

Economic Contribution of California's Forestry and Forest-Products Sectors

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HIGHLIGHTS

- The forestry and forest-products industries contribute approximately \$39 billion and 177,000 jobs to the California economy.
- This economic impact includes \$22 billion and 82,800 jobs in direct contribution and \$17 billion and 95,100 jobs in indirect or induced contribution.
- The forestry and logging industries directly contribute \$437 million and 5,700 jobs to the state economy and \$500 million and 3,600 jobs in indirect or induced economic impact.

INTRODUCTION

California's forests, which cover approximately one third of the state's land area, provide a wide range of economic, environmental, and recreation services. Today, forests are under increasing pressure from urban expansion and related land use conversion, along with increased risk of devastating forest fires, extreme droughts, and insect and disease epidemics (Cohen et al. 2016; Radeloff et al. 2018). Active forest management can help control these risks by reducing tree mortality and increasing forest health. Reducing tree density through timber harvesting allows more space for healthy trees to grow and thus reduces tree competition for water, which also reduces the risk of catastrophic fire and outbreaks of insects and disease. Such proactive forest management not only helps sustain forests but also provides a renewable natural resource that is also beneficial to the state's economy.



Figure 1. California forest cover and regions.

Forestry and forest-products industries are important contributors to California's economy. Forestry and logging provide an important source of jobs in the rural portions of the state, where timber is manufactured into products such as lumber, while downstream forest-products manufacturing also provides economic benefits as primary forest products, such as lumber, are used to manufacture homes, cabinetry, and furniture. Forest-products manufacturing is a very important part of California's economy, benefiting all sections of the state, rural and urban, while also helping forests remain healthy.

This analysis provides an estimate of the direct economic benefits of current forest management activities and related forest-products manufacturing, not only to rural, forest-dependent communities but also to urban areas that benefit from downstream, forest-products manufacturing. In addition, the secondary benefits to the economy that result from both the forest-products manufacturing industry and employee spending are also estimated. Quantifying the direct and secondary economic contributions of California's forestry and forest-products sectors to the state's economy can help stakeholders better communicate the benefits of forest management and forest-products manufacturing to local, regional, and state policy makers involved in forestry and forest-products policy.

Characteristics of California's Forests

California has approximately 33 million acres of forested area, approximately one-third of the state's total land area (Christensen et al. 2016). Forestland is defined as land that is stocked with at least 10 percent trees or land that formerly had such tree cover and which is expected to return. Figure 1 shows the distribution

Table 1. Forest area by ownership class

Ownership type	Ownership class	All forest land		Unreserved timberland	
		Thousand acres	% of total	Thousand acres	% of total
public	National Forest Service	15,586	47.5%	9,141	53%
	other federal	3,279	10%	326	2%
	state/local government	1,127	3.4%	168	1%
private	corporate	4,543	13.8%	4,058	24%
	noncorporate	8,280	25.2%	3,435	20%
Total forest acreage		32,815		17,128	

Source: Christensen et al. 2016. (Table A2-2).

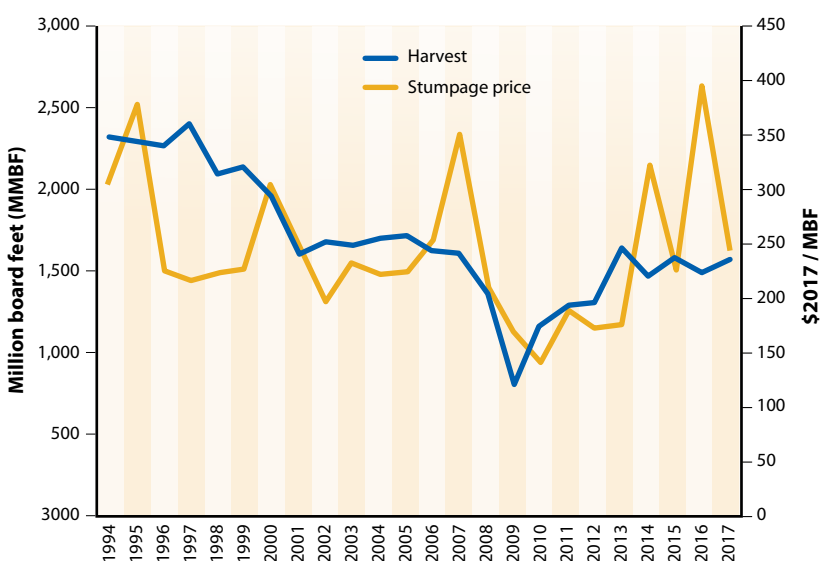


Figure 2. Historical California harvest levels and implied average stumpage price. Source: California Board of Equalization 2017.

