

Forest Products Industries' Economic Contributions: Nebraska

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Foreword

Despite its prairie origins, Nebraska has long been home to a diverse array of trees and forests. From the hardwoods of the Missouri River Valley to remnant timber stands left after glacial epochs, the state's forest resources present opportunities for both stewardship and utilization.

Nebraska represents a unique ecological convergence of woody species. Its forests on the Missouri River bluffs are home to high-quality eastern hardwood species including red and white oak, black walnut, and hickory. The western part of the state contains forests dominated by softwood species including ponderosa pine, Rocky Mountain juniper, and eastern red cedar. Mixed hardwood forests span eastern Nebraska's upland and lowland regions, and extensive riparian corridors containing elm, ash, willow and cottonwood are found throughout the state. There are also relic stands of forest systems left behind after the receding of ice-age glaciers, including stands of ponderosa pine in central Nebraska, limber pine in the southern panhandle, bur oak in the southwest, and birch/aspen forest along the Niobrara River valley across northern Nebraska.

Trees and forests provide many benefits to Nebraska residents, including bolstering the forest industries that create jobs and generate substantial economic growth and opportunity in Nebraska's rural communities. Trees and forests also create valuable wildlife habitat and livable communities, provide recreational opportunities, clean the water and air, save energy, and contribute to Nebraskans' enjoyment of the "Good Life."

The Nebraska Forest Service provides technical and financial assistance to the state's forest products industries, businesses, organizations, municipalities and individuals. The NFS not only aims to promote and develop wood products, but also facilitate utilization opportunities for tree and forest resources statewide.

Innovative utilization and strong forest products markets provide economic incentives for landowners and foresters to ensure the health, longevity, and sustainability of Nebraska's forests. From traditional forest products (e.g., lumber and posts) to emerging products such as biochar, nuts, and woody biomass energy fuel, Nebraska's forests offer opportunities for the development of economic markets to ensure long-term forest health, diversify farm and nonfarm income, and revitalize struggling rural communities.

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Table of Contents

Foreword	2
Acknowledgements	3
Table of Contents	4
Executive Summary	5
Glossary	8
Introduction	10
Forest Resources of Nebraska	11
Forest Products Industries	14
Economic Contributions of Nebraska’s Forest Products Industries	15
Economic Contributions Defined	15
Economic Contribution Results.....	16
Direct and Total Contributions by Forest Products Industries	17
Direct and Total Contributions by Forest Product Industry Groups.....	17
Top Forest Product Sectors	21
Top Nonforest Industries Impacted	22
Neighboring States	22
Importance of the Forest Products Industries in Context	24
Supplemental Economic Contribution Information.....	25
Summary	26
References	27
Appendix A: Methods and Data	28
Appendix B: Forest Products Industries Groupings and IMPLAN Sectors	31
Appendix C: Detailed Economic Contribution Results	33

Executive Summary

This report assesses broad forest conditions and economic contributions of forest products industries in Nebraska. It is one of 20 coordinated and comparable state reports in the northeastern and midwestern United States that provides an improved assessment of forests and the economies they support. Forest data come from the U.S. Forest Service’s Forest Inventory and Analysis website, and economic data come from the 2017 Impact Analysis for Planning (IMPLAN), a commercially available economic input-output (IO) model.

Nebraska boasts 1.5 million acres of forest land that cover 3 percent of its land base. The majority of Nebraska’s forest land is privately owned (89 percent). About 5 percent is owned by state and local governments, and about 6 percent is in federal ownership.

Forest Industries

This report presents seven forest products industries, which are based on 32 economic sectors in IMPLAN, 23 of which are present in Nebraska:

- Forestry
- Logging
- Primary solid wood products
- Secondary solid wood products
- Wood furniture
- Pulp, paper, and paperboard mills
- Secondary paperboard and other paper products

In 2017, Nebraska’s forest products industries provided direct employment to 5,800 people, leading to \$1.5 billion in output. That same year, labor income was \$283.2 million and value-added was \$405.0 million. In total contributions, these industries supported 11,214 jobs, \$571.1 million in labor income, \$883.3 million in value-added, and \$2.4 billion in output.

Among the top sectors (excluding forest products sectors) impacted by forest products industries were wholesale trade, management of companies and enterprises, restaurants, trucking, and real estate. This group of sectors reflects spending by forest products companies, their suppliers, and individuals.

Leading Forest Products Industry Groups

Among the seven industry groups, the leading industries’ rank in terms of direct jobs, value-added, and direct output varied by chosen measure:

- Secondary solid wood products had the highest number of direct jobs (2,121), the second highest value-added (\$124.5 million), and the second highest direct output (\$415.3 million).
- Wood furniture had the second highest employment (1,649), third highest value-added (\$107.9 million), and third highest output (\$296.4 million).
- Secondary paperboard and other paper products had the third highest number of direct jobs (1,534), the highest value-added (\$145.7 million), and the highest direct output (\$707.1 million).

Leading Individual Forest Products Sectors

Among the 23 forest products sectors present in Nebraska, the top four, by measure in order from highest to fourth highest of direct contributions, were:

- Employment—Paperboard container manufacturing; showcase, partition, shelving, and locker manufacturing; wood container and pallet manufacturing; and wood kitchen cabinet and countertop manufacturing were the top four sectors and had a combined total of 3,002 direct jobs, or 51.8 percent of direct employment.
- Labor income—Paperboard container manufacturing, showcase, partition, shelving, and locker manufacturing, engineered wood member and truss manufacturing, and wood kitchen cabinet and countertop manufacturing had the highest labor income, totaling \$158.3 million, or 55.9 percent of direct labor income.
- Value-added—Paperboard container manufacturing; showcase, partition, shelving, and locker manufacturing; wood windows and door manufacturing; and wood kitchen cabinet and countertop manufacturing had the highest value-added, totaling \$212.6 million, or 52.5 percent of direct value-added.
- Output—Paperboard container manufacturing; showcase, partition, shelving, and locker manufacturing; engineered wood member and truss manufacturing; and wood windows and door manufacturing were the top four sectors in output, totaling \$899.6 million, or 58.6 percent of total direct output.

Nebraska’s Forest Products Industries Compared to Other Nebraska Industries

The forest products industries provide more direct labor income, value-added, and output than commercial fishing, hunting, and trapping and mining and oil and gas production. Overall, forest products industries accounted for 9.1 percent of the nonfood manufacturing jobs in Nebraska. In 2017, 5.5 percent of Nebraska’s 101,420 direct manufacturing jobs were in the forest products industries (i.e., over one in 20 manufacturing jobs).

Nebraska's Forest Products Industries Compared to Those of Iowa and Missouri

Forest products industries in three north central states (Nebraska, Iowa, and Missouri) employed over 49,300 workers and accounted for \$13.5 billion in direct output. Missouri's forest products economy was the largest in the region, followed by Iowa. Nebraska had the smallest economy among these three states.

Glossary

The following technical terms are used throughout this report when discussing forestry and economic contributions.

Forestry Terms

Average annual harvest removals: The average annual merchantable volume of growing-stock trees that were live at the time of the previous inventory and were either cut and removed by direct human activity related to harvesting or died as a result of silvicultural or land-clearing activity by the time of the current inventory.

Average annual mortality: The average annual merchantable volume of growing-stock trees that were live at the time of the previous inventory and are dead in the current inventory.

Average annual net growth: The average annual change in merchantable volume of growing-stock trees, after deducting mortality volume, between inventories.

