FORESTRY RESOURCE PLANNING OF THE MISSOURI OZARKS

by

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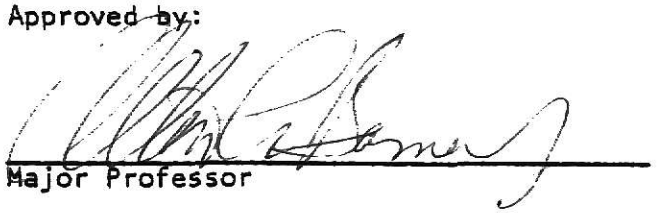

Major Professor

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INTRODUCTION

Chapter 1

INTRODUCTION

The annual removal of trees in Missouri amounted to 168 million cubic feet in 1971 and the annual growth was 177 million cubic feet. But by the year 2002, removals are projected to be as high as 197 million cubic feet with a slight reduction in growing stock (7). With removals outnumbering the growing stock, the available forest resource will be rapidly depleted. According to the United States Department of Agriculture (USDA), the two major reasons for the predicted decline in growing stock are the conversion of forest land to pasture or other uses and the lack of improvement measures to existing forest land after commercially valuable trees have been removed.

Most of the forest land being converted to pasture or other uses is owned by farmers. Although farmers typically own small woodlots, these individuals cumulatively own over sixty percent of all forest land in Missouri. The woodlot owner is under economic pressure to convert to grassland to receive a quicker return on land investment. There is a great time lag, as much as 80 years depending on the species, between the established investment of planting young trees, the optimum harvest date, and the subsequent return on investment.

Statement of Direction

This research examined a twenty-seven county region in the Missouri Ozarks previously investigated in a 1976 study by Marsh and Kurtz of the University of Missouri (20). The economy of the study area is directly influenced by national demand for forest products extracted locally by wood-using industries. With this understanding, current and future rates of sawtimber growth and removals in the study area were estimated utilizing available USDA data and information from the University of Missouri study to determine whether the region may experience a forestry resource deficit problem in coming years.

Once the nature of the potential resource deficit problem was established, goals and objectives were developed for future forestry resource management planning in the study area. After a statistical analysis of independent variables which may affect lumber production levels was accomplished, different resource management scenarios were derived. These resource management scenarios each emphasized certain management objectives, and quantitative projections of how each alternative management scenario would influence the level of future lumber production in the study area were developed.

After development of alternative management scenarios, existing government forest management incentive programs were reviewed. Information from a 1976 study of the Federal Forestry Incentive Program (FIP) and the Agricultural Conservation Program (ACP) by Foutch (19) was used as a point of departure for analyzing alternative government incentive programs for forest land management.

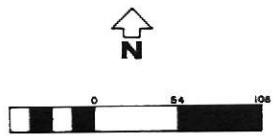
Information gained from review of the Foutch study was subsequently used in developing cost estimates for the implementation of the alternative management scenarios. After an analysis of the degree to which overall goals and strategic objectives would be attained or compromised under each scenario, one scenario was advanced as a recommended future level of forestry management for the study area. Finally, certain recommendations were developed to serve as guidance for the implementation of the preferred management program.

Definition of Study Area

This research examined the same twenty-seven county area used in a 1976 study of wood-using industries in the Missouri Ozarks, prepared by Mr. Jeff Marsh and Dr. William Kurtz of the University of Missouri Forestry Department. The study area contains approximately two-thirds of the eroded Missouri Ozarks Plateau. The study area also contains much of the commercial forest acreage in the state and forest cover as shown on the LANDSAT composite photograph (Map 1).