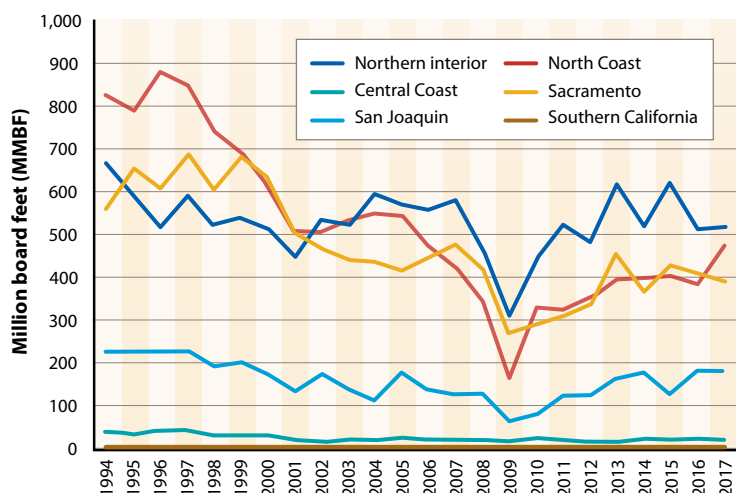


Figure 3. California timber production by region, 1994–2017. Source: California Board of Equalization 2017.

of California’s forests, which are concentrated largely in the northern and central regions of the state (fig. 1).

As shown in table 1, approximately 60 percent of California’s 32.8 million acres of forestland are publicly owned. The federal government is the largest holder of forest area in the state, accounting for approximately 57 percent of the state’s forests and 55 percent of the state’s unreserved timberland, where the majority of harvested timber products are derived. There are 12.8 million acres of private forestland in California, representing 39 percent of the total forest area. Of this privately owned land, 7.5 million acres (59%) are unreserved timberland. While more private forestland is owned by noncorporate entities, the amount of unreserved timberland is quite similar between corporate and noncorporate private forests.

In 2016, California forests produced nearly 1,500 million board feet (MMBF), with a total primary forest product sales value of approximately \$1.47 billion (CA Board of Equalization 2016; Marcille et al. 2019). Figure 2 shows historical timber production and stumpage prices from 1994 to 2017 (fig. 2). Production and prices have largely rebounded from the drop in construction demand brought on by the 2007–2009 recession. As shown in figure 3, for some regions of the state, such as the North Coast and Sacramento, timber production has rebounded moderately from the recession; however, growth remains relatively stagnant, continuing prerecession trends in the regions. The massive decline in housing construction, which dropped nationally by over 75 percent during the recession, resulted in mill closures

throughout the state, thus reducing demand for timber. Some regions of the state have recovered and increased capacity more quickly than others.

METHODOLOGY

This study measures the importance of the forestry and forest-products (FFP) sectors to the California economy by using input-output analysis (I-O). I-O models measure the interconnectedness of an economy's various institutions (Leontief 1986). These economic flows can be used to construct state and regional multipliers showing the economic interrelationships between the FFP sectors and other sectors of the economy. Multipliers are able to capture two additional effects beyond the direct contribution of an economic sector. First, indirect effects measure the supply-chain effects necessary to support the input purchases of the FFP sectors. Second, induced effects measure household-spending effects by employees directly employed in the FFP sectors and employees within the FFP supply chain.

The economic contribution analysis for this study was done using the IMPact Analysis for PLANning (IMPLAN) economic impact assessment software and data, originally developed by the USDA Forest Service and now maintained by IMPLAN LLC., formerly Minnesota IMPLAN Group (MIG) (MIG Inc. 2004). IMPLAN collects data on regional economic accounts, and it constructs regional input-output tables that are used to generate regional multipliers. These multipliers track how changes in spending patterns move throughout the regional economy. Data from 2015, the most recent available, was used for this study. Corrections were made to avoid overestimating the contribution of the five sectors by deducting own-use of FFP products in intermediate purchases (Henderson and Evans 2017). Type SAM (Social Accounting Matrix) multipliers were specified in the I-O models that were closed to households. In addition to capturing the direct and indirect effects, Type SAM multipliers, with internalized households, capture induced effects from changes in labor income spending that results from the initial autonomous change.

The original IMPLAN data provides economic information for 536 sectors, which have been combined in this study to 25 aggregated sectors. This includes five forestry and forest-products sectors (table A1), and 20 nonforest sectors. The five forest-related sectors include forestry and logging, electric power production from wood biomass, solid wood-products manufacturing, pulp and paper manufacturing, and wood furniture manufacturing. IMPLAN's biomass electric power sector includes facilities that utilize both agriculture residue and forest biomass. Modifications to total industry output were made in this study in an attempt to only count biomass electric power utilizing forest biomass.

