associated such as Morice Mountain were also checked The productivity of most of this zone is low as it reflected in the SI column.

Table 17. General Forested Areas ESSFmc

General Forested Aresa ESSFmc																			
OGMA_NUM	Total Area	Landscape Unit	Area_OLD	Primary BEC	AREA_OLD	CORE	SI	Pine_%	At%	New Rank	R-class	Adj	Interior	Struct	B'ry Review	Alternative	Recommendation	Visited? Ortho Field GIS	Comments
48	63	Kidprice	63	ESSFmc	1	0	-1	0	0	0	L	N	N				N	G, L	adjacent to No Harvest zone
326	86	Fulton	75	ESSFmc	1	0	-1	0	0	0	L	L	L	M	N	Y	N	F,L,G	Photos 326 A,B,C,D; Add equivalent of this area, of similar forested quality, to 332 (build up 332)
53	59	Nadina	59	ESSFmc	1	1	-1	-1	0	0	L	N	N	M	Y	N	N	F,L,G	similar to forest in nearby No Harvest zone
152	61	Buck	61	ESSFmc	1	1	-1	-1	0	0	L	N	N				N	G, L	
12	86	Whitesail	84	ESSFmc	2	1	-1	0	0	2	L	N	N				N	G, L	adjacent to No Harvest zone
33	100	Tahtsa	84	ESSFmc	2	1	-1	0	0	2	L	N	N				N	G, L	adjacent to No Harvest zone
269	183	Gosnel	161	ESSFmc	3	1	-1	0	0	3	M	N	M	M	N	N	N	F,L,G	Photo 269; upper slope
332	135	Fulton	129	ESSFmc	3	1	0	0	0	4	M	L	M	M	N	Y	N	F,L,G	Photos 332 A,B,C,D,E; Include subalpine meadow to lake to SE
10	113	Whitesail	107	ESSFmc	3	2	-1	0	0	4	M	N	N				N	G,L	adjacent to No Harvest zone
11	210	Whitesail	204	ESSFmc	5	3	-1	0	0	7	H	N	L	E	N	N	N	F,L,G	
46	266	Nadina	251	ESSFmc	5	3	-1	0	0	7	H	N	L	M	N	Y	N	F,L,G	Photo 46 COGMA of 250+ alternate to N with higher proportion of 250+
219	293	Gosnel	261	ESSFmc	5	3	1	0	0	9	H	N	L	L	N	N	N	F,L,G	Photo 219 A
319	32	Valley	32	ESSFmc	0	0	-1	0	0	-1	L	N	N	E	N	N	P	F,L,G	Photos 319 A,B;
52	32	Nadina	32	ESSFmc	0	0	-1	0	0	-1	L	L	L	L	N	N	P	F,L,G	Seepage receiving
439	61	Granisle	61	ESSFmc_SBSmc	1	1	0	0	0	2	L	N	N				P	G, L	narrow gully unit: straddles to SBSmc2
220	122	Buck	113	ESSFmc	3	1	-1	0	0	3	M	N	N				P	G, L	
18	159	Whitesail	146	ESSFmc_SBSmc	3	1	-1	0	0	3	M	N	N				P	G, L	narrow gully unit: straddles to SBSmc2
279	153	Thautil	127	ESSFmc	3	1	1	-1	0	4	M	N	M	E	N	N	P	F,L,G	Photo 279
314	108	Topley	108	ESSFmc	3	2	-1	0	0	4	M	M	L	L	N	N	P	F,L,G	Photo 314; More dead Pine than in 321; borders small Lake
54	71	Nadina	67	ESSFmc	1	0	0	-1	5	5	M	N	L	M	N	N	P	F,L,G	51 or 54 similar

