APPLICATIONS OF AERIAL PHOTOGRAPHS AND STEREOGRAMS IN THE FOREST SURVEY

By

Charles A. Ott

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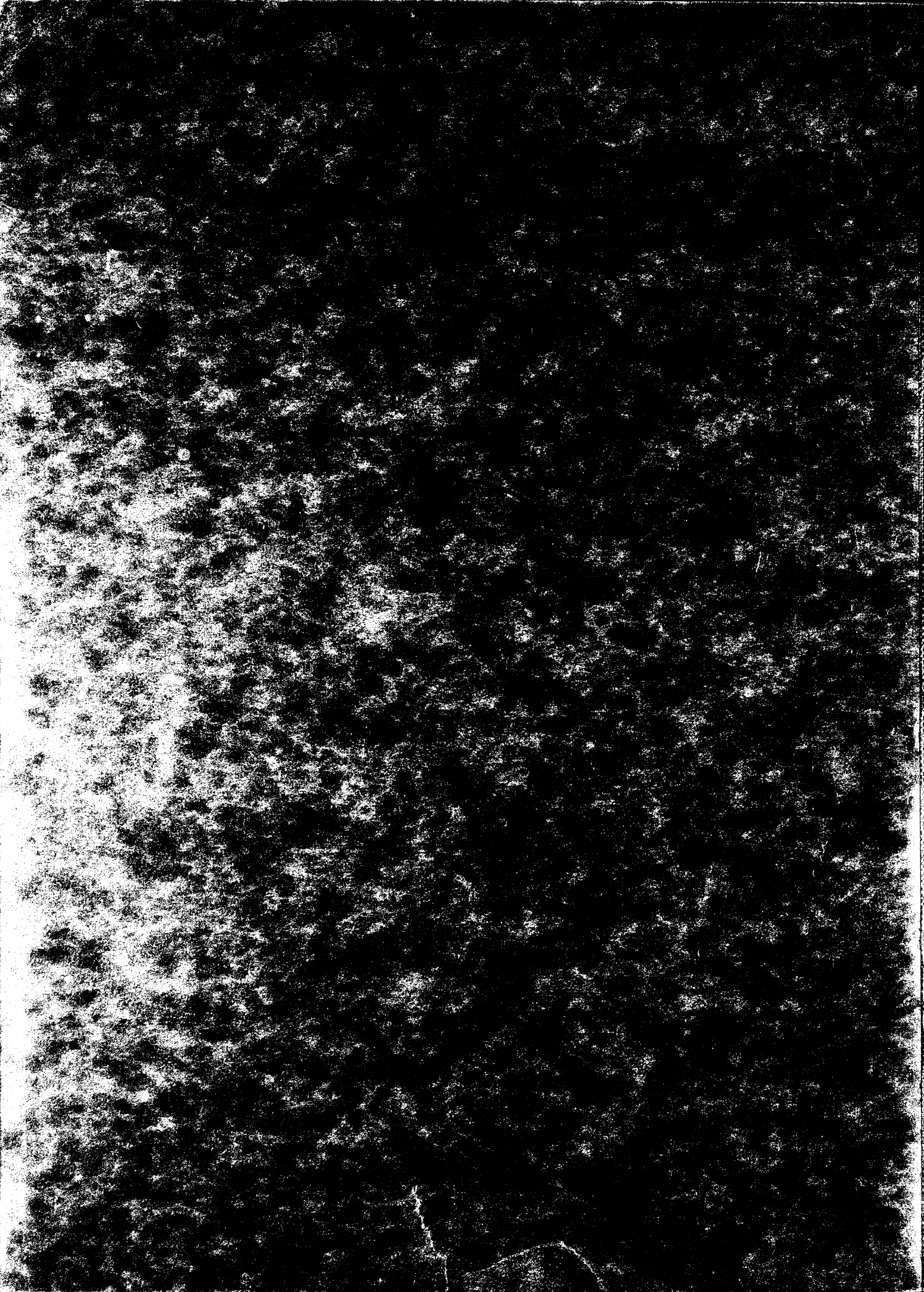

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Charles A. Ott

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PREFACE

During the summer of 1948 I worked on the aerial survey project on the Ottawa National Forest. During that summer the survey was confined to the Iron River Ranger District, but eventually the other districts of the forest will also be surveyed. After returning to school in the fall I decided to register for a master's degree in the spring semester, and thought that I might be able to make some use of my work on the survey project as a problem course thesis. Mr. Carow suggested and supervised my work on this problem.

The problem consists of three parts. The first section deals with the method in which the survey was conducted, and with the uses and advantages of stereograms in the type mapping of aerial photographs. The second section is devoted to a determination of the percentage of ground cruise needed to attain a desired degree of accuracy in each of the hardwood and aspen timber types on the Iron River Ranger District. The third part consists of a comparison of volume estimates obtained by ground cruises and photo cruises of the plots used in the stereograms.

I wish to acknowledge the help that I have received from Mr. John Carow, under whose direction I have written this paper, and from Mr. V. J. Dayharsh, Forest Supervisor, Ottawa National Forest, and Mr. Max Melick, District Ranger, who have made the necessary Forest Service data available to me.

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PART I

Forest Survey

Use of Stereograms

Forest Survey with Aerial Photographs

The United States Forest Service is conducting surveys on the National Forests of Region Nine, the Lake States Region, in order to secure the information necessary for the writing of sustained yield management plans. Basic information needed for the writing of the management plan of each working circle includes stock and stand tables for each forest type, growth data for each species, and accurate maps showing the acreage of each timber type and condition class and the existing road system. A brief description of the way in which the forest survey was conducted on the Iron River Ranger District, Ottawa National Forest, is given in this first chapter.

As the first step in the program, aerial photographs of the forest were taken during the summer of 1948. The Iron River photographs were at a scale of 1:17,350. During the following winter section corners and road markers were located on the photographs by (1) locating on the ground and on the photographs the most accessible corners and road markers, (2) locating on photographs known cutting lines, (3) locating on photographs plantations that were known to be accurately described on other maps. Unlocated corners were then marked in by carrying scale measurements forward on the photographs from the more accurately located corners. Type lines were then drawn on the photographs by Mr. A. Barlock, an experienced Forest Service employee. The ten species types recognized

had a total of fifty different size and density classes. All land within the National Forest boundaries was mapped, regardless of ownership, and no attempt was made at this time to distinguish privately and publicly owned areas.

After the type mapping of the Iron River Ranger District was completed an acreage count was made of the total area in each timber type and condition class. The dot grid count method was used. All forested areas within the Ranger District were included in the area estimate, but brush, cropland, water, marshes, etc., were not counted at this time. The results of this original acreage count appear on Page 63 of the appendix.

Determination of the number of plots to be taken in the survey was the next step. The number of plots to be taken in each timber type and condition class was calculated by the formula:

$$N = \frac{A \times f}{A(E)^2 + a \times f}$$

where N = number of sample plots needed
E = percent of accuracy as a decimal
a = area of sample plot (1/5 acre in this survey)
A = total area to be sampled in acres
f = stand factor from stand factor table

STAND FACTOR TABLE*

	Density		
	Good	Medium	Poor
Large Saw-timber	1.0	2.0	3.0
Small Saw-timber	.4	1.0	2.0
Poles	.2	.6	1.0
Restocking	.1	.4	.5

*Forest Survey Section, Timber Management Handbook-U.S.F.S.

The theoretical number of plots needed, as determined by the above formula, is listed on Page 63. Because of the small acreage in some of the types on particular working circles, it was considered unnecessary to take all of these plots, so the number of plots in certain types was reduced. An estimate of the total acreage for such types was made for the entire forest and this total area was then used as a weight in determining the number of plots needed for the particular working circle. Approximately 1500 plots were actually taken in the Iron River Ranger District.

Placement of these sample plots on the photographs was the next problem. The average acreage to be represented by each sample plot was determined by dividing the total area of each condition class by the number of plots to be taken in that condition class. Then the plots were located on the photographs by distributing them on an acreage basis. For example: In the Md''' type there are 810 acres and 13 sample plots are to be taken. 810 ÷ 13 = 62 acres per plot. Now if the plot course passes through a 45 acre area of Md''', one plot is located in that area. Or if the plot course passes through a 100 acre area of Md''', two plots will be located in that type. The plot course and plot location were then laid out on the ranger's copy of the photographs (ranger's copy is not the type-mapped copy) in yellow ink, with consideration being given to the accessibility of the area to be cruised. Whenever possible, the course was laid out in such a way that plots were located in a closed traverse, and

dead-heading was thus reduced to a minimum. Since the photographs were used as maps in the field, it was possible to use road forks, road markers, fences, etc., as starting points for the traverse.

Field Work

Ground cruising the plots was the next step in the project. Field crews were made up of two men, an estimator and a compassman. Using the photographs as maps, a two-chain tape and pocket compass were used to locate the plots on the ground. Once the center of the plot was located, a tape 52.6 feet long (radius of 1/5 acre plot) was used to describe the limits of the plot. All merchantable trees were tallied by species, diameter, and number of 16 foot logs, or number of 8 foot bolts. Non-merchantable trees were tallied by diameter only. All trees between 1" and 5" diameter on a 1/50 acre plot were then tallied. Cull percent in poles and in sawtimber was estimated, operability recorded, site class determined, some method of silvicultural treatment was recommended, and timber type and condition class were determined.

Sample tree data were collected on approximately every third plot. For each sample tree, total height, merchantable height, 10 and 20-year growth measurements, tree position and class, and total age were recorded. Generally four sample trees were studied, one from each of four size classes--15" DBH and over, 9"-15" DBH, 5"-9" DBH, and under 5" DBH. Fourteen completed tally sheets, each for a different timber type

and condition class, appear in the appendix.

Copies of charts and tables which were taken into the field and used to determine cull percent, site class, and stand density are on Pages 64 and 65 of the appendix. Most of them are self-explanatory. The stand density table shows the number of trees per acre in stands of medium density. If the plot being typed had fewer than the number of trees shown on this table, it was recorded as having poor density; and if it had a greater number of trees, it was recorded as having poor density. In borderline cases where it was difficult to decide just what size class to put the plot in, size class was determined by counting the number of trees in each size class, as shown on the tally sheet, and then throwing the plot into that size class having the greatest number of trees.

Sometimes field work revealed that one of the plots had been placed in an area that had been cut over since the photographs were taken. In these cases, substitute plots were taken in nearby areas that had not been logged. The location of these substitute plots was added to the photographs.

Correction of Type Mapping

Needless to say, the field cruising showed that many areas had been incorrectly type mapped in the original mapping. These errors were corrected on the typed photos from day to day as the field work progressed and the correct designations were determined. Information on the number and kind of these timber type and condition class changes might have made an

interesting study, but no record was kept of the number of changes made. Most of the typing errors were due to overestimates of the size and density. Small sawtimber stands were often mistaken for large sawtimber, pole stands mistaken for small sawtimber, stands of medium density were incorrectly typed as being of good density, and stands of low density were often typed as having medium or good density. Overestimates of density in the sawtimber stands were sometimes due to the understory of pole size trees that served to fill in the gaps in the crown canopy. Some of the overestimates of size class were due to the presence of a few large, old, non-merchantable trees that had not been cut when the stands were first logged and that now overtop the present generation of poles. There were very few instances in which the type mapper had made mistakes in the identification of species and most of these were in the swamp conifers - white spruce and balsam, black spruce, and cedar. The other conifers, the mixed hardwoods, and the aspen types were almost always correctly typed as far as the species was concerned.

Summarization of Data Collected

At times when the weather did not permit field work to be carried on, the field crews were kept busy in the office, locating more plots on the photographs and preparing stock and stand tables. Separate stock and stand tables were prepared for each timber type and condition class. Later, when the data from all the tally sheets have been summarized in

this way, stand and stock tables for the average acre will be computed for each timber type and condition class. A summary sheet of the cull percent, recommended cut, and site class information, was also made.

When the field work of the survey on the Iron River Ranger District was completed and all the corrected type symbols placed on the photographs, the whole set of photos from the district was sent to the regional office of the Forest Service in Milwaukee, Wisconsin. There the engineering staff is transferring the type lines, roads, and physical features from the photographs to base maps of township size. When completed, the base maps will be used to make the final acreage count of each timber type and condition class. The average per acre stand and stock table information will then be applied to these acreages to find the total volume of sawtimber and cordwood in each of the various types on the district. Then when all of this information is gathered together with the findings of the growth studies, the Forest Service can start writing the management plan for the Iron River Ranger District.

Use of Stereograms in Forest Type Mapping

As the use of aerial photographs in forest type mapping becomes more and more common in forest management work, men untrained in the use of such photographs or men unfamiliar with the region often find themselves in the position of photo-interpreter. The method commonly used in training beginning interpreters is to have them spend one or two days each week in the field, checking on the ground the stands that they have just finished mapping in the office. As experience is gained the mapping estimates become more accurate and less time is spent in field checking. Often when the weather is bad or when there is a shortage of transportation, or when the area being mapped is not easily accessible by roads, the interpreter has no way to check on his mapping estimates at all.

Now if the interpreter had on hand a file of photographs already field checked, he would always have something with which to compare the stands that he is presently mapping. The stereograms on the following pages have been prepared as an example of such a file of photographs, and as a training device for men inexperienced with photographs or with the photographs of the Lake States region.

The 14 stereo-pairs are typical of the size classes and density classes found in the mixed hardwoods and aspen types

in Iron County, Michigan. Data on gross volume, number of trees, and height of trees are given for each stereo-pair, as found by a ground cruise of a 1/5 acre sample plot located within the type at the place indicated by the black circle. This was not necessarily the only plot taken in the area, but was the plot that happened to be selected for these purposes. Crown diameter measurements and crown closure percentages were obtained from the photographs themselves by use of photo-measuring devices. A copy of each of the ground cruise tally sheets will be found in the appendix.

By making comparisons between the stands that he is trying to classify and the stands shown in the stereograms, even an inexperienced mapper should be able to make fairly consistent classifications. Occasional ground checking by the interpreter himself would still be desirable, but the gradual building up of a greater supply of stereograms, showing the range of variation found within each type, would minimize the amount of field work necessary. One of the outstanding advantages of aerial photographs in forestry work is that the cost of mapping from photographs is considerably lower than the cost of type mapping on the ground. By cutting down the amount of field checking and by increasing the accuracy of mapping, the use of stereograms in the way advocated here should result in a still lower cost of type mapping.

The building up of a greater supply of stereograms to show the variation found within each type was mentioned in the preceding paragraph. The intention of that statement was

to bring out the fact that with just these 14 stereo-pairs at hand, an interpreter might still find it difficult to decide on borderline cases. Now if three or four stereograms were available for each size and density class, an illustration of the variation to be found within each timber type and condition class would be available to the interpreter and he would probably be able to make quicker and better decisions in doubtful cases.

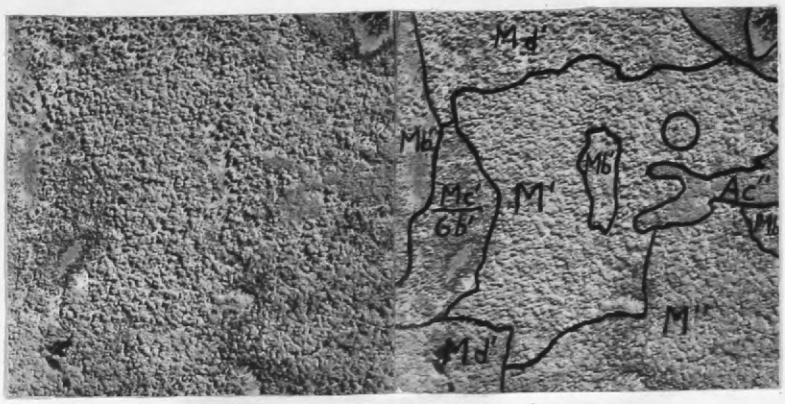
Where a group of interpreters are working together on the mapping of a district the use of the stereograms should serve to make the work of each interpreter consistent with the work of the group as a whole. And where one interpreter is working alone, and is not able to ask another to verify his judgment of borderline cases, he would not have to rely wholly on his own ocular estimate if he had a set of stereograms to consult.

Summarizing, the advantages of having a file of stereograms are: (1) As a training device; (2) To get consistent estimates by a lone interpreter, or by a group of interpreters working together; (3) To minimize field work; (4) To lower the cost of type mapping; (5) To give reasonable accuracy in the mapping of inaccessible areas where field work cannot be done; (6) To speed up the mapping process because the number of precise measurements made with parallax wedge, Harvard wedge, and crown closure devices will be held to a minimum; (7) To give a rough estimate of the volume on areas that might be worth the expense of a ground cruise.

I do not claim that the photographs presented here represent

"average" conditions for each of the size and density classes shown, but only that they are typical of the stands that were encountered in field work and in study of the photographs. The areas selected for the stereo-pairs were picked because ground plots had been taken there, because they were close of the centers of the original 9" x 9" photographs, and because they were the largest areas in each of these 14 types that had been type-mapped as not having an understory.

Mixed Hardwoods - Large Sawtimber



Poor stocking - M'

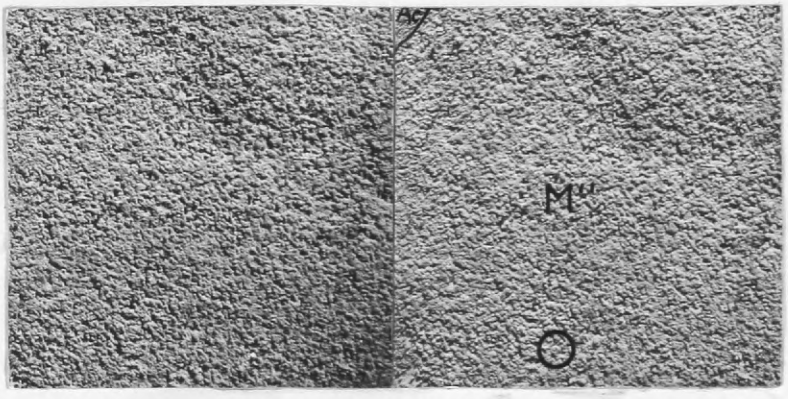
Plot data

Ground Measurments

Height of dominants 72'
No. trees per 1/5 acre:
Sawtimber 4
Cordwood 11
Gross Volume per acre
Sawtimber 2900 b.f.
Cordwood 3.1 Cords

Photo Measurments

Crown diameter 30'-
Crown closure 40 - 55%



Medium stocking - M''

Ground Measurments

Height of dominants 65'
No. trees per 1/5 acre:
Sawtimber 12
Cordwood 19
Gross Volume per acre:
Sawtimber 7900 b.f.
Cordwood 6.5 Cords

Photo Measurments

Crown diameter 30'-
Crowm closure 55 - 75%

Good stocking - M'''

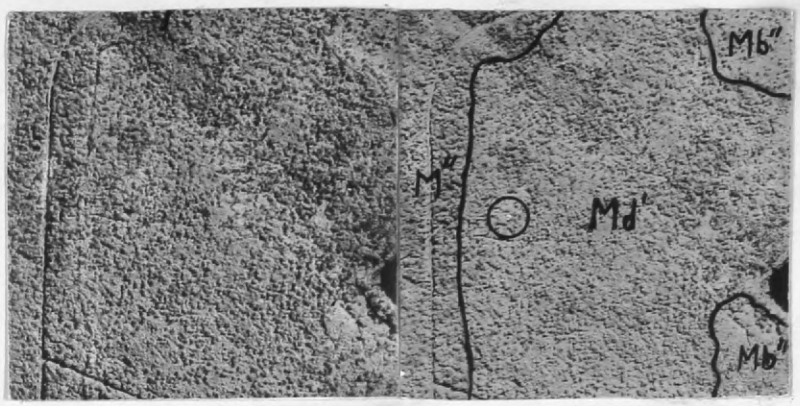
Ground Measurments

Height of dominants 64'
No. trees per 1/5 acre:
Sawtimber 13
Cordwood 9
Gross Volume per acre:
Sawtimber 11,100 b.f.
Cordwood 4.6 Cords

Photo Measurments

Crown diameter 30'-
Crowm closure 70 - 85%

Mixed Hardwoods - Small Sawtimber



Poor stocking - Md'

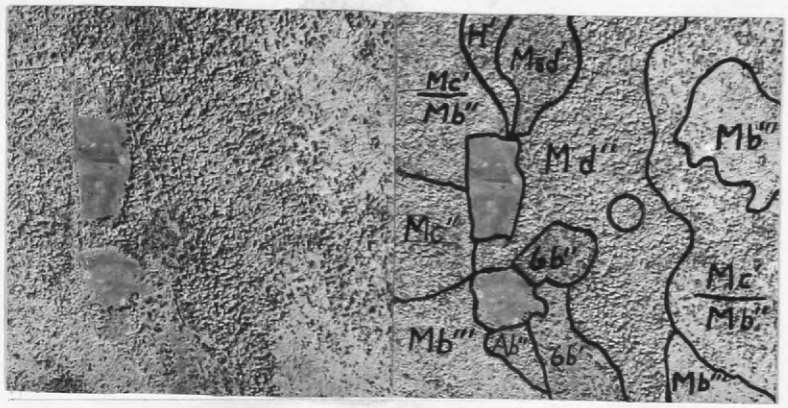
Plot Data

Ground Measurments

Height of dominants	52'
Number trees per plot:	
Sawtimber	8
Cordwood	22
Gross Volume per acre:	
Sawtimber	4600 b.f.
Cordwood	5.4 Cords

Photo Measurments

Crown Diameter	20'- 30'
Crown Closure	25 - 40%



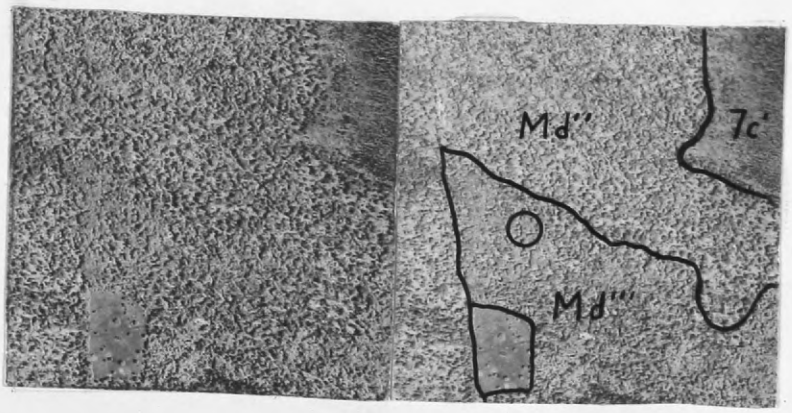
Medium stocking - Md''

Ground Measurments

Height of dominants	65'
Number trees per plot:	
Sawtimber	18
Cordwood	8
Gross Volume per acre:	
Sawtimber	6100 b.f.
Cordwood	2.9 Cords

Photo Measurments

Crown diameter	20'- 30'
Crown closure	55 - 70%



Good stocking - Md'''

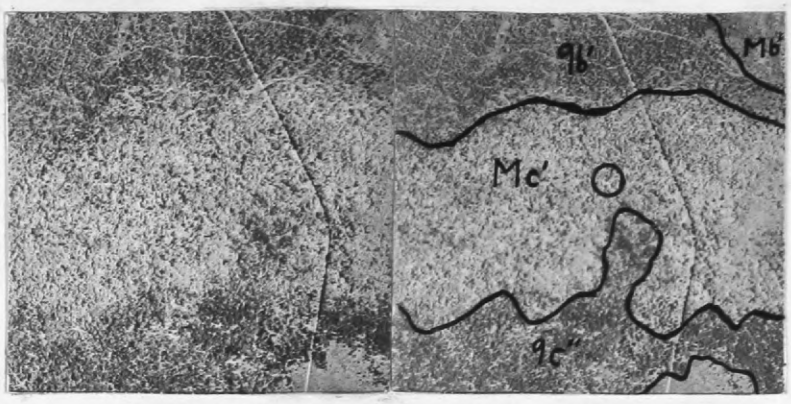
Ground Measurments

Height of dominants	68'
Number trees per plot:	
Sawtimber	15
Cordwood	8
Gross Volume per acre:	
Sawtimber	6900 b.f.
Cordwood	1.2 Cords

Photo Measurments

Crown diameter	20'- 30'
Crown closure	70 - 85%

Mixed Hardwoods - Poles



Poor stocking - Mc'

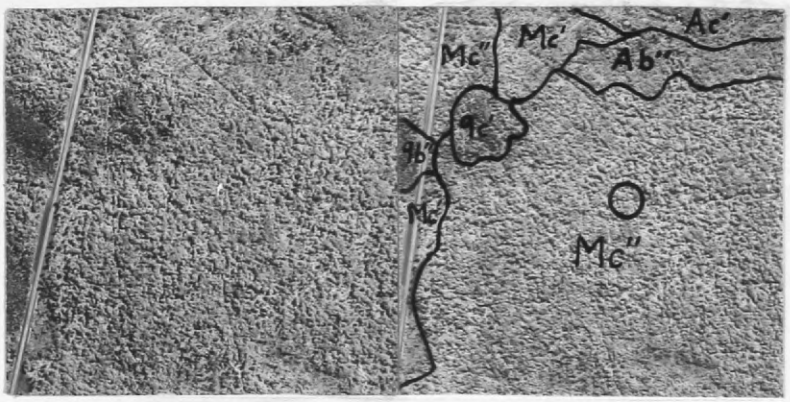
Plot Data

Ground Measurments

Height of dominants 65'
Number trees per plot:
Sawtimber 5
Cordwood 19
Gross Volume per acre:
Sawtimber 2100 b.f.
Cordwood 5.4 Cords

Photo Measurments

Crown diameter 15'- 20'
Crown closure 40 - 55%



Medium stocking - Mc''

Ground Measurments

Height of dominants 44'
Number trees per plot:
Sawtimber 6
Cordwood 24
Gross Volume per acre
Sawtimber 1800 b.f.
Cordwood 8.6 Cords

Photo Measurments

Crown diameter 20'- 30'
Crown closure 70 - 85%

Good stocking - Mc'''

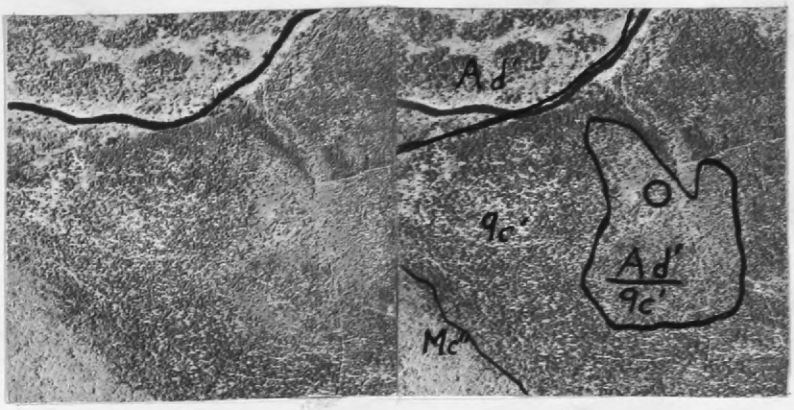
Ground Measurments

Height of dominants 68'
Number trees per plot:
Sawtimber 4
Cordwood 56
Gross Volume per acre:
Sawtimber 1300 b.f.
Cordwood 14.1 Cords

Photo Measurments

Crown diameter 20'- 30'
Crown closure 70 - 85%

Aspen - Small Sawtimber



Poor stocking - *Ad'/9c'

Plot Data

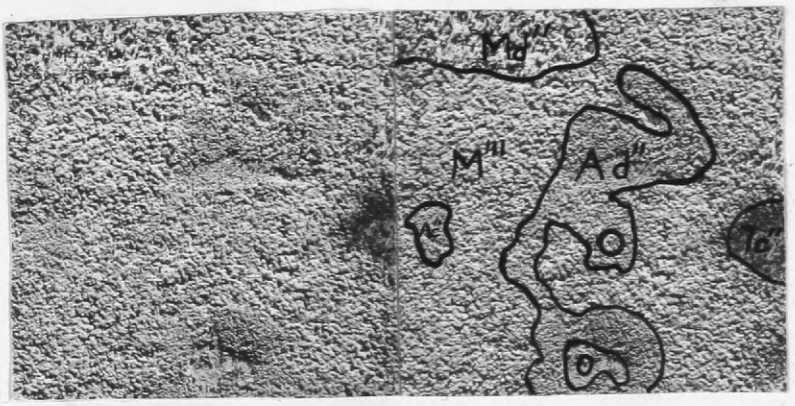
Ground Measurments

Height of dominants	41'
Number trees per plot:	
Sawtimber	8
Cordwood	18
Gross Volume per acre:	
Sawtimber	2300 b.f.
Cordwood	3.5 Cords

Photo Measurments

Crown Diameter	15'- 20'
Crown closure	10 - 25%

* Understory of White Pine poles



Medium stocking - Ad''

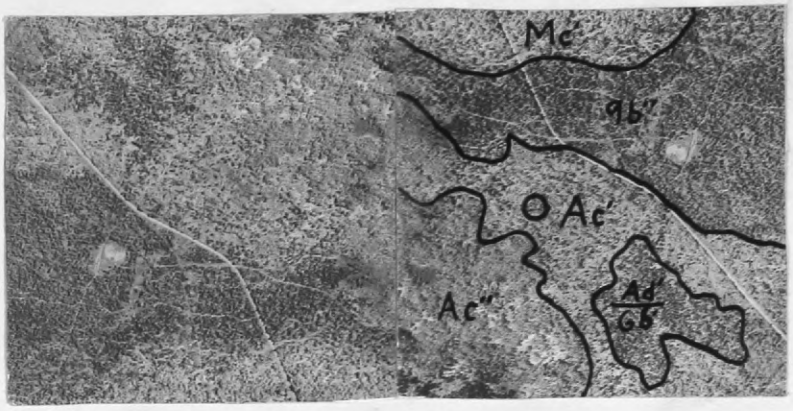
Ground Measurments

Height of dominants	71'
Number trees per plot:	
Sawtimber	12
Cordwood	21
Gross Volume per acre:	
Sawtimber	4700 b.f.
Cordwood	6.3 Cords

Photo Measurments

Crown diameter	15'- 20'
Crown closure	70 - 85%

Aspen - Poles



Poor stocking - Ac'

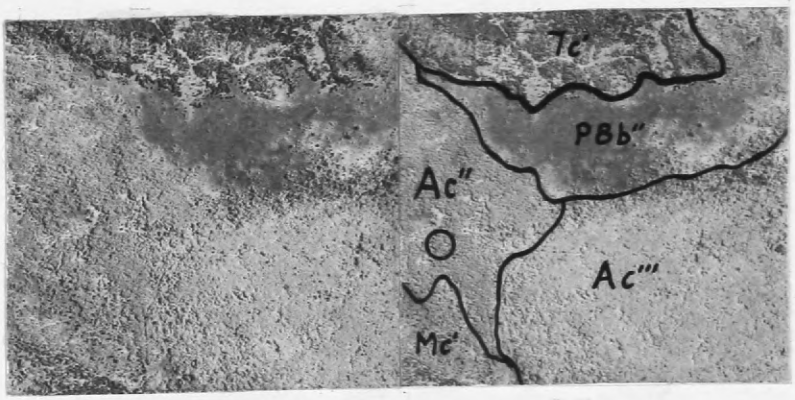
Plot Data

Ground Measurments

Height of dominants	41'
Number trees per plot:	
Sawtimber	0
Cordwood	18
Gross Volume per acre:	
Sawtimber	0
Cordwood	3.5 Cords

Photo Measurments

Crown diameter	10'- 15'
Crown closure	10 - 25%



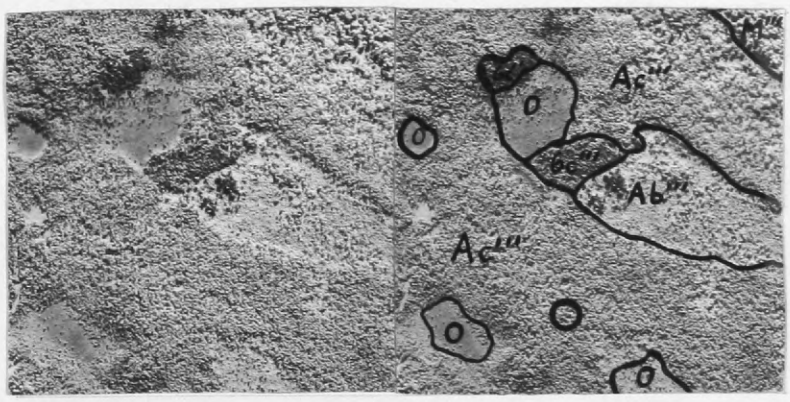
Medium stocking - Ac''

Ground Measurments

Height of dominants	60'
Number trees per plot:	
Sawtimber	0
Cordwood	50
Gross Volume per acre:	
Sawtimber	0
Cordwood	14.8 Cords

Photo Measurments

Crown diameter	10'- 15'
Crown closure	55 - 70%



Good stocking - Ac'''

Ground Measurments

Height of dominants	60'
Number trees per plot:	
Sawtimber	2
Cordwood	41
Gross Volume per acre:	
Sawtimber	700 b.f.
Cordwood	14.8 Cords

Photo Measurments

Crown diameter	10'- 15'
Crown closure	55 - 70%

Description of Stereogram Plots

Plot Type	Description
M'	NE¼ SW¼ Sec.11, T45N R37W
M''	NW¼ SW¼ Sec.36, T45N R35W
M'''	NE¼ NW¼ Sec.24, T44N R35W
Md'	NE¼ NW¼ Sec.14, T44N R37W
Md''	NE¼ NE¼ Sec.17, T42N R36W
Md'''	NE¼ NW¼ Sec.23, T43N R36W
Mc'	NE¼ SE¼ Sec.13, T44N R36W
Mc''	SE¼ SW¼ Sec.34, T44N R37W
Mc'''	NE¼ NE¼ Sec.21, T43N R37W
Ad'	NE¼ NW¼ Sec.24, T44N R36W
Ad''	SW¼ SE¼ Sec.24, T45N R35W
Ac'	NW¼ SW¼ Sec.18, T44N R35W
Ac''	SW¼ SW¼ Sec.18, T44N R35W
Ac'''	NE¼ NE¼ Sec.36, T45N R35W

PART II

Volume Estimates on Specific Descriptions

Cruise Percent Tables

Volume Estimates on Specific Descriptions

This section is devoted to a determination of the percent of cruise that would be necessary in order to obtain a desired degree of accuracy in the volume estimate of certain sized tracts of Mixed Hardwood or Aspen timber.

The stock tables compiled from the information obtained from the 1500 sample plots taken in the survey would no doubt give a good average figure for the volume per acre for the entire area of each type in the working circle. But because of the way the plots were located - scattered at random over the whole Ranger District - and because of the variation found within the types, it probably would not be wise to apply this average figure in determining the volume on any specific land description, at least not if an accurate estimate of volume on that description is required.

However, the plots that have already been taken could be used to determine the (statistical) variation within each timber type and condition class. When this is known, the number of samples necessary to give any desired accuracy of cruise can be determined. This is what has been done to obtain the tables on the following pages.

Construction of Tables

From the whole file of plots that were taken in the survey, 25 plots from each of the Hardwood and Aspen types were picked

at random. (In some types fewer than 25 plots had been taken in the survey so only the number of plots taken were available for use here). The gross volume per acre shown on each of the tally sheets was recorded on a tabulation sheet and then the standard deviation, coefficient of variation, and standard deviation of the mean were calculated. These calculations are shown on Pages 49 to 63 of the appendix. It will be noted that some of the plots within certain types seem to have exceptionally high or low volumes for that type. These were plots that just happened to be located at a particular place within the stand where the density of stocking was greater or less than that of the surrounding timber. For example, in the M' type, plot No. 799 has a sawtimber volume of 11,100 board feet, and apparently should be an M''' plot. However, all the other plots in the surrounding timber were M' plots and therefore the stand was given an M' classification.

By strict statistical methods certain of these plots with too great a divergence from the mean would have to be rejected from the sample and the standard deviation recalculated from the remaining plots. But these plots with unusually high or low volumes do occur within the stands and for that reason the standard deviation as originally calculated has been used in compiling the tables on Pages 22 to 28 .

The six tables showing the percent of cruise needed in each type in order to obtain accuracies of estimate of 5%, 10%, and 20%, and with probabilities of 2 to 1 and 21 to 1,

have been computed from the following formulae:

(1) $n = \frac{N t^2 c^2}{Na^2 + t^2 c^2}$ * Formula for the size of a sample to be taken from a limited population for a specified degree of accuracy.

Where:
- n = number of samples needed.
- N = total number of samples in the population.
- a = percent of accuracy desired, expressed as a decimal.
- c = coefficient of variation as $\frac{\text{standard deviation}}{\text{mean}}$
- t = the multiple of the standard error for limit of error.
  - t = 2, means a probability of 21 to 1; i.e. a variation from the mean of 2 times the standard deviation would not be exceeded more often than once in 21 times.
  - t = 1, means a probability of 2 to 1.

(2) Percent of cruise = $\frac{n}{N} \times 100\%$ Formula for percent of cruise needed for specified accuracy and probability.

For example, in the M' type, if 10% accuracy is desired, with a probability of 2 to 1, and the area to be cruised is 40 acres:

N = 40 acres x 5 plots per acre = 200
a = .10 (i.e., 10% accuracy)
c = .53 (coefficient of variation, from data sheet)
t = 2 (probability of 21 to 1)

then:

$$n = \frac{200 \times 2^2 \times .53^2}{200 \times .1^2 + 2^2 \times .53^2} = 72 \text{ plots}$$

Percent of cruise = $\frac{72 \text{ plots}}{200 \text{ plots}} \times 100\% = 36\%$ cruise required

In using the following cruise percent tables to determine the percent of cruise required, it must be kept in mind that the tables have been compiled from plots that were classified

* Girard and Gerorkiantz -- Timber Cruising

on the ground. It was pointed out on Page 5 that after the stands were ground cruised and the timber type and condition class were determined by this ground cruise, the original classification given by the photo-interpreter was erased from the photograph and the proper ground cruise classification was added to the photograph. The tally sheets were filed according to the ground cruise classification, and no record was kept of the number of changes made in the original classifications. It was from these ground classified plots that the following tables were compiled. It will be well to remember this in using the tables, for the cruise percentages shown might be somewhat conservative when applied to stands that have been photo-classified but not yet ground checked. However, in stands that have been ground classified, the cruise percentages shown should give the desired accuracy of volume estimate.