The reported economic metrics from IMPLAN for this analysis include employment (full- and part-time workers), labor income, output (total sales), and value-added. Value-added represents the total payments by industry made to workers, profits, interest, and indirect business taxes. This is the industry's contribution to gross state product (GSP).

Several sets of contribution analyses were conducted for the study. A regional contribution analysis was performed for each of the six multicounty regions shown in figure 1 and table A2, along with a statewide contribution analysis. In addition to a contribution analysis of the entire forestry and forest-products sector, a separate contribution analysis was performed with just the forestry and logging sectors.

RESULTS

Direct Economic Impacts

The economic contributions of the forestry and forest-products sectors to the California economy include the direct effects of those industries and the indirect effects that FFP sectors have on other sectors of the economy. In many cases the indirect effects of a sector can be as large as, or larger than, the sector's direct effects.

The direct economic contributions of California's forestry and forest-products sectors are shown in table 2. Total economic output of FFP sectors is \$22 billion per year, employing 81,800 full- and part-time workers with nearly

Table 2. Direct economic contribution of the forestry and forest-products sectors

Sector: Direct contributions	Employment	Labor income	Output	Value-added
		\$MM	\$MM	\$MM
forestry and logging	5,748	267	437	238
wood biomass electricity	365	70	539.6	258
solid wood-products manufacturing	26,456	1,352	5,760	1,747
pulp and paper manufacturing	22,238	1,982	11,074	2,657
wood furniture manufacturing	27,005	1,287	4,195	1,454
Total direct contribution	81,812	4,958	22,007	6,354

\$5 billion in labor income per year. Most of the economic contribution of the FFP sectors comes from forest-products manufacturing, which includes solid wood-products, wood furniture, and pulp/paper manufacturing. These activities account for over 95 percent and 92 percent of total FFP output and jobs, respectively.

The pulp and paper manufacturing sector is the single largest FFP sector in terms of gross output (approximately \$11 billion). While California does not have any active pulp and paper mills, there are very large paper board and paper bag manufacturing sectors within the state, which account for 80 percent of output in the pulp and paper manufacturing sector. Wood furniture manufacturing employs the greatest number of workers of the five FFP industries, with just over 27,000 workers. While gross output in this sector is less than half the output of the pulp/paper

manufacturing sectors, the sector's labor intensity is much greater.

As shown in figure 4, the regional distribution of the forest products sectors (i.e., sectors other than forestry and logging) is weighted heavily toward counties in Southern California. Together, these ten counties account for 58% of total forest product manufacturing in the state. Much of the raw forest material for these industries is imported from outside of the state. Only a small fraction of in-state forest biomass is used for California forest-products manufacturing.

California's forestry and logging industries produced approximately \$437 million in economic output and employed just over 5,700 workers with total wage income of \$267 million in 2015. While California's logging sector is small, relative to the size of the California economy (\$2.45 trillion), the number of people employed (17.7 million in 2015), and the broader FFP sector, logging

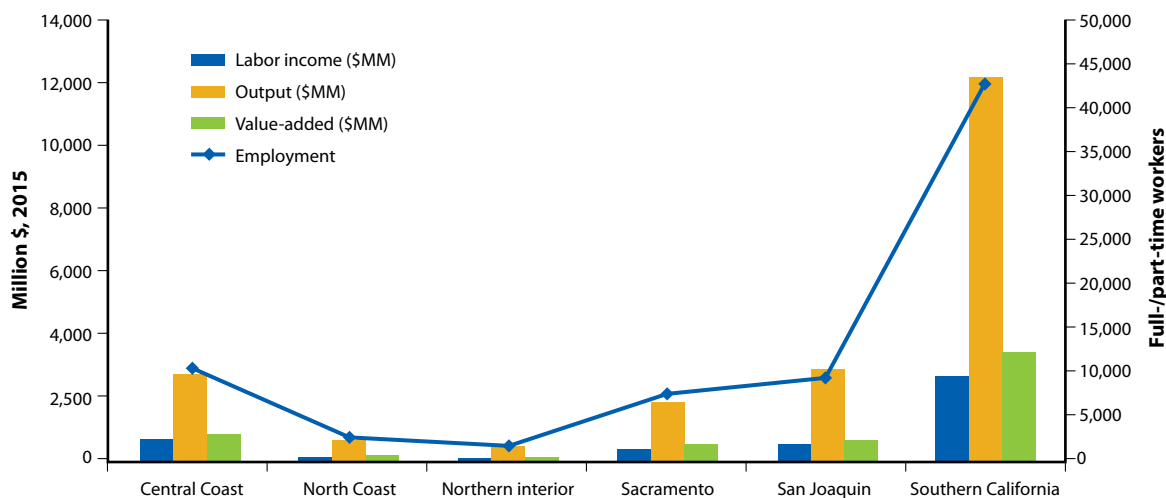


Figure 4. Geographic distribution of forest-products sectors.

