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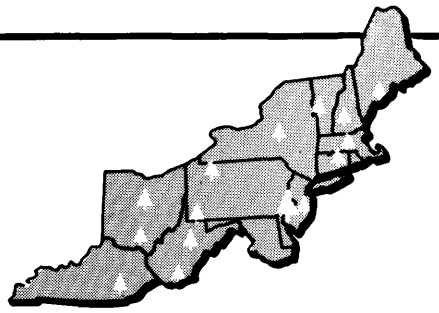

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LAND CLEARING AND WOOD USE IN DELAWARE, 1972

Abstract.—Changing land use often results in removal of the existing forest cover. During a resurvey of Delaware's timber resources, a study was made to measure the losses of wood fiber that resulted from forest land clearing. It was estimated that nearly 33 million cubic feet of growing stock was destroyed on the 37,000 acres of commercial forest land that was cleared between 1954 and 1968.

The Boston-Washington megalopolis boasts one of the greatest concentration of cities on earth. Yet the states that make up this region are in the aggregate nearly 50 percent forested. As urbanization spreads into the outlying woodlands, most suburban residents see little evidence of planning for the orderly harvesting or utilization of trees from the woodlands. They are aware that trees are being removed, but have no knowledge of the actual quantity of wood removed nor the quantity recovered for use.

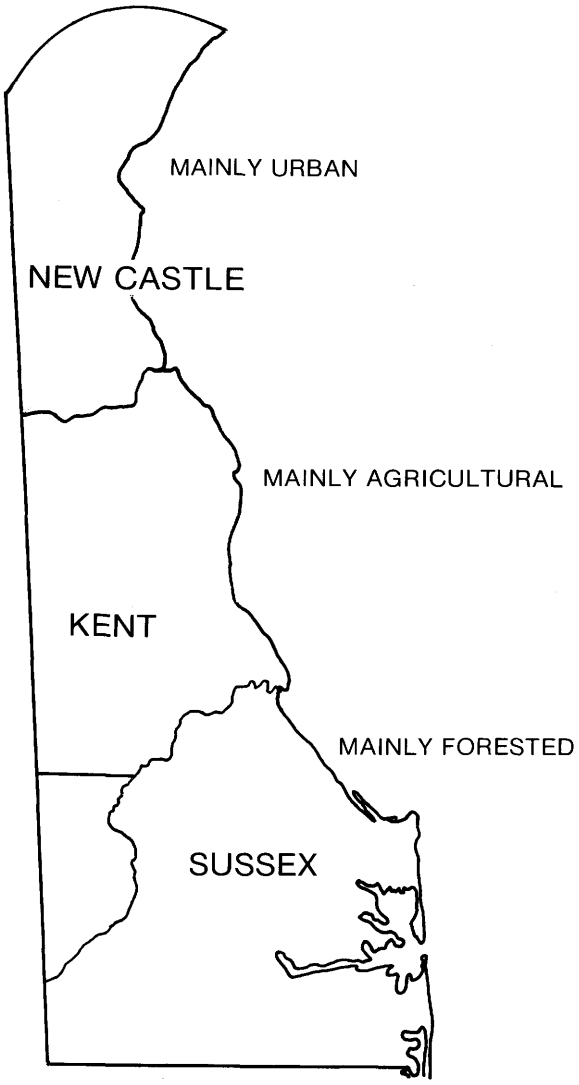
We made a study to (1) develop techniques that could be used for determining the rate of land clearing in rapidly urbanizing areas of other states in the Northeast, and (2) develop procedures for estimating the volume of growing-stock trees actually being destroyed.

(Growing-stock volume is defined as net volume, in cubic feet, of live growing-stock trees that are 5.0 inches d.b.h. and larger, from a 1-foot stump to a minimum 4.0-inch top diameter outside bark of the central stem or to the point where the central stem breaks into limbs. Net volume equals gross volume less deduction for rot.)

Delaware was chosen for the study because timber-resource statistics and complete aerial photographic coverage were available for two points in time, 14 years apart.

Delaware is made up of three counties (fig. 1); each has characteristics that are unique and that represent the conditions prevailing in other counties of the Northeastern States. New Castle County is urban, dominated by the city of Wilmington and its suburbs. The county population in 1970 was 386,000 residents, representing 70 percent of the state total. Kent County is mainly agricultural, having a low population density, a relatively poor transportation network, and is less than 25 percent forested. Sussex County is dominated by small industry—mainly poultry and forest products. It accounted for nearly 93 percent of the industrial roundwood harvest in the state in 1970.

