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April 1, 2021

BY EMAIL

To: Regional Executive Directors

From: Allan Bennett, Director, Timber Pricing Branch

Re: Amendment No. 3 to the *Provincial Logging Residue and Waste Measurement Procedures Manual – Coast, Woodlot Licences, and Community Forest Agreements*

I hereby approve Amendment No. 3 to the *Provincial Logging Residue and Waste Measurement Procedures Manual – Coast, Woodlot Licences, and Community Forests*.

The manual can be found here:

[Provincial Logging Residue and Waste Measurements Procedure Manual - Coast, Woodlot Licenses and Community Forest Agreements](#)

The purpose of this amendment is to:

- update the waste relief application process,
- update waste assessment procedures relative to post harvest appraisal data submissions,
- update the application of the Fibre Recovery Zone waste rates, and
- provide clarity throughout.

Amendment No. 3 comes into effect April 1, 2021.

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Timber Pricing Branch

Highlights

Amendment No. 3 – Provincial Logging Residue and Waste Procedures Manual – Coast, Woodlot Licences, and Community Forests Version Highlights

Section, Table or Appendix Number	Description
Throughout	Removed Pre-Harvest Waste Assessment procedures
Throughout	Minor wording changes
1.1	Removed Waste Assessment Policy and provided new link
1.2.3, 1.2.4	Added clarity on when waste submissions are required
1.2.6.1, 1.2.7	Updated monetary billings relative to the fibre recovery zone fraction
1.2.5	Reorganized definitions and added definition of “conventional”
1.6	Updated Waste Relief procedures
4.4.2	Update to procedure for determining plot location on roadside strata
5.3.2	Added submission requirements for waste assessment areas containing standing timber
5.3.2.2	Reorganized and updated submission and survey requirements
5.3.2.3	Updated wording when billing is required on unharvested cutblocks
5.7.2.1	Updated missing text in the harvest method table
7.4.1.2	Clarified Fibre Recovery Zone applicability and added FRZ adjustment factors
Table 7-1	Updated with new Obligation Adjustment values
Appendix 5	Updated benchmark selection criteria
Appendix 7	Updated the FRZ flow chart

1 Policy and Administration

1.1 Waste Assessment Policy

The Waste Assessment Policy can be found online at:

<https://www2.gov.bc.ca/gov/content/industry/forestry/competitive-forest-industry/timber-pricing/forest-residue-waste>

1.2 Purpose and Rationale

1.2.1 Purpose

Waste assessments are carried out to bill licensees monetarily for timber except reserved timber, whether standing or felled, that will not be removed from the cutting authority area and which meets or exceeds the timber merchantability specifications described below.

Table 1-1 Coast Timber Merchantability Specifications

Description		Mature*	Immature*
Stumps**			
•	no higher than	30 cm	30 cm
Top diameter (inside bark)			
•	all timber that meets or exceeds	15 cm	10 cm
Slab thickness:			
•	all slabs that meet or exceed (cedar only)	15 cm	10 cm
•	all slabs that meet or exceed (all other species)	10 cm	10 cm
Minimum length			
•	log or slab	3 m	3 m

* The selection of Mature or Immature is based on the determination of maturity in a timber cruise of the cutblock. Once a cutblock is determined to be "mature" in a cruise compilation (based on 50 + % of coniferous timber having an average age of 121 years or older and deciduous timber having an average age of 41 years or older), the Mature Timber Merchantable Specifications shall be used for waste measurement of all coniferous and deciduous timber left within the cutblock.

Conversely where a cutblock belongs to immature in a cruise, the Immature Timber Merchantable Specifications shall be used for waste measurement of all coniferous and deciduous timber left within the cutblock.

1.2.2 Rationale

The right to harvest Crown timber is granted in the form of agreements under the *Forest Act*.

The licensee has the discretion of whether or not to harvest the timber from the agreement area subject to the forest management standards required.

Pursuant to the *Forest Act*, an agreement holder must pay stumpage for timber that was harvested.

Under the *Forest Act* and the agreements, the licensee must pay a waste assessment for merchantable timber not harvested and for timber deemed to be wasted.

1.2.3 Scale Based Cutting Authorities

Where the amount of stumpage payable on the timber harvested from a cutting authority is calculated using the information reported in a scale of the timber, the holder of the agreement must conduct a waste assessment on that cutting authority.

1.2.4 Cruise Based Cutting Authorities

Where the amount of stumpage payable on the timber harvested from a cutting authority is calculated using the information reported in a cruise of the timber, the holder of the agreement is not required to conduct a waste assessment on that cutting authority.

1.2.5 Definitions

“**Avoidable waste**” means waste that does not fall within the definition of unavoidable waste.

“**Conventional**” means any harvest method that does not use a helicopter;

“**Fibre Recovery Zone**” (**FRZ**) means the area that is within the geographic boundaries of a Fibre Recovery Zone established by the director of Forest Tenures Branch.

- i. Fibre Recovery Zones are subdivided into three units: Immature Crown Timber, Mature and Immature Crown Timber, and Mature Crown Timber.
- ii. The location(s) of Fibre Recovery Zone(s) may be found online at: <https://www2.gov.bc.ca/gov/content/industry/forestry/competitive-forest-industry/timber-pricing/forest-residue-waste>
- iii. The map is provided as a general spatial representation of the Fibre Recovery Zone boundaries.

- iv. To determine if an area of interest falls within a Fibre Recovery Zone, please refer to the [WHSE ADMIN BOUNDARIES.FADM FIBRE RECOVERY ZONES S P layer](#) located in the BC Geographic Warehouse.