MAP 1

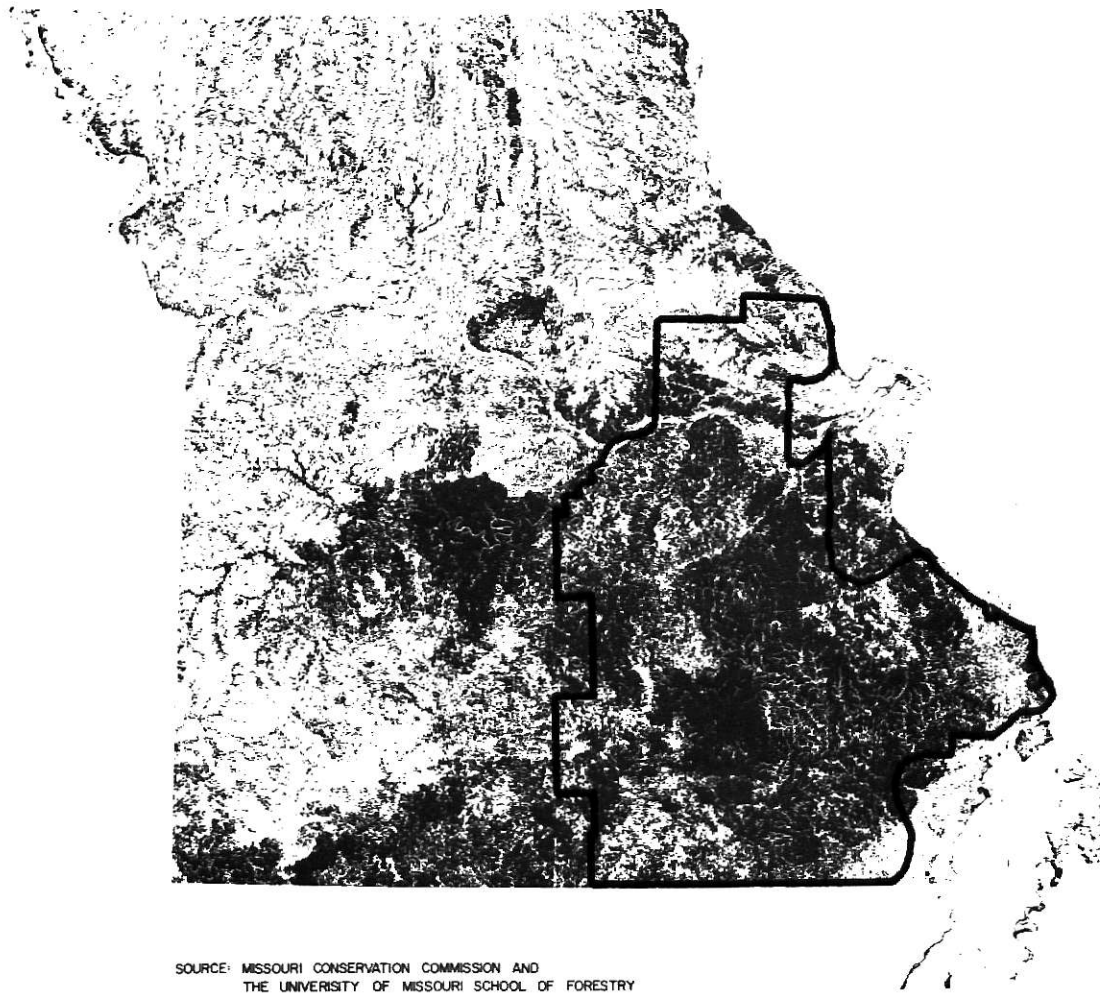
FOREST COVER OF MISSOURI



FOREST COVER

NON-FOREST COVER

TWENTY - SEVEN COUNTY
STUDY AREA BOUNDARY



SOURCE: MISSOURI CONSERVATION COMMISSION AND
THE UNIVERISITY OF MISSOURI SCHOOL OF FORESTRY

The twenty-seven county area includes fourteen counties in the Eastern Ozarks Forest Inventory Area (USDA Forest Service designation) and thirteen adjacent counties which border these fourteen on three sides. Large tracts of Federal and State owned forests comprise about one-third of the commercial forest land in the twenty-seven county area (Map 2).

