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June 2, 2005

**BY EMAIL**

To: Regional Managers

From: Bill Howard  
Director  
Revenue Branch

**Re: Amendment No. 1 to the *Provincial Logging Residue and Waste Measurement Procedures Manual***

I hereby approve Amendment No. 1 to the *Provincial Logging Residue and Waste Measurement Procedures Manual*, and attach a copy for your use.

The highlights of the amendment can be found on page ii.

This amendment will come into force on June 1, 2005.



Bill Howard  
Director  
Revenue Branch

Attachment







<p>FOR FURTHER INFORMATION OR IF YOU HAVE A CHANGE OF ADDRESS, PLEASE CONTACT:</p> <p>John Wai Residue Forester and Log Salvage Policy Forester Revenue Branch Ministry of Forests 6th Floor - 727 Fisgard Street Victoria, BC V8W 1R8 Phone: 356-7671 PROFS userid: John.Wai@gems6.gov.bc.ca FAX: 387-5670</p>	<b>MANUAL TITLE</b>	
	Scaling Manual	
	<b>AMENDMENT</b>	<b>ISSUE DATE</b>
	Amendment No. 1	June 1, 2005
	<b>MANUAL CO-ORDINATOR</b>	
	Judy Laton Manuals Co-ordinator	
	<b>AUTHORIZATION (Name, Title)</b>	
	W. Howard Director, Revenue Branch	

Please make the following changes to your copy of the above Ministry manual.

ACTION	(VOL.) CHAPTER-SECTION-SUBJECT	PAGE(S)	COMMENTS
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REMOVE	Introduction	1 - 4	After Highlights
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REMOVE	Chapter 1	5 - 18	After Chapter 1 Tab
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# Introduction

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In British Columbia, the right to harvest Crown timber is conferred through the form of agreements under the *Forest Act*. The *Forest Act* and the agreements require licensees to carry out waste assessments.

Waste assessments are carried out to quantify the volumes of merchantable timber and waste left on the harvested areas following the completion of primary logging. The waste volume data compiled from the assessments are used to invoice licensees for monetary and cut control charges.

This manual outlines the administration and field measurement procedures to be used in the assessments, and is intended to serve as the reference for industry and government staff who conduct or check waste assessments in British Columbia.

## **To Obtain a Provincial Logging Residue and Waste Measurement Procedures Manual**

The manual is available electronically on the Internet at:

<http://www.for.gov.bc.ca/hva/manuals/rwprocedures/index.htm>

## **Comments and Suggestions**

Any comments on this manual can be sent to:

Waste Assessment Policy Forester  
Ministry of Forests  
Revenue Branch  
PO Box 9511 Stn Prov Govt  
Victoria BC V8W 9C2  
E-mail: [John.Wai@gems6.gov.bc.ca](mailto:John.Wai@gems6.gov.bc.ca)

## **Manual Amendments**

This *Provincial Logging Residue and Waste Measurement Procedures Manual* amends the *Logging Residue and Waste Procedures Manual* dated April, 2001 and the *Provincial Logging Residue and Waste Measurement Procedures Manual*, dated January 1, 1994.

Future amendments to this manual can be printed from the Internet.

Policy 11.5Waste Assessments**Monetary Billing**

Avoidable waste will be billed according to the species and log grades.

Coniferous saw logs (Grade X or better [Coast]); Grade Blank (Interior) will be billed at the 12 month average stumpage rate pertaining to the timber mark and derived in a method described in the *Provincial Logging Residue and Waste Measurement Procedures Manual*.

Coniferous and deciduous Grade Y (Coast), and Grades 3 and 4 (Interior) will be billed at the rates established for these grades in either the *Coast or Interior Appraisal Manual* plus any bonus or levies where applicable.

Deciduous species graded saw log (Grade Blank) will be billed using the appraised stand as a whole rate or the fixed rate for the species as specified in the *Coast or Interior Appraisal Manual*, plus any bonus or levies where applicable.

**Assessment Submissions**

Completed waste assessments must be submitted and signed off under the signature of:

- a registered professional forester or a registered forest technologist registered with the Association of BC Forest Professionals; or
- a licensed logging residue surveyor or a licensed scaler, licensed by the Ministry of Forests.

**References**

- *Forest Act*
- *Provincial Logging Residue and Waste Measurement Procedures Manual*

## 1.1 Purpose and Rationale

### 1.1.1 Purpose

Waste assessments are carried out to bill licensees monetarily for timber except reserved timber, whether standing or felled, that was not 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.