"**Merchantable timber**" means timber that meets or exceeds the timber merchantability specifications that are described in Table 1-1 for the Coast and in Table 1-2 for the Interior in this manual. Timber that is graded dry Y (5) or Z (Coast), graded dry 4, 6 or Z (Interior) is not merchantable.

"**Timber Merchantability Specifications**" means stump height and diameter, log top diameter, slab thickness and log length described in this manual for the Coast and the Interior.

"**Unavoidable waste**" means waste that:

- i. is inaccessible or physically obstructed;
- ii. could not be felled, bucked or removed due to safety or environmental reasons.

"**Waste**" means timber, except timber reserved from cutting, whether standing or felled, which meets or exceeds the timber merchantability specifications described for the Coast and the Interior in this manual that was not removed from the cutting authority area.

"**Waste assessment**" means an assessment conducted in accordance with the procedures set out in the *Provincial Logging Residue and Waste Measurement Procedures Manual* for determining the volumes of merchantable timber and waste left on a harvested area following completion of primary logging.

"**Waste benchmark**" means the volume of avoidable waste, expressed in cubic metres per hectare, that can be left on a harvested area without being subject to a monetary waste assessment.

1.2.6 Monetary Billings

Subject to the waste benchmarks described in Appendix 5, the avoidable waste volumes are billed as follows.

1.2.6.1 Coast

The avoidable conifer grade X, Y and grade U hemlock and balsam waste volumes are billed at:

- i) \$0.25 per m³ when originating from timber located outside a Fibre Recovery Zone **or when the FRZ adjustment factor is 1**, or
- ii) \$2.00 per m³ when originating from timber located inside a Fibre Recovery Zone **and the FRZ adjustment factor is greater than 1**.

Dead/dry grade Y (grade 5) timber not removed from the harvested area is not measured in waste assessments.

The avoidable coniferous waste volumes for hemlock and balsam that are Grade J or better, and for all other species, grade U or better, are billed at rates determined in section 7.4.1 of this manual.

1.2.6.2 Interior

The avoidable waste volumes of grade 4, lumber reject; are billed at \$0.25 per m³.

The avoidable sawlog grades (1 and 2) volumes are billed at the rates determined in section 7.4.1 of this manual.

1.2.7 Deciduous

Deciduous species are treated the same as coniferous species for waste billing purposes. Deciduous timber within the merchantability specifications that is not harvested is measured as waste.

The avoidable sawlog volumes for deciduous species are billed at:

- i. the fixed rate for the species as specified in the *Coast and Interior Appraisal Manuals*, plus any bonus and levies where applicable when the source of the timber is located outside of a Fibre Recovery Zone, **or when the FRZ adjustment factor is 1, or**
- ii. \$2.00 per m³ when the source of the timber is located inside a Fibre Recovery Zone **and the FRZ adjustment factor is greater than 1.**

The avoidable volumes of grades other than sawlog are billed at:

- i. the rates established as per *Coast and Interior Appraisal Manuals* when the source of the timber is located outside a Fibre Recovery Zone, **or when the FRZ adjustment factor is 1, or**
- ii. \$2.00 per m³ when the source of the timber is located inside a Fibre Recovery Zone **and the FRZ adjustment factor is greater than 1.**

1.2.8 Amount Payable

For merchantable Crown timber that is not cut and removed, the amount payable is calculated by multiplying:

- a. the volumes of avoidable waste reported in a waste assessment after deducting the waste benchmark volume allowed under Appendix 5, by
- b. the applicable rates specified in 1.2.4.1, 1.2.4.2, and 1.2.5

1.3 Authority

Waste assessments are carried out under the authority of:

1. The *Forest Act*.
2. The Waste Assessment Policy.
3. The *Provincial Logging Residue and Waste Measurement Procedures Manual*.
4. Agreement and Cutting Permit documents.

1.5.5 Licensees

Agreement holders are responsible for conducting waste assessments on their scale based cutting authorities **in accordance with the *Forest Act***.

The licensees are responsible for:

1. Submitting annual waste assessment plans.
2. Conducting waste assessments in accordance with this manual.
3. Submitting waste field data into the online Waste System.

Where the above mentioned work is performed by a contractor or a sub-contractor, it is the licensee's responsibility for ensuring that the work is carried out in compliance with Ministry standards and requirements.

1.6 Waste Relief Applications

A licensee may apply, in writing, for waste relief with respect to the timber left on a cutting authority provided the government has not issued a waste assessment (invoice) for the timber to the licensee.

1.6.1 Initiating an Application for Waste Relief

An application for waste relief must include:

1. a written statement from the licensee that:
 - a. identifies the applicable Part of the Waste Relief Policy under which the application is made; and
 - b. explains the basis on which the licensee considers that the circumstances relating to the cutting authority meet the criteria of that Part;
2. any evidence upon which the licensee relies; and
3. data on the timber volumes and grades in relation to which the licensee is seeking the relief (the “supporting data”)
(collectively, the “application”).

The supporting data under paragraph 3 must:

- a. provide an accurate estimate of the timber volume remaining on each cutblock in the cutting authority. The estimate of remaining timber volume may be determined by methods that include, but are not necessarily limited to, one or more of the following:
 - i. a full waste survey conducted in accordance with this manual;
 - ii. a timber cruise with a map showing the locations of the timber included in the application.
- b. be submitted into the Waste System with a notation or comment in the Waste System identifying that the information pertains to an application for waste relief.

The licensee must submit the written statement and evidence to the Area Director of Pricing and Tenures and the supporting data into the Waste System.