65	152	Nadina	146	ESSFmc	3	2	1	-1	0	5	M	N	N				P		47% pine
283	227	Thautil	187	ESSFmc	3	3	0	0	0	6	M	L	L	L	N	N	P	F,L,G	valley bottom
315	226	Topley	221	ESSFmc	5	3	-1	0	0	7	H	N	L	E	N	N	P	F,L,G	Photos 315 A,B,C; Similar to 323, but smaller
225	360	Buck	339	ESSFmc	5	4	-1	-1	0	7	H	N	L				P	G, L	27% pine
72	206	Nadina	206	ESSFmc	5	3	0	0	0	8	H	L	L				P	G, L	adjacent to No Harvest zone
348	327	Fulton	324	ESSFmc	5	4	-1	0	0	8	H	L	L	M	N	N	P	F,L,G	Photo 348; upper ESSF - see 338
5	603	Whitesail	575	ESSFmc	10	5	-1	0	0	14	H	N	N				P	G, L	adjacent to No Harvest zone
255	80	Gosnel	77	ESSFmc	1	0	0	0	0	1	L	N	L	M	N	N	P	F,L,G	
51	66	Tahtsa	65	ESSFmc	1	1	0	0	0	2	L	N	L	M	N	N	P	F,L,G	Shedding shallow
270	104	Gosnel	82	ESSFmc	2	1	-1	0	0	2	L	N	M	M	N	N	P	F,L,G	Photos 270 A,B: adjacent to no harvest zone
158	77	Owen	77	ESSFmc	1	2	0	0	0	3	M	N	N				P	G, L	
308	129	Valley	129	ESSFmc	3	2	-1	0	0	4	M	N	N				P	G, L	
222	182	Buck	182	ESSFmc	3	3	-1	-1	0	4	M	N	N				P	G, L	
256	203	Thautil	169	ESSFmc	3	1	1	0	0	5	M	N	N				P	G, L	
309	171	Valley	168	ESSFmc	3	3	-1	0	0	5	M	L	N				P	G, L	
163	179	Kidprice	176	ESSFmc	3	3	-1	0	0	5	M	N	N				P	G, L	
265	107	Buck	107	ESSFmc	3	2	1	0	0	6	M	N	N				P	G, L	
26	123	Tahtsa	114	ESSFmc	3	2	1	0	0	6	M	N	L				P	G, L	
171	206	Buck	205	ESSFmc	5	3	-1	0	0	7	H	L	N				P	G, L	
214	216	Buck	215	ESSFmc	5	3	-1	0	0	7	H	N	N				P	G, L	
44	257	Nadina	241	ESSFmc	5	3	-1	0	0	7	H	N	E	M	N	N	P	F,L,G	200-250+ yrs. Old; 23% Pine
563	288	Morrison	261	ESSFmc	5	3	-1	0	0	7	H	M	L				P	G, L	
9	352	Whitesail	321	ESSFmc_SBSmc	5	3	-1	0	0	7	H	N	M	M	Y	N	P	F,L,G	250+ yrs. Old
128	213	Parrotts	205	ESSFmc	5	3	1	0	0	9	H	L	L				P	G, L	forested ridge top
338	272	Fulton	248	ESSFmc_SBSmc	5	3	1	0	0	9	H	E	M	M	N	N	P	F,L,G	Straddles ESSFmc & SBSmc2; lower elev. Adjacent to 348; Photo 338
290	444	Houston_Tommy	372	ESSFmc	5	3	1	0	0	9	H	L	M				P	G, L	adjacent to alpine
297	503	Thautil	446	ESSFmc	8	4	-1	0	0	11	H	L	L	M	N	N	P	F,L,G	Photo 297 A
64	477	Nadina	450	ESSFmc	8	4	-1	0	0	11	H	N	M	E	N	N	Y	F,L,G	
37	740	Tahtsa	640	ESSFmc	10	3	-1	0	0	12	H	N	M	E	N	N	Y	F,L,G	
236	423	Buck	409	ESSFmc	8	5	-1	0	0	12	H	N	N				Y	G, L	
273	394	Buck	353	ESSFmc_SBSmc	5	3	5	0	0	13	H	N	N				Y	G, L	north aspect elevational transect
207	531	Buck	504	ESSFmc	10	4	-1	0	0	13	H	N	L				Y	G, L	