CRUISE PERCENT NEEDED FOR 20% ACCURACY
WITH ODDS OF 21 TO 1

Timber Type	Area To Be Sampled - Acres													
	5	10	20	30	40	50	60	70	80	90	100	160	320	640
	Percent Of Cruise													
M'	52.8	36.0	21.8	15.7	12.3	10.1	8.55	7.44	6.56	5.89	5.33	3.4	1.73	.87
M''	36.8	22.6	12.7	8.9	6.8	5.5	4.64	4.0	3.52	3.14	2.84	1.77	.88	.45
M'''	30.5	18.0	9.9	6.81	5.2	4.2	3.52	3.04	2.66	2.38	2.14	1.35	.67	.34
Md'	57.8	39.8	24.8	18.0	14.1	11.6	9.85	8.57	7.58	6.80	6.16	3.95	2.00	1.03
Md''	32.2	19.3	10.6	7.4	5.6	4.6	3.83	3.30	2.90	2.58	2.32	1.47	.74	.37
Md'''	70.7	54.5	37.5	28.6	23.1	19.7	16.7	14.7	13.1	11.8	10.7	7.00	3.63	1.85
Mc'	66.0	49.3	32.7	24.4	19.5	16.2	13.9	12.2	10.7	9.7	8.83	5.72	2.94	1.49
Mc''	44.8	28.8	16.8	11.9	9.2	6.8	6.32	5.45	4.81	4.3	3.88	2.47	1.25	.63
Mc'''	41.4	27.1	15.0	10.5	8.1	6.6	5.55	4.8	4.23	3.78	3.41	2.16	1.09	.55
Ad'	45.6	39.6	17.2	12.2	9.5	7.2	6.54	5.65	4.98	4.45	4.01	2.55	1.29	.65
Ad''	58.0	40.8	25.6	18.7	14.7	12.1	10.3	8.98	7.94	7.12	6.45	4.14	2.11	1.07
Ac'	51.8	35.1	21.2	15.3	11.9	9.8	8.3	7.19	6.34	5.68	5.14	3.27	1.67	.84
Ac''	53.1	36.2	22.1	15.9	12.5	10.2	8.64	7.49	6.62	5.93	5.37	3.43	1.74	.87
Ac'''	37.9	23.4	13.2	9.2	7.06	5.7	4.83	4.16	3.67	3.27	2.95	1.87	.94	.47

Odds of 21 to 1 means that a variation from the mean of two times the standard error would not be exceeded more often than once in 21 times.

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CRUISE PERCENT NEEDED FOR 10% ACCURACY
WITH ODDS OF 21 TO 1

Timber Type	Area To Be Sampled - Acres													
	5	10	20	30	40	50	60	70	80	90	100	160	320	640
	Percent of Cruise													
M'	82.0	69.4	53.5	42.8	36.0	31.0	27.2	24.3	21.8	20.0	18.4	12.3	6.5	3.4
M''	70.0	53.9	37.0	28.0	22.7	19.1	16.4	14.3	12.8	11.1	10.5	6.9	3.54	1.78
M'''	63.8	46.8	30.6	22.6	18.0	15.0	12.8	11.1	9.9	8.9	8.1	5.2	2.68	1.35
Md'	84.0	73.5	55.6	46.5	39.5	34.4	30.5	27.2	24.6	22.5	20.8	14.1	7.6	3.94
Md''	65.6	49.0	32.5	24.3	19.3	16.1	13.7	12.0	10.7	9.6	8.8	5.7	2.92	1.48
Md'''	90.4	83.0	70.7	61.6	54.6	49.2	44.4	40.8	37.7	35.1	32.6	23.2	13.1	7.03
Mc'	88.5	79.5	66.0	56.4	49.3	43.6	39.2	35.6	32.6	29.2	28.0	19.5	10.8	5.7
Mc''	76.5	61.9	44.8	35.0	28.8	24.4	21.3	18.8	16.8	15.2	13.9	9.2	4.81	2.47
Mc'''	73.9	58.5	41.3	32.0	26.1	22.0	19.0	16.8	15.0	13.5	12.3	8.0	4.22	2.12
Ac'	81.4	68.5	52.0	42.0	35.2	30.3	26.6	23.6	21.4	19.4	17.8	11.9	6.34	3.21
Ac''	82.0	69.4	53.0	42.9	36.1	31.1	27.4	24.4	22.0	20.1	18.5	12.4	6.6	3.42
Ac'''	70.9	55.0	37.9	28.8	23.3	19.6	17.1	14.8	13.2	11.9	10.8	7.1	3.64	1.87
Ad'	77.2	62.8	45.7	35.9	29.6	25.2	21.9	19.4	17.4	15.7	14.6	9.5	4.99	2.56
Ad''	84.7	76.0	60.0	49.5	42.2	36.8	32.6	28.2	25.6	23.4	21.6	14.7	7.94	4.13

CRUISE PERCENT NEEDED FOR 5% ACCURACY WITH ODDS OF 21 TO 1

Timber Type	Area To Be Sampled - Acres													
	5	10	20	30	40	50	60	70	80	90	100	160	320	640
	Percent of Cruise													
M'	94.9	90.0	81.7	74.8	69.1	64.1	60.0	56.1	52.9	50.0	47.3	35.9	21.9	12.1
M''	90.5	82.4	70.0	60.0	53.8	48.3	43.8	40.0	36.9	34.2	31.9	22.6	12.7	6.8
M'''	87.3	77.6	63.5	53.8	46.6	41.2	36.8	33.2	30.4	28.0	25.9	17.9	9.9	5.2
Md'	95.4	91.1	83.8	77.5	72.1	67.4	63.3	59.6	56.4	53.5	50.9	39.3	24.4	13.9
Md''	88.4	79.1	65.5	56.0	48.8	43.3	38.9	35.2	32.2	29.8	27.6	19.5	10.6	5.6
Md'''	97.5	95.1	90.5	86.5	82.9	79.5	76.3	73.4	70.7	68.2	65.9	54.7	37.6	23.2
Mc'	96.8	93.9	88.5	83.8	79.5	75.5	72.0	68.9	65.9	63.2	60.7	49.2	32.6	19.5
Mc''	92.8	86.5	76.4	68.3	61.8	56.5	52.0	48.1	44.7	41.8	39.3	28.8	16.8	9.2
Mc'''	91.8	84.9	73.8	65.3	58.5	52.9	48.4	44.5	41.3	38.5	36.0	26.0	15.0	8.1
Ad'	93.0	87.0	78.0	69.1	62.6	57.2	52.7	48.9	45.6	42.7	40.1	29.6	17.3	9.5
Ad''	95.6	91.6	84.6	78.6	73.4	68.7	64.7	61.1	57.9	55.0	52.4	40.7	25.6	14.7
Ac'	94.5	89.6	81.2	74.2	68.4	63.4	59.1	55.3	51.9	49.0	46.4	35.1	21.3	11.9
Ac''	94.8	90.0	81.9	75.2	69.4	64.5	60.15	56.4	53.1	50.2	47.5	36.1	22.0	12.4
Ac'''	90.6	82.9	70.7	61.8	54.9	49.3	44.8	41.0	37.8	35.1	32.7	23.3	13.6	7.1

CRUISE PERCENT NEEDED FOR 20% ACCURACY WITH A PROBABILITY OF 2 TO 1

Timber Type	Area To Be Sampled - Acres													
	5	10	20	30	40	50	60	70	80	90	100	160	320	640
	Percent Of Cruise													
M'	22.0	12.3	6.8	4.46	3.4	2.74	2.29	1.97	1.73	1.54	1.38	.87	.44	.22
M''	12.7	6.8	3.52	2.37	1.8	1.44	1.2	1.03	.90	.80	.72	.45	.23	.11
M'''	9.9	5.2	2.68	1.8	1.35	1.08	.90	.77	.68	.60	.54	.34	.17	.09
Md'	24.7	14.1	7.59	5.19	3.94	3.18	2.66	2.29	2.0	1.79	1.62	1.02	.51	.26
Md''	10.7	5.6	2.9	1.95	1.47	1.18	.98	.84	.74	.65	.59	.37	.18	.09
Md'''	37.6	23.2	13.1	9.14	7.0	5.69	4.79	4.14	3.63	3.24	2.92	1.85	.95	.47
Mc'	32.6	19.5	10.8	7.55	5.72	4.63	3.9	3.35	2.95	2.63	2.36	1.49	.75	.38
Mc''	16.8	9.2	4.82	3.27	2.48	1.99	1.66	1.43	1.25	1.11	1.0	.63	.32	.15
Mc'''	15.0	8.1	4.22	3.86	2.16	1.73	1.45	1.25	1.09	.97	.87	.55	.28	.14
Ad'	17.3	9.5	4.98	3.38	2.54	2.05	1.71	1.47	1.29	1.15	1.03	.65	.33	.16
Ad''	25.6	14.7	7.94	5.43	4.13	3.33	2.79	2.40	2.10	1.88	1.7	1.07	.54	.27
Ac'	21.3	11.9	6.35	4.32	3.28	2.64	2.2	1.9	1.66	1.47	1.33	.84	.42	.21
Ac''	22.0	12.4	6.6	4.5	3.42	2.76	2.3	1.98	1.74	1.55	1.4	.87	.44	.22
Ac'''	13.2	7.1	3.67	2.48	1.86	1.5	1.25	1.07	.94	.84	.76	.47	.24	.12

"Probability of 2 to 1" means that a variation from the mean of one times the standard error would not be exceeded more often than once in two times.

CRUISE PERCENT NEEDED FOR 10% ACCURACY
WITH A PROBABILITY OF 2 TO 1

Timber Type	Area To Be Sampled - Acres													
	5	10	20	30	40	50	60	70	80	90	100	160	320	640
	Percent of Cruise													
M'	53.0	48.6	21.9	15.8	12.3	10.1	8.55	7.43	6.56	5.88	5.32	3.39	1.73	.87
M''	36.8	22.5	12.7	8.9	6.8	5.5	4.64	4.0	3.52	3.14	2.84	1.79	.89	.45
M'''	30.5	17.9	9.7	6.8	5.2	4.2	3.52	3.03	2.66	2.47	2.14	1.35	.68	.34
Md'	56.8	39.7	24.7	17.9	14.1	11.6	9.85	8.57	7.58	6.8	6.16	3.94	2.01	1.03
Md''	32.2	19.2	10.6	7.4	5.6	4.6	3.82	3.3	2.89	2.58	2.32	1.47	7.34	3.71
Md'''	70.8	54.3	37.4	28.5	23.0	19.3	16.6	14.6	13.06	11.75	10.7	6.98	3.6	1.87
Mc'	66.0	49.1	32.6	24.4	19.5	16.2	13.9	12.15	10.8	9.7	8.83	5.71	2.94	1.49
Mc''	44.8	28.8	16.8	11.9	9.2	7.5	6.32	5.47	4.82	4.31	3.89	2.46	1.25	.63
Mc'''	41.3	26.2	15.0	10.5	8.1	6.6	5.55	4.8	4.23	3.78	3.41	2.16	1.09	.55
Ad'	45.6	29.5	17.3	12.3	9.5	7.8	6.53	5.64	4.97	4.44	4.01	2.55	1.29	.65
Ad''	58.0	40.7	25.6	18.6	14.7	12.1	70.3	8.95	7.93	6.89	6.45	4.13	2.1	1.06
Ac'	52.0	35.1	21.3	15.5	11.9	9.6	8.3	7.2	6.34	5.68	5.13	3.27	1.66	.84
Ac''	53.0	36.2	22.0	15.8	12.8	10.2	8.6	7.48	6.61	5.92	5.36	3.42	1.78	.88
Ac'''	37.8	23.3	13.4	9.2	7.06	5.7	4.83	4.17	3.66	3.27	2.95	1.83	.94	.47

CRUISE PERCENT NEEDED FOR 5% ACCURACY
WITH A PROBABILITY OF 2 TO 1

Timber Type	Area To Be Sampled - Acres													
	5	10	20	30	40	50	60	70	80	90	100	160	320	640
	Percent Of Cruise													
M'	82.0	69.4	53.2	43.0	36.2	31.2	27.4	24.4	22.0	20.0	18.4	12.4	6.6	3.41
M''	70.0	53.8	36.0	28.0	21.6	18.9	16.2	14.3	12.7	11.5	10.4	6.8	3.63	1.79
M'''	63.5	46.6	30.4	22.6	17.9	14.9	12.7	11.1	9.9	8.9	8.0	5.2	2.66	1.3
Md'	83.8	72.3	56.6	46.5	39.5	34.2	30.3	27.2	24.6	22.4	20.7	14.0	7.55	3.92
Md''	65.5	48.7	32.2	24.0	19.2	16.0	13.7	12.0	10.6	9.6	8.7	5.6	5.30	1.46
Md'''	90.6	83.0	70.7	62.4	54.7	49.1	44.5	40.6	37.5	34.8	32.5	23.1	13.1	7.0
Mc'	88.5	79.5	66.0	56.3	49.2	43.6	39.2	35.6	32.6	30.0	27.9	19.5	11.1	5.7
Mc''	76.5	62.0	44.8	35.0	28.5	24.5	21.2	18.7	16.8	15.2	13.9	9.2	4.97	2.46
Mc'''	74.0	57.5	40.8	32.0	26.1	22.0	19.0	16.8	15.4	13.5	12.4	8.1	4.36	2.2
Ad'	77.0	62.7	45.6	35.9	30.1	25.2	21.8	19.3	17.3	15.7	14.4	9.5	5.14	2.55
Ad''	84.5	73.5	57.9	47.8	40.7	35.4	31.4	28.2	25.6	23.4	21.6	14.7	7.95	4.13
Ac'	81.5	68.5	52.0	42.0	35.1	30.2	26.8	23.6	20.4	19.4	17.8	11.9	6.35	3.28
Ac''	82.0	69.5	53.3	43.1	36.3	31.3	27.5	24.5	22.2	20.2	18.5	12.4	6.6	3.44
Ac'''	71.0	55.3	38.0	29.0	23.4	19.6	16.9	14.7	13.2	11.9	10.8	7.05	3.68	1.86

The following is a summarization of all six charts, showing the percent of cruise needed on a 40 acre area only :

Percent Of Cruise Needed In A 40 Acre Stand

Type	Probability of 21 to 1 Accuracy			Probability of 2 to 1 Accuracy		
	5%	10%	20%	5%	10%	20%
M'	69.1	36.0	12.3	36.2	12.3	3.4
M''	53.8	22.7	6.8	21.6	6.8	1.8
M'''	46.6	18.0	5.2	17.9	5.2	1.35
Md'	72.1	39.5	14.1	39.5	14.1	3.94
Md''	48.8	19.3	5.6	19.2	5.6	1.47
Md'''	82.9	54.6	23.1	54.7	23.0	7.0
Mc'	79.5	49.3	19.5	49.2	19.5	5.72
Mc''	61.8	28.8	9.2	28.5	9.2	2.48
Mc'''	58.5	26.1	8.1	26.1	8.1	2.16
Ad'	62.6	35.2	9.5	30.1	9.5	2.54
Ad''	73.4	36.1	14.7	40.7	14.7	4.13
Ac'	68.4	23.3	11.9	35.1	11.9	3.28
Ac''	69.4	29.6	12.5	36.3	12.8	3.42
Ac'''	54.9	42.2	7.1	23.4	7.1	1.86

Aerial Photo Volume Tables

Timber cruising from aerial photographs has been considered as another possible way of reducing the cost of making a forest inventory. Several forms of aerial photo volume tables, based entirely on the variables measurable on aerial photographs, have been developed. Spurr* reports that a Loblolly Pine Stand Volume Table, which estimates stand volumes by a single variable, height, gave results that compared favorably with ground estimates. In Canada, tables based on two variables, height and density, have given estimates within 10% of ground cruises. Both of these tables are for homogeneous, even-aged coniferous stands, and that may be the reason that they give satisfactory results.

An aerial photo Stand Volume Table for the Mixed Hardwoods types of the Lake States has been developed by S. R. Gevorkiantz at the Lake States Forest Experiment Station. This table, which appears on Page 34 , is based on the three variables measurable on aerial photographs - height, crown diameter, and crown closure. It was designed primarily as an aid to photo-interpreters in stand classification, but it was also set up to show the approximate volumes to be expected in the various conditions classes. Up to the present time, this table has not been tested by comparing its volume estimates with ground cruise volume estimates. This section of

* S. H. Spurr - Aerial Photographs In Forestry

P A R T III

Aerial Photo Volume Tables

the report attempts to make that comparison, using the 14 stereograms appearing in Part I as a basis for the volume estimates.

Volume per acre as found in the ground cruise was obtained directly from the 14 tally sheets used in the preparation of the stereograms. Copies of these tally sheets are in the appendix. The photo-estimate volumes were obtained from the above mentioned stand volume table. Because most of the stands pictured in the stereograms used in this report were not open enough to permit use of the parallax wedge to determine tree height, this measurement was taken from sample tree data found on the reverse side of each of the tally sheets. Average crown diameter of the trees on the plot was measured with the Harvard wedge. Percent of crown closure was determined by use of the crown density scale developed by the Central States Forest Experiment Station.

Comparison of the results obtained by the two cruising methods appears in the last two columns of the following table:

Plot Type	Height	Crown Diameter	Crown Closure Percent	Volume Per Acre Photo-Est.	Volume By Ground Estimation
M'	72'	30'	55%	4M	2.9 M 3.1 Cord
M''	65'	31'	65%	5 M	7.9 M 6.5 Cord
M'''	64'	33'	80%	7 M	11.1 M 4.6 Cord
Md'	52'	21'	30%	-	4.6 M 5.6 Cord
Md''	65'	25'	70%	4 M	6.1 M 2.9 Cord
Md'''	68'	30'	75%	6 M	6.9 M 1.2 Cord
Mc'	65'	19'	45%	10 Cord	2.1 M 5.4 Cord
Mc''	44'	25'	55%	8 Cord	1.8 M 8.6 Cord
Mc'''	68'	25'	75%	18 Cord	1.3 M 14.1 Cord
Ad'	41'	17'	20%	-	2.3 M 3.5 Cord
Ad''	71'	18'	70%	4 M or 18 Cd.	4.7 M 6.3 Cord
Ac'	40'	14'	25%	3 Cord	3.5 Cord
Ac''	60'	13'	70%	18 Cord	14.8 Cord
Ac'''	60'	14'	65%	18 Cord	.7 M 18.8 Cord

Table IX - Comparison of Photo-Cruise and Ground-Cruise Volume Estimates

It will be noted that the photo-cruise volume estimates come reasonably close to the ground cruise estimates only in the three Aspen pole types and in the Mixed Hardwood pole types. In all other cases the photo estimate is much smaller than the actual gross volume on the plot. This indicates that in this region the aerial photo stand volume table could be used to get rough estimates of merchantable volume in pole stands but that this volume table is of little use in determining the volume of saw-timber stands.

The underestimate that the volume table gives in the saw-timber stands may be accounted for in part by the fact that the

volume table seems to overlook the large cordwood volume in pole size trees that are almost always present in the understory. It is unlikely that the photo-volume tables could be made to show volume in both sawtimber and cordwood, since the crowns of the poles, when hidden beneath the dominant trees, are not distinguishable on aerial photographs.

At any rate, the results found here indicate that this stand volume table can be used to obtain rough estimates of the volume of cordwood stands, but that the sawtimber volume estimates given by this table are very inaccurate.

Table 2. -- Stand volume table.

Volume per acre by total height, crown diameter and crown closure.

[illegible]	Total height	Crown		Crown closure percentage 1/					
		Diameter	Texture	10-25	25-40	40-55	55-70	70-85	85-100
	Feet	Feet		M bd. ft. net per acre					
				Poor		Medium	Good 2/		Very good
rge saw timber	100	30+	Coarse	1.5-4	4-6	6-8	8-11	11-13	11-13
mber	90	30+	Coarse	1.5-3	3-5	5-7	7-9	9-11	11-15
5 in. +	80	30+	Coarse	1.5-2	2-4	4-6	6-7	7-9	9-12
b.h.)	80	20-30	Cobbly	1.5-2	2-3	3-5	5-6	6-7	7-10
	70	30+	Coarse	1.5-2	2-3	3-4	4-5	5-7	7-9
				Poor		Medium	Good		Very good
all saw timber	80	10-15	Sandy	1.5-3	3-5	5-7	7-9	9-11	11-15
ber	80	15-20	Pebbly	1.5-2	2-3	3-5	5-6	6-7	7-10
n 11 3/	70	20-30	Cobbly		1.5-3	3-4	4-5	5-6	6-8
to 15	60	30+	Coarse		1.5-2	2-3	3-4	4-5	5-7
d.b.h.)	70	15-20	Pebbly		1.5-2	2-3	3-4	4-5	5-7
	60	20-30	Cobbly		1.5-2	2-3	3-4	4-5	5-6
	50	30+	Coarse		1.5-2	2-3	3-4	4-5	5-6
	70	10-15	Sandy			1.5-2	2-3	3-4	4-5
	60	15-20	Pebbly			1.5-2	2-3	3-4	4-5
	40	30+	Coarse			1.5-2	2-2	2-3	3-4
	50	20-30	Cobbly				1.5-2	2-2	2-3
						Net cords per acre			
				Poor		Medium	Good		Very good
e timber	60	10-15	Sandy	3-6	6-10	10-14	14-18	18-22	22-30
in. to 9	50	0-30	Cobbly	3-5	5-9	8-12	12-15	15-18	18-25
11. in.	50	15-20	Pebbly	3-4	4-7	7-10	10-13	13-16	16-22
.b.h.)	50	10-15	Sandy		3-6	6-8	8-10	10-12	12-17
	40	20-30	Cobbly		3-5	5-7	7-9	9-11	11-15
	40	15-20	Pebbly		3-4	4-5	5-7	7-8	8-11
	40	10-15	Sandy				3-4	4-5	5-7
	30	15-20	Pebbly					3-4	4-5

1/ Percent of crown closure determined from aerial photos.
2/ Poor, medium, good and very good indicate volume class.
3/ 5.0-inch d.b.h. for softwoods and 11.0-inch d.b.h. for hardwoods.

Prepared by Gevorkiantz, at Lake States Forest Experiment Station

A P P E N D I X

UNIVERSITY OF MICHIGAN
SCHOOL OF FORESTRY AND CONSERVATION

35

FORM 99 R-9
REV. 6-17-47

DESIGNED BY LAKE STATES FOREST EXPERIMENT STATION USING COMPOSITE VOLUME TABLES FOR LAKE STATES TIMBER SPECIES

DBH SM
2" ••
4"

CUMULATIVE 1/5 ACRE TALLY SHEET

ESTIMATOR D.W.E. DATE 8/11/48
COURSE 36 Ch. PLOT IR - 787 SEC. T. R.

MAP TYPE M'
PLOT TYPE M'

VOLUME IN TENTHS OF CORDS PER ACRE

DBH	SPEC. & LEGEND	NON-MERCH.	NUMBER OF 8-FOOT BOLTS (4" OR LARGER) PER TREE				MORTALITY / ACRE				TOTALS PER ACRE
			1	3	4		NO. TREES 2"	NO. TREES 4"	VOL. BY SPECIES SPEC.	VOL. BY SPECIES CDS.	BD. FT.
6	SM		1 2 3 4 5 6 6 7 8 9 / 10 11 12 13 14 15 16 / 17 18 18 19 20 21 / 22 23 24 25 26 27	1 3 4 6 7 9 10 12 13 15 16 / 18 19 21 22 24 25 27 28 / 30 31 33 34 36 37 39 40 / 42 43 45 46 48 49 51 52	2 4 6 9 11 13 15 17 19 22 / 24 26 28 30 32 35 37 39 41 / 43 45 48 50 52 54 56 58 60 / 63 65 67 69 71 73 76 78 80	3 6 9 12 14 17 / 20 23 26 29 32 / 35 37 40 43 46 49 / 52 55 58 60 63 66					.4
	YB		1 2 3 4 5 6 6 7 8 / 9 10 11 12 13 14 / 15 16 17 18 18 19	1 3 4 6 7 9 10 12 13 15 / 16 18 19 21 22 24 25 27 / 28 30 31 33 34 36 37 39	2 4 6 9 11 13 15 17 19 22 / 24 26 28 30 32 35 37 39 41 / 43 45 48 50 52 54 56 58 60	3 6 9 12 14 17 20 / 23 26 29 32 35 37 40 / 43 46 49 52 55 58 60					.1
			1 2 3 4 5 6 6 7 / 8 9 10 11 12 13	1 3 4 6 7 9 10 12 13 15 / 16 18 19 21 22 24 25 27	2 4 6 9 11 13 15 17 19 / 22 24 26 28 30 32 35 37	3 6 9 12 14 17 20 23 / 26 29 32 35 37 40 43 46					
			1 2 3 4 5 6 6 / 7 8 9 10 11 12 13	1 3 4 6 7 9 10 12 13 15 / 16 18 19 21 22 24 25 27	2 4 6 9 11 13 15 17 19 / 22 24 26 28 30 32 35 37	3 6 9 12 14 17 20 23 26 / 29 32 35 37 40 43 46 49					
8	SM		2 3 5 6 8 10 11 / 13 14 16 18 / 19 21 22 24	2 5 7 10 12 15 17 20 22 / 25 27 30 32 35 37 40 / 42 45 47 50 52 55 57 / 60 62 64 67 69 72 74	7 10 14 17 21 24 28 / 31 35 38 42 45 49 52 56 / 60 63 66 70 73 77 80 84 / 87 91 94 98 101 105 108	5 9 14 18 23 28 32 37 41 / 46 51 55 60 65 69 74 78 / 83 88 92 97 101 106 111 / 115 120 124 129 134 138	6 12 17 / 23 29 35 / 41 46 52 58 / 64 70 75 81	7 14 / 21 28 / 34 41 48 / 55 62 69	AVERAGE PERCENT DEFECT 5 POLES		.3
	YB		3 5 6 8 10 / 11 13 14 16 / 18 19 21 22	2 5 7 10 12 15 17 20 / 22 25 27 30 32 35 37 / 40 42 45 47 50 52 55	3 7 10 14 17 21 24 28 / 31 35 38 42 45 49 52 56 / 60 63 66 70 73 77 80 84	6 12 17 23 28 32 37 41 / 46 51 55 60 65 69 74 78 / 83 88 92 97 101 106 111	6 12 17 23 / 29 35 41 46 / 52 58 64 70	7 14 21 / 28 34 41 / 48 55 62			.2
	BF		2 3 5 6 8 / 10 11 13 / 22 25 27 30 32 35 37	2 5 7 10 12 15 17 20 / 31 35 38 42 45 49 52 56	3 7 10 14 17 21 24 28 / 41 46 51 55 60 65 69 74	5 9 14 18 23 28 32 37 / 46 51 55 60 65 69 74	6 12 17 23 29 / 35 41 46 52 58	7 14 21 28 / 34 41 48 55			.3
			2 3 5 6 8 / 10 11 13 / 22 25 27 30 32 35	2 5 7 10 12 15 17 20 / 31 35 38 42 45 49 52	3 7 10 14 17 21 24 28 / 41 46 51 55 60 65 69 74	5 9 14 18 23 28 32 37 / 46 51 55 60 65 69 74	6 12 17 23 29 / 35 41 46 52 58	7 14 21 28 / 34 41 48 55		7	
10	SM		2 5 7 10 / 12 15 17 / 20 22 25	4 7 11 15 18 22 26 / 29 33 37 40 44 48 / 51 55 59 62 66 70	5 10 15 20 25 30 35 41 / 46 51 56 61 66 71 76 / 81 86 91 96 101 106	7 13 20 26 33 40 46 53 / 59 66 73 79 86 92 99 106 / 112 119 126 132 139 145	8 17 25 33 42 / 50 58 67 75 83 / 92 100 109 117	10 20 30 40 50 / 60 70 80 90 100 / 110 120 130 140	12 24 36 48 / 60 72 84 96 / 108 120 132		1.8
			2 5 7 / 10 12 15	4 7 11 15 18 22 26 / 29 33 37 40 44 48	5 10 15 20 25 30 35 / 41 46 51 56 61 66 71	7 13 20 26 33 40 46 53 / 59 66 73 79 86 92 99 106	8 17 25 33 42 / 50 58 67 75 83	10 20 30 40 50 / 60 70 80 90 100	12 24 36 48 / 60 72 84 96		
			2 5 7 / 10 12	4 7 11 15 18 22 26 / 29 33 37 40 44 48	5 10 15 20 25 30 35 / 41 46 51 56 61 66 71	7 13 20 26 33 40 46 53 / 59 66 73 79 86 92 99 106	8 17 25 33 42 50 / 58 67 75 83 92 100	10 20 30 40 50 60 / 70 80 90 100 110	12 24 36 48 / 60 72 84 96		
			2 5 7 / 10 12	4 7 11 15 18 22 / 29 33 37 40 44 48	5 10 15 20 25 30 35 / 41 46 51 56 61 66 71	7 13 20 26 33 40 46 53 / 59 66 73 79 86 92 99 106	8 17 25 33 42 50 / 58 67 75 83 92 100	10 20 30 40 50 60 / 70 80 90 100 110	12 24 36 48 / 60 72 84 96		

VOLUME IN HUNDREDS OF BOARD FEET (SCRIBNER) PER ACRE

DBH	SPEC. & LEGEND	NON-MERCH.	NUMBER OF 16-FOOT LOGS (8" OR LARGER) PER TREE				RECOMMENDED CUT (NET) / ACRE				TOTALS PER ACRE
			1/2	1	1 1/2	2	TYPE OF CUT	PERIOD	SPEC.	CORD	M BD. FT.
10			1 1 2 3 3 4 5 / 6 6 7 8 8 9 10 / 11 11 12 13 13 / 14 15 15 16 17	2 3 4 6 7 9 10 12 13 / 15 16 18 19 21 22 24 / 25 27 28 30 31 33 34 / 36 37 39 40 42 43 45	2 4 6 8 10 12 14 16 / 18 20 22 24 26 28 30 / 32 34 36 38 40 42 44 / 46 48 50 52 54 56 58		IMPROVEMENT	5 Yr.			TOT. CORDS 3.1
			1 1 2 3 3 4 5 / 6 6 7 8 8 9 10 / 11 11 12 13 13 / 14 15 15 16 17	2 3 4 6 7 9 10 12 13 / 15 16 18 19 21 22 24 / 25 27 28 30 31 33 34 / 36 37 39 40 42 43 45	2 4 6 8 10 12 14 16 / 18 20 22 24 26 28 30 / 32 34 36 38 40 42 44 / 46 48 50 52 54 56 58		SALVAGE				
			1 1 2 3 3 4 5 / 6 6 7 8 8 9 / 10 12 13 13	2 3 4 6 7 9 10 12 / 13 15 16 18 19 21 22	2 4 6 8 10 12 14 16 / 18 20 22 24 26 28 30 / 32 34 36 38 40 42 44		ROTATION				
			1 1 2 3 3 4 5	2 3 4 6 7 9 10 12	2 4 6 8 10 12 14 16		2 1/2	TOTAL			
12	BF		1 3 4 6 7 8 / 10 11 13 14 / 15 17 18 20 / 21 22 24 25	2 5 7 10 12 14 17 19 / 22 24 29 29 31 34 36 / 38 41 43 46 48 50 53 / 55 58 60 62 65 67 70	3 7 10 13 16 20 23 / 26 30 33 36 40 43 46 / 50 53 56 59 63 66 69 / 73 76 79 82 86 89 92	4 8 12 16 20 23 / 27 31 35 39 43 47 / 51 55 58 62 66 70 / 74 78 82 86 90 94	TOTAL NET VOLUME SPECIES	CORDS	M. BD. FT.		200
			1 3 4 6 7 8 / 10 11 13 14 / 15 17 18 20	2 5 7 10 12 14 17 19 / 22 24 29 29 31 34 / 36 38 41 43 46 48	3 7 10 13 16 20 23 / 26 30 33 36 40 43 / 46 50 53 56 59 63	4 8 12 16 20 23 / 27 31 35 39 43 47 / 51 55 58 62 66 70					
			1 3 4 6 7 8 / 10 11 13 14	2 5 7 10 12 14 17 19 / 22 24 29 29 31 34	3 7 10 13 16 20 23 / 26 30 33 36 40 43 / 27 31 35 39 43 47	4 8 12 16 20 23 / 24 29 34 39					
			1 3 4 6 7 8	2 5 7 10 12 14 17 19	3 7 10 13 16 20 23	4 8 12 16 20 23	3	3 1/2			
14			2 4 6 8 10 12 / 14 16 18 20 / 22 24 26 28	4 7 10 14 18 21 24 / 28 32 35 38 42 46 / 49 52 56 60 63 66	5 10 14 19 24 29 34 / 38 43 48 53 58 62 / 67 72 77 82 86 91	6 12 17 23 29 35 / 41 46 52 58 64 70 / 75 81 87 93 99	7 14 21 28 / 35 42 49 56 / 63 70 78 85	8 16 25 33 / 41 50 58 66 / 74 82	9 19 / 28 38 / 47 57	AVERAGE PERCENT DEFECT 25 SAWTIMBER	
			2 4 6 8 10 12 / 14 16 18 20	4 7 10 14 18 21 24 / 28 32 35 38 42 46	5 10 14 19 24 29 34 / 38 43 48 53 58 62	6 12 17 23 29 35 / 41 46 52 58 64 70	7 14 21 28 / 35 42 49 56	8 16 25 33 / 41 50 58 66	9 19 / 28 38		
			2 4 6 8 10 / 12 14 16 18	4 7 10 14 18 21 24 / 28 32 35 38 42 46	5 10 14 19 24 29 34 / 38 43 48 53 58 62	6 12 17 23 29 35 / 41 46 52 58 64 70	7 14 21 28 / 35 42 49 56	8 16 25 33 / 41 50 58 66	9 19 / 28 38		
			2 4 6 8 10	4 7 10 14 18 21 24	5 10 14 19 24 29 34	6 12 17 23 29 35	7 14 21 28	8 16 25 33	9 19	4	4 1/2 5
16	SM		3 5 8 11 14 / 16 19 22 24	5 9 14 19 23 28 / 33 37 42 46 51 56	6 13 19 26 32 39 / 45 52 58 64 71 77	8 15 24 32 40 47 / 55 63 71 79 87 95	10 19 29 38 / 48 57 67 76	11 22 34 45 / 56 67 78 90	13 25 / 38 50	14 28 / 42 56	800
	H		3 5 8 11 14 / 16 19 22 24	5 9 14 19 23 28 / 33 37 42 46 51 56	6 13 19 26 32 39 / 45 52 58 64 71 77	8 15 24 32 40 47 / 55 63 71 79 87 95	10 19 29 38 / 48 57 67 76	11 22 34 45 / 56 67 78 90	13 25 / 38 50	14 28 / 42 56	600
			3 5 8 11 14	5 9 14 19 23 28	6 13 19 26 32 39	8 15 24 32 40 47	10 19 29 38	11 22 34 45	13 25	14 28	
			3 5 8 11 14	5 9 14 19 23 28	6 13 19 26 32 39	8 15 24 32 40 47	10 19 29 38	11 22 34 45	13 25	14 28	
18			4 7 11 14 / 18 22 25	6 12 18 24 30 37 / 43 49 55 61 69	8 17 25 34 42 50 / 59 67 76 84 92	10 21 31 41 52 62 / 72 83 93 104 114	12 25 37 50 / 62 74 87 99	15 29 44 58 / 73 88 102	16 32 / 48 65	18 36 / 53 71	
			4 7 11 14	6 12 18 24 30 37	8 17 25 34 42 50	10 21 31 41 52 62	12 25 37 50	15 29 44 58	16 32	18 36	
			4 7 11 14	6 12 18 24 30 37	8 17 25 34 42 50	10 21 31 41 52 62	12 25 37 50	15 29 44 58	16 32	18 36	
			4 7 11 14	6 12 18 24 30 37	8 17 25 34 42 50	10 21 31 41 52 62	12 25 37 50	15 29 44 58	16 32	18 36	
20	SM		4 9 14 18 / 22 27 32	8 16 23 31 39 47 / 55 62 70 78 86	11 21 32 42 53 64 / 74 85 95 106 117	13 26 39 52 66 79 / 92 105 118 131 144	16 32 48 63 79 / 95 111 127 143	18 37 55 73 / 92 110 128	20 41 / 61 81	23 45 / 68 90	25 50 / 75 100 27	1300
			4 9 14 18	8 16 23 31 39 47	11 21 32 42 53 64	13 26 39 52 66 79	16 32 48 63 79	18 37 55 73	20 41	23 45	25 50 27	
			4 9 14 18	8 16 23 31 39 47	11 21 32 42 53 64	13 26 39 52 66 79	16 32 42 63 79	18 37 55 73	20 41	23 45	25 50 27	
			4 9 14 18	8 16 23 31 39	11 21 32 42 53 64	13 26 39 52 66 79	16 32 42 63 79	18 37 55 73	20 41	23 45	25 50 27	
22			6 11 17 22	10 19 29 39 48	13 26 39 52 66	16 33 49 66 82 98	20 39 59 78	23 45 68 90	25 50	28 56	31 62 33	
			6 11 17 22	10 19 29 39 48	13 26 39 52 66	16 33 49 66 82 98	20 39 59 78	23 45 68 90	25 50	28 56	31 62 33	
			6 11 17 22	10 19 29 39 48	13 26 39 52 66	16 33 49 66 82 98	20 39 59 78	23 45 68 90	25 50	28 56	31 62 33	
24			7 14 21	12 24 35 47 59	16 32 48 64 80	20 40 60 80 100	24 47 71 94	27 55 82 110	31 61	34 69	38 75 41	
			7 14 21	12 24 35 47 59	16 32 48 64 80	20 40 60 80 100	24 47 71 94	27 55 82 110	31 61	34 69	38 75 41	
			7 14 21	12 24 35 47 59	16 32 48 64 80	20 40 60 80 100	24 47 71 94	24 55 82 110	31 61	34 69	38 75 41	
26			8 16 25	14 28 42 56 70	19 38 57 76 95	24 48 72 96 120 143	28 57 85 113	33 65 98 131	36 73	41 82	45 90 49	
			8 16 25	14 28 42 56 70	19 38 57 76 95	24 48 72 96 120 143	28 57 85 113	33 65 98 131	36 73	41 82	45 90 49	
28			10 20 29	17 33 50 66	22 45 67 90 112	28 55 84 112 140 168	33 66 100 133	38 76 115 153	43 86	48 96	53 57	
			10 20 29	17 33 50 66	22 45 67 90 112	28 55 84 112 140 168	33 66 100 133	38 76 115 153	43 86	48 96	53 57	
30			11 23 34	19 38 57 77	26 52 78 104	32 65 97 130 162	39 77 116 154	44 89 133 177	50 100	56 111	61 67	
			11 23 34	19 38 57 77	26 52 78 104	32 65 97 130 162	39 77 116 154	44 89 133 177	50 100	56 111	61 67	
32			13 26 39	22 44 66 88	30 60 90 120	37 75 112 149 186	44 89 133 178	51 102 153 204	57 114	64 128	71 78	
34			13 26 39	22 44 66 88	30 60 90 120	37 75 112 149 186	44 89 133 178	51 102 153 204	57 114	64 128	71 78	
36			15 29	25 50 75 100	34 68 102 136	42 85 127 169 212 254	50 101 151 202	58 116 174 232	65 129	73 146	81 89	
38			16 33	28 56 85 113	38 77 115 153	48 96 143 191 239	57 114 170 227	65 131 196 261	73 146	82 164	92 101	
40			18 36	32 63 95 127	43 86 128 171	53 107 160 214 267	63 127 190 254	73 146 219 293	82 164	92 184	103 115	
42			20 40	35 70 105	48 95 143 190	59 118 177 237 296	70 141 211 281	82 163 245 326	91 182	103 205	116 129	
			22 44	39 78 117 155	53 106 158 211	65 130 196 261 326	78 155 232 310	90 180 270 360	101 202	113 225	129 145	

FORM 6827

Tot. b.f. 2,900

CEDAR TALLY

D.B.H.	7' Posts	8' Ties	Poles 20'	25'	30'	35'	40'	45'	50'	Shingle Bolts
6										
8										
10										
12										
14										
16										
18										
20										
22										
24										

SAMPLE TREE DATA

Tree No.	Dist. and bearing to tree	Spec.	DBH	Height		Tree Class	Age	Radial Gr.		Defect %
				Total	Merch			10 Yr.	20 Yr.	
		YB	4.0	36		4C	29	.9	1.8	0
		YB	5.6	38	12	4B	40	.7	1.9	0
		SM	20.5	72	37	1B	-	.5	.7	10
		SM	10.9	35	26	4B	-	.5	1.0	25

Site Classification II Operability Fair

*Supplementary Cruise Data

Type acreage _____ Cruise % _____ % Accuracy _____

Stand Description _____

Logging change. Easy ____ Medium ____ Difficult ____ Winter ____ Summer ____ Yearlong ____

Accessability: Miles of road to construct _____ Total road cost _____

Topography: Level ____ Rolling ____ Hilly ____ Rugged ____ Rocky ____

Recommended Silviculture: Marking _____ Species and % cut _____

Designating: Species and Method _____

Hutson-Vandenburg needs:

Planting: Acres _____ Species and Age Class _____ No. _____ Cost _____

T.S.I.: Acres _____ Kind _____ Cost _____

To be filled in only when tally sheet is used in cruising for timber sale.

