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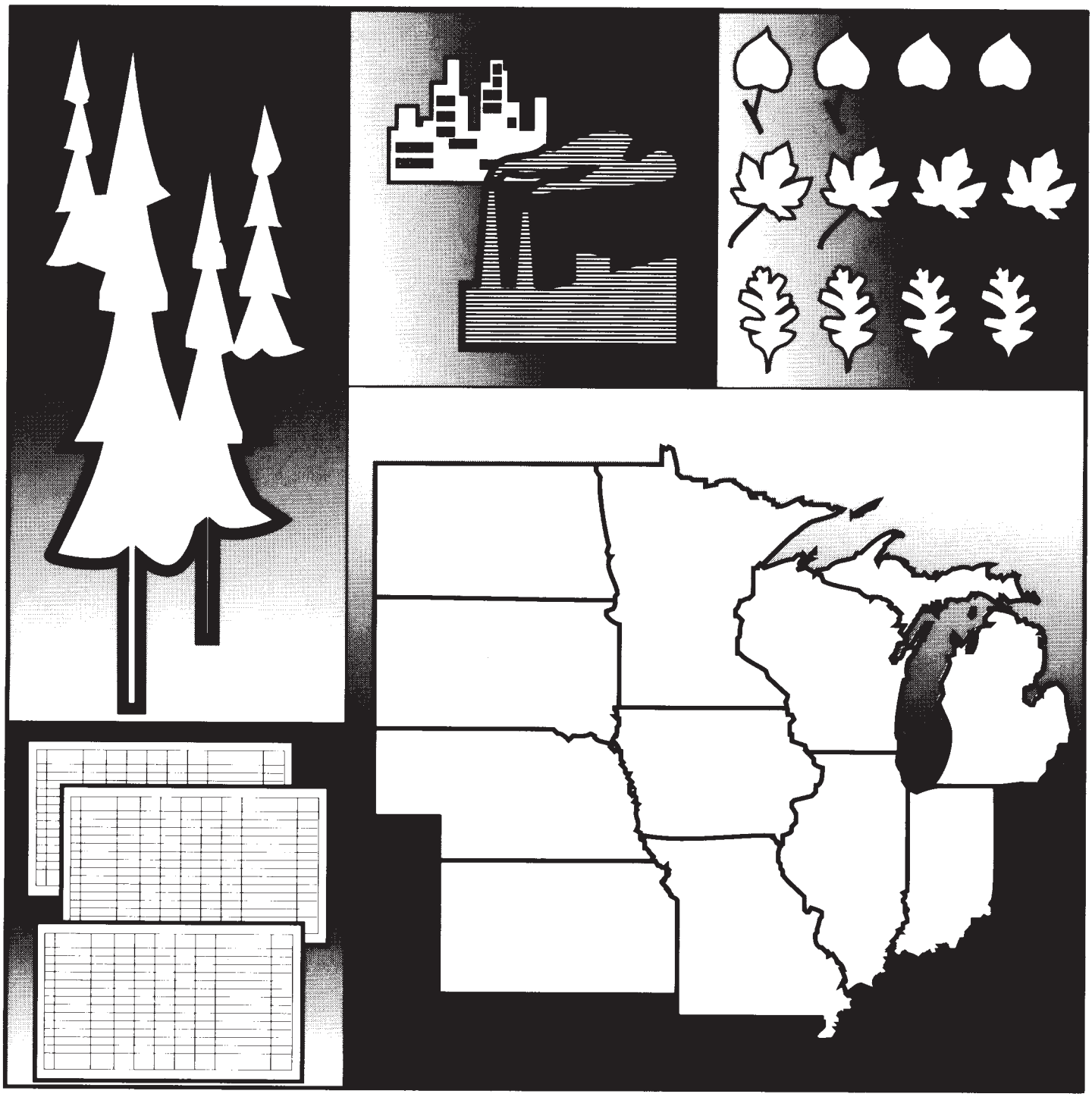
The North Central Forest Inventory and Analysis Timber Product Output Database – A Regional Composite Approach

Dennis M. May



North Central Research Station
Forest Service—U.S. Department of Agriculture
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St. Paul, Minnesota 55108
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FOREWORD

Forest Inventory and Analysis (FIA) is a continuing endeavor as mandated by the Renewable Forest and Rangeland Resources Planning Act of 1974. Prior inventories were mandated by the McSweeney-McNary Forest Research Act of 1928. The objective of FIA is to periodically inventory the Nation's forest land to determine its extent, condition, volume of timber, growth, and removals. USDA Forest Service regional experiment stations are responsible for conducting these inventories and publishing summary reports for individual States. The North Central Research Station is responsible for forest resource evaluation in Illinois, Indiana, Iowa, Kansas, Michigan, Minnesota, Missouri, Nebraska, North Dakota, South Dakota, and Wisconsin.

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The North Central Forest Inventory and Analysis Timber Product Output Database—A Regional Composite Approach

Dennis M. May

The Forest Inventory and Analysis (FIA) Program at the North Central Research Station is responsible for inventorying over 80 million acres of forest land spread across 11 States in the North-Central Region of the United States (fig. 1). As part of this ongoing effort to maintain comprehensive statistics on the current status, past changes, and future potential of the region's forests, FIA also conducts special studies to estimate and track regional timber harvests and their consequential impacts on the forests and economies of the region. These timber product output (TPO) studies quantify timber harvests and timber processing in the region by periodically canvassing all known users of roundwood products (saw logs, veneer logs, pulpwood, firewood, etc.) in each State. Procedures for conducting these studies have been well documented by Smith (1991), but generally two types of TPO studies are conducted: industrial and nonindustrial. Industrial TPO studies are used to determine roundwood harvests for primary wood-using mills (sawmills, veneer mills, pulpmills, etc.). Because pulpmills and composite product mills (OSB, particleboard, chipboard mills, etc.) are relatively few in number and make up such a large portion of total roundwood use in the region, FIA canvasses these mills annually (Piva 1996). All other primary wood-using mills (sawmills, veneer mills, cooperage mills, etc.) are canvassed in cooperation with State forestry agencies at intervals that range from biennial to decennial or longer depending on the State (Hackett and Pilon 1997). State forestry agencies also collaborate with FIA in periodically conducting nonindustrial TPO studies to determine residential uses of roundwood for fuel and posts (May *et al.* 1997). Together, the industrial and nonindustrial studies provide a complete picture of a State's timber product output for a given year.

Figure 1.—*The 11 States in the North-Central Region.*

In 1992, the established procedures for conducting these studies were reevaluated to address the possibility of combining TPO studies into a regional composite that could be managed within the framework of a relational database. The ensuing procedural changes, the reasoning behind those changes, and the development and structure of the resulting regional composite database are outlined in this publication. Examples from industrial TPO studies are used to illustrate the development of the regional database, conceptualize the composite approach, and demonstrate its application in addressing everyday TPO information needs.

PROCEDURAL CHANGES

In the past, each industrial TPO study was considered an independent assessment of a State's production and consumption of roundwood (fig. 2). Considerable effort was expended

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Dennis M. May, Research Forester, received a B.S. in forest management from the University of Maine and an M.S. in forest resources from the University of Idaho. He joined the USDA Forest Service in December 1983 and has been working with the North Central Station's Forest Inventory and Analysis unit since May 1992.

