Coastal Ecosystem Dispersed Retention Stocking Standards

Implementation Guide

Version 3.0

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1 STOCKING STANDARDS

1.1 Silvicultural System

Coastal Ecosystem Dispersed Retention Stocking Standards (CEDRSS[1]) are intended for coastal stands managed under a silvicultural system where both the retention and regeneration components contribute toward achieving the stocking obligation. These systems rely on dispersed retention, where individual trees or small, non-mappable[2] clumps of trees are retained across the harvest area to support specific management objectives. These stands are characterized by extended periods of tree cover, an irregular canopy structure, and an unmanaged mix of age classes over time.

CEDRSS is appropriate where dispersed retention is prescribed prior to harvest. While prescribing future harvest entries beyond the initial one is optional, the first entry must be described in sufficient detail to meet short-term stand structural goals and ensure that stocking obligations can be met.

Note: CEDRSS applies only to silvicultural systems with a regeneration obligation. It is not suitable for intermediate cuts where no regeneration obligation exists. In such cases, separate intermediate cut stocking standards must be developed.

1.2 Context

Before the development of CEDRSS, uneven-aged stocking standards were mainly applied to stands managed using a retention system with dispersed or mixed retention. However, the uneven-aged standards and corresponding multi-storied survey methods were developed for stands managed with an uneven-aged system, such as single tree selection, within the Interior Douglas-fir (IDF) biogeoclimatic zone. As a result, these standards were not suitable for coastal ecosystems or hybrid silvicultural systems.

In 2008, the Forest Practices Board (FPB) completed a special investigation titled *High Retention Harvesting and Timber Sustainability on the British Columbia Coast*. The FPB recommended:

> The Ministry of Forests and Range should require clear, achievable, and measurable up-front targets for post-harvest retention levels. Stocking standards should require the use of residual basal area ranges with compliance limits at both the lower and upper end. Some characterization of vigour and economic viability should be used to allow trees to contribute to stocking.

[1] Previously known as Single Entry Dispersed Retention Stocking Standards (SEDRSS).
[2] Non-mappable is < 0.1 ha.

Ultimately, retention stocking standards must be designed so they can be audited for compliance and monitored for effectiveness.

In response, the Coast Region Implementation Team developed CEDRSS and a corresponding survey methodology to address the structural complexity and regeneration limitations associated with dispersed retention silvicultural systems in coastal ecosystems.

1.3 Modelling and CEDRSS Development

Modelling was conducted across a range of overstorey basal area levels and understorey regeneration densities to support the development of dispersed retention stocking standards for two stand types:

- Old-growth western redcedar (Cw)–western hemlock (Hw) stands with a Cw site index (SI) of 18–30 metres (m).
- Second-growth[3] Douglas-fir (Fdc) leading stands with a Fdc SI of 24–36 m.

Refer to Appendix 1 for recommended CEDRSS tables for old-growth Cw/Hw stands (Table A-1.1) and for second-growth Fdc stands (Table A-1.2).

These standards may be cautiously applied to the same stand types in different developmental stages (e.g., mature or second-growth Cw/Hw, mature or old-growth Fdc), provided an approved variation under a FSP or WLP is in place and limits their application by area.

Further modelling will likely be required to support CEDRSS development for other stand types or site conditions. For assistance, contact silvsurveys@gov.bc.ca.

1.4 Implementation and Planning

Forest professionals intending to implement a silvicultural system with dispersed retention and apply the associated CEDRSS must begin planning early. Pre-harvest forest health and stand structure data must be collected to support a clear, defensible prescription. Adequate pre- and post-harvest stand structure data and summary tables must be prepared.

Note: CEDRSS is a stocking standard intended only for stands where dispersed retention is planned and prescribed prior to harvest. It is not to be used on sites with standing waste, nor should it be treated as a default post-harvest survey method.

Operational monitoring of CEDRSS projects on the coast indicates that implementation challenges are common, and additional oversight is often necessary to achieve prescription and stand structural objectives. Active harvest supervision is essential. Early involvement in tree

[3] Second-growth conifer stands are less than 141 years old for the purpose of CEDRSS.

selection—both removal and retention—is critical. Frequent site supervision during felling allows for timely corrective actions, such as removing forest health hazards or reducing basal area before fallers and equipment leave the site.

As experience with this system increases, a detailed pre-work meeting between a qualified forest professional and the contractor may be sufficient in some cases.

1.5 Legislated Requirements

Individuals preparing CEDRSS in a Forest Stewardship Plan (FSP) must meet the requirements outlined in the Forest Planning and Practices Regulation (FPPR) sections 16(1), (2), (3), 26(3) or (5), and 44(1).

Individuals preparing CEDRSS in a Woodlot Licence Plan (WLP) must meet the requirements outlined in the Woodlot Licence Planning and Practices Regulation (WLPPR) sections 12, 13, 18, 35, and Schedule 1, Factor 6.

The following sections detail these expectations and the components of CEDRSS.

1.5.1 Situations and circumstances

Stocking standards establish a connection between stand-level and forest-level management. CEDRSS is generally only applicable where dispersed retention is required to achieve *Forest and Range Practices Act* (FRPA) management objectives or an objective under an Order. The FSP or WLP must specify the situations and circumstances in which CEDRSS will be applied. If these are not specified, the plan must indicate the number of hectares per year to which CEDRSS will apply to help define the scope and scale of application.

CEDRSS for second-growth Douglas-fir should only apply where group retention cannot operationally meet the non-timber FRPA management objectives. For more information on managing Fdc regeneration with group retention, refer to Appendix 2.

Note: CEDRSS should only be applied in areas where appropriate modelling has been completed. If it is to be applied in situations that were not modelled (e.g., second-growth Hw/Cw), the scope and scale of application must be clearly defined.

1.5.2 Stocking

CEDRSS includes two components:

1. Retention component: Basal area (BA) groupings for the overstorey (Layer 1 trees).
2. Regeneration component: Target and minimum density standards for the combined understorey (Layer 2, 3, and 4 trees).

At the plot level, the crop BA of the Layer 1 trees determines the target and minimum stocking standard for Layer 2, 3, and 4 trees. Additionally, the total BA of the Layer 1 trees may define the ecologically suitable species for the regeneration component. As a result, regeneration stocking standards may vary from plot to plot based on overstorey tree size, density, and distribution.

At the stratum level, the density standard is set based on the stratum's average crop BA (capped).

1.5.3 Ecologically suitable species

CEDRSS must specify preferred and acceptable species, or ecologically suitable species, by site series or site series grouping.

The Ministry of Forests' (FOR) Reference Guide to FDP Stocking Standards provides preliminary guidance for even-aged standards. However, these standards were not designed to account for regeneration under an overstorey canopy. Shade tolerance must be considered, and species regeneration thresholds based on field testing, research, and literature are recommended at higher BA levels for shade-intolerant species.

Example: Modelling and field calibration were completed for second-growth Fdc in 2015 and 2016. Testing showed that the modelled results did not accurately represent Fdc regeneration potential due to its shade intolerance. BA thresholds were identified where increasing overstorey competition began to limit Fdc regeneration growth, making it unsuitable as a viable rotation crop tree.

For the **CEDRSS for old-growth Cw/Hw** (Table A-1.1), the following general standards must apply. These restrictions specifically apply to understorey trees (L2/3/4).

- Fdc, Pw, and Pl are ecologically suitable and unrestricted in non-stratifiable areas with less than 9 m^2/ha total BA.
- Fdc, Pw, and Pl are not ecologically suitable in areas with 9 m^2/ha or more total BA.

For the **CEDRSS for second-growth Fdc** (Table A-2.1), the following general standards must apply. These restrictions specifically apply to understorey trees (L2/3/4).

- Fdc, Pw, and Pl are ecologically suitable and unrestricted in areas with less than 11 m^2/ha total BA.
- Fdc, Pw, and Pl are each restricted to a maximum of 200 well-spaced (WS)/free growing (FG) stems per hectare (sph) (equivalent to 1 tree in a 3.99 m plot) in areas with 11 to 16.99 m^2/ha total BA.
- Fdc, Pw, and Pl are not ecologically suitable in areas with 17 m^2/ha or more total BA.

- Fdc, Pw, and Pl are not ecologically suitable on north aspects unless no residual trees are present within one tree length.
- Cw is ecologically suitable and unrestricted in areas with less than 17 m^2/ha total BA.
- Cw is restricted to a maximum of 200 WS/FG sph in areas with 17 to 23.99 m^2/ha total BA.
- Cw is not ecologically suitable in areas with more than 24 m^2/ha total BA.