UNIVERSITY OF MICHIGAN
SCHOOL OF FORESTRY AND CONSERVATION

36

FORM 99 R-9
REV. 6-17-47

DESIGNED BY LAKE STATES FOREST EXPERIMENT STATION USING COMPOSITE VOLUME TABLES FOR LAKE STATES TIMBER SPECIES

DBH	RM	SM
2"	:	•
4"		

CUMULATIVE 1/5 ACRE TALLY SHEET

ESTIMATOR D.D.L. DATE 8/26/48

COURSE 352 Ch. PLOT IR - 75 SEC. ____ T. ____ R. ____

MAP TYPE M11

PLOT TYPE M11

VOLUME IN TENTHS OF CORDS PER ACRE

NUMBER OF 8-FOOT BOLTS (4" OR LARGER) PER TREE

DBH	SPEC. & LEGEND	NON-MERCH.	1	2	3	4	MORTALITY / ACRE NO. TREES 2"	NO. TREES 4"	VOL. BY SPECIES SPEC.	CDS.	BD. FT.	TOTALS PER ACRE
6	Elm		1 2 3 4 5 6 6 7 8 9 / 10 11 12 13 14 15 16 / 17 18 18 19 20 21 / 22 23 24 25 26 27	1 3 3 3 3 7 9 10 12 13 15 16 / 18 19 21 22 24 25 27 28 / 30 31 33 34 36 37 39 40 / 42 43 45 46 48 49 51 52	2 4 6 9 11 13 15 17 19 22 / 24 26 28 30 32 35 37 39 41 / 43 45 48 50 52 54 56 58 60 / 63 65 67 69 71 73 76 78 80	3 6 9 12 14 17 / 20 23 26 29 32 / 35 37 40 43 46 49 / 52 55 58 60 63 66					.6
	SM		1 2 3 4 5 6 6 7 8 / 9 10 11 12 13 14 / 15 16 17 18 18 19 / 20 21 22 23 24 25 26 27	1 3 3 4 6 7 9 10 12 13 15 / 16 18 19 21 22 24 25 27 / 28 30 31 33 34 36 37 39 / 41 45 46 48 50 52 54 56 58 60	2 4 6 9 11 13 15 17 19 22 / 24 26 28 30 32 35 37 39 41 / 43 45 48 50 52 54 56 58 60 / 63 65 67 69 71 73 76 78 80	3 6 9 12 14 17 20 / 23 26 29 32 35 37 40 / 43 46 49 52 55 58 60 / 63 66 69 72 74 77 80					.7
	YB		1 2 3 4 5 6 6 7 / 8 9 10 11 12 13 / 14 15 16 17 18 19 20 21 / 22 23 24 25 26 27	1 3 4 6 7 9 10 12 13 15 / 16 18 19 21 22 24 25 27 / 28 30 31 33 34 36 37 39 / 41 45 46 48 50 52 54 56 58 60	2 4 6 9 11 13 15 17 19 / 22 24 26 28 30 32 35 37 / 39 41 43 45 48 50 52 54 56 58 60 / 63 65 67 69 71 73 76 78 80	3 6 9 12 14 17 20 23 / 26 29 32 35 37 40 43 46 / 49 52 55 58 60 63 66 / 69 72 74 77 80					.3
			1 2 3 4 5 6 6 6 7 / 8 9 10 11 12 13 / 14 15 16 17 18 19 20 21 / 22 23 24 25 26 27	1 3 4 6 7 9 10 12 13 15 / 16 18 19 21 22 24 25 27 / 28 30 31 33 34 36 37 39 / 42 43 45 46 48 49 51 52	2 4 6 9 11 13 15 17 19 22 / 24 26 28 30 32 35 37 39 41 / 43 45 48 50 52 54 56 58 60 / 63 65 67 69 71 73 76 78 80	3 6 9 12 14 17 20 / 23 26 29 32 35 37 40 / 43 46 49 52 55 58 60 / 63 66 69 72 74 77 80					
8	SM		2 3 5 6 8 10 11 / 13 14 16 18 / 19 21 22 24 / 26 27 29 30	2 5 7 10 12 15 17 20 22 / 25 27 30 32 35 37 40 / 42 45 47 50 52 55 57 / 60 62 64 67 69 72 74	3 7 10 14 17 21 24 28 / 31 35 38 42 45 49 52 56 / 60 63 66 70 73 77 80 84 / 87 91 94 98 101 105 108	5 9 14 18 23 28 32 37 41 / 46 51 55 60 65 69 74 78 / 83 88 92 97 101 106 111 / 115 120 124 129 134 138	6 12 17 / 23 29 35 / 41 46 52 58 / 64 70 75 81	7 14 / 21 28 / 34 41 48 / 55 62 69				.8
	RM		2 3 5 6 8 10 / 11 13 14 16 / 18 19 21 22	2 5 7 10 12 15 17 20 / 22 25 27 30 32 35 37 / 40 42 45 47 50 52 55	3 7 10 14 17 21 24 28 / 31 35 38 42 45 49 52 56 / 60 63 66 70 73 77 80 84	5 9 14 18 23 28 32 37 41 / 46 51 55 60 65 69 74 78 / 83 88 92 97 101 106 111	6 12 17 23 / 29 35 41 46 / 52 58 64 70	7 14 21 / 28 34 41 / 48 55 62	AVERAGE PERCENT DEFECT 10 POLES				.5
	H		2 3 5 6 8 / 10 11 13 / 22 25 27 30 32 35 37	2 5 7 10 12 15 17 20 / 31 35 38 42 45 49 52 56	3 7 10 14 17 21 24 28 / 41 46 51 55 60 65 69 74	5 9 14 18 23 28 32 37 / 52 58 64 70	6 12 17 23 29 / 35 41 46 52 58	7 14 21 28 / 34 41 48 55				.3
			2 3 5 6 8 / 10 11 13 / 22 25 27 30 32 35	2 5 7 10 12 15 17 20 / 31 35 38 42 45 49 52	3 7 10 14 17 21 24 28 / 41 46 51 55 60 65 69	5 9 14 18 23 28 32 37 / 52 58 64 70	6 12 17 23 29 / 35 41 46 52 58	7 14 21 28 / 34 41 48 55	7			
10	SM		2 5 7 10 / 12 15 17 / 29 33 37 40 44 48 / 51 55 59 62 66 70	4 7 11 15 18 22 26 / 46 51 56 61 66 71 / 81 86 91 96 101 106	5 10 15 20 25 30 35 41 / 59 66 73 79 86 92 99 106 / 112 119 126 132 139 145	7 13 20 26 33 40 46 53 / 76 83 90 97 104 111 / 118 125 132 139 146 153	8 17 25 33 42 / 50 58 67 75 83 / 92 100 109 117	10 20 30 40 50 / 60 70 80 90 100 / 110 120 130 140	12 24 36 48 / 60 72 84 96 / 108 120 132			3.3
			2 5 7 / 10 12 15 / 29 33 37 40 44 48	4 7 11 15 18 22 26 / 41 46 51 56 61 66 71	5 10 15 20 25 30 35 / 59 66 73 79 86 92 99 106	7 13 20 26 33 40 46 53 / 76 83 90 97 104 111	8 17 25 33 42 / 50 58 67 75 83	10 20 30 40 50 / 60 70 80 90 100	12 24 36 48 / 60 72 84 96			
			2 5 7 / 10 12 / 29 33 37 40 44 48	4 7 11 15 18 22 26 / 41 46 51 56 61 66 71	5 10 15 20 25 30 35 / 59 66 73 79 86 92 99 106	7 13 20 26 33 40 46 53 / 76 83 90 97 104 111	8 17 25 33 42 50 / 58 67 75 83 92 100	10 20 30 40 50 60 / 70 80 90 100 110	12 24 36 48 / 60 72 84 96			
			2 5 7 / 10 12 / 29 33 37 40 44 48	4 7 11 15 18 22 / 41 46 51 56 61 66 71	5 10 15 20 25 30 35 / 59 66 73 79 86 92 99 106	7 13 20 26 33 40 46 53 / 76 83 90 97 104 111	8 17 25 33 42 50 / 58 67 75 83 92 100	10 20 30 40 50 60 / 70 80 90 100 110	12 24 36 48 / 60 72 84 96			

NUMBER OF 16-FOOT LOGS (8" OR LARGER) PER TREE

VOLUME IN HUNDREDS OF BOARD FEET (SCRIBNER) PER ACRE

DBH	SPEC. & LEGEND	1/2	1	1 1/2	2	RECOMMENDED CUT (NET) / ACRE TYPE OF CUT	PERIOD	SPEC.	CORD	M BD. FT.	TOTALS PER ACRE
10	H	1 2 3 3 4 5 / 6 6 7 8 8 9 10 / 11 11 12 13 13 / 14 15 15 16 17	2 3 4 6 7 9 10 12 13 / 15 16 18 19 21 22 24 / 25 27 28 30 31 33 34 / 36 37 39 40 42 43 45	2 4 6 8 10 12 14 16 / 18 20 22 24 26 28 30 / 32 34 36 38 40 42 44 / 46 48 50 52 54 56 58		IMPROVEMENT	5 YR.				100
		1 1 2 3 3 4 5 / 6 6 7 8 8 9 10 / 11 11 12 13 13	2 3 4 6 7 9 10 12 13 / 15 16 18 19 21 22 24 / 25 27 28 30 31 33 34	2 4 6 8 10 12 14 16 / 18 20 22 24 26 28 30 / 32 34 36 38 40 42 44		SALVAGE					
		1 1 2 3 3 4 5 / 6 6 7 8 8 9 / 11 11 12 13 13	2 3 4 6 7 9 10 12 / 13 15 16 18 19 21 22	2 4 6 8 10 12 14 16 / 18 20 22 24 26 28 30		ROTATION					
		1 1 2 3 3 4 5	2 3 4 6 7 9 10 12	2 4 6 8 10 12 14 16	2 1/2	TOTAL					
12	SM	1 3 4 6 7 8 / 10 11 13 14 / 15 17 18 20 / 21 22 24 25	2 5 7 10 12 14 17 19 / 22 24 29 29 31 34 36 / 38 41 43 46 48 50 53 / 55 58 60 62 65 67 70	3 3 3 6 13 16 20 23 / 26 30 33 36 40 43 46 / 50 53 56 59 63 66 69 / 73 76 79 82 86 89 92	4 8 12 16 20 23 / 27 31 35 39 43 47 / 51 55 58 62 66 70 / 74 78 82 86 90 94	5 10 15 19 / 24 29 34 39 / 44 48 53 58 / 63 68 73 78	TOTAL NET VOLUME SPECIES		CORDS	M. BD. FT.	1000
		1 3 4 6 7 8 / 10 11 13 14 / 15 17 18 20 / 21 22 24 25	2 5 7 10 12 14 17 19 / 22 24 29 29 31 34 / 36 38 41 43 46 48 / 50 53 56 59 63	3 7 10 13 16 20 23 / 26 30 33 36 40 43 / 46 50 53 56 59 63 / 66 69 72 76 79 82 86	4 8 12 16 20 23 / 27 31 35 39 43 47 / 51 55 58 62 66 70 / 74 78 82 86 90 94	5 10 15 19 / 24 29 34 39 / 44 48 53 58 / 63 68 73 78				

CEDAR TALLY

D.B.H.	7' Posts	8' Ties	Poles							Shingle Bolts
			20'	25'	30'	35'	40'	45'	50'	
6										
8										
10										
12										
14										
16										
18										
20										
22										
24										

SAMPLE TREE DATA

Tree No.	Dist. and bearing to tree	Spec.	DBH	Height		Tree Class	Age	Radial Gr.		Defect %
				Total	Merch			10 Yr.	20 Yr.	
		YB	14.5	56	35	3B	90	.5	1.1	30
		SM	18.2	65	44	1C	-	.6	1.1	30

ite Classification I Operability Good

*Supplementary Cruise Data

ype acreage _____ Cruise % _____ % Accuracy _____

tand Description _____

_____

_____

ogging change. Easy ____ Medium ____ Difficult ____ Winter ____ Summer ____ Yearlong ____

ccessability: Miles of road to construct _____ Total road cost _____

opography: Level ____ Rolling ____ Hilly ____ Rugged ____ Rocky ____

ecommended Silviculture: Marking _____ Species and % cut _____

_____

esignating: Species and Method _____

_____

utson-Vandenburg needs:

anting: Acres _____ Species and Age Class _____ No. _____ Cost _____

S.I.: Acres _____ Kind _____ Cost _____

o be filled in only when tally sheet is used in cruising for timber sale.

DEU - 1-17
UNIVERSITY OF MICHIGAN
SCHOOL OF FORESTRY AND CONSERVATION

IM 99 R-9
1. 6-17-47

DESIGNED BY LAKE STATES FOREST EXPERIMENT STATION USING COMPOSITE VOLUME TABLES FOR LAKE STATES TIMBER SPECIES

CUMULATIVE 1/5 ACRE TALLY SHEET

ESTIMATOR Ott DATE 8/25/48
COURSE 18Ch PLOT IR - 95 SEC. T. R.
MAP TYPE M111
PLOT TYPE M111

BH	
2"	••
4"	••

VOLUME IN TENTHS OF CORDS PER ACRE

NUMBER OF 8-FOOT BOLTS (4" OR LARGER) PER TREE

SPEC. & LEGEND	NON-MERCH.	1	2	3	4	5	6
6 SM		1 2 3 4 5 6 6 7 8 9 / 10 11 12 13 14 15 16 / 17 18 18 19 20 21 / 22 23 24 25 26 27	3 4 6 7 9 10 12 13 15 16 / 18 19 21 22 24 25 27 28 / 30 31 33 34 36 37 39 40 / 42 43 45 46 48 49 51 52	2 4 6 9 11 13 15 17 19 22 / 24 26 28 30 32 35 37 39 41 / 43 45 48 50 52 54 56 58 60 / 63 65 67 69 71 73 76 78 80	6 9 12 14 17 / 20 23 26 29 32 / 35 37 40 43 46 49 / 52 55 58 60 63 66		
6		1 3 4 5 6 6 7 8 / 9 10 11 12 13 14 / 15 16 17 18 18 19	1 3 4 6 7 9 10 12 13 15 / 16 18 19 21 22 24 25 27 / 28 30 31 33 34 36 37 39	2 4 6 9 11 13 15 17 19 22 / 24 26 28 30 32 35 37 39 41 / 43 45 48 50 52 54 56 58 60	3 6 9 12 14 17 20 / 23 26 29 32 35 37 40 / 43 46 49 52 55 58 60		
6		1 2 3 4 5 6 6 7 / 8 9 10 11 12 13	1 3 4 6 7 9 10 12 13 15 / 16 18 19 21 22 24 25 27	2 4 6 9 11 13 15 17 19 / 22 24 26 28 30 32 35 37	3 6 9 12 14 17 20 23 / 26 29 32 35 37 40 43 46		
6		1 2 3 4 5 6 6 / 7 8 9 10 11 12 13	1 3 4 6 7 9 10 12 13 15 / 16 18 19 21 22 24 25 27	2 4 6 9 11 13 15 17 19 / 22 24 26 28 30 32 35 37	3 6 9 12 14 17 20 23 26 / 29 32 35 37 40 43 46 49		
8 SM		2 3 5 6 8 10 11 / 13 14 16 18 / 19 21 22 24 / 26 27 29 30	2 5 7 10 12 15 17 20 22 / 25 27 30 32 35 37 40 / 42 45 47 50 52 55 57 / 60 62 64 67 69 72 74	7 10 14 17 21 24 28 / 31 35 38 42 45 49 52 56 / 60 63 66 70 73 77 80 84 / 87 91 94 98 101 105 108	9 14 18 23 28 32 37 41 / 46 51 55 60 65 69 74 78 / 83 88 92 97 101 106 111 / 115 120 124 129 134 138	12 17 / 23 29 35 / 41 46 52 58 / 64 70 75 81	7 14 / 21 28 / 34 41 48 / 55 62 69
8 YB		2 3 5 6 8 10 / 11 13 14 16 / 18 19 21 22	2 5 7 10 12 15 17 20 / 22 25 27 30 32 35 37 / 40 42 45 47 50 52 55	7 10 14 17 21 24 28 / 31 35 38 42 45 49 52 56 / 60 63 66 70 73 77 80 84	9 14 18 23 28 32 37 41 / 46 51 55 60 65 69 74 78 / 83 88 92 97 101 106 111	6 12 17 23 / 29 35 41 46 / 52 58 64 70	7 14 21 / 28 34 41 / 48 55 62
8		2 3 5 6 8 / 10 11 13	2 5 7 10 12 15 17 20 / 22 25 27 30 32 35 37	3 7 10 14 17 21 24 28 / 31 35 38 42 45 49 52 56	5 9 14 18 23 28 32 37 / 41 46 51 55 60 65 69 74	6 12 17 23 29 / 34 41 46 52 58	7 14 21 28 / 34 41 48 55
8		2 3 5 6 8 / 10 11 13	2 5 7 10 12 15 17 20 / 22 25 27 30 32 35	3 7 10 14 17 21 24 28 / 31 35 38 42 45 49 52	5 9 14 18 23 28 32 37 / 41 46 51 55 60 65 69 74	6 12 17 23 29 / 35 41 46 52 58	7 14 21 28 / 34 41 48 55
10 SM		2 5 7 10 / 12 15 17 / 20 22 25	4 7 11 15 18 22 26 / 29 33 37 40 44 48 / 51 55 59 62 66 70	5 10 15 20 25 30 35 41 / 46 51 56 61 66 71 76 / 81 86 91 96 101 106	7 13 20 26 33 40 46 53 / 59 66 73 79 86 92 99 106 / 112 119 126 132 139 145	8 17 25 33 42 / 50 58 67 75 83 / 92 100 109 117	10 20 30 40 50 / 60 70 80 90 100 / 110 120 130 140
10 YB		2 5 7 / 10 12 15	4 7 11 15 18 22 26 / 29 33 37 40 44 48	5 10 15 20 25 30 35 / 41 46 51 56 61 66 71	7 13 20 26 33 40 46 53 / 59 66 73 79 86 92 99 106	8 17 25 33 42 / 50 58 67 75 83	10 20 30 40 50 / 60 70 80 90 100
10		2 5 7 / 10 12 / 15 17	4 7 11 15 18 22 26 / 29 33 37 40 44 48	5 10 15 20 25 30 35 / 41 46 51 56 61 66 71	7 13 20 26 33 40 46 53 / 59 66 73 79 86 92 99 106	8 17 25 33 42 50 / 58 67 75 83 92 100	10 20 30 40 50 60 / 70 80 90 100 110
10		2 5 7 / 10 12 / 15 17	4 7 11 15 18 22 / 25 29 33 37 40 44 48	5 10 15 20 25 30 35 / 41 46 51 56 61 66 71	7 13 20 26 33 40 46 53 / 59 66 73 79 86 92 99 106	8 17 25 33 42 50 / 58 67 75 83 92 100	10 20 30 40 50 60 / 70 80 90 100 110
10		2 5 7 / 10 12 / 15 17	4 7 11 15 18 22 / 25 29 33 37 40 44 48	5 10 15 20 25 30 35 / 41 46 51 56 61 66 71	7 13 20 26 33 40 46 53 / 59 66 73 79 86 92 99 106	8 17 25 33 42 50 / 58 67 75 83 92 100	10 20 30 40 50 60 / 70 80 90 100 110

CEDAR TALLY

D.B.H.	7' Posts	8' Ties	Poles							Shingle Bolts
			20'	25'	30'	35'	40'	45'	50'	
6										
8										
10										
12										
14										
16										
18										
20										
22										
24										

SAMPLE TREE DATA

Tree No.	Dist. and bearing to tree	Spec.	DBH	Height		Tree Class	Age	Radial Gr.		Defect %
				Total	Merch			10 Yr.	20 Yr.	
		SM	5.2	29	10	6B	39	.4	.9	0
		SM	12.9	60	24	4C	89	.5	1.1	10
		SM	18.3	64	44	2A	-	.5	1.0	15
		SM	5.0	39	-	6B	41	.4	.8	0

Site Classification I Operability Good

*Supplementary Cruise Data

Type acreage _____ Cruise % _____ % Accuracy _____

Stand Description _____

Logging change. Easy ____ Medium ____ Difficult ____ Winter ____ Summer ____ Yearlong ____

Accessability: Miles of road to construct _____ Total road cost _____

Topography: Level ____ Rolling ____ Hilly ____ Rugged ____ Rocky ____

Recommended Silviculture: Marking _____ Species and % cut _____

Designating: Species and Method _____

Hutson-Vandenburg needs:

Planting: Acres _____ Species and Age Class _____ No. _____ Cost _____

T.S.I.: Acres _____ Kind _____ Cost _____

To be filled in only when tally sheet is used in cruising for timber sale.

UNIVERSITY OF MICHIGAN
SCHOOL OF FORESTRY AND CONSERVATION

FORM 99 R-9
REV. 6-17-47

DESIGNED BY LAKE STATES FOREST EXPERIMENT STATION USING COMPOSITE VOLUME TABLES FOR LAKE STATES TIMBER SPECIES

DBH	SM	IW	YB
2"	23	2	2
4"	2		2

CUMULATIVE 1/5 ACRE TALLY SHEET

ESTIMATOR Ott DATE 7/26/48
COURSE 490h PLOT IR - 719 SEC. T. R.

MAP TYPE Md'
PLOT TYPE Md'

VOLUME IN TENTHS OF CORDS PER ACRE

DBH	SPEC. & LEGEND	NON-MERCH.	NUMBER OF 8-FOOT BOLTS (4" OR LARGER) PER TREE				MORTALITY / ACRE NO. TREES 2"	MORTALITY / ACRE NO. TREES 4"	VOL. BY SPECIES SPEC.	VOL. BY SPECIES CDS.	VOL. BY SPECIES BD. FT.	TOTALS PER ACRE
			1	2	3	4						
6	Elm		1 2 3 4 5 6 6 7 8 9 / 10 11 12 13 14 15 16 / 17 18 18 19 20 21 / 22 23 24 25 26 27	1 2 3 4 6 7 9 10 12 13 15 16 / 18 19 21 22 24 25 27 28 / 30 31 33 34 36 37 39 40 / 42 43 45 46 48 49 51 52	2 4 6 9 11 13 15 17 19 22 / 24 26 28 30 32 35 37 39 41 / 43 45 48 50 52 54 56 58 60 / 63 65 67 69 71 73 76 78 80	3 6 9 12 14 17 / 20 23 26 29 32 / 35 37 40 43 46 49 / 52 55 58 60 63 66	150	0				.2
	YB		1 1 2 3 4 5 6 7 8 / 9 10 11 12 13 14 / 15 16 17 18 19	1 2 3 4 6 7 9 10 12 13 15 / 16 18 19 21 22 24 25 27 / 28 30 31 33 34 36 37 39	1 2 4 6 9 11 13 15 17 19 22 / 24 26 28 30 32 35 37 39 41 / 43 45 48 50 52 54 56 58 60	3 6 9 12 14 17 20 / 23 26 29 32 35 37 40 / 43 46 49 52 55 58 60						1.2
	SM		1 2 3 4 5 6 6 7 / 8 9 10 11 12 13 / 14 15 16 17 18 19	1 3 4 6 7 9 10 12 13 15 / 16 18 19 21 22 24 25 27 / 28 30 31 33 34 36 37 39	2 4 6 9 11 13 15 17 19 / 22 24 26 28 30 32 35 37 / 41 43 45 48 50 52 54 56 58 60	3 6 9 12 14 17 20 23 / 26 29 32 35 37 40 43 46 / 49 52 55 58 60 63						.2
	BW		1 2 3 4 5 6 6 7 8 9 / 10 11 12 13 14 15 16 / 17 18 19 20 21 22	1 3 4 6 7 9 10 12 13 15 / 16 18 19 21 22 24 25 27 / 28 30 31 33 34 36 37 39	2 4 6 9 11 13 15 17 19 / 22 24 26 28 30 32 35 37 / 40 42 45 47 50 52 55 58 60	3 6 9 12 14 17 20 23 / 26 29 32 35 37 40 43 46 / 49 52 55 58 60 63						.4
8	SM		2 3 5 6 8 10 11 / 13 14 16 18 / 19 21 22 24 / 26 27 29 30	2 5 7 10 12 15 17 20 22 / 25 27 30 32 35 37 40 / 42 45 47 50 52 55 57 / 60 62 64 67 69 72 74	3 7 10 14 17 21 24 28 / 31 35 38 42 45 49 52 56 / 60 63 66 70 73 77 80 84 / 87 91 94 98 101 105 108	6 6 14 18 23 28 32 37 41 / 46 51 55 60 65 69 74 78 / 83 88 92 97 101 106 111 / 115 120 124 129 134 138	5 / 41	6 / 46 52 58 / 34 41 48 / 64 70 75 81	6 12 17 / 23 29 35 / 55 62 69	7 14 / 21 28	AVERAGE PERCENT DEFECT 10 POLES	.9
	IW		2 3 5 6 8 10 / 11 13 14 16 / 18 19 21 22	2 5 7 10 12 15 17 20 / 22 25 27 30 32 35 37 / 40 42 45 47 50 52 55	3 7 10 14 17 21 24 28 / 31 35 38 42 45 49 52 56 / 60 63 66 70 73 77 80 84	6 9 14 18 23 28 32 37 41 / 46 51 55 60 65 69 74 78 / 83 88 92 97 101 106 111		6 12 17 23 / 29 35 41 46 / 52 58 64 70		7 14 21 / 28 34 41 / 48 55 62		.5
	Elm		2 3 5 6 8 / 10 11 13 / 22 25 27 30 32 35 37	2 5 7 10 12 15 17 20 / 31 35 38 42 45 49 52 56	3 7 10 14 17 21 24 28 / 41 46 51 55 60 65 69 74	5 9 14 18 23 28 32 37 / 46 52 58 / 35 41 46 52 58		6 12 17 23 29 / 34 41 48 55		7 14 21 28		.3
	SM		2 3 5 6 8 10 / 12 15 17 / 20 22 25 / 27 30 32 35 37 40	2 5 7 10 12 15 17 20 / 31 35 38 42 45 49 52 56 / 60 63 66 70 73 77 80 84 / 87 91 94 98 101 105 108	3 7 10 14 17 21 24 28 / 41 46 51 55 60 65 69 74 / 83 88 92 97 101 106 111 / 115 120 124 129 134 138	6 12 17 23 29 35 41 / 46 51 55 60 65 69 74 78 / 83 88 92 97 101 106 111 / 115 120 124 129 134 138		6 12 17 23 29 35 41 / 46 52 58 / 34 41 48 / 64 70 75 81		7 14 21 28 / 34 41 48 / 55 62 69	7		
10	SM		2 5 7 10 / 12 15 17 / 20 22 25 / 27 30 32 35 37 40	4 7 11 15 18 22 26 / 29 33 37 40 44 48 / 51 55 59 62 66 70	5 10 15 20 25 30 35 41 / 46 51 56 61 66 71 76 / 81 86 91 96 101 106	7 13 20 26 33 40 46 53 / 59 66 73 79 86 92 99 106 / 112 119 126 132 139 145		8 25 33 42 / 50 58 67 75 83 / 92 100 109 117		10 20 30 40 50 / 60 70 80 90 100 / 110 120 130 140		1.7
			2 5 7 / 10 12 15 / 20 22 25	4 7 11 15 18 22 26 / 29 33 37 40 44 48 / 51 55 59 62 66 70	5 10 15 20 25 30 35 / 41 46 51 56 61 66 71	7 13 20 26 33 40 46 53 / 59 66 73 79 86 92 99 106		8 17 25 33 42 / 50 58 67 75 83 / 92 100 109 117		10 20 30 40 50 / 60 70 80 90 100 / 110 120 130 140		
			2 5 7 / 10 12 / 20 22 25	4 7 11 15 18 22 26 / 29 33 37 40 44 48 / 51 55 59 62 66 70	5 10 15 20 25 30 35 / 41 46 51 56 61 66 71	7 13 20 26 33 40 46 53 / 59 66 73 79 86 92 99 106		8 17 25 33 42 50 / 50 58 67 75 83 92 / 100 109 117 126		10 20 30 40 50 60 / 60 70 80 90 100 110 / 120 130 140 150		
			2 5 7 / 10 12 / 20 22 25	4 7 11 15 18 22 / 29 33 37 40 44 48 / 51 55 59 62 66 70	5 10 15 20 25 30 35 / 41 46 51 56 61 66 71	7 13 20 26 33 40 46 53 / 59 66 73 79 86 92 99 106		8 17 25 33 42 50 / 50 58 67 75 83 92 / 100 109 117 126		10 20 30 40 50 60 / 60 70 80 90 100 110 / 120 130 140 150		

VOLUME IN HUNDREDS OF BOARD FEET (SCRIBNER) PER ACRE

DBH	SPEC. & LEGEND	NUMBER OF 16-FOOT LOGS (8" OR LARGER) PER TREE 1/2	1	1 1/2	2	RECOMMENDED CUT (NET) / ACRE TYPE OF CUT	PERIOD	SPEC.	CORD	M BD. FT.	TOTALS PER ACRE
		1 1 2 3 3 4 5 / 6 6 7 8 8 9 10 / 11 11 12 13 13 / 14 15 15 16 17	2 3 4 6 7 9 10 12 13 / 15 16 18 19 21 22 24 / 25 27 28 30 31 33 34 / 36 37 39 40 42 43 45	2 4 6 8 10 12 14 16 / 18 20 22 24 26 28 30 / 32 34 36 38 40 42 44 / 46 48 50 52 54 56 58		IMPROVEMENT	20+				TOT. CORDS 5.4
						SALVAGE					
		1 1 2 3 3 4 5 / 6 6 7 8 8 9 10 / 11 11 12 13 13	2 3 4 6 7 9 10 12 13 / 15 16 18 19 21 22 24 / 25 27 28 30 31 33 34	2 4 6 8 10 12 14 16 / 18 20 22 24 26 28 30 / 32 34 36 38 40 42 44		ROTATION					
		1 1 2 3 3 4 5	2 3 4 6 7 9 10 12	2 4 6 8 10 12 14 16		TOTAL					
12	SM	1 3 4 6 7 8 / 10 11 13 14 / 15 17 18 20 / 21 22 24 25	2 5 7 10 12 14 17 19 / 22 24 29 29 31 34 36 / 38 41 43 46 48 50 53 / 55 58 60 62 65 67 70	3 6 7 10 13 16 20 23 / 26 30 33 36 40 43 46 / 50 53 56 59 63 66 69 / 73 76 79 82 86 89 92	8 12 16 20 23 / 27 31 35 39 43 47 / 51 55 58 62 66 70 / 74 78 82 86 90 94	TOTAL NET VOLUME SPECIES			CORDS	M. BD. FT.	700
	H	1 3 4 6 7 8 / 10 11 13 14 / 15 17 18 20	5 7 10 12 14 17 19 / 22 24 29 29 31 34 / 36 38 41 43 46 48	3 7 10 13 16 20 23 / 26 30 33 36 40 43 / 46 50 53 56 59 63	4 8 12 16 20 23 / 27 31 35 39 43 47 / 51 55 58 62 66 70						200
		1 3 4 6 7 8 / 10 11 13 14 / 15 17 18 20	2 5 7 10 12 14 17 19 / 22 24 29 29 31 34 / 36 38 41 43 46 48	3 7 10 13 16 20 23 / 26 30 33 36 40 43 / 46 50 53 56 59 63	4 8 12 16 20 23 / 27 31 35 39 43 47 / 51 55 58 62 66 70						
		1 3 4 6 7 8 / 10 11 13 14 / 15 17 18 20	2 5 7 10 12 14 17 19 / 22 24 29 29 31 34 / 36 38 41 43 46 48	3 7 10 13 16 20 23 / 26 30 33 36 40 43 / 46 50 53 56 59 63	4 8 12 16 20 23 / 27 31 35 39 43 47 / 51 55 58 62 66 70						
		2 4 6 8 10	4 7 10 14 18 21 24	5 10 14 19 24 29 34	6 12 17 23 29 35	3	3 1/2				
14	BW	2 4 6 8 10 12 / 14 16 18 20 / 22 24 26 28	4 7 10 14 18 21 24 / 28 32 35 38 42 46 / 49 52 56 60 63 66	5 10 14 19 24 29 34 / 38 43 48 53 58 62 / 67 72 77 82 86 91	6 12 17 23 29 35 / 41 46 52 58 64 70 / 75 81 87 93 99	14 21 28 / 35 42 49 56 / 63 70 78 85 / 92 99	8 16 25 33 / 41 50 58 / 66 74 82	9 19 / 28 38 / 47 57	AVERAGE PERCENT DEFECT 20 SAWTIMBER		700
	H	2 4 6 8 10 12 / 14 16 18 20	4 7 10 14 18 21 24 / 28 32 35 38 42 46	5 10 14 19 24 29 34 / 38 43 48 53 58 62	6 12 17 23 29 35 / 41 46 52 58 64 70	7 14 21 28 / 35 42 49 56	8 16 25 33 / 41 50 58 66	9 19 / 28 38			1200
		2 4 6 8 10 / 12 14 16 18	4 7 10 14 18 21 24 / 28 32 35 38 42 46	5 10 14 19 24 29 34 / 38 43 48 53 58 62	6 12 17 23 29 35 / 41 46 52 58 64 70	7 14 21 28 / 35 42 49 56	8 16 25 33 / 41 50 58 66	9 19 / 28 38			
		2 4 6 8 10	4 7 10 14 18 21 24	5 10 14 19 24 29 34	6 12 17 23 29 35	7 14 21 28	8 16 25 33	9 19	4	4 1/2 5	
16	SM	3 5 8 11 14 / 16 19 22 24	5 9 14 19 23 28 / 33 37 42 46 51 56	6 13 19 26 32 39 / 45 52 58 64 71 77	8 15 24 32 40 47 / 55 63 71 79 87 95	10 19 29 38 / 48 57 67 76	11 22 34 45 / 56 67 78 90	13 25 / 38 50	14 28 / 42 56		1800
		3 5 8 11 14 / 16 19 22 24	5 9 14 19 23 28 / 33 37 42 46 51 56	6 13 19 26 32 39 / 45 52 58 64 71 77	8 15 24 32 40 47 / 55 63 71 79 87 95	10 19 29 38 / 48 57 67 76	11 22 34 45 / 56 67 78 90	13 25 / 38 50	14 28 / 42 56		
		3 5 8 11 14	5 9 14 19 23 28	6 13 19 26 32 39	8 15 24 32 40 47	10 19 29 38	11 22 34 45	13 25	14 28		
		3 5 8 11 14	5 9 14 19 23 28	6 13 19 26 32 39	8 15 24 32 40 47	10 19 29 38	11 22 34 45	13 25	14 28		
18		4 7 11 14 / 18 22 25	6 12 18 24 30 37 / 43 49 55 61 69	8 17 25 34 42 50 / 59 67 76 84 92	10 21 31 41 52 62 / 72 83 93 104 114	12 25 37 50 / 62 74 87 99	15 29 44 58 / 73 88 102	16 32 / 48 65	18 36 / 53 71		
		4 7 11 14	6 12 18 24 30 37	8 17 25 34 42 50	10 21 31 41 52 62	12 25 37 50	15 29 44 58	16 32	18 36		
		4 7 11 14	6 12 18 24 30 37	8 17 25 34 42 50	10 21 31 41 52 62	12 25 37 50	15 29 44 58	16 32	18 36		
		4 7 11 14	6 12 18 24 30 37	8 17 25 34 42 50	10 21 31 41 52 62	12 25 37 50	15 29 44 58	16 32	18 36		
20		4 9 14 18 / 22 27 32	8 16 23 31 39 47 / 55 62 70 78 86	11 21 32 42 53 64 / 74 85 95 106 117	13 26 39 52 66 79 / 92 105 118 131 144	16 32 48 63 79 / 95 111 127 143	18 37 55 73 / 92 110 128	20 41 / 61 81	23 45 / 68 90	25 50 / 75 100	27
		4 9 14 18	8 16 23 31 39 47	11 21 32 42 53 64	13 26 39 52 66 79	16 32 48 63 79	18 37 55 73	20 41	23 45	25 50	27
		4 9 14 18	8 16 23 31 39 47	11 21 32 42 53 64	13 26 39 52 66 79	16 32 42 63 79	18 37 55 73	20 41	23 45	25 50	27
		4 9 14 18	8 16 23 31 39	11 21 32 42 53 64	13 26 39 52 66 79	16 32 42 63 79	18 37 55 73	20 41	23 45	25 50	27
22		6 11 17 22	10 19 29 39 48	13 26 39 52 66	16 33 49 66 82 98	20 39 59 78	23 45 68 90	25 50	28 56	31 62	33
		6 11 17 22	10 19 29 39 48	13 26 39 52 66	16 33 49 66 82 98	20 39 59 78	23 45 68 90	25 50	28 56	31 62	33
24		6 11 17 22	10 19 29 39 48	13 26 39 52 66	16 33 49 66 82 98	20 39 59 78	23 45 68 90	25 50	28 56	31 62	33
		7 14 21	12 24 35 47 59	16 32 48 64 80	20 40 60 80 100	24 47 71 94	27 55 82 110	31 61	34 69	38 75	41
		7 14 21	12 24 35 47 59	16 32 48 64 80	20 40 60 80 100	24 47 71 94	27 55 82 110	31 61	34 69	38 75	41
26		7 14 21	12 24 35 47 59	16 32 48 64 80	20 40 60 80 100	24 47 71 94	27 55 82 110	31 61	34 69	38 75	41
		8 16 25	14 28 42 56 70	19 38 57 76 95	24 48 72 96 120 143	28 57 85 113	33 65 98 131	36 73	41 82	45 90	49
28		8 16 25	14 28 42 56 70	19 38 57 76 95	24 48 72 96 120 143	28 57 85 113	33 65 98 131	36 73	41 82	45 90	49
		10 20 29	17 33 50 66	22 45 67 90 112	28 55 84 112 140 168	33 66 100 133	38 76 115 153	43 86	48 96	53	57
30		10 20 29	17 33 50 66	22 45 67 90 112	28 55 84 112 140 168	33 66 100 133	38 76 115 153	43 86	48 96	53	57
		11 23 34	19 38 57 77	26 52 78 104	32 65 97 130 162	39 77 116 154	44 89 133 177	50 100	56 111	61	67
32		11 23 34	19 38 57 77	26 52 78 104	32 65 97 130 162	39 77 116 154	44 89 133 177	50 100	56 111	61	67
		13 26 39	22 44 66 88	30 60 90 120	37 75 112 149 186	44 89 133 178	51 102 153 204	57 114	64 128	71	78
34		13 26 39	22 44 66 88	30 60 90 120	37 75 112 149 186	44 89 133 178	51 102 153 204	57 114	64 128	71	78
36		15 29	25 50 75 100	34 68 102 136	42 85 127 169 212 254	50 101 151 202	58 116 174 232	65 129	73 146	81	89
38		16 33	28 56 85 113	38 77 115 153	48 96 143 191 239	57 114 170 227	65 131 196 261	73 146	82 164	92	101
40		18 36	32 63 95 127	43 86 128 171	53 107 160 214 267	63 127 190 254	73 146 219 293	82 164	92 184	103	115
42		20 40	35 70 105	48 95 143 190	59 118 177 237 296	70 141 211 281	82 163 245 326	91 182	103 205	116	129
		22 44	39 78 117 155	53 106 158 211	65 130 196 261 326	78 155 232 310	90 180 270 360	101 202	113 225	129	145

FORM 6827

Tot. b.f. 4,600

CEDAR TALLY

D.B.H.	7' Posts	8' Ties	Poles							Shingle Bolts
			20'	25'	30'	35'	40'	45'	50'	
6										
8										
10										
12										
14										
16										
18										
20										
22										
24										

SAMPLE TREE DATA

Tree No.	Dist. and bearing to tree	Spec.	DBH	Height		Tree Class	Age	Radial Gr.		Defect %
				Total	Merch			10 Yr.	20 Yr.	
		H	14	52	32	2B	160	1.0	2.0	5
		BW	5.8	41	26	2B	35	.6	1.6	0

Site Classification II Operability Good

*Supplementary Cruise Data

Type acreage _____ Cruise % _____ % Accuracy _____

Stand Description _____

_____

_____

Logging change. Easy ____ Medium ____ Difficult ____ Winter ____ Summer ____ Yearlong ____

Accessability: Miles of road to construct _____ Total road cost _____

Topography: Level ____ Rolling ____ Hilly ____ Rugged ____ Rocky ____

Recommended Silviculture: Marking _____ Species and % cut _____

_____

Designating: Species and Method _____

_____

Hutson-Vandenburg needs:

Planting: Acres _____ Species and Age Class _____ No. _____ Cost _____

T.S.I.: Acres _____ Kind _____ Cost _____

*To be filled in only when tally sheet is used in cruising for timber sale.

