

Rationale for
Western Forest Products Inc.
Nootka Area

Stocking Standards

ORIGINAL SIGNED & SEALED

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This document is written in support of the Stocking Standards provided as Appendix 1 to the Zeballos Forest Stewardship Plan and other Forest Stewardship Plans that may be prepared for WFP tenures. It is not part of these Forest Stewardship Plans. It provides details around the rationale for setting the stocking standards proposed for each site series or other circumstance.

Even-Aged Management

For the purposes of defining the areas to which even-aged management stocking standards are to apply, an area of 1000 m² was selected as a threshold area for which explicit regeneration objectives would apply. Although somewhat arbitrary, this size was selected as it represents:

- a minimum area that would be practical to plant (about two bundles of seedlings)
- below the threshold would be significantly shaded regardless of shape, thus favouring natural regeneration and discouraging vigorous brush growth under most circumstances
- above the threshold sufficient light would be present such that planted seedlings could be established if necessary, and
- below the threshold would be typically be less than one tree height in diameter.

The 20m chord length was chosen to (1) provide practicality of measurement (and enforcement) and (2) to ensure that long narrow openings would be at least the equivalent of three Layer 1 inter-tree distances wide (for 400 stems/ha inter-tree distance is 5-6m). Opening perimeter would be determined by connecting chords of up to 20m to tree trunks > 12.5 cm dbh around the side of a potential opening and crossing the potential opening whenever a tree on the opposite side was within 20m of a chord's anchor point. The closed traverse so created would determine the area of the opening and thus whether even-aged silviculture systems need apply within the opening.

Atypical Sites

Colluvial “c” Phases

These sites most commonly occur on zonal site series in the CWHvm and may be identified by the following characteristics:

- existing stand is generally composed of Hw, Cw, Fd, & Ba growing between large boulders in a clumpy distribution.
- existing stocking is approximately 150 to 300 sph.
- Shrubs and herbs are not common but where present *Vaccinium* spp. are the main shrub species with a herb layer composed mostly of sword fern and/or deer fern. Step moss and *Rhytidiadelphus loreus* are the dominant moss species.

Bouldery veneers may occur within all BEC variants and on most site series within the Nootka area hence it is impractical to pre-establish a site unit for each possibility. However the CWHvm zonal example provided is to act as a template for further additions of standards units for colluvial phases based on the ecologically and commercially important species for the underlying site series.

Lower minimum stocking standards, along with a 1.0 metre minimum inter-tree spacing are established for these sites to reflect the clumpy distribution of existing trees on these

colluvium sites¹. Clearly 1.0m is rather arbitrary, as is 2.0m for normal sites, but represents a reasonable estimate for what is achievable in boulders. Planting crews and prescriptions will need to capture whatever spots are available, and that may include planting even tighter at the microsite level if there are no other opportunities to achieve desirable, albeit not well-spaced, stocking levels.

Landslides:

Generally three productivity zones are evident corresponding to the initiation zone, the transport zone and the deposition zone. Relative proportions of these zones vary widely from slide to slide. Regeneration objectives may vary within these zones and first rotation timber productivity may be secondary to other objectives such as site stabilization, silt control, and visual amelioration.

- **Deposition Zone:** composed of mixed mineral and organic materials typically >0.5m deep and often including large woody debris. Stocking standards are to be as for the equivalent, often adjacent, site series and generally should be for zonal or more productive site series. Where organic matter is lacking or visual amelioration is sought, red alder (min. height 4.0m) may comprise up to 25% of target stocking. This is not expected to be commonly applied as deposition zones tend to have deep, well-mixed soils with an organic component incorporated and generally are less visible than the upper portions of slide tracks. It is impractical to provide a new standards unit or footnote for each and every possible site series that may be impacted by a slide deposition, hence existing standards units are considered modified to include up to 25% red alder where indicated by a site plan. The 4.0m minimum height is rather arbitrarily selected to correspond to the maximum conifer height typical of the best growing sites. The 25% stocking maximum is designed to ensure that at least 50% crown cover of conifers, and therefore of the potential conifer yield is maintained. As the land base involved would be small and mixed alder stands did contribute to timber supply projections in the last TFL 19 analysis, the impact to timber supply if any would be negligible.

Where a hardwood crop is desired red alder is to be more than 90% of target stocking and the broad-leaved standard (**BL**) is to be followed. As alder and conifers stands are for the most part out of sync with respect to culmination and rotation ages, it is preferred that alder be grown in shorter rotations in near pure stands where timber objectives are primary. The last TSR includes alder in the timber supply and the TFL 19 silviculture strategy recommends alder plantations to alleviate a future pinch point in timber supply.

- **Transport Zone (LT):** typically organic soil layers have been scoured away and the slide track is characterized by exposed remnants of mineral soil horizons and small deposits of mixed mineral and organic materials. Materials can be planted but are usually nutrient poor and often are seeded to reduced further surface erosion. Pioneering coniferous species such as Douglas-fir or shore pine are Preferred and western redcedar, western and mountain hemlock, and yellow cypress are Acceptable within each species' elevation and BEC limits. Hemlock, western red cedar and yellow cypress may also be Preferred species in higher rainfall areas of the region including the CWHvh1 and wetter portions of the CWHvm. Red alder (min. height 2.5m) is acceptable up to 25% of target stocking to ameliorate site productivity and/or visual quality. If desired, alder could be eliminated post-free growing once LF layers are

¹ Sources: John A. Reynolds, *The Classification and Management of Steep Colluvial Sites in the CWHvm Variant*, May 1999, UBC BSF Thesis; and Pacific Forest Products Ltd. Gold River, *Talus/Colluvium Workshop April 1997* by Dr. Karel Klinka

restored and understory and co-dominant conifers are of sufficient height and density to maintain visually-effective green-up. This is most likely to occur 25-40 years post-disturbance. Minimum conifer free-growing heights are as per the 03 site series for the applicable BEC variant which on average are estimated to be similar to slide tracks in long term site potential. Minimum height for alder is reduced from the deposition zone value to reflect the much lower productivity of alder on upslope sites and the low probability that it will be a significant timber component. Rotation ages will be extended for these sites, but are expected to be much shorter than if alder was not included for accelerating soil development. As the area affected is small it has not been explicitly modeled in timber supply calculations but is implicitly accounted for in yield netdowns such as OAF1.

- **Initiation Zone:** typically small in area, very steep, and characterized by removal of the bulk of the productive soil layers leaving mostly unweathered C horizon and/or typically exposed rock. Generally re-classified as Non-Productive with no reforestation objectives or stocking standard. Re-vegetated and spot planted where soil depth/texture and safety considerations allow.

Riparian Management Areas

In certain Riparian Management Areas timber production may not be a primary objective. Accordingly minimum stocking standards for Preferred and Acceptable species (MSS P&A) and minimum inter-tree distance stated in the Tables may - for up to 5.0 ha during the term of this plan - be reduced by up to 50% for specific site plans. This is intended to simulate naturally occurring patterns and maintain a partially open canopy to promote understory vegetation and horizontal patchiness. Red alder (min. height 3.0 m) is acceptable up to 25% of the target stocking² to diversify the canopy and litterfall. The red alder minimum height is a compromise recognizing that the underlying site series and productivity varies considerably along streams but most typically is either medium or good site. Coniferous heights are as per the underlying site series. The 25% stocking maximum follows logic similar to that for landslides, to ensure that 50% or more of the timber grown is coniferous for timber and/or coarse woody debris objectives. This situation is not explicitly modeled in the timber supply calculations but is uncommon and unlikely to be significant. Of course if the alternative is to reserve RMAs to provide for non-timber objectives, employing this strategy will have a positive effect on the short term timber supply. This positive opportunity is limited to 5 ha or less in the next five years due to government concerns that a licensee may apply it on a larger scale as a mechanism to avoid reforestation obligations in Riparian Management Areas.

Where timber objectives are primary and site edatope is as indicated below for broad-leaved species, but herbicide use is undesirable red alder (min. height 4.0 m) may be considered Preferred species and the broad-leaved strategy (BL) would apply. A small component of conifers would be acceptable to ensure diversity and large/coarse woody debris supply.

In most cases Riparian Management Areas will be subject to conifer even-aged stocking standards as set out in the Tables.

²In other coastal locations mixed stands in Riparian Management Zones have been suggested as an alder thinning opportunity with potential positive ecological outcomes.

Broad Leaved Management (BL)

Based on the TFL 19 TSR, the Incremental Silviculture Strategy identifies that on average about 26 ha per year, or 2% of the annual harvest, may be available for alder production and suggested that this could enhance timber supply objectives by filling in an expected deficit period 40-50 years into the future. Therefore to allow for variation from plan to plan and through time, broad-leaved species may be the leading species on up to 3% of the timber harvesting land base harvested and regenerated during the term of an FSP.

On fresh to very moist actual hygrotone and medium to very rich trophotone sites within the following site series:

- CWHvm1 - 05, 07, 08, 09, 10
- CWHvh1 - 05, 06, 07, 08, 09
- CWHxm2 - 01, 05, 06, 07, 08, 09, 13, 14

and where foliar herbicide application is undesirable, red alder in more or less pure stands can be a reliable, short rotation timber producer. The following default stocking standards as recommended by the government are recommended here:

Target: 1500;	Min P&A: 1200;	Min. P: 1000
Min. Intertree: 2.0m;	Regen Date: 3 years;	minimum FG height: 4.0m

Alder timber crops may also be feasible on nutrient-medium portions of other site series such as 01 or 04 but is not recommended there generally as it is riskier than conifer stocking and similar or lower in terms of reliable volume production.

Where the number of red alder trees per hectare becomes excessive stocking control is needed to maintain growth. This will be of most concern where natural regeneration is being relied upon or where natural infill is likely. In such cases spacing should occur at about 10m top height and before live crown ratio drops to 40% or lower. Recommended post-spacing density is between 600 to 900 red alder stems per hectare, but an untreated free growing density of 1500 or less red alder stems per hectare is acceptable for declaration of free growing.

On moist to very moist (but not gleyed) actual hygrotone and rich to very rich trophotone sites within the following site series:

- CWHvm1-05, 07, 08, 09, 10
- CWHxm2-05, 07, 08, 09, 13, 14

and where foliar herbicide application is undesirable, black cottonwood or hybrid poplar in more or less pure stands could produce pulpwood on short rotations. However, District staff object to the use of hybrid poplar in the Campbell River Forest District and the distance of Nootka Sound from suitable pulp mills make any significant deployment of a hardwood pulp strategy unlikely. Therefore *Populus* species are not considered preferred or acceptable species.

Free-Growing Characteristics

All free growing trees must be of good form, colour, and vigour and be relatively free of significant pest infestations. Advanced regeneration trees can be considered free growing if as above, if vigour is demonstrated by greater than 30% continuous live crown and post-harvest leader growth, and if likely to be free of decay as demonstrated by lack of significant scarring. As per Vancouver Region guidelines, open scars with a horizontal width at the widest point(s) less than 25% of the circumference of the tree at that point are considered less likely to lead to significant stem decay/damage.

Western white pine has excellent timber potential and structural wood qualities but is extremely vulnerable to mortality via blister rust infection of lower branches. To be considered free growing western white pine trees should be free of stem infection, and be (1) genetically selected or bred to resist blister rust, or (2) of natural or unimproved origin and pruned up to 60% of tree height to proactively remove branch infections in the lower crown. In the latter case free growing assessments need to be delayed to achieve a pruning height at least equal to the free growing minimum height or a desirable pruning height of 300 cm.

Site Series Transitions and Complexes

The BEC system outlines discrete ecological units that are easily recognizable at the core intersection of their defining ecological components. In reality there is a continuum or gradient of the various biophysical variables that define each ecological unit. In the field it is just as common to be somewhere between two “textbook” ecological units. Often there is overlap in recommended species for reforestation between adjacent ecological units on the edaphic grid and the consequences of this uncertainty are slight. In other cases species selection may be important.

Recognizing that site series transitions, discrete complexes, and combinations of both are very common, professional foresters preparing site plans may combine listed stocking standards to cover these situations. In such circumstances standards for Preferred and Acceptable species, target and minimum height, regeneration date and free growing heights will be based on the dominant site series with variation to reflect the estimated percentages of the minor site series component(s). In some cases where components of a complex are discrete and easily recognizable in the field, yet unmappable, each component may be treated and assessed on the basis of its respective standard.

Given the roll-up of inventory types for the purposes of TSR, the consequences of implementing more refined classifications at the block level are self-balancing and inconsequential.

Minor Acceptable Species

As alluded to above, for the purposes of applying standards there is an underlying assumption of uniformity which really isn't the case in the field. There may be small unmappable inclusions of an undocumented site series within a standards unit or perhaps other sporadic occurrences of unique microsites where an unlisted tree species could perform well. Other factors such as forest health or climate change could unexpectedly favour certain species. To recognize the unforeseeable, coniferous species not listed in the tables for a site series should be allowable if they are performing well at the time of free growing assessment. To limit risk, no more than 5% of the target stocking

should be comprised of such trees. For the purposes of free growing assessment it is suggested that if the height is greater than the lowest minimum height listed among the preferred and acceptable tree species for that site series, it be considered free growing. Where such trees survive to form part of the future stand they will promote biodiversity and may even marginally improve timber yields.

Even-Aged Tables

The forms provided in Appendix 1 summarize the rationale for the species selection and other standards set out in the even-aged stocking standards tables in Appendix 1 of the FSP for common BEC site series and/or phases within the Nootka area.

Note that the first form discusses general considerations that may apply to many or all of the site series specific standards.

Standards may be added or modified by amendment as needed, but will be guided by the principles and comments outlined in the stocking standard text, in this rationale, the Vancouver Region Stocking Standards, or by other professional opinion.

High Retention Approaches

The Silviculture Systems Issues Working Group developed a draft document (May 31, 2005) for the Coast Region Implementation Team. The team coined the term “high retention” to describe a number of harvesting/regeneration systems that are currently being deployed in the Coast Forest Region. These partial cutting systems are characterized by high levels of retained basal area and are often significantly influenced by non-timber and/or social objectives. They may include or overlap classic European silviculture systems with a timber focus, they may be a new approach tailored to BC coastal social, economic, and ecological conditions, or they may be a hybrid approach.

As the District is not in favour of generalized standards and principles providing management direction for Licensees at this time, each new high retention standard requires a “one of” amendment. Two exceptions are provided to allow for continued (1) salvage of special forest products such as cedar blocks from regenerating stands, and (2) limited edge feathering along timber edges susceptible to blowdown such as within riparian management zones along reserves.

Uneven-aged Management

Cutblocks and/or standards units where uneven-aged management is practiced may include harvesting occurring under the following silviculture systems:

- Single Tree Selection
- Retention, where edge influence is 100% and openings are ≤ 0.1 ha
- Group Selection, where openings are ≤ 0.1 ha

Various opening sizes have been suggested to define where the split between even-aged and uneven-aged silviculture should apply including 1 ha, 0.25 ha, and 0.1 ha. In reality there is no right

answer. Openings may be difficult to define. For instance, using the example of the 0.1 ha threshold, if a natural opening was 0.097 ha and cutting a single tree pushed the opening size over the threshold it would not seem reasonable that a Licensee then should assume a reforestation obligation for the entire opening. However if 20 trees were removed from an opening smaller than 0.1 ha it would seem reasonable for the licensee to assume a reforestation obligation. For the reasons set out under the even-aged management section, a size threshold of 0.1 ha was adopted. Licensees will in many instances reforest openings smaller than this but prefer the 0.1 ha threshold for reasons of measurement uncertainty, to streamline compliance issues, and to recognize the inherently low risk to the Crown even if such small openings were left to natural seeding post harvest. It is further noted that the Silviculture Systems Issues Working Group of the Coast Region Implementation Team is recommending a 0.25 ha threshold generally, and 0.1 ha along roads.

