



California's Forest Products Industry and Timber Harvest, 2016

The University of Montana's Bureau of Business and Economic Research (BBER), in conjunction with the USDA Forest Service's Forest Inventory and Analysis (FIA) Program at the Pacific Northwest Research Station (PNWRS), conducted a census of California's timber processors that operated during calendar year 2016. This survey is the fourth of its kind for California and presents information collected from BBER's census of primary manufacturers in the state, as well as facilities in surrounding states that received timber harvested in California.

Primary forest product manufacturers are firms that process timber into products, such as lumber and plywood, as well as facilities like particle board plants that use the wood fiber residue directly from timber processors. Through written questionnaires, phone or in-person interviews, timber-processing and residue-utilizing facilities provided information about their 2016 operations, including:

- Plant location, production, capacity and employment
- Volume of raw material received, by county and ownership
- Species of timber received and live/dead proportions
- Finished products by volumes, types, sales value and market locations
- Volume, utilization and marketing of manufacturing residue

Since this study is based on a census, rather than a statistical sample of firms, there is no sampling error associated with the estimates. When facilities did not respond, data collected during previous surveys were updated with current data collected for facilities of similar size, product type and location, as well as information on market trends and prices. For the 2016 California mill survey, complete data were received for 51 of the 80 active, in-state facilities, accounting for 72 percent of the facilities that processed more than 5 MMBF Scribner of timber. While some estimation was required, responding firms accounted for 80 percent of the timber harvested during 2016.

Highlights

- A total of 80 primary forest products facilities operated in California during 2016. These included 32 sawmills, 23 bioenergy plants, 12 bark and mulch facilities, 2 veneer plants, 1 particleboard plant and 10 manufacturers of other primary wood products.
- California's timber harvest was 1,572 million board feet (MMBF) Scribner in 2016, representing a 10 percent increase since 2012. More than 48 percent (761 MMBF) of the timber harvested came from five counties. Similar to 2012, Shasta County provided the largest proportion at 13.3 percent (209 MMBF), followed by Humboldt County with a timber harvest of 178 MMBF.
- Approximately 80 percent of California's 2016 timber harvest came from private lands, 17 percent came from national forests and the remaining 3 percent came from other public sources. Nearly all (98 percent) of the timber harvested in California was processed within the state.
- Nearly 28 percent of California's 2016 timber harvest was comprised of true fir species, followed by Douglas-fir (24 percent), ponderosa pine (23%) and redwood (14 percent). Approximately 13 percent of the timber harvest in 2016 was reported as dead, up from 11 percent in 2006 and 2 percent in 2012. Ponderosa pine – one of the species most impacted by the bark beetle epidemic – saw a 16 percent increase in dead volume since 2012.
- Of the 367 million cubic feet (MMCF) of wood fiber (excluding bark) harvested in California in 2016, approximately 43 percent was used to generate energy, usually in the form of heat for steam or electricity. Another 33 percent of the volume became lumber, and the remaining 24 percent was used as raw material for a variety of other products.
- Total sales value for California's primary forest products was about \$1.47 billion in 2016, with lumber accounting for 67 percent of the total. The majority (77 percent) of all products were sold in California. Two sectors—sawmills and bioenergy plants—accounted for over 85 percent of the industry sales value in 2016.
- California sawmills produced more than 2 billion board feet of lumber in 2016, accounting for more than 6 percent of U.S. production of softwood lumber and just over 4 percent of U.S. consumption.
- California's forest products industry's annual capacity to process sawtimber has continued to decrease, from 6 billion board feet Scribner in the late 1980s to 1.87 billion board feet in 2016 (up slightly from 1.78 billion in 2012). Of this total processing capacity, 73 percent was utilized in 2016.

- In 2016, approximately 57,890 workers, earning \$3.64 billion, were employed in California's forest industry, including primary and secondary wood and paper products, private sector forestry and logging, and forestry support activities. Wood products manufacturing accounted for 50 percent of employment and 38 percent of earnings within California's total forest products industry.
- Using the Bureau of Economic Analysis' (BEA) RIMS II multipliers, BBER estimates that the wood products manufacturing sector alone supported over 66,200 full- and part-time jobs (direct, indirect and induced) and an associated \$3.43 billion in labor income during 2016. For every wood products manufacturing job in the state another 1.3 jobs are supported in a related sector.
- California's primary wood processing facilities produced nearly 2.1 million bone-dry tons (1.75 million bone-dry units) of residue in 2016. Nearly 58 percent was utilized by the biomass energy sector, over 31 percent by the landscape and other products sector, and 11 percent by the pulp and board sector; less than 1 percent went unutilized.

Table 1- California's timber harvest by ownership class, selected years

Ownership	2000	2006	2012	2016
----- <i>Million board feet^a</i> -----				
Private	1,885.8	1,504.1	1,193.7	1,251.0
Industrial	1,075.2	942.7	1,000.5	1,044.5
Nonindustrial private	800.7	555.8	185.1	199.9
Tribal	9.9	5.6	8.1	6.6
Public	363.9	228.9	231.7	320.6
National forest	337.1	224.7	203.3	265.5
State	18.6	3.5	27.9	51.4
Bureau of Land Management	7.7	0.3	0.4	-
Other public	0.5	0.4	0.1	3.7
Total	2,249.7	1,733.1	1,425.4	1,571.5
----- <i>Percentage of harvest</i> -----				
Private	83.8	86.8	83.7	79.6
Industrial	47.8	54.4	70.2	66.5
Nonindustrial private	35.6	32.1	13.0	12.7
Tribal	0.4	0.3	0.6	0.4
Public	16.2	13.2	16.3	20.4
National forest	15.0	13.0	14.3	16.9
State	0.8	0.2	2.0	3.3
Bureau of Land Management	0.3	0.0	0.0	0.0
Other public	0.0	0.0	0.0	0.2
Total	100.0	100.0	100.0	100.0

^aVolume in Scribner Log Rule

Source: Morgan et al. 2004, 2012; McIver et al. 2015

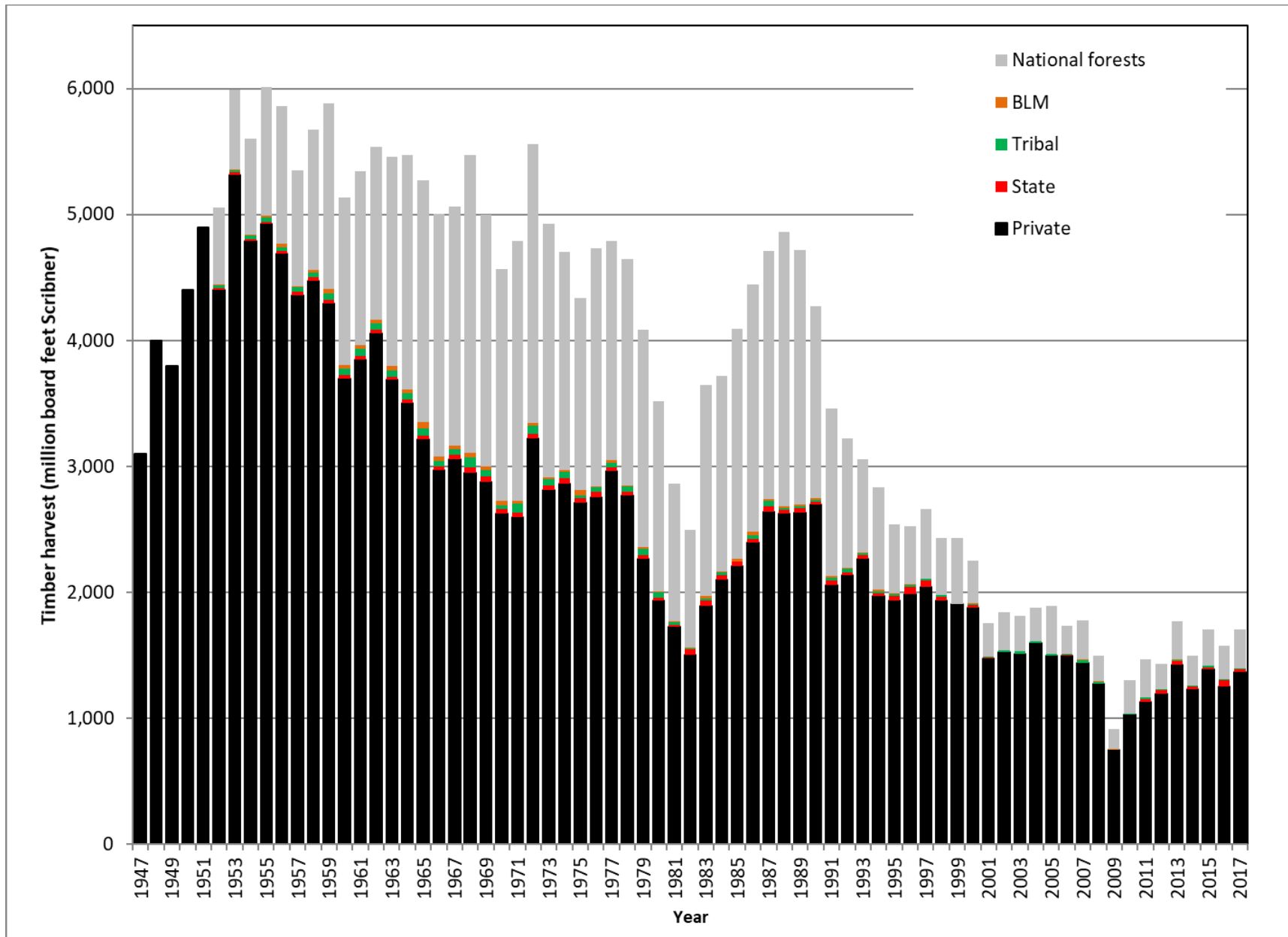


Figure 1 – California’s timber harvest by ownership class, 1947-2017.

