Cheakamus Community Forest

Ecosystem Based Management

Plan

December 2012

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Figure 1. Location of the Cheakamus Community Forest

Introduction

This plan provides guidelines for the management of the Cheakamus Community Forest. It balances the social, environmental, and economic interests of the community. The majority of the work to date has focused on the environmental aspects, as this was identified as the priority of the community. The purpose of this plan is to provide the community with an understanding of the ecosystem based management (EBM) that is being planned and practiced in the community forest. It is a living document and will be updated as information becomes available or as community values change. The area within the Cheakamus Community Forest (CCF) and landscape units has changed a number of times since it was formed, and area numbers are constantly changing as analysis has been done.

NOTE: This version of the document dated December 2012 has been updated to reflect the comments received through the public review from August to December 2012. A 'Monitoring' Section has been added, and the 'Environmental Considerations' Section has been reorganized. Additional comments have been added to the Silviculture Strategy. A new Timber Supply Review (December, 2012) has been completed as part of the Carbon Project and the numbers in the Environment Section have been revised to correspond with that document.

Guidelines are provided in each section of the plan and they are also integrated in to the Standard Operating Procedures of the CCF.

What is EBM? For the purposes of this guidebook, EBM is defined as:

> *An adaptive management approach to managing human activities that seeks to ensure the coexistence of healthy, fully functioning ecosystems and human communities. The intent is to maintain those spatial and temporal ecosystems such that component species and ecological processes can be sustained and human well-being supported and improved.*[1]

A focal point in this definition is the direct connection between ecological function and human well-being. EBM acknowledges the role of humans as an integral part of the ecosystem. Alterations to ecosystems are accepted as necessary to produce the things that people value; however, human uses and alterations must be within the limits of what the ecosystem can produce and sustain without loss of diversity or functions. The main concept of EBM is to manage for associated organisms instead of individual species. It places greater emphasis on what we leave behind before we can decide on what to harvest.

[1] Based on Coast Information Team definition, see http://www.citbc.org/

EBM seeks to balance choices in maintaining and/or enhancing ecological integrity while at the same time maintaining and/or enhancing human well-being. EBM uses science-based decision making, traditional and local knowledge, engagement of community members, ongoing monitoring, and adaptive planning and management, which allows for changing EBM practice and management in response to an evolving knowledge base. This information will help guide the level of precaution/risk deemed acceptable for resource planners and stakeholders when making trade-offs between different values.

Cheakamus Community Forest Vision & Mission

OUR VISION

The Cheakamus Community Forest is among the best managed forests in British Columbia, being very inclusive of community values and focusing on the sustainability of all forest resources.

OUR MISSION

Our mission is to manage the community forest collaboratively and sustainably for the benefit of all community users.

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Social Considerations

The EBM Plan addresses the social aspects of the community forest by focusing on the human needs of its citizens. It takes into consideration jobs, recreation, visual, and spiritual values connected to the community forest. The forests, the mountains and the scenery are all critical to the success of the town of Whistler and the traditional territories of the Squamish Nation and Lil'wat Nation. They provide the backdrop for the tourist and recreational activities.

1. Tourism

The focus of the town of Whistler and the reason for its existence is the tourism industry. The town was created for skiing and outdoor recreation in 1965. The outdoor recreation business began with the Rainbow Lodge in 1914, which tied into the railway and the fishing at Rainbow Lake. Today there are 21,500 jobs directly related to the tourism industry.

The town of Whistler generates $1 billion of gross revenue every year, with $375 million in revenues going to the provincial and federal governments. Clearly this is a significant driver of business in the region. It has been the intent of the CCF to develop a forest management strategy that helps to maintain the recreational experience. The initiation of an ecosystem based approach to forest management was the first step taken, and has been built upon a thorough GIS analysis of the existing forest condition and an understanding of what currently is and should be

protected, to sustain long term forest functions recreational experiences that people expect in Whistler. At this point, interactions with the tourism industry have involved consultations and dialogues with stakeholders at both a general level and with regard to specific issues.

Objectives:

i) To work towards a full understanding of the interactions between tourism and forestry, and develop forest management strategies that complement tourism goals within the region;

ii) To identify revenue generation opportunities for the CCF that will take into account the costs of recreational activities within the CCF.

2. Forestry

Forestry activities were introduced to the Whistler area almost 100 years ago with the construction of the Pacific Great Eastern Railway in 1914. Several sawmills and small logging communities existed long before the Resort Municipality of Whistler (RMOW) was established in 1975 (Whistler Museum, Forest History Project, 2010).

Forestry activities in the area have recently been adapted to a community forest management system, where the community sets the priorities for the forests surrounding the town of Whistler, within the requirements of the provincial government legislation[2] for community forests.

In 2011, the number of jobs related to the community forest totaled 837 person days of work. Approximately 25% of this work was completed by First Nations people. The majority of logs are transported to wood processing facilities in Vancouver and Howe Sound.

Objectives:

i) To ensure the Annual Allowable Cut can be achieved while still equally managing social and environmental considerations;

ii) To look at other forest resource opportunities such as non-timber forest products, forest carbon offsets, bioenergy production etc.

3. High Value Conservation Forests

An interim analysis completed using Forest Stewardship Council (FSC) standards has determined that the entire community forest should be designated as a *High Value Conservation Forest* (HVCF). This is due to the fact the resort community of Whistler depends on the forest values for the success of the tourism industry. The HVCF designation is one of nine principles used to determine if a forest should be certified as a well-managed forest under the FSC certification program.

[2] Forest Act http://www.bclaws.ca/Recon/document/ID/freeside/96157 03#part3 division7.1 Community Tenures Regulation. http://www.bclaws.ca/Recon/document/ID/freeside/16_352_2004

This HVCF designation requires further assessment, but it will help to determine the specific aspects of the forest that need to be managed to maintain the benefits that they provide to the tourism industry.

Objectives:

i) Carry out a full HVCF assessment as per the FSC guidelines to identify critical components of the forests that support the tourism industry.

4. Recreation

As well as protecting the overall visual quality of the region for the tourism industry, specific recreational areas also need to be considered. Areas containing cross-country skiing, hiking, biking and snowmobile trails, for example, are of particular importance and will require special management prescriptions.