The concept of retention within an uneven-aged silviculture system is new and is included here only for completeness to try to cover situations where the gaps created are small, the aerial extent of retention dominates the “cutblock”, and the retention is well dispersed. Such situations are expected to be driven by a non-timber objective; timber extraction would be incidental and where uneconomic could involve falling to waste. An “off the wall” example might be cutting to diversify canopy structure and to, for example, create access for nesting MaMu. This would be a long term objective and periodic entries could be used to maintain favourable access conditions over decades. Although this might have the look and feel of single tree selection or even an irregular shelterwood, neither the short nor the long term objective is necessarily timber centric.

Uneven-aged management is not commonly practiced in Nootka operating areas and these rather simple ideas are considered guidance and general principles only until such time as the frequency of uneven-aged management cutting entries increases significantly and stand-specific diameter class information is available. At that time formal BDq stocking control procedures and standards may be established.

For each BEC site series or phase the Preferred and Acceptable species listed in the Tables for even-aged management (Appendix 1, section 2.7) are considered Preferred with the exception of locally shade-intolerant species (Fd, Dr). In Layer 4 only, locally shade intolerant species are considered Acceptable even if designated Preferred in the even-aged tables. This is to cover instances such as the sunny side of a small opening where shade intolerant species could survive and thrive but recognizes that in most situations shade intolerant species cannot dominate under an uneven-aged regime. In other layers, pre-existing locally shade intolerant species are considered Preferred as their presence in the stand indicates that they have and thus can be successful in these layers.

As hemlock dwarfmistletoe is a concern in uneven-aged management, cutting would target infected overstory trees. However, in some stands and prescriptions restrictions on BA removal would preclude a full sanitation of infected trees. With further cutting cycles over time, infected trees would continue to be removed and infections in the mid to upper canopy should diminish. Depending on initial stand composition there may not be sufficient regeneration of non-susceptible species such that it will be necessary to accept hemlock regeneration to meet stocking targets. During initial entries as-yet uninfected hemlock beneath infected overstory crowns (7m from point of germination for measurability) may comprise up to 50% of Layer 4 stocking. With ongoing harvest entries over time and perhaps understory stocking control, a shift to non-susceptible species would be encouraged and such species would eventually dominate stocking.

The following percentages are to be applied to the even-aged stocking targets and minimums to calculate initial values for uneven-aged targets and minimums for well-spaced trees in Layers 2-4 within each site series:

25%	Layer 2	Pole (7.5cm to 12.4cm dbh)
70%	Layer 3	Sapling (≥ 1.3 m to 7.4cm dbh)
100%	Layer 4	Regeneration (< 1.3 m)

These values are very coarsely chosen to approximate a reverse-J curve as per classic single stem stocking regulation principles, in a manner similar to what is set out in Regional default stocking standards. This standard requires, to the degree possible, that stocking be maintained in all layers so that a J-like stocking distribution across Layers is more likely to be promoted. Other systems employing a “top down” survey protocol may, for example, require no regeneration if stocking density is high in upper Layers.

In some cases existing stands may not carry these densities of well spaced trees in one - or more - layers. Therefore where pre-harvest densities in Layers 2-4 exceed the calculations above by 10%, the calculated values for each Layer would then be deemed the stocking standard densities. In the case where the well spaced density exists or barely exists, the minimum stocking standard densities for Layers 2-4 would be 80% of the pre-harvest density in each Layer. These stocking densities would need to be maintained for 12 months following the completion of a cutting cycle.

For Layer 1 (Mature; ≥ 12.5 cm dbh), up to 50% of pre-harvest basal area might be removed. This is an arbitrary value only. Professional foresters will have to be relied upon to develop and propose for approval site specific basal area removal and retention targets to suit individual sites and stand characteristics.

Partial Cutting

The public, responding to the ideas and concept of “New Forestry” emanating from the US Pacific Northwest, have been demanding changes to forest management practices. Relying on newspaper headlines and television news snippets they have come to understand good forest management to mean leaving trees for wildlife or other non-timber values, particularly visuals. In the public’s eye, goals for timber management seem to have been overlooked, or at the very least are not seen as an important variable in the resource management equation.

Thus in British Columbia the concept of retention forestry was born. Licensee professional foresters have had to come to terms with the idea that in places, in spite of legislative, tenure or other policy direction, timber management - if it is going to occur at all - will have to occur in a manner that places other values front and center. Trees may be harvested where short and/or long term objectives for other values including protection of visual quality, sensitive terrain, cultural heritage features, wildlife features or habitat, and stream bank integrity may be as, or more, important than timber and economic objectives. High retention silviculture may be employed in these situations where otherwise even-aged management would be preferred for timber production.

In cases where timber objectives are secondary, Licensee professional foresters will design high retention cutting standards to encourage or facilitate regeneration or release of desirable timber species as other objectives, logistics and other circumstances allow. Other circumstances may include cost limitations and prospects for success. While the Licensee routinely spreads reforestation costs across blocks and is willing to accept unusually high costs for specific, limited circumstances provided average costs within a Licence are reasonable, this is not without limit. For example, it isn’t practicable to expect disproportionate reforestation investments to address single stem harvests in poorly accessible high retention blocks where the natural processes guiding regeneration and stand development will dominate, regardless of artificial efforts.

“Desirable timber species” are those that are capable of meeting primary objectives and of producing a valuable timber crop in the future, thus maintaining options for future generations. For the most part desirable species are those identified in the even-aged stocking standards as Preferred and Acceptable. In some cases those species identified as “tertiary” in Vancouver Region standards might be included, particularly if they have utility for meeting non-timber primary objectives.

As the possibilities, complexities, and methods will vary with local circumstances, it is impossible to set out stocking standards for most of these situations in advance. For example, in the case of partial cutting to achieve a visual quality objective the minimum retention level generally is about 5% (even-aged standards would apply), but a higher level is often necessary to achieve the objective as the retention needed varies with viewing angle, duration, distance, and other factors contributing to visual sensitivity. Site plans may specify a higher level where necessary to achieve the objective. For other objectives, prescriptions and standards (strategies and results) ought to be left to the discretion of the prescribing professional forester. As Forest District staff do not believe that Licensee professionals are fully experienced and ready to make such discretionary decisions with respect to stocking and silvicultural considerations for partial cutting, for the time being each such proposal will have to be submitted as a FSP stocking standard addition for “one of” approval by the delegated decision maker. Initially such amendments will be cutblock specific; as more is learned in practice and comfort levels increase, it is anticipated that partial cutting regimes could be approved for specific stand types and conditions.

Situations exist where free growing obligations are not necessary to meet objectives. Two high retention possibilities include:

1. stands without long term timber objectives where “light touch” removals of single trees would not adversely affect non-timber objectives and where natural regenerative processes would not be hampered in any material way. These include areas that are:
 - not operable in a physical or economic sense in the immediately foreseeable future (a decade or two) and would typically be excluded from current timber supply planning (if operability mapping for such purposes were to be completed at an operational - rather than an inventory - scale and precision), and
 - areas protected for non-timber purposes.
2. intermediate cutting, including commercial thinning

Where long term timber objectives do not exist, or as in the case of intermediate cutting or commercial thinning where even-aged regeneration objectives are delayed until final harvest, there are then no free growing obligations. In the case of 1 or 2 above the stocking retained must be sufficient to meet the needs of the non-timber objective(s), if any.

Layer 1 stocking, would be managed to a target set by the prescribing professional forester and approved by the delegated decision maker. For the purposes of setting a verifiable minimum stocking level, 30% of the pre-harvest basal area in Layer 1 is suggested as a minimum. Recognize that in practice most, if not all, prescriptions will be to a much higher threshold driven by the need to achieve other resource objectives.

High grading is a potential concern with all partial cutting, yet a prime economic objective of timber management is to harvest valuable stems. The key determinant is that there are stems of similar species and habitat utility retained as well as an understory layer(s) with a species mix sufficient to allow trees to, with time, grow-up into the dominant and co-dominant layer and replace the trees cut with trees of similar or better quality and value. Thus the species composition, as determined by

sampling the number of stems, ought to be managed to a target where at a minimum the combined Layer 1 plus Layer 2 species composition percentage post harvest for each species does not change substantially. A substantial change might be a change of more than 30% from the pre-harvest species percentage, although this percentage could vary with circumstance. By way of example, a C₈H₂ stand could be partially cut to leave a Layer 1+2 post harvest species composition between C₅H₅ and C₁₀, but not a H₆C₄ or higher hemlock species composition. The intent would be to ensure that sufficient cedar remains in co-dominant and lower size classes to remain or develop into valuable stems for future harvest potential and to act as a seed source for recruitment of regeneration. A hemlock dominated stand with a minor component of Douglas-fir such as H₉F₁ would often be indicative of a stand where succession is well advanced toward a shade tolerant climax. To the extent that the primary non-timber values are not adversely affected, removal of the fir component in conjunction with the selective harvest of hemlock sawlogs would be merely accelerating natural succession. Again though, these practices are not preferred or desirable in situations where timber is a primary objective, rather only in situations where public expectations for non-timber values are paramount or significant timber production is impractical. This approach allows for limited extraction of additional economic value in support of the FPPR timber objective while still ensuring other FPPR objectives remain paramount in these locations. Just as non-timber values are accommodated wherever possible on those lands primarily for timber production, so too should areas primarily managed for non-timber values accommodate limited timber extraction if the non-timber value(s) is not compromised.

Special Forest Products

In Nootka operating areas special forest products are almost exclusively shake and shingle blocks salvaged from dead and down western redcedar. Removal of this material causes minimal disturbance to regenerating stands, as crews are instructed to protect seedlings and to remove older regeneration on or in the vicinity of the downed log only as necessary to facilitate safe preparation and (usually aerial) extraction of the salvaged blocks.

Frequently and for administrative simplicity, large cutting permits covering thousands of hectares and active for many years may be issued for the purpose of shake and shingle salvage. It is not reasonable to require the Licensee to maintain stocking liability over this entire area when only a small portion of it may be active or recently active. If this were the case, the Licensees may be reluctant to take on this liability for the small revenue that a salvage operation generates; thus a small crew would be needlessly laid off.

Therefore, where partial cutting involves harvesting of special forest products, stocking standards ought to apply as follows:

- In areas not yet free growing and subject to a site plan, or if no site plan a silviculture prescription, the Licensee will maintain the stocking standards for the standards unit as set out in the site plan or silviculture prescription for 12 months or the attainment of free growing, whichever occurs later.
- In harvest units or blocks forming part of a larger salvage cutting permit and previously declared free growing, and to the extent that stocking levels and species composition are changed by the Licensee's harvesting of special forest products, the Licensee will maintain stocking levels and species composition at 95% or more of pre-harvest levels for 12 months after the harvesting of special forest products is completed.

Proposing Harvests with High Retention

The following decision key is provided for guidance and is to be used when developing standards for requests for “one of” approval of specific high retention proposals. The practicing forester is also referred to the finalized report of the Silviculture System Issues Working Group of the Coast Region Information Team for other perspectives on high retention and partial cutting. The key outlines some considerations for when high retention harvesting of single trees or small groups could be considered. It is expected that this key will evolve over time as it is tested in practice, as other situations come to light, and as “one of” approvals and rejections unfold. The High Retention Decision Diagram presents a simplified version of the key in the form of a flow chart and is provided for general reference. Refer to the key for detail.

DECISION KEY (follow the numbers in sequence until otherwise directed)

1. Will proposed harvesting materially adversely affect the attainment of non-spatial or “soft” constraints such as the Non-Spatial Old Growth Order, a Section 7 wildlife notice, a Visual Quality Objective, or a cover constraint? (if NO skip to “3”)
 2. DO NOT HARVEST
3. Is proposed harvesting of or from a spatially-identified, “hard” reserve such as a Riparian Reserve Zone, Wildlife Habitat Area, Old Growth Management Area, Resource Feature, Culturally Modified Tree? (if NO skip to “9”)
 4. Will proposed harvesting “damage or render ineffective” the reserve for the purpose(s) for which it was established? (if NO skip to “6”)
 5. DO NOT HARVEST. [If currently in TSR as “unconstrained operable”, recommend inventory reclassification]
 6. Is a conditional FSP or other exemption applicable that permits the proposed harvest? (If NO, skip to “8”)
 7. PARTIAL HARVEST very carefully without or with³ regeneration objectives. Document rationale, consult specialists.
 8. DO NOT HARVEST
9. Would a future rotation be impossible if clearcut; or in other words, is the stand unproductive for future timber crops and economically inoperable? (if NO skip to “11”)
 10. PARTIAL HARVEST without regeneration objectives.
11. [if classified “inoperable” in TSR, recommend reclassification.]

Is residual stand unlikely to continue growing to harvestable size and value within reasonable timeframe (30-50 years)? I.e. would partial value removal degrade future harvest potential to the point that future harvest would not be viable? (If NO skip to “13”)

 12. DO NOT HARVEST (High Grading)
13. Could a subsequent stand entry be a profitable clearcut? (if “NO” skip to “15”)

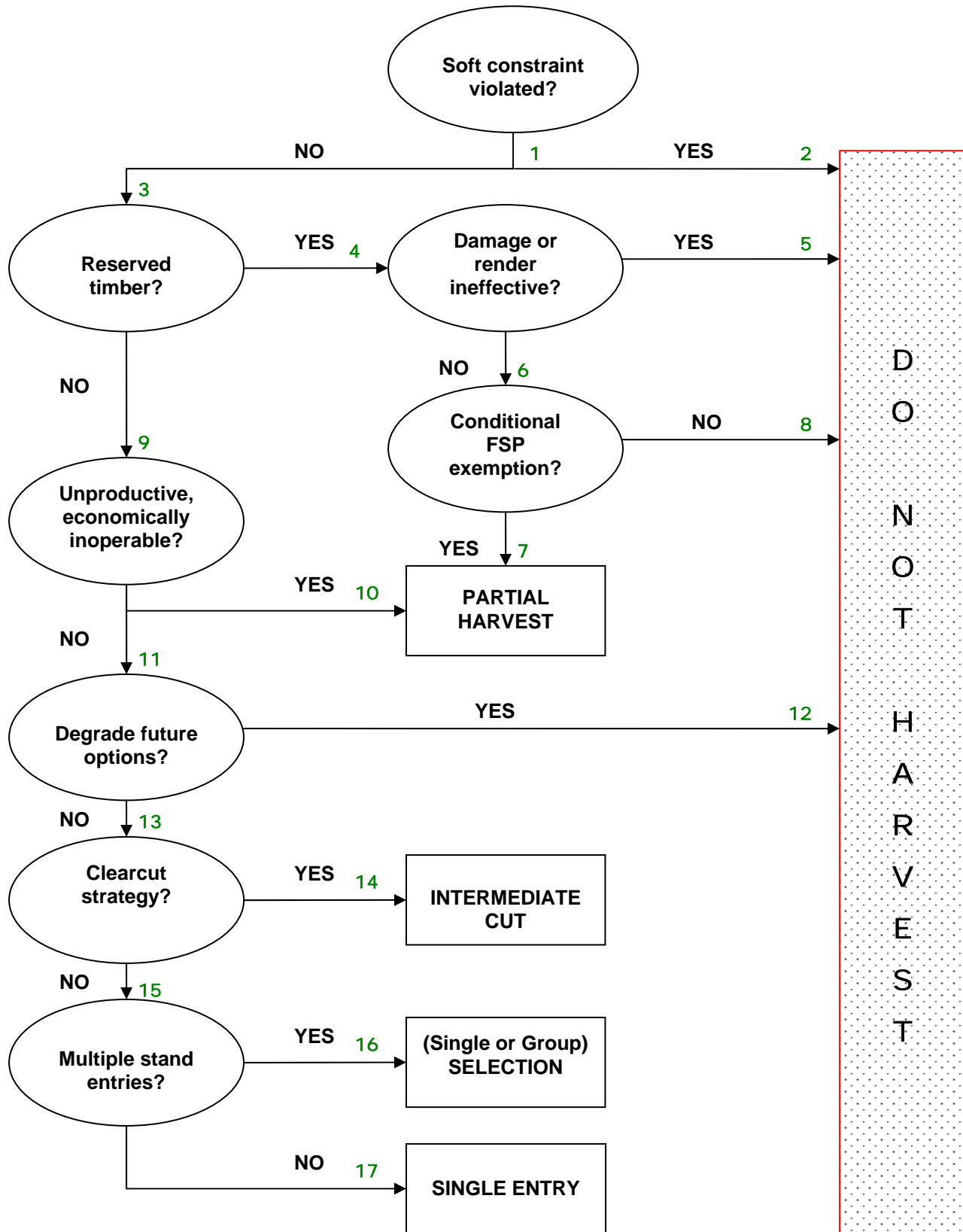
³ generally natural regenerative processes would be preferred unless specific objectives require otherwise.

