



A SILVICULTURE STRATEGY FOR THE CHEAKAMUS COMMUNITY FOREST

Ecosystem Based Management (EBM) will be the guiding principle for the management of the Cheakamus Community Forest and the Silviculture Strategy will be the primary vehicle for achieving EBM on the ground. Timber production will be one of the important outputs of the community forest and both the focus and challenge of the Community Forest silviculture program will be to ensure that timber production is conducted in a manner that is both socially acceptable and economically viable. More specifically, the silvicultural program will need to address and balance all forest values including: spiritual (First Nations) values, aesthetic quality, habitat values, watershed values, recreation values, non-timber forest products production as well as timber production.

Given that the Community Forest area has been very heavily harvested in the past and that the remaining potentially operable timber is very scattered and mixed in quality, silvicultural activities will need to be very site specific and tailored to conditions on the ground. Consequently, this strategy should be considered as a strategic framework, not as a prescription. Also given that some elements of this Silviculture Strategy are innovative for the Community Forest area, an adaptive approach including monitoring will be necessary to ensure that required changes are made as necessary to ensure that the strategy meets the Community Forest objectives. Even so, the following broad strategies will be followed:

➤ **Maintaining and restoring ecosystems and habitats:**

The primary objective of the Silviculture Strategy will be to promote healthy forests, forests that have an appropriate range of stand structures and serial stages (age-classes) across the landscape. Stand structure targets, will include adequate provisions for wildlife trees and coarse woody debris. Historically, cycles of natural disturbances have shaped the structure and age-class distribution of local forests. Local flora and fauna have evolved to depend on and coexist with this range of natural variability. Subject to the protection of visual quality values, the silvicultural strategy will focus on emulating this

pattern of disturbance. The Silviculture Strategy will also be site specific and responsive to the range of local climate and other site factors such as soil moisture regimes that drive disturbance regimes and ecosystem functions.

Detailed ecosystem mapping (TEM) is now available for the Community Forest and this knowledge base will be used to structure the Silviculture Strategy. About 2/3 of the potentially forested area has been mapped as Coastal Western Hemlock dry subarctic and moist subarctic biogeoclimatic subzones (CWHds1 and CWHms1). The remainder, just under 1/3 of the potentially forested area, has been mapped as Leeward Mountain Hemlock moist maritime biogeoclimatic subzones (MHmm2 and MHmmp2). The Silviculture Strategy will be structured by these two bioclimatic zones – the **Coastal Western Hemlock** zone and the **Mountain Hemlock** zone.

Stands located in the **Coastal Western Hemlock** bioclimatic zones are found at lower elevations on relatively dry and warm sites that are subject to or have originated following severe, but infrequent disturbances such as wildfire. They exhibit relatively large “patch sizes” that can range up to several hundred or more hectares in size. These disturbances also often leave behind “biological legacies” such as small scattered patches of mature trees. An appropriate silvicultural strategy for these stands would be to structure harvest prescriptions to achieve a range of larger openings with appropriate patches of “biological legacies”. Generally, these stands should be regenerated to mixed species stands with Douglas-fir being the predominant species.

In contrast, stands located in the **Mountain Hemlock** bioclimatic zone are found at higher elevation on relatively moist and cool sites that are subject to frequent small “gap” disturbances from wind and other causes. Consequently, they often exhibit a more fine grain “patch size”. These stands can also be subjected to very infrequent severe disturbances at a larger scale. An appropriate silviculture strategy for these stands would be to structure harvest prescriptions to achieve a range of small openings or “gaps”, but also with some larger openings to mimic the range of natural variability in these stands. Generally, these stands should be regenerated to mixed species stands with hemlock, balsam and cedars (red and yellow) being the predominant species.

The new TEM mapping has identified the full range of individual ecosystems found on the community forest and this information should be used to apply silvicultural activities on a site specific basis. In particular, some ecosystems in the **Coastal Western Hemlock** bioclimatic zones are found on relatively more moist and cool sites and for purposes of this Silviculture Strategy these should be grouped with the **Mountain Hemlock** bioclimatic subzone.