Variations from general standards may be suggested for the following:

- A conifer species not listed as ecologically suitable in the approved stocking standards may be considered ecologically suitable for Layer 1 crop trees if it was present in the pre-harvest stand and is expected to form a merchantable tree based on observed performance.
- Where listed in the stocking standard table, up to 400 well-spaced or free-growing stems per hectare of Fdc, Pw, and Pl (per species) may be accepted in areas with 11 to 16.99 m^2/ha total basal area, where plots are located on south-, southwest-, or west-facing aspects with slopes greater than 30%, within the CDF or CWH xm, mm, dm, ds or ms subzones.
- Where listed in the stocking standard table, up to 400 well-spaced free-growing Cw stems per hectare (sph) may be accepted in areas with 17 to 23.99 m^2/ha total BA, and up to 200 sph may be accepted in areas with 24 m^2/ha or more, provided one of the following conditions is met:
    - The site index of Cw is greater than that of Hw and the total Hw density (L2, 3,4) is less than 3000 sph;
    - The planted Cw genetic worth is >20% and the total Hw density (L2, 3,4) is less than 3000 sph; or
    - The silvicultural plan indicates the standards unit is planned for an extended rotation (>100 years) to meet the non-timber objective.

Note: If a species is not included as suitable for a site series in the stocking standard tables, it should be considered unsuitable regardless of basal area thresholds.

1.5.4 Minimum heights

Minimum heights are only required for the regeneration component (Layers 2, 3, and 4). It is recommended to use the minimum heights listed in the Reference Guide to FDP Stocking Standards.

1.5.5 Damage criteria

Stocking standards must address immediate and long-term forest health concerns. These are evaluated during obligation surveys, in which all FG understorey trees and Layer 1 crop trees must meet or exceed the damage criteria outlined in the FS 660 Silviculture Survey Reference Guide.

Separate damage tables apply to:

- Surveys completed using Layered, Interior DFP, and CEDRSS methods, and
- Layer 1 (overstorey) trees versus Layers 2, 3, and 4 (understorey) trees.

1.5.6 Dates

On site series with high or very high competing vegetation potential (as per Land Management Handbook 28), a three-year regeneration delay is recommended. For all other site series, a six-year regeneration delay period is appropriate to allow for natural regeneration.

A 20-year free-growing period is recommended to allow for maximum management flexibility.

Note: Free growing surveys should be conducted before regeneration reaches 12.5 cm dbh.

1.5.7 Minimum inter-tree distance

It is recommended that there be no minimum inter-tree distance (MITD) between Layer 1 trees.

For Layer 2, 3, and 4 trees, a typical MITD of 2.0 m is advised. However, it is reasonable to include a variance to reduce the MITD to 1.6 m under specified circumstances to allow more flexible spacing and to optimize planting on preferred microsites.

The MITD between Layer 2, 3, and 4 trees and any Layer 1 tree (whether crop or non-crop, inside or outside the plot or block) is determined by the dripline. The dripline is defined as a vertical line extending downward from the outermost edge of the living crown of the overstorey tree. To be counted as WS or FG, the main stem (measured from the pith) of the understorey tree must be located outside of this dripline (Figure 1).

FIGURE 1. The protected Cw (L4) within the dripline of the Layer 1 tree cannot be taken as well-spaced or free growing (Photo: Paul Barolet, RPF).

2 SURVEYING STANDS UNDER CEDRSS

2.1 Data Collection Template

There is a unique survey procedure for stands under CEDRSS, referred to as the CEDR survey method in the *Silviculture Survey Procedures Manual* and FS 660. This method is difficult to follow using the FS 658 Silviculture Survey Plot Card and FS 659 Silviculture Survey Plot Summary Card.

In response, an Excel template was created to assist surveyors with data collection in dispersed retention stands. While the template includes automated functions, it is not a fully polished tool. Surveyors must understand the data compilation steps and review the formulas to ensure proper functioning. The government assumes no responsibility for potential errors or inaccuracies produced by the spreadsheet; the surveyor and the signing forest professional must ensure that the work is complete, correct, and clear.

The formulas are designed to support up to 40 plots and up to 10 tree species. If that quantity is unnecessary, hide (do not delete) the extra rows and columns to improve field efficiency.

The Excel template supports up to two strata. If more strata are required, surveyors must download and complete additional copies of the template.

There are several tabs in the Excel template:

- **Field Numbers**: All cells requiring data entry or used when creating forest cover labels are identified with a field number. These field numbers correspond to the survey procedure described in Section 2.2.
- **Example-657**: This sheet contains sample data to guide surveyors in completing the template.
- **Example-658/659**: This sheet contains sample data to guide surveyors in completing the template and demonstrates how the formulas function.
- **Template-657**: Surveyors must complete this form for each stratum. Many of its fields are required for auto-calculations in the 658/659 templates. This is a simplified version of the FS 657. The template is not locked, allowing surveyors to add additional fields as needed.
- **Template-658/659**: Surveyors should use this sheet to collect plot data. Two versions are provided—one for Stratum 1 and one for Stratum 2. Surveyors must always begin data collection using a new, blank copy of the template to prevent data entry errors and formula issues. Many fields are locked to protect key formulas from accidental changes.

To learn more about the Excel template and the survey procedure, watch the "CEDRSS - Standards and Survey Method (with Excel Template)" and "CEDRSS - Data Compilation and Reporting (with Excel Template)" on the BC Silviculture Surveys YouTube channel.

If you wish to use paper field cards (FS 658 and FS 659), refer to the field procedure in Appendix 3, which references the field numbers of the paper cards from the 2026 *Silviculture Survey Procedures Manual*.

2.2 Field Procedure

Note: Surveyors should follow the CEDR survey procedure outlined in the *Silviculture Survey Procedures Manual*, as it is updated more frequently.

Note: The CEDR survey method may only be used on standards units where CEDRSS is applied in the site plan. It is not a default survey method.

Pre-Stratification: Confirm that standards units (SUs) intended for CEDRSS are suitable by reviewing the site plan, harvest instructions, post-harvest assessment, cut charts or leave tree tables, and aerial imagery, and/or by conducting a walk-through or fly-over. Refer to the SU stratification criteria below for applicable thresholds and survey requirements.

If existing SUs identified for CEDRSS do not meet the CEDRSS criteria below, delineate the correct SU boundaries and apply the appropriate stocking standards and survey method. A site plan amendment is required to reflect the revised SU stratification and stocking standards.

Once SUs are confirmed or revised, stratify each SU into strata using the criteria outlined in the *Silviculture Survey Procedures Manual*.

Standards unit stratification criteria

Second-Growth Fdc (≥ 1.0 ha)

- For areas with **crop** dispersed retention ≥ 5 m^2/ha and < 40 m^2/ha, create a standards unit and apply CEDRSS–Fdc. Survey using the CEDR method.
- For areas with **crop** dispersed retention < 5 m^2/ha, create a separate standards unit and apply even-aged stocking standards. Survey using conventional procedures. If **total** dispersed retention (crop + non-crop) exceeds 5 m^2/ha, report a Layer 1 inventory.
- For areas with **crop** dispersed retention ≥ 40 m^2/ha, create a separate standards unit and apply an approved intermediate cut stocking standard (no regeneration obligation). Survey using the Intermediate Cut method.

Old-Growth Cw/Hw (≥ 1.0 ha)

- For areas with **crop** dispersed retention ≥ 9 m^2/ha and < 40 m^2/ha, create a standards unit and apply CEDRSS–Cw/Hw. Survey using the CEDR method.

- For areas with **crop** dispersed retention < 9 m^2/ha, create a separate standards unit and apply even-aged stocking standards. Survey using conventional procedures. If **total** dispersed retention (crop + non-crop) exceeds 5 m^2/ha, report a Layer 1 inventory.
- For areas with **crop** dispersed retention ≥ 40 m^2/ha, create a separate standards unit and apply an approved intermediate cut stocking standard (no regeneration obligation). Survey using the Intermediate Cut method.

Uncut Areas (≥ 0.25 ha)

- Remove unharvested areas ≥ 0.25 ha from the net area to be reforested (NAR). Map and classify these as a group reserve, and report to RESULTS.
- Uncut polygons as small as 0.1 ha can be reported spatially. Where practical, stratify and remove these areas from the NAR.

Note: CEDRSS is unsuitable for site series that cannot achieve a closed canopy stand, such as very poor sites with low productivity (e.g., CWH vh1 12). Such conditions should represent only minor inclusions within a stratum.

Plot Size: Use a 3.99-m or 5.64-m radius plot depending on the stand conditions. If low M-values are anticipated based on BA levels, a 5.64-m plot should be used. Use the same plot size throughout the entire stratum.