14. INTERMEDIATE CUT with no regeneration objectives.
15. HIGH RETENTION HARVEST with regeneration objectives. Are multiple stand entries likely within the next century? (if NO skip to “17”)
16. SELECTION SYSTEM (Single Tree or Group) with continuous regeneration objective.
17. SINGLE⁴ ENTRY high retention with regeneration objective.

Note that line 17 of the key is the residual. Although such stands may be rare they likely exist nonetheless. As these productive and accessible stands cannot be clearcut due to constraints, and cannot be managed under a selection system due to economic or other impracticalities, they nevertheless harbour timber values. There needs to be a mechanism to allow partial extraction from such stands provided self replacement will occur with modest artificial reforestation efforts or via natural mechanisms.

⁴ “single” is here used to mean very infrequent entries that for all intents and purposes are unlikely to recur within a human lifetime. Alternatively the regime might be characterized as high retention with very long cutting intervals.

High Retention Decision Diagram



Appendix 1

Review of Factors

Pertaining to the Development
of
Stocking Standards
for the
Nootka Area

Stocking Standard ID: General Comments (broadly applicable to most or many IDs).

Ecological Description: CWH BEC Zone

Existing Health Factors [FPPR 6(2)(b) frequency and extent]:

Refer to http://www.for.gov.bc.ca/hfp/forsite/pest_field_guide/index.htm#defol-broad for description of common pests affecting tree species.

disease:

- hemlock dwarfmistletoe is common in stands with a significant component of western hemlock (Hw) of mountain hemlock (Hm). Frequency and intensity of infection tends to increase with stand age such that old growth stands are most affected. Even-aged silviculture systems are an effective control strategy.
- western white pine (Pw) is severely affected by blister rust. Pruning and resistant planting stock are potential controls but risk remains so Pw cannot be considered a Preferred species.
- root rots, including *Armillaria* and *Phellinus* may affect stocking levels. Root rot is more common in drier edaphic conditions such as south aspects and very well-drained soils where drought stress is common. Frequency and severity is low to moderate in the drier variants (CWHxm2 mostly, CWHvm1 occasionally) and uncommon to non-existent in the wetter variants (CWHvh1, CWHvm2), particularly for *Phellinus*.
- Various stem rots occur, with western redcedar (Cw), yellow cypress (Yc), and Douglas-fir (Fd) being most resistant and red alder (Dr) and true firs (B) most susceptible when injured.
- Various needle rusts may become locally noticeable at times.

insect:

- blackheaded budworm infestations may occur in cycles or sporadically most commonly in CWHvm1 and CWHvh1 stands and perhaps in the CWHvm2. Locally historic damage to Hw has been slight, with stands recovering within a few years of outbreak
- Spruce leader weevil severely restricts use of Sitka spruce (Ss) for regeneration particularly so in warmer variants. Resistant planting stock may be an effective strategy in cooler, moderate to low hazard variants including CWHvh1 and less so in CWHvm.
- Sawflies, Cooley spruce gall aphid, or others may be locally common at times.
- Conifer seedling weevil may damage newly planted seedlings, particularly true firs.

abiotic:

- windthrow can be a significant risk in vulnerable terrain and timber types and increases in occurrence with proximity to the outer coast. In terms of BEC variants, this translates into increasing risk of windthrow as follows: MH; CWHxm2; CWHvm2; CWHvm1; CWHvh1.
- Landslides may occur but typically are small in extent. Again frequency increases with rainfall intensity and wind exposure such that risk follows the same BEC variant pattern as for windthrow.
- Fire is rare in the Nootka area overall but old growth stands in the drier parts of the area, particularly the CWHxm2 and to some degree in parts of the CWHvm1/2 are of fire origin.
- Other abiotic risks may include flooding, sunscald, ice storms, frost damage but are generally inconsequential with respect to timber supply.

other:

- ungulate browsing of seedlings may be significant at specific locations.
- elk herds may damage young trees particularly on or near alluvial sites.

Species risk rank (lower to higher): Fd-Cw-Yc-Dr-Act-Ba-Bg-Hm-Hw-Ss-Pw

The cedars and Douglas-fir are resistant to stem decay, have relatively few endemic insect pests, and are most often windfirm, but the cedars are more susceptible to fire damage. Deciduous species such as black cottonwood (Act), hybrid poplars (Ax), and red alder and *Abies* spp. have few endemic insect pests, but are highly susceptible to stem rots if damaged. The deciduous trees are generally more windfirm than the conifers as damaging winds tend to occur in the winter after the leaves have fallen. Mountain hemlock (Hm) tends to be more resistant to windthrow than western hemlock, if only due to its smaller stature. Hemlocks are also vulnerable to stem decay, but less so than the preceding three species. Hemlock dwarf mistletoe is the biggest risk to the hemlocks and if even-aged management or other controls are employed to reduce mistletoe occurrence their rank could increase. Sitka spruce, although a rapidly growing and desirable tree, is low ranked because of its susceptibility to leader damage by weevils. Where risk is lower or resistant stock is proven, its ranking could increase. Likewise western white pine, highly ranked for sawlog volume production but severely hampered by blister rust, could be ranked higher if blister rust management techniques prove effective. Grand fir (Bg) is considered riskier than Pacific silver fir (Ba) as it is outside or on the edge of its natural range.

Shore pine (Pl) is not included as it is not suitable for timber production, except perhaps on very harsh sites. Exotic species may not be ranked or are ranked with little confidence as risks to these species remain largely unknown, hence they should be used cautiously.

Long Term Health Risk Factors [FPPR 6(2)(a)]:

climate change: A warming coastal climate may manifest new - as yet unforeseen – risks, exacerbate current known risks, and perhaps alleviate other risk factors of current concern. Most obviously drier summers could lead to:

- increased fire risk
- drought stress and perhaps accelerated root rot activity, regeneration difficulties, and epidemics of certain insects

Increased winter storm activity could lead to:

- more windthrow
- perhaps a higher landslide probability
- increase snow press and breakage at higher elevations

disease: As per short term above, plus

- hemlock dwarfmistletoe is likely to become of less importance as the second growth proportion of the landscape peaks, but conversely if uneven-aged and partial cutting systems become significantly more common dwarfmistletoe frequency may increase.
- the climatic change caveat aside, root rots should be less problematic in future stands if current planting programs recognize pockets and resistant species are established.

- Swiss needle cast on Fd has been a problem further south in the PNW, but the likelihood of the problem manifesting itself in the Nootka area is unknown.
- If commercial thinning or other partial cutting entries are contemplated, stem and root scarring could increase wood rot frequency, but so far these systems have not been used extensively in Nootka operating areas.

insect: as per short term above, plus

- Balsam woolly adelgid is unknown in the vicinity of Nootka operating areas but may be a threat to true firs if current range expands beyond drier climates of eastern Vancouver Island. Bg is thought to have better tolerance than Ba.
- Historically mountain pine beetle is thought to have affected western white pine and may be an important risk if pine were to become a significant component of second growth inventory.
- Tent caterpillars may become a risk for deciduous species in the drier parts of the operating areas.
- Spruce leader weevil hazard will increase with a warming climate, particularly in areas with a lower hazard currently.
- Climate change may favour certain insect pests that are as yet unknown or speculative.
- Alien insects such as Asian gypsy moth may prove devastating if introduced. Resistance of native species is largely unknown.

abiotic: as per short term above and as per climate change above.

Ecologically Suitable Tree Species Factors [FPPR 6(3)(a)(i)]:

generic volume potential rank: Pw-Fd-Hw-Ss-Dr-Bg-Ba-Cw-Yc-Act-Hm

This ranking is generic, subjective, and applies broadly at the landscape level only. The magnitude of differences between species are not indicated, hence many adjacent species could easily reverse order in the rank. Clearly rankings will shift by site series, rotation age, stocking level, genetic gain where applicable, and with various mixtures. Refer to the site series rankings. Big-leaf maple (Mb) occurs in the CWHxm2 but is at the edge of its range and not suitable for timber production. Hybrid poplars (Ax) may be a suitable substitute for black cottonwood.

Commercially Valuable Tree Species Factors [FPPR 6(3)(a)(i)]:

value potential rank: Yc-Cw-Fd-Ss-Pw-Dr-Hw-Bg-Ba-Hm-Act

This ranking is also subjective to the extent that it reflects current log values which may not be necessarily reflective of future grade distributions or demand. It assumes equal productivity among species which is of course not the case depending on site conditions.

Preferred and Acceptable Species Rationale: Preferred and Acceptable species are subjectively determined based on current (and possibly changing) ecological suitability, expected product values at rotation age; risk of failure through a rotation; regeneration and tending costs, potential genetic gains, a desire to diversify future species composition; and on stand-level biodiversity or other non-timber objectives that may be applicable in specific circumstances.

Stocking Density/BA Factors and rationale [FPPR 26(3)(a)(i)][FPPR 6(3)(a)(ii)]: Densities specified generally reflect Vancouver Forest Region Standards for coastal site series and are thought to be a reasonable compromise balancing regeneration cost, rotational targets for saw log production, and maintaining near full site occupancy. Where reduced stocking is proposed it is because the natural characteristics of the site cannot support a higher stocking level at a reasonable cost, the productivity is too low to produce a merchantable log within a reasonable rotation age, brush cannot be controlled at a reasonable cost, or non-timber objectives dictate a lower and/or clumpy stocking objective.

Maximum density levels are not specified as density-related growth stagnation has not been scientifically documented on the coast. With rare exceptions, professional foresters working in the Nootka area (or elsewhere on the coast) are not aware of such situations either. The TFL 19 timber supply analysis indicates that density control is not a feasible option to alleviate a future timber supply volume crunch, as the window of opportunity has passed. Stands regenerated today, with or without density control, will be harvested during a period when timber supply is climbing.

Minimum well-spaced Intertree distance tree distribution Factor and rationale [FPPR 6(3)(a)(ii)]: Generally, the Provincial 2.0m standard is used, perhaps reflecting an educated guess derived as much for surveying expediency as for scientific analysis of timber production potential. Where lower intertree distances are set this is to reflect physical characteristics of particular standards units to ensure that desirable, albeit clumpy, stocking levels are achieved as opposed to well-spaced but low stocking levels; or to attain habitat or biodiversity objectives for understorey vegetation. Total area with lower inter-tree spacing prescriptions is small and actual area where lower intertree spacing is realized on the ground is tiny. Although not captured explicitly in timber supply modeling, OAF1 netdowns and many other modeling uncertainties are of overwhelming magnitude in comparison.

Regeneration date and rationale: The timber supply recognizes the actual practice that the majority of sites are planted. Assuming that the majority of sites are planted on average 6-18 months following logging completion, and that the commencement of logging is generally 6-12 months ahead of logging completion, the average regen delay from a compliance perspective is most probably 12-30 months following the commencement of harvesting. Allowing for a normal bell curve around the average it seems probable that even with prompt planting and normal stock juggling that a small but significant number of standards units may not be planted within 36 months of harvest commencement. Hence to avoid frivolous amendments and unwarranted enforcement whilst good forest management is being practiced, a modified default regeneration date of 4 years is justified on sites that do not have a very high brush hazard.

Free Growing height and rationale [FPPR 26(3)(b)]: Generally follows heights in Vancouver Forest Region Standards. Variances from these or other minimum heights stated are on the basis of local knowledge and experience of professional foresters.

Consistency with TSR [FPPR 26(3)(a)(ii)]: TFL 19 TSR modeled establishment density of 1000 stems/ha is consistent with the target stocking standard considering typical planting densities, expected survival, and allowing for 5-20% natural infill. Modestly lower stocking targets on harsher sites are not explicitly modeled in the TSR but volume differences for minor shifts in stocking are not significant. Also minimum harvestable age of stands established in future is not a significant constraint on timber supply in TFL 19. TSR species compositions amalgamated into good, medium, and poor analysis units for each BEC variant reflect expected amalgamated composition resulting

from regeneration to stocking standard species in each of the component site series within each productivity group.

Consistency with the Strathcona TSA TSR is generally reasonable. The TFL 19 TSR is more localized than the analysis of the larger Strathcona TSA and Kyuquot Supply Block could be. For many years, authorized stocking standards in the TSA portion of Nootka operating areas have been based on the adjacent TFL 19 stocking standards. Therefore within the Nootka area, TFL 19 timber supply assumptions are appropriately extrapolated to portions of the TSA immediately adjacent to the TFL.

Regeneration delays assumed in the TFL 19 TSR are estimated averages from completion, or more aptly the midpoint, of harvesting and are adjusted for the purposes of yield estimation to reflect time-of-planting fertilization. Stocking standard regeneration delay is a maximum delay stated for compliance purposes from the start of harvest. Given that it is not uncommon for completion of harvesting to lag the start of falling by 18 months (or more), 12-24 month planting delays (stock falldowns, logistics, etc.) inevitably occur on 5-25% of sites, and expectations for supplemental natural regeneration, the stocking standard regeneration delays stated are consistent with the TSR assumptions, if not more stringent.

Exemption requested [FPPR 91(3)]: Few exemptions are likely to be needed. Variances for standards affecting very small areas should be automatic as they are inconsequential to timber supply calculations.

Notes:

Stocking Standard ID: to be assigned

Ecological Description: Landslides – Transport Zone (LT)

Existing Health Factors [FPPR 6(2)(b) frequency and extent]:

disease: see general comments.

insect: see general comments.

abiotic: see general comments. Further raveling and soil creep may occur increasing the probability of scarring, pistol butts, and leaning trees. In drier variants may be susceptible to drought due to lack of organic matter.

risk rank (lower to higher): Fd-Pl-Cw-Yc-Dr-Hm-Hw-Ss-Pw-Act-Ba-Bg

Higher risk species are more prone to scarring and/or have health risks as outlined in general comments. Fd and Pl are particularly suitable for regeneration of exposed mineral soil, are resistant to grass smothering, and their colour can accelerate the impression of green-up through all seasons.

Long Term Health Risk Factors [FPPR 6(2)(a)]:

climate change: see general comments. Probability of further landslides may increase if winter storms intensify.

disease: see general comments.

insect: see general comments.

abiotic: see general comments.

Ecologically Suitable Tree Species Factors [FPPR 6(3)(a)(i)]:

volume potential rank: Fd-Cw-Pl-Hw-Dr-Yc-Hm-Pw-Ss-Bg-Ba

Fd is the most likely species to produce a merchantable tree within 100 years, except at very high elevations. With a delay of two or more decades and a nearby seed source, Hw natural regen will excel under an alder overstorey in the wetter variants. Alder is particularly prone to developing leans on steep slopes but is well suited for rapid growing season green-up and slope stabilization. Volume potential is low on these sites and declines rapidly to nil as soil depth and site productivity declines. Pl could yield pole-sized timber but is particularly valuable for achieving all season green-up and slope stabilization. Yc and Hm would only be acceptable at higher elevations or hypermaritime climates. Pw, Ss, and Ba may survive but are unlikely to grow satisfactorily on these nutrient poor sites.

Commercially Valuable Tree Species Factors [FPPR 6(3)(a)(i)]:

value potential rank: Yc-Cw-Fd-Ss-Pw-Dr-Hw-Pl-Bg-Ba-Hm

This assumes a merchantable log could be produced but this is unlikely for Ss, Pw, Ba and marginally likely for Dr and Pl. Although cedars are more valuable on a unit basis, Fd yields are likely to be significantly higher in most situations and more valuable overall.

