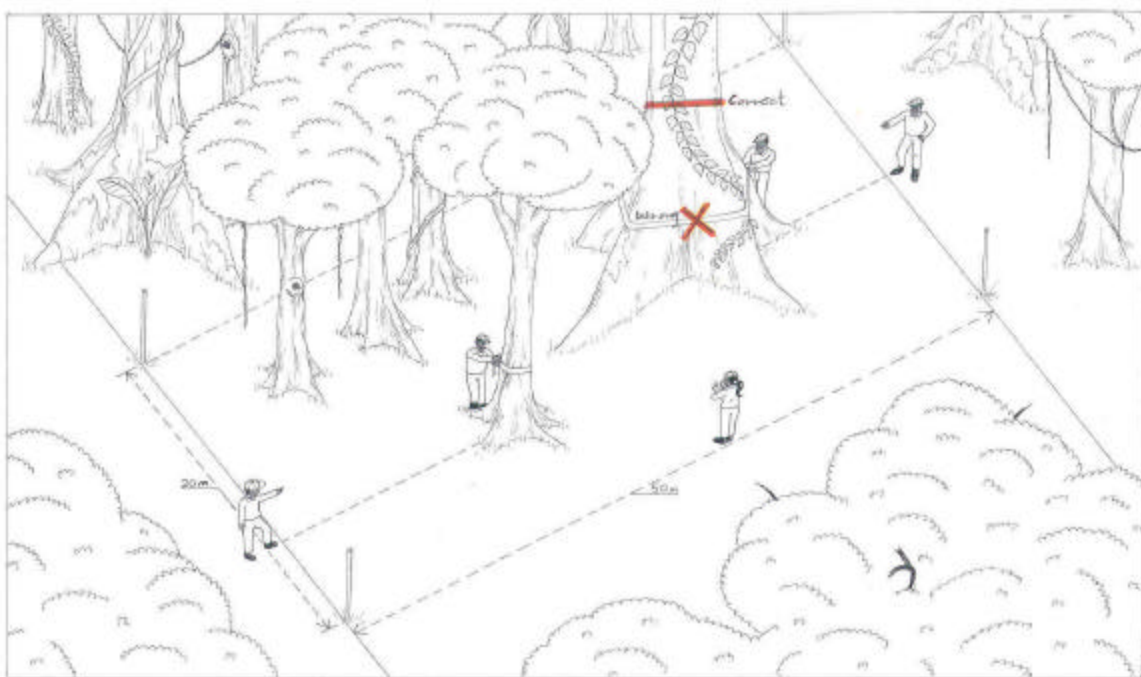


# Guyana Forestry Commission

## Forest Resources Management Division

### Pre-harvest Inventory procedure



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## **Summary**

Pre-harvest inventories (also called stock surveys) are surveys conducted in areas about to be harvested for timber. Their aim is to provide information that facilitates the planning and control of an efficient harvesting operation (within the bounds of relevant legal restrictions and recommended operating practices).

This manual provides the current GFC procedure for conducting pre-harvest inventory. As such the manual's aim is twofold:

- To act as clear instructions for GFC staff involved in carrying out or providing training in pre-harvest inventory work, including technical staff, supervisors, field crew chiefs and office personnel.
- To provide guidance and a possible procedure for concession holders to assist their planning of harvesting operation. Though the procedures set out in this document are not mandatory, they have been found to work well and can usefully be considered by concession holders intending to carry out pre-harvest inventory work. Moreover, if desired, GFC is able to provide assistance in all aspects of these procedures, including planning, field implementation, data processing and mapping.

The manual is divided into two main sections:

Section One sets out the current GFC procedure for these activities. This are intended for use by all GFC staff involved in carrying out sampling inventory work, including technical staff, supervisors, field crew chiefs and office personnel.

Section Two provides supplementary information – guidance noted on applying the procedures, look-up tables and indicative costs pertaining to the procedures.

Due to the scope of this manual, it may be useful to copy particular sections of the document for particular staff. In particular, the section covering fieldwork can be extracted and laminated.

## Introduction

As the name suggests, pre-harvest inventories are surveys conducted in forest areas before timber harvesting. The purpose of this type of inventory is to provide useful information on areas about to be harvested, in particular a list of harvestable trees accompanied by a map showing their locations in relation to the hydrology and terrain within the area. This information can be used to plan an efficient and environmentally sensitive harvesting operation.

The procedures described in this manual have been developed based on experience within Guyana, while note has also been taken of the approaches used in similar tropical countries. To ensure viability, the following (inter-related) aspects have received close attention:

- 1) **Resources** required (number of skilled staff, time, and capital outlay) – these have been kept to a minimum.
- 2) **Complexity** – the procedures have been kept as straight-forward as possible.
- 3) **Technology** – to allow for the range of forestry companies in Guyana, the procedures are designed to allow for two main levels of technology. One makes use of basic methods (but including computer spreadsheets), while the other capitalises on the benefits of producing maps using computer software (GIS).

## GUYANA FORESTRY COMMISSION PRE-HARVEST INVENTORY PROCEDURE

### FIELD PROCEDURE

The following procedure is applied within square or rectangular blocks allocated for timber harvesting (usually these are 100ha in area – see [Figure 1](#)). The felling blocks are demarcated on the ground by means of cut boundary lines and four labelled corner posts. A separate procedure covers the establishment of block boundaries.