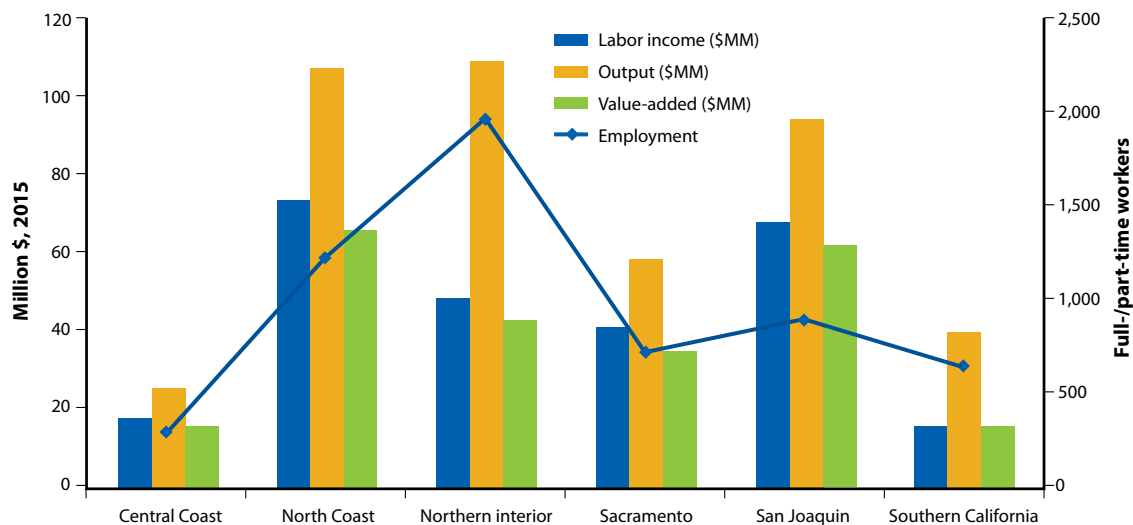


Figure 5. Geographic distribution of forestry and logging sectors.

remains an important regional industry in much of the northern part of the state. Unlike forest products, forestry and logging activity is concentrated in the North Coast and northern interior regions, accounting for approximately 50 percent of the state's gross forestry and logging output and 56 percent of the state's forestry and logging employment (fig. 5). The Sacramento and San Joaquin regions also account for sizable shares of the forestry logging sectors, with 14 percent and 22 percent of total state logging output, respectively.

Indirect/Induced Economic Contribution

The five forestry and forest-products sectors support additional economic activity in the state through (1) the purchasing of materials and services directly within the FFP supply chain (indirect effects) and (2) the purchasing of goods and services by workers in the FFP industries (induced effects). These economic ripple effects can be quantified

using sector-specific multipliers. The Type SAM multipliers for each of the forestry and forest-products sectors in California are shown in table 3. With the exception of pulp and paper manufacturing, the multipliers for forest-products production tend to be slightly higher than the multipliers for forestry and logging.

The indirect and induced economic contribution of California's FFP sectors is shown in table 4, and the contribution of the forestry and logging sectors only is shown in table 5. The FFP sectors support nearly \$17 billion in additional economic activity and over 95,000 additional jobs. The FFP sectors support significant spending in a wide range of economic sectors. The top five sectors in terms of indirect/induced output are manufacturing (13%), wholesale trade (12%), real estate (11%), finance and insurance (8%), and professional services (8%).

Table 3. Type SAM multipliers for forestry and forest-products, by region

Sector	California	Central Coast	North Coast	Northern interior	Sacramento	San Joaquin	Southern CA
forestry and logging	1.998	1.624	2.032	2.010	1.841	1.766	1.710
wood biomass electricity	1.777	1.671	1.584	1.506	1.599	1.424	1.639
solid wood-products manufacturing	2.032	1.708	1.750	1.612	1.749	1.598	1.881
pulp and paper manufacturing	1.973	1.648	1.466	1.496	1.585	1.557	1.905
wood furniture manufacturing	2.016	1.727	1.573	1.449	1.684	1.559	1.917

Table 4. Indirect/induced contribution of California's forestry and forest-products sectors