Preferred and Acceptable Species Rationale: Fd is Preferred for its volume and value potential, relatively rapid soil stabilization, green-up potential, and resistance to grass competition. Pl is Preferred for similar characteristics but volume potential is unproven. Dr, Cw, Hw, Hm, and Yc are acceptable for limited objectives and circumstances as referred to above and in the text section on landslides.

Hw and Cw may be substituted for Fd as preferred species in the wettest variants and Hm and Yc may be substituted in high elevation variants.

Stocking Density/BA Factors and rationale [FPPR 26(3)(a)(i)][FPPR 6(3)(a)(ii)]: defaulted to lower target and minimum stockings in Vancouver Forest Region Standard as applied to harsher sites such as 03 to reflect the lack of and sporadic distribution of plantable microsites.

Minimum well-spaced Intertree distance tree distribution Factor and rationale [FPPR 6(3)(a)(ii)]: defaulted to Vancouver Forest Region Standard as sites are typically slash and debris free and readily plantable where suitable microsites occur.

Regeneration date and rationale: see general comments.

Free Growing height and rationale [FPPR 26(3)(b)]: defaults to 03 standard within the appropriate BEC variant.

Consistency with TSR [FPPR 26(3)(a)(ii)]: see general comments. Although tiny in area at the landscape level and inconsequential to timber supply, TSR species composition for common poor sites broadly includes a significant Fd component in mixture with Hw and Cw.

Exemption requested [FPPR 91(3)]: no

Notes:

Stocking Standard ID: to be assigned

Ecological Description: Broad Leaved Management (BL)

Existing Health Factors [FPPR 6(2)(b) frequency and extent]:

disease: see general comments. Endemic disease problems not observed to be severe within Nootka operating areas.

insect: see general comments. Endemic disease problems not observed to be severe within Nootka operating areas. Occasional sawfly defoliation of red alder expected.

abiotic: Red alder prone to develop leans on slopes. *Populus* spp. and red alder are flood tolerant. Conifer production severely hampered by brush competition and inability to use chemical controls. Brush may also slow growth of deciduous trees.

other: elk damage to young trees may be locally important.

risk rank (lower to higher): Dr-Act-Ax

Long Term Health Risk Factors [FPPR 6(2)(a)]:

climate change: see general comments.

disease: see general comments. Endemic or introduced disease may become important with a warmer and/or wetter climatic regime.

insect: see general comments. Endemic or introduced insects could become epidemic under a changing climate

abiotic: see general comments. Currently fresh moisture regimes may become unsuitable for red alder if summer drought increases.

Ecologically Suitable Tree Species Factors [FPPR 6(3)(a)(i)]:

volume potential rank: Ax-Dr-Act

Commercially Valuable Tree Species Factors [FPPR 6(3)(a)(i)]:

value potential rank: Dr-Ax-Act

Preferred and Acceptable Species Rationale: defaulted to Vancouver Forest Region Standards for red alder and black cottonwood. These species should not be grown in mixtures. Hybrid poplars can be substituted for black cottonwood if timber is prime objective. Big-leaf maple is not included as it is at the edge of it's natural range and productivity. Conifers are Acceptable in minor amounts but target should be a more or less pure stand of red alder or *Populus*.

Stocking Density/BA Factors and rationale [FPPR 26(3)(a)(i)][FPPR 6(3)(a)(ii)]: defaulted to target and minimum stockings stated in Vancouver Forest Region Standard.

Minimum well-spaced Intertree distance tree distribution Factor and rationale [FPPR 6(3)(a)(ii)]: defaulted to Vancouver Forest Region Standard.

Regeneration date and rationale: defaulted to Vancouver Forest Region Standard.

Free Growing height and rationale [FPPR 26(3)(b)]: arbitrary height well above expected salmonberry competition height expected to take 3-6 growing seasons to attain and demonstrate suitability.

Consistency with TSR [FPPR 26(3)(a)(ii)]: TFL 19 TSR did not model deciduous future stands as the proportion of the land base devoted to deciduous production is currently low and it is unlikely that such management would every be a significant component of timber supply. Nevertheless the TFL 19 silviculture strategy (based on the TSR) suggests that deciduous management may be a viable strategy to diversify the future timber profile and such short rotation crops could alleviate a forecast timber supply crunch three to five decades in future and thus enhance timber supply. The 1998 silviculture strategy for the TSA recommends alder for the Kyuquot supply block and the 1999 TSR for the Strathcona TSA assumes 25% of current alder stands will be reforested to alder.

Exemption requested [FPPR 91(3)]: no

Notes:

Stocking Standard ID: 9400

Ecological Description: CWHvm1-01

Existing Health Factors [FPPR 6(2)(b) frequency and extent]:

disease: see general comments.

insect: see general comments.

abiotic: see general comments.

other: see general comments.

risk rank (lower to higher): Fd-Cw-Yc-Dr-Act-Ba-Bg-Hm-Hw-Ss-Pw

Long Term Health Risk Factors [FPPR 6(2)(a)]:

climate change: see general comments.

disease: see general comments.

insect: see general comments.

abiotic: see general comments.

Ecologically Suitable Tree Species Factors [FPPR 6(3)(a)(i)]:

volume potential rank: Pw-Fd-Hw-Ba-Bg-Cw-Ss-Dr-Yc-Hm-Act

Commercially Valuable Tree Species Factors [FPPR 6(3)(a)(i)]:

value potential rank: Yc-Cw-Fd-Ss-Pw-Dr-Hw-Bg-Ba-Hm-Act

Preferred and Acceptable Species Rationale: defaulted to Vancouver Forest Region Standards for Preferred species. Pw and Ss added as Acceptable with significant health and edatope caveats. Yc added as Acceptable to reflect observation of local occurrences and growth, and in recognition of higher potential crop value, but with caveats of cooler microsites or observations of pre-existing occurrence.

Stocking Density/BA Factors and rationale [FPPR 26(3)(a)(i)][FPPR 6(3)(a)(ii)]: defaulted to target and minimum stockings stated in Vancouver Forest Region Standard.

Minimum well-spaced Intertree distance tree distribution Factor and rationale [FPPR 6(3)(a)(ii)]: defaulted to Vancouver Forest Region Standard.

Regeneration date and rationale: defaulted to Vancouver Forest Region Standard.

Free Growing height and rationale [FPPR 26(3)(b)]: defaulted to Vancouver Forest Region Standard.

Consistency with TSR [FPPR 26(3)(a)(ii)]: see general comments. TSR species composition for CWHvm1 medium sites reflects stocking standards and average expected composition.

Exemption requested [FPPR 91(3)]: no

Notes: Yc, Pw and Ss stocking may be higher at specific sites, but at the landscape level composition of these species combined will be much less than 5%. Changing climate may favour more use of Fd on these sites.

Stocking Standard ID: 9401

Ecological Description: CWHvm1-01s (Cedar Hemlock salal phase)

Existing Health Factors [FPPR 6(2)(b) frequency and extent]:

disease: see general comments. Hw in old growth stands tends to have significant dwarfmistletoe infections and stem rots.

insect: see general comments. Higher Cw component leads to few potential insect problems.

abiotic: see general comments. In older stands, higher Cw component means better windthrow resistance but higher risk of fire damage.

other: deer browsing of regenerating cedar may be locally important.

risk rank (lower to higher): Fd-Cw-Yc-Hw-Pw

Long Term Health Risk Factors [FPPR 6(2)(a)]:

climate change: see general comments.

disease: see general comments.

insect: see general comments.

abiotic: see general comments. Cw may have increased fire risk if warmer climate.

Ecologically Suitable Tree Species Factors [FPPR 6(3)(a)(i)]:

volume potential rank: Fd-Cw-Pw-Yc-Hw

Commercially Valuable Tree Species Factors [FPPR 6(3)(a)(i)]:

value potential rank: Yc-Cw-Fd-Pw-Hw

Preferred and Acceptable Species Rationale: defaulted to Vancouver Forest Region Standards. Ba and Ss not productive on salal-dominated sites that by nature tend toward nutrient poor. Fd is Acceptable and may exceed height growth of other species. Pw is Acceptable and height growth may be comparable to Fd, but with a significant health risk caveat. Yc is Acceptable to reflect observation of local occurrences and growth, and in recognition of higher potential crop value, but with caveats of cooler microsites or observations of pre-existing occurrence. Observations from the Salal-Cedar-Hemlock Integrated Research Program indicate acceptable survival and growth of Yc on salal dominated ecosystems.

Stocking Density/BA Factors and rationale [FPPR 26(3)(a)(i)][FPPR 6(3)(a)(ii)]: defaulted to target and minimum stockings stated in Vancouver Forest Region Standard.

Minimum well-spaced Intertree distance tree distribution Factor and rationale [FPPR 6(3)(a)(ii)]: defaulted to Vancouver Forest Region Standard.

Regeneration date and rationale: defaulted to Vancouver Forest Region Standard.

Free Growing height and rationale [FPPR 26(3)(b)]: defaulted to Vancouver Forest Region Standard.

Consistency with TSR [FPPR 26(3)(a)(ii)]: see general comments. TFL 19 TSR species composition for CWHvm1 poor sites reflects stocking standards and average expected composition.

Exemption requested [FPPR 91(3)]: no

Notes:

Stocking Standard ID: 9402

Ecological Description: CWHvm1-03

Existing Health Factors [FPPR 6(2)(b) frequency and extent]:

disease: see general comments.
insect: see general comments.
abiotic: see general comments.
other: see general comments.
risk rank (lower to higher): Fd-Cw-Yc-Ba-Bg-Hm-Hw-Pw

Long Term Health Risk Factors [FPPR 6(2)(a)]:

climate change: see general comments.
disease: see general comments.
insect: see general comments.
abiotic: see general comment.

Ecologically Suitable Tree Species Factors [FPPR 6(3)(a)(i)]:

volume potential rank: Pw-Fd-Hw-Ba-Cw-Yc-Hm

Commercially Valuable Tree Species Factors [FPPR 6(3)(a)(i)]:

value potential rank: Yc-Cw-Fd-Pw-Hw-Ba-Hm

Preferred and Acceptable Species Rationale: defaulted to Vancouver Forest Region Standards for Preferred species. Pw substituted for Pl based on volume potential, albeit with greater health risk.

Stocking Density/BA Factors and rationale [FPPR 26(3)(a)(i)][FPPR 6(3)(a)(ii)]: defaulted to target and minimum stockings stated in Vancouver Forest Region Standard.

Minimum well-spaced Intertree distance tree distribution Factor and rationale [FPPR 6(3)(a)(ii)]: defaulted to Vancouver Forest Region Standard.

Regeneration date and rationale: defaulted to Vancouver Forest Region Standard.

Free Growing height and rationale [FPPR 26(3)(b)]: defaulted to Vancouver Forest Region Standard. Pw height expected to approach that of Fd

Consistency with TSR [FPPR 26(3)(a)(ii)]: see general comments. TFL 19 TSR species composition for CWHvm1 poor sites reflects stocking standards and average expected composition.

Exemption requested [FPPR 91(3)]: no

Notes:

Stocking Standard ID: 9403

Ecological Description: CWHvm1-01c

Existing Health Factors [FPPR 6(2)(b) frequency and extent]:

disease: see general comments. If colluvial raveling is active upslope, stem scarring and decay may be present.

insect: see general comments.

abiotic: see general comments. Deep rubbly soils may reduce windthrow hazard.

risk rank (lower to higher): Fd-Cw-Yc-Hm-Hw-Ss-Pw-Ba-Bg-Dr

General comments apply except:

- deciduous trees are susceptible to scarring damage where colluvial processes are still active and would be difficult to regenerate due to drought mortality and unfavourable substrates.
- all species are relatively windfirm on these sites
- H and to a lesser extent Ss and Pw advance regeneration may be useful where partial cutting is employed.

Long Term Health Risk Factors [FPPR 6(2)(a)]:

climate change: see general comments. These sites may be among the first affected by drier summers and increasingly difficult regeneration, particularly on south aspects.

disease: see general comments and as per existing factors above.

insect: see general comments.

abiotic: see general comments and as per existing factors above.

Ecologically Suitable Tree Species Factors [FPPR 6(3)(a)(i)]:

volume potential rank: Pw-Fd-Ss-Hw-Ba-Cw

Narrow-crowned species may have less volume potential due to restricted number of rooting sites and inability to occupy growing site with lower, clumpy stocking.

Commercially Valuable Tree Species Factors [FPPR 6(3)(a)(i)]:

value potential rank: Cw-Fd-Ss-Pw-Dr-Hw-Bg-Ba

Preferred and Acceptable Species Rationale: defaulted to Vancouver Forest Region Standards with exceptions:

- Ba is deemed Acceptable rather than Preferred due to lower value and volume potential, particularly on less than medium edatopes.
- Although less capable of capturing site potential at low stocking, Hw unchanged due to extensive natural occurrence.
- Pw and Ss added to recognize potential productivity, but only deemed Acceptable (with footnotes) due to risk factors

Stocking Density/BA Factors and rationale [FPPR 26(3)(a)(i)][FPPR 6(3)(a)(ii)]: defaulted to minimum stocking preferred stated in Vancouver Forest Region Standard. Target and minimum preferred plus acceptable densities reduced 10-20% to reflect the lack of stocking opportunities due to boulders and rubble. In some instances even these may be unattainable.

Minimum well-spaced Intertree distance tree distribution Factor and rationale [FPPR 6(3)(a)(ii)]:

Minimum intertree distance reduced 50% from Provincial standard as clumpy stocking is needed to achieve higher stocking levels than would otherwise be possible at normal spacings.

Regeneration date and rationale: defaulted to Vancouver Forest Region Standard.

Free Growing height and rationale [FPPR 26(3)(b)]: defaulted to Vancouver Forest Region Standard to allow for natural fill-in and release of advance natural regeneration. Brush hazard typically moderate to low.

Consistency with TSR [FPPR 26(3)(a)(ii)]: see general comments. TFL 19 TSR species composition for CWHvm1 medium sites reflects stocking standards and average expected composition.

Exemption requested [FPPR 91(3)]: no

Notes:

Stocking Standard ID: 9404

Ecological Description: CWHvm1-04

Existing Health Factors [FPPR 6(2)(b) frequency and extent]:

disease: see general comments.

insect: see general comments.

abiotic: see general comments.

other: see general comments. Scarring may be common on steep slopes.

risk rank (lower to higher): Fd-Cw-Yc-Ba-Bg-Hw-Ss-Pw

Long Term Health Risk Factors [FPPR 6(2)(a)]:

climate change: see general comments.

disease: see general comments.

insect: see general comments.

abiotic: see general comments. Summer drought duration may increase with climatic change which would further marginalize true firs and Sitka spruce.

Ecologically Suitable Tree Species Factors [FPPR 6(3)(a)(i)]:

volume potential rank: Fd-Pw-Cw-Hw-Bg-Ss-Ba-Yc-Hm

Commercially Valuable Tree Species Factors [FPPR 6(3)(a)(i)]:

value potential rank: Yc-Cw-Fd-Ss-Pw-Hw-Bg-Ba-Hm

Preferred and Acceptable Species Rationale: defaulted to Vancouver Forest Region Standards for Preferred species. Ba, Ss, and Pw added to Acceptable species based on observed local occurrences and performance with significant forest health caveats for Ss and Pw.

Stocking Density/BA Factors and rationale [FPPR 26(3)(a)(i)][FPPR 6(3)(a)(ii)]: defaulted to target and minimum stockings stated in Vancouver Forest Region Standard.

Minimum well-spaced Intertree distance tree distribution Factor and rationale [FPPR 6(3)(a)(ii)]: defaulted to Vancouver Forest Region Standard.

Regeneration date and rationale: see general comments.

Free Growing height and rationale [FPPR 26(3)(b)]: defaulted to Vancouver Forest Region Standard. Pw height expected to rival Fd.

