

What's New in Silviculture Surveys - 2023

Email taisa.brown@gov.bc.ca if you would like to:

- join the surveyor distribution list
- provide feedback on the survey procedures, field cards, manual, videos, etc.
- learn about the silviculture surveyor accreditation program

A “What’s New 2023” training session is posted on the BC Silviculture Surveys YouTube [channel](#) and the BC Silviculture Surveys [website](#).

You can order paper field cards from www.dcv.gov.bc.ca (government clients) or dcvcustomerser@gov.bc.ca/ 1 800 282 7955 (other clients).

1. Updates to the Silviculture Survey Procedures Manual

Starting April 3, 2023, surveyors must follow the procedures outlined in the [2023 Silviculture Survey Procedures Manual](#).

There are only minor changes from 2022. These changes are identified in **green** in this document and the manual. Since 2022 was a transition year, the 2022 updates are also included in this document. They are highlighted with **red** font. Small edits or corrections have not been listed.

Section 1.2.1 History:

- Corrected an error regarding woodlot stocking standard replacement. Added a comment stating, “The standards in a woodlot Pre-Harvest Silviculture Prescription can be amended, but not replaced with woodlot license plan standards (FRPA Section 202).”

Section 1.3.1.1 Openings under FPC:

- A woodlot licensee must retain their obligations under these approved plans, up to relief of their obligation.

Section 2.1.1 Regeneration Delay Survey Timing:

- Introduced two best management practices (BMPs):
 - If survival is expected to be poor, licensees should avoid declaring regeneration delay met at the time of planting. This is important to capture and report the forest health factors and the surviving forest cover.
 - If the regeneration obligation is reported at the time of planting and the forest cover inventory significantly changes, it is a BMP to submit an additional forest cover submission to RESULTS.

Section 2.1.3 Free Growing Survey Timing:

- On sites where vegetation competition is a small factor in determining free growing status, the survey can be done any time of the year, subject to the limitations of snow depth and forest health best management practices.
- Introduced two BMPs:

- It is advisable to schedule stocking surveys early in the stand development. This allows for early identification of issues and the opportunity to manage the issues prior to free growing.
- Free growing surveys should be timed to maximize identification of forest health factors. For example, if rust incidence or hazard is high, the survey should be conducted during the rust sporulation season and when rust expression is at its peak.
 - Contact your regional forest pathologist or entomologist for clarification on the rust sporulation season and peak rust expression in your area, or for any other questions you may have regarding the timing of surveys to maximize identification of forest health factors.

Section 3.1 File Review:

- Woodlot licensees may have different requirements and standards outlined in their WLP, defaulted in the WLPPR, or set in a PHSP, Silviculture Prescription, or Site Plan. Defaults are not always used, so you must review the approved plan or prescription.
- Surveyors should be aware of block overlaps with spatially explicit Government Action Regulation (GAR) orders. Some orders (e.g., Cariboo Region's GAR) address factors that stocking standards do not, and these orders supersede approved stocking standards.

3.4.2 Procedures for the Assessment of Vegetation Competition

- No change in procedures.
- This section was re-organized, and more background information from the Establishment to Free Growing Guidebooks was added (e.g., quadrant method, countable broadleaf trees, allowable number of countable broadleaf trees) to improve clarity. The "General Eras of FG Standards" section was deleted.

Section 3.4.3.1 Maximum Density- FRPA era Opening

- In June 2022, the Chief Forester released a [memo](#) providing maximum density guidance. It is posted on the Silviculture Survey Reference Documents [webpage](#).
- In response to this updated guidance, many licensees are expected to amend their FSPs to remove any reference to maximum density thresholds.

Section 3.4.3.4 Countable Conifers:

- It is irrelevant to collect countable conifer data:
 - If maximum density is not listed in the stocking standards
 - For areas where the number of countable conifers is well below the maximum density

Section 3.5.1.1 SIBEC:

- An example of calculating site index using SIBEC for a stratum with multiple site series is provided.
- If the leading inventory species is not available in the SIBEC tables or suitable for growth-intercept, then its site index should be predicted using site class conversion (M) or by converting from another species (I). Do not report the site index for a different species.