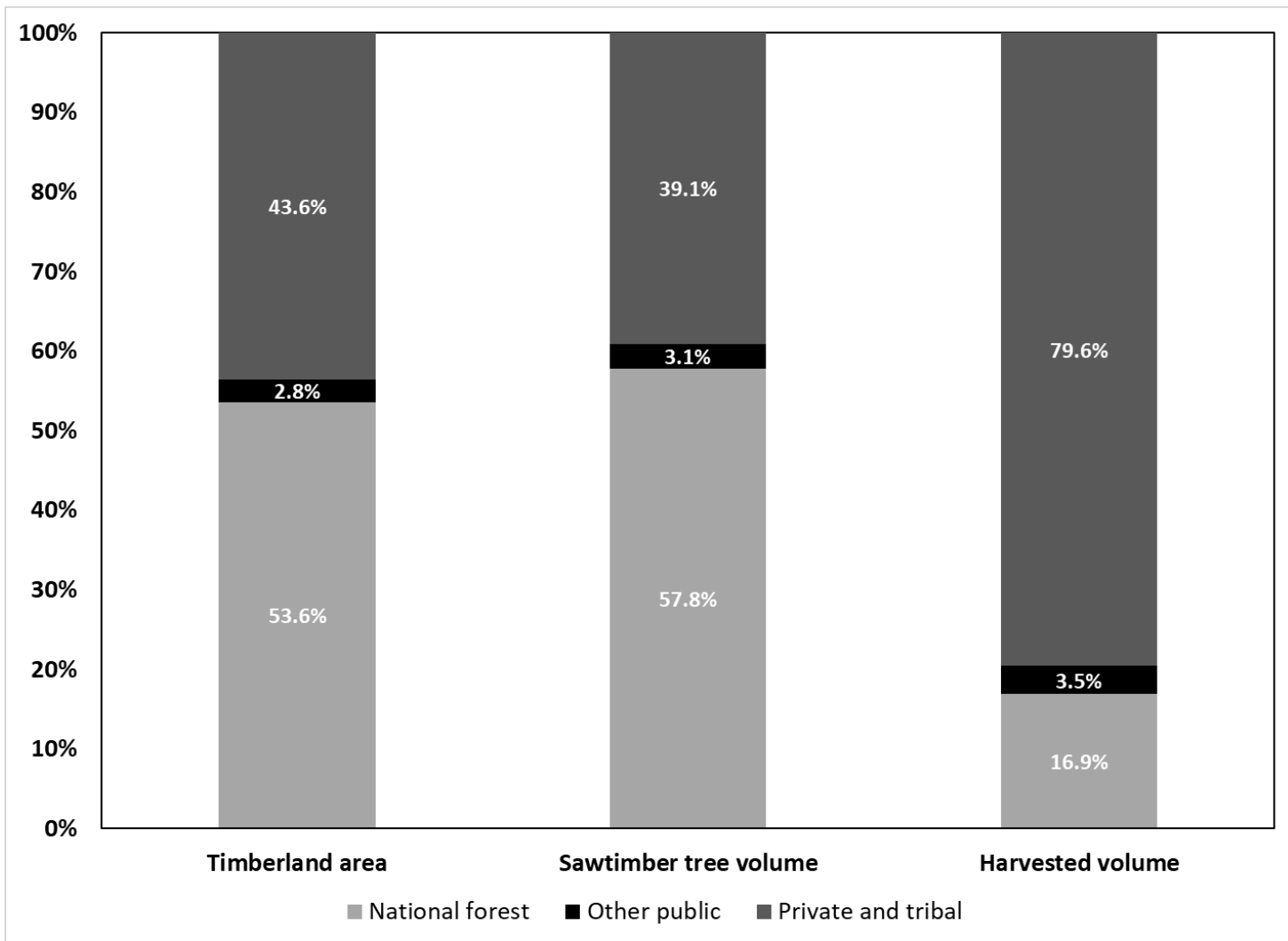


Figure 2 – Characteristics of California’s timberland by ownership class, 2016. Sawtimber is timber of “sufficient size and quality to be suitable for conversion into lumber.”

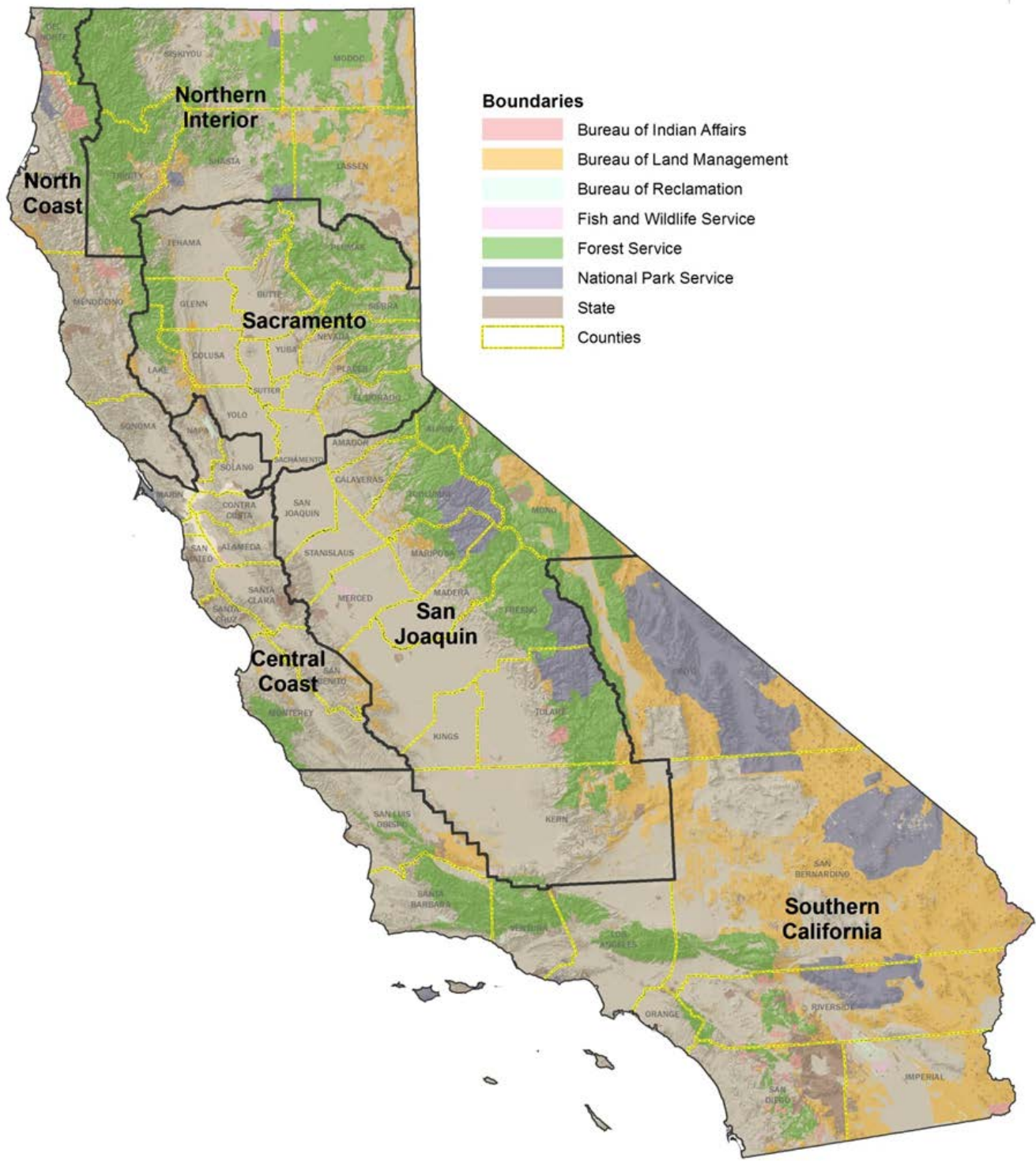


Figure 3 – California’s forest resource areas.

Table 2- California's timber harvest by county, 2000-2016

Resource area	2000 Percentage		2006 Percentage		2012 Percentage		2016 Percentage	
	2000 Volume ^a <i>Million board feet</i>	of Total <i>Percent</i>	2006 Volume ^a <i>Million board feet</i>	of Total <i>Percent</i>	2012 Volume ^a <i>Million board feet</i>	of Total <i>Percent</i>	2016 Volume ^a <i>Million board feet</i>	of Total <i>Percent</i>
Central Coast:								
Napa	-	-	0.3	^b	-	-	-	-
San Benito	-	-	0.1	^b	-	-	-	-
San Mateo	5.6	0.3	4.4	0.3	4.5	0.3	12.4	0.8
Santa Clara	4.2	0.2	4.4	0.3	3.5	0.2	-	-
Santa Cruz	19.6	0.9	9.7	0.6	15.7	1.1	11.2	0.7
Total Central Coast	29.4	1.3	18.8	1.1	23.7	1.7	23.5	1.5
North Coast:								
Del Norte	50.4	2.2	17.6	1.0	19.3	1.4	31.1	2.0
Humboldt	435.3	19.3	345.7	19.9	215.1	15.1	177.9	11.3
Mendocino	193.5	8.6	123.1	7.1	108.8	7.6	106.6	6.8
Sonoma	28.1	1.2	9.9	0.6	8.2	0.6	10.4	0.7
Total North Coast	707.2	31.4	496.3	28.6	351.4	24.6	326.0	20.7
Northern Interior:								
Lassen	69.3	3.1	77.9	4.5	83.8	5.9	74.0	4.7
Modoc	49.9	2.2	26.3	1.5	46.2	3.2	26.9	1.7
Shasta	194.3	8.6	209.0	12.1	229.1	16.1	208.7	13.3
Siskiyou	209.7	9.3	196.0	11.3	147.9	10.4	171.5	10.9
Trinity	99.6	4.4	98.0	5.7	60.4	4.2	75.9	4.8
Total Northern Interior:	622.6	27.7	607.2	35.0	567.5	39.8	557.1	35.4
Sacramento:								
Butte	86.4	3.8	89.2	5.1	52.5	3.7	49.3	3.1
El Dorado	106.7	4.7	99.1	5.7	50.1	3.5	71.1	4.5
Glenn	24.7	1.1	4.9	0.3	3.6	0.2	0.0	0.0
Lake	9.6	0.4	1.6	0.1	^b	^b	50.6	3.2
Nevada	59.6	2.6	39.4	2.3	19.0	1.3	9.5	0.6
Placer	40.4	1.8	47.4	2.7	21.4	1.5	45.3	2.9
Plumas	193.8	8.6	122.4	7.1	82.3	5.8	96.0	6.1
Sierra	33.1	1.5	16.3	0.9	30.5	2.1	56.1	3.6
Tehama	105.3	4.7	45.7	2.6	62.6	4.4	59.6	3.8
Yolo	2.6	0.1	-	-	-	-	-	-
Yuba	36.9	1.6	7.2	0.4	20.9	1.5	22.8	1.4
Total Sacramento	699.0	31.1	473.3	27.3	342.8	24.0	460.3	29.3
San Joaquin:								
Alpine	-	-	^b	^b	-	-	-	-
Amador	22.8	1.0	28.7	1.7	13.5	0.9	3.4	0.2
Calaveras	67.0	3.0	34.9	2.0	41.4	2.9	58.9	3.7
Fresno	19.8	0.9	5.9	0.3	6.8	0.5	27.2	1.7
Kern	3.6	0.2	-	-	2.8	0.2	1.7	0.1
Madera	4.8	0.2	0.1	^b	16.2	1.1	5.3	0.3
Mariposa	3.6	0.2	3.7	0.2	4.5	0.3	14.8	0.9
Merced	0.3	^b	-	-	-	-	-	-
Stanislaus	-	-	-	-	-	-	0.9	0.1
Tulare	8.9	0.4	7.7	0.4	5.0	0.3	5.0	0.3
Tuolumne	60.7	2.7	47.2	2.7	45.2	3.2	79.1	5.0
Total San Joaquin	191.4	8.5	128.1	7.4	135.3	9.5	196.4	12.5
Southern California:								
Inyo	-	-	-	-	3.4	0.2	-	-
Riverside	-	-	-	-	-	-	8.3	0.5
San Bernardino	-	-	9.55	0.55	1.2	0.1	-	-
Total Southern California	0.0	0.0	9.6	0.6	4.6	0.3	8.3	0.5
State Total	2,249.7	100	1,733.1	100	1,425.4	100	1,571.5	100

