

# **Single Entry Dispersed Retention Stocking Standard Framework Implementation Guide (Coastal)**

Silviculture Working Group,  
Coast Region FRPA Implementation Team

Version 2.0

Feb. 14, 2014

## **Acknowledgements**

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# Preface

In November 2009 the Coast FRPA Implementation Team (CRIT) silviculture working group released the discussion paper entitled “Single Entry Dispersed Retention Stocking Standard Framework”. This discussion paper presented a stocking standard framework to replace the multi-storied stocking standard, which was being applied, often incorrectly, on the coast.

This proposed stocking standard framework is intended for stands being managed under a silvicultural system with only a single entry planned partial cut harvest entry, where retained stems contribute towards achieving the stocking obligation. For the purposes of this stocking standard framework additional stand harvest entries are not required to meet the target stand structural objectives.

As a follow up to the release of this discussion paper the CRIT silviculture working group developed and delivered several field based workshops: one on the north coast held in Prince Rupert in 2010; one on northern Vancouver Island held in Port McNeill in 2010; one on Southern Vancouver Island in Tofino in 2011 and one on Haida Gwaii in 2012. As a result of participant feedback from these field based workshops this Implementation Guide was developed and subsequently updated to help guide forest practitioners in implementing the Single Entry Dispersed Retention Stocking Standard (SEDRSS) Framework operationally. In the spring of 2013, new Deviation from Potential (DFP) tables were developed and calibrated for old growth Coastal Hemlock / Cedar stands and incorporated into this implementation guide. This guide is intended to compliment and support the framework described within the discussion paper.

The CRIT silviculture working group would like to remind forest professionals that the tables (Table 3, 4 and 5) within this document have been calibrated only for old growth Coastal Hemlock / Cedar stands. When applying the proposed methodology to other stand types, new tables will need to be developed and calibrated for these new conditions. We suggest that the proposed survey methodology may be used in all circumstances when coupled with the appropriate stand specific stocking tables.

# SEDRSS Implementation Guide

## 1.0 Single Entry Dispersed Retention Stocking Standard (SEDRSS) Survey – Coastal

### 1.1 Single Entry Dispersed Retention System Suitability

This proposed stocking standard framework is meant for stands managed with a Single Entry Dispersed Retention Silvicultural System - defined as a partial cut harvest entry where retained overstorey stems contribute towards a regen and free growing obligation. This stocking standard is meant to replace the multi-storied stocking standard, referenced in the Ministry of Forests and Range (MFR) publication titled: Reference Guide to Forest Development Plan Stocking Standards. It is therefore assumed that future stand entries are not required to meet prescribed long term stand structural objectives. The intent of this standard and subsequent survey methodologies **are for guidance purposes and represent suggested best management practices.**

#### SEDRSS Suitable Stand Criteria:

1. **Dispersed Retention Residual Basal Area (RBA) ranging from 9 to 39 m<sup>2</sup>/ha** (Note this range is an interim guideline and is subject to revision for specific situations) and,
2. **Stands that meet the specific Situations and Circumstances - Section 2.0 below** (SEDRSS is not intended for a broad application across managed landscapes but rather is intended to be a tool to address specific management concerns within a local management unit)

#### Stratification Criteria for Stand Unsuitable for SEDRSS

1. **Areas ≥ 1.0 ha. with ≤ 8m<sup>2</sup>/ha of Dispersed Retention (1)** (*Open stands, clearcuts or stands with low levels of dispersed retention*): Remove from the SU and treat with an Even-aged Stocking Standard;
2. **Areas ≥ 1.0 ha with ≥ 40 m<sup>2</sup>/ha of Dispersed Retention** (*full stocking of ecologically suitable species with no openings > 0.1 ha. in size*): Defined as an **Intermediate cut** (with no regeneration obligations) requiring a separate stocking standard;
3. **Areas ≥ 0.25 ha Uncut:** (*large areas of reserved stems where no harvested or disturbance has occurred*): Remove from SU and map as a **Grouped Retention SU**, classify as **Group Reserve**, removed from NAR and report in RESULTS;
4. **Areas ≥ 1.0 ha. Broadleaf leading:** SEDRSS is designed for conifer management only.

- (1) **Note:** That all stands that have > 5 m<sup>2</sup> of Dispersed Retention, including SEDRSS suitable stands of between 8 and 39 m<sup>2</sup>, require that the overstorey retention inventory labels be reported appropriately into RESULTS as per the document: *Procedures for Submitting Forest Cover to RESULTS for Openings with Treed Retention.*

## 1.2 Situations and Circumstances for SEDRSS

The stocking standard provides the linkage from stand level to forest level management. This type of standard is generally **only applicable** where retention of dispersed stems is required to achieve FRPA management objectives (non- timber). The Forest Stewardship Plan (FSP) **must** specify the situations and circumstances where the stocking standard will be applied.

### **Complexes**

SEDRSS is best applied to only one site series - meaning the dominate site series for an SU- For example: An SU for an 01<sub>8</sub> 12<sub>2</sub> complex should just have the 01 site series standards applied, and not a 01/12 blend of the TSS and MSS threshold values. The SEDRSS standard is best applied to the dominate site series as long as the appropriate stratification practices are used (i.e. 1 ha. contiguous areas of minor 12 site series are not lumped in with 01 site series areas).

### **Low Productivity Sites**

SEDRSS is not applicable for site series that would not be capable of achieving a closed canopy stand – like very poor sites of low productivity where the TSS for even-aged is 400 sph or less (e.g. CWHvh1 12 or 02 sites series). The rationale is that these sites have very low stocking standards already and the application of the DFP concept is unworkable once the BA increases in the SEDRSS tables. It is recommended provincially that where possible harvesting or even partial harvesting with retention should be avoided on these sites. Most likely these sites will represent minor inclusions within a stratum within a dominant site series and areas greater than 1 ha of these sites series where SEDRSS will be applied will likely be very small.

## 1.3 SEDRSS Regen and Free Growing Obligation Criteria

**Table 1:** The following table matrix identifies the application of each obligation criteria relative to the SEDRSS standard (for both SEDRSS methodology options):

Layer	COMMON Criteria (REGEN & FG)			REGEN Criteria	FREE GROWING (FG) Criteria			
	Spp <sup>(1)</sup>	MITD	BA & Density (SEDRSS Tabular only)	REGEN Delay (Max Years)	FG Declaration Date (Min Yrs)	Comp. Brush Factor <sup>(4)</sup>	Min Ht <sup>(5)</sup>	Damage Criteria
<b>Residual Overstorey Layer 1</b>  ≥ 12.5cm DBH	As per FSP or SEDRSS Tabular	0 meters	BA as per SEDRSS Tabular	As per FSP or SEDRSS Tabular	2 <sup>(3)</sup>	N/A	N/A	As per SEDRSS Damage Criteria for Layer 1
<b>Understorey (Advanced or Artificially Established) Layers 2, 3 &amp; 4</b>  < 12.5cm DBH	As per FSP or SEDRSS Tabular	<b>From Layer 1:</b> Dripline <sup>(2)</sup>  <b>Between Layers 2, 3 &amp; 4:</b> 2.0 meters or as per FSP	Minimum Stocking as per SEDRSS Tabular			As per FSP	As per FSP or SEDRSS Tabular	As per SEDRSS Damage Criteria for Layers 2, 3 & 4

Footnotes:

- 1) Preferred and Acceptable species by site series. Option 1): As identified in the MFR publication titled: *Reference Guide to FDP Stocking Standards*. Option 2): Individual FSP authors may prefer to use the guidance in the above mentioned document as a good starting point for identifying one list of ecologically suitable species, and a species composition range for retained layer 1 trees that are based on the pre-harvest conditions. New emerging information, especially as it relates to shade tolerance, contained within published literature, research or data regarding species acceptability will aid FSP authors with this option.

- 2) The Dripline is defined as “*the vertical boundary of the outside of the outer live foliage of the overstorey tree*”. An understory tree is considered outside the Dripline if “*the main stem pith of the understorey stem is outside of the Dripline as defined above*”. Overstorey stems (regardless if counted as a crop tree) inside and *outside* of survey plots are used to determine the Dripline.
- 3) Declaration of the Free Growing Obligation is recommended to be two years or greater after the completion of harvest. Although the date specified under *Forest Planning and Practices Regulation* (FPPR) 44 (1) (b) for which a person who has an obligation to establish a free growing stand must meet the applicable stocking standards and free growing criteria is no more than 20 years from the commencement date, for SEDRSS after two years the stand could be considered having met the Free Growing Criteria if the overstorey trees and understory of advanced regeneration meet the minimum criteria set out in the standard. This is considered as sufficient time for wind throw to be expressed in the residual stand. However, two years post harvest will often be insufficient to allow for expression of added growth or release.
- 4) As required by legislation, a free growing stand must not be impeded by competing plants, shrubs or other trees.
- 5) Acceptable guidance is to list the minimum heights as 75% of the heights listed in the MFR publication titled: *Reference Guide to FDP Stocking Standards* for each species on a given site series unless certified under FPPR 22.1. There may be situations where this reduced minimum height has not been achieved, but the understory stems meet all other criteria. In this situation a forest professional can use Forest Planning and Practices Regulation (FPPR) section 97.1 to indicate the obligation has been met and provide a rationale that indicates the crop trees are well established, free from vegetative competition and are not expected to be impacted by a forest health agent.

## 1.4 SEDRSS Damage Criteria

All stems considered to be crop trees in both SEDRSS Methodologies, must meet or exceed the following damage criteria for both Layer 1 stems and Layers 2, 3, and 4 stems (separate damage criteria tables have been developed for each stand structure component).