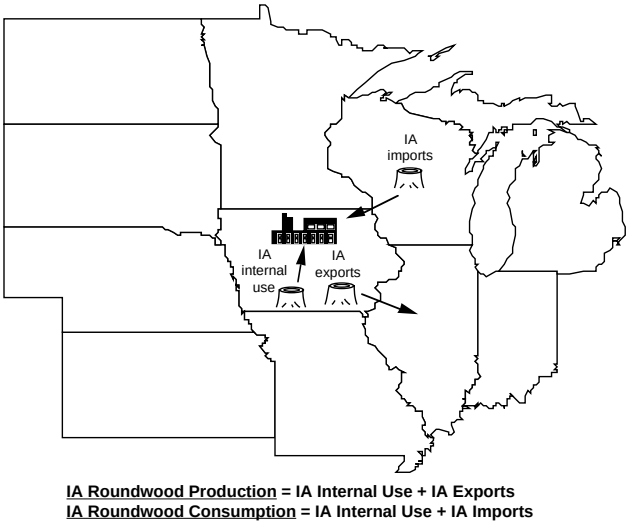

Figure 2.—*Roundwood production versus roundwood consumption.*

on estimating a State's production of roundwood. All primary wood-using mills in the target State would be canvassed to determine the volume of roundwood harvested and processed within the State (internal use). Then certain out-of-State mills, those that had previously used roundwood from the target State and those within some predetermined distance of the target State's border (50 miles, 3 counties, etc.), would be canvassed to ascertain roundwood exports from the target State. Depending on the number of out-of-State mills canvassed in this export zone (fig. 3), the workload could increase substantially relative to the generally small portion of a State's total production that was captured. And invariably, the list of out-of-State mills would be incomplete or the export zone too small, and mills that should have been canvassed would be missed, resulting in an underestimate of exports and consequently of roundwood production. To complete the estimate of roundwood consumption, an estimate of roundwood imports would be collected from the target State's mills as well. This production-focused process would be repeated from State to State, resulting in independent assessments of each target State's timber product output. As a result, mills in the overlapping export zones of neighboring States would receive multiple canvasses asking redundant questions (fig. 4). Aside from being inefficient and burdensome to the receiving mills, the redundant canvassing caused duplication problems (individual mill data entered more than once) when the independent State TPO studies were merged into multi-State or regional summaries.

Although sufficient in the past, this independent approach to TPO studies with its inherent problems and shortcomings was negatively impacting data collection and data management in a time of increasing frequencies of TPO studies and calls for more regional assessments. What the old procedures failed to recognize, and failed to take advantage of, was the duplicity in the data collected in the independent TPO studies. When viewed from a regional perspective rather than from a State-specific perspective, it is apparent that one State's roundwood exports are another State's

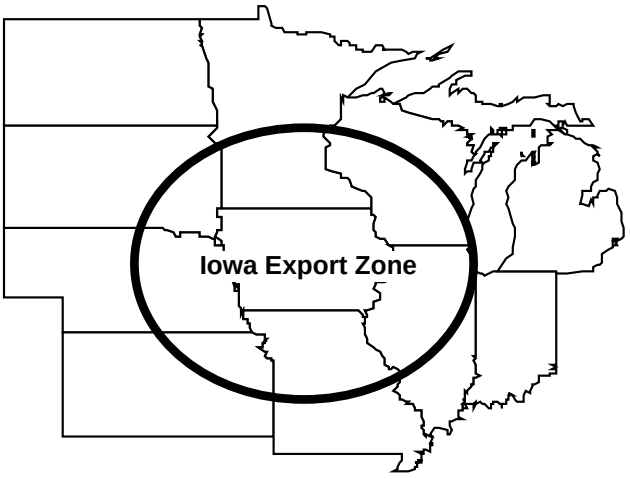

Figure 3.—*Focus on target State's production estimate. Canvass all mills within target State and all mills within export zone.*

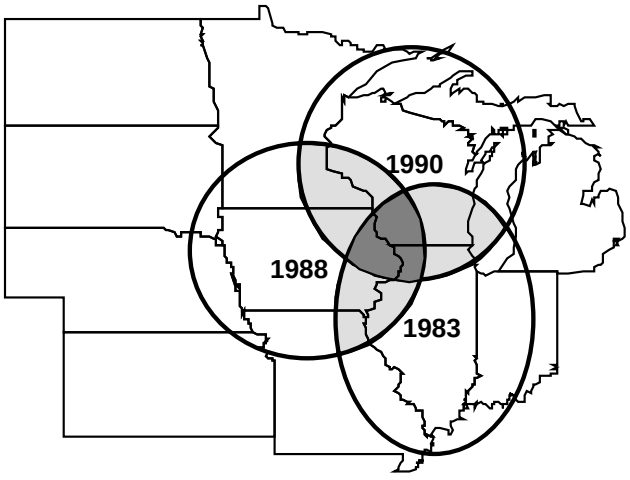

Figure 4.—*Overlapping export zones created by focusing on each target State's production estimate.*

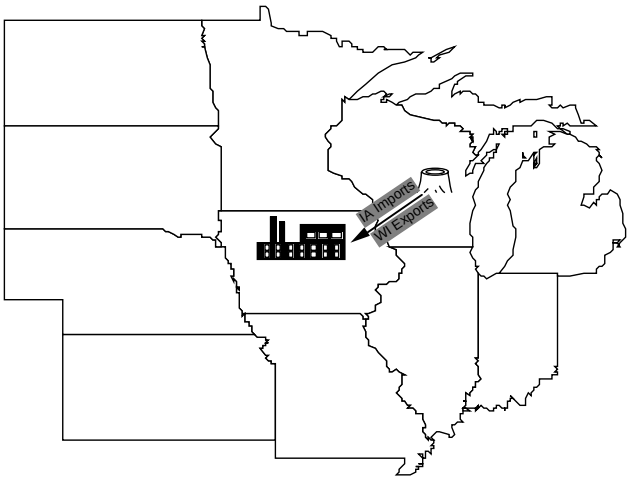

Figure 5.—*One State's roundwood exports are another State's roundwood imports.*

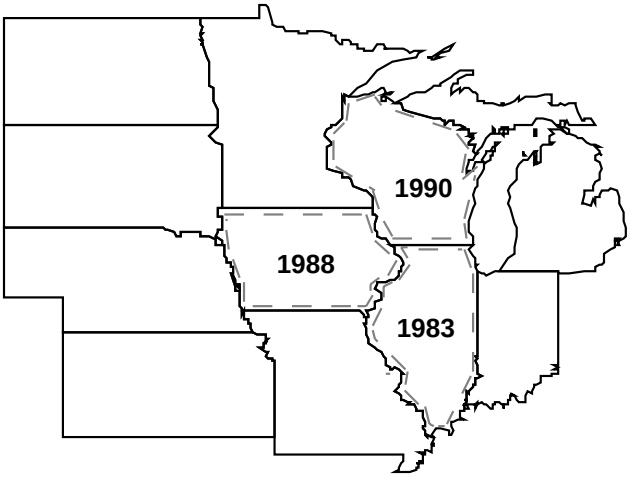

Figure 6.—*Focus on target State's roundwood consumption estimate. Only canvass mills within the target State.*

roundwood imports (fig. 5). Therefore, much of the redundancy and inefficiencies of the past procedures can be eliminated by focusing data collection efforts on consumption estimation rather than production estimation, and then letting the import data collected provide the export data for estimating roundwood production in other States. When we shift to consumption-oriented TPO studies (fig. 6), the canvass zone becomes limited and known (State boundaries define the extent of the canvass zone, and imports, hence exports, are derived from a 100-percent canvass), the mills are canvassed only once during the TPO study for their State (no redundant canvassing), and the import data are shared to provide the export data for other States' production estimates (eliminating the duplicate mill problems when compiling regional or multi-State summaries).

Although the shift to consumption-oriented TPO studies eliminated the problems of the past, it did cause minor dating differences in the data used to estimate production because not all of the State consumption studies that supply the roundwood export data are conducted in the same year. Fortunately, export volume is generally a relatively small proportion of the region's or a State's total production, and the time and effort once expended on redundant export zone canvassing is now used to minimize these dating differences by shortening the interval between TPO studies in each State. To eliminate the need to do export-zone canvassing of mills outside the North-Central Region and repeat the problems of the past at a regional level, FIA conducts cooperative TPO data exchanges with other FIA units, State forestry agencies, and other governmental agencies, swapping information on the volume of roundwood imported into the North-Central Region from neighboring regions for information on the volume of North-Central roundwood exported to those neighboring regions. Essentially then, under this new consumption-oriented approach, industrial TPO studies are no longer independent, but are dependent upon one another for the export portion of their production estimate, and as such, each becomes an integral component of a regional composite (fig. 7).

