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# Management of U.S. Forest Industry Lands: Challenge Ahead

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# MANAGEMENT OF U.S. FOREST INDUSTRY LANDS: CHALLENGE AHEAD

by

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## ABSTRACT

The problem facing the United States Government is one where there are limitations on the ability of the U.S. forests, both under government and private ownership, to meet the demands for an adequate supply of suitable lumber products in the future. This study presents a method of analyzing this dilemma in order to determine a possible means of providing the needed lumber products without depleting the U.S. forests.

In order to do so, the study examines the ever-growing needs of the consumer and the various government management policies used to insure an ever-continuing supply of forest products. The study tries to prove, through verbal arguments and graphical analysis, that specific changes in both the cultivating and harvesting methods now in use will provide the optimum choice of action. A presentation and analysis of various forest management programs are presented in order to point out the numerous options or combination of options that can be applied to any specific lumber producing area in the United States.

Having established a forest management program, the study presents a reasonable course of action to guarantee an adequate supply of lumber products for the future.

# CHAPTER 1

## INTRODUCTION

The plight of the Federal Government in trying to provide the necessary lumber products to the citizens of the United States without significantly raising the cost to the consumer has become a major point of discussion and concern in recent years. Various proposals, ranging from a nationalization of the forest industries to providing the forest lands, have been presented. What has emerged, however, is an ever increasing dependence of the forest industries on Federal, State, and University supported technology.

### Purpose

The study, while basically aimed toward achieving a more comprehensive understanding of the various factors influencing the management decisions in the forest industry, has two specific purposes. These are:

1. To prove through the use of graphs and tables, that the forest industry is capable of meeting future demands at a reasonable price. The limitation of the available reserves coupled with the increasing industrial costs require the

development of a comprehensive policy which will allow for the demand to be met at an affordable price.

2. To establish, through an analytical study, that various changes to the present forest management policies will produce the optimum utilization of forest lands. This study hopes to demonstrate that Close Timber Utilization and Intensive Culture Techniques should be implemented if economic efficiency is to be achieved.

Overview

The completeness and reliability of statistics on forests and forest products vary considerably. The data for forest land area and stand volumes are more reliable for areas that have been recently surveyed than for those for which only estimates are available. As a rule, much more data is available for lumber and other manufactured products such as plywood, veneer, pulp, paper, etc., than for primary forest products such as poles, fuelwood and fence posts.

This report presents information on trends in prices, production, consumption and trade of forest products in the United States. Some material is given for regions.

The 1975, 1976 and 1977 statistics in this study are based on information available in early 1979. This preliminary data should not be regarded as final figures.

All forest service datum includes Alaska and Puerto Rico for all years unless otherwise noted; there are no national forest areas in Hawaii.

Chapter Outline

In trying to reach an analytical conclusion for forest management policies, this independent study consists of four chapters. The introduction, Chapter I, contains a definition of the problem, a brief historical view of the range of solutions to the problem, the purpose of the study, the methodology to be used in the study, a chapter outline and an overview.

Chapter II deals with the trends in the U.S. forest industry from both historic and futuristic viewpoints. It briefly examines the ownership of timber lands and outlines the constraints associated with public versus private ownership. Industrial roundwood and fuelwood production and consumption are examined separately. A forecast of demand for timber products for the 2000 is discussed.

Chapter III presents the dilemma of increasing costs, increasing demand, and the limitation of alternatives in meeting the projected demand. The aim of this chapter is to present facts in the form of tables and figures to illustrate the method of choosing alternatives.

Chapter IV summarizes the highlights of this study and provides an answer to the question of the availability of forest products in the future.

The independent study is, in other words, a comprehensive study of the Forest Products Industry with specific implications directed at the consumer.

# CHAPTER II

## U.S. FOREST INDUSTRY TRENDS

In determining the capability of the Forest Products Industry to meet future demands, current and past data must be assembled in a manner so as to identify major trends in the industry. The first major trend is that there has been little change in the apparent ownership of commerical timberland (table 1). The majority of commerical timberland is owned privately. The private sector has owned, on the average, between 72 and 73 per cent of the commerical timberland in the United States for the period 1953-1970. By 1970, the North, which comprised 25 per cent of the total forest land, had 82 per cent private ownership of their forest lands. The South, which comprised 28 per cent of the total forest land, had 90 per cent in the hands of private ownership. In contrast, the largest concentration of U.S. forest lands, 47 per cent, were found in the West, which had the lowest private ownership, 33 per cent.

These trends have not been significantly reversed since 1970 and should be a determining consideration in proposing

TABLE 1. FOREST LAND--TOTAL AND COMMERCIAL AREA, VOLUME OF SAWTIMBER, AND GROWING STOCK: 1953, 1963, and 1970

(Area in millions of acres; sawtimber in board feet. As of Jan 1.)

| YEAR AND REGION | Total forest land | COMMERCIAL TIMBERLAND OWNERSHIP[1] | | | | | NET VOLUME OF SAWTIMBER[2] | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | All ownerships | Federally owned or managed | State, county, and municipal | Total | Percent of total | Total | Softwood | Hardwood | Growing stock, net (bil. cu.ft.)[3] |
| U.S., 1953 . . | 748 | 495 | 111 | 28 | 356 | 71.9 | 2,412 | 1,979 | 433 | 517 |
| North. . . . . | 178 | 170 | 13 | 19 | 138 | 81.2 | 246 | 59 | 187 | 111 |
| South. . . . . | 214 | 192 | 14 | 3 | 175 | 91.1 | 391 | 186 | 205 | 114 |
| West . . . . . | 356 | 133 | 84 | 6 | 43 | 32.3 | 1,774 | 1,734 | 40 | 292 |
| U.S., 1963 . . | 757 | 508 | 111 | 28 | 369 | 72.6 | 2,431 | 1,956 | 475 | 628 |
| North. . . . . | 183 | 175 | 13 | 19 | 143 | 81.7 | 290 | 69 | 221 | 136 |
| South. . . . . | 219 | 200 | 14 | 3 | 183 | 91.5 | 435 | 230 | 205 | 134 |
| West . . . . . | 355 | 133 | 84 | 6 | 43 | 32.3 | 1,705 | 1,656 | 49 | 357 |
| U.S., 1970 . . | 754 | 500 | 107 | 29 | 364 | 72.8 | 2,420 | 1,905 | 515 | 649 |
| North. . . . . | 186 | 178 | 12 | 20 | 146 | 82.0 | 332 | 80 | 252 | 156 |
| South. . . . . | 212 | 193 | 14 | 3 | 175 | 90.7 | 484 | 276 | 208 | 160 |
| West . . . . . | 355 | 129 | 81 | 6 | 42 | 32.6 | 1,605 | 1,549 | 56 | 334 |