The Train Wreck site, Ancient Cedars Recreation Site and Daisy Lake forest service road climbing wall are good examples of old forest stands that have been set aside for the public use, and incorporated into the EBM approach. Several access roads have also been integrated into recreation trail networks. With the abundance and linear nature of these trails, there is no assumption that trails will not be impacted by harvesting from time to time; however, special management practices will be followed around high value trails to minimize change to the experience of using the trails. Long-term management planning will aim to ensure that these trails are inventoried and kept intact. The timing of forest management activities will take into consideration recreational activities by, for example, minimizing disruptions (i.e. limiting trail access) for recreational users.

Objectives:

i) Inventory existing trails and maintain contact list of those responsible for maintenance where applicable so that proper attention can be given to stakeholders during harvest planning;

ii) Harvesting activities will meet the visual quality objectives set by regulations as detailed in the CCF Forest Stewardship Plan (FSP);

iii) Foreground visual screening along trails and other recreation features will follow the FSP, which focuses on a minimum retention of approximately 1/3 of the trees within 30 metres of the trail or feature;

iv) While inventoried and known existing trails may be closed and disturbed during harvesting operation, they will be repaired or relocated at the end of operations.

5. First Nations

The people of the Squamish and Lil'wat Nations have lived since time immemorial in the Sea to Sky corridor. They draw on the forest for food, shelter, spiritual values and materials. The Lil'wat and Squamish First Nations are equal partners with the RMOW in the ownership and management of the CCF. They participate in management decisions and the philosophy of the CCF.

Objectives:

i) Develop First Nation management objectives within the two cultural management areas inside the CCF boundary, in the Cheakamus and Callaghan valleys;

ii) Ensure opportunities are provided for First Nations to develop businesses and work within the CCF in all aspects of resource management.

6. Public Engagement

The CCF has a strong commitment to communicate with the public. The CCF currently has 34 stakeholders that it communicates with regularly. Meetings are held as needed with stakeholders, including commercial back country recreation operators to discuss issues and management priorities for the CCF. Presentations are made to the RMOW Council on occasion. The RMOW Council-appointed Forest & Wildland Advisory Committee reviews and comments on the CCF activities. The Squamish and Lil'wat Nations review plans through their respective referral committees and share information at public gatherings. An annual report is produced and distributed to the public. The CCF also maintains its own website: www.cheakamuscommunityforest.com.

Objectives:

i) To hold a minimum of two public meetings each year regarding CCF activities;

ii) To maintain the website and ensure that harvesting plans, maps, meeting minutes, project information, etc. are accessible online.

7. FireSmart

The threat of forest fires exists for the CCF and the urban interface areas around Whistler. The CCF provides opportunities for forest fire prevention programs when it carries out thinning operations or modifies forest fuels in strategic locations in the CCF. The provincial government has provided financial subsidies to local governments through the Fire Smart program. The CCF's goal is to conduct 50 hectares of thinning annually. However, the need to reduce fire risks is significant, and greater collective efforts are required. As part of a triple bottom line approach to managing the CCF, it is necessary to look at opportunities that consider managing fire risk as a way of generating economic activity. For instance, thinning and debris could be used as a high quality biofuel if local demands existed. Further details are provided in the 'economic considerations' section of this plan.

Objectives:

i) Develop CCF management strategies and conduct CCF harvesting operations in a manner that will reduce the long term fire risk in the region by taking advantage of government programs and business opportunities.

Social Guidelines

A. Tourism and recreation are the main activities in the community forest and maintaining the integrity of the associated assets is the number one priority. Harvesting activities will integrate recreation and tourism values at all times including in the sustainable harvest

analysis.

B. First Nation jobs are a stated priority of the community forest. Every effort will be made to provide jobs in CCF related management and operations activities.
C. First Nations values provide guidance in operations of the CCF.
D. Recreation sites and trails will be an ongoing focus of attention for the CCF. Agreements will be signed with the provincial government and the commercial recreation industry to promote and maintain recreation facilities (trails & rec sites).
E. Public engagement will be an ongoing activity undertaken by the CCF.
F. A public education program on forest values and forest management will be an ongoing activity.
G. The risk of wildfire to the community is significant. Efforts will be made to reach agreement with the RMOW to collaborate on the FireSmart program, which could become an ongoing program in conjunction with the RMOW.
H. It has been agreed by the three partners that any profits realized will be put towards enhancement of the CCF including roads, trails, signs, public education, improved forest management practices, etc.

Environmental Considerations

1. Ecosystem Based Management

The initial approach taken has been to identify the present conditions and possible rarity of the ecosystems represented, using the Biogeoclimatic Ecosystem Classification (BEC)[3] to the subzone/variant, within the forest, and the protected areas at multiple scales on the landscape. The coarse filter approach used for this analysis moves from an Ecoregion and Ecosection level down to the landscape unit (LU) before a final focus on the community forest itself. As the CCF now lies completely within the newly created (2010) Whistler Landscape Unit (see Figure 3) and is the only licensee operating there, it has become possible to carry out this assessment in the context of the landscape unit, as the different levels of protected areas[4] at that scale directly influence the management unit.

Ensuring ecosystem function is the priority parameter for ecosystem based management, and defining what a functional ecosystem is can be the main source of debate in terms of the economic and environmental elements of EBM. In coastal BC, the majority of forests under natural conditions are in an old forest state, so management of ecosystem function is a matter of managing old forest attributes. Current conservation science for maintaining ecosystem function requires a minimum of 30% of the natural ecosystem representation before irreparable damage for habitat and ecosystem function is done, while maintaining 70% of the natural ecosystem

[3] BEC is an integrated hierarchical classification scheme that combines climate, vegetation and site classifications
[4] See Interim CCF EBM Plan 2011 section 2.5 (pg 16) Levels of Protected Areas for definition. Different levels of protection (High is equal to Parks, mid-levels might be only protected from harvesting and not from mining, small hydroelectric etc., and low is through i.e. voluntary approach or inoperable from harvesting)

representation is considered a precautionary approach. More recent research by Ghislian *et al.* (2010) in Canada *suggests* that maintaining a minimum of 40%[5] of natural ecosystem function as a lower threshold and a more cautious approach. In regards to this, two factors are considered for the CCF:

- The overarching objective driving management decisions is maintaining the critical values necessary to attract and retain visitors for the tourism industry.
- The High Conservation Value Forests assessment for FSC determined the forests are not ranked high value for their biodiversity – they are not large contiguous units of undisturbed forest, the forests have been fragmented by a long history of human disturbance from resource extraction, transportation, energy, and ongoing human utilization.