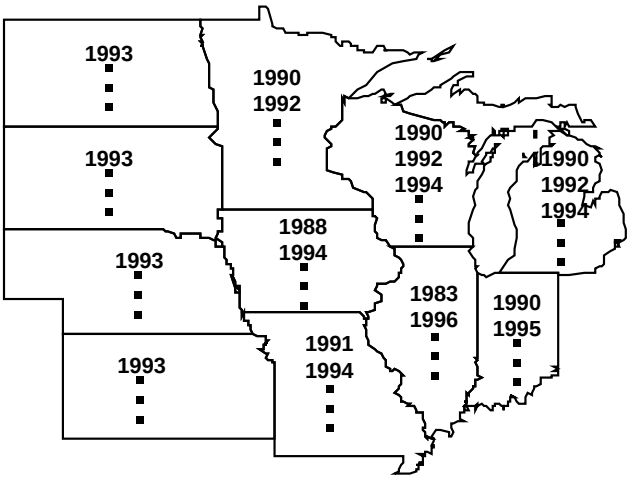

Figure 7.—*Regional composite database of consumption canvasses.*

REGIONAL COMPOSITE DATABASE

The consumption studies for each State are pieced together into a regional composite within a relational database management system. Through the power and flexibility of the relational database management system, we can take full advantage of the interdependencies of the studies to address a wide range of TPO information needs across scales that vary from local to regional. Each TPO study collects the same basic data: information about the wood-using industry itself (location, type, size, etc.), that industry's use of roundwood (geographic source, species, product, etc.), and its generation and disposition of mill residues. All of these data are stored in tables that have been organized into a multi-tiered structure comprised of a central data depository, support tables, and interpretive views (fig. 8). The structure of the database is centered around the main data depository, which consists of three relationally joined tables that contain all of the data collected about the mills,

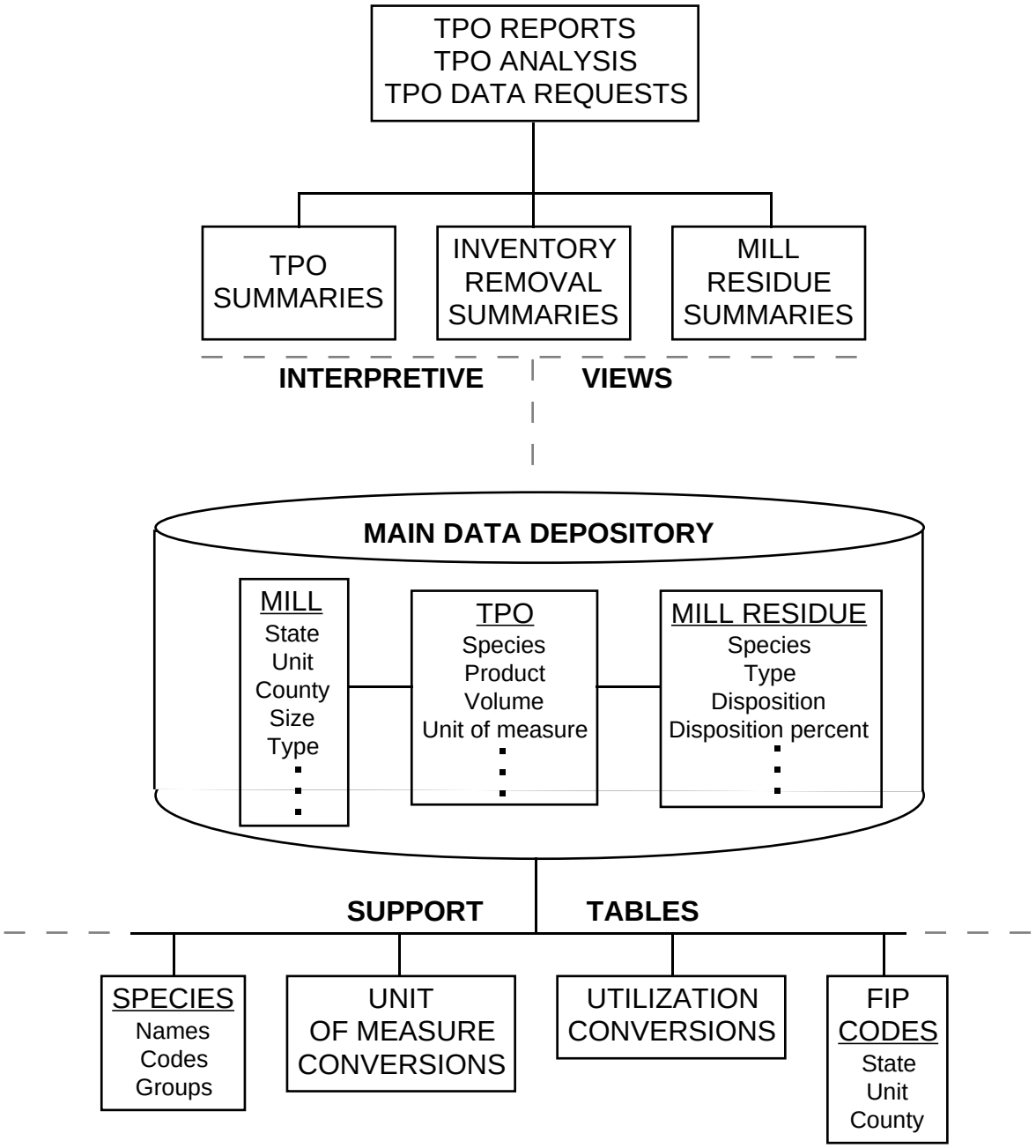

Figure 8.—*Structure of the regional composite database.*

their roundwood use, and their residues. Generally, these basic data need further processing to facilitate their use and interpretation, while at the same time protecting against the disclosure of individual mill data. The transformation of these basic data into an interpretable and meaningful form is accomplished by relationally joining the three tables in the main data depository to a secondary level of tables, called support tables. These support tables contain all of the conversions, factors, descriptive names, etc. for transforming the basic data into interpretable form. Views, a database feature that allows the results of the underlying query of the basic data as modified by the support tables to in turn be displayed and queried, are used to logically organize the interpretable data into easily understood summaries that facilitate information reporting and dissemination.

CONCEPTUAL MODEL

The regional database can be conceptually represented as an initial composite of the latest TPO consumption studies for any State whose mills consumed roundwood harvested from the North-Central Region, and whose data were available at the time of the database's establishment (table 1). Because the data in these studies were deemed to be the best available estimates at the time, some TPO study data, like that for Nebraska 1993, were back filled, while others, like those for Illinois 1983 or Iowa 1988, were carried forward to provide a complete regional composite for calendar year 1990. In each year thereafter, some data from the previous year's regional composite were updated with data from new TPO studies, while the remaining data were carried forward from the previous year to provide a complete regional composite for each calendar year. The extent to which the regional composite is updated in any one year depends on the interval between successive TPO studies for a State and the quantity of roundwood consumed in a State. For example, the annual pulpwood survey accounts for (updates) over half of the region's consumption and production of industrial roundwood in any 1 year, while the interval between the periodic canvasses of all other primary wood-using mills using roundwood other than pulpwood varies considerably by State as evident in table 1. Because each new TPO study partially updates the region's consumption estimate and its imports (other State's exports) can update the production estimate for several States as well, the regional composite progressively and dynamically moves through time, providing a continual time series of the latest available timber production and consumption data for any State in the region, the region as a whole, or any part thereof.

MODEL APPLICATION

Tables 2-7 display a progressive time series of TPO data for the North-Central Region derived from applying the conceptual model to the assessment of industrial roundwood production, consumption, and interstate movement patterns. In 1990, the year of the initial composite estimate, 1,204.1 million cubic feet of industrial roundwood were produced from the region's forests (table 2). Most of this volume (98.2 percent) was retained within the region for processing into a variety of primary wood products (pulp, lumber, veneer, etc.). The remainder was exported out of the region for processing. Canada, Wyoming, and Kentucky were the largest recipients of this exported roundwood. Of the volume of roundwood that was used within the region, 91.5 percent was processed into primary products in the same States from which it was cut. The other 8.5 percent moved between North Central States before being processed. The States of Wisconsin, Michigan, and Indiana were some of the big recipients of the wood, while Michigan, Wisconsin, Minnesota, and Illinois were some of the largest providers of the wood that moved internally. All totaled, the region consumed 1,196.9 million cubic feet of industrial roundwood in 1990, 1.2 percent of which was imported from outside the region. Kentucky, Wyoming, Ohio, and Arkansas supplied most of the roundwood imported for processing in 1990.