Importance of Forest Resource in the State

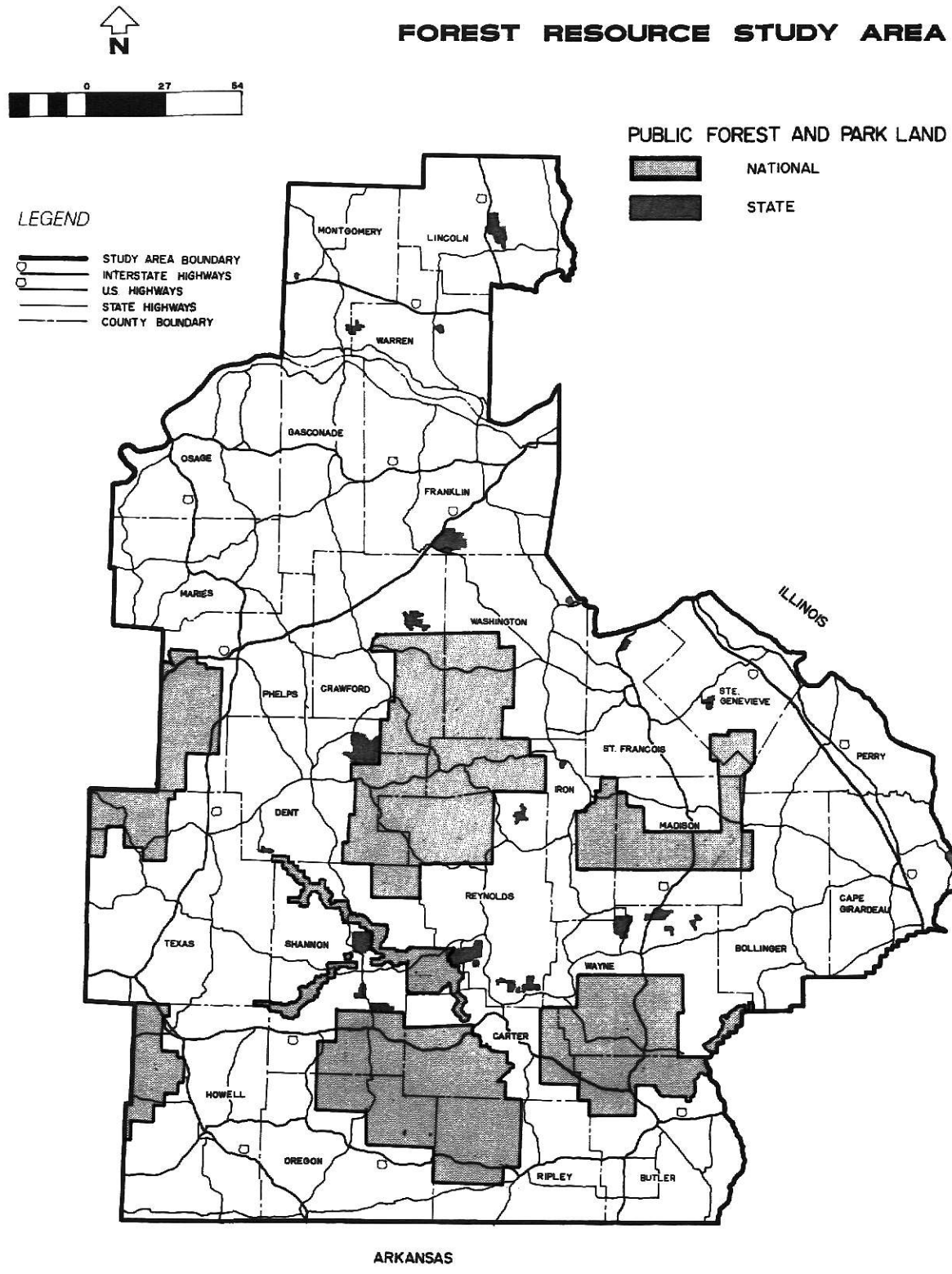
In the past, utilization of the Missouri forest resource and land development in general were governed by the desire for short-term profits. Two-thirds of the state, or thirty million acres, was once virgin forest, and there were so many trees that the early settlers thought the supply would last forever. Forests were perceived as an obstruction to agriculture. Therefore, farmers cleared fifteen million acres to grow corn and wheat and to raise cattle. The steep hills and rocky soils of the Ozark Plateau stopped the settlers from clearing the remaining fifteen million acres.