**FG DAMAGE CRITERIA FOR SINGLE ENTRY DISPERSED RETENTION STOCKING STANDARD (SEDRSS) MANAGED STANDS IN COASTAL B.C.**

**Note: this table overrides all other damage criteria for SEDRSS managed stands**

**TABLE A- Layer 1 -  $\geq 12.5$  cm DBH. SEDRSS damage criteria**

Location of Damage	Type of Damage	Tree being assessed is UNACCEPTABLE if:		Possible damage agents & codes	Comments
		Hw, Ba, Bg, Bl, Cy, Fd, Ss, Pw, Pl, Lw, Sx, Py	Cw		
Stem	Wound	<ul style="list-style-type: none"> <li>Wound girdles <math>&gt;33\%</math> stem circumference, or</li> <li>One wound <math>&gt;400 \text{ cm}^2</math> on stem, or</li> <li>Wound on major root within 1 m of stem, or</li> <li>Tree has <b>gouge</b> in stem.</li> </ul>	<ul style="list-style-type: none"> <li><b>No criteria</b></li> </ul>	fire NB, windthrow NW, sunscald NZ, logging TL, mechanical TT.	A <b>wound</b> is defined as an injury in which the cambium is dead (e.g., sunscald) or completely removed from the tree exposing the sapwood. Measure the wound across the widest point of the exposed sapwood (or dead cambium when the tree is damaged by sunscald). Healed over wounds (=scars) are acceptable.
Stem	Decay	<ul style="list-style-type: none"> <li>Any pathological indicator(s) are present. This may include <b>conk</b>, <b>blind conk</b>, <b>frost crack</b>, or <b>rotten branches</b>.</li> </ul>		various decay fungi DD.	
Stem	Bark Mining	<ul style="list-style-type: none"> <li>Any of the following signs are visible: pitch tubes, boring dust, exit holes on bark surface, galleries under the bark.</li> </ul>	<ul style="list-style-type: none"> <li><b>No criteria</b></li> </ul>	Douglas-fir beetle IBD, Ips pini IBI, Pityogenes & Pityophthorus IBP	<p>Note: pitch tubes can be associated with trees that have successfully repelled bark beetles, bark must be removed above pitch tube to confirm successful attack (successful galleries will be filled with frass and not pitch, contain adult beetles and/or larval galleries).</p> <p>Stressed trees are susceptible to secondary bark and twig beetles.</p>
Stem	Deformation (including crook, fork and dead or broken top)	<ul style="list-style-type: none"> <li>A <b>crook</b> displaces the portion of the stem above the defect by <math>&gt;50\%</math> from the line of growth formed by the stem below the point of defect in the bottom 2/3rds of the stem only.</li> <li>A <b>fork</b> occurs above stump height in the bottom 2/3rds of the stem only.</li> <li>A <b>dead</b> or <b>broken top</b> extends more than 20% of the stem length or the live crown is removed.</li> </ul>	<ul style="list-style-type: none"> <li><b>No criteria</b></li> <li>A <b>dead tree</b> with no live foliage</li> <li>the stem is unable to produce <math>&gt; 50\%</math> merchantable volume.</li> </ul>	frost NG, hail NH, snow NY, drought ND, logging TL, mechanical TT, Dwarf mistletoes (see below).	<p><b>Cw:</b> Unacceptable as a contributing Crop Tree if assessed as unable to produce <b><math>&gt; 50\%</math> Merchantable Volume</b> in the first 10 m. log length – defined as either: 1. <u>Utility Grade</u> – At least a solid 8 inch shell – Shake and Shingle and /or 2. <u>Higher Grade</u> – Complete solid wood – Saw Logs</p> <p><b>Note:</b> Field guidance procedures and photo examples for the estimation of merchantable Cw volume are identified in <b>Appendix 1.</b></p>

Location of Damage	Type of Damage	Tree being assessed is UNACCEPTABLE if:		Possible damage agents & codes	Comments
		Hw, Ba, Bg, Bl, Cy, Fd, Ss, Pw, Pl, Lw, Sx, Py	Cw		
Stem	Dwarf Mistletoe Infection	<ul style="list-style-type: none"> <li>Hawksworth rating &gt;3, or severe stem infections (major swelling or deformity) present.</li> </ul>	<ul style="list-style-type: none"> <li>No criteria</li> </ul>	hemlock dwarf mistletoe DMH	The Hawksworth rating system is described in the FPC <i>Dwarf Mistletoe Management Guidebook</i> (or refer to Appendix AA of this document) For SEDRSS, this rating system will only apply to the tree/plot assessment level, and not at the stand level.
Foliage	Defoliation	<p><b>For defoliating insects:</b></p> <ul style="list-style-type: none"> <li>&gt; 80% of foliage has been removed, lost or damaged due to insect defoliation.</li> </ul> <p><b>For foliar diseases:</b></p> <ul style="list-style-type: none"> <li>&gt; 50% of foliage has been removed, lost or damaged</li> </ul>	<ul style="list-style-type: none"> <li>No criteria</li> </ul>	defoliators ID, foliage diseases DF	
Foliage	Live Crown Vigour	<ul style="list-style-type: none"> <li>Stems &lt; 17.5 cm dbh - &lt; 30% live crown due to poor vigour.</li> <li>Stems ≥ 17.5 cm dbh - &lt; 20% live crown due to poor vigour.</li> </ul>	<ul style="list-style-type: none"> <li>A dead tree with no live foliage</li> </ul>		Percent live crown is the length of continuous green foliage on a tree expressed as a percentage of its total height.

Location of Damage	Type of Damage	Tree being assessed is UNACCEPTABLE if:				Possible damage agents & codes	Comments	
		Hw, Ba, Bg, Bl, Cy, Fd, Ss, Pw, Pl, Lw, Sx, Py		Cw				
Roots	Root Disease	<ul style="list-style-type: none"><li>Sign(s) or definitive combinations of symptoms of root disease are observed</li></ul>	<ul style="list-style-type: none"><li>For Cw, there is no criterion for net down calculation - considered not susceptible or low susceptibility.</li></ul>			armillaria root disease DRA, laminated root rot DRL, annosus root disease DRN.	<b>Signs</b> are direct evidence of the pathogenic fungus including fruiting bodies, distinctive mycelium or rhizomorphs. <b>Symptoms</b> include foliar thinning or chlorosis, pronounced resin flow near the root collar, reduced recent leader growth, a distress cone crop, and wood decay or stain. Symptoms alone are not usually sufficient to identify root disease. Both signs and symptoms may be detected from old stumps, root balls, or other post-harvest remains.	
		<ul style="list-style-type: none"><li>Infected conifer or stump found in plot. See <b>Table Y</b> for well-spaced tree net down calculation by layer.</li></ul>						
		<b>TABLE Y.</b> Deductions from numbers of acceptable well-spaced uninfected stems for trees infected by root disease in layered stands.				armillaria root disease DRA, laminated root rot DRL, annosus root disease DRN.	<b>Example:</b> How to apply net down for root disease.  If root disease-infected trees are found in the plot:  1. Determine the number of healthy, well-spaced trees in each layer using the prescribed minimum inter-tree distance (MITD) (e. g., 3 layer 1, 3 layer 3 and 4 layer 4 = 10 healthy, well-spaced) ignoring the M-value;  2. Count the number of infected trees (e. g., 1 layer 1 tree and 1 layer 3 tree);  3. Working from the uppermost layer down, apply the multiplier in Table Y to each lower layer. Subtract the resultant from each layer in turn, for susceptible species only (e. g., if all trees are susceptible, 1 infected layer 1 tree removes 1 healthy, well-spaced layer 1 tree plus 3 layer 3 trees plus 4 layer 4 trees). Note the effects are cumulative, not exclusive and lower layers do not affect higher layers;  Calculate the remaining healthy, well-spaced trees once all removals due to infected trees are completed (e. g. 10 – 8 = 2). The result is the maximum number of free growing trees tallied for the plot.	
		<b>Tree layer with infected tree(s) or stumps</b>	<b>Multiplier used to determine number of acceptable trees to be deducted from:</b>					
			Layer 1	Layer 2	Layer 3			Layer 4
Layer 1	Deduct BA of infected layer 1 from Crop BA	2	3	4				
Layer 2		2	2	3				
Layer 3			2	2				
Layer 4				2				