From 1990 to 1994, there were progressively larger increases in the region's annual production and consumption of industrial roundwood. In 1995, industrial roundwood production fell slightly from 1994 levels to 1,312.8 million cubic feet, but was still 9 percent higher than in 1990 (table 7). Just over 98 percent of the region's production continued to be internally processed into primary products in 1995, evidence of a concurrent buildup in the region's roundwood processing capacity since 1990. As further testimony to this buildup, imports of roundwood more than doubled, due mostly to

the increased use of Canadian roundwood, while exports remained fairly constant, hovering around 20 million cubic feet over the 6-year period. All totaled, regional consumption reached 1,322.6 million cubic feet in 1995, slightly lower than in 1994 but still 10.5 percent more than in 1990. Minnesota exhibited, by far, the biggest gains in industrial roundwood consumption and production during the period, followed by Wisconsin, Missouri, and Michigan. Indiana was the only State posting a significant decline in roundwood use and harvest over the period. Overall, the region went from being a net producer of industrial roundwood (production greater than consumption) in 1990 to being a net consumer of industrial roundwood (consumption greater than production) in 1995, with the switch occurring in 1993 (table 5).

Each year newly completed TPO studies partially updated the initial composite estimate, allowing the time series of annual composite estimates to be made. In some years, like 1991 (table 3), only the annual pulpwood survey was completed, but it still updated 52 percent of that year's composite estimate. The updating impact of this study does, however, vary considerably from State to State, ranging from updating three-quarters of Minnesota's annual production and consumption of industrial roundwood to having no impact in a State like Nebraska that lacks an established pulp and composite products industry. In other years, like 1994 (table 4) when TPO studies of the other primary wood-using industries in Iowa, Michigan, Missouri, and Wisconsin were completed along with the annual pulpwood survey, 85 percent of that year's composite estimate was made up of new data. The new studies not only update the consumption estimate for their State and the region, but their import data partially update the production estimate for other North Central States. For example, not only did the 1992 TPO consumption study in Michigan update one-quarter of the region's consumption estimate, but its import data partially updated the production estimate of four other North Central States (Illinois, Indiana, Minnesota, and Wisconsin) and through cooperative data exchanges the production estimates of Kentucky, New York, Ohio, Pennsylvania, Tennessee, West Virginia, and Canada as well (table 4).

MOVING AVERAGE

This updating effect is also evident in the steady increment of the average volume-weighted date of the annual production estimates for each North Central State and the region over the 6-year time series (calculated by averaging the date of each consumption survey contributing to the production estimate after weighting each survey's date by the volume contributed). A good example of this updating effect is exhibited in the average volume-weighted dates of Illinois' production estimates. At the time of the database's establishment, the latest consumption study for Illinois was dated 1983. Therefore, Illinois' internal use volume also carried the 1983 date. But, because Illinois' export volume was gathered from the import data of several other States that were surveyed in later years, the resulting average volume-weighted date of the Illinois production estimate for calendar year 1990 was actually 1985.6. And because of the periodic updating of these other States' consumption studies over the 6-year period, the average volume-weighted date for the Illinois production estimate increased to 1987.3 by calendar year 1995 without there ever having been a new Illinois consumption study. The annual pulpwood survey has a similar updating effect on the average volume-weighted date of the consumption surveys for States with pulp and composite product mills. This is evidenced by the non-integer (fractional) dates for some of the consumption studies in the time series. Good examples of this are the fractional average volume-weighted dates of Wisconsin's consumption surveys in the odd-numbered calendar years of the time series, the years in which only the consumption data of the pulp and composite product mills were updated. Over the time series, the average volume-weighted dates of the region's production and consumption estimates increased from 1990.0 in calendar year 1990 to about 1994.2 in calendar year 1995 as a consequence of from 52 to 85 percent of the region's TPO data being replaced (updated) each calendar year. Ongoing consumption studies in 1996 for Arkansas, Illinois, Michigan, Minnesota, and Wisconsin, and that year's pulpwood survey, will ensure that the regional composite continues to advance through time (table 1).

CONCLUSIONS

In this example, the regional composite database was used to assess the production, consumption, and movement patterns of industrial roundwood in the North-Central Region in a progressive time series. With minor modifications to the database query, information could have just as easily been retrieved for specific products (saw logs, veneer logs, etc.), species (red pine, cottonwood, etc.), geographic areas (States, counties, etc.), sources of roundwood (growing stock/cull, live/dead, sawtimber/poletimber/sapling, etc.), segments of the wood-using industry (industrial, nonindustrial, or both), or any group or combination of these or any other of the data attributes collected in the TPO surveys. Or, if we modify the underlying assumptions of how the individual studies are pieced together and related to one another, alternative conceptual models of the regional database could be constructed (regressive time series, point in time, latest available, etc.) to provide the most appropriate information. Such flexibility is one of the benefits of the regional composite approach to TPO data management. The other great benefit of this approach is the dynamic nature of the database, which is continually moving forward in time as each new TPO study partially updates the regional composite, while building a historic archive of data that can be pieced together and manipulated as seen fit to address a whole host of TPO-related questions.

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APPENDIX

DEFINITION OF TERMS

Bolts.—Roundwood products that are less than 8 feet in length.

Byproducts.—Mill residues (slabs, edgings, trimmings, shavings, sawdust, veneer cores and clippings, etc.) that are used for products such as pulp chips, fuel, charcoal, mulch, etc.

Central stem.—The portion of a tree between a 1-foot stump and the minimum 4.0-inch top diameter outside bark, or point where the central stem breaks into limbs.

Coarse mill residue.—Wood residue suitable for chipping such as slabs, edgings, and veneer cores.

Commercial species.—Tree species presently or prospectively suitable for industrial wood products. (Note: Excludes species of typically small size, poor form, or inferior quality such as hophornbeam, Osage-orange, and redbud.)

Cull.—Rough and rotten trees plus sections of the central stem of growing-stock trees that do not meet regional merchantability standards.

Diameter at breast height (d.b.h.).—The outside bark diameter at 4.5 feet above the forest floor on the uphill side of the tree. For determining breast height, the forest floor includes the duff layer that may be present, but does not include unincorporated woody debris that may rise above the ground line.

Fine mill residue.—Wood residue not suitable for chipping such as sawdust and veneer clippings.

Forest land.—Land at least 16.7 percent stocked by forest trees of any size, or formerly having had such tree cover, and not currently developed for nonforest use. (Note: Stocking is measured by comparing specified standards with basal area and/or number of trees, age or size, and spacing.) The minimum area for classification of forest land is 1 acre. Roadside, streamside, and shelterbelt strips of timber must have a crown width of at least 120 feet to qualify as forest land. Unimproved roads and trails, streams, or other bodies of water or clearings in forest areas shall be classed as forest if less than 120 feet wide.

Growing-stock tree.—A live timberland tree of commercial species that meets specified standards of size, quality, and merchantability. (Note: Excludes rough, rotten, and dead trees.)

Hardwoods.—Dicotyledonous trees, usually broad-leaved and deciduous.

Industrial roundwood products.—Logs, bolts, and other round sections of trees (including chips from roundwood) cut for processing at primary wood-using mills (includes saw logs, veneer logs and bolts, cooperage logs and bolts, pulpwood, fuelwood, posts, poles, pilings, shaving/excelsior bolts, mine timbers, etc.).

Internal use roundwood.—(See Roundwood retained).

Merchantable sections.—Refers to sections of the central stem of growing-stock trees that meet either pulpwood or saw-log specifications.

Mill residue.—Wood materials (coarse and fine) and bark generated at primary wood-using mills from roundwood processed into primary products (lumber, veneer, pulp, etc.). These residues include wood products (byproducts) obtained incidental to production of principal products and wood materials not utilized for some product.

Noncommercial species.—Tree species of typically small size, poor form, or inferior quality that normally do not develop into trees suitable for industrial roundwood products. Classified in volume tables as rough trees.