Section 3.6 Basal Area Forest Cover Requirements

The requirements and procedures have not changed. The following are reminders:

- Basal area must be reported if it exceeds 5m²/ha or is part of a stocking standard.
- Section 3.6.1: If basal area is a required reporting attribute (above), then a complete inventory for the Layer 1 overstorey is necessary. This includes species composition, heights and ages, crown closure, and forest health for the Layer 1 trees. The SU must be reported as a multi-layer stand to RESULTS; the SU cannot be reported under Layers “I” and “S”.
- Section 3.6.2: The Layer 1 silviculture component is required if the Layer 1 trees contribute to the stocking obligation and there is a difference between the silviculture and inventory components.

Section 3.8.7 Minimum Stratum Size

- [FPPR 46.11](#) and the [Forest Cover Stratification and Milestone Declaration](#) document do not apply to woodlots.
- A follow-up document to the [Forest Cover Stratification and Milestone Declaration](#) was posted on the Silviculture Surveys Reference Documents webpage in 2022. The new document, [Using Stratification to Achieve Non-Timber Values](#), intends to:
 - Show how FPPR 46.11(2) can be used proactively to achieve non-timber objectives.
 - Demonstrate how to strategically prescribe vegetation management.
 - Provide guidance on silviculture surveying and RESULTS reporting.
- An accompanying [presentation](#) was posted on the BC Silviculture Surveys YouTube [channel](#). The video sets the context, cover survey basics, explains FPPR 46.11, outlines strategies for retaining more broadleaf trees, and provides examples.

Section 4.2 Sampling Intensity

- Sampling intensity must reflect the variability of the inventory characteristics (i.e., total density, inventory species composition, basal area).
- Sampling intensity is not capped at 1.5plots/ha; however, there is no expectation to establish more than 1.5plots/ha.

Section 4.4 Sampling Methods

- Surveyors should be cautious using representative sampling or visual assessments for free growing surveys. Licensees have an obligation to update the forest cover inventory at free growing. The information must be reported in a form and manner that is satisfactory to the minister (FPPR 86(6)). District and provincial audits have indicated that precision standards are not being consistently met with ocular assessments or representative sampling. This is a compliance issue, and it has impacts on the program areas that rely on accurate inventory information.

Section 4.4.1 Grid Sampling

- Only move plots for safety reasons or if they land in non-productive areas.
- If a plot lands under the drip line of the timber edge, complete the plot.

Sections 4.4.3 and 4.4.4 Representative Sampling & Visual Assessments

- The results need to be significantly similar to those that would result from a formal survey.
- Representative sampling and visual sampling are most suitable when:

- Used by skilled and knowledgeable surveyors with many years of directly related experience.
- Used for non-declaration (i.e., stocking) surveys:
 - E.g., To map brushing or juvenile spacing treatment areas.
 - E.g., To check the efficacy of brushing or juvenile spacing treatments.
 - E.g., To confirm that an opening is on track and to schedule a final free growing survey.
- Used on low-risk strata:
 - Obviously free growing and
 - Recent plot survey
 - Low forest health incidence and hazard
 - Low basal area (<5m²)
 - Low species diversity
 - Consistent stocking
- For visual assessments, when there are significant access or safety issues.

Section 4.4.4 Visual Assessments

- A sampling suitability matrix is under development. The matrix will help professionals demonstrate due diligence. To test the draft matrix and provide feedback, email taisa.brown@gov.bc.ca.
- Best management practices will be listed in the 2024 Silviculture Survey Procedures manual. If you have suggestions, email taisa.brown@gov.bc.ca.

Section 7 Field Data Collection

- For government clients, printed waterproof field cards can be ordered from the [Distribution Centre Victoria](#) website. For non-government clients, the cards can be ordered by emailing dcvcustomerser@gov.bc.ca or calling 1 800 282 7955.
- Stay tuned- self calculating excel spreadsheets are coming soon! There will be templates for layered, DFP, and multi-storied surveys.

Section 7.3 Precision Standards & Allowable Errors

- Table 9 now differentiates between legal precision standards and non-legal thresholds.
- Note: The percent allowable error applies to the reported totals and averages. They do not apply to individual measurements.