These factors lead to the conclusion that the CCF is not managing for "intactness" so much as to preserve an image for the region, and as such it is probably not necessary to manage towards the upper end of the undisturbed scale, especially given the CCF is actually a "sub-maritime" location with ecosystems transitional to those of the interior with their higher disturbance rates. The concept of ecosystem representation is critical to maintaining a balance across the landscape, including for recreational and visual values, something that historically has not happened with very little retained at lower elevations and close to the ocean.

The Whistler Landscape Unit is legislated by the province (under the 'Forest Range Protection Act') to retain targets of 9% Old forest for the CWHds1 and CWHms1 and 19% Old forest for the MHmm2. Table 1 below compares the province's FRPA standard targets to Whistler Landscape Unit-EBM targets for old forest biodiversity.

Table 1. Old forest Biodiversity Targets for Whistler Landscape Unit by BEC subzone - Provincial FRPA Standards versus EBM Approach.

BEC Unit	NDT	FRPA OLD Target	Range of Natural Variation[6]	EBM OLD Targets (40% - 70%)
CWHds1	2	9%	90%	36-63%
CWHms1	2	9%	90%	36-63%
MHmm2	1	19%	95%	38-67%

2. Ecosystem Analysis

Using the guidelines above, the following analysis looks at what ecosystems are found within the CCF and determines what is already protected by legislation to determine if it is adequate, and if not, where gaps exist.

[5] Ghislian *et al.* 2010 Vol. 86, No 5. – the Forestry Chronicle

[6] Defines % of forest that is old considering historical disturbances in the ecosystem dynamics and considered the best available model for maintaining conditions to which most species are adapted; however, further research is needed to confirm these numbers for the CCF as they were taken from adjacent landscapes.

Table 2. Area breakdown for the Whistler Landscape Unit and the Cheakamus Community Forest (under EBM planning) 2012 Analysis.

	Whistler Landscape Unit (Hectares)	Cheakamus Community Forest (Hectares)
Total Area	94,131	33,018
Non Forested	47,499	7,480
Forested	46,625	25,538
Protected Areas-including FRPA[7]	68,815	14,254
Not Protected	23,314	18,764
Water	1,972	
Additional EBM Protected Forests		2,958
Inoperable Forests		5,087
Timber Harvesting Land Base[8]		8,056

Two items worth noting in this analysis of the landscape unit and the actual community forest are: 1) while almost half the Whistler Landscape Unit is non-forested, less than a quarter of the CCF is non-forested and 2) the majority of the protected forests lie within the Landscape Unit as a whole and not within the community forest boundaries. This last fact is very important to the following discussion and the resultant recommendations for the amount of protected area within the forest. The community forest by definition is a "working forest." It contains no parks within its boundaries and is generally located in the lower elevations of the Whistler Landscape Unit. The Landscape Unit contains a considerable percentage of protected forests which need to be taken into consideration when making value judgments about how much forest is protected.

The community forest spans 5 BEC sub-zones which are transitional between the coast and the interior, and experiences cooler winters, more snow and warmer summers than in more typical coastal ecosystems. When considering the representation of ecosystems in the forest it is common to look at four age classes, which in some degree cover different structural (seral) stages[9] of a forest as it grows and develops. The breakdown of the representation within the community forest is shown in Table 3 below.

[7] FRPA (Forest and Range Practices Act) is legislated regulations for forest activities that must be followed.
[8] Timber Harvesting Land Base (THLB) is defined by what is the productive forest that supports the timber harvest based current market conditions after deducting areas that are protected, inoperable, not productive etc.
[9] Seral Stage in this specific case is defined by age classes of Early (<40 years), Mid (41-80 years), Mature (81-250, except MH zone (121-250 years), and Old (>250 years); however, stand structure and silviculture treatments to increase attributes could be used as better information is available.

Table 3. Land Use (Hectares) and Seral Stage (Age Range) Representation by BEC zone in the CCF (2011 Analysis)

Cheakamus Community Forest Biogeoclimatic Sub Zone Analysis (Hectares)						
Land Class	**CWHds1**	**CWHms1**	**MHmm2**	**MHmmp2**	**CMA**	**Grand Total**
Forest-Early	22	5,715	501			6,238
Forest-Mid	11	1,403	264	118	31	1,828
Forest-Mature	154	2,628	855	298	21	3,955
Forest-Old	1	5,807	6,442	1,489	284	14,022
Non-forest	12	673	720	1,641	712	3,758
Alpine			29	812	1,870	2,711
Wetland		12	18	46		76
Water		144	29	7	31	212
Urban/road		218	0			218
Grand Total	**199**	**16,600**	**8,860**	**4,411**	**2,950**	**33,018**

What is also often considered is how much forest is currently protected, so that gaps can be identified under the EBM approach. Figure 2 and Table 4 below details the amount of forest in each seral stage, how much is currently legally protected, what kind of designation protects it, and what is available for timber harvesting. It should be noted that there appears to be a small overlap in the boundary between the Whistler Olympic Park and the CCF, and this is why a small area of designated park shows up in the table.

Table 4. Breakdown of legally protected areas (in hecatres) by seral stage in the CCF (2011 Analysis).

