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To the Graduate Council:

I am submitting herewith a thesis written by John Lee Wells entitled "Economics of Timber Resource Availability in a Tennessee Timbershed." I have examined the final electronic copy of this thesis for form and content and recommend that it be accepted in partial fulfillment of the requirements for the degree of Master of Science, with a major in Forestry.

Garland Ray Wells, Major Professor

We have read this thesis and recommend its acceptance:

Charles L. Cleland, David M. Ostermeier

Accepted for the Council:
Carolyn R. Hodges

Vice Provost and Dean of the Graduate School

(Original signatures are on file with official student records.)

February 11, 1977

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I am submitting herewith a thesis written by John Lee Wells entitled "Economics of Timber Resource Availability in a Tennessee Timbershed." I recommend that it be accepted in partial fulfillment of the requirements for the degree of Master of Science, with a major in Forestry.

Garland Ray Wells

Garland Ray Wells, Major Professor

We have read this thesis
and recommend its acceptance:

Charles L. Cleland

David Ostermeier

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Thesis
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ECONOMICS OF TIMBER RESOURCE AVAILABILITY IN A TENNESSEE TIMBERSHED

A Thesis

Presented for the

Master of Science

Degree

The University of Tennessee, Knoxville

John Lee Wells

March 1977

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ABSTRACT

A study of an eleven-county Tennessee timbershed was conducted in order to: (1) estimate the proportion of the aggregate timber resource actually available for harvest; and (2) search out motives for withholding timber from the market from otherwise commercial forest lands, by United States Forest Service definitions.

The procedures used in meeting the objectives of the study involved the use of a stratified random sample of seventy-six private nonindustrial owners and personal interviews. Owners to be interviewed were selected from county tax roles on a stratified basis of size of forest acres owned. Timber volume and growth estimates were extrapolated from the Forest Service forest survey of Tennessee of 1970.

The major finding of the study was that 58.6 percent of the forest lands in the timbershed were estimated available for harvest in 1976. Expressed in terms of volume and growth, an estimated 1,029.2 million cubic feet of growing stock (or 37.0 million cubic feet growth on growing stock) and an estimated 2,800.3 million board feet (International 1/4-inch rule) of sawtimber (or 98.3 million board feet growth on sawtimber), was possibly available for harvest.

The motives for withholding timber from the market involved reasons which may be classified into three categories: financial, competing nontimber uses of the forest resource, and reasons that stem from past experiences and/or external influences. Financial reasons

restricting "willingness to sell" accounted for over one-half the reasons given for withholding timber from the market.

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CHAPTER I

INTRODUCTION

In the Midsouth, 72 percent of the commercial forest land is owned by private nonindustrial forest owners. This type of ownership controls 10.4 million acres or 81 percent of the commercial forest land in Tennessee (20).

The question of how to maintain a consistent and desirable flow of timber from nonindustrial owners is a perennial one. It is feared by forest industry that many of these lands will be "locked up" and unavailable for commercial uses. At the other extreme is the concern that timber within these ownership classes will be cut too heavily, at the expense of future requirements. There is a need to determine an estimate of the available consumable wood resource as contrasted to the net physical inventory of a given timbershed (15).

Morgan outlined three concepts of timber supply that are used today (19). The first concept involves net physical inventory; the second concept desirable cut;[1] and the third concept involves the economic supply. Using the economic supply concept to estimate the availability of the timber resource gives dramatic differences in supply estimates compared to the other two concepts. In general, the physical estimates are much larger than supply estimates from effective demand.

---

[1]Desirable is defined as removal of growth on inventory.

Examples of factors that may affect the economic supply of timber include: change in transportation costs, logging practices, competition of other land uses and motivation of forest owners.

As early as 1961, Duerr (3) recognized the peculiarities of the economics of timber resource availability when he stated:

> The brunt of the (forest supply) dilemma is likely to be borne by the exploitive class of small private forest holdings, the class widely viewed with alarm and called the crux of the forest problem in the United States.
>
> Many of us know of some forest locality where an industrial concern is busy repairing its own forest lands: cutting its growing stocks only lightly so as to let them build up. Meanwhile the concern is buying most of its wood raw material from nearby farmers and so making a heavy drain on the farm woods. In this locality, then, farm woodland exploitation is the means for industrial forest conservation. What a predicament if the farmers insisted on being more conservative! Just so, we should face a national predicament if all forest owners should become ardent conservationists at once, or if society should try to set very high goals for the future or should try to reach goals quickly.
>
> Hence the small, exploitively managed private forest holding is in a sense not a national problem in forest conservation, but a national instrument for forest conservation. All hail the little owner and his bad practices!

According to Kensiton (8), traditional forest research surveys have followed three lines of thought: management-status studies--inventory type, management-status; economic studies--with considerable emphasis on the owner; and nonforestry studies--dealing with the landowner as a person. Certainly the decisions of the owner condition, the availability of timber and all three types of surveys should be combined to estimate the economic supply of timber. For example, timber growth on ownerships where wood utilization is not an objective of the owner is in error since it is added to, rather than subtracted from

current physical supply estimates. The inflated results may seriously affect any conclusions concerning timber availability.

In trying to avoid some of the shortcomings of past studies, the objectives of this study were two-fold:

1. Estimate the proportion of the aggregate timber resource actually available for harvest.
2. Search out motives for withholding timber from the market from commercial lands.

Since the forest owner data were collected independently of the timber resource data, it was impossible to determine the interactions between owner behavior and motives and the proportion controlled of the timber supply. Some basic questions continue to remain unanswered. For example, do owners who are less willing to sell control more, less, or the same as timber owners more willing to sell? Answers to these questions can only be directed toward broad categories or groupings of forest owners such as farm versus nonfarm owners. This study points in the direction of what owner and ownership characteristics need to be measured in future resource surveys.

CHAPTER II

METHODS AND PROCEDURES

An ownership directory was compiled from state property tax records. From the directory a stratified random sample of seventy-six owners, based on forest size-classes was drawn. The sample was later weighted by statistical weights to make it representative of the timbershed population. A personal interview was conducted with each owner in which questions were asked in three areas: general information, experience with timber marketing, and forest practices. Data obtained from the interviews were analyzed using discriminate function analysis and Chi-square tests.

I. THE PRIVATE FOREST OWNER AND TIMBERLAND DIRECTORIES

To meet the objectives of the study, forest landowners had to be first identified. A comprehensive ownership list of all properties, 100 acres and up, for nine of the eleven counties of the study area was completed. Information contained in directory form included: county name, name of owner, address of the owner, map number, parcel number, total acres, and, for five counties, forest acres. This was accomplished by searching available property tax records in the eleven-county timbershed. A check with the State of Tennessee Board of Equalization revealed that Carroll, Henry, Hickman, Humphreys, and Stewart counties (see Figure 1) maintained their tax records on the computer system maintained

FIGURE 1. Eleven-county timbershed.

by the state office in Nashville. From these computer tapes a complete list of all owners who controlled at least 100 total acres was obtained. However, forest acreage estimates were not part of the computer system.

Dickson County had a private computer firm maintain its tax records. All attempts to obtain a copy of this tape failed. At the end of the study these records were being transferred to the state system.

Benton, Decatur, Houston, Montgomery, and Perry counties were not on a computer records system. Ownership lists of all owners who controlled 100 or more total acres were obtained manually by going through the files in the tax assessor offices. An added benefit, however, was the fact that all of the noncomputerized counties, except Montgomery, recorded and classified the acres of each parcel as forest, waste, crop, and residential.

Montgomery County presented a special problem. Because of the Fort Campbell Military Reservation, the county has experienced a high degree of urbanization. The property records were so voluminous it was determined that the time required to search through the records to obtain a complete ownership list could not be justified. However, a recent forest directory published by the Tennessee Division of Forestry gave only one forest ownership above 500 acres (26).

II. THE SAMPLE

Forest Ownership Size Classes

By using the ownership lists it was possible to develop a series of forest ownership size classes to use in the selection of persons who

would be interviewed. The size classes selected were as follows: 100 to 299 forest acres, 300 to 499 forest acres, 500 to 999 forest acres, and 1,000 forest acres and over.

A Stratified Random Sample

A stratified random sample was selected from each forest size class. A simple random sample was not used due to the large sample that would have been necessary to obtain a sufficient number of larger ownerships. This is because of the preponderance of owners in the smaller size classes.

In so far as possible, two primary and two alternates from each forest size class for each county were selected at random. Respondents in those counties where the forest acres were not known, were selected on the basis of total acres owned. The samples for Dickson and Montgomery counties were pulled directly from the tax records rather than from ownership lists. These were also based upon total acres. It should be noted at this point that after all the interviews had been completed, no one was interviewed who owned over 5,000 acres of forest in one tract. This was partially due to the fact that the individuals that owned the larger tracts had a smaller proportion of their land in forest than expected.

Statistical Weights

The use of the stratified random sample necessitated the use of statistical weights to make the sample representative of the population (see Table A-1, in Appendix A). Here again a problem arose. Even though complete lists of owners who control 100 acres and up existed,

there was no practical method completely free of sampling error to determine the amount of land controlled by those individuals who own less than 100 acres. Also, only four county lists noted the forest acres. This necessitated the estimation of forest acres for the other counties from the sample selected. Dickson and Montgomery counties compounded the problem as no ownership lists were developed for these counties. Dickson County was deemed typical of the timbershed, and the assumption was made that any weights applied to the nine counties for which data were available could be applied to Dickson County. Montgomery County, due to the influence of Fort Campbell, was atypical of the timbershed. There were no tracts in the county in the hands of private nonindustrial owners that reached 1,000 acres. The result was that the smaller classes were more predominate in Montgomery County than in the rest of the timbershed. When the public timberland was subtracted from the total timberland, that portion of Montgomery County that was in the hands of the private nonindustrial owner was very small when compared to the timbershed as a whole. A list of owners who owned 500 acres and up available through the State Division of Forestry (26) was used to identify the larger acreages in Dickson and Montgomery counties.

III. INTERVIEWS

After the sample was drawn, person to person interviews were conducted with the individuals selected in the sample. In all cases an attempt was made to interview the owner. When the owner was unavailable, the interview was conducted with the spouse, offspring, or an agent of the owner. In the event a primary respondent could not be interviewed, an alternate was contacted.

IV. QUESTIONNAIRE

A formal questionnaire was developed for the interviewers. A copy of the instrument is given in Appendix B.

Statistical Analysis

Data obtained from the interviews were analyzed using the Statistical Package for the Social Sciences (SPSS) (22) on an IBM 360 computer. Discriminate function analysis was used to classify "willingness to sell" attitudes of forest landowners with various ownership variables measured in the survey. Further analysis was made with the aid of Chi-square tests to test various owner and ownership variables related to "willingness to sell."

CHAPTER III

THE TIMBERSHED

I. OWNERSHIP PATTERN

Ownership Types

Within the timbershed four general ownership types were recognizable: public, forest industry, farming, and miscellaneous private (5). The latter two ownership types make up a group commonly called private, nonindustrial (see Table 1), since forest industry is shown as a separate ownership class.

TABLE 1. Area of Commercial Forest Land of an Eleven-County Tennessee Timbershed by Ownership Class, 1971.

Ownership Class	Thousand Acres
Forest industry	211.6
Public	176.2
Farmer	830.6
Miscellaneous private	694.8
TOTAL	1913.2

SOURCE: Arnold Hedlund and J. M. Earls. 1971. Forest statistics for Tennessee counties. United States Forest Service Resource Bulletin SO-32.

Public ownerships controlled 176.2 thousand acres of commercial forest land in the timbershed. The largest public ownerships included:

Fort Campbell Military Reservation, the Tennessee Valley Authority, Montgomery Bell State Park, Nathan Bedford Forest State Park, and the Tennessee National Wildlife Refuge. Forest industries controlled over 211.6 thousand acres of commercial forest land in the timbershed. The principal industries were the T. J. Moss Tie Company, Koppers Incorporated, and numerous smaller forest industries such as local sawmills. Private nonindustrial owners controlled 1,480.9 thousand acres of the 1,868.7 thousand acres of commercial forest land in the timbershed.