258	545	Buck	533	ESSFmc	10	5	-1	-1	0	13	H	N	N				Y	G, L	
39	528	Tahtsa	518	ESSFmc	10	5	-1	0	0	14	H	N	L				Y	G, L	elevational link from No Harvest to SBSmc2
139	601	Parrotts	570	ESSFmc	10	5	-1	0	0	14	H	N	N				Y	G, L	
264	700	Houston_Tommy	652	ESSFmc	10	5	-1	0	0	14	H	N	M	M	N	N	Y	F,L,G	Photo 264
108	803	Nadina	720	ESSFmc	10	4	1	0	0	15	H	N	E				Y	G, L	3 small lakes within unit
365	895	Fulton	826	ESSFmc	12	5	-1	0	0	16	H	N	M	E	N	N	Y	F,L,G	Upper watershed
274	985	Houston_Tommy	892	ESSFmc	12	5	-1	0	0	16	H	E	E				Y	G, L	adjacent to alpine; inclusions of small lakes and meadows
239	976	Owen	898	ESSFmc	12	5	-1	0	0	16	H	N	L				Y	G, L	
323	1,069	Topley	951	ESSFmc	12	5	-1	0	0	16	H	L	M	M	N	N	Y	F,L,G	Photos 323 A,B,C,D; E of Matzehtzel Mtn.
286	1,448	Thautil	1,336	ESSFmc	12	5	-1	0	0	16	H	M	L	E	N	N	Y	F,L,G	Photos 286 A,B,C; adjacent to alpine, upper Houston-Tommy drainage
245	2,114	Thautil	1,689	ESSFmc	12	5	-1	0	0	16	H	N	M	E	N	N	Y	F,L,G	Photos 245 A,B,C
67	5,258	Nadina	4,624	ESSFmc	12	5	-1	0	0	16	H	N	L	E	N	N	Y	F,L,G	Photo 67 A,B; Shelford Hills
141	924	Owen	880	ESSFmc	12	5	1	0	0	18	H	N	M	L	N	N	Y	F,L,G	Shedding & receiving; Pimpernel Mtn.
492	1,836	Morrison	1,699	ESSFmc_SBSmc	12	5	5	0	0	22	H	N	M	M	N	N	Y	F,L,G	Photos 492 A, B, C, D
307	6,921	Valley	6,553	ESSFmc	12	5	5	0	0	22	H	M	M	E	N	N	Y	F,L,G	Photos 307 A,B; Alpine, steep to creek; some unstable slopes
Y sum =	28165		25,696																

GENERAL FOREST AREA (ESSFmv3)

		Spatial Target	COGMAs ha	% of establishment target
12. General Forested Area	ESSFmv3	5,573	6,028	108%

The ESSFmv3 is restricted to the northeast corner of the LRMP. Five COGMAs are recommended. There are several highly ranked noted as potential candidates.

Table 18. General Forested Area ESSFmv3

OGMA_NUM	Total Area	Landscape Unit	Area_OLD	Primary BEC	AREA_OLD	CORE	SI	Pine_%	At%	New Rank	R-class	Adj	Interior	Struct	B'ry Review	Alternative	Recommendation	Visited? Ortho Field GIS	Comments
473	31	Tochcha_Natowite	31	ESSFmv3	0	0	-1	-1	0	-2	L	N	N				N		
483	34	Tochcha_Natowite	34	ESSFmv3	0	0	-1	0	0	-1	L	N	N				N		
390	28	Tochcha_Natowite	28	ESSFmv3	0	0	-1	0	0	-1	L	L	L	M	Y	N	N	F	Extend to wetland & hilltop
380	49	Tochcha_Natowite	49	ESSFmv3	1	0	-1	0	0	0	L	N	L	E	N	N	N	F	
422	70	Tochcha_Natowite	62	ESSFmv3	1	0	-1	0	0	0	L	N	N				N		
409	60	North_Babine	57	ESSFmv3_SBSmc	1	1	0	-1	0	1	L	L	L	M	M	N	N	F	Adjacent to 406
509	55	Tochcha_Natowite	46	ESSFmv3	1	1	0	0	0	2	M	N	N				N		
421	103	Tochcha_Natowite	94	ESSFmv3	2	0	1	-1	0	2	M	N	N				N		
410	124	Tochcha_Natowite	102	ESSFmv3	3	1	-1	0	0	3	M	L	N				N		borders on a small lake
543	92	Tochcha_Natowite	92	ESSFmv3	2	2	0	0	0	4	M	N	N				N		
516	144	Morrison	144	ESSFmv3	3	3	1	0	0	7	M	N	N				P		
526	645	Tochcha_Natowite	192	ESSFmv3	3	3	3	0	0	9	H	N	M	M	N	N	P	F	Hilltop slide alder; Straddles HBEA , dominantly in ESSFmv3 & minor in SBSmc2
475	296	Tochcha_Natowite	286	ESSFmv3	5	3	3	0	0	11	H	N	N				P		
462	492	Tochcha_Natowite	473	ESSFmv3	8	5	-1	0	0	12	H	L	L				P		
510	351	North_Babine	321	ESSFmv3_SBSmc	5	4	3	0	0	12	H	N	N				Y		