Protected	Forest Early	Forest Mid	Forest Mature	Forest Old	Total Productive	Non Productive	Grand Total
1 WOP	6			18	24	5	30
2 Wildland	166	63	187	3,814	4,230	3,774	8,004
3 WHA		71	123	64	257	491	748
4 UWR	0	18	77	65	161	88	249
5 RRZ	345	119	247	594	1,305	373	1,678
6 OGMA	0	6	125	103	234	4	238
Sub Total	**518**	**277**	**758**	**4,658**	**6,212**	**4,736**	**10,947**
Not Protected Inoperable	283	236	786	3,172	4,477	1,552	6,029
Forest	5,427	1,313	2,413	6,200	15,353	690	16,042
Grand Total	**6,228**	**1,826**	**3,957**	**14,030**	**26,042**	**6,978**	**33,018**

Note: WHA – Wildlife Habitat Area. UWR – Ungulate Winter Range. RRZ – Riparian Reserve Zone. OGMA – Old forest Management Area (technically not currently protected but likely to be again when government does so)

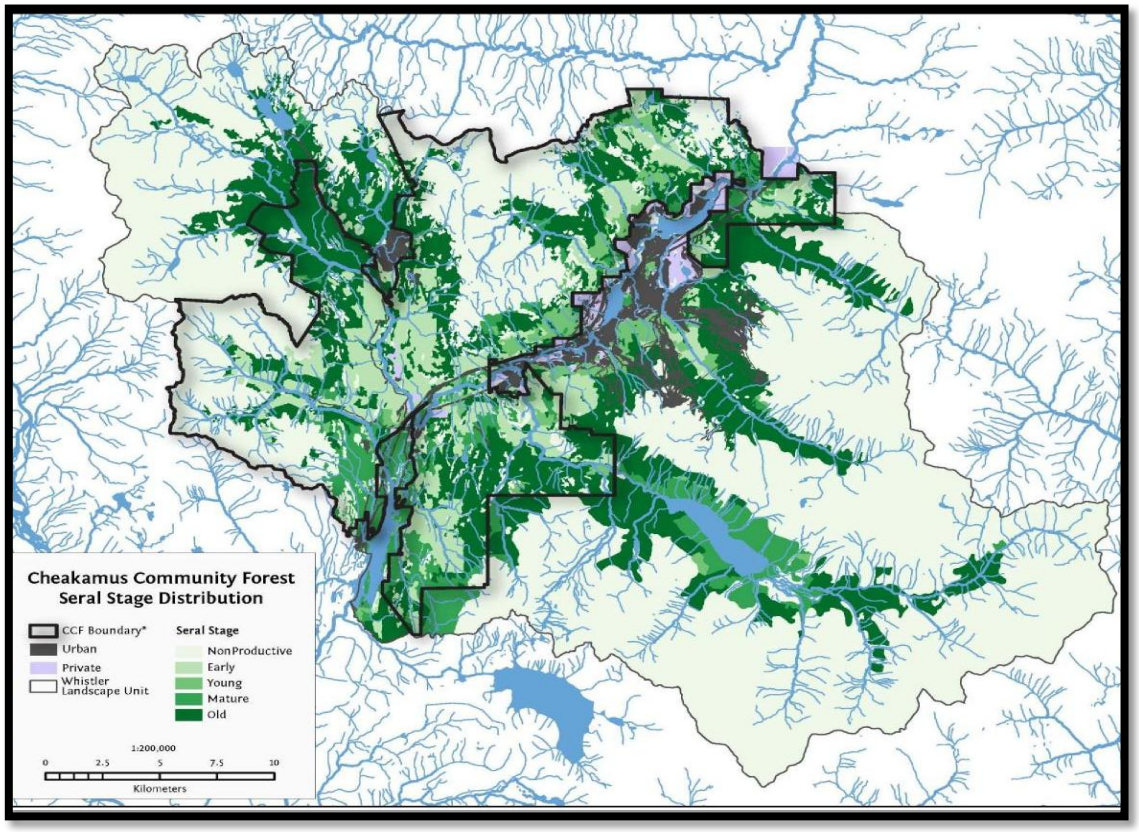

Figure 2. Cheakamus Community Forest Seral Stage (age) Distribution Map

There are a total of 14,030 hectares (54%) of old forests in the productive part of the CCF and of this, 4,658 hectares (18%) are currently protected within the CCF. The total productive forest has 24% currently protected.

3. Natural Resources – Targets for reserves and old forests.

Using the analysis of existing protected areas as a reference point, this report considers what additional protection is required at landscape and stand levels to provide an adequate base for ecosystem protection, and to address the "social license" needed to manage the CCF. The CCF should achieve the lowest target identified by ecologists for EBM which is 40% of natural ecosystem representation of old forest, while moving towards a precautionary approach of 70% of natural ecosystem representation where possible over time. The CCF advocates that their objectives could be achieved by adopting the following management strategies:

1. Increasing riparian protection by implementing the requirements of the FSC standard[10] and up to 200 metre wide buffers for riparian recreation corridors on the Cheakamus, Callaghan, Brandywine and 16 Mile creeks[11]

[10] See CCF Ecosystem Based Management Plan 2011 Appendix 2 for FSC Riparian Standards
[11] See CCF Forest Stewardship Plan for full details
http://www.whistler.ca/images/stories/PDF/Toward%20Sustainability/CCF/Forest%20Stewardship%20Plan.pdf

2. Addressing visual landscape management for critical areas by increasing forest retention in areas such as the Interface Forest Development Unit (FDU) surrounding the town of Whistler.
3. Addressing site series representation through a strategy to manage for red- and blue-listed ecosystems, and rare and unique ecosystems[12].
4. Acknowledge that parts of the THLB will be constrained by recreational demands. These are thought to be small discrete areas of productive forest that can only be defined when operational and stakeholder considerations are implemented.

This approach makes a considerable difference to the overall amount of protected forest and the impact upon the landscape. Two main changes were developed by this unique approach: firstly the identification of the forests behind Whistler (west-northwest of the community) and below the legally identified LRMP Wildlands Area, the main viewscape for those skiing on Whistler and Blackcomb, as something that should not be unduly interrupted by harvest openings. The proposal here is that no more than 20% of the unit can be in a disturbed state and that any harvesting would meet enhanced strict visual guidelines thus limiting it to very small openings or selection / thinning type activities (FireSmart Program); secondly, to protect ecosystems identified as rare at a local level and at the provincial level using information supplied by local experts and the provincial "red and blue" lists[13]. In addition the actual area of forest protected in riparian areas would increase considerably due to the inclusion of reserved forest along some non-fish bearing streams that provide both function for downstream fish waters and habitat for amphibians and other aquatic life. Together, these measures push the total level of protected forest across the CCF from 24% to 35% while the analysis of old forests shows a rise from 18% to 24%. It will be necessary to consider the impact of recruiting younger stands into this mix.