Nonforest land.—Land that has never supported forests, and land formerly forested where use for timber management is precluded by development for other uses. (Note: Includes areas used for crops, orchards, Christmas trees, improved pasture, residential areas, city parks, improved roads of any width and adjoining clearings, powerline clearings of any width, and 1- to 39.9-acre areas of water classified by the Bureau of the Census as land. If intermingled in forest areas, improved roads and nonforest strips must be more than 120 feet wide and more than 1 acre to qualify as nonforest land.)

Nonindustrial roundwood products.—Logs, bolts, and other round sections of trees cut for direct residential use and not for processing at primary wood-using mills (includes fuelwood, posts, etc.).

Poletimber.—A growing-stock tree at least 5.0 inches d.b.h. but smaller than sawtimber size (9.0 inches d.b.h. for softwoods, 11.0 inches d.b.h. for hardwoods).

Primary wood-using mills.—Mills receiving roundwood products or chips from roundwood for processing into primary products (lumber, veneer, pulp, etc.).

Rotten tree.—A tree that does not meet regional merchantability standards because of excessive unsound cull.

Rough tree.—A tree that does not meet regional merchantability standards because of excessive sound cull. Includes noncommercial tree species.

Roundwood consumption.—The quantity of roundwood products processed in a given geographic area (includes internal use (retained) roundwood and roundwood imports).

Roundwood exports.—The quantity of roundwood products harvested in a given geographic area and then transported to another geographic area for processing.

Roundwood imports.—The quantity of roundwood products processed in a given geographic area after being transported in from another geographic area.

Roundwood products.—Logs, bolts, or other round sections of trees (including chips from roundwood) cut for industrial or nonindustrial uses.

Roundwood production.—The quantity of roundwood products harvested in a given geographic area (includes internal use (retained) roundwood and roundwood exports).

Roundwood retained.—The quantity of roundwood products harvested in a given geographic area and processed in the same geographic area.

Sapling.—A live tree between 1.0 and 5.0 inches d.b.h.

Sawtimber tree.—A growing-stock tree containing at least a 12-foot saw log or two noncontiguous saw logs 8 feet or longer, and meeting regional specifications for freedom from defect. Softwoods must be at least 9.0 inches d.b.h. and hardwoods must be at least 11.0 inches d.b.h.

Softwoods.—Coniferous trees, usually evergreen, having needles or scale-like leaves.

Timber product output.—The production and consumption of roundwood in a geographic area plus the volume of mill residues generated by primary wood-using mills in the geographic area.

Timberland.—Forest land that is producing, or is capable of producing, in excess of 20 cubic feet per acre per year of industrial roundwood products under natural conditions, is not withdrawn from timber utilization by statute or administrative regulation, and is not associated with urban or rural development.

Tree.—A woody plant usually having one or more perennial stems, a more or less definitely formed crown of foliage, and a height of at least 12 feet at maturity.

TABLE TITLES

Table 1.—Conceptual model of individual consumption studies making up the regional composite of industrial roundwood use by calendar year, North-Central Region

Table 2.—Composite estimate of industrial roundwood consumption, production, and interstate movement, North-Central Region, 1990

Table 3.—Composite estimate of industrial roundwood consumption, production, and interstate movement, North-Central Region, 1991

Table 4.—Composite estimate of industrial roundwood consumption, production, and interstate movement, North-Central Region, 1992

Table 5.—Composite estimate of industrial roundwood consumption, production, and interstate movement, North-Central Region, 1993

Table 6.—Composite estimate of industrial roundwood consumption, production, and interstate movement, North-Central Region, 1994

Table 7.—Composite estimate of industrial roundwood consumption, production, and interstate movement, North-Central Region, 1995

Table 1.—Conceptual model of individual consumption studies making up the regional composite of industrial roundwood use by calendar year, North-Central Region.

Calendar year	State and dates of individual consumption studies[1/]																			
	Illinois	Indiana	Iowa	Kansas	Michigan	Minnesota	Missouri	Nebraska	North Dakota	South Dakota	Wisconsin	Arkansas	Kentucky	Ohio	Tennessee	Virginia	West Virginia	Wyoming	Canada	Pulpwood[3/]
1990	1983[2/]	1990	1988	^	1990	1990	^	^	^	^	1990	^	1986	1989	1989	1989	1988	^	1990	1990
1991	"	"	"	^	"	"	1991	^	^	^	"	1991	"	"	"	"	"	^	"	1991
1992	"	"	"	^	1992	1992	"	^	^	^	1992	"	"	"	"	1992	"	^	"	1992
1993	"	"	"	1993	"	"	"	1993	1993	1993	"	"	"	"	"	"	"	1993	"	1993
1994	"	"	1994	"	1994	"	1994	"	"	"	1994	"	"	"	"	"	"	"	"	1994
1995	"	1995	"	"	"	"	"	"	"	"	"	"	1995	"	1995	1995	"	"	"	1995
1996[4/]	1996	"	"	"	1996	1996	"	"	"	"	1996	1996	"	"	"	"	"	"	"	1996

[1/] Periodic studies that determine the consumption of industrial roundwood products other than pulpwood.

[2/] Year of initial or subsequent consumption study.

" Consumption study carried forward until updated by new study.

^ Consumption study back filled to provide complete regional composites.

[3/] An annual study that determines the volume of industrial roundwood consumed as pulpwood.

[4/] Regional composite not complete; 1996 studies still ongoing.

Table 2.—Composite estimate of industrial roundwood consumption, production, and interstate movement, North-Central Region, 1990.

(Thousand cubic feet)

	State of destination and average date of consumption estimate																						
	Roundwood retained in North-Central Region												Roundwood exported from North-Central Region										
State of origin	Illinois 1983.0	Indiana 1990.0	Iowa 1988.1	Kansas 1993.0	Michigan 1990.0	Minnesota 1990.0	Missouri 1991.0	Nebraska 1993.0	North Dakota 1993.0	South Dakota 1993.0	Wisconsin 1990.0	Total 1990.0	Arkansas 1991.0	Kentucky 1989.6	Ohio 1989.0	Virginia 1989.0	West Virginia 1988.0	Wyoming 1993.0	Canada 1989.9	Other foreign 1990.5	Total	Production	Average date of production estimate
Illinois	23,590	5,388	1,612	--	34	--	4,382	--	--	--	155	35,161	--	2,637	18	--	--	--	--	100	2,755	37,916	1985.6
Indiana	283	77,504	11	--	285	--	263	--	--	--	--	78,345	--	1,378	957	10	50	--	112	114	2,621	80,968	1990.0
Iowa	169	133	10,729	74	56	390	1,099	792	--	11	201	13,654	--	--	19	--	--	--	9	136	164	13,818	1988.7
Kansas	--	13	62	1,769	--	--	182	20	--	--	--	2,046	--	--	--	--	--	--	--	155	155	2,201	1992.5
Michigan	--	4,551	11	--	311,235	144	--	--	--	--	32,866	348,808	--	--	441	8	--	--	3,311	--	3,760	352,568	1990.0
Minnesota	--	--	932	--	140	218,630	--	--	49	--	11,449	231,200	--	--	51	--	--	--	2,837	665	3,553	234,753	1990.0
Missouri	593	133	898	243	--	--	108,175	84	--	--	--	110,125	387	610	--	--	--	--	--	1,383	2,380	112,506	1990.9
Nebraska	--	--	31	15	--	--	162	5,763	--	1,884	--	7,855	--	--	--	--	--	1,051	--	49	1,100	8,955	1992.9
North Dakota	--	--	--	--	--	7	--	--	462	--	--	469	--	--	--	--	--	--	--	--	--	469	1993.0
South Dakota	--	--	--	--	--	--	--	134	--	8,058	--	8,192	--	--	--	--	--	4,795	--	--	4,795	12,986	1993.0
Wisconsin	693	53	1,048	--	22,326	6,323	--	--	--	--	316,468	346,910	--	--	1	--	--	--	10	1	12	346,921	1990.0
Total	25,328	87,774	15,333	2,102	334,076	225,493	114,263	6,794	511	9,952	361,138	1,182,764	387	4,626	1,485	19	50	5,845	6,280	2,604	21,296	1,204,060	1990.0
	Roundwood imported into North-Central Region																						
Alabama	--	3	--	--	--	--	--	--	--	--	--	3											
Arkansas	--	--	--	--	--	--	2,075	--	--	--	--	2,075											
Kentucky	110	3,197	--	--	41	--	362	--	--	--	--	3,709											
Louisiana	--	253	--	--	--	--	--	--	--	--	--	253											
Maryland	--	8	--	--	39	--	--	--	--	--	--	48											
Mississippi	--	39	--	--	--	--	--	--	--	--	--	39											
Montana	--	--	--	--	--	--	--	--	--	769	--	769											
New York	--	5	--	--	60	--	--	--	--	--	--	65											
Ohio	--	1,820	--	--	218	--	49	--	--	--	--	2,087											
Oklahoma	--	121	--	56	--	--	97	--	--	--	--	274											
Pennsylvania	--	805	7	--	39	--	19	--	--	--	33	904											
Tennessee	--	220	--	--	--	--	317	--	--	--	--	537											
Texas	--	37	--	--	--	--	--	--	--	--	--	37											
Virginia	--	88	--	--	--	--	--	--	--	--	--	88											
West Virginia	--	27	--	--	39	--	--	--	--	--	--	67											
Wyoming	--	--	--	--	--	--	--	--	--	2,798	--	2,798											
Canada	--	--	--	--	95	186	--	--	--	10	76	367											
Imports	110	6,626	7	56	532	186	2,919	--	--	3,577	109	14,121											
Consumption	25,438	94,400	15,341	2,157	334,607	225,679	117,182	6,794	511	13,529	361,247	1,196,886											

