

Forestry Division Procedures	
Subject Title: Timber Harvest Marking and Estimation	Date: December 9, 2023

### **PURPOSE and SCOPE**

The purpose of this document is to provide guidance for the consistent layout and marking of vegetation management activities (timber harvest) and volume estimation on lands managed by the Agency of Natural Resources (ANR) and its individual departments. The goal is a consistent method for marking that is understandable to logging contractors, equipment operators, and forestry staff.

### **RECORDS and METRICS**

Districts maintain volume records at the district level during project development and administration. Board Foot volumes are calculated by species for "grade" logs and by the cord and/or broad product group for lower grade products (pulp, pallet, and chips).

### **ASSOCIATED DOCUMENTS**

All prescriptions shall be stored with the corresponding record in the Land Manager database. The prescriptions will identify any exceptions to this procedure that are specific to the management being carried out. At the close of the project, specific documents (below) will be stored on land manager.

- Vegetative management prescription worksheet
- Archeological review
- Ecological review
- Map(s)
- Prescription worksheet
- Prospectus
- LRMP reference
- Bid opening form with bids
- Contract
- Closeout/Final Volumes Form

Land Manager Database: <http://anrintra.vt.gov/FPR/LandManager/Home.aspx>

Forestry Division Procedures	
Subject Title: Timber Harvest Marking and Estimation	Date: December 9, 2023

**ROLES and RESPONSIBILITY**

Staff who will implement or supervise this procedure:

Job Title	Role
Stewardship Forester or assigned State Land Forester	Harvest/project layout and administration
Forestry division staff and seasonal employees	Harvest/project marking
Stewardship Forester or assigned staff	Supply orders and storage

**TOOLS & SPECIAL EQUIPMENT**

Marking gun, marking paint or ink (appropriate colors), Biltmore stick, loggers’ tape, clinometer, compass, tally book and tally sheets or data recorder, various colors of flagging, GPS unit, batteries, SPOT device and /or phone, small first aid kit, insect/tick repellent and repellent clothing, prescription document, and maps (digital or paper).

**SAFETY REQUIREMENTS** Follow safety precautions on paint products (refer to label and Material Safety Data Sheets). Permethrin treated clothing and gators are highly recommended for regions where ticks are known to occur.

Staff should carry a SPOT device and phone when working alone. Crews should be phone or radio equipped. Position self-upwind of paint vapor when actively marking.

**THE ACTUAL PROCEDURE- Pages 3-9**

<b>Forestry Division Procedures</b>	
<b>Subject Title: Timber Harvest Marking and Estimation</b>	<b>Date: December 9, 2023</b>

## Marking Procedures

**The choice of method is selected by the Forester-in-charge and should be applied consistently and clearly across the unit.**

**How trees to be harvested or left in reserve are designated needs to be clearly articulated in the prospectus and contract and again at the showing and pre-sale conference.**

### Harvest Area Designation:

All harvest boundaries should be clearly and accurately marked in a manner that will last throughout the duration of the planned harvest.

#### **Unit Bounds:**

Sale Boundary: "triple stripe" / / / facing toward harvest area at intervals sufficient to keep contractor within harvest area. Stump mark if designated for removal.

Interior units (i.e., patches): "double stripe" // facing toward unit interior. Stump mark if designated for removal. Ideally different color than / / / but not required.

Equipment Exclusion Zones- when marked or flagged, determined at field level and outlined in sale documents.

Forestry Division Procedures	
Subject Title: Timber Harvest Marking and Estimation	Date: December 9, 2023

**Forest Product Grading and Volume Estimation** - all sawlog volumes are reported by species in thousand board feet (MBF) units using the International ¼" log rule and Girard form class 78 unless otherwise specified.

Species Class	Grade	Minimum DBH	CF or Better	Total Height	Dib	Minimum Product Length <sup>1</sup>
<b>Hardwood</b>						
All Hardwoods	All sawlog Products	12"	2 CF or better sound/straight	Does not include pallet	10"	8' 4"
<b>Softwood</b>						
Spruce/Fir	All sawlog products	8"	Sound/straight	Sawlog height only	6"	12' 4"
White Pine	All sawlog products	10"	Sound/straight (max. 3" knot)	Sawlog height, does not include pine pallet	8"	12' 4"
Hemlock/Red Pine	All sawlog products	10"	Sound/straight	Sawlog height only	8"	12' 4"

Measurements in 8' sections and 2" DBH classes.

Form class 78 unless specified differently in prospectus.

**Applying grading and scaling standards:**

- Sawlog grading defects include visible defects including knots, bumps, epicormics branches, splits, and old wounds.
- Scaling defects include visible defects such as sweep (in excess of 15%), crook, holes, weevil damage, cankers, cracks, seams, and visible decay or indicators of decay.
- Internal defects such as heart size and mineral are not considered in grading.

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<sup>1</sup> "Minimum Product Length" means the minimum length of sawlog material as defined by the specifications for the species that was tallied.

Forestry Division Procedures	
Subject Title: Timber Harvest Marking and Estimation	Date: December 9, 2023

- Hidden defects such as shake, spider-heart, red rot, and stain are not considered in grading or scaling unless experience has shown that a stand or site is predisposed to these conditions, and the deduction is stated in the prospectus.