Figure 1.—The three counties of Delaware.



Study Method

A set of aerial photographs taken in 1968 was used to divide Delaware into two major land classes—forest and nonforest. Four points systematically located on each aerial photograph were examined, and a land class was assigned to each. Of 4,120 points so classified, 2,633 fell into nonforested land classes. The locations of these nonforest points were transferred to a second set of aerial photographs that had been taken 14 years before, in 1954. When the locations on the two sets of aerial photographs were compared, we found that the classification of 135 points had changed from forested to nonforested. These 135 locations were the sample on which the field observations were based.

The office photo-interpretation was verified by checking on the ground. If it was correct (if the forest cover at the point on the ground in 1954 had been removed), the fieldman determined when the cover was removed, the forest type and size of trees removed, and whether all or a portion of the trees were used for forest products. This information and data from the current forest-inventory field plots were used to calculate acreages cleared.

Findings

Commercial forest area.—Nearly 37,000 acres of commercial forest land in Delaware were cleared between 1954 and 1968. The acreage cleared in each county, and the percentage this represented of the total commercial forest acreage reported in 1972 were:

County	*Commercial forest land cleared*	*Relation of area cleared to total commercial forest land*
	(thousand acres)	*(percent)*
Kent	3	3
New Castle	10	17
Sussex	24	10

The highest percentage of commercial forest land clearing was in mostly urban New Castle County. Although Sussex County had the most acreage cleared, 83 percent of the clearing was for agricultural uses rather than residential or industrial construction. The lowest percentage of commercial forest land clearing and least acreage cleared occurred in mostly agricultural Kent County.

Theoretically, at the current rate of clearing, New Castle County's entire commercial forest acreage could be cleared in 81 years, while it would take 466 years to clear the commercial forest land in Kent County. This is based on the assumption that no reforestation would occur during the period and that land clearing would proceed uninhibited.

Timber volume.—Nearly 33 million cubic feet of growing stock—including 54 million board feet of sawtimber—were burned, bur-

Figure 2.—In urban areas, trees are considered a hindrance to development, and few are used for industrial products.

ied, or otherwise destroyed as a result of clearing the 37,000 acres of commercial forest land in Delaware between 1954 and 1968. This loss of wood fiber represents enough volume to satisfy the entire roundwood requirements of the forest-product industry in Delaware for a 3.5-year period at the 1970 operating levels.

Eighty percent of the growing-stock volume and 75 percent of the sawtimber volume that was destroyed was from hardwood trees. Forest land clearing in Sussex County alone accounted for 61 percent of the growing-stock volume and 53 percent of the sawtimber volume that was destroyed.

Forest product utilization.—During the 14 years between 1954 and 1968, the growing-stock volume on 70 percent of the forest acreage cleared in Sussex County was partially recovered and used for industrial products. In New Castle County, however, only 31 percent of the area cleared yielded some industrial products (fig. 2). In Kent County some products were recovered from 75 percent of the acreage cleared (fig. 3).

Complete recovery of products from merchantable sawtimber trees was small. For example, in Kent County recovery occurred on only 25 percent of the acreage. In the suburbs of New Castle County, some residents recovered firewood from land being cleared (fig. 4). Likewise, in Kent County complete

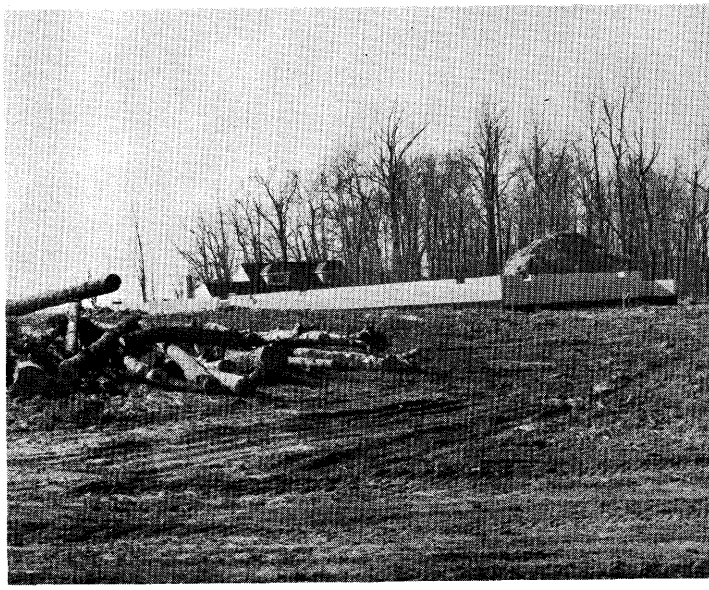


Figure 3.—In rural areas, where markets for forest products are plentiful, considerable industrial wood is recovered during land clearing.

