

BALANCING GROWTH, HARVEST, AND CONSUMPTION OF HARDWOOD RESOURCES IN THE NORTH CENTRAL REGION

Stephen R. Shifley

North Central Research Station
USDA Forest Service
Columbia, Missouri

Neal Sullivan

Department of Forestry
University of Missouri
Columbia, Missouri

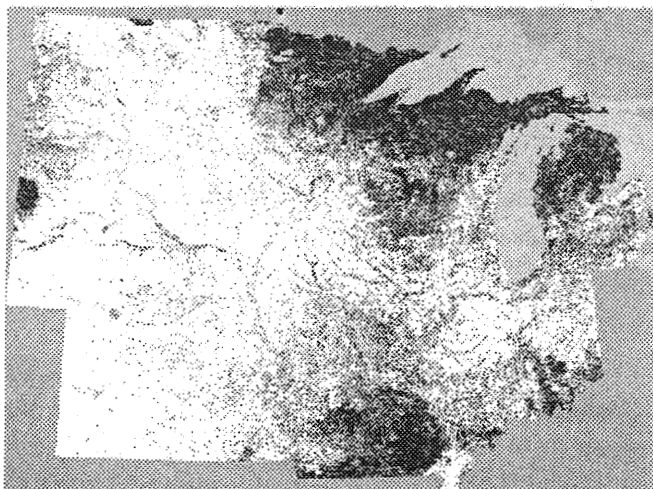
ABSTRACT

The volume of timber in the North Central Region of the United States (IN, IL, IA, MN, WI, MI) has more than doubled since 1950. Annual growth of growing stock on timberland is about 2.3 billion cubic feet (8.5 billion board feet). Removals from growing stock are about 1.1 billion cubic feet (3.4 billion board feet). However, the people who live in the region consume the equivalent of 3.4 billion cubic feet of timber products annually. When considering forest sustainability at local, regional, national and global scales it is also important to be aware of the balance among growth, removals and consumption at each of these scales.

INTRODUCTION

Forest sustainability is a complex issue. In the Midwest, foresters have learned to do a good job managing individual stands and larger forest ownerships for sustainable timber production. But other aspects of sustainability such as maintaining biodiversity or understanding the implications of forest fragmentation are much more complex. Public lands are frequently the focus of discussion and debate about how to manage forests sustainably. Often those discussions are focused on management of individual forest tracts. It is useful to occasionally step back and look at the regional and national context in which our forests exist. This paper provides an overview of the forest resources in the North Central Region of the United States. It presents information on forest area, volume, growth, and harvest. It also examines the consumption of timber products by the people who live in the region and raises questions about the balance among growth, harvest and consumption.

Figure 1. Forest cover in the North Central United States. Forest cover by state is as follows: Indiana 19 percent, Illinois 11 percent, Missouri 30 percent, Iowa 5 percent, Minnesota 29 percent, Wisconsin 45 percent, Michigan 51 percent. (Graphic by Dan Wendt, Forest Inventory and Analysis, North Central Research Station, St. Paul, MN)



INVENTORY AND GROWTH

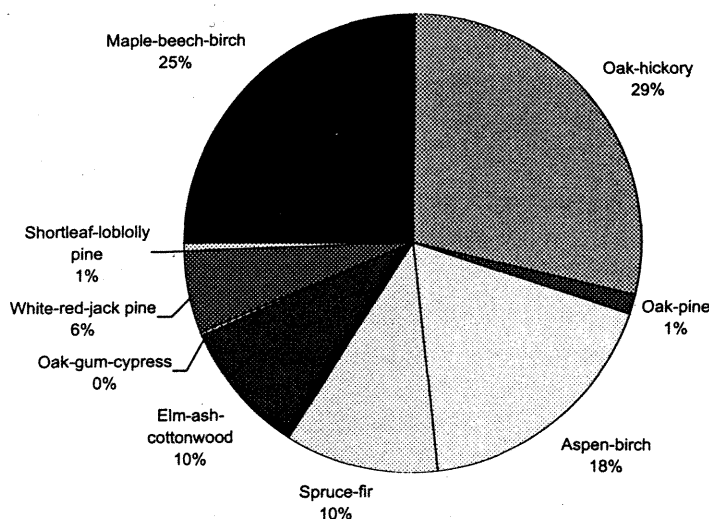
Approximately one-third of the United States (737 million acres) is forested and the forest acreage has changed little since the 1920s. One-fifth of the United States (490 million acres) is classified as timberland – forestland capable of producing at least 20 cubic feet of wood per acre per year and where timber harvest is not administratively or legislatively prohibited. Fourteen percent of U.S. timberland (73 million acres) falls in the North Central Region (i.e., Indiana, Illinois, Missouri, Iowa, Minnesota, Wisconsin, and Michigan.). The proportion of timberland in these states ranges from 5 percent in Iowa to 51 percent in Michigan (Figure 1). For comparison, the combined area of cropland and pasture in these seven states is approximately double the area of timberland.