(continued next page)

TABLE 1 continued

[1]All land producing, or capable of producing, usable crops of wood, economically available on date shown or prospectively, and not withdrawn from timber utilization. [2]International 1 1/4 inch rule. Commercial species which contain at least 1 saw log. Softwoods, must be at least 9 inches in diameter breast height, except in Calif., Oreg., Wash., and coastal Alaska where the minimum diameter if 11.0 inches. [3]All live trees, poletimber trees, saplings, and seedlings meeting specified standards of quality or vigor, excludes cull trees.

Source: U.S. Forest Service, Timber Resources for America's Future, 1958; Timber Trends in the United States, 1965; and The Outlook for Timber in the United States, 1973.

changes to the present forest management policies. In fact, controversial wide range policy changes may be opposed by the private industry sector which owns the majority of the sawtimber reserves.

National Forest System Lands

The national forest system rarely owns all the land within its boundaries. However, unless provided otherwise by statute, the national forest system controls all the land within its boundaries. The national forest system lands also have statutory provisions concerning timber usage. Some areas are specifically set aside as wilderness areas or areas where commerical harvesting is not permitted. A locally known example of this occurence is the Boundary Waters Canoe Area (BWCA) in northeastern Minnesota. This area is part of the Superior National Forest and unlike other areas of the national forest, commerical harvesting is not permitted even though the national forest system controls the entire Superior National Forest area. In addition, national park system lands are not available for commerical harvesting unless provided by statute and controlled by the national forest system.

Forest management policies, therefore, do not include the forests of protected areas as available reserves. If included, the amount of commerical timberland controlled by the federal government would at least triple. The

gross area within the national forest system lands in 1977 was 226 million acres (table 2). This figure is more than twice the area available for commerical use in 1970, 107 million acres (table 1). In case of a national emergency these protected areas theoretically could be used resulting, however, in an aesthetic national loss.

Industrial Roundwood Production and Consumption

Preliminary data indicate that total production of industrial roundwood, that is all timber products except fuelwood, was 11.3 billion cubic feet in 1977 (table 3). Although 1977 production was less than 1976 when total production was 11.4 billion cubic feet, it was some eleven per cent higher than the level achieved in 1975. The 1977 production was the second largest output since the record volume produced in 1973. All of the major timber products contined to show a gradual production increase over time which has contributed to the increased volume.

Fuelwood

In the Demand and Price Situation for Forest Products 1976-77[1], fuelwood production trends are discussed. The rapid drop in fuelwood production during most of the 1900's has stopped (table 4). This had been holding down the total

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[1]U.S. Department of Agriculture, Forest Service. The Demand and Price Situation for Forest Products 1976-77. by Robert B. Phelps, Miscellaneous Publication No. 1357 (Washington, D.C.: Government Printing Office, 1977). pp.4-5.

TABLE 2

NATIONAL FOREST SYSTEM LANDS AND OTHER LANDS WITHIN UNIT BOUNDARIES--STATES AND OTHER AREAS: 1977

(In thousands of acres. As of Sept. 30.)

| STATE | Gross area within unit boundaries[1] | National forest system lands | Other lands within unit boundaries | STATE OR OTHER AREA | Gross area within unit boundaries | National forest system lands | Other lands within unit boundaries |
|---|---|---|---|---|---|---|---|
| Total | 226,165 | 187,709 | 38,456 | Nevada | 5,422 | 5,113 | 309 |
| | | | | New Hampshire | 806 | 683 | 123 |
| | | | | New Mexico | 10,272 | 9,246 | 1,026 |
| | | | | New York | 13 | 13 | --- |
| Alabama | 1,275 | 641 | 634 | North Carolina | 3,166 | 1,154 | 2,012 |
| Alaska | 20,777 | 20,622 | 155 | North Dakota | 1,106 | 1,106 | (z) |
| Arizona | 11,937 | 11,271 | 666 | Ohio | 833 | 168 | 665 |
| Arkansas | 3,495 | 2,467 | 1,028 | | | | |
| California | 24,314 | 20,328 | 3,986 | Oklahoma | 461 | 291 | 170 |
| Colorado | 15,909 | 14,386 | 1,523 | Oregon | 17,445 | 15,593 | 1,852 |
| Connecticut | (z) | (z) | -- | Pennsylvania | 743 | 507 | 236 |
| | | | | South Carolina | 1,380 | 607 | 773 |
| Florida | 1,224 | 1,082 | 142 | South Dakota | 2,269 | 1,995 | 274 |
| Georgia | 1,912 | 857 | 1,055 | Tennessee | 1,212 | 621 | 591 |
| Idaho | 21,653 | 20,290 | 1,263 | Texas | 1,836 | 781 | 1,055 |
| Illinois | 840 | 257 | 583 | | | | |
| Indiana | 645 | 181 | 464 | Utah | 9,129 | 8,046 | 1,083 |
| Kansas | 108 | 108 | -- | Vermont | 630 | 264 | 366 |
| Kentucky | 2,100 | 659 | 1,441 | Virginia | 3,228 | 1,608 | 1,620 |
| | | | | Washington | 10,026 | 9,070 | 956 |
| Louisiana | 1,017 | 597 | 420 | West Virginia | 1,861 | 962 | 899 |
| Maine | 94 | 52 | 42 | Wisconsin | 2,023 | 1,493 | 530 |
| Michigan | 4,870 | 2,709 | 2,161 | Wyoming | 9,691 | 9,252 | 439 |
| Minnesota | 5,466 | 2,787 | 2,679 | | | | |
| Mississippi | 2,311 | 1,139 | 1,172 | Puerto Rico | 56 | 28 | 28 |
| Missouri | 3,082 | 1,455 | 1,627 | Virgin Island | (z) | (z) | -- |
| Montana | 19,087 | 16,768 | 2,319 | | | | |
| Nebraska | 441 | 352 | 89 | | | | |

(continued next page)

TABLE 2 continued

- Represents zero. Z Less than 500 acres. [1]See footnote 2, table 1.

