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State Guides For

**ASSESSING FOREST LAND
AND TIMBER—1966**

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**UNITED STATES DEPARTMENT OF AGRICULTURE
FOREST SERVICE**

Miscellaneous Publication 1061

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³ STATE GUIDES
FOR
ASSESSING FOREST LAND AND TIMBER₎₎
1966₎₎

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^{7a} Miscellaneous Publication 1061)

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PREFACE

This compilation of State guides for the assessment of forest land and timber subject to the general property tax is the third in a series prepared by the Forest Service. Earlier summaries were published in 1941 and 1956.¹

The compilation is intended for State and local tax officials, assessing officers in particular, and for individual forest owners, representatives of forest industry, and others having an interest in property tax questions. Exchange of ideas in the assessment field enables States to benefit from the experience of others and leads to improved assessment administration.

Instructions contained in State assessors' manuals and similar publications, made available through the cooperation of State Tax Commissions, have been the chief source of infor-

mation. Assessment guides or excerpts therefrom are included for each of the States having such material relating to forest lands. Statutory provisions and administrative rulings have also been included where appropriate. These guides have been published current as of December 31, 1966.

The present compilation, like earlier ones, does not include timber exemptions, yield taxes, or other special forest tax laws that remove forest land and timber in whole or in part from the operation of the property tax. Such provisions are contained in the State Forest Tax Law Digest issued periodically by the Forest Service.

An analysis and interpretation of forest assessment developments since publication of the 1956 compilation is scheduled to appear in the Assessors Journal. Reprints of the article, "Progress in the Assessment of Forest Land and Timber 1956-1966," may be obtained from the Forest Service upon request.

¹ Nelson, Alf. Z. Status of official instructions for assessing forest land. Forest Taxation Inquiry. USDA Forest Service, 28 pp. 1941. (Out of print.)

Williams, Ellis T. State guides for assessing forest land and timber—1955. USDA Forest Service, 52 pp. 1956. (Out of print.)

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ARKANSAS¹

COMMERCIAL FOREST LAND

1. Definitions:

a. Commercial forest land is defined as all land, not classed as agriculture, urban or rural, bearing or capable of bearing forest growths of potential commercial use.

b. Non-commercial forest land is defined as the land from which the original forest has been removed, partially or totally, and not used for agriculture, urban or rural purposes.

(1) The types of land in this classification include those variously known as wild land, swamp land, etc.

(2) Uses for this type land are for purposes varying from limited grazing in fringe farming areas, natural and planned reforestation, hunting and allied recreational activities, to no use whatever for certain barren or isolated areas. Some areas are used for run off and erosion control in developed water sheds and some of it is a mere over-burden on known mineral deposits.

2. Forest Regions:

a. Arkansas is divided into four distinct forest regions, based on dominant forest species and physiography. Each of these regions has a predominant forest type, land class and related soils. By comparing the Regional Map (Annex #1) and Forest Type Map (Annex #2) it can be seen that there is a definite relationship of forest type to region.

b. Though the four forest regions of Arkansas are defined both by related soils and forest types, boundaries defining these areas are drawn along county lines, to maintain county integrity, in computing total land acreage, production, etc. Because of county line boundaries two or more regional timber types may fall in one county, such as Pulaski County, which is placed in the Ouachita Mountain Region but timber of all

regions grows there. The four regions are as follows:

(1) Coastal Plain

(2) Ouachita

(3) Ozark

(4) Delta

(5) See Annex #3, Arkansas Forest Regions drawn along County Lines.

(6) See Annex #4, Characteristics of the Different Forest Regions.

3. Classification of Land:

a. As a basis for valuing base soil, four land classes will be recognized that will be applied to the State as a whole.

(1) Coastal plain pine land: All the upland soils of the Coastal Plains Region are potential pine growing soils, despite the presence of hardwood growth, and capability of the soil is based on potential pine yields.

(2) Mountain pine land: Most of the Ouachita Region and the pine sites in the Ozark Region are included. The upland hardwood types of the Ouachita Region are potential pine sites. In the Ozark Region the presence of pine is an indication of the capability of the site for pine and, as a general rule, the South and West slopes of the Ozarks are best adapted for pine.

(3) Bottomland hardwood lands: The most extensive land class which includes the six forest types of the Delta Region and bottomlands of the other regions.

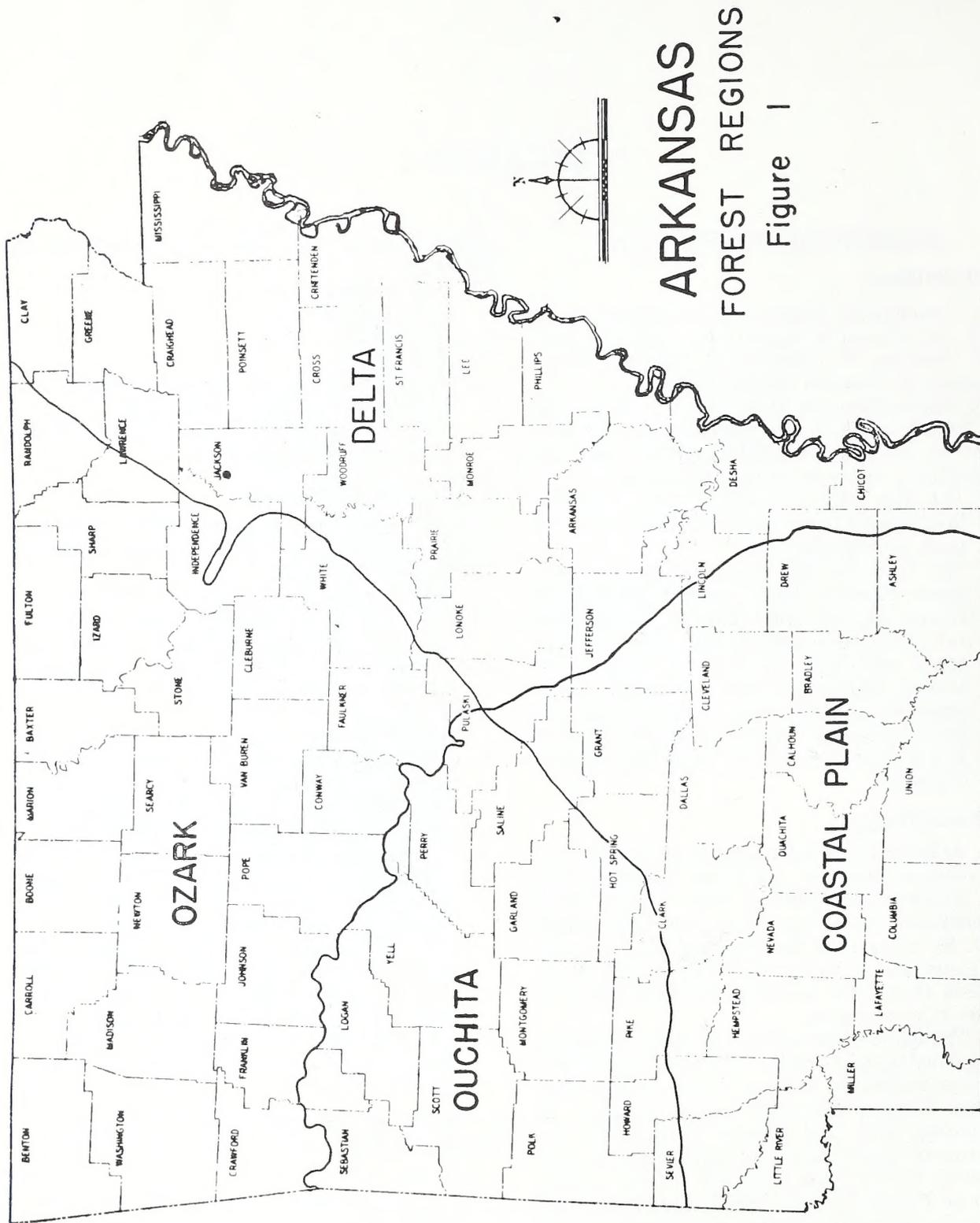
(4) Mountain hardwood lands: Primarily the Ozark Region and includes the upland hardwood type.

4. **Timber Stand Conditions:** Stand timber will be classified into stand size and types as follows:

a. Pine

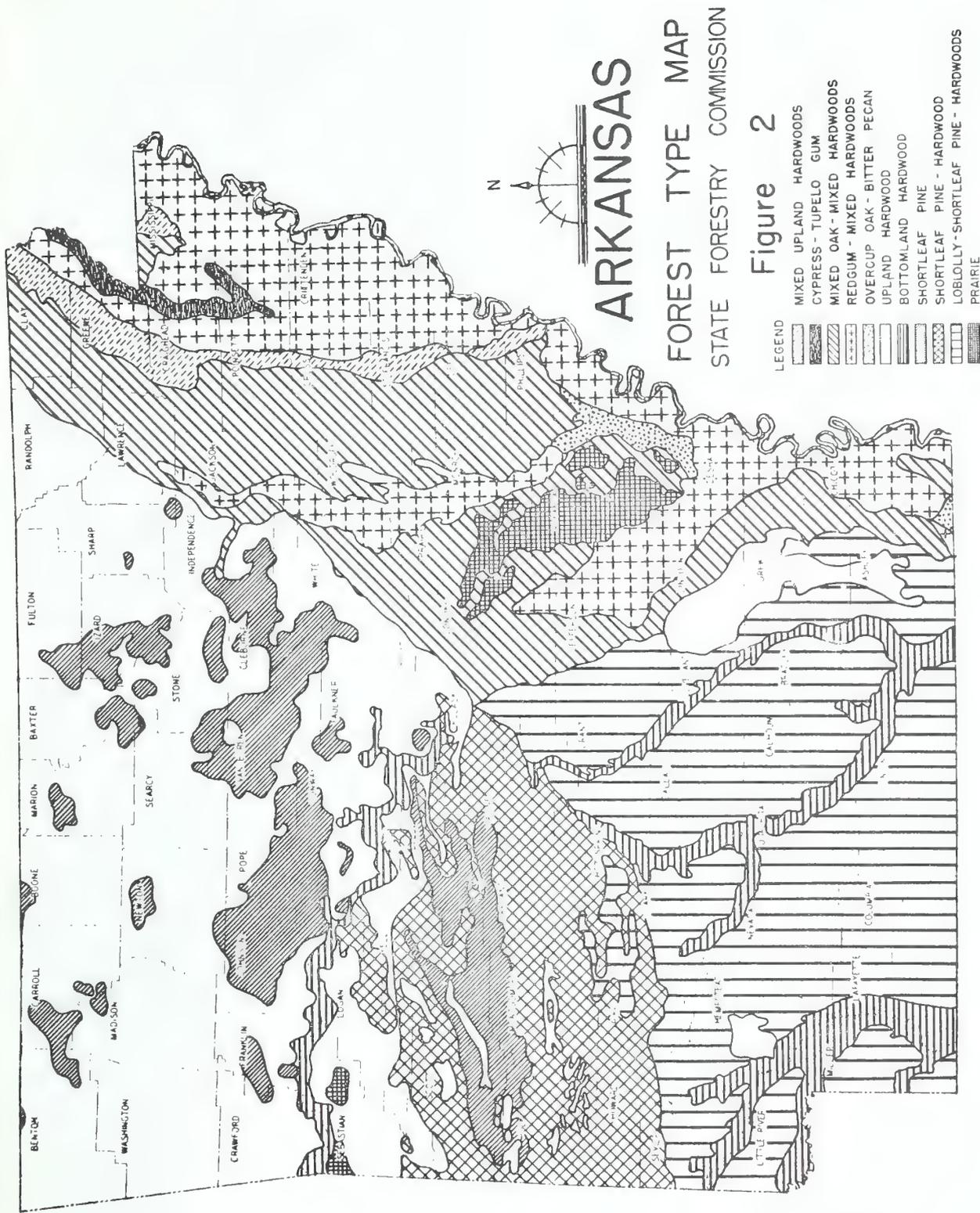
(1) Saw-timber: Stands with the dominant trees ten inches DBH and over, merchantable heights tallied in 1/2 log lengths. The merchantable top will be that point on the stem at which merchantability for saw-timber is limited by large

¹The material included is from the forestry section (revised 1966) of the 1960 Assessors' Manual—Real Estate, Arkansas Public Service Commission.



ARKANSAS FOREST REGIONS Figure 1

[Annex 1. Arkansas forest regions by land class.]



[Annex 2. Arkansas forest types—map.]

branches, deformity, etc., but will be in no instance less than eight inches in diameter.

(2) Pulpwood: Stands with the dominant trees ranging from five through nine inches DBH. Field pine, poor grade, very low, thick branches, will be classified as pulp regardless of DBH. Height, straightness and grade in the pulpwood sizes will point out piling and post types.

(3) Reproduction: Reproduction will be considered as pine growth from seedlings to stems up to four inches in diameter.

(4) Seed trees: Cut over timber lands that have three to five trees per acre left for reseeding.

b. Mixed pine and hardwood: Mixed pines and hardwoods will be classified as follows:

(1) Heavy stand of mixed pine and hardwood on bottomland, growing on a pine site.

(2) Average stand of mixed pine and hardwood on upland, growing on a pine site.

(3) Average stand mixed hardwood on upland or mountains, growing on a hardwood site.

c. Hardwood:

(1) Saw-timber: Stands with the dominant trees ranging from twelve inches DBH and up. Top merchantability will be determined by large branches, deformity, etc., but will never be less than ten inches in diameter.

(2) Pole stands: Only well-stocked, high grade, pole stands free of fire damage, spacing of desirable tree species, at least twelve by twelve feet.

d. Cut over or bare lands: This is a minimum valuation class for each class timber.

5. Evaluation:

a. Cut over land: The cut over area of Arkansas embraces most of the Ozark Region and portions of the other three regions. The value of this property varies greatly from one region to another and few parcels within a given area are of the same value.

b. Cut over land has value deriving from considerations other than forest reproduction. The natural cover is usually a direct indication of basic land capability and possible use, the cover must be considered at all times. The reproduction, therefore, always is an integral part of the consideration in determining value.

c. There are many factors involved in establishing the value of any given parcel. Sales of

cut over land in any area are comparatively limited. Some sales do not fairly reflect market value.

d. The evaluation of cut over and forest land for assessing purposes is accomplished in the following manner:

(1) Determine the type or class of land.

(2) Determine the type and class of cover.

(3) Determine the present utilization.

(4) Establish land value by comparison with similar properties of known value.

(5) If timber is present in commercial quantities they should be considered separately and appropriate values should be added to the parcel.

e. Forest lands are appraised by the same method as used for cut over land. The value of the forest product is added to the basic value of the land. The basic value of land will vary from \$2.50 per acre on the poorer soils to \$20.00 per acre on the more productive soils. This, of course, is assuming that no other utilization possibilities exist other than tree growth. The most important step is the determination of the amount of merchantable forest products on the land.

f. See Annex 5 for description of timber class with basic valuation prices by region.

6. Timber Cruising:

a. Timber cruising is the art of estimating the volume of stands of timber. It is essentially a sampling process, either mechanical or random.

(1) By mechanical, it is meant that a systematic and orderly method will be used on each parcel of land.

(2) By random, it is meant that plots may be taken through a stand entirely chosen by some random process.

b. It is recommended that a 10% line plot cruise be made on each tract, using 1/5-acre circular plots (52.66-foot radius for saw-timber). For pulpwood, it is recommended that a 5% line plot cruise be made using 1/10-acre circular plots (37.24-foot radius) using the same plot centers as used for saw-timber.

c. Annex 6 shows a line plot cruise plan of a 40-acre tract for 10% cruise using 1/5-acre plots.

d. Annex 7 is a method of random cruising.

7. Photo Interpretation:

a. Photo interpreting is the art of recognizing features on aerial photographs. In forestry the interpreter must be able to distinguish pine

from hardwood, saw-timber size trees from pulpwood and recognize density.

b. A good interpreter should have a high degree of stereoscopic perception, which is the ability to see in the third dimension. The lack of this ability will be a serious handicap.

c. Extensive experience in timber work is an essential requisite for interpreting aerial photographs. Timber cruising and estimating is probably the best type of experience. Before an object can be identified on a picture, the observer must know how it looks on the ground. Constant field checking will be required for the interpreter until he gains such experience and confidence that he is positive of his ability.

d. Objects can be identified on aerial photographs because of certain pictorial characteristics such as size, shape, shadow, tone, texture and dimension.

e. Pine can be readily distinguished by tone. Pine appears darker than hardwood. In general, the older and denser the pine stand the darker it appears. Contrast in tone is more easily recognized on infrared pictures.

f. Texture, described in terms of smoothness, roughness and coarseness, is a very important recognition feature. Young pine of sapling size appears very fine and, depending upon age, grades from fine to coarse. Open-grown rough pine appears rough on photos regardless of age.

g. Size and height will serve to distinguish the stand size. The older the timber, the taller it is. By this feature, saw-timber, pulpwood, saplings and reproduction can be identified.

h. Site will serve to identify some features. Most important is to recognize upland from overflow bottomlands.

i. The classification of hardwood stands must be done by an on-the-ground inspection of the stand. Because it is impossible to recognize cull species, cull trees and poor quality on aerial photographs, their use must be restricted to area measurement, stand delineation and an aid for location.

j. Density is discussed in Annex #8.

8. Corner Locations in Timber Areas: (See Annex #9)

9. Estimating Standing Timber: (See Annex #10)

10. General:

a. Aerial photos should be used in all phases of valuing timber. They can be used in cruising to locate stands down to 2½ acres. With photos the cruiser can go into the stand and measure

several plots or enough to satisfy himself that he has a fairly representative sample. In this manner homogeneous stands may be cruised with a low-intensity cruise (5% or less, depending upon the variation in blocking.)

ANNEXES

1. ARKANSAS FOREST REGIONS BY LAND CLASS
2. ARKANSAS FOREST TYPES—MAP
3. ARKANSAS FOREST REGIONS—DRAWN ALONG COUNTY LINES
4. CHARACTERISTICS OF THE FOUR FOREST REGIONS
5. DESCRIPTION OF TIMBER CLASSES WITH BASIC VALUATION PRICES BY REGION
6. LINE-PLOT CRUISE PLAN
7. A METHOD OF RANDOM CRUISING
8. PHOTO DENSITY
9. CORNER LOCATIONS IN TIMBER AREAS
10. ESTIMATING STANDING TIMBER

Annex 4. Characteristics of the Different Forest Regions

1. The Coastal Plain Region is the most important of the four regions. It is characterized by low rolling hills, sandy soil, commercially important stands of pine and hardwood. The associated forest-type is loblolly—shortleaf—hardwood mixture. Growing seasons in this area are from 205 to 220 days. The climate is hot humid summers and mild winters with average temperature of 64 degrees. Average rainfall is from 50 to 55 inches. This region is the center of Arkansas lumbering industry. Markets are readily available. Transportation is good. Extensive tree farming is practiced, with selective cuttings, for sustained growth.

2. The Ouachita Region is characterized by long distinct East-West ridges, shallow rocky soils, and has a high potential for pine production. The associated forest-type is the shortleaf pine—hardwood type. Growing seasons in this area are from 200 to 210 days. The climate is hot summers and mild winters with average temperature of 62 degrees. Average rainfall is from 45 to 50 inches. This region falls second in the Arkansas timber industry. Markets are not always readily available for pulp and chips. Post and piling must be shipped distantly. Transportation is good but confined mostly to trucking. Tree farming is not practiced on a large scale, only small individual parcels of timber. Jack pine grows on the poorer soils.

Much of the land is in Federal Forest.

3. The Ozark Region is composed predominantly of hardwood stands. The region is characterized by rugged mountains, rocky soils, depleted timber stands and relatively low productive potential. While the predominant forest type is the upland hardwood type, many of the South and West slopes could support productive pine stands. The climate is hot summers and mild winters with average temperature of 60 degrees. The growing season is from 190 to 210 days. Average rainfall is from 40 to 50 inches. Markets are not readily available, or too distant. Transportation fair. Very little tree farming. Only small individual parcels of timber. Much of the land is in Federal Forest.

4. The Delta Region is an area of almost pure hardwood. Local pine stands are the exception. Much of timber has been badly managed and cut-over, with a high component of cull, defect, and valueless species. There are six forest types associated with this region. Soils are Bottomland, Loessial Terrace and Loessial Hills. Because of these soils and this being the principal row-crop region of Arkansas, timber is being cleared at a very rapid pace without marketing it. Land use for row-crops far outweighs any for timber value at this time. The climate is hot humid summers with mild winters. The average temperature is 64 degrees. The average growing season is from 205 to 220 days. The average rainfall is 50 to 55 inches.

Annex 5. Description of Timber Classes with Basic Valuation Prices by Region

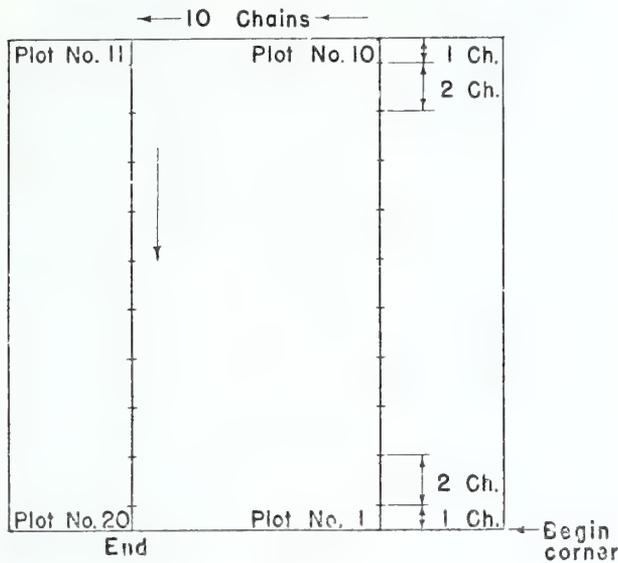
Classification	Stand size	Region value			
		Coastal Plain	Ouachita	Ozark	Delta
Saw Timber					
Pine					
A1.....	Pine land with 6-10 M. per acre.....	100	80	70	100
A2.....	Pine land with 3-6 M. per acre.....	80	65	55	80
A3.....	Pine land with 1-3 M. per acre.....	60	50	40	60
ST.....	Clear cut pine land except 3-5 seed trees per acre.....	40	35	30	40
Pulpwood—Pine					
P1.....	Pulpwood with 6-10 cords per acre.....	80	65	50	80
P2.....	Pulpwood with 3-6 cords per acre.....	60	50	40	60
P3.....	Pulpwood with 1-3 cords per acre.....	40	35	30	40
Reproduction—Pine					
R1.....	Good stand, 1,000 stems and up per acre 1-6 feet between stems.	35	30	25	35
R2.....	Average stand, 500-1,000 stems per acre 6-9 feet between stems.	30	25	20	30
R3.....	Poor stand, up to 500 stems per acre, spaced more than 9 feet apart.	25	20	15	25
Mixed Timber					
PH1.....	Mixed pine and bottomland hardwood on a pine site.....	60	50	40	60
PH2.....	Mixed pine and upland hardwood on a pine site.....	40	35	30	40
HP.....	Mixed hardwood and pine on upland or mountain hardwood site.	30	25	20	30
Hardwood					
H1.....	Good hardwood saw timber 3M and up per acre.....	50	40	40	50
H2.....	Operable hardwood saw timber, 800-3M per acre.....	40	30	30	40
H3.....	Pole stands.....	30	20	20	30
H4.....	Cutover-reproduced brush land or burned land.....	20	15	10	20

Note: 1. All criteria are approached from a "minimum" base of value only and may vary upward.
2. All volumes based on Doyle Rule.

The cruise begins at a known corner, then pacing 5 chains, the first cruise line is located, then the first plot is located 1 chain from the point of beginning on the cruise line and every 2 chains thereafter. When the plots are taken

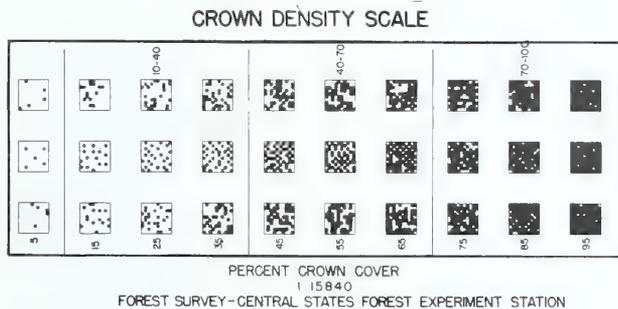
the cruiser proceeds 10 chains on the same "40" to his next cruise line and takes 10 more plots. In this manner 20 plots are sampled constituting 4 acres (20×1/5 acres) which is 10% of the "40."

Annex 6. Line Sample Plot Cruise Plan of a 40-Acre Tract for 10% Cruise Using 1/5-Acre Plots



Annex 8. Photo Density

1. The recognition of photo density classes is based upon the use of a crown density scale.
2. Crown density scale:



3. By comparing crown cover on the aerial photograph with a similar crown cover on the crown density scale the relative density of the stand can be measured. While the measure of density is not a measure of volume, it can be assumed that the more dense a stand the more value it has. Three density classes will be recognized as follows:

- a. Crown Class A: 70-100% of the stand area covered with crowns of pine trees.
- b. Crown Class B: 40-70% of the stand area covered with crowns of pine trees.
- c. Crown Class C: 10-40% of the stand area covered with crowns of pine trees.

4. For all practical purposes, only the density of the dominant merchantable portion of the stand need be considered. If the dominant stand is saw timber then the understory can be ignored.

5. Density of the pine component only will be considered. The classification of the hardwood stands must be done by an on-the-ground inspection of the stand.

6. Description of Pine Timber Classes

Classes	Stand size	Photo density	
		Class	%
A1	Saw Timber.....	A	70-100
A2	Saw Timber.....	B	40-70
A3	Saw Timber.....	C	10-40
P1	Pulpwood.....	A	70-100
P2	Pulpwood.....	B	40-70
P3	Pulpwood.....	C	10-40
R1*	Reproduction.....	A	70-100
R2*	Reproduction.....	B	40-70
R3*	Reproduction.....	C	10-40

*Make a close look for Seed Trees in this area.

7. Before attempting to employ the above procedures in timber volume estimating by use of aerial photos, the following general outline of work is necessary to insure a high degree of accuracy.

- a. Make an intensive field reconnaissance of the forest survey area. Record on photos the various forest types and forest sites observed and other information that might facilitate photo interpretation.
- b. Obtain accuracy information on a sufficient number of randomly selected forest plots within each forest type and site to yield data not determinable from photos.
- c. Simultaneously with paragraph "b" above obtain data to prepare local tree volume tables and measurements for establishment of conversion factors to be used in photo interpretation.
- d. Summarize data collected.
- e. Interpret photos to classify every acre of land.

8. All forest land in the survey unit should be classified according to forest type and site and gross timber volume estimated for each. In order to accomplish this the obvious land use classifications should be delineated first. The following items are considered in order.

- a. Outline nonforest areas such as water, farm land, and residential areas. These categories are obvious and require little or no use of a stereoscope.
 - b. Delineate nonproductive forest areas. These are forested rocky areas, grassy swamp land, brush land or forested areas badly depleted by repeated fires.
 - c. Sketch forest plantation boundaries. Old plantings are readily recognized. New ones less than 5 years old when the aerial photographs were taken, can be determined only by field reconnaissance codings or from ownership records.
 - d. The remaining areas are productive forest lands.
9. See Appendix A for a chronological process of classifying land on aerial photographs.
10. See Appendix B for type site, stand-size class and volume per acre class definitions.
11. Stereograms:
- a. A set of aerial stereograms are attached as Appendix C.
 - b. A set of ground stereograms are attached as Appendix D.
 - c. By using a stereoscope it can be magnified and viewed in three dimensions. By comparing the stereo pairs with photographs the interpreter will be guided in recognizing various stand conditions.
12. Aerial photos general:
- a. The quality of aerial photographs will vary somewhat from county to county, because of film, photography, time of day, atmospheric conditions and seasons of photography.
 - b. Summer panchromatic film may be useless for forestry because of lack of contrast between pine and hardwood.
13. Once again, constant field checking is required of a good photo interpreter.

APPENDIX B. DEFINITION OF TERMS

1. Forest Sites:

a. Site is determined by number of 16-foot logs contained in each mature dominant or co-dominant tree. Mature trees to be recognized in the survey should be pine with diameters of at least 20 inches DBH and hardwood 16 inches DBH.

b. Number of 16 foot logs by site and type.

<i>Forest site</i>	<i>Pine</i>	<i>Hardwood</i>
I	at least 5	at least 3
II	3 to 4½	2 or 2½
III	less than 3	less than 2

c. For areas where mature trees are not present, site is determined by comparing the heights and forms of the immature trees with heights and forms of immature trees found in mature stands of known site quality in similar locations.

2. Merchantable Tree Dimensions:

a. Minimum saw timber size trees:

- (1) Pine—10 inches DBH
- (2) Hardwood—12 inches DBH

b. Minimum pulp or pole size trees:

- (1) Pine—5 inches DBH
- (2) Hardwood—5 inches DBH

c. Minimum top diameters:

- (1) Pine—8 inches
- (2) Hardwood—12 inches

3. Stand Size Class:

a. Saw timber minimum stands:

- (1) Pine—1,000 board feet per acre
- (2) Hardwood—800 board feet per acre

b. Pulpwood minimum stands:

- (1) Pine—2 cords but less than 1,000 board feet per acre
- (2) Hardwood—2 cords or pole timber with at least 12 × 12 feet spacing, and less than 800 board feet of saw timber

c. Reproduction:

- (1) Seedlings and sapling stands less than 5 inches DBH

4. Gross volume per acre classes:

a. Reproduction, seedlings and saplings:

- (1) Poor stand, less than 500 stems per acre
- (2) Average stand, 500–1,000 stems per acre
- (3) Good stand, 1,000 or more stems per acre

b. Pulpwood:

- (1) Light, 1–3 cords per acre
- (2) Medium, 3–6 cords per acre
- (3) Heavy, 6–10 cords per acre

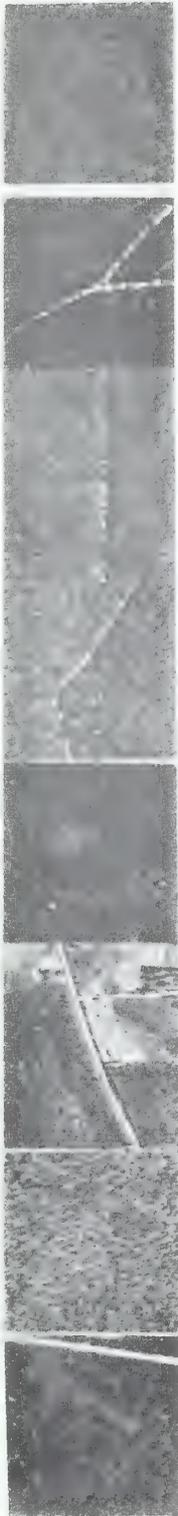
c. Saw-timber:

- (1) Light, 1–3 M per acre
- (2) Medium, 3–6 M per acre
- (3) Heavy, 6–10 M per acre

5. Cull:

a. Cull volume: Amount of wood unmerchantable because of decay or defects. Includes top sections of trees to merchantable limits usually left in woods because of many limbs or excessive crook.