Table 1. Volume of growing stock on timberland for the top 10 species, North Central Region. Based in individual state inventories made from 1985 to 1998.

<u>Species</u>	<u>Cubic foot volume (billion)</u>	<u>Board foot volume (billion, Intl ¼")</u>
Northern red oak	19	5
Sugar maple	18	8
Quaking aspen	17	8
White oak	17	5
Black oak	12	3
Red maple	11	6
Red pine	11	3
Northern white-cedar	9	3
American basswood	8	3
Paper birch	4	3
Total for top 10	126	47
All other species	104	36

The volume of timber in the North Central Region is substantial: 84 billion cubic feet or 235 billion board feet of growing stock timber on timberland. If those cubic feet were stacked on end they could circle the earth more than 600 times. About 80 percent of that volume is in hardwoods (Table 1). Oak-hickory is the predominant forest cover type. It covers 29 percent of the timberland area in the North Central region and more than 64 percent in Indiana, Illinois, and Missouri. The maple-beech forest type occurs on 25 percent of the region's timberland, followed by aspen at 18 percent (Figure 2).

Figure 2. Area of timberland by forest cover type in the North Central Region. Total area is 73 million acres



Net annual growth of growing stock in the North Central Region is about 2.3 billion cubic feet annually, an amount equivalent to 2.9 percent of the standing inventory. In terms of board feet, annual growth is 3.8 percent of standing inventory or 8.5 billion board feet (percentage is greater for board feet as it includes only those conifer trees with dbh's greater than 9 inches and deciduous trees with dbh's greater than 11 inches).

This estimate of net growth is for growing stock trees on timberland. It is adjusted for losses due to natural causes (e.g., competition, wind, disease) but does not include adjustments for timber harvesting; those are discussed later. In the past decade, the greatest net increase in volume per state occurred in Michigan, the state with the greatest timberland area. But the greatest mean growth per acre occurred in Indiana which has fewer acres of timberland, but the forests are mature and are on comparatively high quality sites. According to the latest state-wide inventories, the mean growth per acre for the North Central Region was 32 cubic feet per acre or 116 board feet per acre annually. Corresponding values for Indiana were 52 cubic feet per acre and 217 board feet per acre annually. These and many other statistics about forests in the North Central Regions can be found or generated at the Forest Inventory and Analysis web sites (U.S. Forest Service 2001a, b, c)

HARVEST

Removals of growing stock trees on timberland in the North Central Region are approximately 1.1 billion cubic feet (3.4 billion board feet) annually. Removals include timber harvested for products as well as removals for land clearing or development. Overall, growth of growing stock is 2.1 times greater than removals. In addition to the 1.1 billion cubic feet of removals from growing stock trees on timberland, additional non growing stock trees and trees that are not on timberland are harvested and utilized. These include trees with poor form or of noncommercial species that are used for low-value products or fuel and trees from non-forest areas such as shelterbelts or wooded pastures.

There are more than 2200 primary processing mills in the North Central Region. Nearly 2000 of these are sawmills of various sizes. The volume of wood processed by the 39 pulp mills in the region is nearly equal to the total volume processed by all the sawmills. Each category accounts for about 31 percent of roundwood use. The remaining 38 percent of removals are used to produce composite panels (12 percent), veneer (2 percent), fuel (22 percent), and other products (2 percent).

As a consequence of growth exceeding removals in the North Central Region for the past 50 years, the volume of standing timber on timberland has more than doubled from 37 to 83 billion cubic feet. Board foot inventories in the North Central Region increased from 86 to 230 billion board feet over the same period.

CONSUMPTION

We each consume the equivalent of 73 cubic feet of wood annually (Howard 1999). Total U.S. consumption is nearly 20 billion cubic feet per year. The 46 million people in the North Central Region consume the equivalent of 3.4 billion cubic feet of wood annually, or 17 percent of the nation's total. Consumption by the people who live in the region is far greater than the growth of growing stock on timberland (2.3 billion cubic feet) or the removals for timber and other purposes (1.1 billion cubic feet). U.S. per capita consumption of timber products is more than three times the world average of 21 cubic feet (Gardner-Outlaw and Engelman 1999).