**Table 1-2 Interior Timber Merchantability Specifications**

Description		All Stands	
Stumps**			
•	no higher than	30 cm	
Diameter (outside bark) at stump height			
•	Lodgepole pine: all timber that meets or exceeds	15 cm	
•	All other species: all timber that meets or exceeds	20 cm	
Top diameter (inside bark or slab thickness)			
•	For all species and ages, except Cedar older than 141 years, all timber that meets or exceeds	10 cm	
•	For Cedar older than 141 years	15 cm	
Minimum length			
•	log or slab	3 m	
**	Measured on the side of the stump adjacent to the highest ground.		

Waste volumes are measured and billed monetarily in accordance with the following Table 1-3.

**Table 1-3: The Disposition of Waste Volumes in Monetary Billing**

Table Values Effective January 1, 2005 (Valid for all Species)								
LOG  TYPE	G R A D E S		ALL STANDS					
			AVOIDABLE (from field data)			UNAVOIDABLE (from field data)		
	Coast	Interior	Class W/X	Measure YES/NO	Rate * S/\$0.25	Class W/X	Measure YES/NO	Rate * S/\$0.25
Saw Log	X or better	_____	W	YES	S	W	YES	NB
Dead Dry Saw Log		3 Endemic	W	YES	\$0.25	X	NO	NB
		3 Catastrophic	W	YES	\$0.25	W	YES	NB
Lumber Reject	Y	4	W	YES	\$0.25	W	YES	NB
Dead Dry Lumber Reject	5		X	NO	NB	X	NO	NB
		5 Endemic & Catastrophic	X	NO	NB	X	NO	NB
Undersize		6	X	NO	NB	X	NO	NB
Firmwood Reject	Z	Z	X	NO	NB	X	NO	NB

**Class:** Waste, X other

**Measure/Record:** YES or NO

**Rate:** S = 12-month average Stumpage rate for all coniferous species, and the stumpage rates established in the Coast or Interior Appraisal Manual for all deciduous species, \$0.25 = fixed base rate. NB = No Billing.

All rates charged will include any bonus bids and levies where applicable.

- See Appendix 5 for waste benchmarks.



### 1.1.2 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.

### 1.1.3 Definitions

“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.

“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.

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

“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), Grade 5, 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.

“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.

#### **1.1.4 Monetary Billings**

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

##### **1.1.4.1 Coast**

The avoidable grade Y waste volumes are billed at \$0.25 per m<sup>3</sup>.

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

The avoidable grade X or better waste volumes are billed at the average stumpage rates determined in Appendix 3 of this manual.

##### **1.1.4.2 Interior**

In the Interior, timber marks are classified as either endemic or catastrophic.

For both endemic and catastrophic timber marks, the avoidable waste volumes of grade 4, lumber reject; and grade 3, dead/dry sawlogs; are billed at \$0.25 per m<sup>3</sup>.

The avoidable sawlog grade volumes are billed at the average stumpage rates determined in Appendix 3 of this manual.

#### **1.1.5 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.

#### **1.1.6 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 stumpage rates as follows:
  - i. Coniferous species graded:
    - (a) sawlog - the average stumpage rate derived in a method described in Appendix 3,
    - (b) grades other than sawlog - the rates established as per *Coast and Interior Appraisal Manuals*,
  - ii. Deciduous species graded:
    - (a) sawlog - the fixed rate for the species as specified in the appraisal manuals, plus any bonus and levies where applicable.
    - (b) Grades other than sawlog - the rates established as per appraisal manuals.

## **1.2 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.

### 1.3 Background

Starting in the late 1960s, timber harvesting policy provided for waste measurements. At that time, in the Interior, waste measurement provisions were by and large not exercised except where waste was considered flagrant. On the Coast, waste was measured and charged for cut control purposes but only waste considered 'flagrant' was billed on a monetary basis. The definition of flagrant waste varied over the years.

In the mid-1980s some major forest companies on the Coast left very high levels of waste. In response to public outcries on the Queen Charlottes Islands in 1987, the Ombudsman commissioned T.M. Thomson & Associates to review a major coastal licensee's waste measurement procedures and utilization practices on the Queens Charlottes. The review determined that there was a need to develop consistent and enforceable utilization standards and waste measurement procedures for the entire province.