**AERIAL STEREOGRAMS OF TYPICAL
STAND CLASSIFICATIONS**



Stereo 1 A1a
Coastal Plain Pine Sawtimber
5,000 F.B.M. per acre Doyle
55 Sawlog trees per acre

Stereo 2 B1a
Ouachita Pine Sawtimber
4,360 F.B.M. per acre Doyle
56 Sawlog trees per acre

Stereo 3 A1b
Coastal Plain Pine Sawtimber
2,410 F.B.M. per acre Doyle
24 trees per acre

Stereo 4 A1c
Coastal Plain Pine Sawtimber
1,020 F.B.M. per acre Doyle
12 trees per acre

Stereo 5 B2a
Ouachita Pine Pulpwood
15.8 standard cords per acre
460 trees per acre

Stereo 6 A2b
Coastal Plain Pine Pulpwood
7 cords per acre
177 trees per acre

Stereo 7 B2c
Ouachita Pine Pulpwood
3.5 cords per acre
47 trees per acre

Stereo 8 B3a
Ouachita Pine Saplings
Height: 8 feet
Spacing: 1-3 feet

Appendix C

GROUND STEREOGRAMS OF FOREST STANDS



1. A1a Coastal Plain
Pine sawtimber
a density



2. B1a Ouachita
Pine sawtimber
a density



3. A1b Coastal Plain
Pine sawtimber
b density



4. A1c Coastal Plain
Pine sawtimber
c density



5. A2a Coastal Plain
Pine pulpwood
a density



6. A2b Coastal Plain
Pine pulpwood
b density

Appendix D



7. A2c Coastal Plain
Pine pulpwood
c density



8. B3a Ouachita
Pine reproduction
a density



9. A3b Coastal Plain
A3a Pine saplings
Foreground *b* density
Background *a* density



10. A3b Coastal Plain
A3a Pine
A1a Foreground
b density saplings
Center
a density saplings
Background
a density sawtimber



11. C3 Bottomland
Hardwood
Pole stand
Recently cut selectively



12. D4 Ouachita
Scrub hardwood
Minimum valuation

Appendix D—Continued

CALIFORNIA ¹

CONTENTS

CHAPTER I	The value of timber properties
CHAPTER II	The appraisal process
CHAPTER III	Timber property appraisal procedure
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	Appendix

THE VALUE OF TIMBER PROPERTIES

[Chapter I]

The value of a timber property probably is dependent upon a greater number of variables than the value of any other class of real property. Standing timber may be converted to lumber, plywood, hardboards, and various types of pulp products. The ability of forest lands to produce Christmas trees, split products, poles, piling, and fuel wood affect the price these properties will bring in the market. In addition to the consideration of the highest and best use of the timber, multiple land use for homesites, commercial sites, recreation, grazing, watershed management, mineral production, and many other uses must be weighed carefully to arrive at a reasonable estimate of the present worth of future benefits to be derived from the property. Many physical factors have a direct bearing on how much people in general are willing to pay for any particular property. Stand density, species, timber quality, distribution of diameter classes, topography, and accessibility are instrumental in determining the net return.

A diminishing supply of available standing timber has brought about extreme competition between timber buyers. High unit prices for stumpage may be paid to gain access because of a favorable depreciation position, to eliminate competition, to block in timber management units, and for other reasons peculiar to a particular operation.

In the harvest of timber stands, the quantity of timber involved often requires a period of years for the completion of an operation. During this operating period the operator is confronted with costs which are not present in an

operation for immediate liquidation. These additional costs and the less desirable nature of income to be received at some future date should be reflected in the estimate of present worth.

In giving the proper weight to all the variable physical and economic factors, the timber appraiser should bear in mind that the product of his labors is an estimate of market value as it pertains to a willing buyer and a willing seller. The end for which his estimate may be used probably will dictate the amount of time and details which may be employed, but the result sought is market value.

TIMBER PROPERTY APPRAISAL PROCEDURE

[Chapter III]

METHODS OF DETERMINING PRESENT MARKET VALUE FOR VARIOUS CLASSES OF TIMBER PROPERTIES

While timber is considered to be land for assessment purposes, a separate value must be determined for both land and timber in the appraisal process. For a given parcel, the sum of land and timber values, converted to an assessed value, will appear in the "land" column on the assessment roll.

Land

General Considerations

Land is permanent. The amount of it is fixed. It is indestructible even though its productivity may be altered or even destroyed. Therefore, it is basic. Almost all forest land is capable of more than one use. Some forest lands are ideally suited to residential or commercial use. At the present time some areas of this type are being held speculatively in anticipation of residential and industrial expansion.

Demand for recreational use of forest land is growing. Many times, if recreational use is not intensive, such use is compatible with commercial timber growing. Intensive uses are not. It is likely that those areas of forest land best suited to intensive use are also the most productive timber lands, but valuation should be based upon highest and best use of the land. Consideration should be given by the appraiser to all uses to which forest lands being appraised are subjected. For purposes of this manual,

¹ The material included is from Assessors' Handbook—The Appraisal of Timber Property, California State Board of Equalization, 1965. Chapters II and VII are not included. For chapters IV-VI and appendix, only the contents pages are included.

however, forest lands will be considered from the standpoint of timber production being their highest and best use.

Effect of Timber Exemption Upon Land

The exemption of timber as provided in the State Constitution, Section 12 $\frac{3}{4}$, Article XIII, indicates that, in the appraisal of forest land, the value of timber of any ages ranging from seedlings to trees of merchantable size, should be excluded. As a result of the exemption, the land should be considered as being devoid of any timber stocking. The land is often referred to as "bare land" in the attempt to ignore the existence upon it of any stocking of coniferous reproduction, saplings, or small poles, which are considered to be exempt if Section 12 $\frac{3}{4}$ is applicable.

Indicators of Land Value

Courts of law favor evidences of market value based upon current sales and comparability—the market data approach to value. Of the total number of sales of forest land that occur, only a relatively few of them consist of bare land. Some sales of "bare land", however, may be found. As in any transaction, these sales should be confirmed. A determination must be made that the conditions of a market sale have been met. If the appraiser determines that both buyer and seller were willing to negotiate, that both were aware of all uses to which the property was adaptable, that neither took advantage of the hardships of the other, the confirmed sale may be used as an indication of market value.

All forest land is not of the same quality. Variations exist in the physical characteristics of forest lands. Therefore, confirmed sales must be analyzed from the standpoint of many factors. In making comparisons between tracts, considerations must be given to site quality, topography, access and location. Confirmed bare-land sales classified according to site quality, topography, access and location form an excellent base upon which to develop a range of values.

Generally, however, prices paid are evidences of the value of forest growth in addition to the worth of the land itself. To derive a value for sub-merchantable timber from sales of forest land is difficult because reproduction and timber of less than merchantable size is seldom sold except together with land. When forest lands supporting no presently-merchantable stands of timber are bought and sold, the degree, age, and species composition of stocking of sub-

merchantable timber is of importance to the informed principals. It is the value of this stocking that must be estimated if a residual land value is to be derived from a total property value.

As has been suggested, by using a base value derived from sales of *bare* land of given site qualities, factored for other physical characteristics, timber and land allocations may be made from a total sale price.

Soil rent theories have been advanced as a means of deriving bare land value. Values derived from solving these formulae are a present worth of the sum of all costs incurred in planting a forest crop and carrying that crop to a given harvest age. These theories presume that each acre of harvestable timber has been started from bare soil, and has been nurtured through the rotation to time of cutting. In California, limited areas of forest land have been developed in this manner; i.e., burned areas have been planted, or clear-cut areas have been burned and reseeded. This replacement cost approach has been referred to earlier, and it serves as another means of developing an indicator of value.

The third value indicator may be estimated from capitalizing the net income expected to be derived from the land. Net income for capitalization attributable to timber would be that based upon the average net annual growth per acre. This capitalized value is attributable to land and timber, and a timber value must be extracted to derive a bare land value.

Timber

The Inventory

The first step towards arriving at fair market value is the determination of an inventory of standing timber. The various ways of arriving at inventory figures are discussed in Chapter VIII.

Stumpage Value

The second step is the determination of a present value per thousand board feet by species and area. In most cases, stumpage values will be derived through use of value schedules prepared by the county. Preparation of value schedules will be discussed in a later section. Retail stumpage values, used at this point in the appraisal process, disregard the time factor but reflect differences in quality, location, log and lumber haul, and other local factors affecting value.

Consideration of Time

The third step considers the factor of time. A market approach to value certainly must consider the time element. In analyzing sales of timber properties, consideration must be given to the amount and quality of timber involved. These elements, combined with a method of operation, determine the timber stand's length of life. It is part of the appraiser's function to learn whether or to what degree, the purchase price reflects allowances made for the uncertainties attached to holding or operating timber over a period of time. Sales of blocks of comparable timber may give an indication of the present worth of a particular property. Such sales may indicate the amount of discount that occurs because of the time element involved.

The income approach to value also must consider time. In this approach, the appraiser estimates the present worth of the income stream that he expects will flow from the property being appraised. To derive this value, the appraiser must estimate the length of the operating period. Operations may be classed into the following categories: (1) Liquidation operation, (2) Deferred income operation, (3) Operating unit, and (4) A combination operation.

1. *Liquidation Operation*

Short term liquidation

Timber in the process of being liquidated over a relatively short period (1 to 3 years) generally is appraised on the basis of present market value without discount.

(a) Long term liquidation

The income from a timber stand which is in the process of being liquidated over a period of years should be discounted for the operating period as a terminating series of equal annual payments at an adequate discount rate.

2. *Deferred Income Operation*

In some instances for reasons beyond his control, a timber property owner is unable to produce an income from the harvest of standing timber for a period of several years. In this event, the appraiser may make an estimate of the value of the total future benefits which will be realized during a future operating period. The value of the future benefits at the beginning of the operation then will be considered as deferred income and discounted as a single sum to the present.

3. *Operating Unit*

(a) Long term operation

In effect, the discounting of income from properties under long term management is identical to the method of discounting income from

timber stands which are being systematically liquidated over a long period of time. However, a property under good management practices will substantiate to a greater degree the selection of a longer discount period than a liquidation operation. This type of operation is one which is acquiring additional lands and carrying on forest regeneration practices to sustain the operation through a longer period of time. To repeat for emphasis, the future benefits of a managed property are discounted as a series of equal annual payments based on the expected average annual cut and discounted for the operating period at an adequate discount rate.

To meet the requirement of recording values by legal subdivision, unit values will be prorated by volume to the subdivisions.

(b) Sustained yield unit

As an operation attains a status of cutting on a sustained yield basis, which means the average annual cut equals the annual growth, the value of the property is determined by capitalizing the net annual income at an accepted rate of return.

Since production is in perpetuity, the land is always in production and the property value is based entirely upon its ability to produce timber. No value for land will be computed directly.

4. *A Combination Operation*

It is entirely possible to have a timber property which may not fall into one of the above classifications but may require two or more separate discount periods. By discounting the income from each of these periods to present worth, a total over-all value may be determined.

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TIMBER INVENTORY METHODS

[Chapter VIII]

Timber inventories for assessment purposes may be obtained in various ways. The responsibility of the property owner to report all taxable property is clearly set forth in the statutes. Estimates of timber volumes are still necessary for spot-checking submitted cruises, for field checking areas reported as cut-over and for obtaining information on unreported areas. Satisfactory cruises may be obtained (1) from a county cruise, (2) from the property owner, (3) by field sampling, and (4) through the use of photogrammetric methods and field sampling.

COUNTY CRUISE

A county cruise is a survey made by qualified county personnel or completed under contract, which tabulates the physical factors on each timber parcel to a certain set of standards. If a county cruise has been made to acceptable standards and has been kept current, it is probably the best source of inventory information to produce equitable assessments.

Because of the complex nature of the procedures and equipment generally used to complete a cruise of a large area at a reasonable cost, a county cruise in most instances will be done under contractual arrangements.

INVENTORY SUBMITTED BY PROPERTY OWNER

Under increasingly intensive management practices within the timber industry, owners have found it necessary to develop better inventory data. In the absence of a county cruise, property owners should be requested to submit the best available information as required by the statutes of California. Information submitted should include:

1. Timber volumes by species, preferably by 40-acre legal subdivisions.

2. The date the cruise was made, by whom it was made, and the standards used. (Sampling method, minimum top and breast high diameters, deductions for cull and breakage, etc.)

3. Existing physical factors which deviate from the normal and have an influence on value.

4. An annual report showing logged areas by legal subdivision or mapped topographic unit, the volume removed from each assessor's parcel, the type of logging (clear-cut, selective), and an estimate of the relationship of the value to the volume of timber removed.

FIELD SAMPLING

Inventory procedures will normally be confined to spot-checking submitted information and examining areas reported as logged each year. Some inventory estimates undoubtedly will be made on properties for which no report is obtained.

To estimate timber volumes on large areas, requires a statistical sample of a representative portion of the property. This may be accomplished by "running" strips, which are spaced equal distance apart in the parcel to be cruised, making a complete count in the sample area, and then relating the sample data to the whole. Circular plots spaced at intervals may be used in a similar way, and the number of plots or the amount of strip sample may be determined from prepared tables.

A chart in the Appendix indicates the number of one-fifth acre plots to be used. The Timber property Cruise Record form in Chapter VI, paragraph 604.25, presents a means of recording the data. Appraisers generally work alone in the field. Circular plot cruising is more adaptable to use by one man than strip cruising. For this reason, cruising by means of circular plots is recommended.

SAMPLING BY PHOTOGRAMMETRIC METHODS PLUS FIELD CHECKING

In using mass appraisal techniques, comparison between comparable properties plays an important part in arriving at value estimates. To facilitate the comparison of similar timbered areas, procedures using aerial photo-

graphs and timber-type maps derived from these photographs have been developed. Timber-type maps delineate timbered areas of similar vegetative density and cover.

The maximum use of available field and office time will probably be realized by determining the existing timber types on an area to be cruised and field checking the area by types. This will result in the accumulation of data which can be used to construct a schedule of average volumes per acre by types which is valuable in comparing similar properties. A typical type map is shown in the Appendix.

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COLORADO

The Rural Land Manual recommends classification of land by productivity classes. Among these are the following:

"Class V. Highest grazing land carrying capacity classification. Not suitable for cultivation, but suited for permanent vegetation that may be used for grazing. May be level and subject only to limited erosion. Usually consists of land too wet or stony for cultivation, but produces forage or woodland products. No special restrictions are required. Slope 0-30%.

"Class VI. Good grazing land carrying capacity classification. Suitable for permanent vegetation for use as grazing or woodland and not suitable for cultivation. Moderately sloping and subject to wind and water erosion. Grazing is limited to the carrying capacity, deferred grazing to permit spring growth of grass, and rotation of grazing. May require severe restrictions to permit recovery of vegetation. Slope 0-35%.

"Class VII. Fair grazing land carrying capacity classification. Not suitable for cultivation; requires severe restrictions if used for pasture or woodland, and is steep, rough, eroded, or highly susceptible to erosion. All

this land must have capacity capability for production of useful vegetation that furnishes woodland products or forage. Slope 17-35%.

"Class VIII. Waste land is the usual identification. Not suitable for cultivation or for the production of useful, permanent vegetation that may be harvested by grazing or woodland use. Chiefly rough, extremely stony, barren land or permanent swamps and marshes, useful for wildlife, recreation, or watershed protection. Slope 0-35%."

"... each land class should be designated according to use such as:

- D—Dryland (Farm)
- G—Grassland
- Id—Irrigated by Ditch
- Ip—Irrigated by Pump
- T—Timberland
- O—Orchards"

Assessors' Handbook, Rural Land Manual, Sec. 2, pp. 6-8, Colorado Tax Comm., 1965.

Detailed discussion of timberland valuation methods, included in an earlier manual, was omitted from the 1965 revision because most timberlands in the State are in Federal ownership and thus not subject to ad valorem taxes.

CONNECTICUT

"The valuation of timber calls for a special technical knowledge. Where there is considerable timber or woodland in a town, it is recommended that the assessor contact the county agricultural agent, state extension forester, or some other qualified specialist for assistance. The laws of the State are particularly explicit in their directions on how certain types of woodland are to be valued, assessed, and taxed." (p. 77)

Handbook for Connecticut Assessors,
Institute of Public Service,
University of Connecticut.
Storrs. 1963.

In 1963, legislation was adopted relating to the taxation and preservation of farm, forest, and open space land (Public Act 490 Laws of 1963). Under this provision "forest land" is defined as "any tract or tracts of land aggregating twenty-five acres or more in area bearing tree growth in such quantity and so spaced as to constitute in the opinion of the State Forester a forest area and maintained in the

opinion of the State Forester in a state of proper forest conservation".

An owner of land designated as forest land by the State Forester may apply for its classification as such by filing application with the assessor. The "present true and actual value" of forest land thus classified shall be based upon "its current use without regard to neighborhood land use of a more intensive nature,"

Proposed values for major land-use categories have been formulated as follows:

<i>Land Classification</i>	<i>Value per acre</i>
Tillable A (shade tobacco and nursery)	\$500.00
Tillable B (binder tobacco, vegetables, and potatoes)	250.00
Tillable C (cornland, forage crops, tillable pasture)	125.00
Orchard	200.00
Untillable pasture (permanent pasture)	50.00
Woodland, brushland, sproutland	25.00
Waste, swamp and ledge	10.00

"These values should be considered as average for the state as a whole and local assessors may use higher or lower values depending upon local circumstances.

"If assessors do deviate from these values, it is stressed that the relationship among the various categories be maintained.

"This schedule was prepared cooperatively by the University of Connecticut, Connecticut Association of Assessors, Connecticut Farm Bureau Association, and many other groups and individuals."

Issued by Agricultural Center, Haddam, Conn. Sept. 18, 1963.

FLORIDA

In 1963 legislation was adopted (Chap. 63-245 Laws of 1963) that included forestry operations within the definition of "agricultural purposes" for lands qualifying for assessment as agricultural lands. Under earlier legislation (Chap. 57-195 Laws of 1957) agricultural lands are to be assessed upon an acreage basis regardless of location within a plat, subdivision, or other real estate development. Florida thus falls within the group of States providing for assessment of forest lands at their "present use" value.

To facilitate the assessment of forest lands at values that reflect their earning capacity, a timber section has been added to the Real Estate Guide for assessing officers. The material that follows is taken from the Guide.¹

SECTION 3.7—WOODLAND

3.7-1 Valuation Basis.

(A) This section describes a procedure for the appraisal of woodland on the basis of average annual growth from seedling to mature timber. Actually, this is a modified "sustained yield" method in that the annual increment of value represented by growth is recognized, rather than a "liquidation" value. The growth increment is converted into a dollar value. All expenditures including but not limited to management and protection are deducted and the resulting annual net income is capitalized in the same manner as that described for other agricultural lands.

(B) The pine tree is treated as the primary woodland crop because the trend in timber cut from 1935 to 1960 shows pine to be rising, while cuttings of hardwoods and cypress are declining. A pertinent factor in this trend ap-

pears to be the suitability of pine for pulpwood. During the past 25 years a shift from a lumber to a pulpwood economy has taken place. Pulpwood represented 6% of timber used in 1935, but by 1958 it had risen to 62%; however in areas where hardwood trees of commercial value predominate, values per acre as indicated in Section 3.7-7 may be used.

(C) The definition of woodland or forest land is as follows:

Land which is stocked with trees of commercial or non-commercial species and is (1) producing or physically capable of producing usable crops of wood, (2) economically accessible now or in the foreseeable future, and (3) not withdrawn from wood products utilization for use as parks, orchards, pastures or other purposes.

This definition includes land from which the timber has been removed, but which has not been developed for other purposes. It excludes homesites or building areas which are occupied by trees for ornamental purposes.

(D) In addition to the value of the wood, the values of naval stores and range pasture usage are to be considered. These values are to be added where applicable.

(E) Because of marked differences in drainage, soils, and ground cover, the state of Florida has been divided into four (4) areas. The boundaries of these areas are the same as those recognized by the United States Forest Service in conducting official forest inventories, Exhibit No. 31 and No. 31a.

3.7-2 Indicated Value Per Acre.

(A) Exhibit No. 32 shows the indicated value per acre of slash and longleaf pine woodland on the basis of capitalization of net annual income represented by growth. Values per acre where loblolly and sand pine species predominate are values related to slash pine. The assessor's only task in the use of this table of

¹ Real Estate Guide for Assessors, Office of Comptroller, Jacksonville (in course of publication).

FLORIDA FOREST SURVEY UNITS
UNITED STATES FOREST SERVICE
SOUTHEASTERN FOREST EXPERIMENT STATION



Exhibit 31

Indicated Value Per Acre of Pine Woodland on the Basis of Capitalization of Net Income Derived From Growth

Tree	Site index class	Stocking	Florida Forest Survey Units			
			Northwest	Northeast	Central	South
Slash Pine	80	A	\$81	\$78	\$56	(1)
	70	A	58	56	38	
	60	A	38	36	23	
	50	A	22	21	11	
Loblolly Pine	80	A	65	63	45	
	70	A	45	43	30	
	60	A	30	28	18	
	50	A	15	14	9	
Longleaf Pine	80	A	67	64	45	
	70	A	45	44	29	
	60	A	28	26	15	
	50	A	12	11	4	
Sand Pine	70	A	16	16	11	
	60	A	9	9	6	

Derivation: Net annual income Exhibit 33 capitalized at 7%. Loblolly and Sand Pine by ratio to slash pine.
¹ See Section 3.7-2 (B).

Calculation of Net Annual Income From Slash and Longleaf Pine Woodland on the Basis of Growth Per Acre Per Year

Tree	Site index	Stocking density	(1) Average growth per acre per year (cords)	Net income per acre allowing \$1.50 per acre expense (3)			
				(2) Average stumpage price per cord			
				\$7.80	\$7.59	\$5.87	\$4.22
				Northwest Florida	Northeast Florida	Central Florida	South Florida
Slash Pine	80	A	.92	\$5.68	\$5.48	\$3.90	(4)
	70	A	.71	4.04	3.89	2.67	
	60	A	.53	2.63	2.52	1.61	
	50	A	.39	1.54	1.46	.79	
Longleaf Pine	80	A	.79	4.66	4.50	3.14	
	70	A	.60	3.18	3.05	2.02	
	60	A	.44	1.93	1.84	1.08	
	50	A	.30	.84	.78	.26	

¹ Column 8, Exhibits 35 and 35a.
² Exhibit 34.
³ Section 3.7-4 (C).
⁴ See Section 3.7-2 (B).

values is determining species and site index, a one-time procedure.

(B) In that the South Florida area has little or no commercial producing pine or hardwoodland, other criteria should be used to determine value, such as pasture land, cropland, or other.

3.7-3 Formula for Determining Assessed Value.

The valuation of properties based on capitalization of the average net annual income is derived by dividing the average net annual income by a capitalization rate which properly

reflects risk and profit. The assessed value of woodland or forest land can be determined by the following formula:

Average net annual income divided by capitalization rate equals assessed value where average net annual income equals growth increment multiplied by stumpage value, less applicable expenditures.

3.7-4. Source of Data for Formula.

(A) The average annual growth increment can be determined for each of the four areas or U. S. Forest Service Survey Units from yield tables for well stocked stands published in "Growth and Yields of Natural Stands of the Southern Pine", by F. Schumacher and T. S. Coile, Exhibits 35 and 35a. These yield tables predict the yield of well-stocked stands of different site indexes for various rotations. The predicted yield divided by the years of the rotation will give the average growth increment.

(B) Pine stumpage prices can be determined from information available from numerous sources, among which are:

- (1) Florida Forest Service.
- (2) Local forest industries.
- (3) Local Consulting Foresters.

Pine stumpage prices per cord as compiled by the Florida Forest Service are shown in Exhibit No. 34.

(C) The growth and yield information used in this presentation are predicted yields, and are not based on present actual growth. To realize the growth indicated for pine land for the different site classes will require an intensive forestry program, including annual expenditures for stand conversion, planting, timber stand improvement, thinning and other land development expenditures, such as water control, access facilities, etc.

The annual expenditure of \$1.50 per acre is used in this presentation to cover cost of establishment and maintenance of firebreaks, basic fire protection, thinning, pruning, disease control, ranger labor, etc. Property tax expense is provided for in the capitalization rate.

(D) The minimum capitalization rate recommended for forest land or woodland is 7%, which provides adequately for hazard.

3.7-5 Adjustments.

(A) Consideration has been given the mat-

ter of possible adjustments for accessibility with the conclusion that no adjustment is indicated. It is to be noted that the factors of accessibility of transport are reflected in the standard price for the particular Forest Survey Units. The prices are average and they represent market value which has been established by bidders taking into consideration the matter of accessibility, etc.

(B) Deferment of income would not be a valid adjustment since average annual growth on a sustained yield basis is converted to monetary income from which expense applicable to produce such growth are deducted. The net income is capitalized annually, thus the process is not cumulative. This spreads property tax expense over the life of the tree. Woodland thus bears its share of the property tax base through the use of an accepted method of valuation consistent with statutory requirements.

Exhibit 33

Computation of Net Annual Income Per Acre, Exhibit 33

Formula—Stumpage price \times average annual growth per acre minus expense allowance equals net annual income per acre.

Example 1: Slash pine, site index 80, Northwest Florida

Stumpage price per cord	\$7.80
Average annual growth per acre (cords)	\times .92
Gross annual income per acre	\$7.18
Expense allowance	— 1.50
Net annual income per acre	\$5.68

Example 2: Longleaf pine, site index 60, Central Florida

Stumpage price per cord	\$5.87
Average annual growth per acre (cords)	\times .44
Gross annual income per acre	\$2.58
Expense allowance	— 1.50
Net annual income per acre	\$1.08

Pine Stumpage Prices (all products), 1963

Product (71.6 cu. ft. per cord)	N.W. Florida unit			N.E. Florida unit			Central Florida unit			South Florida unit		
	All products	Av. price/cu. ft.	Weighted price/cu. ft.	All products	Av. price/cu. ft.	Weighted price/cu. ft.	All products	Av. price/cu. ft.	Weighted price/cu. ft.	All products	Av. price/cu. ft.	Weighted price/cu. ft.
Pulpwood	Percent 58.17	0.095	0.055	Percent 73.25	0.098	0.072	Percent 58.88	0.071	0.042	Percent 64.29	0.051	0.033
Saw logs, veneer logs, and bolts	22.28	0.123	0.027	20.13	0.121	0.024	29.14	0.110	0.032	22.47	0.095	0.021
Other industrial wood	19.55	0.140	0.027	6.62	0.156	0.010	11.98	0.067	0.008	13.24	0.037	0.005
Total	0.109			0.106			0.082			0.059		
Weighted price per cord	\$7.80			\$7.59			\$5.87			\$4.22		

Exhibit 34. Compiled by Florida Forest Service.

Slash Pine: Yields of Well-Stocked Stands ¹
By F. X. Schumacher and I. S. Coile

Age (years)	Height of dominant stand (ft.)	Basal area per acre (sq. ft.)	Average trees per acre (number)	Average d.b.h. (inches)	Volume per acre over 4.5" d.b.h. (cfs.)	Annual yield/ac. per by rotation use (cfs.)	Average yield/ac. all rotation (cfs.)
Site index 50 feet							
20	30	91	1,308	3.6	8.2	.41	.39
30	40	97	702	5.0	13.5	.45	
40	46	101	518	6.0	17.3	.43	
50	50	104	432	6.7	20.5	.41	
60	53	107	384	7.1	21.8	.36	
70	55	108	352	7.5	23.5	.33	
80	57	110	330	7.8	24.7	.31	
Site index 60 feet							
20	38	96	875	4.5	12.3	.61	.53
30	49	104	499	6.2	19.3	.64	
40	56	109	379	7.3	23.9	.60	
50	60	113	318	8.0	26.4	.53	
60	63	115	290	8.6	30.0	.50	
70	65	118	268	9.0	31.4	.45	
80	67	119	254	9.3	33.1	.41	
Site index 70 feet							
20	46	102	628	5.5	17.4	.87	.71
30	58	111	377	7.4	25.9	.86	
40	65	117	294	8.6	31.5	.79	
50	70	122	254	9.4	35.5	.71	
60	73	126	231	10.0	38.3	.64	
70	76	128	215	10.5	40.6	.58	
80	78	131	205	10.8	42.7	.53	
Site index 80 feet							
20	55	108	474	6.5	23.5	1.17	.92
30	68	120	298	8.6	33.8	1.13	
40	75	128	238	9.9	40.5	1.01	
50	80	134	209	10.8	45.6	.91	
60	83	138	191	11.5	49.0	.82	
70	86	141	176	12.0	50.9	.73	
80	88	144	172	12.4	54.1	.68	

¹Data from—"Growth and Yields of Natural Stands of the Southern Pines" By F. X. Schumacher and T. S. Coile. Copyright 1960 by T. S. Coile, Inc., Durham, North Carolina.

*Longleaf Pine Yields of Well-Stocked Stands*¹
By F. X. Schumacher and T. S. Coile

Age (years)	Height of dominant stand (ft.)	Basal area per acre (sq. ft.)	Average trees per acre (number)	Average d.b.h. (inches)	Volume per acre over 4.5" d.b.h. (cfs.)	Annual yield/ac. per by rotation use (cfs.)	Average yield/ac. all rotation (cfs.)
Site Index 50 Feet							
20	26	37	588	3.4	2.9	.15	.30
30	38	57	343	5.5	8.9	.30	
40	46	69	263	6.9	13.9	.34	
50	50	77	224	7.9	17.5	.35	
60	53	82	202	8.7	20.1	.33	
70	55	86	187	9.2	22.3	.32	
80	57	90	177	9.6	23.8	.30	
Site Index 60 Feet							
20	31	45	578	3.8	4.4	.22	.44
30	46	70	337	6.2	13.1	.43	
40	55	85	259	7.8	20.3	.51	
50	60	95	220	8.9	25.3	.51	
60	64	101	198	9.7	29.2	.49	
70	67	106	184	10.3	32.4	.46	
80	69	110	174	10.8	34.6	.43	
Site Index 70 Feet							
20	36	54	570	4.2	6.3	.32	.60
30	54	83	332	6.8	18.2	.61	
40	64	101	255	8.5	27.7	.70	
50	70	113	217	9.8	34.7	.69	
60	74	121	196	10.6	40.0	.67	
70	78	127	181	11.3	44.4	.63	
80	80	131	171	11.9	47.4	.59	
Site Index 80 Feet							
20	42	62	563	4.5	8.4	.42	.79
30	61	97	328	7.4	23.9	.80	
40	73	118	252	9.3	36.7	.92	
50	80	131	214	10.6	45.7	.91	
60	85	141	193	11.6	52.7	.88	
70	89	148	179	12.3	58.0	.83	
80	91	153	169	12.9	61.9	.77	

¹ Data from—"Growth and Yields of Natural Stands of the Southern Pines."
By F. X. Schumacher and T. S. Coile.
Copyright 1960 by T. S. Coile, Inc., Durham, North Carolina.

Exhibit 35a

Section 3.7-7 Hardwood Land.

Primary or best hardwood producing land normally consists of river bottoms, creek or branch bottoms and hammocks. Such land is usually characterized by a clay or silt soil,

which is relatively well drained but subject to periodic flooding. Species which occur naturally are gums, oaks, bays, magnolia, ash, and bald cypress. The following table indicates land values where hardwood trees are predominant:

*Indicated Value Per Acre Hardwood Land*¹

Florida Forest Survey Unit	Average annual growth (cords)	Value per cord	Gross annual income	Annual expense	Net income	Value per acre
Northwest Florida.....	.43	\$4.59	\$1.97	\$.25	\$1.72	\$24.00
Northeast Florida.....	.39	4.30	1.68	.25	1.43	20.00
Central Florida.....	.47	4.45	2.09	.25	1.84	26.00
South Florida.....						

See Section 3.7-2 (B).

¹ Source: Florida Forestry Association.

3.7-9 Site Quality Index of Pine Woodland.

(A) Site quality index refers to the dominant tree heights at 50 years of age. The relative higher tree indicates more productive soil with consequent greater earning value of the land under appraisal. Reasonably accurate determination of site index is the most important appraisal step. It is a one-time task—site index does not change.

Methods available in the order of preference include:

Method 1—Sample borings to determine age and measurement of tree height. Reference to site index curves, Exhibits 42 a-c, will give the index for the specific parcel. An increment borer and hypsometer are the tools to be used. This is the preferred method for sites having sufficient trees of adequate diameter.

Method 2—For use in the absence of a recent soil survey. Gain familiarity with the area's terrain, representative soils, and pasture sites, as described in Exhibit 40. Site index may then be determined by reference to Exhibit 41. This method is used for sites recently clear-cut and those having seedlings and small saplings.

Method 3—If a recent Soil Survey Report exists, reference to it will reveal site indices for the entire county, identifiable by detailed maps.

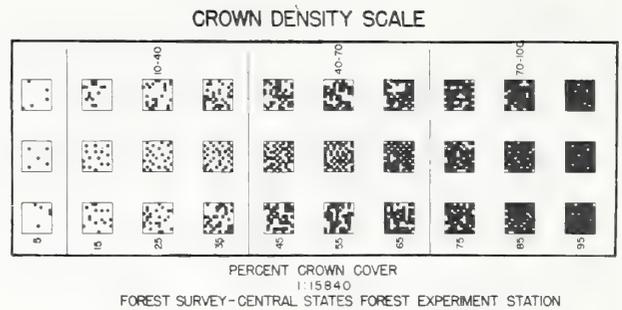
3.7-10 Density of Stocking.