BAF: Suggested BAFs are 3-10.

Sampling intensity: The minimum sampling intensity is:

Stratum Area (ha)	Minimum Number of Plots
< 5 ha	5 plots
5 – 20 ha	1 plot per hectare
> 20 ha	20 plots + ((stratum area – 20) ÷ 2)

Plot Measurements:

1. Tally the residual overstorey (Layer 1 (L1) trees, ≥ 12.5 cm dbh) using a variable-radius plot (prism or angle gauge).

   a. Record “Number In” by species (crop and non-crop) in Field 1.

   b. Tally the crop “Number In” by species in Field 2.

2. Tally the residual overstorey (L1 trees) using a fixed-area plot. This does not need to be done by tree species. Record the sum in Field 3.
   Note: This step is only required if the polygon status is immature[4].
3. Tally the regeneration understorey (Layers 2, 3 and 4 (L2/3/4), ≤12.5 cm dbh) using a fixed-area plot.
   a. Tally all living trees (excluding germinants[5]) by species in Field 4.
   b. Tally well-spaced (WS) trees by species, including those in excess of the plot's M-value, in Field 5.
   c. Tally free growing (FG) trees by species, including those in excess of the plot's M-value, in Field 6.
4. Record forest health data for the overstorey layer (L1) and the combined understorey layer (L2/3/4) at each plot. Refer to the damage criteria in Section 27 for Layer 1 trees and Section 28 for Layer 2, 3, and 4 trees of the FS 660 Silviculture Reference Guide.
   a. Enter the damage agent code in Field 7.
   b. Enter the layer[6] (O or U) in Field 8. If a damage agent affects both the overstorey and understorey layer, a separate row is needed for each layer.
   c. Enter the tree species code in Field 9. If a damage agent affects multiple tree species, a separate row is needed for each species.
   d. Tally the trees impacted by the damage agent that do not meet the FG damage criteria for the relevant layer and tree species. Enter the sum of living affected trees in Field 10 and the sum of dead affected trees in Field 11.
      - Examine all Layer 2, 3 and 4 trees within the fixed-area plot.
      - Examine all Layer 1 trees counted "In" the variable-radius plot.

      Note: Layer 1 Cw must be able to produce ≥50% merchantable volume in the first 10-m log length to be counted as crop. If this criterion is not met, there may not be an associated forest health agent to report. Refer to Appendix 5 for examples and guidance on evaluating merchantable volume in mature western redcedar.
5. Tally plantable spots at each plot, as needed, and enter the total in Field 12.
6. Tally germinants at each plot, as needed, and enter the total in Field 13.

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[4] For RESULTS, the stocking status for the polygon component is recorded as "IMM" if the stratum is stocked, and the layer expected to have the highest volume at the next rotation is currently less than 120 years old.
[5] A germinant is a naturally established tree that is 5 cm tall or less, excluding any reduction in height caused by forest health damage. Age is not a consideration.
[6] Use O for Layer 1 residuals. Use U for all other trees.

7. On the first plot and every fourth plot thereafter (a minimum of three data sets per stratum), collect the following:
    a. Record the crown closure for Layer 1 in Field 14 and for the combined Layer 2/3/4 in Field 15.
    b. Record the ground vegetation. Enter the species in Field 16, the percent cover in Field 17, and the average height in Field 18.
    c. For the overstorey layer, enter the stratum's leading[7] inventory species in Field 19 and the stratum's secondary inventory species in Field 20. For the leading species, select the tallest "In" tree from the variable-radius plot and measure its height and age and record in Fields 21 and 22. For the secondary species, select the tallest "In" tree from the variable-radius plot, measure its height and age, and record these in Fields 23 and 24.
    d. For the understorey layer, enter the stratum's leading[8] inventory species in Field 25 and the stratum's secondary inventory species in Field 26. For the leading species, select the tallest tree from the fixed-area plot, measure its height and age, and record these in Fields 27 and 28. For the stratum's secondary species, select the tallest tree from the fixed-area plot, measure its height and age, and record these in Fields 29 and 30.
    e. For the overstorey layer, enter the stratum's leading silviculture species in Field 31. Select a representative crop tree for the stratum's leading silviculture species. For the selected tree, measure its height and age, and record these in Fields 32 and 33.
    f. For the understorey layer, enter the stratum's leading silviculture species in Field 34 if the stratum is SR or in Field 35 if the stratum is FG. If the stratum is SR, select a representative WS tree of the leading silviculture species, measure its height and age, and record these in Fields 36 and 37. If the stratum is FG, select a representative FG tree of the leading silviculture species, measure its height and age, and record these in Fields 38 and 39.
8. Estimate the overall Layer 1 Tree Cover Pattern for the stratum being surveyed. Record in Field 40.
9. Record the reserve type (Dis) in Field 41 and the reserve objective in Field 42.
10. Identify the layer expected to contribute the most volume at the next rotation. Report the site index (SI) for that layer's leading inventory species using SIBEC and record it in Field 43.

[7] For the overstorey layer, leading and secondary species is determined based on basal area.
[8] For the understorey layer, leading and secondary species is determined based on density.

11. Enter the stratum's stocking status in Field 71.
12. Enter a declaration comment in Field 72.
13. Enter the most abundant understorey layer based on a visual estimation of total density in Field 73.

2.3 Data Compilation

1. Verify that all data fields required for calculations are complete (e.g., plot multiplier, BAF, and total completed plots).
2. Review the spreadsheet carefully to ensure that all formulas are working:
    - Check whether any formulas have been accidentally deleted or altered.
    - Unhide all columns and rows. Delete any data found in hidden cells if it is no longer needed.
    - If compiling data across multiple surveyors, confirm that species were entered in the same order in all sections.
3. For each plot, compare the well-spaced or free growing tallies to the plot's MSS. Contiguous areas greater than 1 ha that do not meet their plot's MSS must be stratified prior to stratum-level calculations.
4. Determine the stratum's status. Statistics are not required.
    a. Compare the stratum's WS density (Field 44) to the stratum's MSS (Field 45). If the WS density is greater than the MSS, the stratum is SR; if it is less, the stratum is NSR. Record the status in Field 46.
    b. If applicable, compare the stratum's FG density (Field 47) to the stratum's MSS (Field 45). If the FG density is greater than the MSS, the stratum is FG; if it is less, the stratum is NFG. Record the status in Field 46.
5. Create inventory labels for Layer 1 and the combined Layer 2, 3, 4.
    a. Layer 1: Pull the species composition from Field 47, the leading species' age from Field 48, the secondary species' age from Field 49, the leading species' height from Field 50, the secondary species' height from Field 51, the crown closure from Field 52, and the total density from Field 53 (if applicable).
    b. Layer 2/3/4: Pull the species composition from Field 54, the leading species' age from Field 55, the secondary species' age from Field 56, the leading species' height from Field 57, the secondary species' height from Field 58, the crown closure from Field 59, and the total density from Field 60.
6. Create silviculture labels for Layer 1 and the combined Layer 2, 3, 4.

a. Layer 1: Pull the species composition from Field 61, the leading species' age from Field 62, and the leading species' height from Field 63.

b. Layer 2/3/4: If the stratum is SR, pull the species composition from Field 65, the leading species' age from Field 66, the leading species' height from Field 67, and the WS density from Field 44. If the stratum is FG, pull the species composition from Field 68, the leading species' age from Field 69, the leading species' height from Field 70, and the FG density from Field 47.

3 REPORTING

3.1 RESULTS Forest Cover Submission

A multi-layer forest cover (FC) must be submitted for stands managed under CEDRSS. To view an example of a multi-layer FC submission to RESULTS, refer to Appendix 5. For further guidance on reporting stands with treed retention, review the *Procedures for Submitting Forest Cover to RESULTS for Openings with Treed Retention*.

The reporting requirements are similar to those for even-aged, single layer stands, with the following changes or additional data requirements:

Polygon Component:

- **Reserve Type**: Enter Dispersed.
- **Reserve Objective**: Enter TIM if residuals are considered short-term retention and are available for a subsequent harvest entry within the current rotational planning cycle. Enter an alternative reserve code if residuals are long-term retention and unavailable for harvest until the next rotational planning cycle.
- **Tree Cover Pattern**: Enter the Tree Cover Pattern number that best represents the pattern of Layer 1 residuals. Refer to Section 35 of the FS 660.
- **Site Index**: Report the site index (SI) for the leading inventory species of the layer expected to contribute the highest volume at the next rotation.
- **Stocking Status:** If the polygon meets the stocking standard, enter IMM if the layer expected to have the highest volume at the next rotation is currently less than 120 years old; enter MAT if it is 120 years old or older.