The responsibility for developing the utilization policy was placed with the Director of RTEB. The Coast and Interior utilization policies were implemented in the early 1990s. Both policies prescribed the minimum cutting specifications, log grade utilization and cut control requirements.

The responsibility for developing the waste measurement standards was placed with the Director of Revenue Branch. Necessitated by the implementation of the zero waste policy, the Residue and Waste Measurement Procedures Manual was released and approved for use in the entire province in 1991. All harvest completed cutblocks in the Interior and on the Coast were required to have waste measured and reported in accordance with the standards and procedures set out in the manual.

Until the year-end of 1998, the province had a zero waste policy. Under this policy, logs that were sawlog grade were required to be utilized (mandatory utilization); if they were not utilized and left on the cutblock, these logs were classified and billed as waste. This policy meant that all useable logs except low quality pulp (grade Y or 4) logs, were required to be removed from the cutblock by the company licensed to harvest the area. Under this policy, all logs that were sawlog grade and physically possible to be removed were required to be utilized by the licensees.

Starting in 1999, waste benchmarks were established to allow a volume of waste to be left without being monetarily billed. The waste benchmarks allow the licensees to decide which logs to remove or to leave behind as waste. The concept was that market forces would drive the business decisions. Licensees would recover logs to their economic margins. Another purpose of the waste benchmarks was to accommodate coarse woody debris, which is important in the nutrient and organic matter dynamics of forest ecosystems.

The benchmarks were not based on scientific studies or quantitative analyses. Rather, the benchmarks were set as a starting point to recognize that zero waste was not a sound ecological policy and economics was not served by compelling licensees to remove every log.

In the spring of 2003, the government announced the Forestry Revitalization Plan and brought forward legislation to reform forest policy. Waste policy was further aligned with the Ministry policy reform undertaken to allow market forces to drive business decisions. Foremost was the elimination of the mandatory species and log grade utilization (cut and remove) requirements, so that licensees are free to extract any logs of value to them within the cutting authority areas subject to the *Forest and Range Practices Act* and the required forest management standards. Licensees must pay stumpage on timber removed and scaled, and waste assessments on timber, whether standing or felled that was not removed from the the cutting authority area. This is referred to as the “Take or Pay” Policy.

## **1.4 Responsibility**

The responsibilities are as follows:

### **1.4.1 Revenue Branch**

#### **1.4.1.1 Director, Revenue Branch**

The Director, Revenue Branch is responsible for:

1. Approving *Provincial Logging Residue and Waste Measurement Procedures Manual* and amendments.
2. Processing and maintaining waste data.
3. Billing licensees by issuing waste invoices for monetary and cut control charges.

#### **1.4.1.2 Waste Assessment Policy Forester, Revenue Branch**

The Waste Assessment Policy Forester is responsible for:

1. Developing and maintaining standards and procedures for determining and reporting waste.
2. Providing training and technical support.
3. Providing policy interpretation to industry and ministry staff.
4. Maintaining software compilation programs and standards.
5. Conducting technical reviews of Forest Regions and Forest Districts for policy and procedure compliance.

### **1.4.2 Regional Manager**

The Regional Manager is responsible for:

1. Ensuring that district staff adhere to policy and procedures, and where necessary, provide training to district staff.
2. Recommending survey procedure changes where necessary, to the Director, Revenue Branch.
3. Advising industry and forest district staff on matters relating to waste assessments.

4. Processing waste reports and FS 702 for waste monetary billing and cut control where required.
5. Providing Waste Systems training to district staff and industry users.

### **1.4.3 District Manager**

The District Manager is responsible for:

1. Conducting waste assessments (full surveys and/or ocular estimates) on forestry licences to cut and occupant licences to cut, and timber sale licences (non BCTS).
2. Conducting check surveys in accordance with manual standards.
3. Implementing and administering the policy and procedures, and recommending survey procedure changes where necessary to the Regional Manager.
4. Approving waste assessment plans and issuing reporting unit numbers.
5. Checking for completeness of licensees' submitted reports.
6. Processing waste reports and FS 702 for waste monetary billing and cut control where required.

### **1.4.4 Timber Sales Manager**

The Timber Sales Manager is responsible for:

1. Conducting waste assessments (full surveys and/or ocular estimates) on timber sale licences, permits and forestry licences to cut issued under BC Timber Sales.
2. Submitting an annual waste assessment plan to the District Manager for approval.
3. Compiling waste field data and completing waste reports and FS 702.
4. Submitting completed waste assessment reports in the required format to the District Manager within the time frame specified in this manual.



