

**Proceedings of the  
SYMPOSIUM ON  
INTENSIVE CULTURE OF  
NORTHERN FOREST TYPES**



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**FOREST SERVICE, U.S. DEPARTMENT OF AGRICULTURE  
NORTHEASTERN FOREST EXPERIMENT STATION  
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## FOREWORD

**T**HE NORTHERN FOREST TYPES constitute a vast natural resource for the United States and Canada. For instance, in the eastern United States there are more than 10 million acres of commercial forest land supporting spruce and fir types alone. The magnitude and variety of this resource is such that treating it in any detail at a 3-day meeting was impossible. Rather, the idea that germinated and developed into this symposium was to present a broad picture of the extent of our knowledge of intensive cultural techniques, the status and trends of our research in the northern forest types, and some actual experiences in managing this resource; and to explore those factors that affect our use of the intensive cultural techniques we have at hand.

There is no doubt that we face a new era in the management of northern forests. The production of wood products is no longer the primary objective of many owners, and increased pressure for the social values of our forests is being felt by all landowners. We must recognize these other forest values, which in turn dictates intensification of all aspects of forest management if we are to meet the future demands of a wood-hungry society.

The enthusiastic efforts of the symposium sponsors—the School of Forest Resources, University of Maine; the Maine Bureau of Forestry; the Maine Forest Products Council; and the U.S.D.A. Forest Service—and the individuals behind those efforts, should be commended. Special thanks are due to Great Northern Nekoosa, Inc., and Brooks B. Mills for their help in providing interesting field trips, and to the Casco Bank and Trust Co. for sponsoring the symposium brochure. Also, without the enthusiastic participation of the experts invited to present papers, and the moderators of each session, the Symposium could not have taken place.