Inventory Component:

- **Layers:** Report inventory information for the mature overstorey layer (L1) and the combined understorey layer (L2, 3, and 4). Report the combined understorey layer to the most abundant layer (L2, 3, or 4), based on total density.
- **BA**: Enter Total BA (including crop and non-crop stems) in Layer 1.
- **Density**: Total density is not required for Layer 1 if the stocking status is mature (MAT).
- **Species Composition**: Based on total BA for Layer 1 and total density for the combined understorey layer (L2, 3, and 4).

Silviculture Component:

- **Layers**: Report silviculture information for the mature overstorey layer (L1) and the combined understorey layer (L2, 3, and 4). Report the combined understorey layer to the most abundant layer (L2, 3, or 4), based on total tree density (Field 73).
- **BA**: Enter the crop BA in Layer 1.
- **WS/FG Density**: A WS or FG density is not required for Layer 1.
- **Species Composition:** Based on crop BA for Layer 1 and WS or FG density for the combined understorey layer (L2, 3, and 4).

Comments:

- In the RESULTS declaration comments field, indicate that the standards unit uses CEDRSS.

3.2 FSP Tracker

CEDRSS includes multiple target and minimum stocking standards that are applied at the plot level during field surveys. However, entering all possible variations into the FSP Tracker is impractical due to the administrative burden and the risk of overwhelming the system with potentially redundant stocking standard identification numbers (SSIDs).

Instead, licensees can enter CEDRSS in the FSP Tracker for each stand type (old-growth Cw/Hw, second-growth Fdc) specified in their FSP, using a single subzone/site series and basal area (BA) grouping. If CEDRSS is expected to be applied regularly, licensees may also choose to add standards for each subzone, or even for each site series, while still limiting it to one BA grouping per entry.

For any standards unit where CEDRSS applies, one of these SSIDs will be assigned in RESULTS, then modified with an approved variation to align with the CEDRSS tables in the FSP for the stratum's site series and post-harvest basal area level. Instructions for this process are provided in Section 3.3.

The licensee may manually create the SSIDs in the FSP Tracker or copy SSIDs **1081047** (CWH vh2 101) for old-growth Cw/Hw and **1081048** (CWH dm1 101) for second-growth Fdc into their FSP. Copied standards will be assigned new SSIDs and automatically appear in draft form.

Once a new SSID is created—either by copying or manual entry—other fields can be edited to align with the FSP CEDRSS tables and the most common anticipated post-harvest site and stand conditions. All edits or entries should follow the instructions below. At minimum, the organization unit and client number must be updated.

Regen Delay and Late FG Date: Enter the regeneration delay and FG date for the applicable subzone and site series.

Additional Standards: Reference the FSP attachment and indicate that an approved variation will be used to modify the standard based on different ecological conditions or BA levels. As applicable, enter the stocking standard clauses that restrict the suitability of Fdc, Pw, and Pli for all stand types (Table A-1.1, A-1.2), and the suitability of Cw for second-growth Fdc stands (Table A-1.2).

Attachments: Attach a PDF version (<1 MB) of the FSP CEDRSS tables, including all subzones, variants, and site series. Do not attach the entire FSP or full stocking standards section—only the relevant CEDRSS tables.

Residual BA: From the FSP stocking standard table, identify the post-harvest crop BA grouping that is most likely to occur. Enter the lowest value of the BA grouping in the Minimum field of the Residual BA column in the Layer 1 tab. It is not possible to submit a BA range.

Species: Enter the ecologically suitable species for Layers 1, 2, 3, and 4.

Densities: For Layers 2, 3, and 4, enter the target (TSS), minimum preferred (MSSp), and minimum stocking standard (MSS) that correspond with the BA grouping identified above.

If all species are listed as ecologically suitable (no divide between preferred and acceptable) in the FSP CEDRSS tables, the MSSp and MSS will be the same.

Min Horiz: Enter 2.0 m for Layers 2, 3, and 4. Leave MITD blank for Layer 1.

Min Height: Enter the minimum heights by species for Layers 2, 3, and 4.

3.3 Approved Variations

When a block is harvested, an opening is created in RESULTS, and a stocking standard identification number (SSID) must be entered for each standards unit (SU). For CEDRSS, one of the FSP Tracker default SSIDs (refer to Section 3.2) must be applied.

Before submitting a regeneration declaration for an SU, the default standards should be modified in RESULTS using an Approved Variation to:

- Update ecologically suitable species and minimum heights based on the stratum's biogeoclimatic zone, subzone, variant, and site series.
- Update the target and minimum stocking standards based on the stratum's crop BA.

If the modified standard aligns with an approved FSP CEDRSS table, an Approved Variation is acceptable and does not require district review at the time of submission. However, a rationale should be provided for auditing purposes.

Note: If changes cause the standard to differ from the FSP or WLP CEDRSS tables, an FSP or WLP amendment is required.

Example process:

Scenario: Rainforest Management Inc. included CEDRSS for old-growth Cw/Hw in their FSP for all biogeoclimatic zones, subzones, variants, and site series listed in Table A-1.1. In the FSP Tracker, they created an SSID for old-growth Cw/Hw in the CWH vh2 101, copied from SSID 1081047.

In 2022, an old-growth Cw/Hw opening in the CWH vm1 110 was harvested using a retention system with dispersed retention to meet a visual quality objective. The opening was assigned the SSID for old-growth Cw/Hw in the CWH vh2 101 (1081047).

In 2024, the opening was surveyed using the CEDRSS table for old-growth Cw/Hw for the CWH vm1 110 from the FSP, and the SU met the regeneration delay obligation. The average crop BA was 12 m^2/ha, and the stratum's average WS density was 720 sph.

Prior to completing the declaration in RESULTS, the licensee must follow the Approved Variation process:

1. Navigate to the Stocking Standards tab in RESULTS for the relevant opening and standards unit and click "Approved Variation" at the bottom of the window.
2. Update all components of the stocking standards to comply with the approved FSP. In this example:
    - Update the species and minimum heights for each layer to match those for CWH vm1 110.
    - Enter the lowest value of the applicable crop BA range for the stratum, based on the survey data. With a stratum crop BA of 12 m^2/ha, the 9–15.99 m^2/ha grouping applies. Enter 9 m^2/ha under the Layer 1 residual BA field.
    - Update the target and minimum stocking standard densities for the understorey layers to 800 sph (TSS) and 400 sph (MSS), based on the BA grouping.
3. Include a rationale stating that:

- The stratum is in a different subzone, variant, and site series than the default standard.
- A lower BA level than the default was required to meet the visual quality objective.

APPENDICES

Appendix 1 Recommended CEDRSS tables

Email silvsurveys@gov.bc.ca to request an editable Word copy of these tables. Versions using the LMH 28 BEC classification are also available upon request.

TABLE A-1.1. CEDRSS for old-growth Cw/Hw: Densities by basal area, ecologically suitable species, minimum heights, MITD, and regeneration delay and free growing dates

Layer 1 residuals (≥ 12.5 cm dbh)	**Crop BA (m^2/ha)**	0–8.99	9–15.99	16–22.99	23–28.99	29–39.99	≥ 40	For each plot, the TSS/MSS is determined based on the plot's crop BA. For the stratum, the TSS/MSS is determined based on the stratum's average crop BA (capped).
Layers 2, 3, 4 (<12.5 cm dbh)	**Well-spaced/ free growing SPH**	TSS 900 MSS 500	TSS 800 MSS 400	TSS 700 MSS 350	TSS 600 MSS 300	TSS 500 MSS 250	TSS 0 MSS 0	

Minimum Inter-Tree Distance (MITD) between L1 trees= 0 m, between L2/3/4 trees= 2 m, between L2/3/4 trees and L1 trees = outside of dripline
Free growing= 20 years
Refer to FS 660 for damage criteria for L1 trees and L2/3/4 trees.
L2/3/4 Fdc, Pw, and Pl: Where listed in Table A-1.1, they are suitable in non-stratifiable areas with <9 m^2/ha total basal area (BA); otherwise they are unsuitable.