### **1.4.5 Licensees**

Holders of a major licence, community forest agreement, community salvage licence, woodlot licence, road permit, and master licence to cut are responsible for conducting waste assessments (full surveys or ocular estimates) on their scale-based cutting authorities.

The licensee's are responsible for:

1. Submitting annual waste assessment plans, for approval by the District Manager.
2. Conducting waste assessments in accordance with this manual.
3. Compiling waste field data by using appropriate software.
4. Submitting completed waste assessment reports in the required format to the District Manager within time frame specified in this manual.

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.

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6. Upon receipt of the District Manager's approval, the licensee shall submit a waste report for the exempted block within sixty (60) days. This report will be based on the survey data from the approved parent block.
7. The data reported for an exempted block will be subject to check survey and used for monetary billing and cut control purposes.
8. Blocks rejected from exemption will be subject to surveys under the RSI, FSI or the Aggregate Option.

### **3.3 Ocular Estimate**

The ocular estimate is designed to reduce surveying costs and administration time on cutblocks. Licensees will be billed for monetary charges as per volumes estimated.

For all Forest Regions, ocular estimates must be submitted and signed off by a licensed surveyor or scaler, RPF or RFT. Where there are no revenue concerns, a district manager may exempt this requirement for minor tenures and woodlot licences.

#### **3.3.1 Ocular Estimate Levels**

The maximum allowable avoidable waste levels for performing ocular estimates are the waste benchmark levels established in Appendix 5, for cutblocks in all forest regions excepting the Coast Forest Region. In the Coast Forest Region, old growth cutblocks are subject to a maximum level of 20 m<sup>3</sup>/ha and second growth cutblocks are subject to a maximum of 10 m<sup>3</sup>/ha of avoidable waste respectively. The Regional Manager may set lower ocular levels for cutblocks within a forest region to address revenue or forest management risks.

Where both the representatives of the licensee or the party responsible for ocular and the District Manager agree, standing timber waste volumes may be derived using the ocular estimate method. The average net piece volume contained in the Extended Type Stand and Stock Table in the cruise report may be used to derive the standing timber volume. Grades for the standing trees are assigned using the historical billing history records. In the instances that the billing history records are absent or if an RPF or RFT considers the historical records are unrepresentative of the grade profile on site, grade allocations may be derived by an RPF or RFT based on actual on site examinations.

#### **3.3.2 Conditions**

This procedure can be applied when:

1. The estimated level of avoidable waste on the cutblock meets Section 3.3.1.
2. The volume of waste can be reasonably estimated and there is minimal revenue risk.

If these two criteria cannot be met, a plot sampling survey will be required.

#### **3.3.3 Responsibility**

Similar to full surveys, major licensees and woodlot licensees are responsible for carrying out oculars on their scale based cutting authorities. The District Manager is responsible for conducting oculars on forestry licences to cut (minor and occupant). The Timber

Sales Manager is responsible for conducting oculars on Timber Sale Licences, permits and forestry licences to cut sold by BC Timber Sales.

The party responsible for ocular is also responsible for entering and submitting the ocular data using the web based Waste System.

### **3.3.4 Procedures**

1. A licensee or party responsible for ocular estimate should review previous waste assessments done on blocks with similar forest types, harvesting systems and conditions, and preferably logged by the same operator to determine if an ocular estimate would be appropriate, and in accordance with Section 3.3.2.
2. A final harvesting inspection should be conducted by the licensee, or its representative, preferably jointly with the Forest Service. On this inspection, enough of the cutblock should be seen to get a representative picture of the levels of waste to decide if an ocular estimate is appropriate.
3. If an ocular is not appropriate, a FSI or an RSI survey is required.
4. If an ocular estimate is appropriate, the volumes of waste are estimated using Form RW 01 (copy attached).
5. "Inspection plots" or transect lines should be used to support the ocular estimate. Inspection plots should be of 50 m<sup>2</sup> (3.99 m radius) minimum in size and selectively located in areas with representative levels of avoidable waste.

Heavy accumulations of avoidable waste on a block may have to be excluded from the estimate and measured and returned separately.