Section 7.4 Inventory Label Background

- This section outlines and rationalizes all the changes to the inventory label. The changes are being driven by the data needs of internal program areas that use survey information (e.g., growth and yield, carbon, forest health, wildlife, wildfire, etc.). There are new procedures for determining species composition, heights, ages, and density. These changes apply to all stand structures, stocking standards, and survey methodologies (e.g., even-aged, DFP, SEDRSS, multi-storey, layered).

Section 7.5.1 Plot Types

- Outlines the data elements and frequency for “count plots” and “full measure plots.”
- Height and age measurements will sometimes happen at count plots when the target species is not present at the full measure plot.
- Swiss needle cast data should be collected at the full measure plots (if applicable).

Section 7.5.2 FS658 Silviculture Survey Plot card, with sample data

BRITISH COLUMBIA		MINISTRY OF FORESTS		SILVICULTURE SURVEY PLOT CARD		SURVEYOR NAME(S) & REGISTRATION NO(S)		SURVEY DATE		PAGE																	
MAPSHEET-OPENING NO.		LICENCE NO.		CUTTING PERMIT		BLOCK		STANDARDS UNIT		STRATUM																	
93B023-123		FLA12345		678		9a		1		3 5																	
PLOT NO.	STRATUM	DATA TYPE OR LAYER	COUNT CON.	COUNT HEIGHT (m)	Fdi	Sx	Cw	Bl	Pa	At	TOTALS	STRATUMS INV/SILV SPP #1	INV / SILV SPP #1 HT	INV / SILV SPP #1 AGE	STRATUMS INV / SPP #2	INV / SPP #2 HT	INV / SPP #2 AGE	INV / CRWN CLSR	PLANTABLE	PREPARABLE	GERMINANTS NUMBER 'N'	GROUND VEGETATION		FOREST HEALTH			
																						SPECIES	% COVER	HT (m)	PEST CODE	TREE SPECIES AND # AFFECTED	LIVE TREES
1	A	T	36	1.3	29	2	15	9	-	26	81	Fdi	1.7	12	At	1.6	11	21	1	-	6	At	23	2.0	DRA	1Fdi, 1Bl	1Fdi
		W			3	1	-	1	-	-	5	-	-	-	-	-	-	-	-	-	-	Rubu par	10	1.5	AD	1Fdi	-
		F			3	1	-	Br	-	-	4	Fdi	1.6	12	-	-	-	-	-	-	-						
2	A	T	29	0.8	21	12	2	6	-	17	58	-	-	-	-	-	-	-	1	1	0	At	50	2.2	IWW	15x	-
		W			1	1	2	-	-	-	4	-	-	-	-	-	-	-	-	-	-				DRA	-	15x
		F			1	1	2	-	-	-	4	-	-	-	-	-	-	-	-	-	-						
3	A	T	41	1.1	21	12	12	1	-	15	61	Fdi	1.6	12	At	1.6	11	20	1	-	0	Sali spp.	15	2.0	DRA	1Fdi, 15x	1Fdi
		W			3	1	2	1	-	-	M	-	-	-	-	-	-	-	-	-	-						
		F			2 & 1Ht	1	1 & 1Ht	-	-	-	4	Fdi	1.5	12	-	-	-	-	-	-	-						
4	A	T	38	1.5	22	11	1	5	-	16	55	-	-	-	-	-	-	-	1	-	3	At	40	2.1	DRA	1Fdi, 15x	-
		W			3	2	1	-	-	-	M	-	-	-	-	-	-	-	-	-	-				AD	1Fdi	-
		F			3	1 & 1Ht	1	-	-	-	5	-	-	-	-	-	-	-	-	-	-						
5	A	T	32	1.3	27	1	5	6	1	19	59	Fdi	1.7	14	At	1.7	13	15	1	-	2	Sali spp.	20	2.4	DRA	1Fdi, 1Bl	1Fdi
		W			4	1	1	1	1	-	M	-	-	-	-	-	-	-	-	-	-	Rubu par	20	1.4			
		F			4	1	Br	1	-	-	M	Fdi	1.5	12	-	-	-	-	-	-	-						

Notes: Plot 1-The well spaced are clustered to one side so there is still one plantable spot. Plot 2-no signs of regression in the conifers.
Plot 5-Willow is being browsed. The remaining well spaced Fdi and Sx will outgrow the minor willow competition in 2 or 3 years. Pa looks good but is unacceptable species.