BEC Zone, Subzone, Variant and Site Series	**Ecologically Suitable Tree Species and Minimum Heights (m)**	**Regen Delay (years)**
CWH vh1 101	Cw[48]-1.5, Hw-2.0, Yc[212]-1.5, Pl[6,210]-1.5, Ba-2.0, Ss[7,35,216]-3.0	6
CWH vh1 104	Ba[47]-2.25, Hw-3.0, Cw[48]-2.0, Ss[35,216]-3.5	6
CWH vh1 105	Ba[47]-2.25, Cw[48]-2.0, Hw-3.0, Yc[212]-2.0, Ss[35,216]-4.0	3
CWH vh1 110	Ba[47]-2.25, Cw[48]-2.0, Yc[212]-2.0, Hw-1.75, Ss[35,216]-4.0	3
CWH vh2 101	Cw[48]-1.5, Hw-2.0, Yc[212]-1.5, Pl[210,214]-1.5, Ss[7,210,216]-3.0, Ba[210]-2.0	6
CWH vh2 104	Ba[47]-2.0, Hw-2.0, Ss[216]-4.0, Cw[48]-2.0, Yc[210,212]-2.0	6
CWH vh2 105, 110, 111	Ba[47]-2.0, Cw[48]-2.0, Ss[216]-4.0, Hw-2.0, Yc[210,212]-2.0	3
CWHvm1 101	Cw[48]-1.5, Hw-3.0, Fd[9,215]-3.0, Ba[26,47, 213]-1.75	6
CWH vm1 105	Cw[48]-1.5, Hw-3.0, Fd[9,215]-3.0	3

BEC Zone, Subzone, Variant and Site Series	Ecologically Suitable Tree Species and Minimum Heights (m)	Regen Delay (years)
CWH vm1 110	Ba[47,213]-1.75, Cw[48]-1.5, Hw-3.0, Fd[9,215]-3.0, Ss[35,210,216]-3.0	3
CWH vm1 111, 111.1, 111.2	Ba[26,47,213]-1.75, Cw[48]-1.5, Hw-3.0	6
CWH vm1 112, 112.1, 112.2	Ba[47,213]-2.25, Cw[48]-2.0, Fd[1,9,215]-3.0, Hw-4.0, Ss[35,210,216]-4.0	3
CWH vm1 114	Ba[47,213]-2.25, Cw[48]-2.0, Hw-4.0	3
CWH vm3 101, 111, 111.1, 111.2	Hw-2.0, Ba[26]-1.4, Cw[48]-1.5, Ss[7,26,35,210,216]-2.0	6
CWH vm3 104, 110, 112, 112.1, 112.2	Hw-2.0, Ba-1.4, Cw[48]-1.5, Ss[35,210,216]-2.0	3
CWH vm2 101	Fdc[9,14]-2.25, Hw-2.5, Cw-1.5, Yc[13,212]-1.5, Ba[47,213]-1.75, Hm[13]-2.0, Pw[31]-2.5	6
CWH vm2 110	Fdc[1,8,9,14]-2.25, Cw-1.5, Hw-2.5, Ba[47,213]-1.75, Yc[13,212]-1.5	3
CWH vm2 111, 111.1, 111.2	Cw-1.5, Hw-2.5, Yc[13,212]-1.5, Ba[47,213]-1.75, Fdc[1,9,14,210]-2.25	6
CWH vm2 112, 112.1, 112.2	Cw-2.0, Yc[13,212]-2.0, Ba[47,213]-2.25, Hw-3.5, Ss[15,35]-4.0, Hm[13]-3.5	3
CWH vm4 101	Hw-2.0, Ba-1.4, Cw[14]-1.5, Hm[13]-1.0, Ss[7,35]-2.0, Yc[13,212]-1.5	6
CWH vm4 110	Hw-2.0, Ba-1.4, Cw[14]-1.5, Yc[13,212]-1.5, Ss[35]-2.0, Hm[13]-1.0	3
CWH vm4 111	Hw-2.0, Ba-1.4, Cw[14]-1.5, Yc[212]-1.5, Hm[13]-1.0, Ss[7,35]-2.0	6
CWH vm4 112	Hw-2.0, Ba-1.4, Cw[14]-1.5, Yc[212]-1.5, Hm[13]-1.0, Ss[35]-2.0	3
CWH wh1 101	Ss-3.0, Hw-2.0, Cw[48]-1.5	6
CWH wh1 102	Ss-2.0, Hw-1.25, Cw[48]-1.0, Pl[210]-1.25	6
CWH wh1 110	Hw-1.25, Cw[48]-1.0, Pl-1.25	6
CWH wh1 105, 111, 112, 116	Ss-4.0, Hw-2.75, Cw[48]-2.0	3
CWH wh1 104	Ss-3.0, Hw-2.0, Cw[48]-1.5	3
CWH mm2 101, 101a, 101b	Hm[13]-1.0, Hw-1.25, Cw-1.0, Fdc[9]-2.25, Yc-1.0, Pw[31]-1.0, Ba[47,213]-0.75	6
CWH mm2 103	Fdc[9]-2.0, Hw-2.0, Yc-1.5, Hm[13]-1.5, Cw-1.5, Pw[7,31]-1.5, Ba[47,213]-1.5	3
CWH mm2 110	Ba[47,213]-2.0, Cw-2.0, Fdc[9]-3.0, Yc-2.0, Bp[47,213]-2.0, Pw[31]-3.0, Hw[210]-3.0, Hm[210]-3.0	3
CWH mm2 111	Hw-1.5, Cw-1.5, Yc-1.5, Ba[47,213]-1.0, Hm[13]-1.5, Fdc[9,41]-2.0	6
CWH mm2 112	Ba[47,213]-1.0, Cw-1.25, Yc-1.25, Fdc[1,9,41,210]-3.0, Pw[31]-3.0	3
CWH mm2 113	Ba[47,213]-1.0, Cw-1.25, Yc-1.25, Pw[31]-3.0	3

TABLE A-1.2. CEDRSS for second-growth Fdc: Densities by basal area, ecologically suitable species, minimum heights, MITD, and regeneration delay and free growing dates

Layer 1 residuals (≥ 12.5 cm dbh)	**Crop BA (m^2/ha)**	0–4.99	5–10.99	11–16.99	17–23.99	24–39.99	≥ 40	For each plot, the TSS/MSS is determined based on the plot's crop BA. For the stratum, the TSS/MSS is determined based on the stratum's average crop BA (capped).
Layers 2, 3, 4 (<12.5 cm dbh)	**Well-spaced/ free growing SPH**	TSS 900 MSS 500	TSS 800 MSS 400	TSS 700 MSS 350	TSS 600 MSS 300	TSS 500 MSS 250	TSS 0 MSS 0	

Minimum Inter-Tree Distance (MITD) between L1 trees= 0 m, between L2/3/4 trees= 2 m, between L2/3/4 trees and L1 trees = outside of dripline

Regen delay= 3 years, Free growing= 20 years

Refer to FS 660 for damage criteria for L1 trees and L2/3/4 trees.

L2/3/4 Fdc, Pw, and Pl: Where listed in Table A-1.2, they are suitable in areas with <11 m^2/ha total basal area (BA), restricted to 200 WS/FG sph each in areas with ≥11 m^2/ha and <17 m^2/ha total BA, and not suitable in areas with ≥17 m^2/ha total BA. They are also not suitable on north aspects at any BA level unless no residual trees are within 1 tree length.

L2/3/4 Cw: Where Cw is listed in Table A-1.2, it is suitable in areas with <17 m^2/ha total BA, restricted to 200 WS/FG sph in areas with ≥17 m^2/ha and <24 m^2/ha total BA, and not suitable in areas with ≥24 m^2/ha total BA.