^a Volume in Scribner Log Rule

^b Volume is less than .05 MMBF or percentage of total harvest is less than .05%.

Source: Morgan et al. 2004; Morgan et al. 2012; McIver et al. 2015

Table 3- Percentage of total harvest for California's leading timber harvest counties, 1968-2016

County	Volume^a	Percentage of total	County	Volume^a	Percentage of total
	<i>Million board feet</i>	<i>Percent</i>		<i>Million board feet</i>	<i>Percent</i>
1976:			1994:		
Humboldt	1,073.3	22.7	Humboldt	559.6	19.7
Mendocino	489.2	10.3	Plumas	163.5	5.8
Shasta	359.3	7.6	Shasta	147.5	5.2
Siskiyou	337.1	7.1	Lassen	123.3	4.3
Del Norte	236.4	5.0	Trinity	117.2	4.1
Total county	2,495.3	52.7	Total county	1,111.1	39.1
California total	4,731.0		California total	2,839.0	
1982:			2000:		
Humboldt	456.2	18.3	Humboldt	435.3	19.3
Mendocino	448.1	17.9	Siskiyou	209.7	9.3
Plumas	164.7	6.6	Shasta	194.3	8.6
Trinity	161.2	6.5	Plumas	193.8	8.6
Tehama	148.3	5.9	Mendocino	193.5	8.6
Total county	1,378.5	55.2	Total county	1,226.6	54.5
California total	2,497.0		California total	2,249.7	
1985:			2006:		
Humboldt	608.1	15.0	Humboldt	345.7	20.0
Mendocino	435.1	10.7	Shasta	209.0	12.1
Shasta	204.1	5.0	Siskiyou	196.0	11.3
Plumas	202.2	5.0	Mendocino	123.1	7.1
Siskiyou	201.8	5.0	Plumas	122.4	7.1
Total county	1,651.3	40.7	Total county	996.2	57.5
California total	4,056.0		California total	1,733.1	
1988:			2012:		
Humboldt	769.0	15.9	Shasta	229.1	16.1
Mendocino	499.1	10.3	Humboldt	215.1	15.1
Siskiyou	295.6	6.1	Siskiyou	147.9	10.4
Trinity	272.1	5.6	Mendocino	108.8	7.6
Plumas	271.5	5.6	Lassen	83.8	5.9
Total county	2,107.3	43.5	Total county	784.7	55.1
California total	4,840.0		California total	1,425.4	
1992:			2016:		
Humboldt	502.2	15.6	Shasta	208.7	13.3
Mendocino	271.6	8.5	Humboldt	177.9	11.3
El Dorado	195.1	6.1	Siskiyou	171.5	10.9
Lassen	158.8	4.9	Mendocino	106.6	6.8
Shasta	142.9	4.4	Plumas	96.0	6.1
Total county	1,270.6	39.5	Total county	760.7	48.4
California total	3,214.0		California total	1,571.5	

^aVolume in Scribner Log Rule

Source: Barrette et al. 1970; Hiserote and Howard 1978; Howard 1974, 1984; Howard and Ward 1988, 1991; Ward 1995, 1997; Morgan et al. 2004; Morgan et al. 2012; McIver et al. 2015

Table 4- California's timber harvest by species, 2016

Species	Volume ^a	Percentage of total
	<i>Million board feet</i>	<i>Percent</i>
True firs	429.8	27.4
Douglas-fir	371.2	23.6
Ponderosa pine	357.2	22.7
Redwood	218.4	13.9
Sugar pine	113.0	7.2
Incense-cedar	54.4	3.5
Lodgepole	14.5	0.9
Other softwoods ^b	7.8	0.5
Western hemlock	2.9	0.2
Hardwoods	2.3	0.1
All species	1,571.5	100

^aVolume in Scribner Log Rule

^bOther softwoods include Jeffrey pine, spruces, giant sequoia, and other coniferous species

Table 5- Percentage of California's timber harvest by species, 1968-2016^a

Species	1968	1972	1976	1982	1985	1988	1992	1994	2000	2006	2012	2016
	----- <i>Percent</i> -----											
True firs	22.4	21.8	19.9	21.1	22.0	23.0	22.9	25.6	19.0	28.3	26.7	27.4
Douglas-fir	32.2	26.9	27.4	22.9	24.1	26.5	23.2	26.7	27.6	24.2	28.4	23.6
Ponderosa and sugar pine	23.7	25.3	25.4	27.0	26.3	26.9	23.4	22.0	23.8	23.1	23.7	29.9
Redwood	18.2	18.7	19.5	24.3	22.6	18.2	24.9	21.9	16.7	14.3	14.7	13.9
Other softwoods ^c	3.3	3.0	3.6	0.5	1.4	1.3	1.3	1.3	7.7	5.4	1.5	1.6
Incense-cedar	^b	4.1	4.1	3.9	3.0	3.7	4.3	2.4	4.7	4.8	4.9	3.5
Hardwoods	0.2	0.2	0.2	0.4	0.5	0.5	^d	^d	0.5	^d	^d	0.1
Total	100	100	100	100	100	100	100	100	100	100	100	100

^aHarvest for years prior to 2000 does not include timber delivered to out-of-state mills.

^bIncluded in "Other softwoods"

^cOther softwoods include western hemlock, lodgepole pine, spruces, and other coniferous species.

^dLess than 0.05 percent

Source: Barrette et al. 1970; Hiserote and Howard 1978; Howard 1974, 1984; Howard and Ward 1988, 1991; Ward 1995, 1997; Morgan et al. 2004.; Morgan et al. 2012; McIver et al. 2015

Table 6- Proportion of California's timber harvest by species reported as dead in 2000, 2006, 2012 and 2016

Species	2000	2006	2012	2016
	----- Percent dead -----			
Jeffrey pine	<i>na</i>	<i>na</i>	40%	40%
Sugar pine	10%	5%	6%	27%
Lodgepole pine	11%	4%	21%	18%
Ponderosa pine	8%	6%	2%	18%
Cedar ^a	3%	9%	0%	15%
Douglas-fir	5%	12%	3%	14%
True firs	6%	4%	2%	11%
Hardwoods	0%	2%	0%	1%
Other softwoods ^b	12%	1%	0%	0%
Redwood	1%	31%	0%	0%
Total % dead	6%	11%	2%	13%
Dead volume (MMBF)	129.1	182.8	35.0	207.4
Total harvest volume (MMBF)	2,249.7	1,733.1	1,425.4	1,571.6

^aIncludes Port-Orford, Incense and Western red cedar.

^bOther softwoods include Western white pine, hemlock, spruces and other coniferous species.

Source: Morgan et al. 2004.; Morgan et al. 2012; McIver et al. 2015

Table 7- Percentage of California's timber harvest by product type, 1968-2016^a

Product type	1968	1972	1976	1982	1985	1988	1992	1994	2000	2006	2012	2016
	----- Percent -----											
Sawlogs ^b	86	86	86	91.2	92	92.5	99.3	92.9	89.8	88.1	82.8	82.2
Veneer logs	10	12	11.5	6.1	5	4.7	^c	5.2	7.4	8.0	8.4	11.0
Pulpwood	1	1.5	0.1	1.1	0.8	1.1	^d	^d	^d	^d	-	-
Other ^e	3	0.5	2.4	1.6	2.2	1.7	0.7	1.9	0.4	<0.3	0.6	1.4
Bioenergy	^f	^f	^f	^f	^f	^f	^f	^f	2.4	3.6	8.2	5.3
Total	100	100	100	100	100	100	100	100	100	100	100	100

^aHarvest for years prior to 2000 does not include timber delivered to out-of-state mills.

^bIncludes reported log exports leaving California.

^cIncluded in "sawlogs".

^dIncluded in "other".

^eIncludes utility poles, houselogs, log furniture, firewood and fiber logs; does not include bioenergy.

^fNot reported prior to 2000.