#### ***Stage 1 - Establishing strip lines and recording topographic features within the block***

- i) The four-person team consists of a compass operator, line cutter, line marker and a booker.
- ii) The inventory of each block commences at its South West corner. The Southern boundary of each block is treated as its inventory base line. The compass operator and line cutter establish lightly cut strip lines at 50m intervals along the base line (i.e. these lines run South to North and *vice versa*). This must be 50m **horizontal distance**; therefore adjustment is required if the ground is sloping. Strip marker posts are established at the start and end of each strip line by the booker and line marker (see [Figure 2](#)). These posts are labelled with the block and strip number using a **permanent** marker pen or aluminium tags.
- iii) To make horizontal adjustment between the strip marker posts, two methods may be used.

a) Horizontal chaining method. If the slope is minor (e.g. less than 10%) the 50m horizontal distance is measured as normal but ensuring that the chain is as horizontal as possible. The third person should assist this by supporting the chain at around the 25m mark. The limit to this approach is reached where the person down-slope cannot hold the tape high (and taught) enough to keep it horizontal. This can be overcome by splitting the 50m into two or three stages (e.g. 20m + 30m). This is often called step chaining. It may also be useful where the topography changes within the 50m stretch.

Provided it is used carefully, this method is quick to implement and is sufficiently accurate for the purposes of this kind of survey.

b) Slope correction method. If the horizontal distance cannot be conveniently established by the above method (e.g. on very steep slopes) 50m is first measured along the base line, by the line marker, using a 50m chain. In this method, the chain follows the gradient of the slope, i.e. it runs parallel to the ground.

A new strip marker post is lightly inserted into the ground at the point reached. A clinometer reading is now taken from the existing strip post to the new one by the booker. This requires that the posts are marked at the same height from the ground (preferably at around eye height); the clinometer reading is taken between these marked points on the posts. The booker consults the slope correction tables and calls out the distance adjustment to be added, based on the slope percentage read from the clinometer. The line marker moves the new strip post accordingly and inserts it firmly into the ground. If possible, the entire 50m should be measured and adjusted in one operation; if visibility is restricted or if the terrain is difficult the distance can be split into two or more stages (as with step chaining), with a correction applied to each.

- iv) As each strip line is being cut through the block, the line marker and booker also establish smaller marker pickets at 20m intervals along the line. Pickets are marked with block and strip number and the distance (in metres) of the picket along the line, using a permanent marker pen. The distance between the pickets is adjusted as

necessary to ensure that it is 20m **horizontal distance**. To this end, the same procedure is used as in iii) and iv), above. Whichever method is used, the booker records the slope % measurement on the topographic data form.

- v) At 200-metre intervals (i.e. at the end of each 1ha section), the crew measures the distance across the strip to the last strip line, to check the width of the strip. A 30m tape is used for this, i.e. the measurement is made in two stages. It is important that the tape is held horizontally, to enable an accurate horizontal reading. This strip width figure is booked on the field form. Provided this is between 45 and 55 metres, no correction is made (the map can be corrected later in the office). If the strip width is outside of this range, the strip line should be re-cut from the last point where it was within the range – if necessary, completely starting again from the baseline. The check distances are recorded on the Topographic form in the appropriate columns.
- vi) As the team progresses, the booker records the location of any creeks, other water features (including swamps), gulleys, rock outcrops and any other terrain features which would affect the harvesting operation (see field form)
- vii) When the team reaches the end of the strip line (i.e. at the northern boundary of the block) the team then walks back to the southern base line and then repeat Procedures i to vi for the next strip line.