DEU - 4 - 37

UNIVERSITY OF MICHIGAN

SCHOOL OF FORESTRY AND CONSERVATION

FORM 99 R-9
REV. 6-17-47

DESIGNED BY LAKE STATES FOREST EXPERIMENT STATION USING COMPOSITE VOLUME TABLES FOR LAKE STATES TIMBER SPECIES

CUMULATIVE 1/5 ACRE TALLY SHEET

ESTIMATOR Ott

DATE

COURSE 340h PLOT IR - 1234 SEC. T. R.

MAP TYPE Md 11

PLOT TYPE Md 11

BH	
2"	•
4"	

VOLUME IN TENTHS OF CORDS PER ACRE

VOLUME IN HUNDREDS OF BOARD FEET (SCRIBNER) PER ACRE

NUMBER OF 8-FOOT BOLTS (4" OR LARGER) PER TREE

DBH	SPEC. & LEGEND	NON-MERCH.	1	2	3	4
6	SM		1 2 3 4 5 6 6 7 8 9 / 10 11 12 13 14 15 16 / 17 18 18 19 20 21 / 22 23 24 25 26 27	✗ 3 4 6 7 9 10 12 13 15 16 / 18 19 21 22 24 25 27 28 / 30 31 33 34 36 37 39 40 / 42 43 45 46 48 49 51 52	✗ 4 6 9 11 13 15 17 19 22 / 24 26 28 30 32 35 37 39 41 / 43 45 48 50 52 54 56 58 60 / 63 65 67 69 71 73 76 78 80	✗ 6 9 12 14 17 / 20 23 26 29 32 / 35 37 40 43 46 49 / 52 55 58 60 63 66
	BF		1 2 3 4 5 6 6 7 8 / 9 10 11 12 13 14 / 15 16 17 18 18 19	1 3 4 6 7 9 10 12 13 15 / 16 18 19 21 22 24 25 27 / 28 30 31 33 34 36 37 39	✗ 4 6 9 11 13 15 17 19 22 / 24 26 28 30 32 35 37 39 41 / 43 45 48 50 52 54 56 58 60	3 6 9 12 14 17 20 / 23 26 29 32 35 37 40 / 43 46 49 52 55 58 60
			1 2 3 4 5 6 6 7 / 8 9 10 11 12 13	1 3 4 6 7 9 10 12 13 15 / 16 18 19 21 22 24 25 27	2 4 6 9 11 13 15 17 19 / 22 24 26 28 30 32 35 37	3 6 9 12 14 17 20 23 / 26 29 32 35 37 40 43 46
8	SM		1 2 3 4 5 6 6 / 7 8 9 10 11 12 13	1 3 4 6 7 9 10 12 13 15 / 16 18 19 21 22 24 25 27	2 4 6 9 11 13 15 17 19 / 22 24 26 28 30 32 35 37	3 6 9 12 14 17 20 23 26 / 29 32 35 37 40 43 46 49
			2 3 5 6 8 10 11 / 13 14 16 18 / 19 21 22 24 / 26 27 29 30	2 5 7 10 12 15 17 20 22 / 25 27 30 32 35 37 40 / 42 45 47 50 52 55 57 / 60 62 64 67 69 72 74	✗ 7 10 14 17 21 24 28 / 31 35 38 42 45 49 52 56 / 60 63 66 70 73 77 80 84 / 87 91 94 98 101 105 108	✗ 9 14 18 23 28 32 37 41 / 46 51 55 60 65 69 74 78 / 83 88 92 97 101 106 111 / 115 120 124 129 134 138
			2 3 5 6 8 10 / 11 13 14 16 / 18 19 21 22	2 5 7 10 12 15 17 20 / 22 25 27 30 32 35 37 / 40 42 45 47 50 52 55	3 7 10 14 17 21 24 28 / 31 35 38 42 45 49 52 56 / 60 63 66 70 73 77 80 84	5 9 14 18 23 28 32 37 41 / 46 51 55 60 65 69 74 78 / 83 88 92 97 101 106 111
			2 3 5 6 8 / 10 11 13 / 15 16 18 19	2 5 7 10 12 15 17 20 / 22 25 27 30 32 35 37	3 7 10 14 17 21 24 28 / 31 35 38 42 45 49 52 56	5 9 14 18 23 28 32 37 / 41 46 51 55 60 65 69 74
			2 3 5 6 8 / 10 11 13 / 15 16 18 19	2 5 7 10 12 15 17 20 / 22 25 27 30 32 35 37	3 7 10 14 17 21 24 28 / 31 35 38 42 45 49 52 56	5 9 14 18 23 28 32 37 / 41 46 51 55 60 65 69 74
10	SM	•	2 5 7 10 / 12 15 17 / 20 22 25	4 7 11 15 18 22 26 / 29 33 37 40 44 48 / 51 55 59 62 66 70	5 10 15 20 25 30 35 41 / 46 51 56 61 66 71 76 / 81 86 91 96 101 106	✗ ✗ 20 26 33 40 46 53 / 59 66 73 79 86 92 99 106 / 112 119 126 132 139 145
			2 5 7 / 10 12 15 / 18 19 21	4 7 11 15 18 22 26 / 29 33 37 40 44 48 / 51 55 59 62 66 70	5 10 15 20 25 30 35 / 41 46 51 56 61 66 71	7 13 20 26 33 40 46 53 / 59 66 73 79 86 92 99 106
			2 5 7 / 10 12 / 14 15 16 17	4 7 11 15 18 22 26 / 29 33 37 40 44 48 / 51 55 59 62 66 70	5 10 15 20 25 30 35 / 41 46 51 56 61 66 71	7 13 20 26 33 40 46 53 / 59 66 73 79 86 92 99 106
			2 5 7 / 10 12 / 14 15 16 17	4 7 11 15 18 22 26 / 29 33 37 40 44 48 / 51 55 59 62 66 70	5 10 15 20 25 30 35 / 41 46 51 56 61 66 71	7 13 20 26 33 40 46 53 / 59 66 73 79 86 92 99 106
			2 5 7	4 7 11 15 18 22	5 10 15 20 25 30 35	7 13 20 26 33 40 46 53

NUMBER OF 16-FOOT LOGS (8" OR LARGER) PER TREE

		1/2	1	1 1/2	2	2 1/2	3	3 1/2	4	4 1/2	5
10	H	✗ ✗ ✗ 3 4 5 / 6 6 7 8 8 9 10 / 11 11 12 13 13 / 14 15 15 16 17	2 3 4 6 7 9 10 12 13 / 15 16 18 19 21 22 24 / 25 27 28 30 31 33 34 / 36 37 39 40 42 43 45	2 4 6 8 10 12 14 16 / 18 20 22 24 26 28 30 / 32 34 36 38 40 42 44 / 46 48 50 52 54 56 58							
		1 1 2 3 3 4 5 / 6 6 7 8 8 9 10 / 11 11 12 13 13	2 3 4 6 7 9 10 12 13 / 15 16 18 19 21 22 24 / 25 27 28 30 31 33 34 / 36 37 39 40 42 43 45	2 4 6 8 10 12 14 16 / 18 20 22 24 26 28 30 / 32 34 36 38 40 42 44							
		1 2 3 3 4 5 / 6 6 7 8 8 9	2 3 4 6 7 9 10 12 / 13 15 16 18 19 21 22	2 4 6 8 10 12 14 16 / 18 20 22 24 26 28 30							
12	YB	✗ 3 4 6 7 8 / 10 11 13 14 / 15 17 18 20 / 21 22 24 25	✗ 5 7 10 12 14 17 19 / 22 24 29 29 31 34 36 / 38 41 43 46 48 50 53 / 55 58 60 62 65 67 70	4 8 12 16 20 23 / 26 30 33 36 40 43 46 / 50 53 56 59 63 66 69 / 73 76 79 82 86 89 92	5 10 15 19 / 24 29 34 39 / 44 48 53 58 / 63 68 73 78	5 10 15 19 / 24 29 34 39 / 44 48 53 58 / 63 68 73 78					
	H	1 3 4 6 7 8 / 10 11 13 14 / 15 17 18 20	✗ 5 7 10 12 14 17 19 / 22 24 29 29 31 34 / 36 38 41 43 46 48	3 7 10 13 16 20 23 / 26 30 33 36 40 43 / 46 50 53 56 59 63	4 8 12 16 20 23 / 27 31 35 39 43 47 / 51 55 58 62 66 70	5 10 15 19 / 24 29 34 39 / 44 48 53 58					
	SM	1 3 4 6 7 8 / 10 11 13 14 / 15 17 18 20	2 5 7 10 12 14 17 19 / 22 24 29 29 31 34 / 36 38 41 43 46 48	3 7 10 13 16 20 23 / 26 30 33 36 40 43 / 46 50 53 56 59 63	✗ 8 12 16 20 23 / 27 31 35 39 43 47 / 51 55 58 62 66 70	5 10 15 19 / 24 29 34 39 / 44 48 53 58					
		1 3 4 6 7 8 / 10 11 13 14 / 15 17 18 20	2 5 7 10 12 14 17 19 / 22 24 29 29 31 34 / 36 38 41 43 46 48	3 7 10 13 16 20 23 / 26 30 33 36 40 43 / 46 50 53 56 59 63	4 8 12 16 20 23 / 27 31 35 39 43 47 / 51 55 58 62 66 70	5 10 15 19 24 / 29 34 39 44 / 48 53 58					
14	SM	2 4 6 8 10 12 / 14 16 18 20 / 22 24 26 28	4 7 10 14 18 21 24 / 28 32 35 38 42 46 / 49 52 56 60 63 66	✗ 10 14 19 24 29 34 / 38 43 48 53 58 62 / 67 72 77 82 86 91	✗ ✗ 25 29 35 / 41 46 52 58 64 70 / 75 81 87 93 99	7 14 21 28 / 35 42 49 56 / 63 70 78 85	8 16 25 33 / 41 50 58 / 66 74 82	9 19 / 28 38 / 47 57			
	YB	✗ 4 6 8 10 12 / 14 16 18 20	4 7 10 14 18 21 24 / 28 32 35 38 42 46	5 10 14 19 24 29 34 / 38 43 48 53 58 62	6 12 17 23 29 35 / 41 46 52 58 64 70	7 14 21 28 / 35 42 49 56	8 16 25 33 / 41 50 58 66	9 19 / 28 38			
	SM	2 4 6 8 10 / 12 14 16 18	✗ 7 10 14 18 21 24 / 28 32 35 38 42 46	5 10 14 19 24 29 34 / 38 43 48 53 58 62	6 12 17 23 29 35 / 41 46 52 58 64 70	7 14 21 28 / 35 42 49 56	8 16 25 33 / 41 50 58 66	9 19 / 28 38			
		2 4 6 8 10	4 7 10 14 18 21 24	5 10 14 19 24 29 34	6 12 17 23 29 35	7 14 21 28	8 16 25 33	9 19	4	4 1/2	5
16	SM	3 5 8 11 14 / 16 19 22 24	5 9 14 19 23 28 / 33 37 42 46 51 56	✗ 13 19 26 32 39 / 45 52 58 64 71 77	8 15 24 32 40 47 / 55 63 71 79 87 95	10 19 29 38 / 48 57 67 76	11 22 34 45 / 56 67 78 90	13 25 / 38 50	14 28 / 42 56		
	YB	3 5 8 11 14 / 16 19 22 24	5 9 14 19 23 28 / 33 37 42 46 51 56	✗ 13 19 26 32 39 / 45 52 58 64 71 77	8 15 24 32 40 47 / 55 63 71 79 87 95	10 19 29 38 / 48 57 67 76	11 22 34 45 / 56 67 78 90	13 25 / 38 50	14 28 / 42 56		
		3 5 8 11 14	5 9 14 19 23 28	6 13 19 26 32 39	8 15 24 32 40 47	10 19 29 38	11 22 34 45	13 25	14 28		
		3 5 8 11 14	5 9 14 19 23 28	6 13 19 26 32 39	8 15 24 32 40 47	10 19 29 38	11 22 34 45	13 25	14 28		
18		4 7 11 14 / 18 22 25	6 12 18 24 30 37 / 43 49 55 61 69	8 17 25 34 42 50 / 59 67 76 84 92	10 21 31 41 52 62 / 72 83 93 104 114	12 25 37 50 / 62 74 87 99	15 29 44 58 / 73 88 102	16 32 / 48 65	18 36 / 53 71		
		4 7 11 14	6 12 18 24 30 37	8 17 25 34 42 50	10 21 31 41 52 62	12 25 37 50	15 29 44 58	16 32	18 36		
		4 7 11 14	6 12 18 24 30 37	8 17 25 34 42 50	10 21 31 41 52 62	12 25 37 50	15 29 44 58	16 32	18 36		
20		4 9 14 18 / 22 27 32	8 16 23 31 39 47 / 55 62 70 78 86	11 21 32 42 53 64 / 74 85 95 106 117	13 26 39 52 66 79 / 92 105 118 131 144	16 32 48 63 79 / 95 111 127 143	18 37 55 73 / 92 110 128	20 41 / 61 81	23 45 / 68 90	25 50 / 75 100	27
		4 9 14 18	8 16 23 31 39 47	11 21 32 42 53 64	13 26 39 52 66 79	16 32 48 63 79	18 37 55 73	20 41	23 45	25 50	27
		4 9 14 18	8 16 23 31 39 47	11 21 32 42 53 64	13 26 39 52 66 79	16 32 42 63 79	18 37 55 73	20 41	23 45	25 50	27
		4 9 14 18	8 16 23 31 39	11 21 32 42 53 64	13 26 39 52 66 79	16 32 42 63 79	18 37 55 73	20 41	23 45	25 50	27
22		6 11 17 22	10 19 29 39 48	13 26 39 52 66	16 33 49 66 82 98	20 39 59 78	23 45 68 90	25 50	28 56	31 62	33
		6 11 17 22	10 19 29 39 48	13 26 39 52 66	16 33 49 66 82 98	20 39 59 78	23 45 68 90	25 50	28 56	31 62	33
		6 11 17 22	10 19 29 39 48	13 26 39 52 66	16 33 49 66 82 98	20 39 59 78	23 45 68 90	25 50	28 56	31 62	33
24		7 14 21	12 24 35 47 59	16 32 48 64 80	20 40 60 80 100	24 47 71 94	27 55 82 110	31 61	34 69	38 75	41
		7 14 21	12 24 35 47 59	16 32 48 64 80	20 40 60 80 100	24 47 71 94	27 55 82 110	31 61	34 69	38 75	41
		7 14 21	12 24 35 47 59	16 32 48 64 80	20 40 60 80 100	24 47 71 94	24 55 82 110	31 61	34 69	38 75	41
26		8 16 25	14 28 42 56 70	19 38 57 76 95	24 48 72 96 120 143	28 57 85 113	33 65 98 131	36 73	41 82	45 90	49
28		8 16 25	14 28 42 56 70	19 38 57 76 95	24 48 72 96 120 143	28 57 85 113	33 65 98 131	36 73	41 82	45 90	49
		10 20 29	17 33 50 66	22 45 67 90 112	28 55 84 112 140 168	33 66 100 133	38 76 115 153	43 86	48 96	53	57
30		10 20 29	17 33 50 66	22 45 67 90 112	28 55 84 112 140 168	33 66 100 133	38 76 115 153	43 86	48 96	53	57
		11 23 34	19 38 57 77	26 52 78 104	32 65 97 130 162	39 77 116 154	44 89 133 177	50 100	56 111	61	67
32		11 23 34	19 38 57 77	26 52 78 104	32 65 97 130 162	39 77 116 154	44 89 133 177	50 100	56 111	61	67
		13 26 39	22 44 66 88	30 60 90 120	37 75 112 149 186	44 89 133 178	51 102 153 204	57 114	64 128	71	78
34		13 26 39	22 44 66 88	30 60 90 120	37 75 112 149 186	44 89 133 178	51 102 153 204	57 114	64 128	71	78
36		15 29	25 50 75 100	34 68 102 136	42 85 127 169 212 254	50 101 151 202	58 116 174 232	65 129	73 146	81	89
38		16 33	28 56 85 113	38 77 115 153	48 96 143 191 239	57 114 170 227	65 131 196 261	73 146	82 164	92	101
40		18 36	32 63 95 127	43 86 128 171	53 107 160 214 267	63 127 190 254	73 146 219 293	82 164	92 184	103	115
42		20 40	35 70 105	48 95 143 190	59 118 177 237 296	70 141 211 281	82 163 245 326	91 182	103 205	116	129
		22 44	39 78 117 155	53 106 158 211	65 130 196 261 326	78 155 232 310	90 180 270 360	101 202	113 225	129	145

MORTALITY / ACRE

NO. TREES 2"	NO. TREES 4"	VOL. BY SPECIES SPEC.	VOL. BY SPECIES CDS.	VOL. BY SPECIES BD. FT.

AVERAGE PERCENT DEFECT 5 POLES

AVERAGE PERCENT DEFECT 30 SAWTIMBER

RECOMMENDED CUT (NET) / ACRE

TYPE OF CUT	PERIOD	SPEC.	CORD	M BD. FT.
IMPROVEMENT	20 Yr.			
SALVAGE				
ROTATION				
TOTAL				

TOTAL NET VOLUME

SPECIES	CORDS	M. BD. FT.

TOTALS PER ACRE

	.6
	.2
	.8
	1.3
TOT. CORDS	2.9
	300
	600
	200
	400
	2800
	200
	400
	600
	600

CEDAR TALLY

D.B.H.	7' Posts	8' Ties	Poles 20'	25'	30'	35'	40'	45'	50'	Shingle Bolts
6										
8										
10										
12										
14										
16										
18										
20										
22										
24										

SAMPLE TREE DATA

Tree No.	Dist. and bearing to tree	Spec.	DBH	Height		Tree Class	Age	Radial Gr.		Defect %
				Total	Merch			10 Yr.	20 Yr.	
		H	10.1	36	10	B	102	.6	.8	5
		SM	6.7	38	22	5C	58	.6	1.1	5
		YB	16.2	65	29	1A	-	.8	1.6	15
		H	3.9	16	-	6C	56	.2	.5	0

ite Classification I Operability Good

*Supplementary Cruise Data

ype acreage _____ Cruise % _____ % Accuracy _____

tand Description _____

_____

_____

gging change. Easy ____ Medium ____ Difficult ____ Winter ____ Summer ____ Yearlong ____

ccessability: Miles of road to construct _____ Total road cost _____

pography: Level ____ Rolling ____ Hilly ____ Rugged ____ Rocky ____

commended Silviculture: Marking _____ Species and % cut _____

_____

signating: Species and Method _____

_____

utson-Vandenburg needs:

anting: Acres _____ Species and Age Class _____ No. _____ Cost _____

S.I.: Acres _____ Kind _____ Cost _____

o be filled in only when tally sheet is used in cruising for timber sale.

UNIVERSITY OF MICHIGAN

SCHOOL OF FORESTRY AND CONSERVATION

FORM 99 R-9
REV. 6-17-47

DESIGNED BY LAKE STATES FOREST EXPERIMENT STATION USING COMPOSITE VOLUME TABLES FOR LAKE STATES TIMBER SPECIES

CUMULATIVE 1/5 ACRE TALLY SHEET

ESTIMATOR Ott DATE 9/1/48

COURSE 91 Ch PLOT IR - 383 SEC. ____ T. ____ R. ____

MAP TYPE Md'''

PLOT TYPE Md'''

DBH	SM	YB
2"	✗	
4"	••	•

VOLUME IN TENTHS OF CORDS PER ACRE

VOLUME IN HUNDREDS OF BOARD FEET (SCRIBNER) PER ACRE

SPEC. & LEGEND	NON-MERCH.	NUMBER OF 8-FOOT BOLTS (4" OR LARGER) PER TREE				MORTALITY / ACRE				TOTALS PER ACRE
		1	2	3	4	NO. TREES 2"	NO. TREES 4"	VOL. BY SPECIES SPEC.	VOL. BY SPECIES CDS.	VOL. BY SPECIES BD. FT.
YB		1 2 3 4 5 6 6 7 8 9 / 10 11 12 13 14 15 16 / 17 18 18 19 20 21 / 22 23 24 25 26 27	1 3 4 6 7 9 10 12 13 15 16 / 18 19 21 22 24 25 27 28 / 30 31 33 34 36 37 39 40 / 42 43 45 46 48 49 51 52	2 4 6 9 11 13 15 17 19 22 / 24 26 28 30 32 35 37 39 41 / 43 45 48 50 52 54 56 58 60 / 63 65 67 69 71 73 76 78 80	3 6 9 12 14 17 / 20 23 26 29 32 / 35 37 40 43 46 49 / 52 55 58 60 63 66					.1
IW		1 2 3 4 5 6 6 7 8 / 9 10 11 12 13 14 / 15 16 17 18 18 19	3 4 6 7 9 10 12 13 15 / 16 18 19 21 22 24 25 27 / 28 30 31 33 34 36 37 39	2 4 6 9 11 13 15 17 19 22 / 24 26 28 30 32 35 37 39 41 / 43 45 48 50 52 54 56 58 60	3 6 9 12 14 17 20 / 23 26 29 32 35 37 40 / 43 46 49 52 55 58 60					.1
BF		2 3 4 5 6 6 7 / 8 9 10 11 12 13	1 3 4 6 7 9 10 12 13 15 / 16 18 19 21 22 24 25 27	2 4 6 9 11 13 15 17 19 / 22 24 26 28 30 32 35 37	3 6 9 12 14 17 20 23 / 26 29 32 35 37 40 43 46					.1
Elm		2 3 4 5 6 6 / 7 8 9 10 11 12 13	1 3 4 6 7 9 10 12 13 15 / 16 18 19 21 22 24 25 27	2 4 6 9 11 13 15 17 19 / 22 24 26 28 30 32 35 37	3 6 9 12 14 17 20 23 26 / 29 32 35 37 40 43 46 49					.1
H		5 6 8 10 11 / 13 14 16 18 / 19 21 22 24 / 26 27 29 30	5 7 10 12 15 17 20 22 / 25 27 30 32 35 37 40 / 42 45 47 50 52 55 57 / 60 62 64 67 69 72 74	3 7 10 14 17 21 24 28 / 31 35 38 42 45 49 52 56 / 60 63 66 70 73 77 80 84 / 87 91 94 98 101 105 108	5 9 14 18 23 28 32 37 41 / 46 51 55 60 65 69 74 78 / 83 88 92 97 101 106 111 / 115 120 124 129 134 138	5: 6 12 17 / 23 29 35 / 41 46 52 58 / 64 70 75 81	6: 7 14 / 21 28 / 34 41 48 / 55 62 69	AVERAGE PERCENT DEFECT 5 POLES		.5
SM		2 3 5 6 8 10 / 11 13 14 16 / 18 19 21 22	2 5 7 10 12 15 17 20 / 22 25 27 30 32 35 37 / 40 42 45 47 50 52 55	2 5 7 10 14 17 21 24 28 / 31 35 38 42 45 49 52 56 / 60 63 66 70 73 77 80 84	5 9 14 18 23 28 32 37 41 / 46 51 55 60 65 69 74 78 / 83 88 92 97 101 106 111	6 12 17 23 / 29 35 41 46 / 52 58 64 70	7 14 21 / 28 34 41 / 48 55 62			.3
		2 3 5 6 8 / 10 11 13 / 22 25 27 30 32 35 37	2 5 7 10 12 15 17 20 / 31 35 38 42 45 49 52 56	3 7 10 14 17 21 24 28 / 41 46 51 55 60 65 69 74	5 9 14 18 23 28 32 37 / 50 58 67 75 83	6 12 17 23 29 / 35 41 46 52 58	7 14 21 28 / 34 41 48 55			
		2 3 5 6 8 / 10 11 13 / 22 25 27 30 32 35 37	2 5 7 10 12 15 17 20 / 31 35 38 42 45 49 52 56	3 7 10 14 17 21 24 28 / 41 46 51 55 60 65 69 74	5 9 14 18 23 28 32 37 / 50 58 67 75 83	6 12 17 23 29 / 35 41 46 52 58	7 14 21 28 / 34 41 48 55			
		2 5 7 10 / 12 15 17 / 20 22 25	4 7 11 15 18 22 26 / 29 33 37 40 44 48 / 51 55 59 62 66 70	5 10 15 20 25 30 35 41 / 46 51 56 61 66 71 76 / 81 86 91 96 101 106	7 13 20 26 33 40 46 53 / 59 66 73 79 86 92 99 106 / 112 119 126 132 139 145	8 17 25 33 42 / 50 58 67 75 83 / 92 100 109 117	10 20 30 40 50 / 60 70 80 90 100 / 110 120 130 140	7: 12 24 36 48 / 60 72 84 96 / 108 120 132		
		2 5 7 / 10 12 15 / 20 22 25	4 7 11 15 18 22 26 / 29 33 37 40 44 48 / 51 55 59 62 66 70	5 10 15 20 25 30 35 / 41 46 51 56 61 66 71	7 13 20 26 33 40 46 53 / 59 66 73 79 86 92 99 106 / 112 119 126 132 139 145	8 17 25 33 42 / 50 58 67 75 83 / 92 100 109 117	10 20 30 40 50 / 60 70 80 90 100 / 110 120 130 140	12 24 36 48 / 60 72 84 96 / 108 120 132		
		2 5 7 / 10 12 / 20 22 25	4 7 11 15 18 22 26 / 29 33 37 40 44 48 / 51 55 59 62 66 70	5 10 15 20 25 30 35 / 41 46 51 56 61 66 71 / 81 86 91 96 101 106

CEDAR TALLY

D.B.H.	7' Posts	8' Ties	Poles 20'	25'	30'	35'	40'	45'	50'	Shingle Bolts
6										
8										
10										
12										
14										
16										
18										
20										
22										
24										

SAMPLE TREE DATA

Tree No.	Dist. and bearing to tree	Spec.	DBH	Height		Tree Class	Age	Radial Gr.		Defect %
				Total	Merch			10 Yr.	20 Yr.	
		Elm	12.2	68	17	2A	51	1.0	1.9	10
		SM	4.8	38	8	5B	31	.7	1.7	5
		H	20.4	64	45	B	-	.3	.7	45
		BF	5.5	45	10	5B	42	.7	1.7	0

ite Classification I Operability Good

*Supplementary Cruise Data

ype acreage _____ Cruise % _____ % Accuracy _____

tand Description _____

_____

_____

ogging change. Easy ____ Medium ____ Difficult ____ Winter ____ Summer ____ Yearlong ____

ccessability: Miles of road to construct _____ Total road cost _____

opography: Level ____ Rolling ____ Hilly ____ Rugged ____ Rocky ____

commended Silviculture: Marking _____ Species and % cut _____

_____

signating: Species and Method _____

_____

utson-Vandenburg needs:

anting: Acres _____ Species and Age Class _____ No. _____ Cost _____

S.I.: Acres _____ Kind _____ Cost _____

o be filled in only when tally sheet is used in cruising for timber sale.

DEU - 3 - 20
UNIVERSITY OF MICHIGAN
SCHOOL OF FORESTRY AND CONSERVATION

FORM 99 R-9
REV. 6-17-47

DESIGNED BY LAKE STATES FOREST EXPERIMENT STATION USING COMPOSITE VOLUME TABLES FOR LAKE STATES TIMBER SPECIES

DBH	SM		RM		
2"	•		•		
4"	•				

CUMULATIVE 1/5 ACRE TALLY SHEET

ESTIMATOR Ott DATE 7/26/48

COURSE 37Ch. PLOT IR - 346 SEC. T. R.

MAP TYPE Mc¹

PLOT TYPE Mc¹

VOLUME IN TENTHS OF CORDS PER ACRE

NUMBER OF 8-FOOT BOLTS (4" OR LARGER) PER TREE

DBH	SPEC. & LEGEND	NON-MERCH.	1	2	3	4	5	6	TOTALS PER ACRE
6	BF		1 2 3 4 5 6 6 7 8 9 / 10 11 12 13 14 15 16 / 17 18 18 19 20 21 / 22 23 24 25 26 27	1 3 4 6 7 9 10 12 13 15 16 / 18 19 21 22 24 25 27 28 / 30 31 33 34 36 37 39 40 / 42 43 45 46 48 49 51 52	2 4 6 9 11 13 15 17 19 22 / 24 26 28 30 32 35 37 39 41 / 43 45 48 50 52 54 56 58 60 / 63 65 67 69 71 73 76 78 80	3 6 9 12 14 17 / 20 23 26 29 32 / 35 37 40 43 46 49 / 52 55 58 60 63 66			.1
	RM		1 2 3 4 5 6 6 7 8 / 9 10 11 12 13 14 / 15 16 17 18 18 19	1 3 4 6 7 9 10 12 13 15 / 16 18 19 21 22 24 25 27 / 28 30 31 33 34 36 37 39	4 6 9 11 13 15 17 19 22 / 24 26 28 30 32 35 37 39 41 / 43 45 48 50 52 54 56 58 60	3 6 9 12 14 17 20 / 23 26 29 32 35 37 40 / 43 46 49 52 55 58 60			.2
	WB		2 3 4 5 6 6 7 / 8 9 10 11 12 13	1 3 4 6 7 9 10 12 13 15 / 16 18 19 21 22 24 25 27	2 4 6 9 11 13 15 17 19 / 22 24 26 28 30 32 35 37	3 6 9 12 14 17 20 23 / 26 29 32 35 37 40 43 46			.1
	SM		2 3 4 5 6 6 / 7 8 9 10 11 12 13	2 3 4 5 6 7 9 10 12 13 15 / 16 18 19 21 22 24 25 27	2 4 6 9 11 13 15 17 19 / 22 24 26 28 30 32 35 37	3 6 9 12 14 17 20 23 26 / 29 32 35 37 40 43 46 49			.9
8	RM		2 3 5 6 8 10 11 / 13 14 16 18 / 19 21 22 24 / 26 27 29 30	2 5 7 10 12 15 17 20 22 / 25 27 30 32 35 37 40 / 42 45 47 50 52 55 57 / 60 62 64 67 69 72 74	3 7 10 14 17 21 24 28 / 31 35 38 42 45 49 52 56 / 60 63 66 70 73 77 80 84 / 87 91 94 98 101 105 108	8 14 18 23 28 32 37 41 / 46 51 55 60 65 69 74 78 / 83 88 92 97 101 106 111 / 115 120 124 129 134 138	6 12 17 / 23 29 35 / 41 46 52 58 / 64 70 75 81	7 14 / 21 28 / 34 41 48 / 55 62 69	1.2
			2 3 5 6 8 10 / 11 13 14 16 / 18 19 21 22	2 5 7 10 12 15 17 20 / 22 25 27 30 32 35 37 / 40 42 45 47 50 52 55	3 7 10 14 17 21 24 28 / 31 35 38 42 45 49 52 56 / 60 63 66 70 73 77 80 84 / 87 91 94 98 101 106 111	6 12 17 23 / 7 14 21 / 28 34 41 / 48 55 62 / 52 58 64 70			
	SM		2 3 5 6 8 / 10 11 13	2 5 7 10 12 15 17 20 / 22 25 27 30 32 35 37	3 7 10 14 17 21 24 28 / 31 35 38 42 45 49 52 56	8 14 18 23 28 32 37 / 41 46 51 55 60 65 69 74	6 12 17 23 29 / 35 41 46 52 58	7 14 21 28 / 34 41 48 55	
			2 3 5 6 8 / 10 11 13	2 5 7 10 12 15 17 20 / 22 25 27 30 32 35 37	3 7 10 14 17 21 24 28 / 31 35 38 42 45 49 52 56	6 12 17 23 29 / 41 46 51 55 60 65 69 74	7 14 21 28 / 35 41 46 52 58	34 41 48 55	
10	RM		2 5 7 10 / 12 15 17 / 20 22 25	4 7 11 15 18 22 26 / 29 33 37 40 44 48 / 51 55 59 62 66 70	8 10 15 20 25 30 35 41 / 46 51 56 61 66 71 76 / 81 86 91 96 101 106	7 13 20 26 33 40 46 53 / 59 66 73 79 86 92 99 106 / 112 119 126 132 139 145	8 17 25 33 42 / 50 58 67 75 83 / 92 100 109 117	10 20 30 40 50 / 60 70 80 90 100 / 110 120 130 140	12 24 36 48 / 60 72 84 96 / 108 120 132	1.2
	YB		2 5 7 / 10 12 15	4 7 11 15 18 22 26 / 29 33 37 40 44 48	8 10 15 20 25 30 35 / 41 46 51 56 61 66 71	7 13 20 26 33 40 46 53 / 59 66 73 79 86 92 99 106	8 17 25 33 42 / 50 58 67 75 83	10 20 30 40 50 / 60 70 80 90 100	12 24 36 48 / 60 72 84 96	.5
			2 5 7 / 10 12	4 7 11 15 18 22 26 / 29 33 37 40 44 48	5 10 15 20 25 30 35 / 41 46 51 56 61 66 71	7 13 20 26 33 40 46 53 / 59 66 73 79 86 92 99 106	8 17 25 33 42 50 / 58 67 75 83 92 100	10 20 30 40 50 60 / 70 80 90 100 110	12 24 36 48 / 60 72 84 96
			2 5 7	4 7 11 15 18 22	5 10 15 20 25 30 35	7 13 20 26 33 40 46 53	8 17 25 33 42 50	10 20 30 40 50 60	12 24 36 48