370	870	North_Babine	686	ESSFmv3	10	5	-1	0	0	14	H	N	M	M	N	N	Y		Photos 370 A,B,C,D,E; subalpine lakes & knobs
448	3,027	Tochcha_Natowite	2,843	ESSFmv3	12	5	-1	0	0	16	H	L	L				Y		borders alpine
561	1,450	Morrison	1,279	ESSFmv3	12	5	-1	0	0	16	H	L	E	E	N	N	Y	F	Photos 561 A,B,C; Has 200+ yrs
431	756	Tochcha_Natowite	581	ESSFmv3	10	5	5	0	0	20	H	N	L				Y		
Y Sum	6,455		5,710																

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Appendix One: Working Group COGMA Selection process

From Ryan Holmes, ILMB.

1. Gather data. See <Morice Biodiversity Implementation GIS Data Dictionary.xls> for details.

2. Using <pfor141+yrs.shp> as a template, erase the following overlapping areas:
    a. Woodlots
    b. Private land
    c. Indian Reserves
    d. Grazing leases
    e. Existing parks/protected areas
    f. Morice LRMP new parks/protected areas (draft)
    g. Morice LRMP no harvest zones
    h. Forest Licensee harvest blocks (existing and proposed) as well as 50m buffered roads[12]
    i. 50m buffered TRIM, DRA and FS roads

    * This step creates the "Crown old available" (COA) layer for potential OGMA placement. Old is > 140 yrs.

3. Load the following background layers into an ArcMap MXD file to begin delineating OGMAs:
    a. COA
    b. THLB from most recent TSR (ie. post LRMP)
    c. General Forested Area (GFA)
    d. High Biodiversity Emphasis Areas (HBEA)
    e. BEC
    f. MOE OGMA candidates
    g. Hot Spot (HS) resultant layer
    h. THLB constrained[13] areas
    i. 1:50 000 scale Watershed Atlas lines
    j. VRI/Forest Cover lines
    k. 2006 Landsat image
    l. Orthophoto coverage (various years)

4. Priority work flow for OGMA selection (with hectare targets at hand):
    - Large COA outside of THLB, overlapping with MOE candidates ("best case")
    - Small COA outside of THLB, overlapping with MOE candidates
    - Large COA outside of THLB not overlapping with MOE candidates
    - Small COA outside of THLB not overlapping with MOE candidates
    - Large COA in THLB, overlapping with MOE candidates

[12] Roads have been buffered by 50m to account for spatial inaccuracies as well as to avoid placing OGMAs immediately adjacent.

[13] THLB constrained areas include Environmentally Sensitive Areas (from Forest Cover); Archaeological Areas; UREPs and other designated recreation areas; Key Forested Habitat for Caribou; Ungulate Winter Range; and Visuals (High Scenic Areas from LRMP).

- Small COA in THLB, overlapping with MOE candidates
- Large COA in THLB, not overlapping with MOE candidates
- Small COA in THLB, not overlapping with MOE candidates

* If needing to use near-old stands to reach targets, the order is the same as above. Near-old is 100 to 140 years.

* Minimum polygon size is 28 ha, assuming that the polygon is relatively round or oval in shape. Linear polygons following riparian features have a higher minimum size due to greater edge effects. Width along linear riparian OGMAs may be as little as 100m.