Forest land: Land that is at least 10 percent stocked by trees of any size, including land that formerly had such tree cover and that will be naturally or artificially regenerated. Forest land includes transition zones, such as areas between heavily forested and nonforested lands that have at least 10 percent canopy cover with live tally trees, or recently had at least 10 percent canopy cover by live tally trees based on the presence of stumps, snags or other evidence, and forest areas adjacent to urban and built-up lands, including pinyon-juniper and chaparral areas in the western U.S. and afforested areas. The minimum area for classification of forest land is one acre and 120 feet wide measured stem-to-stem from the outermost edge. Unimproved roads and trails, streams, and clearings in forest areas are classified as forest land if less than 120 feet wide.

Growing stock: Live trees of commercial species that meet minimum merchantability standards and only includes trees at least 5 inches in diameter at breast height. In general, these trees have at least one solid eight-foot section, are reasonably free of form defect on the merchantable bole, and at least 34 percent or more of the volume is merchantable. Excludes rough or rotten cull trees.

Timberland: A subset of forest land that produces or can produce crops of industrial wood and not withdrawn from timber utilization by statute or administrative regulation. (Note: Areas qualifying as timberland can produce at least 20 cubic feet per acre per year of industrial wood in natural stands. Currently inaccessible and inoperable areas are included.)

Economic Contribution Terms

Direct effects/contributions: The economic activities (e.g., output, employment, labor income, and value-added) associated with an industry or sector in the study area. These can describe the current economic sectors or changes to those sectors.

Employment: The number of full- and part-time jobs associated with an industry.

Indirect effects/contributions: The impact of local industries purchasing goods and services from other industries, leading to others' outputs, employment, and labor income. This report uses "indirect effects" to refer to the combination of indirect and induced effects.

Induced effects/contributions: The impact of labor income (employee compensation and proprietor income) via goods and services purchased due to the direct and indirect spending by industries. For this report, induced effects are included with indirect effects and referred to as indirect effects.

Labor income: The dollar total of employee compensation and proprietor income; the latter is associated with self-employed individuals.

Output: The dollar measure of production within an area; it is also viewed as sales.

Social Accounting Matrix (SAM) multipliers: These multipliers are derived by dividing the sum of direct, indirect, and induced effects by the direct effects. The social accounts include payments made between households, households and government, and more. These are available for output, employment, labor income, and value-added and are used to assess effects of changes in industry activity (i.e., "ripple effects").

Total effects/contributions: The sum of direct, indirect, and induced effects.

Value-added (also known as gross state product, or GSP): The sum of labor income, other property income (e.g., rents and profits), and indirect business taxes (e.g., excise and sales taxes). It is the difference between an industry's total output and the cost of its intermediate inputs. The sum of value-added for all economic sectors within the region equals the total GSP.

Introduction

Forest products industries are an integral component of Nebraska's economy and improving the health of Nebraska's forests. They provide jobs, raw materials, and finished goods that generate additional economic activity throughout the state, region, and nation. Due to the size of Nebraska's forest products industries, there has not been significant work to quantify their impact because Nebraska has traditionally been identified as an agricultural state. Evaluating the size and impacts of its forest products industries and comparing them to those in similarly sized states will provide greater insights as to the importance of these industries to Nebraska's rural communities and the state as a whole.

This report compares the contributions of Nebraska's forest products industries with those of adjacent states. It is one of 20 reports in the Northeast and Midwestern area of the United States that broadly assesses forests and their economic contributions. The interactions of these 20 states are covered in a regional report. In total, these documents provide a consistent reporting format, compiled using identical methods, across the northeastern and midwestern United States. Previous state-level reports in this area were not comparable because they used different methods and data.

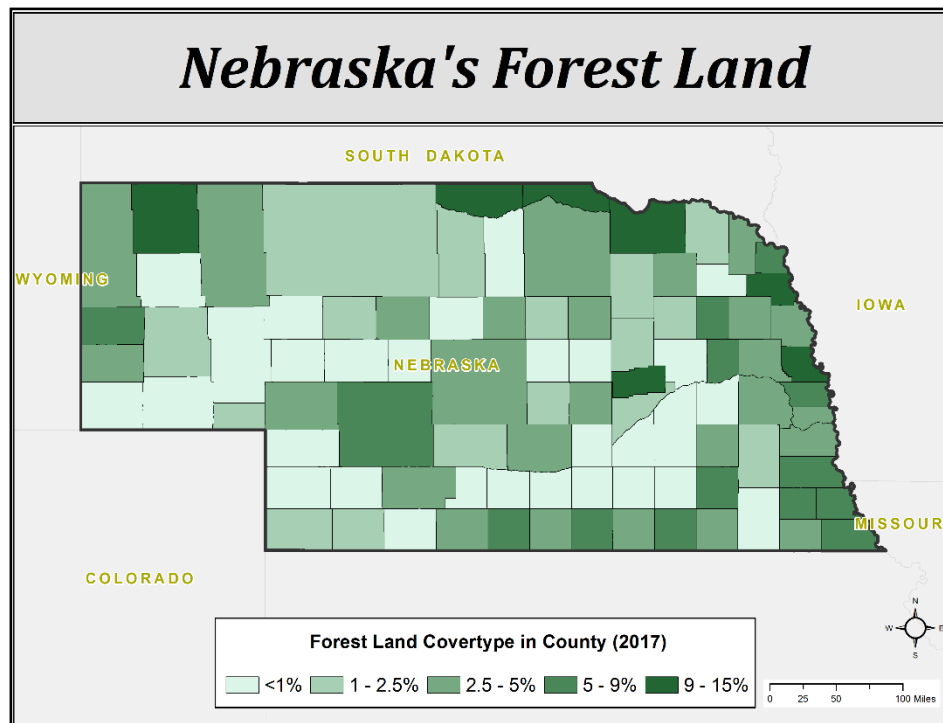
To help quantify these relationships and consistently document the industries' contributions, the Forest Markets & Utilization Committee of the Northeast—Midwest State Foresters Alliance secured federal grant funds to conduct an analysis of 20 midwestern- and northeastern-area states as well as Nebraska. As part of this work, the same project team that completed the individual state reports—comprising members of the Michigan Department of Natural Resources, Public Sector Consultants, Michigan State University forestry economics professor emeritus Larry Leefers, and state forestry experts—published a 20-state report summarizing the economic contributions of forest products industries at a regional level. The U.S. Forest Service funded this work through a 2017 Landscape Scale Restoration grant.

Much of the data used in this report were derived from the U.S. Forest Service Forest Inventory and Analysis database and from IMPLAN, a widely used economic modeling system. These data and related information are presented in four major sections: Forest Resources of Nebraska, Forest Products Industries, Economic Contributions of Nebraska's Forest Products Industries, and Summary. Due to rounding, some figures in the following tables may not sum to the exact total indicated. The appendices present the economic methods and detailed economic sector data used for this report.

Forest Resources of Nebraska

Nebraska boasts a diverse array of forest resources. Central hardwood forests representative of the eastern United States, ponderosa pine forests representative of the Rocky Mountains, and paper birch forests representative of the northern boreal forests all converge in Nebraska (Schmidt and Wardle 1998). Exhibit 1 shows the percentage of forest land by county throughout the state.

Exhibit 1. Nebraska's Forest Land by Percentage of County, 2017



Nebraska has nearly 1.5 million acres of forest land covering 3 percent of its land base. (Exhibit 2). Trees are important across Nebraska. They are in our forests, along our rivers, and in our yards. It is estimated that there are nearly 380 million trees in Nebraska, which translates to roughly 200 trees for each Nebraskan. In addition to traditional forest land, Nebraska is home to 1.3 million acres of additional tree-covered land including agroforestry plantings (windbreaks and shelterbelts) and narrow tree corridors along rivers and streams (Meneguzzo et al. 2012).