II. TRENDS IN FOREST LAND OWNERSHIP

Landuse Changes

Between 1961 and 1971 the total commercial forest acreage in the State of Tennessee decreased 5 percent (see Table 2). During the same period of time, commercial forest of the central and west central Tennessee decreased by 6 percent. All figures above were adjusted to reflect a continuing loss of 0.6 percent per year of commercial forest land. Most of the decrease was due to conversion of forest to pasture. Schallau (23) indicated that in Michigan losses in the economic supply of timber occurred due to the fragmentation of larger tracts into smaller units which are less economical to harvest. There was an indication that the same type fragmentation occurred in at least one county of the timbershed, Humphrey County, as studied by Meredith (18). This county is located near the center of the timbershed (see Figure 1, page 5).

TABLE 2. Commercial Forest Land in Tennessee in 1971 and Change Since 1961.

Region	Commercial Forest	Change Since Last Survey	Proportion of Region Forested[a]
	Thousand Acres	Percent	Percent
West	1,768.5	- 7	29
West Central	2,290.9	- 1	69
Central	2,276.3	-12	36
Plateau	3,077.0	- 3	70
East	3,407.1	- 2	54
All regions	12,819.8	- 5	49

[a]Total forest, including noncommercial, as a proportion of total area in the region.

SOURCE: Paul A. Murphy. 1972. Forest Resources of Tennessee. U. S. Forest Service, USDA Forest Service Resource Bulletin SO-35, 2.

Consolidation

Murphy (20) indicated that, state-wide, forest industries increased their holdings within the 1961 to 1971 time period 175,500 acres. Public ownership during the same period increased moderately. The largest single acquisition was by the Tennessee Valley Authority of 64,000 acres in the Land-Between-the-Lakes area which is located on the northern edge of the timbershed. Meredith (18) indicated that consolidation was minimal in Humphreys County from 1945 to 1975.

III. RESOURCE BASE[1]

Forest Lane Area

The eleven-county timbershed occupies 3,397 thousand acres, roughly 8 percent of the total land area of the State of Tennessee. Of this total, 1,913.2 acres were covered by commercial forest in 1971. Net annual growth totaled 79,676.6 thousand cubic feet for growing stock and 216,618.3 thousand board feet for sawtimber in 1971 (see Table A-2, Appendix A) (6).

Timber Volumes

Timber volumes for the timbershed exceeded 3,000 board feet per acre in 1971. The majority of the volume of sawtimber, 89 percent, was located in the private sector (see Table A-3, Appendix A). As a basis

---

[1]A special resource analysis for the timbershed was purchased from the U. S. Forest Service, Forest Resources Branch, Southern Forest Experiment Station, New Orleans. Data pertinent only to the eleven counties were pooled from the last statewide survey in 1970.

for comparison, commercial forests of Tennessee contained over 12 billion cubic feet of wood in 1971 (20).

Timber Availability

Timber availability is dependent upon two factors identified by Nelson and Stone (21): operability and owner objectives. Operability is composed of cost factors and market value factors. Cost factors include location, accessibility, timber quantity per tract, tract size, topography and terrain. Market value factors include tree size, quality, species, and usable length. Timber availability is also conditioned by owner objectives. Whenever the owner places more emphasis on nonmarket values, whether sentimental, aesthetic, or whatever, the timber is effectively unavailable until either the owner changes his attitudes towards selling timber or the property changes ownership. Findings of several studies verify this hypothesis. Holemo (7) found that in the Piedmont region of Georgia, 34 percent of the land that had merchantable timber was not offered on the market. Lawrence (14) reported that the differences in "willingness to sell" in the three regions of Florida were due to different objectives for land use and to varying degrees of awareness of timber value and its importance as a major component of the economy.

CHAPTER IV

THE FOREST OWNER

I. PERSONAL CHARACTERISTICS OF FOREST OWNERS[1]

Because of the attitudinal and objective limitations on supply, interviews of the seventy-six owners in the sample population of the timbershed measured and recorded several personal characteristics (see Table 3). All results are reported unweighted.

Sex

Almost three-fourths, 73.7 percent, of the sample owners were male. In 1965, a study by Sharp and Dotson in five Tennessee counties reported that 93 percent of all forest landowners were male, but this was not necessarily a random population (24).

Age

In the Tennessee timbershed, 28.9 percent of the sample were in their fifties and 23.7 percent were seventy years of age or older. This relative older age is in agreement with many other ownership studies in the eastern United States. For example, the 1965 Tennessee study found

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[1]Characteristics of the sample were weighed by size class to make them more representative of the population. Answers given by owners of size class 1 were multiplied by 1268, size class 2 by 205, size class 3 by 27, size class 4 by 10, and size class 5 by 8 (see Table A-1, Appendix A).

TABLE 3. Personal Characteristics of Forest Owners of the Tennessee Timbershed, 1976.

	Percent of Owners	
	Sample	Timbershed[a]
Sex		
Male	73.7	82.6
Female	26.3	17.4
Age		
Under 30	2.6	.1
30 - 39	3.9	1.5
40 - 49	21.1	13.3
50 - 59	28.9	45.7
60 - 69	17.1	15.4
70 and over	23.7	23.9
No response	2.6	.1
Number of dependents		
None	27.6	16.4
1	36.8	49.0
2 - 4	27.9	25.2
5 - 8	6.5	9.4
Educational attainment		
Less than high school	35.5	48.9
High school	14.5	12.8
Training beyond high school	50.0	38.3
Health		
Good	73.7	56.5
Fair	14.5	12.8
Poor	7.9	3.7
No response	1.8	.1
Income level		
$1000 - 4999	9.2	21.2
$5000 - 9999	25.0	25.5
$10000 and up	63.2	51.8
No response	2.6	1.5
Occupation		
Full-time farmer	28.9	34.4
Nonfarmer	71.1	65.6

[a]Estimated from sample weights.

that 27 percent of the owners were in their fifties and 31 percent were sixty or more (24).

Number of Dependents

Despite the age structure of the sample population, only 36.8 percent reported at least one dependent, not including the spouse. One respondent refused to devulge his number of dependents. Another respondent had eight dependents. This was the maximum number encountered.

Educational Level

Fifty percent of the sample had one year or more college. Included in the sample were two individuals with Ph.D.'s, a gentleman who received a Master's degree from The University of Tennessee in 1927, and one owner who stated that he "haint ever been to no school." A contrast would be the 1965 Tennessee study in which only 11 percent of the respondents indicated any educational training past high school (24).

Health

When the respondents were asked how they perceived their physical health, 73.7 percent of the sample indicated that they were in good health. Only 7.9 percent stated that they were in poor health.

Income Level

Only two individuals refused to give their income level in general terms. However, the levels of income measured were not as sensitive as had been expected. A problem arose in that the breakdown was not specific enough when concerned with individuals making over 10,000 dollars annually. For example, one man laughed when told the top

figure was 10,000 dollars up. He said that his income was well above the 10,000 dollar mark. Nearly two-thirds of the sample indicated that they made 10,000 dollars or more during the past year. The 1965 Tennessee study reported that in 1962 only 9 percent of the forest landowners had an income greater than 10,000 dollars (24).

Occupation

Current occupations of the sample were broken into seven categories: trades and labor, farming, housekeeping, mercantile, professional, retired, and other. The largest single group was the full-time farmers with 28.9 percent. The smallest group, 9.2 percent of the sample, was the trades and labor group. Sixteen individuals indicated that they were retired. Owners were classified, based on occupation, as either full-time farmers or "nonfarmers." Nearly one-third of the sample fell into the full-time farmer classification. When adjusted by the statistical weights to make the sample representative of the timbershed, the full-time farmer category rose to an estimated 34.4 percent. The rest of the population was classified as "nonfarmers."

II. SITUATIONAL FACTORS

In addition to the forest owner's personal characteristics, situational factors can be used to describe the owner (see Table A-4, Appendix A). Situational factors include distance of residence from forest tract,[2] legal form of ownership of property, how long the owner

[2]The influence of absentee landowners and timber availability was studied in detail in a companion thesis (see Wiggins, 1977).

has owned the property (tenure), and in the case of inherited property the number of generations the property has been in the same family.

Distance of Residence from Forest Tract

Fifty percent of the sample lived on the tract of land where the forest was located. Of those not living on the tract, nearly one-fourth of the sample owners, 22.3 percent (nearly half), lived within 10 miles of their forest tract. The mean distance from the tract, excluding those owners who lived on the same tract where the forest is located, was 35 miles.

Legal Form of Ownership

Slightly over three-fourths (76.3 percent) of the sample owners were individual owners. Another 13.2 percent held forest land in partnership with one or more persons. The rest of the sample owners' forest land was in incorporated farms, unsettled estates, and life estates.

Acquisition of Property

Nearly 70 percent of the sample purchased their land. Slightly less than one-fourth of the owners sampled inherited all of their property. The rest either obtained their property by a combination of purchase and inheritance or as a gift. One respondent refused to devulge how he obtained his property.

Tenure

The responses were distributed from one to eighty-two years with a concentration in the shorter periods of tenure. The modal response

was three years. Fifty-one percent of the owners sampled owned their property between eleven and thirty years.

Number of Generations in the Family

Of the 25 percent of the respondents who inherited part or all of their property, 52.6 percent of the properties had been in the same family for two generations. Nearly 31 percent and 15.8 percent of the inherited properties had been in the same families for three and four generations, respectively.

III. OWNERSHIP GOALS

Reasons for Purchase

Ownership goals included the reasons given for initial purchase of forest properties, reasons for holding property at the present time, future plans for disposition of the tract, and interest in long-term leasing of timberlands (see Table A-5, Appendix A). Of all respondents, 38.9 percent gave farming as the reason for the initial purchase of their property. Twenty-four percent of the owners purchased their land as an investment.

Reasons for Holding Property at Present Time

Possibly of more importance than the original reason for the purchase were the reasons given by respondents for holding their land at the time of the survey. Slightly over one-fourth, 27.6 percent, of the sample held onto their land in order to farm. Another 22.4 percent were holding their property as an investment.

Disposition of Property

At one time or another private property must change owners, usually either when the present owner decides to sell or when he dies and the property is passed on to his descendants. Ownership goals of property owners usually include the plans for its ultimate disposition. The owners were asked to give their plans for the disposition of their property. Their answers included: leave to direct heirs, leave to other heirs, sell before death, and no present plans. Of the seventy-six owners, 59.2 percent stated that they intended to leave their forest land to their direct heirs. Thirteen percent intended to sell the property at some time in the future. One gentleman was in the process of selling his forest land at the time of the interview. Three persons had already sold their land but had maintained life estate interests.

Leasing of Forest Land

In the South, it has become necessary for wood-using industries to lease timberlands under long-term contracts to ensure a supply of timber for their firms. About 6.7 million acres of land owned by private, nonindustrial landowners were under such contracts by forest industries in the South in 1970 (25). There are three types of contracts as outlined by Darwin (2): cash rental, long-term timber sales, and share crop and timber royalty contracts. As of the summer of 1976, no evidence was found in the survey of leasing arrangements in the eleven-county timbershed. A detailed study of all forest land 500 acres and larger in Humphreys County did uncover a few owners with leasing arrangements from two to ninety-nine years (see Meredith, 1976). Because

of the trend in other parts of the South, owners were asked if they had any interest in such contracts. About one-fourth of the respondents, 23.7 percent, expressed strong interest in the long-term timber lease agreements. Another one-fourth, 22.4 percent, expressed slight interest in the contracts. The remainder, 53.9 percent, had no interest in the contracts. No one interviewed was familiar with timber-leasing contracts or knew anyone who had leased his timberlands, suggesting that either Humphreys County may be unique or leasing is not widespread at this time.