Sector: Indirect/induced contributions	Employment	Labor income	Output	Value-added
		\$MM	\$MM	\$MM
ag, fish, and hunting	1,621	74	161	95
mining	282	29	70	46
utilities	280	48	274	122
construction	1,666	101	285	140
manufacturing	5,151	396	2,248	755
wholesale trade	7,774	686	2,043	1,330
retail trade	7,979	316	748	528
transportation/warehousing	7,335	446	1,236	582
information	2,080	341	1,202	621
finance and insurance	5,459	447	1,311	711
real estate and rental	4,056	160	1,880	1,300
professional services	9,344	754	1,292	866
management of companies	3,272	444	827	534
administrative/waste services	9,318	361	667	446
educational services	1,757	81	128	86
health and social services	9,019	550	921	604
arts: entertainment and recreation	2,261	82	190	120
accommodation and food services	8,628	231	568	342
other services	6,550	299	620	355
government	1,289	137	300	154
Total indirect/induced contribution	95,122	5,984	16,972	9,738

Because of higher employment intensities in service sectors, most of the FFP sectors' indirect/indirect employment effects are in service industries, such as professional, administrative, health, and accommodation/food, which together account for 38 percent of the indirect/induced employment contribution.

The forestry and logging sectors support nearly \$500 million in additional output and over 3,600 indirect/induced jobs (see table 5). The sectors that benefit most from forestry and logging activity, in terms of sales, include agriculture, real estate, manufacturing, and wholesale trade. In terms of employment, the forestry and logging sector has the largest

impact on agriculture, health/social services, retail trade, and accommodation/food services.

Summing up the direct, indirect, and induced effects provides a greater appreciation of the economic contribution of California's forestry and forest-products industry. The total economic contribution of the forestry and forest-products industry, which is the sum of the direct, indirect, and induced effects, accounts for nearly 177 thousand jobs, \$10.9 billion in income, \$39 billion in output or sales, and over \$16 billion in value-added (table 6). In general, the direct effects of employment, labor income, and value-added account for just under half of the total economic contribution of the FFP sectors.

Table 5. Indirect/induced contribution of California's forestry and logging sector

Sector	Employment	Labor income	Output	Value-added
		\$MM	\$MM	\$MM
ag, fish, and hunting	1304	53	103	68
mining	8	1	2	1
utilities	3	1	3	1
construction	27	2	5	2
manufacturing	58	5	42	13
wholesale trade	156	14	41	27
retail trade	294	12	28	19
transportation/warehousing	126	7	20	9
information	35	5	22	11
finance and insurance	157	12	38	20
real estate and rental	123	5	63	44
professional services	141	12	20	14
management of companies	23	3	6	4
administrative/waste services	154	6	11	7
educational services	74	3	5	4
health and social services	371	23	38	25
arts: entertainment and recreation	65	2	6	4
accommodation and food services	254	7	16	10
other services	248	11	23	13
government	30	3	7	3
Total indirect/induced contribution	3,649	186	498	301

Table 6. Total contribution (direct + indirect + induced effects) of California's forestry and forest-products sectors

Sector: Direct contribution	Employment	Labor income	Output	Value-added
		\$MM	\$MM	\$MM
forestry and logging	5,748	267	437	238
wood biomass electricity	365	70	539.6	258
solid wood-products manufacturing	26,456	1,352	5,760	1,747
pulp and paper manufacturing	22,238	1,982	11,074	2,657
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wholesale trade	7,774	686	2,043	1,330
retail trade	7,979	316	748	528
transportation/warehousing	7,335	446	1,236	582

continued

Table 6, continued. Total contribution (direct + indirect + induced effects) of California's forestry and forest-products sectors

Sector: Indirect/induced contribution	Employment	Labor income	Output	Value-added
		\$MM	\$MM	\$MM
information	2,080	341	1,202	621
finance insurance	5,459	447	1,311	711
real estate and rental	4,056	160	1,880	1,300
professional services	9,344	754	1,292	866
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educational services	1,757	81	128	86
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arts: entertainment and recreation	2,261	82	190	120
accommodation and food services	8,628	231	568	342
other services	6,550	299	620	355
government	1,289	137	300	154
Contribution totals	Employment	Labor income	Output	Value-added
		\$MM	\$MM	\$MM
Total direct contribution	81,812	4,958	22,007	6,354
Total indirect/induced	95,122	5,984	16,972	9,738
Total effect (direct + indirect + induced)	176,934	10,942	38,979	16,092

CONCLUSION

In this publication we quantify the economic contribution of California's forestry and forest-products sectors, highlighting the contribution to economic activity and employment. Our results also quantify regional differences across the state, emphasizing the importance of different sources of the FFP value chain to the state's regional economies. Active forest management and the renewable natural resources produced are part of a value chain with a total economic contribution accounting for a \$39 billion industry, generating over \$16 billion in value-added or gross state product (GSP) and employing nearly 177 thousand people with income amounting to \$10.9 billion. California's forestry and forest-products industry makes a substantial economic contribution to the state and its regional economies. For reference, California's agriculture production and food-and-beverage-products industry each contribute approximately \$38 billion and \$82 billion, respectively, to the state's economy (UCAIC 2012; Sexton et al. 2015). Much of this

contribution is from the indirect and induced impacts of the forestry and forest-products industries.