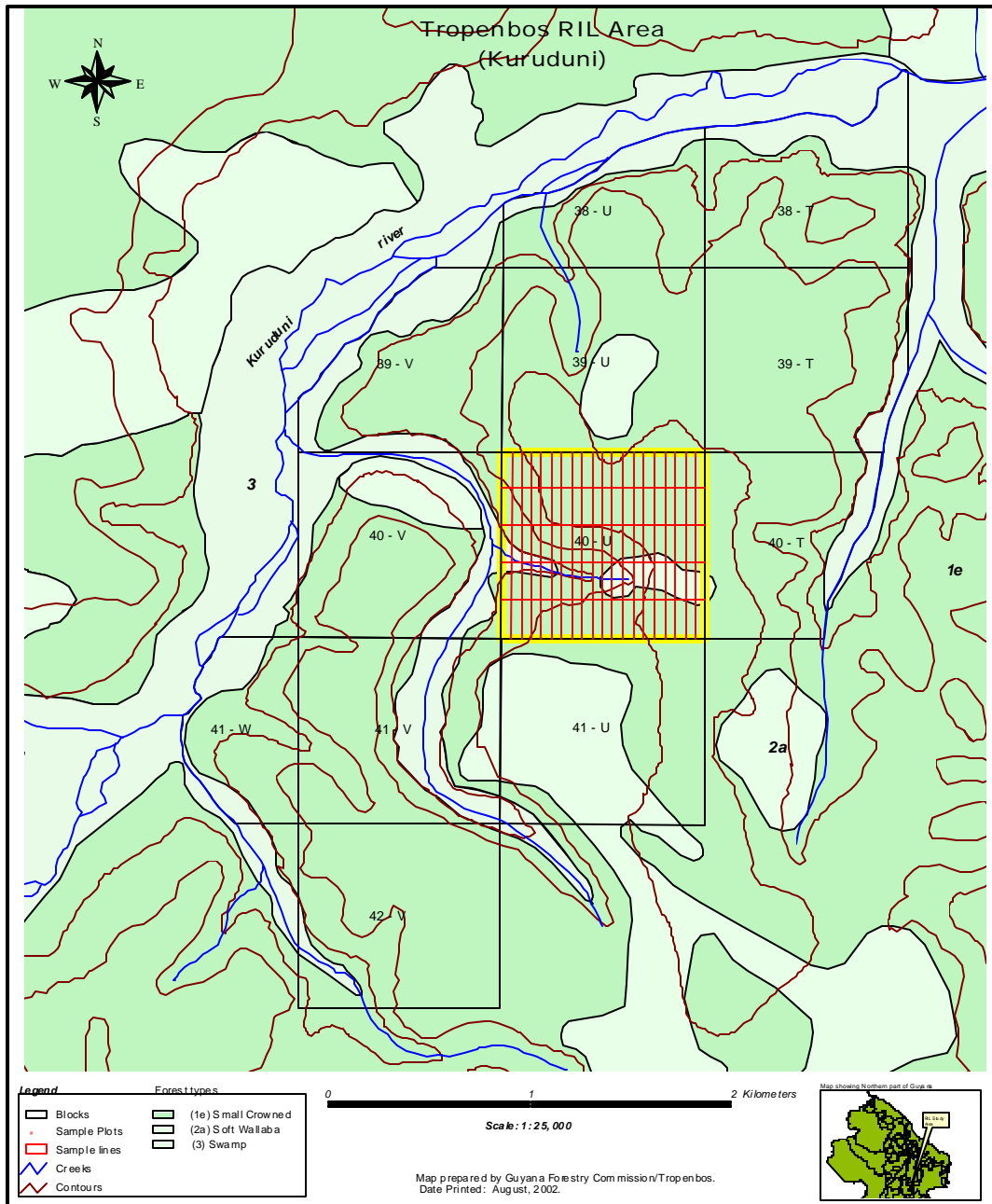
**Key points:**

***When establishing block and strip lines, particular care must be taken in setting compass bearings and in making slope corrections, as even small errors can have serious consequences.***

***Ensure that the correct magnetic declination is set on the compass and that the chain and 30m tape are in good working order.***

***Ensure that care is taken in numbering pickets and that none are missed out - this will lead to serious problems later. This can be achieved by using aluminium tags, which can be labelled prior to the field work.***

**Figure 1: Showing an overview of a typical harvesting area**



**Figure 1 – illustrates variation in block shape and size.**

Figure 2: Block layout

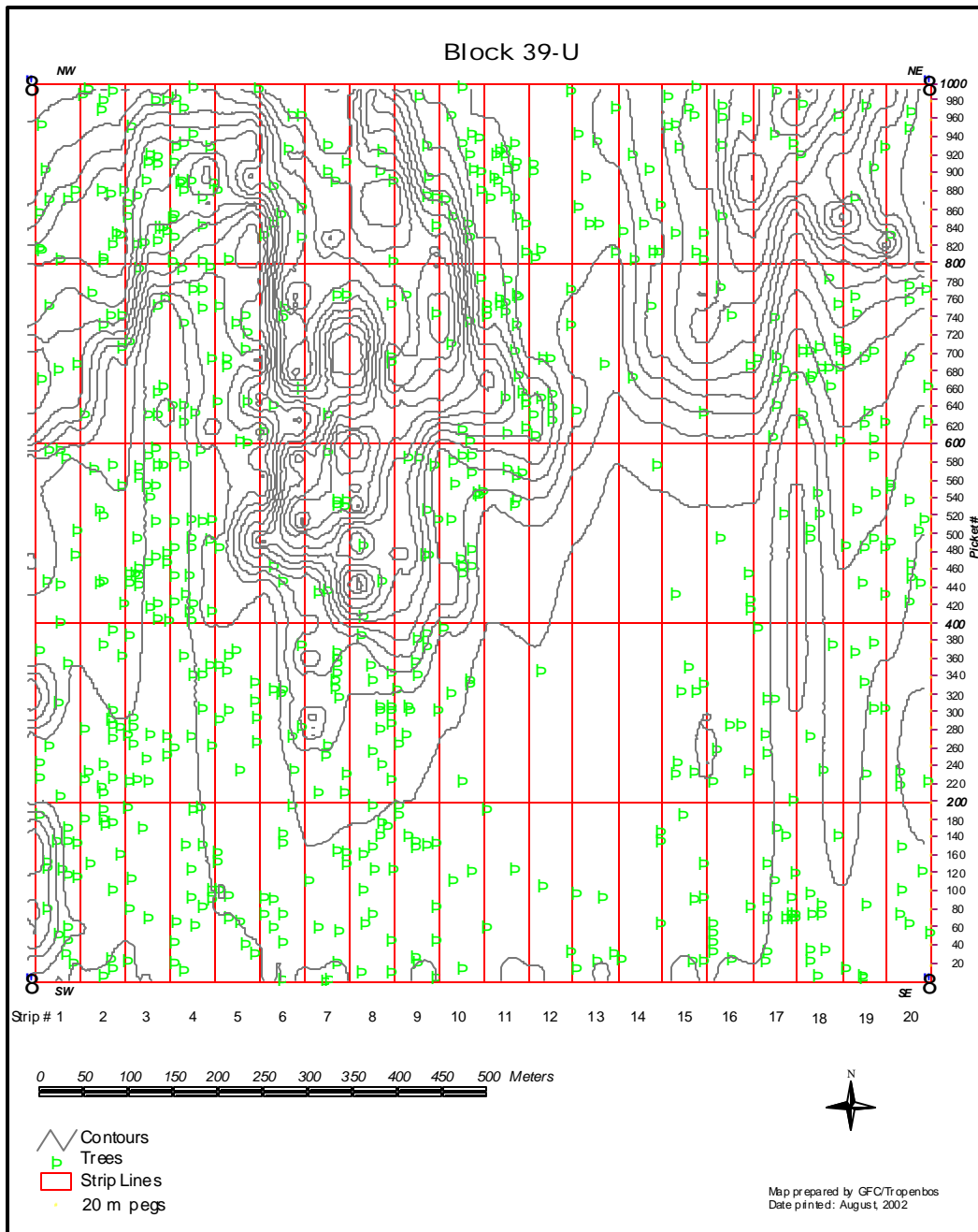


Figure 2: Showing one block layout, including contours, strip lines, corner posts, numbered pickets and a few tree crowns.