AVERAGE PERCENT DEFECT 10 POLES

NUMBER OF 16-FOOT LOGS (8" OR LARGER) PER TREE

		1/2	1	1 1/2	2	2 1/2	3	3 1/2	4	4 1/2	5	TOTALS PER ACRE
10		1 1 2 3 3 4 5 / 6 6 7 8 8 9 10 / 11 11 12 13 13 / 14 15 15 16 17	2 3 4 6 7 9 10 12 13 / 15 16 18 19 21 22 24 / 25 27 28 30 31 33 34 / 36 37 39 40 42 43 45	2 4 6 8 10 12 14 16 / 18 20 22 24 26 28 30 / 32 34 36 38 40 42 44 / 46 48 50 52 54 56 58									TOT. CORDS 5.4
		1 1 2 3 3 4 5 / 6 6 7 8 8 9 10 / 11 11 12 13 13 / 14 15 15 16 17	2 3 4 6 7 9 10 12 13 / 15 16 18 19 21 22 24 / 25 27 28 30 31 33 34 / 36 37 39 40 42 43 45	2 4 6 8 10 12 14 16 / 18 20 22 24 26 28 30 / 32 34 36 38 40 42 44 / 46 48 50 52 54 56 58								
		1 1 2 3 3 4 5 / 6 6 7 8 8 9	2 3 4 6 7 9 10 12 / 13 15 16 18 19 21 22	2 4 6 8 10 12 14 16 / 18 20 22 24 26 28 30								
		1 1 2 3 3 4 5	2 3 4 6 7 9 10 12	2 4 6 8 10 12 14 16								
12	RM	1 3 4 6 7 8 / 10 11 13 14 / 15 17 18 20 / 21 22 24 25	2 5 7 10 12 14 17 19 / 22 24 29 29 31 34 36 / 38 41 43 46 48 50 53 / 55 58 60 62 65 67 70	3 7 10 13 16 20 23 / 26 30 33 36 40 43 46 / 50 53 56 59 63 66 69 / 73 76 79 82 86 89 92	4 8 12 16 20 23 / 27 31 35 39 43 47 / 51 55 58 62 66 70 / 74 78 82 86 90 94	5 10 15 19 / 24 29 34 39 / 44 48 53 58 / 63 68 73 78						800
		1 3 4 6 7 8 / 10 11 13 14 / 15 17 18 20	2 5 7 10 12 14 17 19 / 22 24 29 29 31 34 / 36 38 41 43 46 48	3 7 10 13 16 20 23 / 26 30 33 36 40 43 / 46 50 53 56 59 63	4 8 12 16 20 23 / 27 31 35 39 43 47 / 51 55 58 62 66 70	5 10 15 19 / 24 29 34 39 / 44 48 53 58						
		1 3 4 6 7 8 / 10 11 13 14	2 5 7 10 12 14 17 19 / 22 24 29 29 31 34	3 7 10 13 16 20 23 / 26 30 33 36 40 43	4 8 12 16 20 23 / 27 31 35 39 43 47	5 10 15 19 / 24 29 34 39						
		1 3 4 6 7 8	2 5 7 10 12 14 17 19	3 7 10 13 16 20 23	4 8 12 16 20 23	5 10 15 19 24						
14		2 4 6 8 10 12 / 14 16 18 20 / 22 24 26 28	4 7 10 14 18 21 24 / 28 32 35 38 42 46 / 49 52 56 60 63 66	5 10 14 19 24 29 34 / 38 43 48 53 58 62 / 67 72 77 82 86 91	6 12 17 23 29 35 / 41 46 52 58 64 70 / 75 81 87 93 99	7 14 21 28 / 35 42 49 56 / 63 70 78 85	8 16 25 33 / 41 50 58 66 / 74 82 90 98	9 19 / 28 38 / 47 57				
		2 4 6 8 10 12 / 14 16 18 20	4 7 10 14 18 21 24 / 28 32 35 38 42 46	5 10 14 19 24 29 34 / 38 43 48 53 58 62	6 12 17 23 29 35 / 41 46 52 58 64 70	7 14 21 28 / 35 42 49 56	8 16 25 33 / 41 50 58 66	9 19 / 28 38				
		2 4 6 8 10 12 / 14 16 18	4 7 10 14 18 21 24 / 28 32 35 38 42 46	5 10 14 19 24 29 34 / 38 43 48 53 58 62	6 12 17 23 29 35 / 41 46 52 58 64 70	7 14 21 28 / 35 42 49 56	8 16 25 33 / 41 50 58 66	9 19 / 28 38				
		2 4 6 8 10	4 7 10 14 18 21 24	5 10 14 19 24 29 34	6 12 17 23 29 35	7 14 21 28	8 16 25 33	9 19	4	4 1/2	5	
16	RM	8 8 11 14 / 16 19 22 24	5 9 14 19 23 28 / 33 37 42 46 51 56	6 13 19 26 32 39 / 45 52 58 64 71 77	8 15 24 32 40 47 / 55 63 71 79 87 95	10 19 29 38 / 48 57 67 76	11 22 34 45 / 56 67 78 90	13 25 / 38 50	14 28 / 42 56			500
		3 5 8 11 14 / 16 19 22 24	5 9 14 19 23 28 / 33 37 42 46 51 56	6 13 19 26 32 39 / 45 52 58 64 71 77	8 15 24 32 40 47 / 55 63 71 79 87 95	10 19 29 38 / 48 57 67 76	11 22 34 45 / 56 67 78 90	13 25 / 38 50	14 28 / 42 56			
		3 5 8 11 14	5 9 14 19 23 28	6 13 19 26 32 39	8 15 24 32 40 47	10 19 29 38	11 22 34 45	13 25	14 28			
		3 5 8 11 14	5 9 14 19 23 28	6 13 19 26 32 39	8 15 24 32 40 47	10 19 29 38	11 22 34 45	13 25	14 28			
18		4 7 11 14 / 18 22 25	6 12 18 24 30 37 / 43 49 55 61 69	8 17 25 34 42 50 / 59 67 76 84 92	10 21 31 41 52 62 / 72 83 93 104 114	12 25 37 50 / 62 74 87 99	15 29 44 58 / 73 88 102	16 32 / 48 65	18 36 / 53 71			
		4 7 11 14	6 12 18 24 30 37	8 17 25 34 42 50	10 21 31 41 52 62	12 25 37 50	15 29 44 58	16 32	18 36			
		4 7 11 14	6 12 18 24 30 37	8 17 25 34 42 50	10 21 31 41 52 62	12 25 37 50	15 29 44 58	16 32	18 36			
		4 7 11 14	6 12 18 24 30 37	8 17 25 34 42 50	10 21 31 41 52 62	12 25 37 50	15 29 44 58	16 32	18 36			
20	H	4 9 14 18 / 22 27 32	8 16 23 31 39 47 / 55 62 70 78 86	11 21 32 42 53 64 / 74 85 95 106 117	13 26 39 52 66 79 / 92 105 118 131 144	16 32 48 63 79 / 95 111 127 143	18 37 55 73 / 92 110 128	20 41 / 61 81	23 45 / 68 90	25 50 / 75 100	27	800
		4 9 14 18	8 16 23 31 39 47	11 21 32 42 53 64	13 26 39 52 66 79	16 32 48 63 79	18 37 55 73	20 41	23 45	25 50	27	
		4 9 14 18	8 16 23 31 39 47	11 21 32 42 53 64	13 26 39 52 66 79	16 32 48 63 79	18 37 55 73	20 41	23 45	25 50	27	
		4 9 14 18	8 16 23 31 39	11 21 32 42 53 64	13 26 39 52 66 79	16 32 42 63 79	18 37 55 73	20 41	23 45	25 50	27	
22		6 11 17 22	10 19 29 39 48	13 26 39 52 66	16 33 49 66 82 98	20 39 59 78	23 45 68 90	25 50	28 56	31 62	33	
		6 11 17 22	10 19 29 39 48	13 26 39 52 66	16 33 49 66 82 98	20 39 59 78	23 45 68 90	25 50	28 56	31 62	33	
		6 11 17 22	10 19 29 39 48	13 26 39 52 66	16 33 49 66 82 98	20 39 59 78	23 45 68 90	25 50	28 56	31 62	33	
24		7 14 21	12 24 35 47 59	16 32 48 64 80	20 40 60 80 100	24 47 71 94	27 55 82 110	31 61	34 69	38 75	41	
		7 14 21	12 24 35 47 59	16 32 48 64 80	20 40 60 80 100	24 47 71 94	27 55 82 110	31 61	34 69	38 75	41	
		7 14 21	12 24 35 47 59	16 32 48 64 80	20 40 60 80 100	24 47 71 94	24 55 82 110	31 61	34 69	38 75	41	
26		8 16 25	14 28 42 56 70	19 38 57 76 95	24 48 72 96 120 143	28 57 85 113	33 65 98 131	36 73	41 82	45 90	49	
		8 16 25	14 28 42 56 70	19 38 57 76 95	24 48 72 96 120 143	28 57 85 113	33 65 98 131	36 73	41 82	45 90	49	
28		10 20 29	17 33 50 66	22 45 67 90 112	28 55 84 112 140 168	33 66 100 133	38 76 115 153	43 86	48 96	53	57	
30		10 20 29	17 33 50 66	22 45 67 90 112	28 55 84 112 140 168	33 66 100 133	38 76 115 153	43 86	48 96	53	57	
		11 23 34	19 38 57 77	26 52 78 104	32 65 97 130 162	39 77 116 154	44 89 133 177	50 100	56 111	61	67	
32		11 23 34	19 38 57 77	26 52 78 104	32 65 97 130 162	39 77 116 154	44 89 133 177	50 100	56 111	61	67	
		13 26 39	22 44 66 88	30 60 90 120	37 75 112 149 186	44 89 133 178	51 102 153 204	57 114	64 128	71	78	
34		13 26 39	22 44 66 88	30 60 90 120	37 75 112 149 186	44 89 133 178	51 102 153 204	57 114	64 128	71	78	
36		15 29	25 50 75 100	34 68 102 136	42 85 127 169 212 254	50 101 151 202	58 116 174 232	65 129	73 146	81	89	
38		16 33	28 56 85 113	38 77 115 153	48 96 143 191 239	57 114 170 227	65 131 196 261	73 146	82 164	92	101	
40		18 36	32 63 95 127	43 86 128 171	53 107 160 214 267	63 127 190 254	73 146 219 293	82 164	92 184	103	115	
42		20 40	35 70 105	48 95 143 190	59 118 177 237 296	70 141 211 281	82 163 245 326	91 182	103 205	116	129	
		22 44	39 78 117 155	53 106 158 211	65 130 196 261 326	78 155 232 310	90 180 270 360	101 202	113 225	129	145	

RECOMMENDED CUT (NET) / ACRE

TYPE OF CUT	PERIOD	SPEC.	CORD	M BD. FT.
IMPROVEMENT	20+			
SALVAGE				
ROTATION				
TOTAL				

TOTAL NET VOLUME

SPECIES	CORDS	M. BD. FT.

AVERAGE PERCENT DEFECT 10 SAWTIMBER

Tot. b.f. 2,100

FORM 6827

CEDAR TALLY

D.B.H.	7' Posts	8' Ties	Poles							Shingle Bolts
			20'	25'	30'	35'	40'	45'	50'	
6										
8										
10										
12										
14										
16										
18										
20										
22										
24										

SAMPLE TREE DATA

Tree No.	Dist. and bearing to tree	Spec.	DBH	Height		Tree Class	Age	Radial Gr.		Defect %
				Total	Merch			10 Yr.	20 Yr.	
		RM	12.9	65	30	2B	85	.8	1.9	0
		BF	6.1	36	12	4A	48	.9	1.8	0

Site Classification II Operability Good

*Supplementary Cruise Data

Type acreage _____ Cruise % _____ % Accuracy _____

Stand Description _____

_____

_____

Logging change. Easy ____ Medium ____ Difficult ____ Winter ____ Summer ____ Yearlong ____

Accessability: Miles of road to construct _____ Total road cost _____

Topography: Level ____ Rolling ____ Hilly ____ Rugged ____ Rocky ____

Recommended Silviculture: Marking _____ Species and % cut _____

_____

Designating: Species and Method _____

_____

Watson-Vandenburg needs:

Planting: Acres _____ Species and Age Class _____ No. _____ Cost _____

T.S.I.: Acres _____ Kind _____ Cost _____

*To be filled in only when tally sheet is used in cruising for timber sale.

DEU - 5 - 49
UNIVERSITY OF MICHIGAN
SCHOOL OF FORESTRY AND CONSERVATION

FM 99 R-9
6-17-47

DESIGNED BY LAKE STATES FOREST EXPERIMENT STATION USING COMPOSITE VOLUME TABLES FOR LAKE STATES TIMBER SPECIES

BH	BW	SM	BF	E
2"			•	
4"	•	•		•

CUMULATIVE 1/5 ACRE TALLY SHEET

ESTIMATOR Ott DATE 8/24/48
COURSE 10Ch. PLOT IR - 1406 SEC. T. R.

MAP TYPE Mc''
PLOT TYPE Mc''

VOLUME IN TENTHS OF CORDS PER ACRE

VOLUME IN HUNDREDS OF BOARD FEET (SCRIBNER) PER ACRE

SPEC. & LEGEND	NON-MERCH.	NUMBER OF 8-FOOT BOLTS (4" OR LARGER) PER TREE				MORTALITY / ACRE					TOTALS PER ACRE
		1	2	3	4	NO. TREES 2"	NO. TREES 4"	VOL. BY SPECIES SPEC.	VOL. BY SPECIES CDS.	VOL. BY SPECIES BD. FT.	
SM		2 3 4 5 6 6 7 8 9 / 10 11 12 13 14 15 16 / 17 18 18 19 20 21 / 22 23 24 25 26 27	4 6 7 9 10 12 13 15 16 / 18 19 21 22 24 25 27 28 / 30 31 33 34 36 37 39 40 / 42 43 45 48 49 51 52	6 9 11 13 15 17 19 22 / 24 26 28 30 32 35 37 39 41 / 43 45 48 50 52 54 56 58 60 / 63 65 67 69 71 73 76 78 80	9 12 14 17 / 20 23 26 29 32 / 35 37 40 43 46 49 / 52 55 58 60 63 66						.8
Elm		1 2 3 4 5 6 6 7 8 / 9 10 11 12 13 14 / 15 16 17 18 18 19	4 6 7 9 10 12 13 15 / 16 18 19 21 22 24 25 27 / 28 30 31 33 34 36 37 39	6 9 11 13 15 17 19 22 / 24 26 28 30 32 35 37 39 41 / 43 45 48 50 52 54 56 58 60	3 6 9 12 14 17 20 / 23 26 29 32 35 37 40 / 43 46 49 52 55 58 60						.7
YB		1 2 3 4 5 6 6 7 / 8 9 10 11 12 13	3 4 6 7 9 10 12 13 15 / 16 18 19 21 22 24 25 27	2 4 6 9 11 13 15 17 19 / 22 24 26 28 30 32 35 37	3 6 9 12 14 17 20 23 / 26 29 32 35 37 40 43 46						.1
SM		1 2 3 4 5 6 6 / 7 8 9 10 11 12 13	1 3 4 6 7 9 10 12 13 15 / 16 18 19 21 22 24 25 27	2 4 6 9 11 13 15 17 19 / 22 24 26 28 30 32 35 37	3 6 9 12 14 17 20 23 26 / 29 32 35 37 40 43 46 49						
SM		2 3 5 6 8 10 11 / 13 14 16 18 / 19 21 22 24 / 26 27 29 30	2 5 7 10 12 15 17 20 22 / 25 27 30 32 35 37 40 / 42 45 47 50 52 55 57 / 60 62 64 67 69 72 74	10 14 17 21 24 28 / 31 35 38 42 45 49 52 56 / 60 63 66 70 73 77 80 84 / 87 91 94 98 101 105 108	9 14 18 23 28 32 37 41 / 46 51 55 60 65 69 74 78 / 83 88 92 97 101 106 111 / 115 120 124 129 134 138	5: 6 12 17 / 23 29 35 / 41 46 52 58 / 64 70 75 81	6: 7 14 / 21 28 / 34 41 48 / 55 62 69				1.2
Elm		2 3 5 6 8 10 / 11 13 14 16 / 18 19 21 22	5 7 10 12 15 17 20 / 22 25 27 30 32 35 37 / 40 42 45 47 50 52 55	7 10 14 17 21 24 28 / 31 35 38 42 45 49 52 56 / 60 63 66 70 73 77 80 84	14 18 23 28 32 37 41 / 46 51 55 60 65 69 74 78 / 83 88 92 97 101 106 111	6 12 17 23 / 29 35 41 46 / 52 58 64 70	7 14 21 / 28 34 41 / 48 55 62	AVERAGE PERCENT DEFECT 3 / POLES			1.4
YB		2 3 5 6 8 / 10 11 13	2 5 7 10 12 15 17 20 / 22 25 27 30 32 35 37	3 7 10 14 17 21 24 28 / 31 35 38 42 45 49 52 56	8 9 14 18 23 28 32 37 / 41 46 51 55 60 65 69 74	7 12 17 23 29 / 35 41 46 52 58	7 14 21 28 / 34 41 48 55				1.1
A		2 3 5 6 8 / 10 11 13	2 5 7 10 12 15 17 20 / 22 25 27 30 32 35	3 7 10 14 17 21 24 28 / 31 35 38 42 45 49 52	5 9 14 18 23 28 32 37 / 41 46 51 55 60 65 69 74	7 12 17 23 29 / 35 41 46 52 58	7 14 21 28 / 34 41 48 55	7			.6
SM		2 5 7 10 / 12 15 17 / 20 22 24 26 / 29 31 33 34 36 38 40	4 7 11 15 18 22 26 / 27 30 32 34 36 38 40 42 44 / 46 48 50 51 53 55 57 59	5 10 15 20 25 30 35 41 / 46 51 56 61 66 71 76 / 81 86 91 96 101 106 / 112 117 119 126 132 139 145	20 26 33 40 46 53 / 59 66 73 79 86 92 99 106 / 112 119 126 132 139 145 / 92 100 109 117	8 17 25 33 42 / 50 58 67 75 83 / 92 100 109 117	10 20 30 40 50 / 60 70 80 90 100 / 110 120 130 140	12 24 36 48 / 60 72 84 96 / 108 120 132			1.3
YB		2 5 7 / 10 12 15 / 17 20 22 24 / 26 29 31 33 35 37 39	4 7 11 15 18 22 26 / 29 33 37 40 44 48	5 10 15 20 25 30 35 / 41 46 51 56 61 66 71	6 13 20 26 33 40 46 53 / 59 66 73 79 86 92 99 106	8 17 25 33 42 / 50 58 67 75 83 / 92 100 109 117	10 20 30 40 50 / 60 70 80 90 100 / 110 120 130 140	12 24 36 48 / 60 72 84 96 / 108 120 132			1.4
		2 5 7 / 10 12 / 15 17 / 20 22 24 26 / 29 31 33 35 37 39	4 7 11 15 18 22 26 / 29 33 37 40 44 48	5 10 15 20 25 30 35 / 41 46 51 56 61 66 71	7 13 20 26 33 40 46 53 / 59 66 73 79 86 92 99 106	8 17 25 33 42 50 / 58 67 75 83 92 100	10 20 30 40 50 60 / 70 80 90 100 110	12 24 36 48 / 60 72 84 96			
		2 5 7 / 10 12 / 15 17 / 20 22 24 26 / 29 31 33 35 37 39	4 7 11 15 18 22 26 / 29 33 37 40 44 48	5 10 15 20 25 30 35 / 41 46 51 56 61 66 71	7 13 20 26 33 40 46 53 / 59 66 73 79 86 92 99 106	8 17 25 33 42 50 / 58 67 75 83 92 100	10 20 30 40 50 60 / 70 80 90 100 110	12 24 36 48 / 60 72 84 96			

NUMBER OF 16-FOOT LOGS (8" OR LARGER) PER TREE

	1/2	1	1 1/2	2
A	1 1 2 3 3 4 5 / 6 6 7 8 8 9 10 / 11 11 12 13 13 / 14 15 15 16 17	2 3 4 6 7 9 10 12 13 / 15 16 18 19 21 22 24 / 25 27 28 30 31 33 34 / 36 37 39 40 42 43 45	4 6 8 10 12 14 16 / 18 20 22 24 26 28 30 / 32 34 36 38 40 42 44 / 46 48 50 52 54 56 58	
BW	1 1 2 3 3 4 5 / 6 6 7 8 8 9 10 / 11 11 12 13 13	3 4 6 7 9 10 12 13 / 15 16 18 19 21 22 24 / 25 27 28 30 31 33 34	2 4 6 8 10 12 14 16 / 18 20 22 24 26 28 30 / 32 34 36 38 40 42 44	
	1 1 2 3 3 4 5 / 6 6 7 8 8 9	2 3 4 6 7 9 10 12 / 13 15 16 18 19 21 22	2 4 6 8 10 12 14 16 / 18 20 22 24 26 28 30	
	1 1 2 3 3 4 5	2 3 4 6 7 9 10 12	2 4 6 8 10 12 14 16	

RECOMMENDED CUT (NET) / ACRE

TYPE OF CUT	PERIOD	SPEC.	CORD	M BD. FT.
IMPROVEMENT	20+			
SALVAGE				
ROTATION				
TOTAL				

TOT. CORDS 8.6

TOTAL NET VOLUME

SPECIES	CORDS	M. BD. FT.

| | | | | | |

CEDAR TALLY

D.B.H.	7' Posts	8' Ties	Poles 20'	25'	30'	35'	40'	45'	50'	Shingle Bolts
6										
8										
10										
12										
14										
16										
18										
20										
22										
24										

SAMPLE TREE DATA

Tree No.	Dist. and bearing to tree	Spec.	DBH	Height		Tree Class	Age	Radial Gr.		Defect %
				Total	Merch			10 Yr.	20 Yr.	
		Elm	4.9	28	-	5B	42	.4	.8	0
		Bass.	10.1	52	17	2A	54	.8	1.7	0
		SM	6.7	44	17	2A	59	.4	.7	0

ite Classification I Operability Good

*Supplementary Cruise Data

ype acreage _____ Cruise % _____ % Accuracy _____

tand Description _____

_____

_____

ogging change. Easy ____ Medium ____ Difficult ____ Winter ____ Summer ____ Yearlong ____

ccessability: Miles of road to construct _____ Total road cost _____

opography: Level ____ Rolling ____ Hilly ____ Rugged ____ Rocky ____

ecommended Silviculture: Marking _____ Species and % cut _____

_____

esignating: Species and Method _____

_____

utson-Vandenburg needs:

anting: Acres _____ Species and Age Class _____ No. _____ Cost _____

S.I.: Acres _____ Kind _____ Cost _____

o be filled in only when tally sheet is used in cruising for timber sale.

DEU - 5 - 67
UNIVERSITY OF MICHIGAN
SCHOOL OF FORESTRY AND CONSERVATION

FORM 99 R-9
6-17-47

DESIGNED BY LAKE STATES FOREST EXPERIMENT STATION USING COMPOSITE VOLUME TABLES FOR LAKE STATES TIMBER SPECIES

BH	YB	SM
2"	⁘	⁘
4"	••	:•

CUMULATIVE 1/5 ACRE TALLY SHEET

ESTIMATOR Ott DATE 8/30/48
COURSE 20Ch. PLOT IR - 915 SEC. T. R.

MAP TYPE Mc'''
PLOT TYPE Mc'''

VOLUME IN TENTHS OF CORDS PER ACRE

SPEC. & LEGEND	NON-MERCH.	NUMBER OF 8-FOOT BOLTS (4" OR LARGER) PER TREE: 1	2	3	4	MORTALITY / ACRE: NO. TREES 2"	NO. TREES 4"	VOL. BY SPECIES SPEC.	CDS.	BD. FT.	TOTALS PER ACRE
YB		~~1~~ ~~2~~ ~~3~~ ~~4~~ ~~5~~ ~~6~~ ~~7~~ ~~8~~ ~~9~~ ~~10~~ ~~11~~ ~~12~~ ~~13~~ ~~14~~ ~~15~~ 16 17 18 18 19 20 21 22 23 24 25 26 27	~~1~~ ~~2~~ ~~3~~ ~~4~~ ~~5~~ ~~6~~ ~~7~~ ~~8~~ ~~9~~ ~~10~~ ~~11~~ ~~12~~ ~~13~~ ~~14~~ ~~15~~ 16 18 19 21 22 24 25 27 28 30 31 33 34 36 37 39 40 42 43 45 46 48 49 51 52	~~2~~ ~~3~~ ~~4~~ ~~5~~ ~~6~~ ~~7~~ ~~8~~ ~~9~~ 11 13 15 17 19 22 24 26 28 30 32 35 37 39 41 43 45 48 50 52 54 56 58 60 63 65 67 69 71 73 76 78 80	~~3~~ 6 9 12 14 17 20 23 26 29 32 35 37 40 43 46 49 52 55 58 60 63 66						4.0
SM		~~1~~ ~~2~~ ~~3~~ ~~4~~ ~~5~~ ~~6~~ ~~7~~ ~~8~~ 9 10 11 12 13 14 15 16 17 18 18 19	~~1~~ ~~2~~ ~~3~~ ~~4~~ ~~5~~ ~~6~~ ~~7~~ ~~8~~ 9 10 12 13 15 16 18 19 21 22 24 25 27 28 30 31 33 34 36 37 39	~~2~~ ~~3~~ ~~4~~ ~~5~~ ~~6~~ 9 11 13 15 17 19 22 24 26 28 30 32 35 37 39 41 43 45 48 50 52 54 56 58 60	3 6 9 12 14 17 20 23 26 29 32 35 37 40 43 46 49 52 55 58 60						1.4
Elm		1 2 3 4 5 6 6 7 8 9 10 11 12 13	~~1~~ ~~3~~ 4 6 7 9 10 12 13 15 16 18 19 21 22 24 25 27	2 4 6 9 11 13 15 17 19 22 24 26 28 30 32 35 37	3 6 9 12 14 17 20 23 26 29 32 35 37 40 43 46						.1
YB		1 2 3 4 5 6 6 7 8 9 10 11 12 13	1 3 4 6 7 9 10 12 13 15 16 18 19 21 22 24 25 27	2 4 6 9 11 13 15 17 19 22 24 26 28 30 32 35 37	3 6 9 12 14 17 20 23 26 29 32 35 37 40 43 46 49						4.8
A		2 3 5 6 8 10 11 13 14 16 18 19 21 22	2 5 7 10 12 15 17 20 22 25 27 30 32 35 37 40 42 45 47 50 52 55	2 5 7 10 14 17 21 24 28 31 35 38 42 45 49 52 56 60 63 66 70 73 77 80 84	5 9 14 18 23 28 32 37 41 46 51 55 60 65 69 74 78 83 88 92 97 101 106 111	5	6 6 12 17 23 29 35 41 46 52 58 64 70 75 81	7 14 21 28 34 41 48 55 62 69	AVERAGE PERCENT DEFECT 5 POLES		.6
		2 3 5 6 8 10 11 13	2 5 7 10 12 15 17 20 22 25 27 30 32 35 37	2 5 7 10 14 17 21 24 28 31 35 38 42 45 49 52 56	5 9 14 18 23 28 32 37 41 46 51 55 60 65 69 74		6 12 17 23 29 35 41 46 52 58	7 14 21 28 34 41 48 55			
		2 3 5 6 8 10 11 13	2 5 7 10 12 15 17 20 22 25 27 30 32 35	3 7 10 14 17 21 24 28 31 35 38 42 45 49 52	5 9 14 18 23 28 32 37 41 46 51 55 60 65 69 74		6 12 17 23 29 35 41 46 52 58	7 14 21 28 34 41 48 55			
SM		2 5 7 10 12 15 17 20 22 25	4 7 11 15 18 22 26 29 33 37 40 44 48	5 10 15 20 25 30 35 41 46 51 56 61 66 71 76	7 13 20 26 33 40 46 53 59 66 73 79 86 92 99 106 112 119 126 132 139 145		~~8~~ ~~17~~ ~~25~~ 33 42 50 58 67 75 83 92 100 109 117	10 20 30 40 50 60 70 80 90 100 110 120 130 140	7 12 24 36 48 60 72 84 96 108 120 132		2.5
YB		2 5 7 10 12 15	4 7 11 15 18 22 26 29 33 37 40 44 48	5 10 15 20 25 30 35 41 46 51 56 61 66 71	~~7~~ 13 20 26 33 40 46 53 59 66 73 79 86 92 99 106		8 17 25 33 42 50 58 67 75 83	10 20 30 40 50 60 70 80 90 100	12 24 36 48 60 72 84 96		.7
		2 5 7 10 12 15	4 7 11 15 18 22 26 29 33 37 40 44 48	5 10 15 20 25 30 35 41 46 51 56 61 66 71	7 13 20 26 33 40 46 53 59 66 73 79 86 92 99 106		8 17 25 33 42 50 58 67 75 83 92 100	10 20 30 40 50 60 70 80 90 100 110	12 24 36 48 60 72 84 96		
		2 5 7	4 7 11 15 18 22	5 10 15 20 25 30 35	7 13 20 26 33 40 46 53		8 17 25 33 42 50	10 20 30 40 50 60	12 24 36 48		

VOLUME IN HUNDREDS OF BOARD FEET (SCRIBNER) PER ACRE

SPEC. & LEGEND	NON-MERCH.	NUMBER OF 16-FOOT LOGS (8" OR LARGER) PER TREE: 1/2	1	1 1/2	2	2 1/2	3	3 1/2	4	4 1/2	5	TOTALS PER ACRE
A		~~1~~ 2 3 3 4 5 6 6 7 8 8 9 10 11 11 12 13 13 14 15 15 16 17	~~2~~ 3 4 6 7 9 10 12 13 15 16 18 19 21 22 24 25 27 28 30 31 33 34 36 37 39 40 42 43 45	~~2~~ 4 6 8 10 12 14 16 18 20 22 24 26 28 30 32 34 36 38 40 42 44 46 48 50 52 54 56 58								TOT. CORDS 14.1
		1 1 2 3 3 4 5 6 6 7 8 8 9 10 11 11 12 13 13 14 15 15 16 17	2 3 4 6 7 9 10 12 13 15 16 18 19 21 22 24 25 27 28 30 31 33 34 36 37 39 40 42 43 45	2 4 6 8 10 12 14 16 18 20 22 24 26 28 30 32 34 36 38 40 42 44 46 48 50 52 54 56 58								500
		1 1 2 3 3 4 5 6 6 7 8 8 9 10 11 11 12 13 13 14 15 15 16 17	2 3 4 6 7 9 10 12 13 15 16 18 19 21 22 24 25 27 28 30 31 33 34 36 37 39 40 42 43 45	2 4 6 8 10 12 14 16 18 20 22 24 26 28 30 32 34 36 38 40 42 44 46 48 50 52 54 56 58								
		1 1 2 3 3 4 5 6 6 7 8 8 9	2 3 4 6 7 9 10 12 13 15 16 18 19 21 22	2 4 6 8 10 12 14 16 18 20 22 24 26 28 30								
		1 1 2 3 3 4 5	2 3 4 6 7 9 10 12	2 4 6 8 10 12 14 16								
		1 3 4 6 7 8 10 11 13 14 15 17 18 20 21 22 24 25	2 5 7 10 12 14 17 19 22 24 29 29 31 34 36 38 41 43 46 48 50 53 55 58 60 62 65 67 70	3 7 10 13 16 20 23 26 30 33 36 40 43 46 50 53 56 59 63 66 69 73 76 79 82 86 89 92	4 8 12 16 20 23 27 31 35 39 43 47 51 55 58 62 66 70 74 78 82 86 90 94	5 10 15 19 24 29 34 39 43 48 53 58 63 68 73 78						
		1 3 4 6 7 8 10 11 13 14 15 17 18 20 21 22 24 25	2 5 7 10 12 14 17 19 22 24 29 29 31 34 36 38 41 43 46 48 50 53 56 59 63 66 69	3 7 10 13 16 20 23 26 30 33 36 40 43 46 50 53 56 59 63	4 8 12 16 20 23 27 31 35 39 43 47 51 55 58 62 66 70	5 10 15 19 24 29 34 39						
		1 3 4 6 7 8 10 11 13 14 15 17 18 20	2 5 7 10 12 14 17 19 22 24 29 29 31 34 36 38 41 43 46 48	3 7 10 13 16 20 23 26 30 33 36 40 43 46 50 53 56 59 63	4 8 12 16 20 23 27 31 35 39 43 47 51 55 58 62 66 70	5 10 15 19 24 29 34 39						
		1 3 4 6 7 8 10 11 13 14	2 5 7 10 12 14 17 19 22 24 29 29 31 34	3 7 10 13 16 20 23 26 30 33 36 40 43	4 8 12 16 20 23 27 31 35 39 43 47	5 10 15 19 24 29 34 39						
		1 3 4 6 7 8	2 5 7 10 12 14 17 19	3 7 10 13 16 20 23	4 8 12 16 20 23	5 10 15 19 24						
WS	•	2 4 6 8 10 12 14 16 18 20 22 24 26 28	4 7 10 14 18 21 24 28 32 35 38 42 46 49 52 56 60 63 66	6 12 17 23 29 35 38 43 48 53 58 62 67 72 77 82 86 91	7 14 21 28 35 42 49 56 63 70 78 85	8 16 25 33 41 50 58 66 74 82	9 19 28 38 47 57					800
		2 4 6 8 10 12 14 16 18 20	4 7 10 14 18 21 24 28 32 35 38 42 46	6 12 17 23 29 35 38 43 48 53 58 62 67 72 77 82 86 91	7 14 21 28 35 42 49 56 63 70 78 85	8 16 25 33 41 50 58 66 74 82	9 19 28 38 47 57					
		2 4 6 8 10 12 14 16 18 20	4 7 10 14 18 21 24 28 32 35 38 42 46	6 12 17 23 29 35 38 43 48 53 58 62 67 72 77 82 86 91	7 14 21 28 35 42 49 56 63 70 78 85	8 16 25 33 41 50 58 66 74 82	9 19 28 38 47 57					
		2 4 6 8 10	4 7 10 14 18 21 24	5 10 14 19 24 29 34 38 43 48 53 58 62 67 72 77 82 86 91	6 12 17 23 29 35 38 43 48 53 58 62 67 72 77 82 86 91	7 14 21 28 35 42 49 56 63 70 78 85	8 16 25 33 41 50 58 66 74 82	9 19 28 38 47 57				
	•	3 5 8 11 14 16 19 22 24	5 9 14 19 23 28 33 37 42 46 51 56	6 13 19 26 32 39 45 52 58 64 71 77	8 15 24 32 40 47 55 63 71 79 87 95	10 19 29 38 48 57 67 76	11 22 34 45 56 67 78 90	13 25 38 50	14 28 42 56			
		3 5 8 11 14 16 19 22 24	5 9 14 19 23 28 33 37 42 46 51 56	6 13 19 26 32 39 45 52 58 64 71 77	8 15 24 32 40 47 55 63 71 79 87 95	10 19 29 38 48 57 67 76	11 22 34 45 56 67 78 90	13 25 38 50	14 28 42 56			
		3 5 8 11 14	5 9 14 19 23 28	6 13 19 26 32 39	8 15 24 32 40 47	10 19 29 38	11 22 34 45	13 25	14 28			
		3 5 8 11 14	5 9 14 19 23 28	6 13 19 26 32 39	8 15 24 32 40 47	10 19 29 38	11 22 34 45	13 25	14 28			
		4 7 11 14 18 22 25	6 12 18 24 30 37 43 49 55 61 69	8 17 25 34 42 50 59 67 76 84 92	10 21 31 41 52 62 72 83 93 104 114	12 25 37 50 62 74 87 99	15 29 44 58 73 88 102	16 32 48 65	18 36 53 71			
		4 7 11 14	6 12 18 24 30 37	8 17 25 34 42 50	10 21 31 41 52 62	12 25 37 50	15 29 44 58	16 32	18 36			
		4 7 11 14	6 12 18 24 30 37	8 17 25 34 42 50	10 21 31 41 52 62	12 25 37 50	15 29 44 58	16 32	18 36			
		4 7 11 14	6 12 18 24 30 37	8 17 25 34 42 50	10 21 31 41 52 62	12 25 37 50	15 29 44 58	16 32	18 36			
		4 9 14 18 22 27 32	6 16 23 31 39 47 55 62 70 78 86	11 21 32 42 53 64 74 85 95 106 117	13 26 39 52 66 79 92 105 118 131 144	16 32 48 63 79 95 111 127 143	18 37 55 73 92 110 128	20 41 61 81	23 45 68 90	25 50 75 100	27	
		4 9 14 18	6 16 23 31 39 47	11 21 32 42 53 64	13 26 39 52 66 79	16 32 48 63 79	18 37 55 73	20 41	23 45	25 50	27	
		4 9 14 18	6 16 23 31 39 47	11 21 32 42 53 64	13 26 39 52 66 79	16 32 42 63 79	18 37 55 73	20 41	23 45	25 50	27	
		4 9 14 18	6 16 23 31 39	11 21 32 42 53 64	13 26 39 52 66 79	16 32 42 63 79	18 37 55 73	20 41	23 45	25 50	27	
		6 11 17 22	10 19 29 39 48	13 26 39 52 66	16 33 49 66 82 98	20 39 59 78	23 45 68 90	25 50	28 56	31 62	33	
		6 11 17 22	10 19 29 39 48	13 26 39 52 66	16 33 49 66 82 98	20 39 59 78	23 45 68 90	25 50	28 56	31 62	33	
		6 11 17 22	10 19 29 39 48	13 26 39 52 66	16 33 49 66 82 98	20 39 59 78	23 45 68 90	25 50	28 56	31 62	33	
		7 14 21	12 24 35 47 59	16 32 48 64 80	20 40 60 80 100	24 47 71 94	27 55 82 110	31 61	34 69	38 75	41	
		7 14 21	12 24 35 47 59	16 32 48 64 80	20 40 60 80 100	24 47 71 94	27 55 82 110	31 61	34 69	38 75	41	
		7 14 21	12 24 35 47 59	16 32 48 64 80	20 40 60 80 100	24 47 71 94	24 55 82 110	31 61	34 69	38 75	41	
		8 16 25	14 28 42 56 70	19 38 57 76 95	24 48 72 96 120 143	28 57 85 113	33 65 98 131	36 73	41 82	45 90	49	
		8 16 25	14 28 42 56 70	19 38 57 76 95	24 48 72 96 120 143	28 57 85 113	33 65 98 131	36 73	41 82	45 90	49	
		10 20 29	17 33 50 66	22 45 67 90 112	28 55 84 112 140 168	33 66 100 133	38 76 115 153	43 86	48 96	53	57	
		10 20 29	17 33 50 66	22 45 67 90 112	28 55 84 112 140 168	33 66 100 133	38 76 115 153	43 86	48 96	53	57	
		11 23 34	19 38 57 77	26 52 78 104	32 65 97 130 162	39 77 116 154	44 89 133 177	50 100	56 111	61	67	
		11 23 34	19 38 57 77	26 52 78 104	32 65 97 130 162	39 77 116 154	44 89 133 177	50 100	56 111	61	67	
		13 26 39	22 44 66 88	30 60 90 120	37 75 112 149 186	44 89 133 178	51 102 153 204	57 114	64 128	71	78	
		13 26 39	22 44 66 88	30 60 90 120	37 75 112 149 186	44 89 133 178	51 102 153 204	57 114	64 128	71	78	
		15 29	25 50 75 100	34 68 102 136	42 85 127 169 212 254	50 101 151 202	58 116 174 232	65 129	73 146	81	89	
		16 33	28 56 85 113	38 77 115 153	48 96 143 191 239	57 114 170 227	65 131 196 261	73 146	82 164	92	101	
		18 36	32 63 95 127	43 86 128 171	53 107 160 214 267	63 127 190 254	73 146 219 293	82 164	92 184	103	115	
		20 40	35 70 105	48 95 143 190	59 118 177 237 296	70 141 211 281	82 163 245 326	91 182	103 205	116	129	
		22 44	39 78 117 155	53 106 158 211	65 130 196 261 326	78 155 232 310	90 180 270 360	101 202	113 225	129	145	

RECOMMENDED CUT (NET) / ACRE

TYPE OF CUT	PERIOD	SPEC.	CORD	M BD. FT.
IMPROVEMENT	20+			
SALVAGE				
ROTATION				
TOTAL				

TOTAL NET VOLUME

SPECIES	CORDS	M. BD. FT.

AVERAGE PERCENT DEFECT 20 SAWTIMBER

FORM 6827

Tot. b.f. 1,300

CEDAR TALLY

D.B.H.	7' Posts	8' Ties	Poles 20'	25'	30'	35'	40'	45'	50'	Shingle Bolts
6										
8										
10										
12										
14										
16										
18										
20										
22										
24										

SAMPLE TREE DATA

Tree No.	Dist. and bearing to tree	Spec.	DBH	Height		Tree Class	Age	Radial Gr.		Defect %
				Total	Merch			10 Yr.	20 Yr.	
		WS	14.9	68	50	2A	71	.4	1.2	0
		YB	5.2	52	10	3A	42	.6	1.2	0
		SM	3.3	47	-	3A	30	.5	1.2	0

Site Classification I Operability Good

*Supplementary Cruise Data

Type acreage _____ Cruise % _____ % Accuracy _____

Stand Description _____

Logging change. Easy ____ Medium ____ Difficult ____ Winter ____ Summer ____ Yearlong ____

Accessability: Miles of road to construct _____ Total road cost _____

Topography: Level ____ Rolling ____ Hilly ____ Rugged ____ Rocky ____

Recommended Silviculture: Marking _____ Species and % cut _____

Designating: Species and Method _____

Hutson-Vandenburg needs:

Planting: Acres _____ Species and Age Class _____ No. _____ Cost _____

T.S.I.: Acres _____ Kind _____ Cost _____

*To be filled in only when tally sheet is used in cruising for timber sale.

DEU - 3 - 19
UNIVERSITY OF MICHIGAN
SCHOOL OF FORESTRY AND CONSERVATION

FORM 99 R-9
REV. 6-17-47

DESIGNED BY LAKE STATES FOREST EXPERIMENT STATION USING COMPOSITE VOLUME TABLES FOR LAKE STATES TIMBER SPECIES

CUMULATIVE 1/5 ACRE TALLY SHEET

ESTIMATOR Ott DATE 9/19/48
COURSE 7 Ch. PLOT IR - 1083 SEC. T. R.