6. If the waste level appears to be higher than reported in the ocular estimate, the Forest Service may not accept the ocular estimate. A FSI waste survey will be required by the licensee.
7. If the licensee and the Forest Service accept the estimate, the completed Form RW 01 *must be signed by both parties*. The licensee proceeds to enter and submit the ocular estimated waste volumes by using the Waste System.
8. If either the licensee or the Forest Service disagrees, a full sampling intensity survey must be conducted by the licensee.

### **3.3.5 Monitoring**

1. Senior and more experienced district staff should monitor implementation of this procedure to ensure consistency.

2. Regional Waste Coordinators should audit district's work, provide necessary training and make recommendations to the Branch on the implementation of the procedures and its effect on the waste assessment program.

## 4.2 Sampling Design

### 4.2.1 Population

The population is the volume of waste generated during the specified reporting year within the approved waste reporting unit. The size of the population depends on:

- the option selected for the waste reporting unit,
- the area logged in that year.

### 4.2.2 Sub-Populations

The population usually consists of three sub-populations: accumulated, dispersed and standing trees. Each sub-population may be subdivided into one or more strata.

*Accumulated* waste occurs at landings, along roadsides and at other areas in the reporting unit where logs have been yarded or skidded to and where sample plots may be established. Where sample plots cannot be safely established, or are not appropriate, volumes are either estimated or 100 percent measured (each piece measured individually).

*Dispersed* waste occurs on the areas from which trees or logs have been removed and where sample plots can safely be established. Dispersed areas are sampled independently of accumulation areas. The area of the rights-of-way leading into the cutblock must be included in the net area of cutblock unless the waste volume has been included in a previous waste survey or as provided under Section 4.6.2.

*Standing trees* are trees authorized for harvest under the cutting authority (excepting reserved trees) but at the discretion of the licence holder, are not cut and removed. Individual standing trees that are found at different locations of the cutblock can be measured and scaled individually, and be treated as part of the dispersed sub-population. Standing tree patches will be delineated separately from the dispersed to form their own sub-population and the volumes determined with methods outlined under Section 5.3.2.

### 4.2.3 Stratification

Stratification can increase the precision of sub-population volume estimates, and reduce the amount of sampling required to achieve a desired level of precision.

It is therefore useful to stratify the sub-populations, where possible, by harvesting system, different logging contractor, timber type, or relative quantity of waste generated.

#### **4.2.4 Block Survey Plan**

A good block survey plan in the form of a map is essential to an efficient waste survey.

The Block Survey Plan is not required to be approved by the District Manager.

A licensee or party responsible for survey must submit a Block Survey Plan or Notification to the District Manager thirty (30) days prior to the anticipated field work providing information required by the District Manager.

Only one survey plan or notification may be submitted for each cutblock, and waste report submissions must comply with the submitted plan or notification. No alterations will be allowed to be made to the waste billing volumes.

After the field survey is completed for the block, the final Block Survey Plan map must be submitted with the waste survey reports.

The map must show the cutblock boundaries, roads, the point of commencement, strip and plot locations, and must meet ministry standards. Each area must be carefully measured by mapping and planimetry. All roads, water, swamp and other non-forest areas must be delineated on the maps and the areas measured with a planimeter. Accumulations and standing trees not harvested should be clearly indicated on the maps.

#### **4.2.5 Sampling Objective**

The sampling objective is to estimate the total volume of waste in each sub-population to a calculated minimum level of precision, or sampling error percent (S.E. %), at the 95 percent confidence level. Generally, calculated sampling errors decrease with increased sub-population size.

The sampling error and number of plots required for each sub-population are determined from plot Tables 4-2 to 4-5 in this chapter.



Refer to the Grid Spacing Worksheet (Table 4-1). The grid spacing is calculated from the formula of  $\text{SQR}(10\,000 \times \text{ha/plots})$  where SQR means "take the square root of", and should be rounded down to the next 5 m.

If necessary, grid spacing is reduced or increased, in 10 m increments, to fit the required number of plots within the cutblock boundaries.