—**BARTON M. BLUM**  
Symposium Chairman

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### PUBLISHER'S NOTE

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SYMPOSIUM ON  
INTENSIVE CULTURE OF  
NORTHERN FOREST TYPES**

*held 20-22 July 1976 at Nutting Hall, University of Maine, at  
Orono.*

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## CONTENTS

TRANSLATING FORESTRY KNOWLEDGE INTO FORESTRY ACTION: John R. McGuire .....	1
WOOD AS A STRATEGIC MATERIAL: Kenneth S. Rolston, Jr. ....	9
NATIONAL AND REGIONAL NEEDS FOR INCREASING WOOD YIELDS THROUGH INTENSIVE MANAGEMENT: Robert B. Phelps .....	17
LET'S CALL THE WHOLE THING OFF!: Gordon Baskerville .....	25
PRESENT METHODS AND TECHNOLOGY AVAILABLE FOR INTENSIVE MANAGEMENT AND EXTENT OF PRESENT USE: Gordon F. Weetman .....	31
HOW APPLICABLE IS EVEN-AGED SILVICULTURE IN THE NORTHEAST?: Ralph H. Griffin .....	43
HOW APPLICABLE IS UNEVEN-AGED MANAGEMENT IN NORTHERN FOREST TYPES?: Stanley M. Filip .....	53
EVEN-AGED INTENSIVE MANAGEMENT: TWO CASE HISTORIES: Harold M. Klaiber ...	63
SILVICULTURAL SYSTEMS—UNEVEN-AGED MANAGEMENT: Morris R. Wing .....	67
NATURAL REGENERATION—SMALL OWNERSHIPS FROM CONCEPT TO PRACTICE: Arthur G. Dodge, Jr. ....	73
PUBLIC LANDS—FROM CONCEPT TO PRACTICE: John J. Vrablec .....	77
ARTIFICIAL REGENERATION; APPLICABILITY, OPTIONS AND RESEARCH NEEDS Herschel G. Abbott .....	83
LARGE-SCALE SOFTWOOD PLANTING OPERATIONS IN NEW BRUNSWICK: M. K. Barteaux .....	97
HARDWOOD PLANTING IN SOUTHERN ONTARIO: F. W. von Althen .....	101
DIRECT SEEDING IN NORTHERN FOREST TYPES: Ralph H. Griffin .....	111
INTERMEDIATE CULTURAL PRACTICES: Robert Dinneen .....	127
SILVICULTURAL POTENTIAL FOR PRE-COMMERCIAL TREATMENT IN NORTHERN FOREST TYPES: H. W. Hocker, Jr. ....	135
FIELD EXPERIENCE SILVICULTURAL CLEANING PROJECT IN YOUNG SPRUCE AND FIR STANDS IN CENTRAL NOVA SCOTIA: Theodore C. Tryon and Thomas W. Hartranft	151
INDICATIONS OF SILVICULTURAL POTENTIAL FROM LONG-TERM EXPERIMENTS IN SPRUCE-FIR TYPES: Robert M. Frank .....	159
FIELD EXPERIENCES IN PRE-COMMERCIAL THINNING, PLANTING AND CONTAINER GROWING OF NORTHERN SOFTWOODS: Oscar Selin .....	179
STATUS OF FERTILIZATION AND NUTRITION RESEARCH IN NORTHERN FOREST TYPES: Miroslaw M. Czapowskyj .....	185
SITE CLASSIFICATION FOR NORTHERN FOREST SPECIES: Willard H. Carmean .....	205
NUTRIENTS: A MAJOR CONSIDERATION FOR INTENSIVE FOREST MANAGEMENT: James W. Hornbeck .....	241
STATUS OF GROWTH AND YIELD INFORMATION IN NORTHERN FOREST TYPES: Dale S. Solomon .....	251
THE STATUS OF TREE IMPROVEMENT PROGRAMS FOR NORTHERN TREE SPECIES: David S. Canavera .....	261
STATUS OF HERBICIDE TECHNOLOGY FOR CONTROL OF TREE SPECIES AND TO REDUCE SHRUB AND GRASS COMPETITION: Maxwell L. McCormack, Jr. ....	269
COMPATABILITY OF INTENSIVE TIMBER CULTURE WITH RECREATION, WATER AND WILDLIFE MANAGEMENT: Samuel P. Shaw .....	279
PLANNING PITFALLS: James H. Freeman .....	291
PLANNING FOR & IMPLEMENTING INTENSIVE CULTURAL LONG & SHORT RANGE PLANNING: Lester W. Hazelton .....	299
SMALL WOODLAND OWNERSHIP MANAGEMENT: Albert J. Childs .....	307
EFFECTS OF TAXATION ON THE PLANNING AND IMPLEMENTATION OF INTENSIVE TIMBER MANAGEMENT: David Field .....	311
EFFECTS OF INCENTIVE PROGRAMS: Duane L. Green .....	333
POSSIBLE LEGISLATIVE CONSTRAINTS TO INTENSIVE SILVICULTURAL PRACTICES IN NORTHERN FOREST TYPES: Brendan J. Whittaker .....	341
TECHNICAL ASSISTANCE FOR INTENSIVE CULTURE OF NORTHERN FOREST TYPES: Timothy G. O'Keefe .....	351
CLOSING COMMENTS: Fred B. Knight .....	355

NATIONAL AND REGIONAL NEEDS FOR INCREASING WOOD  
YIELDS THROUGH INTENSIVE MANAGEMENT

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Abstract

Several recent studies show that U. S. timber markets are likely to grow rapidly in the next few decades. Part of the rising demand can be met by increasing the utilization of the timber harvested and more efficient manufacturing and construction processes. In addition, part of the increase can probably be supplied by rises in net imports, particularly at higher price levels. However, it seems clear that to meet prospective increases in demand much beyond the 1970's, it will be necessary to grow more timber in domestic forests. There are opportunities for increasing supplies from all ownerships and in all sections of the country. Through intensified management, domestic forests have the capability of producing at least twice the volume of timber they are growing today.

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In recent years, spectacular increases in the price of stumpage and timber products, difficulties of many mills in obtaining wood, and concern about the future adequacy of our timber supplies has created a lot of interest in our prospective timber situation. This has resulted in a number of congressional hearings and studies. Since 1968, there have been at least 12 major studies and reports on the topic.