Forest-dependent communities in the northern and central parts of the state benefit mostly from primary forest-products manufacturing, while the urban portions of the state benefit mostly from secondary forest-products manufacturing. Most of California's wood fiber inputs used in the secondary downstream manufacturing are actually sourced from forests outside of California, where the standards of sustainability are not always as strong as those practiced in California. The potential certainly exists to increase forest-products manufacturing with better utilization of locally sourced forest products, which will benefit both rural and urban sections of the state. More importantly, active forest management can improve the health of California's forests by reducing tree density. Timber sourced from California's forests can also be used to make a substantial contribution to the entire California economy. Benefits would go to rural, forest-dependent

communities, where timber is harvested and processed, and to urban areas that benefit from downstream forest-products manufacturing of secondary products, such as paper products, furniture, and cabinetry.

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APPENDICES

- Appendix A, tables A1 and A2
Appendix B, tables B1 through B6

APPENDIX A: Forestry and Forest-Products Sectors and Regional Aggregations

Table A1. Forestry and forest-products sectors aggregation scheme

Sector aggregation	IMPLAN sector	IMPLAN description	NAICS 2012
forestry and logging	15	forestry, forest-products, and timber tract production	1131-2
	16	commercial logging	1133
wood biomass	47	electric power generation; biomass	221117
solid wood	134	sawmills	321113
	135	wood preservation	321114
	136	veneer and plywood manufacturing	321211-2
	137	engineered wood member and truss manufacturing	321213-4
	138	reconstituted wood-products manufacturing	321219
	139	wood windows and door manufacturing	321911
	140	cut stock, resawing lumber, and planing	321912
	141	other millwork, including flooring	321918
	142	wood container and pallet manufacturing	32192
	144	prefabricated wood building manufacturing	321992
pulp and paper	145	all other miscellaneous wood-products manufacturing	321999
	146	pulp mills	322110
	147	paper mills	322120
	148	paperboard mills	322130
	149	paperboard container manufacturing	322210
	150	paper bag and coated and treated paper manufacturing	322220
	151	stationary products manufacturing	322230
wood furniture	152	sanitary paper products manufacturing	322291
	153	all other converted paper products manufacturing	322299
	368	wood kitchen cabinet and countertop manufacturing	33711
	369	upholstered household furniture manufacturing	337121
	370	nonupholstered wood household furniture manufacturing	337122
	373	wood office furniture manufacturing	337211
	374	custom architectural woodwork and millwork	337212
	376	showcase, partition, shelving, and locker manufacturing	337215

Table A2. California forest region aggregation scheme

Region	Counties
Central Coast	Alameda, Contra Costa, Marin, Monterey, Napa, San Benito, San Francisco, San Mateo, Santa Clara, Santa Cruz, Solano
North Coast	Del Norte, Humboldt, Mendocino, Sonoma
Northern interior	Lassen, Modoc, Shasta, Siskiyou, Trinity
Sacramento	Butte, Colusa, El Dorado, Glenn, Lake, Placer, Plumas, Nevada, Sacramento, Sierra, Sutter, Tehama, Yolo, Yuba
San Joaquin	Alpine, Amador, Calaveras, Fresno, Kern, Kings, Madera, Mariposa, Merced, Mono, San Joaquin, Stanislaus, Tulare, Tuolumne
Southern California	Imperial, Inyo, Los Angeles, Orange, Riverside, San Bernardino, San Diego, San Luis Obispo, Santa Barbara, Ventura

Appendix B. Detailed Economic Contribution Results for Forestry and Forest Products by Region**Table B1.** Central Coast