## **4.4 Plot Layout**

### **4.4.1 Dispersed**

Plots for dispersed types are to be located on a systematic, staggered grid. The steps required are as follows:

1. Using the hectares and an estimate of C.V. specific to the reporting unit, look up the minimum number of plots required in either Table 4-2 (Coast) or Table 4-4 (Interior).
2. Compute the grid spacing distance (GSD) using the grid spacing worksheet (Table 4-1).
3. Locate the POC where the main road enters the cutblock, and establish the baseline in the cardinal direction which most closely parallels the contours. The POC for helicopter blocks is the most south-westerly point on the block.
4. Obtain the Starting Point Interval Factor (SPIF) from the forest district staff. The SPIF multiplied by the GSD will determine the horizontal distance from the POC to the mapped location of the initial strip (IS). (SPIF will be randomly determined by Ministry of Forests staff to either be 1/4, 1/2, 3/4 or other fractions of GSD.).
5. Map the initial strip (IS) at the SPIF distance along and at right angles to the baseline from the POC.
6. Map all remaining strips at the full GSD along the baseline in both directions from the IS. Strips are mapped at right angles to the baseline.
7. Number the Strips:
  - a. on blocks with North/South baselines number the strips sequentially from South to North, and
  - b. on blocks with East/West baselines number the strips sequentially from West to East.
8. On odd numbered strips, locate the first two plots at one half the GSD along the strip in both directions from the baseline. Locate the remaining plots at full GSD along the strip.
9. On even numbered strips, locate one plot at the intersection of the strip and the baseline, and all remaining plots at full GSD along the strip.
10. Number the plots. Each plot in a given block should have a unique number.

## 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.

#### **5.3.2.1 Clearcut**

Surveyors should reference appropriate documents to determine the conifer and/or deciduous leave trees identified by species to be retained as reserved timber for the cutblock to be waste assessed. These specifications apply to trees outside of the mapped wildlife tree patches.

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 cutblock 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.

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.

Except for individual standing or downed trees where each tree is individually graded, the grade allocations for large tree patches left in clearcuts, are based on the historic billing grade profile of the timber mark for the cutting authority. Only in the absence of the billing history records or if an RPF or RFT considers the historical records are 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

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 cutblock within the cutting permit or agreement.

Timber volume that is left in excess of the leave volume will be billed as waste subject to the application of the waste benchmarks.

There are at least two methods - recruise, fixed area waste plots, for determining the unharvested standing tree volume in a partial cut. Choose a method that is appropriate for the cutblock.

For a recruise, a licensee must strive to put in a sufficient number of cruise plots that will either meet or exceed the sampling error achieved in the original cruise.

If waste plots are used, the plot size should be 400 m<sup>2</sup>. 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 cutblock is not stratified, two plots per cutblock.

Once the unharvested standing tree volume has been derived, the timber scale grades will be assigned 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 an RPF or RFT considers the records are unrepresentative, grades may be derived by an RPF or RFT on the basis of actual grade compositions of the stand left on site.

### 5.3.2.3 Unharvested Cutblocks

The District Manager may bill an unharvested cutblock in an expired, surrendered or cancelled cutting permit or authority. 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 historic billing grade profile of the timber mark for the cutting authority. Only in the absence of the billing history records or if an RPF or RFT considers the records are unrepresentative, grades may be derived by an RPF or RFT based on examinations of the actual grade compositions of the stand left on site.

### 5.3.3 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.

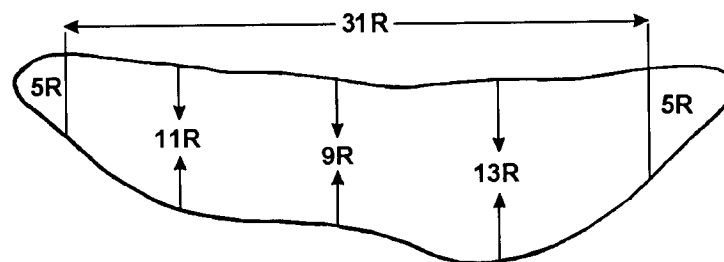
$$\text{i.e., } 11 + 9 + 13 = 33/3 = 11 \text{ rads}$$

2. Measure 1 width between 5 rad edges.

$$\text{i.e., Width} = 31 \text{ rads}$$

3. Average the thickness and the width.

$$\text{i.e., } 11 + 31 = 42/2 = 21 \text{ rads}^*$$



*Figure 5.3 Measuring Slabs.*

### 5.3.4 Stumps

A stump is defined as any piece with more than half (1/2) of its original circumference remaining, less than 3.3 m in length and still attached to the roots. The length is to be