Consistency with TSR [FPPR 26(3)(a)(ii)]: see general comments. TFL 19 TSR species composition for CWHvm1 medium sites reflects stocking standards and average expected composition.

Exemption requested [FPPR 91(3)]: no

Notes:

Stocking Standard ID: 9405

Ecological Description: CWHvm1-05

Existing Health Factors [FPPR 6(2)(b) frequency and extent]:

disease: see general comments.

insect: see general comments.

abiotic: see general comments.

other: see general comments.

risk rank (lower to higher): Fd-Cw-Yc-Dr-Act-Ba-Bg-Hm-Hw-Ss-Pw

Long Term Health Risk Factors [FPPR 6(2)(a)]:

climate change: see general comments.

disease: see general comments.

insect: see general comments.

abiotic: see general comments.

Ecologically Suitable Tree Species Factors [FPPR 6(3)(a)(i)]:

volume potential rank: Pw-Fd-Hw-Ss-Cw-Bg-Ba-Dr-Yc-Hm

Commercially Valuable Tree Species Factors [FPPR 6(3)(a)(i)]:

value potential rank: Yc-Cw-Fd-Ss-Pw-Dr-Hw-Bg-Ba-Hm

Preferred and Acceptable Species Rationale: defaulted to Vancouver Forest Region Standards. Pw added to Acceptable with significant forest health caveat.

Stocking Density/BA Factors and rationale [FPPR 26(3)(a)(i)][FPPR 6(3)(a)(ii)]: defaulted to target and minimum stockings stated in Vancouver Forest Region Standard.

Minimum well-spaced Intertree distance tree distribution Factor and rationale [FPPR 6(3)(a)(ii)]:

defaulted to Vancouver Forest Region Standard.

Regeneration date and rationale: see general comments.

Free Growing height and rationale [FPPR 26(3)(b)]: defaulted to Vancouver Forest Region Standard. Pw expected to equal or exceed Fd height.

Consistency with TSR [FPPR 26(3)(a)(ii)]: see general comments. TFL 19 TSR species composition for CWHvm1 medium sites reflects stocking standards and average expected composition.

Exemption requested [FPPR 91(3)]: no

Notes:

Stocking Standard ID: 9406

Ecological Description: CWHvm1-06

Existing Health Factors [FPPR 6(2)(b) frequency and extent]:

disease: see general comments.

insect: see general comments.

abiotic: see general comments. Flooding would exclude Fd.

other: see general comments.

risk rank (lower to higher): Cw-Yc-Dr-Ba-Bg-Hm-Hw-Ss-Pw-Fd

Long Term Health Risk Factors [FPPR 6(2)(a)]:

climate change: see general comments.

disease: see general comments.

insect: see general comments.

abiotic: see general comments.

Ecologically Suitable Tree Species Factors [FPPR 6(3)(a)(i)]:

volume potential rank: Hw-Cw-Pw-Ba-Ss-Yc-Dr-Bg-Fd-Hm

Commercially Valuable Tree Species Factors [FPPR 6(3)(a)(i)]:

value potential rank: Yc-Cw-Fd-Ss-Pw-Dr-Hw-Bg-Ba-Hm

Preferred and Acceptable Species Rationale: defaulted to Vancouver Forest Region Standards for Preferred species. Ss, Pw, and Yc added to Acceptable with caveats. Yc productivity may rival cedar on very moist or wetter moisture regimes.

Stocking Density/BA Factors and rationale [FPPR 26(3)(a)(i)][FPPR 6(3)(a)(ii)]: defaulted to target and minimum stockings stated in Vancouver Forest Region Standard.

Minimum well-spaced Intertree distance tree distribution Factor and rationale [FPPR 6(3)(a)(ii)]: defaulted to Vancouver Forest Region Standard.

Regeneration date and rationale: defaulted to Vancouver Forest Region Standard.

Free Growing height and rationale [FPPR 26(3)(b)]: defaulted to Vancouver Forest Region Standard.

Consistency with TSR [FPPR 26(3)(a)(ii)]: see general comments. TFL 19 TSR species composition for CWHvm1 poor sites reflects stocking standards and average expected composition.

Exemption requested [FPPR 91(3)]: no

Notes: potential drainage candidate.

Stocking Standard ID: 9407

Ecological Description: CWHvm1-06s (salal)

Existing Health Factors [FPPR 6(2)(b) frequency and extent]:

disease: see general comments.

insect: see general comments.

abiotic: see general comments. Flooding will exclude Fd.

other: thick forest floors and salal competition.

risk rank (lower to higher): Cw-Yc-Dr-Act-Ba-Bg-Hm-Hw-Ss-Pw-Fd

Long Term Health Risk Factors [FPPR 6(2)(a)]:

climate change: see general comments.

disease: see general comments.

insect: see general comments.

abiotic: see general comments.

Ecologically Suitable Tree Species Factors [FPPR 6(3)(a)(i)]:

volume potential rank: Cw-Yc-Pw-Ss-Hw-Hm-Ba-Dr-Bg-Fd-Act

Commercially Valuable Tree Species Factors [FPPR 6(3)(a)(i)]:

value potential rank: Yc-Cw-Fd-Ss-Pw-Dr-Hw-Bg-Ba-Hm-Act

Preferred and Acceptable Species Rationale: Ba dropped from Preferred list due to poor productivity.

Yc, Pw, and Pl added to Acceptable list in recognition of observed potential. Hw free growing height reduced as local knowledge and experience suggest that 3.0m is overstated. Pl expected to rival Hw height growth. Yc growth on wettest microsites will rival Cw.

Stocking Density/BA Factors and rationale [FPPR 26(3)(a)(i)][FPPR 6(3)(a)(ii)]: defaulted to target and minimum stockings stated in Vancouver Forest Region Standard.

Minimum well-spaced Intertree distance tree distribution Factor and rationale [FPPR 6(3)(a)(ii)]: defaulted to Vancouver Forest Region Standard.

Regeneration date and rationale: defaulted to Vancouver Forest Region Standard.

Free Growing height and rationale [FPPR 26(3)(b)]: defaulted to Vancouver Forest Region Standard.

Consistency with TSR [FPPR 26(3)(a)(ii)]: see general comments. TFL 19 TSR species composition for CWHvm1 poor sites reflects stocking standards and average expected composition.

Exemption requested [FPPR 91(3)]: no

Notes: potential drainage candidate.

Stocking Standard ID: 9408

Ecological Description: CWHvm1-07

Existing Health Factors [FPPR 6(2)(b) frequency and extent]:

disease: see general comments.

insect: see general comments.

abiotic: see general comments. Flooding.

other: see general comments

risk rank (lower to higher): Cw-Yc-Dr-Act-Bg-Ba-Hw-Ss-Pw-Fd

Long Term Health Risk Factors [FPPR 6(2)(a)]:

climate change: see general comments.

disease: see general comments.

insect: see general comments.

abiotic: see general comments

Ecologically Suitable Tree Species Factors [FPPR 6(3)(a)(i)]:

volume potential rank: Ss-Dr-Cw-Bg-Act-Ba-Pw-Hw-Yc-Hm-Fd

Fd may be productive on raised microsites or where hygrotone is no wetter than moist, with little flooding.

Commercially Valuable Tree Species Factors [FPPR 6(3)(a)(i)]:

value potential rank: Yc-Cw-Fd-Ss-Pw-Dr-Hw-Bg-Ba-Hm-Act

Preferred and Acceptable Species Rationale: defaulted to Vancouver Forest Region Standards with the exception of Fd downgraded to Acceptable based on risk of flood mortality.

Stocking Density/BA Factors and rationale [FPPR 26(3)(a)(i)][FPPR 6(3)(a)(ii)]: defaulted to target and minimum stockings stated in Vancouver Forest Region Standard.

Minimum well-spaced Intertree distance tree distribution Factor and rationale [FPPR 6(3)(a)(ii)]: defaulted to Vancouver Forest Region Standard.

Regeneration date and rationale: defaulted to Vancouver Forest Region Standard.

Free Growing height and rationale [FPPR 26(3)(b)]: defaulted to Vancouver Forest Region Standard.

Consistency with TSR [FPPR 26(3)(a)(ii)]: see general comments. TFL 19 TSR species composition for CWHvm1 good sites reflects stocking standards and average expected composition.

Exemption requested [FPPR 91(3)]: no

Notes: possible drainage candidate.

Stocking Standard ID: 9409

Ecological Description: CWHvm1-14

Existing Health Factors [FPPR 6(2)(b) frequency and extent]:

disease: see general comments.

insect: see general comments.

abiotic: see general comments. Flooding and high water table.

other: see general comments.

risk rank (lower to higher): Cw-Pl-Yc-Dr-Act-Ba-Bg-Hm-Hw-Ss-Pw-Fd

Long Term Health Risk Factors [FPPR 6(2)(a)]:

climate change: see general comments.

disease: see general comments.

insect: see general comments.

abiotic: see general comments.

Ecologically Suitable Tree Species Factors [FPPR 6(3)(a)(i)]:

volume potential rank: Cw-Ss-Pl-Dr-Yc-Act-Hw-Bg-Ba-Hw-Act-Hm-Pw-Fd

Commercially Valuable Tree Species Factors [FPPR 6(3)(a)(i)]:

value potential rank: Yc-Cw-Fd-Ss-Pw-Dr-Pl-Hw-Bg-Ba-Hm-Act

Preferred and Acceptable Species Rationale: defaulted to Vancouver Forest Region Standards.

Stocking Density/BA Factors and rationale [FPPR 26(3)(a)(i)][FPPR 6(3)(a)(ii)]: defaulted to target and minimum stockings stated in Vancouver Forest Region Standard. Minimum stocking may be reduced to 80% of available hummocks if suitable microsite density is very low.

Minimum well-spaced Intertree distance tree distribution Factor and rationale [FPPR 6(3)(a)(ii)]:

Reduced to 1.0m to allow two trees to be planted per hummock.

Regeneration date and rationale: see general comments.

Free Growing height and rationale [FPPR 26(3)(b)]: Vancouver Forest Region Standard heights reduced as local knowledge and experience suggests that they are too optimistic.

Consistency with TSR [FPPR 26(3)(a)(ii)]: see general comments. TFL 19 TSR species composition for CWHvm1 poor sites reflects the amalgamation of these stocking standards and amalgamated average expected composition. This unit is very small in area and of little timber supply consequence.

Exemption requested [FPPR 91(3)]: no

Notes: possible drainage candidate.

Stocking Standard ID: 9410

Ecological Description: CWHvm2-01

Existing Health Factors [FPPR 6(2)(b) frequency and extent]:

disease: see general comments.

insect: see general comments. Incidence of Ss leader weevil may decline with elevation.

abiotic: see general comments.

abiotic: see general comments. Fd, Ss and Dr increasingly likely to be damaged by snow loads with increasing elevation.

other: see general comments.

risk rank (lower to higher): Yc-Cw-Fd-Ba-Bp-Hm-Hw-Dr-Ss-Pw

Long Term Health Risk Factors [FPPR 6(2)(a)]:

climate change: see general comments.

disease: see general comments.

insect: see general comments. Incidence of Ss leader weevil attack may increase with warming climate.

abiotic: see general comments. Snow loads may decrease with warming climate in lower part of variant. Loads may increase in upper part of variant due to increased winter precipitation.

Ecologically Suitable Tree Species Factors [FPPR 6(3)(a)(i)]:

volume potential rank: Pw-Fd-Bp-Hw-Ss-Ba-Yc-Cw-Hm-Dr

Commercially Valuable Tree Species Factors [FPPR 6(3)(a)(i)]:

value potential rank: Yc-Cw-Fd-Ss-Pw-Dr-Hw-Bp-Ba-Hm

Preferred and Acceptable Species Rationale: defaulted to Vancouver Forest Region Standards. Noble fir (Bp) added to Acceptable list based on results of preliminary trials. Hm added to acceptable list at higher elevation where snow loading is high. Ss dropped due to forest health concerns.

Stocking Density/BA Factors and rationale [FPPR 26(3)(a)(i)][FPPR 6(3)(a)(ii)]: defaulted to target and minimum stockings stated in Vancouver Forest Region Standard.

Minimum well-spaced Intertree distance tree distribution Factor and rationale [FPPR 6(3)(a)(ii)]: defaulted to Vancouver Forest Region Standard.

Regeneration date and rationale: defaulted to Vancouver Forest Region Standard.

Free Growing height and rationale [FPPR 26(3)(b)]: defaulted to Vancouver Forest Region Standard.

Hm height lower than Hw as will be deployed at higher elevations. Bp height expected to rival Ba.

Consistency with TSR [FPPR 26(3)(a)(ii)]: see general comments. TFL 19 TSR species composition for CWHvm2 medium sites reflects stocking standards and average expected composition. TSR modeling techniques do not recognize any yield difference between Cw and Yc.

Exemption requested [FPPR 91(3)]: no

Notes:

Stocking Standard ID: 9411

Ecological Description: CWHvm2-03

Existing Health Factors [FPPR 6(2)(b) frequency and extent]:

disease: see general comments.

insect: see general comments.

other: see general comments. Fd increasingly likely to be damaged by snow loads with increasing elevation.

risk rank (lower to higher): Yc-Cw-Ba-Hm-Hw-Fd-Pw

Long Term Health Risk Factors [FPPR 6(2)(a)]:

climate change: see general comments.

disease: see general comments.

insect: see general comments.

abiotic: see general comments. See vm2-01.

Ecologically Suitable Tree Species Factors [FPPR 6(3)(a)(i)]:

volume potential rank: Fd-Hw-Yc-Pw-Cw-Hm-Ba

Commercially Valuable Tree Species Factors [FPPR 6(3)(a)(i)]:

value potential rank: Yc-Cw-Fd-Pw-Hw-Ba-Hm

Preferred and Acceptable Species Rationale: defaulted to Vancouver Forest Region Standards. Hm added to Acceptable list for use at higher elevations.

Stocking Density/BA Factors and rationale [FPPR 26(3)(a)(i)][FPPR 6(3)(a)(ii)]: defaulted to target and minimum stockings stated in Vancouver Forest Region Standard.

Minimum well-spaced Intertree distance tree distribution Factor and rationale [FPPR 6(3)(a)(ii)]: defaulted to Vancouver Forest Region Standard.

Regeneration date and rationale: defaulted to Vancouver Forest Region Standard.

Free Growing height and rationale [FPPR 26(3)(b)]: defaulted to Vancouver Forest Region Standard. Hm height lower than Hw as will be deployed at higher elevations.

Consistency with TSR [FPPR 26(3)(a)(ii)]: see general comments. TFL 19 TSR species composition for CWHvm2 poor sites reflects stocking standards and average expected composition.

Exemption requested [FPPR 91(3)]: no

Notes:

Stocking Standard ID: 9412

Ecological Description: CWHvm2-01c

Existing Health Factors [FPPR 6(2)(b) frequency and extent]:

disease: see general comments. See vm1-01c

insect: see general comments. See vm2-01.

abiotic: see general comments. See vm2-01.

other: see general comments. See vm1-01c.

risk rank (lower to higher): Yc-Cw-Fd-Ba-Bp-Hm-Hw-Dr-Ss-Pw

Long Term Health Risk Factors [FPPR 6(2)(a)]:

climate change: see general comments.

disease: see general comments.

insect: see general comments. See vm2-01.

abiotic: see general comments. See vm2-01.

Ecologically Suitable Tree Species Factors [FPPR 6(3)(a)(i)]:

volume potential rank: Pw-Fd-Bp-Hw-Ss-Ba-Yc-Cw-Hm-Dr

Commercially Valuable Tree Species Factors [FPPR 6(3)(a)(i)]:

value potential rank: Yc-Cw-Fd-Ss-Pw-Dr-Hw-Bp-Ba-Hm

Preferred and Acceptable Species Rationale: defaulted to Vancouver Forest Region Standards with exceptions:

- Ba is deemed Acceptable rather than Preferred due to lower value and volume potential, particularly on less than medium nutrient regimes.
- Hw unchanged due to extensive natural occurrence.
- Yc downgraded to Acceptable to recognize that colluvium is predominantly in the lower elevation portions of the variant.