BEC Zone, Subzone, Variant and Site Series	**Ecologically Suitable Tree Species and Minimum Heights (m)**
CDF mm 101	Fdc-2.0, Bg[7,47]-1.25, Cw[48]-1.0
CDF mm 110	Fdc-3.0, Bg[47]-1.75, Cw[48]-1.5
CDF mm 111	Fdc[41]-3.0, Cw[48]-1.5
CDF mm 112, 112a	Cw[48]-2.0, Bg[47]-2.25, Fdc[1,41]-4.0
CWH dm1 101, 101a	Fdc-3.0, Hw[10]-2.0, Cw[48]-1.5, Pw[31]-2.5
CWH dm1 101b	Fdc-3.0, Hw[10]-2.0, Cw[48]-1.5, Pw[31]-2.5, Pl-2.0
CWH dm1 104	Fdc-3.0, Cw[48]-1.5, Pw-2.5[31]
CWH dm1 110	Cw[48]-2.0, Fdc-4.0, Pw[31]-2.5, Bg-3.0
CWH dm1 111	Cw[48]-1.5, Hw-2.0, Fdc[41]-3.0, Bg[7]-2.5
CWH dm1 112, 112a, 112b	Cw[48]-2.0, Fdc[1,41]-4.0, Bg[47]-3.5
CWH dm2 101, 101a	Fdc-3.0, Hw-2.0, Cw[48]-1.5, Pw[31]-2.5, Bg[7,47]-3.0

BEC Zone, Subzone, Variant and Site Series	Ecologically Suitable Tree Species and Minimum Heights (m)
CWH dm2 101b	Fdc-3.0, Hw-2.0, Cw[48]-1.5, Pw[31]-2.5
CWH dm2 105	Fdc-3.0, Cw[48]-1.5, Hw-2.0, Pw[31]-2.5, Lw[18,211]-3.0
CWH dm2 110	Cw[48]-2.0, Fdc-4.0, Bg-4.0, Pw[31]-2.5
CWH dm2 111	Cw[48]-1.5, Hw-2.0, Fdc[41]-3.0, Bg[7]-3.0
CWH dm2 112, 112.1, 112.2	Cw[48]-2.0, Fdc[41]-4.0, Bg[47]-3.5, Pw[31]-3.5
CWH dm3 101	Fdc[215]-3.0, Cw[48]-1.5, Hw-3.0, Pw[31]-2.5, Bg[47]-3.0
CWH dm3 103	Fdc[215]-2.5, Cw[48]-1.0, Hw-2.0, Lw[211]-2.5
CWH dm3 104	Fdc[215]-3.0, Cw[48]-1.5, Hw-2.0, Pw[31]-2.5, Lw[211]-3.0
CWH dm3 110	Cw[48]-2.0, Fdc[215]-4.0, Pw[31]-2.5, Bg[47]-3.5, Hw-4.0
CWH dm3 111	Cw[48]-1.5, Hw-3.0, Fdc[1,41,215]-3.0
CWH dm3 112	Bg[47]-3.5, Cw[48]-2.0, Fdc[41,215]-4.0, Hw-4.0
CWH ds1 101, 101a	Fdc[217]-2.25, Cw-1.5, Pw[31]-2.5
CWH ds1 110	Fdc[217]-2.25, Cw-1.5, Hw-1.0, Pw[13,31]-2.5, Sx[13,18,35,210]-1.0
CWH ds1 111	Hw-1.0, Fdc[41,217]-2.25, Cw-1.5
CWH ds1 112	Cw-2.0, Fdc[41,217]-3.0, Bg[47]-2.0, Hw-1.25
CWH mm1 101, 101a	Fdc-3.0, Cw[48]-1.5, Hw-2.0, Ba[47,213]-1.5, Pw[31]-3.0
CWH mm1 101b	Fdc-3.0, Cw[48]-1.5, Hw-2.0, Ba[47,213]-1.5
CWH mm1 104	Fdc-3.0, Cw[48]-1.0, Hw[210]-3.0, Pw[31]-2.5, Ba[42,47,213]-1.5
CWH mm1 110	Fdc-4.0, Cw[48]-2.0, Ba[47,213]-2.0, Hw[210]-3.0, Pw[31]-3.5
CWH mm1 112	Cw[48]-2.0, Fdc[1,41]-4.0, Ba[47,213]-3.0
CWH ms3 101	Cw-1.5, Fdc[217]-2.25, Hw[10,13]-1.5, Ba[10,13,47]-0.75, Sx[13,18,35,210]-1.0
CWH ms3 110	Cw-2.0, Fdc[217]-3.0, Ba[10,13,47]-1.0, Sx[13,18,35,210]-1.25, Hw[10,13]-2.0, Pw[31]-2.5
CWH ms3 112	Cw-2.0, Fdc[41,217]-3.0, Sx[13,18,35,210]-1.25, Ba[13,47]-1.0, Bg[14,17,47]-2.5
CWH ms4 101	Cw-1.5, Fdc-2.25, Hw[10,13]-1.5, Ba[10,13,47]-0.75, Pw[31,210]-2.5, Sx[18,35,210]-1.0, Yc[210]-1.5, Lw[210,211]-2.25
CWH ms4 110	Hw-2.0, Cw-2.0, Fdc[217]-3.0, Ba[17]-1.0, Sx[18,35,210]-1.25, Pw[31]-2.5
CWH ms4 112	Cw-2.0, Yc[13]-2.0, Hw-2.0, Ba[13,47]-1.0, Sx[18,35,210]-1.25, Fdc[41,217]-3.0
CWH ms5 101, 101.2	Cw-1.5, Fdc[217]-2.25, Sx[35,210]-1.0, Hw-1.5, Ba[47]-0.75, Bl[47]-0.75, Bp[7,47]-0.75
CWH ms5 101.1	Cw-1.5, Fdc[217]-2.25, Sx[35,210]-1.0, Hw-1.5, Ba[47]-0.75, Bp[7,47]-0.75
CWH ms5 110	Cw-2.0, Fdc[217]-3.0, Ba[47]-1.0, Hw-2.0, Pw[31]-2.5, Sx[35,210]-1.25

BEC Zone, Subzone, Variant and Site Series	Ecologically Suitable Tree Species and Minimum Heights (m)
CWH ms5 112	Cw-2.0, Fdc[1,41,217]-3.0, Sx[35,210]-1.25, Ba[13,47]-1.0, Bg[14,47]-2.5
CWH vm1 101	Cw[48]-1.5, Hw-3.0, Fdc[9,215]-3.0, Ba[26,47,213]-1.75
CWH vm1 103, 104	Cw[48]-1.0, Hw-2.0, Fdc[9,215]-2.0, Pl[210]-1.25
CWH vm1 105	Cw[48]-1.5, Hw-3.0, Fdc[9,215]-3.0
CWH vm1 110	Ba[47,213]-1.75, Cw[48]-1.5, Hw-3.0, Fdc[9,215]-3.0, Ss[35,210,216]-3.0
CWH vm3 101	Hw-2.0, Ba[26]-1.4, Cw[48]-1.5, Ss[7,26,35,210,216]-2.0
CWH vm3 103	Cw[48]-1.0, Hw-1.4, Fdc-1.0, Pl[210,214]-1.4

1- suitable on elevated microsites

6- suitable on nutrient-very-poor sites

7- suitable on nutrient-medium sites

8- suitable on steep slopes

9- suitable on warm aspects

10- suitable on cool aspects

13- suitable at upper elevations

14- suitable at lower elevations

18- suitable on eastern portion of biogeoclimatic unit

26- suitable minor species on nutrient poor sites

31- must use of blister rust resistant stock. See BC Journal of Ecosystems and Management 10(1): 97-100 for supplementary information.

35- use resistant stock to mitigate risk of spruce weevil damage. See Ss Weevil Decision Tool.

41- limited by poorly drained soils

42- suitable on sites with a fresh soil moisture regime

47- risk of balsam woolly adelgid. Limit percentage of Abies spp. across the landscape.

48- risk of browsing by ungulates. Consider seedling protection.

210- Maximum of 20% of well spaced stems per hectare of the silviculture label at free growing.

211- Hold for Lw restriction and the current Lw seed use guidance.

212- Risk of Yc decline on sites where winter snowpack is not consistent.

213- Risk of conifer sawfly. Consult the aerial overview survey and local forest health strategy.

214- Risk of Dothistroma. Not suitable on cold air drainage sites.

215- Risk of Swiss Needle Cast. Consult the aerial overview survey and local forest health strategy.

216- Risk of Spruce aphid close to the ocean, up to 2 km from the shore. Consult the aerial overview survey and local forest health strategy.

217- Consult the aerial overview survey and local forest health strategy for information on areas of high hazard for western spruce budworm.

Appendix 2 Managing Douglas-fir Regeneration with Retention

Coastal Douglas-fir (Fdc) is a light-demanding species with reduced growth rates under retained trees due to light interception.

Retaining trees in a dispersed[9] pattern generally has a greater negative impact on understorey Fdc growth than group[10] retention[11]. Research indicates that growth losses increase significantly when dispersed retention exceeds 4 to 6 m^2/ha of total basal area (BA) in second-growth Fdc stands. These conditions promote a shift toward more shade tolerant species, such as western hemlock.

Dispersed retention in stands managed for Fdc regeneration should only be considered if group retention cannot operationally meet the non-timber objectives. If dispersed retention is necessary, it should focus on retaining trees that directly support those objectives — typically veteran trees or large-diameter stems with structural features like multiple leaders or cavities.

If Fdc is the only suitable or desired species for regeneration, residual basal area must not exceed 17 m^2/ha. Above this threshold, no Fdc trees can be counted as well-spaced or free growing (WS/FG), making it impossible to meet stocking requirements. When basal area is between 11 and 16.99 m^2/ha, understory Fdc is generally limited to a maximum of 200 well-spaced or free-growing stems per hectare (sph), while the minimum stocking requirement is 350 sph. To allow flexibility in planting any Fdc density, residual basal area should be kept below 11 m^2/ha.