Source: Barrette et al. 1970; Hiserote and Howard 1978; Howard 1974, 1984; Howard and Ward 1988, 1991; Ward 1995, 1997; Morgan et al. 2004; Morgan et al. 2012; McIver et al. 2015

Table 8- California's timber harvest by ownership class and product type, 2016

Ownership source	Sawlogs ^a	Veneer and	Bioenergy	All products
		Other ^b		
-----Million board feet ^c -----				
Private timberlands:	1,030.7	156.7	63.6	1,251.0
Industrial	837.6	143.7	63.3	1,044.5
Nonindustrial and Tribal	193.1	13.0	0.3	206.4
Public timberlands:	261.6	39.5	19.5	320.6
National forests	223.3	32.2	10.0	265.5
Other public	38.3	7.3	9.4	55.1
Total	1,292.3	196.2	83.1	1,571.5

^aIncludes log exports.

^bOther product types include houselogs, firewood, furniture logs, fiber logs and utility poles.

^cVolume in Scribner Log Rule

Table 9- California's timber harvest by species and product type, 2016

Species	Sawlogs ^a	Veneer and	Bioenergy	All products
		other ^b		
-----Million board feet ^c -----				
True firs	314.9	85.5	29.4	429.8
Douglas-fir	288.2	63.6	19.4	371.2
Ponderosa pine	311.1	32.0	14.1	357.2
Redwood	218.2	0.2	-	218.4
Sugar pine	97.4	9.6	5.9	113.0
Incense-cedar	48.5	1.1	4.9	54.4
Other softwoods ^d	10.9	2.2	9.3	22.3
Western hemlock	2.9	-	-	2.9
Hardwoods	0.1	2.2	-	2.3
All species	1,292.3	196.2	83.1	1,571.5

^aIncludes log exports.

^bOther product types include houselogs, firewood, furniture logs, fiber logs and utility poles.

^cVolume in Scribner Log Rule

^dIncludes lodgepole pine, Jeffrey pine, giant sequoia, & western white pine.

Table 10- Timber volume received by California facilities by ownership and product, 2016

Ownership source	Veneer and			All products
	Sawlogs ^a	other ^b	Bioenergy	
-----Million board feet ^c -----				
Private timberlands:	1,016.2	141.4	63.6	1,221.1
Industrial	831.4	133.1	63.3	1,027.8
Nonindustrial and Tribal	184.7	8.2	0.3	193.3
Public timberlands:	262.0	35.7	19.5	317.2
National Forests	223.6	28.2	10.0	261.9
Other public	38.4	7.4	9.4	55.3
Total	1,278.2	177.0	83.1	1,538.3

^aIncludes log exports.

^bOther product types include houselogs, firewood, furniture logs, fiber logs and utility poles.

^cVolume in Scribner Log Rule

Table 11- Interstate timber flow into and out of California to processing facilities^a, 2016

Timber products	Log flow into	Log flow out of	Net Imports
	California	California	(Net Exports)
-----Million board feet ^b -----			
Saw and veneer logs	11.5	44.8	(33.2)
Total	11.5	44.8	(33.2)

^aDoes not include international log exports or imports.

^bVolume in Scribner Log Rule

Table 12- California timber flow by resource area, 2016

Harvest area	Receiving area					Total harvest
	North Coast and Central Coast ^a	Northern Interior ^b	Sacramento ^c	San Joaquin ^d and Southern California ^e	Out of state ^f	
-----Million board feet Scribner-----						
North Coast and Central Coast ^a	302.9	38.0	0.1	-	8.5	349.5
Northern Interior ^b	-	444.1	77.2	0.0	35.8	557.1
Sacramento ^c	17.4	81.5	355.4	5.5	0.5	460.3
San Joaquin ^d	-	-	35.8	160.6	-	196.4
Southern California ^e	-	-	-	8.3	-	8.3
Out of state ^f	-	8.3	3.2	0.1	N/A	11.5
Total received	320.3	571.9	471.6	174.5	44.8	

N/A = not applicable

^aNorth Coast and Central Coast regions are combined to avoid disclosure, North Coast includes Del Norte, Humboldt, Mendocino, and Sonoma Counties and Central Coast includes Napa, Solano, Marin, Contra Costa, Alameda, San Francisco, San Mateo, Santa Clara, Santa Cruz, San Benito, and Monterey counties.

^bNorthern Interior region includes Lassen, Modoc, Siskiyou, Shasta, and Trinity counties.

^cSacramento region includes Butte, Colusa, El Dorado, Glenn, Lake, Nevada, Placer, Plumas, Sacramento, Sierra, Sutter, Tehama, Yolo, and Yuba counties.

^dSan Joaquin region Includes Alpine, Amador, Calaveras, Fresno, Kern, Kings, Madera, Mariposa, Merced, Mono, San Joaquin, Stanislaus, Tulare, and Tuolumne counties.

^eSouthern California region includes Imperial, Inyo, Los Angeles, Orange, San Luis Obispo, Riverside, San Bernardino, San Diego, Santa Barbara, and Ventura counties.

^fOut of state region includes Oregon, and Nevada. They do not capture logs exported internationally.

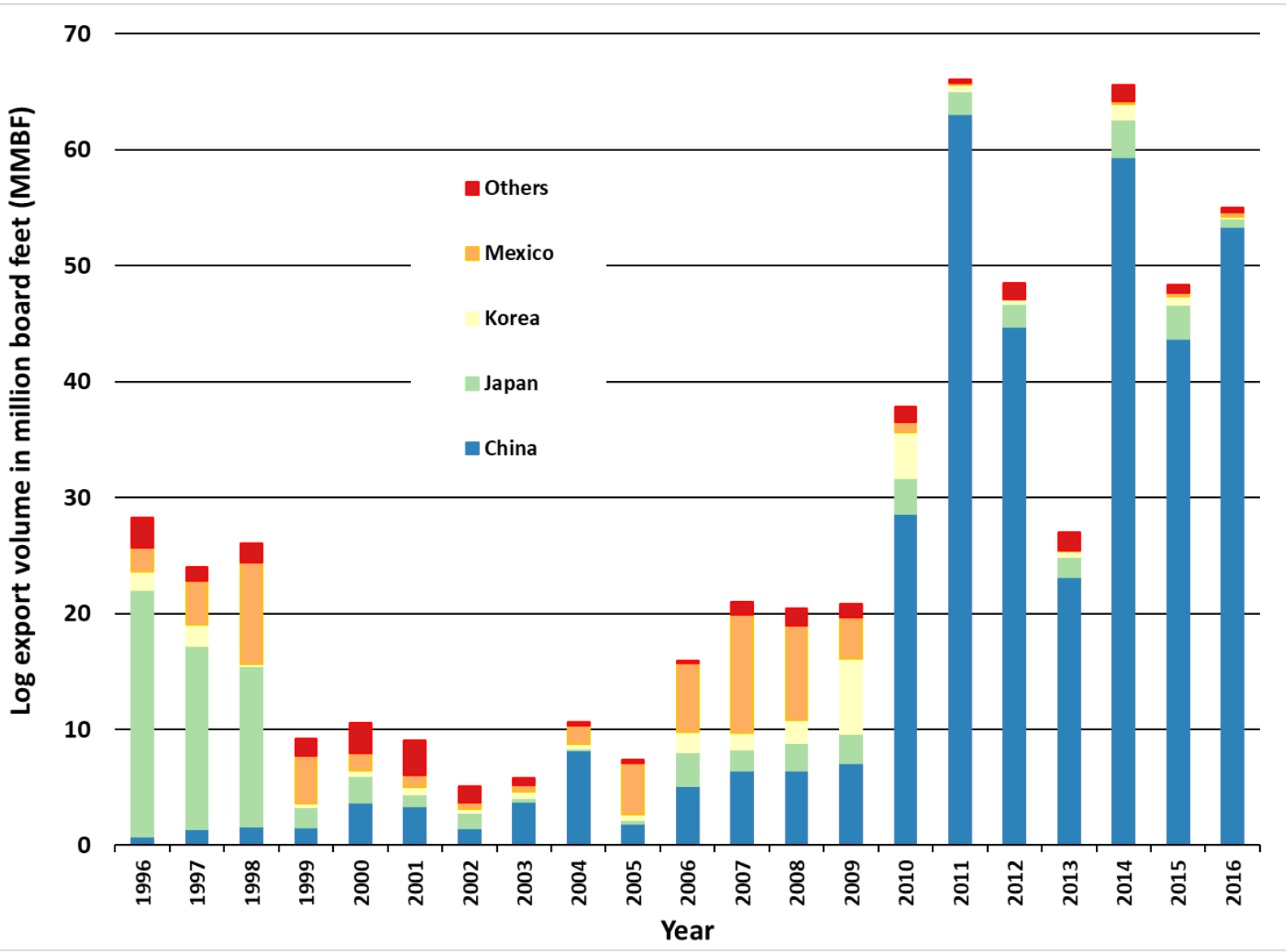
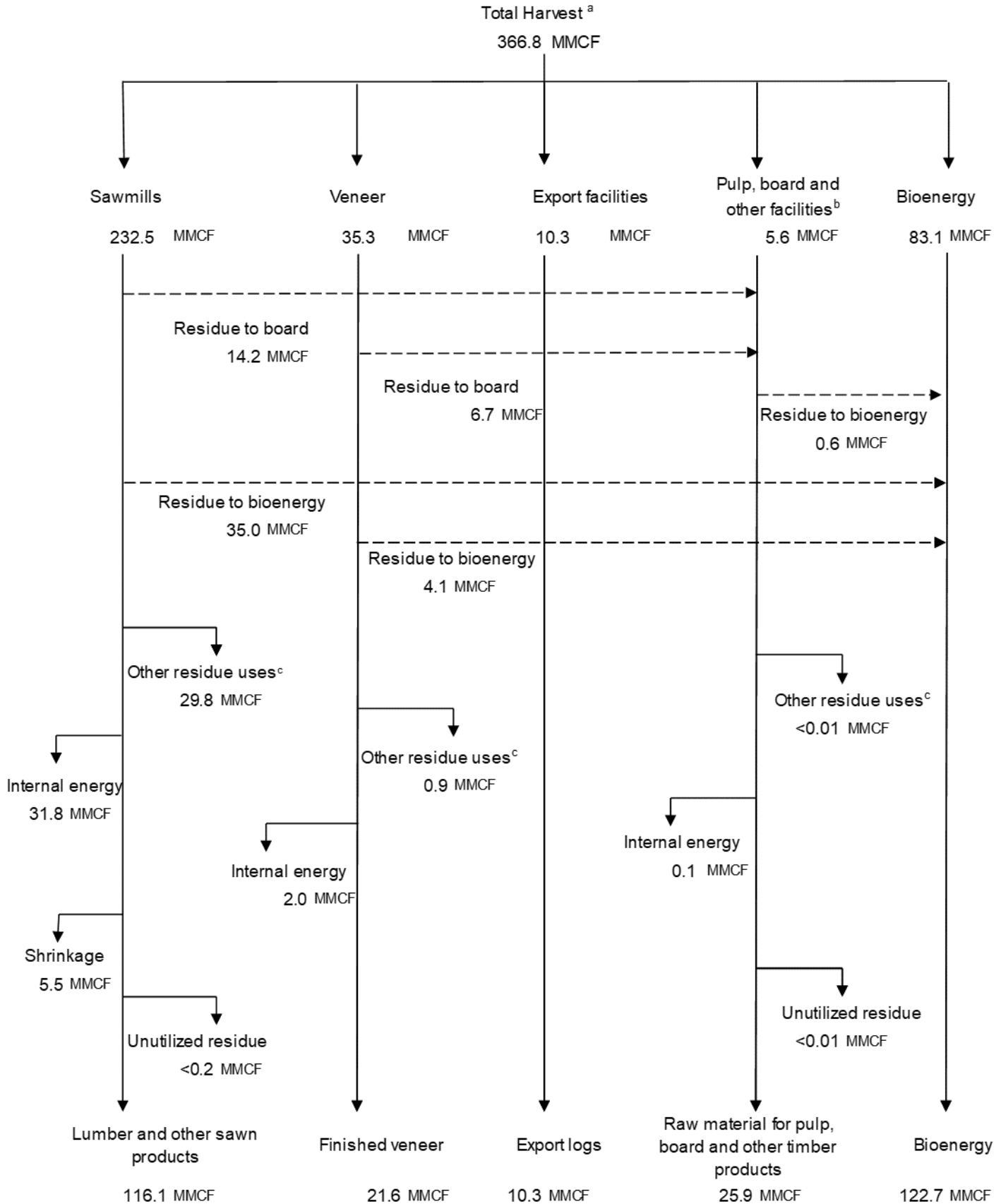