Source: U.S. Bureau of the Census, Statistical Abstract of the United States, 1978.

TABLE 3. TIMBER PRODUCTS--INDUSTRIAL ROUNDWOOD SUMMARY: 1950 TO 1977
(In millions of cubic feet, roundwood equivalent)

| YEAR | DOMESTIC PRODUCTION | | | | APPARENT CONSUMPTION | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | Total[1] | Lumber | Plywood and veneer | Pulp products | Total[2] | Lumber | Plywood and veneer | Pulp products | Miscellaneous[3] |
| 1950. . . . | 8,525 | [4]5,905 | 345 | [4]1,500 | 9,910 | 6,360 | 350 | 2,385 | 770 |
| 1955. . . . | 9,225 | [4]5,785 | 575 | [4]2,200 | 10,495 | 6,215 | 615 | 3,000 | 630 |
| 1960. . . . | 8,920 | [4]5,080 | 705 | 2,575 | 10,145 | 5,560 | 765 | 3,290 | 510 |
| 1965. . . . | 10,540 | 5,670 | 1,030 | 3,095 | 11,930 | 6,340 | 1,125 | 3,890 | 560 |
| 1970. . . . | 11,120 | 5,355 | 1,070 | 3,855 | 12,130 | 6,110 | 1,225 | 4,395 | 425 |
| 1971. . . . | 11,100 | 5,495 | 1,225 | 3,560 | 12,620 | 5,465 | 1,430 | 4,265 | 450 |
| 1972. . . . | 11,370 | 5,605 | 1,360 | 3,485 | 13,060 | 6,795 | 1,600 | 4,225 | 430 |
| 1973. . . . | 11,665 | 5,730 | 1,310 | 3,690 | 13,300 | 6,860 | 1,490 | 4,515 | 425 |
| 1974. . . . | 11,200 | 5,145 | 1,140 | 4,125 | 12,380 | 5,965 | 1,240 | 4,780 | 380 |
| 1975. . . . | 10,175 | 4,850 | 1,205 | 3,380 | 10,930 | 5,495 | 1,300 | 3,800 | 325 |
| 1976. . . . | 11,385 | 5,475 | 1,380 | 3,635 | 12,555 | 6,430 | 1,515 | 4,220 | 380 |
| 1977. . . . | 11,300 | 5,565 | 1,425 | 3,425 | 12,995 | 6,915 | 1,585 | 4,070 | 400 |

[1]Includes log exports and other products. [2]Includes log imports and other products. [3]Includes cooperage logs, poles and piling, fence posts, hewn ties, round mine timbers, box bolts, etc. [4]Excludes Alaska and Hawaii.

Source: U.S. Bureau of the Census, Statistical Abstract of the United States, 1978.

TABLE 4 continued

Z Less than 500,000 cubic feet. [1]Includes log exports and other products. [2]Includes log imports and other products. [3]Excludes Alaska and Hawaii. [4]Includes cooperage logs, poles and piling, fence posts, hewn ties, round mine timbers, box bolts, etc.

Source: U.S. Bureau of the Census, Statistical Abstract of the United States, 1978

of roundwood produced annually. In recent years the use of fireplaces as a supplemental source of heat has caused the downward trend to bottom out or reverse itself. Increasing costs of alternative sources of heat coupled with shortages of other fuels could cause a significant increase in the consumption of industrial roundwood as fuelwood in the years ahead. Fuelwood consumption is presently estimated 0.5 billion cubic feet.

Consumption for all products in 1977 increased to 13.0 billion cubic feet, roundwood equivalent, a 2 billion cubic feet increase since 1975 (table 3). Consumption in 1977 has increased toward the record high consumption reached in 1973 of 13.3 billion cubic feet. The major increase in consumption is due to the residential construction industry. More than one-third of the softwood lumber and plywood and substantial amounts of other forest products are consumed in the residential construction industry. Recent projections indicate a high demand for housing by the 1980's. These levels are expected to push annual levels above the levels of housing production in 1976 and 1977.[2] An increase in consumption of timber products is therefore also projected.

A graph of the totals of industrial roundwood production and consumption indicates the probable future trends of the forest industries (figure 1). The difference