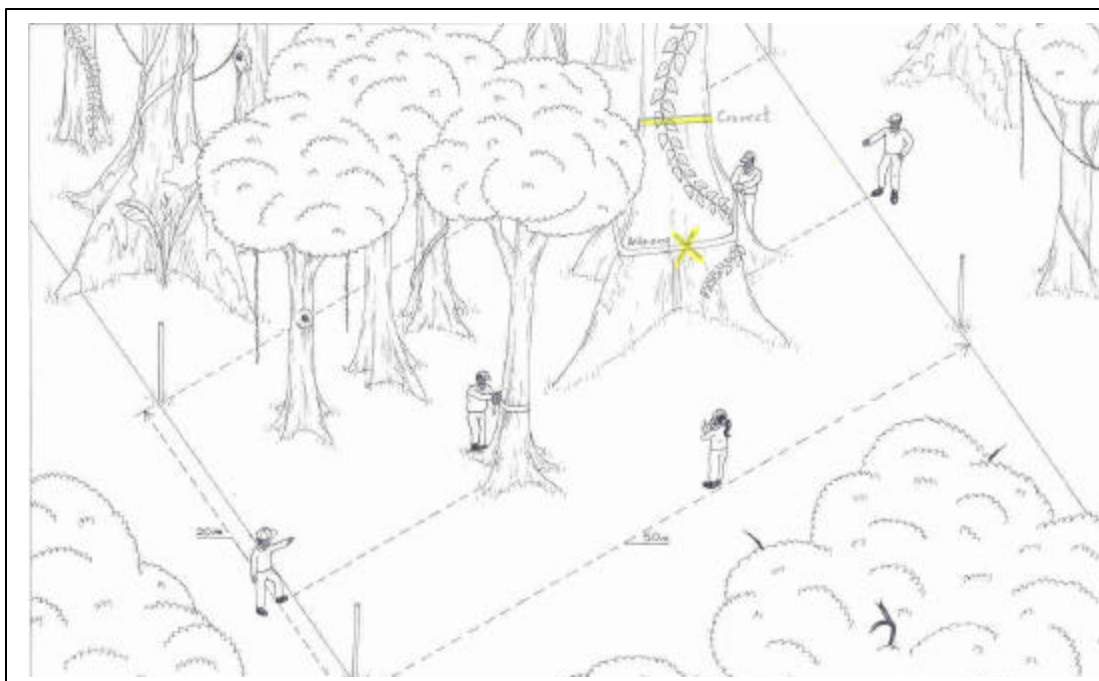
## Stage 2 - Enumerating trees within the strip lines

- i) The enumeration team consists five persons: these two tree enumeration staff, two tree location staff and a booker. The booker is responsible for supervising the team and recording all information on the field form.
- ii) The two enumerators spread out on either side of the booker, who walks more or less along the center of the strip. Each enumerator is responsible for covering the 25-m strip either side of the booker and moves around as necessary to assess/measure trees within this area.
- iii) The two tree location staff walk along the two strip lines, providing tree coordinate information (x and y distances - see below) by carefully estimating the positions of enumerated trees in relation to the 20-m pickets. These staff also helps to ensure that all possible commercial trees are spotted along the edges of the strip. If a possible tree is seen, the tree enumerator is nonetheless called to enumerate the tree. This reduces the amount of walking required on the part of the enumeration staff (since they do not have to move to and fro across the strip as much) and also reduces the chance of target trees being missed. Clearly each tree enumerator works with only one tree location person on each strip.
- iv) At each 20-m marker, the team lines up across the strip to ensure all personnel are moving in tandem.
- v) Each enumerator locates all commercial trees within his/her "half-strip" (with help from the tree location staff as necessary). Trees are enumerated if they meet the requirements of the survey - these must be defined at the outset of the exercise, though they can adapt over time, e.g. in response to new market orders.
- vi) These enumeration requirements are based on a species list, accompanied by the minimum commercial diameter (e.g. 35-cm) and minimum usable bole dimensions (usually bole length - e.g. 4-m, but may also include minimum top or mid-diameter). These three elements must be determined in advance of the field exercise and be clearly set out in a list carried by the booker. **It must be emphasised that close attention must be paid to tree quality – tree form and likely presence of decay.** This aspect has been found to cause the greatest discrepancies between the trees enumerated and those trees considered suitable by chainsaw operators. Additional guidance on tree selection is set out in [Appendix 1](#)
- vii) The information for each tree meeting these prescribed specifications is assessed/collected and called to the booker. Additional information on how to carry out these specific tasks is given in [Appendix 2](#). The booker repeats the information to the enumerator and receives correction or confirmation as appropriate, before recording it on the field form.
- viii) Each tree recorded in the exercise is marked with a timber crayon (**tree number or just an X or dbh in cm?**) to facilitate finding it again when harvesting is about to commence.
- ix) Two options are available for **recording tree locations**, depending on whether stock maps will be produced manually or using GIS.

### *Option A - Where stock maps are to be produced using GIS*

- x) The location coordinates for each tree are estimated by the tree location staff and called to the booker. The booker checks that these coordinates are reasonable estimates before recording them. They consist of two distances given to the nearest metre.