➤ **Maintaining and enhancing visual quality:**

A major element of the Whistler tourism experience is the visual quality of views capes within the Community Forest; consequently, these visual values far outweigh other forest based values such as timber production. In recognition of the importance of visual values throughout the Whistler corridor, the land use zoning of the Sea to Sky Land and Resource Management Plan (LRMP) includes a “Front country” zone which mandates special emphasis on maintaining visual quality. Much of the Community Forest is in this “Front country” zone. Traditionally, visual quality provisions have focused on views from major transportation and public use areas such as highways and ski areas. The community forest is also heavily used year around throughout the forested and backcountry area so, close-up visual quality is also an important recreational consideration. Consequently, the Silviculture Strategy will also place special emphasis on maintaining visual values throughout the Community Forest.

Considerable social science research on public acceptance of the visual impact of harvesting is available to guide the design of the Silviculture Strategy. This research has indicated that “clearcut” harvesting is generally not accepted, while harvesting activities that leave approximately 25% or more of the original stand on the ground are accepted. Dispersed retention is also preferred over patch retention and good visual design of openings is important. One challenge of the Silviculture Strategy is to reconcile the EBM considerations of emulating natural patterns of disturbance while still maintaining visual values; this will be especially challenging in Coastal Western Hemlock Biogeoclimatic zone stands.

➤ **Suggested Silvicultural Systems and activities:**

As discussed earlier, separate silvicultural systems and will be identified for the two major forested Biogeoclimatic Zones found in the Cheakamus Community Forest: **Coastal Western Hemlock** and **Mountain Hemlock**. In addition, separate silvicultural activities and systems will be identified for two broad age based groups: Old + Mature and Young (second growth). Generally, final harvest activities would be limited to Old and Mature stands. In all Biogeoclimatic zones, **Old** will be considered to be over 250 years while **Mature** will be considered to be over 100 years within the **Coastal Western Hemlock** zone and 150 years in the **Mountain Hemlock** zone.

- **Harvesting mature and old stands within the Coastal Western Hemlock Biogeoclimatic zone:**

The default silvicultural system for these stands would be “Low” retention as defined in the *Cheakamus Community Forest Field Layout and Marking Standards*.; on sites where visual quality concerns are relatively high or where high development costs preclude group selection, the shelterwood silvicultural system would be used. The application of the shelterwood approach would also allow the establishment of some larger openings to achieve some variability in opening size and should be applied relatively more often than with stands within the Mountain Hemlock Biogeoclimatic zone. Individual openings would be separated by buffers generally equivalent to the average opening size and green-up would be considered to be achieved when regenerated stands reach 3 m over average snow depth.

“Low” variable retention openings would be 1 to 2 hectares in size, although small remnant patches up to 4 hectares that are best managed as a single unit could also be included. About 10 to 15 of the original stems per hectare would be retained within openings to retain some old growth structure as part of an overall wildlife habitat strategy; to promote visual values, these wildlife trees should be somewhat disbursed throughout the opening. Expected natural regeneration would be augmented with planted Douglas-fir and other appropriate species to produce mixed species stands. Depending on site conditions, species mixtures would include a hardwood component to facilitate site amelioration as well as to increase fire resistance.

Shelterwood openings would be 2 to 10 hectares in size. The initial entry would be a “Medium or High” retention entry as defined in the *Cheakamus Community Forest Field Layout and Marking Standards*, but would remove no more than 3/4 of the basal area. Due to the increased visual impact of these larger openings, a higher level of final retention would be appropriate and the final harvest would be a medium retention harvest as defined in the *Cheakamus Community Forest Field Layout and Marking Standards* and would retain up to 40 trees per hectare for wildlife and other purposes. Reserved trees should be marked prior to harvest. To promote the survival and eventual removal of the shelterwood, reserved trees should be selected from among the larger and more vigorous trees in each stand. Regeneration would be achieved with fill/enrichment planting as needed and the leave trees would be removed when regeneration reaches 3 m over average snow depth. To minimize harvest damage to the understory and to minimize harvesting costs, shelterwood variants such as group or strip shelterwood may be appropriate. Successful application of the Shelterwood silvicultural system on steep slopes is very difficult and should be limited in these areas.