Stocking Density/BA Factors and rationale [FPPR 26(3)(a)(i)][FPPR 6(3)(a)(ii)]: defaulted to target and minimum stockings stated in Vancouver Forest Region Standard. Target and minimum Preferred plus Acceptable densities reduced 10-20% to reflect the lack of stocking opportunities due to boulders and rubble.

Minimum well-spaced Intertree distance tree distribution Factor and rationale [FPPR 6(3)(a)(ii)]:

Minimum intertree distance reduced 50% from Provincial standard as clumpy stocking is needed to achieve higher stocking levels than would otherwise be possible at normal spacings.

Regeneration date and rationale: defaulted to Vancouver Forest Region Standard.

Free Growing height and rationale [FPPR 26(3)(b)]: defaulted to Vancouver Forest Region Standard except that Fd adjusted upwards and Ba adjusted downwards to reflect local knowledge and experience.

Consistency with TSR [FPPR 26(3)(a)(ii)]: see general comments. TFL 19 TSR species composition for CWHvm2 medium sites reflects stocking standards and average expected composition.

Exemption requested [FPPR 91(3)]: no

Notes:

Stocking Standard ID: 9413

Ecological Description: CWHvm2-04

Existing Health Factors [FPPR 6(2)(b) frequency and extent]:

disease: see general comments.

insect: see general comments. See vm2-01

abiotic: see general comments. Scarring may be common on steep slopes. Fd and Ss increasingly likely to be damaged by snow loads with increasing elevation.

other: see general comments.

risk rank (lower to higher): Cw-Yc-Ba-Fd-Hm-Hw-Ss-Pw

Long Term Health Risk Factors [FPPR 6(2)(a)]:

climate change: see general comments.

disease: see general comments.

insect: see general comments. See vm2-01

abiotic: see general comments. See vm2-01

Ecologically Suitable Tree Species Factors [FPPR 6(3)(a)(i)]:

volume potential rank: Pw-Fd-Hw-Ss-Ba-Cw-Yc-Hm

Commercially Valuable Tree Species Factors [FPPR 6(3)(a)(i)]:

value potential rank: Yc-Cw-Fd-Ss-Pw-Hw-Ba-Hm

Preferred and Acceptable Species Rationale: defaulted to Vancouver Forest Region Standards.

Stocking Density/BA Factors and rationale [FPPR 26(3)(a)(i)][FPPR 6(3)(a)(ii)]: defaulted to target and minimum stockings stated in Vancouver Forest Region Standard.

Minimum well-spaced Intertree distance tree distribution Factor and rationale [FPPR 6(3)(a)(ii)]: defaulted to Vancouver Forest Region Standard.

Regeneration date and rationale: defaulted to Vancouver Forest Region Standard.

Free Growing height and rationale [FPPR 26(3)(b)]: defaulted to Vancouver Forest Region Standard.

Consistency with TSR [FPPR 26(3)(a)(ii)]: see general comments. TFL 19 TSR species composition for CWH medium and good sites reflects stocking standards and average expected composition.

Exemption requested [FPPR 91(3)]: no

Notes:

Stocking Standard ID: 9414

Ecological Description: CWHvm2-05

Existing Health Factors [FPPR 6(2)(b) frequency and extent]:

disease: see general comments.

insect: see general comments. See vm2-01.

abiotic: see general comments. See vm2-01.

other: see general comments.

risk rank (lower to higher): Cw-Yc-Fd-Ba-Dr-Hm-Hw-Ss-Pw

Long Term Health Risk Factors [FPPR 6(2)(a)]:

climate change: see general comments.

disease: see general comments.

insect: see general comments. See vm2-01

abiotic: see general comments. See vm2-01.

Ecologically Suitable Tree Species Factors [FPPR 6(3)(a)(i)]:

volume potential rank: Pw-Fd-Hw-Ss-Dr-Ba-Cw-Yc-Hm

Commercially Valuable Tree Species Factors [FPPR 6(3)(a)(i)]:

value potential rank: Yc-Cw-Fd-Ss-Pw-Dr-Hw-Ba-Hm

Preferred and Acceptable Species Rationale: defaulted to Vancouver Forest Region Standards except Bp substituted for Ss based on trial results and forest health concerns for Ss.

Stocking Density/BA Factors and rationale [FPPR 26(3)(a)(i)][FPPR 6(3)(a)(ii)]: defaulted to target and minimum stockings stated in Vancouver Forest Region Standard.

Minimum well-spaced Intertree distance tree distribution Factor and rationale [FPPR 6(3)(a)(ii)]: defaulted to Vancouver Forest Region Standard.

Regeneration date and rationale: defaulted to Vancouver Forest Region Standard.

Free Growing height and rationale [FPPR 26(3)(b)]: defaulted to Vancouver Forest Region Standard.

Consistency with TSR [FPPR 26(3)(a)(ii)]: see general comments. TFL 19 TSR species composition for CWHvm2 medium sites reflects stocking standards and average expected composition.

Exemption requested [FPPR 91(3)]: no

Notes:

Stocking Standard ID: 9415

Ecological Description: CWHvm2-06

Existing Health Factors [FPPR 6(2)(b) frequency and extent]:

disease: see general comments.

insect: see general comments. See vm2-01.

abiotic: see general comments. See vm2-01

other: see general comments.

risk rank (lower to higher): Fd-Cw-Yc-Dr-Ba-Bp-Hm-Hw-Ss-Pw

Long Term Health Risk Factors [FPPR 6(2)(a)]:

climate change: see general comments.

disease: see general comments.

insect: see general comments. See vm2-01

abiotic: see general comments. See vm2-01

Ecologically Suitable Tree Species Factors [FPPR 6(3)(a)(i)]:

volume potential rank: Hw-Bp-Ba-Cw-Yc-Fd-Pw-Hm-Ss-Dr

Commercially Valuable Tree Species Factors [FPPR 6(3)(a)(i)]:

value potential rank: Yc-Cw-Fd-Ss-Pw-Dr-Hw-Bp-Ba-Hm

Preferred and Acceptable Species Rationale: Preferred defaulted to Vancouver Forest Region Standards.

Bp added to Acceptable based on trial results and intuition but this site may not be representative of trials. Hm added to Acceptable to substitute for Hw on potential cool soils at upper elevations. Fd added to Acceptable as may be productive at lower elevations on warm aspects.

Stocking Density/BA Factors and rationale [FPPR 26(3)(a)(i)][FPPR 6(3)(a)(ii)]: defaulted to target and minimum stockings stated in Vancouver Forest Region Standard.

Minimum well-spaced Intertree distance tree distribution Factor and rationale [FPPR 6(3)(a)(ii)]: defaulted to Vancouver Forest Region Standard.

Regeneration date and rationale: defaulted to Vancouver Forest Region Standard.

Free Growing height and rationale [FPPR 26(3)(b)]: defaulted to Vancouver Forest Region Standard except Fd increased modestly to reflect local experience. Bp height based on trials.

Consistency with TSR [FPPR 26(3)(a)(ii)]: see general comments. TFL 19 TSR species composition for CWHvm2 poor sites reflects stocking standards and average expected composition.

Exemption requested [FPPR 91(3)]: no

Notes:

Stocking Standard ID: 9416

Ecological Description: CWHvm2-07

Existing Health Factors [FPPR 6(2)(b) frequency and extent]:

disease: see general comments.

insect: see general comments. See vm2-01.

abiotic: see general comments. See vm2-01. Flooding may hamper reforestation to Fd.

other: see general comments.

risk rank (lower to higher): Cw-Yc-Ba-Hm-Hw-Ss-Fd-Dr-Pw

Long Term Health Risk Factors [FPPR 6(2)(a)]:

climate change: see general comments.

disease: see general comments.

insect: see general comments. See vm2-01.

abiotic: see general comments. See vm2-01.

Ecologically Suitable Tree Species Factors [FPPR 6(3)(a)(i)]:

volume potential rank: Ss-Ba-Cw-Hw-Yc-Fd-Pw-Dr-Hm

Commercially Valuable Tree Species Factors [FPPR 6(3)(a)(i)]:

value potential rank: Yc-Cw-Fd-Ss-Pw-Dr-Hw-Ba-Hm

Preferred and Acceptable Species Rationale: defaulted to Vancouver Forest Region Standards with Fd added to Acceptable with elevation and aspect caveats.

Stocking Density/BA Factors and rationale [FPPR 26(3)(a)(i)][FPPR 6(3)(a)(ii)]: defaulted to target and minimum stockings stated in Vancouver Forest Region Standard.

Minimum well-spaced Intertree distance tree distribution Factor and rationale [FPPR 6(3)(a)(ii)]: defaulted to Vancouver Forest Region Standard.

Regeneration date and rationale: see general comments.

Free Growing height and rationale [FPPR 26(3)(b)]: defaulted to Vancouver Forest Region Standard.

Consistency with TSR [FPPR 26(3)(a)(ii)]: see general comments. TFL 19 TSR species composition for CWHvm2 good sites reflects stocking standards and average expected composition.

Exemption requested [FPPR 91(3)]: no

Notes:

Stocking Standard ID: 9433

Ecological Description: CWHvm2-09

Existing Health Factors [FPPR 6(2)(b) frequency and extent]:

disease: see general comments.

insect: see general comments.

abiotic: see general comments. See vm2-01. Flooding may hamper reforestation to Fd.

other: see general comments.

risk rank (lower to higher): Cw-Yc-Ba-Ss-Hw-Hm-Dr-Fd-Pw

Long Term Health Risk Factors [FPPR 6(2)(a)]:

climate change: see general comments.

disease: see general comments.

insect: see general comments.

abiotic: see general comments. See vm2-01.

Ecologically Suitable Tree Species Factors [FPPR 6(3)(a)(i)]:

volume potential rank: Hw-Ba-Cw-Yc-Ss-Hm-Dr-Pw-Fd

Commercially Valuable Tree Species Factors [FPPR 6(3)(a)(i)]:

value potential rank: Yc-Cw-Fd-Ss-Pw-Dr-Hw-Ba-Hm

Preferred and Acceptable Species Rationale: defaulted to Vancouver Forest Region Standards except Ba upgraded to Preferred as this site unit is often medium nutrient regime and Pl added to Acceptable for poorer nutrient conditions.

Stocking Density/BA Factors and rationale [FPPR 26(3)(a)(i)][FPPR 6(3)(a)(ii)]: defaulted to target and minimum stockings stated in Vancouver Forest Region Standard.

Minimum well-spaced Intertree distance tree distribution Factor and rationale [FPPR 6(3)(a)(ii)]: defaulted to Vancouver Forest Region Standard.

Regeneration date and rationale: see general comments.

Free Growing height and rationale [FPPR 26(3)(b)]: defaulted to Vancouver Forest Region Standard.

Consistency with TSR [FPPR 26(3)(a)(ii)]: see general comments. TFL 19 TSR species composition for CWHvm2 poor sites reflects stocking standards and average expected composition.

Exemption requested [FPPR 91(3)]: no

Notes:

Stocking Standard ID: 9417

Ecological Description: CWHxm2-01

Existing Health Factors [FPPR 6(2)(b) frequency and extent]:

disease: see general comments.

insect: see general comments.

abiotic: see general comments.

other: see general comments.

risk rank (lower to higher): Fd-Cw-Dr-Act-Bg-Ba-Hw-Ss-Pw

Long Term Health Risk Factors [FPPR 6(2)(a)]:

climate change: see general comments.

disease: see general comments.

insect: see general comments.

abiotic: see general comments.

Ecologically Suitable Tree Species Factors [FPPR 6(3)(a)(i)]:

volume potential rank: Pw-Fd-Cw-Dr-Hw-Bg-Ss-Ba-Act

Commercially Valuable Tree Species Factors [FPPR 6(3)(a)(i)]:

value potential rank: Cw-Fd-Ss-Pw-Dr-Hw-Bg-Ba-Act

Preferred and Acceptable Species Rationale: Hw and Cw are upgraded to Preferred to reflect the climate gradient in the Nootka operating areas with the CWHxm2 subzone being at the northwesterly limit of the zone and in transition to CWHvm1. Bg is added as an acceptable species as it is at the edge of its natural range and can be productive on fresh sites with a medium nutrient regime.

Stocking Density/BA Factors and rationale [FPPR 26(3)(a)(i)][FPPR 6(3)(a)(ii)]: defaulted to target and minimum stockings stated in Vancouver Forest Region Standard.

Minimum well-spaced Intertree distance tree distribution Factor and rationale [FPPR 6(3)(a)(ii)]: defaulted to Vancouver Forest Region Standard.

Regeneration date and rationale: see general comments.

Free Growing height and rationale [FPPR 26(3)(b)]: defaulted to Vancouver Forest Region Standard. Pw height expected to rival Fd. Bg height expected to rival Hw.

Consistency with TSR [FPPR 26(3)(a)(ii)]: see general comments. TFL 19 TSR species composition CWHxm medium sites reflects stocking standards and average expected composition.

Exemption requested [FPPR 91(3)]: no

Notes:

Stocking Standard ID: 9418

Ecological Description: CWHxm2-03

Existing Health Factors [FPPR 6(2)(b) frequency and extent]:

disease: see general comments.

insect: see general comments.

abiotic: see general comments.

other: see general comments.

risk rank (lower to higher): Fd-Cw-Yc-Ba-Bg-Hw-Ss-Pw

Long Term Health Risk Factors [FPPR 6(2)(a)]:

climate change: see general comments.

disease: see general comments.

insect: see general comments.

abiotic: see general comments.

Ecologically Suitable Tree Species Factors [FPPR 6(3)(a)(i)]:

volume potential rank: Fd-Pw-Cw-Hw-Ss-Ba-Bg

Commercially Valuable Tree Species Factors [FPPR 6(3)(a)(i)]:

value potential rank: Cw-Fd-Ss-Pw-Hw-Bg-Ba

Preferred and Acceptable Species Rationale: Fd is the species of choice except in root rot pockets. Hw and Cw are added to reflect the climate gradient in the Nootka operating areas with the CWHxm2 subzone being at the northwesterly limit of the zone and in transition to CWHvm1. Local observations suggests that more valuable Cw is equally to modestly more productive than Hw and thus is Preferred. Hw productivity increases on northerly and easterly aspects and wetter parts of the variant where soil moisture deficits are less severe. Pw replaces Pl as Acceptable, particularly on nutrient medium sites but with a significant health caveat.

Stocking Density/BA Factors and rationale [FPPR 26(3)(a)(i)][FPPR 6(3)(a)(ii)]: defaulted to target and minimum stockings stated in Vancouver Forest Region Standard.

Minimum well-spaced Intertree distance tree distribution Factor and rationale [FPPR 6(3)(a)(ii)]: defaulted to Vancouver Forest Region Standard.

Regeneration date and rationale: see general comments.

Free Growing height and rationale [FPPR 26(3)(b)]: defaulted to Vancouver Forest Region Standard.

Consistency with TSR [FPPR 26(3)(a)(ii)]: see general comments. TFL 19 TSR species composition for CWHxm2 poor sites reflects stocking standards and average expected composition.

Exemption requested [FPPR 91(3)]: no

Notes:

Stocking Standard ID: tba

Ecological Description: CWHxm2-04

Existing Health Factors [FPPR 6(2)(b) frequency and extent]:

disease: see general comments.

insect: see general comments.

abiotic: see general comments.

other: see general comments.

risk rank (lower to higher): Fd-Cw-Ba-Bg-Hw-Ss-Pw

Long Term Health Risk Factors [FPPR 6(2)(a)]:

climate change: see general comments.

disease: see general comments.

insect: see general comments.

abiotic: see general comments.