Following the farmers were the lumber and other wood-using industries. These industries came during the 1880's from Michigan and Minnesota after the northern pines were depleted. At that time, a lumber mill located at Grandin in Carter County became the largest mill in the nation, operating twenty-four hours a day. With intensive logging, the virgin forests of the Ozarks were depleted before World War I. However, trees are a renewable resource and the fifteen million acres of forest land that were not cleared for farming continued to grow new trees. This allowed smaller wood-using industries to remain in the area.

Today, Missouri has three major wood-using industry groups: lumber, cooperage (barrel making), and charcoal. Missouri leads the nation in the production of black walnut, white oak barrel staves, and charcoal (4). Other industries include veneer, pulp, wood preservatives, tool handles, and fence posts. Of the 681 large plants in 1969, 549 or 81 percent were sawmills. Much

MAP 2

FOREST RESOURCE STUDY AREA



of the lumber is used for making hardwood pallets and shipping boxes. Other lumber products include railroad ties, furniture stock, and cedar novelties (7). Map 3 shows the industry distribution in the study area. In 1969, wood-using plants employed 28,400 people, which was 6.8 percent of the total manufacturing employment in the state. These wood-using firms paid $174 million in wages and produced products worth $780 million (7).

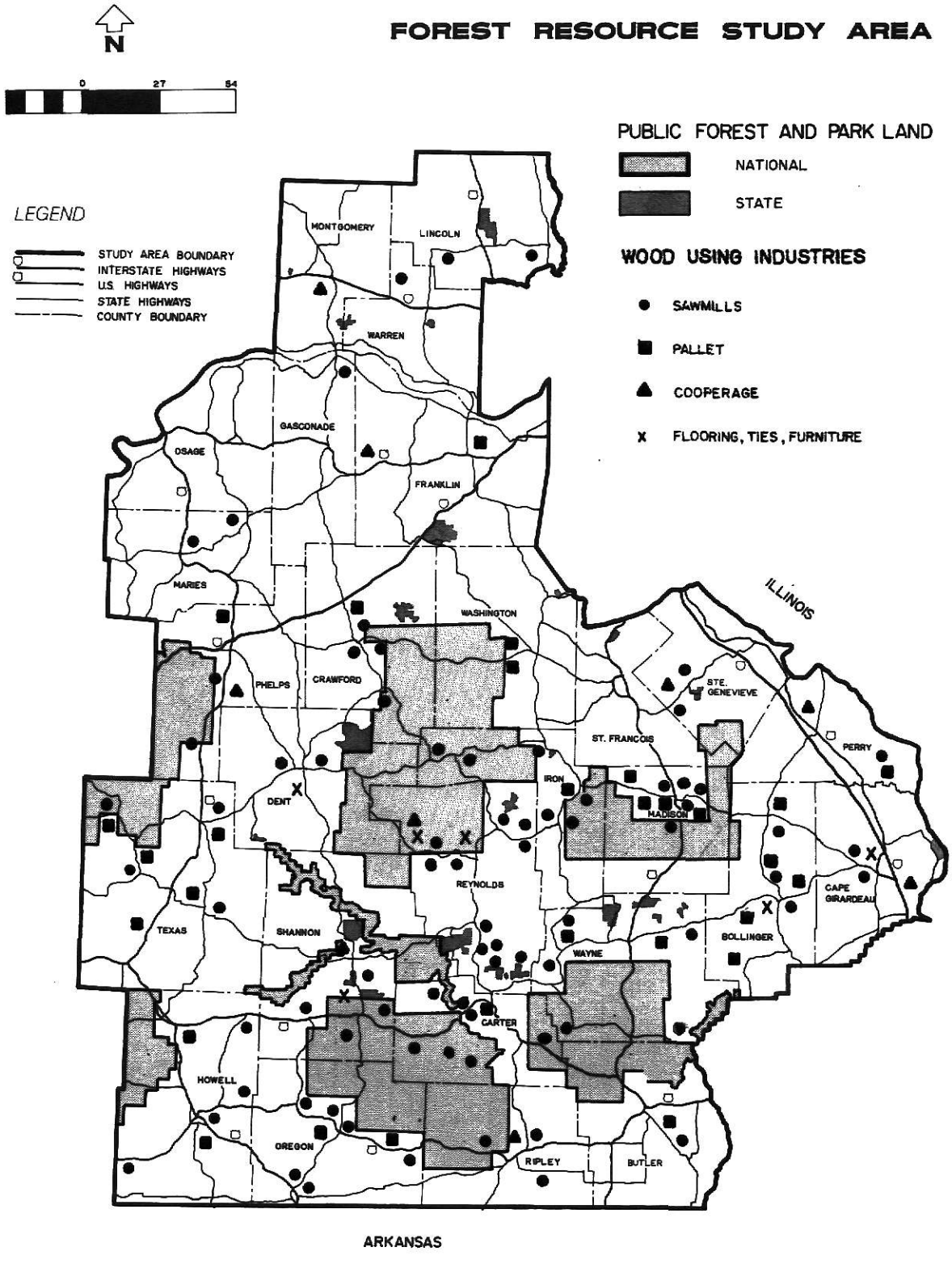
Government Agencies and Private Groups Involved in Forestry in the State