The order of OGMA selection demonstrates the following:
- The top priority is to capture old, non-pine leading stands and to not impact the THLB.
- Age takes precedence over size (ie. a smaller OGMA will be captured around an old stand before moving to a larger, near-old stand)

Additional notes

- Hot Spot resultant layer (particularly key forested habitat for caribou and goshawk nests) are considered in the placement of OGMAs. Constrained areas are also considered in OGMA placement, but to a lesser degree.
- OGMAs are intentionally placed around goshawk nests in non-pine leading stands only; there are 5 instances of this. 1 goshawk nest is located in a pine leading stand.
- OGMAs digitized anywhere from 1:5,000 to 1:50,000 scale, depending on their size. Generally the larger the OGMA, the smaller the scale it is digitized at. For example, a 28 ha OGMA is usually digitized at a 1:5,000 scale whereas a 2,800 ha OGMA is digitized closer to 1:50,000 scale.
- VRI/Forest Cover lines are not used as the base linework to capture OGMAs, but rather as a reference. Small areas of younger forest and non-forest are included within OGMAs if required to help reach overall interior forest condition.
- Try to strike a balance between avoiding THLB and following actual features on the ground such as streams, lake edges, cut block boundaries, ridges, bottom lands, etc.
- Try to avoid linearity to reduce edge effects, except around riparian strips and similar landscape linkages.
- Try to achieve even distribution over the TSA and within constituent BEC zones.

Specific direction from the LRMP re: Special Resource Management Zones (SRMZ)

- **UWR** -- Pg 131, objective 11 - "Where feasible incorporate old growth areas in and/or around occupied goat habitat areas."
    - Some OGMAs naturally overlap with Mountain Goat WR in upper ESSF forest that is greater than 140 years old, although most key WR is classified as non-forested or non-productive. Not a significant overlap here.

- Also insignificant overlap with Moose and Deer WR as this in mostly in the SBSdk where there is minimal old forest available for OGMAs.

- **Nadina SRMZ** -- pg 154, objective 2 - "Consider Peter Alec portion of the Nadina Petition Area for designation as an old growth management area."
    - Overwhelming majority of forest in this area is near-old pine leading overlapping with THLB, and therefore not suitable for OGMAs in this exercise.

- **Friday/Nakinilerak/Hautete Lakes SRMZ** -- Pg 155, objective 1 - "Consider fire-originated, naturally regenerated areas around Friday and Nakinilerak Lakes for recruitment of future old growth management area."
    - Polygon history attributes from VRI/Forest Cover identify sizeable burned areas ~3 km south of Nakinilerak Lake at the edge of this SRMZ. OGMAs drafted around these areas.
    - Had to use near-old stands to reach the old target in this SRMZ.

- **Morisson Lake SRMZ --** Pg 157, objective 2 - "Retention of mature and old forest will give priority to the conservation of hygric sites and riparian ecosystems [in Morrison Lake SRMZ]."
    - Special attention paid to old and near-old hydroriparian areas as candidate OGMAs.

- **Nadina River SRMZ** -- Pg 170, objective 2 - "Distribute mature and old forest within both the operable and inoperable landbase [Nadina River SRMZ, within *the 500 metre buffer beyond the 100-year floodplain*]"
    - Completed.

- **Thautil/Gosnell SRMZ** -- Pg 171, objective 1 - "Proportion of mature and old forest retention (from Measure 1.1) located within the contributing forest landbase. >=50%. [Thautil/Gosnell]"
    - Areas outside THLB selected first as in other HBEAs and the GFA.
    - Short of target by several hundred hectares in the ESSFmc and SBSmc2. Need to draw additional areas in this SRMZ to reach old target.