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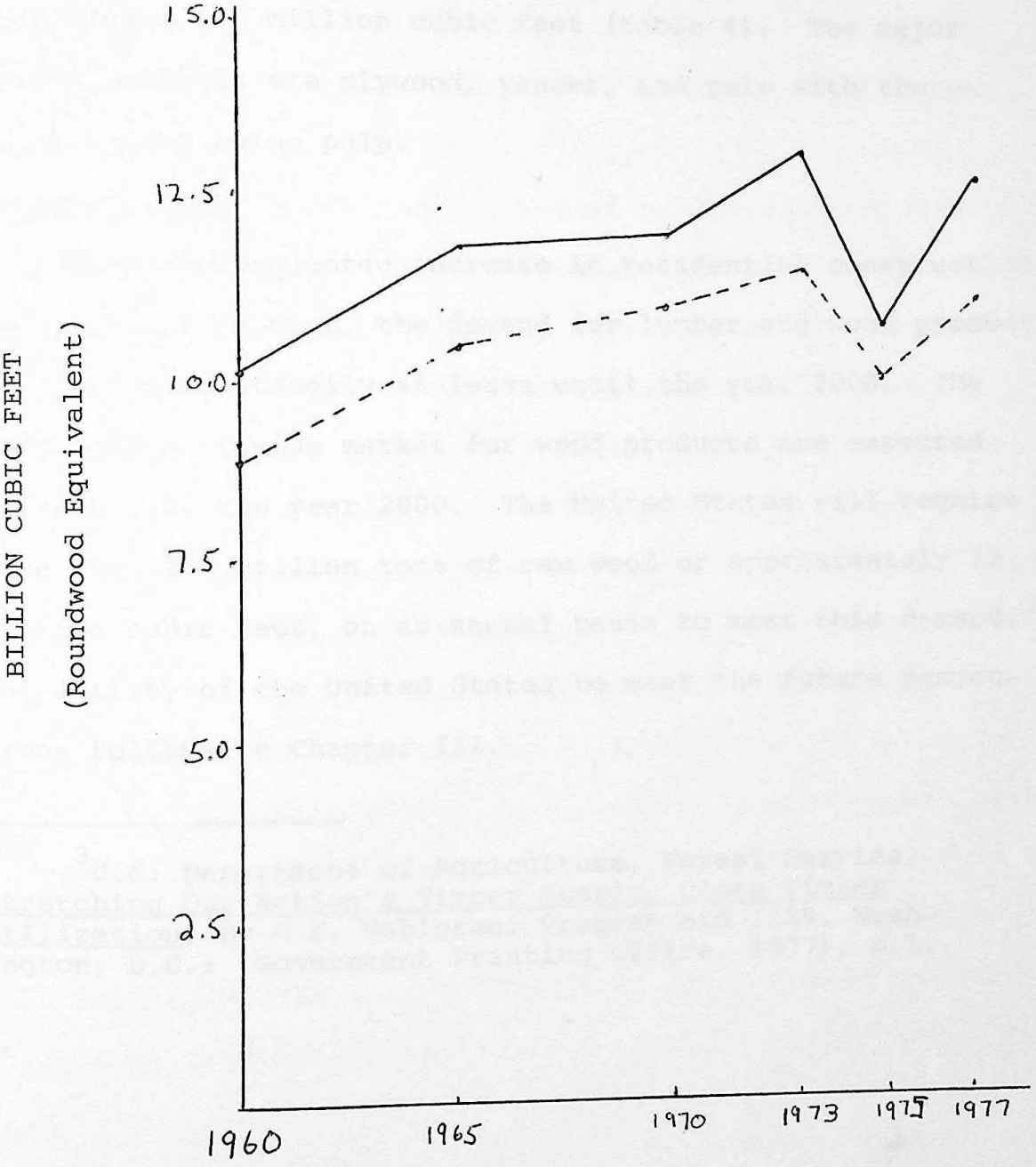
[2]Ibid., pp 2-3.

FIGURE 1

INDUSTRIAL ROUNDWOOD PRODUCTION

AND CONSUMPTION

FIGURES



between these two sets of figures is due to international trade. Both imports and exports have been increasing, however the preliminary figures for 1977, show imports at 3.2 million cubic feet while exports are less than half that figure 1.5 million cubic feet (table 4). The major import products are plywood, veneer, and pulp with the major export being pulp.

Future Outlook

With the projected increase in residential construction as its major impetus, the demand for lumber and wood products will increase steadily at least until the year 2000. The predicted worldwide market for wood products are expected to double by the year 2000. The United States will require more than 250 million tons of raw wood or approximately 22 billion cubic feet, on an annual basis to meet this demand.[3] The ability of the United States to meet the future projections follows in Chapter III.

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[3]U.S. Department of Agriculture, Forest Service, Stretching Our Nation's Timber Supply, Close Timber Utilization, by H.E. Wahlgren, Program aid 1189, Washington, D.C.: Government Printing Office, 1977), p.1.

## CHAPTER III

## THE FOREST PRODUCTS INDUSTRY: PROBLEMS AND SOLUTIONS

The projected demand for forest products along with rapidly increasing prices, is causing the Forest Products Industry to re-examine virtually every aspect of this industry. The demand is likely to increase more rapidly than supplies causing increased prices and possible market shortages. Rapid increases in timber product prices would also adversly affect consumers by raising the costs of houses, furniture and paper. With housing prices skyrocketing, fewer people will be able to afford adequate housing and government programs to improve the housing environment would become more expensive. Assuming a continuation of 1970 management levels in the forest products industry, the equilibrium prices in constant dollars at which softwood lumber demand and supply will balance by the year 2000 will at least double the general level that has prevailed from the 1950 to present. The

projected equilibrium price for paper and board in constant dollars will only increase from 15 to 20 per cent above present levels.[4]

Raising timber product prices to the levels mentioned above would induce substitution of other materials when possible. Substitution would have some adverse effect on the environment. Increased population levels associated with the increased manufacturing is a probable result. The energy requirement to produce these materials would be likely to tax the capacities of the utilities and increase prices. Mining of our valuable resources, which are non-renewable stocks of ores and energy material, would accelerate depletion. Once the depletion becomes readily apparent, the nation's focus would turn back to timber as it is a renewable resource.

Per Capita Consumption

Per capita consumption of timber products has a direct effect on the economics of the supply, demand and price dilemma presented. Per capita consumption in 1950 was 80.0 cubic feet per year. By 1975 consumption was down to 53.9 cubic feet. 1976 consumption increased to 61.2 cubic feet and 1977 preliminiary figures indicate an approximate level of 62.9 cubic feet (table 5). Per capita consumption can

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[4]U.S. Department of Agriculture, Forest Service. The Demand and Price Situation for Forest Products 1976-77, by Robert B. Phelps, Miscellaneous Publication No. 1357 (Washington, D.C.: Government Printing Office, 1977) pp.10-11.

TABLE 5 PER CAPITA CONSUMPTION OF TIMBER PRODUCTS, BY MAJOR PRODUCT, 1950 TO 1977[1]