1.6.2 Processing of Application

Following receipt of an application that complies with the requirements of section 1.6.1, the Area Director of Pricing and Tenures will direct the preparation of a draft information package that includes:

1. the licensee’s application,
2. relevant additional information on the cutting authority,
3. an estimated waste monetary assessment based on the timber grade profile (for each cutblock in the application as applicable) and the applicable waste rates,
4. if the application is made under Part 2 of the Waste Relief Policy, an assessment of the opportunity for resale of the timber included in the application, including the current market value, and

5. a draft Briefing Note to the ADM providing analysis of whether the application meets the criteria of the Waste Relief Policy and should be approved.

The Area Director of Pricing and Tenures will forward the draft information package in electronic form to the Director, Timber Pricing Branch, Ministry of Forests, Lands, Natural Resource Operations and Rural Development.

The Director, Timber Pricing Branch will review, update, and submit the information package to the ADM for a preliminary assessment.

If the ADM's preliminary assessment following review of the information package is that the application:

1. should not be approved:
 - a. the ADM will disclose to the licensee the evidence and rationale supporting the preliminary assessment and offer the licensee the opportunity to respond within a defined period;
 - b. any response from the licensee must be submitted to the ADM and is appended into the information package;
 - c. if the ADM determines that further clarification is needed, the ADM will offer the licensee the opportunity to provide such clarification within a defined period, and any response from the licensee must likewise be submitted to the ADM and appended into the information package;
 - d. once the ADM is satisfied that no further clarification is required regarding the licensee's response the information package is deemed to be final; and
 - e. the final waste relief determination is made under section 1.6.3.
2. should be approved:
 - a. the information package is deemed to be final, and the final waste relief determination is made under section 1.6.3.

1.6.3 Final Waste Relief Determination

Following review of the final information package, the ADM will approve or reject the application and notify the licensee, with a copy to the District Manager, the Timber Sales Manager in the case of BCTS agreements, and the Area Director of Pricing and Tenures.

If the application is rejected, the waste survey will be processed, and an invoice will be issued for the timber included in the application.

If the application is approved, the waste survey submission status in the Waste System will be updated so that billing will not occur for the timber included in the application.

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2 General Assessment Requirements and Reporting Units

2.1 Field Assessments and Reporting Time Frames

1. Where the amount of stumpage payable on the timber harvested on a cutblock by the holder of:

- a. a major licence,
- b. a community forest agreement,
- c. a community salvage licence,
- d. a woodlot licence,
- e. a road permit,
- f. a licence to cut, or
- g. a timber sale licence,

is calculated using the information reported in a scale of the timber, the holder of the agreement must conduct a waste assessment on that **waste assessment area the earliest of:**

- i. sixty (60) days after primary logging has been completed on the **waste assessment area**, or
 - ii. within sixty (60) days after the cutting authority authorizing the harvesting of that timber expires or is otherwise terminated, whichever occurs first, or
 - iii. as soon thereafter that the ground is sufficiently free of snow that an assessment may be carried out on the cutblock.
2. The holder must submit the waste assessment data for a cutblock to the district manager within thirty (30) days of the completion of the waste assessment.

2.4 Reporting Unit Options

1. Blocks are reported in the Waste System using a 'Reporting Unit' that is unique to the license owner of the block(s). A Reporting Unit is a reporting mechanism to store and report waste information. Reporting Units can be created for the following reporting options:
 - a. the cutblock option – used to report a waste assessment area.
 - b. the aggregate option – used to report a group of blocks using the parent/child method.
 - c. the ocular estimate option – used to report a group of blocks using only ocular estimate submissions.

2.4.1 Waste Assessment Area

A waste assessment area can be either a cutblock, or a portion of a cutblock submitted in a waste assessment.

Cutblocks containing both helicopter and conventional harvest methods must be separated into two waste assessment areas and sampled separately in the Coast Area.

Waste assessments may be submitted as separate waste assessment areas for each year of harvest when the harvest of a cutblock has occurred over multiple years.

2.4.2 Fibre Recovery Zone Cutblocks

Waste assessments for cutblocks in which a portion of the cutblock area is within a Fibre Recovery Zone, and the FRZ waste rate is applicable to the waste assessment area, must be surveyed either:

1. As two waste assessment areas, with one assessment area within a Fibre Recovery Zone and the other assessment area outside of a Fibre Recovery Zone, or
2. As one waste assessment area, and
 - a. The waste assessment area submitted into the Waste System will contain the areas inside and outside the FRZ, and
 - b. The FRZ rate will apply to the entire submission.

2.4.3 Cutblock Option

1. Where the holder of an agreement uses the cutblock option, each cutblock is a separate reporting unit.
2. Each cutblock must be sampled in accordance with the number of plots required to meet the approved sampling error objective that applies to that cutblock as required in Chapter 4 of this manual.

2.4.4 Aggregate Option

The aggregate option is a method of reporting waste for more than one waste assessment area.

1. Where the holder of an agreement uses the aggregate option, waste assessment areas may be amalgamated to form an Aggregate Reporting Unit. An aggregate reporting unit must be comprised of at least two cutblocks which can be originated from different cutting authorities.
2. Subject to subsection (3) of this section, an aggregate reporting unit may only be comprised of waste assessment areas from within a single Forest District that have been harvested by the holder of an agreement.
3. Each aggregate reporting unit may only consist of:
 - a. only waste assessment areas that contained old growth timber,
 - b. only waste assessment areas that contained second growth timber, or
 - c. only waste assessment areas that contained timber that was transported from the waste assessment area by a helicopter.
4. Each waste assessment area within the aggregate reporting unit must be assessed individually using either the number of plots as calculated using the pertinent algorithm in Table 4-1 of this manual or the Historic Waste Information from Appendix 7 of this manual.
5. Aggregate reporting units created for all methods must be sampled in accordance with number of plots required to meet the sampling error objective that applies to that reporting unit as required in Chapter 4 of this manual.
6. Where the holder of an agreement uses the aggregate option and did not meet the sampling error objective when using an aggregate option previously, the holder must use the next higher coefficient of variation required to be used by this manual unless the district manager determines that the use of the lower coefficient of variation will not create a significant revenue risk to the government.