IV. ATTITUDES AND GENERAL ORIENTATION

Contact with Forestry Information

Attitudes and general orientation depicts the conscious effort on the part of owners to seek out information that may help them make decisions in the management of their forest land (see Table A-6, Appendix A). Of those owners interviewed, 57.9 percent had never contacted anyone or any organization for forestry information. Some owners expressed an interest in learning who they might contact. Those who had made contact with organizations for forestry information were asked with whom contact was made. Three-fourths of the owners contacted the State Division of Forestry service forester. Sixteen percent contacted local timber buyers. One owner, who remembered asking someone about forestry, stated that it had been so long ago that he could not remember who the person worked for. Sharp and Dotson reported that in 1965, 87 percent of Tennessee residents interviewed had not sought any advice or contacted a Soil Conservationist. Sixteen percent had contacted a service forester (24).

The owners who had made contact for forestry information were asked how the contact was made. Of these owners, 59.4 percent indicated that they phoned the agent specifically to ask for forestry information.

Future Contacts with Forestry Information

When asked who they would contact in the future should they need forestry information, a wide variety of answers were given. State Division of Forestry would attract 39.5 percent of the respondents. Nearly 8 percent of the owners stated that they did not know who they would contact. One respondent said that he would contact the federal government.

Membership in Organizations

Owners were asked about membership in various organizations. An attempt was made to find out something of the owner's tendency to associate with other people as this association has sometimes been a source of information of one type or another. Nearly three-fourths of the sample belonged to at least one organization. Not quite one-half belonged to only one organization. Those who belonged to farm organizations accounted for 32.9 percent of the sample.

V. THE PRACTICE OF FORESTRY

Forest practices that individual owners have attempted are shown by number and type in Table A-7, Appendix A. Thirty owners or 39.5 percent of the sample have done at least one forest practice. Three owners or 3.9 percent of the sample participated in six practices each.

Cull-Tree Removal

The practice most commonly reported was the removal of cull trees (57.9 percent of the sample). It was suspected that the trees were removed for firewood rather than for silvicultural reasons in most cases.

Planting Trees

Almost 45 percent of the respondents had planted trees. After the responses were weighted, 31.2 percent of the timbershed owners had planted trees. Acreages planted tended to be small with nine persons planting less than 10 acres. Five persons planted between 20 and 40 acres, four planted between 80 and 100 acres, and one person planted 500 acres of black walnut (*Juglans nigra*). Nineteen people could not remember how many acres they planted. Some of these people indicated by statements like "can't remember just how many acres I planted--wasn't very many I know that," that the owners probably planted less than 10 acres. Tree planting may be less popular in the future as many owners remarked that they planted loblolly pines and an ice storm in 1973 ruined all of the trees. They further indicated that they would not plant pines again. Some owners also remarked that there was no market in the area for pine and to replace the destroyed trees would be useless. In 1965, only 19 percent of the owners in selected Tennessee counties had planted trees (24). In the same study 20 percent of the owners had removed cull trees.

Construction of Firebreaks and Fireroads

According to the State service forester in Houston County, the area has relatively few fires, so it came as a surprise that 10.5 percent of the sample had constructed firebreaks and 9.2 percent had constructed fireroads. These responses may be related to recreational objectives of ownership.

Use of Federal Cost-Sharing Programs

The sample was questioned about past use of federal cost-sharing programs to attempt to ascertain owner attitudes towards governmental assistance. Fifty percent of all owners or 61 percent of those who had followed at least one practice had not used federal cost-sharing programs for forestry practices. Of those who used federal programs, two used the soil bank program (8.7 percent) and seven (30.4 percent) used the ACP program. Sixty-one percent of the persons who used the federal programs could not remember which program they used. No owner interviewed had used the new forest incentives program (FIP). This was not surprising as Lovelace (17) found that in East Tennessee in 1974, FIP participation was extremely low. Lovelace pointed out that the reasons for the low participation included a lack of promotion of the program by Agricultural Stabilization and Conservation Service (ASCS) personnel and others and the low cost-sharing payments offered.

All owners were asked about future interest in federal cost-sharing programs. Fifty-nine percent stated that they were definitely interested in the programs. One out of three stated that he definitely was not interested in governmental assistance. One respondent summed

up his disinterest by saying, "The government is getting too nosey. They were counting my cattle last week and I don't need them counting my trees."

VI. PAST EXPERIENCE IN TIMBER MARKETING

Former Timber Sales

A past history of timber sales could be an indicator of future timber sales by a timberland owner (see Table A-8, Appendix A). Owners sampled in the eleven-county timbershed were asked if they had ever sold timber. Of the owners interviewed, 69.7 percent indicated that they had sold timber in the past.

Location of Last Timber Sale

The respondents were asked if the last timber sale they had was on the particular parcel in question. Over 80 percent of those owners who had a timber sale in the past stated that the sale was on that parcel. Thirty-four percent of those who had conducted a timber sale did so within the past year. The longest period of time since a timber sale was 20 years.

The individuals who had made timber sales within the past three years were asked if they were satisfied with their last timber sale. Four owners indicated that they were dissatisfied with the last sale. Each owner gave a different reason why he was dissatisfied. The reasons included: unfair log rules used, did not get enough money for timber, distrusted the loggers to give them a fair share of the proceeds, and a feeling that the loggers cut trees that should have been left. Several

comments were made about destructive logging, "damned" skidders, and "fancy equipment that tears up the ground" by the owners who indicated satisfaction with their last sale.

Marking of Timber

Of the nearly 70 percent of the owners in the Tennessee timbershed interviewed who had sold timber within the past three years, 17.2 percent had their timber marked before the sale. Another 7 percent of the owners had their timber marked by a forester. About 7 percent said that a logger marked their timber. Four out of five owners who indicated that their timber was marked stated that only the marked trees were cut.

Contracts and Methods of Sale

Over one-half of the forest landowners who sold timber within the past three years executed a sales contract. More than one-third of the contracts executed were written. Nearly one-fourth of the timber sales in the Tennessee timbershed within the past three years were on a lump-sum basis. Eleven owners indicated that they set a diameter limit, normally from 12 to 14 inches. About 10 percent sold their timber on "shares." Generally the terms were one-third to the owner and two-thirds to the buyer. About one out of eight owners received bids before the sale. One-half of those who asked bids for their timber could not remember how many bids were received. When asked who made the initial contact that led to their last timber sale, 48.3 percent of the owners stated that a buyer made initial contact, 20.7 percent stated that they made the initial contact, and the rest did not remember how the contact was made.

Timber Products Sold

Timber products sold by owners during the past three years included: sawtimber, pulpwood, and timber for crossties. Approximately 44.8 percent of the owners who made timber sales sold sawtimber, 37.9 percent sold timber for crossties, and 10.3 percent sold pulpwood. It was interesting to note that 10.3 percent of the sample did not know what they sold.

Reasons for Last Timber Sale

The twenty-nine owners who had made timber sales within the past three years were asked why they made their last sale. A solid majority (62.1 percent) gave financial considerations as the reason for the sale. One person in five stated that they harvested timber to improve the quality of the forest. Forest land was cut in 6.9 percent of the cases to free the land for other uses.

Home and Farm Use of Timber

All of the sample owners of the timbershed were asked if they used timber cut from their land for personal consumption. Over half (59.2 percent) said that they cut trees on their property for their own use. Most owners (88.9 percent) who cut trees for their own use burned them as firewood. Those owners interviewed who burned firewood cut from their property estimated 306 cords during the past year. This would average 7.65 cords per owner per year. Over 20 percent of the owners had lumber sawn from timber grown on their property. Forty-two percent of the owners cut fence posts from their own timber.

VII. KNOWLEDGE OF RESOURCE AND MARKETING

Past Ownership of Merchantable Timber

Nearly all of the owners (94.7 percent) stated that they have owned merchantable timber in the past. One owner did not know if he has ever owned merchantable timber or not. Eighty-four percent of the owners stated that they had merchantable timber on their property at the time of the interview. Five percent did not know if they had merchantable timber in their forest at the time of the interview. One owner refused to answer the question. When asked to compare their timber with that of their neighbors, 32.9 percent stated that their timber was better. Only 6.6 percent thought their timber was worse, 5.3 percent did not know how their timber compared with their neighbor's timber, and the rest (55.3 percent) of the owners thought that their timber was about the same quality as that of their neighbors.

Knowledge of Timber Prices

Seventy-one percent of the sample owners did not know current timber prices. However, 75 percent indicated that they would like to have access to timber price information. Of those who said they knew current timber prices, 68.2 percent said they knew the price of sawtimber. Almost 60 percent stated that they were familiar with the price of crossties. Nearly 14 percent knew the price for pulpwood.

Capital Gains Treatment of Forest Income

Encouragingly, more than 68 percent of all owners interviewed were familiar with capital-gains treatment of income from timber sales.

This was a surprisingly large number compared to other studies (Yoho, 1964).

Opinion of Timber Buyers and Loggers

The owners sampled were requested to rate timber buyers and loggers on a scale of one to ten with ten being a high opinion and one being a low opinion. Timber buyers averaged 7.3 on the scale with 32.9 percent having no opinion. Loggers faired less well with an average rating of 6.7 and 32.9 percent no opinion. Several times a comment was made about loggers' drinking habits. It was the opinion of some of the respondents that the loggers drank too much beer while on the job and littered the woodland with their empty cans.

VIII. FUTURE TIMBER MARKETING PLANS

In order to estimate the future availability of timber in the eleven-county timbershed, the sample owners were asked if they were going to sell timber in the future. Three answers were recorded: yes, do not know, and no (see Table 4). A majority of the owners (55.3 percent) indicated that they intended to sell timber in the future. One-fourth indicated that they would not sell timber in the future. The rest were undecided as to future timber sales.

Other studies have asked the same important question (1) (7) (12) (15) (9) (10) (11). Massachusetts residents were almost the reverse of Tennessee owners with 45 percent not expecting to sell, 15 percent expecting to sell, and the rest undecided.

TABLE 4. Future Timber Marketing Plans of Forest Owners of the Tennessee Timbershed, 1976.[a]

	Basic Answer		Willingness to Sell[b]	
	Number	Percent	Number	Percent
Will sell timber	42	55.3	41	53.9
May sell timber	15	19.7	8	10.5
Will not sell timber	19	25.0	27	35.5

[a]Based on the number of individuals sampled who scored on the "willingness to sell" score as follows: 8 to 10 points, will sell; 6 to 7 points, may sell; and 5 or less points, will not sell.

[b]N = 76.

In Georgia's Piedmont region owners were similar to those of Massachusetts with 52.1 percent unwilling to sell forest products, 29.2 percent willing to sell forest products, and the rest undecided as to what to do in the future given the present market price. Nearly two-fifths of large owners in Pennsylvania intended to sell forest products in the years ahead. Less than one-fourth of the medium-sized owners and only one-tenth of the small-sized owners planned sales. In Florida, "willingness to sell" varied with the geographic area of the state. Values ranged from 30 percent unwilling to sell in area III, located in the northeast, to 62 percent unwilling to sell in areas VI-VII, located in the southern part of the state.

Forty-seven percent of the forest owners in Delaware indicated that they will never sell timber. In New Jersey, 59 percent of the owners

never plan to harvest timber. The largest proportion (70 percent) of owners who indicated that they never intend to sell timber was reported in southern New England.

The Tennessee owners were not restricted as to either time or price in order to determine the basic underlying attitudes that either would lead a person to sell timber or not to sell timber during his tenure. It was felt that asking an owner to place a time frame on his decision to sell would have been met with resistance.

Willingness to Sell Score

There existed the possibility that the owner's answer to the question, "Do you intend to sell timber in the future?" was not truly reflective of his attitudes and objectives of ownership. Because of this, a ten-point willingness to sell score based upon attitudinal questions and past history was developed. A detailed explanation of the score is offered by Wiggins (28) in his Master's thesis. A basic score was given to each owner, depending on how he answered the question on future sales. A yes answer was given a six, a no answer was given a four, and a don't know answer was given a five. This continuous base score was modified either up or down by the reasons given by the owner for his answer. The answers were also weighed by the owner (see ladder scale in Appendix B). A perfect score rating was given to owners who met all of the following requirements: (1) gave a yes answer, (2) had sold timber before, (3) had not had unfavorable experiences with loggers, and (4) who did not list emergency funds as their primary reason for selling timber in the future. A score of eight or better was considered as "willing to sell" in this thesis with respect to availability.