"The Outlook for Timber in the United States", prepared by the Forest Service (which will form the basis of most of my talk), the "Report of the President's Advisory Panel on Timber and the Environment", and "Timber: The Renewable Material", prepared for the National Commission on Materials Policy, have been widely distributed and are probably familiar to many of you. Some of you have also seen and possibly reviewed a draft of the Forest Service's assessment of all renewable resources which was required by the Forest and Rangeland Renewable Resources Planning Act of 1974.

Although there are substantive differences among the reports in content and objectives, the major conclusions about the timber

outlook are in remarkably close agreement. For example, there was agreement that the Nation's demands for timber products are likely to grow rapidly in the decades ahead. Since this is an important conclusion in analyzing our timber situation, I would like to briefly discuss its basis. I will follow this with a discussion of the possible ways of meeting the projected increases in demand.

Patterns of past consumption provide one indication of future demand. A look at recent trends shows that U. S. consumption of industrial roundwood (i.e., all timber products except fuelwood) increased from 9.9 billion cubic feet in 1950 to a peak of 13.4 billion in 1973--a rise of some 35 percent. Consumption fell in 1974 and again in 1975 as economic activity in most of the major markets declined. Particularly important were the down-swing in housing output, which in 1975 dropped to the lowest level in about 30 years, and the declines in paper and board demand. In response to these trends, consumption of industrial roundwood dropped to 10.7 billion cubic feet in 1975--about a fifth under 1973 demand. Despite the sharp decline, however, 10.7 billion cubic feet is still 5 percent above average consumption in the early 1960's. Current trends indicate that total consumption for 1976 will be somewhat larger than in 1975 and probably rise further in 1977.

Now these data on what has been happening are interesting and instructive as I noted before. However, our basic concern here is in what lies ahead. Can we expect continued growth in demand or is the current cyclical down-turn a harbinger of things to come?

Today, the future appears to be much more uncertain than it did a few years ago. The large jump in the price of fossil fuels, inflation, and the other problems that we face could materially affect economic growth and future markets for timber products. However, our historical experience suggests that we will surmount our present difficulties and that we can, with some degree of confidence, expect markets for timber to continue to expand and grow.

One of the important indicators of future demands for timber products is population. Recent trends in fertility rates indicate that population growth is likely to be below what had been generally anticipated in the 1950's and 1960's. Nonetheless, the most recent Bureau of Census projections show that if present fertility and immigration rates continue, the Nation's population will be some 265 million people in 2000, about 50 million more than we have today. I know that this is difficult to relate to timber demand. But perhaps it may help to realize that an increase of this size is about four times the current combined population of the six New England States. When you consider the

number of houses, stores, schools, factories, and other structures in this area, you can begin to appreciate what the anticipated growth in population means in the way of additional demands for timber and other materials.

In addition to this increase in numbers, the income available for people to spend is likely to continue to grow rapidly. Most recent projections, for example, indicate that per capita disposable income will more than double by the year 2000. This means, of course, that we will not only be faced with the task of meeting the additional demands of 50 million people, but the demands of 265 million people with a much higher standard of living.

On the basis of these kinds of expectations about population and economic and income growth, it seems clear that we are faced with the prospect of large increases in the demands for most timber products. The demand for paper and board, for example, is projected to roughly double by the year 2000. The demand for pulpwood is expected to show a similar rise. Projected demands for lumber and plywood also show substantial increases.

There seems to be only three practical ways of meeting the projected increases in demand. First, we can improve the efficiency with which we utilize the timber we harvest; second, we can increase the volume of net imports; and third, we can grow more timber in our domestic forests.

We have made large gains in the utilization of wood material that once presented a residual disposal problem. For example, the volume of chips--products from slabs, edgings, veneer cores, and other similar coarse material--consumed in woodpulp mills increased from 1.3 million cords in 1950 to nearly 28 million cords in 1974. Use of sawdust, shavings, and other fine material for pulp and particleboard also has been increasing.