Note: The Forest Stewardship Plan (FSP) may include a variation from the general standard to allow up to 400 sph of well-spaced or free growing Fdc in areas with 11 to 16.99 m^2/ha total basal area, provided the required site conditions are met.

Where Fdc is the primary species for regeneration, a retention system with group retention is the preferred approach. The following are best management practices for designing group retention to minimize shading in second-growth Fdc stands (Figure A3.1):

- Groups must be:
    - Spaced at least two average tree lengths apart
    - Oriented north to south
    - Greater than 0.1 ha in size

[9] Dispersed-scattered individual trees or small clumps of several trees.
[10] Group- intact portions of the pre-harvest stand
[11] In this guide, the term retention refers to both retention and reserves.

- No more than 20 m wide and 150 m long

- A retention system with dispersed or group retention is not recommended on north-facing aspects—particularly in wetter or more northern CWH subzones—when Fdc is the intended crop species[12].

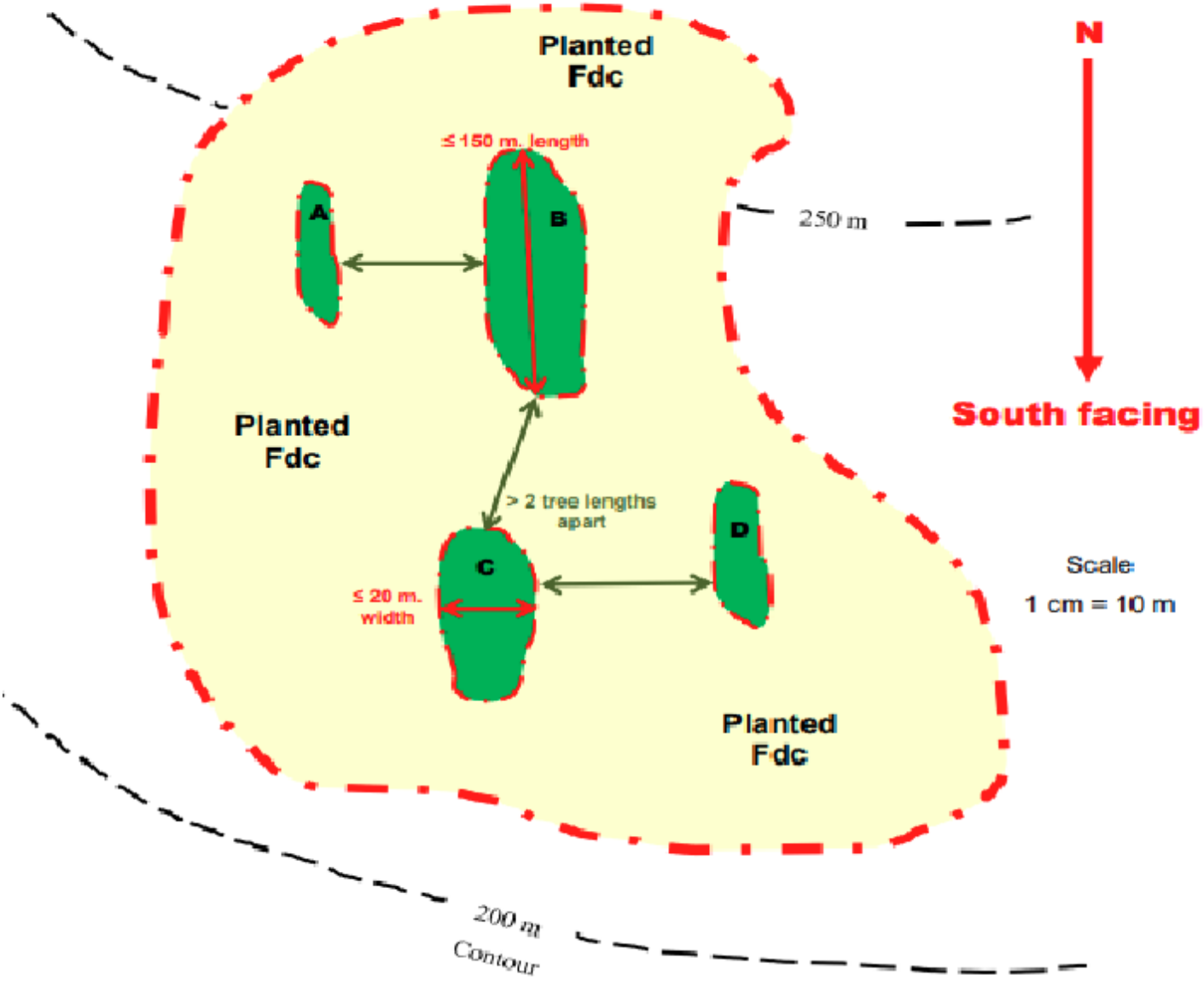

FIGURE A-2.1. Retention silvicultural system with group retention meeting recommended design criteria.

[12] Douglas-fir's shade tolerance varies across subzones. It can be somewhat shade tolerant on xeric Coastal Douglas-fir (CDF) sites but is highly shade intolerant in Coastal Western Hemlock (CWH) vm1 and vm2.

Appendix 3 Survey Procedure Using Paper Field Cards (FS 658 and FS 659) for Stands with CEDRSS

1. Tally the residual overstorey (Layer 1 (L1) trees, ≥ 12.5 cm dbh) using a variable-radius plot (prism).
   a. Record “Number In” by species (crop and non-crop) in Field 95 of the T1 row.
   b. Sum the total “Number In” in Field 110 in the T1 row.
   c. Tally the crop “Number In” by species in Field 97 of the F1 row.
   d. Sum the crop “Number In” and record in Field 110 of the F1 row.
2. Look up the TSS and MSS for the plot based on the crop BA (step 1). Use the tabular stocking standard table for the standards unit. Record in two unused fields.
3. Tally the residual overstorey (L1 trees) using a fixed-area plot. Record in Field 98 of the T1 row. This does not need to be done by tree species.
4. Tally the Regeneration Understorey (Layers 2, 3 and 4 (L2/3/4), ≤12 cm dbh) using a fixed-area plot.
   - Tally all living, commercial trees (excluding germinants) by species in Field 95 of the combined understorey total tree row (T2/3/4). In the same row, record the sum of the total tree tallies in Field 98.
   - Tally well-spaced (WS) trees by species in the combined understorey WS row (W2/3/4). Tally all WS trees, including those in excess of the M-value (determined in Step 2), in Field 96. In the same row, record the sum of the WS trees up to the M-value in Field 99.
   - Tally free growing (FG) trees by species in the combined understorey FG row (F2/3/4). Tally all FG trees, including those in excess of the M-value (determined in Step 2), in Field 97. In the same row, record the sum of the FG trees up to the M-value in Field 100.
5. Record forest health data for Layer 1 and for the combined Layer 2, 3, and 4 at each plot. Refer to Section 27 of FS 660 for damage criteria for Layer 1 trees, and to Section 28 for trees in Layers 2, 3, and 4.
6. Tally plantable spots and preparable spots at each plot, as needed.
7. On the first plot and every fourth plot thereafter (minimum of three data sets per stratum), collect the following:
   a. Record the ground vegetation.
   b. Record the crown closure for Layer 1 and the combined Layer 2/3/4.

c. For the overstorey and combined understorey layer, choose a representative WS (or FG) tree of the leading silviculture species. The leading silviculture species may be different between the overstorey and understorey layers. For the selected trees, measure heights and ages. Heights include in-season growth.

d. For the overstorey and combined understorey layer, choose the tallest living tree of the leading inventory species and the tallest tree of the secondary inventory species. For the combined Layer 2/3/4, the selected tree should be within the fixed-area plot. For Layer 1, the selected tree should be "In" the variable-radius plot. For the selected trees, measure heights and ages. Heights include in-season growth.

8. Estimate the overall Tree Cover Pattern for the stratum being surveyed for the Layer 1 trees. Record in the Notes section.
9. Use SIBEC to determine site index for the leading inventory species for the layer with the highest volume or next due for harvest (the layer with the great site occupancy).