Figure 4 – Volume of California’s log exports in million board feet (MMBF, Scribner) by destination country, 1996-2016.



^a Harvest volume does not include bark.

^b Other facilities include producers of posts, poles, utility poles, log homes, log furniture, firewood, bark and other products.

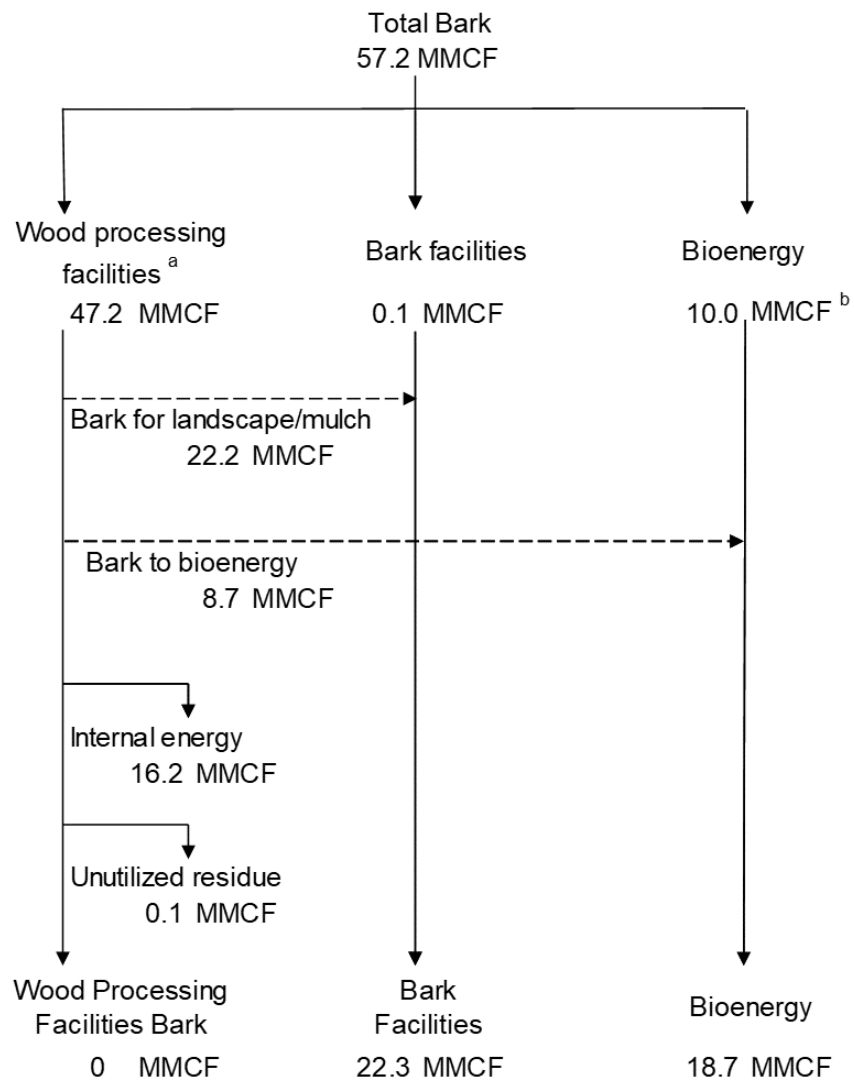
^c Other uses include landscape, mulch, pellets and animal bedding.

Figure 5 – Utilization of California’s timber harvest, 2016. MMCF = million cubic feet.

The following conversion factors were developed using log size specifications as well as product and residue recovery information developed from the 2016 mill survey in California:

- 5.32 board feet per cubic foot for sawlogs and export logs
- 4.92 board feet per cubic foot for veneer logs
- 4.29 board feet per cubic foot for pulp, board and other logs
- 1.0 board feet per cubic foot for bioenergy logs

Figure 6 – Utilization of bark generated through timber harvest and processing in California, 2016.



^a Wood processing facilities include saw mills, veneer manufacturers, post, poles, utility poles, log homes, log furniture, firewood, board producers and log export entities.

^b Estimated.

Figure 7 – (A) Final disposition of wood harvested in California by industry sector, 2016 (excludes bark); (B) Final disposition of mill residue in California, 2016 (includes bark).

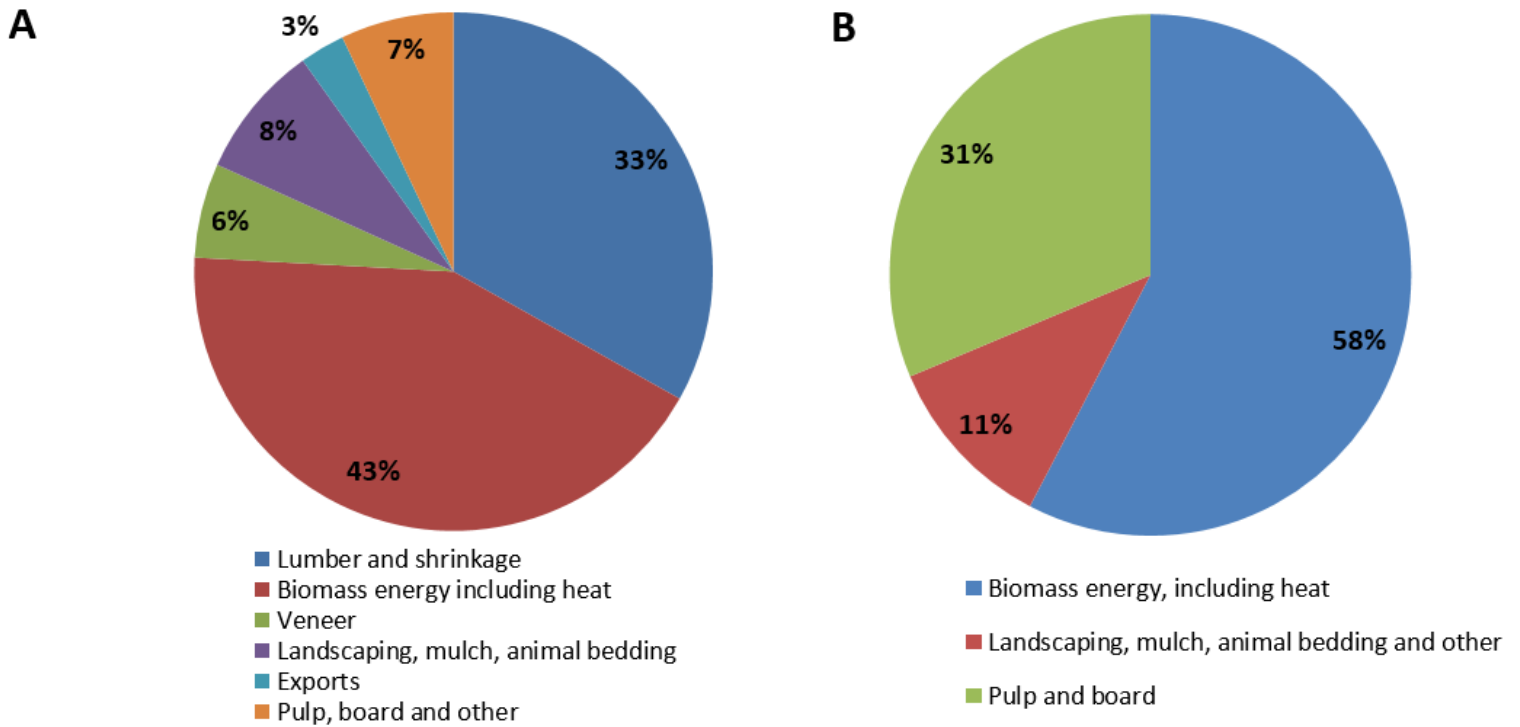


Table 13- Active California primary wood products facilities by sector, 1968-2016

Industry sector	1968	1972	1976	1982	1985	1988	1992	1994	2000	2006	2012	2016
Sawmills	216	176	142	101	89	93	56	53	47	33	30	32
Veneer and Plywood	26	25	21	10	6	6	3	4	2	2	2	2
Pulp and board	17	18	7	10	11	11	9	12	7	4	1	1
Bioenergy	b	b	b	b	b	b	b	b	25	25	26	23
Decorative bark	b	b	b	b	b	b	b	b	10	10	11	12
Other ^a	3	13	13	9	9	9	5	6	2	3	7	10
Total	262	232	183	130	115	119	73	75	93	77	77	80

^aOther includes log home producers, firewood producers, log furniture makers, fuel pellet facilities, export entities, as well as utility pole manufacturers.