Figure 3: Showing general view of the procedure in action



- xi) The first distance ( $x$ ) is that from the tree to the nearer of the two strip lines. As the strips are around 50m wide, this distance should be somewhere between 0 and 25 metres. Where a tree is close to the center of the strip, the choice of which strip line to measure is to be made according to which enumerator decides to cover the tree.
- xii) To ensure that the distance data does not get mixed up: If the tree is measured from the western strip line, it is called as a positive distance (e.g. "Plus 18"). If it is measured to the eastern line, it is given a negative distance (e.g. Minus 12").
- xiii) A tree falling exactly on the Eastern strip line will be included in the next strip (where it will have an  $x$  coordinate of 0).
- xiv) The second distance ( $y$ ) is the distance of the tree from the block baseline. This is carefully estimated by the tree location person to the nearest 1 metre by referring to the tree's position in relation to the strip line (which is marked every 20 metres). The distance along the strip line is estimated by finding the point on the strip line exactly level with the tree and determining the distance of this point along the measuring from the nearest 20m marker to the point on the line exactly in line with the tree and working out the exact distance of this point along the line. Therefore the measurement will normally be within the range of 0 to 1000m.

**Key points:**

***Trees within a strip can share an  $x$  distance, as they can be in line with each other along the strip (i.e. if they are at different points along the strip).***

***Trees can also share their  $y$  distance, if they are lined up across the strip.***

***However, two trees within a strip cannot share both distances at once, since that would mean that they were occupying the same space on the ground. Even if two or more target trees are very close together, they should be distinguished by at least one of the  $x$  or  $y$  distances.***

*Option B - Where stock maps are to be produced manually:*

- xv) The position of each tree is estimated by the booker and plotted onto the strip map on the field form. A number is assigned to each mapped tree, corresponding with the number of the same tree in the tree data section of the form.

These two approaches are illustrated below:

**Figure 4 Recording tree locations**

**Two parts showing how the same tree would be recorded under each approach**

For both methods:

- xvi) The booker draws on the field map any rivers and creeks (including the direction of flow) along with sketched contours to indicate steep slopes or gulleys. Any skid trails and roads observed are also sketched onto the field map. Under Option A only this information is mapped; under option B the map is also used to plot the positions of enumerated trees (as above).
- xvii) On reaching the end of the 1000m strip, the team **walks back to the base line** (i.e. the southern boundary of the block) and repeats the exercise for the next strip.

Possible option:

Timber crayons may be of use for rapidly marking trees to avoid later confusion. Trees can be marked with an "X" or with other information such as dbh and bole length. Another option is for the booker can call back the number the tree has been given on his/her booking form – this can then be written onto the bole of the tree using the crayon.

## GFC PROCEDURE FOR CONSISTENCY CHECKING: PRE-HARVEST INVENTORY

The following procedure is used to check the consistency of pre-harvest inventory fieldwork.

A 2.5% check is made by dividing the block into 40 half-strips (i.e. dividing each strip into two) and selecting one of these at random for the consistency check. The checks made are set out in the following table, along with the consistency, which should be achieved for the exercise to be considered acceptable.

**Table 1: Consistency check**

Phase of survey	Element checked	Check performed in selected half-strip	Required consistency
Strip establishment	Bearings and horizontal distances	Bearings are measured at the starting of every strip line.  Five strip width checks are made by running a 50m chain across the strip at 100m intervals	All bearings at the starting of strip lines within 2 degrees  Strip width does not diverge by more than 5m at any point
Picket establishment	Horizontal distances	Re-measure horizontal distances between 10 pickets	90% (9 out of 10) of the 20m horizontal picket distances within 0.2m of the correct value
Topographic mapping	Mapped features	Repeat enumeration and mapping procedure in each check section	90% of required features are mapped and can be relocated within 5m of stated location
Tree enumeration	Number of trees Species id Dbh measurement Log length estimation Tree coordinates (both options)		90% consistent 90% consistent 90% within 5cm 90% within 2m  90% within 5m

The results of the check are reported in the table overleaf

**Table 2: Results of consistency check**

Phase of survey	Element Checked	Consistency Status	Total	Per cent	Acceptable		
					Yes	Ok	No
Strip establishment	Bearings	Within 2 degrees					
		More than 2 degrees out					
	Strip width	Within 5m					
		More than 5m out					
Picket establishment	Horizontal distances	Within 0.2m					
		More than 0.2m out					
Topographic mapping	Mapped features	Match					
		Loss at re-measurement					
		Gain at re-measurement					
		Within 5m					
		More than 5m out					
Tree enumeration	Number of trees	Match					
		Loss at re-measurement					
		Gain at re-measurement					
	Species identification	Match					
		Non-match					
	Stem diameter	Within 2cm					
		More than 2cm out					
	Log length	Within 2 metres					
		More than 2 metres out					
	Tree coordinates	Within 5m					
More than 5m out							

Interpreting the results of the consistency check

The exercise must record **scores of “Y” throughout the righthand column** for it to be considered acceptable.

IF OK:

If this is found to be the case, the work should continue, ensuring that the quality is maintained. The crew should be given positive feedback on their performance. Attention should nonetheless be paid to any aspects of the procedure, which showed errors (although they were within the allowable range), since these are indications of potential future weaknesses. These may point to particular crew members in need of additional training and/or guidance.

If not OK:

If one or more entries in this field score a “N” a decision is made by the supervisor as to whether

- a) the problems identified can be rectified individually. This depends on the nature of the problem(s) identified. (e.g. by sending a small team back to check or rectify picket numbers), or whether
- b) there are so many problems that the whole exercise needs to be repeated. This is a serious situation which must be avoided - if the procedures in this manual are followed carefully by an experienced and well supervised crew, it should never arise. Due to the high cost of repeating the survey, the supervisor will immediately report any such situation to his manager and await instructions.

Any elements recording a score of "N" should immediately be addressed through additional explanation and training. They may also indicate a need to improve the description of the procedure in this manual.