MAP TYPE Ad' / Ac' = Ad'
PLOT TYPE Ad' / Ac' = Ad'

DBH WP
2" •
4" •

VOLUME IN TENTHS OF CORDS PER ACRE

NUMBER OF 8-FOOT BOLTS (4" OR LARGER) PER TREE

DBH	SPEC. & LEGEND	NON-MERCH.	1	2	3	4	MORTALITY / ACRE NO. TREES 2"	NO. TREES 4"	VOL. BY SPECIES SPEC.	CDS.	BD. FT.	TOTALS PER ACRE
6	A		1 2 3 4 5 6 6 7 8 9 / 10 11 12 13 14 15 16 / 17 18 18 19 20 21 / 22 23 24 25 26 27	1 2 3 4 6 7 9 10 12 13 15 16 / 18 19 21 22 24 25 27 28 / 30 31 33 34 36 37 39 40 / 42 43 45 46 48 49 51 52	2 4 6 9 11 13 15 17 19 22 / 24 26 28 30 32 35 37 39 41 / 43 45 48 50 52 54 56 58 60 / 63 65 67 69 71 73 76 78 80	3 6 9 12 14 17 / 20 23 26 29 32 / 35 37 40 43 46 49 / 52 55 58 60 63 66					.9
	WP		1 2 3 4 5 6 6 7 8 / 9 10 11 12 13 14 / 15 16 17 18 18 19	1 3 4 6 7 9 10 12 13 15 / 16 18 19 21 22 24 25 27 / 28 30 31 33 34 36 37 39	2 4 6 9 11 13 15 17 19 22 / 24 26 28 30 32 35 37 39 41 / 43 45 48 50 52 54 56 58 60	3 6 9 12 14 17 20 / 23 26 29 32 35 37 40 / 43 46 49 52 55 58 60						.3
8			1 2 3 4 5 6 6 7 / 8 9 10 11 12 13	1 3 4 6 7 9 10 12 13 15 / 16 18 19 21 22 24 25 27	2 4 6 9 11 13 15 17 19 / 22 24 26 28 30 32 35 37	3 6 9 12 14 17 20 23 / 26 29 32 35 37 40 43 46						
	A		1 2 3 4 5 6 6 / 7 8 9 10 11 12 13	1 3 4 6 7 9 10 12 13 15 / 16 18 19 21 22 24 25 27	2 4 6 9 11 13 15 17 19 / 22 24 26 28 30 32 35 37	3 6 9 12 14 17 20 23 26 / 29 32 35 37 40 43 46 49	5	6				
	WS		2 3 5 6 8 10 11 / 13 14 16 18 / 19 21 22 24	2 5 7 10 12 15 17 20 22 / 25 27 30 32 35 37 40 / 42 45 47 50 52 55 57	2 5 7 10 14 17 21 24 28 / 31 35 38 42 45 49 52 56 / 60 63 66 70 73 77 80 84	5 9 14 18 23 28 32 37 41 / 46 51 55 60 65 69 74 78 / 83 88 92 97 101 106 111	6 12 17 23 / 29 35 41 46 / 52 58 64 70	7 14 21 / 28 34 41 / 48 55 62	AVERAGE PERCENT DEFECT 10 POLES			1.6
	BF		2 3 5 6 8 / 10 11 13	2 5 7 10 12 15 17 20 / 22 25 27 30 32 35 37	3 7 10 14 17 21 24 28 / 31 35 38 42 45 49 52 56	5 9 14 18 23 28 32 37 / 41 46 51 55 60 65 69 74	6 12 17 23 29 / 35 41 46 52 58	7 14 21 28 / 34 41 48 55				.3
	BS		2 3 5 6 8 / 10 11 13	2 5 7 10 12 15 17 20 / 22 25 27 30 32 35	3 7 10 14 17 21 24 28 / 31 35 38 42 45 49 52 56	5 9 14 18 23 28 32 37 / 41 46 51 55 60 65 69 74	6 12 17 23 29 / 35 41 46 52 58	7 14 21 28 / 34 41 48 55	7			.2
10			2 5 7 10 / 12 15 17 / 20 22 25	4 7 11 15 18 22 26 / 29 33 37 40 44 48 / 51 55 59 62 66 70	5 10 15 20 25 30 35 41 / 46 51 56 61 66 71 76 / 81 86 91 96 101 106	7 13 20 26 33 40 46 53 / 59 66 73 79 86 92 99 106 / 112 119 126 132 139 145	8 17 25 33 42 / 50 58 67 75 83 / 92 100 109 117	10 20 30 40 50 / 60 70 80 90 100 / 110 120 130 140	12 24 36 48 / 60 72 84 96 / 108 120 132			
			2 5 7 / 10 12 15	4 7 11 15 18 22 26 / 29 33 37 40 44 48	5 10 15 20 25 30 35 / 41 46 51 56 61 66 71	7 13 20 26 33 40 46 53 / 59 66 73 79 86 92 99 106	8 17 25 33 42 / 50 58 67 75 83	10 20 30 40 50 / 60 70 80 90 100	12 24 36 48 / 60 72 84 96			
			2 5 7 / 10 12	4 7 11 15 18 22 26 / 29 33 37 40 44 48	5 10 15 20 25 30 35 / 41 46 51 56 61 66 71	7 13 20 26 33 40 46 53 / 59 66 73 79 86 92 99 106	8 17 25 33 42 50 / 58 67 75 83 92 100	10 20 30 40 50 60 / 70 80 90 100 110	12 24 36 48 / 60 72 84 96			
			2 5 7	4 7 11 15 18 22	5 10 15 20 25 30 35	7 13 20 26 33 40 46 53	8 17 25 33 42 50	10 20 30 40 50 60	12 24 36 48			

VOLUME IN HUNDREDS OF BOARD FEET (SCRIBNER) PER ACRE

NUMBER OF 16-FOOT LOGS (8" OR LARGER) PER TREE

		1/2	1	1 1/2	2	RECOMMENDED CUT (NET) / ACRE TYPE OF CUT	PERIOD	SPEC.	CORD	M BD. FT.	TOT. CORDS 3.5
10	A	1 2 3 3 4 5 / 6 6 7 8 8 9 10 / 11 11 12 13 13 / 14 15 15 16 17	2 3 4 6 7 9 10 12 13 / 15 16 18 19 21 22 24 / 25 27 28 30 31 33 34 / 36 37 39 40 42 43 45	2 4 6 8 10 12 14 16 / 18 20 22 24 26 28 30 / 32 34 36 38 40 42 44 / 46 48 50 52 54 56 58		IMPROVEMENT	5 Yr. A				600
		1 1 2 3 3 4 5 / 6 6 7 8 8 9 10 / 11 11 12 13 13 / 14 15 15 16 17	2 3 4 6 7 9 10 12 13 / 15 16 18 19 21 22 24 / 25 27 28 30 31 33 34 / 36 37 39 40 42 43 45	2 4 6 8 10 12 14 16 / 18 20 22 24 26 28 30 / 32 34 36 38 40 42 44 / 46 48 50 52 54 56 58		SALVAGE					
		1 1 2 3 3 4 5 / 6 6 7 8 8 9 / 11 11 12 13 13	2 3 4 6 7 9 10 12 / 13 15 16 18 19 21 22 / 25 27 28 30 31 33 34	2 4 6 8 10 12 14 16 / 18 20 22 24 26 28 30 / 32 34 36 38 40 42 44		ROTATION					
		1 1 2 3 3 4 5	2 3 4 6 7 9 10 12	2 4 6 8 10 12 14 16		TOTAL					
12	A	1 3 4 6 7 8 / 10 11 13 14 / 15 17 18 20 / 21 22 24 25	2 5 7 10 12 14 17 19 / 22 24 29 29 31 34 36 / 38 41 43 46 48 50 53 / 55 58 60 62 65 67 70	3 7 10 13 16 20 23 / 26 30 33 36 40 43 46 / 50 53 56 59 63 66 69 / 73 76 79 82 86 89 92	4 8 12 16 20 23 / 27 31 35 39 43 47 / 51 55 58 62 66 70 / 74 78 82 86 90 94	2 1/2					
		1 3 4 6 7 8 / 10 11 13 14 / 15 17 18 20 / 21 22 24 25	2 5 7 10 12 14 17 19 / 22 24 29 29 31 34 36 / 38 41 43 46 48 50 53 / 55 58 60 62 65 67 70	3 7 10 13 16 20 23 / 26 30 33 36 40 43 46 / 50 53 56 59 63 66 69 / 73 76 79 82 8689 92	4 8 12 16 20 23 / 27 31 35 39 43 47 / 51 55 58 62 66 70 / 74 78 82 86 90 94	TOTAL NET VOLUME SPECIES		CORDS	M. BD. FT.		1700
		1 3 4 6 7 8 / 10 11 13 14 / 15 17 18 20 / 21 22 24 25	2 5 7 10 12 14 17 19 / 22 24 29 29 31 34 / 36 38 41 43 46 48	3 7 10 13 16 20 23 / 26 30 33 36 40 43 / 46 50 53 56 59 63	4 8 12 16 20 23 / 27 31 35 39 43 47 / 51 55 58 62 66 70						
		1 3 4 6 7 8 / 10 11 13 14 / 15 17 18 20

CEDAR TALLY

D.B.H.	7' Posts	8' Ties	Poles 20'	25'	30'	35'	40'	45'	50'	Shingle Bolts
6										
8										
10										
12										
14										
16										
18										
20										
22										
24										

SAMPLE TREE DATA

Tree No.	Dist. and bearing to tree	Spec.	DBH	Height		Tree Class	Age	Radial Gr.		Defect %
				Total	Merch			10 Yr.	20 Yr.	
		A	5.1	40	15	4C	44	.5	1.1	10
		WP	4.2	18	-	4A	30	.9	2.0	0
		A	10.0	41	25	1C	72	.5	1.3	10

Site Classification II Operability Good

*Supplementary Cruise Data

Type acreage _____ Cruise % _____ % Accuracy _____

Stand Description _____

_____

_____

Logging change. Easy ____ Medium ____ Difficult ____ Winter ____ Summer ____ Yearlong ____

Accessability: Miles of road to construct _____ Total road cost _____

Topography: Level ____ Rolling ____ Hilly ____ Rugged ____ Rocky ____

Recommended Silviculture: Marking _____ Species and % cut _____

_____

Designating: Species and Method _____

_____

Hutson-Vandenburg needs:

Planting: Acres _____ Species and Age Class _____ No. _____ Cost _____

T.S.I.: Acres _____ Kind _____ Cost _____

To be filled in only when tally sheet is used in cruising for timber sale.

DEU - 1 - 17
UNIVERSITY OF MICHIGAN
SCHOOL OF FORESTRY AND CONSERVATION

FORM 99 R-9
REV. 6-17-47

DESIGNED BY LAKE STATES FOREST EXPERIMENT STATION USING COMPOSITE VOLUME TABLES FOR LAKE STATES TIMBER SPECIES

CUMULATIVE 1/5 ACRE TALLY SHEET

ESTIMATOR Ott DATE 8/25/48
COURSE 720Ch PLOT IR - 111 SEC. T. R.

MAP TYPE Ad''
PLOT TYPE Ad''/Ac'

DBH | BF | YB
2" | : |
4" | • | •

VOLUME IN HUNDREDS OF BOARD FEET (SCRIBNER) PER ACRE — VOLUME IN TENTHS OF CORDS PER ACRE

NUMBER OF 8-FOOT BOLTS (4" OR LARGER) PER TREE

DBH	SPEC. & LEGEND	NON-MERCH.	1	2	3	4
6	A		1 2 3 4 5 6 6 7 8 9 / 10 11 12 13 14 15 16 / 17 18 18 19 20 21 / 22 23 24 25 26 27	4 6 7 9 10 12 13 15 16 / 18 19 21 22 24 25 27 28 / 30 31 33 34 36 37 39 40 / 42 43 45 46 48 49 51 52	2 4 6 9 11 13 15 17 19 22 / 24 26 28 30 32 35 37 39 41 / 43 45 48 50 52 54 56 58 60 / 63 65 67 69 71 73 76 78 80	3 6 9 12 14 17 / 20 23 26 29 32 / 35 37 40 43 46 49 / 52 55 58 60 63 66
	RM		1 2 3 4 5 6 6 7 8 / 9 10 11 12 13 14 / 15 16 17 18 18 19	6 7 9 10 12 13 15 / 16 18 19 21 22 24 25 27 / 28 30 31 33 34 36 37 39	4 6 9 11 13 15 17 19 22 / 24 26 28 30 32 35 37 39 41 / 43 45 48 50 52 54 56 58 60	3 6 9 12 14 17 20 / 23 26 29 32 35 37 40 / 43 46 49 52 55 58 60
	BF		3 4 5 6 6 7 / 8 9 10 11 12 13	1 3 4 6 7 9 10 12 13 15 / 16 18 19 21 22 24 25 27	4 6 9 11 13 15 17 19 / 22 24 26 28 30 32 35 37	3 6 9 12 14 17 20 23 / 26 29 32 35 37 40 43 46
	YB		3 4 5 6 6 / 7 8 9 10 11 12 13	1 3 4 6 7 9 10 12 13 15 / 16 18 19 21 22 24 25 27	2 4 6 9 11 13 15 17 19 / 22 24 26 28 30 32 35 37	3 6 9 12 14 17 20 23 26 / 29 32 35 37 40 43 46 49
8	A		2 3 5 6 8 10 11 / 13 14 16 18 / 19 21 22 24 / 26 27 29 30	2 5 7 10 12 15 17 20 22 / 25 27 30 32 35 37 40 / 42 45 47 50 52 55 57 / 60 62 64 67 69 72 74	3 7 10 14 17 21 24 28 / 31 35 38 42 45 49 52 56 / 60 63 66 70 73 77 80 84 / 87 91 94 98 101 105 108	5 6 / 9 14 18 23 28 32 37 41 / 46 51 55 60 65 69 74 78 / 83 88 92 97 101 106 111 / 115 120 124 129 134 138
	Elm		2 3 5 6 8 10 / 11 13 14 16 / 18 19 21 22	2 5 7 10 12 15 17 20 / 22 25 27 30 32 35 37 / 40 42 45 47 50 52 55	3 7 10 14 17 21 24 28 / 31 35 38 42 45 49 52 56 / 60 63 66 70 73 77 80 84	5 6 / 9 14 18 23 28 32 37 41 / 46 51 55 60 65 69 74 78 / 83 88 92 97 101 106 111 / 115 120 124 129 134 138
	BF		2 3 5 6 8 / 10 11 13	2 5 7 10 12 15 17 20 / 22 25 27 30 32 35 37	3 7 10 14 17 21 24 28 / 31 35 38 42 45 49 52 56	5 6 / 9 14 18 23 28 32 37 41 / 46 51 55 60 65 69 74 / 41 46 52 58 / 34 41 48 55
			2 3 5 6 8 / 10 11 13	2 5 7 10 12 15 17 20 / 22 25 27 30 32 35	3 7 10 14 17 21 24 28 / 31 35 38 42 45 49 52	5 6 / 9 14 18 23 28 32 37 / 46 51 55 60 65 69 74 / 41 46 52 58 / 34 41 48 55
10			2 5 7 10 / 12 15 17 / 20 22 25	4 7 11 15 18 22 26 / 29 33 37 40 44 48 / 51 55 59 62 66 70	5 10 15 20 25 30 35 41 / 46 51 56 61 66 71 76 / 81 86 91 96 101 106	7 13 20 26 33 40 46 53 / 59 66 73 79 86 92 99 106 / 112 119 126 132 139 145
			2 5 7 / 10 12 15	4 7 11 15 18 22 26 / 29 33 37 40 44 48	5 10 15 20 25 30 35 / 41 46 51 56 61 66 71	7 13 20 26 33 40 46 53 / 59 66 73 79 86 92 99 106
	BF		2 5 7 / 10 12 / 15 17	4 7 11 15 18 22 26 / 29 33 37 40 44 48	5 10 15 20 25 30 35 / 41 46 51 56 61 66 71	7 13 20 26 33 40 46 53 / 59 66 73 79 86 92 99 106
			2 5 7	4 7 11 15 18 22	5 10 15 20 25 30 35	7 13 20 26 33 40 46 53

MORTALITY / ACRE	NO. TREES		VOL. BY SPECIES		
	2"	4"	SPEC.	CDS.	BD. FT.

AVERAGE PERCENT DEFECT 10 POLES

NUMBER OF 16-FOOT LOGS (8" OR LARGER) PER TREE

	1/2	1	1 1/2	2
A	1 2 2 3 3 4 5 / 6 6 7 8 8 9 10 / 11 11 12 13 13 / 14 15 15 16 17	2 3 4 6 7 9 10 12 13 / 15 16 18 19 21 22 24 / 25 27 28 30 31 33 34 / 36 37 39 40 42 43 45	2 4 6 8 10 12 14 16 / 18 20 22 24 26 28 30 / 32 34 36 38 40 42 44 / 46 48 50 52 54 56 58	
	1 1 2 3 3 4 5 / 6 6 7 8 8 9 10 / 11 11 12 13 13	2 3 4 6 7 9 10 12 13 / 15 16 18 19 21 22 24 / 25 27 28 30 31 33 34	2 4 6 8 10 12 14 16 / 18 20 22 24 26 28 30 / 32 34 36 38 40 42 44	
	1 1 2 3 3 4 5 / 6 6 7 8 8 9 / 11 11 12 13 13	2 3 4 6 7 9 10 12 / 13 15 16 18 19 21 22 / 25 27 28 30 31 33 34	2 4 6 8 10 12 14 16 / 18 20 22 24 26 28 30 / 32 34 36 38 40 42 44	
	1 1 2 3 3 4 5	2 3 4 6 7 9 10 12	2 4 6 8 10 12 14 16	

RECOMMENDED CUT (NET) / ACRE				
TYPE OF CUT	PERIOD	SPEC.	CORD	M BD. FT.
IMPROVEMENT	5Yr	A		
SALVAGE				
ROTATION				
TOTAL				

2 1/2	3	3 1/2
1 3 4 6 7 8 / 10 11 13 14 / 15 17 18 20 / 21 22 24 25	2 5 7 10 12 14 17 19 / 22 24 29 29 31 34 36 / 38 41 43 46 48 50 53 / 55 58 60 62 65 67 70	3 7 10 13 16 20 23 / 26 30 33 36 40 43 46 / 50 53 56 59 63 66 69 / 73 76 79 82 86 89 92

CEDAR TALLY

D.B.H.	7' Posts	8' Ties	Poles							Shingle Bolts
			20'	25'	30'	35'	40'	45'	50'	
6										
8										
10										
12										
14										
16										
18										
20										
22										
24										

SAMPLE TREE DATA

Tree No.	Dist. and bearing to tree	Spec.	DBH	Height		Tree Class	Age	Radial Gr.		Defect %
				Total	Merch			10 Yr.	20 Yr.	
		YB	3.9	45	-	6C	53	.3	.6	0
		A	11.6	71	40	1A	94	.5	.9	5

Site Classification II Operability Fair

*Supplementary Cruise Data

Type acreage _____ Cruise % _____ % Accuracy _____

Stand Description _____

_____

_____

Logging change. Easy ____ Medium ____ Difficult ____ Winter ____ Summer ____ Yearlong ____

Accessability: Miles of road to construct _____ Total road cost _____

Topography: Level ____ Rolling ____ Hilly ____ Rugged ____ Rocky ____

Recommended Silviculture: Marking _____ Species and % cut _____

Designating: Species and Method _____

Hutson-Vandenburg needs:

Planting: Acres _____ Species and Age Class _____ No. _____ Cost _____

T.S.I.: Acres _____ Kind _____ Cost _____

*To be filled in only when tally sheet is used in cruising for timber sale.

DEU - 3 - 20

UNIVERSITY OF MICHIGAN

SCHOOL OF FORESTRY AND CONSERVATION

FORM 99 R-9
REV. 6-17-47

DESIGNED BY LAKE STATES FOREST EXPERIMENT STATION USING COMPOSITE VOLUME TABLES FOR LAKE STATES TIMBER SPECIES

CUMULATIVE 1/5 ACRE TALLY SHEET

ESTIMATOR Ott DATE 7/26/48

COURSE 67Ch PLOT IR - 349 SEC. T. R.

MAP TYPE Ac'

PLOT TYPE Ac'

DBH	BC	A
2"	•	•
4"		

VOLUME IN TENTHS OF CORDS PER ACRE

VOLUME IN HUNDREDS OF BOARD FEET (SCRIBNER) PER ACRE

NUMBER OF 8-FOOT BOLTS (4" OR LARGER) PER TREE

DBH	SPEC. & LEGEND	NON-MERCH.	1	2	3	4	MORTALITY / ACRE NO. TREES 2"	MORTALITY / ACRE NO. TREES 4"	VOL. BY SPECIES: SPEC.	VOL. BY SPECIES: CDS.	VOL. BY SPECIES: BD. FT.	TOTALS PER ACRE
6	A		1 2 3 4 5 6 6 7 8 9 / 10 11 12 13 14 15 16 / 17 18 18 19 20 21 / 22 23 24 25 26 27	1 3 4 5 7 9 10 12 13 15 16 / 18 19 21 22 24 25 27 28 / 30 31 33 34 36 37 39 40 / 42 43 45 46 48 49 51 52	2 4 6 9 11 13 15 17 19 22 / 24 26 28 30 32 35 37 39 41 / 43 45 48 50 52 54 56 58 60 / 63 65 67 69 71 73 76 78 80	3 6 9 12 14 17 / 20 23 26 29 32 / 35 37 40 43 46 49 / 52 55 58 60 63 66	50	0				1.6
6			1 2 3 4 5 6 6 7 8 / 9 10 11 12 13 14 / 15 16 17 18 18 19	1 3 4 6 7 9 10 12 13 15 / 16 18 19 21 22 24 25 27 / 28 30 31 33 34 36 37 39	2 4 6 9 11 13 15 17 19 22 / 24 26 28 30 32 35 37 39 41 / 43 45 48 50 52 54 56 58 60	3 6 9 12 14 17 20 / 23 26 29 32 35 37 40 / 43 46 49 52 55 58 60						
6			1 2 3 4 5 6 6 6 7 / 8 9 10 11 12 13	1 3 4 6 7 9 10 12 13 15 / 16 18 19 21 22 24 25 27 / 29 30 32 34 36 37 39 40	2 4 6 9 11 13 15 17 19 / 22 24 26 28 30 32 35 37 / 43 45 48 50 52 54 56 58 60	3 6 9 12 14 17 20 23 / 26 29 32 35 37 40 43 46 / 49 52 55 58 60 63 66						
6			1 2 3 4 5 6 6 / 7 8 9 10 11 12 13	1 3 4 6 7 9 10 12 13 15 / 16 18 19 21 22 24 25 27 / 29 30 32 34 36 37 39 40	2 4 6 9 11 13 15 17 19 / 22 24 26 28 30 32 35 37 / 43 45 46 49	3 6 9 12 14 17 20 23 26 / 29 32 35 37 40 43 46 49						
8	A		2 3 5 6 8 10 11 / 13 14 16 18 / 19 21 22 24 / 26 27 29 30	2 5 7 10 12 15 17 20 22 / 25 27 30 32 35 37 40 / 42 45 47 50 52 55 57 / 60 62 64 67 69 72 74	3 7 10 14 17 21 24 28 / 31 35 38 42 45 49 52 56 / 60 63 66 70 73 77 80 84 / 87 91 94 98 101 105 108	5 9 14 18 23 28 32 37 41 / 46 51 55 60 65 69 74 78 / 83 88 92 97 101 106 111 / 115 120 124 129 134 138	5	6				1.7
8	WP		2 3 5 6 8 10 / 11 13 14 16 / 18 19 21 22	2 5 7 10 12 15 17 20 / 22 25 27 30 32 35 37 / 40 42 45 47 50 52 55	3 7 10 14 17 21 24 28 / 31 35 38 42 45 49 52 56 / 60 63 66 70 73 77 80 84	5 9 14 18 23 28 32 37 41 / 46 51 55 60 65 69 74 78 / 83 88 92 97 101 106 111	6 12 17 23 / 29 35 41 46 / 52 58 64 70	7 14 21 / 28 34 41 / 48 55 62	AVERAGE PERCENT DEFECT 5 POLES			.2
8			2 3 5 6 8 / 10 11 13	2 5 7 10 12 15 17 20 / 22 25 27 30 32 35 37	3 7 10 14 17 21 24 28 / 31 35 38 42 45 49 52 56	5 9 14 18 23 28 32 37 / 41 46 51 55 60 65 69 74	6 12 17 23 29 / 35 41 46 52 58	7 14 21 28 / 34 41 48 55				
8			2 3 5 6 8 / 10 11 13	2 5 7 10 12 15 17 20 / 22 25 27 30 32 35	3 7 10 14 17 21 24 28 / 31 35 38 42 45 49 52	5 9 14 18 23 28 32 37 / 41 46 51 55 60 65 69 74	6 12 17 23 29 / 35 41 46 52 58	7 14 21 28 / 34 41 48 55				
10			2 5 7 10 / 12 15 17 / 20 22 25	4 7 11 15 18 22 26 / 29 33 37 40 44 48 / 51 55 59 62 66 70	5 10 15 20 25 30 35 41 / 46 51 56 61 66 71 76 / 81 86 91 96 101 106	7 13 20 26 33 40 46 53 / 59 66 73 79 86 92 99 106 / 112 119 126 132 139 145	8 17 25 33 42 / 50 58 67 75 83 / 92 100 109 117	10 20 30 40 50 / 60 70 80 90 100 / 110 120 130 140	7	12 24 36 48 / 60 72 84 96 / 108 120 132			
10			2 5 7 / 10 12 15	4 7 11 15 18 22 26 / 29 33 37 40 44 48	5 10 15 20 25 30 35 / 41 46 51 56 61 66 71	7 13 20 26 33 40 46 53 / 59 66 73 79 86 92 99 106	8 17 25 33 42 / 50 58 67 75 83	10 20 30 40 50 / 60 70 80 90 100		12 24 36 48 / 60 72 84 96		
10			2 5 7 / 10 12 / 15	4 7 11 15 18 22 26 / 29 33 37 40 44 48	5 10 15 20 25 30 35 / 41 46 51 56 61 66 71	7 13 20 26 33 40 46 53 / 59 66 73 79 86 92 99 106	8 17 25 33 42 50 / 58 67 75 83 92 100	10 20 30 40 50 60 / 70 80 90 100 110		12 24 36 48 / 60 72 84 96		
10			2 5 7 / 10 12	4 7 11 15 18 22	5 10 15 20 25 30 35	7 13 20 26 33 40 46 53 / 59 66 73 79 86 92 99 106	8 17 25 33 42 50 / 58 67 75 83 92 100	10 20 30 40 50 60 / 70 80 90 100 110		12 24 36 48 / 60 72 84 96		
10			2 5 7	4 7 11 15 18 22	5 10 15 20 25 30 35	7 13 20 26 33 40 46 53	8 17 25 33 42 50	10 20 30 40 50 60		12 24 36 48		

NUMBER OF 16-FOOT LOGS (8" OR LARGER) PER TREE

1/2	1	1 1/2	2	RECOMMENDED CUT (NET) / ACRE: TYPE OF CUT	PERIOD	SPEC.	CORD	M BD. FT.	TOT. CORDS 3.5
1 1 2 3 3 4 5 / 6 6 7 8 8 9 10 / 11 11 12 13 13 / 14 15 15 16 17	2 3 4 6 7 9 10 12 13 / 15 16 18 19 21 22 24 / 25 27 28 30 31 33 34 / 36 37 39 40 42 43 45	2 4 6 8 10 12 14 16 / 18 20 22 24 26 28 30 / 32 34 36 38 40 42 44 / 46 48 50 52 54 56 58		IMPROVEMENT	20+				
1 1 2 3 3 4 5 / 6 6 7 8 8 9 10 / 11 11 12 13 13	2 3 4 6 7 9 10 12 13 / 15 16 18 19 21 22 24 / 25 27 28 30 31 33 34	2 4 6 8 10 12 14 16 / 18 20 22 24 26 28 30 / 32 34 36 38 40 42 44		SALVAGE					
1 1 2 3 3 4 5 / 6 6 7 8 8 9	2 3 4 6 7 9 10 12 / 13 15 16 18 19 21 22	2 4 6 8 10 12 14 16 / 18 20 22 24 26 28 30		ROTATION					
1 1 2 3 3 4 5	2 3 4 6 7 9 10 12	2 4 6 8 10 12 14 16							

1/2	1	1 1/2	2	2 1/2	TOTAL NET VOLUME: SPECIES	CORDS	M. BD. FT.
1 3 4 6 7 8 / 10 11 13 14 / 15 17 18 20 / 21 22 24 25	2 5 7 10 12 14 17 19 / 22 24 29 29 31 34 36 / 38 41 43 46 48 50 53 / 55 58 60 62 65 67 70	3 7 10 13 16 20 23 / 26 30 33 36 40 43 46 / 49 53 56 59 63 66 69 / 73 76 79 82 8689 92	4 8 12 16 20 23 / 27 31 35 39 43 47 / 51 55 58 62 66 70 / 74 78 82 86 90 94	5 10 15 19 / 24 29 34 39 / 44 48 53 58 / 63 68 73 78			
1 3 4 6 7 8 / 10 11 13 14 / 15 17 18 20	2 5 7 10 12 14 17 19 / 22 24 29 29 31 34 / 36 38 41 43 46 48	3 7 10 13 16 20 23 / 26 30 33 36 40 43 / 46 50 53 56 59 63	4 8 12 16 20 23 / 27 31 35 39 43 47 / 51 55 58 62 66 70	5 10 15 19 / 24 29 34 39 / 44 48 53 58			
1 3 4 6 7 8 / 10 11 13 14	2 5 7 10 12 14 17 19 / 22 24 29 29 31 34	3 7 10 13 16 20 23 / 26 30 33 36 40 43	4 8 12 16 20 23 / 27 31 35 39 43 47	5 10 15 19 / 24 29 34 39			
1 3 4 6 7 8	2 5 7 10 12 14 17 19	3 7 10 13 16 20 23	4 8 12 16 20 23	5 10 15 19 24			

3	3 1/2	AVERAGE PERCENT DEFECT SAWTIMBER: 4	4 1/2	5
2 4 6 8 10 12 / 14 16 18 20 / 22 24 26 28	4 7 10 14 18 21 24 / 28 32 35 38 42 46 / 49 52 56 60 63 66	5 10 14 19 24 29 34 / 38 43 48 53 58 62 / 67 72 77 82 86 91	6 12 17 23 29 35 / 41 46 52 58 64 70 / 75 81 87 93 99	7 14 21 28 / 35 42 49 56 / 63 70 78 85	8 16 25 33 / 41 50 58 66 / 74 82	9 19 / 28 38 / 47 57			
2 4 6 8 10 12 / 14 16 18 20	4 7 10 14 18 21 24 / 28 32 35 38 42 46	5 10 14 19 24 29 34 / 38 43 48 53 58 62	6 12 17 23 29 35 / 41 46 52 58 64 70	7 14 21 28 / 35 42 49 56	8 16 25 33 / 41 50 58 66	9 19 / 28 38			
2 4 6 8 10 / 12 14 16 18	4 7 10 14 18 21 24 / 28 32 35 38 42 46	5 10 14 19 24 29 34 / 38 43 48 53 58 62	6 12 17 23 29 35 / 41 46 52 58 64 70	7 14 21 28 / 35 42 49 56	8 16 25 33 / 41 50 58 66	9 19 / 28 38			
2 4 6 8 10	4 7 10 14 18 21 24	5 10 14 19 24 29 34	6 12 17 23 29 35	7 14 21 28	8 16 25 33	9 19	14 28		
3 5 8 11 14 / 16 19 22 24	5 9 14 19 23 28 / 33 37 42 46 51 56	6 13 19 26 32 39 / 45 52 58 64 71 77	8 15 24 32 40 47 / 55 63 71 79 87 95	10 19 29 38 / 48 57 67 76	11 22 34 45 / 56 67 78 90	13 25 / 38 50	14 28 / 42 56		
3 5 8 11 14 / 16 19 22 24	5 9 14 19 23 28 / 33 37 42 46 51 56	6 13 19 26 32 39 / 45 52 58 64 71 77	8 15 24 32 40 47 / 55 63 71 79 87 95	10 19 29 38 / 48 57 67 76	11 22 34 45 / 56 67 78 90	13 25 / 38 50	14 28 / 42 56		
3 5 8 11 14	5 9 14 19 23 28	6 13 19 26 32 39	8 15 24 32 40 47	10 19 29 38	11 22 34 45	13 25	14 28		
3 5 8 11 14	5 9 14 19 23 28	6 13 19 26 32 39	8 15 24 32 40 47	10 19 29 38	11 22 34 45	13 25	14 28		
4 7 11 14 / 18 22 25	6 12 18 24 30 37 / 43 49 55 61 69	8 17 25 34 42 50 / 59 67 76 84 92	10 21 31 41 52 62 / 72 83 93 104 114	12 25 37 50 / 62 74 87 99	15 29 44 58 / 73 88 102	16 32 / 48 65	18 36 / 53 71		
4 7 11 14	6 12 18 24 30 37	8 17 25 34 42 50	10 21 31 41 52 62	12 25 37 50	15 29 44 58	16 32	18 36		
4 7 11 14	6 12 18 24 30 37	8 17 25 34 42 50	10 21 31 41 52 62	12 25 37 50	15 29 44 58	16 32	18 36		
4 7 11 14	6 12 18 24 30 37	8 17 25 34 42 50	10 21 31 41 52 62	12 25 37 50	15 29 44 58	16 32	18 36		
4 9 14 18 / 22 27 32	8 16 23 31 39 47 / 55 62 70 78 86	11 21 32 42 53 64 / 74 85 95 106 117	13 26 39 52 66 79 / 92 105 118 131 144	16 32 48 63 79 / 95 111 127 143	18 37 55 73 / 92 110 128	20 41 / 61 81	23 45 / 68 90	25 50 / 75 100	27
4 9 14 18	8 16 23 31 39 47	11 21 32 42 53 64	13 26 39 52 66 79	16 32 48 63 79	18 37 55 73	20 41	23 45	25 50	27
4 9 14 18	8 16 23 31 39 47	11 21 32 42 53 64	13 26 39 52 66 79	16 32 42 63 79	18 37 55 73	20 41	23 45	25 50	27
4 9 14 18	8 16 23 31 39	11 21 32 42 53 64	13 26 39 52 66 79	16 32 42 63 79	18 37 55 73	20 41	23 45	25 50	27
6 11 17 22	10 19 29 39 48	13 26 39 52 66	16 33 49 66 82 98	20 39 59 78	23 45 68 90	25 50	28 56	31 62	33
6 11 17 22	10 19 29 39 48	13 26 39 52 66	16 33 49 66 82 98	20 39 59 78	23 45 68 90	25 50	28 56	31 62	33
6 11 17 22	10 19 29 39 48	13 26 39 52 66	16 33 49 66 82 98	20 39 59 78	23 45 68 90	25 50	28 56	31 62	33
7 14 21	12 24 35 47 59	16 32 48 64 80	20 40 60 80 100	24 47 71 94	27 55 82 110	31 61	34 69	38 75	41
7 14 21	12 24 35 47 59	16 32 48 64 80	20 40 60 80 100	24 47 71 94	27 55 82 110	31 61	34 69	38 75	41
7 14 21	12 24 35 47 59	16 32 48 64 80	20 40 60 80 100	24 47 71 94	24 55 82 110	31 61	34 69	38 75	41
8 16 25	14 28 42 56 70	19 38 57 76 95	24 48 72 96 120 143	28 57 85 113	33 65 98 131	36 73	41 82	45 90	49
8 16 25	14 28 42 56 70	19 38 57 76 95	24 48 72 96 120 143	28 57 85 113	33 65 98 131	36 73	41 82	45 90	49
10 20 29	17 33 50 66	22 45 67 90 112	28 55 84 112 140 168	33 66 100 133	38 76 115 153	43 86	48 96	53	57
10 20 29	17 33 50 66	22 45 67 90 112	28 55 84 112 140 168	33 66 100 133	38 76 115 153	43 86	48 96	53	57
11 23 34	19 38 57 77	26 52 78 104	32 65 97 130 162	39 77 116 154	44 89 133 177	50 100	56 111	61	67
11 23 34	19 38 57 77	26 52 78 104	32 65 97 130 162	39 77 116 154	44 89 133 177	50 100	56 111	61	67
13 26 39	22 44 66 88	30 60 90 120	37 75 112 149 186	44 89 133 178	51 102 153 204	57 114	64 128	71	78
13 26 39	22 44 66 88	30 60 90 120	37 75 112 149 186	44 89 133 178	51 102 153 204	57 114	64 128	71	78
15 29	25 50 75 100	34 68 102 136	42 85 127 169 212 254	50 101 151 202	58 116 174 232	65 129	73 146	81	89
16 33	28 56 85 113	38 77 115 153	48 96 143 191 239	57 114 170 227	65 131 196 261	73 146	82 164	92	101
18 36	32 63 95 127	43 86 128 171	53 107 160 214 267	63 127 190 254	73 146 219 293	82 164	92 184	103	115
20 40	35 70 105	48 95 143 190	59 118 177 237 296	70 141 211 281	82 163 245 326	91 182	103 205	116	129
22 44	39 78 117 155	53 106 158 211	65 130 196 261 326	78 155 232 310	90 180 270 360	101 202	113 225	129	145

FORM 6827

CEDAR TALLY

D.B.H.	7' Posts	8' Ties	Poles 20'	25'	30'	35'	40'	45'	50'	Shingle Bolts
6										
8										
10										
12										
14										
16										
18										
20										
22										
24										

SAMPLE TREE DATA

Tree No.	Dist. and bearing to tree	Spec.	DBH	Height		Tree Class	Age	Radial Gr.		Defect %
				Total	Merch			10 Yr.	20 Yr.	
		A	5.3	37	8	2B	19	1.0	-	5
		A	6.9	40	29	1B	29	1.4	2.6	0

Site Classification II Operability Good

*Supplementary Cruise Data

Type acreage _____ Cruise % _____ % Accuracy _____

Stand Description _____

Logging change. Easy ____ Medium ____ Difficult ____ Winter ____ Summer ____ Yearlong ____

Accessability: Miles of road to construct _____ Total road cost _____

Topography: Level ____ Rolling ____ Hilly ____ Rugged ____ Rocky ____

Recommended Silviculture: Marking _____ Species and % cut _____

Designating: Species and Method _____

Hutson-Vandenburg needs:

Planting: Acres _____ Species and Age Class _____ No. _____ Cost _____

T.S.I.: Acres _____ Kind _____ Cost _____

*To be filled in only when tally sheet is used in cruising for timber sale.

DEU - 3 - 20

UNIVERSITY OF MICHIGAN

SCHOOL OF FORESTRY AND CONSERVATION

FORM 99 R-9
REV. 6-17-47

DESIGNED BY LAKE STATES FOREST EXPERIMENT STATION USING COMPOSITE VOLUME TABLES FOR LAKE STATES TIMBER SPECIES

DBH	A	RM
2"	••	☒
4"	⁘	

CUMULATIVE 1/5 ACRE TALLY SHEET

ESTIMATOR DDL DATE 7/26/48

COURSE 100Ch PLOT IR - 350 SEC. T. R.