- g. Make sure that the **Exclude Firmwood Reject** and **Exclude Waste/Residue** buttons are checked.
3. Click on the **Configure PDF Report** button at the bottom of the page and the program will take you to the **mark Monthly Billing Report Configuration** page.
  - a. Under the heading **Group Output** by, click on **Region Harvested/District Harvested**.
  - b. Under the heading **Detail Lines Displayed**, you must click on at least the **Volume/Value (\$/m3)** box. Also clicking on the **Volume** and **Value** boxes will provide the total volume billed and the total value billed for each month as well as the totals for the 12-month period.
  - c. Under the heading **Include Species/Product/Grade Groups** you will normally click on the **None** button. You can click on **Species** or **Species and Grade** if you need to be more specific but it is not normally required for **Waste**.
4. Click on the **Send PDF Report** button at the bottom of the page and you will be taken to the **Report Delivery Address Screen** where you will be shown what you have requested (format, billing date (12-month period), timber mark, species, product, grade, exclusions and group by).

If the information is correct click on the **Submit** button and the report will be sent to by e-mail.

If the information is not correct go back and correct it before submitting the report. The **View PDF Preview** button just shows you how the report will be laid out but does not contain any of the data you requested.

5. Clicking on the Internet address in the e-mail note that is sent by the HBS system will take you into your report where you can save and/or print the report.
6. If no average stumpage rate is available from the HBS due to no harvest in the twelve-month period, use the average timber appraisal stumpage rate for the timbermark derived in a twelve-month period preceding from the primary logging completion or cutting authority expiry date.

#### 7.4.1.2 Coding Rates

Due to the implementation of the waste billing benchmarks, the rates obtained from HBS need to be adjusted in order that only the volumes in excess of the benchmarks are billed monetarily.

At the time of waste assessment report submission, licensees are required to complete the worksheet for waste billings against benchmarks Figure A5.1 (Coast), Figure A5.2a (Interior Endemic) and Figure A5.2b and A5.2c (Interior Catastrophic). Follow the

procedures outlined in the worksheets for adjusting and coding the appropriate stumpage rates for the applicable log grades.

Using the worksheet procedure, only the waste volumes in excess of the waste benchmark are billed monetarily by applicable grade and the entire waste volume of the cutblock is charged to the licensee's cut control.



## Appendix 5 Waste Benchmarks

### 1. Benchmarks

On an individual cut block basis, the following waste benchmarks in cubic meters per hectare will be used for monetary billing of avoidable waste:

Coast	Immature	Mature
Normal	10 m <sup>3</sup> /ha	35 m <sup>3</sup> /ha

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

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. Benchmark Calculations and Billings

#### a. Coast

Avoidable waste volumes in sawlog grades (X or better) 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 cutblock, 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 cutblock, monetary billings will be made on the sawlog grade volumes exceeding the benchmark.

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

#### b. Interior

Avoidable waste volumes in sawlog grade and catastrophic grade 3 from the dispersed, accumulated and the standing tree subpopulations of the cutblock will be applied to the benchmark. Catastrophic grade 3 will be applied to the benchmark first followed by the sawlog grade.

Where the avoidable waste volumes in sawlog grades and catastrophic grade 3 are below the established benchmark for the cutblock, no monetary billing of avoidable waste in sawlog and catastrophic grade 3 will be made.

Where the avoidable waste volumes in sawlog grade and catastrophic grade 3 are above the established benchmark for the cutblock, monetary billings will be made on the sawlog and the catastrophic grade 3 volumes exceeding the benchmark.

Avoidable waste volumes in endemic grade 3, and grade 4 will not be applied to the benchmark but will be billed monetarily in all cases.

### 3. Benchmark Eligibility

All cutblocks where primary logging had been completed after January 1, 1999 will qualify for the waste benchmarks.

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

### 4. Coarse Woody Debris Targets



The waste benchmarks currently specified for the Coast and Interior will be used for blocks surveyed until December 31, 2005.

Effective January 1, 2006, waste benchmarks will be replaced by coarse woody debris targets specified in Schedule B of the cutting permit or agreement.

References will be made to Schedule B which may contain the total CWD volume retention target in cubic metres per hectare for each individual cutblock. The total CWD volume target should be segregated by species and grade.

The CWD target is applicable only to the dispersed subpopulation area of the cutblock.

Only the saw log grade volume components of the CWD target specified in Schedule B will be used to offset the avoidable waste sawlog grade volume compiled from the dispersed subpopulation of the cutblock. The excess volume after the offset and all the waste volumes from the accumulated and standing tree subpopulations of each cutblock will be billed as waste.