^bData unavailable for bioenergy and decorative bark sectors for 1968-1994.

Source: Barrette et al. 1970; Hiserote and Howard 1978; Howard 1974, 1984; Howard and Ward 1988, 1991; Ward 1995, 1997; Morgan et al. 2004.; Morgan et al. 2012; McIver et al. 2015

Figure 8 – California’s active timber-processing facilities, 2016.

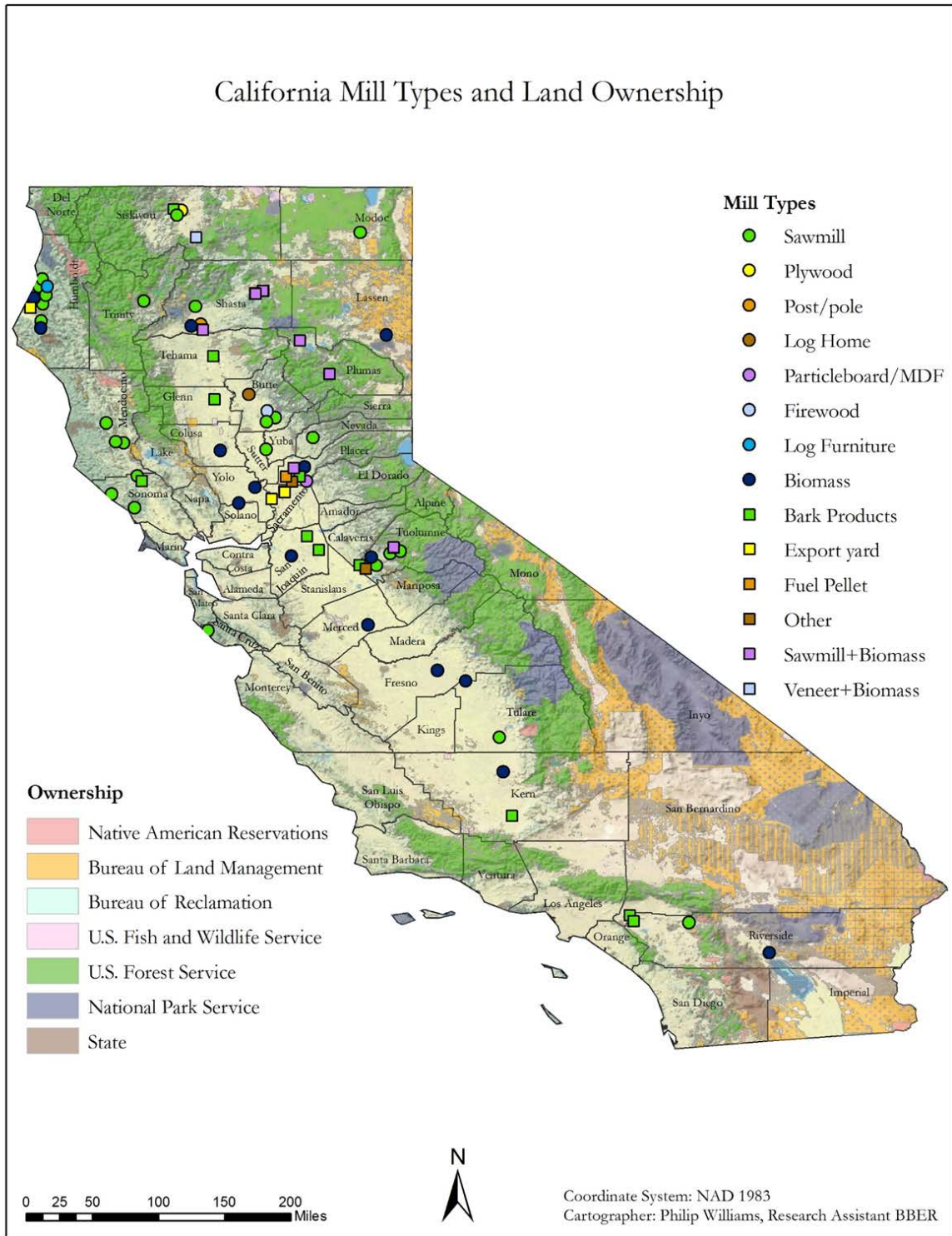


Table 14- Active California primary wood products facilities by county and sector, 2016

County	Sawmills	Veneer	Medium-density fiberboard and particleboard		Decorative		Other ^a	Total
				Bioenergy	bark			
Amador	-	-	1	-	-	-	1	
Butte	2	-	-	-	-	2	4	
Colusa	-	-	-	1	-	-	1	
Del Norte	-	-	-	-	-	-	0	
El Dorado	-	-	-	-	-	-	0	
Fresno	-	-	-	2	-	-	2	
Glenn	-	-	-	-	1	-	1	
Humboldt	5	-	-	2	-	2	9	
Kern	-	-	-	1	1	-	2	
Lassen	-	-	-	1	-	-	1	
Madera	-	-	-	-	-	-	0	
Mendocino	2	-	-	-	-	-	2	
Merced	-	-	-	1	-	-	1	
Modoc	1	-	-	-	-	-	1	
Nevada	1	-	-	-	-	-	1	
Placer	1	-	-	2	1	2	6	
Plumas	2	-	-	2	-	-	4	
Riverside	1	-	-	1	1	-	3	
Sacramento	-	-	-	-	1	2	3	
San Bernardino	-	-	-	-	1	-	1	
San Joaquin	-	-	-	1	2	-	3	
Santa Cruz	1	-	-	-	-	-	1	
Shasta	4	-	-	4	-	1	9	
Sierra	-	-	-	-	-	-	0	
Siskiyou	1	2	-	1	1	-	5	
Sonoma	4	-	-	-	1	-	5	
Sutter	1	-	-	-	-	-	1	
Tehama	-	-	-	-	1	-	1	
Trinity	1	-	-	-	-	-	1	
Tulare	1	-	-	-	-	-	1	
Tuolumne	4	-	-	2	1	1	8	
Yolo	-	-	-	2	-	-	2	
Yuba	-	-	-	-	-	-	0	
2016 Total	32	2	1	23	12	10	80	
2012 Total	30	2	1	26	11	7	77	
2006 Total	33	2	4	25	10	3	77	
2000 Total	47	2	5	25	10	4	93	

^aOther includes log home producers, firewood, log furniture facilities, export entities, animal bedding, fuel pellets and utility pole manufacturers.

Table 15- Sales value of California's primary wood products, 2000-2016

Product	2000	2006	2012	2016
----- <i>Thousand 2016 dollars</i> -----				
Lumber, timbers, and associated products	2,002,204	1,159,524	921,692	984,380
Bioenergy	349,180	237,156	344,385	273,542
Residue-utilizing sector ^a	622,577	302,999	129,116	133,416
Veneer and other primary wood products ^b	103,377	113,387	46,619	79,133
Total	3,077,338	1,813,066	1,441,813	1,470,471

^aResidue-utilizing sector includes pulp, paper, and board manufacturers, animal bedding producers, fuel pellet manufacturers and decorative bark.

^bVeneer and other products include log home accents, peeler cores, posts, poles, pilings, log furniture, firewood, and veneer.

Source: Morgan et al. 2004; Morgan et al. 2012; McIver et al. 2015

Table 16- Destination and value of California's primary wood products sales, 2016

Product	California	Far West	Rockies	North Central	Northeast	South	Other ^a	Total
----- <i>Thousand 2016 dollars</i> -----								
Lumber, timbers, and associated products	742,619	34,025	71,116	65,248	12,691	51,594	7,087	984,380
Energy and electric	273,542	-	-	-	-	-	-	273,542
Residue-utilizing sector ^b	115,521	5,201	7,428	1,930	1,494	1,708	133	133,416
Veneer and other primary wood products ^c	3,231	73,421	2,119	48	24	24	266	79,133
2016 All primary wood products	1,134,912	112,648	80,663	67,226	14,209	53,326	7,487	1,470,471
2012 All primary wood products	1,111,181	81,703	87,719	71,784	12,194	60,070	17,162	1,441,813
2006 All primary wood products	1,263,715	179,075	98,287	79,923	35,356	26,249	130,463	1,813,066
2000 All primary wood products	1,903,053	353,796	237,619	286,183	112,677	80,095	103,915	3,077,338