- **Harvesting mature and old stands within the Mountain Hemlock Biogeoclimatic zone:**

The default silvicultural system for these stands would be group selection. The generally lower current market value for the most common species, the requirement for extra road/bridge development cost and the scattered, remnant nature of some stands will limit the application of the group selection silviculture system in the short term. Successful application of the Shelterwood silvicultural system on steep slopes is also very difficult and should be limited in these areas. Even so, the group selection silvicultural system should be used whenever and wherever operationally feasible. When this is not possible, either the “Low” retention approach described above or the shelterwood approach described below should be used.

Group selection openings would be ½ to 1 hectare in size, harvesting 1/3 of the area on a 35 year cutting cycle for medium sites and 50 years for poor sites. Fill/enrichment planting would be undertaken as needed to augment advanced regeneration and expected natural regeneration using a mix of species including yellow cedar on appropriate sites. 10 to 15 suitable wildlife trees distributed singly or in patches would be identified to retain some old growth structure as part of an overall wildlife habitat strategy.

Shelterwood openings would be 1 to 5 hectares in size. The initial entry would be a “Medium or High” retention entry as defined in the *Cheakamus Community Forest Field Layout and Marking Standards*, but would remove no more than 3/4 of the basal area. Due to the increased visual impact of these larger openings, a higher level of final retention would be appropriate and the final harvest would be a medium retention harvest as defined in the *Cheakamus Community Forest Field Layout and Marking Standards* and would retain up to 40 trees per hectare for wildlife and other purposes. Reserved trees should be marked prior to harvest. To promote the survival and eventual removal of the shelterwood, reserved trees should be selected from among the larger and more vigorous trees in each stand. Regeneration would be achieved with fill/enrichment planting as needed and the leave trees would be removed when regeneration reaches 3 m over average snow depth. To minimize harvest damage to the understory, shelterwood variants such as group or strip shelterwood may be appropriate.

- **Second growth stands :**

Extended rotations are an important component of Ecosystem Based Management as older stands supply a relatively higher level of ecosystem services such as carbon storage, biodiversity and wildlife habitat. Extended rotations also reduce the total harvested area needed to produce the approved annual harvest (AAC) thereby reducing the total area in regeneration and early development stages. Where possible, naturally regenerated stands in the Coastal Western Hemlock Biogeoclimatic Zone would not be harvested before age 100 and naturally regenerated stands in the Mountain Hemlock Biogeoclimatic Zone would not be harvested before age 150. Although Community Forest plantations will not be ready for harvest for some time, a younger harvest age would be appropriate, depending on individual stand management histories.

Younger stands suitable for commercial thinning would be identified, commercially thinned and managed with extended rotations. Thinning prescriptions would incorporate a variable density approach to develop some stand level heterogeneity. The primary consideration for undertaking commercial thinning will be economic viability which will depend on the eventual development of a strong second growth log market. Each thinning entry will remove approximately 1/3 of the basal area and eligible stands will produce a minimum removal of 150 cubic metres per hectare. It is anticipated that initial commercial thinning operations will be limited to older second growth stands on moderate slopes (<40%).

- **Wildlife Trees:**

Wildlife trees are an important component of the Silviculture Strategy and will be part of each harvest block. The intent for wildlife trees is to leave a permanent legacy of larger, trees that will progress over time from live to dead to coarse woody debris. Although requirements for wildlife trees are included for each stand type/silvicultural system, these should be considered as suggestions subject to revision when harvest blocks are laid out on the ground. Where possible, wildlife trees should include a range of tree species as well as a range of size and decadence.

It is anticipated that a significant proportion of the old forest will be placed in reserves for EBM purposes. This significant area of old forest reserve along with the smaller opening sizes will result in many opening being adjacent to areas that contain suitable wildlife trees and sources of other ecosystem elements that can facilitate re-colonization of these elements into openings. For this reason, retention of 10 to 15 dispersed wildlife trees per hectare for the default silvicultural system and up to 40 dispersed wildlife trees per hectare in shelterwood openings should be adequate. This assumption should be treated as a hypotheses and should be tested with adaptive monitoring.