For many years government agencies concerned with forestry have been active in programs that have provided direct or indirect benefits to taxpayers. The first forest inventory of Missouri was conducted in 1947 by the USDA Forest Service. Subsequent inventories were conducted in 1959 and 1972 (7). The Missouri Conservation Commission's Forestry Department was established in 1938. At the same time the Federal government was utilizing the Civilian Conservation Corps (CCC) to accomplish tree planting and other timber improvement projects in the state. The first forestry college degree was offered in 1875 from the University of Missouri and, in 1911, the first funds for forestry research were offered at the same school (1).

Currently, the largest land owner in Missouri is the USDA Forest Service. It administers approximately 1.4 million acres in the Mark Twain National Forest, and twelve Forest Service ranger districts, established in the 1930's, are located in the Ozarks. The Forest Service has developed the Columbia Forest Research Center in Columbia, Missouri as part of the Federally funded North Central Forest Experiment Station. This station has a staff of six professionals assigned to oak-hickory forest research. The USDA also administers economic incentive programs to improve forestry. A major program is the Forestry Incentive Program (FIP), which will be discussed in the cost/benefit chapter of this report. Other Federally funded loan and cost-sharing programs are administered by the Soil Conservation Service and the Farmers Home Administration.

MAP 3

FOREST RESOURCE STUDY AREA



SOURCE: U.S.D.A. FOREST SERVICE

The National Park Service (United States Department of Interior) administers 50,000 acres of National Scenic Riverways located in the study area. These 50,000 acres are maintained in a pristine state for the enjoyment of canoeists, hikers and campers. Park Service rangers provide information and protect wildlife from poaching and fire.

Another Federal agency which controls forest land in the state is the United States Army Corps of Engineers. The Corps administers forest recreation sites around most of the large reservoirs in the state.