FS 658 2023/04/01 A brushing treatment is not required. Moose browse on the willow.

Section 7.5.2 FS658 Silviculture Survey Plot card, with field numbers

BRITISH COLUMBIA		MINISTRY OF FORESTS		SILVICULTURE SURVEY PLOT CARD		SURVEYOR NAME(S) & REGISTRATION NO(S)		SURVEY DATE		PAGE																											
MAPSHEET-OPENING NO.		LICENCE NO.		CUTTING PERMIT		BLOCK		STANDARDS UNIT		STRATUM																											
7		8		9		10		11		12																											
PLOT NO.	STRATUM	DATA TYPE OR LAYER	COUNT CON.	COUNT HEIGHT (m)	←	→	93	←	→	94	←	→	95	←	→	96	←	→	97	←	→	TOTALS	STRATUMS INV/SILV SPP #1	INV / SILV SPP #1 HT	INV / SILV SPP #1 AGE	STRATUMS INV / SPP #2	INV / SPP #2 HT	INV / SPP #2 AGE	INV / CRWN CLSR	PLANTABLE	PREPARABLE	GERMINANTS NUMBER 'N'	GROUND VEGETATION		FOREST HEALTH		
																																	SPECIES	% COVER	HT (m)	PEST CODE	TREE SPECIES AND # AFFECTED
86	87	88	91	92																		98	102a	103a	101b	102b	103b	106	107	108	110	111	112	113	114	115	116
		89																				99	101a	104a	105a												
		90																				100															

Notes: 117

FS 658 2023/04/01

Section 7.5.2 FS658 Data Entry

- Fields 88-90- **Data Type or Layer**: In the “Data Type or Layer” column, indicate the data type for each row with a T (total trees), W (well-spaced) and F (free growing). If there are multiple layers, the rows will need to be replicated for each applicable layer. E.g., T1, T2, T3, and T4.
- Field 93- **Blank/Species**: List all the commercial tree species present within the stratum. Commercial= trees species listed in Table 6 of the FS660 or the RESULTS tree list.
- Field 94- **Blank/Acceptability**: Indicate the level of acceptability (p, a, u) for each tree species.
- Field 95- **Total Trees**: Tally the living, commercial trees by species in the plot. Include acceptable and unacceptable quality trees. All trees are to be tallied, except germinants.
- Field 95- **Total Trees**: If there are >50 trees in the 3.99m plot (all species combined, excluding germinants), then it is reasonable to estimate tree counts by species. Surveyors must still exercise caution because the precision standards must be met at the stratum level.
- Field 98- **Totals (Total Trees)**: Record the sum of the total tree tallies by species.
- Field 101a- **Stratum’s INV/SILV SPP#1**: Record the stratum’s leading species for the applicable layer or data type.
- If the leading silviculture species for the stratum is unclear based on your walk-through, collect heights and ages for each of the potentially leading species. These measurements can be averaged by species and reported to RESULTS.
- If the leading or second inventory species for the stratum is unclear based on your walk-through, collect inventory heights and ages for each of the potentially leading and second inventory species. These measurements can be averaged by species and reported to RESULTS.
- While it is optional, there are many benefits to collecting and reporting silviculture heights and ages for the non-leading silviculture species. For example, silviculture heights and ages by species can be used to compare free growing heights for each species to the stocking standard minimum heights, to predict free growing timing, and to understand growth rates by species.
- The same sample tree must be used for both height and age measurements.
- Fields 102a, 103a- **Inv SPP #1 Height/Age**: Select the tallest (excluding residuals), living tree in the 3.99m plot for the leading inventory species of the stratum. Measure and record the age and height of the selected tree.
- Fields 104a,105a- **Silv SPP #1 Height/Age**: Select a representative well-spaced or free growing tree from within the plot for the leading WS and/or FG species of the stratum. Measure and record the age and height of the selected tree.
- Field 101b- **Stratum’s INV/SILV SPP#2**: Record the stratum’s secondary species for the applicable layer and data type.
- Fields 102b, 103b- **Inv SPP #2 Height/Age**: Select the tallest (excluding residuals), living tree in the 3.99m plot for the secondary inventory species of the stratum. Measure and record the age and height of the selected tree.
- Fields 104b,105b- **Silv SPP #2 Height/Age (Optional)**: Select a representative well-spaced or free growing tree from within the plot for the secondary WS and/or FG species of the stratum. Measure and record the age and height of the selected tree.
- Field 106- **Crown Closure**: If available, estimate crown closure for the stratum using recent aerial imagery. If not available, the surveyor should estimate the crown closure of the living commercial tree species for the plot and surrounding area. Crown closure can be rounded to the nearest 5%.