While these gains have been impressive, there is the potential for far greater increases. In 1970, for example, more than 20 million cords of wood were left unused in the forests after logging or land clearing. This was the material left from what we call growing stock (i.e., live desirable or acceptable trees of commercial species more than 5 inches in diameter at breast height). There are much larger volumes of rough and rotten trees, dead trees, limbs, material under 4 inches in diameter, and roots available for use. As you all know, we are beginning to use this material; whole tree chippers are coming into common use in some sections of the country, and developmental work is underway aimed at making it economically feasible to utilize the taproots of some species such as the southern pine.

In addition to these kinds of residues, there was approximately 12 million cords of wood left unused in primary manufacturing plants in 1970. There were also large volumes of waste paper and other secondary manufacturing and consumer residues available for use.

A substantial part of the residues I have been talking about occur in such small volumes or in locations so remote from processing facilities that they are not now, or are they likely to be, economically usable. Nonetheless, the potential is great and this resource is likely to be drawn upon to an increasing degree in the period immediately ahead.

Some of the projected increases in the demand for lumber and plywood could be met by increasing the product output from logs through the use of thinner saws and more precise manufacturing methods and equipment. Development of stress grading systems and better product design could also extend supplies by increasing the efficiency in the use of lumber and plywood in manufacturing and construction. There is also the possibility of increasing pulp yields, although in recent decades technological advances in this direction have apparently been offset by the losses associated with the increasing production of semi-bleached and bleached pulps.

When all things are added together, it seems clear that the potential from improved utilization is large. However, even the most optimistic estimate of prospective gain is far below the projected increases in total demand.

I would now like to turn to the second possibility, increasing supplies through improving our net imports situation.

Between 1950 and 1973, imports of timber products increased from about 1.5 to 3.1 billion cubic feet. Although the volumes imported dropped somewhat in 1974 and 1975, they were still above any year prior to 1966. Softwood lumber, nearly all from Canada, accounted for over half of the growth in imports in the past 25 years and pulp and paper products, also nearly all from Canada, most of the remainder. Hardwood plywood and veneer imports, chiefly made from lauan originating in the tropical forests of insular Southeast Asia, also increased rapidly, although in 1975 they still represented less than 10 percent of total imports.

The softwood timber resources in British Columbia and the northern parts of the eastern Canadian Provinces can support a much larger harvest. A substantial increase in imports of softwood lumber, newsprint, and woodpulp from this resource is thus possible, especially at the higher prices which seem to be in prospect. Tropical hardwood forests also have the potential to supply much larger quantities of hardwood plywood and lumber.

Exports of timber products, chiefly pulp products and softwood logs, have also been rising rapidly since 1950, moving up from 0.1 billion to 1.3 billion cubic feet. Exports were also down in 1975, however, the decline was not nearly as great as for imports. Most of the growth in exports has largely reflected a combination of rapid increases in demand and inadequate timber supplies in western Europe and Japan--the major importing areas--and relatively stable prices in the United States. The latest studies of the timber outlook in the importing areas indicate that demands will continue to grow and that domestic timber supplies will fall increasingly short of domestic requirements.

In summary then, it seems that if prices remain relatively stable, increasing exports will largely offset rising imports and our net import situation may not change appreciably. At higher prices, net imports could show a significant rise, especially net imports of softwood lumber, newsprint, and wood-pulp from Canada.

Although part of the projected growth in demand can be met by improved utilization and increases in net imports, the potential gains are relatively small in comparison to the projected total growth in timber product markets. Thus, if the projected growth in demand is to be met, it must come from domestic resources.

As is the case with economic growth, recent developments have tended to cloud the outlook and make our domestic timber supply prospects more uncertain. Among the things I have in mind is the increasing pressure to earmark land--and particularly the public lands--for some exclusive use such as parks and wildernesses, and increasing withdrawals for residential use, highways, reservoirs, and other similar purposes.

There has also been increasing concern about the protection and maintenance of our forest environment and about the production of recreation, wildlife, water, and other nontimber goods and services of the forests. These are legitimate concerns, but they will inevitably mean added constraints on the use of forest lands for timber production.

From an analytical standpoint, many of the changes that have been taking place are in their early stages, and unfortunately it is impossible at this time to accurately appraise their ultimate impact. In projecting timber supplies, they have been recognized and an attempt has been made to take them into account.