The effect of the rating was to reduce the number of those who said that they would sell from 55.3 percent to 53.9 percent of the respondents. Those who indicated they "would not sell" were increased from 25 to 35.5 percent. The most important result was the reduction of the middle area of those who were unsure of future sales from 19.7 to 10.5 percent (see Table 4, page 31).

Reasons for Selling Timber in the Future

The forty-two respondents who indicated that they intended to sell timber in the future were asked to list the reasons they considered when making their decision to sell (see Table A-9, Appendix A). Eight reasons were given by this group. Timber maturity was mentioned thirty-seven times. This represented 88.1 percent of all those who said they intended to sell timber in the future. Fifty-seven percent mentioned a "good" market price as a reason for selling timber. Approximately 58 percent of the same group mentioned that they intended to harvest their forest in the future to improve the quality of the forest. Salvage of diseased or injured trees and timber needed thinning followed as the next two most frequent reasons for harvesting the forest.

Forty-five percent said that timber maturity was their most important reason for having made a timber sale. Nineteen percent said that timber maturity was their second most important reason. Twelve percent indicated that timber maturity was their third most important reason for having a timber sale. Good market price was mentioned by 19 percent of those who said they intended to sell in the future as their most important reason. Emergency funds and timber needed thinning

were each mentioned by 14 percent as the second most important reason for selling timber.

Reasons for Not Selling Timber in the Future

The nineteen people in the sample who indicated that they were not going to sell timber in the future were asked to list the reasons why they would not sell (see Table A-10, Appendix A). Over one-half of these owners indicated that they were keeping their timber for financial security. Nearly one-half of the owners who indicated that they would not sell timber in the future expressed no interest in selling timber. Of those who indicated that they did not intend to sell timber in the future, 26.3 percent stated that the "most important" reason for not selling was that they were keeping the timber for financial security. Twenty-one percent stated that wildlife was the "second most important" reason for not selling their timber. Almost 11 percent mentioned that trees hold water and soil and financial security as their "third most important reason" for not selling timber in the future.

Conditions Under Which Timber May Be Sold

The fifteen owners who did not know if they would have a timber sale in the future were asked under what conditions would they sell their timber (see Table A-11, Appendix A). The two most common answers were if the price was "good" and if the need for emergency funds arose. These answers were given by two-thirds of the group. Next in popularity (60 percent) came these reasons: I would cut if the trees were attacked by insects or disease, and I would cut if the timber needed thinning. Fifty-three percent of the undecided group mentioned that they would sell timber if the timber were mature.

CHAPTER V

TIMBER AVAILABILITY

The special resource analysis made by the United States Forest Service provided estimates of forest area and timber volume by broad owner categories for the timbershed. But these analyses did not provide estimates of the volume or acreage of timber that might be available for harvesting. Nor did they describe the attitudes of typical forest landowners, their reasons for owning forest land, or their views toward timber harvesting, and forest management (5). The purpose of this section is to explore these factors that make up the economic supply[1]--a schedule of timber offered at different prices (4). General supply restrictions, motives of forest landowners, and estimates of one point in the economic supply schedule of timber in the timbershed are developed in this chapter.

I. RESTRICTIONS UPON SUPPLY

Restrictions on the supply of timber involve the attitudes and objectives of the forest landowner in addition to the operability restrictions of cost and market factors (21). Ownership restrictions on a specific parcel of land last only during the tenure of the owner or the duration of legal estates or trusts.

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[1]The economic supply estimates in this chapter were made from landowner responses regarding "willingness to sell." A low price could be cited as a reason for not selling, but in general, landowners' knowledge of prices were limited.

Within the timbershed there are several restrictions on the supply of timber that are owner oriented. These can be divided into three groups (Table 5): financial, competing nontimber uses of the forest resource, and reasons that stem from past experiences and/or external influences. The first group contained 56 percent of the 109 multiple responses. (Some individuals mentioned more than one reason that could be considered in restriction of the timber supply.) In general, the individual, who stated reasons contained in the financial list, regards the forest as an insurance policy. It was not to be depleted unless funds were needed for some dire emergency, to put the children through school, to help pay property tax,[2] or to provide a retirement income for the owner when he retires. To a lesser extent some owners regard the forest as a source of funds to which they can turn in case they decide to build a new barn, house, or anything else that could not be deemed an emergency expenditure. Three individuals interviewed indicated that if they cut the forest the value of their property would be lowered, making it difficult to sell.

Competing uses may possibly be considered longer term restrictions than the financial ones. The individuals, who gave these reasons, tend to value the forest for its many non-timber values. Wildlife, erosion control, waterholding qualities, and shade for livestock rate higher in importance than timber productivity. Two owners interviewed indicated that they would sell only enough timber to make room for either a

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[2]In most counties, forest lands were taxed at a lower rate than productive agricultural land.

TABLE 5. Owner Related Restrictions Upon Supply.

Restrictions	Number Responses	Percent
Economic Restrictions		
Timber is a source of emergency funds	27	35.5
Timber helps ensure financial security	10	13.2
Timber is a source of nonemergency funds	14	18.4
Timber can help my children if the need arises	4	5.3
Timberland is taxed at a lower rate than agricultural land and can be a source of money to pay the tax	3	3.9
Timber, if cut, will make my land harder to sell	3	3.9
Competing Uses		
I need the shade the timber provides for my livestock	5	6.6
Timber shelters my crops from the wind	2	2.6
If I cut my timber the wildlife will have no home	7	9.2
Timber holds water and soil in place	7	9.2
Timber makes the land more attractive as a site for housing or industry	2	2.6
Past Experience or External Influences		
I am not interested in selling timber	9	11.8
I have seen what damage can be done when timber is harvested and I do not want my land destroyed	6	7.9
The last time I sold timber the loggers destroyed more timber than they cut	4	5.3
I am against cutting trees	3	3.9
Dad never sold timber and I am like Dad	2	2.6
I have a life estate and it would be too much trouble to try to agree to terms with the owner	1	1.3

subdivision or industrial expansion. They viewed the presence of timber per se as a strong selling point in their future plans for the property.

Past experiences and external influences may present a strong influence for a long period of time on timber availability. Owners who listed reasons that fell into this group have formed negative opinions of timber harvests from either personal experience or from the experiences of others. Some fear destruction of their forest. Others had unpleasant experiences in selling timber sometime in the past or have known someone who had a bad experience as a result of a timber sale. Also included in this group were the individuals who have inherited property and for some reason or another do not want to change anything from the way "Dad left it." Life estates and unsettled estates are included in this category because of the difficulty of having all interested parties agree on a timber sale.

As can be seen from the above discussion, the restrictions placed on the supply of timber have their roots deep within the motivations and objectives of the owner. Once these areas have been explored, an attempt may be made to estimate the economic supply of timber in a given area.

II. MOTIVES OF FARM WOODLAND OWNERS' "WILLINGNESS TO SELL"

In the short run, timber availability in the eleven-county Tennessee timbershed is dependent upon how willing the large number[3] of

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[3]Estimated to be 14,183 owners in the private nonindustrial class who own 10 acres or more of forest land.

private nonindustrial owners are to sell timber. In the past, a majority of timber sales have been made by the rural population, especially full-time farmers. One theory is that farm owners need income from these sales as a source of capital. W. B. Lord (16) stated the situation as follows:

> Under the prevailing owner-operator form of organization, farmers are unable to obtain or accumulate the capital necessary to fully and continually adapt to rapid technological change. One result is an artificial scarcity of capital, high alternative rates of return in the various investment possibilities open to the farmer, and consequent rational disinvestment (timber sales) in forestry.

In short, farmers harvest their timber as a source of capital (see Table 6).

All of the variables found to be significant point to the forest landowners with a rural background as being those most "willing to sell" timber. The first variable, occupation, either full-time farming or "nonfarming," is very highly significant. In the Florida study (15) it was also found that a rural background was significantly related to "willing to sell." However, occupation per se was not significant.

The owner's plans for disposition of the tract may indicate the owner's "willingness to sell" timber. Rural landowners are associated with leaving their land to their direct descendants. Farmers, accustomed to selling not only farm crops but also timber, are in a position to know when they have a product that can be sold. In the past the most common sales have been on a twenty-year cycle with a diameter-limit cut and a written contract suggesting that the farmer is aware of the merchantability of his timber.

TABLE 6. Significant Variables and "Willingness to Sell."

Variable	X^2	DF	Level of Significance
1. Occupation (Farmers are more "willing to sell" timber than "nonfarm" owners.)	28.2585	10	0.001
2. Property disposition plans (Persons who plan on leaving their forest land to their direct descendents are more willing to sell timber than those who plan to sell the land before their death or had no plans for the land disposition.)	12.42925	6	0.05
3. Knowledge of merchantable timber (Persons who stated that they had merchantable timber at the time of the survey were more willing to sell timber than those who did not have or did not know if they had merchantable timber.)	13.38129	6	0.04
4. Cutting of fence posts (Persons who cut fence posts were more willing to sell timber than those who did not.)	5.78312	2	0.05
5. Use of ACP forestry program (Individuals who participated in the Agricultural Conservation Program's forestry practices were more willing to sell timber than those who had not participated.)	6.24154	2	0.04
6. Interest in future participation in government assistance programs (Persons who expressed an interest in future participation in governmental cost-sharing programs were more willing to sell timber than those who were not interested.)	11.47467	4	0.02
7. Interest in long-term leasing of forest land (Those individuals who expressed an interest in long-term leasing of forest land were more willing to sell than those who are not interested.)	12.96646	4	0.01

Conversely, the opposite trend may also be true. The "nonfarming" landowners generally have either no definite plans for disposition of the tract or plan on selling the tract at some time in the future. There are indications that the larger (1,000 acres up) owners in the timbershed fall into this category. They purchased the land as a speculative investment. Timber values are secondary, and timber sales may be regarded as having a detrimental effect on property values.

The fourth variable that is significantly associated with "Willingness to sell" was the cutting of timber for fence posts. This activity would again be definitely associated with farming activities.

Farmers are in a position to take advantage of forestry assistance programs. The farmer has used governmental assistance for other conservation practices; examples include liming pastures or building stock watering ponds. It follows that he would be more familiar with the older Agricultural Conservation Programs (ACP) in Forestry. Interest in future use of forestry assistance programs was also associated with "willingness to sell." This finding may also be encouraging. Larsen and Gansner (13) stated that Pennsylvania owners may sell timber to help recover investment in forestry activities.

Interest in long-term leasing of timberland may also be associated with the rural owner as he is nearing the age of retirement. A frequent remark of owners was the need for retirement security. A possible explanation of the relationship between interest in the long-term lease and "willingness to sell" is that self-employed persons,

farmers, have no paid retirement plans with the possible exception of self-employed social security.

The relationship between residence and "willingness to sell" was not significant for the timbershed as a whole. This was possibly due to the relative small number of nonresidents sampled (20 percent) by the stratified random sample. Wiggins (28), in a companion study, paired rural and urban ownerships from the timbershed and found that urban residents who controlled over 150 acres of timberland were less "willing to sell."

Two studies that dealt specifically with availability per se have reported similar findings (13) (15). Pennsylvania owners who sold timber in the past and practiced some form of forest management were inclined to sell. Also, those owners, who have not experienced recent sales and whose properties were not mortgaged, expressed little interest in sales. Questions regarding mortgages were not asked in the current study as it was feared that respondents would have been less inclined to answer other questions. However, Meredith (18) pointed out that in Humphreys County the existence of a mortgage may have made fragmentation more likely.

The history of past timber sales was used in the calculations of the "willingness to sell" score. However, not all owners who made timber sales in the past were willing to sell in the future as has been assumed in another study (29).

Florida timber landowners who were "more willing to sell" were described as owning more land, older, and of a rural background. There was a strong relationship found in the current study between size class

and "willingness to sell" (see Figure 2) up to 1,000 acres. Interestingly, the ownerships in the largest size class were somewhat less "willing to sell." The reason for this may be found in the initial reasons for land purchase and the reasons given for currently holding forestland. The larger ownerships were held primarily for investment and recreation purposes.

