

PROCEDURES FOR HEMLOCK LOOPER EGG/IMPACT STUDY

SITE SELECTION

Sampling areas will be selected from the various regions where the general egg survey was conducted. An "area" will be a stand of hemlock (100-300 acres) that covers at least one half mile of road frontage. Each area will be comprised of five (5) sample points spaced at least one tenth (1/10) mile apart. A sample point must have a good combination of overstory and regeneration trees.

These sample sites will be revisited over the next several years and trees will need to be painted, so it would be prudent to contact the landowner and get permission before establishing a plot.

EGG SAMPLING PROCEDURES

Only dominant, codominant, intermediate and regeneration that is sixteen (16') or less in height will be sampled. One (100cm) branch will be pruned from the midcrown from each of three overstory trees and three regeneration trees. Trees selected should yield at least 4-6 100cm branches for this study because these same trees will be resampled several times. Each sample tree will need to be flagged and painted so the exact same trees can be sampled again. Tree numbers should correspond to the tree number on the data form (fig.1). Roman numerals I, II, and III will be marked on the butts of the overstory branches collected and the tree's bole should have the same marking. Regeneration branch butts will be marked with the dot method (*=1, **=2, ***=3) and the regeneration trees sampled will be flagged and boles painted with the appropriate number of dots.

The data form will require a good written description so the sampling area can be found, as well as each sample site within the sample area. Specific data will be collected for each tree sampled and tree data for the general sample location will also be required. The specific data to be collected is as follows:

1. Overstory and Regeneration Trees
 - a. Current and Previous Defoliation
 - b. Needle Retention for '89, '88, '87.
+=25% Or more, -=less than 25%, 0= none
2. Overstory Trees Only
 - a. Crown Class
 - b. Vigor
 - c. Bole Damage (Mechanical, Frost Cracks etc.)

- 3. General Area
 - a. Bare Tops
 - b. Dead Trees
 - c. Hemlock Borer

The numbering system for identifying the egg collections will be as follows. Assign a number to each sample area and then use numbers 1 thru 5 to identify the sample point in each area. The letter "T" will follow the sample point number for overstory trees and the letter "R" will follow the sample point number for the regeneration sampled. The following is an example:

AREA	SAMPLE POINT	TREE CATEGORY
1	1	T
1	1	R
1	2	T
1	2	R

2	1	T
2	1	R
2	2	T
2	2	R

The overstory branches collected at each sample point should be tied together and a shipping tag attached with the following information on it:

- AREA NUMBER
- SAMPLE POINT NUMBER
- TREE or REGENERATION DESIGNATION
- DATE SAMPLED

Each sample site should have a sketch map drawn to show the approximate location of the overstory and regeneration trees in relation to the road and to each other. This will make it much easier to locate (especially the regeneration) the next time the site is sampled. Also record any additional information that you may observe that would be of benefit to this study in the "comment" section on the data form.

IMPACT PLOT SET-UP

Impact of hemlock looper damage to the hemlock resource will be evaluated at each sample point established for egg population assessment. A compass bearing will be determined at the base of tree #1 used for egg sampling to establish the course of the plot layout. Ten trees will be randomly selected for assessment along the plot course. The first

impact tree should be at least one chain from the base of population tree number one. Impact trees should fall within a one chain corridor of the plot course. Impact trees should be spaced about 30 feet apart.

Once you have reached your starting point, the first hemlock encountered will be selected. All crown classes are acceptable for impact trees, but no trees less than 4" DBH should be taken. Trees selected should be flagged and numbered.

GENERAL IMPACT PLOT DATA

General information to be recorded for each impact line (fig.2) is as follows:

1. Plot Number (Area no. and Sample point no.)
2. Drainage: Good, Fair and Poor
3. Aspect
4. Slope
5. Date
6. Forest Type (softwood 75%+ or Mixwood 50/50)
7. Dead Trees In Area
8. Bearing of Plot Line
9. Hemlock Borer Activity
10. Cut History: Recent cut = within last 3 years,
Old cut = 4 to 10 years ago, and Uncut

SPECIFIC IMPACT TREE DATA

The data to be collected for each impact tree will be similar to some of the ratings used on Forest Health Monitoring Plots (fig.2). The following will be recorded for each impact tree:

1. DBH to nearest 1/10 inch
 2. Crown Class:
 - 1=Open Grown
 - 2=Dominant
 - 3=Codominant
 - 4=Intermediate
 - 5=Overtopped (Suppressed)
 3. Vigor (Condition of tree to recover from damage)
 - G=Good
 - F=Fair
 - P=Poor
 - VP=Very poor (No chance to recover)
 4. Alive or Dead
 5. Bare Top: Yes or No
 6. Tree Height: Estimated in increments of 5 feet
 7. Bole Injury: Mechanical, Frost crack etc.
 8. Current Defoliation: Increments of 5%
 9. Previous Defoliation (last year's needles only)
Increments of 5%
 - *10. Crown Width
 - *11. Crown Ratio
 - *12. Crown Density
 - *13. Dieback
 - *14. Transparency
- * These measurements will be rated and recorded by the method developed for Forest Health Plots.

REGENERATION IMPACT DATA

Three regeneration plots will be established for each impact line. The plot size will be 1/200 acre (8 1/3'). They will be located by offsetting from the boles of tree numbers 2, 5, +10 twelve feet at a bearing of 90 degrees (east). Only hemlock, balsam fir and white spruce will be tallied. Each regeneration tree must be at least 3 feet in height, but not exceed 16 feet.