We have been making rather substantial progress in the way we manage our forests for both timber and other products in recent decades. In the South, for example, fire control and other forestry programs, including extension work, have improved the

timber situation to the point where timber harvests may be gradually increased as much as 60 percent over the next few decades. This increase will be largely offset, however, by expected declines in the harvesting of old-growth timber from forest industry lands in the West.

From the national standpoint, with present levels of forest management, future harvests of softwood timber cannot be increased above current levels without overcutting and reduced supplies of this preferred timber in some future period. Thus, if recent levels of timber management continue, we are faced with the prospect of large increases in the relative prices of softwood timber products as sharply rising demands are brought into balance with supplies.

In contrast, hardwood forests can support a much larger volume of harvests. Net annual growth on all growing stock trees 5 inches and larger, is some 3.5 billion cubic feet above removals. Most of this timber is on the small ownerships in the North, and is in relatively small trees of the less desirable species. However, it is suitable for use as pulpwood, and represents a major source of future wood supply for the pulp industry.

The prospective hardwood sawtimber situation is roughly similar to that of softwoods. Although the data on growth and removals indicate that sawtimber stands can support an increased level of cutting, recent increases in hardwood sawtimber stumpage prices suggest that the resource data probably overstates the volume of sawtimber that is economically accessible and available for sale. For example, much of the projected supply of hardwood sawtimber is in species and low-quality trees for which markets are currently limited. Much of the demand, on the other hand, is for species such as select white oak and red oak, sweetgum, yellow birch, hard maple, walnut, and black cherry, and for the larger sized high-quality trees. Removals have been close to or above annual growth for this preferred material in recent years.

In addition, part of the larger sized hardwood sawtimber that is suitable for the manufacture of high-quality lumber or veneer occurs as widely dispersed trees or groups of trees that may not be economically harvestable. A substantial part of the hardwood timber is also in privately owned tracts that are held primarily for recreation or other purposes that are not compatible with timber harvesting.

In summary, the data we have shows that if we continue to practice forestry much as we have in recent years, we will not be able to significantly increase our harvests of softwoods with-

out overcutting. Harvests of hardwoods can be increased, although it seems clear that it will take substantial increases in prices over the levels of the 1950's and 1960's to induce the owners of the available hardwood sawtimber to put it on the market.

Now I want to stress that this is the outlook if we do not intensify management. With better management, U. S. timber supplies, in time, could be dramatically increased. The growth attainable in fully stocked natural stands is approximately double what we are averaging today. Through the use of genetically-improved planting stock, fertilization, moisture control, and the best spacing and thinning techniques, we could go much further, but no one knows the attainable limits.

There are opportunities for intensifying management on all ownerships and in all sections of the country.

The National Forests, and particularly those in the West, have the capability of supporting much larger harvests and doing so in the near future. Through additional investments in reforestation, stand improvement, road construction, thinning, and salvage, it would be possible to increase timber harvests fairly quickly from the old growth stands which compose much of these public holdings in the West.

Growth on industry lands in all sections of the country is much below what can be achieved in fully stocked natural stands. So the forest industries also have an opportunity to increase timber supplies by intensifying management.

From the national standpoint, the biggest opportunity to increase timber growth is on the 59 percent of all commercial timberland--296 million acres--in farm and miscellaneous private ownerships. We recognize that many of these lands are held mainly for recreation, speculation, or other nontimber objectives and that management efforts for timber are limited. Average growth per acre is 36 cubic feet--considerably below reasonably attainable levels. Expanded programs of technical assistance and financial incentives to increase planting, timber stand improvement, and other management practices could, in time, result in substantial increases in the Nation's timber supply.

In closing, I would like to summarize what I have had to say as follows:

Several recent studies have shown that timber markets in the U. S. are likely to grow rapidly in the decades ahead. Although part of the increase can be met by improved utilization and increases in net imports, the potential gains are relatively

small in comparison to the total growth in timber product demands. The best opportunity for increasing supplies is through intensified management of our domestic forests. There are opportunities for intensifying management on all ownerships and all regions of the country. The Nation's forest lands have the capability under intensive management of growing at least twice the volume of timber produced today.