Exhibit 2. Nebraska Land Area by Land Use Type, 2017 (U.S. Forest Service)

Land Use Type	Acres	Percentage
Forest land	1,474,626	3.0%
Nonforest land	47,580,059	97.0%
Total	49,054,685	100.0%

Most of Nebraska’s forest land is privately owned (88.6 percent), and the State of Nebraska, local governments, and the federal government are the major public owners (Exhibit 3).

Exhibit 2. Forest Land by Ownership Group (2017)

Ownership Group	Acres	Percentage
National Forest	49,426	3.4%
Other Federal	37,887	2.6%
State and local governments	80,711	5.4%
Private	1,306,602	88.6%
Total	1,474,626	100.0%

Landowners pursue diverse goals. Private landowners have wide latitude in how they treat their lands—some have a hands-off approach, while others pursue active management. There are several state and federal programs designed to encourage the active management of private forest lands. State and national forests are actively managed in many areas, while resource protection is emphasized in others. Active timber management is frequently driven by the need to reduce forest stocking rates to reduce the risk of catastrophic wildfire and restore native vegetation. Timber harvest can be variable, with targeted species including eastern cottonwood, ponderosa pine, bur oak, black walnut, and eastern red cedar.

Nebraska’s major forest types include elm/ash/cottonwood, oak/hickory, other eastern softwoods (including eastern red cedar), ponderosa pine, and oak/pine (Exhibit 4). Tree species with the greatest standing volume include eastern cottonwood, ponderosa pine, bur oak, green ash, hackberry, basswood, and eastern red cedar. While Nebraska is not known as a significant forest products manufacturing state, it is home to a small wood products manufacturing industry, producing pallet lumber, blocking, and other lumber products used in freight shipping. In addition to pallet lumber, Nebraska businesses produce fence posts, animal bedding, specialty lumber products, and small volumes of wood pellets and veneer. Periodic timber harvests in Nebraska’s ponderosa pine forests supply logs to sawmills in the Black Hills of South Dakota.

Exhibit 3. Forest Land Area by Forest Type Group (2017)

Forest Type Group	Acres	Percentage
Elm/ash/cottonwood	366,323	24.8%
Oak/hickory	347,965	23.6%
Other eastern softwoods	226,408	15.4%
Ponderosa pine	220,288	14.9%
Oak/pine	96,524	6.5%
Other	217,118	14.7%
Total	1,474,626	100.0%

The estimated volume of standing timber suitable for forest products was 912.8 million cubic feet, or about 12 million standard cords¹ (Exhibit 5). Recent catastrophic wildfires in Nebraska’s ponderosa pine and eastern red cedar forests had a significant negative impact on the timber industry and forest productivity, burning nearly 250,000 acres. Average annual harvest removals of growing stock were about 4.0 million cubic feet, or roughly 0.4 percent of standing volume.

Exhibit 4. Characteristics of Growing Stock in Nebraska, 2017 (in million cubic feet)

Measure	Total	National Forest	Other Federal	State and Local Government	Private
Net volume	912.8	29.6	74.3	45.8	763.0
Average annual net growth	0.9	(1.1)	1.6	(0.5)	0.9
Average annual harvest removals	4.0	-	-	0.2	3.8
Average annual mortality	26.4	1.8	1.1	1.8	21.7

Note: Net volume is merchantable volume, in cubic feet, of growing-stock trees for timber species (trees where diameter is measured at breast height) from a 1-foot stump to a minimum 4-inch top diameter, or to where the central stem breaks into limbs all of which are less than 4.0 inches in diameter. Volume loss due to rotten, missing, and form cull has been deducted. Growing stock is defined as live trees of commercial species that meet minimum merchantability standards and only includes trees at least 5 inches in diameter at breast height. Net growth is the average annual change (gross growth minus mortality) in merchantable volume, in cubic feet, of growing-stock trees on forestland. Harvest removals are the average annual merchantable volume, in cubic feet, of growing-stock trees at the time of removal from forest land. Annual mortality is the average annual merchantable volume, in cubic feet, of growing-stock trees at the time of mortality on forest land.

¹ A standard cord is a unit of measurement for pulpwood or sawlogs, generally equivalent to a stack of wood measuring four feet wide by four feet tall by eight feet long. A stacked cord of wood typically contains about 79 cubic feet of solid wood, excluding air space.

Forest Products Industries

Contribution analysis focuses on industries' role in an economy. The first step is often defining the region (e.g., a state). One of the next steps is to define exactly which economic sectors comprise the focus industries. To analyze the contributions of the forest industries, representatives from the U.S. Forest Service's northeastern and midwestern states and Nebraska selected 32 sectors by consensus for inclusion in the analysis. A description of the methods and data is presented in Appendix A. To concisely describe and communicate the economic contribution of the forest products industries, these 32 sectors were aggregated into seven broad groups (Appendix B):

- Forestry
- Logging
- Primary solid wood products
- Secondary solid wood products
- Wood furniture
- Pulp, paper, and paperboard mills
- Secondary paperboard and other paper products

In total, these sectors cover forest-specific manufacturing activities, including the conversion of trees into primary products and the manufacture of products used by other sectors and households. Primary industries (e.g., sawmills, reconstituted wood products [such as oriented strand board], and power plants) use wood directly from the forest, including roundwood, chips, or similar forms. Secondary industries (e.g., trusses and furniture) use one or more primary forest products (e.g., lumber and paperboard) in their manufacturing processes. Value is added as the timber is processed through primary and secondary manufacturers. Several sectors included wood and nonwood products (e.g., institutional furniture manufacturing). Therefore, output and other measures were reduced to better reflect the wood-only component by using published government data or surveys (Gibson, Leefers, and Poudel 2020).

This report used IMPLAN to estimate economic contributions of the forest products industries. IMPLAN is a widely used input-output model that comprises economic data and software. IO models characterize financial linkages among and between sectors, households, and institutions. Within these models, various sectors have production functions that show the value of inputs used in production of outputs or commodities. Nebraska's economy was represented by 417 sectors in 2017, the most recent year available for IMPLAN data at the time of the analysis. These sectors are based on the North American Industrial Classification System (NAICS).

IMPLAN models can be constructed for different geographic areas. State data were used in this report, but given IMPLAN's structure, substate and multistate analyses can be developed.