| YEAR | All products | Industrial, roundwood used for-- | | | | | | | | | Fuelwood |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Total | Lumber | | Plywood and veneer | | Pulp products | | Miscellaneous products[2] | | |
| | Cubic feet | Cubic feet | Cubic feet | Board feet (lumber tally) | Cubic feet | Board feet (local log rule) | Cubic feet | Cords | Cubic feet | Cubic feet | Cords |
| 1950. . . | 80.0 | 65.1 | 41.8 | 269 | 2.3 | 13.5 | 15.6 | 0.2 | 5.1 | 14.9 | 0.2 |
| 1951. . . | 78.6 | 64.2 | 38.9 | 250 | 2.6 | 14.9 | 17.8 | .2 | 4.7 | 14.4 | .2 |
| 1952. . . | 75.8 | 63.0 | 38.7 | 249 | 2.8 | 16.3 | 16.9 | .2 | 4.4 | 12.7 | .2 |
| 1953. . . | 74.5 | 62.6 | 37.7 | 243 | 3.1 | 18.1 | 17.3 | .2 | 4.2 | 12.0 | .2 |
| 1954. . . | 72.3 | 61.0 | 36.8 | 237 | 3.1 | 18.3 | 16.8 | .2 | 4.0 | 11.3 | .2 |
| 1955. . . | 73.8 | 63.3 | 37.5 | 242 | 3.7 | 21.9 | 18.1 | .2 | 3.8 | 10.5 | .1 |
| 1956. . . | 74.6 | 64.8 | 37.5 | 242 | 3.7 | 22.1 | 19.9 | .3 | 3.6 | 9.8 | .1 |
| 1957. . . | 65.9 | 56.8 | 31.6 | 204 | 3.5 | 20.8 | 18.2 | .2 | 3.4 | 9.1 | .1 |
| 1958. . . | 64.0 | 55.5 | 31.9 | 206 | 3.8 | 22.7 | 16.5 | .2 | 3.2 | 8.5 | .1 |
| 1959. . . | 68.2 | 60.4 | 35.2 | 228 | 4.4 | 26.6 | 17.6 | .2 | 3.0 | 7.8 | .1 |
| 1960. . . | 63.3 | 56.1 | 30.8 | 199 | 4.2 | 25.4 | 18.2 | .2 | 2.8 | 7.2 | .1 |
| 1961. . . | 61.0 | 54.4 | 29.9 | 193 | 4.5 | 26.9 | 17.3 | .2 | 2.7 | 6.6 | .1 |
| 1962. . . | 62.0 | 56.0 | 30.9 | 200 | 4.7 | 28.2 | 17.8 | .2 | 2.5 | 6.0 | .1 |
| 1963. . . | 63.3 | 57.7 | 32.0 | 207 | 5.0 | 30.3 | 17.9 | .2 | 2.7 | 5.6 | .1 |
| 1964. . . | 65.0 | 59.9 | 32.9 | 213 | 5.5 | 32.9 | 8.7 | .2 | 2.8 | 5.1 | .1 |
| 1965. . . | 66.1 | 61.4 | 32.7 | 212 | 5.8 | 34.9 | 20.0 | .3 | 2.9 | 4.7 | .1 |
| 1966. . . | 65.8 | 61.5 | 32.0 | 207 | 5.8 | 35.1 | 20.7 | .3 | 2.9 | 4.3 | .1 |
| 1967. . . | 62.4 | 58.5 | 30.1 | 195 | 5.7 | 34.4 | 20.0 | .3 | 2.6 | 3.9 | .1 |
| 1968. . . | 64.8 | 61.3 | 31.9 | 207 | 6.4 | 38.6 | 20.5 | .3 | 2.4 | 3.5 | (4) |
| 1969. . . | 64.1 | 61.0 | 31.3 | 212 | 6.0 | 36.2 | 21.5 | .3 | 2.2 | 3.1 | (4) |

(continued next page)

*TABLE 5 continued*

| | Cubic feet | Cubic feet | Cubic feet | Board feet (lumber tally) | Cubic feet | Board feet (lumber tally) | Cubic feet | Cords | Cubic feet | Cubic feet | Cords |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1970. . . | 62.1 | 59.5 | 29.8 | 193 | 6.0 | 36.1 | 21.5 | .3 | 2.1 | 2.6 | (4) |
| 1971. . . | 63.4 | 61.0 | 31.2 | 210 | 6.9 | 41.8 | 20.6 | .3 | 2.2 | 2.4 | (4) |
| 1972. . . | 65.0 | 62.7 | 32.5 | 219 | 7.7 | 46.1 | 20.2 | .3 | 2.1 | 2.3 | (4) |
| 1973. . . | 65.6 | 63.2 | 32.6 | 219 | 7.1 | 42.7 | 21.5 | .3 | 2.0 | 2.4 | (4) |
| 1974. . . | 60.9 | 58.4 | 28.2 | 189 | 5.9 | 35.6 | 22.6 | .3 | 1.8 | 2.5 | (4) |
| 1975. . . | 53.9 | 51.2 | 25.7 | 173 | 6.1 | 37.1 | 17.8 | .2 | 1.5 | 2.7 | (4) |
| 1976. . . | 61.2 | 58.4 | 29.9 | 201 | 7.1 | 42.9 | 19.6 | .3 | 1.8 | 2.8 | (4) |
| 1977[3]. . . | 62.9 | 59.9 | 31.4 | 213 | 7.3 | 44.5 | 18.8 | .2 | 1.8 | 2.9 | (4) |

1. Data may not add to totals because of rounding
2. Includes cooperage logs, poles and piling, fenceposts, hewn ties, round mine timbers, bos bolts, excelsior bolts, chemical wood, shingle bolts, and miscellaneous items.
3. Preliminary
4. Less than .05 cord.

Sources: Based on data published by the U.S. Departments of Commerce and Agriculture. Data for 1900-49 in The Demand and Price Situation for Forest Products, 1964, table 3.

be slowed or even reduced by reusing paper and board. All increases in price of forest products will act as an incentive for consumers to conserve and recycle the forest products. Other methods which meet the projected growth in demand follow.

This paper presents three possibilities for meeting the projected growth in demand for timber:

Increase the net volume of imports, improve the use of timber once harvested, and grow more timber.

Increasing the Net Volume of Imports

Canada has the timber resources to supply a large portion of softwood lumber and pulp products to the United States. The needed hardwood resources are contained in the tropical regions of the world. In both cases, most of the unused resources are in undeveloped regions or regions without the necessary transportation systems, sawmills, manufacturing plants and other needed facilities. To develop these areas profitably, a substantial increase in product price would occur.

Western Europe and Japan are the major recipients of U.S. timber exports. These areas are projected to need additional imports in the future. Reducing net exports to these countries appears improbable.

The continued timber demands of Western Europe and Japan combined with the higher costs involved in using

the timber resources in Canada dictate that a significant change is unlikely unless domestic prices increase. These prospective increases of domestic prices will have a relatively insignificant effect in relation to the projected increase in demand.