(A) Stocking is a measure of the degree to which growing space is effectively utilized by trees. It is defined as follows:

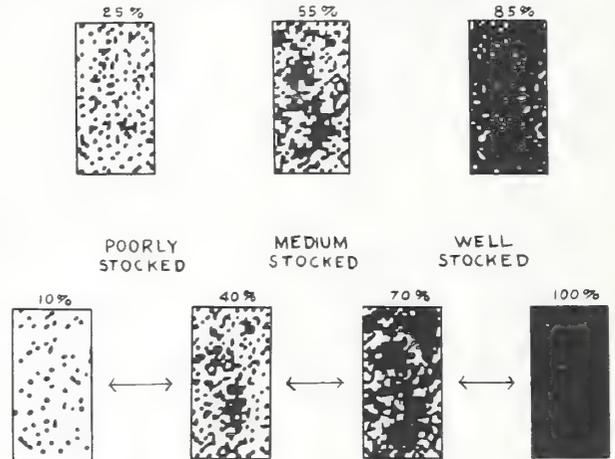
- A—Well stocked—areas 70% or better stocked with growing stock.
- B—Medium stocked—areas 40 to 70% stocked with growing stock.
- C—Poorly stocked—areas 10 to 40% stocked with growing stock.

(B) Density of stocking is best estimated by aerial photo interpretation in conjunction with ground observation. Crown closure percent, also referred to as crown cover or crown density, is the proportion of the forest canopy occupied by tree crowns. Measurements of crown closure percent are made by viewing aerial photos under stereoscope, using a crown density scale similar to the examples shown here. Exercise care not to overestimate crown closure by overlooking small stand openings or including portions of crown shadows.

(C) A second method is measurement of basal



TIMBER SURVEY AID NO 5
GUIDE FOR ESTIMATING DEGREE OF STOCKING ON AERIAL PHOTOS
BASED ON CROWN DENSITY OF DOMINANT AND CODOMINANT TREES



MAY BE ORDERED FROM:

DIRECTOR, PACIFIC NORTHWEST FOREST & RANGE EXPERIMENT STATION
OR FROM: REGIONAL FORESTER, U.S. FOREST SERVICE PORTLAND, OREGON

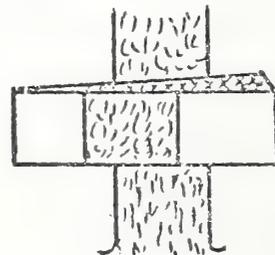
area by the use of a prism calibrated to a factor of 10. Step by step procedure is as follows:

Step 1—Select an observation point in the stand that is representative of average stand density as estimated by general observation.

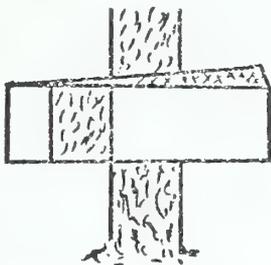
Step 2—Observe all surrounding trees through the prism, regardless of distance, and tally them according to the following schedule:

DBH Tally

- 1.0—Any tree where the image is within the balance of the tree:



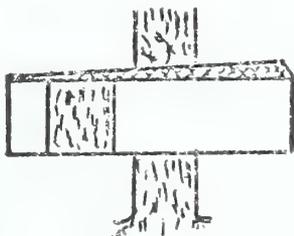
0.5—Any tree where the image is displaced exactly the width of the tree:



0.0—Any tree where the displacement is greater than the width of the tree:

(Total & average)

(Total to whole no.)



Step 3—Total the tally and add "0". If 8 trees showing an image within balance have been counted, the basal area is 80.

Step 4—Repeat Steps 1-3 as necessary if it appears that density and stem diameter varies greatly within the stand, and calculate basal area by the following formula:

$$10 \times \frac{\text{Number of trees tallied}}{\text{Number of sampling points}}$$

Step 5—Refer to the following table for percent of stocking.

3.7-11 Personnel undertaking to determine site index and density of stocking should be thoroughly trained in the field, particularly as to sampling error, selection of plots, avoidance of bias, etc.

Cumulative Stocking Percent
Basal Area Factor = 10

Dbh class	*Number of sound commercial trees tallied												
	1	2	3	4	5	6	7	8	9	10	11	12	13
Seedling	10	20	30	40	50	60	70	80	90	100			
2	12	25	38	50	62	75	88	100					
	Tally on hundredth of an acre												
4	17%	34	51	68	85	102							
5	15%	30	45	60	75	90	105						
6	13%	26	39	52	65	78	91	104					
7	12%	24	36	48	60	72	84	96	108				
8	12%	24	36	48	60	72	84	96	108				
9-13	11%	22	33	44	55	66	77	88	99	110			
14-18	10%	20	30	40	50	60	70	80	90	100			
19-32	9%	18	27	36	45	54	63	72	81	90	99	108	
33-38	8%	16	24	32	40	48	56	64	72	80	88	96	104

*The sum of tally under (C) above.

Note: A plot may have both a prism count and tally.

Although no forest assessment guides have been adopted by the State, a proposed guide was prepared in 1965 as a cooperative project of the University of Georgia School of Forestry, Georgia Forest Research Council, Georgia Forestry Commission, and College of Agriculture Experiment Station. The material that follows is taken from this publication.¹

INTRODUCTION

F. R. Fairchild in his thorough study, *Forest Taxation in The United States*, stated: "The ideal tax system is that which accomplishes, in a workable and not too expensive fashion, an equitable distribution of the cost of government among all persons having an interest in the government. To be ideal the tax system must first of all be workable. A tax system which is incapable of effective administration, which is uncertain as to the amount of the taxpayer's liability or which encourages evasion and fraud must be rejected, whatever other virtues it may claim. Secondly, the operation of the system must not be too expensive in comparison with the revenue received. Thirdly, the system must accomplish an equitable distribution of the cost of government.

"The ideal method of taxing forests is that which will require a just contribution from forest owners, while being of such form as will not place a special obstacle (beyond what any just tax may impose) in the way of the best use of the forests and forest lands from the viewpoint of the public interest. In pursuance of this ideal, a balance must be struck between the needs of the forest owners and the needs of the forest communities. The forest owner should have the opportunity to pursue his forest business without the obstacle of unreasonable taxation; the forest community, on the other hand, should supply money to finance necessary government expenses.

"It is not to be presumed that an ideal tax system would require that large areas of forest or other land be placed on the delinquent-tax rolls year after year. To confiscate forest property by taxation is as much against public policy as to exempt it from carrying its fair share of governmental burdens."²

¹ Proposed Assessment Guide for Forest Lands in Georgia. Georgia Forest Research Council, Rep. 11, 24 pp. 1965.

² Fairchild, Fred R., et al. 1935. *Forest Taxation in the United States*. U.S.D.A. Misc. Publ. 218. Introduction.

JUSTIFICATION OF PROPOSAL

Georgia's basic land tax is the ad valorem tax. There is at present no yield, severance, or modified forest land tax. Investigations of the history of these types of taxes in other states lead the authors to believe that they offer no basis for improving the forest land tax situation in Georgia. The yield tax presents serious problems because of fluctuations in income from year to year, which would not be acceptable to many local governments. The severance tax has no relationship to the property tax. It is a tax levied in addition to the property tax. Modified taxes on forest lands create many problems and complexities which seem undesirable.

Currently the Georgia Code specifies that "All property shall be returned for taxation at its fair market value."³ An assessment ratio is usually applied to the fair market value to arrive at the assessed or taxable value. Georgia courts have consistently held that standing timber in realty.⁴

As soon as timber is severed from the stump it becomes personalty.⁵ Under these holdings the trees must be considered as part of the land and, as such, considered in setting the assessed value of the land. However, agricultural products are expressly exempt from ad valorem taxation by statutory provisions.⁶

The assessment of standing timber in the same manner as the land which supports it is fundamentally wrong. When land and timber are assessed together or when the value of the existing timber stand is added to the value of the land for purposes of determining annual taxation, the annual growth of each year in the life of the stand is taxed during every subsequent year until harvest.

In other words, the growth which occurs the year a stand is established is taxed not only during that year, but in all other years of the rotation. With a 30-year rotation, the first year's growth is taxed 28 times, and so on. The difference between an annual crop, like cotton, and a crop harvested only once in a period of years, like timber, is obvious. The fact that the annual growth of a timber stand is not harvested each year should not make

³ *Ga. Code Ann.* §92-5701 (1961).

⁴ *Moore V. Vickers*, 126 Ga. 42, 54 S.E. 814 (1906).

⁵ *Graham V. West*, 126 Ga. 624, 55 S.E. 931 (1906).

⁶ *Ga. Code Ann.* §5-606 (1962).

that growth subject to taxation for more than the one year in which it occurred.

The tax on a merchantable stand of timber, just before cutting, will have been collected during each year of the life of the stand if annual growth (productivity) is the basis for evaluation; there should be no tax liability against the accumulated growth at the time of harvest. This protection for the timber grower encourages him to practice good forest management by realizing the maximum yield from the site and by carrying the timber crop through to economic maturity.

On the contrary, assessing (and taxing) timber land or land plus timber based on a current market value, year after year, can lead only to premature cutting and liquidation of the timber-growing enterprise. This taxing procedure is entirely inconsistent with the principles of sound forest management. Those who manage their lands, and thus have better stands of timber, are taxed at a higher rate than those who do not manage or who mismanage their stands and have poor quality and a small quantity of timber. A stagnated stand of timber with little or no growth may be taxed at a high rate because the timber standing is old growth timber, whereas a good highly productive site may be taxed at a low rate because of poor stands resulting from uncontrolled fire, poor cutting practices, or other acts of poor management.

The current classification of timber as realty creates assessment problems that are difficult to resolve if the law is strictly followed. The very nature of a constantly changing biological entity, such as a stand of timber means that each year there is a change in value created by growth, mortality, or harvesting operations. Thus the requirement that the timber be assessed places heavy burdens on this system to meet the ideals of effective administration and cost of assessment compared to revenue received.

The answer to this is to have valuation based on productivity. This is not a new concept except as applied to woodlands. Agricultural land is classed as excellent, good, fair, poor, etc., and this classification is based on nothing more than the productive capacity of the land. An acre of good cotton land is one that will produce one and one-half or more bales of cotton per year. A poor acre will produce less and is taxed accordingly. Urban property has long been taxed relative to its ability to earn income. Location and improvements are factors affecting urban real estate valuations, and

these are direct measurements of income producing capacity. It is not unreasonable or illogical that timberlands should be valued and taxed on the same basis—their productive capacity.

The use of productive capacity as the basis for assessment of forest land would encourage good management. The person with the best class land would have to pay the top tax rate and would thus be encouraged to manage his land in order to get the greatest income from it, if for no other reason than to pay the taxes.

An assessment on productive capacity would greatly simplify and increase effectiveness of administration of the property tax. All forest land in the state would be classified into one of a number of productive capability classes based on factors such as site index and quality. Once the classification is made, frequent revisions would not be necessary because the productive capacity changes very little in the absence of drastic external factors, such as severe erosion, water inundation, or mechanical changes.

There are a number of ways to measure the productive capacity of forest land. The most accurate method is actual measurement of the growth of a stand of trees under ideal conditions, i.e., good stocking and stand composition. But this also is the most time consuming and difficult method.

One of the most reliable and widely used means of measuring productive capacity of forest land is by the use of site index. Site index is defined as an expression of forest site quality based on the height of the dominant stand at an arbitrarily chosen age. The age of 50 years is commonly used in the South. From established curves, site index may be estimated for a stand of trees of any age.

The reason site index is so widely accepted as a measurement of productive capacity is that the height of a tree is, except in very rare circumstances, determined primarily by the characteristics of the site. It is not affected by environmental factors other than site quality, whereas diameter is affected by factors such as stand composition, density, silvicultural practices, etc.

Extensive research in the field of soil-site index relationships has indicated that there is a close relationship between kind of soil and site index. Site index varies for a given soil mapping unit by species because some species are better adapted to certain soils than to other soils.

The U. S. Department of Agriculture Soil

Conservation Service has published tables showing the average site index for major soil mapping units and major tree species. These tables are available for use in classifying soils by productive capacity.

IMPLEMENTATION OF GUIDELINES

Considerable effort will be required initially to implement this assessment guide on the part of tax assessors and the State Revenue Department. However, the proposed guidelines offer long-range economies in the administration of the property tax on forest land. This system of assessment is based on the productive capacity of the land as related to site index.

The first step in its implementation is the classification of all forest land ownerships by site index. There are two feasible methods of accomplishing this requirement. One method is to make necessary field measurements on each forest property sufficient to determine reasonably accurate site indices for the property. The measurements required are relatively simple and instruments required for the job are inexpensive. It is possible that assessors may obtain help from Georgia Forestry Commission personnel in performing this work. Assessors themselves could be given special training in the procedures for determining the site indices of a property, but since the job will only have to be performed once in the foreseeable future on most forest land they may prefer to seek assistance from other public agencies and concentrate their efforts on providing up-to-date ownership maps for use in this project.

However the job is accomplished, the objective is to obtain site indices by ownerships.

Another method of obtaining site indices is by the use of soil maps. As previously mentioned, the Soil Conservation Service has mapped much of the land in Georgia by mapping units. These soil mapping units have been grouped into woodland suitability by three major resource areas. These areas are:

- (1) The Limestone Valley and Mountain resource area
- (2) The Piedmont resource area
- (3) The Coastal Plain resource area

This information has been published by the U.S.D.A. Soil Conservation Service.⁷

These woodland suitability groups are correlated by species of trees with site index. With

⁷ United States Department of Agriculture, Soil Conservation Service, Soil Survey Interpretation for Woodland Conservation, Georgia, Progress Report, 1961.

proper ownership maps it would be possible to determine site index on a given property with these soil maps, with very little field checking. If aerial photographs are available, species groupings could be determined and the land classified by site index with reasonable accuracy in the office.

The fact that the site index, which is a measure of productive capacity, seldom changes in the absence of external factors means that this job would only have to be done one time except in rare instances. Examples of soil survey maps and procedures for calculating the average site index of an individual property are outlined in the appendix.

TABLES OF VALUES BY SITE INDEX CLASSES

Once the land is classified by site index, the assessor needs to know the value of the class. It is impractical to expect each individual property using the market, cost, or income approaches ordinarily used in forest valuation.

To simplify the job on the local level the State Revenue Department should periodically calculate a range of assessed values to be assigned to each site index class for each of the three resource areas of Georgia. These tables should be published by the Revenue Department and recommended to local assessors for their use.

The State Revenue Department, perhaps assisted by a committee of assessors, appraisers, foresters, and soil scientists, would consider the productive capacity of site index classes and determine a range of values for each class in each resource area. General market conditions and area locations would be considered in setting these values. However, specific locational factors within the county which would influence the basic land value would be determined by the local tax assessor within the published range of values for a specific site index class.

For purposes of illustration the following tables are offered:

TABLE 1.—Assessed values of forest land by site index classes for the Coastal-Plain Resource Area (ASSESSMENT RATIOS 10-100)

Site index	Ratio = 10	Ratio = 20
Less than 56	\$ 0.12— 0.50	\$ 0.25— 1.00
56 to 65	\$ 0.50— 1.20	\$ 1.00— 2.40
66 to 75	\$ 1.20— 2.00	\$ 2.40— 4.00
76 to 85	\$ 2.00— 3.00	\$ 4.00— 6.00
86 to 95	\$ 3.00— 4.00	\$ 6.00— 8.00
96 to 105	\$ 4.00— 6.00	\$ 8.00— 12.00
106 to 115	\$ 6.00— 8.00	\$12.00— 16.00
116 and over	\$ 8.00—10.00	\$16.00— 20.00

TABLE 1.—Continued

	Ratio=30	Ratio=40
Less than 56	\$ 0.37— 1.50	\$ 0.50— 2.00
56 to 65	\$ 1.50— 3.60	\$ 2.00— 4.80
66 to 75	\$ 3.60— 6.00	\$ 4.80— 8.00
76 to 85	\$ 6.00— 9.00	\$ 8.00— 12.00
86 to 95	\$ 9.00—12.00	\$12.00— 16.00
96 to 105	\$12.00—18.00	\$16.00— 24.00
106 to 115	\$18.00—24.00	\$24.00— 32.00
116 and over	\$24.00—30.00	\$32.00— 40.00
	Ratio=50	Ratio=60
Less than 56	\$ 0.65— 2.50	\$ 0.75— 3.00
56 to 65	\$ 2.50— 6.00	\$ 3.00— 7.20
66 to 75	\$ 6.00—10.00	\$ 7.20— 12.00
76 to 85	\$10.00—15.00	\$12.00— 18.00
86 to 95	\$15.00—20.00	\$18.00— 24.00
96 to 105	\$20.00—30.00	\$24.00— 36.00
106 to 115	\$30.00—40.00	\$36.00— 48.00
116 and over	\$40.00—50.00	\$48.00— 60.00
	Ratio=70	Ratio=80
Less than 56	\$ 0.87— 3.50	\$ 1.00— 4.00
56 to 65	\$ 3.50— 8.40	\$ 4.00— 9.60
66 to 75	\$ 8.40—14.00	\$ 9.60— 16.00
76 to 85	\$14.00—21.00	\$16.00— 24.00
86 to 95	\$21.00—28.00	\$24.00— 32.00
96 to 105	\$28.00—42.00	\$32.00— 48.00
106 to 115	\$42.00—56.00	\$48.00— 64.00
116 and over	\$56.00—70.00	\$64.00— 80.00
	Ratio=90	Ratio=100
Less than 56	\$ 1.12— 4.50	\$ 1.25— 5.00
56 to 65	\$ 4.50—10.80	\$ 5.00— 12.00
66 to 75	\$10.80—18.00	\$12.00— 20.00
76 to 85	\$18.00—27.00	\$20.00— 30.00
86 to 95	\$27.00—36.00	\$30.00— 40.00
96 to 105	\$36.00—54.00	\$40.00— 60.00
106 to 115	\$54.00—72.00	\$60.00— 80.00
116 and over	\$72.00—90.00	\$80.00—100.00

The approximate average site index for forest land in Georgia is 70 feet. Using the 70 foot class as a base figure, projections of costs and returns and average sales prices indicate that the fair market value of the land should be from \$12.00 to \$20.00.⁸ Using the 40% assessment ratio recommended by the State Revenue Department for revaluation studies, the range of assessed values would be from \$4.80 to \$8.00. Growth and yield studies furnish a guide for variations from the base figure of 70 feet. On this basis a millage rate of 50 times the assessed values gives a range of \$0.25 to \$0.40 as the tax to be levied for site index 70 in the Coastal Plains Resource Area. In 1963 the average median range of taxes was \$0.26 to \$0.45.

Tables 1 through 3 indicate the assessment values based upon the values supplied by Sizemore. They represent the assessment ratios from 10 to 100 percent by 10 percent increments for the three major geographical areas. These, of course could vary with the base value assigned to the various site index classes

⁸ Sizemore, William R., unpublished dissertation, University of Georgia, 1964.

of land and can easily be re-evaluated using computers when deemed necessary.

To be objective the local assessor could determine the base level within the range of assessed values at which the average ownership from the standpoint of location of the property will be placed. If he determines this to be \$6.50 (mid-point of range) for site index class 66-75 he then must determine if this particular property should be assessed either below or above the base value for the class by the use of locational factors such as nearness to roads, accessibility, etc.

In some instances questions will arise on a particular property as to whether it should be properly classed as forest land or for some higher use. These questions of necessity must be left to the local assessor, and to the arbitration procedure when disagreements between the assessor and landowner arise.

This proposed assessment guide fulfills to a degree the requirements of the ideal tax system. It can be administered effectively and at low cost compared to returns expected. It should help to standardize assessments between and within counties. It allows landowners to predict with reasonable accuracy their tax liability. It eliminates the necessity of trying to determine annually the constantly changing amount, quality, and value of the standing timber by the local assessor. Local governments are assured of a stable tax base which is not possible with the yield tax, because of fluctuating volumes of timber cut from year to year. It places the taxation of forest land on the same basis as agricultural land, i.e., productive capacity. Further, it is a system which will allow forest owners to manage their lands for the production of goods and services for the public on a businesslike basis. There would be in effect a penalty on the owner who did not properly manage his lands in that he would have to pay taxes as great as those who do with the same class of land.

While there are many refinements which could be introduced into this system, one of its greatest assets is its simplicity. It represents a reasonable and equitable approach to the assessment of forest land and would do much for the progress of Georgia.

APPENDIX

INSTRUCTIONS FOR DETERMINATION OF AVERAGE SITE INDEX OF A FOREST PROPERTY

Site index is an expression of forest site quality based on the height of the dominant stand at an arbitrarily chosen age. Site is further defined as an area, considered as to its ecological factors with reference to capacity to produce forest or other vegetation; the combination of biotic, climatic, and soil conditions of an area.⁹

For our purposes we will consider site index as the total height attainable by the average dominant and codominant trees in stands at the age of fifty years.¹⁰

⁹ Society of American Foresters. *Forestry Terminology*. Third Edition. 1958.

¹⁰ Gevorkiantz, S. R. 1957. *Site Index Curves for White Pine in Lake States*. Technical note 483, Lake States Forest Experiment Station, St. Paul, Minn.

The measurements required for the determination of site index can be made by one man, but better results are usually achieved by two to four man crews.

Equipment required for the job includes an increment borer for determination of age of the tree, a hypsometer for measuring tree height, a one-chain tape, and site index curves for the desired tree species. The tape will not be necessary if a range finder is on the hypsometer.

PROCEDURE ¹¹

¹¹ Avery, T. E. and Herrick, A. M. *Field Projects and Classroom Exercises in Basic Forest Measurements*. University of Georgia Press-Athens. 1963.

FIGURE 1.—Determination of site index

Form 1

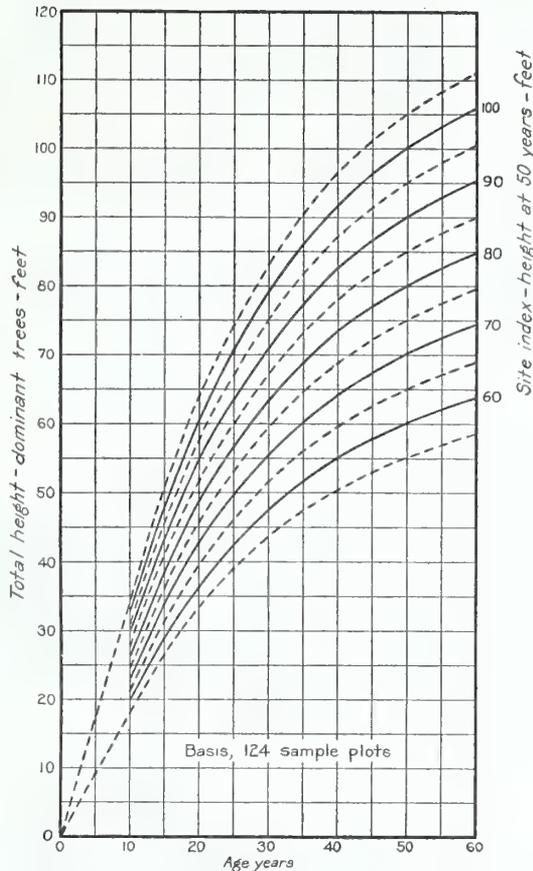
Property ownership _____ Species _____ County _____

Date _____ Person performing work _____

Tree no.	Crown class ¹	Total height	Age at dbh	Total age
1				
2				
3				
4				
5				
6				
7				
8				
9				
10				
11				
12				
Totals			xxx	
Means			xxx	
Site index (from curves):				

1. Dominant or codominant

FIGURE 6. SITE INDEX CURVES FOR SLASH PINE



Site Index Curves on pages 17-20 from Avery and Herrick.
Original Source: U. S. D. A. Miscellaneous Publication No. 50.

10

1. Locate a stand of the desired tree species. A minimum of 6 to 10 dominant and codominant trees should be measured for total height and age. The required number of samples may also be determined by this rule-of-thumb formula:

$$\text{Number of sample trees} = 5 + \frac{R^2}{30}$$

Where "R" is the estimated range of total heights of dominant and codominant trees in the stand. For example, if the range in total heights of dominant and codominant trees is 20 feet, the number of

sample trees would be $5 + \frac{(20)^2}{30}$ or 18.

AVAILABLE SOIL SURVEYS

Figure 2 shows the status of Soil Surveys as of 1964 within Georgia.

Information furnished in the soil survey of each county includes:

1. Soil mapping unit index. (See Figure 3).
2. Detailed soil maps prepared from aerial photographs. (See Figure 4).

A theoretical ownership is plotted on Figure 4. Because maps on the scale used in Figure 4 are difficult to work with, larger scale maps should be obtained, if possible, from the SCS by County officials. Perhaps the State Revenue Department could make arrangements to obtain the larger scale maps where available.

The acreage in different soil series of the ownership must first be determined. This can be done by use of a polar planimeter or dot grid. Then the woodland suitability group of each soil series represented must be determined by use of either the County Soil Survey (now available in ten counties) or the tables and information found in the appendix (taken from *Soil Survey Interpretations For Woodland Conservation*).¹² The site index of each soil series should be determined; this information is recorded on Form 2 (Figure 5), and calculations

¹² United States Department of Agriculture, Soil Conservation Service, op. cit.

FIGURE 5.

Property owner		County	Resource area		Person preparing form	
John H. Smith		Douglas	Piedmont		Al Jones	
1	2	3	4	5	6	
Soil series	Gross acreage in forest	Woodland suitability group	Species short-leaf	Site index	Col. 2X Col. 5	
Alm-----	8.3	2	Lob. P	75	622.5	
Alp-----	3.2	2	Lob. P	105	336.0	
LeC ₃ -----	1.3	4	Lob. P	80	91.0	
LjE ₂ -----	36.3	5	Lob. P	80	2904.0	
LjF-----	6.4	5	Lob. P	80	512.0	
MiC ₃ -----	.6	4	Lob. P	80	48.0	
MiD ₃ -----	.6	6	Lob. P	75	45.0	
Totals	56.7	-----	-----	-----	4558.5	

$$\text{Average site index} = \frac{\text{Total wt. (Col. 6)}}{\text{Total forest acreage (Col. 2)}} = \frac{4558.5}{56.7}$$

are made to determine the average site index for the entire ownership.

As a matter of policy and for further simplicity, the County assessor may wish to classify all pine lands regardless of species at the average site index for all pines of the resource area.

For areas not growing pine the Site Index curves shown in Figures 10 through 13 should be used to determine the index for the species.

Some swamps and certain deep sand ridges should be classified at below site index 50, as their productivity is negligible.

HAWAII

Legislation adopted in 1961 and amended in 1963 provides that, in order to encourage the development of lands for uses to which they are best suited, the power to zone shall be exercised by the State. Methods of real property assessment should encourage rather than penalize those who would develop these uses.¹ Provision is made for four major land use districts into which all lands in the State will be classified: Urban, rural, agricultural, and conservation. Conservation districts include watersheds, scenic areas, parks and wilderness, and forestry and related activities.

¹ Chapter 98 H, Revised Laws of Hawaii 1955 (1961 Supplement as amended).

In assessing property within a district, its potential as well as present use or uses would be considered. The landowner within an agricultural or conservation district may, for a minimum period of 10 years, dedicate his land for a specific agricultural use and have the land assessed at its value in this use.

The Department of Taxation advises that, in assessing forested lands, sales data are used to the extent available. Because of infrequent sales, adopting a modified cost method of appraisal is planned, on the assumption that the cost of growing timber is equal to its value at any particular time. To this the raw land value is added. Forest land and timber assessment guides are being prepared.

IDAHO

Under legislation adopted in 1965 (Chapter 321 Laws of 1965), only the bare land of all forest type lands is to be classified as real property; its cash value is that of the annual productive capacity to grow a forest crop. Such land is to be assessed at the same percentage of cash value as other real property. Forest crops growing on forest type lands are classified as personal property and are exempt from property tax except at time of severance.¹

Regulations for the assessment of forest land and of forest crops under the 1965 Act are as follows.²

ART. 325. ASSESSED VALUE OF FOREST LANDS

"Forest Type Lands" are defined as those lands which produce wood fiber and have this wood fiber production as their highest and best

¹ Although the tax on forest crops is referred to as a "severance tax," it represents a personal property tax levied in the year of harvest.

² Ad Valorem Property Tax Regulations, Idaho State Tax Commission, 1965.

use. Lands not having a productivity of Western white pine site class IV or Ponderosa pine site class V based on 100-year rotation and 75% normal stocking (U.S. Dept. of Agriculture Technical Bulletins #630 and #323 generally known as the "Meyer & Haig Tables) shall not be considered as forest type land. The valuation of this type land shall be assessed according to Sec. 63-202, I.C.

There are three separate productivity classes of forest type lands, poor, medium and good. These broad classes are related in the following manner by definition to the "Meyer and Haig Tables."

A. Poor productivity class is defined as forest type land having a median mean annual increment (MAI) of 106 board feet per acre, based on a 100-year rotation and 75% of normal stocking. This productivity class includes Western white pine site classes III and IV, and Ponderosa pine site classes IV and V. One hundred six (106) board feet per acre MAI shall be used in the evaluation formula.

B. Medium productivity class is defined as forest type land having a median mean annual increment (MAI) of 278 board feet per acre,

based on a 100-year rotation and 75% of normal stocking. This productivity class includes Western white pine site class II and Ponderosa pine site classes II and III. Two hundred seventy-eight (278) board feet per acre MAI shall be used in the evaluation formula.

C. Good productivity class is defined as forest type land having a median mean annual increment (MAI) of 451 board feet per acre, based on a 100-year rotation and 75% of normal stocking. This productivity class includes Western white pine site class I and Ponderosa pine site class I. Four hundred fifty-one (451) board feet (MAI) shall be used in the evaluation formula.

EVALUATION OF PRODUCTIVITY CLASSES

To determine the full cash value of forest type land, a minimum base of \$5.00 per acre will be used. This value takes into consideration the inherent rights and uses of ownership (Sec. 63-329 I.C.)

A. The poor productivity class shall have a full cash value equal to the minimum base full cash value.

B. The formula for determining the full cash value of the medium productivity class is:

$$\frac{\text{Med. Prod. Class MAI/acre}}{\text{Poor Prod. Class MAI/acre}} \times \text{Base Value} = \text{Full cash value of the medium productivity class}$$

Example: $\frac{278}{106} \times \$5.00 = \13.10 per acre

C. The formula for determining the full cash value of the good productivity class is:

$$\frac{\text{Good Prod. Class MAI/acre}}{\text{Poor Prod. Class MAI/acre}} \times \text{Base Value} = \text{Full cash value of the good productivity class}$$

Example: $\frac{451}{106} \times \$5.00 = \21.25 per acre

The same assessment ratio will apply to the full cash values established for forest type lands as is applied to other rural real property full cash values within the county wherein the land is located.

ART. 326. ASSESSED VALUE OF FOREST CROPS

“Forest Crops” are defined as any forest growth having market value, whether standing or down, alive or dead, and irrespective of age or size.

“Severance” is defined as any act or acts by which saleable forest crops are cut or removed from the stump, or down material is removed from the land.

Forest Crops will be considered separately, under this law, from the land on which they are situated, and as such will be classified as “Personal Property” and exempt from taxation until the year of harvest. In the year of harvest all forest crops severed from privately owned land will be subject to a full year’s “severance tax.” This is not to be confused with the personal property tax on log inventories which have come from publicly owned lands.

Timber harvested or severed from any privately owned land, regardless of its classification, will be subject to the one year’s “severance tax.” That is, the land from which forest products are harvested does not have to be classified as forest type land in order to make these products subject to the “severance tax.”

In computing this one year’s severance tax on all forest crops harvested from privately owned lands, the same assessment ratio used on all other personal property will be applied to the full cash value of the forest crop immediately prior to severance, in other words, its stumpage value.

Factors to be considered when determining stumpage values:

1. Average Timber Quality by Species

The market selling price of lumber and logs, and in turn the value of standing timber from which those products are derived, varies greatly between species and between individual trees of the same species. For this reason every effort should be made to determine as accurately as possible the average grade or quality, by species, of the material harvested from the tract.

2. Logging Costs

The cost of converting standing timber into marketable logs varies primarily with distance from market, the amount of road development necessary, topography, and to a lesser degree with the volume per acre harvested and the method of logging.

For example, good timber may cost very little to log, and as a result, will bring premium prices for stumpage; whereas timber of the same species and identical quality a few miles away may present a set of logging costs so high as to bring the stumpage value down to a minimum.