Economic Contributions of Nebraska’s Forest Products Industries

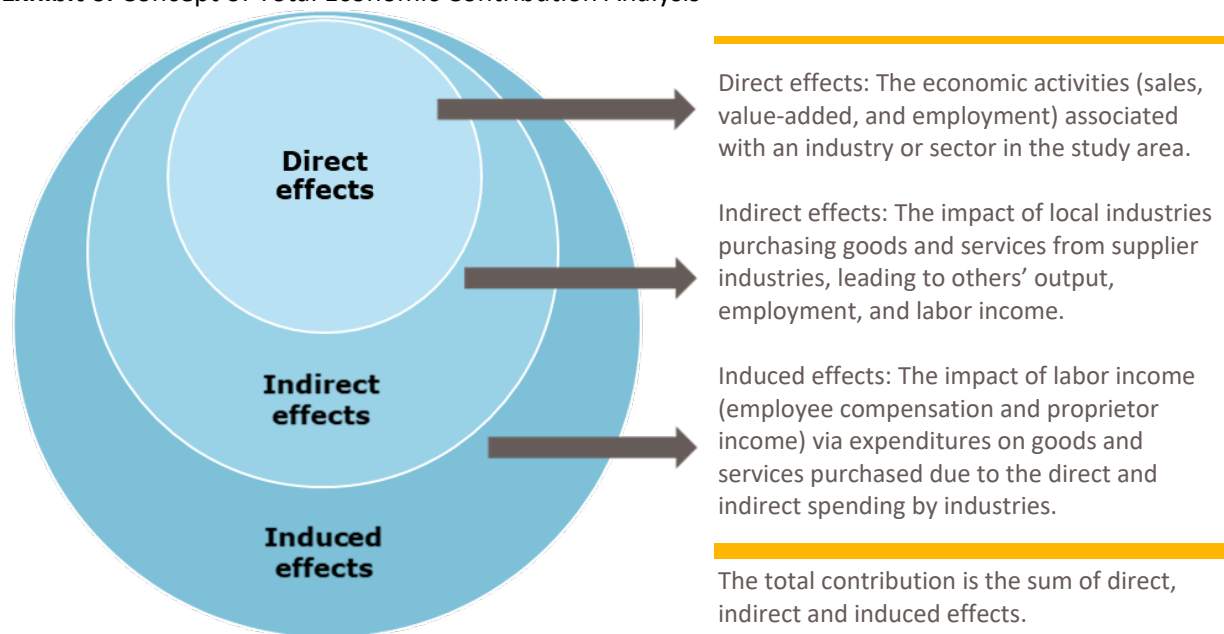
This section of the report includes four major subsections: Economic Contributions Defined, Economic Contribution Results, Importance of the Forest Products Industries in Context, and Supplemental Economic Contribution Information.

Economic Contributions Defined

Input-Output Analysis and IMPLAN

Forest products industries influence the economy in three ways: direct effects (when industries sell commodities in response to demand), indirect effects (as suppliers to directly impacted sectors), and induced effects (household spending by employees in directly and indirectly impacted sectors) (Exhibit 6). The total economic contribution is the value of production required to meet all the needs stemming from the initial activity—in this case, forest product–related purchases.

Exhibit 6. Concept of Total Economic Contribution Analysis



IO modeling using IMPLAN software and data is a conventional approach for documenting forest products industries' economic contributions. This analysis used the matrix inversion approach with external IMPLAN model adjustment as a primary method for estimating economic contributions of forest products industries in Nebraska (Gibson, Leefers, and Poudel 2020). Major economic indicators generated by IMPLAN include employment (full- and part-time jobs), labor income, total output, and value-added.

Interaction Between State and Regional Analyses

IMPLAN models are based on interactions across the economy. One important aspect of these interactions is whether commodities are sourced locally or imported. In smaller areas (e.g., counties), fewer commodities are sourced locally. As a result, leakages occur when purchases are made—that is, fewer dollars stay in the local economy.

Larger economies have fewer leakages and more commodities are sourced locally. For example, an examination of the logging industries (IMPLAN sector 16) in Iowa and Nebraska reveals that the direct employment for 2017 was 610 and 197 jobs, respectively. Summing the individual state's total employment contributions (direct, indirect, and induced) yields 1,014 jobs. However, if the states are combined as one region, the total employment contribution increases to 1,023 jobs. This increase reflects less leakage and more local purchases.

The larger role is due to trade, but IMPLAN does not explicitly show trade with specific states, only overall imports and exports. The regional analysis highlights the larger role of forest products industries in the region's economy. Consequently, the state-level analyses underestimate the actual contributions from a regional perspective.

Economic Contribution Results

This section presents direct and total contributions for all forest products industries, direct and total contributions by forest product industry groups (e.g., logging, furniture, etc.), the top forest products sectors, and the top nonforest products sectors affected by the forest products industries. Finally, this section compares forest industries in nearby states, other natural resources industries, and manufacturing industries within the state.

Forests and forest products industries are central for the transition to a greener and more sustainable economy. A green goods and services economy relies on the sustainable use of natural resources, and Nebraska's forest products industries are tightly bound to forests and the goods and ecosystem services that they provide (e.g., wildlife habitat, watershed protection, carbon sequestration, etc.).

Direct and Total Contributions by Forest Products Industries

Contribution analysis provides a means to assess the role various industries play in a state’s economy. Nebraska forest products industries’ total economic contribution in terms of output was \$2.4 billion, based on direct output of \$1.5 billion (Exhibit 7). A total of 5,800 direct jobs were associated with this level of economic activity, and the total number of jobs supported was 11,214. Direct labor income, which includes employee compensation and proprietor income, was \$283.2 million, or \$48,830 per job. Total labor income—which includes income paid directly to industry employees and proprietors, their suppliers, and the other industries they support—totaled \$571.1 million.

Exhibit 5. Region-wide Economic Contribution of Forest Products Industries, 2017 Dollars

Effect	Employment	Labor Income (Thousands of Dollars)	Value-added* (Thousands of Dollars)	Output (Thousands of Dollars)
Direct	5,800	\$283,216	\$404,977	\$1,534,558
Total	11,214	\$571,068	\$883,299	\$2,364,985

* Value-added in IMPLAN is equivalent to GSP.

Each direct job in the forest products industries supported 0.9 additional jobs, and every \$1 million in direct labor income supported slightly more than \$1.0 million in indirect and induced labor income.

Most state economies are large relative to any particular industry or group of industries. The forest products industries are no exception. In 2017, Nebraska’s population was estimated at 1.9 million people, with total employment of 1.3 million. The gross state product was \$121.7 billion from 417 economic sectors (of the possible 536 in the US). The GSP’s largest component was labor income, which was \$74.4 billion.

Direct value-added for forest products industries was \$405.0 million; 0.3 percent of Nebraska’s total GSP. The percentage more than doubles to 0.7 percent when considering total value-added effects. These percentages hold for other economic measures (e.g., jobs) as well.

Direct and Total Contributions by Forest Product Industry Groups

As previously noted, the 32 IMPLAN forest products sectors were combined into seven industry groups (Appendix B). In Nebraska, secondary solid wood products was the largest of these groups in terms of direct employment, and the second largest in terms of labor income, value-added, and output (Exhibit 8). Wood furniture was the second largest group in terms of direct employment, and the third largest group in terms of labor income, value-added, and output. Secondary paperboard and other paper products was the third largest group in terms of direct employment, and the largest group in terms of labor income, value-added, and output. Forestry was the smallest group in terms of value-added and

output; pulp, paper, and paperboard mills was the smallest in terms of direct employment, and logging was the smallest in terms of labor income.

Two groups—secondary paperboard and other paper products and secondary solid wood products—accounted for nearly three-quarters of the output of forest products industries. Nearly two-thirds of forest products industries employment was in the secondary solid wood products and wood furniture groups.