 <b>BRITISH COLUMBIA</b>	<b>COAST</b> <b>Worksheet for Waste Billing Against Benchmarks</b>	Ministry of Forests 
To be Completed by Licensees		
Licence No.	CP No.	Cut Block
Timber Mark	Reporting Unit No.	
Primary Logging Completion Date	Cut Block Net Area <span style="float: right;">ha</span>	
Location	Stand/Site Type	
<b>Calculations</b>		
Avoidable waste (sawlog)	= _____	M <sup>3</sup> /ha..... (A)
Established benchmark	= _____	M <sup>3</sup> /ha..... (B)
(A) - (B)	= _____	M <sup>3</sup> /ha..... (C)
If (C) < or = 0.0000, stop		
If (C) > 0.0000, proceed as follows:		
Waste Monetary Reduction Factor (WMRF) =	(C)/(A) = _____	.....(D)
	(to four decimals)	
To be Completed by Forest Service		
<b>Processing</b>		
If (C) is < or = 0.0000, on FS 702, code:		
Avoidable all species sawlogs (X or better):	\$0.00/m <sup>3</sup>	
Avoidable all species grade Y:	\$0.25/m <sup>3</sup>	
Unavoidable all species all grades:	\$0.00/m <sup>3</sup>	
If (C) is > 0.0000, request average sawlog rate from HBS		
Average coniferous sawlog rate (HBS) =	\$ _____ /m <sup>3</sup>	.....(E)
Deciduous sawlog rate =	\$ _____ /m <sup>3</sup>	.....(F)
On FS 702, code		
Avoidable coniferous species sawlogs (D x E) =	\$ _____ /m <sup>3</sup>	
Avoidable deciduous species sawlogs: (D x F) =	\$ _____ /m <sup>3</sup>	
Avoidable all species grade Y: \$0.25/m <sup>3</sup>		
Unavoidable all species all grades: \$0.00/m <sup>3</sup>		
Approved by Forest Officer (signature)	Date	

*Figure A5.1 Sample of Worksheet for Waste Billing Against Benchmarks (Coast).*



		<b>INTERIOR ENDEMIC</b> <b>Worksheet for Waste Billing Against Benchmarks</b>		Ministry of Forests 	
To be Completed by Licensees					
Licence No.		CP No.		Cut Block	
Timber Mark			Reporting Unit No.		
Primary Logging Completion Date			Cut Block Net Area <span style="float: right;">ha</span>		
Location			Stand/Site Type		
<b>Calculations</b>					
Avoidable Waste:					
	Sawlog	=	_____	M <sup>3</sup> /ha....	( A )
	Grade 3	=	0	M <sup>3</sup> /ha....	( B )
	Establish benchmark	=	_____	M <sup>3</sup> /ha....	( C )
	[( A ) + ( B )] - ( C )	=	_____	M <sup>3</sup> /ha....	( D )
If ( D ) < or = 0.0000, stop					
If ( D ) > 0.0000, proceed as follows:					
Waste Monetary Reduction Factor					
	(WMRF) =	$\frac{D}{A}$	=	_____	.....( E )
				(to four decimals)	
To be Completed by Forest Service					
<b>Processing</b>					
If ( D ) is < or = 0.0000, on FS 702, code:					
	Avoidable all species sawlogs:			\$0.00/m <sup>3</sup>	
	Avoidable all species grade 3:			\$0.25/m <sup>3</sup>	
	Avoidable all species grade 4:			\$0.25/m <sup>3</sup>	
	Unavoidable all species all grades:			\$0.00/m <sup>3</sup>	
If ( D ) is > 0.0000, request average sawlog rate from HBS					
	Average coniferous sawlog rate (HBS) =		\$ _____ /m <sup>3</sup>		.....( F )
	Deciduous sawlog rate =		\$ _____ /m <sup>3</sup>		.....( G )
On FS 702, code					
	Avoidable coniferous species sawlogs ( E x F ) =		\$ _____ /m <sup>3</sup>		
	Avoidable deciduous species sawlogs: ( E x G ) =		\$ _____ /m <sup>3</sup>		
	Avoidable all species grade 3: \$0.25/m <sup>3</sup>				
	Avoidable all species grade 4: \$0.25/m <sup>3</sup>				
	Unavoidable all species all grades: \$0.00/m <sup>3</sup>				
Approved by Forest Officer (signature)				Date	

Figure A5.2a Sample of Worksheet for Waste Billing Against Benchmarks (Interior Endemic).