All of the above mentioned logging cost fac-

tors have a definite bearing on stumpage value, however, normally the single most important item is distance from market. The importance of this factor will be reflected in the hauling costs. While adequate allowance must be made for hauling, it should not be over-allowed for. That is, transportation costs should be figured to the *nearest permanent* market, which normally purchases for further manufacture and/or distribution the particular type of forest products being produced from the tract under consideration. The election of an owner to transport his forest crop to a more distant market, is not justification for allowing, in the appraisal of his stumpage value, the additional hauling cost experienced.

One of the major cost factors to consider in an appraisal is road development. However, Section 63-326 states . . . "shall be assessed on the cash value of the crop immediately prior to severance . . .", and this eliminates the necessity of deducting road development costs. The phrase "immediately prior to severance" indicates a point in time at which the necessary road development would already be completed.

Below are two formulas, either one of which can be used to determine the value of the forest crop immediately prior to severance.

Formula No. 1

Adj. Stumpage Val. = Ave. log selling price —
(LC + HC + SD + SC + P&R + ST)

Adjusted stumpage value is: The value of the forest crop, in place in the woods, after all necessary road development has been completed.

Average log selling price is: The average price per unit that forest crops of the same species and quality could be expected to bring at the nearest permanent market which normally purchases the particular forest products being considered.

NOTE: As used in this formula, the term "log selling price" should be interpreted to mean the market value per unit of any forest product

being produced of whatever nature—to include, but not limited to the following: sawlogs, expressed in dollars per 1,000 bd. ft.; pulpwood, expressed in dollars per cord; poles and piling, expressed in dollars per piece or dollars per foot of length; fence posts, expressed in dollars per piece; Christmas trees, expressed in dollars per bundle.

LC: Logging cost. This factor is to include direct logging costs only. In the case of sawlogs, this would be the dollars per 1,000 bd. ft. that it takes to convert standing trees into logs on the truck at the landing. (Does not include road development costs.)

HC: Hauling cost. In the case of sawlogs, this would be the dollars per 1,000 bd. ft. that it costs to transport the logs from the landing to the nearest permanent market which normally purchases the particular species and grades being produced.

SD: Slash disposal. The amount withheld for slash disposal purposes under Sec. 38-108 I.C., is to be expressed in dollars per unit of measure.

SC: Scaling cost. The cost of scaling and/or grading the forest crop being appraised to be expressed in dollars per unit of measure.

P&R: Profit & risk. Factor as used in accepted stumpage appraisal practices.

ST: Severance tax. This is the estimated tax to be paid on the forest crop in the year of harvest.

Formula No. 2

Adj. stumpage val = Stumpage value + RD

Adjusted stumpage value: The value of the forest crop, in place in the woods, after all necessary road development has been completed.

Stumpage value: The price that a prudent operator would pay for a comparable forest crop, all conditions being equal. To be expressed in dollars per unit of measure.

RD: Road development cost. This would be the cost of developing roads necessary to harvest the particular forest crop being appraised. To be expressed in dollars per unit of measure.

ILLINOIS

Procedure for Appraisal of Merchantable Timber

"The following outlines the procedure for valuing merchantable timber. The base land value of merchantable timberland on any tract is determined by adding the value of merchantable timber to the base land capability value as

described in the preceding paragraphs on rural land valuation.

"The general practice provides that merchantable timber is not valued separately unless such tracts have pole size and saw log size stands and are used exclusively for the growing of timber. Thus, young timberland or small windbreaks and cattle shelter timber tracts are

not considered in valuing merchantable timber.

"The value of merchantable timber depends on the kind and size of trees and the number of acres of such trees. While young timberland containing small growing trees has some value separable from the land, such value cannot be realized without reducing the productive value of the timberland. Therefore, the smaller trees should be included in the valuation of the land, and a separate value should be added only for pole size and saw log stands of merchantable timber.

"Following are the main steps for the appraisal of such merchantable timber:

- (1) Determine the approximate number of acres which are covered with merchantable timber. Aerial photographs, in addition to field checks, furnish this information and the use of a planimeter or grid gives the number of acres.
- (2) Determine the estimated number of pole size and saw log stands of trees in each

acre of the tract. Again the aerial photographs and the field inspection assist in furnishing information on the number of acres of such mature trees.

- (3) Multiply the total number of acres having such merchantable timber on the tract by the average value per acre. The average value per acre is estimated according to the quality and average number of pole size and saw log stands per acre.
- (4) Add the total value of the merchantable timber on the tract to the base land capability value to obtain the total land value of the tract.

"The Department will give necessary technical assistance on the valuation of merchantable timber, when requested by the assessing official."

Real Property Assessment Manual, p. 53
Department of Revenue
Property Tax Division. 1952.

INDIANA

"... properties ... classified into sub-classes as follows:

- ...
- B-1 Farms without improvements
- B-2 Farms with improvements
Value of land plus improvements
- ...

B-5 All other nonfarm land
This class shall include strip mine spoil banks, waste lands, abandoned and unoccupied farms, forest lands, etc., and should be assessed comparable to adjacent farmland." (p. 62.)

Methods of appraising farm acreage, including woodland, by means of productivity ratings are explained and use of average assessed values per acre shown in the following table is suggested. (pp. 238-244.)

Real Estate Assessment Guide, No. 2,
2nd ed. State Board of Tax
Commissioners. 1961.

TABLE VII.—Grades and suggested values per acre of farm land alone (from Indiana Real Estate Assessment Guide)

Kind of land and grade	Capable of producing	Productivity rating average = 100 ¹	Estimated cash value ²
Woods:			
A----	Large sawtimber-----	13	\$150 and up
B----	Medium sawtimber-----	10	\$100—\$150
C----	Medium to small sawtimber.	7	\$ 50—\$100
D----	Small second growth-----	5	\$ 20—\$ 50
E----	Badly eroded and cut-over land.	2	\$ 10—\$ 20

¹ Productivity factor of 100 represents a national standard for agricultural productivity of an average year and under average farm management practice of 50 bu. of corn per acre, 25 bu. of wheat per acre, 25 bu. of soybean per acre, 2 tons of mixed hay per acre, or their equivalents.

² Estimated cash value and average cash values are at 100%. Assessed values will be at 33 $\frac{1}{3}$ % of above.

KENTUCKY

TIMBER

"General practice provides that merchantable timber is not valued separately unless the tracts have pole size and saw log size stands and are used principally for growing timber.

"The value of merchantable timber depends on the kind and size of trees and the number of acres of such trees. While young timberland containing small growing trees has some value, separable from the land, such value cannot be realized without reducing the productive value of the timberland. Therefore, the smaller trees should be included in the value of the land, and a separate value should be added only for pole size and saw log stands. The main steps for the appraisal of such merchantable timber are:

- a. Determine the approximate number of acres which are covered with merchantable timber. Aerial photographs, in addition to field checks, furnish this information and the use of a planimeter or grid gives the number of acres.
- b. Estimate the number of pole size and saw log stands of trees in every 1/5 acre (93 ft.) square or a circle with 52.7 foot radius) of the tract. The aerial photos and the field inspection will assist in furnishing information as to the number of acres of mature trees. Multiply the 1/5 acre counts by 5 to make estimate per acre.
- c. Multiply the total number of acres having merchantable timber on the tract by the average value per acre. The average value per acre is estimated according to the quality and quantity of the stand. Accessibility is of prime importance and deductions should be made to reflect the added cost of removing timber from inaccessible places. Presence of public roads, rail or water transportation considerably improves marketability."

Kentucky Property Assessment
Administration Manual
Department of Revenue
1958, rev. 1963, pp. 4.22-4.23

PROCEDURE FOR APPRAISAL OF MARKETABLE TIMBER¹

The following pages outline the general procedure used by professional timber appraisers

¹ The following material is taken from the Real Property Appraisal Manual, Dep. of Revenue, pp. 93-97. 1962.

for valuing marketable timber. This procedure should not be used by the inexperienced appraiser without the assistance of a qualified appraiser. It is included in this manual to point up the complexity of timberland appraising and for educational purposes.

The base land value of any tract containing timberland is determined by adding the value of such timber to the base land capability value, as described in the preceding section on rural land valuation.

The general practice in the valuation of timberland for assessment purposes provides that timber is not valued separately unless such tracts have pole size and saw log size stands and are used exclusively for the growing of timber. Thus, young timberland or small windbreaks and cattle shelter timber tracts are not considered in valuing timber.

The value of timber depends on the kind and size of trees and the number of acres of such trees. While young timberland containing small growing trees has some value separable from the land, such value cannot be realized without reducing the productive value of the timberland. Therefore, the smaller trees are included in the valuation of the land, and a separate value is added only for pole size and saw log stands of timber.

To be classified as saw timber, soft woods (pines, cedar, hemlock, spruce) must be at least nine inches in diameter at breast height (DBH, 4½ feet above ground) and hardwoods eleven inches DBH. To be classified as pole timber, softwood should be five to nine inches DBH and hardwood five to eleven DBH. The term pole timber is simply a measuring term and does not refer to the use which will be made of the timber. Pulpwood, for example, falls in the "pole timber" classification. Unlike saw timber, which is measured in board feet, pole timber is measured by the cord. Also, oak used for cooperage purposes is measured in "bolt feet". Cooperage timber is cut to approximately thirty-nine inches in length. A stave bolt cut to this length and measuring twelve inches from outer corners of the sapwood would contain one bolt foot. Heading bolts are cut in twenty-four inch lengths and it is not recommended that trees less than twelve inches in diameter be cut for this purpose. To convert board feet to bolt feet or vice versa, a thousand board-foot log is assumed to be the equivalent of one hundred bolt feet, or sufficient quantity to make ten barrels.

Accurate appraisal of standing timber in-

volves a careful inspection of the trees and estimation of the board footage or cordage, as the case may be, of lumber which it will produce. In the valuation of small timber tracts, all trees of marketable size are measured if possible. However, for mass appraisal purposes of even the smallest tracts this is often impractical. For this reason some simpler method which will still give a reasonable estimate must be followed. The recommended procedure is to establish an acreage value based on a typical acre in the tract. To do this, a general review of a large portion of the tract must first be made for determination of species and average size of the marketable trees. Sample areas of normal growth and density can be selected, either small measured plots (1/5 acre—circle with radius of 52.7 feet) or strips, and an accurate measurement of the trees within these areas made as a guide to valuation of the entire tract. Board footage estimates may be made through measurement of the diameter and usable height. The diameter is measured at breast height DBH and usable height from approximately one foot above the ground (stump height) to about where the trunk is broken by large branches or where the minimum diameter is approximately nine inches.

The simplest method of measuring diameter is by measuring around the tree and dividing the circumference by three. (The exact division is 3.1416; however, three gives an answer within standards of accuracy.)

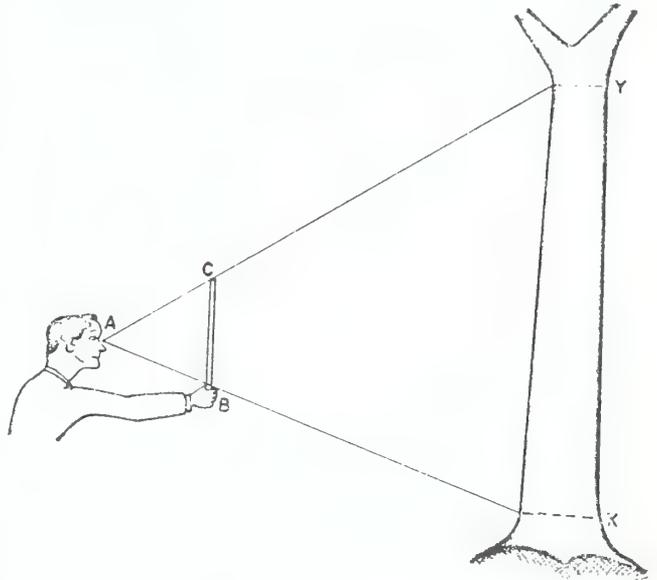
There are several methods which can be employed in measuring the point at which the maximum usable height of a tree occurs. One, the point where the trunk either forks or is broken by large branches has already been mentioned. Another method used by some estimators is the formula (circumference in inches at BH \times .28) — 2" which will give the diameter inside the bark at the top of the first sixteen foot log. Deduction of two inches for each additional sixteen feet of length will give the diameter at the top of each additional log. For example, a tree eighteen inches DBH (circumference 18 \times 3.1416 = 56.5) is calculated as follows:

$(56.5 \times .28) = 15.8 - 2 = 13.8''$ diameter inside bark at top of the first 16-foot log. At the top of the second log or 32 feet, the diameter would be $13.8'' - 2''$ or $11.8''$

One of the simplest methods of measuring the usable height is based on similar isosceles triangles. In measuring the height, a stick, slightly longer than the arm (with arm fully extended, end of stick should just touch eye) is held at

arm's length in a vertical position. When at a distance where the stump height of the tree may be seen over the top of the hand, and the top of the usable length of the tree can be seen over the top of the stick, the distance from the tree will equal the height of the tree. (NOTE: The head should not be moved when sighting the upper and lower limits of the tree.)

The following sketch illustrates the use of this method:



AB and BC are equal, therefore, AY' and XY' are equal.

After the diameter and height are determined, the board content of the included trees can be estimated by use of the following volume table. This table is based on the average volume in a large number of trees. The height is indicated in half-logs or eight foot units. It is also based on a minimum inside bark diameter of eight inches top diameter.

The following table may be used in estimating the cordage obtainable from one acre of pole timber.

Diameter	Number of trees to make one cord
5	42
6	22
7	14
8	10
9	7
10	6

In using the sample plot (1/5 acre) method, a tally sheet which provides for recording the diameters, heights and species of the trees in the plot is necessary. Upon completion of the measurements, the total number of trees in each species of similar size are combined for easier

Volume Table
Board Feet International 1/4" Log Rule
O. B. - Form Class 85

Dbh	Number of 16.3-foot logs							
	1/2	1	1 1/2	2	2 1/2	3	3 1/2	4
Inches	Gross volume in board feet							
10.....	21	34	46	57	67	77		
11.....	26	43	58	71	84	96	107	
12.....	32	52	70	87	102	117	131	144
13.....	38	63	85	104	123	140	157	173
14.....	45	75	100	124	146	167	186	206
15.....	53	88	118	145	171	195	219	241
16.....	61	102	137	169	199	226	254	279
17.....	70	117	157	194	228	261	292	321
18.....	81	133	180	221	261	297	333	366
19.....	91	151	203	251	295	337	377	416
20.....	103	170	229	282	332	379	425	468
21.....	115	190	256	316	372	425	474	524
22.....	128	212	285	352	413	472	528	582
23.....	142	234	316	389	458	524	586	646
24.....	156	259	348	430	506	577	646	711
25.....	171	284	383	472	555	634	710	782
26.....	188	311	419	516	608	695	776	857
27.....	205	340	457	564	665	759	847	935
28.....	223	370	497	612	721	824	923	1016
29.....		401	538	664	782	893	1000	1102
30.....		434	582	718	845	966	1081	1191
31.....		468	628	774	912	1042	1167	1285
32.....		502	676	834	982	1119	1253	1384
33.....		540	726	895	1052	1202	1346	1483
34.....		578	778	959	1130	1288	1442	1589
35.....		618	832	1026	1208	1377	1542	1698
36.....		659	887	1094	1288	1472	1644	1816
37.....		703	994	1164	1371	1567	1754	1932
38.....			1005	1239	1459	1667	1862	2056
39.....			1067	1315	1549	1770	1982	2183
40.....			1130	1396	1641	1875	2099	2312

calculation of total per acre and the board content.

For example:

- 5 trees 18 inches in diameter $\times 5 = 25$ trees
- 10 trees 12 inches in diameter $\times 5 = 50$ trees
- 15 trees 8 inches in diameter $\times 5 = 75$ trees

The board footage would be calculated as follows: (All trees of the same diameter are assumed to be of equal height in this example.)

- 25 trees 18 inches in diameter 32 feet high $\times 221 = 5,525$ bd. ft.
- 50 trees 12 inches in diameter 24 feet high $\times 70 = 3,500$ bd. ft.
- 75 trees 8 inches in diameter (pole)
 $75 \div 10 = 7\frac{1}{2}$ cords

If the tract being appraised contained 20 acres of timber, the total volume would be:

Saw timber:

$20 \text{ acres} \times 9,025 = 180,500$ board feet

Pole timber:

$20 \text{ acres} \times 7\frac{1}{2} \text{ cord} = 150$ cord

The valuation of the timber tract is completed by applying average acre values developed from market data on the going rate or rates for timber of the species and general log size contained in the subject to the total timber acreage.

Content of stand:

180,500 bd. ft. saw timber, one-half good quality, one-half medium or below, white oak, pine and hemlock mixed. 150 cords of mixed pulpwood.

Saw logs

90,250 bd. ft. @ \$50 per thousand	\$4,512.50
90,250 bd. ft. @ \$30. per thousand	2,707.50

Pulpwood

150 cord @ \$15. cord	2,250.00
Total	<u>\$9,470.00</u>

Prices used in this example are average zone market prices for the Northeast Kentucky For-

est Utilization region as of June, 1961. There are seven utilization regions in the state and the stumpage prices vary by regions. Information on the latest market quotations by regions may be obtained from the Department of Revenue.

Timber stands can also be valued by comparison with similar tracts which have been sold. However, it must be established that the timber is comparable in species, age or size of trees and all other factors including location and access. Generally this method is followed in the valuation of timber for property tax purposes.

LOUISIANA¹

"Forest lands are hereby classified for assessment purposes as follows:

1. TIDEWATER CYPRESS LAND—Forest land that is adjacent to tidewater and that is supporting a growth of trees which are predominantly cypress or that at some time in the past supported a growth of trees which were predominantly cypress, and which has not been captured or occupied predominantly by commercial species other than cypress.
2. HARDWOOD LAND—Forest land that is supporting a growth of trees or shrubs, which are predominantly broadleaf species and that in the past supported a growth of predominantly broadleaf species, and which has not been captured or occupied by tidewater cypress or pine. Tidewater Cypress Land, Longleaf Pine Land, and Other Pine Land on which broadleaf species of commercial importance have become established as predominant species is Hardwood Land.
3. LONGLEAF PINE LAND—Forest land that is supporting a growth of pine predominantly of the longleaf pine species (*Pinus Palustris*) or that at some time in

the past supported a growth of longleaf pine and on which other pine species or broadleaf species of commercial importance have not become established as the predominant species.

4. OTHER PINE LAND—Forest land that is supporting a growth of pine predominantly of a species other than longleaf pine or that at some time in the past supported a growth of pine predominantly of a species other than longleaf pine and on which longleaf pine or broadleaf species of commercial importance have not become established as predominant species.

"For the purpose of taxation, the assessed values of the above classifications of forest lands shall be determined and the assessment of such lands shall be made in the manner provided by law. After the effective date of this amendment, no additional value shall be added to the assessment of land by reason of the presence of timber thereon in excess of such value as was included in the assessment of said lands and timber thereon at the time of the adoption of this amendment; provided that standing timber shall be and remain liable equally with the land on which it stands, for ad valorem taxes levied on said land."

Constitution of Louisiana, Art. X, Sec. 1, as amended pursuant to Act 759, Laws of 1954, eff. Jan. 1, 1955.

¹ Standing timber, other than virgin timber, is exempt from the general property tax under Constitutional Amendment, effective Jan. 1, 1955. However, forest land remains subject to the property tax.

MAINE

“Standing Wood, Bark, and Timber

Whenever the owner of real estate notifies the assessors that any part of the wood, bark, and timber standing thereon has been sold by contract in writing, and exhibits to them proper evidence, they shall assess such wood, bark, and timber to the purchaser.”

“Woodlands

The valuation and assessment of woodlands is one of the most important yet difficult duties of the assessor. The well-being of his town and the state depends on how he treats this problem. As with other kinds of property, the assessor should assess all taxable woodlands in accordance with their value, which value is complicated by the fact that the income arising from the woodlands may be deferred for many years, during which time taxes and other annual carrying costs accrue.

“Although no values are here suggested, since the quantity, type, character and species of wood, and the operability and nearness to market of the land affect value so that it is difficult to generalize, it is believed that assessors know the relative value of their woodlands with other kinds of land. But it must be kept in mind that it usually takes from 40 to 60 years to produce a timber crop. Undoubtedly, timber cruising, or the use of aerial photographs, is desirable as a tool in establishing such values.

“An aerial survey has been made of Hancock County which together with ground control was used as the basis of a report on forest taxation, which disclosed that for the most part woodlands can be successfully subjected to an annual property tax without confiscation, provided that the tax is administered such that all taxable property is assessed fairly and without discrimination. The exceptions are those municipalities which demand or need services greater than the available tax resources.

“In general, the assessor has two major problems, namely, finding the property, and giving it a value. In the case of woodlands neither problem can be easily solved or lightly treated. A good map of the town is essential in order to know who owns what, and exactly what it is, that is owned. Aerial photographs have been made of a good part of the State, although in some instances they are not available to the assessor. These photos are not maps but are useful in determining acreages, ownerships, and character of the land and the growth.

“As in the case of valuing farms, we believe in land classification; i.e., the number of acres

of each class of land with the kind of growth thereon. It is only in this way that the poorer lands can be profitably held in private ownership, since then the better lands will pay their way and in so doing relieve the poorer lands. The acreages are important, for it is well known that in many towns the assessed acreage is considerably under that indicated by a map, giving due allowance for lakes and streams. Improvements, such as buildings and all taxable personal property, must of course be assessed on the same basis as land.

“Uniformity in woodland assessments has created gross inequities and consequent repercussions which have often embarrassed many assessors. For example: When all woodland parcels are valued uniformly as though the growth were immature or removed, the taxpayer cannot understand why his assessment is not reduced after he has removed a mature stand. It is only common sense that a parcel having marketable mature growth is worth more and should be assessed more per acre than another which is immature or not operable. This means not that the growth be valued on the basis of being presently stripped but rather as an enlightened woodland owner practicing good forestry believes it adds value to the land. Thus, woodland values should be reviewed from time to time so that changes in value can be properly recognized.

“Although no unit values are here given, it is believed that they should be such that the tax will not confiscate the property, will yield an annual income to the town and at the same time encourage good forestry practice to develop and maintain forest resources, and not induce wanton cutting and waste.”

Guide for Use of Assessors, Bureau of Taxation, pp. 79-80. 1962.

Under legislation adopted in 1954 as amended (Revised Statutes Title 36 Sections 563-4), it is declared the policy of the State to encourage sustained yield operation of forest lands. Uniformity of assessment is to be sought, taking into consideration the productivity of the land. Forest assessments are to be held in excess of just value by the Courts upon a showing by the owner that he is unable by efficient operation to obtain an adequate return commensurate with the risk involved. For purposes of this provision, forest land includes any single tract exceeding 25 acres under one ownership devoted to commercial timber production.

MARYLAND

In 1956 legislation was adopted providing that lands actively devoted to farm or agricultural use were to be assessed on the basis of such use and not as if subdivided or on any other basis. As reenacted in 1957 criteria were provided for determining agricultural use; among such criteria was "productivity of the land including timberlands and lands used for reforestation". This Act was held unconstitutional by the State Supreme Court and was reenacted in 1960 without reference to timberlands and lands used for reforestation. The 1960 Act (Article 81 Section 19(b) Maryland Code) was validated by amendment of the State Constitution.

The Department of Assessments and Taxation advises that forest lands forming part of a farm unit can generally be classified as agri-

cultural lands subject to "present use" assessment. When not part of a farm unit, use value practice is not followed and such land is subject to assessment on the basis of market value.¹

No State assessment guides for forest land have been adopted. Soil capability is being introduced as a basis for agricultural assessments through use of soil classification maps. Two classes of woodland, according to capability, have so far been established. These do not now consider the size of timber, but it is thought that this aspect may need to be considered at a future date.

¹ Woodlands under forest management agreement approved by the State Department of Forests and Parks may be subject to frozen assessments; little use has been made of this optional provision (Article 81 Section 19(d) Maryland Code).

MICHIGAN¹

CUT OVER AND FOREST LAND

DEFINITIONS

Cut Over Land

The land from which the original forest has been removed, partially or totally, and not used for agricultural, suburban, or urban purposes.

The types of land in this classification include those variously known as wild land, swamp land, plains land.

It is usually used for purposes varying from limited grazing in fringe farming areas, natural and planned reforestation, hunting and allied recreational activities to no use whatever of certain barren and isolated areas. Power companies retain it for run-off and erosion control in developed water sheds and some of it is mere over-burden on known mineral deposits.

Forest Land

The same type land as cut over except that the commercial forest products on the land exceed the residual value of the land itself.

Evaluation

The cut over area of Michigan embraces most of the upper half of the lower peninsula

and a large portion of the upper peninsula, as shown by the map on page 216. *The value of this property varies greatly from one area of the state to another and few parcels within a given area are of the same value.*

Cut over land has value deriving from considerations other than forest reproduction. The subjects of land value and forest product value will be discussed separately. However, because the natural cover is usually a direct indication of basic land capability and possible use, the cover must be considered at all times. The reproduction, therefore, always is an integral part of the considerations in determining value.

There are many factors involved in establishing the value of any given parcel. Sales of cut over land in any area are comparatively limited. Some sales do not fairly reflect market value. The appraiser must *avail himself of all available reliable information before the true cash value of any parcels sold can be determined.* Once this analysis of certain key parcels has been made, *assessing becomes a matter of making fair and equitable comparisons.*

The evaluation of cut over and forest land for assessing purposes is accomplished in the following manner:

1. Determine the type or class of land.
2. Determine the type and extent of cover.
3. Determine the present utilization.
4. Establish land value by comparison with similar properties of known value.

¹ Assessor's Manual, Michigan State Tax Commission, pp. 212-219, 228-32. 1955.

5. If timber products are present in commercial quantities, they should be considered separately, and appropriate values should be added to the parcel.

The information in the following pages is necessarily of a *general nature* but it is *generally true*. In many instances factors will vary from the typical examples provided. For example, the cover listed as typical of the general soil types is that which the soil generally is best capable of reproducing. Local conditions, such as severe burns, lack of seed trees, floods, etc., may cause variations. However, the assessor will find that the examples provided are typical of thousands of parcels throughout the cut over area.

Principal Soil Groupings

The cut over lands include many of the forty catalogued Michigan soil types, which vary greatly in capability and thus in use and value.

These soil classifications might be the foundation for scientific assessment of land, but for the cut over areas, it would be impractical.

Nevertheless, the basic soil can not be ignored. It is the primary factor determining the capabilities of the land. Together with location and climate, this determines the use and value of the land.

Soils of the cut over area fall naturally into six, almost self-evident groups. These groups are easily recognized by their general characteristics.

1. Loams and sand loams
2. Sand loams and better sands
3. Heavy sand plains
4. Dry sand plains
5. Poorly drained organic soils
6. Non-productive areas

On the following page is a table summarizing these brand general groups and their general features. This table is followed by more detailed descriptions of each group.

MAP OF GENERAL LAND GROUPS

(Small areas)

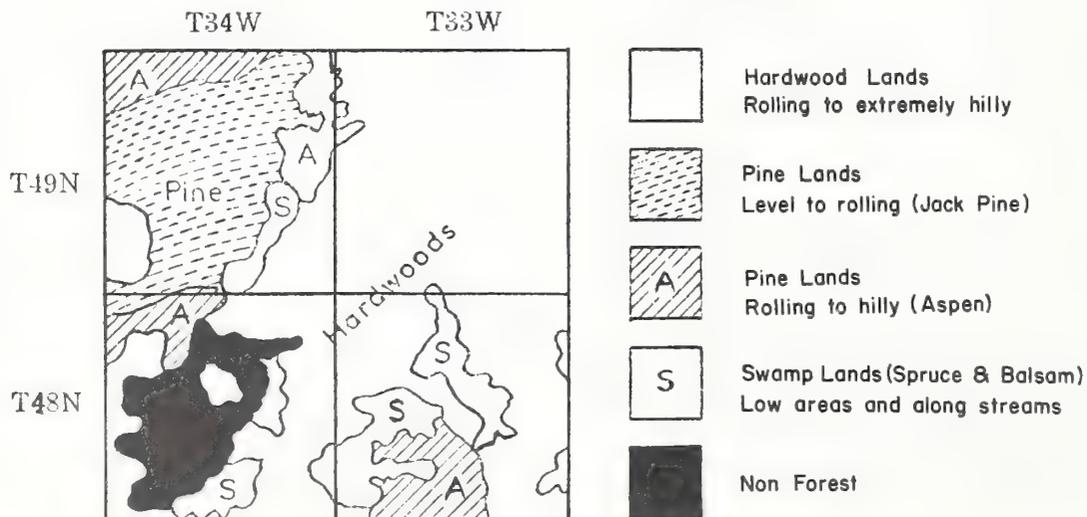
The majority of the lands in the cut over area can be included in the six major land groups outlined in the Summary of Major Classes of land. Most of it is either Pine Land, Hardwood Land or Swamp Land.

The state map on the preceding page shows rough outlines of the Major Land Groups. However, each major area includes smaller areas of the other classes within their boundaries.

The map below shows four townships in the general hardwood land group of soils in Baraga County. While the greater part of the area is hardwood lands, there are, within it smaller areas of Pine and Swamp land to be considered.

The cross hatched sections on the map to the right show some of the wooded areas of the state. It will be noted that the Northern Hardwood area follows quite closely to the rolling hilly loamy soils shown as hardwood land in the preceding map. The swamp timber is, of course, found in the lowland area and the Aspen, Pine, Oak and brush plains follow the outlines of the undulating to rolling plains area.

These maps of course are of a very general nature. Many exceptions exist in every instance. Comparisons with actual spot conditions will serve to emphasize the necessity of examining every parcel of property to make a fair assessment.



Summary of major classes

Soil	Topography	Cover	Location	Characteristics
LOAMS SAND LOAMS Hardwood Land	Rolling Plains Broad Ridge Tops Hills, Slopes	ORIGINAL Hardwood Occasional White Pine Hemlock PRESENT Largely Aspen Northern Hardwood White Spruce	West part of U.P. N. & W. Sec. of L.P. Typical areas in Iron Co. Marquette Co. Antrim Co. Osceola Co.	Usually a good stand of 2nd growth started. Some of this land now in agri- culture. Land generally of higher basic value than other classes. Luxuriant ground cover.
SANDY LOAMS BETTER SAND White Pine Land	Undulating to rolling	ORIGINAL Some Hardwood White Pine Red Pine Mixed Pine and Hard- wood PRESENT Aspen White Birch Scrub Oak Soft maple	Large areas in central and east part of L. P. Scattered in U. P. Typical areas in Marquette Co. Alger Co. Montmorency Co. Lake Co.	Much of this covered with good grade Aspen. Pro- duces fast growing Jack Pine. Good site for Red and White Pine. Good wild pasture. Badly burned areas may be exceedingly poor.
HEAVY SAND PLAINS BETTER SAND Norway Land	Level to rolling	ORIGINAL Largely Norway Some White Pine Poor Hardwoods PRESENT Largely Scrub Oak Slow growing Jack	Chiefly in North-Cen- tral part of U. P. and North-Central part of L. P. Typical areas in Schoolcraft Co. Alger Co. Kalkaska Co. Roscommon Co.	Produces fair Jack Pine. Black Oak, Pin Oak, Course Grasses and Brush. Much of this badly burned and exceedingly poor.
DRY SAND PLAINS Jack Pine Land	Level	ORIGINAL Poor Norway Mixed Brush Coarse Grass PRESENT Scattered Jack Pine Scattered Brush Coarse Grass	Large areas in northern half of L. P. Typical areas in Alger Co. Crawford Co. Roscommon Co.	Non-Productive Usually lowest value. Generally producing Sparse grasses, Scrub Aspen, Blueberries, Sweet Fern. Badly burned white pine and Norway lands re- verted to this class of land.
POORLY DRAINED ORGANIC AND LOWLAND SOIL PEAT-MUCK Swamps	Flat to Un- dulating	ORIGINAL Tamarack, Spruce, Balsam, Cedar, Ash, Elm, Balm of Gilead, and other swamp species. PRESENT Growing back to original species.	Large areas in eastern part of U. P. and north- ern L. P. Typical areas in Chippewa Co. Schoolcraft Co. Alpena Co. Cheboygan Co. Smaller parcels in many counties.	Generally growing back to similar swamp specie. Sometimes valuable as wild Christmas tree pro- ducing areas.
NON-PRODUCTIVE Sand Dunes Rock Muskeg Marsh Land Boulder Strewn	Variable	Practically None	Scattered	Little Value. Generally very low value. Occasional Scenic or Bldg. Site Value.