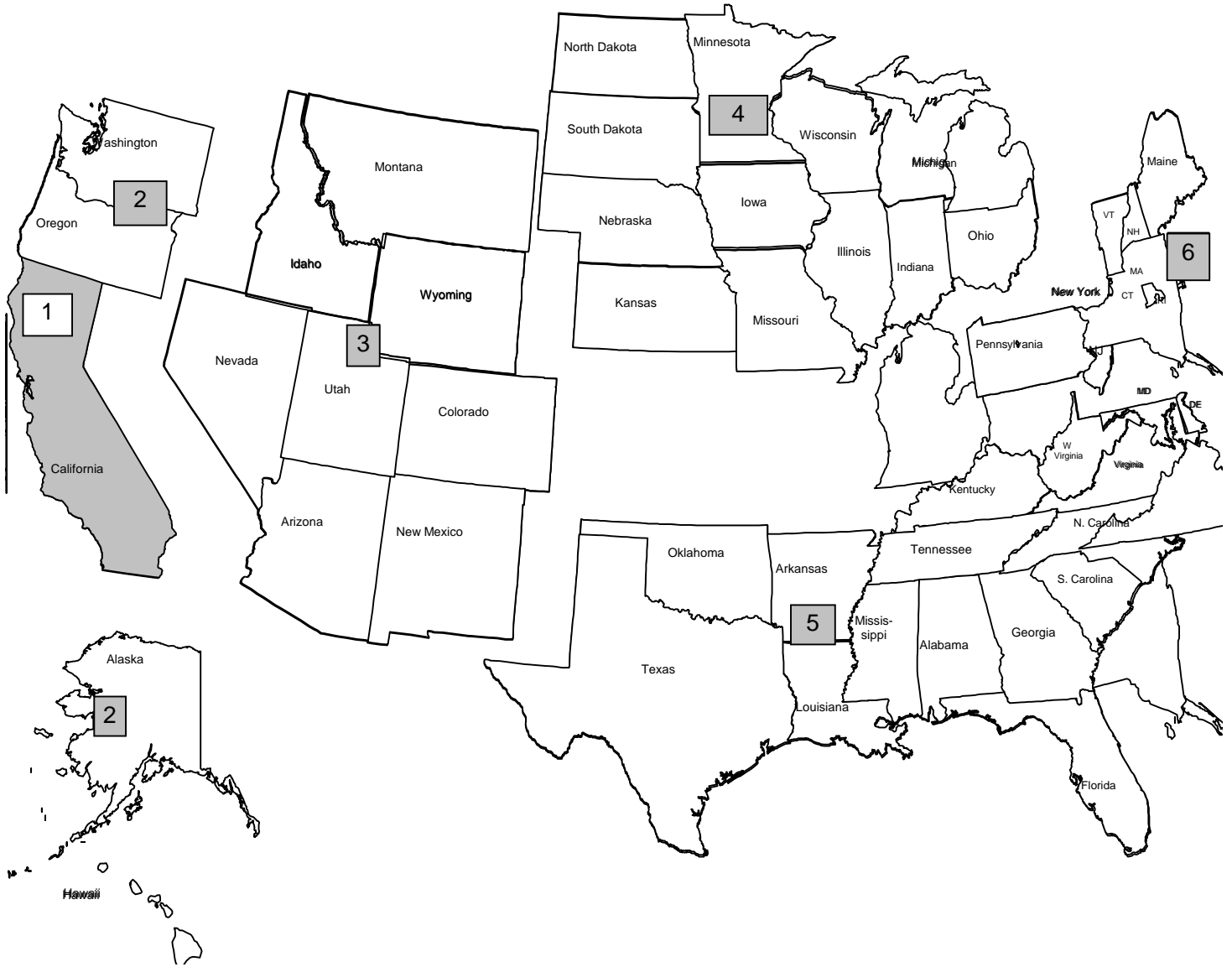
^aOther destinations include Pacific Rim and Canada.

^bResidue-utilizing sector includes facilities that use residues from the manufacture of lumber and other products, including pulp mills, board facilities, fuel pellet

^cVeneer and other primary wood products include log home accents, peeler cores, animal bedding, utility poles, firewood, furniture, and veneer.

Source: Morgan et al. 2004; Morgan et al. 2012; McIver et al. 2015

Figure 9 – Shipment destination of California’s primary wood products.



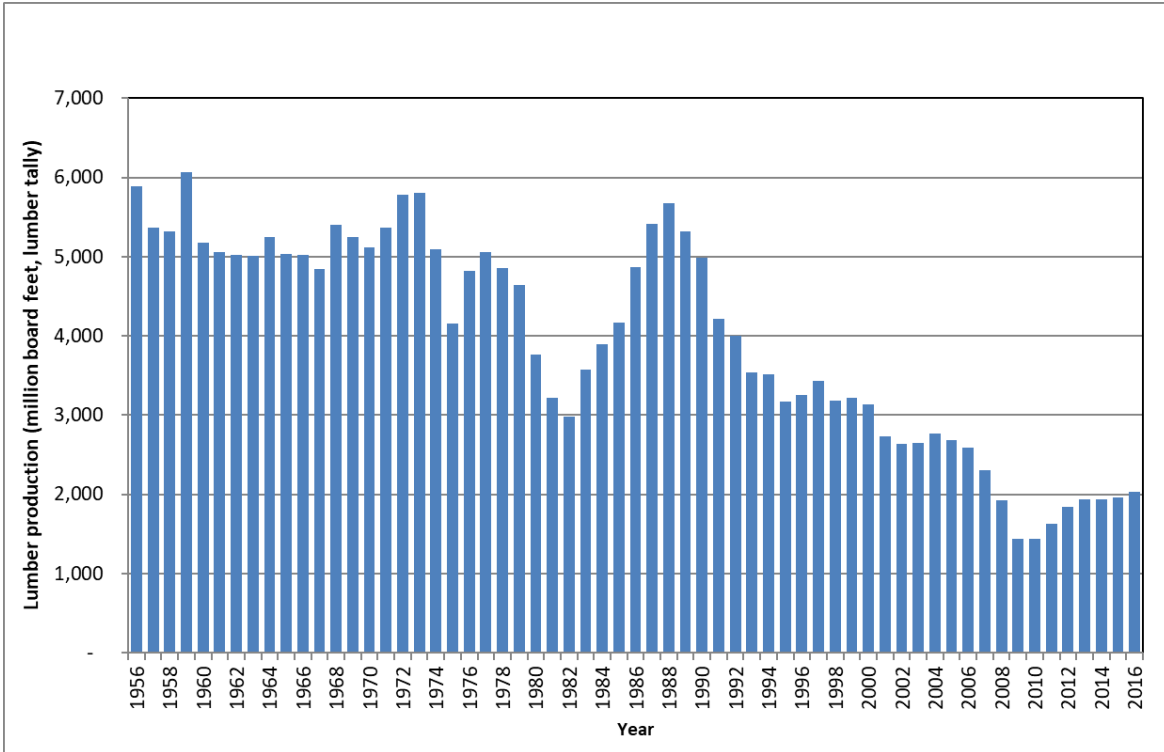


Figure 10 – California’s lumber production, 1956-2016 (WWPA).

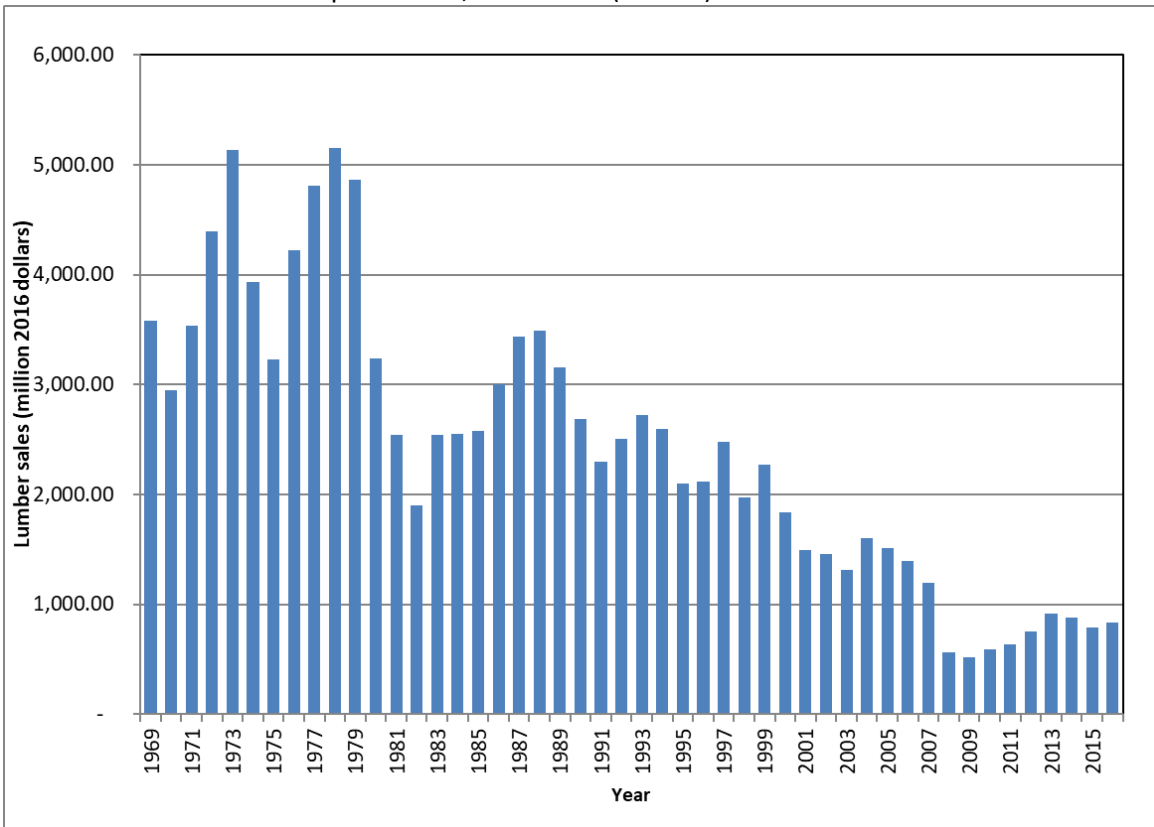


Figure 11 – California’s inflation-adjusted lumber sales, 1969-2016 (WWPA).