Exhibit 6. Direct Economic Contributions in Nebraska, Industry Groups, 2017

Industry Group	Employment	Labor Income (Thousands of Dollars)	Value-added (Thousands of Dollars)	Output (Thousands of Dollars)
Forestry	36	\$1,293	\$1,411	\$1,549
Logging	197	\$885	\$5,434	\$9,768
Primary solid wood products	246	\$10,471	\$17,624	\$91,874
Secondary solid wood products	2,121	\$94,830	\$124,545	\$415,319
Wood furniture	1,649	\$73,162	\$107,901	\$296,447
Pulp, paper, and paperboard mills	17	\$1,263	\$2,402	\$12,454
Secondary paperboard and other paper products	1,534	\$101,311	\$145,659	\$707,147
Total	5,800	\$283,216	\$404,977	\$1,534,558

Exhibit 7. Total Economic Contributions in Nebraska, Industry Groups, 2017

Industry Group*	Employment	Labor Income (Thousands of Dollars)	Value-added (Thousands of Dollars)	Output (Thousands of Dollars)
Forestry	23	\$623	\$563	\$242
Logging	113	\$1,282	\$4,000	\$7,015
Primary solid wood products	610	\$27,815	\$48,145	\$136,563
Secondary solid wood products	3,802	\$181,542	\$269,770	\$674,092
Wood furniture	2,797	\$131,350	\$203,929	\$468,388
Pulp, paper, and paperboard mills	61	\$3,870	\$6,807	\$19,474
Secondary paperboard and other paper products	3,807	\$224,587	\$350,085	\$1,059,212
Total	11,214	\$571,068	\$883,299	\$2,364,985

*Forestry and logging are reported in this table, but most of their contributions are as indirect inputs or intermediate inputs used for production in the other five industry groups.

For the following sector-specific discussions, refer to Exhibit 8 for direct contribution details and Exhibit 9 for total contribution details. See Appendix C for detailed economic measures for industry groups and their component sectors.

Forestry

The forestry group includes timber tract operations, establishments primarily engaged in the operation of timber tracts for the purpose of selling standing timber, and support activities for forestry such as estimating timber; forest firefighting; forest pest control; treating burned forests from the air for reforestation or on an emergency basis; and consulting on wood attributes and reforestation related to timber production, wood technology, forestry economics and marketing, and forest protection.

Out of seven industry groups, forestry was the second smallest in terms of direct contributions in 2017. Direct contributions were \$1.5 million in output, 36 jobs, \$1.3 million in labor income, and \$1.4 million value-added. Total contributions are based, in part, on backward linkages to suppliers. Total contributions for forestry can be lower than direct contributions (i.e., initial IMPLAN levels) because many of the contributions are inputs into other industries. For example, over a third (38 percent) of forestry jobs are counted as contributions in other industries, mostly logging and primary solid wood products (e.g., sawmills). Hence, the total contributions displayed in Exhibit 9 underrepresent the industry's

broader contributions—reporting total contributions for forestry is somewhat misleading because much of the forestry total contribution effects are hidden in the total contributions of other industries. The same holds true for logging below.

Logging

The logging industry group contains establishments primarily engaged in one or more of the following: cutting timber, cutting and transporting timber, and producing wood chips in the field. Logging was the third smallest in terms of direct employment. The direct contributions of logging were \$9.8 million in output, 197 jobs, \$0.9 million in labor income, and \$5.4 million in value-added. Most logging activity is an input into production in other industries, especially for manufacturing primary solid wood products (e.g., lumber), paper, and paperboard. In Nebraska, over half (51 percent) of logging jobs are included in the total contributions of other industries. As with forestry, logging's total contributions are underrepresented due to their inclusion in other industries.

Primary Solid Wood Products

The primary solid wood products industry group was the fourth largest group in terms of direct employment in Nebraska. Primary solid wood products sectors include wood-based electric power generation, sawmills, wood preservation, veneer and plywood manufacturing, and reconstituted and wood product manufacturing industries. The direct contributions of the group were \$91.9 million in output, 246 jobs, \$10.5 million in labor income, and \$17.6 million in value-added. Total contributions for

primary solid wood products, including direct, indirect and induced effects, were \$136.6 million in output, 610 jobs, \$27.8 million in labor income, and \$48.1 million in value-added. Many primary solid wood products (e.g., lumber and panels) are inputs in other industries, which counted in other industries' total contributions.

Secondary Solid Wood Products

Secondary solid wood products was the largest group in terms of direct employment in Nebraska. This group contains engineered wood member and truss manufacturing; wood windows and doors manufacturing; cut stock, resawing lumber, and planing; other millwork, including flooring, wood container, and pallet manufacturing; manufactured home (mobile home) manufacturing; prefabricated wood building manufacturing; and all other miscellaneous wood product manufacturing. Direct contributions of secondary solid wood products were \$415.3 million in output, 2,121 jobs, \$94.8 million in labor income, and \$124.5 million in value-added. Total contributions were \$674.1 million in output, 3,802 jobs, \$181.5 million in labor income, and \$269.8 million in value-added.

Wood Furniture

Wood furniture was the second largest group in terms of direct employment in Nebraska. Wood furniture includes wood kitchen cabinet and countertop manufacturing; upholstered household furniture manufacturing; nonupholstered wood household furniture manufacturing; institutional wood furniture manufacturing; wood office furniture manufacturing; custom architectural woodwork and millwork manufacturing; and showcase, partition, shelving, and locker manufacturing. Direct contributions of wood furniture were \$296.4 million in output, 1,649 jobs, \$73.2 million in labor income, and \$107.9 million in value-added. Total contributions of wood furniture were \$468.4 million in output, 2,797 jobs, \$131.4 million in labor income, and \$203.9 million in value-added.

Pulp, Paper, and Paperboard Mills

The pulp, paper, and paperboard mills industry group was the smallest in terms of direct employment in Nebraska. The group includes pulp mills, paper mills, and paperboard mills that make paper or pulp from raw wood and from purchased pulp. The pulp, paper, and paperboard mills group's direct contributions were \$12.5 million in output, 17 jobs, \$1.3 million in labor income, and \$2.4 million in value-added. Total contributions were \$19.5 million in output, 61 jobs, \$3.9 million in labor income, and \$6.8 million in value-added.

Secondary Paperboard and Other Paper Products

The secondary paperboard and other paper products group was the third largest in terms of direct employment in Nebraska. The group comprises paper and paperboard manufacturing, paper bag and coated and treated paper manufacturing, stationery product manufacturing, sanitary paper product manufacturing, and all other converted paper product manufacturing. Facilities in this group manufacture products from purchased pulp, paper, paperboard, or recycled materials. The direct

contributions in 2017 were \$707.1 million in output, 1,534 jobs, \$101.3 million in labor income, and \$145.7 million in value-added. Total contributions were \$1.1 billion in output, 3,807 jobs, \$224.6 million in labor income, and \$350.1 million in value-added.

Top Forest Product Sectors

Among the 32 industry sectors that comprise the seven industry groups listed above, the leading sectors varied by the contribution measure examined. In terms of direct jobs, the four largest forest products sectors are paperboard container manufacturing (1,259 jobs); showcase, partition, shelving, and locker manufacturing (697 jobs); wood container and pallet manufacturing (538 jobs); and wood kitchen cabinet and countertop manufacturing (508 jobs). These sectors reflect the diversity of manufacturing in the state.

The paperboard container manufacturing sector comprises establishments primarily engaged in converting paperboard into containers without manufacturing paperboard. These establishments use corrugating, cutting, and shaping machinery to form paperboard into containers. Products made by these establishments include boxes, corrugated sheets, pads, pallets, paper dishes, fiber drums, and reels. In a consumer-driven economy with more and more shipping, this industry is well positioned for growth.

The showcase, partition, shelving, and locker manufacturing sector comprises establishments primarily engaged in manufacturing wood and nonwood office and store fixtures, shelving, lockers, frames, partitions, and related fabricated products of wood and nonwood materials, including plastics laminated fixture tops. The products are made on a stock or custom basis and may be assembled or unassembled (i.e., knockdown). Establishments exclusively making furniture parts (e.g., frames) are included in this industry. Like Institutional Furniture Manufacturing, this sector includes both wood and nonwood components.

The wood container and pallet manufacturing sector comprises establishments primarily engaged in manufacturing wood pallets, wood box shoo, wood boxes, other wood containers, and wood parts for pallets and containers.