The stratum crown closure should be within 10% of an auditor. Crown closure should reflect conditions under full leaf flush.

- **Determining Tree Ages:** Explained how age can be determined for determinate and indeterminate species and for planted trees.
- **Determining tree heights:** Measure from the point of germination to the top of the dominant leader of the selected tree. During the active growing season, include the leader growth (in-season partial growth) in the height measurement.
- **Frequency of measurements:** Measurements for silviculture and inventory heights and ages should be recorded on the first plot and every fourth plot thereafter. Ex. 1, 5, 9, 13, etc. If the target species is not present, complete the height measurement at the next plot with the species present. At minimum, 3 samples should be collected per stratum, although more samples are encouraged.
- **Field 107- Plantable:** If the number of plantable spots meets the planting “M-value”, record the letter “M” rather than the numeric value.
- **Field 109- Germinants/Number ‘In’ Check Box:** Indicate what data is being collected in the column. Germinants is optional, though strongly recommended where it can have an impact on treatment recommendations (e.g., natural regeneration assessments or survival surveys). Number ‘In’ must be collected if basal area is specified in the stocking standards or if basal area >5m²/ha.
- **Field 110- Germinants/ Number ‘In’:** If germinants is checked in Field 109, then record the number of germinants within the plot. A germinant is a ≤ 5cm natural (disregarding the loss of height by a forest health factor). Age is not a consideration. Planted seedlings or well-spaced trees of any size or age are counted under total trees by species (Field 95), not germinant (Field 110). If Number ‘In’ is checked in Field 110, record the number of Layer 1 trees ‘in’ the prism sweep.
- **Field 111-113: Ground Vegetation:** Estimate the % cover and average height of the vegetation in and around the plot. At minimum, competing vegetation species should be recorded. Based on local-level interests and needs, vegetation can include invasive, forage, edible, medicinal, or culturally important species.
- **Field 114- Forest Health Pest Code:** If there are multiple forest health factors on the same tree, record only the one with the longer and/or more damaging impact. If you are uncertain about which forest health factors have longer and/or more damaging impact, contact your regional Forest Pathologist and Entomologist for clarification before beginning your surveys.
- **Field 114- Forest Health Pest Code (Regen Delay):** Forest health information should now be reported at regeneration delay. Tally all incidences of forest health factors (max of 1 per tree). Trees with very minor damage can be excluded if they meet conditions specified on pg. 90. Trees with reportable damage can still be considered well-spaced unless the damage will prevent the tree from attaining free-growing status in the future (e.g., rust on the main stem). During stocking surveys, the regeneration delay guidance should be followed if free growing data will not be collected. If free growing trees will be tallied, then the free growing guidance should be followed and the damage criteria should be applied.
 - One of the conditions on Pg.90 was modified to “good foliar colour and needle retention for the trees species and age.”

Other (FS658 deletions):

- The POC, Bearing & Distance fields have been removed. If you are still using map and compass, record your POC, bearing and distances on the back of the field card or in unused fields.

- The Total Con field has been removed. It is not a reportable data element. If you would like to know the number of conifer trees, sum the conifer tree counts in Field 95.
- The GI Sample & Data Spp. column has been removed from the FS658. If using growth intercept, enter the data in the FS659.
- The inventory section of the FS658 has been deleted. This information is now collected at the plot in the “T” rows.