Improving the use of Harvested Timber

A portion of the projected increase in demand for forest products can be achieved by improving the use of harvested timber. These practices are known as close timber utilization techniques. It is estimated that 9.6 billion cubic feet of wood residues are left in the commerical U.S. forest annually, in addition, a huge backlog of salvageable dead material has been accumulating. It is estimated that 6 of the 9.6 billion cubic feet of residues left in the forest each year could be made into usable products.[5] The residues left in the forest consist of burned and diseased material, tops, limbs, and cull from logging slash and land clearing and thinning practices. In addition, undesirable species are often left in the forest which occupies needed land. Unused residues are also found at primary manufacturing plants.

Substantial improvements in use of harvested timber have taken place during the 1950-76 period (table 6). During

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[5] U.S. Department of Agriculture, Forest Service, Stretching Our Nation's Timber Supply, Close Timber Utilization, by H.E. Wahlgren, Program aid 1189, Washington, D.C.: Government Printing Office, 1977), p.1.

this period, the tonnage of all forest products consumed increased by approximately 6 per cent while the tonnage of products from industrial roundwood consumed increased by approximately 50 per cent. A major contributor to this increase is the growing use of slabs, edgings, veneer cores, sawdust, and other material for the manufacture of pulp, particleboard and other products such as charcoal[6]. Additional improvements of close timber utilization techniques both in the forest and at the manufacturing plants can help in stretching the use of harvested timber.

Growing More Timber

As a renewable stock, timber presents us with a unique raw material in contrast to the options of using stocks. Phelps best exemplified this when he said:

> Through intensified management and research it would be possible in time to more than double present net annual growth.
>
> There are opportunities for increasing growth on all types of forest ownerships. For example, net annual growth on the 67 million acres of commercial timberland in forest industry ownerships averaged only 52 cubic feet per acre in 1970--about 60 per cent of the average attainable in fully stocked natural stands and less than a third of that attained in some intensively managed plantations.
>
> There is a major opportunity to increase timber growth on the 296 million acres of commercial forest land in farm and miscellaneous private ownerships. Management of most of these lands for timber production

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[6]U.S. Department of Agriculture, Forest Service. The Demand and Price Situation for Forest Products 1976-77, by Robert B. Phelps, Miscellaneous Publication No. 1357 (Washington, D.C.: Government Printing Office, 1977), pp.10.

> is limited and average net annual growth per acre--36 cubic feet in 1970--is far below potential. Because of short planning horizons, limited capital, lack of technical forest management skills, and other programs, the realization of any substantial increase in growth on these ownerships will require large public technical assistance and cost sharing programs.[7]

In 1973, the U.S. Forest Service continually documented the fact that national forest and nonindustrial private lands could provide much more additional wood through intensive culture techniques which is a method intensified forest management. Recent studies placed relatively less emphasis on opportunities for intensive culture techniques for industrially managed land.[8] Industry lands have a high degree of owner control and a record of substantial investments. For this reason, the owners of the industrial lands have the motivation and ability to use intensive culture techniques; it pays best.

A study of twelve intensive culture techniques was conducted in 1975 for the forest industry in the North.[9] Trends in the recent past and anticipated future of the following practices were surveyed: Short rotation or silage, intensified protection, genetic improvement,

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[7] Ibid., p.11.

[8] U.S. Department of Agriculture, Forest Service, Intensive Culture on Northern Forest-Industry Lands: Trends, Expectations, and Needs, by David A. Gansner, Owen W. Herric, and Dietmar W. Rose, Research Paper NE-371, (Washington, D.C.: Government Printing Office, 1977), p.1.

[9] Ibid.

drainage, fertilization, irrigation, weed control, site preparation, species conversion, timber-stand improvement, precommerical thinning, and commerical thinning (figure 2). Responses to the questions concerning the adequacy of current information and priorities for research and development are summarized in figure 2. The key finding is that industrial managers express a high priority need for more knowledge about genetic tree improvement, site preparation, fertilization, and species conversion. The major sources for intensive culture practices are also summarized (figure 3). Generally, industrial managers rely heavily on universities and the Federal and State governments to provide industry with the most recent information. The remaining key findings are:

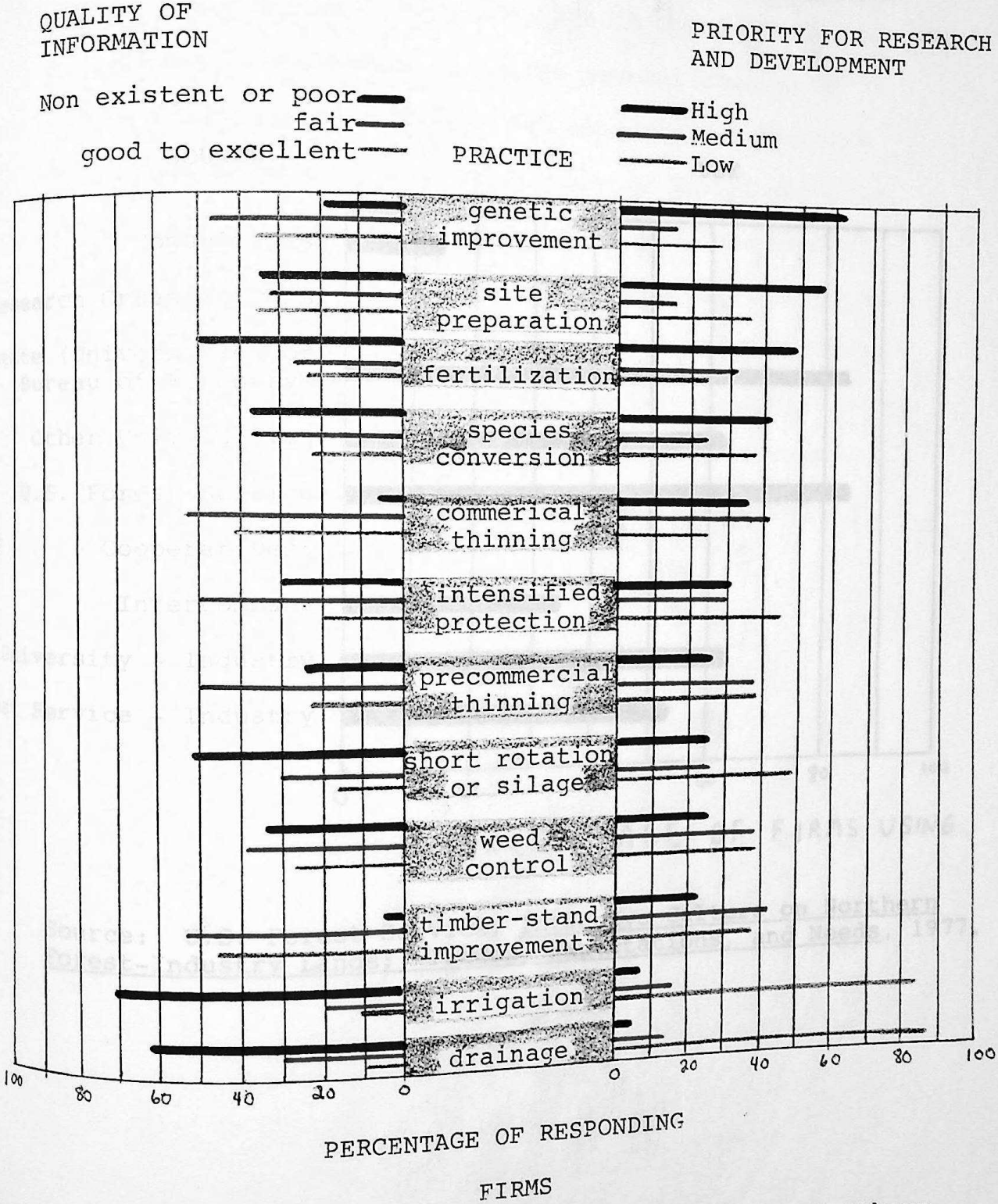
1. Estimated increases in recent annual harvests due to intensive culture averaged about 4 per cent.

2. During the next decade, increases in annual harvests due to intensive culture are expected to average about 9 per cent.

3. Increased harvests from intensive culture on industrial lands will increase total annual wood harvests in the North by no more than 2 per cent in the next decade.

FIGURE 2

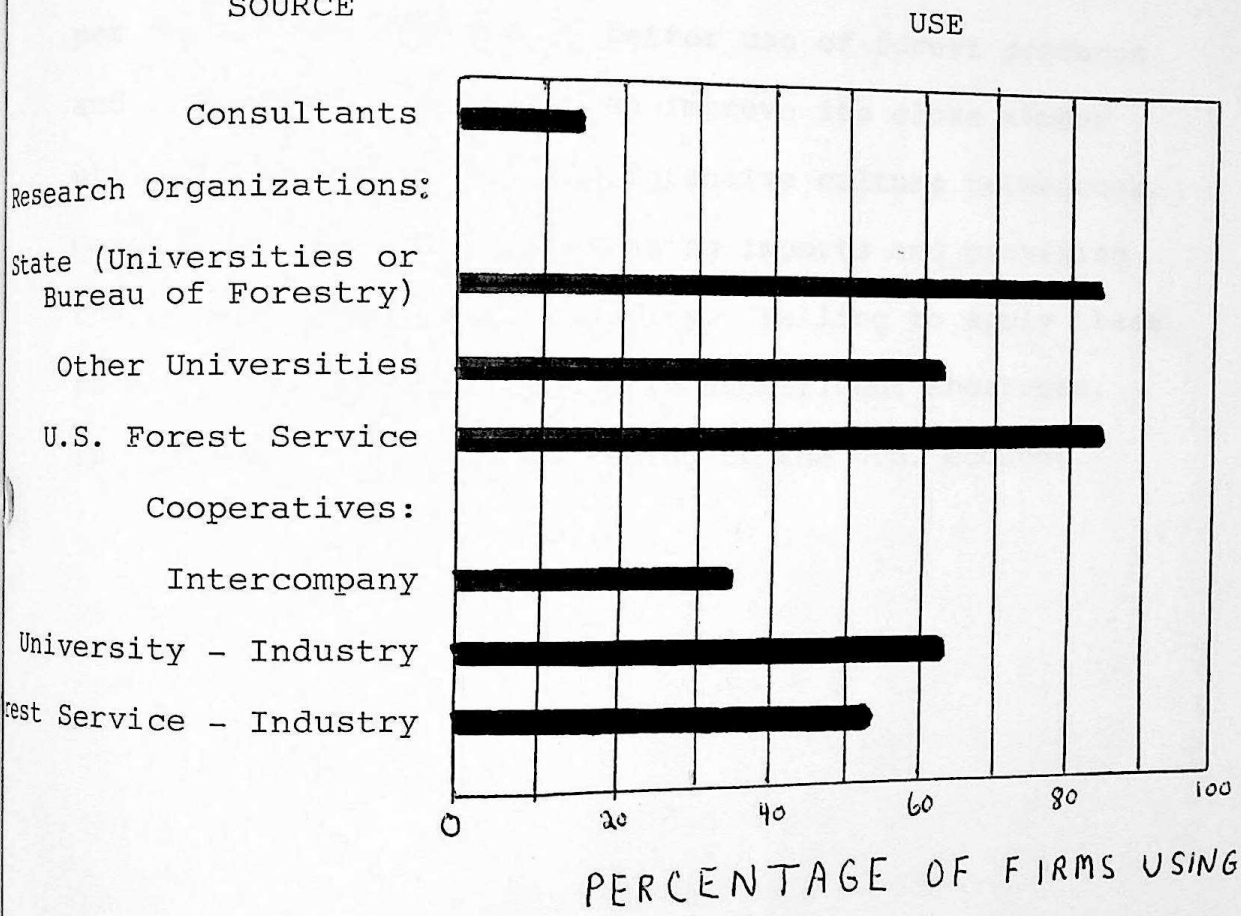
Quality of current information and priorities for research and development of intensive-culture practices in the North.




Source: U.S. Forest Service, Intensive Culture on Northern Forest-Industry Lands: Trends, Expectations, and Needs, 1977.

FIGURE 3.