Table 3.—Composite estimate of industrial roundwood consumption, production, and interstate movement, North-Central Region, 1991

(Thousand cubic feet)

State of origin	State of destination and average date of consumption estimate: Roundwood retained in North-Central Region — Illinois 1983.0	Indiana 1990.0	Iowa 1988.3	Kansas 1993.0	Michigan 1990.6	Minnesota 1990.8	Missouri 1991.0	Nebraska 1993.0	North Dakota 1993.0	South Dakota 1993.0	Wisconsin 1990.6	Total 1990.5	Roundwood exported from North-Central Region — Arkansas 1991.0	Kentucky 1990.5	Ohio 1989.0	Virginia 1989.0	West Virginia 1988.0	Wyoming 1993.0	Canada 1990.5	Other foreign 1990.5	Total	Production	Average date of production estimate
Illinois	23,590	5,418	2,147	--	34	--	4,382	--	--	--	240	35,810	--	2,671	18	--	--	--	--	100	2,789	38,599	1985.8
Indiana	283	76,790	11	--	285	--	263	--	--	--	--	77,632	--	1,399	957	10	50	--	112	114	2,642	80,274	1990.0
Iowa	169	133	11,023	74	56	390	1,099	792	--	11	201	13,947	--	--	19	--	--	--	9	136	164	14,111	1988.8
Kansas	--	13	62	1,769	--	--	182	20	--	--	--	2,046	--	--	--	--	--	--	--	155	155	2,201	1992.5
Michigan	--	4,551	11	--	315,639	387	--	--	--	--	32,121	352,710	--	--	441	8	--	--	3,076	--	3,525	356,235	1990.6
Minnesota	--	--	932	--	57	223,843	--	--	49	--	9,437	234,318	--	--	51	--	--	--	2,004	665	2,720	237,037	1990.8
Missouri	593	133	744	243	--	--	108,212	84	--	--	--	110,008	387	711	--	--	--	--	--	1,383	2,481	112,490	1990.9
Nebraska	--	--	31	15	--	--	162	5,763	--	1,884	--	7,855	--	--	--	--	--	1,051	--	49	1,100	8,955	1992.9
North Dakota	--	--	--	--	--	7	--	--	462	--	--	469	--	--	--	--	--	--	--	--	--	469	1993.0
South Dakota	--	--	--	--	--	--	--	134	--	8,058	--	8,192	--	--	--	--	--	4,795	--	--	4,795	12,986	1993.0
Wisconsin	693	53	1,048	--	23,810	4,114	--	--	--	--	310,731	340,449	--	--	1	--	--	--	10	1	12	340,461	1990.6
Total	25,328	87,090	16,007	2,102	339,881	228,741	114,300	6,794	511	9,952	352,730	1,183,436	387	4,781	1,485	19	50	5,845	5,211	2,604	20,382	1,203,818	1990.5
Roundwood imported into North-Central Region																							
Alabama	--	3	--	--	--	--	--	--	--	--	--	3											
Arkansas	--	--	--	--	--	--	2,075	--	--	--	--	2,075											
Kentucky	110	3,197	--	--	41	--	362	--	--	--	--	3,709											
Louisiana	--	253	--	--	--	--	--	--	--	--	--	253											
Maryland	--	8	--	--	39	--	--	--	--	--	--	48											
Mississippi	--	39	--	--	--	--	--	--	--	--	--	39											
Montana	--	--	--	--	--	--	--	--	--	769	--	769											
New York	--	5	--	--	60	--	--	--	--	--	--	65											
Ohio	--	1,820	--	--	218	--	49	--	--	--	--	2,087											
Oklahoma	--	121	--	56	--	--	97	--	--	--	--	274											
Pennsylvania	--	805	7	--	39	--	19	--	--	--	33	904											
Tennessee	--	220	--	--	--	--	317	--	--	--	--	537											
Texas	--	37	--	--	--	--	--	--	--	--	--	37											
Virginia	--	88	--	--	--	--	--	--	--	--	--	88											
West Virginia	--	27	--	--	39	--	--	--	--	--	--	67											
Wyoming	--	--	--	--	--	--	--	--	--	2,798	--	2,798											
Canada	--	--	--	--	--	2,366	--	--	--	10	76	2,453											
Total	110	6,626	7	56	437	2,366	2,919	--	--	3,577	109	16,206											
Consumption	25,438	93,716	16,015	2,157	340,318	231,107	117,219	6,794	511	13,529	352,839	1,199,642											

Table 4.—Composite estimate of industrial roundwood consumption, production, and interstate movement, North-Central Region, 1992

(Thousand cubic feet)