Sector: Direct	Employment	Labor income	Output	Value-added
		<i>\$MM</i>	<i>\$MM</i>	<i>\$MM</i>
forestry and logging	285	18	26	16
wood biomass electricity	0	0	0	0
solid wood manufacturing	3,422	183	658	227
pulp and paper manufacturing	2,813	309	1,455	389
wood furniture manufacturing	4,539	222	665	248
Sector: Indirect/induced	Employment	Labor income	Output	Value-added
		<i>\$MM</i>	<i>\$MM</i>	<i>\$MM</i>
ag, fish, and hunting	69	3	6	4
mining	11	1	2	1
utilities	39	8	38	18
construction	177	13	34	18
manufacturing	319	29	155	58
wholesale trade	708	85	220	155
retail trade	753	35	78	58
transportation/warehousing	589	35	104	48
information	210	43	135	74
finance and insurance	457	54	129	80
real estate and rental	353	15	198	141
professional services	943	87	139	98
management of companies	332	62	104	74
administrative/waste services	816	40	70	50
educational services	225	12	19	13
health and social services	868	59	94	65
arts: entertainment and recreation	253	8	20	12
accommodation and food services	831	25	58	36
other services	630	33	63	38
government	99	13	18	9
Contribution totals	Employment	Labor income	Output	Value-added
		<i>\$MM</i>	<i>\$MM</i>	<i>\$MM</i>
Total direct	11,059	731	2,804	880
Total indirect/induced	8,684	660	1,685	1,051
Total contribution	19,743	1,391	4,490	1,931

Table B2. Northern interior

Sector: Direct contribution	Employment	Labor income	Output	Value-added
		<i>\$MM</i>	<i>\$MM</i>	<i>\$MM</i>
forestry and logging	1,970	48	110	43
wood biomass electricity	41	6	70	38
solid wood manufacturing	1,791	90	473	112
pulp and paper manufacturing	3	2	3	2
wood furniture manufacturing	78	3	10	3
Sector: Indirect/induced contribution	Employment	Labor income	Output	Value-added
		<i>\$MM</i>	<i>\$MM</i>	<i>\$MM</i>
ag, fish, and hunting	262	10	18	13
mining	14	0	2	1
utilities	7	1	6	2
construction	48	2	7	3
manufacturing	4	0	1	0
wholesale trade	188	10	39	22
retail trade	202	6	17	11
transportation and warehousing	167	10	28	12
information	28	2	10	4
finance and insurance	99	4	20	8
real estate and rental	107	2	34	20
professional services	221	8	18	9
management of companies	105	4	15	5
administrative and waste services	196	5	10	6
educational services	23	1	1	1
health and social services	225	13	23	14
arts: entertainment and recreation	60	1	3	1
accommodation and food services	195	4	12	7
other services	157	7	15	8
government	47	4	10	5
Contribution totals	Employment	Labor income	Output	Value-added
		<i>\$MM</i>	<i>\$MM</i>	<i>\$MM</i>
Total direct	3,883	149	665	199
Total indirect/induced	2,353	93	287	153
Total contribution	6,236	243	952	351

Table B3. North Coast

Sector: Direct contribution	Employment	Labor income	Output	Value-added
		\$MM	\$MM	\$MM
forestry and logging	1,970	48	110	43
wood biomass electricity	41	6	70	38
solid wood manufacturing	1,791	90	473	112
pulp and paper manufacturing	3	2	3	2
wood furniture manufacturing	78	3	10	3
Sector: Indirect/induced contribution	Employment	Labor income	Output	Value-added
		\$MM	\$MM	\$MM
forestry and logging	1,230	74	108	66
wood biomass	61	9	103	56
solid wood manufacturing	2,159	123	614	166
pulp and paper manufacturing	61	6	26	8
wood furniture manufacturing	369	20	54	22
Total direct	3,880	233	905	318
ag, fish, and hunting	161	5	9	6
mining	10	0	1	1
utilities	5	1	3	1
construction	78	4	12	6
manufacturing	18	1	8	2
wholesale trade	340	22	78	47
retail trade	290	10	26	18
transportation and warehousing	282	9	34	12
information	51	4	19	8
finance and insurance	143	7	29	14
real estate and rental	173	5	60	40
professional services	363	15	32	17
management of companies	63	7	14	9
administrative and waste services	275	8	17	10
educational services	41	1	2	1
health and social services	328	19	32	21
arts: entertainment and recreation	114	2	6	3
accommodation and food services	322	8	19	11
other services	227	10	21	12
government	61	5	12	6
Contribution totals	Employment	Labor income	Output	Value-added
		\$MM	\$MM	\$MM
Total direct	3,880	233	905	318
Total indirect/induced	3,345	144	435	243
Total contribution	7,225	378	1,340	561