- **Coarse Wood Debris:**

Coarse woody debris (CWD) is a feature of all healthy forest ecosystems. The CWD levels required by the BC Forest Planning and Practices Regulations (a minimum of 4 logs per hectare, each being a minimum of 5 m in length and 30 cm in diameter at one end) are lower than levels expected in local old forest stands. The State of Washington is reputed to have the toughest forest practice legislation in the Western U.S. and their forest ecosystems are similar; they require 5 logs per hectare which is a 25% increase over the BC Forest Planning and Practices Regulations. As an interim target, 5 logs per hectare with a minimum of 5 m in length and 30 cm in diameter at one end will be accepted. It is anticipated that a permanent sample plot based community forest monitoring system will eventually be implemented and this CWD requirement can be revised at that time based on local levels of CWD found in old forest areas.

- **Tending regenerated stands:**

Young stand management treatments such as weeding to control competing vegetation and spacing to reduce the stocking in dense stands will be used as need to achieve the “free to grow” stocking standards Provincially mandated in the Forest Stewardship Plan. Weeding and spacing will be carried out in a manner that considers and supports a full range of ecosystem values by using techniques such as “clumpy spacing” and differential retention of species with wildlife habitat value or value for minor forest products.

Where required to meet other objectives such as wildfire hazard abatement (Firesmart), wildlife habitat enhancement or enhanced timber production, additional tending treatments such as pruning and fertilization will also be undertaken. Where appropriate, consideration would also be given to using municipal sewage sludge to enhance ecosystem productivity.

- **Riparian Areas:**

Depending on specific stream characteristics, some harvesting may take place in riparian areas. In these cases, single tree selection would be used with the prescribed volume removal limited to levels that would be less than or equal to the default practice requirements specified in the Forest Planning and Practices Regulations (FRPR) of the Forest and Range Practices Act. More specifically, it is anticipated that volume removals would be significantly less than the defaults values specified in the FRPR to protect identified site specific recreational and habitat values.

- **Wind throw:**

Provisions to minimize wind throw risk must be an important component of the Community Forest silviculture strategy. These provisions will include pre-harvest assessments to identify potential risks as well as site specific modifications to harvest practices such edge feathering and crown modification. Appropriate procedures and practices identified in the Provincial and Soo wind throw guidebook and manual should be followed.

- **Spur roads:**

Spur roads should be temporary in nature and designed, located and constructed to occupy the smallest possible footprint, while still incorporating adequate water drainage provisions. As the Community Forest Silviculture Strategy is based on repeated stand entry and as many spur roads will support recreational and other access needs, these roads would generally be “put to bed” rather than deactivated following harvest. Wherever possible, roads should be located with due consideration to harvesting needs as well general access for recreational and other purposes as identified in the Community Forest access plan.

- **Silvicultural trials:**

Establish single tree selection trials to investigate operational constraints and identify feasible approaches for applying single tree selection systems in the Whistler context.

- **Restoration treatments:**

Areas identified for recruitment into the Whistler Protected Area Network, areas at significant risk from wildfire due to excessive fuel loading i.e. areas included in the RMOW Fire Smart program or areas with other forest health concerns, areas of high recreational significance and areas needing habitat value enhancement will be subject to site specific restoration treatments. In some cases, these treatments may involve the removal of merchantable timber and would also be included in the Community Forest’s harvest program.

➤ **Summary of Suggested Silvicultural Systems:**

Coastal Western Hemlock Zone - Old and Mature	
Age Range	250 yrs.+ and 100 yrs. to 250 yrs.
Default System	"Low" Variable Retention, 1 - 2 hectare openings
High Visual values or development/operating cost	Shelterwood, 2-10 hectare openings
Coastal Western Hemlock Zone - Second Growth	
Age Range	Under 100
Default System	Variable commercial thinning with extended rotations
High Visual values or development/operating cost	Extended rotations
Mountain Hemlock Zone - Old and Mature	
Age Range	250 yrs.+ and 150 yrs. to 250 yrs.
Default System	Group Selection, 1/2 - 1 hectare openings, 3 pass
Optional	"Low" Variable Retention, 1 - 2 hectare openings
High Visual values or development/operating cost	Shelterwood, 1-5 hectares
Mountain Hemlock Zone - Second Growth	
Age Range	Under 150
Default System	Variable commercial thinning with extended rotations
High Visual values or development/operating cost	Extended Rotations

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