Adding in the mature forest component brings the amount of protected forest very close to 30% and places the CCF on the right track over time. As a final approach to ensuring that adequate areas are protected to address a combination of biodiversity and recreation requirements, a total of 390 hectares of forest was identified for special features on the landscape. These forests include all the CWHds1 sub-zone as it is nearly all "red listed"[14] in an old forest state and such well known locations as the Train Wreck on the Cheakamus River, and the Daisy Lake FSR Climbing Wall.

[12] Refer to the CCF Ecosystem Based Management Plan, June 2011 for a full account of the red and blue lists and rare and unique ecosystems or Green. R. 2010. CCF Rare and Unique Ecosystems (unpublished report for CCF)

[13] At this point there is no intention to reserve "blue" listed ecosystems in the CWHms1 as they cover the majority of the CCF and adequate attention has been given to ecosystem representation. Ongoing assessment of this issue will be done.

[14] Red Listed in management terms is that we will protect these areas from harvesting until the ecosystem shows recovery in targets.

The result of this is that 29% of the total productive forest is now old and mature forest and protected within the CCF. The total forest protected is 36% and over time this will all become mature and old forests. Table 5 (2011 numbers) below presents the analysis for what the proposed ecosystem based approach to managing the land base looks like.

Table 5. Analysis of Protected Areas and Timber Harvesting Land Base (THLB) under proposed EBM approach (2011 Analysis).

Protected	Productive Forest-Early	Forest-Mid	Forest-Mature	Forest-Old	Total Productive	Non Productive	Grand Total
1 WOP	6			18	24	5	30
2 Wildland	166	63	187	3,814	4,230	3,774	8,004
3 WHA		71	123	64	257	491	748
4 UWR	0	18	77	65	161	88	249
5 RRZ	567	185	328	942	2,022	373	2,395
6 OGMA	0	6	125	103	234	4	238
7 West Interface * 80%	260	454	196	581	1,494	42	1,533
8 Listed Ecosystems	84	4	65	472	627	21	648
9 Recreation Reserves	20	38	190	142	390	18	408
Sub Total	**1,104**	**839**	**1,291**	**6,202**	**9,439**	**4,817**	**14,254**
Not Protected							
Inoperable (elevation)	283	236	562	3,172	4,252	1,552	5,804
Forest	4,842	750	2,104	4,655	12,351	609	12,960
Grand Total	**6,229**	**1,825**	**3,957**	**14,029**	**26,042**	**6,978**	**33,018**

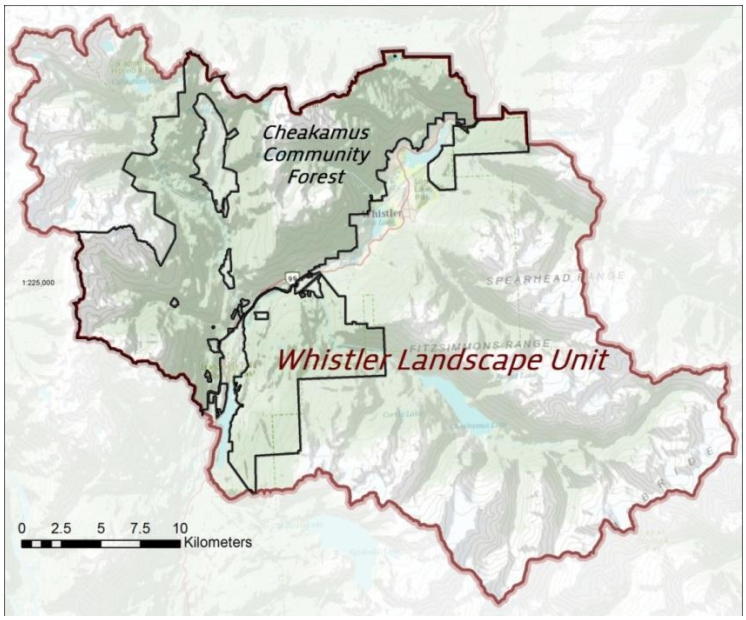

Figure 3. Map of the entire Whistler Landscape Unit with Cheakamus Community Forest within it

One other item to consider is the forest currently described as inoperable, which generally consists of the higher elevation stands that may be uneconomic to access due to stand values or they are in terrain too rugged for conventional harvesting. It can be assumed that at any point in time a sizeable portion of this forest will never be harvested and could be included in a determination of the total amount of forest protected from harvesting. Although this inoperable area that is potentially available for counting towards targets may not be pinned down spatially, it is still possible to use a proportion of it towards the targets. Assuming half the area of inoperable old and mature forest may never be harvested then an additional 1,867 hectares of forest can be included in the total which pushes the amount of old and mature forest providing habitat and visual quality objectives to 9,360 hectares and 36% of the productive forest.

5. Management Recommendations by BEC sub-zones.

The analysis of the CCF considers the total forest area, but when we truly think of ecosystem representation it is necessary to do so at the biogeoclimatic sub-zone level, to make sure that sections of the forest are not over harvested while others carry the lion's share of the protected areas. Table 2 above identifies all the units in the CCF, but there are only 3 sub-zones which carry all the operable timber where harvesting will be carried out:CWHds1, CWHms1 and MHmm2[15].

For the analysis below, the short-term target refers to < 25 years; mid-term target refers to 25-110 years; and the long-term target refers to > 110 year. Old forest is defined as greater than 250 years old while mature and old forest is defined as greater than 140 years old. When a target is not met or falls short, a strategy needs to be developed to meet it.

Since these are the areas where harvesting would be planned, this plan will only focus on them and develop plans for their management even though non timber harvesting use of the areas will be occurring.

CWHds1 Old forest Targets:

This is the low elevation land at the southern end of the community forest around Daisy Lake below the CWHms1. The CWHds1 is a very small portion of landscape and community forest; regardless, it has been heavily disturbed by harvesting, fire, transportation and hydro. It also has considerably less protected forest than it should at the provincial scale because of community development in these valley bottom areas and easy access for harvesting. Because of this, nearly all the site series in this sub-zone have been identified as either red or blue listed by the BC Conservation Data Center.