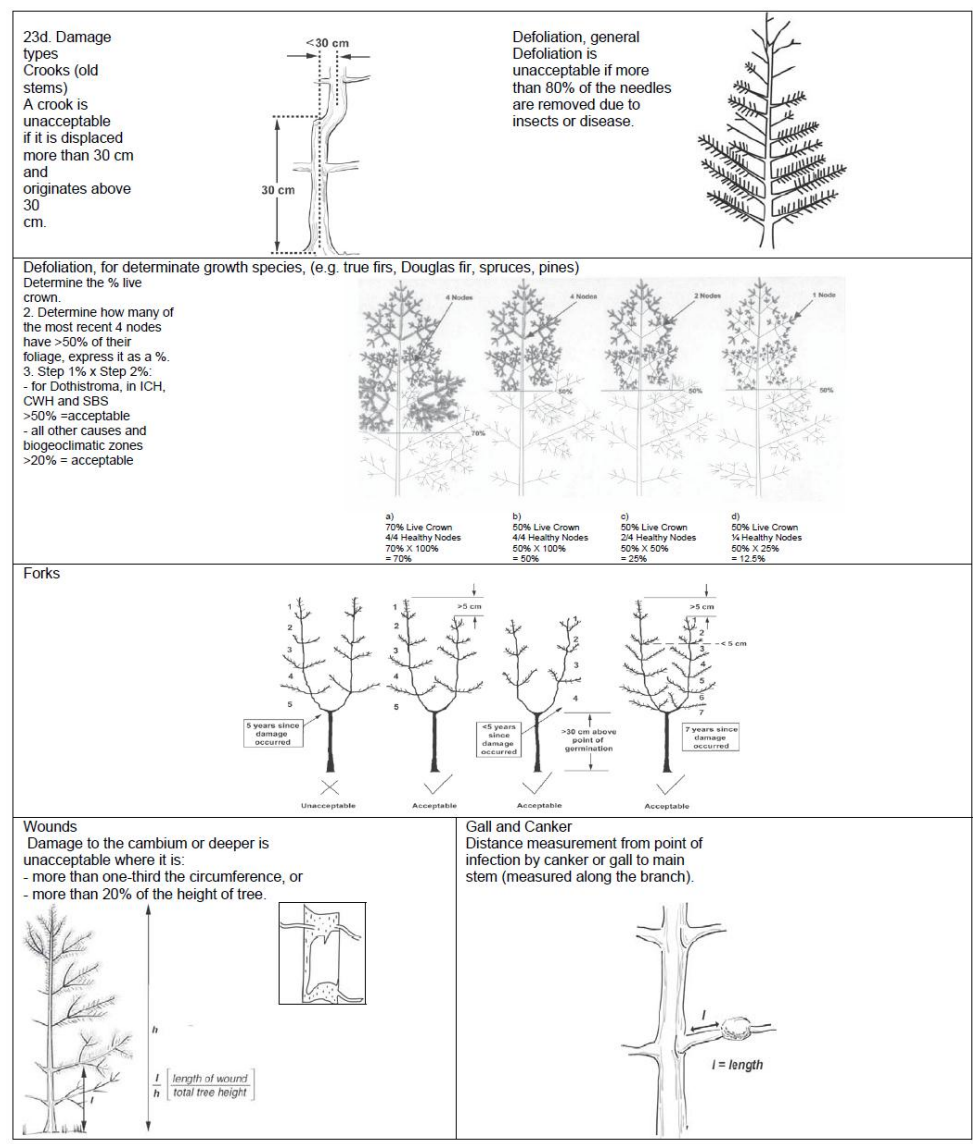
**TABLE B- Layers 2, 3 & 4 - < 12.5 cm DBH. SEDRSS damage criteria**

Location of Damage	Type of Damage	Tree being assessed is UNACCEPTABLE if:	Host Species	Possible damage agents & codes	Comments
Stem	Wound	<ul style="list-style-type: none"> <li>Wound girdles &gt;25% stem circumference, or</li> <li>One wound &gt;10% the length of stem</li> </ul>	All	fire NB, windthrow NW, sunscald NZ, logging TL, mechanical TT.	A <b>wound</b> is defined as an injury in which the cambium is dead (e.g., sunscald) or completely removed from the tree exposing the sapwood. Measure the wound across the widest point of the exposed sapwood (or dead cambium when the tree is damaged by sunscald). Healed over wounds (=scars) are acceptable.
Stem	Decay	<ul style="list-style-type: none"> <li>Any pathological indicator(s) are present. This may include <b>conk, blind conk, frost crack, or rotten branches.</b></li> </ul>	All	various decay fungi DD.	
Stem	Bark Mining	<ul style="list-style-type: none"> <li>Any of the following signs are visible: pitch tubes, boring dust, exit holes on bark surface, galleries under the bark.</li> </ul>	All	Douglas-fir beetle IBD, Ips pini IBI, Pityogenes & Pityophthorus IBP	<p>Note: pitch tubes can be associated with trees that have successfully repelled bark beetles, bark must be removed above pitch tube to confirm successful attack (successful galleries will be filled with frass and not pitch, contain adult beetles and/or larval galleries).</p> <p>Stressed trees are susceptible to secondary bark and twig beetles.</p>
Stem	Deformation (including crook, fork and dead or broken top)	<ul style="list-style-type: none"> <li>The pith is horizontally displaced more than 30 cm from the point of defect and originates above 30 cm from the point of germination</li> </ul>	All	defoliators ID, white pine (spruce) weevil IWS, lodgepole pine terminal weevil IWP,	
		<ul style="list-style-type: none"> <li>The tree leader has been killed three or more times in the last 5 years (weevil only)</li> </ul>	Ss	cattle AC, deer AD, elk AE, moose AM, frost NG, hail NH,	This criterion applies only for terminal weevil damage.
		<ul style="list-style-type: none"> <li>The tree has two or more leaders with no dominance expressed after five years growth and the fork originates above 30 cm from the point of germination.</li> <li>The tree has a dead or broken top at a point that is &gt; 3cm in diameter.</li> <li>The tree has a flat top (umbrella like) form and no distinct leader.</li> </ul>	All	snow NY, drought ND, logging TL, mechanical TT, Dwarf mistletoes (see below).	Leader dominance occurs when the tallest leader is at least 5 cm taller than the second tallest leader. See Appendix AA on Damage Types.
Stem	Lean and Sweep	<ul style="list-style-type: none"> <li>The tree leans &gt;30° from the vertical with or without growth correction.</li> </ul>	All	Flooding NF, snow NY, slides NS, wind NW, mechanical TM	

Location of Damage	Type of Damage	Tree being assessed is UNACCEPTABLE if:	Host Species	Possible damage agents & codes	Comments
Stem	Infection (includes cankers and galls)	<ul style="list-style-type: none"> <li>Any infection occurs on the stem.</li> </ul>	All	white pine blister rust DSB, atopellis canker DSA, Dwarf mistletoes (see below).	<b>Note:</b> Wounds caused by rodent feeding around rust cankers should have stem rust recorded as the causal agent.
Branch	Infection (cankers)	<ul style="list-style-type: none"> <li>An infection occurs on a live branch less than 60 cm from the stem.</li> </ul>	Pw, Pl, Py	white pine blister rust DSB, comandra blister rust DSC, stalactiform blister rust DSS.	
Branch	Galls	<ul style="list-style-type: none"> <li>A gall rust infection occurs on a live branch less than 5 cm from the stem.</li> </ul>	Pl, Py	western gall rust DSG.	
Foliage	Defoliation	<ul style="list-style-type: none"> <li>&gt;60% tree foliage has been removed by hemlock looper</li> </ul>	Hw	Hemlock looper IDL	
		<ul style="list-style-type: none"> <li>&gt; 80% of foliage has been removed, lost or damaged due to insect defoliation.</li> </ul>	All other	defoliators ID	
		<ul style="list-style-type: none"> <li>&gt; 50% of foliage has been removed, lost or damaged due to foliar disease.</li> </ul>	All	foliage diseases DF	
Foliage	Live Crown Vigour	<ul style="list-style-type: none"> <li>&lt;30% live crown present due to poor vigour.</li> </ul>			Percent live crown is the length of continuous green foliage on a tree expressed as a percentage of its total height.
Stem or Branch	Adelgid Gouting	<ul style="list-style-type: none"> <li>Any adelgid <b>gouting</b> occurs on a stem or branch.</li> </ul>	Ba, Bg, Bl	balsam woolly adelgid IAB.	<b>Gouting</b> is defined as excessive swelling on a branch or shoot caused by balsam woolly adelgid, and is often accompanied by misshapen needles and buds. It is most common on branch tips and at nodes near the ends of branches. Consult a recent distribution map to identify the geographic extent of this pest.
Stem or Branch	Dwarf Mistletoe Infection	<ul style="list-style-type: none"> <li>Any infection occurs on the stem or a live branch, or</li> <li>A susceptible tree is located within 10 m of the bole of a higher layer tree that is infected with dwarf mistletoe.</li> </ul>	Hw	hemlock dwarf mistletoe DMH	<b>Note:</b> To confirm infection, the surveyor must observe mistletoe aerial shoots or basal cups on regeneration or on live or dead fallen brooms.

Location of Damage	Type of Damage	Tree being assessed is UNACCEPTABLE if:	Host Species	Possible damage agents & codes	Comments
Roots	Root Disease	<ul style="list-style-type: none"> <li>Sign(s) or definitive combinations of symptoms of root disease are observed</li> </ul>	All	armillaria root disease DRA, laminated root rot DRL, annosus root disease DRN.	<b>Signs</b> are direct evidence of the pathogenic fungus including fruiting bodies, distinctive mycelium or rhizomorphs. <b>Symptoms</b> include foliar thinning or chlorosis, pronounced resin flow near the root collar, reduced recent leader growth, a distress cone crop, and wood decay or stain. Symptoms alone are not usually sufficient to identify root disease. Both signs and symptoms may be detected from old stumps, root balls, or other post-harvest remains.
		<ul style="list-style-type: none"> <li>Infected conifer or stump found in plot. See <b>Table Y</b> for well-spaced tree net down calculation by layer.</li> </ul>	All	armillaria root disease DRA.	<b>Example:</b> How to apply net down for root disease. If root disease-infected trees are found in the plot: 4. Determine the number of healthy, well-spaced trees in each layer using the prescribed minimum inter-tree distance (MITD) (e. g., 3 layer 1, 3 layer 3 and 4 layer 4 = 10 healthy, well-spaced) ignoring the M-value; 5. Count the number of infected trees (e. g., 1 layer 1 tree and 1 layer 3 tree); 6. Working from the uppermost layer down, apply the multiplier in Table Y to each lower layer. Subtract the resultant from each layer in turn, for susceptible species only (e. g., if all trees are susceptible, 1 infected layer 1 tree removes 1 healthy, well-spaced layer 1 tree plus 3 layer 3 trees plus 4 layer 4 trees). Note the effects are cumulative, not exclusive and lower layers do not affect higher layers; Calculate the remaining healthy, well-spaced trees once all removals due to infected trees are completed (e. g. 10 – 8 = 2). The result is the maximum number of free growing trees tallied for the plot.
		<ul style="list-style-type: none"> <li>Infected conifer or stump found in plot. See <b>Table Y</b> for well-spaced tree net down calculation by layer.</li> </ul>	Fd, Ba, Bg	laminated root rot DRL.	<b>Note:</b> Bl, Cw, Pl, Pw, and broadleaf species are considered <b>not susceptible</b> for survey purposes only
		<ul style="list-style-type: none"> <li>Infected conifer or stump found in plot. See <b>Table Y</b> for well-spaced tree net down calculation by layer.</li> </ul>	Ba, Hw, Ss	annosus root rot DRN.	<b>Note:</b> Bg, Bl, Cw, Cy, Fd, Hm, Pl, Pw, and broadleaf species are considered <b>not susceptible</b> for survey purposes only.