The variables occupation, knowledge of ownership of merchantable timber, cutting of fence posts, use of Agricultural Conservation Programs for forestry, interest in future use of governmental cost-sharing programs for forestry, and interest in long-term leasing of timberlands were also tested by discriminate function analysis to determine how effective they were in predicting "willingness to sell" (see Table 7). The variables were able to correctly classify the owners that were "willing to sell" 82.9 percent of the time. For all owners these variables were able to predict the correct response 72.37 percent of the time.

III. ESTIMATES OF THE ECONOMIC SUPPLY OF TIMBER IN THE TIMBERSHED

An estimate of the acreages available for harvest, given the present market conditions, was obtained by the "willingness to sell score" weighted by individual size classes (Table 8; also see Figure 2).

In calculating the percent of forest land available in Table 8, each forest size-class was considered separately. For example, 56.3 percent of the sample owners, who owned timberland falling between 100 and 299 acres, were determined to be willing to sell (six or more on the

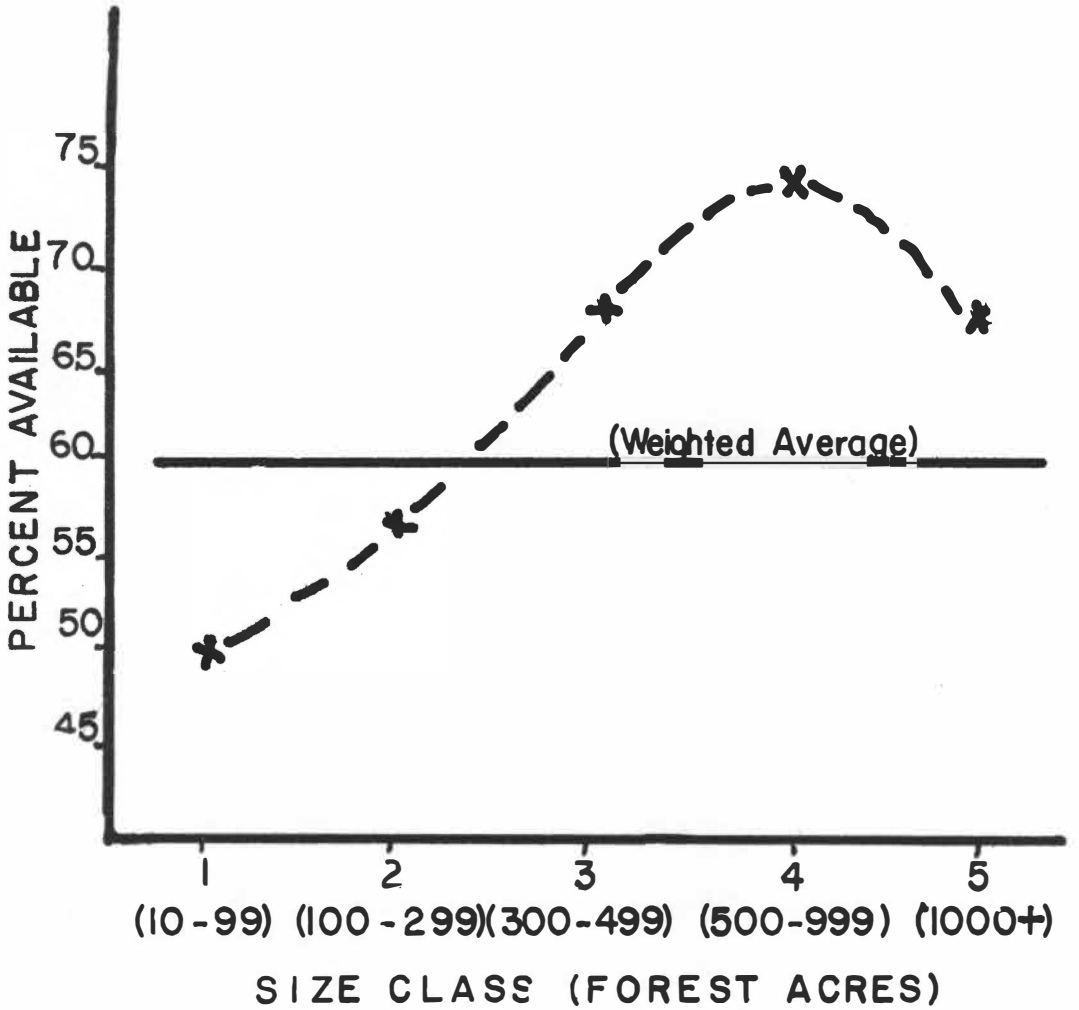

FIGURE 2. Estimated timber availability as a function of size-class for the timbershed.

TABLE 7. Wilks' Lambda (U-Statistic) and F-Ratio with Two and Seventy-Three Degrees of Freedom for Variables Entered into Discriminate Function Analysis.

Variable	Wilks' Lambda	F
Occupation	0.8725	5.3318
Property disposition plans	0.9561	1.6775
Knowledge of merchantable timber	0.8871	4.6439
Cutting of fence posts	0.9027	3.9324
Use of ACP forestry program	0.9134	3.4607
Interest in future participation in government assistance programs	0.8602	5.9342
Interest in long-term leasing of forest land	0.9192	3.2103

TABLE 8. Timber Availability of the Eleven-County Tennessee Timbershed, 1976.[a]

Size Class Forest Acres	Forest Acres Controlled	Percent Available[b]	Available Forest Acres
10 - 99	(456,014)	50.0	228,007
100 - 299	(439,354)	56.3	247,356
300 - 499	(231,453)	66.7	154,379
500 - 999	119,086	73.7	87,766
1,000 or above	234,277	66.7	156,263
TOTAL	1,480,184	58.6	867,388

[a]Figures in parentheses are estimated. Acres adjusted from 1971 by -0.6 percent per year.

[b]Developed from "willingness to sell scores" of the sample.

"willingness to sell" score). Owners of this size class controlled an estimated 439,354 acres of commercial forestland. Fifty-six and three-tenths percent of 439,354 acres leaves 248,356 acres available. Like calculations were made for the other size classes. Available acres for each size class were totaled and divided by the total commercial forest acres under the control of private nonindustrial owners and multiplied by 100 to obtain the weighted average of timber available (58.6 percent).

In order to make the level of availability more meaningful, estimates of the 1976 volumes of sawtimber and growing stock were constructed for the timbershed (see Tables A-12 and A-13, Appendix A). In arriving at the 1976 volumes, several assumptions had to be made. A net loss of commercial forest land from 1961 to 1971 in the timbershed was calculated from data provided by Murphy (20) (Table 2, page 12) to be -0.6 percent per year. This same loss rate was extrapolated from 1971 to 1976. The loss of commercial forestland to land use change was assumed to have been equally distributed over all ownership types. Net annual growth as reported by the United States Forest Service from 1961 to 1971 (6) (27) was assumed to remain constant from 1971 to 1976. Growth was also assumed to be equal on all ownership size-classes.

The assumption was also made that the "net" growth of the forest remained the same from 1971 to 1976. If this assumption had not been made, it would have been difficult to measure changes in cut which is responsive, in the private sector, to price. This assumption may not be valid given the high and low timber prices preceding and during the recession years of 1973-1974. The extrapolations above are less critical

than the assumption that volumes were equal on all ownerships. It was not possible to determine timber volumes on any specific parcel from available data. If, for example, those owners who are "unwilling to sell" control the larger volumes, then the economic supply estimate of this study would be inflated. Fragmentation of ownerships into smaller economic units was not considered.

As of 1976, the eleven-county Tennessee timbershed contained 1,480.2 thousand acres of commercial forest land under the control of private nonindustrial owners. This land contained an estimated 4,150 million board feet (International one-fourth inch rule) sawtimber and an estimated 1,523.4 million cubic feet of growing stock. Over 40 percent of the commercial forest land of private, nonindustrial owners was restricted by owner attitudes and objectives given 1976 market conditions. Therefore, in 1976 there was an estimated 2,431.9 million board feet of sawtimber and 892.7 million cubic feet of growing stock available (see Table 9).

Net growth on inventory is another concept of supply (19). In the timbershed annual growth equalled 42.4 cubic feet per acre for growing stock and 113.3 board feet[4] per acre for sawtimber. After considerations for owner attitudes and objectives have been applied to growth, 41.4 percent is no longer available. This would leave an estimated 98.3 million board feet of sawtimber and 37 million cubic feet of growing stock available for sale in 1976 (see Table 9).

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[4]International one-fourth inch rule.

TABLE 9. Available Timber and Growth Controlled by Private Nonindustrial Owners in the Eleven-County Tennessee Timbershed in 1976.

Item	Estimated Supply	
	Physical	Economic[a]
Acreage (thousands)	1480.2	867.4
Growing stock		
Inventory		
Volume per acre (cu. ft.)	1029.2	1029.2
Cubic feet (millions)	1523.4	892.7
Growth		
Growth per acre (cu. ft.)	42.4	42.4
Cubic feet (millions)	62.8	37.0
Sawtimber		
Inventory		
Volume per acre (bd. ft.)[b]	2800.3	2800.3
Board feet (millions)	4150.0	2431.9
Growth		
Growth per acre (bd. ft.)	113.3	113.3
Board feet (millions)	167.7	98.3

[a]Assumed available at current prices.

[b]International one-fourth inch rule.

CHAPTER VI

MAJOR FINDINGS

In the study of the eleven-county Tennessee timbershed, seventy-six private, nonindustrial woodland owners were interviewed in order to:

(1) Estimate the proportion of the aggregate timber resource actually available for harvest.

(2) Search out motives for withholding timber from the market from commercial lands.

An estimated 14,183 owners controlled 1,480.2 thousand acres of commercial forest in the timbershed. After the stratified sample was weighted, it was estimated that 58.6 percent of the commercial forest land was available for timber harvest in 1976. Thus, timber availability, expressed in terms of volume and growth, was as follows: An estimated 1,029.2 million cubic feet of growing stock (or 37.0 million cubic feet growth on growing stock) and an estimated 2,800.3 million board feet (International one-fourth inch rule) of sawtimber (or 98.3 million board feet growth on sawtimber) was possibly available for harvest.

Full-time farmers were the persons found who were most willing to sell timber. About one-third of the owners were full-time farmers, and their characteristics dominated the significant variables related to "willingness to sell."

The motives for withholding timber from the market involved reasons which may be classified into three categories: financial, competing nontimber uses of the forest resource, and reasons that stem from past experiences and/or external influences. Financial reasons accounted for over one-half the reasons given for withholding timber from the market.

Other findings included:

1. Personal and situational factors of the owner. The average forest landowner was male, somewhere in his fifties, married with one dependent, with less than a high school education, good health, and earned over 10,000 dollars annually from a job that was something other than full-time farming. He lived on the same tract of land where his forest was located. He purchased his land as an individual between eleven and thirty years ago or if he inherited his hand, he was only a second generation owner.

2. Ownership goals. Over one-half of the forest landowners in the timbershed who purchased their property did so for farming, either full or part-time. When asked why they held their land at the time of the interview, 45 percent of the owners indicated that they farmed the land either full or part-time. Most farm-oriented owners intended to leave their land to their children.

Thirty-nine percent of the forest landowners in the timbershed were interested in long-term leasing of forest land. The interest in leasing was slightly stronger with the owners of the larger size classes.

3. Forest practices and timber marketing. Over three-fourths of the landowners have attempted at least one forestry practice. The

two most popular practices were cull-tree removal and tree planting. Only the older cost-sharing programs, such as ACP and soil bank were extensively used, and then only by slightly over one-fourth of the owners who participated. Three-fifths of the owners expressed an interest in future participation in cost-sharing programs. None of the owners sampled had used the new Forest Incentive Program.