5% of the productive forest is currently protected and this is in Riparian Reserve Zones. There is inoperable forest caused by rocky sites with low stocking forest on the west side of Daisy Lake and the thin strip along the south east shore of the lake around the Buddhist Retreat CenterSince there is a very small amount of this sub-zone within the CCF and no old forest, the red and blue

[15] CWHds1- Coastal Western Hemlock dry sub-maritime. CWHms1 – Coastal Western Hemlock moist sub-maritime, MHmm2 –Mountain Hemlock moist maritime

listed site series would not receive any protection. A short-term target of Mature Forest should be identified for **recruitment** to Old seral stage.

Current % of Old forest in CWHds1 (2011):

- 1% Old forest in CCF
- 9% Old forest in WLU

Recommendations: Old Forest Representation Targets

- **Short term target** is to reserve all forested areas in the CWHds1 sub-zone from harvesting in the CCF, to allow time to develop more detailed management strategies. The entire CWHds1 area (199 hectares) should be mapped out as a no harvest zone in the CCF.
- **Mid term target is** to **recruit** at least 50% of Mature forest for Old seral stage while the rest of the area will be available for thinning or selective harvest only for the purpose of developing an uneven aged forest structure/old forest attributes. In less than 40 years, over 80% of the area will become old and mature seral stage.
- **Long term target** is to allow an estimated 150 years before 40% of the area becomes Old Seral Stage.

CWHms1 Old forest Targets:

The CWHms1 is generally located in the valley bottoms and lower elevations and has historically been where most of the harvesting has occurred. It will also be the main operating area for the CCF into the future, as it is where virtually all the second growth stands are found.

27% of the productive forest area of this subzone is protected, with 16% in the mature and old seral stages. There is a large component of higher elevation inoperable forest, totaling 8% of the forest, the majority of which is old forest that provides excellent biodiversity habitat and visual quality management. The majority of this subzone(64%) is in the Timber Harvest Land Base and will remain the location for the majority of harvesting activity in the CCF. The Provincial Old forest targets for the CWHms1 are 9%.

Current % of Old forest in CWHms1 (2011):

- 37% Old forest in CCF
- 40% Old forest in WLU

Recommendations: Old Forest Representation Target

- A recruitment strategy for mature trees that retains over 40% (old and mature) within the WLU portion at all times.
- **Short term target** is to drop just below 30%, as the second growth forest still needs 25-30 years before it will be economically viable and/or large enough to harvest. 20% of the Old forest forest is within a protected or reserved area and an estimated 9,000 hectares of the 15,000 hectares in the CCF portion of the CWHms1 is reserved or inoperable for harvesting. A recruitment strategy for mature trees retains over 40% (old and mature) within the CCF portion at all times.

- **Mid term target** is to recruit within the protected and inoperable mid-seral forest to achieve 36 % target of the forest in a mature seral state.
- **Long term target** will target a minimum threshold of 25% of the forested area in old and mature forest that is protected through recruitment. An estimated 40% of the subzone will be in an old seral stage by 250 years within the CCF.

MHmm2 Old forest Targets:

The Mountain Hemlock zone is the high elevation forest above the CWHms1, and consists of mostly mountain hemlock, balsam fir, yellow cedar and some red cedar and some Douglas fir in the warmer, drier aspects. Historically, there has been little harvesting in this forest type, so the majority of this subzone is still Old forest.

42% of the productive forest is protected and a further 30% is classified as inoperable because of elevation and aspect, leaving only 28% available to harvest. The Provincial Old forest targets for the MHmm2 are 19%.

Current % of Old forest in MHmm2 (2011):

- 76% Old forest in CCF
- 83% Old forest in WLU

Recommendations: Old Forest Representation Target

- **Short-term target** to retain > 70% Old forest
- **Long-term target** to retain >70% Old forest.

A combination of riparian reserves, other protected areas, and non-harvestable areas retains a precautionary approach of over 70% of the natural old forest, over the next 250 years.

6. Stand Level Considerations

The foregoing objectives and recommendations all relate to landscape level aspects of forest management, however, it is also necessary to consider what is done within the actual harvesting units to ensure a truly ecosystem based approach is being maintained.

With multiple objectives for management around biodiversity and recreation a number of different approaches will be needed, but much of it is delivered through the choice of harvesting system, the resultant opening size and the amount of trees retained both standing and down on the forest floor. The silviculture systems that will be employed on the CCF are described fully in the silviculture strategy for the CCF, May 2012 update, and more briefly in this document under economic considerations. The main stand level considerations that are managed at the stand level are:

1. Visual Quality – this refers to the views and visual experience when inside the forest or in the foreground when traveling through the forest on major roads. This is managed by restricting the overall opening size and retaining trees within the opening as necessary to break up the view. Openings will generally be in the 1-5 hectare range depending on location and visual sensitivity (significant public viewpoints), and where trails and recreation features are adjacent a varying amount of tree retention along a linear zone will be retained. Specifics are detailed in the CCF Forest Stewardship Plan.
2. Future Stand Structure – this refers to the provision of ongoing wildlife habitat through ensuring that there is vertical structure in the forest with trees of different ages providing a variety of canopy heights. This is achieved by retaining trees of various sizes in the harvest openings which determined in the choice of silviculture system. Retention rates from as low as 10-15% can have a positive impact and be manipulated to address either general habitat provision or specific issues. Probably the main habitat issue that will have to be managed for on the CCF is that of northern spotted owls. A new designation for future potential spotted owl habitat is being developed with the implementation of a series of new Wildlife Management Areas (2-524 and 2-525) which will require a specific tree retention level to provide large overstory trees to be present in any future opening. Details are being developed at this time and will be incorporated in the EBM plan when available. In addition, where it is possible, to develop a strategy to protect 1000 year old trees with in block retention.
3. Coarse Woody Debris (CWD) – this refers to the trees, logs and branches left behind on the forest floor after harvest that provide a specific habitat for wildlife as well as a future supply of nutrients into the ecosystem. Although there are legal requirements for CWD, they are not scientifically determined and the amount required for ecological function will be variable depending on the forest type being harvested. Higher elevation forests with slower decomposition rates and less fire generally have more CWD on the forest floor than low elevation forests especially if they have a more frequent fire return interval as would be the case in the CCF. A recent Ministry of Forests study[16] indicated that a sample of cutblocks in the CWHms1 had an average of 80 pieces/ hectare (167m^3/ha) of CWD >20cm in diameter at one end and >10m long which provides more than adequate amounts for future biodiversity requirements. It is Recommended:

    - that a minimum of 10 pieces per hectare should be the target initially but that some monitoring of current levels both in blocks and in retention areas be carried out as soon as possible to get an understanding of what is being maintained at the stand level.
    - that some research be carried out to determine what the appropriate level of CWD would be for long term habitat management in the CCF.