MAP TYPE Ac11

PLOT TYPE Ac11

VOLUME IN TENTHS OF CORDS PER ACRE

VOLUME IN HUNDREDS OF BOARD FEET (SCRIBNER) PER ACRE

DBH	SPEC. & LEGEND	NON-MERCH.	NUMBER OF 8-FOOT BOLTS (4" OR LARGER) PER TREE				MORTALITY / ACRE				TOTALS PER ACRE
			1	2	3	4	NO. TREES 2"	NO. TREES 4"	VOL. BY SPECIES SPEC.	VOL. BY SPECIES CDS.	VOL. BY SPECIES BD. FT.
6	A		1 2 3 4 5 6 6 7 8 9 / 10 11 12 13 14 15 16 / 17 18 18 19 20 21 / 22 23 24 25 26 27	18 19 21 22 24 25 27 28 / 30 31 33 34 36 37 39 40 / 42 43 45 46 48 49 51 52	20 23 26 29 32 / 35 37 39 41 / 43 45 48 50 52 54 56 58 60 / 63 65 67 69 71 73 76 78 80	35 37 40 43 46 49 / 52 55 58 60 63 66	200	100			6.2
8	A		1 2 3 4 5 6 6 7 8 / 9 10 11 12 13 14 / 15 16 17 18 18 19	1 3 4 6 7 9 10 12 13 15 / 16 18 19 21 22 24 25 27 / 28 30 31 33 34 36 37 39	2 4 6 9 11 13 15 17 19 22 / 24 26 28 30 32 35 37 39 41 / 43 45 48 50 52 54 56 58 60	3 6 9 12 14 17 20 / 23 26 29 32 35 37 40 / 43 46 49 52 55 58 60					
			1 2 3 4 5 6 6 7 / 8 9 10 11 12 13	1 3 4 6 7 9 10 12 13 15 / 16 18 19 21 22 24 25 27	2 4 6 9 11 13 15 17 19 / 22 24 26 28 30 32 35 37	3 6 9 12 14 17 20 23 / 26 29 32 35 37 40 43 46					
			1 2 3 4 5 6 6 / 7 8 9 10 11 12 13	1 3 4 6 7 9 10 12 13 15 / 16 18 19 21 22 24 25 27	2 4 6 9 11 13 15 17 19 / 22 24 26 28 30 32 35 37	3 6 9 12 14 17 20 23 26 / 29 32 35 37 40 43 46 49					
10	A		2 3 5 6 8 10 11 / 13 14 16 18 / 19 21 22 24 / 26 27 29 30	2 5 7 10 12 15 17 20 22 / 25 27 30 32 35 37 40 / 42 45 47 50 52 55 57 / 60 62 64 67 69 72 74	21 24 28 / 31 35 38 42 45 49 52 56 / 60 63 66 70 73 77 80 84 / 87 91 94 98 101 105 108	5 / 6 12 17 / 23 29 35 / 41 46 52 58 / 64 70 75 81 / 88 92 97 101 106 111 / 115 120 124 129 134 138	6 12 17 / 23 29 35 / 41 46 52 58 / 64 70 75 81 / 88 92 97 101 106 111 / 115 120 124 129 134 138	7 14 / 21 28 / 34 41 48 / 55 62 69			8.6
			2 3 5 6 8 10 / 11 13 14 16 / 18 19 21 22	2 5 7 10 12 15 17 20 / 22 25 27 30 32 35 37 / 40 42 45 47 50 52 55	3 7 10 14 17 21 24 28 / 31 35 38 42 45 49 52 56 / 60 63 66 70 73 77 80 84	5 9 14 18 23 28 32 37 41 / 46 51 55 60 65 69 74 78 / 83 88 92 97 101 106 111 / 115 120 124 129 134 138	6 12 17 23 / 29 35 41 46 / 52 58 64 70 / 75 81 86 90	7 14 21 / 28 34 41 / 48 55 62			
			2 3 5 6 8 / 10 11 13 / 14 16 18 / 19 21 22 24	2 5 7 10 12 15 17 20 / 22 25 27 30 32 35 37 / 40 42 45 47 50 52 55	3 7 10 14 17 21 24 28 / 31 35 38 42 45 49 52 56 / 60 63 66 70 73 77 80 84	5 9 14 18 23 28 32 37 41 / 46 51 55 60 65 69 74 78 / 83 88 92 97 101 106 111	6 12 17 23 29 / 35 41 46 52 58 / 64 70 75 81 / 86 90	7 14 21 28 / 34 41 48 55 / 62 69

CEDAR TALLY

D.B.H.	7' Posts	8' Ties	Poles 20'	25'	30'	35'	40'	45'	50'	Shingle Bolts
6										
8										
10										
12										
14										
16										
18										
20										
22										
24										

SAMPLE TREE DATA

Tree No.	Dist. and bearing to tree	Spec.	DBH	Height		Tree Class	Age	Radial Gr.		Defect %
				Total	Merch			10 Yr.	20 Yr.	
		A	5.3	60	17	4B	42	.5	1.1	0
		A	7.1	60	35	3B	43	1.1	2.1	0

te Classification II Operability Good

*Supplementary Cruise Data

pe acreage _____ Cruise % _____ % Accuracy _____

and Description _____

gging change. Easy ___ Medium ___ Difficult ___ Winter ___ Summer ___ Yearlong ___

cessability: Miles of road to construct _____ Total road cost _____

pography: Level ___ Rolling ___ Hilly ___ Rugged ___ Rocky ___

commended Silviculture: Marking _____ Species and % cut _____

signating: Species and Method _____

utson-Vandenburg needs:

anting: Acres _____ Species and Age Class _____ No. _____ Cost _____

S.I.: Acres _____ Kind _____ Cost _____

o be filled in only when tally sheet is used in cruising for timber sale.

DEU - 1 - 15

UNIVERSITY OF MICHIGAN

SCHOOL OF FORESTRY AND CONSERVATION

FORM 99 R-9
REV. 6-17-47

DESIGNED BY LAKE STATES FOREST EXPERIMENT STATION USING COMPOSITE VOLUME TABLES FOR LAKE STATES TIMBER SPECIES

CUMULATIVE 1/5 ACRE TALLY SHEET

ESTIMATOR LWL DATE 8/27/48

COURSE 292Ch. PLOT IR - 70 SEC. ____ T. ____ R. ____

MAP TYPE Ac'11

PLOT TYPE Ac'11

DBH	RM	BF
2"	••	
4"	••	•

NUMBER OF 8-FOOT BOLTS (4" OR LARGER) PER TREE

DBH	SPEC. & LEGEND	NON-MERCH.	1	2	3	4	5	6
6	A		1 2 3 4 5 6 6 7 8 8 9 10 10 11 12 13 14 15 16 17 18 18 19 20 21 22 23 24 25 26 27	8 8 4 6 7 9 10 12 13 15 16 18 19 21 22 24 25 27 28 30 31 33 34 36 37 39 40 42 43 45 46 48 49 51 52	2 4 6 8 9 11 13 15 17 19 22 24 26 28 30 32 35 37 39 41 43 45 48 50 52 54 56 58 60 63 65 67 69 71 73 76 78 80	8 8 8 12 14 17 20 25 26 29 32 35 37 40 43 46 49 52 55 58 60 63 66		
	WB		1 2 3 4 5 6 6 7 8 9 10 11 12 13 14 15 16 17 18 18 19 28 30 31 33 34 36 37 39	8 3 4 6 7 9 10 12 13 15 16 18 19 21 22 24 25 27 28 30 31 33 34 36 37 39 40 42 43 45 46 48 49 51 52	2 4 6 9 11 13 15 17 19 22 24 26 28 30 32 35 37 39 41 43 45 48 50 52 54 56 58 60 63 65 67 69 71 73 76 78 80	8 6 9 12 14 17 20 23 26 29 32 35 37 40 43 46 49 52 55 58 60		
			1 2 3 4 5 6 6 7 8 9 10 11 12 13 16 18 19 21 22 24 25 27 30 31 33 34 36 37 39 40 42 43 45 46 48 49 51 52	1 3 4 6 7 9 10 12 13 15 16 18 19 21 22 24 25 27 28 30 31 33 34 36 37 39 40 42 43 45 46 48 49 51 52	2 4 6 9 11 13 15 17 19 22 24 26 28 30 32 35 37 63 65 67 69 71 73 76 78 80	3 6 9 12 14 17 20 23 26 29 32 35 37 40 43 46 49 52 55 58 60		
			1 2 3 4 5 6 6 7 8 9 10 11 12 13 16 18 19 21 22 24 25 27 28 30 31 33 34 36 37 39 40 42 43 45 46 48 49 51 52	1 3 4 6 7 9 10 12 13 15 16 18 19 21 22 24 25 27 28 30 31 33 34 36 37 39 40 42 43 45 46 48 49 51 52	2 4 6 9 11 13 15 17 19 22 24 26 28 30 32 35 37 63 65 67 69 71 73 76 78 80	3 6 9 12 14 17 20 23 26 29 32 35 37 40 43 46 49 52 55 58 60		
8	BS-0		2 3 5 6 8 10 11 13 14 16 18 19 21 22 24 26 27 29 30	2 5 7 10 12 15 17 20 22 25 27 30 32 35 37 40 42 45 47 50 52 55 57 60 63 66 70 73 77 80 84 87 91 94 98 101 105 108	8 8 10 14 17 21 24 28 31 35 38 42 45 49 52 56 60 63 66 70 73 77 80 84	8 8 14 18 23 28 32 37 41 46 51 55 60 65 69 74 78 83 88 92 97 101 106 111 115 120 124 129 134 138	8 12 17 23 28 33 38 44 49 54 59 64 70 75 81	0 14 21 28 34 41 48 55 62 69
	A							
	WB		3 5 6 8 10 11 13 14 16 18 19 21 22	2 5 7 10 12 15 17 20 22 25 27 30 32 35 37 40 42 45 47 50 52 55 60 63 66 70 73 77 80 84	3 7 10 14 17 21 24 28 31 35 38 42 45 49 52 56 63 66 70 73 77 80 84	5 9 14 18 23 28 32 37 41 46 51 55 60 65 69 74 78 83 88 92 97 101 106 111	6 12 17 23 29 35 41 46 52 58 64 70	7 14 21 28 34 41 48 55 62
	WS		2 3 5 6 8 10 11 13 14 16 18 19 21 22	2 5 7 10 12 15 17 20 22 25 27 30 32 35 37 40 42 45 47 50 52 56 60 63 66 70 73 77 80 84	3 7 10 14 17 21 24 28 31 35 38 42 45 49 52 56 63 66 70 73 77 80 84	8 8 14 18 23 28 32 37 41 46 51 55 60 65 69 74 78 83 88 92 97 101 106 111	6 12 17 23 29 35 41 46 52 58 64 70	7 14 21 28 34 41 48 55 62
	BF		2 3 5 6 8 10 11 13 14 16 18 19 21 22	2 5 7 10 12 15 17 20 22 25 27 30 32 35 37 40 42 45 47 50 52 56 60 63 66 70 73 77 80 84	3 7 10 14 17 21 24 28 31 35 38 42 45 49 52 56 63 66 70 73 77 80 84	8 8 14 18 23 28 32 37 41 46 51 55 60 65 69 74 78 83 88 92 97 101 106 111	6 12 17 23 29 35 41 46 52 58 64 70	7 14 21 28 34 41 48 55 62
10	VOLUME IN TENTHS OF CORDS PER ACRE		2 5 7 10 12 15 18 20 22 25 28 30 32 35 37 40 42 45 47 50 52 55 57 60 62 65 67 70 72 75 77 80 82 85 87 90 92 95 97 100 102 105 107 110 112 115 117 120 122 125 127 130 132 135 137 140 142 145 147 150 152 155 157 160 162 165 167 170 172 175 177 180 182 185 187 190 192 195 197 200 202 205 207 210 212 215 217 220 222 225 227 230 232 235 237 240 242 245 247 250 252 255 257 260 262 265 267 270 272 275 277 280 282 285 287 290 292 295 297 300 302 305 307 310 312 315 317 320 322 325 327 330 332 335 337 340 342 345 347 350 352 355 357 360 362 365 367 370 372 375 377 380 382 385 387 390 392 395 397 400 402 405 407 410 412 415 417 420 422 425 427 430 432 435 437 440 442 445 447 450 452 455 457 460 462 465 467 470 472 475 477 480 482 485 487 490 492 495 497 500 502 505 507 510 512 515 517 520 522 525 527 530 532 535 537 540 542 545 547 550 552 555 557 560 562 565 567 570 572 575 577 580 582 585 587 590 592 595 597 600 602 605 607 610 612 615 617 620 622 625 627 630 632 635 637 640 642 645 647 650 652 655 657 660 662 665 667 670 672 675 677 680 682 685 687 690 692 695 697 700 702 705 707 710 712 715 717 720 722 725 727 730 732 735 737 740 742 745 747 750 752 755 757 760 762 765 767 770 772 775 777 780 782 785 787 790 792 795 797 800 802 805 807 810 812 815 817 820 822 825 827 830 832 835 837 840 842 845 847 850 852 855 857 860 862 865 867 870 872 875 877 880 882 885 887 890 892 895 897 900 902 905 907 910 912 915 917 920 922 925 927 930 932 935 937 940 942 945 947 950 952 955 957 960 962 965 967 970 972 975 977 980 982 985 987 990 992 995 997 1000	4 6 8 9 11 13 15 17 19 22 24 26 28 30 32 35 37 39 41 43 45 48 50 52 54 56 58 60 63 65 67 69 71 73 76 78 80 82 84 87 89 91 93 95 97 100 102 104 106 108 111 113 115 117 119 121 124 126 128 130 132 134 137 139 141 143 145 147 150 152 154 156 158 160 163 165 167 169 171 173 176 178 180 182 184 186 189 191 193 195 197 199 202 204 206 208 210 212 215 217 219 221 223 225 228 230 232 234 236 238 241 243 245 247 249 251 254 256 258 260 262 264 267 269 271 273 275 277 280 282 284 286 288 290 293 295 297 299 301 303 306 308 310 312 314 316 319 321 323 325 327 329 332 334 336 338 340 342 345 347 349 351 353 355 358 360 362 364 366 368 371 373 375 377 379 381 384 386 388 390 392 394 397 399 401 403 405 407 410 412 414 416 418 420 423 425 427 429 431 433 436 438 440 442 444 446 449 451 453 455 457 459 462 464 466 468 470 472 475 477 479 481 483 485 488 490 492 494 496 498 501 503 505 507 509 511 514 516 518 520 522 524 527 529 531 533 535 537 540 542 544 546 548 550 553 555 557 559 561 563 566 568 570 572 574 576 579 581 583 585 587 589 592 594 596 598 600 602 605 607 609 611 613 615 618 620 622 624 626 628 631 633 635 637 639 641 644 646 648 650 652 654 657 659 661 663 665 667 670 672 674 676 678 680 683 685 687 689 691 693 696 698 700	2 4 6 8 10 12 14 16 18 20 22 24 26 28 30 32 34 36 38 40 42 44 46 48 50 52 54 56 58 60 62 64 66 68 70 72 74 76 78 80 82 84 86 88 90 92 94 96 98 100 102 104 106 108 110 112 114 116 118 120 122 124 126 128 130 132 134 136 138 140 142 144 146 148 150 152 154 156 158 160 162 164 166 168 170 172 174 176 178 180 182 184 186 188 190 192 194 196 198 200 202 204 206 208 210 212 214 216 218 220 222 224 226 228 230 232 234 236 238 240 242 244 246 248 250 252 254 256 258 260 262 264 266 268 270 272 274 276 278 280 282 284 286 288 290 292 294 296 298 300 302 304 306 308 310 312 314 316 318 320 322 324 326 328 330 332 334 336 338 340 342 344 346 348 350 352 354 356 358 360 362 364 366 368 370 372 374 376 378 380 382 384 386 388 390 392 394 396 398 400	3 6 9 12 15 18 21 24 27 30 33 36 39 42 45 48 51 54 57 60 63 66 69 72 75 78 81 84 87 90 93 96 99 102 105 108 111 114 117 120 123 126 129 132 135 138 141 144 147 150 153 156 159 162 165 168 171 174 177 180 183 186 189 192 195 198 201 204 207 210 213 216 219 222 225 228 231 234 237 240 243 246 249 252 255 258 261 264 267 270 273 276 279 282 285 288 291 294 297 300 303 306 309 312 315 318 321 324 327 330 333 336 339 342 345 348 351 354 357 360 363 366 369 372 375 378 381 384 387 390 393 396 399 402 405 408 411 414 417 420 423 426 429 432 435 438 441 444 447 450 453 456 459 462 465 468 471 474 477 480 483 486 489 492 495 498 501 504 507 510 513 516 519 522 525 528 531 534 537 540 543 546 549 552 555 558 561 564 567 570 573 576 579 582 585 588 591 594 597 600	4 8 12 16 20 24 28 32 36 40 44 48 52 56 60 64 68 72 76 80 84 88 92 96 100 104 108 112 116 120 124 128 132 136 140 144 148 152 156 160 164 168 172 176 180 184 188 192 196 200	5 10 15 20 25 30 35 40 45 50 55 60 65 70 75 80 85 90 95 100 105 110 115 120 125 130 135 140 145 150 155 160 165 170 175 180 185 190 195 200
12	VOLUME IN HUNDREDS OF BOARD FEET (SCRIBNER) PER ACRE		2 5 7 10 12 15 18 20 22 25 28 30 32 35 37 40 42 45 47 50 52 55 57 60 62 65 67 70 72 75 77 80 82 85 87 90 92 95 97 100 102 105 107 110 112 115 117 120 122 125 127 130 132 135 137 140 142 145 147 150 152 155 157 160 162 165 167 170 172 175 177 180 182 185 187 190 192 195 197 200 202 205 207 210 212 215 217 220 222 225 227 230 232 235 237 240 242 245 247 250 252 255 257 260 262 265 267 270 272 275 277 280 282 285 287 290 292 295 297 300 302 305 307 310 312 315 317 320 322 325 327 330 332 335 337 340 342 345 347 350 352 355 357 360 362 365 367 370 372 375 377 380 382 385 387 390 392 395 397 400 402 405 407 410 412 415 417 420 422 425 427 430 432 435 437 440 442 445 447 450 452 455 457 460 462 465 467 470 472 475 477 480 482 485 487 490 492 495 497 500 502 505 507 510 512 515 517 520 522 525 527 530 532 535 537 540 542 545 547 550 552 555 557 560 562 565 567 570 572 575 577 580 582 585 587 590 592 595 597 600 602 605 607 610 612 615 617 620 622 625 627 630 632 635 637 640 642 645 647 650 652 655 657 660 662 665 667 670 672 675 677 680 682 685 687 690 692 695 697 700	4 6 8 10 12 14 16 18 20 22 24 26 28 30 32 34 36 38 40 42 44 46 48 50 52 54 56 58 60 62 64 66 68 70 72 74 76 78 80 82 84 86 88 90 92 94 96 98 100 102 104 106 108 110 112 114 116 118 120 122 124 126 128 130 132 134 136 138 140 142 144 146 148 150 152 154 156 158 160 162 164 166 168 170 172 174 176 178 180 182 184 186 188 190 192 194 196 198 200 202 204 206 208 210 212 214 216 218 220 222 224 226 228 230 232 234 236 238 240 242 244 246 248 250 252 254 256 258 260 262 264 266 268 270 272 274 276 278 280 282 284 286 288 290 292 294 296 298 300 302 304 306 308 310 312 314 316 318 320 322 324 326 328 330 332 334 336 338 340 342 344 346 348 350 352 354 356 358 360 362 364 366 368 370 372 374 376 378 380 382 384 386 388 390 392 394 396 398 400	3 6 9 12 15 18 21 24 27 30 33 36 39 42 45 48 51 54 57 60 63 66 69 72 75 78 81 84 87 90 93 96 99 102 105 108 111 114 117 120 123 126 129 132 135 138 141 144 147 150 153 156 159 162 165 168 171 174 177 180 183 186 189 192 195 198 201 204 207 210 213 216 219 222 225 228 231 234 237 240 243 246 249 252 255 258 261 264 267 270 273 276 279 282 285 288 291 294 297 300 303 306 309 312 315 318 321 324 327 330 333 336 339 342 345 348 351 354 357 360 363 366 369 372 375 378 381 384 387 390 393 396 399 402 405 408 411 414 417 420 423 426 429 432 435 438 441 444 447 450 453 456 459 462 465 468 471 474 477 480 483 486 489 492 495 498 501 504 507 510 513 516 519 522 525 528 531 534 537 540 543 546 549 552 555 558 561 564 567 570 573 576 579 582 585 588 591 594 597 600	4 8 12 16 20 24 28 32 36 40 44 48 52 56 60 64 68 72 76 80 84 88 92 96 100 104 108 112 116 120 124 128 132 136 140 144 148 152 156 160 164 168 172 176 180 184 188 192 196 200	5 10 15 20 25 30 35 40 45 50 55 60 65 70 75 80 85 90 95 100 105 110 115 120 125 130 135 140 145 150 155 160 165 170 175 180 185 190 195 200
14			2 4 6 8 10 12 14 16 18 20 22 24 26 28 30 32 34 36 38 40 42 44 46 48 50 52 54 56 58 60 62 64 66 68 70 72 74 76 78 80 82 84 86 88 90 92 94 96 98 100 102 104 106 108 110 112 114 116 118 120 122 124 126 128 130 132 134 136 138 140 142 144 146 148 150 152 154 156 158 160 162 164 166 168 170 172 174 176 178 180 182 184 186 188 190 192 194 196 198 200 202 204 206 208 210 212 214 216 218 220 222 224 226 228 230 232 234 236 238 240 242 244 246 248 250 252 254 256 258 260 262 264 266 268 270 272 274 276 278 280 282 284 286 288 290 292 294 296 298 300 302 304 306 308 310 312 314 316 318 320 322 324 326 328 330 332 334 336 338 340 342 344 346 348 350 352 354 356 358 360 362 364 366 368 370 372 374 376 378 380 382 384 386 388 390 392 394 396 398 400	4 7 10 14 18 21 24 28 32 35 38 42 46 49 52 56 60 63 66 70 73 77 80 84 87 91 94 98 101 105 108 112 115 119 122 126 129 133 136 140 143 147 150 154 157 161 164 168 171 175 178 182 185 189 192 196 199 203 206 210 213 217 220 224 227 231 234 238 241 245 248 252 255 259 262 266 269 273 276 280 283 287 290 294 297 301 304 308 311 315 318 322 325 329 332 336 339 343 346 350 353 357 360 364 367 371 374 378 381 385 388 392 395 399 402 406 409 413 416 420 423 427 430 434 437 441 444 448 451 455 458 462 465 469 472 476 479 483 486 490 493 497 500	5 10 14 19 24 29 34 38 43 48 53 58 62 67 72 77 82 86 91 96 101 106 110 115 120 125 130 134 139 144 149 154 158 163 168 173 178 182 187 192 197 202 206 211 216 221 226 230 235 240 245 250 254 259 264 269 274 278 283 288 293 298 302 307 312 317 322 326 331 336 341 346 350 355 360 365 370 374 379 384 389 394 398 403 408 413 418 422 427 432 437 442 446 451 456 461 466 470 475 480 485 490 494 499 504 509 514 518 523 528 533 538 542 547 552 557 562 566 571 576 581 586 590 595 600	6 12 17 23 29 35 41 46 52 58 64 70 75 81 87 93 99 104 110 116 122 128 133 139 145 151 156 162 168 174 180 185 191 197 203 208 214 220 226 232 237 243 249 255 260 266 272 278 284 289 295 301 307 312 318 324 330 336 341 347 353 359 364 370 376 382 388 393 399 405 411 416 422 428 434 440 445 451 457 463 468 474 480 486 492 497 503 509 515 520 526 532 538 543 549 555 561 566 572 578 584 590 595 601 607 613 618 624 630 636 641 647 653 659 664 670 676 682 688 693 699 705 711 716 722 728 734 739 745 751 757 762 768 774 780 786 791 797 803 809 814 820 826 832 837 843 849 855 860 866 872 878 884 889 895 901 907 912 918 924 930 935 941 947 953 958 964 970 976 982 987 993 999 1005	7 14 21 28 35 42 49 56 63 70 77 84 91 98 105 112 119 126 133 140 147 154 161 168 175 182 189 196 203 210 217 224 231 238 245 252 259 266 273 280 287 294 301 308 315 322 329 336 343 350 357 364 371 378 385 392 399 406 413 420 427 434 441 448 455 462 469 476 483 490 497 504 511 518 525 532 539 546 553 560 567 574 581 588 595 602 609 616 623 630 637 644 651 658 665 672 679 686 693 700 707 714 721 728 735 742 749 756 763 770 777 784 791 798 805 812 819 826 833 840 847 854 861 868 875 882 889 896 903 910 917 924 931 938 945 952 959 966 973 980 987 994 1001 1008 1015 1022 1029 1036 1043 1050 1057 1064 1071 1078 1085 1092 1099 1106 1113 1120 1127 1134 1141 1148 1155 1162 1169 1176 1183 1190 1197 1204 1211 1218 1225	8 16 24 32 40 48 56 64 72 80 88 96 104 112 120 128 136 144 152 160 168 176 184 192 200 208 216 224 232 240 248 256 264 272 280 288 296 304 312 320 328 336 344 352 360 368 376 384 392 400
16			3 5 8 11 14 16 19 22 24 27 30 33 35 38 41 43 46 49 52 54 57 60 62 65 68 71 73 76 79 81 84 87 90 92 95 98 100 103 106 109 111 114 117 119 122 125 128 130 133 136 139 141 144 147 149 152 155 158 160 163 166 168 171 174 177 179 182 185 187 190 193 196 198 201 204 206 209 212 215 217 220 223 225 228 231 234 236 239 242 244 247 250 253 255 258 261 263 266 269 272 274 277 280 282 285 288 291 293 296 299 301 304 307 310 312 315 318 320 323 326 329 331 334 337 339 342 345 348 350 353 356 358 361 364 367 369 372 375 377 380 383 386 388 391 394 396 399 402 405 407 410 413 415 418 421 424 426 429 432 434 437 440 443 445 448 451 453 456 459 462 464 467 470 472 475 478 481 483 486 489 491 494 497 500	5 9 14 19 23 28 33 37 42 46 51 56 60 65 70 74 79 84 88 93 98 102 107 112 116 121 126 130 135 140 144 149 154 158 163 168 173 177 182 187 191 196 201 205 210 215 219 224 229 233 238 243 247 252 257 261 266 271 275 280 285 289 294 299 303 308 313 317 322 327 331 336 341 345 350 355 359 364 369 373 378 383 387 392 397 401 406 411 415 420 425 429 434 439 443 448 453 457 462 467 471 476 481 485 490 495 499 504 509 513 518 523 527 532 537 541 546 551 555 560 565 569 574 579 583 588 593 597 602 607 611 616 621 625 630 635 639 644 649 653 658 663 667 672 677 681 686 691 695 700	6 13 19 26 32 39 45 52 58 65 71 78 84 91 97 104 110 117 123 130 136 143 149 156 162 169 175 182 188 195 201 208 214 221 227 234 240 247 253 260 266 273 279 286 292 299 305 312 318 325 331 338 344 351 357 364 370 377 383 390 396 403 409 416 422 429 435 442 448 455 461 468 474 481 487 494 500 507 513 520 526 533 539 546 552 559 565 572 578 585 591 598 604 611 617 624 630 637 643 650 656 663 669 676 682 689 695 702 708 715 721 728 734 741 747 754 760 767 773 780 786 793 799 806 812 819 825 832 838 845 851 858 864 871 877 884 890 897 903 910 916 923 929 936 942 949 955 962 968 975 981 988 994 1001 1007 1014 1020 1027 1033 1040 1046 1053 1059 1066 1072 1079 1085 1092 1098 1105 1111 1118 1124 1131 1137 1144 1150 1157 1163 1170 1176 1183 1189 1196 1202 1209 1215 1222 1228 1235 1241 1248 1254 1261 1267 1274 1280 1287 1293 1300	7 14 21 28 35 42 49 56 63 70 77 84 91 98 105 112 119 126 133 140 147 154 161 168 175 182 189 196 203 210 217 224 231 238 245 252 259 266 273 280 287 294 301 308 315 322 329 336 343 350 357 364 371 378 385 392 399 406 413 420 427 434 441 448 455 462 469 476 483 490 497 504 511 518 525 532 539 546 553 560 567 574 581 588 595 602 609 616 623 630 637 644 651 658 665 672 679 686 693 700 707 714 721 728 735 742 749 756 763 770 777 784 791 798 805 812 819 826 833 840 847 854 861 868 875 882 889 896 903 910 917 924 931 938 945 952 959 966 973 980 987 994 1001 1008 1015 1022 1029 1036 1043 1050 1057 1064 1071 1078 1085 1092 1099 1106 1113 1120 1127 1134 1141 1148 1155 1162 1169 1176 1183 1190 1197 1204 1211 1218 1225 1232 1239 1246 1253 1260 1267 1274 1281 1288 1295 1302 1309 1316 1323 1330 1337 1344 1351 1358 1365 1372 1379 1386 1393 1400	8 16 24 32 40 48 56 64 72 80 88 96 104 112 120 128 136 144 152 160 168 176 184 192 200 208 216 224 232 240 248 256 264 272 280 288 296 304 312 320 328 336 344 352 360 368 376 384 392 400
18			4 7 11 14 18 21 25 28 32 35 39 42 46 49 53 56 60 63 67 70 74 77 81 84 88 91 95 98 102 105 109 112 116 119 123 126 130 133 137 140 144 147 151 154 158 161 165 168 172 175 179 182 186 189 193 196 200 203 207 210 214 217 221 224 228 231 235 238 242 245 249 252 256 259 263 266 270 273 277 280 284 287 291 294 298 301 305 308 312 315 319 322 326 329 333 336 340 343 347 350 354 357 361 364 368 371 375 378 382 385 389 392 396 399 403 406 410 413 417 420 424 427 431 434 438 441 445 448 452 455 459 462 466 469 473 476 480 483 487 490 494 497 501 504 508 511 515 518 522 525 529 532 536 539 543 546 550 553 557 560 564 567 571 574 578 581 585 588 592 595 599 602 606 609 613 616 620 623 627 630 634 637 641 644 648 651 655 658 662 665 669 672 676 679 683 686 690 693 697 700	6 12 18 24 30 37 43 49 55 61 69 59 67 76 84 92 72 83 93 104 114 62 74 87 99 73 88 102 48 65 53 71	8 17 25 34 42 50 10 21 31 41 52 62 12 25 37 50 15 29 44 58 16 32 18 36				
20			4 7 11 14 18 21 25 28 32 35 39 42 46 49 53 56 60 63 67 70 74 77 81 84 88 91 95 98 102 105 109 112 116 119 123 126 130 133 137 140 144 147 151 154 158 161 165 168 172 175 179 182 186 189 193 196 200 203 207 210 214 217 221 224 228 231 235 238 242 245 249 252 256 259 263 266 270 273 277 280 284 287 291 294 298 301 305 308 312 315 319 322 326 329 333 336 340 343 347 350 354 357 361 364 368 371 375 378 382 385 389 392 396 399 403 406 410 413 417 420 424 427 431 434 438 441 445 448 452 455 459 462 466 469 473 476 480 483 487 490 494 497 501 504 508 511 515 518 522 525 529 532 536 539 543 546 550 553 557 560 564 567 571 574 578 581 585 588 592 595 599 602 606 609 613 616 620 623 627 630 634 637 641 644 648 651 655 658 662 665 669 672 676 679 683 686 690 693 697 700	4 9 14 18 22 27 32 36 41 45 50 55 59 64 68 73 77 82 86 91 95 100 105 109 114 118 123 127 132 136 141 145 150 155 159 164 168 173 177 182 186 191 195 200 205 209 214 218 223 227 232 236 241 245 250 255 259 264 268 273 277 282 286 291 295 300 305 309 314 318 323 327 332 336 341 345 350 355 359 364 368 373 377 382 386 391 395 400	8 16 23 31 39 47 55 62 70 78 86 74 85 95 106 117 92 105 118 131 144 95 111 127 143 92 110 128 61 81 68 90	11 21 32 42 53 64 74 85 96 106 117 92 105 118 131 144 95 111 127 143 92 110 128 61 81 68 90	13 26 39 52 66 79 92 105 118 131 144 95 111 127 143 92 110 128 61 81 68 90	16 32 48 63 79 95 111 127 143 92 110 128 61 81 68 90	18 37 55 73 92 110 128 61 81 68 90	20 41 61 81 68 90	23 45 68 90 75 100	25 50 75 100
22			4 9 14 18 22 27 31 36 40 45 49 54 58 63 67 72 76 81 85 90 94 99 103 108 112 117 121 126 130 135 139 144 148 153 157 162 166 171 175 180 184 189 193 198 202 207 211 216 220 225 229 234 238 243 247 252 256 261 265 270 274 279 283 288 292 297 301 306 310 315 319 324 328 333 337 342 346 351 355 360 364 369 373 378 382 387 391 396 400	8 16 23 31 39 47 55 62 70 78 86 74 85 95 106 117 92 105 118 131 144 95 111 127 143 92 110 128 61 81 68 90	11 21 32 42 53 64 74 85 96 106 117 92 105 118 131 144 95 111 127 143 92 110 128 61 81 68 90	13 26 39 52 66 79 92 105 118 131 144 95 111 127 143 92 110 128 61 81 68 90	16 32 48 63 79 95 111 127 143 92 110 128 61 81 68 90	18 37 55 73 92 110 128 61 81 68 90	20 41 61 81 68 90	23 45 68 90 75 100	25 50 75 100
24			4 9 14 18 22 27 31 36 40 45 49 54 58 63 67 72 76 81 85 90 94 99 103 108 112 117 121 126 130 135 139 144 148 153 157 162 166 171 175 180 184 189 193 198 202 207 211 216 220 225 229 234 238 243 247 252 256 261 265 270 274 279 283 288 292 297 301 306 310 315 319 324 328 333 337 342 346 351 355 360 364 369 373 378 382 387 391 396 400	8 16 23 31 39 47 55 62 70 78 86 74 85 95 106 117 92 105 118 131 144 95 111 127 143 92 110 128 61 81 68 90	11 21 32 42 53 64 74 85 96 106 117 92 105 118 131 144 95 111 127 143 92 110 128 61 81 68 90	13 26 39 52 66 79 92 105 118 131 144 95 111 127 143 92 110 128 61 81 68 90	16 32 48 63 79 95 111 127 143 92 110 128 61 81 68 90	18 37 55 73 92 110 128 61 81 68 90	20 41 61 81 68 90	23 45 68 90 75 100	25 50 75 100
26			4 9 14 18 22 27 31 36 40 45 49 54 58 63 67 72 76 81 85 90 94 99 103 108 112 117 121 126 130 135 139 144 148 153 157 162 166 171 175 180 184 189 193 198 202 207 211 216 220 225 229 234 238 243 247 252 256 261 265 270 274 279 283 288 292 297 301 306 310 315 319 324 328 333 337 342 346 351 355 360 364 369 373 378 382 387 391 396 400	8 16 23 31 39 47 55 62 70 78 86 74 85 95 106 117 92 105 118 131 144 95 111 127 143 92 110 128 61 81 68 90	11 21 32 42 53 64 74 85 96 106 117 92 105 118 131 144 95 111 127 143 92 110 128 61 81 68 90	13 26 39 52 66 79 92 105 118 131 144 95 111 127 143 92 110 128 61 81 68 90	16 32 48 63 79 95 111 127 143 92 110 128 61 81 68 90	18 37 55 73 92 110 128 61 81 68 90	20 41 61 81 68 90	23 45 68 90 75 100	25 50 75 100
28			4 9 14 18 22 27 31 36 40 45 49 54 58 63 67 72 76 81 85 90 94 99 103 108 112 117 121 126 130 135 139 144 148 153 157 162 166 171 175 180 184 189 193 198 202 207 211 216 220 225 229 234 238 243 247 252 256 261 265 270 274 279 283 288 292 297 301 306 310 315 319 324 328 333 337 342 346 351 355 360 364 369 373 378 382 387 391 396 400	8 16 23 31 39 47 55 62 70 78 86 74 85 95 106 117 92 105 118 131 144 95 111 127 143 92 110 128 61 81 68 90	11 21 32 42 53 64 74 85 96 106 117 92 105 118 131 144 95 111 127 143 92 110 128 61 81 68 90	13 26 39 52 66 79 92 105 118 131 144 95 111 127 143 92 110 128 61 81 68 90	16 32 48 63 79 95 111 127 143 92 110 128 61 81 68 90	18 37 55 73 92 110 128 61 81 68 90	20 41 61 81 68 90	23 45 68 90 75 100	25 50 75 100
30			4 9 14 18 22 27 31 36 40 45 49 54 58 63 67 72 76 81 85 90 94 99 103 108 112 117 121 126 130 135 139 144 148 153 157 162 166 171 175 180 184 189 193 198 202 207 211 216 220 225 229 234 238 243 247 252 256 261 265 270 274 279 283 288 292 297 301 306 310 315 319 324 328 333 337 342 346 351 355 360 364 369 373 378 382 387 391 396 400	8 16 23 31 39 47 55 62 70 78 86 74 85 95 106 117 92 105 118 131 144 95 111 127 143 92 110 128 61 81 68 90	11 21 32 42 53 64 74 85 96 106 117 92 105 118 131 144 95 111 127 143 92 110 128 61 81 68 90	13 26 39 52 66 79 92 105 118 131 144 95 111 127 143 92 110 128 61 81 68 90	16 32 48 63 79 95 111 127 143 92 110 128 61 81 68 90	18 37 55 73 92 110 128 61 81 68 90	20 41 61 81 68 90	23 45 68 90 75 100	25 50 75 100
32			4 9 14 18 22 27 31 36 40 45 49 54 58 63 67 72 76 81 85 90 94 99 103 108 112 117 121 126 130 135 139 144 148 153 157 162 166 171 175 180 184 189 193 198 202 207 211 216 220 225 229 234 238 243 247 252 256 261 265 270 274 279 283 288 292 297 301 306 310 315 319 324 328 333 337 342 346 351 355 360 364 369 373 378 382 387 391 396 400	8 16 23 31 39 47 55 62 70 78 86 74 85 95 106 117 92 105 118 131 144 95 111 127 143 92 110 128 61 81 68 90	11 21 32 42 53 64 74 85 96 106 117 92 105 118 131 144 95 111 127 143 92 110 128 61 81 68 90	13 26 39 52 66 79 92 105 118 131 144 95 111 127 143 92 110 128 61 81 68 90	16 32 48 63 79 95 111 127 143 92 110 128 61 81 68 90	18 37 55 73 92 110 128 61 81 68 90	20 41 61 81 68 90	23 45 68 90 75 100	25 50 75 100
34			4 9 14 18 22 27 31 36 40 45 49 54 58 63 67 72 76 81 85 90 94 99 103 108 112 117 121 126 130 135 139 144 148 153 157 162 166 171 175 180 184 189 193 198 202 207 211 216 220 225 229 234 238 243 247 252 256 261 265 270 274 279 283 288 292 297 301 306 310 315 319 324 328 333 337 342 346 351 355 360 364 369 373 378 382 387 391 396 400	8 16 23 31 39 47 55 62 70 78 86 74 85 95 106 117 92 105 118 131 144 95 111 127 143 92 110 128 61 81 68 90	11 21 32 42 53 64 74 85 96 106 117 92 105 118 131 144 95 111 127 143 92 110 128 61 81 68 90	13 26 39 52 66 79 92 105 118 131 144 95 111 127 143 92 110 128 61 81 68 90	16 32 48 63 79 95 111 127 143 92 110 128 61 81 68 90	18 37 55 73 92 110 128 61 81 68 90	20 41 61 81 68 90	23 45 68 90 75 100	25 50 75 100
36			4 9 14 18 22 27 31 36 40 45 49 54 58 63 67 72 76 81 85 90 94 99 103 108 112 117 121 126 130 135 139 144 148 153 157 162 166 171 175 180 184 189 193 198 202 207 211 216 220 225 229 234 238 243 247 252 256 261 265 270 274 279 283 288 292 297 301 306 310 315 319 324 328 333 337 342 346 351 355 360 364 369 373 378 382 387 391 396 400	8 16 23 31 39 47 55 62 70 78 86 74 85 95 106 117 92 105 118 131 144 95 111 127 143 92 110 128 61 81 68 90	11 21 32 42 53 64 74 85 96 106 117 92 105 118 131 144 95 111 127 143 92 110 128 61 81 68 90	13 26 39 52 66 79 92 105 118 131 144 95 111 127 143 92 110 128 61 81 68 90	16 32 48 63 79 95 111 127 143 92 110 128 61 81 68 90	18 37 55 73 92 110 128 61 81 68 90	20 41 61 81 68 90	23 45 68 90 75 100	25 50 75 100
38			4 9 14 18 22 27 31 36 40 45 49 54 58 63 67 72 76 81 85 90 94 99 103 108 112 117 121 126 130 135 139 144 148 153 157 162 166 171 175 180 184 189 193 198 202 207 211 216 220 225 229 234 238 243 247 252 256 261 265 270 274 279 283 288 292 297 301 306 310 315 319 324 328 333 337 342 346 351 355 360 364 369 373 378 382 387 391 396 400	8 16 23 31 39 47 55 62 70 78 86 74 85 95 106 117 92 105 118 131 144 95 111 127 143 92 110 128 61 81 68 90	11 21 32 42 53 64 74 85 96 106 117 92 105 118 131 144 95 111 127 143 92 110 128 61 81 68 90	13 26 39 52 66 79 92 105 118 131 144 95 111 127 143 92 110 128 61 81 68 90	16 32 48 63 79 95 111 127 143 92 110 128 61 81 68 90	18 37 55 73 92 110 128 61 81 68 90	20 41 61 81 68 90	23 45 68 90 75 100	25 50 75 100
40			4 9 14 18 22 27 31 36 40 45 49 54 58 63 67 72 76 81 85 90 94 99 103 108 112 117 121 126 130 135 139 144 148 153 157 162 166 171 175 180 184 189 193 198 202 207 211 216 220 225 229 234 238 243 247 252 256 261 265 270 274 279 283 288 292 297 301 306 310 315 319 324 328 333 337 342 346 351 355 360 364 369 373 378 382 387 391 396 400	8 16 23 31 39 47 55 62 70 78 86 74 85 95 106 117 92 105 118 131 144 95 111 127 143 92 110 128 61 81 68 90	11 21 32 42 53 64 74 85 96 106 117 92 105 118 131 144 95 111 127 143 92 110 128 61 81 68 90	13 26 39 52 66 79 92 105 118 131 144 95 111 127 143 92 110 128 61 81 68 90	16 32 48 63 79 95 111 127 143 92 110 128 61 81 68 90	18 37 55 73 92 110 128 61 81 68 90	20 41 61 81 68 90	23 45 68 90 75 100	25 50 75 100
42			4 9 14 18 22 27 31 36 40 45 49 54

CEDAR TALLY

D.B.H.	7' Posts	8' Ties	Poles							Shingle Bolts
			20'	25'	30'	35'	40'	45'	50'	
6										
8										
10										
12										
14										
16										
18										
20										
22										
24										

SAMPLE TREE DATA

Tree No.	Dist. and bearing to tree	Spec.	DBH	Height		Tree Class	Age	Radial Gr.		Defect %
				Total	Merch			10 Yr.	20 Yr.	
		A	9.1	60	26	2B	60	.6	1.2	0
		A	6.4	60	23	3C	43	.6	1.3	0
		BF	4.0	25	-	6B	30	.7	1.6	0

ite Classification I Operability Fair

*Supplementary Cruise Data

ype acreage _____ Cruise % _____ % Accuracy _____

tand Description _____

_____

_____

ogging change. Easy ____ Medium ____ Difficult ____ Winter ____ Summer ____ Yearlong ____

ccessability: Miles of road to construct _____ Total road cost _____

opography: Level ____ Rolling ____ Hilly ____ Rugged ____ Rocky ____

ecommended Silviculture: Marking _____ Species and % cut _____

_____

esignating: Species and Method _____

_____

utson-Vandenburg needs:

anting: Acres _____ Species and Age Class _____ No. _____ Cost _____

S.I.: Acres _____ Kind _____ Cost _____

o be filled in only when tally sheet is used in cruising for timber sale.