4.4.2 Roadside Accumulations

For grapple yarding roadside accumulations, the number of plots required is based on the total area of the roadside accumulations. This area is calculated by measuring the length, along the road of "one-sided" and/or for "two-sided" accumulations. The length is then multiplied by an average width for the accumulation (usually but not restricted to 10 m).

The procedures are as follows:

One-sided or a mixture of one and two-sided accumulations	Two-sided Accumulations
<ol style="list-style-type: none"> 1. Start from the POC. 2. Measure the length of the one-sided accumulation; and the length of the two-sided accumulations multiplied by two. 3. Add the one-sided and two-sided accumulations together. 4. Calculate the area of the stratum as follows: $\text{Area (ha)} = (\text{length} \times \text{width}) / 10,000.$ 5. Look up the number of plots required from Table 3 (Coast) or Table 5 (Interior). 6. Calculate the grid spacing distance (GSD) as follows: $\text{Grid Spacing} = \text{length} / \text{number of plots required}.$ 	<ol style="list-style-type: none"> 1. Start from the POC. 2. Measure the length of the accumulations x 2. 3. Add the widths of the accumulations on both sides of the road together.
<p>Example:</p> <p>Total length of one-sided accumulation = 1500 m Total length of two-sided accumulation = 750 m x 2 = 1500 m 1500 m + 1500 m = 3000 m Area = 3000 m x 10 m = 3 ha = 15 plots (at 100% CV on the Coast) Grid Spacing Distance = 3000 / 15 = 200 m</p>	<p>Example:</p> <p>Total length of roadside accumulation = 3000 m x 2 = 6000 Width of roadside accumulation = 20 m (10 m on each side of the road) Area = 6000 m x 10 m = 6 ha = 16 plots (at 100% CV on the Coast) Grid Spacing Distance = 6000 / 16 = 375 m</p>

Laying Out of the Plots

1. Start from the POC and on the right hand side of the road.
2. Using the Starting Point Interval Factor (SPIF) for the month, establish the first plot at the GSD multiplied by the SPIF along the road.
3. For one-sided or a mixture of one and two-sided accumulations, locate a full size plot on the right side of the road. For two-sided accumulations, locate a full size plot on each side of the road.
4. Break chain the end of each accumulation and resume chaining at the beginning of the next accumulation until each GSD is covered.

5. Always stay to the right hand side of the road in the direction of travel when laying out the plots. When coming to a spur, go up the spur on the right hand side. At the end of the spur, turn around and come down on the right hand side.
6. For two sided accumulations when an odd number of plots are required, establish the last plot on one side of the road. If the last digit of the cutting permit is odd, establish it on the right hand side. If the last digit of the cutting permit is even, establish it on the left hand side.

Roadside accumulations must be marked on the map so the layout can be audited. When on-site stratification is done, it must be done on a non-bias basis.

4.4.3 Spot Accumulations

Spot accumulations include high-lead, spar, or tower landings, as well as skidder, helicopter landings.

Again, the number of plots is found from Table 4-3 (Coast) or 4-5 (Interior), and the minimum number of plots per stratum is two.

The method for selecting the first spot accumulation is to use the date of the month when the surveyor first arrives on site to do the survey.

Example 1:

31 piles requiring 6 plots, surveyed on the 23rd of the month
 $31 / 6 = 5.17$ Survey every 5th pile

Select the following piles: #23, #28, #2, #7, #12, #17

Example 2:

11 piles requiring 3 plots, surveyed on the 30th
 $11 / 3 = 3.67$ Survey every 4th pile

$30 - 11 = 19$; $19 - 11 = 8$

Select the following piles: #8, #1, #5.

For fixed width roadside stratum that are over 15 m wide, rectangular plots must be used and the minimum acceptable size is 50 m². Each plot must cover half the width of the stratum by the distance required to make the plot size. The plots will be staggered with the odd number plots covering the outside half of the stratum and the even number of plots covering the inside half (i.e., for a 20 m wide stratum each plot would be 10 m wide by 5 m long). Alternatively, 100 m² rectangular plots covering the entire width of the stratum are acceptable.

For varying width stratum, map the width of the stratum every 25 m along the road. Rectangular plots (which cover the entire width of the stratum where the plot is located) must be used. The minimum acceptable plot size is 100 m² unless the maximum width of the stratum is 10 m or less and then 50 m² plots are acceptable (i.e., for a 18 m wide stratum use an 18 m by 5.56 m plot).

5.3 Kind of Material

5.3.1 Logs

A log is defined as any near-round piece with more than half of its *original circumference* remaining and with an average diameter equal to or larger than the timber merchantability specification diameter for at least 3 m of length.

Logs are measured in accordance with the *Scaling Manual* and *Scaling Regulation*, with some exceptions, as specified in this manual.

Measure the diameter to the nearest radius class unit on the scale stick (1 rad = 2 cm) and measure the length to the nearest 0.1 m (i.e., nearest decimetre).

"Log length" is the length that a scaler records to accurately determine the gross volume of the piece; i.e., without making any deductions for rot.

A broken top piece is measured from the top contractual diameter, and then a length deduction (from the diameter to the XY line) is applied to account for the missing wood, as illustrated in Section 5.5.1.1 (Figure 5.10).