The Forestry Division of the Missouri Department of Conservation employs about seventy-five foresters and other professionals to administer 200,000 acres of state forest and thirteen fire protection districts. This state agency also assists private forest land owners and wood-using industries in twenty-two farm forestry districts and two urban forestry centers. Farm foresters from the Forest Division provide in-the-field forest management advice and help land owners obtain State and Federal funds for timber stand improvements. The Forestry Division also provides tree seedlings at nominal cost from the Lickling, Missouri State Nursery.

The two major private forestry concerns in the state are the wood-using industries and the private forest land owners. The industries have formed the Missouri Forest Industries Committee, which is based in Jefferson City, Missouri, to encourage better forest practices and to conduct legislative lobbying. Major lobbying issues are tax reduction, increased economic incentives for private forestry concerns, and the expansion of timber harvesting on public land. The largest private group interested in forestry is the forest land owners. There are some commercial Christmas tree and walnut plantations, but most private forest land owners are farmers with woodlots on their property.

Sources of Information

The main sources of information that have been used in this study are:

the third Forest Survey of Missouri in 1972 (USDA); "An Economic Analysis of Alternative Federal Incentive Schemes for Small Woodlot Management: Dent and Reynolds Counties, Missouri" by Mrs. T.K. Foutch of Washington University; the "Missouri Primary Wood Using Industry Study" by Mr. Jeff Marsh and Dr. William Kurtz of the University of Missouri; and direct discussions with Dr. Kurtz.

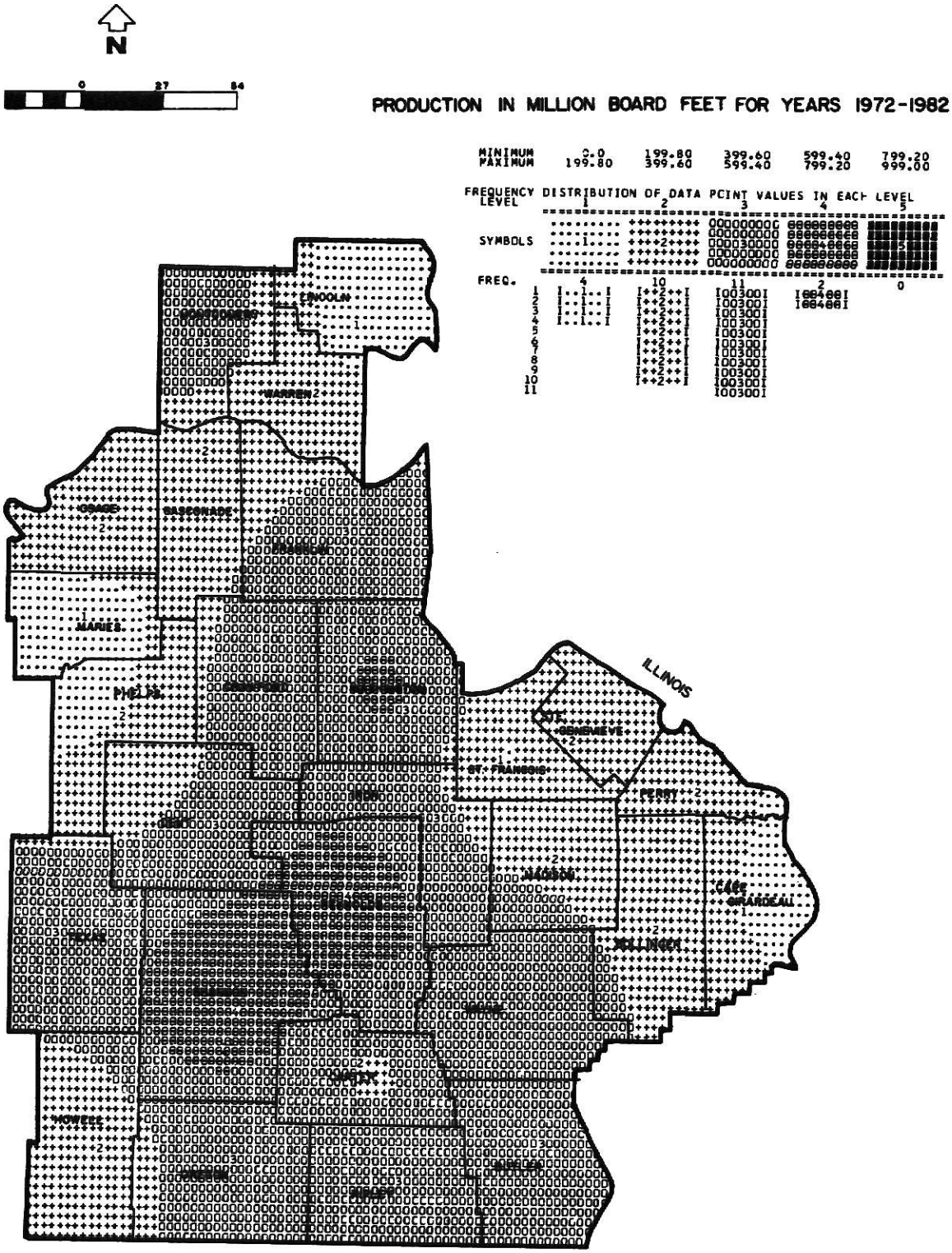
The Forest Survey of Missouri (1972) is the third forest survey accomplished by the USDA in accordance with the McSweeney-McNary Forest Research Act of 1928. Through such surveys, the USDA periodically inventories the country's forest lands to determine their extent, conditions, volumes of timber, growth, and removals. Information from the 1972 survey was used in this study to predict future supply and demand for sawtimber for each county in the study area. Map 4 is a computer graphic representation of this sawtimber data (see Appendix A).