The numbering system for recording each tree will be on a running tally basis per impact line. Number 1 will be used as a prefix to identify the first plot, 2 the second plot and 3 the third plot. Each plot number will be followed by a decimal and a 0 if no trees, or by 1 thru the number of trees tallied on the plot. For example:

1.1
1.2
2.0
3.1

The first regeneration plot had two trees recorded, and the second plot had none, and the third plot had just one tree.

Data to be gathered on regeneration trees (fig.3) will be as follows:

1. Tree No.
2. Species (hemlock, fir +white spruce only)
3. Height (to nearest foot)
4. Alive or Dead
5. DBH (measure only 1 inch plus trees)
6. Crown Vigor (forest health monitoring categories)
7. Current Defoliation
8. Previous Defoliation (one year old needles only)

PRISM PLOT

One prism plot will be taken on each impact line using a 10 factor prism. This information will help to characterize the forest stand. The plot will be established at the same center point used for the regeneration plot taken at impact tree number 5. The following data will be recorded for each tree tallied:

1. Tree Species (all trees will be tallied)
2. DBH (to nearest 1/10 inch)
3. Alive or Dead
4. Tree Height (estimated on Hemlock only)

The data will be recorded on the bottom of the Impact plot form (fig.2).

HEMLOCK LOOPER EGG SURVEY TEST - 1991

Area #: _____ Point #: _____ DATE: _____ Hemlock Borer: Yes / No
 Bare Tops: None / 1-10% / 11%+ Dead Trees: None / 1-5% / 11%+

Tree Data							# Eggs				
Tree#	Cr.Cl.	Vig.	C.Def.	P.Def.	N R	Bole Inj	BR	GR	CL	BK	TOT
T 1					/ /						
T 2					/ /						
T 3					/ /						
R 1	****	***			***	*****					
R 2	****	***			***	*****					
R 3	****	***			***	*****					
Mean											

Town: _____ Location: _____

SKETCH MAP:

COMMENTS:

HEMLOCK LOOPER IMPACT PLOT

AREA#: _____ POINT#: _____ DRAINAGE: _____ ASPECT: _____ SLOPE: _____ DATE: _____

FOREST: Soft / Mixed DEAD TREES: None / 1-5% / 11%+ BEARING: _____

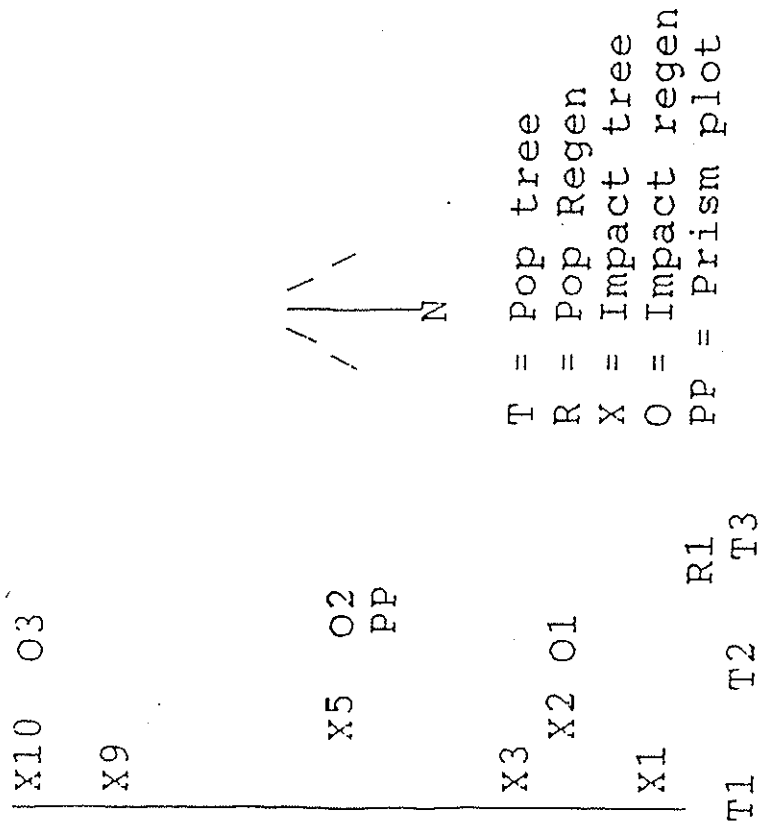
HEMLOCK BORER: Yes / No CUT HISTORY: Recent(0-3) / Old(4-10) / Uncut

IMPACT PLOT

Tree#	DBH	Vig	A/D	B. Top	Cur Def	Pre def	Crown Class	Est. Ht.	Crown Width	Crown Ratio	Crown Density	Die-Back	Trans	Bole Injury
									X					
									X					
									X					
									X					
									X					
									X					
									X					
									X					
									X					
0									X					

PRISM PLOT

SPECIES	DBH	A/D	HT.	SPECIES	DBH	A/D	HT.	SPECIES	DBH	A/D	HT.	SPECIES	DBH	A/D	HT.
1				8				15				22			
2				9				16				23			
3				10				17				24			
4				11				18				25			
5				12				19				26			
				13				20				27			
				14				21				28			



R2 R3