Over the past 10 years, annual consumption of timber products has varied between 73 and 82 cubic feet per capita (Howard 1999), but total consumption is expected to continue to increase as the U. S. population increases by an expected 60 million people in the next 25 years (U.S Census Bureau 2001). The U.S. is a net importer of about 10 percent of the timber products we consume.

DISCUSSION

A primary condition of sustainability is that the amount of timber harvested should not exceed growth. Clearly, growth in the North Central region exceeds harvest by a substantial margin and has done so for the past 50 years, allowing timber volumes to accumulate. There are, of course, many other factors that relate to sustainable forestry (e.g., Woodley et al.) but the ratio of growth to harvest is one important, measurable index. Consumption is a factor that is receiving increased attention in discussions of sustainable forestry (MacCleery, 2000) and one that we could consider more explicitly in the North Central Region. In the past, consumption of forest products by the people who live in a region has not been factored into thinking about local sustainability.

However, in the North Central Region:

- We hold 14 percent of the nation's timberland.
- We grow 10 percent of the nation's wood.
- We harvest 9 percent of the nation's wood.
- We consume 17 percent of the nation's wood.

With a global economy it is not realistic to think that the forests of North Central Region could produce all the timber products consumed by the people who live there. But it is reasonable, in the context of national and international forest resources, to consider how much timber the North Central Region could produce under alternative future scenarios. It is important to consider the future ecological and social ramifications of various levels of regional timber production. There are both local and global considerations associated with decisions to grow and harvest more (or less) timber locally.

The issues are complex. For example, although the physical supply of wood on timberland in the North Central Region is large, it may or may not be economically available under prevailing market conditions. Or the 1.3 million private landowners that hold the majority of timberland in the region may or may not be inclined to sell timber.

Currently, the forests of the South, Southeast, and the Pacific Northwest provide the majority of wood and paper products that are consumed in the United States. Draft projections of long term U.S. timber supply and demand have recently been completed through 2050 as part of the Resources Planning Act (RPA) Timber Assessment. These detailed RPA projections are based on trends in forest change, in economic conditions, in technological improvements in timber processing, and many other factors. The draft RPA projections show a scenario for the next 50 years where: U.S timber harvest increases by 38 percent; Eastern timber harvest increases from 79 percent to 83 percent of total U.S. harvest; Southern forests account for 60 percent of U.S. harvest; the expanding consumption of wood and paper products continues to be predominantly drawn from domestic timber supplies; and imports increase in a total volume but decrease as a percent of total consumption (Haynes et al. 2000, Haynes 2001). Projections indicate that by 2050 the hardwood harvest in the North Central and Northeastern U.S. is expected to increase from 2.9 to 4.3 billion cubic feet.

In the coming decades we will certainly witness conflicts over forest management practices and timber harvesting. We will also have better data and better opportunities to consider our own role in the growth, production, and consumption of forest resources at multiple spatial scales: from local to state to regional to national to global. Contemplation of the future raises a number of interesting and important questions about how we manage and utilize wood locally within the context of all the commodities and amenities that forests provide. Specifically, we might consider for the North Central Region:

- How much wood will we consume?
- How much wood can we produce?
- How much wood should we produce?
- What will the larger forest landscape be like at various levels of growth and harvest?
- What is the local impact on forest ecosystems if we locally grow and harvest more timber?
- What is the global impact on forest ecosystem sustainability if we do not?

Most of these questions are difficult to answer definitively, but they are questions that we should consider whether we are landowners, wood processors, land managers, or consumers.

ACKNOWLEDGEMENT

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FOR FURTHER READING

The library of on-line publications at the North Central Research Station includes many of the individual state forest inventory publications. <http://www.ncrs.fs.fed.us/> (May 7, 2001)

Or for paper copies contact:

Publications Distribution
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A thought-provoking series of articles and replies related to consumption of forest resources can be found in the October, 2000, issue of the Journal of Forestry:

Goetzl, A. 2000. Consumption and concerns: a delicate balance. *J. For.* 98:19-21.

Lemons, J. 2000. The heavy footprint-and moral burden-of consumers. *J. For.* 98:15-18.

Luzadis, V. A. 2000. On consumption and the land ethic: a moral and professional imperative. *J. For.* 98:16-18

MacCleery, D. W. 2000. Aldo Leopold's land ethic: is it only half a loaf? *J. For.* 98:5-7

Skog, K. E. and P. J. Ince. 2000. Industrial ecology and sustainable forestry. *J. For.* 98:20-21.

Wernick, I. K., P. E. Waggoner, and J. H., Ausubel. 2000. The foresters lever; industrial ecology and wood products *J. For.* 98:8-14