## OFFICE PROCEDURES

### *Tree data Management*

Update with appropriate references to Denis Alder's software and user guide, once developed

i) The FRMD Procedure for Field Data Management is followed. This requires that all field sheets are photocopied prior to data entry. The copied sheets are used for data entry and stock map production.

ii) In the office tree and coordinate data are entered into the GFC Excel template file. This is named after the block number in question, with the word "TREES" added at the end, e.g. 39VTREES.

iii) The x coordinate value for each tree must be corrected to provide its distance from the western **block** boundary (rather than the western **strip** boundary, which is recorded in the field). This is carried out automatically, using the pre-set Excel macro function.

No correction is required for trees in Strip no. 1 (since the strip boundary is the block boundary); Strip no. 2 must have 50m added to each x value, Strip no. 3 must have 100m added etc. This allows all tree positions to be referenced to the southwest corner of the block. Y values do not require correction, since all values are already referenced to the southern block boundary. The resulting, corrected spreadsheet is saved as a database (.dbf) file of the same name.

iv) A stand table and stock table are produced using the pre-set command contained in the *Preharvest* programme.

In most cases only those trees of interest to the concession holder will be recorded in the field. Hence the stand tables produced will address the concessionaire's needs. However, if desired, the tree data may be filtered to narrow down the trees meeting additional species or size requirements – e.g. if a separate table is desired for peeler species only.

v) Trees 10m or less apart are identified by running the Excel Macro *Treeprox* on the TREES datafile. This creates an additional field in the TREES file, which provides the identity (strip and tree number) of any tree within 10m of the tree in the record. If the file is then sorted by this new field, all of the tree records in question are brought together. These records are then highlighted and copied to a new file called PROXTREES, which is saved as a .dbf file.

### *Topographic data management*

i) The data collected on the topographic data form are entered into an Excel template file. This is named after the block number in question, with the word "TOPO" added at the end, e.g. 39VTOPO.

ii) When this is completed, the *Topographic* macro is used to generate an extra column containing elevation information. This file is saved as a .dbf file of the same name for use in Arcview (GIS) software.

iii) The distances recorded in the check measurements made across the strips at intervals are used to as an input to the programme *XYCorrection*, which is run on the TREES file, created above. This corrects the tree coordinates based on deviations in the cutting of strip lines.

## ***Production of Stock maps***

Two different approaches are used for producing stock maps, following on from the distinction made in the field procedure.

### *Option A - Using ArcView GIS*

i) ArcView GIS software is opened and the standard block template theme showing the outer block boundary and 50m strip lines is opened as a new view within a new project.

ii) The corrected database file (e.g. 39VTREES) is added as a table within the project. The data are now projected as an Event Theme, using the x and y coordinate information in the table. This results in the tree positions being shown as a map; the view can be manipulated to differentiate between tree species and/or diameters by use of colours or symbols, according to the user's requirements.

iii) The TOPO file for the block is added as a table and projected in Spatial Analyst to produce a contour map. This is saved as a shape file and added as a new theme to the existing view of the block.

iv) Other terrain (gulleys, steep slopes, rock outcrops etc.) information is manually digitized into a fourth theme superimposed onto the above using a set of standard symbols (see Appendix 3). Creeks and any other water features are manually digitised using the mouse into the same theme, as line and polygon features respectively.

vii) 10 and 20m buffer zones are created around each water feature, as per the Code Of Practice. Areas are calculated for these zones.

viii) The project is saved, named after the block covered. *Note that the project file simply records the locations of the individual themes and tables: if files are moved (e.g. to a new directory) after the project is saved, it will not be possible to re-open the project.*

### *Option B - Using a manual method*

As stated above, photocopies of the original field sheets are used for data entry. In the case of manual stock map compilation, the same photocopied sheets are then used for producing the final stock map.

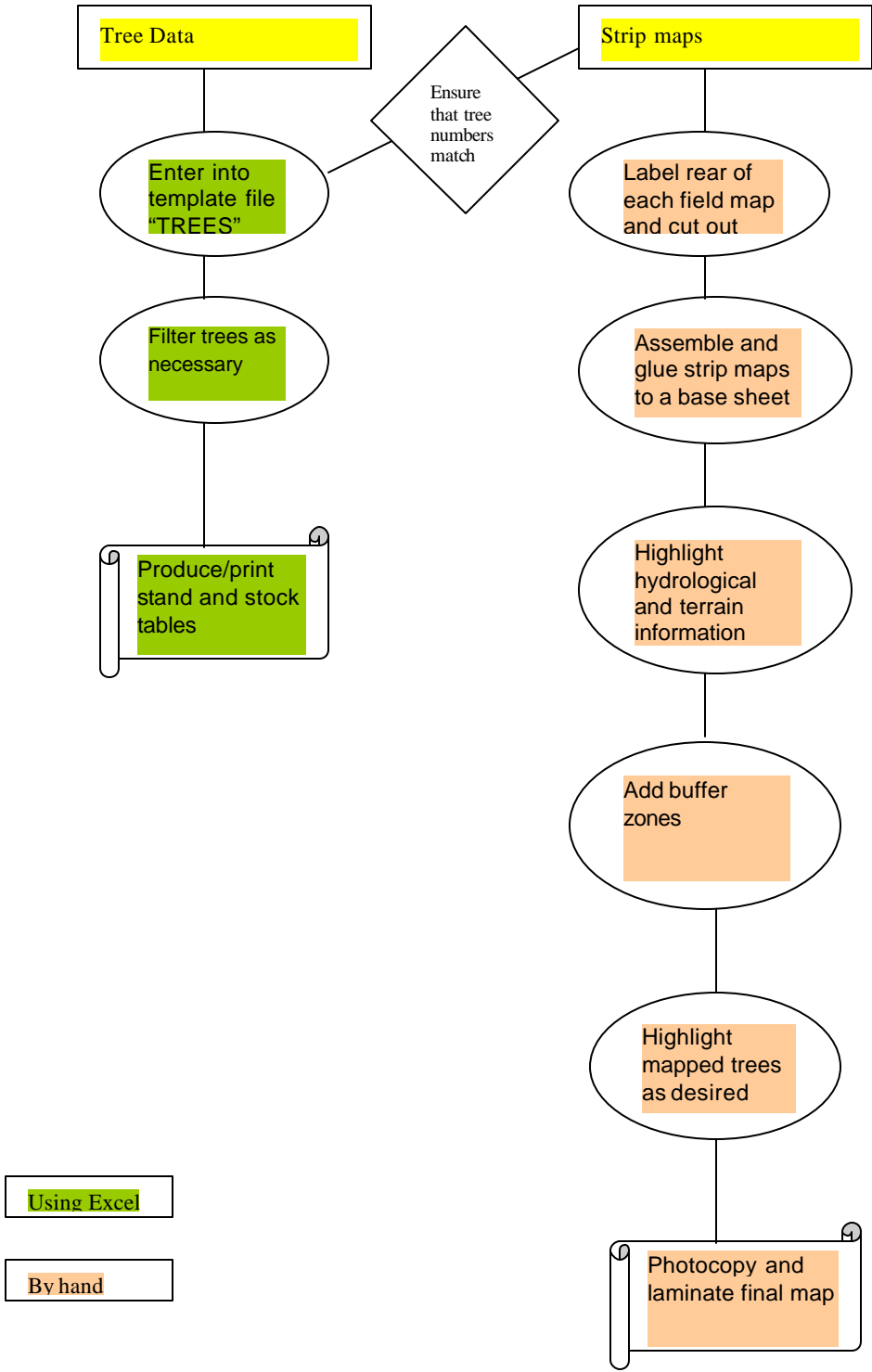
Following data entry, field maps are labeled with block, strip and sheet number on the reverse side of the field form in order that each field map can be uniquely identified after it is cut out. Therefore it is critical to ensure that the information is written in the correct part of the reverse side of the field sheet.