VALUE

The value of cut over land of every class varies from area to area because of the innumerable local conditions and physical char-

acteristics. The foregoing sections describe and illustrate the classification of the cut over areas by similar broad general characteristics, easily recognized by an assessor. The following information and examples are a guide for the

application of that information in making assessments.

In general, it may be said that the Non-Productive class is the least valuable while the Hardwood class is the most valuable. Local and physical factors are so variable that countless exceptions are to be found. The basic rule will apply, however, in most cases.

Locational and Physical Characteristics

A partial list of local and physical conditions that affect value includes:

LOCATIONAL	PHYSICAL
1. Location or accessibility: No road. Trail road Improved dirt road Gravel or paved road Availability of electricity Proximity of telephone	1. Topography: General, Level, Rolling Hilly Erosion, Drainage
2. Demand or Salability: : Close to town—Building sites Close to farms—Pasture Hunting area Resort area Tree Farms	2. Water: Lakes and streams Cost of wells 3. Forest Products: Seedlings, Saplings Poles, Pulp, Logs Christmas Trees Misc. other products

The examples on the following pages illustrate methods of arriving at the value of parcels when influenced by some of the above noted factors.

The basic method is to *determine the value of specific parcels in the area using sales and other available information. Then by comparison and consideration of various factors listed above, determine comparative equitable assessments* for all parcels in the same class.

The value of this class of real estate can be established *only in the assessing area*. Numerous sales generally are a good guide to value. Occasional sales must be carefully analyzed before too much reliance is placed on them in establishing value.

Specific Price Information

Appraisers for the Lands Division of the Department of Conservation have learned that they seldom need to ask less than \$2.50 per acre in order to dispose of even the least desirable land. There are instances, however, when descriptions offered for as little as \$1.50 per acre have not been sold. This indicates that any value of less than \$2.50 per acre would be questionable.

A large number of forty acre tracts were sold in the vicinity of T 29 N, R 3 W, during the years 1953 and 1954. These were rolling

to hilly medium sand White Pine land. The cover varied from scattered Aspen to good stands of Aspen and Soft Maple with some scattered pine. Some of the parcels adjoined an improved dirt road and some did not. Sale prices varied from \$10.00 to \$15.00 per acre. The average for this area was well established at \$13.00 per acre.

Recent sales of Jack Pine plains and Norway land with medium stands of Jack Pine or Scrub Oak in Crawford and Roscommon Counties have varied from \$15.00 to \$20.00 per acre.

Many parcels in the upper peninsula have sold for \$5.00 per acre. Many have sold for more and a few for less depending on location and other factors.

It is therefore *necessary that the local assessor determine the value of the various classes of cut over land in his area*. Once the true cash value of specific parcels have been determined for the assessment district, it should be relatively simple, by use of the information and examples assembled in this manual, to determine comparative values for final assessment use.

Location: Considerable areas throughout most of the Lower Peninsula and the west end of the Upper Peninsula. Typical large areas in Iron, Dickinson, Menominee, Antrim, Otsego and Osceola Counties. Many small areas in other counties.

Soil: Varies from Clay to Sandy Loam. Usually well drained.

Topography: Rolling to hilly relief. Area of slopes exceeds that of flat land.

Cover: Typical species are Sugar Maple, Yellow Birch, Beech, Basswood, White Ash, Elm, Aspen, White Birch, Hemlock and White Pine frequently intermixed.

Utilization: When suitably located much of this area has been developed for farming. Hilly and isolated areas not cleared are developing natural reproduction or are being reforested by the owners.

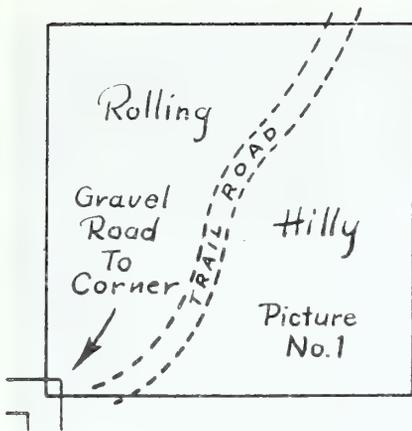
Broad leaf species ranging from Aspen to Maple are the usual natural cover. Much of the open area has been planted to pine.

Due to the prevalence of small lakes and streams and the variety of natural cover, this type of land, in the wild state, produces and supports a variety of game animals and birds which creates a demand for it as hunting and recreational land.

Location: Scattered throughout the state.

Soil and

Topography: The dunes bordering the Great



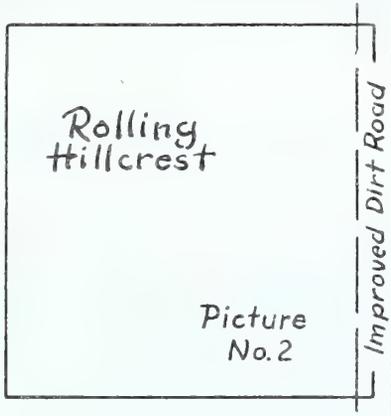
T31N R6W
 Sec. 1
 SW $\frac{1}{4}$ of SW $\frac{1}{4}$
 Rolling to hilly
 Sandy Loam
 Mxd. Hwd. 0"-6"

Average prevailing value
 for this area \$10.00 Per A.

Add for good stand second
 growth \$5.00 per A.

40 Acres @ \$10.00	\$ 400.00
Good 2nd. Growth	200.00
Gravel Road	50.00
	\$ 650.00

Original Forest
 Hardwood



T29N R4W
 Sec. 22
 NW $\frac{1}{4}$ of NW $\frac{1}{4}$
 Rolling Hill Crest
 Med. Loam
 Mxd. Hwd. 0"-6"
 Some 6"-9" Maple
 Scattered Basswood

Average prevailing value
 for this area \$10.00 Per A.

Excellent Stand Second Growth
 Approx. 500 Cord Cordwood

40 Acres @ \$10.00	\$ 400.00
*500 Cd. Wood \$1.00	500.00
Improved dirt road	50.00
	\$ 950.00

Original Forest
 Mxd. Hardwood

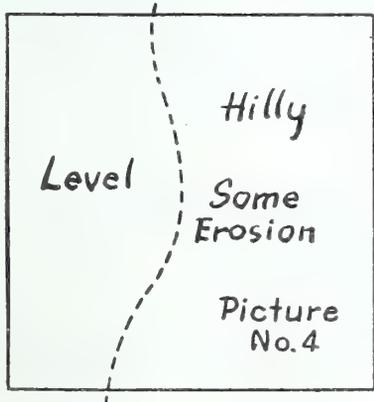


T31N R6W
 Sec. 4
 SW $\frac{1}{4}$ of SW $\frac{1}{4}$
 Very Hilly
 Heavy Loam

Average prevailing value
 for this area \$12.00

40 Acres @ \$12.00	\$ 480.00
*200 M bd. ft. Maple \$30.	6,000.00
*100 M bd. ft. Beech \$15.	1,500.00
* 35 M bd. ft. Hem. \$20.	700.00
Gravel Road	100.00
Fenced	100.00
	\$ 8,880.00

Original stand of
 Mxd. Hwd. & Hemlock
 If cut, would leave
 excellent stand of
 second growth.



T31N R6W
 Sec. 12
 NW $\frac{1}{4}$ of NW $\frac{1}{4}$
 Level to Hilly
 Heavy Sand
 Grass & Moss
 Scattered Trees

Average prevailing value
 for this area \$10.00

Land cleared & worked for short
 period, then abandoned.
 15 Acres good tree farm area

15 Acres @ \$20.00	\$ 300.00
25 Acres @ 5.00	125.00
Gravel Road	50.00
	\$ 475.00

Original Forest
 Hardwood

*Forest product values shown are 1954 stumpage rates.



No. 1—Rolling to Hilly. Mixed Hardwood Cover.



No. 2—Rolling Hillcrest. Mixed Hardwood Cover.



No. 3—Very Hilly. Original Hardwood Cover.



No. 4—Level to Hilly. No Timber Reproduction.

Lakes, Rock Strewn areas in Chippewa County, Rock Knobs in Gogebic County and undrained Muskegs of Marshes bordering shallow lakes in many sections of the state are typical of this type of land.

Cover: Little or none of any value to either wild life or man.

Utilization: Little or none. Not suited to any type of forest reproduction.

Recreational use very limited and confined to small areas.

Greatest value generally found where this land is adjacent to lakes. If there are accessible building sites small areas are sometimes used for cottages.

Production cost is the major factor to be considered by the assessor when using stumpage prices to determine the value of forest products.

Production of "Logging Costs" include such items as:

1. Accessibility of the tract to roads

2. Terrain or Topography
3. Amount of "underbrush"
4. Drainage or quality of the soil
5. Quality of the timber
6. Density of growth
7. Uniformity of size
8. Uniformity of species
9. Availability of right of way to the tract

Considerable quantities of commercial size timber have existed in areas where the cost of harvesting the product would have exceeded the F.O.B. price and so has not been cut. In instances of this kind it might be successfully argued that the timber, as such, had no value for the present.

EXAMPLES OF APPRAISALS

Swamp and Non-Productive Land

No attempt will be made to provide any examples of appraisals of swamp lands. Any sample provided would not be representative



No. 21—Rock Knobs & Outcrop. Shrubs in Cracks.



No. 22—Boulder Strewn. Grass & Stunted Trees.



No. 23—Muskegs & Marshes. Grasses & Rushes.



No. 24—Sand Dunes. Blow Outs. Stunted Vegetation.

of enough general area in the state to be of any value because of the variability of this type.

As a *General Rule* swamp land has very *Little Value As Such*. If it is the type of swamp that will reproduce timber the value of the product may be high. Well drained lowlands in some areas may be stocked with Aspen or White Spruce that will cut out at twenty cords of pulp per acre.

Based on a stumpage value of \$2.00 per cord, an acre of this type of swamp land could be said to be worth \$40.00 for the timber products alone. Also the land will have a certain value because it will reproduce timber.

However, if a similar parcel was stocked with second growth that would not be merchantable for ten or fifteen years, it obviously would be worth much less. Assuming that such land had no value except for reforestation, and

the owner was willing to accept only a 3% return on his investment, the maximum capitalized value would not exceed \$22.81.

A similar parcel might be stocked with 1,000 saleable Christmas Trees per acre. Based on a stumpage value of 25¢ per tree, such a swamp could be said to be worth \$250.00 per acre plus something for the land itself.

The other extreme is the Tamarack and Tag Alder swamps. Usually poorly drained, frequently inaccessible and producing very little game food, they have practically no use value and are on a par with the moving sand dunes and muskegs for valuation for assessment purposes.

The *Unrealistic Practice* of too many *Assessors* is to assess all swamp land and all wild land at some predetermined figure throughout the unit. This system of assessing is *No More Justifiable* than if *All Farms* or *All Homes*

were assessed at the same figure. Only by *Careful Analysis* and *Fair Comparison Can Honest Values* and *Equitable Assessments* be established.

FOREST LAND

This section contains information of value to the assessor in estimating the amount of forest products under various conditions when more accurate cruises are not available.

Forest lands are appraised by the same method as is used for cut over land. *The value of the forest products is added to the basic value of the land.* The basic land will vary in value from \$2.50 to \$10.00 per acre depending on the productive quality of the soil, \$2.50 per acre on the poorer sandy soils to \$10.00 per acre on the more productive clays and the better sand loams. This, of course, is assuming no other utilization possibilities other than tree growth. The most important step is the determination of merchantable forest products on the land. It is recommended that *timber cruiser's reports* be used to determine the amount of merchantable forest products. If no cruise reports are available, then volume tables may be used to estimate the board feet of logs or the cords of pulp, box bolts, etc., per acre. The stumpage prices for the most common forest products are given in table 2 below.

The stumpage price multiplied by the amount of logs, pulp, etc. will give the value of the forest products. Some computations are made for the assessor in table 3 below.

The essential information needed and the sources are listed below:

1. *Basic Soil Value*
 - A. See cutover section.
2. *Amount of Merchantable Forest Products*
 - A. Timber cruise reports
 - B. Volume tables 1 and 2
3. *Stumpage Value of Forest Products*
 - A. Table 2, see notes
 - B. Computations, Table 3

When it is necessary to use volume tables, the following procedure is recommended:

First—Determine the diameter range of the trees: seedlings, saplings, pole timber, etc. The diameter range should be for the majority of the trees present.

Second—Determine the volume range. The trees may run heavy to the large size and the high volume range used or, if the stand runs heavy to the smaller size, the low volume range

should be used. This is to select the proper volume range.

Third—Determine the stocking class of the land. The tables are based on the percent of growing space effectively utilized by trees with 10–39% rated as poor, 40–69% rated as medium, and over 69% rates as good stocking. The stand will fall into one of these groups.

This will give the board feet per acre or the cords of pulpwood per acre, depending on the species. Interpolation can also be done.

It is obvious that a uniform stand of pulp size Aspen of good quality that might produce 20 cords per acre can be harvested more cheaply than, and thus be worth more than, if it would produce only 4 cords per acre. Likewise, any timber stand is worth more on a fairly level area where trucks can be driven to the product than a stand on hilly, rocky terrain where the product has to be skidded by tractor or team to a loading site. Furthermore, producing Aspen pulp from a mixed timber stand is usually more expensive, due chiefly to the extra cost of collecting the product from scattered locations.

It will be noted most of the variables are cost factors that must be deducted from the "going Price" when determining the value of the timber "in place." Similar factors must be considered when determining the value of every other forest product. The assessor in districts where this type of property is found will usually be familiar with these conditions.

Addition of Forest Product Value

Forest products of commercial size and quality, growing on cut over or forest land, must be evaluated together with the basic land value when assessing this class of property.

Forest products include:

1. Christmas Trees
2. Fence Posts
3. Poles
4. Railroad ties
5. Mine Props
6. Excelsior Wood
7. Pulp Wood
8. Chemical Wood
9. Cabin Logs
10. Saw Logs
11. Veneer Logs
12. Fire Place and Stove Wood (usually by-products)

The "stumpage value" (value of the uncut timber in the woods) varies from year to year. It also varies from one area of the state to

APPRAISAL ILLUSTRATIONS

10 Acres
 Mixed Hardwood
 9"-12"
 Poor Stocking

Mixed Hardwood
 12"-18"
 Medium Stocking
 30 Acres

40 Acres of Hardwood land. Timber is easily accessible. Part of 40 is lighter sand loam.

10 Acres Mixed Hardwood @ 1.5 M bd. ft.	
Per Acre =	15 M bd. ft.
30 Acres Mixed Hardwood @ 5 M bd. ft.	
Per Acre =	150 M bd. ft.
	165 M bd. ft.

	TOTAL	
Land — 10 Acres @ \$ 5.00 =	\$ 50	
30 Acres @ \$10.00 =	300	
	LAND	\$ 350
165 M bd. ft. @ \$20 Per M =	3,300	
	TOTAL LAND & TIMBER	\$3,650

40 Acres
 Jack Pine
 6"-9"
 Medium Poor
 Stocking

Uniform old
 stand

40 Acres of level sandy land. The productivity of land is poor. When cut reproduction will be poor. Stand is old and at its maximum stocking now. Large number of trees per acre but are short.

Pulpwood on this tract will average 5 cords per acre.

40 Acres x 5 cord =	200 cords	
200 cords @ \$4.00 =	\$800	
Land — 40 Acres @ \$2.50 =	100	

TOTAL VALUE LAND & PULP	\$900
-------------------------	-------

40 Acres
 Hilly Hemlock
 15"-20"
 Medium Stocking
 Low Volume
 Range

40 Acres of uniform Hemlock. Land is rough. Difficult terrain to log. Stumpage price adjusted to compensate for rugged terrain. Timber runs about 5 M bd. ft. per acre.

40 Acres @ 5 M bd. ft. per Acre =	200 M bd. ft.
Stumpage price adjusted for abnormal conditions — \$8.00 per M	
TIMBER VALUE	\$1,600

40 Acres @ \$4.00 per Acre =	160
------------------------------	-----

TOTAL LAND AND TIMBER	\$1,760
-----------------------	---------

40 Acres
 12"-15"
 Good Stocking
 Uniform
 26 Cords per Acre

40 Acres of loam (30-50% silt & clay). Good growth of Aspen. Good stocking of tall trees. Readily accessible and close to market. Good roads.

40 Acres @ 26 cords per acre = 1,040 cords

Price adjustment for location and quality — \$4.00 per cord

PULP VALUE	\$4,160
------------	---------

40 Acres @ \$7.50 per acre =	300
------------------------------	-----

TOTAL LAND & PRODUCTS	\$4,460
-----------------------	---------

another depending on availability of markets, use of materials, etc. There is a further variation from current *area* stumpage value between localities *within* the area. These variations are usually attributable to distance from market, type of transportation available and labor costs.

The assessor will easily determine the going stumpage value of all forest products in his

district. However, there are several other important factors to be considered in adjusting these rates to determine the actual market value of the products. The stumpage rates offered by local timber buyers are usually adjusted to compensate for variations because of transportation costs so this factor need not be considered by the assessor.

TABLE 1.—Volume per acre by stand size and stocking class

Size class	Diameter range	Volume range	Stocking					
			Good		Medium		Poor	
			Bd. ft.	Cords	Bd. ft.	Cords	Bd. ft.	Cords
Seedlings.....	Inches 0-1		0	0	0	0	0	0
Saplings.....	1-5	Low.....	0	0	0	0	0	0
		Average.....	0	2.5	0	2.2	0	1.5
		High.....	0	2.9	0	2.8	0	2.0
Pole timber.....	5-9	Low.....	700	13.0	500	7.0	200	3.0
		Average.....	1,400	20.0	1,000	12.1	990	5.2
		High.....	1,500	24.0	1,500	12.9	1,200	7.0
Small saw timber.....	9-15	Low.....	6,000	18.0	3,000	13.0	1,500	5.0
		Average.....	7,700	22.9	4,950	17.6	2,800	10.9
		High.....	10,000	26.0	6,000	20.0	3,000	13.0
Large saw timber.....	15-	Low.....	10,000	24.0	5,000	17.0	1,500	6.0
		Average.....	14,850	33.5	8,100	21.2	4,140	12.1
		High.....	18,000	40.0	10,000	26.0	5,000	16.0

Table compiled by Paul C. Guilkey, Research Forester, U. S. F. S.

TABLE 2.—1954 stumpage prices

Mixed Hardwoods:		Swamp Hardwoods:	
Hard Maple, Oak, Birch, Basswood.....	\$18-\$25 per M	Elm, Ash, Softmaple.....	\$10-\$20 per M
Yellow Birch.....	\$40 and up, Per M	White and Red Pine.....	\$30-\$40 Per M
Basswood.....	\$25-\$35 Per M	Jackpine.....	\$18-\$25 Per M
Hardmaple.....	\$25-\$30 Per M	Hemlock.....	\$15-\$25 Per M
Butternut.....	\$30-\$35 Per M	Elm.....	\$10-\$20 Per M
Red and White Oak.....	\$20-\$30 Per M		

TIE CUTS

Red and White Oak, Hard Maple.....	\$.35-\$.50 each
Soft Maple.....	\$.30-\$.45 each
Other Softwoods.....	\$.25-\$.30 each

CHEMICAL WOOD

\$7 Per Ton
Wild Christmas Trees, 10c-50c per saleable tree

PULP WOOD

Per 4' x 4' x 100" cord

Aspen.....	\$2.00-\$3.50	Balsamfir.....	\$4.00-\$6.00
Hemlock.....	\$3.00-\$5.00	Pine.....	\$4.50-\$6.00
White Birch, Oak and Hard Maple.....	\$3.00-\$5.00	Spruce.....	\$5.00-\$8.00

BOX BOLTS

Per 4' x 8' x 55" cord

Aspen.....	\$2.00-\$3.00	White Birch.....	\$1.50-\$2.00
Basswood.....	\$5.00-\$7.00	Jackpine.....	\$3.00-\$4.50

CEDAR POSTS

7 foot post.....	\$.03-\$.05 each	7 and 8 foot cedar post.....	\$3.00 per cord
10 foot post.....	\$.06 each	(Note: 4' x 8' x 8' is considered 2 cords.)	

TABLE 2.—Continued

POLES

Prices per lineal foot

Cedar.....	6c per foot up to 30 feet	Pine.....	6c per foot up to 30 feet
Cedar.....	8c per foot if over 30 feet		

PILING

Prices per lineal foot

Pine.....	10c-15c per foot up to 30 feet	Hardwood.....	15c per foot up to 35 feet
Pine.....	15c-20c per foot over 30 feet		

NOTE: These prices may vary in different areas. They may be adjusted to fit area and other unusual conditions which decrease or increase the cost of logging, or quality of timber. Average cost of logging as of July 15, 1954 was \$25 per M.

TABLE 3.—Per acre values with various stumpage prices and board feet

NOTE: A basic land value addition is required.

Stumpage price per 1000 bd. ft.	\$10	\$15	\$20	\$25	\$30	\$35	\$40	\$45	\$50
Board feet per acre									
500 B F.....	\$ 5.00	\$ 7.50	\$ 10.00	\$ 12.50	\$ 15.00	\$ 17.50	\$ 20.00	\$ 22.50	\$ 25.00
1000 B F.....	10.00	15.00	20.00	25.00	30.00	35.00	40.00	45.00	50.00
1500 B F.....	15.00	22.50	30.00	37.50	45.00	52.50	60.00	67.50	75.00
2000 B F.....	20.00	30.00	40.00	50.00	60.00	70.00	80.00	90.00	100.00
2500 B F.....	25.00	37.50	50.00	62.50	75.00	87.50	100.00	112.50	125.00
3000 B F.....	30.00	45.00	60.00	75.00	90.00	105.00	120.00	135.00	150.00
3500 B F.....	35.00	52.50	70.00	87.50	105.00	122.50	140.00	157.50	175.00
4000 B F.....	40.00	60.00	80.00	100.00	120.00	140.00	160.00	180.00	200.00
4500 B F.....	45.00	67.50	90.00	112.50	135.00	157.50	180.00	202.50	225.00
5000 B F.....	50.00	75.00	100.00	125.00	150.00	175.00	200.00	225.00	250.00
5500 B F.....	55.00	82.50	110.00	137.50	165.00	192.50	220.00	247.50	275.00
6000 B F.....	60.00	90.00	120.00	150.00	180.00	210.00	240.00	270.00	300.00
6500 B F.....	65.00	97.50	130.00	162.50	195.00	227.50	260.00	292.50	325.00
7000 B F.....	70.00	105.00	140.00	175.00	210.00	245.00	280.00	315.00	350.00
7500 B F.....	75.00	112.50	150.00	187.50	225.00	262.50	300.00	337.50	375.00
8000 B F.....	80.00	120.00	160.00	200.00	240.00	280.00	320.00	360.00	400.00
8500 B F.....	85.00	127.50	170.00	212.50	255.00	297.50	340.00	382.50	425.00
9000 B F.....	90.00	135.00	180.00	225.00	270.00	315.00	360.00	405.00	450.00

MINNESOTA

“For the purposes of taxation, ‘real property’ includes the land itself . . . and all . . . trees on . . . it.” Sec. 201

“When lands are conveyed or transferred to the United States, to the State of Minnesota, or to any governmental subdivision of either, for any purpose and the owner reserves any right or interest in the timber upon . . . such land, such timber interest and any structure which the owner of such timber . . . interest may erect on such land shall be assessed and taxed as real estate, . . .” Sec. 203

Maps In the County Assessor's or Supervisor of Assessments' Office

“The county topographical map required for all county assessment offices is developed from

aerial photographs. Each office should have at least one set with the boundaries outlined of all parcels identified by parcel or code numbers. Aerial photographs at a 1/8 mile to one inch are available and are convenient to use. An extra set of aerial photographs can be cut into section maps for insertion with the assessor's appraisal cards, each section map preceding the appraisal cards for the section. Such maps are invaluable in measuring acreages of crop land, swamp, timber and other types of land, in pinpointing building locations and making comparisons.” Sec. 218

Land Classification

“The land in each farm should be placed in the following categories:

Timber or Woodlot—variable slope.

Land with a high percentage of trees, either natural or planted. Land that is too rough, stony, or wet to support any vegetation other than trees." Sec 221.

Rural Land Used Exclusively for Growing Timber 20%

"Land on which approved tree growing practices have been established and are carried out is entitled to this classification provided the land is not adaptable to non-rural use and is not being used for any other purpose. Use for homestead, residential, farming, commercial,

seasonal recreational, or any other purpose is not use exclusively for growing timber and therefore precludes this classification. Land devoted exclusively to growing Christmas trees qualifies for this classification; land growing nursery stock does not." Sec. 256.

Minnesota Assessors' Manual, Department of Taxation.

"Real estate, rural in character, and used exclusively for the purpose of growing trees for timber, lumber, wood and wood products shall constitute class three 'e', and shall be valued and assessed at 20 percent of the full and true value thereof." Laws of 1955, Chapter 751.

MISSISSIPPI¹

"... 1. 'cultivable lands' and 2. 'uncultivable lands' . . . are the classifications fixed by law. . . . 'Uncultivable lands' consist of the following types of land:

- (f) Gullies, sand beds and hills which cannot be used for agricultural purposes; low lands, which are so often overflowed, that they cannot be used for agriculture—growing of crops.
- (g) Lands so thickly with stumps,

bushes or trees as not to be usable for agriculture.

- (h) Lands so lacking in fertility that the soil is not capable of producing crops by the use of ordinary methods of preparation and the ordinary use of fertilizer." (pp. 30-31)

"... reservations and other interests, having a value, when owned by another than the owner of the fee, or surface owner, are to be assessed separately. . . . Long term timber reservations are to be assessed. Standing timber is exempt." (p. 30)

¹ Standing timber is exempt from the property tax under provisions of the mandatory yield (severance) tax law adopted in 1940. Forest land remains subject to the property tax.

Handbook for Property Tax Assessments. State Tax Commission. 1962.

MISSOURI

Procedure for Land Valuation—Rural Land

"In appraising rural properties the assessor is more concerned with the productiveness of land than with location. As indicated on the real estate record card, rural land is divided into three main categories: crop land, pasture land, and timber land. In each of these categories it is suggested that a quality grade of "average," "below average," or "above average" be assigned. Under this system this means that for equalization the assessor must assign unit values for the various classes and qualities of farm land.

"In each county the assessor has at his disposal several ways of arriving at these unit land values. In a few of the counties there are soil surveys which have been published showing the various soil types which can be used as a basis for his classification. Of course, the most reli-

able method of establishing the various unit values is through the use of market sales data. By collecting information concerning the farms for which he has recent sales prices, the assessor can relate the average per acre sales price to the various quantities of crop land, pasture land, and timber land on each farm. Naturally, these sales prices include the improvements, which must be deducted from the total sales price in order to arrive at an indicated value of the farm land. Also, the assessor can make use of the data contained in the Census of Agriculture of 1954. The fourth source of assistance is through the use of a land value committee similar to the one recommended for urban land values."

Assessors' Manual
State Tax Commission
n.d., p. 54.

MONTANA

Under legislation adopted in 1957 (Revised Statutes Section 84-429.12), the Board of Equalization was called upon to provide a "general and uniform" method of classifying lands for assessment. Timberlands were specifically included in this requirement.

The timberland aspects of the project were divided into four phases:

- I Area determination
- II Timber stand volume table preparation
- III Valuation table preparation
- IV Tax assessment

Phases I and II were accomplished in the main by the State Forester assisted for timber

stand volume table determination by representatives of the timber industry and Federal Foresters. An Operational Manual for Inventory of Private Forest Land—Phase I Area Determination was published in 1958. This manual of about 40 pages outlines the general plan for forest land and timber assessments. With specific reference to area determination, the manual covers forest land area determination and classification, field checking procedures, preparation of base maps, and area calculation. Land use, forest type, stand-size, stocking, access, and topography classes are defined. The access and topography classification is shown in the table reproduced below.

Access and Topography Classification Table

Access and topography	Road development characteristic to tract	Topography on tract	Distance from manufacturing point**	Total grade in class*
FAVORABLE	Grade R-1 Tract within 1 mile of usable road. Easy Road construction. No rock outcrops or swamp barriers.	Grade T-1 Flat to gentle Slopes generally under 40%. No rock outcrops or swamps. Good tractor logging grd.	Grade D-1 Less than 25 miles	3 and 4
AVERAGE	Grade R-2 Tract 1 to 3 miles from usable road. No difficult road problems. Average construction.	Grade T-2 Variable slopes under 60%. Some rock outcrop or swampy ground. Average logging conditions.	Grade D-2 25 to 50 miles	5, 6 and 7
DIFFICULT	Grade R-3 Tract 3 to 6 miles from usable road. Also includes tracts closer, but with difficult construction problems such as rock or water barriers and rough terrain.	Grade T-3 Rough, broken ground. Steep slopes. Numerous rock outcrops and bluffs or other features which make logging difficult.	Grade D-3 50 to 90 miles	8 and 9
IMPRACTICAL	Grade R-4 Tract over 6 miles from usable road.	Grade T-3 (Same as above)	Grade D-4 90-120 miles	10 and Over
UNPRODUCTIVE	Any one of the following factors will place the tract into this class: Extreme physical barriers preventing accessibility. Extreme low grade of land and timber. (See specifications for unproductive noncommercial forest land) If legal barriers, (Rights of way, etc.) or reservations for recreation, watershed or other use which will prevent logging for an indefinite period do exist, determination will be made by the County Assessors.			

* Class of Accessibility and Topography is determined by the sum of the numerical values of the grade average to tract in each of the divisions of this classification.

**A manufacturing point is defined as: a location with planer facilities to produced finished (S 4 S) lumber (or equivalent) which has been, or appears will be, in continuous seasonal operation for five (5) years and has an annual output of at least one million board feet (1,000 Mbf).

Valuation was dealt with under Phase III. The following excerpts are taken from a 1963 report of the State Forester's Evaluation Committee "Proposed Valuation of the Reclassified Private Forest Lands." The system developed in the report has since been adopted by the Board.

Guiding Principles and Facts:

This valuation has been based on the following principles, facts, and assumptions:

- A. The valuation system will be utilized in Ad Valorem Taxation under existing laws. Proposed changes in taxation methods requiring legislation were not considered as assigned to this committee.
- B. The system will make maximum utilization of the information collected under the Operation Manual for Reclassification of Private Forest Land as Adopted and Revised by the Board of Equalization.
- C. The system is designed to be practical from the assessor's standpoint.
- D. The valuation system was designed from the standpoint of a prudent man in the business of growing trees.
- E. This valuation system must be re-examined periodically and revised to meet economic changes that may occur.
- F. Lands will be valued as timber lands only when the value of the timber exceeds other values of the land.
- G. All forest lands must carry some value. A minimum assessed value of \$1.00/acre is assigned to all forest lands. Care must be taken that this minimum value is *NOT* added to any value placed by the grazing or other values that may be present.
- H. This valuation does not consider any watershed or recreational values that may be present.
- I. The marketing of miscellaneous forest products including poles, piling, posts, pulpwood and other minor items is of such sporadic and incidental nature that separate valuation, thereof, would prove extremely difficult and impractical for application by county assessors. In view of the difficulties involved, separate valuation of these products are not included herein, only the discounted potential value of future merchantable sawtimber stands has been calculated. Such valuation may be considered to include the miscellaneous forest products produced.

- J. Christmas trees present a separate problem. Due to the extremely variable factors affecting the value of this product, difficulty of making an inventory thereof, and the localized character of commercial Christmas tree operations, this product is not considered in this valuation.
- K. Experience indicates variables within individual tracts eliminate any calculable advantage that a favorable classification (accessibility and topography) may have over an average classification. Therefore favorable and average classifications (accessibility and topography) have similar values.
- L. Calculated values per Mbf assume a certain minimum volume available to harvest. Favorable or average rate per Mbf will apply only to stands with at least 5 Mbf/Acre. Difficult rate when between 2 and 5 Mbf/Acre. Impractical rate will apply to the remainder.
- M. No differential over and above minimum land value (G above) should be applied to non-stocked forest lands for any potential use they may have as timber lands. Costs of ownership normally exceeds this value. For example, fire protection is a cost of ownership required by law which absorbs in some cases all the value that may be applied to the bare forest land. In addition, the application of a bare land value to some forest types creates an obviously unrealistic valuation of that land, especially in Eastern Montana.
- N. Forest stands of Seedling-Sapling Stand Size are subject to so many variables for such a long period of time that no account value may be applied. The same factors listed above (under M) eliminate, in many cases, what little value may be present in these stands.