The wood kitchen cabinet and countertop manufacturing sector count establishments primarily engaged in manufacturing wood or plastics laminated on wood kitchen cabinets, bathroom vanities, and countertops (except freestanding). The cabinets and counters may be made on a stock or custom basis.

In terms of labor income, paperboard container manufacturing, showcase, partition, shelving, and locker manufacturing, engineered wood member and truss manufacturing, and wood kitchen cabinet and countertop manufacturing were the highest, totaling \$158.3 million. In terms of value-added, paperboard container manufacturing, showcase, partition, shelving, and locker manufacturing, wood windows and door manufacturing, and wood kitchen cabinet and countertop manufacturing had the highest amounts, totaling \$212.6 million. For output, paperboard container manufacturing, showcase,

partition, shelving, and locker manufacturing, engineered wood member and truss manufacturing, and wood windows and door manufacturing were the top four sectors, totaling \$899.6 million.

Top Nonforest Industries Impacted

Contribution analysis using IMPLAN relies on backward linkages from forest products industries sectors among themselves and to other sectors in Nebraska. Including the 23 forest products industries present in Nebraska, 114 sectors were impacted in 2017 (counting sectors with ten or more jobs supported). The top ten sectors (excluding forest products sectors) included wholesale trade, management of companies and enterprises, restaurants, trucking, and real estate (Exhibit 10). This set of sectors reflects indirect and induced spending by forest products companies, their suppliers, and individuals.

These data were at an aggregate level, so 209 jobs in truck transportation included log trucks, delivery trucks, and office jobs for some trucking companies, among others. Six of these sectors were among the top ten sectors in the state of Nebraska (wholesale trade was number two, followed by real estate (number three) and hospitals (number five)—each had over 35,000 jobs).

Exhibit 8. Direct Jobs Impacted by the Forest Products Industries Among Nebraska’s Top Ten Non-Forest Products Industries in 2017

IMPACT Sector	Description	Jobs
395	Wholesale trade	451
461	Management of companies and enterprises	288
502	Limited-service restaurants	218
501	Full-service restaurants	211
411	Truck transportation	209
440	Real estate	190
482	Hospitals	154
468	Services to buildings	143
464	Employment services	101
405	Retail - General merchandise stores	96
Total	NA	2,061

Neighboring States

The north central states of Nebraska, Iowa, and Missouri are important for forest products. Forest products industries employ 49,333 workers across these states and account for almost \$13.5 billion in direct output (Exhibits 11 and 12). Missouri had the largest forest products economy with 25,699 direct jobs and output of nearly \$7.0 billion. Nebraska’s industries were roughly one-fifth the size of Missouri’s.

Iowa falls between the two. The three largest industry groups, each with over 11,000 employees, were secondary solid wood products, wood furniture, and secondary paperboard and other paper products.

Exhibit 9. Forest Products Industries’ Direct Employment in Nebraska, Iowa, and Missouri, 2017

Industry	Nebraska	Iowa	Missouri
Forestry	36	94	536
Logging	197	610	2,270
Primary solid wood products	246	590	3,053
Secondary solid wood products	2,121	9,038	5,989
Wood furniture	1,649	3,751	7,063
Pulp, paper, and paperboard mills	17	63	460
Secondary paperboard and other paper products	1,534	3,688	6,329
Sum of direct contributions	5,800	17,834	25,699

Exhibit 12. Forest Products Industries’ Direct Output in Nebraska, Iowa, and Missouri, 2017

Industry	Nebraska (Thousands of Dollars)	Iowa (Thousands of Dollars)	Missouri (Thousands of Dollars)
Forestry	\$1,549	\$5,317	\$35,816
Logging	\$9,768	\$39,080	\$199,936
Primary solid wood products	\$91,874	\$177,580	\$894,618
Secondary solid wood products	\$415,319	\$2,064,553	\$1,106,338
Wood furniture	\$296,447	\$581,969	\$1,187,050
Pulp, paper, and paperboard mills	\$12,454	\$67,209	\$399,724
Secondary paperboard and other paper products	\$707,147	\$2,042,494	\$3,162,490
Sum of direct contributions	\$1,534,558	\$4,978,201	\$6,985,972

Importance of the Forest Products Industries in Context

To help contextualize the relative importance of the forest products industries, it is useful to compare the contribution of Nebraska’s forest products industries with those of other industries. Agricultural production and mining and oil and gas production make important contributions to the diversity of economic activities reflected in Nebraska’s \$121.7 billion GSP (Exhibit 13). The forest products industries provide more direct labor income, value-added, and output than commercial fishing, hunting, and trapping and mining and oil and gas production. Nebraska’s forest products industries comprised 0.3 percent of the GSP in 2017. Agricultural production provided the largest amount of direct employment (full- and part-time), labor income, value-added, and output, by far, of these industries.

Exhibit 10. Natural Resources and Agricultural Production Industries in Nebraska, 2017

Industry	Employment	Labor Income (Thousands of Dollars)	Value-added (Thousands of Dollars)	Output (Thousands of Dollars)
Forest products	5,800	\$283,216	\$404,977	\$1,534,558
Commercial fishing, hunting, and trapping	209	\$(10)	\$1,899	\$2,081
Mining and oil and gas production	3,538	\$108,179	\$221,253	\$518,210
Agricultural production (plant crop and animal)	67,028	\$5,596,888	\$7,335,543	\$22,342,748
Total	76,576	\$5,988,272	\$7,963,672	\$24,397,598

Labor income per job is highest in agricultural production (\$83,501). For forest products, the average per job is \$48,830; mining and oil and gas has the third highest average income at \$30,576. IMPLAN results indicate that commercial fishing, hunting, and trapping generates a loss of income. It is, by far, Nebraska’s smallest natural resource industry.

Most of the forest products industries are manufacturers, however, the forestry, logging, and biomass power groups are not. There were 101,420 manufacturing jobs in Nebraska in 2017. Of those, 5,567 were in the forest products industries, or 5.5 percent of the total. Of 16 industries, forest products manufacturing was fifth in terms of employment, behind food, machinery, fabricated metal, and transportation equipment manufacturing. It was ninth in terms of labor income and value-added, and eighth in terms of output (Exhibit 14).

Exhibit 11. Manufacturing Industries in Nebraska, 2017

Manufacturing Industries	Employment	Labor Income (Thousands of Dollars)	Value-added (Thousands of Dollars)	Output (Thousands of Dollars)
Food	38,866	\$2,189,799	\$4,326,219	\$26,766,827
Machinery	9,027	\$660,628	\$1,065,161	\$3,469,607
Fabricated metal	8,662	\$514,905	\$796,798	\$2,084,254
Transportation equipment	8,256	\$536,108	\$813,473	\$3,906,670
Forest products	5,567	\$281,038	\$398,132	\$1,523,241
Plastics and rubber products	5,422	\$320,144	\$541,319	\$1,680,848
Miscellaneous	5,345	\$363,524	\$1,044,931	\$2,277,943
Chemical	5,015	\$608,245	\$1,962,311	\$6,287,193
Printing	3,632	\$172,830	\$217,117	\$532,810
Computer and electronic product	3,613	\$252,277	\$433,830	\$1,200,949
Nonmetallic mineral product	3,116	\$186,020	\$282,960	\$974,340
Electrical equipment	1,312	\$112,990	\$245,901	\$540,539
Textiles and apparel	1,308	\$53,833	\$95,365	\$326,769
Primary metal	1,182	\$106,838	\$187,076	\$731,871
Beverage and tobacco product	1,045	\$45,953	\$108,827	\$578,606
Petroleum and coal	52	\$336,245	\$51,228	\$294,026
Total	101,420	\$6,741,376	\$12,570,649	\$53,176,491

Supplemental Economic Contribution Information

The report by Gibson, Leefers, and Poudel provides a detailed discussion of which sectors were included and excluded from this analysis (2020). Most economic data used in this report were derived from IMPLAN, with one notable exception.