Appendix AA
Damage Types



Instructions

Step 1

Divide live crown into thirds.

Step 2

Rate each third separately. Each third should be given a rating of 0, 1, or 2 as described below:

(0) no visible infections

(1) light infection (1/2 or less of total number of branches in the third infected)

(2) heavy infection (more than 1/2 total number of branches in the third infected).

Step 3

Add ratings of thirds to obtain rating for total tree.

Example

If this third has no visible infections, its rating is (0).

If this third is lightly infected, its rating is (1).

If this third is heavily infected, its rating is (2).

The tree in this example gets a rating of: 0 + 1 + 2 = 3.

Figure 4. The Hawksworth six-class dwarf mistletoe rating system.

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## 1.5 SEDRSS Methodologies – Two Options: 1) SEDRSS DFP or 2) SEDRSS Tabular

### 1.5.1 Background - DFP Concept – (Note: This section is only for Silv. Survey manual)

The Deviation From Potential (DFP) method of stocking assessment recognizes two stand components: overstorey trees - those trees greater than a designated DBH (e.g., 12.5cm) - and understory trees, those less than the designated diameter. The DFP method focuses on the future yield from the understory component. The underlying concept is that understory yield varies based on understory density and the amount of overstorey.

To calibrate the concept, Martin et al (2005)<sup>1</sup> used TIPSy and TASS to relate understory density to future yield. Without an overstorey, as understory density increases, future yield increase rapidly and then level off. Predictions from TASS and other published research on the growth impact of retained overstorey were used to relate overstorey basal area to understory yield reduction. With increased overstorey basal area, understory yield potential decreases.

The DFP combines the two relationships providing future understory yield over a range of understory density and overstorey basal area. Since the DFP is constructed from these fundamental relationships, it provides a solid biological basis for stocking assessments and standards.

Deviation From Potential ranges from 0 to 1. A DFP of 0 at a sample point indicates that the sample point is fully stocked - that is there is no additional space available for added stocking at that point. At the other end of the spectrum a DFP of 1 (or 100%) indicates the point has no stocking and has a 100% deviation from the potential.

This concept is a significant departure from historic forest stocking evaluation processes. Two implementation protocols are presented for SEDRSS to aid in clarifying the concept. Evaluation and survey approaches are presented based on either 1) the **DFP** model or 2) the **Tabular** integrated approach. These alternative approaches are presented to show how the stocking standard could be developed for an FSP submission. The working group members and resource specialists involved in the design and testing of this protocol strongly recommend forest professionals adopt option 2, the **Tabular** approach. Of the two methodologies the Tabular approach is considered as being the most accurate and practical methodology for use within a Forest Stewardship Plan.

### 1.5.2 Common Methodologies for Options 1) and 2)

#### 1.5.2.1 Survey Design

- **Pre-stratification:** Identify the areas suitable for SEDRSS as per the criteria listed in Section 1.0
- **Plots:** Establish 1 plot per ha within SU (stratum) or a minimum of 5 plots per SU (stratum).

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<sup>1</sup> Martin, P.J., Bancroft, B., Day, K., and Peel, K. 2005. A new basis for understory stocking standards for partially harvested stands in the British Columbia Interior. West. J. Appl. For. 20(1): 5–12.



- **Plot Size:** To tally understory stems use a 3.99m. or 5.64m. radius plot depending on stand condition. Use the same plot size throughout the entire SU.
- **Prism size:** Choose a prism that captures a minimum of 4 trees per plot from the pre-harvest condition (in cut areas this would be a combination of standing trees and stumps).

### 1.5.2.2 RESULTS Entry

The *RESULTS Information Submission Specifications* document has a recent supplement document (dated July 28, 2010) called - *Procedures for Submitting Forest Cover to RESULTS for Openings with Treed Retention*. This document clearly provides the content requirements for reporting SU's with Dispersed and Grouped Tree Retention.

Basically, the reporting of Polygon, Inventory and Silviculture components are the same as reporting an even-aged clear cut stand with  $< 5\text{m}^2$  of RBA, *except* for the following additional information:

1. Polygon Component
  - a. Reserve Type: Enter **Dispersed**.
  - b. Reserve Objective: Enter **TIM** (for timber objective, for the retained stems are contributing to the stocking and the next harvest).
  - c. Tree Cover Pattern: Enter the **Tree Cover Pattern Number** for the pattern observed and recorded on the field card that best represented the pattern of the layer 1 residuals.
2. Inventory Component
  - a. Layers: Report for layers 1 and individually for all other regen layers – layer 2, 3, and 4, as explained in the data summary section below.
  - b. Basal Area: Enter the **Total BA  $\text{m}^2/\text{ha}$**  value (including crop and non-crop stems) for the Residual Layer – *but not just the Crop BA*.
3. Silviculture Component
  - a. Layers: As for the Inventory Component, report for layers 1 and individually for all other regen layers – layer 2, 3, and 4, as explained in the data summary section below.
  - b. Well-spaced or Free Growing: Enter the mean WS or FG/ ha. value from the summary data (Whichever is being reported).
  - c. Free Growing: Enter the mean FG / ha. value from the summary data.
  - d. Basal Area: enter the **Crop BA  $\text{m}^2/\text{ha}$**  value for the Residual Layer – *not the total BA as for the Inventory Label*.
4. Add Comments regarding SEDRSS use
  - a. In the comments field next to a milestone declaration, include a comment on the SEDRSS methodology used. Specifically for the SEDRSS DFP method, include the mean DFP value and the % stocking classes.

### 1.5.2.3 Entry of SEDRSSs into the FSP Tracker System

All Stocking Standards approved in the Forest Stewardship Plan (FSP), including SEDRSS, need to be entered into the FSP Tracking System (FSPTS) so that they can be accessible to RESULTS. Available options to enter the SEDRSS into the FSPTS are provided as guidance within appendix 2. .

## 1.5.3 Option 1) SEDRSS DFP - Survey Sampling Procedures

This approach uses the DFP table (developed for the interior by Martin 2005) solely as the basis for the stocking decision. The resultant DFP derived from the Dispersed Retention BA and present understorey stocking levels at each plot produces an averaged DFP value for the SU, which must meet a standards threshold value. In addition three other thresholds must be met by the SU in order to achieve the obligation (a threshold percent of the plots in each stocking class of the DFP table must be met - refer to the decision table below).

### 1.5.3.1 Field Survey

- **Measurements:** Determine the Dispersed Retention BA per plot and assess regen stocking using criteria for WS stems from the stocking standard. Use the overstorey crop trees BA only, and tally non crop BA separately. The non crop tally may be used to identify the need for additional harvesting if non crop trees are found to be fully occupying the site. In some cases the stand may have been dominated by trees of non crop status and this should be identified prior to assessment to address what should be tallied.
  - **Plot card data field modifications (use of modified FS 658 – Example shown in Figure 1 - *without the WS and FG M values*):**
  - **Data Collection procedures (using the modified FS 658 above):**
    - Set up the card similar as one would while collecting data for a multi-storey or a layered even-aged survey (i.e. one row for each layer 1 and then another line for understorey /regen – layers 2, 3 and 4 combined)
  - **Tally of Residual Overstorey Layer 1**
    1. Start with tallies for **Residual Layer 1** in the first row:
      - a. **Layer 1** = all stems  $\geq 12.5$  cm. DBH
      - b. **TT** and **TC**;
      - c. **Number of Crop stems by species** (all stems are recorded, for there is no MITD)
      - d. in GI column record **Total # in sweep** regardless if crop or non-crop stem;
      - e. in the plantable/in column record **Crop #in sweep**;
      - f. in the preparable column record **Crop BA** (crop # in sweep x BAF)
      - g. Record the DFP for that plot using the DFP table below (a copy of this table is required to be included in the surveyors note book or loaded in their handheld program).
    2. Record Tree Cover Pattern during the full survey data collection. **Estimate** the overall Tree Cover Pattern for the SU being surveyed, based on the diagram in Section 9.3.4.1 of the

Silviculture Survey Manual. Write the corresponding Tree Cover Pattern number in the comments section of the FS 658.

- **Tally of Regeneration Understorey Layers 2, 3 and 4**

1. Tally the remaining **Regeneration Layers 2, 3 and 4** in separate rows below layer 1's row (no nesting of Layers, but use drip line MITD from **ALL layer 1 stems regardless if Crop or Non-Crop trees or inside or outside of the plot (influence layer 1 trees are considered)** – and use MITD from the FSP for all other trees between layers 2, 3 and 4):
  - a. **TT and TC** for each regeneration layer;
  - b. **Number of WS stems by species** in the preferred and acceptable species columns relative to MITD criteria;
  - c. In the total W column total **all WS per each Regeneration Layer for all species**;
  - d. In the total FG column total **all FG per each Regeneration Layer for all species**;
2. Tally **Plantable Spots, Preparable Spots and Competing Vegetation** as regular surveys for each Regeneration Layer row and tally **Forest Health Agents** as regular surveys for each Regeneration Layer.