Ecologically Suitable Tree Species Factors [FPPR 6(3)(a)(i)]:

volume potential rank: Pw-Fd-Cw-Hw-Ss-Bg-Ba

Commercially Valuable Tree Species Factors [FPPR 6(3)(a)(i)]:

value potential rank: Cw-Fd-Ss-Pw-Hw-Bg-Ba

Preferred and Acceptable Species Rationale: defaulted to Vancouver Forest Region Standards.

Stocking Density/BA Factors and rationale [FPPR 26(3)(a)(i)][FPPR 6(3)(a)(ii)]: defaulted to target and minimum stockings stated in Vancouver Forest Region Standard.

Minimum well-spaced Intertree distance tree distribution Factor and rationale [FPPR 6(3)(a)(ii)]: defaulted to Vancouver Forest Region Standard.

Regeneration date and rationale: see general comments.

Free Growing height and rationale [FPPR 26(3)(b)]: defaulted to Vancouver Forest Region Standard.

Consistency with TSR [FPPR 26(3)(a)(ii)]: see general comments. TFL 19 TSR species composition for CWHxm medium sites reflects stocking standards and average expected composition.

Exemption requested [FPPR 91(3)]: no

Notes:

Stocking Standard ID: 9419

Ecological Description: CWHxm2-05

Existing Health Factors [FPPR 6(2)(b) frequency and extent]:

disease: see general comments.

insect: see general comments.

abiotic: see general comments.

other: see general comments.

risk rank (lower to higher): Fd-Cw-Dr-Ba-Bg-Act-Hw-Ss-Pw

Long Term Health Risk Factors [FPPR 6(2)(a)]:

climate change: see general comments.

disease: see general comments.

insect: see general comments.

abiotic: see general comments.

Ecologically Suitable Tree Species Factors [FPPR 6(3)(a)(i)]:

volume potential rank: Pw-Fd-Cw-Bg-Ba-Ss-Dr-Act-Hw

Commercially Valuable Tree Species Factors [FPPR 6(3)(a)(i)]:

value potential rank: Cw-Fd-Ss-Pw-Dr-Hw-Bg-Ba-Act

Preferred and Acceptable Species Rationale: defaulted to Vancouver Forest Region Standards for Preferred species. Hw, and Ss added to Acceptable to reflect the climate gradient in the Nootka operating areas with the CWHxm2 subzone being at the northwesterly limit of the zone and in transition to CWHvm1. Bg added to reflect expected productivity.

Stocking Density/BA Factors and rationale [FPPR 26(3)(a)(i)][FPPR 6(3)(a)(ii)]: defaulted to target and minimum stockings stated in Vancouver Forest Region Standard.

Minimum well-spaced Intertree distance tree distribution Factor and rationale [FPPR 6(3)(a)(ii)]: defaulted to Vancouver Forest Region Standard.

Regeneration date and rationale: see general comments.

Free Growing height and rationale [FPPR 26(3)(b)]: defaulted to Vancouver Forest Region Standard except Hw increased to reflect expected productivity closer to CWHvm subzone.

Consistency with TSR [FPPR 26(3)(a)(ii)]: see general comments. TFL 19 TSR species composition for CWHxm good sites reflects stocking standards and average expected composition.

Exemption requested [FPPR 91(3)]: no

Notes:

Stocking Standard ID: 9420

Ecological Description: CWHxm2-06

Existing Health Factors [FPPR 6(2)(b) frequency and extent]:

disease: see general comments.

insect: see general comments.

abiotic: see general comments.

other: see general comments.

risk rank (lower to higher): Fd-Cw-Dr-Act-Ba-Bg-Hw-Ss-Pw

Long Term Health Risk Factors [FPPR 6(2)(a)]:

climate change: see general comments.

disease: see general comments.

insect: see general comments.

abiotic: see general comments.

Ecologically Suitable Tree Species Factors [FPPR 6(3)(a)(i)]:

volume potential rank: Fd-Hw-Cw-Pw-Ss-Dr-Bg-Ba-Act

Commercially Valuable Tree Species Factors [FPPR 6(3)(a)(i)]:

value potential rank: Cw-Fd-Ss-Pw-Dr-Hw-Bg-Ba-Act

Preferred and Acceptable Species Rationale: defaulted to Vancouver Forest Region Standards for Preferred species. Bg and Ss added to Acceptable based on potential performance on medium nutrient regimes or microsites.

Stocking Density/BA Factors and rationale [FPPR 26(3)(a)(i)][FPPR 6(3)(a)(ii)]: defaulted to target and minimum stockings stated in Vancouver Forest Region Standard.

Minimum well-spaced Intertree distance tree distribution Factor and rationale [FPPR 6(3)(a)(ii)]: defaulted to Vancouver Forest Region Standard.

Regeneration date and rationale: defaulted to Vancouver Forest Region Standard.

Free Growing height and rationale [FPPR 26(3)(b)]: defaulted to Vancouver Forest Region Standard. Ss productivity expected to rival Bg on medium sites.

Consistency with TSR [FPPR 26(3)(a)(ii)]: see general comments. TFL 19 TSR species composition for CWHxm medium sites reflects these preferred species although average amalgamated composition for medium sites is skewed to reflect the much more common zonal site.

Exemption requested [FPPR 91(3)]: no

Notes:

Stocking Standard ID: 9421

Ecological Description: CWHxm2-07

Existing Health Factors [FPPR 6(2)(b) frequency and extent]:

disease: see general comments.

insect: see general comments.

abiotic: see general comments.

other: see general comments.

risk rank (lower to higher): Fd-Cw-Dr-Act-Ba-Bg-Hw-Ss-Pw

Long Term Health Risk Factors [FPPR 6(2)(a)]:

climate change: see general comments.

disease: see general comments.

insect: see general comments.

abiotic: see general comments.

Ecologically Suitable Tree Species Factors [FPPR 6(3)(a)(i)]:

volume potential rank: Fd-Cw-Bg-Ss-Act-Dr -Ba-Pw-Hw

Commercially Valuable Tree Species Factors [FPPR 6(3)(a)(i)]:

value potential rank: Cw-Fd-Ss-Pw-Dr-Hw-Bg-Ba-Act

Preferred and Acceptable Species Rationale: defaulted to Vancouver Forest Region Standards for Preferred except Bg upgraded based on expected productivity. Hw and Ss added to Acceptable to reflect expected productivity in proximity to CWHvm subzone.

Stocking Density/BA Factors and rationale [FPPR 26(3)(a)(i)][FPPR 6(3)(a)(ii)]: defaulted to target and minimum stockings stated in Vancouver Forest Region Standard.

Minimum well-spaced Intertree distance tree distribution Factor and rationale [FPPR 6(3)(a)(ii)]: defaulted to Vancouver Forest Region Standard.

Regeneration date and rationale: see general comments.

Free Growing height and rationale [FPPR 26(3)(b)]: defaulted to Vancouver Forest Region Standard except Hw increased to reflect increasing productivity closer to the CWHvm subzone.

Consistency with TSR [FPPR 26(3)(a)(ii)]: see general comments. TFL 19 TSR species composition for CWHxm good sites reflects stocking standards and average expected composition.

Exemption requested [FPPR 91(3)]: no

Notes:

Stocking Standard ID: 9422

Ecological Description: CWHvh1-01

Existing Health Factors [FPPR 6(2)(b) frequency and extent]:

disease: see general comments.

insect: see general comments.

abiotic: see general comments.

other: see general comments.

risk rank (lower to higher): Fd-Cw-Yc-Pl-Dr-Ba-Ss-Hm-Hw -Pw

Long Term Health Risk Factors [FPPR 6(2)(a)]:

climate change: see general comments.

disease: see general comments.

insect: see general comments.

abiotic: see general comments.

Ecologically Suitable Tree Species Factors [FPPR 6(3)(a)(i)]:

volume potential rank: Fd-Cw-Yc-Hw-Ss-Dr-Pw-Ba-Pl-Hm

Commercially Valuable Tree Species Factors [FPPR 6(3)(a)(i)]:

value potential rank: Yc-Cw-Fd-Ss-Pw-Dr-Hw-Pl-Ba-Hm

Preferred and Acceptable Species Rationale: defaulted to Vancouver Forest Region Standards for Preferred species. Ss, Pw, Fd, and Ba added to Acceptable based on locally observed productivity.

Stocking Density/BA Factors and rationale [FPPR 26(3)(a)(i)][FPPR 6(3)(a)(ii)]: defaulted to target and minimum stockings stated in Vancouver Forest Region Standard.

Minimum well-spaced Intertree distance tree distribution Factor and rationale [FPPR 6(3)(a)(ii)]: defaulted to Vancouver Forest Region Standard.

Regeneration date and rationale: defaulted to Vancouver Forest Region Standard.

Free Growing height and rationale [FPPR 26(3)(b)]: defaulted to Vancouver Forest Region Standard.

Consistency with TSR [FPPR 26(3)(a)(ii)]: Strathcona TSR modeled establishment density of 1200 stems/ha is consistent with the target stocking standard considering typical planting densities, expected survival, and allowing for 10-50% natural infill of Hw. Strathcona TSR species composition for “Cedar M” (<18m SI) sites and TFL 19 TSR species composition for CWHvm subzone poor reflects stocking standards and average expected composition.

Exemption requested [FPPR 91(3)]: no

Notes:

Stocking Standard ID: 9423

Ecological Description: CWHvh1-03

Existing Health Factors [FPPR 6(2)(b) frequency and extent]:

disease: see general comments.

insect: see general comments.

abiotic: see general comments.

other: see general comments.

risk rank (lower to higher): Fd-Cw-Pl-Yc-Dr-Ba-Hm-Hw-Ss-Pw

Long Term Health Risk Factors [FPPR 6(2)(a)]:

climate change: see general comments.

disease: see general comments.

insect: see general comments.

abiotic: see general comments.

Ecologically Suitable Tree Species Factors [FPPR 6(3)(a)(i)]:

volume potential rank: Cw-Fd-Hw-Pl-Yc-Ss-Hm-Dr-Pw-Ba

Commercially Valuable Tree Species Factors [FPPR 6(3)(a)(i)]:

value potential rank: Yc-Cw-Fd-Ss-Pw-Dr-Pl-Hw-Ba-Hm

Preferred and Acceptable Species Rationale: defaulted to Vancouver Forest Region Standards except that Pl downgraded to Acceptable to reflect local experience and modestly lower productivity and/or value relative to other Preferred species..

Stocking Density/BA Factors and rationale [FPPR 26(3)(a)(i)][FPPR 6(3)(a)(ii)]: defaulted to target and minimum stockings stated in Vancouver Forest Region Standard.

Minimum well-spaced Intertree distance tree distribution Factor and rationale [FPPR 6(3)(a)(ii)]: defaulted to Vancouver Forest Region Standard.

Regeneration date and rationale: defaulted to Vancouver Forest Region Standard.

Free Growing height and rationale [FPPR 26(3)(b)]: defaulted to Vancouver Forest Region Standard.

Consistency with TSR [FPPR 26(3)(a)(ii)]: Strathcona TSR modeled establishment density of 1200 stems/ha is consistent with the target stocking standard considering typical planting densities, expected survival, and allowing for 10-50% natural infill of Hw. Strathcona TSR species composition for “Cedar M” (<18m SI) sites and TFL 19 TSR species composition for CWHvm subzone poor reflects stocking standards and average expected composition.

Exemption requested [FPPR 91(3)]: no

Notes:

Stocking Standard ID: 9424

Ecological Description: CWHvh1-04

Existing Health Factors [FPPR 6(2)(b) frequency and extent]:

disease: see general comments.

insect: see general comments. Ss weevil risk declines with proximity to outer coast.

abiotic: see general comments. Original stands may have been of windthrow origin.

other: see general comments.

risk rank (lower to higher): Fd-Cw-Yc-Dr-Pl-Ba-Ss-Hm-Hw-Pw

Long Term Health Risk Factors [FPPR 6(2)(a)]:

climate change: see general comments.

disease: see general comments.

insect: see general comments. Ss weevil risk increasing with warmer summers.

abiotic: see general comments.

Ecologically Suitable Tree Species Factors [FPPR 6(3)(a)(i)]:

volume potential rank: Hw-Ss-Ba-Dr-Cw-Fd-Pw-Yc-Pl-Hm

Commercially Valuable Tree Species Factors [FPPR 6(3)(a)(i)]:

value potential rank: Yc-Cw-Fd-Ss-Pw-Dr-Pl-Hw-Ba-Hm

Preferred and Acceptable Species Rationale: defaulted to Vancouver Forest Region Standards.

Stocking Density/BA Factors and rationale [FPPR 26(3)(a)(i)][FPPR 6(3)(a)(ii)]: defaulted to target and minimum stockings stated in Vancouver Forest Region Standard.

Minimum well-spaced Intertree distance tree distribution Factor and rationale [FPPR 6(3)(a)(ii)]: defaulted to Vancouver Forest Region Standard.

Regeneration date and rationale: defaulted to Vancouver Forest Region Standard.

Free Growing height and rationale [FPPR 26(3)(b)]: defaulted to Vancouver Forest Region Standard.

Consistency with TSR [FPPR 26(3)(a)(ii)]: Strathcona TSR modeled establishment density of 1200 stems/ha is consistent with the target stocking standard considering typical planting densities, expected survival, and allowing for 10-50% natural infill of Hw. Strathcona TSR species composition for “H/B M” sites and TFL 19 TSR species composition for CWHvm subzone Medium sites reflects stocking standards and average expected composition.

Exemption requested [FPPR 91(3)]: no

Notes:

Stocking Standard ID: 9425

Ecological Description: CWHvh1-06

Existing Health Factors [FPPR 6(2)(b) frequency and extent]:

disease: see general comments.

insect: see general comments. Ss weevil risk declines with proximity to outer coast.

abiotic: see general comments.

other: see general comments.

risk rank (lower to higher): Fd-Cw-Yc-Dr-Pl-Ba-Act-Ss-Hm-Hw-Pw

Long Term Health Risk Factors [FPPR 6(2)(a)]:

climate change: see general comments.

disease: see general comments.

insect: see general comments. Ss weevil risk increasing with warmer summers.

abiotic: see general comments.

Ecologically Suitable Tree Species Factors [FPPR 6(3)(a)(i)]:

volume potential rank: Ss-Ba-Dr-Cw-Fd-Pw-Yc-Hw-Act-Pl-Hm

Commercially Valuable Tree Species Factors [FPPR 6(3)(a)(i)]:

value potential rank: Yc-Cw-Fd-Ss-Pw-Dr-Pl-Hw-Act-Ba-Hm

Preferred and Acceptable Species Rationale: defaulted to Vancouver Forest Region Standards except Hw upgraded to Preferred to reflect local observations of productivity.

Stocking Density/BA Factors and rationale [FPPR 26(3)(a)(i)][FPPR 6(3)(a)(ii)]: defaulted to target and minimum stockings stated in Vancouver Forest Region Standard.

Minimum well-spaced Intertree distance tree distribution Factor and rationale [FPPR 6(3)(a)(ii)]: defaulted to Vancouver Forest Region Standard.

Regeneration date and rationale: see general comments..

Free Growing height and rationale [FPPR 26(3)(b)]: defaulted to Vancouver Forest Region Standard.

Consistency with TSR [FPPR 26(3)(a)(ii)]: Strathcona TSR modeled establishment density of 1200 stems/ha is consistent with the target stocking standard considering typical planting densities, expected survival, and allowing for 10-50% natural infill of Hw. Strathcona TSR species composition for “Cedar G” sites and TFL 19 TSR species composition for CWHvm subzone good sites reflects stocking standards and average expected composition.

Exemption requested [FPPR 91(3)]: no

Notes:

Stocking Standard ID: 9426

Ecological Description: CWHvh1-07

Existing Health Factors [FPPR 6(2)(b) frequency and extent]:

disease: see general comments.

insect: see general comments. Ss weevil risk declines with proximity to outer coast.

abiotic: see general comments.

other: see general comments.

risk rank (lower to higher): Fd-Cw-Yc-Dr-Pl-Ba-Act-Ss-Hm-Hw-Pw

Long Term Health Risk Factors [FPPR 6(2)(a)]:

climate change: see general comments.

disease: see general comments.

insect: see general comments. Ss weevil risk increasing with warmer summers.

abiotic: see general comments.