For most of the partial sectors (Appendix B), ratios of published government data were used to identify a portion of the industry that would be treated as forest products. In cases where only part of an IMPLAN sector was associated with forest products, analysts faced three options. The most conservative option was to include only sectors viewed as 100 percent in forest products, excluding sectors where only part produced forest products. At the other end of the spectrum, analysts could have focused on sectors producing any forest products at all, even if the forest products represented a small part of total output. Between these extremes, analysts could choose a third option—selecting the portion of a sector that produced forest products and include only that portion, mindful to include a means for assessing the magnitude of that portion. That is the approach used in this report.

Wood is used in many other products not covered by these 23 sectors highlighted in this report. For example, boats, blinds, musical instruments, burial caskets, organic chemicals, and pharmaceuticals may use wood directly or as an extract. However, the wood-only component of these product groups is difficult to quantify and was unable to be included in this report. Surveys could be designed and conducted to determine the forest products component of these sectors. In practice, the production functions, employment, output, and other metrics would need to be compiled and inserted into IMPLAN.

Summary

Over the last 20 years, individual states located in the midwestern and northeastern area of the United States have conducted statewide economic contributions studies of the forest products industries. However, these studies differed in approach, data used, and measures reported. Developing a consistent approach required funding that spanned multiple states. The Forest Markets & Utilization Committee of the Northeast—Midwest State Foresters Alliance secured grant funds through the Landscape Scale Restoration Program within the U.S. Forest Service, Eastern Region, State and Private Forestry to support investigation of the economic contributions of the forest products industry in the 20 northeastern and midwestern states and Nebraska. To that end, the Michigan Department of Natural Resources Forest Resources Division (serving as the lead on the grant project) contracted with Public Sector Consultants to facilitate discussions among the project partner states and to reach consensus on an appropriate analysis methodology and report template for both the regional and state reports, in addition to conducting the analysis.

This report serves as a snapshot of economic contributions of the forest products industries in Nebraska for 2017, as well as a baseline report for future analyses. State data were used in this report, but given IMPLAN's structure, substate and multistate analyses can be developed. However, future analyses may again require funding from the U.S. Forest Service or other institutions for assessments across multiple states. Methods used in developing this report are consistent across the region. There were 5,800 direct jobs in the forest products industries, and overall, 11,214 jobs were supported. Direct labor income was \$283.2 million with total labor income at \$571.1 million. Direct value-added was \$405.0 million, and the total contribution for value-added was \$883.3 million. Finally, direct output was \$1.5 billion with a total contribution of \$2.4 billion in output. Similar report findings are available from other states in the region and are summarized in a regional report.

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Appendix A: Methods and Data

Input-Output Analysis: IMPLAN

Several key decisions related to methods were developed through a consensus process (Gibson, Leefers, and Poudel 2020). The project team, in consultation with the states, made consensus decisions regarding the modeling method for estimating economic contributions, the forest products sectors to include in analysis (either in total or in part), the IMPLAN year for reporting results, and the use of an analysis spreadsheet for consistent reporting.

The economic contributions of the region and each state's forest products industries relied on 2017 IMPLAN software and data. IMPLAN is a widely used economic IO model that focuses on interdependence among various producing and consuming sectors in the economy. IMPLAN has 536 industry sectors for the 2017 data set and is based on the NAICS. IMPLAN data are compiled and linked by the IMPLAN software (Version 3.1.1001.12); data come from various government agencies, including the U.S. Census Bureau, the U.S. Bureau of Labor Statistics, and the U.S. Bureau of Economic Analysis. Economic measures in IMPLAN include employment, labor income, value-added, output, and others. More detailed information on data sources is available at [the IMPLAN website](#).

Wassily Leontief developed IO modeling in the mid-20th century. Impact analysis examines the effects of changes in demand in a regional economy, while contribution analysis can evaluate the role of several related sectors in a region. IMPLAN provides the software and data to conduct such analyses. Each sector has a production function tracing the backward linkages (i.e., suppliers) to other sectors. Various sectors produce commodities (e.g., the logging sector produces logs). Leakages (e.g., foreign and domestic imports/exports) to and from other regions are also modeled. Social accounting flows among industries, households, government, and capital are included in IMPLAN.

The analysis process begins with creating an IMPLAN model. One or more geographic areas (e.g., counties or states) are selected as the region. Then, models are run through the creation of multipliers. This report uses Social Accounting Matrix (SAM) multipliers. Next, activities are selected to estimate either economic impacts or contributions. For example, analysts can estimate the impacts of expanding or contracting industries. In the case of contribution analysis, it is important to ensure that the level of production does not exceed the actual level of production in the region. Contribution analysis essentially counters the effects of the multipliers.

Contributions can be in terms of value-added, output, employment, and/or labor income. Value-added is commonly used to describe an industry's economic contributions and is a conservative measure of these contributions. Value-added is the difference between an industry's output, and the costs of intermediate inputs. When a sawmill sells a board, the value of the log and other inputs is not counted in value-added because they were counted when produced by loggers and others. Thus, only new additions to value (e.g., labor income) are included. Labor income is the major component of value-

added and includes employee compensation and proprietor income. Value-added, summed across all sectors, is equal to GSP.

Another measure of economic contribution is industry output. For example, if a log is sold to a sawmill that sells boards, both sales are counted as part of the overall region's output, as they are important economic activities. Another measure, employment, includes both full- and part-time jobs. As the number of sectors in an analysis increases, there can be overlap in the number of part-time jobs across sectors.

Methods

IMPLAN estimates economic impacts (i.e., effects of economic changes) and contributions (i.e., effects of existing industries). Two methods for multisector economic contribution analysis are available (Parajuli et al. 2018), both requiring significant data manipulation.

The first method customizes the IMPLAN model by changing selected endogenous tables, whereas the second method adjusts input values based on matrix inversion prior to analysis. In method one, the changes are internal to IMPLAN and difficult to monitor from a quality control perspective.

Method two relies mostly on spreadsheet-based manipulation and is easier to monitor. When the contribution analysis is completed, direct effects from the IMPLAN sectors of interest equal the amounts shown in IMPLAN's "Industry Detail" table, and the total contributions (direct plus indirect plus induced) are estimated. Both methods prevent overreporting of total effects, which can occur if standard economic impact analysis is used when contribution analysis results are desired.

IMPLAN was designed for economic impact analysis. Multipliers ensure that the ripple effect manifests across the economy. A portion of those effects often involve self-purchases within the sector of interest. That is, if the output from the logging sector is \$1 million in a local economy, the economic impact of \$1 million in sales would be greater than that amount due to self-purchases. The contribution methods are designed to yield the \$1 million direct contribution and its associated effects. Put simply, the amount of sales (direct contribution) estimated cannot exceed the amount that actually exists. Methods one and two accomplish this.