The Foutch study is a thesis submitted to Washington University in August 1976. Ms. Foutch's objectives were to study costs and rates of return in forest management, to determine financial break-even points with Federal funding involvements, and to make recommendations to change the current USDA Forest Incentive Program and Agricultural Conservation Program allocation guidelines to meet the predicted break-even points. There were two counties surveyed in the Foutch study. One county survey (Reynolds) dealt with hardwood deciduous management and the other county survey (Dent) dealt with softwood pine trees. Information from the Foutch study is utilized in the section of this report which discusses the costs and benefits of existing Federal incentives for woodlot management.

The Missouri Primary Wood Using Industry Study was initiated in 1976 by Marsh and Kurtz of the University of Missouri. The survey requested information from individual wood-using industries concerning location, type of business, number of employees, cost of equipment, hauling distance, taxes, and capital investment. Because the information is confidential, site specific

MAP 4

BASE YEAR - SAME GROWTH RATE



SOURCE: U.S.D.A. FOREST SERVICE

data were not available for the present research. The only information available for this resource study was the number and type of industry by county, value of products by type, size of sawmills, average hauling distance to the mills, and production in million board feet for the entire study area.

Resource Planning and Comprehensive Regional Planning

The supply/demand of a resource such as wood can affect the future economic welfare of a region. If the demand for wood products increases and the local industry increases production, more jobs are created and additional demands for housing and community facilities in the region are generated. New roads may need to be built to reach previously inaccessible stands of timber. Conversely, if the demand for wood declines, or if the forest resource is depleted, new industries must be recruited and developed or people may have to leave the region to seek employment opportunities.

Forestry is an important industry in the sparsely populated twenty-seven county area identified in this study, and planning for the future management of the forest resource would be a key component of any comprehensive regional planning effort. Comprehensive planning studies the relationship of man and his environment. In a comprehensive planning process, population, land use, transportation and economic factors are inventoried and related to weather, soils, topography, natural resources, and other environmental characteristics. Predictions of future growth/decline and supply/demand are calculated. Though the present study was limited to the forestry resource, it could serve as one of the more important parts of a comprehensive regional planning study of the area.