In a waste survey, the term "logs" encompasses all down logs, slabs, that are a minimum of 3 m in length with a top diameter of 10 cm or 15 cm. Record as "L" under "Kind of Material" on the plot survey card (FS 161).

5.3.2 Trees

Trees left standing after timber harvesting that are not reserved for silviculture, biodiversity or a forest management reason are measured in a waste assessment and classified as avoidable or unavoidable waste.

Appropriate documents such as tenure licence documents, timber appraisal applications and maps need to be referenced to determine the conifer and/or deciduous leaf trees identified by species to be retained as reserved timber for the waste assessment area being waste assessed. These specifications apply to trees outside of the mapped wildlife tree patches.

In all cases, a document detailing the post harvest standing tree specifications must be submitted into the Waste System and updated documents (maps, etc.) must be provided to the waste surveyor.

For cutting authorities requiring a post harvest appraisal data submission under the *Coast Appraisal Manual*, when a waste assessment area contains standing timber, the post harvest standing tree specifications must be documented in an assurance statement prepared by a forest professional. For cutting authorities that have not been submitted into the Electronic Commerce Appraisal System (ECAS), this document must confirm:

- 1. If standing timber is to be excluded from the net cruise volume of the post harvest appraisal data submission, and that standing timber is not to be tallied, or**
- 2. If standing timber is to be tallied as waste and contain a description of the standing timber characteristics.**

When a post harvest appraisal data submission has been completed in ECAS, the waste assessment must align with the information contained within that submission.

5.3.2.1 Clearcut

Individual standing tree volumes that are measured must be kept separate from the plot waste volumes. Standing tree dimensions are recorded using FS 161, Waste Survey Plot Tally. Trees that were left scattered sparingly throughout the waste assessment area are measured individually and each tree is numbered and marked with paint. Record the timber merchantability specification top diameter in rads as the top diameter. The length is determined using a tape/chain and a clinometer or an electronic measuring device such as a laser instrument. The waste surveyor visually estimates the location of the top diameter and then measures the length from this point down to the timber merchantability stump height (must make a 3 m log that meets the timber merchantability specifications).

If the top is broken, the waste surveyor visually estimates the diameter at the break, and measures the length from the break mid-point to the stump height. The butt diameter is obtained by measuring the tree diameter at the timber merchantability specification stump height, accounting for flare.

On the FS 161, under Kind, record T for standing trees or D for downed trees, classify the trees as avoidable or unavoidable. Enter the dimensions for length, top and butt diameters, end codes, and assign a log grade.

One possible method for determining the volume of standing trees is to record the species and diameter of each tree and use the Extended Type Stand and Stock Table from the timber cruise compilation.

For trees that were left in a large patch where individual tree measurement is impractical, the waste surveyor will perform a closed traverse measuring the precise area represented by the tree patch. The cruise net volume per hectare (for that timber type(s)) will be used to determine the volume of timber in the tree patch that was not harvested. A patch is defined to be a grouping of trees occupying an area of more than one hectare. For a patch that is less than one hectare, a surveyor may apply the cruise net average or opt for individual tree measurement.

For scattered standing trees, the standing tree areas must be properly stratified. Plots will be allowed but the block must be surveyed using the Cutblock option.

Except for individual standing or downed trees where each tree is individually graded, the species and grade allocations for large tree patches left in clearcuts, are based on the cruise compilation information for the cutblock being waste assessed. Alternately, the historic billing grade profile of the timber mark for the cutting authority may be used when a cruise compilation is not available.

If a forest professional considers the historical records or cruise compilation information to be unrepresentative of the grade profile on site, grades may be derived by an RPF or RFT based on examinations of the actual grade compositions of the stand left on site.

5.3.2.2 Partial Cut

Timber volume that is left in excess of the leave volume **and is not, or will not be, excluded in a post harvest appraisal data submission for the cutting authority** will be billed as waste subject to the application of the waste benchmarks.

Surveyors should reference appropriate documents that provide the volume percent reduction by either one or more of species, timber type, risk group/tree class or treatment unit for each individual waste assessment area within the cutting permit or agreement.

There are at least two methods **for determining the unharvested standing tree volume in a partial cut – by re-cruising the waste assessment area, or by tallying the standing timber in** fixed area waste plots. Choose a method that is appropriate for the waste assessment area.

1. For a re-cruise, a licensee must strive to put in a sufficient number of cruise plots that will either **achieve the sampling error objective as stated in the *Cruising Manual*, or meet the conditions required to waive it.**
2. If waste plots are used, the plot size should be 400 m². A licensee must strive to put in a sufficient number of waste plots that will meet or exceed the sampling error objective approved for the reporting unit. The minimum sampling intensity required is at least two plots per stratum or if the waste assessment area is not stratified, two plots per waste assessment area.

Except when waste plots are used, once the unharvested standing tree volume has been derived, the **species and** grade allocations are based on the **re-cruise compilation information for the cutblock being waste assessed**. **Alternately**, the historic billing grade profile of the timber mark for the cutting authority **may be used when a cruise compilation is not available**.

If a **forest professional** considers the historical records **or cruise compilation information to be** unrepresentative of the grade profile on site, grades may be derived by an RPF or RFT based on examinations of the actual grade compositions of the stand left on site.

The survey results for waste assessment areas that have been harvested using partial cut systems must be **submitted or** sponsored by an RPF or RFT **in the Waste System**. This is to confirm that the partial cut timber harvesting requirements that were previously stated in **the** Schedule B or the Percent Reduction Report in the appraisal cruise compilation submission have been met and there are no waste billing concerns on the remaining standing tree volumes.