Section 7.6.2 Forest Health Resources

- The links to the FPC forest health guidebooks have been removed. They were considered too out-of-date by the forest health specialists. Instead, they recommended referencing the Stand Establishment Decision Aids or information on the FOR-Forest Health website.

Section 7.6.4 Swiss Needle Cast (SNC)

- A new SNC data collection procedure was released on February 1st, 2023. It applies to the Coast region of British Columbia.
- The SNC data collection should be completed on all stands with $\geq 50\%$ Fdc with trees ≥ 5 years old.
 - The SNC data should be collected on strata where Fdc was the *intended* crop species. If your operating area experiences high levels of natural infill, consider using a lower Fdc threshold.
- For detailed instructions on the SNC data collection procedure, please refer to:
 - <https://www2.gov.bc.ca/gov/content/industry/forestry/managing-our-forest-resources/silviculture/silviculture-surveys/silviculture-survey-reference-documents>
 - Download the spreadsheet. It includes written instructions, the submission template, helpful graphics, and reference pictures.
 - Watch the linked training videos.

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Section 8.1: FS659 Silviculture Survey card, front side

- Field 125: **Blank/Total Trees By Species**: Sum total trees by species across all plots.
- Field 126: **Total Trees**: Sum the total tree counts by species in Field 125.
- Field 127: **Total trees species composition**: Calculate species composition using the total tree value and the tree counts by species.
- Fields 128, 129, 130, 131, 141, 142: **Inv and Silv heights and ages**: Average the silviculture height and age measurements by species. Average the inventory height and age measurements by species.
- Field 132: **Crown Closure**: If crown closure was determined using ground-based estimates, average the plot estimates.
- Field 136: **Germinants**: If germinants is recorded in Field 110, record the sum of germinants across all plots.
- Field 154: **Calculations**: Calculate the average germinants per hectare.
- Field 161: **Species & %**: The inventory label species composition is based on Field 127. The inventory label can host 10 species. If there are greater than 10 species, group the most minor species with the leading species. If the total does not result in 100% due to mathematical rounding, adjust the leading species percentage. For single-layer SUs, the species composition is based on density (tree counts by species). For multi-layer SUs, inventory species composition is based on basal area (number “in” by species) for Layer 1 and density for Layers 2, 3, and 4.

Section 8.1 FS659 Silviculture Survey card, back side

- Field 170-171: If edible, medicinal, invasive, or forage species were recorded, the annual height increment, current competition, and potential competition fields may not be necessary.
- Field 173: **Area if only part of the stratum is affected**: Warning- this field does not exist in SNAP or SAP or many licensee databases. However, it is a required reporting element for RESULTS.
- Fields 178-179: **Treatment Recommendations and Considerations**: The RESULTS objective code field is now mandatory for drought or frost-caused replants or fill plants. If applicable, indicate in the treatment recommendations to use NG (frost) or ND (drought) as the objective code.

Section 8.1.1.4 Statistical Analysis

- Clarification: The “e-value” used in the formula to determine the number of additional plots is based on **trees/plot**, not trees/ha.

Section 8.1.3.2 RESULTS Reporting

- With the Forest Statutes Amendment Act (Bill 23), written declarations are now **legally required** for free growing.
- FPPR 97(7) requires a current forest cover update when a milestone declaration is submitted. “Current” can be interpreted as <18 months.

Section 8.1.4 Inventory Label- Polygon

- Fully re-written to reflect the changes in procedures.

Old: Fdi40At30Sx10Bl10Cw10 -13/12-1.4/1.3-21/I-20-12,700(22)

New: Fdi38At30Sx12Bl11Cw9-13/12-1.7/1.6-21/I-20-12,520(22)

Key Changes:

- Record species composition to the nearest 1%
- For single-layer SUs: Base species composition on tree counts by species (excluding germinants).
- For multi-layer SUs: Base species composition on basal area sweeps by species for Layer 1 and tree counts by species (excluding germinants) for Layers 2, 3, and 4.
- Include in-season partial growth in height measurements.
- For height and age measurements, select the tallest, living tree (excluding residuals) within the plot for the stratum's leading and secondary species.