Calculated Valuation Factors:

- A. Land Value Per Acre: None
(Non-commercial, "Map Symbol—NC" and all non-stocked, "Map Symbol—6" assigned Timber Grade U, minimum assessed value of \$1.00/Acre assigned.)
- B. Seedling-Sapling Stands Value Per Acre: None
(All seedling-sapling size stands "Map Symbol—7" assigned Timber Grade U, minimum assessed value of \$1.00/Acre assigned.)
- C. Board foot Value/Mbf. (Table 1) (Table 2a) (Table 2b)

Details of the Appraisal—TABLE I

	Group I	Group II	Group III
	Ponderosa pine	Douglas fir Larch-Spruce	White fir Hemlock Lodgepole pine
Lumber Selling Price (Western Pine average 1957-61)-----	\$87.22	\$68.35	\$61.38
Profit Allowance (12%)-----	10.47	8.20	7.37
Manufacturing Cost (Industry Average)---	34.79	27.07	23.13
Overrun Percentage (Industry Average)---	4.9%	9.1%	5.9%
Value, log scale, at mill	44.02	36.09	32.70
Stumpage Value after Logging Costs:			
Favorable & Average @ \$29.47-----	14.55	6.62	3.23
Difficult @ 35.36-----	8.66	.73	-----
Impractical @ 40.00-----	4.00	-----	-----
Wholesale Value @ 25%:			
Favorable & Average-----	3.65	1.65	.80
Difficult-----	2.15	.20	None
Impractical-----	1.00	None	None

TABLE 2a

(Areas West of Continental Divide)

Applicable to Board foot Volume in trees 11" dbh & over

Species Group	Accessibility & Topography Class		Value/Mbf
I	White pine Ponderosa pine	Favorable	\$3.65
		Average	3.65
		Difficult	2.15
		Impractical	1.00
II	Larch Douglas Fir Spruce	Favorable	1.65
		Average	1.65
		Difficult	.20
		Impractical	None
III	Lodgepole pine Cedar, White bark Pine, true firs Western hemlock	Favorable	.80
		Average	.80
		Difficult	None
		Impractical	None
IV	Cottonwoods Other Hardwoods & other species	No value unless a market exists locally and then same as Group III	

TABLE 2b

(Areas East of Continental Divide—Includes all of Deer Lodge & Silver Bow Counties—Lewis and Clark Co. is divided)

Applicable to Board foot volume in trees 11" dbh and over

Species Group	Accessibility & Topography Class		Value/Mbf
I & II	None	None	None
III	Ponderosa pine Douglas Fir Spruce Lodgepole pine Cedar, White bark pine, true firs	Favorable	.80
		Average	.80
		Difficult	None
		Impractical	None
IV	Cottonwoods, other hardwoods & other species	No value unless a market exists locally and then same as Group III	

D. Present value (Table 3a and 3b) cubic foot volume of pole size trees (5 to 11" dbh) is based on the following assumptions:

1. An average of thirty years or more may be required before growth will convert the cubic foot volume to a merchantable board foot volume. To compensate the present value was discounted 80%.
2. Board feet per cubic foot ratio = 4.5 to 5.0

TABLE 3a

(Areas West of Continental Divide)

Applicable to cubic foot volume in trees 5 to 11" dbh

Species Group	Accessibility & Topography Class		Value/M cu. ft.
I	White pine Ponderosa pine	Favorable	\$3.30
		Average	3.30
		Difficult	2.00
		Impractical	.90
II	Larch Douglas fir Spruce	Favorable	1.50
		Average	1.50
		Difficult	.20
		Impractical	None
III	Lodgepole pine Cedar, White bark Pine, true firs Western hemlock	Favorable	.75
		Average	.75
		Difficult	None
		Impractical	None
IV	Cottonwoods Other hardwoods, & other species	No value unless a market exists locally and then same as Group III	

TABLE 3b

(Areas East of Continental Divide—Includes all of Deer Lodge & Silver Bow Counties—Lewis & Clarke Co. is divided)
Applicable to cubic foot volume in trees 5 to 11" dbh

Species Group	Accessibility & Topography Class		Value/M cu. ft.
I & II	None	None	None
III	Ponderosa pine Douglas Fir Spruce Lodgepole pine Cedar, White bark pine, true firs	Favorable Average Difficult Impractical	.75 .75 None None
IV	Cottonwoods Other hardwoods & other species	No value unless a market exists locally and then same as Group III	

E. Revised Stand Volume Tables for various counties or groups of counties prepared by the committee show the average board foot volume per acre in trees 11" dbh and over and the percent by species group. Similar information is shown for the cubic foot volume in trees 5 to 11" dbh. These Tables are an annex to this proposal.

NEW HAMPSHIRE¹

Land Value; How Determined

"22. How is the value of the land on which non-taxable standing timber is growing to be determined?

A. In the same manner as the value of other taxable property; namely, on a fair sale basis. The question is, what would the land without the timber sell for at a fair sale under normal conditions?

"23. Is there a standard value for land covered with timber, or for cut-over land?

A. Absolutely none. Each piece of land, whether covered with trees or cut over, must be judged separately.

"24. In determining the value of cutover land, what must be considered?

A. (a) Its location;

- (b) Its adaptability to grow timber;
- (c) The quality of the soil;
- (d) The possible use for other purposes: for example, house lots, pasture, etc.
- (e) Its proximity to farms or villages;
- (f) Its location with reference to highways and the kind of highway—whether dirt road or hard surface;
- (g) Its location with relation to possible markets.

"25. If after investigation the selectmen decide that Jones is unreasonably depriving the town of tax revenue by failure to cut mature timber, what can they do?

A. Beginning April 1st of any year after such decision has been reached, they can assess this timber as other property in the town is assessed, on its full value at the local rate." (pp. 8-10)

Questions and Answers prepared by the Tax Commission (in pamphlet describing Forest Yield Tax, 1949.)

¹The mandatory yield tax enacted in 1949 as amended, exempts from the property tax standing timber, other than mature timber which an owner fails to cut with the result that the tax district is unreasonably deprived of revenue. Such timber and also forest land remains subject to the property tax.

NEW JERSEY

Legislation adopted in 1964 (Chapter 48 Laws of 1964) provided that land actively devoted to agriculture might, upon application of the owner, be valued in such use. Agricultural use was defined to include the production for sale of trees and forest products. New Jersey falls within the group of States providing for assessment of forest lands at their "present use" value.

To implement "present use" assessment, the 1964 Act created a State Farmland Evaluation Advisory Committee charged with determining a range of values for each of the several classifications of agricultural land in the various areas of the State. Excerpts from the 1966 report of the Committee¹ are reproduced below.

FARMLAND ASSESSMENT— STATUTORY LIMITATION

The Farmland Assessment Act authorizes and mandates assessment of qualified farmland on the basis of its productivity value in agriculture or horticulture rather than on the basis of its market value.

PRODUCTIVITY VALUE

Assessment of farmland on the basis of its productivity value presents a number of difficulties. The principal difficulties arise for two important reasons:

1. Exact measures of the innate productivity of the 215 soil types in New Jersey are not available although there is a scientific base for making reasonable estimates of productivity.
2. The productivity of farmland varies with its particular use.

A method of overcoming the principal difficulties lies in combining the scientific knowledge available on the characteristics of New Jersey soils and their economic potential according to current uses in agriculture. The procedure is simplified by grouping the 215 soil types into five rated soil groups and four of the most common uses of land by farmers. Net income from the land is capitalized and allocated on the basis of the above rated capabilities.

¹ Report of the State Farmland Evaluation Advisory Committee 1966. 12 pp. Local Property Tax Bureau, Trenton, N.J.

AGRICULTURAL SOIL GROUPING

New Jersey is fortunate in having a complete set of maps and a description of all of its soils. To aid in the assessing process, the agricultural soils have been categorized² into five³ groups:

Group A—Very productive farmland, suitable for permanent cultivation. With proper management, yields tend to be high. Usually the most desirable soil in the area.

Group B—Good farmland, suitable for permanent cultivation. Yields are generally fairly high.

Group C—Fair farmland, suitable for permanent cultivation. Yields tend to be lower than those in Groups A and B. The limiting factors are usually shallowness, droughtiness, or excessive moisture.

Group D—Rather poor farmland, usually wet, stony, droughty, or otherwise unsuitable for permanent cultivation.

Group E—Land unsuitable for tillage, usually because of excessive water, shallowness, stoniness, or droughtiness.

In arriving at a realistic classification (placing each soil into one of five groups), the following factors were primarily used: general suitability of the soil for farming, mechanical composition, depth of the soil, drainage, stoniness, and other related properties. This grouping, however, does not take into consideration improved roads, highways, power lines, water supply and related conditions, nearness to markets, topography, soil erosion, and the degree of slope.

LAND USE CLASSES

Land use on the typical New Jersey farm differs for various reasons but the primary uses

² Productive Capability of New Jersey Soils; Dr. J. C. F. Tedrow, Department of Soils and Crops, Rutgers—the State University. A Soils Guide for Use in Connection with the Valuation, Assessment and Taxation of Land Under the "Farmland Assessment Act of 1964" Chapter 48, Laws of 1964. (N.J.S.A. 54:4-23.1 et seq.)

³ There is a sixth group, Group F, which is land of no agricultural value, consisting of rock outcrop, rough stony land, coastal beaches and clay pits. Such land is not deemed eligible for assessment under the Farmland Assessment Act of 1964.

of land can be combined into four distinct classes: cropland harvested, cropland pastured, permanent pasture, and woodland. These classes are described below:

1. *Cropland harvested*—This is the heart of the farm and represents the highest use of land in agriculture. All land from which a crop was harvested in the current year falls into this category.
2. *Cropland pastured*—This land can be and sometimes is used for cropland. However, because of the organization of certain types of farming, it is often found in pasture from which the maximum potential income may not be realized in any particular year. All cropland pastured falls into this category.
3. *Permanent pasture*—This land is not cropped because its economic potential is greater in pasture. It is meadow land, the rough and stony land, the land with a high degree of slope. It is usually unimproved land which farmers have found to be non-productive except for pasturing and haying.
4. *Woodland*—Many farms have woodlots—not always because wood is needed on the farm but because this particular land has a marginal value in agriculture.

DERIVING FARMLAND ASSESSMENT VALUES

Determining average values for the classes of land that exist in each county was accomplished by capitalizing the net income from farming. These average values are shown in Table I.

The average values in Table I were adjusted on the basis of the potential productivity of the soil groups. These adjusted values, shown in Table II, are the final estimates of the fair value of farmland based upon its productive capabilities when devoted to agricultural or horticultural uses.

The general methods of calculation employed in the derivation of farmland assessment values are shown in Appendix A.

Important note to assessors.—The values in Table II are suggested values which may be modified in individual instances by special conditions such as topography of the land, erosion, degree of slope, and location on improved roads. These values are designed as guidelines for the assessors, but it remains his ultimate responsibility to determine the assessed valuation of qualified farmland in accordance with the standards prescribed in the Farmland Assessment Act of 1964.

TABLE I.—Average value per acre of New Jersey classes of farmland, based on capitalized net farm income—by county as of October 1966 (published annually)

County	Cropland harvested	Cropland pastured	Permanent pasture	Woodland
	(\$ per acre)	(\$ per acre)	(\$ per acre)	(\$ per acre)
Atlantic.....	340	170	68	17
Bergen.....	540	270	108	27
Burlington..	240	120	48	12
Camden.....	340	170	68	17
Cape May....	220	110	44	11
Cumberland..	340	170	68	17
Essex.....	540	270	108	27
Gloucester...	340	170	68	17
Hudson.....	580	290	116	29
Hunterdon..	200	100	40	10
Mercer.....	220	110	44	11
Middlesex...	360	180	72	18
Monmouth...	320	160	64	16
Morris.....	300	150	60	15
Ocean.....	220	110	44	11
Passaic.....	560	280	112	28
Salem.....	220	110	44	11
Somerset...	240	120	48	12
Sussex.....	220	110	44	11
Union.....	380	190	76	19
Warren.....	200	100	40	10

APPENDIX A

DERIVATION OF THE FARMLAND ASSESSMENT VALUES

a. "Estimates of the acreage of land in 1966 for the land use classes in each county were projected on the basis of Census data from 1949 to 1964.

b. "Census categories were combined into exclusive and easily identifiable land use classes of Cropland Harvested, Cropland Pastured, Permanent Pasture and Woodland. Estimates of the acreage in each class for 1966 were determined by the method shown in Step a. above.

c. "The percentage of State farm income arising from agriculture in each county in 1966 was projected on the basis of Census data from 1949 to 1964.

d. "State net farm income for 1966 was projected on the basis of annual U.S.D.A. farm income data from 1949 to 1964.

e. "State net farm income was allocated to the counties in the ratio calculated under Step c.

f. "Net income per county was then capitalized according to a return of 8 percent, establishing total value of land in farms in each county.

g. "A basic formula was established to determine the value of the four classes of land

TABLE II.—*Estimates of ranges in fair value of farmland based upon its productive capabilities when devoted to agricultural or horticultural use—by county as of October 1966 (published annually)*

County	Soil group	Cropland harvested		Cropland pastured		Permanent pasture		Woodland	
		Soil rating	Value per acre	Soil rating	Value per acre	Soil rating	Value per acre	Soil rating	Value per acre
Atlantic	A	120	\$408	120	\$204	110	\$ 75	110	\$19
	B	100	340	100	170	100	68	100	17
	C	70	238	70	119	80	54	90	15
	D	40	136	40	68	70	48	80	14
	E	10	34	10	17	60	41	70	12
Bergen	A	120	648	120	324	110	119	110	30
	B	100	540	100	270	100	108	100	27
	C	70	378	70	189	80	86	90	24
	D	40	216	40	108	70	76	80	22
	E	10	54	10	27	60	65	70	19
Burlington	A	120	288	120	144	110	53	110	13
	B	100	240	100	120	100	48	100	12
	C	70	168	70	84	80	38	90	11
	D	40	96	40	48	70	34	80	10
	E	10	24	10	12	60	29	70	8
Camden	A	120	408	120	204	110	75	110	19
	B	100	340	100	170	100	68	100	17
	C	70	238	70	119	80	54	90	15
	D	40	136	40	68	70	48	80	14
	E	10	34	10	17	60	41	70	12
Cape May	A	120	264	120	132	110	48	110	12
	B	100	220	100	110	100	44	100	11
	C	70	154	70	77	80	35	90	10
	D	40	88	40	44	70	31	80	9
	E	10	22	10	11	60	26	70	8
Cumberland	A	120	408	120	204	110	75	110	19
	B	100	340	100	170	100	68	100	17
	C	70	238	70	119	80	54	90	15
	D	40	136	40	68	70	48	80	14
	E	10	34	10	17	60	41	70	12
Essex	A	120	648	120	324	110	119	110	30
	B	100	540	100	270	100	108	100	27
	C	70	378	70	189	80	86	90	24
	D	40	216	40	108	70	76	80	22
	E	10	54	10	27	60	65	70	19
Gloucester	A	120	408	120	204	110	75	110	19
	B	100	340	100	170	100	68	100	17
	C	70	238	70	119	80	54	90	15
	D	40	136	40	68	70	48	80	14
	E	10	34	10	17	60	41	70	12
Hudson	A	120	696	120	348	110	128	110	32
	B	100	580	100	290	100	116	100	29
	C	70	406	70	203	80	93	90	26
	D	40	232	40	116	70	81	80	23
	E	10	58	10	29	60	70	70	20
Hunterdon	A	120	240	120	120	110	44	110	11
	B	100	200	100	100	100	40	100	10
	C	70	140	70	70	80	32	90	9
	D	40	80	40	40	70	28	80	8
	E	10	20	10	10	60	24	70	7

[Balance of table omitted]

according to its use.

h. "Value per acre for the classes of land was calculated for each county. (See Table I)

i. "Class values in each county were adjusted in accordance with the ratings of the soil groups. (See Table II)"

NOTE: Values among the four land classes were apportioned to give cropland pastured a value of one-half that of cropland, permanent pasture a value of one-fifth that of cropland, and woodland a value of one-twentieth that of cropland.

NEW YORK

FOREST LAND

"For assessment purposes there are two fundamental types of forest land, each of which requires a different approach in estimating current full value. The first, which includes the majority of the forested acreage in the state, is land whose value is based solely on the timber which it bears and the ability of the land to produce wood products. The second is wooded land whose value is influenced by certain non-timber considerations. When value determinations are made for either type of forest land, recognition must be given to all factors that influence the total value.

"Non-timber values can be appraised by employing appropriate conventional methods presented in other sections of this manual. Occasionally the non-timber values will be minor, such as the rental of forest land for hunting privileges, in which case they become supplements to the timber values. More frequently, as in the case of building sites and recreational areas, these values may be considerably larger than the timber values. In fact, the timber values become an integral part of the over-all value; not because of their wood-products contribution but because of their aesthetic contribution. In a few restricted areas where valuable minerals are the dominant items of value, the timber values may become almost negligible by comparison.

"When determining full value for forest land possessing only timber values the following factors must be considered.

1. Location:

This refers to proximity to markets for wood products, proximity to good transportation facilities, and topographic conditions. All three of these influence the cost of harvesting wood products and delivering them to markets.

2. The Timber:

Kind, quality and amount of timber are the important considerations here. The value of standing timber varies greatly between species and between individual trees of the same species. For example, the stumpage price for "woods-run" yellow birch logs may be \$45. per thousand board feet (MBF), while for beech logs in the same area the price may be only \$6. per MBF; and in some regions of the state beech may not even have a market.

"Similarly, the stumpage price for "woods-run" logs of yellow birch may be \$45. per MBF, but the price on logs, because of inferior or superior quality, may range from as low as \$20. to as high as \$75. per MBF.

"Amount of timber per acre, or per forest tract, affects timber value for two reasons. The obvious one is; the more timber the more value, assuming a constant price per unit of volume. The other relates to the different prices that are paid for unit of timber volume, depending on the amount that is available. Lower prices are usually paid per unit for smaller amounts. This is especially true for timber that is being harvested in a relogging operation.

3. Bare Land Value:

Productive capacity of land to grow timber, commonly known as "site quality", and proximity to good transportation facilities are important factors in the determination of this value. For example, protected, well-drained cove areas will produce much more timber volume in a given length of time than will exposed, dry, shallow-soil mountain tops; and forest land that is located near improved highways is worth more on the market than remote lands.

4. Sale Value:

The sale value, or market value, of forest land is not necessarily the same as the combined value of timber and bare land. For appraising forest land, it therefore becomes necessary to develop factors that can be used to convert the combined timber and bare land values to forest land market values. There are several methods of developing these factors. The most promising one is to collect information on bona fide sales of forest land parcels and compute the actual ratios of sales prices to the combined timber and bare land values. An analysis of many such sales should provide the required conversion factors.

"The State Board is endeavoring to develop a simplified procedure of forest valuation that can be used by assessors without forestry training or equivalent forestry experience. Many studies have been conducted and others are now in progress to that end. It is hoped that in the near future a simplified valuation guide which is adaptable to use by individuals having a limited knowledge of a few readily recognizable forest characteristics, can be issued as a supplement to this manual."

"The following State lands shall be subject to taxation for all purposes:

(a) All wild or forest lands owned by the State within the forest preserve . . ." Par. 530

"Assessment of State lands; approval thereof

1. State lands subject to taxation shall be valued as if privately owned and assessed at the same percentage of full valuation as other taxable real property in the assessing unit . . .

3. No such assessment shall be valid for any purpose without the approval of the State Board . . ." Par. 542 Real Property Tax Law.

NORTH CAROLINA

"It is hereby declared to be the policy of this State so to use its system of real estate taxation as to encourage the conservation of natural resources . . . and all tax assessors are hereby instructed that in assessing real estate . . . they shall make no increase in the tax valuation of real estate as a result of the owner's enterprise in adopting any one or more of the following progressive policies: . . .

"4. Protection of forest against fire.

"5. Planting of forest trees on vacant land for reforestation purposes (for ten years after such planting)." Gen. Stat. 105-294.

"In determining the value of land the assessors shall consider as to each tract, parcel or lot separately listed at least its advantages as to location, quality of soil, quantity and quality of timber, water power, water privileges, mineral or quarry or other valuable deposits, fertility, adaptability for agricultural, commercial or industrial uses, the past income therefrom, its probable future income, the present assessed valuation, and any other factors which may affect its value." Gen. Stat. 105-295.

applied to forest land. In both cases value can best be determined by analyzing the productive capacity of the soil and its location.

"Timber, apart from the forest land on which it stands, is more nearly comparable to mineral rights, since in both cases the thing appraised is distinguished from the surface rights in the land.

"From these general observations, it is evident that the timber and the forest land must be appraised separately for *ad valorem* tax purposes, except in one particular situation to be dealt with in a later section of this chapter.

DEFINITION OF FOREST LAND

"Forest land is defined as land bearing forest growth, or land from which the forest has been removed and which shows no evidence of any other recent land use. . . . The test of whether abandoned agricultural land should be considered forest land is whether it is at least 5% stocked with trees. Assessors can determine whether 5% stocking exists on an acre of land by reference to the following table:

THE ASSESSMENT OF TIMBER AND FOREST LAND¹

"The kind of real property most nearly comparable to forest land itself is ordinary rural agricultural and pasture land. The principles involved there can, with slight modification, be

¹ This material is taken from the "Assessment of Real Property for Taxation in North Carolina," Institute of Government, Chapel Hill, pp. 147-163. 1948.

The instructions, suggestions, and systems contained in this publication are tentative or experimental in character and have not been officially adopted by the State.

If the tree diameter is: *The number of trees per acre indicated below is required to make a 5% stocking:*

Seedlings	40
4 inches	30
6 inches	22
8 inches	15

"The term 'Waste land' as used in the general section dealing with rural land has significance in this discussion of forest land. As defined earlier in this manual 'waste land' includes what is generally called 'non-productive forest land.' Such land is defined as forest land of such low

fertility that it never has and probably never will grow sound commercial saw timber. Brush covered sand dunes, and dry, rocky ridge tops in the mountains are examples of this class of land. Since non-productive forest land meets the definition of waste land, county assessing authorities should apply to it the same classification and assessment standards."

APPRAISAL OF FOREST LAND APART FROM STANDING TIMBER

"... for general assessment purposes, the two primary factors in setting base per acre values on forest land as such are producing power and accessibility to timber market. . . it is suggested that the Advisory Board set base per acre values for such land (including cutover land), using a table substantially as follows for recording their decisions:

Productivity	Accessibility to timber market		
	Good (A)	Average (B)	Poor (C)
I Above average	IA	IB	IC
II Average	IIA	IIB	IIC
III Below average	IIIA	IIIB	IIIC

. . . In setting these base values the Advisory Board must always keep in mind that their figures should represent *average* market values for each grade, not unusually high or unusually low prices for the particular kind of forest land property considered.

"... there is an exception to the rule that forest land and timber should be assessed separately. . . forest land on which there is no *merchantable* timber, but on which there is either a growth of 'seedlings and saplings' or a growth classified as 'poorly stocked.' Seedlings and saplings have no market value if severed from the land, and poorly stocked timber, regardless of the possible value of individual trees, has no market value simply because there is not enough of it to the acre to warrant the costs of severing it. Yet, in both cases, the presence of this timber enhances the value of the land on which it lies above its bare or cutover value. The difference in value caused by this growth must be taken into account in the tax assessment of the forest land itself, and not in a separate timber value.

"... Two possible ways of making this adjustment present themselves.

"The simplest procedure would be for . . . a flat sum addition per acre . . ."

"A better procedure would be for the Advisory Board to set up flat sums per acre to be added in these cases in the following manner:

Class		Stand-size class	
Forest type	Quality	Seedlings & saplings (per acre)	Poorly stocked (per acre)
I Softwood	A. Above average	I A S & S	I A PS
	B. Average	I B S & S	I B PS
	C. Below average	I C S & S	I C PS
II Softwood-hardwood	A. Above average	II A S & S	II A PS
	B. Average	II B S & S	II B PS
	C. Below average	II C S & S	II C PS
III Upland hardwood	A. Above average	III A S & S	III A PS
	B. Average	III B S & S	III B PS
	C. Below average	III C S & S	III C PS
IV Cove hardwood	A. Above average	IV A S & S	IV A PS
	B. Average	IV B S & S	IV B PS
	C. Below average	IV C S & S	IV C PS
V Bottomland hardwood	A. Above average	V A S & S	V A PS
	B. Average	V B S & S	V B PS
	C. Below average	V C S & S	V C PS

"Having settled upon flat additions for the presence of such growths, the Advisory Board should insert them in the table shown above. This table will make it easy for the list taker and assessor to compute the additions to base value for any individual tract of forest land he is called on to appraise.

APPRAISAL OF TIMBER APART FROM THE LAND ON WHICH IT STANDS

"... merchantable timber in North Carolina is classed as timber 5 inches or larger in diameter measured 4½ feet from the ground, usually expressed as 'diameter breast high.' Trees under 5 inches in diameter would normally not command a market price if they were cut. . ."

"... For tax assessment purposes there are five readily recognizable broad forest types in North Carolina:

- (1) Softwood . . .
- (2) Mixed softwood and hardwood . . .
- (3) Upland hardwoods . . .
- (4) Cove hardwoods . . .
- (5) Bottomland hardwoods . . .

"The County Valuation Committee and its Advisory Board on Timber and Forest Land

will be able to identify the forest types existing in their county and can disregard the others in their setting of base values.

"For tax assessment purposes five stand-size classes have been established . . .

- (1) Sawtimber . . .
- (2) Pole timber . . .
- (3) Seedlings and saplings . . .
- (4) Poorly stocked . . .
- (5) Plantations . . .

"The County Valuation Committee through its Advisory Board on Timber and Forest Land will be faced with a problem different from that it faced with forest land valuation when it comes to setting base values on timber itself.

"Timber, like oil or mineral ore, has value only because of the products that can be made from it after it has been removed from the ground, transported to a manufacturing plant, and made into finished or semi-finished products. The value of timber can be said to be a *residual value*—that is, the value of the finished product less the cost of harvesting, transportation, manufacture, and a sum for profit and risk. This value is commonly called 'stumpage value.'"

"The most important factors that assessing authorities have to consider in setting base timber values are:

1. Volume per acre
2. Size of trees
3. Species in the stand
4. Quality of the timber
5. Logging conditions
6. Roads
7. Distance from market

"It is suggested that the Advisory Board tabulate the base values in the following manner:

Table of base timber values for _____ county

Class		Stand-size Class	
Forest type	Quality	Saw timber (per 1,000 board feet)	Pole timber (per cord)
I Softwood	A. Above average	I A	
	B. Average	I B	
	C. Below average	I C	
II Softwood-hardwood	A. Above average	II A	
	B. Average	II B	
	C. Below average	II C	

Class		Stand-size Class	
Forest type	Quality	Saw timber (per 1,000 board feet)	Pole timber (per cord)
III Upland hardwood	A. Above average	III A	
	B. Average	III B	
	C. Below average	III C	
IV Cove hardwood	A. Above average	IV A	
	B. Average	IV B	
	C. Below average	IV C	
V Bottomland hardwood	A. Above average	V A	
	B. Average	V B	
	C. Below average	V C	

Note: Since stands of seedlings and saplings and poorly stock stands are to be valued at a base figure per acre, they are not included in this table.

"In setting an assessed valuation on stands of timber, the discussion so far has been confined to stands in what can be called "average" locations, that is, locations representing the normal logging conditions, distance from roads and distance from markets in the particular county. It is immediately obvious, however, that few tracts of timber can be estimated solely on the basis of "average" location, because when the assessor is faced with a particular taxpayer's tract of timber, he must modify this average value that he first places on it to account for its 'accessibility'.

"By the term 'accessibility' is meant the location of the timber with regard to distance from market, logging conditions, and the kind of roads available . . .

"It is suggested that 'accessibility' be rated 'Good,' 'Average' and 'Poor,' and that percentage adjustments be established in substantially the following manner:

If accessibility rated:

Good ---- Allow up to 30% increase in base timber value.

If accessibility rated:

Average _ Allow no adjustments to base value.

If accessibility rated:

Poor ---- Allow up to 30% deduction to base timber value."

OHIO

BTA-5-04 (Rule 03) *Adoption and use of property records*

Each county auditor shall adopt a system of currently maintained property records for each lot, tract or parcel of real property in the county of his jurisdiction as provided in Revised Code 5713.03. Such property records shall be in either sheet or card form as determined by the county auditor. The information contained on this record, in conjunction with the actual viewing of the property by the appraiser and other pertinent information available, shall be used in estimating the true value in money of each parcel of real property in the county. Each such card or sheet shall provide, insofar as possible, the following information: . . .

(C) AGRICULTURAL LAND FACTORS

1. Soil type
2. Topography
3. Erosion
4. Drainage
5. Land use (number of acres) classified as follows:
 - (a) Homesite
 - (b) Tillable land
 - (c) Orchard
 - (d) Permanent pasture
 - (e) Woodland
 - (f) Waste
6. The computation of agricultural land value shall include the following, insofar as applicable:
 - (a) Price per acre for each grade and use of land
 - (b) Total land value for each tract of land of different grade and use
 - (c) Total land value for entire parcel.

BTA-5-05 (Rule 104) *Valuation of land*

(A) *General*

All land shall be appraised at its true value in

money as of tax lien date of the year in which the appraisal is made. In arriving at the true value in money the county auditor shall consider, along with other factors, not only the present use of the land but also its highest and best probable use during the next ensuing 6-year period. A tract of land shall be valued in the same manner as land similarly used and located unless it has a greater value due to probable use for plant expansion, creation of shopping centers, residential allotments, or any other higher and better probable use.

All relevant facts tending to influence the market value of land shall be considered, including, but not limited to, size, shape, topography, soil and subsoil, drainage, utility connections, street or road, land pattern, neighborhood type and trend, zoning, restrictions, easements, hazards and actual arm length sales of land in the immediate vicinity.

The county auditor shall deduct from the value of each separate parcel of real property the amount of land occupied and used by a canal or used as a public highway as provided in Revised Code 5713.04.

(B) *Agricultural*. Agricultural lands shall be classified according to their characteristics and capabilities for use, based primarily on what they will produce under average conditions and typical management in the locality. Assessors shall obtain all information available relating to soil classification, land capabilities, land use and soil maps, production records, price records and other information from the Ohio State University, Ohio Agricultural Research and Development Center, County A.S.C., Soil Conservation Service, Soil and Water Conservation Districts, and other sources.

—Ohio Real Property Valuation Rules, eff. for tax year 1966 and thereafter.

Board of Tax Appeals, Dep. of Taxation.

OREGON

A somewhat complex pattern of special forest tax legislation in part modifies, and in part replaces, the property tax as it applies to forest land and timber. The Western Oregon Ad Valorem Tax adopted in 1961 (Oregon Revised Statutes 321.605) is applicable to lands lying west of the Cascade Mountains.¹ The Act modi-

¹ Amendments and regulations thereunder applicable to the tax year 1968-69 are not reflected in the following material. See Chapter 543 Laws 1967, approved June 30, 1967.

fies the application of the property tax for both land and timber. The true cash value of forest land continues to be determined under the general statutes relating to the property tax except that so long as the primary use of the area remains forest land, it is to be valued as such. The true cash value of timber is to be determined according to the provisions of the Act.

The Eastern Oregon Severance Tax also adopted in 1961 (ORS 321.405) is applicable

to that part of the State situated east of the Cascade Mountains. Forest land remains subject to the general property tax; a yield (severance) tax is substituted for the property tax on timber. In addition to the Acts just mentioned, two optional provisions are available to forest owners of the State.²

The State Tax Commission has responsibility for inventorying and appraising timber and timberland subject to the property tax in western Oregon. In this connection the Valuation Division of the Commission has developed techniques in using electronic computers. Leadership by the State in the administration of the property tax as it relates to forest land and timber, together with detailed requirements of special forest tax laws, have lessened the need for State guides to local assessors. Excerpts from the "Ad Valorem Property Tax Regulations" issued periodically by the State Tax Commission follow.

Article 21605. (Relates to Western Oregon Ad Valorem Tax).

A. "Forest Land Definitions:

1. "Forest land" is defined as land which either bears forest growth or is being held or used for forest production, and is the land alone. Such land is rural land which by the nature of its topography, soil quality, productivity, cover, and current and recent use is suited for forest growth.