If a field or office review by ministry staff identifies an apparent discrepancy with the species or volume harvested, the licensee or the TSM may be directed by the District Manager to re-cruise or resurvey the residual standing trees.

5.3.2.3 Unharvested Cutblocks

An unharvested cutblock in an expired, surrendered or cancelled cutting permit or authority where harvest has occurred on the cutting authority will be billed as waste unless:

1. A waste relief application has been approved, or
2. The cutblock contains only standing timber and is removed from the net cruise volume in the cutting authority in the post harvest appraisal data submission.

The billings will be made on the basis of the net cruise volume attributed to the unharvested cutblock.

Once the net cruise volume is determined, the grade allocations will be based on the cruise compilation for the unharvested cutblock or by using the historic billing grade profile of the timber mark for the cutting authority. Only in the absence of the billing history records, or if a forest professional considers the records are unrepresentative, grades may be derived by a forest professional based on examinations of the actual grade compositions of the stand left on site.

5.3.2.4 Tabular Stumpage Rates

1. This section only applies to cutblocks where primary logging is completed on or after November 1, 2009.
2. Subject to subsection (3) of this section, and notwithstanding sections 5.3.2, 5.3.2.1 and 5.3.2.2 of this manual, where a stumpage rate for a cutting authority must be determined under Section 6.1.1, or Section 6.1.2 of the *Interior Appraisal Manual*, or Section 7.2 of the *Coast Appraisal Manual*, timber left standing on the cutting authority area after primary logging has been completed will not be measured nor billed as waste.
3. Where the District Manager determines that the holder of the agreement failed to harvest the standing timber in accordance with:
 - a. the results or strategies of a Forest Stewardship Plan, or the default or alternative performance requirements that pertain to the agreement, or
 - b. the results, strategies, or the measures of a Woodlot Licence Plan that pertain to the agreement,

the District Manager may require the holder of the cutting authority to conduct a waste assessment of the standing timber and will bill this residual timber on the cutting authority area as avoidable waste.

4. Subsections (2) and (3) apply to standing timber only, a waste assessment of the dispersed and accumulated subpopulations of the cutblock must be conducted as per this manual's requirements.

5.3.3 Slabs

A slab is defined as any non-round piece with less than half (1/2) of its original circumference remaining, a minimum thickness of 10 cm and an average diameter equal to or larger than the timber merchantability specification diameter. The *only* exception is mature red cedar (on the Coast only) which must have a minimum thickness of 15 cm to be measured or recorded.

Slabs are measured, graded and recorded as a “Log” (L) if they have a minimum thickness of at least 10 cm for at least 3 m in length or as “Bucking Waste” (W) if they are bucked at the butt end or both ends and have a minimum thickness of a least 10 cm for less than 3 m but at least a tenth (0.1) of a metre.

Chapter 5 of the *Scaling Manual* should be referred to for measurement procedures for slab ends in various shapes (i.e., semi-circle, quadrant, sector, segment, etc).

Alternatively, the following method is continuously accepted for computing slab diameters, for waste purposes.

Using Figure 5.3, slab diameters are computed using the following steps:

1. Measure and average 3 thickness.
i.e., $11 + 9 + 13 = 33/3 = 11$ rads
2. Measure 1 width between 5 rades.
i.e., Width = 31 rads
3. Average the thickness and the width.
i.e., $11 + 31 = 42/2 = 21$ rads*

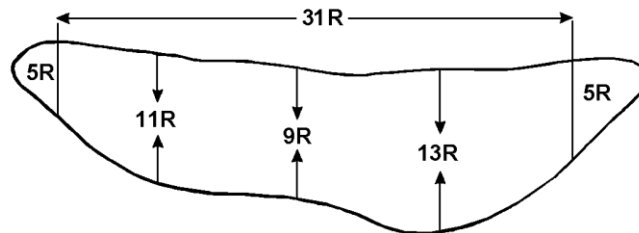


Figure 5-3 Measuring Slabs

The SECOND character (alpha) identifies the method used to harvest the waste type being sampled. This is a descriptive label only and will not cause a separate stratum to be created. Harvesting method codes are shown as follows:

Harvesting Method	Code
Spar (high lead)	S
Grapple yarder	G
Tractor (cat)	T
Horse	P
Rubber-tired skidder	R
Hand logging	M
Hoe chucking	B
Helicopter	H
Wyssen	W
Other	O

Open slash that has been logged using more than one harvesting method can be given the code for the predominant method or the code for a combination of methods.

The THIRD character identifies the assessment method used.

There are four assessment methods, and their codes are:

•Ocular Estimate	O
•Estimate Percent	E
•100% Measure	S
•Plot	P

When a method other than plot is used, use the "alpha" method code.

When the plot method is used, select the "Numeric" code that corresponds with the plot size in the table below. There must be at least two plots in each stratum.

0 - 50 m ²	5 - 500 m ²
1 - 100 m ²	6 - 600 m ²
2 - 200 m ²	7 - 1 000 m ²
3 - 300 m ²	8 - 5 000 m ²
4 - 400 m ²	9 - 10 000 m ²

The FOURTH character (alphanumeric) identifies any *stratification* of waste types into waste levels.

When significantly different levels of waste occur within a waste type and they can be easily identified and mapped, the waste surveyor must stratify them into waste levels.

The codes: "L", "M" and "H" for "light, medium and heavy" respectively or one to nine (1 to 9) may be used.

If no stratification is done, or for 100 percent piece scales, record "X".

Stratification, if done carefully, can reduce the coefficient of variation and therefore also reduce the sampling error.

Stratification of accumulation waste types, when significantly different waste levels exist, can help accomplish this in either sampling option.