- **Le Talh Giz** -- Pg 172, objective 2 - "Consider portion of the area for designation as an old growth management area. [Le Talh Giz] "

Appendix Two: Rare Ecosystems

Description	Scientific Name	English Name	Global Rank	Prov Rank	BC Status	Track	BGC	Endemic
Forest upland	*Pinus albicaulis / Cladonia spp. - Dicranum fuscescens*	whitebark pine / clad lichens - curly heron's-bill moss	GNR	S3	Blue	Y	**ESSFmk/02;ESSFmk/03**	
Forest upland	*Pinus contorta / Carex pauciflora / Sphagnum spp.*	lodgepole pine / few-flowered sedge / peat-mosses	GNR	S2S3	Blue	Y	**ESSFmc/11;ESSFmc/Wb10**;ESSFwc3/04;ESSFwc3/Wb10;ICHwk2/10;ICHwk2/Wb10;**SBSmc2/15;SBSmc2/Wb10**	
Forest upland	*Pinus contorta / Juniperus communis / Oryzopsis asperifolia*	lodgepole pine / common juniper / rough-leaved ricegrass	GNR	S3	Blue	Y	**SBSdk/02**	
Forest upland	*Pinus contorta / Vaccinium membranaceum / Cladina* spp.	lodgepole pine / black huckleberry / reindeer lichens	G3	S3	Blue	Y	SBSvk/09;SBSwk1/02;SBSwk2/02;**SBSwk3/02**	Y
Forest swamp	*Populus balsamifera* (ssp. *balsamifera*, ssp. *trichocarpa*) - *Picea* spp. / *Cornus stolonifera*	(balsam poplar, black cottonwood) - spruces / red-osier dogwood	GNR	S2	Red	Y	BWBSdk1/12 ;BWBSdk1/Fm02 ;BWBSmw1/09 ;BWBSmw1/Fm02 ;ICHwk4/10 ;ICHwk4/Fm02 ;**SBSdk/08**;SBSwk1/13 ;SBSwk1/Fm02	
Forest upland	*Pseudotsuga menziesii - Picea engelmannii* x *glauca / Rubus parviflorus*	Douglas-fir - hybrid white spruce / thimbleberry	GNR	S3	Blue	Y	SBSdh1/06;SBSdw1/06;SBSmh/01;SBSmh/05;SBSmh/06;SBSvk/03;**SBSwk3/03**;SBSwk3a/01;SBSwk3a/03	
Forest upland	*Pseudotsuga menziesii / Pleurozium schreberi - Hylocomium splendens*	Douglas-fir / red-stemmed feathermoss - step moss	G3	S3	Blue	Y	IDFdk3/05;IDFdk4/07;IDFxm/05;IDFxm/06;**SBSdk/04**	Y
Forest riparian	*Alnus incana / Cornus stolonifera / Athyrium filix-femina*	mountain alder / red-osier dogwood / lady fern	GNR	S3	Blue	Y	ICHmc2/Fl02;ICHvc/52;ICHvc/Fl02;ICHwc/52;ICHwc/Fl02;ICHwk1/Fl02;ICHwk4/Fl02;**SBSdk/Fl02**;SBSmk2/Fl02;SBSvk/Fl02;SBSwk1/Fl02	
Shrub upland	*Amelanchier alnifolia / Elymus trachycaulus*	saskatoon / slender wheatgrass	GNR	S2	Red	Y	**SBSdk/81**	
Fen wetland	*Carex lasiocarpa / Drepanocladus aduncus*	slender sedge / common hook-moss	GNR	S3	Blue	Y	BWBSdk1/Wf05;ICHdk/Wf05;ICHmc1/Wf05;ICHmc2/Wf05;ICHmw1/Wf05;ICHmw3/Wf05;ICHvk1/Wf05;ICHwk1/Wf05;ICHwk2/Wf05;IDFdk1/Wf05;IDFdk3/Wf05;IDFdk4/Wf05;IDFdm2/Wf05;MSdk/Wf05;MSdm1/Wf05;MSdm2/Wf05;MSdm3/Wf05;MSdm3w/Wf05;SBPSdc/Wf05;SBPSmk/Wf05;SBPSxc/Wf05;**SBSdk/Wf05;SBSmc2/Wf05**;SBSmk1/Wf05;SBSwk1/Wf05	