The maps are then cut out and assembled on a large sheet of paper in the correct sequence. This produces a stock map at 1:1000 scale, i.e. each 100ha block is shown on a map 100cm x 100cm.

Before the map is finally stuck down onto the base sheet of paper, a careful check is made to ensure that the sequence and direction of strips exactly match the layout established in the field. **This is of critical importance, as any mistake at this stage will completely invalidate the final map.**



**B: Using Excel and manual mapping**



## Appendices

### Summary of key points

#### *General*

New staff should not carry out operational inventory work (field or office) until they are fully trained and tested

Crew should not rush work but go at a comfortable pace with a break no less than every two hours (including lunch break)

#### *Block and line establishment*

Care in numbering pickets

Care in compass bearings when line cutting - take back bearings!

Care in establishing horizontal distances

#### *Tree enumeration*

Work with logging crew periodically to fine tune tree selection skills and how terrain limits felling and extraction practices

Practice log length estimation

Adhere to dbh measurement conventions to ensure consistency

#### *Supervisor*

Must stay in the field all of the times, except where there is a special reason to temporarily return to camp for some specific reason.

Must bear in mind the requirements of the consistency check and ensure **that at all times** these are being met. Failure to do so will have serious impacts later, since the work may well fail the test. The principle that must be followed is that *“prevention (of errors) is better than cure”*. This involves two types of continual checking by the supervisor:

i) Checking fieldwork while it is in progress. This involves actively checking the crew's measurements, assessments and decisions throughout day and questioning/ correcting these as necessary.

ii) Checking the forms for the day's work each evening

- All parts of form completed
- Species spellings and codes correct and completed. Only required species (set out in tree specifications list) have been recorded.
- Tree diameters and bole lengths recorded meet requirements of the tree specifications list and are within expected ranges (e.g. a bole length of 35m or dbh of 300cm cannot be correct). If recordings are suspect – e.g. at the limit of what could possibly be expected, the crew member responsible should be consulted, since he/she will certainly remember a tree of this type (this is the advantage of carrying out the check on the same day).

- Adjacent field maps fit together - contours, creeks, gulleys, other continuous features

## **Instructions for tree assessment**

### **Tree identification**

A list of species and minimum dbh is provided for each exercise. The exact content of this list is decided by the party instigating the inventory. The list must also indicate the level of species identification required, e.g. whether different Baromalli's must be distinguished (commune,/swamp, fragrans/sand) or grouped as one category.

The enumeration team must familiarize themselves (and each other) with the particular species on the list prior to the exercise. If the list contains species none of them can confidently identify they should consult any available field guides and attempt to find specimens of the species prior to the commencement of the survey. If this is not possible, the supervisor should alert management before continuing. If necessary, companies can approach GFC to request assistance with tree identification.

### **Measurement of diameter at breast height (dbh)**

insert file and diagrams

### **Defect Assessment**

Particular care must be taken over this assessment as it has a crucial impact on the results and usefulness of the inventory.

Defect assessment should be based as closely as possible on the criteria used by chain saw operators. The enumeration crew should therefore work along-side chain saw operators for a period of time (at least half a day) to gain a full appreciation of the methods used. It is important to take account of species when carrying out this assessment.

This exercise can be considered complete when there is close agreement between the chainsaw operators and enumeration crew. However, it should be repeated every few months to ensure consistency over time.

It is important that each tree is assessed from all sides, by walking around it, carefully inspecting for decay, wounds and poor form from ground level up into the crown. Any tree with visible external decay should be rejected.

### **Estimation of log length**

Care should be taken in this activity, as it is a difficult task requiring much practice and testing. Tree enumerators should practice this skill prior the exercise, ensuring that they make attempts from a variety of angles, including standing directly under the trees. Verification of estimates should be carried out from a distance of 10-20m from the tree where possible, to ensure that the clinometer reading is accurate.