Almost all (98 percent) of the owners indicated that they owned merchantable timber in 1976. Nearly three-fourths of the private non-industrial owners have sold timber in the past. However, this act alone did not guarantee a positive response about future timber sales. Sawtimber and crosstie logs were sold, most commonly, for "shares" on a diameter-limit basis. The use of timber sales contracts was almost routine. Most sales were conducted for financial reasons as opposed to silvicultural reasons. Sixty-eight percent of the owners were familiar with capital-gains treatment of income derived from the sale of timber.

Generally, timber buyers were regarded favorably. Attitudes toward loggers were almost equally divided between favorable, unfavorable, and no opinion.

Few owners were familiar with the current price of timber. However, three-fourths of the owners were interested in receiving price reporting information on a regular basis.

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APPENDICES

APPENDIX A

TABLE A-1. Statistical Weights of Stratified Random Sample.[a]

Size Class[b] Total Acres	Number of Owners	Total Acres Controlled	Percent Forest[f]	Forest Acres Controlled	Average Forest Acres Owned	Size Class[b] Forest Acres	Sample Owners	Weights
1	(7874)[c] (2260)[d] (10134)[e]	(540183) (111269) (651452)	(70)	(354320) (101694) (456014)	45	1	8	1268
2	3272 (462) (3734)	912839 (243356) (1156195)	38	346879 (92475) (439354)	106	2	16	205
3	562 (112) (674)	252124 (60659) (312774)	74	186572 (44881) (231453)	300	3	21	27
4	209 11 220	156369 9028 165397	72	112586 6500 119086	539	4	19	11
5	94 1 95	264406 1818 266224	88	232677 1600 234277	2475	5	12	8
Total	(11449) (2734) (14183)	(2125921) (426121) (2552042)	58	1233034 247150 1480184	104		76	

TABLE A-1. (continued)

[a]Figures in parentheses are estimated. Acres adjusted from 1971 by -.6 percent per year.

[b]Size class: 1, 10-99; 2, 100-299; 3, 300-499; 4, 500-999; 5, 1000 acres up.

[c]Benton, Carroll, Decatur, Henry, Hickman, Houston, Humphreys, Perry, and Stewart counties.

[d]Montgomery and Dickson counties.

[e]Totals for timbershed.

[f]Estimated from samples.

TABLE A-2. Net Annual Growth of Growing Stock and Sawtimber on Commercial Forest Land of the Tennessee Timbershed by Species Group and Ownership, 1971.

Ownership Class	Softwood GS[a]	Hardwood GS[a]	Softwood ST[b]	Hardwood ST[b]
Public	464.5	6252.5	5673.9	17606.4
Forest industry	154.4	8315.9	820.2	19703.1
Farmer	1029.8	36260.8	522.7	92734.7
Miscellaneous private	1282.8	26115.9	3515.8	76041.5
Total	2931.5	76945.1	10532.6	206085.7

[a]Thousand cubic feet.

[b]Thousand board feet.

SOURCE: United States Forest Service. 1971. Unpublished resource data available under the authority of the McSweeney-McNary Forest Research Act of May 22, 1928 (45 Stat. 699; 16 USC 581a-i). With adjustments in ownership class acreages in accordance with Arnold Hedlund and J. M. Earls. 1971. Forest statistics for Tennessee counties. United States Forest Service Resource Bulletin SO-32.

TABLE A-3. Volume[a] of Commercial Forest Land of the Tennessee Timbershed by Ownership Class, 1971.

Ownership Class	Softwood GS[b]	Hardwood GS[b]	Softwood ST[c]	Hardwood ST[c]
Public	14.0	155.2	59.8	435.8
Forest industry	3.0	159.8	6.9	315.8
Farmer	13.1	679.2	12.4	1380.9
Miscellaneous private	16.7	537.5	22.4	1991.7
Total	46.8	1531.7	101.5	3324.2

[a]International one-fourth inch rule.

[b]Million cubic feet.

[c]Million board feet.

SOURCE: United States Forest Service. 1971. Unpublished resource data available under the authority of the McSweeney-McNary Forest Research Act of May 22, 1928 (45 Stat. 699; 16 USC 581a-i). With adjustments in ownership class acreages in accordance with Arnold Hedlund and J. M. Earls. 1971. Forest statistics for Tennessee counties. United States Forest Service Resource Bulletin SO-32.

TABLE A-4. Situational Factors of Forest Owners of the Tennessee Timbershed, 1976.

	Percent of Owners	
	Sample	Timbershed[a]
Distance from forest tract		
Live on tract	50.0	76.8
1 - 10 miles	22.4	6.0
11 - 50 miles	13.2	11.0
51 - 80 miles	11.8	4.7
81 miles up	2.6	1.5
Legal form of ownership		
Individual	76.3	96.7
Partnership	13.2	.9
Incorporated farm	2.6	.4
Unsettled estate	3.9	.2
Life estate	3.9	1.8
Tenure		
1 - 5 years	19.7	23.3
6 - 10 years	14.5	12.5
11 - 30 years	51.3	24.6
31 - 50 years	10.5	34.3
51 - 82 years	2.6	5.1
No response	1.4	.2
Acquisition of property		
No response	1.3	.1
Purchase	69.7	84.9
Gift	3.9	13.3
Purchase/inheritance	2.6	.2
Inheritance	22.4	1.5
Name of generations[b] in same family		
2	52.6	50.1
3	31.6	43.1
4	15.8	6.8

[a]Estimated.

[b]Based on the number parcels either completely or partially inherited.

TABLE A-5. Ownership Goals of Forest Owners of the Tennessee Timbershed, 1976

	Percent of Owners	
	Sample	Timbershed[a]
Reasons for purchase of property[b]		
Investment	20.9	24.1
Retirement security	13.6	7.4
Wanted some land	2.4	3.7
Sentimental reasons	4.9	11.0
For children	.3	1.9
For farming	52.7	38.9
Country home	4.7	7.4
Recreation	3.7	.2
Cattle farm	.1	1.9
Reasons for holding tract		
For children	10.5	2.3
Investment	22.4	5.4
Satisfaction of ownership	3.9	1.6
Sentimental reasons	9.2	13.7
Place to live	10.5	19.8
For farming	27.6	45.0
Unsettled estate	3.9	.2
Retirement security	3.9	10.2
Recreation	3.9	.3
Cattle farm	3.9	1.5
Future plans for disposition		
Sell before death	13.2	3.2
Leave to direct heirs	59.2	68.9
Leave to other heirs	1.3	.2
No present plans	26.3	27.7
Interest in long-term leasing of timber lands		
Strong interest	23.7	7.0
Slight interest	22.4	32.1
No interest	53.9	60.9

[a]Estimated.

[b]Based on the number of owners who purchased all or part of their property.

TABLE A-6. Attitudes and General Orientation of Forest Owners of the Tennessee Timbershed, 1976.

	Percent of Owners	
	Sample	Timbershed[a]
Contacts with forestry information		
Contacts not made	57.9	70.9
Contacts made	43.1	29.1
Organization or individual contacted[b]		
ASCS	6.3	1.3
State service forester	71.9	91.9
Timber buyer	15.6	6.4
Forestry consultant	3.1	.2
Cannot remember	3.1	.2
Method of contact		
Phoned agent for forestry info.	59.4	86.0
Visited agent for forestry info.	12.5	6.0
Agent visited to suggest forestry	12.5	1.8
Visited agent after appointment	3.0	4.9
Other	6.3	.4
Cannot remember	6.3	.9
Future contacts for forestry information		
ASCS	3.9	.2
State service forester	39.5	9.1
County agent	31.6	30.3
University extension service	2.6	35.9
Family members	5.3	8.9
Consultant forester	3.9	12.1
Timber buyer	2.6	1.7
Federal government	1.3	.2
Other	1.3	1.5
Do not know	7.9	.1

TABLE A-6. (continued)

	Percent of Owners	
	Sample	Timbershed[a]
Membership in organizations		
Member of no organizations	26.3	16.2
Membership in organizations	73.7	83.8
Member of one organization[c]	69.6	70.4
Member of two organizations	28.6	29.4
Member of three organizations	1.8	.2
Type of organizations[c,d]		
Member of civic organization	11.8	3.8
Member of farm organization	32.9	46.7
Member of conservation organization	1.3	.1
Member of professional organization	15.8	14.0
Member of other organization (church)	32.9	41.1

[a]Estimated.

[b]Based on number of owners making contact with forestry information.

[c]Based on number of owners who indicated membership in one or more organizations.

[d]Some individuals belong to more than one organization; therefore, total does not add up to 100 percent.

TABLE A-7. The Practice of Forestry by Forest Owners of the Tennessee Timbershed, 1976.

	Percent of Owners	
	Sample	Timbershed[a]
Forest practice participation		
Has not practices forestry	18.4	23.0
Has practiced forestry	81.6	77.0
Number of practices[b]		
One	46.8	65.0
Two	21.0	18.7
Three	16.1	13.0
Four	4.8	.5
Five	8.1	.8
Six	3.2	2.0
Type of practices[c]		
Plant trees	54.8	31.2
Site preparation and plant trees	4.8	13.5
Precommercial thinning	6.5	.3
Understory release	14.5	14.6
Cull-tree removal	71.0	82.7
Fencing of forest	11.3	2.7
Construction of firebreaks	12.9	3.1
Construction of fireroads	11.3	2.8
Commercial thinning	27.4	6.0
Participation in federal cost-sharing programs		
Did not participate	61.3	71.4
Cannot remember	1.6	.2
Participated	37.1	28.4
Program used[d]		
Soil bank	8.7	1.7
ACP	30.4	43.6
Cannot remember	60.9	54.7
Interest in future participation in federal cost-sharing programs		
Definitely interested	59.2	61.0
Maybe interested	5.3	.5
Definitely not interested	35.5	38.5

[a]Estimated.

[b]Based on the number of owners who practiced forestry.

[c]Some owners participated in more than one practice; therefore, percents may not total 100.

[d]Based on the number of owners who used a cost-sharing program.

TABLE A-8. Past Experience in Timber Marketing of Forest Owners of the Tennessee Timbershed, 1976.

	Percent of Owners	
	Sample	Timbershed[a]
Former timber sales		
Have not sold timber	30.3	26.7
Have sold timber	69.7	73.3
Location of sale[b]		
Parcel in question	83.0	69.2
Another parcel	17.0	30.8
Time since last sale		
1 year	34.0	25.0
2 - 3 years	11.3	16.6
4 - 10 years	45.3	43.9
11 - 20 years	9.4	14.5
Satisfaction with last sale[c]		
Satisfied	85.0	79.6
Dissatisfied	15.0	20.4
Marking of timber		
Timber not marked	80.0	96.6
Timber marked by forester	10.0	1.6
Timber marked by logger	5.0	1.3
Timber marked by owner	5.0	.5
Timber sales contracts		
No contract	40.0	23.4
Oral contract	15.0	70.2
Written contract	45.0	6.4
Method of sale[d]		
Lump sum	30.0	3.2
Diameter limit	45.0	22.0
Received bids	15.0	1.1
Sold by price per unit	10.0	2.3
Sold on shares	15.0	62.8
Did not remember	5.0	8.6
Initiation of sale[c]		
Buyer initiated sale	65.0	27.3
Seller initiated sale	15.0	69.3
Did not remember	20.0	3.4

TABLE A-8. (continued)

	Percent of Owners	
	Sample	Timbershed[a]
Products sold		
Sawtimber	40.0	36.9
Pulpwood	12.0	2.8
Crossties	36.0	16.8
Other products	4.0	22.1
Did not know	8.0	23.2
Reasons for making sale[e]		
Financial	75.0	87.0
Improve forest	15.0	1.9
Timber needed thinning	5.0	1.1
Clear land for other uses	10.0	.8
Other reasons	10.0	9.0
Home and farm use of timber		
Cut timber for home or farm use	59.2	61.1
Did not cut for home or farm use	39.5	38.8
No response	1.3	.1
Products used[f,g]		
Firewood	88.9	97.0
Lumber	22.2	8.2
Fence posts	42.2	41.7
Heavy timbers	4.4	.2
Knowledge of resource and marketing		
Past ownership of merchantable timber		
Have owned timber in past	94.7	98.1
Have never owned timber	3.9	1.7
Did not know	1.3	.2
Present ownership of merchantable timber		
Own merchantable timber	84.2	79.4
Do not own merchantable timber	9.2	10.0
Did not know	5.3	10.6
No response	1.3	.0
Owner's opinion of quality of timber		
Better than neighbors'	32.9	42.1
Same as neighbors'	55.3	54.1
Worse than neighbors'	6.6	2.2
Did not know	5.3	1.6
Knowledge of current timber prices		
Knew current prices	28.7	14.0
Did not know current prices	71.1	86.0

TABLE A-8. (continued)

	Percent of Owners	
	Sample	Timbershed[a]
Prices known[h,i]		
Sawtimber	68.2	94.8
Pulpwood	13.6	12.1
Firewood	4.5	1.4
Crossties	59.1	19.4
Pine	9.1	2.7
Hardwood	31.8	76.9
Interest in price reporting information		
Interested	75.0	74.9
Not interested	25.0	25.1
Knowledge of capital gains treatment of income from timber sales		
Aware	68.4	81.4
Unaware	31.6	18.6
Opinion of timber buyers and loggers		
Opinion of timber buyers		
1 - 5 Low range	21.1	29.2
6 - 10 High range	46.1	43.5
No opinion	32.9	27.3
Opinion of loggers		
1 - 5 Low range	26.3	33.6
6 - 10 High range	40.8	31.7
No opinion	32.9	34.7

[a]Estimated.