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SUPPLY AND DEMAND OF THE FORESTRY RESOURCE

Chapter 2

SUPPLY AND DEMAND OF THE FORESTRY RESOURCE

To understand the supply and demand for hardwood lumber produced in the Missouri Ozarks study area, one needs to be briefed on the supply and demand situation for the entire United States. Most of the study area's output is used outside of the Ozarks, and national demand largely controls the local lumber market. The supply and demand of hardwood products will be emphasized in the discussion below because most of the study area's products are made from hardwood. However, softwood will be discussed where appropriate. The national information comes from the 1973 USDA study, The Outlook for Timber in the United States (13).

According to the USDA, the nation's use of industrial wood products such as lumber, pulp, plywood, etc. increased 65 percent between the years 1942 and 1972. In this period, lumber consumption rose 25 percent, and veneer and plywood consumption rose over 438 percent. The use of fuelwood, poles and posts declined. The USDA study (13) projected that demand for hardwood sawtimber will rise from 15.0 billion board feet in 1970 to 21.3 billion board feet in the year 2000, a rise of 42 percent. These figures are repeated in Table 1, which presents a summary of timber removals, net growth, mortality, roundwood supplies, timber inventories in the 1952-70 period, and projections for 1980-2020 as developed in the USDA study (13). As shown in Table 1, the national production of hardwood sawtimber is predicted to rise from 11.2 billion board feet in 1970 to 19.5 billion board feet in the year 2000.

As Table 1 indicates, removals of all sizes and species of hardwood timber in 1970 was 23.9 percent less than net growth, and projected supplies of hardwood sawtimber should exceed predicted demand in the year 2000. Hardwood inventories in both cubic feet and board feet will continue to rise between 1970 and 2020, although at a considerably slower rate than previously (13).

TABLE 1

PROJECTED TIMBER SUPPLIES
IN THE NATION - 1970 LEVEL OF MANAGEMENT
(In Billion Board Feet)

Item	1952	1962	1970	1980	1990	2000	2020
SOFTWOODS							
Removals from sawtimber:							
Roundwood products	35.3	34.1	43.5	45.6	47.6	50.8	50.1
Logging residues	2.6	2.3	2.5	2.3	2.0	1.8	1.5
Other removals	1.3	1.3	1.7	1.5	1.6	1.6	1.6
Total:	39.2	37.7	47.7	49.4	51.2	54.2	53.2
Net growth	29.5	34.7	40.3	43.3	45.7	47.2	48.4
Mortality	11.9	11.6	11.3	10.8	10.6	10.4	10.0
Roundwood supplies:							
From sawtimber	35.3	34.1	43.5	45.6	47.6	50.8	50.1
From other stands	3.5	3.4	3.4	3.2	3.3	3.4	3.8
Total:	38.8	37.5	46.9	48.8	50.9	54.2	53.9
Inventory of sawtimber:	1978.9	1955.5	1905.3	1823.0	1777.1	1724.6	1621.9
HARDWOODS							
Removals from sawtimber:							
Roundwood products	11.3	10.0	11.2	14.4	17.1	19.5	19.4
Logging residues	.9	1.0	1.2	1.1	1.0	1.0	.8
Other removals	1.1	1.6	2.6	.7	.8	.8	.7
Total:	13.3	12.6	15.0	16.2	18.9	21.3	20.9
Net growth	15.6	17.6	19.7	20.8	21.0	20.9	20.3
Mortality	3.1	3.6	4.0	4.3	4.6	4.7	4.7
Roundwood supplies:							
From sawtimber	11.3	10.0	11.2	14.4	17.1	19.5	19.4
From other stands	.8	.8	1.1	1.1	1.1	1.1	1.1
Total:	12.1	10.8	12.3	15.5	18.2	20.6	20.5
Inventory of sawtimber:	433.1	474.8	515.5	572.8	608.3	618.8	611.6

SOURCE: U.S. Department of Agriculture Forestry Service, The Outlook for Timber in the United States, (Washington, D.C.: Government Printing Office, 1973), p. 47.