[16] http://www.for.gov.bc.ca/ftp/hfp/external/!publish/frep/extension/FREP_Extension_Note_21.pdf

Environmental Guidelines

A. An ecosystem based approach to management adapted from work elsewhere in coastal BC will be the driver for the CCF. A detailed understanding of the forest cover and inventory will be the backbone of this approach to enable ecosystem representation within the management unit.
B. Although biodiversity is important, the requirement to retain old forests is more about providing an environment for recreation and tourism and in fact the forests do not in of themselves have especially high conservation values17. As such, viewscapes and specific forest features are very important aspects of forest management.
C. Forest protection has been achieved through a combination of legal requirements and statutes such as the Land and Resource Management Plan Wildlands and Wildlife Habitat Areas and the non-legal voluntary approaches taken by the CCF. This requires a careful assessment of the Forest Stewardship Plan (legal) and the EBM Plan (non-legal) to determine the required environmental protection.
D. The CCF has built the EBM approach around four core considerations which collectively push the amount of reserved forest into a much more functional landscape:
    a. Increasing the amount of riparian protection based on the FSC principle.
    b. Preserving the visual quality behind Whistler by retention of at least 80% of the forest in the Interface FDU.
    c. Legally establish OGMAs on the ground and on maps
    d. Protecting ecosystems identified as rare and unique.
    e. Protecting additional areas identified as important for recreation and tourism.
E. At the stand level, biodiversity and recreation objectives are addressed through the use of retention or small opening silviculture systems that will retain variable amounts of standing timber for a varied duration. Aspects such as visual quality, future stand structure for wildlife habitat and coarse woody debris will all be manipulated through an adaptive management process based upon a sound monitoring system.

Economic Considerations

1. Annual Logging Program

The annual logging program generates funds to operate the community forest. It meets the provisions of the forest tenure awarded to the partners by the provincial government. The logging program is designed and implemented following the conditions and constraints of this EBM Plan. A three year logging plan is developed annually to inform the community of future activities. The annual logging plan will be made public annually, in the early spring.

Objectives:

[17] As determined by the Forest Stewardship Council "High Conservation Value Forest" assessment.

i) Develop annual logging plans that achieve the Allowable Annual Cut (AAC) in an economic manner while adhering to the guidelines of the EBM plan.

ii) Complete public and stakeholder reviews, and comment on the annual plans in a timeframe that allows for meaningful public feedback.

2. Sustainable Harvesting Determination – AAC

The present AAC has been approved at 20,000 m^3/year from 2009 to 2013. A new AAC will be calculated by the CCF for approval by the provincial government in 2013. This harvest level is considerably lower than historic levels, before the area became a community forest, when licences were part of the Squamish TSA. These levels were as high as 40-60,000 m^3/year when large scale clear cutting was carried out in the Callaghan valley and lower Cheakamus valley. The current and upcoming calculations take into account high tourism values (page 4), natural resource reserves and recreational reserves (page 22). The AAC is determined with forest analysis techniques approved by the Ministry of Forests. A new forest management plan will be written in 2013 for approval by the provincial government. It will use this EBM Plan as its guiding document to help determine the output of the AAC.

2.1 Tourism Values and Public Reserves

The main impacts of timber harvesting on tourism values are disruption to trails and visual quality changes of the landscape. Managing for each of these does have a short term negative impact on the AAC as timber must be retained to provide screening in both the foreground and background.

The analysis of existing forest conditions, subsequent design of a protection strategy to maintain suitable levels of old and mature forest in the landscape, and choice of suitable silviculture guidelines goes a long way towards protecting the visual quality of the landscape. These actions can be quantified in terms of areas removed from the Timber Harvesting Land Base (THLB) or as a basal area reduction in the amount of timber that can be removed from a stand of trees. Retention of large trees scattered across openings in addition to the Wildlife Tree Patches will further break up the visual impact of harvest openings especially from more distant viewpoints. The impacts of these are factored into the modeling of timber supply as known “net downs,” which reduce the total volume available for harvesting.

2.2 Natural Resource Reserves

In the same way that the management of tourism values has a negative impact on timber harvests, the development of a protected area network of reserves – those that are legally required and those identified by the CCF as part of the EBM approach - results in extensive net downs to the timber supply. The preceding section on environmental considerations carefully itemizes the steps that the CCF is taking to manage for biodiversity and tourism values. A critical step is to determine the impact on timber supply to ensure that the remaining THLB has forests of sufficient productivity to grow enough volume on an annual

basis for this to be a sustainable management scenario.

Across the community forest, the impacts of managing for tourism and biodiversity have resulted in a total net down of >10,000 hectares for protected areas. In addition to this, the >5,000 hectares of inoperable forest has to be factored in through a reduction in the volume of timber contributing towards the AAC. The resulting area contributing to the AAC under this plan is 8,056 hectares.

Objectives:

i) Develop and implement an integrated EBM plan that provides protection for biodiversity and tourism values while providing enough THLB to allow an economically viable AAC.

ii) Carry out a Timber Supply Analysis to determine a new AAC within two years of completing the EBM plan that is an output of the plan.