Data Summary

10. Silviculture and Inventory Labels will be generated for the overstorey (Layer 1) and combined understorey (L2 + 3+ 4) layer.
    a. The Layer 1 inventory label will include species composition (based on total BA), heights and ages for the leading and second species, crown closure, total density, and total BA.
    b. The Layer 1 silviculture label will include species composition (based on crop BA), height and age for the leading crop species, and crop BA. It does not include a WS/FG density.
    c. The inventory and silviculture label for the combined understorey L2/3/4 layer should be compiled, as per normal practices.
    d. To determine the silviculture species composition for Layer 1 and the combined understorey layer, use the tallies (WS/FG/crop BA) without the M-value applied.
    e. The WS and FG density for the combined understorey layer should be based on the WS and FG totals, with the M-value applied.
11. Determine the average crop BA/ha.
    - Calculate the average crop BA for the residual Layer 1 trees from the plot data. Note**:** There is a BA cap of 40 m^2. If any plots have >40 m^2 of crop trees, then they should be reduced to 40 m^2 for the purpose of calculating the average crop BA/ha for the stratum.
12. Determine the mean WS or FG/ ha.

- Calculate the average WS or FG density per hectare. It should be based on the WS/FG totals, with the M-value applied.
  Note**:** Statistical analysis is not applicable, due to the lower stocking values used in this methodology.

13. Look up the average crop BA (step 11) in the tabular table and find the corresponding TSS and MSS.
14. Compare the average stratum WS or FG density (step 12) to the MSS (step 13). If the WS/FG mean is ≥ the MSS sph, the regeneration or free growing obligation is met.

Appendix 4 Field Guidance for the Estimation of Cw Merchantable Volume

Western redcedar has a species-specific damage criterion for Layer 1 trees. To meet free growing, the stem must be able to produce ≥50% merchantable volume in the first 10 m log length, defined as either:

1. Utility grade—At least a solid 8-inch shell: Shake and/or Shingle
2. Higher grade—Complete solid wood: Saw logs

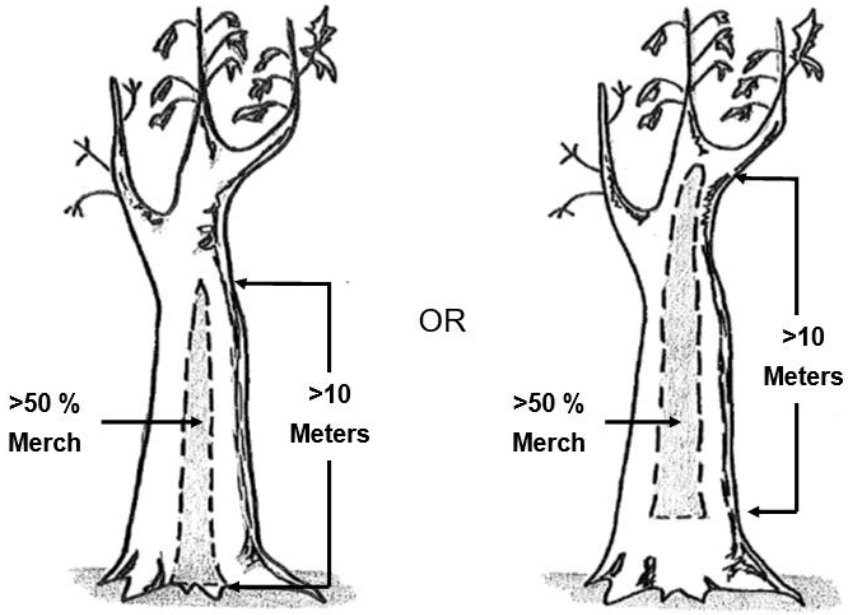

FIGURE A-4.1. Visual examples of Cw stem merchantability criteria.

The surveyor should look for visible defects that may indicate unmerchantable conditions. Common examples include:

- See through gaps in the flared butt, above the root collar, due to significant butt rot.
- Woodpecker holes around the complete circumference of the first and second 10 m. length of the stem.
- Excessive grain twist to the left[13] for the entire first and second 10m length of the stem.
- Large branches greater than the diameter of sound bole wood around the complete circumference of the first and second 10 m. length of the stem.
- Excessive sun checks on the upper segment of a dead top. Sun checks can penetrate twice the visible distance into sound wood to create unacceptable splitting.

[13] Twist to the left extends into the heartwood, significantly degrading the log quality and value.

FIGURE A-4.2. Acceptable butt rot: The butt rot does not extend completely through the tree.

FIGURE A-4.3. Acceptable forking and form: The first 10m log contains >50% merchantable volume.

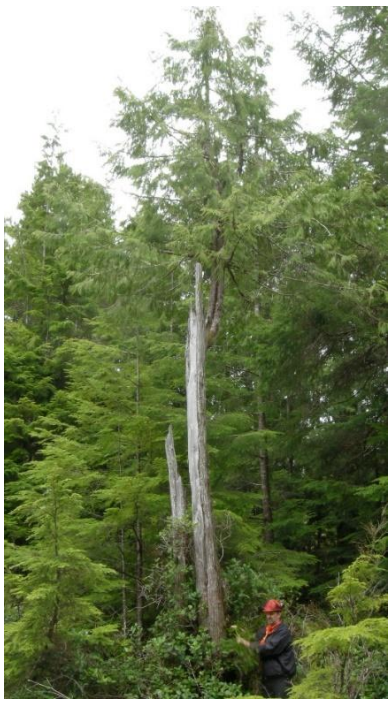

FIGURE A-4.4. Catface and fork: The first and second 10m logs contain less than 50% merchantable volume.

FIGURE A-4.5. Significant spiral grain.

Appendix 5 Example Forest Cover Submission to RESULTS

Last Action Date: 2025-04-28 **Comments:** No Forest Cover Map 4 rows returned

SU	Polygon ID	Non-Mapped Area	Layer	Polygon Area Gross	Polygon Area Net	Stocking Stat	Stocking Type	Reference Year	Species Code			Stems/ha Total	Stems/ha Total Well Spaced	Stems/ha Well Spaced	Stems/ha Free Growing	
1	T1		1	20	20	IMM	ART	2025	HW	CW	BA	110				Details
1	T1		1S	20	20	IMM	ART	2025	HW	CW	BA					Details
1	T1		3	20	20	IMM	ART	2025	HW	CW	BA	3940				Details
1	T1		3S	20	20	IMM	ART	2025	CW	HW			790	770	490	Details

1 of 1 |< < > >|

Last Action Date:	2025-04-28 02:48:03 PM	**Comments:**	No		
SU:	1	**Forest Cover ID:**	1042084	**Polygon :**	T1
Gross Area(ha):	20	**Net Area(ha):**	20		
Reference Year:	2025	**Reserve Type:**	D - Dispersed	**Reserve Objective:**	BIO - Biodiversity
Site Class:		**Site Index:**	28	**Site Index Source:**	E - SI from Biogeoclimatic Ecosystem Classification
Stocking Status:	IMM - Immature	**Stocking Type:**	ART - Artificial	**SI Species:**	HW - western hemlock
Tree Cover Pattern:	3 - Several (>3) sporadic occurrences of limited extent, circular to irregular shape.			**Re-Entry Year:**	

Layer 1 Mature

	Species	%	Average Age	Average Height
1	HW - western hemlock	56	130	31.1
2	CW - western redcedar	36	171	28.7
3	BA - amabilis fir	8		

Crown Closure:	20	**Basal Area**	12		
Stems/ha Total	110	**Total Well Spaced**		**Well Spaced**	**Free Growing**

Damage Agent	%	Area
DMH - Hemlock Dwarf Mistletoe (L. Arceuthobium tsugense)	13	
ND - Drought	10	
NW - Windthrow	1	
TL - Logging Wounds	5	

Layer 1S Silviculture Layer 1 - uneven aged

	Species	%	Average Age	Average Height
1	HW - western hemlock	72	130	35
2	CW - western redcedar	21		
3	BA - amabilis fir	7		

Crown Closure:		**Basal Area**	10		
Stems/ha Total		**Total Well Spaced**		**Well Spaced**	**Free Growing**

Layer 3 Sapling

	Species	%	Average Age	Average Height
1	HW - western hemlock	44	10	2.8
2	CW - western redcedar	42	12	3.6
3	BA - amabilis fir	11		
4	YC - yellow-cedar	3		

Crown Closure:	26	**Basal Area**					
Stems/ha Total	3940	**Total Well Spaced**		**Well Spaced**		**Free Growing**	

Damage Agent	%	Area

Layer 3S Silviculture Layer 3 - uneven aged

	Species	%	Average Age	Average Height
1	CW - western redcedar	87	12	2.4
2	HW - western hemlock	13		

Crown Closure:		**Basal Area**					
Stems/ha Total		**Total Well Spaced**	790	**Well Spaced**	770	**Free Growing**	490

Damage Agent	%	Area