Ecologically Suitable Tree Species Factors [FPPR 6(3)(a)(i)]:

volume potential rank: Ss-Ba-Dr-Cw-Fd-Pw-Yc-Hw-Act-Pl-Hm

Commercially Valuable Tree Species Factors [FPPR 6(3)(a)(i)]:

value potential rank: Yc-Cw-Fd-Ss-Pw-Dr-Pl-Hw-Act-Ba-Hm

Preferred and Acceptable Species Rationale: defaulted to Vancouver Forest Region Standards.

Stocking Density/BA Factors and rationale [FPPR 26(3)(a)(i)][FPPR 6(3)(a)(ii)]: defaulted to target and minimum stockings stated in Vancouver Forest Region Standard.

Minimum well-spaced Intertree distance tree distribution Factor and rationale [FPPR 6(3)(a)(ii)]: defaulted to Vancouver Forest Region Standard.

Regeneration date and rationale: see general comments.

Free Growing height and rationale [FPPR 26(3)(b)]: defaulted to Vancouver Forest Region Standard.

Consistency with TSR [FPPR 26(3)(a)(ii)]: Strathcona TSR modeled establishment density of 1200 stems/ha is consistent with the target stocking standard considering typical planting densities, expected survival, and allowing for 10-50% natural infill of Hw. Strathcona TSR species composition for “Cedar G” sites and TFL 19 TSR species composition for CWHvm subzone good sites reflects stocking standards and average expected composition.

Exemption requested [FPPR 91(3)]: no

Notes:

Stocking Standard ID: 9427

Ecological Description: CWHvh1-11

Existing Health Factors [FPPR 6(2)(b) frequency and extent]:

disease: see general comments.

insect: see general comments.

abiotic: see general comments.

other: see general comments.

risk rank (lower to higher): Cw-Yc-Pl-Dr-Act-Ba-Hm-Hw-Ss

Long Term Health Risk Factors [FPPR 6(2)(a)]:

climate change: see general comments.

disease: see general comments.

insect: see general comments.

abiotic: see general comments.

Ecologically Suitable Tree Species Factors [FPPR 6(3)(a)(i)]:

volume potential rank: Cw-Yc-Pl-Hw-Hm-Ss-Dr-Ba-Act

Commercially Valuable Tree Species Factors [FPPR 6(3)(a)(i)]:

value potential rank: Yc-Cw-Ss-Dr-Pl-Hw-Ba-Hm-Act

Preferred and Acceptable Species Rationale: defaulted to Vancouver Forest Region Standards.

Stocking Density/BA Factors and rationale [FPPR 26(3)(a)(i)][FPPR 6(3)(a)(ii)]: defaulted to target and minimum stockings stated in Vancouver Forest Region Standard.

Minimum well-spaced Intertree distance tree distribution Factor and rationale [FPPR 6(3)(a)(ii)]: defaulted to Vancouver Forest Region Standard.

Regeneration date and rationale: see general comments.

Free Growing height and rationale [FPPR 26(3)(b)]: defaulted to Vancouver Forest Region Standard.

Consistency with TSR [FPPR 26(3)(a)(ii)]: Strathcona TSR modeled establishment density of 1200 stems/ha is consistent with the target stocking standard considering typical planting densities, expected survival, and allowing for 10-50% natural infill of Hw. Strathcona TSR species composition for “Cedar M”⁵ sites (<18m SI) and TFL 19 TSR species composition for CWHvm subzone poor sites reflects stocking standards and average expected composition.

Exemption requested [FPPR 91(3)]: no

Notes:

Stocking Standard ID: 9428

Ecological Description: CWHvh1-12

Existing Health Factors [FPPR 6(2)(b) frequency and extent]:

disease: see general comments.
insect: see general comments.
abiotic: see general comments.
other: see general comments.
risk rank (lower to higher): Cw-Pl-Yc-Dr-Hm-Hw-Ss

Long Term Health Risk Factors [FPPR 6(2)(a)]:

climate change: see general comments.
disease: see general comments.
insect: see general comments.
abiotic: see general comments.

Ecologically Suitable Tree Species Factors [FPPR 6(3)(a)(i)]:

volume potential rank: Pl-Yc-Cw-Hw-Hm-Ss-Dr

Commercially Valuable Tree Species Factors [FPPR 6(3)(a)(i)]:

value potential rank: Yc-Cw-Ss-Pl-Dr-Hw-Hm

Preferred and Acceptable Species Rationale: defaulted to Vancouver Forest Region Standards.

Stocking Density/BA Factors and rationale [FPPR 26(3)(a)(i)][FPPR 6(3)(a)(ii)]: defaulted to target and minimum stockings stated in Vancouver Forest Region Standard except Hw added to Preferred and Ss added to Acceptable to reflect observations of existing occurrences.

Minimum well-spaced Intertree distance tree distribution Factor and rationale [FPPR 6(3)(a)(ii)]:

defaulted to Vancouver Forest Region Standard.

Regeneration date and rationale: see general comments.

Free Growing height and rationale [FPPR 26(3)(b)]: defaulted to Vancouver Forest Region Standard.

Consistency with TSR [FPPR 26(3)(a)(ii)]: Strathcona TSR modeled establishment density of 1200 stems/ha is consistent with the target stocking standard considering typical planting densities, expected survival, and allowing for 10-50% natural infill of Hw. Strathcona TSR species composition for “Cedar M”⁵ sites (<18m SI), with the exception of Pl, and TFL 19 TSR species composition for CWHvm subzone poor sites (with poor site Fd a surrogate for Plc) reflects stocking standards and average expected composition.

Exemption requested [FPPR 91(3)]: no

⁵ The Strathcona TSR3 analysis will incorporate a “Cedar P” (<13.5m SI) type which is presumed to be more representative of these sites.

Notes:

Stocking Standard ID: 9429

Ecological Description: CWHvh1-13

Existing Health Factors [FPPR 6(2)(b) frequency and extent]:

disease: see general comments.

insect: see general comments. Ss weevil risk declines with proximity to outer coast.

abiotic: see general comments. Fd off-site and subject to flooding.

other: see general comments.

risk rank (lower to higher): Cw-Yc-Pl-Dr-Ba-Hw-Hm-Act-Ss-Pw-Fd

Long Term Health Risk Factors [FPPR 6(2)(a)]:

climate change: see general comments.

disease: see general comments.

insect: see general comments. Ss weevil risk increasing with warmer summers.

abiotic: see general comments.

Ecologically Suitable Tree Species Factors [FPPR 6(3)(a)(i)]:

volume potential rank: -Hw-Ss-Dr-Bg-Ba-Cw-Yc-Act-Pw-Pl-Hm-Fd

Commercially Valuable Tree Species Factors [FPPR 6(3)(a)(i)]:

value potential rank: Yc-Cw-Fd-Ss-Pw-Pl-Dr-Hw-Ba-Hm-Act

Preferred and Acceptable Species Rationale: defaulted to Vancouver Forest Region Standards except Ss added to Preferred to reflect potential productivity on selected microsites and Pl added to Acceptable to reflect occurrence.

Stocking Density/BA Factors and rationale [FPPR 26(3)(a)(i)][FPPR 6(3)(a)(ii)]: defaulted to target and minimum stockings stated in Vancouver Forest Region Standard.

Minimum well-spaced Intertree distance tree distribution Factor and rationale [FPPR 6(3)(a)(ii)]: defaulted to Vancouver Forest Region Standard.

Regeneration date and rationale: see general comments.

Free Growing height and rationale [FPPR 26(3)(b)]: defaulted to Vancouver Forest Region Standard.

Consistency with TSR [FPPR 26(3)(a)(ii)]: Strathcona TSR modeled establishment density of 1200 stems/ha is consistent with the target stocking standard considering typical planting densities, expected survival, and allowing for 10-50% natural infill of Hw. Strathcona TSR species composition for “Cedar M” sites (<18m SI), and TFL 19 TSR species composition for CWHvm subzone poor sites reflects stocking standards and average expected composition.

Exemption requested [FPPR 91(3)]: no

Notes:

Stocking Standard ID: 9430

Ecological Description: MHmm1-01,03

Existing Health Factors [FPPR 6(2)(b) frequency and extent]:

disease: see general comments. Dwarfmistletoe may affect Hm.

insect: significant pest problems unknown or unstudied.

abiotic: Snow loading, short snow-free period. Trees tend to be windfirm. Fire extremely rare.

other: regeneration can be very slow until trees extend above spring snowpack thus allowing earlier respiration.

risk rank (lower to higher): Yc-Ba-Bp-Se-Hm-Hw

Long Term Health Risk Factors [FPPR 6(2)(a)]:

climate change: see general comments.

disease: see general comments.

insect: Balsam woolley aphid adaptation to wet, high elevation climate is not known but Ba and Bl may be at risk.

abiotic: see general comments. Snow loads may increase if wetter winters with climate change.

Ecologically Suitable Tree Species Factors [FPPR 6(3)(a)(i)]:

volume potential rank: Bp-Se-Yc-Ba-Hm-Hw

Commercially Valuable Tree Species Factors [FPPR 6(3)(a)(i)]:

value potential rank: Yc-Se-Ba-Bp-Hw-Hm

Preferred and Acceptable Species Rationale: defaulted to Vancouver Forest Region Standards for Preferred species. Hw added to Acceptable as a minor component at lower elevations. Se and Bp added to Acceptable based on trial results.

Stocking Density/BA Factors and rationale [FPPR 26(3)(a)(i)][FPPR 6(3)(a)(ii)]: defaulted to target and minimum stockings stated in Vancouver Forest Region Standard.

Minimum well-spaced Intertree distance tree distribution Factor and rationale [FPPR 6(3)(a)(ii)]: defaulted to Vancouver Forest Region Standard.

Regeneration date and rationale: defaulted to Vancouver Forest Region Standard for 01 site series.

Free Growing height and rationale [FPPR 26(3)(b)]: defaulted to Vancouver Forest Region Standard.

Consistency with TSR [FPPR 26(3)(a)(ii)]: see general comments. TFL 19 TSR species composition for MH sites reflects stocking standards and average expected composition.

Exemption requested [FPPR 91(3)]: no

Notes:

Stocking Standard ID: 9431

Ecological Description: **MHmm1-04**

Existing Health Factors [FPPR 6(2)(b) frequency and extent]:

- disease: see MHmm1-01 comments.
- insect: see MHmm1-01 comments.
- abiotic: see MHmm1-01 comments.
- other: see MHmm1-01 comments.
- risk rank (lower to higher): Yc-Ba-Bp-Se-Hm-Hw

Long Term Health Risk Factors [FPPR 6(2)(a)]:

- climate change: see HMmm1-01 comments. Spring soil moisture may increase if deeper snow packs result from climate change.
- disease: see MHmm1-01 comments.
- insect: see MHmm1-01 comments.
- abiotic: see MHmm1-01 comments.

Ecologically Suitable Tree Species Factors [FPPR 6(3)(a)(i)]:

- volume potential rank: Ba-Yc-Bp-Se-Hm-Hw

Commercially Valuable Tree Species Factors [FPPR 6(3)(a)(i)]:

- value potential rank: Yc-Se-Hw-Ba-Bp-Hm

Preferred and Acceptable Species Rationale: defaulted to Vancouver Forest Region Standards except Se added to Acceptable to reflect trial results.

Stocking Density/BA Factors and rationale [FPPR 26(3)(a)(i)][FPPR 6(3)(a)(ii)]: defaulted to target and minimum stockings stated in Vancouver Forest Region Standard.

Minimum well-spaced Intertree distance tree distribution Factor and rationale [FPPR 6(3)(a)(ii)]: adjusted to better utilize tree islands/hummocks.

Regeneration date and rationale: defaulted to Vancouver Forest Region Standard.

Free Growing height and rationale [FPPR 26(3)(b)]: defaulted to Vancouver Forest Region Standard.

Consistency with TSR [FPPR 26(3)(a)(ii)]: see general comments. TFL 19 TSR species composition for MH sites reflects stocking standards and average expected composition.

Exemption requested [FPPR 91(3)]: no

Notes:

Stocking Standard ID: to be assigned

Ecological Description: **MHmm1-05,07**

Existing Health Factors [FPPR 6(2)(b) frequency and extent]:

- disease: see MHmm1-01 comments.
- insect: see MHmm1-01 comments.
- abiotic: see MHmm1-01 comments.
- other: see general comments.
- risk rank (lower to higher): Yc-Se-Bp-Ba-Hm-Hw

Long Term Health Risk Factors [FPPR 6(2)(a)]:

- climate change: see MHmm1-01 comments. Spring soil moisture may become excessive if deeper snow packs result from climate change
- disease: see MHmm1-01 comments.
- insect: see MHmm1-01 comments.
- abiotic: see MHmm1-01 comments.

Ecologically Suitable Tree Species Factors [FPPR 6(3)(a)(i)]:

- volume potential rank: Se-Yc-Bp-Ba-Hm-Hw

Commercially Valuable Tree Species Factors [FPPR 6(3)(a)(i)]:

- value potential rank: Yc-Se-Hw-Bp-Ba-Hm

Preferred and Acceptable Species Rationale: defaulted to Vancouver Forest Region Standards.

Stocking Density/BA Factors and rationale [FPPR 26(3)(a)(i)][FPPR 6(3)(a)(ii)]: defaulted to target and minimum stockings stated in Vancouver Forest Region Standard.

Minimum well-spaced Intertree distance tree distribution Factor and rationale [FPPR 6(3)(a)(ii)]:

- adjusted to better utilize tree islands/hummocks.

Regeneration date and rationale: defaulted to Vancouver Forest Region Standard.

Free Growing height and rationale [FPPR 26(3)(b)]: defaulted to Vancouver Forest Region Standard for 05.

Consistency with TSR [FPPR 26(3)(a)(ii)]: see general comments. TFL 19 TSR species composition for MH sites reflects stocking standards and average expected composition.

Exemption requested [FPPR 91(3)]: no

Notes:

Stocking Standard ID: 9432

Ecological Description: **MHmm1-06**

Existing Health Factors [FPPR 6(2)(b) frequency and extent]:

- disease: see MHmm1-01 comments.
- insect: see MHmm1-01 comments.
- abiotic: see MHmm1-01 comments.
- other: see MHmm1-01 comments.
- risk rank (lower to higher): Yc-Ba-Hm-Hw

Long Term Health Risk Factors [FPPR 6(2)(a)]:

- climate change: see MHmm1-05 comments.
- disease: see MHmm1-01 comments.
- insect: see MHmm1-01 comments.
- abiotic: see MHmm1-01 comments.

Ecologically Suitable Tree Species Factors [FPPR 6(3)(a)(i)]:

- volume potential rank: Yc-Ba-Hm-Hw

Commercially Valuable Tree Species Factors [FPPR 6(3)(a)(i)]:

- value potential rank: Yc-Hw-Ba-Hm

Preferred and Acceptable Species Rationale: defaulted to Vancouver Forest Region Standards except Ba upgraded to Preferred and Hw added to acceptable based on observed occurrences on medium sites.

Stocking Density/BA Factors and rationale [FPPR 26(3)(a)(i)][FPPR 6(3)(a)(ii)]: defaulted to target and minimum stockings stated in Vancouver Forest Region Standard.

Minimum well-spaced Intertree distance tree distribution Factor and rationale [FPPR 6(3)(a)(ii)]: adjusted to better utilize tree islands/hummocks.

Regeneration date and rationale: defaulted to Vancouver Forest Region Standard.

Free Growing height and rationale [FPPR 26(3)(b)]: defaulted to Vancouver Forest Region Standard.

Consistency with TSR [FPPR 26(3)(a)(ii)]: see general comments. TFL 19 TSR species composition for MH sites reflects stocking standards and average expected composition.

Exemption requested [FPPR 91(3)]: no

Notes: