

## TIMBER INVENTORY INSTRUCTIONS

### Introduction

A complete timber inventory is conducted in every block during selected years. The purpose is to collect new diameter and condition data for numbered trees, to number ingrowth trees, and to record any fallen trees. It is undertaken primarily by student crews beginning in mid-May and continues until completion.

### Set-up

#### Covering the area

All blocks in the study area are measured. The block progression should begin with 6C and proceed east on C, west on D, east on E, west on F, east on G, west on H, east on I, west on J. Within a block each quadrat is tallied separately, moving in the "U" shaped order 1, 3, 4, 2, when going east, and 2, 4, 3, 1 when going west (see "Tree Mapping Instructions").

#### Crews

Crews consist of three people, one recorder and two observers. The recorder is responsible for recording data on the polycorder, making sure all numbered trees are found, and defining the southern line of the measuring area. The observers measure trees.

### Procedure

1. When a crew first arrives at a quadrat, the observers lay out the 50m ropes along the two quadrat lines to help define the quadrat boundaries. Quadrat lines are marked by two horizontal blue lines painted on bordering trees.
2. The recorder records the date, observers, recorder, weather, and comments on a tally sheet to keep a record of observation dates and any problems encountered.
3. The most efficient means for covering the area of a quadrat is to make three parallel sweeps (east-west) beginning in the NW corner (see illustration on page 33). This can be varied according to stand density. While the observers make the sweeps, the recorder defines the southern edge of the quadrat, keeps the observers in line, and makes sure all trees are measured.
4. The observers call out the tree number, species, diameter, and condition (if it is in a category other than "live"). The recorder repeats the information back to each observer to corroborate it, and then records it on the polycorder with the timber inventory program.

- a. *Diameter measurements.* Measure tree diameter with a diameter tape at breast height as defined by the top edge of a DBH paint line, 130cm up from the base of the bole (see Figure 3–2a). All trees with a DBH greater than 9.49cm will be recorded by one-centimeter classes. A DBH class (x) is delineated by the following rule: [(x-1)+.5] to [x+.49], e.g., [(10-1)+.5] to [10+.49] = 9.5 to 10.49.
  - b. *Tree number, species, and condition.* Tree number is found on an aluminum tag at the base of the tree. Tree species and condition codes are found in Table 3–1. The conditions are defined as (0) live—a healthy tree; (1) dead--no living cambium layer; (2) cull—a deformed or damaged tree of no commercial value; (3) dead top—a tree with the top 1m or more dead; (4) almost dead—a tree that will probably die within 5 years; (5) still standing—a tree that was dead during a previous inventory and is still standing; and (6) dead and down—a dead tree that has fallen.
5. Mark the tree on its south side with a chalk stick so the recorder can check the tally. Mark dead trees permanently by hacking them twice on the south side so they are not recorded again in future inventories.
  6. In all subsequent timber inventories, crews must look for “recruitment” trees, trees that have grown into the TI class by reaching a DBH  $\geq 9.5$  (measure, don’t estimate). Recruitment trees are given a unique number (bring appropriate tags for this purpose), and the DBH line is marked (see “Instructions for Tree Numbering and DBH Marking”). Then measure the tree for timber inventory and record the data.
  7. Any TI trees that have faded DBH marks or multi-stem letters should be remarked with paint tubes.

#### Equipment

Diameter tapes (3)	Height stick (1) 130cm
Marking chalk (2–3 per quadrat)	Chalk holders
50m ropes (2)	Hatchet (2) for marking dead trees
Instructions	
Polycorder	Numbered aluminum tags, nails, hammer for recruitment trees
Paint tubes for DBH lines	

### Evaluation

The timber inventory (a 100% tally of the trees in the study area) is a very effective means of closely monitoring the growth, condition and death of individual trees in the forest, but it is labor intensive. It takes a 3-person crew most of a 12-week field season to complete an inventory. The set-up (see "Instructions for Tree Numbering and DBH Marking") is also labor intensive. Approximately 30,000 trees are measured in a complete timber inventory.

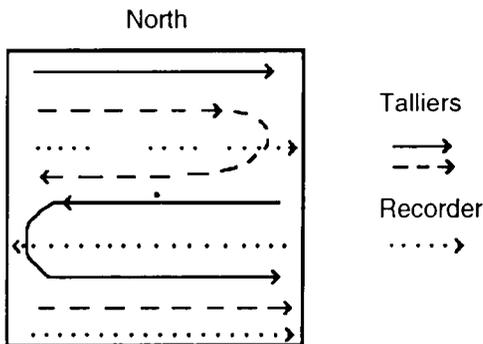
It is very important to make sure that all trees are tallied and that ingrowth trees are found. The role of the recorder is particularly important; he/she must be vigilant in watching the talliers to catch missed trees and incorrect species or condition. An improved polycorder program for tree checking would improve the speed and quality of field checks for "missing" trees.

We have also found that the quadrat (2500m<sup>2</sup>) level sample area seems to contain too many trees to handle efficiently when checking data or locating missing trees. Furthermore many other study components are measured at the subquad (625m<sup>2</sup>) level, so comparisons are difficult. In the future, the timber inventory will be conducted at the subquad level.

The original timber inventory methods included both measuring and estimating tree heights. This was dropped because of time constraints. Additionally, the reliability of the height estimates was poor, and the sample size (estimating every tenth tree and measuring every fortieth) was not adequate.

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Routes to cover a quadrat.

Table 3-1. Tree species and condition codes.

Species Name	Tree Species Codes	
	Common Name	Number
<i>Pinus strobus</i>	White Pine	1
<i>Picea rubens</i>	Red Spruce	2
<i>Abies balsamea</i>	Balsam Fir	3
<i>Tsuga canadensis</i>	Hemlock	4
<i>Quercus rubra</i>	Red Oak	5
<i>Quercus alba</i>	White Oak	6
<i>Acer rubrum</i>	Red Maple	7
<i>Betula alleghaniensis</i>	Yellow Birch	8
<i>Betula papyrifera</i>	Paper Birch	9
<i>Betula populifolia</i>	Gray Birch	10
<i>Fagus grandifolia</i>	Beech	11
<i>Fraxinus americana</i>	White Ash	12
<i>Acer pensylvanicum</i>	Striped Maple	13
<i>Populus grandidentata</i>	Bigtooth Aspen	14
<i>Populus tremuloides</i>	Quaking Aspen	15
<i>Prunus serotina</i>	Black Cherry	16
<i>Pyrus malus</i>	Apple	17
<i>Ostrya virginiana</i>	Hop Hornbeam	18
<i>Pinus resinosa</i>	Red Pine	19
<i>Pinus rigida</i>	Pitch Pine	20
<i>Hamamelis virginiana</i>	Witch Hazel	25
<i>Alnus</i> sp.	Alder Sp.	26

Tree Condition Codes	
Tree Condition Class	Code
Live	0
Dead	1
Cull	2
Dead-Top	3
Almost Dead	4
Still Standing	5
Dead and Down	6