Stratification of dispersed waste types could also be beneficial in the cut block sampling option. It will, however, be of limited use in the aggregate sampling option due to the generally small number of plots involved.

Where the plot method is used, each stratum created in either the accumulation or dispersed sub-population requires a minimum of two plots.

If sampling error is reduced with good stratification in the field, it is possible to reduce the number of plots required for the next sampling year.

3. Cutblocks with No Harvesting and No Harvesting has Occurred on the Cutting Authority

If there has been no harvesting on the cutblock, and there has been no harvesting on the cutting authority, then waste billings do not apply to cutblocks upon expiry, surrender, termination or cancellation of the cutting authority, as the case may be.

7.4.1.2 Waste Rate Within a Fibre Recovery Zone

1. Applicability of Waste Rates

The Coast Fibre Recovery Zone (FRZ) has geographic boundaries for Immature, Mature and Immature, and Mature Crown Timber. The applicability of these boundaries is based on:

1. The FRZ boundaries in effect on the date the waste survey is initially submitted into the Waste System, and
2. The maturity of the cutblock as assessed under the timber merchantability specifications in section 1.2.
 - a. For a waste assessment area to be considered within an FRZ, the maturity of the cutblock must be the same as the FRZ geographic boundaries it is contained within. For example:
 - A mature cutblock in a mature FRZ is in the FRZ
 - A mature cutblock in an immature FRZ is not in the FRZ

Waste assessment areas with any portion of the harvest area located within a Fibre Recovery Zone (FRZ) will be billed using the waste rate derived in this section, **unless exempted below. Fibre recovery zone rates apply to all strata in a waste assessment area.**

The items listed below are not subject to a Fibre Recovery Zone waste rate and are billed using the procedure in section 7.4.1.1:

- i. All avoidable western red cedar waste volume,
- ii. Areas within a Fibre Recovery Zone harvested using helicopter logging methods, and
- iii. Forestry licences to cut with stumpage rates determined under Chapter 7 of the *Coast Appraisal Manual*, master **licenses** to cut, and occupant **licenses** to cut.

Refer to Appendix 8 Waste Benchmarks in the Coast Area and Fibre Recovery Zone (FRZ) Waste Rates for guidance on application.

2. Fibre Recovery Zone Waste Rate Calculation

The following rates will apply to waste from timber originating in Fibre Recovery Zones **unless exempted above**:

- i. The avoidable conifer grade X, Y and grade U hemlock and balsam waste volumes will be billed at the rates applicable under section 1.2.4.1
- ii. Deciduous species within a Fibre Recovery Zone will be subject to the waste rate applicable under section 1.2.5
- iii. The waste rate for coniferous sawlog grades other than those listed in (i) for:
 - a. major licensees,
 - b. community forest agreements,
 - c. woodlot licenses,
 - d. road permits, and
 - e. forestry licences to cut with stumpage rates not determined under Chapter 7 of the *Coast Appraisal Manual*,will be:
 - the waste rate calculated for each species and grade under section 7.4.1.1 **multiplied by the FRZ adjustment factor**.

Where:

- **The FRZ adjustment factor under this subsection is 1.**

- iv. The waste rate for timber sale licenses for coniferous sawlog grades other than those listed in (i) will be the greater of:
 - \$2.00 per m³, or
 - (Stumpage rate – obligation adjustment) **multiplied by the FRZ adjustment factor**.

Where:

Stumpage rate = the total of the upset stumpage rate plus the bonus bid that must be paid by the licensee as per the *Coast Appraisal Manual* expressed in \$/m³

Obligation adjustment = the obligation adjustment \$/m³ for the district under Table 7-1 Timber Sales Licence Fibre Recovery Zone TOA adjustment values by district

The FRZ adjustment factor under this subsection is 3.

Table 7-1 Timber Sales Licence Fibre Recovery Zone Obligation Adjustment Values by District

District	Obligation Adjustment \$/m3
DCK	29.87
DCR	24.96
DHG	32.10
DNC	35.29
DNI	26.07
DSC	24.10
DSI	23.00
DSQ	29.19

7.5 Interior Log Grade Changes

The Interior log grade changes are scheduled to take effect April 1, 2006. Areas logged prior to April 1, 2006 will be waste surveyed using the grades in effect before the grade change subject to conditions specified below.

The cut blocks that will be affected are:

1. Blocks that are harvesting complete prior to April 1, 2006, but are surveyed and/or entered into the Waste System after April 1, 2006.
2. Blocks with areas partially harvested prior to April 1, 2006.

For those affected cut blocks, licensees have until April 30, 2006 to submit to the District Manager (or for timber sale licence*, the Timber Sale Manager) a listing of cut blocks where timber harvesting is completed and/or partially completed as of March 31, 2006.

The listing for completed cutblocks must include: Licence, CP, Block #s, Geographic Location, Block net area, and in addition for partially completed blocks, the areas harvested prior to the grade change, and maps clearly showing the harvested areas.

*For fixed rate Timber Sale Licences advertised before December 2, 2005, and expiring on or after April 1, 2006, the deadline for declaring harvesting complete is extended to May 31, 2006.

When the survey data for the cut blocks in the listing are entered into the Waste System, **the Survey Date on screen 102 must be artificially changed by the licensee to March 13, 2006**. This step will enable the grade listing in effect prior to April 1, 2006. When these blocks are submitted, the actual survey date must be entered on the comment box. Additionally, for administrative purposes, **the primary logging completion date must be entered with a date no later than February 28, 2006** for the purpose of the waste rate twelve-month average calculations.