**Commercial list with room for additions - adapt from Silvicultural Survey list**

*List of commercial species assessed in Silvicultural Survey No. 3*

<b>Common name</b>	<b>Scientific name</b>	<b>GFC Species code</b>
Aromata	<i>Clathrotropis</i> spp.	1852
Burada	<i>Parinari</i> spp.	1853
Barakaro	<i>Ormosia</i> spp.	1862
Baromalli	<i>Catostemma</i> spp.	1859
Bulletwood	<i>Manilkara bidentata</i>	552
Buruma	<i>Pourouma guianensis</i>	1311
Crabwood	<i>Carapa guianensis</i>	<u>211</u>
Dalli	<i>Virola</i> spp.	1863
Dukali	<i>Parahancornia fasciculata</i>	<u>1201</u>
Fukadi	Combretaceae spp.	1866
Futui	<i>Jacaranda copaia</i>	808
Greenheart	<i>Chlorocardium rodiei</i>	266
Hachiballi	<i>Pera</i> spp.	1873
Haiariballi	<i>Alexa</i> spp.	1872
Haiawa	<i>Protium</i> spp.	1869
Hububalli	<i>Loxopterygium sagotii</i>	<u>900</u>
Huruasa	<i>Abarema jupunba</i>	3
Itikiboroballi	<i>Swartzia</i> spp.	1874
Kabukalli	<i>Goupia glabra</i>	663
Kaditiri	<i>Sclerolobium guianense</i>	1512
Karohoro	<i>Schefflera</i> spp.	1884
Kurokai	<i>Protium</i> spp.	1941
Kuyama	<i>Xylopia</i> spp.	1887
Locust	<i>Hymenaea courbaril</i>	751
Maho	<i>Sterculia</i> spp.	1897
Manni	<i>Symphonia globulifera</i>	1646
Manniballi	<i>Moronbea coccinea</i>	1077
Maporokon	<i>Inga alba</i>	1939
Mora	<i>Mora excelsa</i>	1070
Morabukea	<i>Mora gonggripii</i>	1069
Purpleheart	<i>Peltogyne</i> spp.	1903
Red Cedar	<i>Cedrela odorata</i>	243
Sarebebeballi	<i>Vouacapoua macropetala</i>	1823
Shibidan	<i>Aspidosperma</i> spp.	1906
Silverballi	<i>Licaria cannella</i>	<u>879</u>
Simarupa	<i>Simarouba amara</i>	1539
Suya	<i>Pouteria speciosa</i>	1330
Tauroniro	<i>Humiria balsamifera</i>	737
Tatabu	<i>Diplotropis purpurea</i>	1930
Tonka Bean	<i>Dipteryx odorata</i>	505
Ulu	<i>Trattinickia</i> spp.	1912
Wadara	<i>Couratari</i> spp.	1917
Wallaba (soft)	<i>Eperua falcata</i>	557
Wamara	<i>Swartzia leiocalycina</i>	1633

## **Appendix      Equipment and materials required for stock survey**

### **A Field Equipment**

#### Line-cutting team:

- (1)      GPS
- (3)      Cutlasses
- (2)      Cutlass files
- (2)      Chains or 50m tapes
- (2)      30m tapes
- (2)      Compasses
- (2 rolls) Flagging tape
- (2)      Permanent markers
- (2)      Clinometer
- (2)      Slope correction table

#### *Enumeration team:*

- (5)      Cutlasses
  - (3)      Cutlass files
  - (5)      Diameter tapes
  - (2)      Clinometers
  - (2)      Compasses
  - (2)      Slope correction table
  - (2)      30m tapes
- 
- (1)      Clipboard
  - (2)      Pencil
  - (2)      Eraser
  - (50)    Field sheets
  - (1)      Species list

### **B Office**

#### Data management/GIS mapping

Hardware:      Computer, printer, zip drive  
Software:      Arc View GIS, Excel, Ozie Explorer (GPS downloading software)  
Other items:    (1) Zip disk, (1) 1.4MB Disk, B&W/Colour Printer cartridges, A4 Paper;

#### Manual mapping:

- (3) Mapping pens, ink
- (1) Sheets large format paper
- (1) Large rule

The above quantities are based on one team carrying out a stock survey over an entire block of 100 hectares (1km<sup>2</sup>), with follow-up office activities.

**GUYANA FORESTRY COMMISSION**

**PREHARVEST INVENTORY REPORT**

Concession Name:

Code:

Compartment number(s) covered

Block number(s) covered:

Total area covered:

FMP reference:

Period:

Approval date:

Person submitting report:

Designation:

Date:

**Description of work**

Any variations on CoP, if similar, otherwise summarise and attach procedures manual)

Office procedures, ditto

List of personnel involved in the exercise (including designation and role within team). Breakdown of dates and time spent on line cutting, enumeration and processing of information.

**Results**

Excerpt from concession map, showing compartment(s) and block(s) covered.

Summary table containing information on each block covered: vegetation types, number of harvestable trees and estimated standing volume, terrain, accessibility, sensitive areas, special factors

Stock map for each block (manual or GIS), showing

- Block boundaries, internal strip boundaries, 10m grid throughout
- tree positions, numbered within each strip
- terrain - contours, outcrops, swamps,
- unproductive and/or unworkable areas (shaded)
- buffer zones

Stand and stock table per block (usually around 100ha)

Compartment number:		Block number:		Area (ha):		Stems/volume (m3) by Diameter Classes				
Species	Min dbh (cm)	Min length (m)			35-50cm	50 - 65cm	65 - 80	80+	Totals	
Greenheart										
Purpleheart										
Wamara										
Kabukalli										
Simarupa										
etc										
				<b>Totals</b>						

Diameter classes are set according to the interests of the party conducting the survey.