Table B4. Sacramento

Sector: Direct contribution	Employment	Labor income	Output	Value-added
		<i>\$MM</i>	<i>\$MM</i>	<i>\$MM</i>
forestry and logging	710	41	59	35
wood biomass	120	10	61	153
solid wood manufacturing	5,362	258	1,191	344
pulp and paper manufacturing	1,074	88	514	113
wood furniture manufacturing	1,355	57	180	63
Sector: Indirect/induced contribution	Employment	Labor income	Output	Value-added
		<i>\$MM</i>	<i>\$MM</i>	<i>\$MM</i>
ag, fish, and hunting	141	4	9	6
mining	10	0	2	1
utilities	19	3	23	10
construction	178	10	29	14
manufacturing	84	5	36	11
wholesale trade	665	42	150	89
retail trade	722	25	62	42
transportation and warehousing	707	37	109	46
information	166	15	68	29
finance and insurance	461	30	105	51
real estate and rental	435	12	152	100
professional services	908	53	104	62
management of companies	339	30	67	37
administrative and waste services	869	30	57	37
educational services	100	3	5	3
health and social services	726	45	76	50
arts: entertainment and recreation	213	5	13	7
accommodation and food services	755	18	47	27
other services	557	24	52	30
government	176	19	50	26
Contribution totals	Employment	Labor income	Output	Value-added
		<i>\$MM</i>	<i>\$MM</i>	<i>\$MM</i>
Total direct	8,621	453	2,004	708
Total indirect/induced	8,232	411	1,214	677
Total contribution	16,853	865	3,218	1,385

Table B5. San Joaquin

Sector: Direct contribution	Employment	Labor income	Output	Value-added
		<i>\$MM</i>	<i>\$MM</i>	<i>\$MM</i>
forestry and logging	906	68	95	62
wood biomass	8	1	13	7
solid wood manufacturing	3,482	152	745	202
pulp and paper manufacturing	4,377	301	1,969	390
wood furniture manufacturing	1,677	76	222	84
Sector: Indirect/induced contribution	Employment	Labor income	Output	Value-added
		<i>\$MM</i>	<i>\$MM</i>	<i>\$MM</i>
ag, fish, and hunting	325	14	27	17
mining	15	2	4	3
utilities	26	4	23	11
construction	184	10	29	13
manufacturing	107	7	53	14
wholesale trade	862	51	190	111
retail trade	877	29	72	48
transportation and warehousing	848	52	136	64
information	122	10	51	20
finance and insurance	401	18	80	34
real estate and rental	440	12	153	99
professional services	710	35	72	39
management of companies	315	26	59	31
administrative and waste services	1,032	29	59	36
educational services	84	2	5	3
health and social services	902	51	90	57
arts: entertainment and recreation	151	3	9	4
accommodation and food services	861	19	54	30
other services	596	28	60	35
government	132	12	29	13
Contribution totals	Employment	Labor income	Output	Value-added
		<i>\$MM</i>	<i>\$MM</i>	<i>\$MM</i>
Total direct	10,450	599	3,043	746
Total indirect/induced	8,990	413	1,255	682
Total contribution	19,440	1,012	4,298	1,428

Table B6. Southern California

Sector: Direct contribution	Employment	Labor income	Output	Value-added
		<i>\$MM</i>	<i>\$MM</i>	<i>\$MM</i>
forestry and logging	642	16	40	16
wood biomass	115	41	201	112
solid wood manufacturing	10,226	546	2,077	694
pulp and paper manufacturing	13,910	1,276	7,108	1,755
wood furniture manufacturing	18,950	908	3,060	1,032
Sector: Indirect/induced contribution	Employment	Labor income	Output	Value-added
		<i>\$MM</i>	<i>\$MM</i>	<i>\$MM</i>
ag, fish, and hunting	338	15	30	20
mining	149	17	38	26
utilities	153	24	150	64
construction	883	51	147	71
manufacturing	2,841	203	1,139	370
wholesale trade	4,333	369	1,117	720
retail trade	4,545	173	415	288
transportation and warehousing	4,021	249	678	323
information	1,146	153	630	311
finance and insurance	3,190	237	740	389
real estate and rental	2,217	91	1,045	723
professional services	5,094	390	700	462
management of companies	1,776	204	406	247
administrative and waste services	5,345	194	363	239
educational services	999	45	73	48
health and social services	5,186	300	510	327
arts: entertainment and recreation	1,205	47	105	68
accommodation and food services	4,685	123	304	182
other services	3,697	160	339	191
government	712	75	177	92
Contribution totals	Employment	Labor income	Output	Value-added
		<i>\$MM</i>	<i>\$MM</i>	<i>\$MM</i>
Total direct	43,843	2,787	12,485	3,609
Total indirect/induced	52,517	3,119	9,109	5,160
Total contribution	96,360	5,906	21,594	8,769

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