[b]Based on owners who have had a timber sale.

[c]Based on owners who have had a timber sale on the parcel in question within the past three years.

[d]Owner may have used more than one method; therefore, totals may not equal 100 percent.

[e]Owner may have listed more than one reason; therefore, totals may not equal 100 percent.

[f]Based on the owners who cut timber for home or farm use.

TABLE A-8. (continued)

[g]Owner may have used more than one product; therefore, totals may not equal 100 percent.

[h]Based on owners who knew current prices of timber.

[i]Owner may have known more than one price; therefore, totals may not equal 100 percent.

TABLE A-9. Reasons Forest Owners of the Tennessee Timbershed for Selling Timber in the Future, 1976.[a]

Reason	Value	Times Mentioned	Percent of Owners	Most Important Reason		Second Most Important Reason		Third Most Important Reason	
				Number	Percent	Number	Percent	Number	Percent
Timber mature	+1	37	88.1	18	42.9	8	19.0	5	11.9
Emergency funds	-1	17	40.5	6	14.3	6	14.3	2	4.8
Clear land for other uses	+1	14	33.3	2	4.8	5	11.9	5	11.9
Timber needed thinning	+1	21	50.0	2	4.8	6	14.3	2	4.8
Nonemergency expenditures	-.5	12	28.6	3	7.1	1	2.4	2	4.8
Salvage of injured or diseased trees	+1	22	52.4	0	.1	4	9.5	5	11.9
"Good" market price	+1	24	57.1	8	19.0	4	9.5	8	19.0
Improve quality of the forest	+1	23	54.8	3	7.1	4	9.5	5	11.9
Tax purposes	-.5	2	4.8	0	.0	1	2.4	0	.0

[a]Forty-two persons indicated that they intended to sell timber in the future.

TABLE A-10. Reasons of Forest Owners in the Tennessee Timbershed for Not Selling Timber in the Future, 1976.[a]

Reason	Value	Times Mentioned	Percent of Owners	Most Important Reason		Second Most Important Reason		Third Most Important Reason	
				Number	Percent	Number	Percent	Number	Percent
Not interested	-1	9	47.4	4	21.1	3	15.9	0	.0
Keep for financial security	-1	10	52.6	5	26.3	0	.0	2	10.5
Trust for children	-1	4	21.1	1	5.3	1	5.3	1	5.3
I use the timber myself	+1	2	10.5	0	.0	1	5.3	0	.0
Shade for cattle	-1	5	26.3	2	10.5	0	.0	0	.0
Allow trees to grow in size	+1	6	31.6	2	10.5	0	.0	0	.0
Allow trees to grow in value	+1	5	26.3	1	5.3	1	5.3	0	.0
Wildlife	-1	7	36.8	0	.0	4	21.1	0	.0
Protect crops from wind	-1	2	10.5	0	.0	0	.0	0	.0
Low price paid for logs or pulpwood	+1	1	5.3	0	.0	0	.0	1	5.3

TABLE A-10. (continued)

Reason	Value	Times Mentioned	Percent of Owners	Most Important Reason		Second Most Important Reason		Third Most Important Reason	
				Number	Percent	Number	Percent	Number	Percent
Trees hold water and soil	-1	7	36.8	1	5.3	1	5.3	2	10.5
Destructive logging in previous sales	-1	4	21.1	0	.0	0	.0	1	5.3
Distrust of buyers	-1	1	5.3	0	.0	0	.0	0	.0
Opposition to cutting	-1	3	15.9	0	.0	0	.0	0	.0
Sentimental	-1	2	10.5	0	.0	1	5.3	0	.0
Fear of destroying the forest, its beauty, usefulness	-1	6	31.6	0	.0	1	5.3	1	5.3
Tax reasons	-.5	1	5.3	0	.0	1	5.3	0	.0
Selling land	-1	3	15.9	3	15.9	0	.0	0	.0
Life estate	-.5	1	5.3	0	.0	0	.0	0	.0

[a]Nineteen persons indicated that they did not intend to sell timber in the future.

TABLE A-11. Conditions Under Which Forest Owners of the Tennessee Timbershed May Sell Timber in the Future, 1976.[a]

Reason	Value	Times Mentioned	Percent of Owners	Most Important Reason		Second Most Important Reason		Third Most Important Reason	
				Number	Percent	Number	Percent	Number	Percent
If the market price of timber was "good"	+1	10	66.7	3	20.0	2	13.2	2	13.2
If the timber were mature	+1	8	53.3	1	6.7	3	20.0	2	13.2
If timber were attacked by insects or disease	+1	9	60.0	1	6.7	3	20.0	2	13.2
If timber needed thinning	+1	9	60.0	1	6.7	0	.0	2	13.2
If you needed more land for agricultural purposes	+1	2	13.2	1	6.7	0	.0	0	.0
If you wanted to develop land for housing or industry	-.5	2	13.3	1	6.7	1	6.7	0	.0
If you had need for money in an emergency	-1	10	66.7	7	46.6	0	.0	1	6.7

TABLE A-11. (continued)

Reason	Value	Times Mentioned	Percent of Owners	Most Important Reason		Second Most Important Reason		Third Most Important Reason	
				Number	Percent	Number	Percent	Number	Percent
If you wanted some money for buying farm equipment, home improvement or a trip	-.5	2	13.3	0	.0	0	.0	0	.0

[a]Fifteen owners were undecided as to future timber sales.

TABLE A-12. Adjustment of Sawtimber Volume[a] for Loss of Commercial Forestland and Net Growth.

Year	Forest Acres[b]	Percent Loss	Annual Growth[c]	Sawtimber Volume[d]	Volume per Acre[e]
1971	1525.4	.6	113.3	3407.4	2233.8
1972	1516.2	.6	113.3	3558.8	2347.1
1973	1507.2	.6	113.3	3708.2	2460.4
1974	1498.1	.6	113.3	3855.7	2573.7
1975	1489.1	.6	113.3	4001.3	2687.0
1976	1480.2	.6	113.3	4150.0	2800.3

[a]International one-fourth inch rule.

[b]Thousands of acres.

[c]Board feet per acre.

[d]Millions of board feet.

[e]Board feet.

TABLE A-13. Adjustment of Growing Stock Volume[a] for Loss of Commercial Forestland and Net Growth.

Year	Forest Acres[b]	Percent Loss	Annual Growth[c]	Growing Stock Volume[d]	Volume per Acre[e]
1971	1525.4	.6	42.4	1246.5	817.2
1972	1516.2	.6	42.4	1303.4	859.6
1973	1507.2	.6	42.4	1359.4	902.0
1974	1498.1	.6	42.4	1414.8	944.4
1975	1489.1	.6	42.4	1469.5	986.8
1976	1480.2	.6	42.4	1523.4	1029.2

[a]International one-fourth inch rule

[b]Thousands of acres.

[c]Cubic feet per acre.

[d]Millions of cubic feet.

[e]Cubic feet.

APPENDIX B

Department of Forestry
The University of Tennessee, Knoxville

Parcel # _____
Acres _____
Forest _____
County _____
Interviewer _____
Date _____

(IF RESPONDENT IS NOT OWNER) What is the nature of your arrangement with the owner?

_____Salaried manager or agent, _____Other (SPECIFY) _____

I. PRESENT OWNER INFORMATION

A. _____Individual (FILL OUT FOLLOWING FOR OWNER, IF POSSIBLE, OTHERWISE FOR LAND MANAGER OF AGENT)

1. Sex: ____Male ____Female
2. Age: under 30, 30-39, 40-49, 50-59, 60-69, 70 or above (CIRCLE PROPER CLASS)
3. Number of dependents _____ Age of youngest _____
4. Last year of school you completed (CIRCLE HIGHEST YEAR COMPLETED)
   0 1 2 3 4 5 6 7 8 9 10 11 12 13 or more
5. How is your health? _____good _____fair _____poor
6. Distance your residence is from tract: _____miles (GIVE COUNTY IF DIFFERENT FROM TRACT LOCATION _____)
7. Income (ESTIMATE IF NECESSARY) _____ under $1000; _____ $1000 to $4,999; _____ $5,000 to $9,999; _____ $10,000 +.
   CHECK HERE ( ) IF INTERVIEWER'S ESTIMATE
8. Principle occupation: ___Trades and labor, ___Farming, ___Housekeeping, ___Mercantile, ___Professional, ___Retired (ALSO CHECK WHAT LAST OCCUPATION WAS), ___Other (SPECIFY) _____

B. Legal Form of ownership: ___individual ___partnership ___corporate ___estate

C. How many years has tract been owned by present owner? _____years

D. How does the owner plan to dispose of tract? ___sell before death; ___to other heirs; ___to direct descendents; ___no definite plans

E. How did the owner acquire this tract of land? ___Purchased ___Inherited ___Gift

F. If this tract was purchased, what was the owner's chief reason for originally acquiring this tract?

_____

G. If this tract was inherited, how many generations has it been owned by the same family? _____number of generations

H. Regardless of acquisition, why does this owner hold property now?

_____

I would like to find out just a little more about you.

I. With what organizations are you associated?

Civic _____, Farm _____, Conservation _____, Other _____

J. Have you ever contacted anyone for forestry information?
Yes ___ No ___ (IF YES)

K. Who was contacted:

SCS___, State Forestry Service___, County Agent___,
University___, Other _____

L. How did you make the contact with the agent? (DO NOT READ LIST)

___1. None
___2. Asked about forestry in phone contact for other purpose
___3. Wrote or telephoned specifically to inquire about forestry
___4. Asked agent about forestry when visiting for other purposes
___5. Visited agent specifically to ask about forestry
___6. Agent suggested forestry at time of visit for another purpose
___7. Agent visited specifically to suggest forestry
___8. Visited agent following letter or phone appointment
___9. Agent visited following letter or phone appointment
___10. Agent visited following your visit
___11. Other _____

M. If you needed forestry information who would you contact? SCS ___,
State Forestry Service ___, County Agent ___, University ___,
Other _____

N. What is your opinion of the timber buyers in this area?
The loggers?

Buyers
Low 1 2 3 4 5 6 7 8 9 10 High
No opinion _____

Loggers
Low 1 2 3 4 5 6 7 8 9 10 High
No opinion _____

O. Do you think that price reporting information would be of use to you as a timber owner? Yes ___ No ___

P. Do you know current timber prices in the market area near your property? Yes ___ No ___

Q. (IF YES TO P) With which prices are you the most familiar?

Sawtimber ___, Pulpwood ___, Firewood ___, Crossties ___, Pine ___, Hardwood ___, Other _____

R. In the deep South, long-term contracts and leasing of timberlands is a common practice. Do you have any interest in such an arrangement? ___Strong Favor ___Slight Interest ___No Interest

S. Are you familiar with capital gains treatment of income from timber sales? Yes___ No___

Section II
EXPERIENCE WITH TIMBER MARKETING

1. Have you ever been involved in a timber sale? ___Yes ___No

2. (IF YES) Was the sale on this particular parcel of land?
   Yes ___ No ___

3. (IF YES TO QUESTION 1) How long ago was the last sale with which you were involved? _____years

4. Do you have merchantable (marketable) timber on your property now?
   Yes ___ No ___ Don't know ___

5. How do you rank your timber with that of your neighbors, or other properties within the county?

   Better ____ Same _____ Worse _____

6. Have you ever owned land with merchantable timber?
   Yes ___ No ___ Don't know ___

7. Where would you go to find out whether or not you could sell your timber should you need money?

8. Do you or your friends cut any timber for your or their own use?
   Yes ___ No ___

9. (IF YES) What did you use the timber for?
   Firewood ___, Lumber ___, Fences ___, Other ___ (Specify) _____
   (No. cords _____)

(IF ANSWER TO QUESTION 1 IS YES AND IF INVOLVED WITH A SALE DURING THE LAST THREE YEARS, ANSWER THE FOLLOWING QUESTIONS. IF ANSWER TO QUESTION 1 IS YES AND THE SALE WAS MORE THAN THREE YEARS AGO, GO TO QUESTION 16.)