Section 8.1.5 Silviculture Label-SU

- Fully re-written to reflect the changes in procedures.

Old: FG-Fdi56Sx22Bl13Cw9-12-1.2-21/E-920(22)

New: FG-Fdi56Sx22Bl13Cw9-12-1.5-920(22)

Key changes:

- Include in-season partial growth in height measurements.
- Measure height and age on a representative WS or FG tree of the stratum's leading species.
- Site index and source is optional. It is not reported to RESULTS.

Section 9 Alternative Survey Methodologies

- The stocking standards and survey methodologies outlined in silviculture plans or prescriptions take precedence over the Survey Selection Matrix. However, if stocking standards have been incorrectly applied, such as using uneven-aged stocking standards in a multi-layer opening intended for even-aged management, the site plan or prescription should be amended.
- The data collection steps for the Multi-Storey, Layered, DFP, and SEDRSS methods were modified to align with the procedural changes outlines in Sections 7 and 8:
 - Count trees by species for Layers 2, 3, and 4, or the combined understorey layer (DFP/SEDRSS).
 - Count total trees for Layer 1.
 - Count total "Number In" by species for Layer 1.
 - At the full measure plots, record crown closure, silviculture heights/ages and inventory heights/ages by layer, as per Section 7.5.2.
 - The sample trees for the height/age measurements should be within the fixed area plots for Layers 2, 3, and 4. The sample trees should be "In" the variable radius plots for Layer 1.
 - Estimate the Tree Cover Pattern of the Layer 1 trees for the stratum.

Section 9.1.3 Forest Cover Reporting

There is no change in requirements/procedures. The following are reminders:

- If basal area is a required reporting attribute, a complete inventory for the Layer 1 overstorey is mandatory. The standards unit must be reported to RESULTS as a multi-layer stand. The understorey layers must be reported as Layers 2, 3, 4, or as a combined understorey layer. The SU cannot be reported under Layers "I" and "S".

- There are additional reporting requirements for the polygon component: reserve type, reserve objective, and tree cover pattern.
- If you are surveying in stands with Layer 1 trees, please read [*Submitting Forest Cover to RESULTS for Openings with Treed Retention*](#).

Section 9.2.1 Multi-Storey Survey

- Outlined the key features of a multi-storey survey.
- Linked Dave Weaver's training video: https://www.youtube.com/watch?v=C4k-LwAwW2Q&ab_channel=NRSBC

Section 9.2.2 Layered Survey

- Recommended BA is <10m² for the Interior and <18m² for the Coast.
- The key features of a layered survey are listed.
- Linked Dave Weaver's training video: https://www.youtube.com/watch?v=C4k-LwAwW2Q&ab_channel=NRSBC

Section 9.2.3 Deviation from Potential Survey- Interior Method

- Linked Dave Weaver's training video: https://www.youtube.com/watch?v=C4k-LwAwW2Q&ab_channel=NRSBC
- Linked the "Stocking in Partial Cut Stands" webpage. It includes the DFP training workbook, a technical report, and an extension note.

Section 9.2.4 SEDRSS Survey

- Linked the Appendix 3: Coastal Second Growth Douglas-fir Retention Stocking Standard.
- Linked two videos from the BC Silviculture Surveys YouTube Channel:
 - SEDRSS- 2022 Survey Procedures: <https://youtu.be/C4lltOt9Ugw>
 - CSC 2022- SEDRSS Background Info: <https://youtu.be/0a8XgXfuZ0c>
- Added the second growth Fdc criteria.
- Added new tabular stocking standard examples.
- The SEDRSS DFP Option 1 was removed from the survey manual. Use the tabular method.
- Reporting by layer is not required. You can report two layers: an overstorey (Layer 1) and a combined understorey (Layers 2, 3, and 4). Report the combined understorey layer to the most abundant layer in RESULTS (L2, L3, or L4).
- Record the total and crop "Number In" by species.
- Total density is not required if stocking status is MAT-mature.

Section 9.4.2 Use of Planting Quality Inspection Plots to Meet Regen Delay Declaration Survey

- FS704 plots must be stratified by standards unit and any other applicable stratification criteria, as listed in Section 2 of the FS660.