Source of outside information for decisions about intensive-culture practices in the North.




Source: U.S. Forest Service, Intensive Culture on Northern Forest-Industry Lands: Trends, Expectations, and Needs, 1977.

## Future Outlook

Inflation demand and increased operating costs will affect the price of timber products in the future. To prevent rapid increases of prices several courses of action have been presented. The consumer can decrease per capita consumption by better use of forest products and recycling. Industry can improve its close timber utilization techniques and intensive culture techniques. Government can act by increasing imports and providing the needed research to industry. Failing to apply these recommendations will result in significant shortages, spiraling costs and a weakening of the U.S. economy.

# CHAPTER IV

## SUMMARY AND CONCLUSIONS

This study has attempted to fulfill the stated objectives discussed in Chapter I. Chapter II has established that the majority of timber land is owned privately, that the National Forest System has large reserves of timber land, of which only a portion is available for timber harvesting, and that industrial roundwood production and consumption is increasing. Moreover, all of the present trends are likely to continue. In Chapter III, it was shown that there is a need for the United States to face the problem of meeting projected demand for forest products in the future and supplying them at a reasonable price. The solution was presented after an analysis of the complexities of the various components. Recommendations were given as to the appropriate courses of action for government, industry and consumer.

This study having presented the above, concludes that the implementation of the proposals will lead to an adequate supply of lumber at a reasonable cost for the present

and future years. The overall benefit of implementation of these proposals will assist in assuring the continued well being of the consumer, the government, and the timber industry.

# APPENDIX

## DEFINITIONS

Forest Land -- To be classified as forest land, an area must be at least 10 per cent stocked by forest trees of any size, or formerly having had such tree cover and not currently developed for nonforest use. Includes chaparral areas in the West and afforested acres. The minimum area for classification of forest land is 1 acre. Roadside, streamside, and shoulder belt strips of timber must have a crown width at least 120 feet wide to qualify as forest land. Unimproved roads and trails, streams, and clearings in forest areas are classed as forest if less than 120 feet in width.

Commercial Timber Land -- Forest land which is producing or is capable of producing crops of industrial wood and not withdrawn from timber utilization by statute or administrative regulation. Includes areas suitable for management to grow crops of industrial wood generally capable of producing in excess of 20 cubic feet per acre of annual growth. Includes both accessible and inaccessible areas.

Net Growing Stock Volume -- The net volume in cubic feet of live sawtimber and pole timber trees from stump to a minimum 4-inch top (of central stem) outside bark or to the point where the central stem breaks into limbs.

Gross Area Under Forest Service Administration -- The Federal Government seldom has complete ownership of all the land within the national forests and other units under administration of the Forest Service. Parts of such units are under private, State, county and municipal ownership, or under the jurisdiction of a Federal agency other than the Forest Service. Gross area under Forest Service administration is thus the net area in the units owned by the United States and administered by the Forest Service. National forests comprise the largest part of this net area, accounting for 98 per cent of the total in 1970. National grasslands, administered under Title III of the Bankhead-Jones Farm Tenant Act account for most of the remainder.

Forest Product Raw Materials - Production, Imports, Exports, and Consumption in Constant 1967 Dollars -- This is based on statistics compiled by the Forest Service and the Bureau of the Census. Forest products classes were combined into three major groups: Saw logs, pulpwood, and other forest products. The other forest products series include: veneer logs, fuelwood (roundwood), other (except naval stores), turpentine, and rosin. These seven product

classes, measured in physical quantity units were combined by means of unit-value weights. The basic unit values of forest products at first point of market were supplied by the Forest Service or, for naval stores, taken from reports of the Agricultural Marketing Service, Department of Agriculture. The quantity of production, imports, and exports series used were as compiled by the Forest Service and AMS, although the basic import and export series, and part of the production series were collected by the Bureau of the Census.

The production series represent about 99 per cent of the total value of forest products from the United States (excluding Hawaii). The major item not included is Christmas trees. (Maple syrup and maple sugar are covered in the agricultural production series rather than in forest products.) Other minor forest products excluded are tanbark, holly, mistletoe, ferns, wild nuts, and balsam.

Per Capita Consumption -- These figures were derived by dividing the apparent consumption of each product or group of products by total population, including Armed Forces overseas, as of July 1 each year until 1976 when using as of October 1 began.

Apparent Consumption -- This is production plus imports minus exports.

Precommercial Thinning -- A thinning made in immature stands for the purpose of increasing the growing-space of residual trees. No merchantable products are removed.

Timber-Stand Improvement -- This includes treatments imposed on intermediate-age stands to improve stand composition, condition, or growth rate. It may be accomplished by cutting, girdling, or poisoning of undesirable trees.

Commercial Thinning -- This differs from precommercial thinning in that merchantable products are removed in the thinning. It also may be done to salvage merchantable stems that would be lost through mortality.

Fertilization -- Application of fertilizers to forest stands for the purpose of accelerating their growth rate.

Site Preparation -- Action taken for the primary purpose of improving survival and growth rate of a new stand. Site preparation includes prescribed fire, herbicide application, and various mechanical measures; it does not include broadcast burning done primarily for fuel reduction or slash disposal.

Species Conversion -- Actions taken to change the composition of a stand from one species type to another (for example, from hardwood to pine).

Genetic Improvement -- Any of several approaches aimed at improving the quality of reproductive material (seeds, cuttings, seedlings) used in establishing new stands.

Weed Control -- Operations aimed at suppressing or eliminating competition from undesirable vegetation during the early stages of a forest crop. Weed control includes cultivation and application of herbicides (including release of conifers from brush and hardwood competition).

Short-Rotation or Silage -- Coppice management of hardwoods at close spacing; for example, sycamore silage on rotations or cutting cycles of 10 years or less.

Drainage -- Removal of excess water from sites to enhance survival and growth of forest crops.

Irrigation -- Addition of water to sites for the purpose of increasing growth of forest crops.

Intensified Protection -- Includes special measures to reduce losses associated with disease, insects, animals and fire. Standard fire protection does not qualify as intensified protection.

Close Timber Utilization (CTU) -- Stretching our Nation's timber supply to meet growing demands in a manner consistant with responsible management of the forest ecosystem.

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