State of origin	State of destination and average date of consumption estimate: Roundwood retained in North-Central Region — Illinois 1983.0	Indiana 1990.0	Iowa 1988.3	Kansas 1993.0	Michigan 1992.0	Minnesota 1992.0	Missouri 1991.0	Nebraska 1993.0	North Dakota 1993.0	South Dakota 1993.0	Wisconsin 1992.0	Total 1991.5	Roundwood exported from North-Central Region — Arkansas 1991.0	Kentucky 1991.4	Ohio 1989.0	West Virginia 1988.0	Wyoming 1993.0	Canada 1991.3	Other foreign 1991.0	Total	Production	Average date of production estimate
Illinois	23,590	5,095	1,901	--	47	--	4,382	--	--	--	21	35,035	--	2,525	18	--	--	--	100	2,643	37,678	1985.8
Indiana	283	76,535	11	--	321	--	263	--	--	--	2	77,415	--	1,394	980	50	--	112	114	2,650	80,066	1990.0
Iowa	169	133	10,668	74	--	262	1,099	792	--	11	503	13,711	--	--	19	--	--	9	136	164	13,875	1988.8
Kansas	--	13	62	1,769	--	--	182	20	--	--	--	2,046	--	--	--	--	--	--	155	155	2,201	1992.5
Michigan	--	4,551	11	--	305,606	309	--	--	--	--	32,910	343,387	--	--	441	--	--	2,928	--	3,369	346,755	1992.0
Minnesota	--	--	932	--	71	252,684	--	--	49	--	10,612	264,348	--	--	51	--	--	3,963	665	4,679	269,027	1992.0
Missouri	593	133	1,070	243	--	--	108,183	84	--	--	40	110,346	387	1,165	--	--	--	--	1,383	2,935	113,281	1991.0
Nebraska	--	--	31	15	--	--	162	5,763	--	1,884	--	7,855	--	--	--	--	1,051	--	49	1,100	8,955	1992.9
North Dakota	--	--	--	--	--	--	--	--	462	--	--	462	--	--	--	--	--	--	--	--	462	1993.0
South Dakota	--	--	--	--	--	--	--	134	--	8,058	--	8,192	--	--	--	--	4,795	--	--	4,795	12,986	1993.0
Wisconsin	693	53	1,048	--	22,200	8,157	--	--	--	--	324,777	356,928	--	--	1	--	--	10	1	12	356,940	1992.0
Total	25,328	86,511	15,732	2,102	328,246	261,411	114,271	6,794	511	9,952	368,867	1,219,726	387	5,084	1,508	50	5,845	7,022	2,604	22,500	1,242,225	1991.5
Roundwood imported into North-Central Region																						
Alabama	--	3	--	--	--	--	--	--	--	--	--	3										
Arkansas	--	--	--	--	--	--	2,075	--	--	--	--	2,075										
Kentucky	110	3,197	--	--	108	--	362	--	--	--	--	3,777										
Louisiana	--	253	--	--	--	--	--	--	--	--	--	253										
Maryland	--	8	--	--	--	--	--	--	--	--	10	19										
Mississippi	--	39	--	--	--	--	--	--	--	--	--	39										
Montana	--	--	--	--	--	--	--	--	--	769	--	769										
New York	--	5	--	--	20	--	--	--	--	--	--	25										
Ohio	--	1,820	--	--	300	--	49	--	--	--	174	2,343										
Oklahoma	--	121	--	56	--	--	97	--	--	--	--	274										
Pennsylvania	--	805	7	--	112	--	19	--	--	--	23	967										
Tennessee	--	220	--	--	108	--	317	--	--	--	--	645										
Texas	--	37	--	--	--	--	--	--	--	--	--	37										
Virginia	--	88	--	--	--	--	--	--	--	--	10	99										
West Virginia	--	27	--	--	9	--	--	--	--	--	--	36										
Wyoming	--	--	--	--	--	--	--	--	--	2,798	--	2,798										
Canada	--	--	--	--	344	2,675	--	--	--	10	40	3,069										
Total	110	6,626	7	56	1,002	2,675	2,919	--	--	3,577	257	17,228										
Consumption	25,438	93,137	15,740	2,157	329,248	264,086	117,191	6,794	511	13,529	369,124	1,236,954										

Table 5.—Composite estimate of industrial roundwood consumption, production, and interstate movement, North-Central Region, 1993

(Thousand cubic feet)

	State of destination and average date of consumption estimate																					
	Roundwood retained in North-Central Region												Roundwood exported from North-Central Region									
State of origin	Illinois 1983.0	Indiana 1990.0	Iowa 1988.4	Kansas 1993.0	Michigan 1992.6	Minnesota 1992.8	Missouri 1991.0	Nebraska 1993.0	North Dakota 1993.0	South Dakota 1993.0	Wisconsin 1992.7	Total 1992.1	Arkansas 1991.0	Kentucky 1992.1	Ohio 1989.1	West Virginia 1988.0	Wyoming 1993.0	Canada 1991.9	Other foreign 1991.0	Total	Production	Average date of production estimate
Illinois	23,590	5,101	1,848	--	47	--	4,382	--	--	--	5	34,972	--	1,796	18	--	--	--	100	1,914	36,886	1985.7
Indiana	283	76,438	11	--	321	--	263	--	--	--	2	77,318	--	1,176	984	50	--	112	114	2,436	79,755	1990.0
Iowa	169	133	10,885	74	--	262	1,099	792	--	11	503	13,928	--	--	19	--	--	9	136	164	14,092	1988.9
Kansas	--	13	62	1,769	--	--	182	20	--	--	--	2,046	--	--	--	--	--	--	155	155	2,201	1992.5
Michigan	--	4,551	11	--	330,875	905	--	--	--	--	27,974	364,317	--	--	441	--	--	2,511	--	2,952	367,269	1992.6
Minnesota	--	--	932	--	71	271,442	--	--	49	--	13,819	286,313	--	--	51	--	--	3,418	665	4,134	290,447	1992.8
Missouri	593	133	816	243	--	--	107,984	84	--	--	40	109,892	387	864	--	--	--	--	1,383	2,634	112,527	1991.0
Nebraska	--	--	31	15	--	--	162	5,763	--	1,884	--	7,855	--	--	--	--	1,051	--	49	1,100	8,955	1992.9
North Dakota	--	--	--	--	--	--	--	--	462	--	--	462	--	--	--	--	--	--	--	--	462	1993.0
South Dakota	--	--	--	--	--	--	--	134	--	8,868	--	9,002	--	--	--	--	4,795	--	--	4,795	13,796	1993.0
Wisconsin	693	53	1,048	--	21,538	8,189	--	--	--	--	320,567	352,088	--	--	1	--	--	10	1	12	352,100	1992.6
Total	25,328	86,421	15,643	2,102	352,853	280,798	114,072	6,794	511	10,762	362,911	1,258,194	387	3,836	1,513	50	5,845	6,061	2,604	20,296	1,278,489	1992.1
	Roundwood imported into North-Central Region																					
Alabama	--	3	--	--	--	--	--	--	--	--	--	3										
Arkansas	--	--	--	--	--	--	2,075	--	--	--	--	2,075										
Kentucky	110	3,197	--	--	108	--	362	--	--	--	--	3,777										
Louisiana	--	253	--	--	--	--	--	--	--	--	--	253										
Maryland	--	8	--	--	--	--	--	--	--	--	10	19										
Mississippi	--	39	--	--	--	--	--	--	--	--	--	39										
Montana	--	--	--	--	--	--	--	--	--	769	--	769										
New York	--	5	--	--	20	--	--	--	--	--	--	25										
Ohio	--	1,820	--	--	300	--	49	--	--	--	174	2,343										
Oklahoma	--	121	--	56	--	--	97	--	--	--	--	274										
Pennsylvania	--	805	7	--	112	--	19	--	--	--	23	967										
Tennessee	--	220	--	--	108	--	317	--	--	--	--	645										
Texas	--	37	--	--	--	--	--	--	--	--	--	37										
Virginia	--	88	--	--	--	--	--	--	--	--	10	99										
West Virginia	--	27	--	--	9	--	--	--	--	--	--	36										
Wyoming	--	--	--	--	--	--	--	--	--	2,798	--	2,798										
Canada	--	--	--	--	2,084	6,007	--	--	--	10	40	8,140										
Total	110	6,626	7	56	2,741	6,007	2,919	--	--	3,577	257	22,299										
Consumption	25,438	93,047	15,650	2,157	355,593	286,805	116,991	6,794	511	14,339	363,168	1,280,493										

Table 6.—Composite estimate of industrial roundwood consumption, production, and interstate movement, North-Central Region, 1994

(Thousand cubic feet)