3. Silviculture Guidelines

Silviculture systems were first introduced in the section about stand level considerations, as this is the main tool for implementing the CCFs objectives on the ground. However, as well as determining what the forest will look like in the future, silviculture system choices can also have a major impact upon the economics of the community forest. Large block sizes and clear cutting with minimal retention simplifies management considerations and can maximize returns on infrastructure and logging costs, while small block sizes and high retention levels will often do the opposite. While an ecosystem based approach maintains biodiversity and visual quality, it also places some major restrictions on the harvesting options.

In order to adequately manage the range of sites and diversity of forest ecosystems within the CCF, a range of silviculture systems is required, as well as a commitment to using an adaptive management approach. The two silviculture systems most likely to be employed are as follows:

- **Variable Retention** – opening sizes are targeted at an average of 1-2 hectares in size, with a maximum of 5 hectares. Within the harvest unit, a low level of trees will be retained. This low level of permanent retention will be 10-15 stems per hectare, either scattered through the block (dispersed retention) or clumped together (group retention) depending on site specific issues for each block. Although some natural regeneration will occur, these blocks will be planted following harvesting to achieve full stocking and the next crop of trees.
- **Shelterwood system** – opening sizes range between 2-10 hectares, and trees within the harvest opening will be removed in two stages, separated by many years. The first stage will remove no more than $^{3}/_{4}$ of the volume in the stand and help to create better conditions for regeneration of natural seedlings. The second stage, maybe 10 to 20 years later, will then remove the majority of remaining overstory trees, while retaining at least 40 large trees per hectare to provide some ongoing “shelterwood,” as well as visual

quality. Some planting may be necessary to fill gaps after the second harvest.

- **Group selection** – opening sizes average 1/2-1 hectares and trees are removed in one to three passes, which are separated by periods of more than 20 years. At the final harvest, some overstory trees should retained in or around the opening, in order to provide long term structure to the forest. Any gaps in the stand will be fill planted after the final harvest.

These three basic systems, using adaptations to suit conditions (ecological, physical, visual and economic) should provide the CCF with enough options to manage the forest in a manner consistent with an ecosystem based approach. The issues already identified will need to be addressed in younger, second growth stands; however, efforts will be made to increase forest ages to at least 100 years, where economics will allow for it, through commercial thinning operations. These intermediate harvests will remove some volume at each entry, with the intention of providing more growing space for the residual trees to continue growing. Harvesting will only occur in forests less than 100 years of age when implementing FireSmart or landscape level fuel management under a shaded fuel break scenario.

Ongoing monitoring of the results of harvesting operations should be tied into adaptive management planning.

4. Operating Costs

The CCF's average annual fixed operating costs are approximately $60,000. This covers rents to the provincial government, insurance, administration, management costs, information database & mapping, public engagement programs, etc. Road maintenance has also been carried out within the budget up to this point, but major items including new surfacing, bridge and drainage structures will require additional funds.

Objectives:

i) Maintain operating costs within the revenue projections from the CCF operations

5. Carbon Credits

When the CCF was first established between the 3 partners, it was clear that revenues solely from timber harvesting would not cover operating costs under the EBM plan and its increased forest management protections and practices. It was also known that the same hectare of forest could produce wood products, carbon storage, habitat, water filtration, storage, scenic views, recreation opportunities, botanical products etc. Coastal temperate native forests accumulate above and below ground carbon better than almost any other terrestrial ecosystem. Recognizing an opportunity to include carbon as a potential source of revenues, the CCF decided to develop a carbon project, based on carbon storage strategies which include extending rotations and creating additional protection/retention for riparian zones, threatened ecosystems, recreational areas, etc., while continuing to

produce high quality timber and other environmental amenities generated by native forests. Forest management practices above and beyond the legal requirements of the province can provide climate change mitigation benefits are a valuable tool to reduce greenhouse gas emissions. The co-benefits of forest sequestration projects include: (1) generation of additional carbon with minimum leakage[18] effects, (2) help reduce industry carbon and (3) enhanced biodiversity and conservation of other forest values.

Objective:

i) To capture additional carbon stored in the forest, rather than harvesting it.

ii) To develop a carbon offset project that will generate enough revenues to support these improved forest management practices.

6. Firewood

Firewood is currently provided free of charge to the local community, and also sold to commercial firewood companies.

The risk of wildfire is significant in the community of Whistler. The development of a local urban interface wildfire plan that removes fuel from the forest through stand management, such as commercial thinning and pre-commercial thinning, can help to mitigate this risk.

7. Community Improvements

CCF's mission and vision involves providing benefits to the community. The CCF is actively involved in improving recreation sites and trails (Ancient Cedars, Loggers Lake, Alexander Falls, etc) and public education (signs, workshops, public open houses). Road improvements and access management are a key support for public and commercial recreation.

Economic Guidelines

Tourism is an important factor for the community forest. The logging program will integrate and compliment recreation and tourism values at all times. Tourism values will be considered in the sustainable harvest analysis (AAC determination).

A. The Timber Harvesting Land Base has been defined in this plan, and is managed to provide logging opportunities on an ongoing basis.

B. First Nation jobs and opportunities are a priority of the community forest. Every effort will be made to create and maintain these jobs.

C. The carbon credit program will be used to provide revenue and to protect forest values.

[18] Leakage mean that wood supply might shift to other sites, including other countries, exacerbating global climate change and causing other environmental problems, or that wood products might be replaced by other products that use more energy to manufacture (thus releasing more CO2).

D. Any revenues earned by the community forest will be spent on improvements to the forest area, such as roads public, education, recreation facilities

MONITORING PLAN

It is important that the activities in the community forest are monitored, and trends are tracked. The CCF endorses the principle of "adaptive management" and as such, changes will be made in management practices as lessons are learned.

The following activities are recorded and reported on annually:

1. Volume logged
2. Area logged
3. Area of old forest logged
4. Area reforested.
5. Person days of direct employment
6. First Nations days of employment

A growth monitoring program began in 2012 with the establishment of permanent forest sample plots (following the national forest inventory protocol). Additional monitoring establishment is planned in 2013, when the carbon project is operational.

CONCLUSION

This EBM Plan will be updated from time to time as new information and priorities are developed. The EBM plan will also serve as the basis for a new Forest Management Plan, which is scheduled to be completed in 2013 for approval by the provincial government.