- **Record Inventory Label Data**

- An **Inventory Label** is recorded every 1<sup>st</sup> and 4<sup>th</sup> plot as regular surveys for each layer. This can be located at the bottom of the FS 658 comprised of a line per layer 1 and a line for each regen layer. If the leading species changes per layer, additional leading species can be listed in the additional inventory table to the right.
- The best way to estimate **Site Index** for SEDRSS stands is to use the SIBEC methodology – accessible from the following [SIBEC website](#) . Specifically the 1<sup>st</sup> approximation SIBEC (if available for the site series) would be best used for the Layer 1 overstorey SI and the 2<sup>nd</sup> approximation SIBEC for the other Layers in the understorey labels.

**NOTE:** The 1<sup>st</sup> approximation **SIBEC Site Indexes** are identifiable by the listing of **WHOLE** numbers with no decimal places and no Standard Error (SE) value in the SIBEC Table for the species and sites series referenced. In contrast, the 2<sup>nd</sup> approximation SIBEC Site Indexes are identifiable by the listing of **FRACTIONS** with decimal places and SE values in the SIBEC Table for the species and sites series referenced.

### 1.5.3.2 Data Summary

The field survey results are tallied and the following thresholds are calculated:

1. **The average DFP value** from all individual plots.
2. **The percent of the total plots established per stocking class** from the plot data and a value generated for each class – stocked; partial stocked; and open.
3. **Inventory and Silviculture Labels** will be generated for **Layer 1** and individually for all other regen layers – **Layer 2, 3, and 4**. The Inventory Label will be generated from the data collected in the field every 1<sup>st</sup> and 4<sup>th</sup> plot for total species %, crown closure and from the mean TT summary for all layers. The Silviculture Label will be generated from the tally totals for WS and FG values and species percentages.

### 1.5.3.3 Stocking Decision

The SU is found to have met its **Regen Obligation or Free Growing Obligation** if the following table's criteria have been met.

**Table 2: DFP Regen and FG Obligation Criteria**

DFP Threshold Value	Obligation Standard
Average DFP	0.32 or less
Proportion of plots in “open” class (shaded red on DFP table)	$\leq 25\%$

**Table 3: DFP COASTAL 2013 version 2 \*- Basal Area and WS/ha.** (Note: 1. Guidance for this table application is only recommended for cedar/ hemlock stands of SI<sub>50</sub> for Cw between 18 to 30m; if used below SI 18, provide rationale; 2. Red shaded areas are “open” and green shaded are “stocked” categories).

BA of Overstorey crop trees ≥ 12.5 cm dbh	Understorey density – well spaced sph.												
	0	100	200	300	400	500	600	700	800	900	1000	1200	1400
0	1.00	0.81	0.65	0.51	0.41	0.32	0.25	0.20	0.15	0.12	0.09	0.05	0.03
1	0.98	0.79	0.63	0.50	0.40	0.31	0.25	0.19	0.15	0.12	0.09	0.05	0.03
2	0.95	0.77	0.62	0.49	0.39	0.31	0.24	0.19	0.15	0.11	0.09	0.05	0.02
3	0.93	0.75	0.60	0.48	0.38	0.30	0.23	0.18	0.14	0.11	0.08	0.05	0.02
4	0.90	0.73	0.59	0.46	0.37	0.29	0.23	0.18	0.14	0.11	0.08	0.05	0.02
5	0.88	0.71	0.57	0.45	0.36	0.28	0.22	0.17	0.13	0.10	0.08	0.04	0.02
6	0.85	0.69	0.55	0.44	0.35	0.27	0.22	0.17	0.13	0.10	0.08	0.04	0.02
7	0.83	0.67	0.54	0.43	0.34	0.27	0.21	0.16	0.13	0.10	0.08	0.04	0.02
8	0.80	0.65	0.52	0.41	0.33	0.26	0.20	0.16	0.12	0.10	0.07	0.04	0.02
9	0.78	0.63	0.50	0.40	0.32	0.25	0.20	0.15	0.12	0.09	0.07	0.04	0.02
10	0.76	0.61	0.49	0.39	0.31	0.24	0.19	0.15	0.12	0.09	0.07	0.04	0.02
11	0.73	0.59	0.47	0.38	0.30	0.24	0.18	0.14	0.11	0.09	0.07	0.04	0.02
12	0.71	0.58	0.46	0.36	0.29	0.23	0.18	0.14	0.11	0.08	0.06	0.04	0.02
13	0.69	0.56	0.45	0.35	0.28	0.22	0.17	0.14	0.11	0.08	0.06	0.04	0.02
14	0.67	0.54	0.43	0.34	0.27	0.21	0.17	0.13	0.10	0.08	0.06	0.03	0.02
15	0.64	0.52	0.42	0.33	0.26	0.21	0.16	0.13	0.10	0.08	0.06	0.03	0.02
16	0.62	0.51	0.40	0.32	0.25	0.20	0.16	0.12	0.10	0.07	0.06	0.03	0.02
17	0.60	0.49	0.39	0.31	0.25	0.19	0.15	0.12	0.09	0.07	0.05	0.03	0.02
18	0.58	0.47	0.38	0.30	0.24	0.19	0.15	0.12	0.09	0.07	0.05	0.03	0.02
19	0.56	0.46	0.37	0.29	0.23	0.18	0.14	0.11	0.09	0.07	0.05	0.03	0.01
20	0.55	0.44	0.35	0.28	0.22	0.18	0.14	0.11	0.08	0.06	0.05	0.03	0.01
21	0.53	0.43	0.34	0.27	0.21	0.17	0.13	0.10	0.08	0.06	0.05	0.03	0.01
22	0.51	0.41	0.33	0.26	0.21	0.16	0.13	0.10	0.08	0.06	0.05	0.03	0.01
23	0.49	0.40	0.32	0.25	0.20	0.16	0.12	0.10	0.08	0.06	0.04	0.03	0.01
24	0.48	0.39	0.31	0.24	0.19	0.15	0.12	0.09	0.07	0.06	0.04	0.02	0.01
25	0.46	0.37	0.30	0.24	0.19	0.15	0.12	0.09	0.07	0.05	0.04	0.02	0.01
26	0.44	0.36	0.29	0.23	0.18	0.14	0.11	0.09	0.07	0.05	0.04	0.02	0.01
27	0.43	0.35	0.28	0.22	0.17	0.14	0.11	0.08	0.07	0.05	0.04	0.02	0.01
28	0.41	0.34	0.27	0.21	0.17	0.13	0.10	0.08	0.06	0.05	0.04	0.02	0.01
29	0.40	0.32	0.26	0.21	0.16	0.13	0.10	0.08	0.06	0.05	0.04	0.02	0.01
30	0.39	0.31	0.25	0.20	0.16	0.12	0.10	0.08	0.06	0.05	0.04	0.02	0.01
31	0.37	0.30	0.24	0.19	0.15	0.12	0.09	0.07	0.06	0.04	0.03	0.02	0.01
32	0.36	0.29	0.23	0.19	0.15	0.12	0.09	0.07	0.06	0.04	0.03	0.02	0.01
33	0.35	0.28	0.22	0.18	0.14	0.11	0.09	0.07	0.05	0.04	0.03	0.02	0.01
34	0.34	0.27	0.22	0.17	0.14	0.11	0.08	0.07	0.05	0.04	0.03	0.02	0.01
35	0.32	0.26	0.21	0.17	0.13	0.10	0.08	0.06	0.05	0.04	0.03	0.02	0.01
36	0.31	0.25	0.20	0.16	0.13	0.10	0.08	0.06	0.05	0.04	0.03	0.02	0.01
37	0.30	0.24	0.19	0.15	0.12	0.10	0.08	0.06	0.05	0.04	0.03	0.02	0.01
38	0.29	0.24	0.19	0.15	0.12	0.09	0.07	0.06	0.04	0.03	0.03	0.01	0.01
39	0.28	0.23	0.18	0.14	0.11	0.09	0.07	0.06	0.04	0.03	0.03	0.01	0.01
40	0.27	0.22	0.17	0.14	0.11	0.09	0.07	0.05	0.04	0.03	0.02	0.01	0.01

\*(The development of this new 2013 table involved growth models assuming Cw and Hw overstorey and understorey; SI 24 of the overstorey and a rotation of 100 years.)

# 1.5.4 Option 2) SEDRSS Tabular - Survey Sampling Procedures

This approach integrates the overstorey and understorey aspects of the DFP approach and presents them in a tabular format. The working group members and resource specialists involved in the design and testing of this protocol strongly recommend that forest professionals adopt the **Tabular** approach. Of the two methodologies, the tabular approach is considered as being the most accurate and practical for use within a Forest Stewardship Plan.

The DFP Table has been consolidated by grouping basal area (BA) and listing the density groups into a table (an example is shown below in Table 4). The tabular format is designed to match as close as possible, the current stocking standard tables found in the MFR publication titled: Reference Guide to FDP Stocking Standards – at the following link:  
[http://www.for.gov.bc.ca/ftp/hfp/external/!publish/Stocking%20Standards%20for%20FDPs/Reference\\_Guide.xls](http://www.for.gov.bc.ca/ftp/hfp/external/!publish/Stocking%20Standards%20for%20FDPs/Reference_Guide.xls)

Target and minimum Well Spaced (WS) density standards are listed for each BA grouping in the table. These values were derived from the original DFP table and correspond to the open and stocked threshold lines used in the DFP approach above. The primary difference in using this Tabular approach versus the DFP approach above is the concept of a maximum (**M value**) for BA and for target WS stems. For example, if the maximum overstorey BA is set at 40 m<sup>2</sup>/ha, for a plot with more than 40 m<sup>2</sup>/ha, the value would be capped at 40 m<sup>2</sup>/ha with the understory contributing “0” WS. Correspondingly, the WS density has an **M** value depending on the BA grouping.