Fen Wetland	*Carex limosa - Menyanthes trifoliata / Drepanocladus* spp.	shore sedge - buckbean / hook-mosses	GNR	S3	Blue	Y	ESSFwc3/Wf08;ESSFxc/Wf08;ESSFxv1/Wf08;MSdc1/Wf08;MSdc1d/Wf08;MSdm3/Wf08;MSdm3w/Wf08;MSmw1/Wf08;MSxk/Wf08;MSxv/Wf08;SBPSdc/Wf08;**SBSdk/Wf08;SBSmc2/Wf08**;SBSmk2/Wf08;SBSwk1/Wf08	
Marsh Wetland	*Eleocharis palustris* Herbaceous Vegetation	common spike-rush	GNR	S3	Blue	Y	BGxw2/Wm04;CDFmm/Wm04;ESSFdvd/Wm04;ESSFdv/Wm04;IDFxm/Wm04;**SBSdk/Wm04**;SBSmk2/Wm04	
Fen Wetland	*Eleocharis quinqueflora / Drepanocladus* spp.	few-flowered spike-rush / hook-mosses	GNR	S2	Red	Y	**ESSFmc/Wf09**;ESSFxc/Wf09;ESSFxv1/Wf09;MSdm2/Wf09;MSxv/Wf09;SBPSxc/Wf09;**SBSmc2/Wf09**	
Marsh Wetland	*Equisetum fluviatile - Carex utriculata*	swamp horsetail - beaked sedge	GNR	S3	Blue	Y	BGxh2/Wm02;BWBSdk1/Wm02;ESSFmw/Wm02;ICHmw3/Wm02;ICHwk4/Wm02;IDFdm2/Wm02;MSdc2/Wm02;MSdm3/Wm02;MSdm3w/Wm02;MSmw2/Wm02;MSxk/Wm02;MSxv/Wm02;SBPSdc/Wm02;SBPSmk/Wm02;SBPSxc/Wm02;**SBSdk/Wm02**;SBSdw3/Wm02;SBSmk2/Wm02;SBSwk1/Wm02	
Fen Wetland	*Eriophorum angustifolium - Carex limosa*	narrow-leaved cotton-grass - shore sedge	GNR	S3	Blue	Y	ESSFdc1/Wf13;ESSFdc3/Wf13;**ESSFmc/Wf13**;ESSFmw/Wf13;ESSFwc2/Wf13;ESSFxc/Wf13;MSdm1/Wf13;SBSwk2/Wf13	
Fen Wetland	*Menyanthes trifoliata - Carex lasiocarpa*	buckbean - slender sedge	GNR	S3	Blue	Y	CDFmm/Wf06;CWHws1/Wf06;ICHwk1/Wf06;IDFdk2/Wf06;**SBSdk/Wf06**	
Grassland	*Poa secunda* ssp. *secunda - Elymus trachycaulus*	Sandberg's bluegrass - slender wheatgrass	GNR	S1	Red	Y	**SBSdk/82**	
Swamp Wetland	*Salix bebbiana / Calamagrostis canadensis*	Bebb's willow / bluejoint reedgrass	GNR	S3	Blue	Y	BGxw1/Ws03;**SBSdk/Ws03**	
Swamp Wetland	*Salix maccalliana / Carex utriculata*	MacCalla's willow / beaked sedge	GNR	S3	Blue	Y	ESSFdvd/Ws05;ESSFdv/Ws05;ESSFxc/Ws05;IDFdk1/Ws05;IDFdk3/Ws05;IDFdk4/Ws05;MSdm1/Ws05;SBPSmk/Ws05;SBPSxc/Ws05;SBSdh1/Ws05;**SBSdk/Ws05**	
Bog Wetland	*Scheuchzeria palustris / Sphagnum spp.*	scheuchzeria / peat-mosses	GNR	S3	Blue	Y	ICHmc2/Wb12;ICHmk3/Wb12;SBSdw3/Wb12;**SBSmc2/Wb12**;SBSvk/Wb12	
Fen Wetland	*Trichophorum alpinum / Scorpidium revolvens*	Hudson Bay clubrush / rusty hook-moss	GNR	S2	Red	Y	CWHxm1/Wf10;**SBSmc2/Wf10**;SBSmk2/Wf10	

Appendix Three:Landscape unit maps showing COGMAs and other long term older forest retention areas.

Available separately.