Species Symbols Used On Cumulative Volume Tally Sheets

Symbol	Species
A	Aspen
BC	Black Cherry
BF	Balsam Fir
BS	Black Spruce
BW	Basswood
E	Elm
H	Hemlock
IW	Ironwood
RM	Red Maple
SM	Sugar Maple
WB	White Birch
WP	White Pine
WS	White Spruce
YB	Yellow Birch

Type - M'

Plot No.	Defect		Height		Vol. Per Acre		Deviation From Mean -100 Bd.Ft.	
	Cd.wd. %	Sawt. %	Dom. -Ft.	Under-story	Cords	Bd.Ft. -100's	X	X^2
418	3	20	--	--	2.5	24	-32	1024
976	5	35	70'	48'	3.3	48	- 8	64
687	5	35	63'	45'	2.5	18	-38	1444
690	5	40	55'	42'	2.3	29	-27	729
417	3	5	--	--	2.1	11	-45	2025
792	5	20	--	--	.8	21	-35	1225
894	10	20	79'	22'	3.4	93	+37	1396
904	5	25	78'	--	1.3	65	+ 9	81
900	5	35	--	--	1.5	101	+45	2025
487	3	40	58'	--	1.5	66	+10	100
799	5	20	--	--	5.2	111	+55	3025
746	5	30	--	--	3.2	38	-16	256
1223	5	25	76'	62'	10.1	19	-37	1396
699	2	15	80'	47'	2.6	33	-23	529
751	2	15	--	--	2.3	61	+ 5	25
1225	5	25	--	--	3.5	97	+41	1681
1222	5	20	--	--	7.0	87	+31	961
1220	5	25	90'	55'	8.3	31	- 5	25
1267	5	25	--	--	6.9	59	+ 3	9
795	5	30	78'	37'	1.0	91	+35	1225
762	5	20	--	--	.5	96	+40	1600
700	3	25	--	--	.5	46	-10	100
761	5	20	66'	48'	1.0	28	-28	784
710	3	25	--	--	3.3	30	-26	676
756	5	20	--	--	.9	52	- 4	16
759	5	20	--	--	1.1	70	+14	196
Total					78.6	1445		22617
Average					3.0	56		

Standard Deviation =

$$\sigma = \sqrt{\frac{22617}{26}} = 2940 \text{ Bd. ft.}$$

Coefficient of Variation

$$\sim = \frac{2940}{5600} = .53$$

Standard Deviation of the mean

$$\sigma_M = \frac{2940}{\sqrt{26}} = \pm 576 \text{ bd. ft.}$$

Type - M''

Plot No.	Defect		Height		Vol. Per Acre		Deviation From Mean -100 Bd. Ft.	
	Cd.wd. %	Sawt. %	Dom. -Ft.	Under-story	Cords	Bd.ft. -100's	X	X^2
696	5	40			2.7	114	+ 39	1521
52	5	50			4.7	49	-26	676
784	5	25	74	34	1.4	135	+60	3600
1306	5	20			1.4	121	+46	2116
1340	5	20	58	36	2.1	31	-44	1936
61	5	50	62	41	5.5	122	+47	2209
1348	10	25	87	59	4.9	55	-20	400
44	10	60	82	52	2.4	83	+ 8	64
1383	5	60			2.6	54	-21	441
408	5	30	80	36	6.2	94	+19	361
49	5	40	63	39	4.6	111	+36	1296
39	5	40	72	45	5.5	63	-12	144
1412	5	15			.6	31	-44	1936
693	2	30	85	55	2.5	48	-27	729
1339	5	30	60	36	2.3	109	+34	1156
1338	5	25			1.5	53	-22	484
491	0	25	56	38	3.1	50	-25	625
834	5	10			3.1	62	-13	169
997	5	20	80	31	3.9	63	-12	144
1155	-	0			0.0	73	- 2	4
67	5	40	72	47	4.4	104	+29	841
75	10	10	82	60	6.5	79	+ 4	16
1246	5	30	68	33	5.5	64	-11	121
1240	5	30			.4	52	-23	529
1383	5	40	66	34	3.6	68	- 7	49
164	5	20	60	43	1.4	72	- 3	9
Total					82.8	1960		21,576
Average					3.2	75		

$$\sigma = \sqrt{\frac{21576}{26}} = 2880 \text{ Bd. ft.}$$

$$\sim = \frac{2880}{7500} = .382$$

$$\sigma_M = \frac{2880}{\sqrt{26}} = \pm 565 \text{ bd. ft.}$$

Type - M'''

Plot No.	Defect		Height		Vol.per acre		Deviation From Mean -100 bd.ft.	
	Cd.wd. %	Sawt. %	Dom. -Ft.	Under-story	Cords	Bd.ft. 100's	X	X^2
1581	5	30	60	00	.6	93	-34	1156
236	3	10	65	37	1.3	87	-40	1600
1578	5	35			2.0	179	+52	2704
221	15	35	105	55	6.6	153	+28	784
90	5	15	78	54	4.8	111	-16	256
85	10	20	82	44	2.9	87	-40	1600
358	5	10			6.1	215	+88	7744
136	10	30	110		4.8	252	+125	15625
1497	10	10	72		8.6	75	-52	2704
132	10	40			3.1	68	-59	3481
129	10	40	80	44	2.0	107	-20	400
122	10	40			3.7	143	+16	256
106	5	25	83	37	3.3	135	+ 8	64
109	10	20	88	45	3.6	129	+ 2	4
133	10	40			2.6	148	+21	441
94	5	30	64	39	4.5	128	+ 1	1
1364	5	35			5.0	98	-29	841
494	5	25			4.1	99	-28	784
195	5	30	78	49	.5	159	+32	1024
208	25	50	69	55	1.0	112	-15	225
297	5	20	55		3.6	144	+17	289
55	5	40	78	39	4.9	99	-28	784
234	3	10	69		3.02	87	-40	1600
138	15	40			1.0	159	+32	1024
127	10	40	76		6.8	118	- 9	81
317	5	30			1.5	113	-14	196
Total					91.9	3298		45,668
Average					3.5	127		

$$\sigma = \sqrt{\frac{45668}{26}} = 4200 \text{ Bd. ft.}$$

$$v = \frac{4200}{12,700} = .331$$

$$\sigma_M = \frac{4200}{\sqrt{26}} = \pm 824 \text{ bd. ft.}$$

Type - Md'

Plot No.	Defect		Height		Vol.per acre		Deviation From Mean -100 bd.ft.	
	Cd.wd. %	Sawt. %	Dom. -Ft.	Under-story	Cords	Bd.ft. -100's	X	X^2
466	5	25	48	29	5.9	14	-16	256
557	3	35			4.2	25	- 5	25
705	3	30			.4	12	-18	324
605	5	20	76	34	1.0	12	-18	324
119	10	20	42	24	1.6	24	- 6	36
543	5	30	84	39	.2	33	+ 3	9
540	5	30	71	36	.8	52	+22	484
537	5	30	73	33	2.4	36	+ 6	36
407	5	20			2.5	70	+40	1600
946	5	35	44	29	7.8	5	-25	625
887	3	10	46	26	2.8	16	-14	196
822	10	20			2.0	65	+35	1225
801	5	40	62	28	.3	52	+22	484
715	5	10	52		6.1	16	-14	196
718	0	10	64	42	5.0	29	- 1	1
521	4	10			1.7	24	- 6	36
313	10	5	45		4.3	22	- 8	64
216	5	15	60		4.4	39	+ 9	81
213	10	30	41	36	1.4	29	- 1	1
201	3	55	64	49	1.9	10	-20	400
311	20	30	35		4.5	8	-22	484
1458	8	40	72	32	2.3	53	+23	529
307	5	15			3.4	52	+22	484
819	5	20			3.8	35	+ 5	25
805	3	25			1.1	23	- 7	49
505	10	10	71	40	6.1	33	+ 3	9
Total					77.9	789		7983
Average					3.0	30		

$$\sigma = \sqrt{\frac{7983}{26}} = 1750 \text{ bd.ft.}$$

$$\nu = \frac{1750}{3000} = .573$$

$$\sigma_M \quad \frac{1750}{\sqrt{26}} = \pm 344 \text{ bd.ft.}$$

Type - Md''

Plot No.	Defect		Height		Vol.per acre		Deviation From Mean -100 bd.ft.	
	Cd.wd. %	Sawt. %	Dom. -Ft.	Under-story	Cords	Bd.ft. -100's	X	X^2
441	5	30	62	48	1.0	44	- 5	25
315	8	30	62	40	2.4	33	-16	256
811	5	30	75	49	.9	41	- 8	64
934	5	25	80	48	5.8	29	-20	400
1234	5	30	65	38	2.9	61	+11	121
928	5	20	68	44	6.1	33	-16	256
744	3	15	72	35	1.5	33	-16	256
475	3	20	98	38	1.0	43	- 6	36
681	5	25	89	36	5.0	82	+33	1089
678	5	25	78	55	1.3	54	+ 5	25
479	3	20			3.0	71	+22	484
118	5	20			1.8	42	- 7	49
555	5	30	69	43	.5	71	+22	484
685	5	35			1.5	41	- 8	64
733	3	20	76	63	2.7	76	+27	729
205	3	20	56		2.6	58	+ 9	81
355	5	25	77	37	2.2	43	- 6	36
353	3	20	55	29	4.3	53	+ 4	16
501	5	20	66	46	1.3	9	-40	1600
597	5	25			5.5	65	+16	256
200	5	35	70	40	2.8	51	+ 2	4
256	5	10	47	18	4.4	30	-19	361
532	5	25	97	28	3.2	34	-15	225
465	10	60			6.9	53	+ 4	16
471	6	40			3.5	71	+22	484
936	5	20			1.6	46	- 3	9
Total					75.7	1267		7426
Average					2.9	49		

$$\sigma = \sqrt{\frac{7426}{26}} = 1690 \text{ bd.ft.}$$

$$v = \frac{1690}{4900} = .345$$

$$\sigma_M = \frac{1690}{\sqrt{26}} = \pm 332. \text{ bd.ft.}$$

Type - Md'''

Plot No.	Defect		Height		Vol.per acre		Deviation From Mean Bd. Ft.	
	Cd.wd. %	Sawt. %	Dom. -Ft.	Under-story	Cords	Bd.ft. -100's	X	X^2
376	5	40			2.0	41	- 3240	10,497,600
377	5	40	62	34	5.7	26	- 4740	22,467,600
383	5	40	68	43	1.2	69	- 440	193,600
384	5	25			3.7	35	- 3840	14,745,600
385	5	20			2.8	40	- 3340	11,155,600
185	3	10	78	48	2.1	204	+13060	170,563,600
191	10	20		61	4.8	125	+5160	4.579,600
31	2	15	70	30	5.8	47	-2640	26,625,600
Total					28.1	587		260,828,800
Average					3.5	73.4		

$$\sigma = \sqrt{\frac{260,828,800}{8}} = 5700 \text{ bd. ft.}$$

$$v = \frac{5700}{7340} = .777$$

$$\sigma_M = \frac{5700}{\sqrt{8}} = \pm 2010 \text{ bd. ft.}$$

Type - Mc'

Plot No.	Defect Cd.wd. %	Defect Sawt. %	Height Dom. -Ft.	Height Under-story	Vol.per acre Cords	Vol.per acre Bd.ft. -100's	Deviation From Mean -Cords X	X^2
394	5	20	72	52	2.4	15	+ .4	.16
708	3	20			.6	11	-1.4	1.96
703	3	15			1.9	24	- .1	.01
702	3	20			1.3	11	- .7	.49
405	5	20			.7	5	-1.3	1.69
402	5	10			1.1	14	- .9	.81
400	5	20			1.5	11	- .5	.25
399	5	30			.9	5	-1.1	1.21
397	5				.7		-1.3	1.69
395	5	20			2.1	11	+ .1	.01
559	5	25			2.2	5	+ .2	.04
461	3	5			1.6	2	- .4	.16
398	5	10	58	33	.9	40	-1.1	1.21
396	5		35		2.6		+ .6	.36
346	10	10	65	36	5.4	21	-3.4	11.56
347	5		30		.9		-1.1	1.21
713	5	25	54	40	2.4	57	+ .4	.16
255	5	5	59	9	5.7	7	+3.7	13.69
306	10		28		3.2		+1.2	1.44
305	5	40	53	37	1.7	8	- .3	.09
232	5	10	84	32	1.8	52	- .2	.04
231	15	10	48		1.5	20	- .5	.25
230	10	50	60		5.2	17	+3.2	10.24
1214	10		62	33	.5		-1.5	2.25
954	5	30	52	36	1.4	18	- .6	.36
1072	5		52	44	3.6		+1.6	2.56
Total					53.8	318	+1.8	53.91
Average					2.0	12		

Arithmetic Average

$d = \frac{\Sigma(fx)}{N} = \frac{+1.8}{26} = +.0693$

$A = 2.0000$

$M = A + d = 2.0693$

$s^2 = \frac{\Sigma(fx^2)}{N} = \frac{53.91}{26} = 2.08$

$\sigma = \sqrt{s^2 - d^2} = \sqrt{2.08 - .069^2} = 1.49$ Cd.

$v = \frac{\sigma}{M} = \frac{1.44}{2.07} = .695$ Cd

$\sigma_M = \frac{\sigma}{\sqrt{26}} = \frac{1.44}{\sqrt{26}} = \pm .383$ Cd.

Type - Mc''

Plot No.	Defect Cd.wd. %	Defect Sawt. %	Height Dom. -Ft.	Height Under-story	Vol.per acre Cords	Vol.per acre Bd.ft. -100's	Deviation From Mean - Cords X	Deviation From Mean ^{2} X
1010	5	20			3.5	10	- 3.2	10.24
1167	5	20			5.6	7	- 1.1	1.21
1198	5	25			8.4	11	+ 1.7	2.89
1436	5	20			3.9	49	- 2.8	7.84
1407	3	10			6.5	11	- .2	.04
1406	3	5	52	28	8.6	18	+ 1.9	3.61
1408	3	10			10.5	18	+ 3.8	14.44
1640	5	30			5.3	17	- 1.4	1.96
1152	5	25			5.8	21	- .9	.81
1178	5	10			6.5	10	- .2	.04
1387	5	25			11.0	6	+ 4.3	18.49
1096	5	25			3.0	4	- 3.7	13.69
1084	5	10			7.5	22	+ .8	.64
570	5	30			7.6	22	+ .9	.81
1165	5	40	58		8.3	14	+ 1.6	2.56
1011	5	20	64		6.2	19	- .5	.25
1183	5		53	43	17.1		+10.4	108.16
1426	5	50	62	41	2.9	11	- 3.8	14.44
1426	5		51		7.1		+ .4	.16
33	5	30	74	51	7.8	33	+ 1.1	1.21
1434	5	20		39	4.4	19	- 2.3	5.29
432	5	5	62	56	7.3	14	- .6	.36
1442	5		41	29	3.2		- 3.5	12.25
1015	5	5	67	40	5.0	18	- 1.7	2.89
1174	5		65	37	3.6	2	- 3.1	9.61
462	3	20	66	23	6.8	17	+ .1	.01
Total					173.4	373		233.9
Average					6.7	14		

$$\sigma = \sqrt{\frac{233.9}{26}} = 3 \text{ cd.}$$

$$v = \frac{3}{6.67} = .45$$

$$\sigma_M = \frac{3}{\sqrt{26}} = \pm .588 \text{ cd.}$$

Type - Mc'''

Plot No.	Defect		Height		Vol.per acre		Deviation From Mean Cords	
	Cd.wd. %	Sawt. %	Dom. -Ft.	Under-story	Cords	Bd.ft. -100's	X	X^2
431	10	5			9.4	7	+2.3	5.29
53	5	60			5.7	50	-1.4	1.96
914	5	30			4.4	29	-2.7	7.29
916	5	25			10.7	27	+3.6	12.96
917	5	25			9.3	20	+2.2	4.84
919	5	25			6.8	7	- .3	.09
975	2	10			10.7	2	+3.6	12.96
454	5	20			1.6	3	-5.5	30.25
436	5				8.4		+1.3	1.69
202	5	10	63	56	6.1	12	-1.0	1.00
253	5		48		5.4		-1.7	2.89
1076	2	15	54		8.9	27	+1.8	3.24
515		40	55		7.8	17	+ .7	.49
516	5	30	76		4.9	32	-2.2	4.84
571	5	15			9.3	15	+2.2	4.84
271	3		41		2.5		-4.6	21.16
187	2	15	64	48	8.1	21	+1.0	1.00
292	15	10	55		4.9	8	-2.2	4.84
264	2	30	61	25	2.9	39	-4.2	17.67
91	5	20	48	37	4.7	22	-2.4	5.76
886	3	15	66	37	5.6	22	-1.5	2.25
973	5	20	90	72	7.9	47	+ .8	.64
915	5	20	68	52	14.1	13	+7.0	49.00
918	5	40	70	62	11.5	35	+4.4	19.36
686	5	50	65	45	5.1	3	-2.0	4.00
Total					176.7	458		220.31
Average					7.1	18		

$$\sigma = \sqrt{\frac{220.31}{25}} = 2.97 \text{ cd.}$$

$$v = \frac{2.97}{7.1} = .42$$

$$\sigma_M \quad \frac{2.97}{\sqrt{25}} = \pm .582 \text{ cd.}$$

Type - Ad'

Plot No.	Defect		Height		Vol.per acre		Deviation From Mean		
	Cd.wd. %	Sawt. %	Dom. - Ft.	Under-story	Cords	Bd.ft. -100's	X	Bd. Ft.	X^2
1083	10	20		40	3.5	23	+850	722,500	
1038	5	20	43	22	1.8	19	+450	202,500	
1040	3	20		40	6.0	8	-650	422,500	
1039	5	20	52	27	1.5	8	-650	422,500	
Total					12.8	58		1,770,000	
Average					3.2	14.5			

$$\sigma = \sqrt{\frac{1,770,000}{4}} = 665 \text{ bd.ft.}$$

$$\sim = \frac{665}{1450} = .485$$

$$\sigma_M = \frac{665}{\sqrt{4}} = \pm 332 \text{ bd.ft.}$$

Type - Ad''

Plot No.	Defect		Height		Vol.per acre		Deviation From Mean	
	Cd.wd. %	Sawt. %	Dom. -Ft.	Under-story	Cords	Bd.ft. -100's	Bd.Ft. X	X^2
111	10	20			6.3	47	+ 900	810,000
108	5	40			8.2	9	-2900	8,416,000
110	10	20			9.4	28	-1000	1,000,000
112	5	20	88	50	4.7	69	+3100	9,610,000
Total						153		19,830,000
Average						38		

$$\sigma = \sqrt{\frac{19,830,000}{4}} = 2230 \text{ bd. ft.}$$

$$\nu = \frac{2230}{3800} = .587$$

$$\sigma_M = \frac{2230}{\sqrt{4}} = \pm 1120. \text{ bd.ft.}$$

Type - Ac'

Plot No.	Defect		Height		Vol.per acre		Deviation From Mean Cords	
	Cd.wd. %	Sawt. %	Dom. -Ft.	Under-story	Cords	Bd.ft. -100's	X	X^2
440	10				1.2		-1.8	3.24
1154	5	20	52	18	5.0	6	+2.0	4.00
1507	3	15			5.2	6	+2.2	4.84
1357	3	15	51	34	4.3	3	+1.3	1.69
1085	5		63	16	4.1		+1.1	1.21
75	15	30	68	32	3.2	8	+ .2	.04
73A	20				1.5		-1.5	2.25
911	3	5			3.9	8	+ .9	.81
912	3	5	48	37	3.3	2	+ .3	.09
82	5	20	39		2.1	2	- .9	.81
1071	5				1.9		-1.1	1.21
1451	5				3.2		+ .2	.04
1450	5				2.4		- .6	.36
594					5.3	1	+2.3	5.29
1008	5	15	43		2.3	1	- .7	.49
349	5		40		3.5		+ .5	.25
1271	10		45		4.0		+1.0	1.00
186	3		58	38	2.3		- .7	.49
274	10			25	2.0	3	- .7	.49
280	2	20	42	38	1.0		-1.0	1.00
263	1		43		2.0		-2.0	4.00
1192	5		45		2.7		-1.0	1.00
1188	4		37		.3	1	- .3	.09
1213	5	15	68	14	7.0	5	-2.7	7.29
1315	5	20			1.0	1	+4.0	16.00
278	4	20	44				-2.0	4.00
Total					77.0	47		61.98
Average					3.0	1.8		

$$\sigma = \sqrt{\frac{61.98}{26}} = 1.54 \text{ cd.}$$

$$v = \frac{1.54}{2.96} = .52$$

$$\sigma_M = \frac{1.54}{\sqrt{26}} = \pm .302 \text{ cd.}$$

Type - Ac''

Plot No.	Defect Cd.wd. %	Defect Sawt. %	Height Dom. -Ft.	Height Under-story	Vol.per acre Cords	Vol.per acre Bd.ft. -100's	Deviation From Mean Cords X	Deviation From Mean Cords X^2
203	5	5	73		8.3	15	- .2	.04
433 a	2	20			7.5	4	- 1.0	1.00
1336	5		47	31	5.2		- 3.3	10.89
1398	5		68	40	9.2		+ .7	.49
1397	5				14.6		+ 6.1	37.21
1396	5		77	49	14.1		+ 5.6	31.36
910	5		56	35	9.1		+ .6	.36
1400		3			11.8	3	+ 3.3	10.89
164	5	20			6.7	2	- 1.8	3.24
972	3	15	76	51	9.3	14	+ .8	.64
1410	5	10			3.5	11	- 5.0	25.00
1409	5	10			12.3	4	+ 3.8	15.21
281 a	10		45		8.0		- .5	.25
350			60		14.8		+ 6.3	39.69
1560	5		45		2.0		- 6.5	42.25
1352	3	5	62	54	19.7	16	+11.2	125.44
1359	5		38		5.8		- 2.7	7.29
1190	6	25	68		9.2	10	+ .7	.49
1166	10				4.2		- 4.3	18.49
1325	5	30			2.3	1	- 6.2	38.44
1328	5				13.9		+ 5.4	29.16
1329	5	20			9.4	5	+ .9	.81
1073	3		40		2.5		- 6.0	36.00
1	10				2.5		- 6.0	36.00
1202	5	20			11.9		+ 3.4	11.56
905	5	10			4.3	7	- 4.2	17.64
Total					222.1	92		539.84
Average					8.5	3.5		

$$\sigma = \sqrt{\frac{539.84}{26}} = 4.55 \text{ cd.}$$

$$v = \frac{4.55}{8.55} = .532$$

$$\sigma_M = \frac{4.55}{\sqrt{26}} = \pm .892 \text{ cd.}$$

Type - Ac'''

Plot No.	Defect		Height		Vol.per acre		Deviation From Mean Cords	
	Cd.wd. %	Sawt. %	Dom. -Ft.	Under-story	Cords	Bd.ft. -100's	X	X^2
314	3	10			9.5	2	- .8	.64
764	5	20			6.8	11	-3.5	12.25
1117	5	15			13.0	34	+2.7	7.29
1118	5	15			15.5	13	+5.2	27.04
70a	10	30			10.1	16	- .2	.04
70	10	20	60	25	14.8	7	+4.4	19.36
53a	10	30	68	35	9.5	26	- .8	.64
79	3	20	68	42	8.9	9	-1.4	1.96
1068	3	10	62		11.5	30	+1.2	1.44
308	5	5	58		6.4	12	-3.9	15.21
220	5	10	80	60	11.6	46	+1.3	1.69
27	3		51		7.9		-2.4	5.76
19	5		45		4.6		-5.7	32.49
1067	3	10	63		16.8	18	+6.5	42.25
227	5	5		50	15.5	12	+5.2	27.05
22	5	30		53	2.4	15	-7.9	62.41
Total					164.8	251		257.52
Average					10.3	16		

$$\sigma = \sqrt{\frac{257.52}{16}} = 4 \text{ cd.}$$

$$v = \frac{4}{10.3} = .39$$

$$\sigma_M = \frac{4}{\sqrt{16}} = \pm 1 \text{ cd.}$$

Acreage Table - Iron River Ranger District

Forest Type	Total Area In Acres	Theoretical No. Plots Needed	Forest Type	Total Area In Acres	Theoretical No. Plots Needed
4d'	20	20	Ac'''	9,000	12
4c'''	207	7	Ac''	11,880	60
4c''	655	24	Ac'	7,755	47
4c'	325	20	*M'''	3,115	186
5d'''	15	49	*M''	3,110	197
5c'''	100	5	*M'	677	107
5c''	100	12	*Md'''	810	13
5c'	40	10	*Md''	16,287	104
6c'''	2380	16	*Md'	10,730	207
6c''	5622	38	*Mc'''	10,537	20
6c'	2262	51	*Mc''	10,390	56
7c'''	1442	16	*Mc'	4,720	46
7c''	1770	38	Msd''	35	14
7c'	465	20	Msd'	377	44
8''	2	9	Msc'''	17	2
8d''	55	19	Msc''	297	11
8d'	110	44	Msc'	670	27
8c''	40	9	Tc'''	205	7
8c'	255	20	Tc''	277	16
9'''	77	76	Tc'	45	14
9''	277	109	Hardwood Saplings	59,245	37
9d'''	135	15	Conifer Saplings	14,965	38
9d''	487	27	Planta-tions	8,725	19
9d'	502	68	**Other	30,961	
9c'''	1297	16			
9c''	2260	38			
9c'	1270	51			
			TOTAL	227,000	2,036

* Mixed Hardwoods and Hemlock
** Includes marsh, muskeg, brush, cropland, grass, offsite aspen, non-productive swamp.

The Mixed Hardwood and Aspen types total 148,256 acres, or 65% of the total area.

Explanation of the type-mapping symbols used here is shown on Page 64 of the appendix.

This table is based on preliminary acreage count before field survey was started.

* Type Mapping Symbols

Symbol	Forest Type	Symbol	Forest Type
4	White Cedar	Ih	Upland brush
5	Jack Pine	Is	Lowland brush
6	White Spruce and Balsam Fir	C	Crop land
			Marsh
7	Black Spruce	Q	Grassland - less than 10% stocked by commercial trees.
8	Red Pine		
9	White Pine		
A	Aspen and White Birch	Ax	Offsite Aspen
		Sx	Non-productive swamp
M	Northern Hardwoods		
Ms	Swamp Hardwoods		
T	Tamarack		

Size Class Symbols

Symbol	Size Class	
none	Large sawtimber	15" - DBH
d	Small sawtimber	9" to 15" DBH
c	Pole timber	5" to 9" DBH
b	Saplings	1" to 5" DBH
a	Seedlings	0 to 1"

Stand Density Symbols

Symbol	Stand Density
'	Poor Density
''	Medium density
'''	Good density

Tree Position Symbols

Symbol	Tree Position
0	Open grown
1	Head dominant
2	Strong dominant
3	Conditional dominant and codominant
4	Weak dominant and codominant
5	Intermediate
6	Suppressed

Crown Density Symbols

Symbol	Crown Density
a	Good crown, at least 2/3 filled
b	Medium crown
c	Poor crown, less than 1/3 filled and with foliage poor color and of less than normal size

Table of Cull Percent - Northern Hardwoods
(Adopted from Defect Factor Table by S. R. Gevorkiantz)

Number of Defects - Cull Percent

DBH	No. of 16' logs	1 minor	1 major	2 major	3 major or more
10" to 32"	1	7%	20%	47%	Cull
	2	6%	17%	39%	Cull
	3	4%	14%	32%	54%
	4	4%	11%	26%	45%

Site Class Table

Number of logs in Dominant Trees

Site	Hardwoods	Pines
I	4 - 4½ logs	5 - 5½ logs
II	3 - 3½ logs	4 - 4½ logs
III	2 - 2½ logs	3 - 3½ logs
IV	1 - 1½ logs	2 - 2½ logs
V	½ log	- 1 log

Field Guide For Determination Of Stand Density

Medium Density

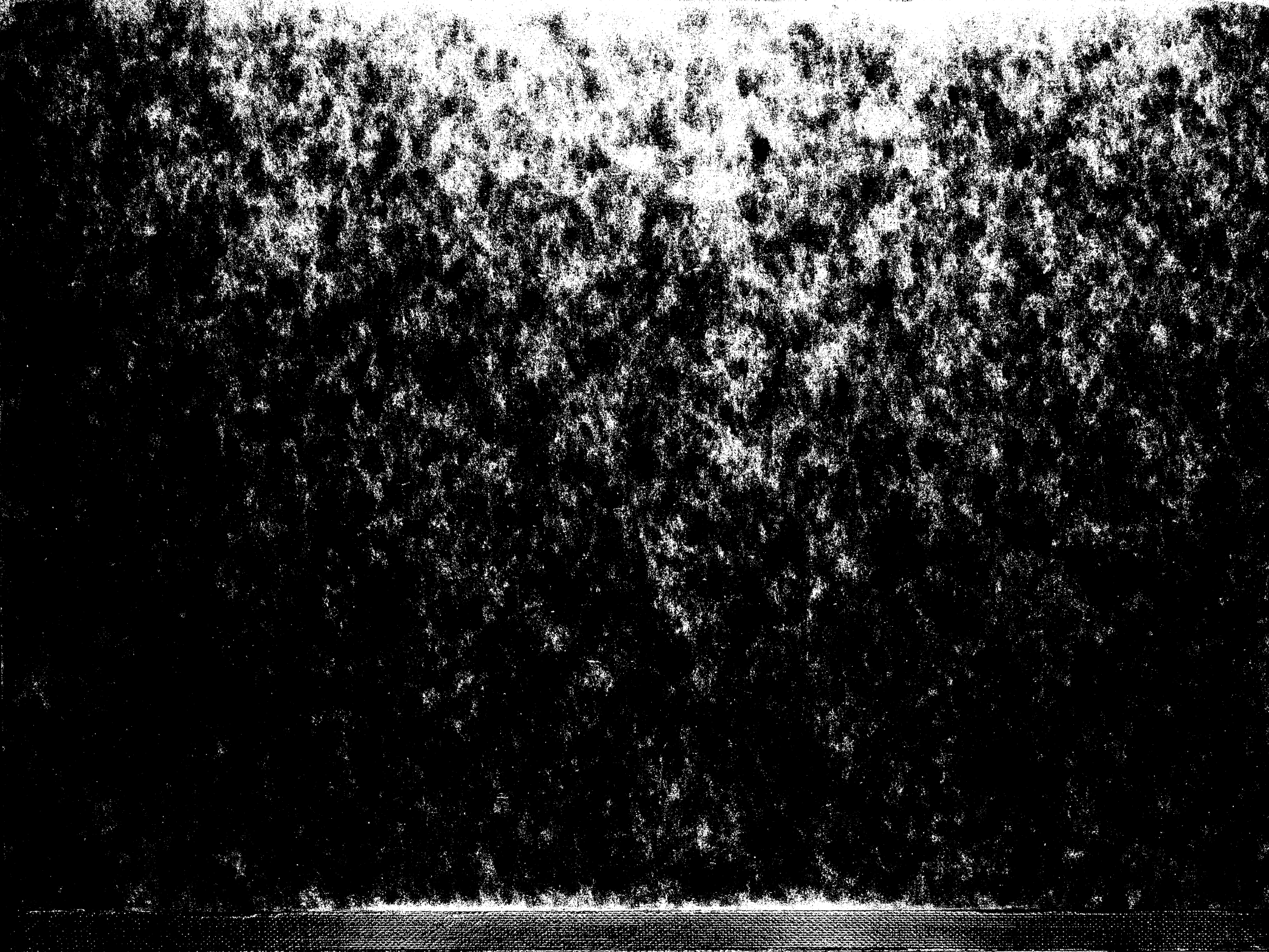
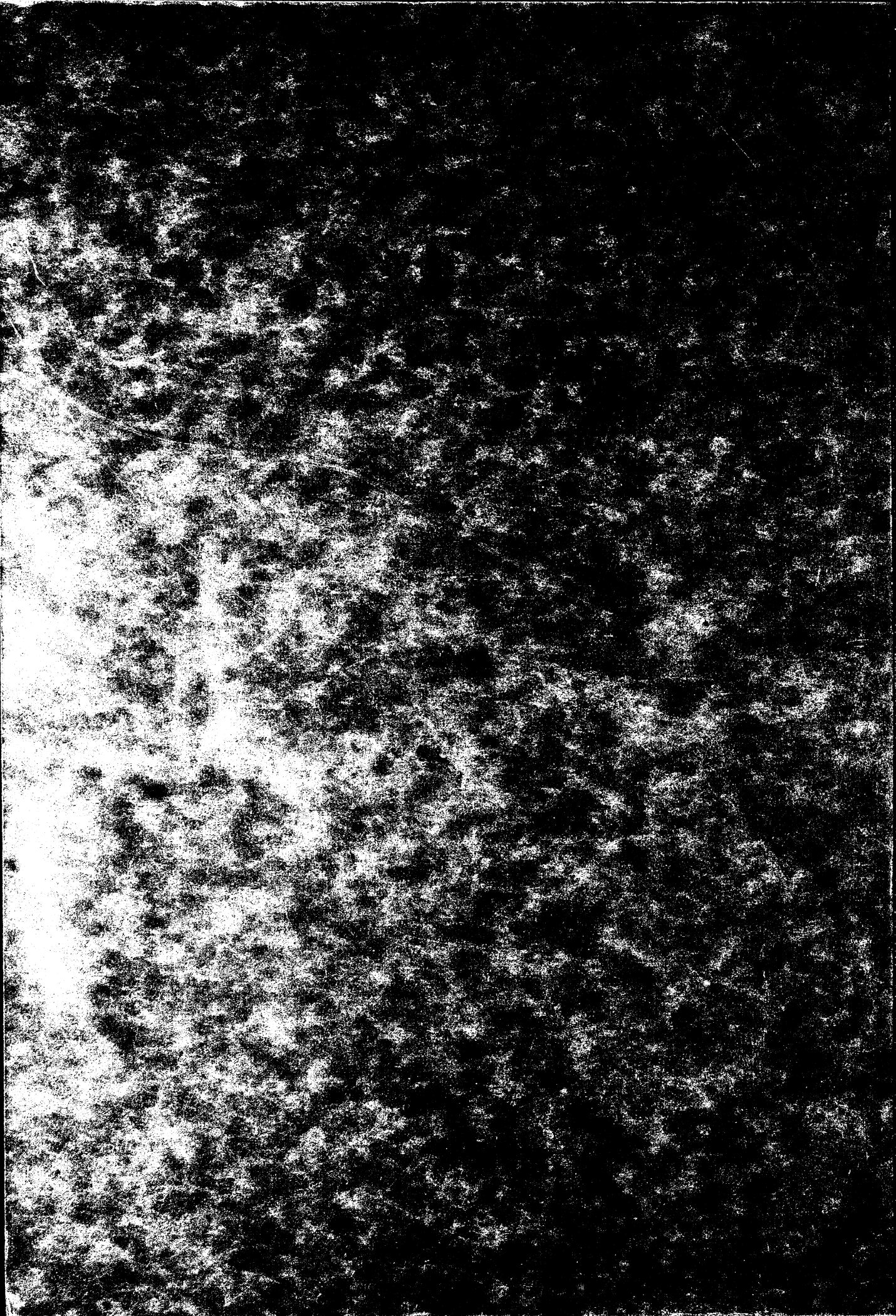
Size Class	Avg.DBH inches	Number of stems per acre		
		Hardwoods	Upland Conifers	Lowland conifers
Seedlings	1	1500 - 2500	1750 - 3500	2000 - 4000
Saplings	2	800 - 1500	900 - 1750	1000 - 2000
	4	400 - 800	400 - 900	500 - 1000
Poles	6	250 - 400	300 - 500	300 - 500
	8	150 - 250	200 - 300	200 - 300
Small sawtimber	10	100 - 150	125 - 200	125 - 200
	12	75 - 100	100 - 125	100 - 125
	14	60 - 75	80 - 100	80 - 100
Large Sawtimber	15	30 - 60	40 - 80	40 - 80

* These symbols and tables are from the Forest Survey Section, Timber Management Handbook.

REFERENCES

Forest Survey Section, Timber Management Handbook, North Central Region, 1947 - by U.S.F.S.

Aerial Photographs in Forestry, by S. H. Spurr

Forest Stand-Size Class Keys for Photo Interpreters, by K. E. Moessner, Journal Forestry, February, 1948

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