State of origin	State of destination and average date of consumption estimate: Roundwood retained in North-Central Region: Illinois 1983.0	Indiana 1990.0	Iowa 1994.0	Kansas 1993.0	Michigan 1994.0	Minnesota 1993.5	Missouri 1994.0	Nebraska 1993.0	North Dakota 1993.0	South Dakota 1993.1	Wisconsin 1994.0	Total 1993.4	Roundwood exported from North-Central Region: Arkansas 1991.0	Kentucky 1993.2	Ohio 1989.2	West Virginia 1988.0	Wyoming 1993.0	Canada 1992.3	Other foreign 1992.3	Total	Production	Average date of production estimate
Illinois	23,590	5,109	1,994	--	47	--	3,818	--	--	--	326	34,884	--	2,704	18	--	--	--	104	2,826	37,710	1986.5
Indiana	283	76,566	--	--	333	--	112	--	--	--	117	77,410	--	1,090	1,010	50	--	112	113	2,375	79,785	1990.1
Iowa	169	133	13,661	74	--	262	202	792	--	11	1,005	16,308	--	--	19	--	--	9	25	53	16,362	1993.8
Kansas	--	13	--	1,769	--	--	377	20	--	--	--	2,179	--	--	--	--	--	--	14	14	2,193	1993.2
Michigan	--	4,551	--	--	344,742	1,438	--	--	--	--	33,338	384,070	--	--	441	--	--	2,393	--	2,834	386,904	1993.9
Minnesota	--	--	353	--	897	270,212	--	--	49	--	14,393	285,903	--	--	51	--	--	2,444	665	3,160	289,062	1993.6
Missouri	593	133	1,102	243	--	--	128,395	84	--	--	66	130,616	387	929	--	--	--	--	661	1,977	132,593	1993.9
Nebraska	--	--	70	15	--	--	8	5,763	--	1,884	--	7,741	--	--	--	--	1,051	--	1	1,052	8,792	1993.0
North Dakota	--	--	--	--	--	187	--	--	462	--	--	650	--	--	--	--	--	--	--	--	650	1993.3
South Dakota	--	--	--	--	--	--	--	134	--	8,868	--	9,002	--	--	--	--	4,795	--	--	4,795	13,796	1993.1
Wisconsin	693	53	1,495	--	21,368	8,387	4	--	--	--	345,547	377,547	--	--	1	--	--	10	--	11	377,557	1994.0
Total	25,328	86,557	18,674	2,102	367,388	280,485	132,917	6,794	511	10,762	394,793	1,326,310	387	4,723	1,538	50	5,845	4,968	1,582	19,093	1,345,404	1993.4
Roundwood imported into North-Central Region																						
Alabama	--	3	--	--	--	--	--	--	--	--	--	3										
Arkansas	--	--	--	--	--	--	2,106	--	--	--	--	2,106										
Kentucky	110	3,197	--	--	108	--	174	--	--	--	55	3,644										
Louisiana	--	253	--	--	--	--	--	--	--	--	--	253										
Maine	--	--	--	--	--	--	--	--	--	--	66	66										
Maryland	--	8	--	--	--	--	--	--	--	--	--	8										
Mississippi	--	39	--	--	--	--	--	--	--	--	--	39										
Montana	--	--	--	--	--	--	--	--	--	769	--	769										
New York	--	5	--	--	20	--	--	--	--	--	125	150										
Ohio	--	1,820	--	--	257	--	36	--	--	--	151	2,264										
Oklahoma	--	121	--	56	--	--	185	--	--	--	--	362										
Pennsylvania	--	805	--	--	108	--	1	--	--	--	22	937										
Tennessee	--	220	--	--	108	--	114	--	--	--	1	443										
Texas	--	37	--	--	--	--	9	--	--	--	--	46										
Vermont	--	--	--	--	--	--	--	--	--	--	16	16										
Virginia	--	88	--	--	--	--	--	--	--	--	13	102										
West Virginia	--	27	--	--	--	--	--	--	--	--	6	33										
Wyoming	--	--	--	--	--	--	--	--	--	2,798	--	2,798										
Canada	--	--	--	--	4,670	9,205	--	--	--	10	735	14,620										
Total	110	6,626	--	56	5,272	9,205	2,625	--	--	3,577	1,189	28,659										
Consumption	25,438	93,183	18,674	2,157	372,660	289,690	135,541	6,794	511	14,339	395,982	1,354,969										

Table 7.—Composite estimate of industrial roundwood consumption, production, and interstate movement, North-Central Region, 1995

(Thousand cubic feet)

State of origin	State of destination and average date of consumption estimate: Roundwood retained in North-Central Region: Illinois 1983.0	Indiana 1995.0	Iowa 1994.1	Kansas 1993.0	Michigan 1994.6	Minnesota 1994.3	Missouri 1994.0	Nebraska 1993.0	North Dakota 1993.0	South Dakota 1993.1	Wisconsin 1994.7	Total 1994.3	Roundwood exported from North-Central Region: Arkansas 1991.0	Kentucky 1995.0	Ohio 1990.0	Tennessee 1995.0	Virginia 1995.0	West Virginia 1988.0	Wyoming 1993.0	Canada 1991.7	Other foreign 1992.7	Total	Production	Average date of production estimate
Illinois	23,590	4,112	1,994	--	47	--	3,818	--	--	--	326	33,887	--	3,565	18	--	21	--	--	--	104	3,708	37,594	1987.3
Indiana	283	61,439	--	--	333	--	112	--	--	--	117	62,283	--	1,739	1,243	815	110	50	--	112	113	4,182	66,465	1994.8
Iowa	169	4	13,661	74	--	262	202	792	--	11	1,005	16,179	--	--	19	--	--	--	--	9	25	53	16,232	1993.8
Kansas	--	--	--	1,769	--	--	377	20	--	--	--	2,166	--	--	--	--	--	--	--	--	14	14	2,181	1993.2
Michigan	--	2,878	--	--	327,934	1,474	--	--	--	--	35,697	367,983	--	31	441	--	43	--	--	2,712	--	3,227	371,210	1994.6
Minnesota	--	--	353	--	323	268,033	--	--	49	--	15,430	284,188	--	--	51	--	--	--	--	349	665	1,065	285,253	1994.3
Missouri	593	105	1,102	243	--	--	128,264	84	--	--	66	130,458	387	1,996	--	--	--	--	--	--	661	3,044	133,501	1994.0
Nebraska	--	--	70	15	--	--	8	5,763	--	1,884	--	7,741	--	--	--	--	--	--	1,051	--	1	1,052	8,792	1993.0
North Dakota	--	--	--	--	--	242	--	--	462	--	--	704	--	--	--	--	--	--	--	--	--	--	704	1993.7
South Dakota	--	--	--	--	--	--	--	134	--	8,868	--	9,002	--	--	--	--	--	--	4,795	--	--	4,795	13,796	1993.1
Wisconsin	693	66	1,495	--	20,519	10,454	4	--	--	--	343,851	377,083	--	--	1	--	--	--	--	10	--	11	377,093	1994.6
Total	25,328	68,603	18,674	2,102	349,157	280,465	132,785	6,794	511	10,762	396,492	1,291,674	387	7,331	1,772	815	174	50	5,845	3,193	1,582	21,149	1,312,822	1994.2
	Roundwood imported into North-Central Region																							
Alabama	--	3	--	--	--	--	--	--	--	--	--	3												
Arkansas	--	--	--	--	--	--	2,106	--	--	--	--	2,106												
California	--	19	--	--	--	--	--	--	--	--	--	19												
Kentucky	110	3,239	--	--	108	--	174	--	--	--	55	3,686												
Louisiana	--	215	--	--	--	--	--	--	--	--	--	215												
Maine	--	--	--	--	--	--	--	--	--	--	66	66												
Maryland	--	6	--	--	--	--	--	--	--	--	--	6												
Mississippi	--	21	--	--	--	--	--	--	--	--	--	21												
Montana	--	--	--	--	--	--	--	--	--	769	--	769												
New York	--	102	--	--	20	--	--	--	--	--	125	247												
Ohio	--	1,241	--	--	257	--	36	--	--	--	151	1,685												
Oklahoma	--	114	--	56	--	--	185	--	--	--	--	355												
Pennsylvania	--	1,461	--	--	108	--	1	--	--	--	22	1,593												
Tennessee	--	263	--	--	108	--	114	--	--	--	1	486												
Texas	--	53	--	--	--	--	9	--	--	--	--	62												
Vermont	--	--	--	--	--	--	--	--	--	--	16	16												
Virginia	--	--	--	--	--	--	--	--	--	--	13	13												
West Virginia	--	490	--	--	--	--	--	--	--	--	6	496												
Wyoming	--	--	--	--	--	--	--	--	--	2,798	--	2,798												
Canada	--	23	--	--	4,632	11,265	--	--	--	10	368	16,297												
Total	110	7,250	--	56	5,234	11,265	2,625	--	--	3,577	823	30,938												
Consumption	25,438	75,854	18,674	2,157	354,391	291,730	135,410	6,794	511	14,339	397,315	1,322,612												

May, Dennis M.
1998. **The North Central Forest Inventory and Analysis timber product output database—a regional composite approach**. Gen. Tech. Rep. NC-200. St. Paul, MN: U.S. Department of Agriculture, Forest Service, North Central Research Station. 16 p.

Discusses a regional composite approach to managing timber product output data in a relational database. Describes the development and structure of the regional composite database and demonstrates its use in addressing everyday timber product output information needs.

KEY WORDS: Consumption, exports, imports, production, roundwood.