Figure 4.—Some urban residents, who otherwise would pay $30 to $40 a cord for fireplace wood, salvage wood when nearby building lots are cleared.

recovery occurred for such farm uses as fuelwood, fence posts, and agricultural poles.

Observations

Imbalance of demand between softwoods and hardwoods.—Forest-product industries have used most of the pine harvest in Sussex County and neighboring Kent County for many years. In the past 14 years, changes in the makeup of these wood-using industries have allowed even greater use of the available softwood growing stock. In 1956 two-thirds of the pine harvest went to sawmills, but in 1970 over 70 percent was being shipped to pulpmills. Much of the pine harvested today is transported tree-length to concentration points where it is segregated into poles and pilings, sawlogs, veneer logs, or pulpwood. Because of the many alternative products, little of the pine growing stock is left unused in the forests or destroyed during forest land clearing.

Demand for hardwood growing stock has been mixed. Although the large-diameter hardwood trees of good quality have been sought for veneer logs and sawlogs, the wood from poor-quality hardwood sawtimber trees and poletimber trees has had few commercial outlets. Between 1956 and 1970, hardwood sawlog production in Delaware decreased 42 percent, and veneer-log production decreased 43 percent as the demand for wooden baskets waned. The opportunity to channel hardwood material from land-clearing operations to industrial wood users has been very limited.

Pine types contain significant amounts of hardwoods.—Up to a quarter of the growing-stock volume in Delaware pine stands is in hardwood trees. During the 1960's, standard cutting practice in these stands was to harvest the pine for products and windrow and burn the hardwoods with the logging slash unless high quality hardwood sawtimber was present.

Availability of markets differed between counties.—Much of the forest land cleared in New Castle County was cleared in preparation for residential or commercial construction. Trees were often considered a hindrance to the sloping, grading, and landscaping operations. In those few instances when forest products were recovered, an intermediary was used who had a specific use for the wood and who was willing to conform to the building contractor's work schedule.

Forest land clearing in Sussex County afforded industry the greatest opportunity to recover forest products, because alternative markets were readily available. Residents recognized that timber had a value, and timber buyers were plentiful. In Kent County many residents were too far from forest-product plants to arrange for the one-time sale of relatively small quantities of timber.

Opportunities

As the Nation's population increases, the demand for wood fiber will also grow. Woodlands close to the urban consumer could be a cheap source of wood fiber if marketing channels are developed and improved techniques and equipment are designed to process it. A market for low-quality hardwood sawtimber and poletimber-size trees for pulpwood is developing in Delaware. Establishment of this new market should facilitate the complete utilization of the fiber produced from Delaware's urban woodlands.

Complete utilization is a desirable goal for everyone in our society, producing many fringe benefits. It affords the land manager and trained conservationist an opportunity to demonstrate renewable resource use to urban and suburban residents. Utilizing these urban trees also facilitates the removal of unwanted material—a solid-waste disposal problem—and turns it into an asset rather than a cost.

Table 1.—*Area of commercial forest land in Delaware in 1972, and area cleared between 1954 and 1968, by counties*

County	Area of commercial forest land, 1972	Area of commercial forest land cleared, 1954-1968		
		Total	Percent of 1972 area	Average annual clearing
	Thousand acres	*Thousand acres*	*Percent*	*Acres*
Kent	93.1	2.8	3.0	198
New Castle	55.8	9.6	17.2	683
Sussex	235.5	24.3	10.3	1,738
All counties	384.4	36.7	9.5	2,619

Table 2.—*Net volume of growing stock and sawtimber destroyed during land clearing in Delaware between 1954 and 1968, by species group*

County	Growing stock (million cubic feet)		Sawtimber (million board feet)[a]	
	Softwood	Hardwood	Softwood	Hardwood
Kent	0.3	2.4	0.4	4.0
New Castle	1.3	8.9	2.5	18.4
Sussex	5.0	15.7	10.5	18.5
All counties	6.6	27.0	13.4	40.9

[a]International ¼-inch rule.

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