For purposes of this definition "rural land" is defined as land in the country as differing from urban lands in cities, towns, or communities.

2. "Forest land is the land alone" is defined as the soil and the total natural and cultural environment within which forest production takes place, but excluding the forest growth.
3. "Forest land is the land alone" excludes the following:
 - a. All woody plants or trees occupying the soil.
 - b. All improvements except the contribution to value of the land by roads, and all buildings, structures, machinery, equipment or fixtures erected upon, under, above or affixed thereto."

Article 21620. (Relates to the Western Oregon Ad Valorem Tax).

² The Forest Fee and Yield Tax adopted in 1929 (ORS 321.255). The Western Oregon Small Tract Optional Tax adopted in 1961 (ORS 321.705). For provisions of special forest tax legislation see State Forest Tax Law Digest mentioned in preface of this compilation.

A. Definitions:

1. "Area involved" is defined as the area of forest land within one ownership where the ownership is the contiguous land owned by the same person or persons.
2. "Primary use" as forest land is defined as that use which is a dominant and bona fide engagement in the production of commercial forest products from the area, or that use which is a principal activity in the commercial production of forest growth.

Examples of exclusions:

- a. A forested area occupied by a trailer court would not have its primary use as forest land.
- b. A forested area which provides unrestricted grazing for domestic animals and where such grazing is obviously being conducted at the expense of forest production would not have its primary use as forest land.
- c. A forested area along or bordering streams, lakes, roads, or recreation areas which has been subdivided or platted presently is being used for other than the production of commercial forest crops.

B. Criteria:

1. In making a determination of whether the "area involved" is being "primarily used" as "forest land," consideration should be given but not limited to the following criteria:
 - a. Whether the land has been subdivided or a plat has been filed under ORS 92.100.
 - b. Whether the land would be subject to the requirements of the Oregon Forest Conservation Act (ORS Chapter 527).
 - c. Whether it is classified as "timberland" under subsection (17) ORS 477.001.
 - d. The present uses of the land.
 - e. The acres of forest growth in the ownership.
 - f. The other uses of the ownership.
 - g. Whether there is a forest management plan for the area involved and whether it is being implemented.
 - h. Whether the area involved is being used for grazing.
 - i. Date of acquisition and purchase price.
 - j. Business activity of owner on and off the subject property.

- k. Forest management activities including reforestation, timber harvesting, and protection on the land.

ORS 321.955. Timber Severance Reports³

If merchantable timber subject to assessment by any county in this State is severed during any calendar year from real property, the owner or his agent shall, before March 3 of the year following the severance, make and file a report with the county assessor of each county in which the real property is situated. The report shall contain a legal description of the property from which the merchantable timber has been severed, a statement of the area from which the timber has been severed, the best estimate of the acres logged and of the percentage of total volume of timber, by species, severed from such acreage, and the best estimate of the acres of merchantable timber remaining uncut. The report shall include a map or sketch showing the area logged and be signed by the owner or his agent.

Article 21955. (Relates to Timber Severance Reports under Western Oregon Ad Valorem Tax).

A. Definitions:

1. "*Merchantable Timber.*" The statutory definition is designed to follow current utilization practices in the county or in the area logged. Owners are required to report the merchantable timber which currently is considered by the Commission as subject to inventory and assessment. Owners should check annually with the county assessor to determine types and classes of timber which were assessable for ad valorem tax purposes as of January 1 of the year of severance.
2. "*Owner.*" The statute provides that the owner at the time of severance file the report. Where the owner on the assessment date is not the owner at the time of severance, the report should still be filed by the owner at the time of severance; however, he may make the owner on the assessment date his agent for reporting purposes if, for any reason,

it is more convenient to have that person make the report.

3. "*Severance.*" The statutory definition is designed to cover all situations where conversion of the stumpage to logs is begun. Merchantable timber may be removed from the stump but not removed from the land; nevertheless, the severance must be reported. On the other hand, wind-fallen timber need not be reported as severed until it is removed from the place of blowdown to another location, whether that be a cold deck, pond or mill.

ORS 308.236. Land and timber values to reflect presence of roads; roads themselves not assessed; exception for certain timber roads.

1. The availability, usefulness and cost of using roads, including all roads of the owner of land or timber, and all roads which such owner has the right to use, shall be taken into consideration in determining the true cash value of land, the unit value of timber on reforestation lands, and the immediate harvest value of other timber as defined . . .
2. Roads themselves, except principal exterior timber access roads, shall not be appraised, valued or assessed . . . The underlying land upon which roads are constructed shall be assessed if it is otherwise subject to assessment.
3. (a) As used in this section, "road" includes fills, ballast, bridges, culverts, drains, surfacing and other appurtenances of a like kind commonly associated with roads, but excludes railroads. (b) "Principal exterior timber access roads" means those portions of high standard main-line private roads that provide access from a conversion center or public way to the exterior boundary of the principal forest area served by the road. A high standard main-line private road is a permanent road of two lanes or more which is paved, macadamized, or with fine-gravel surface which is permanently and continuously maintained.

³ Applicable to Western Oregon ad valorem tax only.

PENNSYLVANIA

"It shall be the duty of the several elected and appointed assessors, in their return of real estate to the commissioners of the proper county at each triennial assessment, to make returns of all the timberland in their proper district by

specifying in separate columns how many acres each tract contains of cleared land and how many in timber."

The General County Assessment Law (Act of May 22, 1933), Sec. 418.

SOUTH CAROLINA

“65-1621. RETURNS OF TIMBER, ETC.; CONSIDERED REALTY.

Any person owning any deed, lease or contract whereby timber or timber rights are conveyed to him on lands in the State shall, at the time fixed by law for making annual returns of personal property for the purpose of taxation, return for taxation the value of such deed, lease or contract in the county in which the timber covered by such deed, lease or contract stands or is situated and not in the county of the domicile or principal place of business of such person, and for the purpose of §65-1621 to 65-1623 such deed, lease or contract covering timber or timber rights shall have the character of and be considered real and not personal property, except that returns thereof shall be made annually, instead of once in four years.

“65-1622. ENTRY OF SUCH TIMBER RIGHTS ON TAX BOOKS.

The value of any such deed, lease or contract so required to be returned shall be entered upon the tax books of such county and shall be sub-

ject to all statutory and other provisions relating to the return, assessment, equalization and taxation of real property and the collection of taxes thereon in this State, except that returns thereof shall be made annually instead of once in four years.

“65-1623. SEPARATE RETURNS OF EACH DEED, ETC.; OF TIMBER NOT REQUIRED.

Sections 65-1621 to 65-1623 shall not be construed as to require any such person owning more than one such deed, lease or contract to return the value of each separately, but it shall be a sufficient compliance with the requirements of said sections for the value of all such deeds, leases or contracts to be returned collectively, in the proper county, or counties, as designated by said sections. But if any such deed, lease or contract covers timber or timber rights in more than one county, the value of such deed, lease or contract shall be prorated between or among such counties, with relation to the value thereof, in each county.”

Code of Laws for 1962 as amended.

SOUTH DAKOTA

“. . . It shall be the duty of the assessor to determine and report each year the acreage of timber within his district. Such report shall indicate separately the acreage of natural and cultivated or planted forests averaging four feet over in height, and shall also specify the kind of trees. Such data shall be taken and reported by the assessor without extra compensation . . .”

South Dakota Code, Sec. 57.0308

“Real property for the purpose of taxation shall be construed to include the land itself . . . trees or other fixtures of whatsoever kind thereon. . . . Trees planted under the Timber Culture Act of Congress shall not be considered as improvement on land for the purpose of taxation.”

South Dakota Code, Sec. 57.0312

“Forest land from which the usable timber has been removed is ‘agricultural land’ within the statute, although only a small portion of it could be cultivated.”

Attorney General’s Opinion
May 27, 1940.

Lands from which trees are harvested for pulpwood or posts are assessed on the basis of market value with the timber value added to that of the land. Factors considered by assessors are terrain, grazing value of the land itself, distance to market and size of timber.

Letter from Division of Taxation
Dept. of Revenue
Jan. 4, 1966.

TENNESSEE

“All mineral and timber interests and all other interests of whatsoever character, whether for life or a term of years, in real estate, . . . which said interest or interests is or are owned separate from the general freehold, shall be assessed to the owner thereof, separately from

the other interests in such real estate, which other interest shall be assessed to the owner thereof, all of which shall be assessed as real estate.

“It shall be the duty of the . . . State Forester, when called upon to do so by the Commissioner

of Finance and Taxation, or the State Board of Equalization, to render assistance to said Commissioner or State Board in ascertaining the value of any or all . . . timberlands in the State, to the end that such property may be accurately assessed at its actual cash value."

Sec. 67-606 and 607,
Tennessee Code Annotated.

A State Assessors' Manual, including information on the assessment of timber and forest lands, is being prepared.

TEXAS

"... the Land Commissioner shall furnish... to the various . . . tax assessors . . . a full and complete list of all timber sold by the State belonging to the school funds, giving the number of acres, price and to whom sold, in the respective counties where the timber so sold is situated . . ."

Revised Civil Statutes, Art. 7173.

"Where timber has been sold separately and apart from land, though standing, it is taxable separately and apart from the land and to the owner. This rule applies whether the timber

stands on land owned by the State or individuals . . ." (p. 35)

"Timber held by persons or corporations heretofore or hereafter purchased from the State under the various laws for that purpose, shall likewise be subject to assessments for taxes and the value thereof for taxation shall be ascertained as the value of other property is ascertained. . . ." (p. 35)

County Tax Assessor—Collector Instruction Manual
Comptroller of Public Accounts.
(n.d.)

UTAH

"Real estate includes:

- (a) The possession of, claim to, ownership of or right to the possession of land.
- (b) . . . all timber belonging to individuals or corporations growing or being on

the lands of this state or the United States, and all rights and privileges appertaining thereto." (p. 6)

Property Tax Manual,
State Tax Commission, 1950.

VERMONT¹

INTRODUCTION

The appraisal of timberland in Vermont varies considerably from town to town. No doubt it varies even within the towns. It is a tremendous problem, not only in Vermont, but throughout the entire United States. Considerable study has been devoted to the subject in the various states with some of them using a "severance tax" in lieu of the property tax. In Vermont you listers are supposed to appraise all property at its "fair market value." Realizing the difficulties under which you labor in regard to your remuneration and the limited amount of time in which to complete your work, we hope the following information and recommendations

will serve as a guide to help you achieve EQUITY when appraising timberland.

The appraisal of property differs from state to state, depending on the amount of money available by the taxing district, whether it is a town, city, county or state. Our recommendations will take into consideration the conditions that exist here in Vermont. We must remember it takes a long time to grow trees. Whoever has his money invested in timberland is entitled to a fair return on his investment. Often it will not be a yearly return, and in some cases there will not be any return during the lifetime of the taxpayer. Another peculiarity of timberland is that the trees have to be assessed for taxes and the owner cannot realize any income from the property, other than from maple sugar orchards, without cutting the trees. We must be fair with the taxpayer and the town for which we work. Therefore, *we want to be sure the various types of timberland are NOT appraised so high the taxpayer will be forced to cut his timber off completely in order to pay the taxes.*

¹ Timberland Appraisal Guide, Vermont Tax Dep. 13 pp. 1960. Due to current trends in land values, the Guide was recently withdrawn. It is included in this compilation to illustrate a simplified approach to forest assessment suited to use by assessing officers lacking specialized training or experience in estimating timber volumes and values.

When that happens, the taxpayer, the town and the state lose tremendously.

According to Title 32, Vermont Statutes Annotated, Section 4152 (7) (A), you listers are supposed to record in the grand list book the approximate acreages of woodland, cropland and pasture land owned by the different individuals in your town. In the Handbook for Vermont Listers and TAX AIDS, we have recommended that rural land be appraised according to these three different types of land. We have noted that land for cultivation, as well as land used for pasture, is very apt to be of more than one grade on nearly every farm and should be appraised accordingly. This also holds true for land that is devoted to raising timber.

Land that is used for cultivation raises a crop each year, whereas land used for growing trees will take from 50 years to 125 years to raise a single crop of pulpwood or merchantable saw timber, depending on whether or not the trees are hardwood or softwood and the capability of the soil. The same is true for the growing of trees as for the growing of yearly crops, the better the soil, the better the crop. Some soils will grow trees much faster than will others. Also, some species of trees will grow better in a given location than will other kinds.

There are many problems connected with the appraising of timberland. In some sections of the state, the bulk of the timber is being used for pulp in the paper industry, while in other sections the timber is used for veneer, furniture manufacturing, construction material, etc. There are other sections that are being opened up for recreation—hunting, fishing, skiing. A few areas are seeing plantings of seedlings for Christmas trees, which will be ready for the market in eight to fifteen years, depending on the type of tree planted. There are the active maple sugar orchards, some of which are quite extensive. Also, there are stands of various kinds of hardwood timber, such as beech, yellow birch, white birch, maple, ash, black cherry, etc., while other stands will be of softwood only. Occasionally, there will be combinations of both. You will find a considerable variation in a given tract of land. As an example, we found an 800 acre tract when making the study for the recommendations contained herein, that consisted of 200 acres of maple and ash, 560 acres of cutover land and 40 acres that had been planted to pine.

We have repeatedly advised you listers that real estate cannot be appraised from the back seat of an automobile or sitting in the town clerk's office. The same holds true for timberland as for buildings, pasture land and culti-

vated land, you must examine the timberland if you expect to make an equitable appraisal. Also, you should look it over once every ten years, at least. It will take just about that much time for a change in the size of timber to be noticed. You don't have to worry about depreciation due to cuttings, the owners will notify you.

While it is true that some species of hardwoods are more valuable than others, as with the softwoods, we are not going to suggest you appraise the timberlands according to the species grown. Most of us know some of the various kinds of trees growing in our Vermont woods, but very few, other than foresters or trained timber cruisers, can tell all of the different types from the bark, or shape, and without leaves. Therefore, the categories submitted for your use will be more general in character and are illustrated with pictures and defined on pages 3 to 8.

TOOLS TO WORK WITH TAX MAPS

Just as the recommendations herewith are a tool for the better appraisal of timberland, there are other tools available. For instance, aerial photographs of your town would be a big help. Many taxing jurisdictions have been completely photographed in other states and provinces, with tax maps made therefrom showing the different types of timber and soils, rivers, ponds, roads, etc. Tax maps are just as valuable for a rural community as they are for the larger towns and cities. For those rural towns with hundreds of acres of timberland, aerial photographs would help the listers immensely. While many of the aerial photographs are so old that they have lost some of their value, information on available photographs may be obtained from the Soil Conservation Service offices throughout the state.

While aerial photography is the best method to use for surveying large tracts of timberland and making tax maps therefrom, we realize not all towns can afford the cost of such work. We firmly believe tax maps, which could be made from an ordinary map of the town or from enlarged copies of topographic maps, should be available to the listers. The topographic maps are available in stores in the larger towns of the state, at least, and are very inexpensive. With aerial photographs, someone trained in their interpretation could give you all the information you need, including the size and kind of trees, the acreages of the different tracts and a lot of information relative to the soils. Where

aerial photographs are not used, then the acreages must be determined by deed, or as near as possible from the knowledge of the individual owners. This information should be put onto a tax map, together with the information secured by viewing the timberland. Once this is on a map, it should not be too difficult to maintain it. Also, with the establishment of tax maps, you might be surprised at the amount of lost property that might come to light and would be entered on the tax rolls for the first time in a number of years.

Many farmers, and possibly timberland owners, have had their holdings surveyed by the Soil Conservation Service. Aerial photographs have been taken and maps made for the owners. These maps will show the different types of soil, the location of the cultivated land, pasture land and timberland. The information contained on these maps should be of immense assistance to you. We feel sure the property owners will be glad to let you use their maps and photographs.

RECORD CARD

Another tool is a good record card for each taxpayer on which should be recorded the number of acres for each classification of timberland, the rate per acre used when appraising the property and the total appraised value for the various classifications. This same card could be used for all the rural land, which would include the cultivated land and the pasture land along with the timberland. It is possible you would want to include on the card an outline, or diagram, of the taxpayer's holdings and even show the number of acres for each classification of land.

In any event, some kind of a permanent record card should be kept pertaining to the timberland holdings of each taxpayer so you would know how you appraised his property. You also need this information in order to know what to do when there has been a cutting made and the taxpayer comes in for a reduction in his appraisal.

CLASSIFICATIONS

In order to assist you to the greatest extent possible, we have divided timberland into six broad or general classifications. That means we must define each classification in terms that every lister will readily understand. However, each general classification may contain trees that belong to some other classification. You will determine the classification by the size of the majority of trees in the area.

WASTE LAND

This is the least valuable land there is—it is worthless and should be figured as such. It includes mountain tops that are all rocks or where only short scrub trees will grow that have no value whatsoever. There may be areas on mountain sides that are all ledges, which will make that particular area valueless. Also included in this category will be swamps where only swale grass and cattails grow, which will be worthless.

BRUSH LAND

This will include cultivated or pasture land that has been abandoned for farm purposes and might be covered with clumps of small worthless trees such as alder, willow, cherries and gray birch, that will never grow to a marketable size. The areas coming under this heading will be a little better than the waste land because it could grow merchantable trees with proper care.

In this category we also include the swamps and bogs where there might be some cedars for fence posts, or a few merchantable trees. Due to the swampy condition of the land, the value is exceedingly low and the merchantable timber could only be removed under extremely poor conditions. This type of timberland is just out of the worthless classification and should be appraised at a low value per acre. (See Figure 1)

SEEDLINGS AND SAPLINGS

This will be land covered with young trees up to five inches in diameter of varieties which will produce merchantable timber. It will include cut-over land, or abandoned farm land, or reforested areas. (See Figure 2)

POLE SIZE TIMBER

An area of this type will have trees that will be five to nine inches in diameter. You might, or might not, find a few trees over nine inches, or even trees of a merchantable size. These might be widely scattered and would hardly be worth cutting. The type of land, whether it is particularly good for growing merchantable trees or not, accessibility for future harvesting, general condition of the area, and the kind of forest practices being used, will all help to determine the value per acre. (See Figure 3)



Figure 1.—Brush Land



Figure 2.—Seedlings and Saplings



Figure 3.—Pole Size Timber

YOUNG SAW TIMBER

An area that falls in this classification will contain trees largely between nine inches and twelve inches in diameter at breast height. You may find a scattering of smaller trees and a few trees that will be larger. While there may be a few trees of a merchantable size, the majority of them should be left for another ten to twenty years or more before being cut, depending on the condition of the trees, and whether they are hardwood or softwood. You will determine the value per acre by the same method as that described in the latter part of the previous classification. (See Figure 4)

MERCHANTABLE SAW TIMBER

An area to come under this classification should contain mostly trees over twelve inches in diameter at breast height. Here again, however, you may find a scattering of trees much smaller. The trees should be commercially usable species. The value will be determined by

taking into consideration the condition of the trees, whether they are alive, sound, of good quality, and still growing, or showing signs of decay. While some species of trees are more in demand than others, and therefore more valuable, the number of board feet per acre would have a bearing on the amount a purchaser would pay. We cannot stress these items without making the appraisal of timberland so hard that you will find it difficult to follow the instructions. However, you can readily tell the difference between a tract that has a great many trees over twelve inches in diameter and one that does not have as many, both areas being in this particular classification. (See Figure 5)

In many areas you will find small acreages of good merchantable timber that would ordinarily bring a fairly good price on the market. However, there is such a small quantity available that it will not be worth the cost to harvest. When you find these conditions, even though the available timber is of the best, you should not appraise it at the highest value because it will not bring this price on the open market.



Figure 4.—Young Saw Timber

RECOMMENDED APPRAISED VALUE PER ACRE

Title 32, Vermont Statutes Annotated, Section 3481, as amended by No. 175 of the Acts of 1959, pertaining to definitions reads as follows: "‘Appraisal Value’ shall mean the estimated fair market value of property. ‘Listed Value’ shall mean that proportionate part of the appraisal value agreed upon by the board of listers, and recorded with the town clerk. Each town may determine

the ratio of listed value to appraisal value to be used in the town, but the ratio shall be the same for both real and personal property."

The values we are recommending are "*appraisal value*" and NOT "*listed value*." The range in values given is intended to cover the variations in *quality, accessibility, quantity* and *other factors* which affect the value within the category. You will multiply the number of acres by the rate per acre in the particular classification applicable to the area being appraised to determine "*estimated fair market value*."



Figure 5.—Merchantable Saw Timber

Waste land --stone, swamp, ledge or any other land incapable of growing usable timber.
\$0.

Brush land --clumps of small trees that will never grow to marketable timber, growing on abandoned agricultural land.
\$2.—\$6.

Seedlings and saplings, excluding Christmas tree plantations. lands growing principally young trees not over five inches in diameter which could grow to merchantable timber; also includes cut-over land.
\$4.—\$10.

Pole size timber. lands growing largely young trees not over nine inches in diameter.
\$6.—\$12.

Young saw timber. so-called second growth, largely trees nine inches to twelve inches in diameter.
\$6.—\$16.

Merchantable saw timber. land growing largely trees over twelve inches in diameter which are commercially usable. Includes maple sugar orchards.
\$9.—\$30.

As an EXAMPLE ONLY, to illustrate the use of the suggested values, we will say Joe Dokes owns 100 acres of timberland divided into the following classifications:

- 50 acres of "pole size timber" with an estimated value of \$8.00 per acre
- 25 acres of "young saw timber" with an estimated value of \$10.00 per acre
- 25 acres of "merchantable saw timber" with an estimated value of \$15.00 per acre

In each case we have used a value per acre that is within the range suggested for each classification under consideration. The total "estimated fair market value" of the tract and the "listed value," the value that will show in the grand list book, follows:

50 acres @ \$ 8.00	\$ 400.00
25 acres @ \$10.00	250.00
25 acres @ \$15.00	375.00
Total "appraised value"	\$1,025.00
"Agreed Ratio"	25%
Total "listed" value	\$ 256.00

At this point a word of caution is necessary. We have suggested values for you to use. Each classification has a low and a high dollar value per acre. DO NOT figure every acre of land in each classification in your town at the highest value per acre. In actual practice, and to be absolutely fair with the taxpayer, probably there will be only a small portion of the timberland in any town that will be worth the maximum amount for any given classification. Be sure you take into consideration *location*, *accessibility* and *quality* of the trees. Furthermore, compare one property with another to be sure you are appraising all timberland on an absolutely EQUITABLE BASIS.

APPRAISING PROCESS

Appraising timberland, the same as appraising buildings, is a matter of ascertaining known facts and using that information together with good old fashioned common sense, to arrive at an equitable valuation. There is the matter of *accessibility* to be considered, the *quantity* and *quality* of timber available, the prevailing market price as established by known sales between a willing, well informed buyer and a willing and well informed seller, neither being under any compulsion to act.

In order to establish the value of timberland you MUST go over it, or there must be aerial photographs of fairly recent date available for examination and evaluation by individuals trained in that work.

If you are going to "cruise," or go over, the timberland of a taxpayer, *we believe it would be good judgment to do so with the owner* or his representative. It should not be necessary for the entire board of listers to cruise each tract. Rather, the work should be divided so each lister who is physically able to do so, would have his portion of the town to examine. Trying to go over each tract annually is not necessary and should not even be attempted. That is altogether too much work and uncalled for. You

may be able to ascertain the predominant features of some tracts of timberland without going over every foot of them. However, most lots will need to be gone over carefully in order to equitably establish their proper classifications.

When you go into the woods to look it over, you are quite apt to find more than one classification of timberland. This will be especially true where the tract covers hundreds of acres. As an illustration only, on a timberland tract of 200 acres, you might have 50 acres of "pole size timber," 100 acres of "young saw timber," and 50 acres of "merchantable saw timber." In each separate classification in this example, and it will hold true in actual practice, there will be some trees that would ordinarily come under a different classification. For instance, in the "pole size timber," you may find trees that will measure more than nine inches in diameter at breast height and it is possible a few would be more than twelve inches in diameter. The different classifications will therefore depend on the size of the majority of trees in the area.

Most land owners will have a fairly accurate estimate of the number of acres of timberland they own and can break it down into the categories previously described. Even with this information, you should look over the timberland, because you cannot tell what value to set per acre equitably, and be able to substantiate your appraisal, unless you do. As you have noticed, each category has a fairly good spread between the low valuation per acre and the high valuation. *You must exercise your good judgment to decide the exact valuation per acre to use, and the highest dollar value per acre should only be used for the best possible timberland that will be found in a particular category.*

Furthermore, the timber must be in an area that is *readily accessible*. There are numerous locations in the state where there are good stands of merchantable timber, but the areas are so inaccessible the market value will be fairly low. The cost to get out the timber, in some cases, will be so high the lumbermen will have to purchase the standing timber at a very low figure in order to make it a paying proposition. Therefore, be sure you always take into consideration *accessibility*, *quality* and *quantity* of the trees when appraising timberland. This was very forcibly brought to our attention by a lister who owns a good size farm and has on it a small stand of merchantable softwood. The area is so inaccessible, the quantity so small, no timber operator will buy the standing timber, even though it is good merchantable timber.

If, as has been suggested previously, you go

over the timberland again in ten years, you may find that the growth in some areas has been sufficient to raise the area to the next higher classification. For instance, a "pole size" tract may have grown enough to be reclassified as "young saw timber." This could mean increasing the value per acre to some small extent to reflect the growth of the timber in the ten year period.

When a cutting has been made, the timberland owner will no doubt ask for an adjustment of the appraised value of his holdings. With the classifications used as defined, by going over the tract the owner feels should be adjusted, you will readily be able to determine to what classification the tract ought to be changed. As an illustration ONLY, we will say X Corporation has cut the merchantable timber on 200 acres

of land which you had classified as such and appraised at \$25.00 per acre. After going over the land with the owner, you have determined the classification has changed to "pole size timber," which, in your opinion, should be appraised at \$8.00 per acre. In other words, the majority of the trees that have been left to grow are between five and nine inches in diameter at breast height. There would be some trees smaller than five inches, also there might be some "seedlings and saplings," which would not change the classification from "pole size timber" but might have some bearing on the value per acre.

You can readily see where the classifications that are suggested will help with an original appraisal and when adjustments are necessary due to normal growth or to cuttings.

VIRGINIA

"When the surface of the land is owned by one person and the standing timber trees thereon are owned by another, the relative value of each shall be determined and the several owners assessed with the value of their respective interests. 58-804(f)

"When the surface and standing timber trees are owned by the same person, the value of the land, inclusive of the standing timber trees, shall be ascertained and assessed at such ascer-

tained value. 58-804(g)

". . . when any timberland heretofore assessed, the owner of the timber on which is also the owner of the land, is reduced in value to the extent of two hundred dollars and upwards by the removal of the timber therefrom, the commissioner shall assess the land in its then present condition and reduce the charge for the same to the amount so assessed." 58-813

Code of Virginia 1950.

WASHINGTON

The following sections of the Revised Code of Washington provide a statement of legislative intent on forest taxation, establish criteria for timber and timberland valuation, and set forth requirements for preparation and periodic revision of the Timber Appraisal Manual.

VALUATION OF TIMBER AND TIMBERLANDS—CRITERIA ESTABLISHED

RCW 84.40.032

Based upon the study as directed by house concurrent resolution No. 10 of the thirty-seventh session of the legislature relating to the taxation of timber and timberlands, the legislature hereby establishes the criteria set forth in RCW 84.40.031 through 84.40.035 as standards for the valuation of timber and timberlands for tax purposes.

"TIMBERLANDS" DEFINED AND DECLARED LANDS DEVOTED TO REFORESTATION

RCW 84.40.032

As used in RCW 84.40.031 through 84.40.035 "timberlands" mean land primarily suitable and used for growing a continuous supply of forest products, whether such lands be cut-over, selectively harvested, or contain merchantable or immature timber, and includes the timber thereon. Timberlands are lands devoted to reforestation within the meaning of Article VII, section 1 of the state Constitution as amended.

LEGISLATIVE FINDINGS

RCW 84.40.033

It is hereby found and declared that:

(1) Timber constitutes the primary renew-

able resource of this state.

(2) It is the public policy of this state that timberlands be managed in such a way as to assure a continuous supply of forest products.

(3) It is in the public interest that forest valuation and taxation policy encourage and permit timberland owners to manage their lands to sustain maximum production of raw materials for the forest industry, to maintain other public benefits, and to maintain a stable and equitable tax base.

(4) Forest management entails continuous and accumulative burdens of taxes, protection, management costs, interest on investment, and risks of loss from fire, insects, disease and the elements over long periods of time prior to harvest and realization of income.

(5) Existing timberland valuation and taxation procedures under the general property tax system are consistent with the public interest and the public policy herein set forth only when due consideration and recognition is given to all relevant factors in determining the true and fair value in money of each tract or lot of timberland.

(6) To assure equality and uniformity of taxation of timberland, uniform principles should be applied for determining the true and fair value in money of such timberlands, taking into account all pertinent factors such as regional differences in species and growing conditions.

(7) The true and fair value in money of timberlands must be determined through application of sound valuation principles based upon the highest and best use of such properties. The highest and best use of timberlands, whether cut-over, selectively harvested, or containing merchantable or immature timber, is to manage, protect and harvest them in a manner which will realize the greatest economic value and assure the maximum continuous supply of forest products. This requires that merchantable timber originally on timberlands be harvested gradually to maintain a continuous supply until immature timber reaches the optimum age or size for harvesting, that immature timber on timberlands be managed and protected for extensive periods until it reaches such optimum age or size that such timberlands be continually restocked as harvested.

(8) Reforestation entails an integrated forest management program which includes gradual harvesting of existing merchantable timber, management and protection of immature timber during its growth cycle until it reaches the optimum size or age for harvesting and a con-

tinual preparation and restocking of areas after harvest. Such management of timberlands is now generally followed and practiced in this state and it is in the public interest that such management be continued and encouraged.

(9) The prices at which merchantable timber is sold generally reflect values based upon immediate harvesting, and the prices at which both merchantable and immature timber are sold frequently reflect circumstances peculiar to the particular purchaser. Such prices generally make little or no allowance for the continuous and accumulative burdens of taxes, protection, management costs, interest on investment, and risks of loss from fire, insects, disease, and the elements which must be borne by the owner of timberlands over long periods of time prior to the time timber is harvested and income is realized. Such prices do not, therefore, provide a reliable measure of the true and fair value in money. Accordingly, both the public policy and the public interest of this state and sound principles of timber valuation require that in the determination of the true and fair value in money of such properties appropriate and full allowance be made for such continuous and accumulative burdens over the period of time between assessment and harvest.

FACTORS TO BE CONSIDERED IN VALUATION OF TIMBERLANDS

RCW 84.40.034

In determining the true and fair value in money of timberlands, sales prices, or values based upon immediate harvesting, however ascertained, shall be adjusted to give full consideration and effect to, and make appropriate allowance for, the following factors:

(1) Forest land quality, which shall be determined by analysis of existing timber stands, if present, of soil quality and of other generally accepted indicators.

(2) Age and density of timber stand.

(3) Species of timber.

(4) Quality of timber, which shall be determined by analysis of the percentages of the various log grades that will be recovered, such grades to be determined by references to generally accepted log grade rules.

(5) Harvesting costs which will be incurred in converting the timber to marketable products, as affected by topography, distance from roads, distance from markets, harvesting methods and volume and size of timber.

(6) Accumulative burdens which will be in-

curred during the period of time between the date of assessment and the probable date of harvesting. The allowance made for such burdens shall include full and adequate provisions for each of the following elements:

(a) The current rate of return obtainable on long-term, risk-free investments.

(b) The risks of loss due to fire, insects, disease and storms.

(c) Property taxes.

(d) Other carrying charges, which shall include, but not be limited to, costs of protection, regeneration, administration and management.

The period of time between the date of assessment and the probable date of harvesting shall be ascertained by the rate of harvesting in the area and other relevant factors. For the purposes hereof, the area considered may be county-wide and include all the timberlands in the county but shall not be smaller than the individual owner's tract of timberlands in the county.