The intention is for FSP licensees to develop stocking standard tables’ **specific** to their coastal BEC Subzones and site series (or grouping of site series) for Single Entry Dispersed Retention management regimes.

**Table 4: SEDRSS Tabular Method (derived from the DFP Table – table 3) - COASTAL 2013**  
 Showing grouped BA Categories and corresponding MSS (red) threshold and TSS (green) threshold.  
 (Note: The red shaded area is the MSS threshold & less; the green shaded area is the TSS & more; the grey shaded area is the management area in-between the MSS and TSS thresholds)

BA of Overstorey crop trees ≥ 12.5 cm dbh	Understorey density – well spaced sph.												
	0	100	200	300	400	500	600	700	800	900	1000	1200	1400
0	1.00	0.81	0.65	0.51	0.41	0.32	0.25	0.20	0.15	0.12	0.09	0.05	0.03
1	0.98	0.79	0.63	0.50	0.40	0.31	0.25	0.19	0.15	0.12	0.09	0.05	0.03
2	0.95	0.77	0.62	0.49	0.39	0.31	0.24	0.19	0.15	0.11	0.09	0.05	0.02
3	0.93	0.75	0.60	0.48	0.38	0.30	0.23	0.18	0.14	0.11	0.08	0.05	0.02
4	0.90	0.73	0.59	0.46	0.37	0.29	0.23	0.18	0.14	0.11	0.08	0.05	0.02
5	0.88	0.71	0.57	0.45	0.36	0.28	0.22	0.17	0.13	0.10	0.08	0.04	0.02
6	0.85	0.69	0.55	0.44	0.35	0.27	0.22	0.17	0.13	0.10	0.08	0.04	0.02
7	0.83	0.67	0.54	0.43	0.34	0.27	0.21	0.16	0.13	0.10	0.08	0.04	0.02
8	0.80	0.65	0.52	0.41	0.33	0.26	0.20	0.16	0.12	0.10	0.07	0.04	0.02
9	0.78	0.63	0.50	0.40	0.32	0.25	0.20	0.15	0.12	0.09	0.07	0.04	0.02
10	0.76	0.61	0.49	0.39	0.31	0.24	0.19	0.15	0.12	0.09	0.07	0.04	0.02
11	0.73	0.59	0.47	0.38	0.30	0.24	0.18	0.14	0.11	0.09	0.07	0.04	0.02
12	0.71	0.58	0.46	0.36	0.29	0.23	0.18	0.14	0.11	0.08	0.06	0.04	0.02
13	0.69	0.56	0.45	0.35	0.28	0.22	0.17	0.14	0.11	0.08	0.06	0.04	0.02
14	0.67	0.54	0.43	0.34	0.27	0.21	0.17	0.13	0.10	0.08	0.06	0.03	0.02
15	0.64	0.52	0.42	0.33	0.26	0.21	0.16	0.13	0.10	0.08	0.06	0.03	0.02
16	0.62	0.51	0.40	0.32	0.25	0.20	0.16	0.12	0.10	0.07	0.06	0.03	0.02
17	0.60	0.49	0.39	0.31	0.25	0.19	0.15	0.12	0.09	0.07	0.05	0.03	0.02
18	0.58	0.47	0.38	0.30	0.24	0.19	0.15	0.12	0.09	0.07	0.05	0.03	0.02
19	0.56	0.46	0.37	0.29	0.23	0.18	0.14	0.11	0.09	0.07	0.05	0.03	0.01
20	0.55	0.44	0.35	0.28	0.22	0.18	0.14	0.11	0.08	0.06	0.05	0.03	0.01
21	0.53	0.43	0.34	0.27	0.21	0.17	0.13	0.10	0.08	0.06	0.05	0.03	0.01
22	0.51	0.41	0.33	0.26	0.21	0.16	0.13	0.10	0.08	0.06	0.05	0.03	0.01
23	0.49	0.40	0.32	0.25	0.20	0.16	0.12	0.10	0.08	0.06	0.04	0.03	0.01
24	0.48	0.39	0.31	0.24	0.19	0.15	0.12	0.09	0.07	0.06	0.04	0.02	0.01
25	0.46	0.37	0.30	0.24	0.19	0.15	0.12	0.09	0.07	0.05	0.04	0.02	0.01
26	0.44	0.36	0.29	0.23	0.18	0.14	0.11	0.09	0.07	0.05	0.04	0.02	0.01
27	0.43	0.35	0.28	0.22	0.17	0.14	0.11	0.08	0.07	0.05	0.04	0.02	0.01
28	0.41	0.34	0.27	0.21	0.17	0.13	0.10	0.08	0.06	0.05	0.04	0.02	0.01
29	0.40	0.32	0.26	0.21	0.16	0.13	0.10	0.08	0.06	0.05	0.04	0.02	0.01
30	0.39	0.31	0.25	0.20	0.16	0.12	0.10	0.08	0.06	0.05	0.04	0.02	0.01
31	0.37	0.30	0.24	0.19	0.15	0.12	0.09	0.07	0.06	0.04	0.03	0.02	0.01
32	0.36	0.29	0.23	0.19	0.15	0.12	0.09	0.07	0.06	0.04	0.03	0.02	0.01
33	0.35	0.28	0.22	0.18	0.14	0.11	0.09	0.07	0.05	0.04	0.03	0.02	0.01
34	0.34	0.27	0.22	0.17	0.14	0.11	0.08	0.07	0.05	0.04	0.03	0.02	0.01
35	0.32	0.26	0.21	0.17	0.13	0.10	0.08	0.06	0.05	0.04	0.03	0.02	0.01
36	0.31	0.25	0.20	0.16	0.13	0.10	0.08	0.06	0.05	0.04	0.03	0.02	0.01
37	0.30	0.24	0.19	0.15	0.12	0.10	0.08	0.06	0.05	0.04	0.03	0.02	0.01
38	0.29	0.24	0.19	0.15	0.12	0.09	0.07	0.06	0.04	0.03	0.03	0.01	0.01
39	0.28	0.23	0.18	0.14	0.11	0.09	0.07	0.06	0.04	0.03	0.03	0.01	0.01
40	0.27	0.22	0.17	0.14	0.11	0.09	0.07	0.05	0.04	0.03	0.02	0.01	0.01

**Table 5: Example SEDRSS Tabular Method Coastal 2013 for CWHvh1 01 (based on table 4)**

		Regeneration Guide									Free Growing Guide	
		Species	Site Occupancy						Regen Delay (max yrs)	MITD		
BGCU	Layer		All BA combinations are applicable to survey plots								Species	Height (m)
			Only used during plots	One of these 4 BA combinations are applicable to final SU REGEN / FG SEDRSS obligations				Only used during plots				
CWH vh1 01	Residual Layer (L1) (≥12.5dbh) (BA m <sup>2</sup> /ha)	Cw, Hw, Cy, Pl	0-8 m <sup>2</sup> /ha	9-15 m <sup>2</sup> /ha	16-22 m <sup>2</sup> /ha	23-28 m <sup>2</sup> /ha	29-39 m <sup>2</sup> /ha	≥ 40 m <sup>2</sup> /ha	3	N/A	N/A	
	Regen Layer (L2-L4) (WS / ha. TSS – Target MSS - Minimum)	Cw, Hw, Cy, Pl	900 TSS 500 MSS	800 TSS 400 MSS	700 TSS 300 MSS	500 TSS 200 MSS	400 TSS 100 MSS	0 0	3	L1 Drip line or 2.0 m (L2-L4)	Cw,Yc,Pl Hw	1.5 2.0

#### 1.5.4.1 Field Survey

- **Measurements:** Determine BA per plot and assess regen stocking using the obligation criteria for WS and/or FG stems from stocking standard (Insure to reference all possible BA range columns regardless of the level of dispersed retention – for all ranges can be present within any Stratum being sampled – but overall the resultant average BA for the Stratum will be within one level of dispersed retention – Moderate or High).
  - **Plot card data field modifications (use of modified FS 658 – Example shown in Figure 1 ):**
    1. Within Column Heading Boxes across the top of the data entry section, modify: Count Conifer column to **TSS**; Count Height to **MSS**
  - **Data Collection procedures (using the modified FS 658 above):**
    2. Set up the card similar as one would while collecting data for a multi-storey or a layered even-aged survey (i.e. one row for each layer 1 and then another line for understorey /regen – layers 2, 3 and 4 combined)
  - **Tally of Residual Overstorey Layer 1**
    3. Start with tallies for **Residual Layer 1** in the first row:
      - a. **Layer 1** = all stems ≥ 12.5 cm. DBH
      - b. **TT** and **TC**;
      - c. **Number of Crop stems by species** (all stems are recorded, for there is no MITD)