10. Were you satisfied with your last sale? ___Yes ___No

11. If not what made you dissatisfied with the sale? _____
    _____
    _____

12. By what method was the sale made?
    Timber marked Yes__ No__ By forester ___ By logger ___ Other _____
    Lump sum _____
    Diameter limit _____
    Bids received _____ No. bids _____
    Price/unit _____
    Contract _____ Oral _____ Written _____
    Sell only those trees marked _____

13. Who made the initial contact? Buyer ___ Seller ___

14. What type products were sold? Sawtimber ___, Pulpwood ___, Poles ___, Ties ___, Firewood ___, Hardwood, ___, Pine ___, Other _____

15. What were your reasons for making a sale?
    Financial ___, Forest improvement ___, Thinning ___,
    Other _____, Clear land other use _____

16. Do you intent to sell timber in the future?
    Yes ___, No ___, Don't know _____

Section II
(IF NO TO QUESTION 16)

N

Parcel # _____
Acres _____
Forest _____
County _____
Interviewer _____
Date _____

17. Check all the reasons you considered in answering the last question (13).

___ A. Not interested
___ B. Keep for financial security
___ C. Trust for children
___ D. I use the timber myself
___ E. Shade for cattle
___ F. Cannot find a buyer
___ G. Allow trees to grow in size (too few trees, too small trees)
___ H. Allow trees to grow in value (poor quality trees)
___ I. Wildlife
___ J. Protect crops from wind
___ K. Insufficient knowledge of what or how to sell
___ L. Rather put money into agricultural effort for higher return
___ M. Low prices paid for logs or pulpwood
___ N. Trees hold water and soil
___ O. Destructive logging in previous sales
___ P. Don't have time to supervise harvest
___ Q. Distrust of buyers
___ R. Opposition to cutting
___ S. Sentimental; e.g., My father never sold and I don't intend to either
___ T. Only recently acquired land
___ U. Fear of destroying the forest, its beauty, usefulness
___ V. Unsettled estate
___ W. Other Please specify _____
___ X. Other Please specify _____
___ Y. Other Please specify _____
___ Z. Other Please specify _____

18. Using the items you listed in the above question which three (3) reasons were most important in making your decision not to sell?

Most important ___
Next most important ___
Third most important ___

19. Now using the ladder scale, rank these three reasons according to the amount of weight you placed on them in making your decision. The total should not be over 100 percent.

Section II
(IF YES TO QUESTION 16)

Y

Parcel # _____
Acres _____
Forest _____
County _____
Interviewer _____
Date _____

17. If you answered YES to question 16, which of the following factors did you take into consideration in making your decision?

___ A. Timber mature
___ B. Emergency funds
___ C. Clear land for other uses
___ D. Timber needed thinning
___ E. Nonemergency expenditures
___ F. Salvage of injured or diseased trees
___ G. "Good" market price
___ H. Improve quality of the forest
___ I. Other Please specify _____
___ J. Other Please specify _____
___ K. Other Please specify _____

18. Using the items you listed in the above question, which three (3) reasons were most important in making your decision?

___ Most important
___ Next most important
___ Third most important

19. Now using the ladder scale, rank these three reasons according to the amount of weight you placed on them in making your decision. The total should not be over 100 percent.

Section II
(IF DON'T KNOW TO QUESTION 16)

?

Parcel # _____
Acres _____
Forest _____
County _____
Interviewer _____
Date _____

17. If you answered don't know to question 16, which of the following conditions would cause you to consider having a timber sale? Indicate your answers below.

___ A. If the market price of timber was "good"
___ B. If the timber were mature
___ C. If timber were attacked by insects or disease
___ D. If timber needed thinning
___ E. If you needed more land for agricultural purposes
___ F. If you wanted to "develop" the land for housing or industry
___ G. If you had need for money in an emergency
___ H. If you wanted some money for buying farm equipment, home improvement, or a trip
___ I. Other Please specify _____
___ J. Other Please specify _____
___ K. Other Please specify _____

18. Using your choices from the question above, pick the three (3) considerations that would be most important to you.

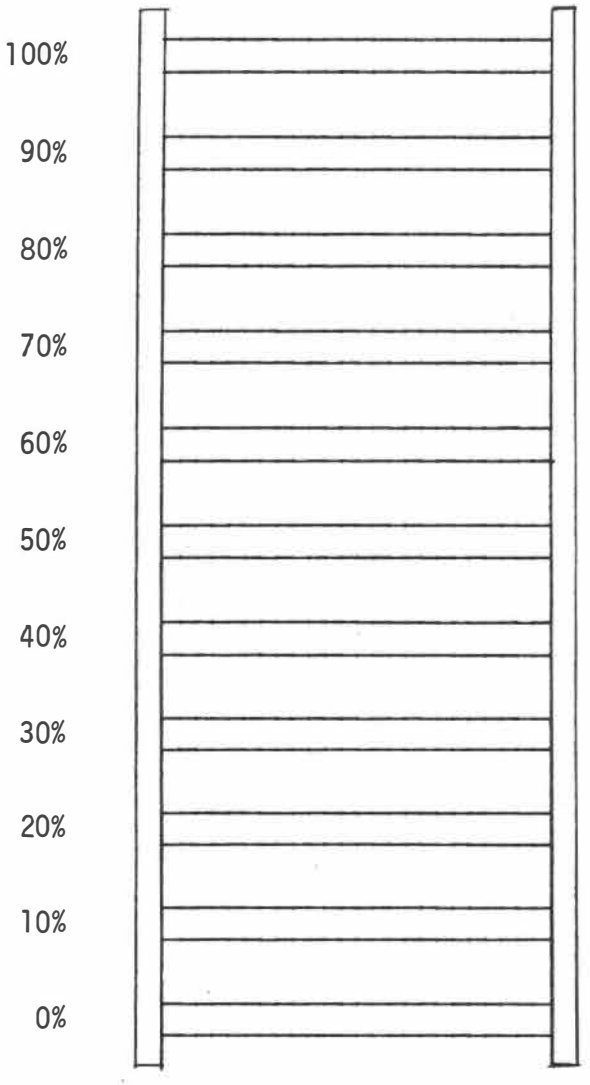
Most important ___
Next most important ___
Third most important ___

19. Using the ladder scale, rank your three choices in terms of importance. The total should not be over 100 percent.

Parcel # _____
Acres _____
Forest _____
County _____
Interviewer _____
Date _____

LADDER SCALE

CONSIDERATION IN DECISION



Section III
PRACTICES

1. Has the owner ever practiced forestry? Yes ___ No ___

2. (IF YES) Specify practices. Acres involved

Plant Bare Land ___	_____
Site Preparation and Plant ___	_____
Pre-commercial Thinning ___	_____
Understory Release ___	_____
Site Preparation for Natural Regeneration ___	_____
Cull Tree Removal ___	_____
Pruning ___	_____
Fencing (to keep animals out of forest) ___	_____
Firebreaks ___	_____
Fire Protection Roads ___	_____
Commercial Thinning ___	_____
Other ___	_____

3. Were cost-sharing programs used? Yes ___ No ___

(IF YES, SPECIFY)

FIP ___ REAP ___ Soil Bank ___ ACP ___ No. Acres _____

4. Would owner be interested in assistance through cost-sharing programs?

APPENDIX C

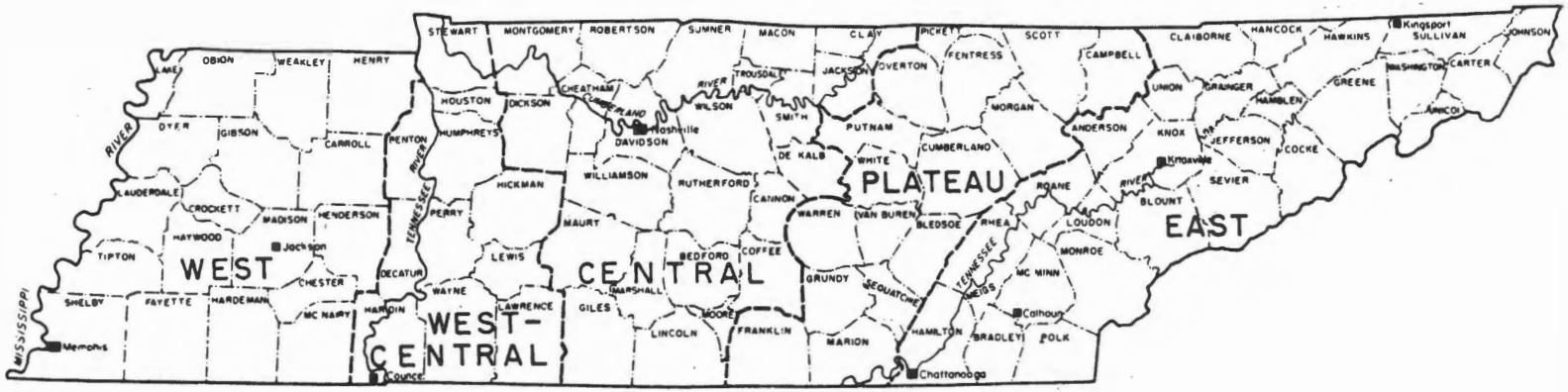


FIGURE C-1. Forest regions in Tennessee.

SOURCE: Paul A. Murphy. 1972. Forest resources of Tennessee. United States Forest Service Resource Bulletin SO-35.

APPENDIX D

DEFINITION OF TERMS

COMMERCIAL FOREST LAND--Forest land producing or capable of producing crops of industrial wood and not withdrawn from timber utilization.

GROWING-STOCK TREES--Live trees that are of commercial species and qualify as desirable or acceptable trees.

GROWING-STOCK VOLUME--Net volume in cubic feet of growing-stock trees at least 5.0 inches in diameter at breast height, from a 1-foot stump to a minimum 4.0-inch top diameter outside bark of the central stem, or to the point where the central stem breaks into limbs.

NET ANNUAL GROWTH--The increase in volume of a specified size class for a specific year.

SAWTIMBER TREES--Live trees that are of commercial species, contain at least a 12-foot saw log, and meet regional specifications for freedom from defect. Softwoods must be at least 9.0 inches in diameter at breast height and hardwoods at least 11.0 inches.

SAWTIMBER VOLUME--Net volume of the saw-log portion of live sawtimber in board feet, International 1/4-inch rule.

PRIVATE NONINDUSTRIAL OWNERS--A combination of U. S. Forest Service classifications of Farmers and Miscellaneous private.

VITA

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The author is a member of Xi Sigma Pi and Gamma Sigma Delta honor societies and the Society of American Foresters.