The matrix inversion approach relies on developing detailed SAM output multipliers for each sector in the forest products industries. Hence, a 32x32 matrix is developed with the diagonal yielding a value close to 1.0 for the detailed multipliers relating each row-column sector to itself (e.g., logging to logging, sawmills to sawmills, etc.). The actual matrix can be developed in several ways. For example, the SAM matrix can be exported from IMPLAN and narrowed down to the appropriate row and columns for the forest products industries. Then, it can be used to develop detailed multipliers via matrix inversion. Alternatively, detailed multipliers can be exported and rearranged into a 32x32 matrix. The approach used in this report was to rely on a matrix developed by IMPLAN staff for the state. Then, the matrix was

inverted and multiplied the initial IMPLAN output values for forest industries sectors to yield inputs for IMPLAN analysis.

Appendix B: Forest Products Industries Groupings and IMPLAN Sectors

Exhibit B1. Forestry Industry Grouping and IMPLAN Sectors

IMPLAN Sector	Sector Name
10	Maple syrup production*
15	Forestry, forest products, and timber tract production
19	Support activities for forestry*

Note: Sectors with an “*” indicate that only a portion of the sector is included in the forest products industries.

Exhibit B2. Logging Industry Grouping and IMPLAN Sector

IMPLAN Sector	Sector Name
16	Commercial logging

Exhibit B3. Primary Solid Wood Products Industry Grouping and IMPLAN Sectors

IMPLAN Sector	Sector Name
47	Electric power generation—biomass*
134	Sawmills
135	Wood preservation
136	Veneer and plywood manufacturing
138	Reconstituted wood product manufacturing

Note: Sectors with an “*” indicate that only a portion of the sector is included in the forest products industries.

Exhibit B4. Secondary Solid Wood Products Industry Grouping and IMPLAN Sectors

IMPLAN Sector	Sector Name
137	Engineered wood member and truss manufacturing
139	Wood windows and doors manufacturing
140	Cut stock, resawing lumber, and planing
141	Other millwork, including flooring
142	Wood container and pallet manufacturing
143	Manufactured home (mobile home) manufacturing
144	Prefabricated wood building manufacturing
145	All other miscellaneous wood product manufacturing

Exhibit B5. Wood Furniture Industry Grouping and IMPLAN Sectors

IMPLAN Sector	Sector Name
368	Wood kitchen cabinet and countertop manufacturing
369	Upholstered household furniture manufacturing
370	Nonupholstered wood household furniture manufacturing
372	Institutional wood furniture manufacturing*
373	Wood office furniture manufacturing
374	Custom architectural woodwork and millwork manufacturing
376	Showcase, partition, shelving, and locker manufacturing*

Note: Sectors with an “*” indicate that only a portion of the sector is included in the forest products industries.

Exhibit B6. Pulp, Paper, and Paperboard Mills Industry Grouping and IMPLAN Sectors

IMPLAN Sector	Sector Name
146	Pulp mills
147	Paper mills
148	Paperboard mills

Exhibit B7. Secondary Paperboard and Other Paper Products Industry Grouping and IMPLAN Sectors

IMPLAN Sector	Sector Name
149	Paperboard container manufacturing
150	Paper bag and coated and treated paper manufacturing
151	Stationery product manufacturing
152	Sanitary paper product manufacturing
153	All other converted paper product manufacturing

Appendix C: Detailed Economic Contribution Results

Direct Economic Contribution by IMPLAN Sector

Exhibit C1. Direct Economic Contributions, Forestry Detail, 2017

Sector	Employment	Labor Income (Thousands of Dollars)	Value-added (Thousands of Dollars)	Output (Thousands of Dollars)
Forestry, forest products, and timber tract production	-	-	-	-
Support activities for forestry	36	\$1,293	\$1,411	\$1,549
Maple syrup production	-	-	-	-
Subtotal	36	\$1,293	\$1,411	\$1,549

Exhibit C2. Direct Economic Contributions, Logging Detail, 2017

Sector	Employment	Labor Income (Thousands of Dollars)	Value-added (Thousands of Dollars)	Output (Thousands of Dollars)
Commercial logging	197	\$885	\$5,434	\$9,768
Subtotal	197	\$885	\$5,434	\$9,768

Exhibit C3. Direct Economic Contributions, Primary Solid Wood Products Detail, 2017

Sector	Employment	Labor Income (Thousands of Dollars)	Value-added (Thousands of Dollars)	Output (Thousands of Dollars)
Electric power generation—biomass	-	-	-	-
Sawmills	79	\$1,763	\$2,202	\$19,567
Wood preservation	82	\$4,181	\$9,869	\$49,000
Veneer and plywood manufacturing	85	\$4,526	\$5,553	\$23,307
Reconstituted wood product manufacturing	-	-	-	-
Subtotal	246	\$10,471	\$17,624	\$91,874

Exhibit C4. Direct Economic Contributions, Secondary Solid Wood Products Detail, 2017

Sector	Employment	Labor Income (Thousands of Dollars)	Value-added (Thousands of Dollars)	Output (Thousands of Dollars)
Engineered wood member and truss manufacturing	451	\$22,585	\$25,318	\$97,804
Wood windows and doors manufacturing	417	\$20,087	\$27,122	\$92,690
Cut stock, resawing lumber, and planing	-	-	-	-
Other millwork, including flooring	62	\$2,286	\$3,419	\$12,032
Wood container and pallet manufacturing	538	\$20,127	\$25,289	\$80,158
Manufactured home (mobile home) manufacturing	272	\$13,752	\$23,810	\$69,009
Prefabricated wood building manufacturing	282	\$12,159	\$14,250	\$46,345
All other miscellaneous wood product manufacturing	98	\$3,835	\$5,338	\$17,281
Subtotal	2,121	\$94,830	\$124,545	\$415,319

Exhibit 12. Direct Economic Contributions, Wood Furniture Detail, 2017

Sector	Employment	Labor Income (Thousands of Dollars)	Value-added (Thousands of Dollars)	Output (Thousands of Dollars)
Wood kitchen cabinet and countertop manufacturing	508	\$21,320	\$26,867	\$72,760
Upholstered household furniture manufacturing	-	-	-	-
Nonupholstered wood household furniture manufacturing	99	\$2,975	\$4,807	\$12,312
Institutional wood furniture manufacturing	64	\$3,122	\$4,302	\$12,462
Wood office furniture manufacturing	126	\$7,149	\$14,999	\$32,554
Custom architectural woodwork and millwork manufacturing	154	\$7,737	\$10,491	\$25,173
Showcase, partition, shelving, and locker manufacturing	697	\$30,859	\$46,435	\$141,186
Subtotal	1,649	\$73,162	\$107,901	\$296,447

Exhibit 13. Direct Economic Contributions, Pulp, Paper, and Paperboard Mills Detail, 2017

Sector	Employment	Labor Income (Thousands of Dollars)	Value-added (Thousands of Dollars)	Output (Thousands of Dollars)
Pulp mills	-	-	-	-
Paper mills	17	\$1,263	\$2,402	\$12,454
Paperboard mills	-	-	-	-
Subtotal	17	\$1,263	\$2,402	\$12,454

Exhibit C7. Direct Economic Contributions, Secondary Paperboard and Other Paper Products Detail, 2017

Sector	Employment	Labor Income (Thousands of Dollars)	Value-added (Thousands of Dollars)	Output (Thousands of Dollars)
Paperboard container manufacturing	1,259	\$83,512	\$112,170	\$567,911
Paper bag and coated and treated paper manufacturing	171	\$11,850	\$18,093	\$74,589
Stationery product manufacturing	-	-	-	-
Sanitary paper product manufacturing	87	\$5,150	\$14,364	\$59,574
All other converted paper product manufacturing	18	\$799	\$1,032	\$5,073
Subtotal	1,534	\$101,311	\$145,659	\$707,147

Note: Value-added in IMPLAN is equivalent to gross state product.

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