Conditions:

The survey results for both **harvested** and partially harvested block in the listing must be submitted within sixty days from the date of notification or snow free. Those blocks that are submitted late must use the log grades in effect April 1, 2006.

Forest Districts will monitor on the basis of the survey date and the comments entered for ensuring the cut blocks submitted are indeed blocks eligible to use the grades in effect prior to April 1, 2006.

Any waste created after April 1, 2006, must be graded using the new grades in effect April 1, 2006.

Appendix 4 Riparian Management Zone (RMZ)

A4.1 Assessment Method

For waste assessments to be conducted within the riparian management zone, the assessment method should commensurate with the silvicultural system used, as follows:

•	single tree selection	-	100 percent piece scale, or 50 m ²
•	group selection	-	100 percent piece scale or (circular or rectangular) plot of 50 to 400 m ² that best fits the group selection harvested area.

Refer to Section 4.7 for assessing partial cutting (variable retention) cutblocks, and Section 5.7.2 for stratum codes.

A4.2 Stream Clean-out

For stream clean-out conducted in accordance with the Riparian Management Area Guidebook, the waste classification procedures are as follows:

1. Where a log is left across a creek, classify the log as unavoidable for environmental reasons.
2. If a creek was machine cleaned and it was reasonable to recover the log pieces, classify the pieces as avoidable.
3. If a creek was hand cleaned and the log was bucked into small segments and thrown out of the creek channel, classify the pieces as unavoidable.

Appendix 5 Waste Benchmarks

1. Benchmarks

The following waste benchmarks in cubic meters per hectare will be used for monetary billing of avoidable waste and applied on an individual cutblock basis:

Coast

Harvest System	Immature	Mature
Ground base	10 m ³ /ha	10 m ³ /ha
Cable/ Skyline	10 m ³ /ha	25 m ³ /ha
Helicopter	10 m ³ /ha	35 m ³ /ha

The waste benchmark selection is based on the actual harvest method used within the waste assessment area.

Interior

Interior	Dry Belt	Transition Zone	Wet Belt
Normal	4 m ³ /ha	10 m ³ /ha	20 m ³ /ha

The Waste Benchmark zones are identified using the document 'Interior Forest Residue and Waste Benchmark and BEC Zones 2006' available at the website below:

http://www2.gov.bc.ca/assets/gov/farming-natural-resources-and-industry/forestry/docs/timber-pricing/residue-and-waste/bec_zones_linkage_to_interior_waste_benchmarks.pdf

The waste benchmark volume of a cutblock is derived by multiplying the value of the benchmark with the total of the dispersed, accumulation and standing trees sub population areas reported in a waste assessment of the cutblock.

2. Waste Benchmarks for Mature Blocks in the Coast Area with More Than One Conventional Harvest Method

- a. Mature cutblocks in the Coast Area containing more than one conventional harvest method will receive a prorated benchmark. The benchmark will be based on the **actual** harvest method **areas within a waste assessment area**.
- b. For cutting authorities that:
 - i. **require an appraisal data submission**, the benchmark will be based on:
 1. **the areas from the initial appraisal data submission when the post harvest condition of the cutblock matches this submission, or**
 2. **the areas listed in a professional certification, or**
 3. **the areas listed within the post harvest appraisal data submission as outlined in the *Coast Appraisal Manual* (as available).**
 - ii. do not require harvest method submission in the appraisal **data** submission, the harvest method proration **calculation must be** submitted with the waste assessment and signed off by a forest professional.
- c. The benchmark will be calculated as follows and rounded to the nearest whole number:

$$\frac{(CY+SL)(25 \text{ m}^3/\text{ha}) + (GS)(10\text{m}^3/\text{ha})}{(CY+SL+GS)}$$

Where:

CY = cable yarding **harvest method area (ha)**

GS = ground skidding **harvest method area (ha)**

SL = Skyline Logging **harvest method area (ha)**

- d. Where only a portion of a cutblock is being surveyed and submitted, the proration will be based on the harvest **method area (ha)** for the entire cutblock being surveyed regardless of which portions are harvested.
- e. Benchmark proration calculations must be attached in the Waste System for each waste assessment area.

3. Benchmark Calculations and Billings

Avoidable waste volumes in sawlog grades X or better (Coast), and conifer sawlog grades 1 and 2 (Interior) from the dispersed, accumulated and the standing tree subpopulations of the cutblock will be applied to the benchmarks.

Where the avoidable waste volumes in sawlog grades are below the established benchmark for the waste assessment area, no monetary billing of avoidable waste in sawlog grades will be made.

Where the avoidable waste volumes in sawlog grades are above the established benchmark for the waste assessment area, monetary billings will be made on the sawlog grade volumes exceeding the benchmark.

Avoidable waste volumes in grade Y or 4 will not be applied to the benchmark but will be billed monetarily in all cases.

4. Benchmark Eligibility

The benchmarks are administered on an individual waste assessment area basis, regardless of whether the waste assessment area is in the Cutblock, the Aggregate or the Ocular Reporting Unit. Therefore, each waste assessment area must be individually assessed to determine whether the avoidable waste within the waste assessment area is above or below the benchmark.

No waste benchmarks will be applied to log decks that in the determination of a forest officer are subject to scaling at a scale site or being field scaled. Such log decks must be clearly marked by the licensee and not to be included in the waste assessment.

Waste benchmarks do not apply to the unharvested cutblocks.

No waste benchmark will be applied to an area of a waste assessment area where the wasted timber volume compromised the site-specific forest management objective(s). The area must be delineated, waste assessed and billed separately from the remaining area of the waste assessment area.

Appendix 7 Waste Benchmarks in the Coast Area and Fibre Recovery Zone (FRZ) Waste Rates