Section 10.1 Staying Current

- Listed steps for staying current in silviculture surveys.

Appendix 1: Glossary

- Some terms were removed or edited.
- Planting (PL): The planting technique code refers to a planting activity with a planting/planted density $\geq 80\%$ of the Target Stocking Standard (TSS). It only applies to sites that have not been previously planted.
- Replant (RP): The replant technique code refers to a planting activity on a previously planted site with a planting/planted density $\geq 80\%$ of the Target Stocking Standard (TSS).
- Fill plant (FP): The fill plant technique code refers to a planting activity where the planting/planted density is $< 80\%$ of the Target Stocking Standard (TSS). The fill planting technique code can apply on previously and not previously planted sites.

Appendix 3: List of References and Hyperlinks

- All references updated with live links.

Appendix 5: Forest Cover Map Legend

- 6.2 Old Forest Cover Legend deleted.

Appendix 8: Local Geographic Free Growing Competition Assessment Criteria

- “Appendix 13” will now be known as “Appendix 8”.
- Coastal TSAs updated.

Appendix: Magnetic Declination and Annual Change

- Deleted

Appendix: Ministry of Forests Field Cards and Forms

- Deleted

Appendix: Crown Closure Comparative Diagrams

- Deleted. Refer to 2023 FS660.

Appendix: FS660 Silviculture Survey Reference Card (oct. 2017)

- Deleted. Refer to 2023 FS660 document.

Appendix: Free-Growing Damage Criteria for Even-Aged (Age Class 1) Coniferous Trees (rev. 6, July 2014)

- Deleted. Refer to 2023 FS660 document.

Appendix: Broadleaf Free-Growing Damage Criteria as a supplement to the FS660 (Oct 2011)

- Deleted. Refer to 2023 FS660 document.

2. Updates to Field Cards

FS660

- Section 1: Consider the stratum's ecological classification during the walk-through.
- Section 4: In your history label, it may be helpful to specify the planting technique (PL, FP, RP).
E.g., L'08-10, PL'11, FP'13
- Section 5: Fixed 2 typos for 11.28m radius plots. The plot area is 400m² and the multiplier is 25.
- Section 6: Fixed typo for Noble fir and updated its code to Bp.
- Section 16: Updated this section to focus on Local Geographic Competition Criteria.
- Sections 18b, c, d: Included overlapping regions in brackets, though the decision keys are linked to TSAs.
- Section 21a-d: The forest health team updated the FS747 in 2022. The FS660 includes several additional codes that are relevant for young stands at regeneration delay. E.g., AN=horseradish, PBC= gray mold, PFX=Fusarium spp., PPG= Damping-off disease
- Section 25a: Basal area must be reported if it exceeds 5m²/ha or is specified in the stocking standards.
- Section 25b: Included the definition of germinants (≤5cm natural) and provided examples.
- Section 27a and b: Fixed typos and errors in the tables.
- Section 30: Removed df column to prevent confusion for new surveyors. Changed Step 4 to "find t-value for 90% and n".
- Section 31c: Fixed typo. The 2nd row was meant to be At, not Act.
- Section 32: Average site index relationships can be used with growth intercept. If used, the site index source code should be "I".
- Section 33: Fully updated to reflect new methodologies and reporting requirements.
- Section 34: Added boring height age correction table.

1138A:

- Colour coded the card to make the formulas easier to follow.
- Instruction changed to "t90 for n" to correspond with Section 30 in the FS660.

FS658:

- The "Competing Vegetation" heading was changed to "Ground Vegetation." As needed, this field can be used to record competing vegetation, forage, edible, medicinal, or invasive species.
- Added 2 new columns: Stratum's Inv/Silv Spp #1 and Stratum's Inv/Silv Spp#2.
 - The 1st/2nd species may be different between the inventory and silviculture label and between the Layers. These new columns will prevent data entry or compilation errors.

FS659:

- "Ground Vegetation" heading vs "Competing Vegetation".
- Added 2 new columns: Stratum's Inv/Silv Spp #1 and Stratum's Inv/Silv Spp#2.