Applying the 2 clear-face grading rule for hardwood sawlogs:

- Look at the entire tree and if there is at least an 8' bolt with 2 clear faces anywhere in the tree, tally it.
- Trees may be butted (generally to eliminate excessive decay or ingrown bark), and a grade log scaled above the butted section. To scale a tree which has been butted, estimate what the DBH would be if the section that has the 2cf in it were the butt log and estimate sawlog height. For example, if a 16" DBH tree had an 8' butt log that was not 2cf, followed by an 8' section that was 2cf, the upper log might be tallied as a 14" DBH, .5 log tree.
- *NOTE:* Each SAWLOG scaled must have at least 2 clear faces; it is not necessary to have the same faces clear for the entire sawlog product length of the tree.

It is recommended that roundwood volume in topwood be added to the scaled (sawtimber) volume to determine total volume of the sale when preparing the prospectus. This practice will result in more accurate volumes for reporting and for operational considerations for the contractor. Commonly a ratio of ½ cord per MBF is used.

### Roundwood (Pallet and Pulp)\*

Species Class	Product	Minimum DBH	Grade Standard	Total Height	DIB
Hardwood	Pallet (length 8'6" minimum)	12"	0 or 1 CF, sound	n/a	10"
	Pulp	6"	Sound	n/a	n/a
Softwood	Hemlock – Spruce – Fir Pulp	6"	Sound	n/a	n/a
	Pine Pulp	6"	Reasonably Sound	n/a	5"

*\*All tallied and/or estimated by the cord.*

Forestry Division Procedures	
Subject Title: Timber Harvest Marking and Estimation	Date: December 9, 2023

# Tree Marking Standards:

Mark to Cut - projects where harvested trees are marked

## Method

- Two opposing sides of tree marked and a stump mark at ground level. Same color throughout unit. **Blue is the preferred color for marking trees to harvest.** If blue is not available at the time of marking, any other color is acceptable provided it is used consistently on the entire project.
- Product tallied designated on tree 5'-7' from ground level. See table below.

Sawlogs:	/ and stump mark	Drop and Leave*:	Large 'C' front and back, no stump mark
Pulp/pallet:	• and stump mark	Loggers Choice*:	(fell or girdle, or harvest) •• and stump mark
Leave Tree	L, no stump mark	Changes	"X"- Reserved for undoing things during layout or administration.
Girdle Only*:	G - no stump mark,		

\*tally #s of trees only

Forestry Division Procedures	
Subject Title: Timber Harvest Marking and Estimation	Date: December 9, 2023

## Mark to Leave - projects where retention trees are marked patch cuts, clear-cuts, and overstory removal

These systems are typically used to meet young forest objectives and/or to develop intolerant and intermediate species regeneration. Generally, all vegetation over some size threshold is severed. Diameter or height can be used. Must be specified in prospectus.

### Method

- Tally method 1:
  - o Sawtimber tally only. Designate tallied sawtimber trees with a single spot on both sides, no stump mark.
  - o Pulp/pallet-no mark. Estimate volumes based on forest inventory or USFS quick cruise charts. All other designations as in "Mark to Cut".
- Tally method 2: 100% tally. Use "Mark to Cut" slash/spot symbology. If patch cut is marked trees only, unit witness trees are not needed. If some other cut standard, such as severing all 2" and up is used, witness trees will be needed.

### Seed tree and low-density shelterwood.

Leave tree marking can be an effective and efficient method where the objective is a low density residual stand. Retention trees are identified with paint rather than cut trees. It can improve the results where low residual stocking is a critical objective and/or where there are high numbers of poor quality trees to harvest. It can also be used in conjunction with 'Mark to Cut systems' where certain species are to be removed in large numbers (such as aspen, white birch or red maple) with retention of the limited number of quality stems often associated with these species. Typically, only sawtimber trees are tallied with a 100% tally and pulp/pallet are estimated by inventory or with SAF quick cruise charts.

### Method

- Sawtimber tally trees marked with a single blue spot on both sides, no stump mark.
- Leave trees marked with a single alternate color horizontal stripe front and back with a stump mark.

Forestry Division Procedures	
Subject Title: Timber Harvest Marking and Estimation	Date: December 9, 2023

- Ideally, leave trees and tally trees are marked in different colors, e.g., leave trees in orange or yellow, tally trees blue.
- If the unit is embedded in a larger 'Mark to Cut' unit, delineate the treatment boundary with double slashes (leave tree color) facing into the unit on retained witness trees.
- Where system is applied to limited species within a 'Mark to Cut' unit, delineate leave trees with a bright color horizontal stripe, front and back, with a stump mark. When mixing systems, ideally all harvested trees are a different color than retention trees, e.g. 'Mark to Cut' species in blue and 'cut by prescription' tally stems with a single blue spot, leave trees of select species in an alternate color.

**MONITORING**

Staff should informally monitor how sale layout procedures are being understood and utilized by contractors and the subject discussed at the annual state lands meeting. The accuracy of volume estimates should be discussed at this time as well. Adjustments to the procedure and/or estimation methods should be overseen and coordinated by the State Lands Program Manager and approved by the Director, Forests Division.

**SIGNATURE**

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Oliver Pierson  
Print Name

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Director, Forests Division  
Title

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Signature

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12/09/2023  
Date