- d. in GI column record **Total # in sweep** regardless if crop or non-crop stem;
  - e. in the plantable/in column record **Crop # in sweep**;
  - f. in the preparable column record **Crop BA** (crop # in sweep x BAF)
4. Using Crop BA determined above and the DFP tabular table, enter the **TSS M value and MSS M value** for the plot in the columns as modified above (example: If using a 5.64 m radius plot [1/100 ha.], and the BA is 20 m<sup>2</sup>, then the TSS is 400 or 4 M value and MSS is 200 or 2 stems per plot). Note: Cap determination of BA at 40 m<sup>2</sup> when entering plot data – i.e. if 50m<sup>2</sup> recorded in plot, 40 m<sup>2</sup> is entered.
  5. Record Tree Cover Pattern during the full survey data collection. **Estimate** the overall Tree Cover Pattern for the SU being surveyed, based on the diagram in Section 9.3.4.1 of the Silviculture Survey Manual. Write the corresponding Tree Cover Pattern number in the comments section of the FS 658.
- **Tally of Regeneration Understorey Layers 2, 3 and 4**
    6. Tally the remaining **Regeneration Layers 2, 3 and 4** in separate rows below layer 1's row (no nesting of Layers, but use drip line MITD from *ALL layer 1 stems regardless if Crop or Non-Crop trees or inside or outside of the plot - influence layer 1 trees are considered* – and use the MITD from the table or FSP for all other trees between layers 2, 3 and 4):
      - a. **TT** and **TC** for each regeneration layer;
      - b. **Number of WS stems by species** in the preferred and acceptable species columns relative to MITD criteria;
      - c. In the total W column total **all WS per each Regeneration Layer for all species**, if the sum exceeds the M value for that plot, enter the **M value**;
      - d. In the total FG column total **all FG per each Regeneration Layer for all species**, if the sum exceeds the M value for that plot, enter the **M value**;
    7. Tally **Plantable Spots, Preparable Spots and Competing Vegetation** as regular surveys for each Regeneration Layer row and tally **Forest Health Agents** as regular surveys for each Regeneration Layer.
  - **Record Inventory Label Data**
    1. An **Inventory Label** is recorded every 1<sup>st</sup> and 4<sup>th</sup> plot as regular surveys for each layer. This can be located at the bottom of the FS 658 comprised of a line per layer 1 and a line for each regen layer. If the leading species changes per layer, additional leading species can be listed in the additional inventory table to the right.
    2. The best way to estimate Site Index for SEDRSS stands is to use the SIBEC methodology. Specifically the 1<sup>st</sup> approximation SIBEC (if available for the site series) would be best used for the layer 1 overstorey SI and the 2<sup>nd</sup> approximation SIBEC for the other layer understorey labels.

[illegible]

The field survey results are tallied and the mean calculated using the following test steps:

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### 1.5.4.3 Stocking Decision

The SU is found to have met its **Regen Obligation or Free Growing Obligation** if:

5. **the mean Regen or FG sph**  $\geq$  **the MSS sph**  
for the corresponding **Average Crop BA** from the table.

# Appendix 1: Field Guidance Procedures for the Estimation of Cw Merchantable Volume

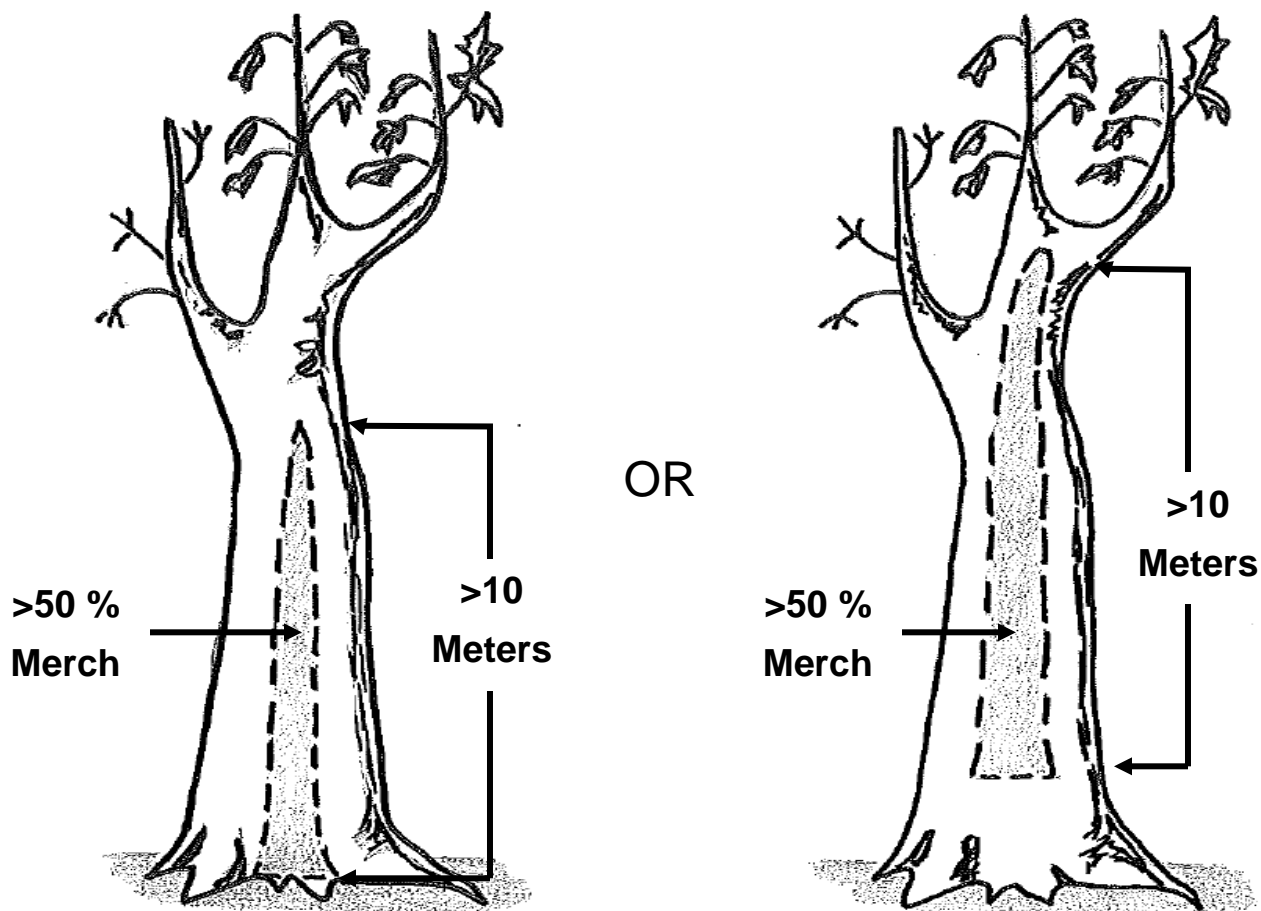
## 1.0 Cw Stem Merchantability Criteria

**Criteria Definition:** A Cw tree being assessed is Unacceptable as a contributing Crop Tree if –

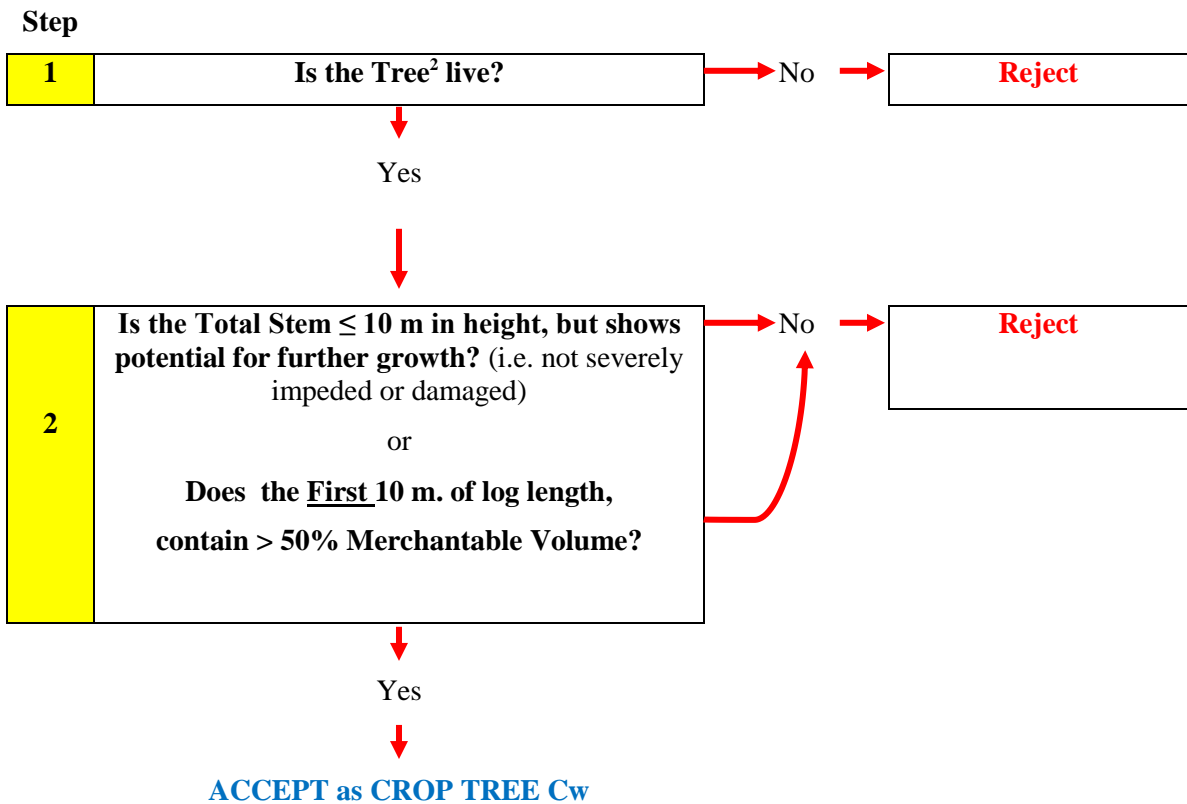
*-unable to produce > 50% Merchantable Volume in the first 10 m. of log length, either:*

1. Utility Grade – At least a solid 8 inch shell – Shake and Shingle and /or
2. Higher Grade – Complete solid wood – Saw Logs

**Figure 2: Visual Graphic Examples of Cw Stem Merchantability Criteria**



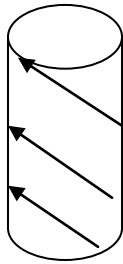
## 2.0 Suggested Assessment Key Steps



<sup>2</sup> Live tree means a tree has at least 1 live branch with green foliage.