TIMBER APPRAISAL MANUAL

RCW 84.40.035

The timber appraisal manual heretofore prepared and published pursuant to chapter 20, Laws of 1951 second extraordinary session shall be revised and updated by seven county assessors with the advice of the state tax commission and shall thereafter be revised and updated at least once every four years. The seven assessors shall be selected by the executive board of the Washington state association of county assessors as follows: Two members shall be from the western district of the association of county assessors; two members from the Puget Sound district; one member from the central district; one member from the eastern district; and the duly elected and acting president of the association. The districts herein specified shall be designated in the bylaws of the association adopted in September, 1961. The department of natural resources shall aid and assist in the preparation of the manual. The aforementioned parties shall meet within thirty days of June 13, 1963 and shall revise and update the timber appraisal manual. The revised and updated manual shall be delivered to the tax commission on or before January 1, 1964. The tax commission shall reproduce the manual in suitable form and furnish two copies free of charge to each county assessor prior to March 15, 1964, and shall furnish the manual to others upon request at a price of five dollars per copy. The purposes of revising and updating this manual shall be

solely in accordance with RCW 84.40.031 through 84.40.035 and no other.

The State Tax Commission in 1964 adopted and recommended to western Washington assessors specifications for use in their timber appraisal programs.¹ The table of contents for this publication indicates its breadth of coverage and is reproduced below.

Section

- I Introduction
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The Timber and Timberland Appraisal Manual prepared for the State Tax Commission in

¹ Advisory Specifications for County Forest Inventories for Property Tax Purposes, western Washington, State Tax Commission 23 pp., 1964. Appendixes.

1952 by consulting foresters and revised in 1956 by the Commission was further revised in 1963 by a committee of the State Association of County Assessors.² The purpose of the Manual is to provide a simplified guide for determining fair market value of forest land and timber taking into consideration such items as

² Appraisal Manual for Timber and Timberland. State Tax Commission, 50 pp. 1963.

forest land quality, timber quality and species, logging costs, time of cutting and uninsurable risks. The Manual contains separate sections for western and eastern Washington, suggestions for improvement of inventory procedures including volume tables and discussion of log grades, and attorney general's opinions. The following tables from the Manual are reproduced as examples.

Table I-W

**FOREST LAND QUALITY
WESTERN WASHINGTON**

Forest land quality class	Age of trees in years	Average height of dominant and codominant trees (in feet)		General description
		All Douglas-fir types	Coastal hemlock and spruce types	
GOOD Site Index 170 and Over	10	10' and over	10' and over	Usually consists of bottom lands, lower slopes and coves. Deep, rich soil. Moist condition. Use this class when 60% or more of the tract area meets specifications and most of remainder is in Average Class.
	20	45' and over	35' and over	
	30	80' and over	65' and over	
	40	100' and over	90' and over	
	50	120' and over	110' and over	
	60	130' and over	125' and over	
	70	145' and over	140' and over	
	80	155' and over	150' and over	
	90	165' and over	160' and over	
	100	170' and over	170' and over	
	Old Growth	225' and over	190' and over	
AVERAGE Site Index 120 to 170	10	5' to 10'	5' to 10'	Usually consists of middle and upper slopes. Medium to shallow soil. Moderate moisture condition. 60% or more of area in this class and better.
	20	30' to 45'	25' to 35'	
	30	55' to 80'	45' to 65'	
	40	70' to 100'	65' to 90'	
	50	80' to 120'	75' to 110'	
	60	90' to 130'	90' to 125'	
	70	100' to 145'	100' to 140'	
	80	110' to 155'	105' to 150'	
	90	115' to 165'	110' to 160'	
	100	120' to 170'	120' to 170'	
	Old Growth	150' to 225'	125' to 190'	
POOR Under Site Index 120	10	Under 5'	Under 5'	Consists of gravel flats, rocky slopes and shallow, poor soil types with dry moisture condition. 50% or more of area in this class.
	20	Under 30'	Under 25'	
	30	Under 55'	Under 45'	
	40	Under 70'	Under 65'	
	50	Under 80'	Under 75'	
	60	Under 90'	Under 90'	
	70	Under 100'	Under 100'	
	80	Under 110'	Under 105'	
	90	Under 115'	Under 110'	
	100	Under 120'	Under 120'	
	Old Growth	Under 150'	Under 125'	

Revised January, 1956.

Table II-W
FOREST LAND ACCESS AND TOPOGRAPHY
WESTERN WASHINGTON

<i>Access and topography</i>	<i>Road development characteristics to tract</i>	<i>Topography on tract</i>	<i>Distance from log market</i>	<i>Total grade in class*</i>
FAVORABLE	Grade 1 Tract within 1 mile of usable road. Easy road construction. No rock outcrops or swamp barriers	Grade 1 Flat to gentle slopes generally under 40%. No rock outcrops or swamps. Good tractor logging conditions.	Grade 1 Less than 15 miles	3 and 4
AVERAGE	Grade 2 Tract within 3 miles of usable road. No difficult road problems. Average construction.	Grade 2 Variable slopes under 60%. Some rock outcrop or swampy ground. Average logging conditions.	Grade 2 15 to 50 miles	5, 6 and 7
DIFFICULT	Grade 3 Tract over 3 miles from usable road. Also includes tracts closer to road but with difficult construction problems such as rock or water barriers and rough terrain.	Grade 3 Rough, broken ground. Steep Slopes. Numerous rock outcrops and bluffs or other features which make logging difficult.	Grade 3 Over 50 miles	8 and 9

*Total grade in class is arrived at by adding any combination of rating of road development, topography on tract, and distance from log market.

Table III-W
FOREST LAND APPRAISAL GUIDE
BARE LAND VALUES*—WESTERN
WASHINGTON

<i>Forest land quality</i> ¹	<i>Accessibility and topography</i> ²	<i>100% fair market value of bare land in dollars per acre</i>
GOOD	Favorable	\$25.00
	Average	20.00
	Difficult	12.50
AVERAGE	Favorable	20.00
	Average	15.00
	Difficult	7.50
POOR	Favorable	12.50
	Average	7.50
	Difficult	5.00

* Including land with trees generally 1-10 years of age.

¹ Based on Table I-W.

² Based on Table II-W.

Revised December 5, 1963.

Table IV-W
IMMATURE CONIFER TIMBER APPRAISAL GUIDE—WESTERN WASHINGTON

Age 10-40 Years—All Species—Trees Generally Under 12" D.B.H.

Land quality ¹	Access and topography ²	Advisory market values in dollars per acre								
		Age 31 to 40 years			Age 21 to 30 years			Age 11 to 20 years		
		70%+*	40-70%*	10-40%*	70%+*	40-70%*	10-40%*	70%+*	40-70%*	10-40%*
GOOD	Favorable	\$105.00	\$68.00	\$29.00	\$62.00	\$43.00	\$22.00	\$40.00	\$32.00	\$14.00
	Average	72.00	47.00	18.00	40.00	29.00	14.00	25.00	18.00	9.00
	Difficult	40.00	18.00	11.00	22.00	14.00	7.00	14.00	11.00	5.00
AVERAGE	Favorable	57.00	32.00	18.00	32.00	25.00	13.00	22.00	18.00	11.00
	Average	40.00	22.00	11.00	22.00	18.00	11.00	14.00	11.00	7.00
	Difficult	25.00	14.00	7.00	14.00	9.00	5.00	9.00	7.00	5.00
POOR	Favorable	14.00	11.00	7.00	11.00	7.00	5.00	7.00	5.00	3.00
	Average	11.00	7.00	5.00	7.00	5.00	3.00	5.00	3.00	2.00
	Difficult	7.00	5.00	3.00	5.00	3.00	2.00	3.00	2.00	2.00

¹ Based on Table I-W.

² Based on Table II-W.

* Stocking indicated by per cent of tract area covered by trees of commercially valuable coniferous species which are generally spaced not over 10 feet apart and are generally well formed and healthy.

Revised December 2, 1965.

Table V-W
TIMBER QUALITY—WESTERN WASHINGTON

Mature Douglas Fir Timber—Over 100 Years Age—Other Species—Merchantable Timber

Timber quality class	Timber species	Log grade specifications	Average tree description
GOOD	Douglas Fir, old growth (Includes Yellow Fir, Bastard Fir and large Red Fir)	40% peeler and better	Over 36" DBH and 60 ft. surface clear
	Cedar Spruce and Noble Fir White Pine	20% #1 lumber grade and better 35% peeler and better 15% peeler and better	Over 32" DBH and 50 ft. surface clear
	Hemlock, White Fir and miscellaneous species	25% #1 saw and peeler and better	Over 30" DBH and 50 ft. surface clear
AVERAGE	Douglas Fir, old growth (Includes Yellow Fir, Bastard Fir and large Red Fir)	15-39% peeler	Over 30" DBH and 40 ft. surface clear
	Cedar Spruce and Noble Fir White Pine	10-20% #1 lumber grade 15-35% peeler 5-15% peeler	Over 26" DBH and 30 ft. surface clear
	Hemlock, White Fir and miscellaneous species	5-25% #1 saw and peeler	Over 24" DBH and 30 ft. surface clear
POOR	Douglas Fir, old growth (Includes Yellow Fir, Bastard Fir and large Red Fir)	Under 15% peeler	Less than average
	Cedar Spruce and Noble Fir White Pine	Under 10% #1 lumber grade Under 15% peeler Under 5% peeler	Less than average
	Hemlock, White Fir and miscellaneous species	Under 5% #1 saw and peeler	Less than average

DBH—Diameter Breast High

Table VI-W

TIMBER QUALITY—WESTERN WASHINGTON

Immature Douglas Fir Timber—Under 100 Years Age—Over 12" D.B.H.

<i>Timber quality class</i>	<i>Tree and stand characteristics</i>
GOOD	Trees well formed, without injuries from fire or other cause, practically free of rot. Natural pruning good for age of stand. Stand generally uniform and even-aged and on good to average land class. <i>Douglas Fir</i> would have good poles and piling with a high proportion of peelable blocks (over 18" diameter) in the larger trees. Sawlogs would average 50% or more #2 second growth grade.
AVERAGE	Trees generally well formed but with normal amount of defect and injury from fire, rot and other causes. Pruning fair to good for age of stand but with tendency to limbiness in younger aged trees. Stand uniform to scattered clumps, even and mixed ages. On average to good quality forest land. <i>Douglas Fir</i> would have scattered poles and piling, a few peelable blocks (over 18" diameter) in the larger trees and sawlogs would run 25% to 50% #2 grade.
POOR	Unusual amount of deformity or injury in stand. Rot common. Trees limby. Mixed ages. Stand scattered. Logs, poles and piling of low grade.

Revised December 5, 1963.

Table VII-W

LOGGING CLASSIFICATION

Merchantable Timber—Western Washington

<i>Logging class</i>	<i>Logging cost elements and cost per 1,000 board feet</i>			
	<i>Road development</i>	<i>Direct logging</i>	<i>Log haul to market</i>	<i>Total cost</i>
FAVORABLE	Under \$5.00 Minimum road development	Under \$15.00 Usually tractor logging. Flat to gentle topography	Under \$10.00 Less than 15 miles	Under \$30.00
AVERAGE	\$5.00 to \$7.00 Average road development	\$15.00 to \$20.00 Cable or tractor logging. Variable slopes under 50%	\$10.00 to \$13.00 15 to 50 miles	\$30.00 to \$40.00
DIFFICULT	Over \$7.00 Unusual road development	Over \$20.00 Cable logging, steep, broken, rough topography. Over 50% slopes.	Over \$13.00 Over 50 miles	\$40.00 to \$50.00

See explanation (to use of stumpage value tables) on Page 4.
Revised December 5, 1963.

Table VIII-W

MERCHANTABLE TIMBER APPRAISAL GUIDE—WESTERN WASHINGTON

“Retail Values”

Period of Cutting 0–3 years from Date of Assessment

Timber quality ¹	Logging class ²	Stumpage value in dollars per 1,000 board feet (100% fair market value)			
		Douglas-fir		Cedar, Sitka spruce, white pine, and noble fir	Hemlock, white fir, and other species
		Mature timber over 100 yr. age	Immature timber under 100 yr. age	Merchantable timber	Merchantable timber
GOOD	Favorable	\$48.50	\$25.00	\$22.50	\$24.00
	Average	38.50	15.00	12.50	14.00
	Difficult	28.50	5.00	2.50	4.00
AVERAGE	Favorable	37.50	20.00	18.50	20.00
	Average	27.50	10.00	8.50	10.00
	Difficult	17.50	3.00	1.00	2.00
POOR	Favorable	27.50	16.00	15.50	14.00
	Average	17.50	6.00	5.50	4.00
	Difficult	7.50	1.00	1.00	1.00

¹ Based on Tables V-W and VI-W.

² Based on Table VII-W.

Revised December 5, 1963.

Table IX-W

MERCHANTABLE TIMBER APPRAISAL GUIDE—WESTERN WASHINGTON

“Wholesale Values”

Period of cutting 4 to 10 Years from Date of Assessment

Timber quality ¹	Logging class ²	Stumpage value in dollars per 1,000 board feet (100% fair market value)			
		Douglas-fir		Cedar, Sitka spruce, white pine, and noble fir	Hemlock, white fir, and other species
		Mature timber over 100 yr. age	Immature timber under 100 yr. age	Merchantable timber	Merchantable timber
GOOD	Favorable	\$24.00	\$15.00	\$11.00	\$21.00
	Average	19.00	9.00	6.00	7.00
	Difficult	14.00	3.00	1.00	2.00
AVERAGE	Favorable	19.00	12.00	9.00	10.00
	Average	14.00	6.00	4.00	5.00
	Difficult	9.00	2.00	1.00	1.00
POOR	Favorable	14.00	9.50	8.00	7.00
	Average	9.00	3.50	3.00	2.00
	Difficult	4.00	1.00	1.00	1.00

¹ Based on Tables V-W and VI-W.

² Based on Table VII-W.

Revised December 5, 1963.

Table XII-W

MERCHANTABLE TIMBER APPRAISAL GUIDE—WESTERN WASHINGTON

"Wholesale Values"

Period of Cutting Over 30 Years from Date of Assessment

Timber quality ¹	Logging class ²	Stumpage value in dollars per 1,000 board feet (100% fair market value)			
		Douglas-fir		Cedar, Sitka spruce, white pine, and noble fir	Hemlock, white fir, and other species
		Mature timber over 100 yr. age	Immature timber under 100 yr. age	Merchantable timber	Merchantable timber
GOOD	Favorable	\$7.50	\$6.50	\$3.50	\$3.50
	Average	6.00	4.00	2.00	2.00
	Difficult	4.50	1.50	1.00	1.00
AVERAGE	Favorable	5.50	5.00	3.00	3.00
	Average	4.00	2.50	1.50	1.50
	Difficult	2.50	1.00	1.00	1.00
POOR	Favorable	4.00	4.00	2.50	2.00
	Average	2.50	1.50	1.00	1.00
	Difficult	1.00	1.00	1.00	1.00

¹ Based on Tables V-W and VI-W.² Based on Table VII-W.

Revised December 5, 1963.

APPRAISAL OF HARDWOODS— IMMATURE AND MATURE

NOTE: Attention is directed to the definition of timberland on page 4 of this Manual.

REMARKS

1. Because of the relatively narrow range of values indicated for hardwood lands and timber, it is felt the number of variables applicable to the table of values should be kept to a minimum. Broader age grouping has also been employed. Forty years of age has been used as the break-off point between "immature" and "mature" hardwoods. This age may vary in different Counties and within each County. In the valuing of a hardwood tract, the County Forester will use his best judgment in determining when to depart from the "immature" schedule and commence the use of the "mature" schedule.
2. Immature forest land, primarily hardwood in content, so located because of terrain or distance, as to preclude its profitable holding and ultimate conversion to logs or cordwood, shall be treated as poorly stocked or non-stocked coniferous forestland, with appropriate land quality and logging classification factors.

3. Sawlog size hardwoods which cannot be economically logged by virtue of inaccessible terrain, or distance to market, or very poor quality timber, has no value, and where this type of timber occurs, the land only will be valued.
4. Hardwoods include alder and cottonwood only. Definition of variables as used in the Hardwood Appraisal Guides.

LOGGING CLASS AND ACCESSIBILITY

- Favorable* Located within 25 miles of a hardwood processing plant* and generally 600 feet from usable road. 1965 logging costs average \$25/M.
- Average* Located within 25 to 50 miles of a hardwood processing plant* and generally within 600 to 1,000 feet of usable road. Logging costs average \$30/Mbf.
- Poor* Generally over 1,000 feet from usable road. Logging costs average \$35/Mbf.

* Refers to stationary type plants.

December 2, 1965

TIMBER QUALITY

- Good* Hardwoods: Stands average over 45% sawlogs.

Average Hardwoods: Stands average 35% sawlogs.
Poor Hardwoods: Stands average under 25% sawlogs.

Table XIII-W

IMMATURE HARDWOOD APPRAISAL GUIDE

Logging class and access	100% fair market value in dollars per acre ¹			
	Age 21-30 stocking		Age 31-40 stocking	
	Good	Medium	Good	Medium
FAVORABLE-----	\$15.00	\$10.00	\$35.00	\$25.00
AVERAGE-----	10.00	5.00	25.00	15.00
POOR-----	5.00	3.00	15.00	10.00

¹ Refer to Table III-W for land values.

Table XIV-W

MATURE HARDWOOD APPRAISAL GUIDE

Retail Values

Logging class and access	100% fair market value in dollars per M bd. ft.		
	Hardwoods timber quality		
	Good	Average	Poor
FAVORABLE-----	\$14.00	\$12.00	\$ *
AVERAGE-----	9.00	7.00	4.00
POOR-----	4.00	2.00	1.00

*Not applicable to entirely pulp stands.
 For wholesale rates apply the percentages as outlined for mature timber on page 40 of the State Timber & Timber Land Appraisal manual.
 December 2, 1965.—as revised 4-18-66.

WEST VIRGINIA

"All property must be classified as of the first day of the taxable year as follows:

Class I shall include all tangible personal property employed exclusively in agriculture . . .

Class II shall include . . . all farms, including land used for horticulture and grazing, occupied and cultivated by their owners or bona fide tenants;

Class III shall include all real and personal property situated outside of municipalities, exclusive of Classes I and II property; . . .

Class IV shall include all real and personal property situated outside of municipalities, exclusive of Classes I and II property.

"For the purpose of giving effect to the tax limitation amendment, particularly with respect to the classification of property, the statute laws . . . are to be interpreted in accordance with the following definitions . . . :

"Farm" shall mean a tract or contiguous tracts of land used for agriculture, horticulture or grazing.

"Occupied and cultivated" shall mean subjected as a unit to farm purposes, whether used for habitation or not, and although parts may be lying fallow, in timber or in waste lands."

"Generally, some timber lands used in con-

nection with a farm may be entitled to a preferred classification, but large tracts of cutover land and timber lands not used in connection with a farm, are not entitled to the preferred classification." ¹ (pp. 39, 40)

Guide for West Virginia Assessors, State Tax Commissioner, 1958.

If timber is in a tract of sufficient size to have commercial value it is classified as Class III property. Some timberlands used in connection with farming are classified as Class II property.

Tracts are considered as within the commercial timber classification if they will cut out 3,000 board feet or more per acre with trees measuring 12 inches or more at a point 12 inches above the ground on the high side. The assessors have been advised to value standing timber at its true and actual value per thousand board feet. Major operators are requested to submit annual depletion reports to the assessor in order that the valuation can be accurately adjusted each assessment year.

Communication from Assessment Equalization Division, State Tax Commissioner's Office. Jan. 5, 1966.

¹ Under the Tax Limitation Amendment to the State Constitution adopted in 1932, maximum rates of levies per \$100 valuation apply as follows: Class I 50 cents, Class II \$1.00, Class III \$1.50, Class IV \$2.00.

WISCONSIN

Real estate, how valued. (1) Real property shall be valued by the assessor from actual view or from the best information that the assessor can practicably obtain, at the full value which could ordinarily be obtained therefore at private sale. In determining the value the assessor shall consider, as to each piece, its advantage or disadvantage of location, quality of soil, quantity of standing timber . . .

“(b) In towns, he shall segregate into the following classes on the basis of use and set down separately in proper columns the acreage and the value of the parts of land, exclusive of improvements, and the improvements which fall within each class:

- A. Residential
- B. Mercantile
- C. Manufacturing
- D. Agricultural
- E. Swamp, or waste
- F.1 Productive forest land
- F.2 Nonproductive forest land

“(c) For the purpose of this subsection “swamp or waste” means bog, marsh, lowland brush or other nonproductive lands not otherwise classified under this subsection; “productive forest land” means land which is producing or is capable of producing commercial forest products and is not otherwise classified under this subsection; “nonproductive forest land” means land which because of soil or site conditions is not producing or is not capable of producing commercial forest products and which is not otherwise classified under this subsection.”

Wisconsin Statutes Annotated
Sec. 70.32.

The following material is taken from the Property Assessment Manual for Wisconsin Assessors, v. I, Wisconsin Dep. of Taxation 1965.

RESIDUAL LANDS

DEFINITION

Residual lands are defined as those with use classifications other than Residential (Class A), Mercantile (Class B), Manufacturing (Class C) or Agricultural (Class D) and which are identified in the assessment roll as Swamp or Waste (Class E), Productive Forest Land (Class F₁), and Non-Productive Forest Land (Class F₂).

Class E—Swamp or waste land is further defined by statute to include bog, marsh, lowland

brush or other non-productive lands not otherwise classified.

Productive forest land (F₁) is defined as land which is producing or is capable of producing commercial forest products and is not otherwise classified. Non-productive forest land (F₂) includes land which because of soil or site conditions is not producing or is not capable of producing commercial forest products and which is not otherwise classified.

ASSESSMENT OF SWAMP OR WASTE

Swamp lands command a wide range of prices because of the varied use being made of this class of property. When such lands serve as a useful adjunct to a commercial-cranberry bog, for example, they are much more valuable than similar lands not so located. Other swamp lands throughout the state harbor wild life and have a recreational potential which has been recognized by state and federal conservation agencies who have acquired much of this type of acreage in recent years. Although sales to the latter do not necessarily reflect ordinary market value they should alert the local assessor to the potential value of similar lands. Certain swamp lands have a potential value for muck farming where the muck is of sufficient depth and the area can be successfully drained. In a few areas of central Wisconsin certain swamp lands produce a species of moss which grows in the wild state, is harvested and has a commercial use. This crop is very slow growing, is not cultivated and is not regarded as an agricultural pursuit.

Much of Wisconsin's swamp acreage, particularly in the northern two-thirds of the state, has little value and is rarely sold as such, so that the market value of such acreage is difficult to establish. When sold it is usually in conjunction with other lands of a productive nature. This requires careful analysis of such sales by the assessor so that proper weight can be given the various component lands in such sales.

A small amount of the total Class E acreage of the state is regarded as waste land. Such lands are barren, inaccessible and totally non-productive or useful for any present purpose or need. Such lands should, however, carry a nominal value.

ASSESSMENT OF FOREST LANDS

Although the greatest portion of Wisconsin

forest acreage falls within the productive classification (F₁), there are isolated areas, particularly in the far northern counties where distance from the available market and local topography make the harvesting of such forest products unprofitable. Under such circumstances the assessor should regard such acreage as non-productive (F₂) and adjust his values accordingly.

The assessment of forest lands requires as much care and knowledge as do the other classes of property and to cope with this challenge the assessor should equip himself with a knowledge of species and kinds of forest products harvested in his taxing jurisdiction. The amount of forest products on a given description can only be ascertained through inspection by the assessor or from accurate cruise reports. Where such cruise reports are not available the assessor should resort to volume tables to estimate the number of board feet of saw logs or cords of pulpwood and other products on a given description. Stumpage values are made available to assessors each year by the Supervisors of Assessments based on information obtained from the Wisconsin Conservation Department and University Extension Service. Such pricing guides, with necessary area adjustments for transportation and other unusual factors, are reliable guides for establishing the market value of forest land.

The first step in valuing forest land is to estimate the value of the bare land. To this bare land value is added the stumpage value of the trees thereon and this combined value becomes the net value of the forest land.

Bare land values are best found by analyzing sales of recently clear cut or cut-over land sold for forest plantation purposes. Lands purchased for recreational or scenic purposes introduce an additional dimension of value which must eventually be recognized, but which is best not considered in estimating bare land value.

The second step is to estimate the stumpage value of the forest growth as found. The essential information needed for this purpose is:

1. Kind and amount of merchantable forest products found on the land.
2. Respective unit market prices of the forest products (From Wisconsin Conservation Department and University Extension Service—Published annually).

The kind and amount of merchantable forest products are most accurately determined from reports of skilled timber cruisers. Satisfactory results have also been obtained through the interpretation of special aerial photography by

highly skilled specialists. Lacking this information the assessor's next best alternative is to establish the kind of forest product by his own visual inspection and to estimate the amount by making use of the volume table found on page 46.

USE OF VOLUME TABLE

In order to use the volume table the assessor must first establish the class of "stocking" or tree stem density. Since tree growth does not always uniformly cover the area of land and since "stocking" is also dependent upon the size and diameter of the trees, the following tables and pictures are provided as guide lines for the assessor.

TABLE 1

	Stocking Class or Density		
	Good	Medium	Poor
Area Covered by Growing Trees-----	69-100%	40-69%	10-39%

TABLE 2

Size Class	Stocking Class or Density		
	Good	Medium	Poor
	(Number of trees per acre)		
Seedling-Sapling 0-5" @ 4½'-----	1400+	800-1400	200-800
Pole Timber 5-11" @ 4½'-----	100-330	60-325	25-225
Small Saw Timber 11-15" @ 4½'-----	50-175	30-170	15-85
Large Saw Timber 15" + @ 4½'-----	60-80	35-65	10-35

SUGGESTED STUMPAGE VALUES

The following values have been determined for the purpose of computing severance taxes on timber cut from forest croplands and are in effect from September 1, 1964 to August 31, 1965.

LOGS (Stumpage per M feet board measure)

Yellow birch -----	\$44.00
Basswood, hard maple -----	26.00
White pine -----	22.00
Norway pine -----	20.00
Red or white oak -----	14.00
Spruce, white birch, hemlock, soft maple -----	13.00
Black or white ash -----	12.00
Jack pine, tamarack, soft or rock elm, cedar, oak, (species other than red or white) -----	10.00
Aspen, all other species -----	6.00

CORD PRODUCTS² (Stumpage per piled cord, 4' x 4' x 100" or 4' x 8' x 4')

Spruce -----	7.50
Jack pine -----	5.80
Hemlock -----	4.00
Balsam -----	3.70
Norway pine -----	3.50
Tamarack -----	3.20
White pine -----	2.70
Aspen, white birch -----	1.80
Mixed hardwoods, cedar -----	1.60
Oak ("scrub") -----	1.20
Chemical wood -----	} per cord .75
	} per ton .30
Fuelwood, green, all species -----	.50
Excelsior bolts (Stumpage per piled cord, 4' x 8' x 55") -----	2.00

PIECE PRODUCTS (Stumpage per piece)

Posts and Poles	
7 and 8 ft. -----	.03
10 and 12 ft. -----	.06
14 and 16 ft. -----	.12
18 and 20 ft. -----	.25
25 ft. -----	.50
30 ft. and over -----	.80
Christmas Trees	
Black spruce -----	.30
All other species -----	.45

It will usually be necessary to view or sample several areas within a forty acre tract in order to determine whether the stand is uniform. If the stand is not uniform, an average estimate for the entire forty acre tract can be made by an actual count of trees within several circles

¹ These prices are conservative in relation to sales of record.

² These values based on rough products. When reporting peeled cordwood volume, add the following percentages to convert to rough cord equivalent:

12½ percent for hand peeled
25 percent for machine peeled

with a radius of 1 rod (16½ feet). A count within such a circle multiplied by 50 will provide an estimate of size and stocking per acre. The average of several counts within test circles strategically selected will provide an average estimate for the tract.

A more rapid method for obtaining the information on volume of growing forest products on a given description than the method described above was devised in 1948 and is known as the Bitterlich System and is referred to as the point sampling method of measuring basal area. This method requires the use of an angle-gauge or a wedge prism with which the cruiser counts the number of trees around a sampling point whose diameters at breast height appear larger than the crossarm of the angle-gauge. When using a wedge prism, the cruiser counts the number of trees whose stem sections at breast height when viewed through the prism do not appear to be detached from the main stem. The tree count is multiplied by a predetermined factor and the basal area per acre is obtained around a given sampling point. Since there is a definite correlation between tree basal area and tree volume, timber estimates may be obtained by counting trees of merchantable height classes or by counting and recording the total number of logs or pulpwood bolts. This procedure must be repeated in a number of areas for reliable results.

Further information on the use of the above method for timber cruising may be obtained from technical bulletins provided by the Wisconsin Conservation Department.

After the size class (diameter range) and the stocking class have been established the number of board feet or cords of the various forest products can be read from the volume table below. The column headed "Volume Range" provides for the variation of tree height and tree diameter within each size class. This variation also accounts for the great degree of overlapping in the number of trees per acre in the pole timber and small saw timber size class in Table 2. Generally, if the average diameter of the tree trunks (measured at breast height or 4½ ft. from the ground) is at the lower end of the diameter range, the low volume line should be used in the volume table. However, the height of the tree also effects the volume range and only experience will sharpen the assessor's judgment in this respect.

As a further guide to the assessor, it is worth noting that except for Menomonee County there is very little large saw timber found in Wisconsin.

The number of cords or board feet of each forest product multiplied by the unit stumpage values yields the additional value that must be added to the bare land value.

The accompanying appraisal illustrations are

given to suggest a practical way to summarize the field appraisal of a forty acre description. All the basic information is shown and may be set up in such a manner as to provide a permanent assessment record.

TABLE 3.—Volume per acre by stand size and stocking class

Size class	Diameter range	Volume range	Stocking					
			Good		Medium		Poor	
	Inches		Bd. ft.	Cords	Bd. ft.	Cords	Bd. ft.	Cords
Seedlings	0-1		0	0	0	0	0	0
Saplings	1-5	Low	0	0	0	0	0	0
		Average	0	2.5	0	2.2	0	1.5
		High	0	2.9	0	2.8	0	2.0
Pole timber	5-9	Low	700	13.0	500	7.0	200	3.0
		Average	1,400	20.0	1,000	12.1	990	5.2
		High	1,500	24.0	1,500	12.9	1,200	7.0
Small saw timber	9-15	Low	6,000	18.0	3,000	13.0	1,500	5.0
		Average	7,700	22.9	4,950	17.6	2,800	10.9
		High	10,000	26.0	6,000	20.0	3,000	13.0
Large saw timber	15-	Low	10,000	24.0	5,000	17.0	1,500	6.0
		Average	14,850	33.5	8,100	21.2	4,140	12.1
		High	18,000	40.0	10,000	26.0	5,000	16.0

Table compiled by Paul C. Guilkey, Research Forester, U.S.F.S.

Volume I 1-65

APPRAISAL ILLUSTRATIONS

40 Acres Aspen 5"-9" Medium Stocking High Volume	}	Value of Land: 40 Ac @ \$3.00	\$ 120
		Value of Forest Products: 40 Ac @ 13 Cords/Ac = 520 Cords 520 Cords @ \$2.00 =	1,040
		Value of Forest Land (F ₂) =	\$1,160
30 Acres Norway Pine 9"-15" Medium Stocking Low Volume	}	Value of Land: 40 Ac @ \$5.00 =	\$ 200
		Value of Forest Products: Norway Pine: 30 Ac @ 3M Bd. Ft. = 90 M Bd. Ft. 90M Bd. Ft. @ \$20.00 =	1,800
10 Acres White Pine 9"-15" Poor Stocking Low Volume	}	White Pine: 10 Ac @ 1.5 M Bd. Ft. = 15 M Bd. Ft. 15 M Bd. Ft. @ \$22.00 =	330
		Value of Forest Land (F ₂) =	\$2,330
40 Acres Aspen 1"-5" Good Stocking Low Volume	}	Value of Land: 40 Ac @ \$4.00 =	\$ 160
		Value of Forest Products: No Merchantable Products =	None
		Value of Forest Land =	\$ 160

Note: The above values and unit prices are for illustration only and are not meant to be a standard or average value.

The above examples illustrate the valuation process for forest lands where the market value is influenced by the forest products on the land and the capability of producing such forest products. Where market value is also influenced by recreational or scenic factors such influence must be carefully ascertained and recognized by the assessor.

If forest lands sought for recreational and

scenic uses brings a higher price than similar forest land similarly located; and if a recognizable pattern or trend for such uses has been established, the assessor has no alternative but to recognize the higher value in making his assessment. If a problem similar to that encountered in the assessment of urban agricultural land is present, the same discounting process described there may be applied to forest lands which are located in a recreational area.

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