### 3.0 Significant Visible Defect Indicators - Representing Unmerchantable Conditions

1. Significant Butt Rot as to produce a complete “see through gap” in the flared butt of a Cw – above the root collar.
2. Woodpecker Holes around the complete circumference of the first and second 10 m. length of the stem.
3. Excessive Grain Twist to the Left<sup>3</sup> for the entire first and second 10 m. length of the stem.




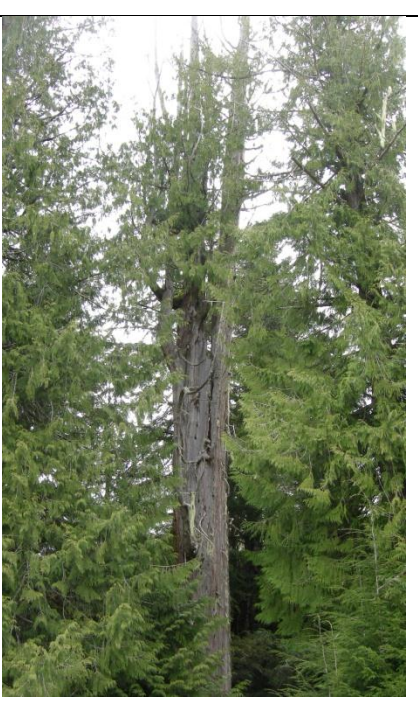
4. Large Branches  $\geq$  the diameter of sound bole wood around the complete circumference of the first and second 10 m. length of the stem.
5. Excessive Sun Check on “grey ghost” upper segment of dead top on a Cw – for sun checks will penetrate twice the visible distance into sound wood to create unacceptable splitting.

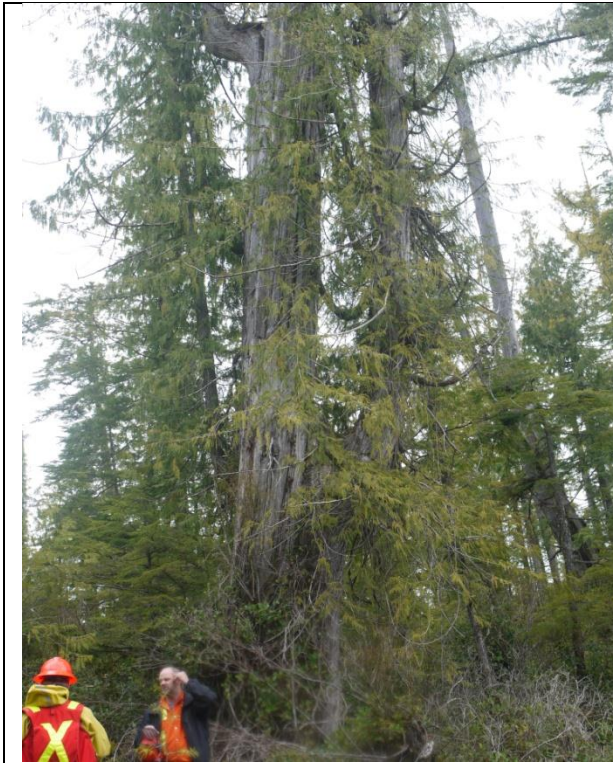
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<sup>3</sup> Twist to the left extends into the heartwood significantly degrading the log quality and value.

## 4.0 Example Photos of Acceptable and Unacceptable Cw Trees

### Acceptable Cw Trees

		<p><b><u>Acceptable Butt Rot</u></b></p> <p>Note: Butt rot does not extend completely through the tree.</p>
		<p><b><u>Acceptable Forking and Form</u></b></p> <p>Live tree with first 10 meters containing &gt; 50 % merchantable volume</p>



### **Live Tree**

First 10 meter log shows contains > 50 % merchantable volume

## **Unacceptable Cw trees**



### **Catface and Live Fork**

First and second 10 meters of stem contain < 50 % merchantable volume due to large catface.



# Appendix 2: Guidance for Stocking Standard IDs and Entry of SEDRSS into the FSP Tracker

## 1.0 TABULAR APPROACH: Step by Step Procedure – using an Example Scenario

**Intent and Concept:** Develop and enter only a few of the most common site series for SEDRSS within a biogeoclimatic zone that a licensee will likely use most frequently. Do not enter all possible combinations into the FSP tracker as it is time consuming and results in the creation of Stocking Standard Identification (SSID) numbers that will likely never be used operationally and will only serve to clog the system.

Recommended to choose one biogeoclimatic zone variant, one or two site series, and one Basal Area grouping **from which all other possible combinations will be developed from using the Approved Variation method.** These base standards are the key for further adjustments to a SU's final standard. As long as all of the potential resultant standards are contained in a SEDRSS table in the approved FSP – i.e. for all subzone variants, site series, ecologically suitable species, basal area groups and original even-aged Target and Minimum stocking standard combinations (like 900 – 500 sph and 800 – 400 sph respectively).

### **For Example:**

**Step 1 – Initial FSPT Entry:** One may choose to enter and fully develop the CWH vh1 01 for the Basal Area (BA) grouping of 16-22 m<sup>2</sup>/ ha and the corresponding Target and Minimum stocking standard of 700 and 300 sph respectively, from the SEDRSS Tabular method on Table 5 of this document as a default. While surveying in the field, all BA groupings approved in the FSP apply at the plot level. Generally, it is typical for this operating area example to have a post harvest basal area contributing to stocking that ranges between 16 and 22 m<sup>2</sup>/ha. BA, therefore this is the initial values entered.

Note, that only one value can be entered into the FSPT, therefore the mid-point for the grouping must be used. In this case it would be 18 m<sup>2</sup>.

It is critical to ensure that all stocking standard fields (e.g., species, well spaced, MITD, etc) are populated within the FSP tracking system by layer so this data will be available for use within RESULTS. Please refer to SSID #1045857 for SEDRSS as an example.

**Step 2 – Post – harvest Field Assessment:** Following a complete survey of the block for the assessment of the stocking (usually around year 2), the regeneration obligation is determined by the amount of residual BA contributing to stocking. In this example, there is currently 25 m<sup>2</sup>/ha of residual basal area contributing to stocking obligations, and therefore a modification has to be made, as per the next step

**Step 3 – Approved Variation Modification in RESULTS:** An opening definition in RESULTS has already been created and it is in the Standard Unit (SU) tab where the regime for the CWHvh1 01 SEDRSS is established – Note: the 16-22 m<sup>2</sup>/ha BA has already been applied. Now, an adjustment is required to this approved SEDRSS regime at the SU level, to reflect the actual post harvest BA and corresponding Target and Minimum standards. The functionality is at the bottom of the SU screen, simply “click” on the Approved Variation button.

Once the approved variation has been pushed, proceed to update components of the stocking standards to comply with the approved FSP. In this example scenario, the SEDRSS regime is being changed from the combination BA 16 - 22 m<sup>2</sup> to 23 – 28 m<sup>2</sup>, due to 25 m<sup>2</sup> assessed in the field in Step 2 above. As well, the Target and Minimum standards have changed from 700 and 300 sph to 500 and 200 sph respectively.

It is also possible in other scenarios that the variant or site series may have to be changed, if the original base SEDRSS standard is not applicable relative to the field assessment data. As well, this may also require a change in ecologically suitable species. These are all possible at this time – as long as they comply again with the approved FSP SEDRSS combination table.

**Approved Variation Key Points:**

- Does not require District Manager approval as the regimes are already approved in an FSP;
- Submit only the SUs requiring approved variations (as opposed to all SUs), and include all attributes and spatial information for those SUs;
- Include a rationale within the approved variation submission (in the Rationale input box once the approved variation has been activated). Examples of rationale text are as follows:
  - basal area retained is higher than prescribed and includes standing waste based on the post harvest cruise;
  - severe wind-throw event and 50% less basal area prior to free growing that has been salvaged harvested reducing mature site occupancy;
  - more Hemlock Dwarf Mistletoe than anticipated, therefore less contributing over-story than prescribed; or
  - harvest volume removed greater than prescribed but overall objectives met. Less mature site occupancy and greater understory obligations created.
  - different variant and/or site series than default (e.g., CWHvh1 05 rather than 01).
  - modify data fields within generic stocking standard to match specific situation or circumstance (e.g., BGC zone, subzone, site series, and basal area grouping)Ensure all data fields are populated by layer. (for example, review example SSID# 1045857)
- This is a process with a final product; therefore all changes are auditable via SU History.
- When making changes to each of the required sections, **Save as you Go**. Modify any portion of the stocking standard as required to meet the required condition for the

approved variation. Select “Back” to finish Approved Variation for the SU. Repeat steps for Approved Variation to other SU’s for the same opening if required.

**Step 4 – Declaration in RESULTS:** Once the SU has been surveyed (either for the REGEN or FG milestone) using the SSID with SEDRSS Tabular method, report all of the required forest cover information into RESULTS, including residual BA for layer 1.

## **2.0 DFP APPROACH: - Step by Step Procedure**

**Step 1 – Initial FSPT Entry:** Using an existing SSID for the BEC variants and site series that are anticipated being used for the DFP SEDRSS method, submit the Stocking Standards for the SSID as they would be for even-aged standards into the FSPT. Then add within the **Additional Standards** column, a statement referencing the use of the current SEDRSS DFP standards and include the criteria for stocking and free growing obligation of:  $\leq .32$  DFP and  $\leq 25\%$  of Open Class Plots.

**Step 2 – Declaration in RESULTS – SEDRSS DFP in Comments:** Once the SU has been surveyed (either for the REGEN or FG milestone) using the SSID with SEDRSS DFP, report all of the required forest cover information into RESULTS, including residual BA for layer 1. Then include in the Comments section – starting with the acronym series “SEDRSS DFP”, include the actual DFP standard values for that SU – the DFP value and the % of plots in the Open Class.