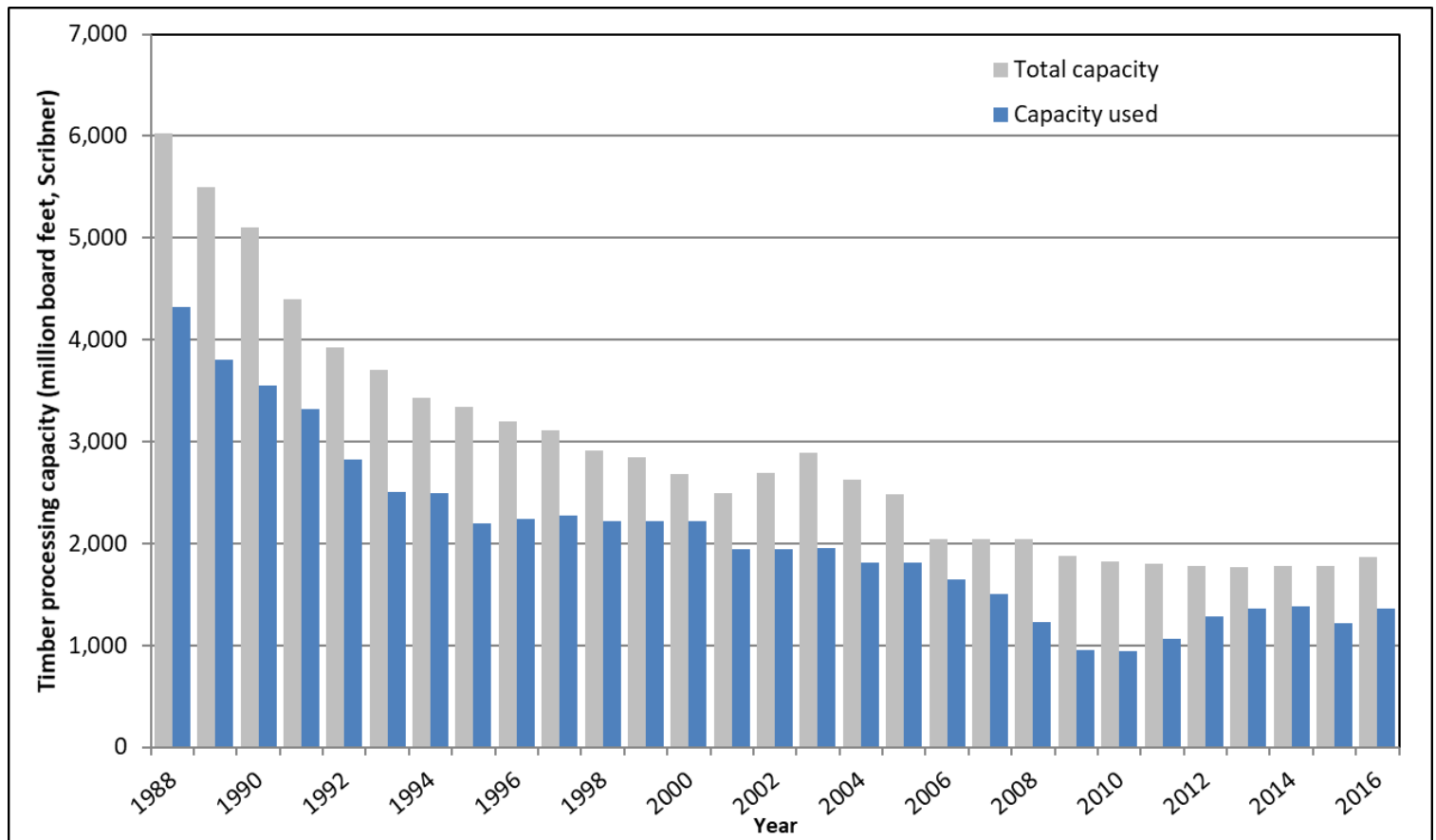


Figure 12 – California's capacity for processing sawtimber, 1988-2016.

Table 17- Number of active California sawmills, capacity, production, and proportion of capacity utilized by capacity size class, 2016

Production capacity size class	Number of mills	Production Capacity	Percentage of total capacity	Average capacity per mill	Production	Percentage of total production	Average production per mill	Capacity utilized
		MMBF ^a	Percent	MMBF ^a	MMBF ^a	Percent	MMBF ^a	Percent
10 MMBF or less	10	18.1	0.8	1.8	8.7	0.4	0.9	48.3
Over 10 to 50 MMBF	6	166.4	7.2	27.7	138.3	6.8	23.1	83.1
Over 50 to 100 MMBF	5	415.0	18.1	83.0	347.5	17.2	69.5	83.7
Over 100 MMBF	11	1,697.0	73.9	154.3	1,527.9	75.5	138.9	90.0
2016 Total	32	2,296.5	100.0	71.8	2,022.5	100.0	63.2	88.1
2012 Total	30	2,467.5	100.0	82.2	1,917.0	100.0	63.9	77.7
2006 Total	33	3,067.2	100.0	92.9	2,453.3	100.0	74.3	80.0
2000 Total	47	3,878.5	100.0	82.5	3,137.7	100.0	66.8	80.9

^aVolume in million board feet lumber tally.

Source: Morgan et al. 2004; Morgan et al. 2012; McIver et al. 2015

Figure 13 – Lumber recovery factor and overrun in California sawmills, various years.

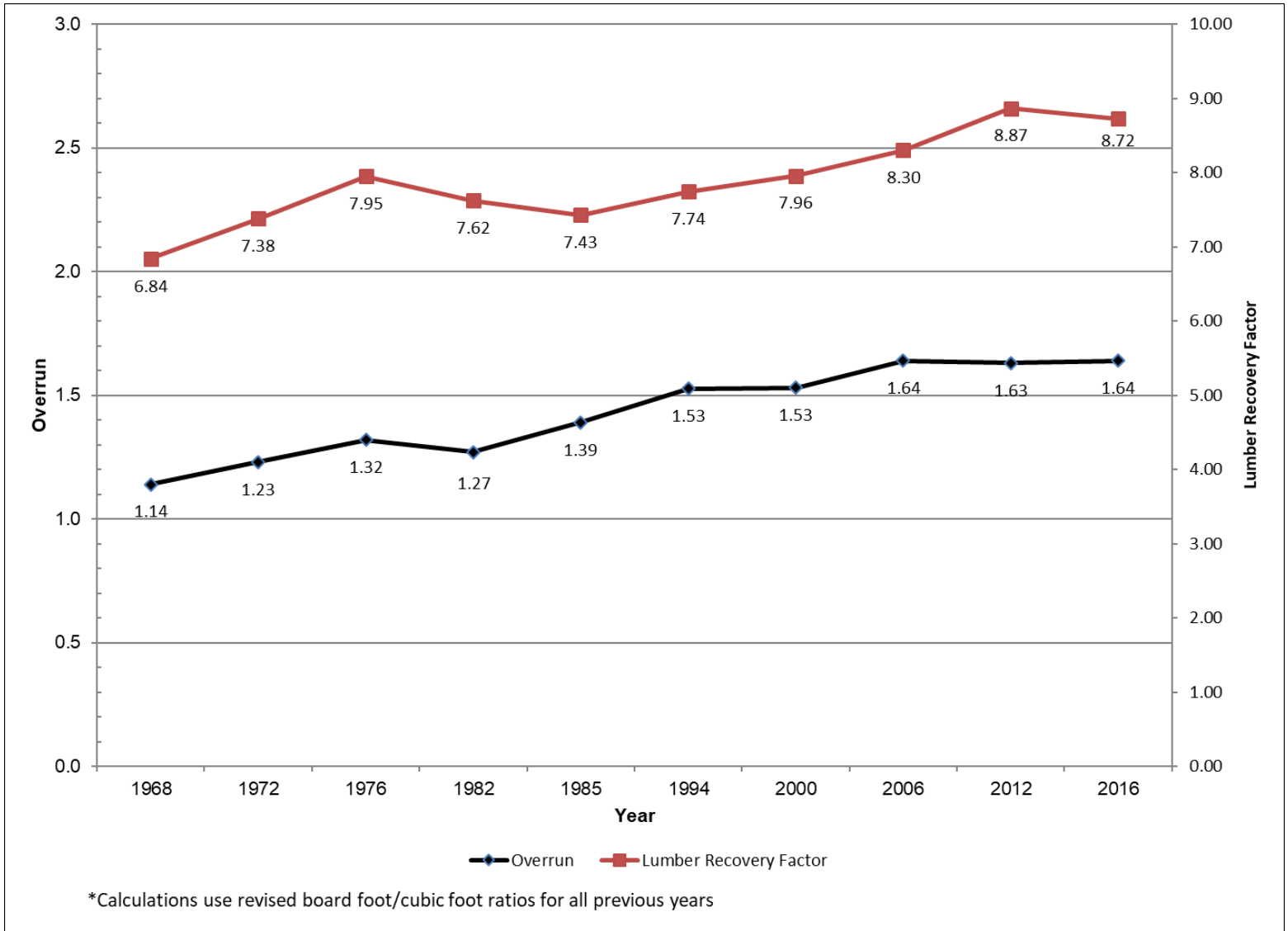


Table 18- Proportion of logs processed by sawmills by small-end diameter

Small-end Diameter (inches)	2006	2012	2016
<7	0.09	0.07	0.07
7-10	0.19	0.18	0.15
Total <10	0.28	0.25	0.22
10-24	0.51	0.52	0.58
>24	0.21	0.23	0.20
Total >10	0.72	0.75	0.78

Table 19- California's sawmill residue factors 2000-2016

Type of residue	2000	2006	2012	2016
----- <i>Bone-dry units per MBF^a</i> -----				
Coarse	0.41	0.37	0.33	0.33
Sawdust	0.15	0.15	0.14	0.14
Planer shavings	0.13	0.11	0.08	0.10
Bark	0.23	0.21	0.22	0.21
Total	0.92	0.85	0.77	0.78

^aBone-dry units (2,400 pounds of oven-dry wood) of the various residue types generated for every 1,000 board feet of lumber manufactured.

Source: Morgan et al. 2004; Morgan et al. 2012; McIver et al. 2015

Table 20- Volume of wood residue generated by California's sawmills, 2016

Residue type	Wood residue			Percentage of type		Percentage of total
	Used	Unused	Total	Used	Unused	
----- <i>Bone-dry units^a</i> -----			----- <i>Percent</i> -----			
Coarse	664,937	65	665,002	99.99	0.01	42.01
Fine						
Sawdust	276,012	1,488	277,500	99.46	0.54	17.53
Planer shavings	211,693	29	211,722	99.99	0.01	13.37
Bark	427,881	877	428,758	99.80	0.20	27.09
All Residues	1,580,523	2,458	1,582,981	99.84	0.16	100

^aBone-dry unit = 2,400 pounds of oven-dry wood.

Table 21- California's production and disposition of wood products residue, 2016

Type of residue ^b	Total utilized	Pulp and board	Landscape products, animal bedding, and other uses		Unutilized	Total produced
			Energy			
-----Bone-dry units ^a -----						
Coarse	754,134	160,450	470,734	122,951	80	754,214
Fine						
Sawdust	287,770	16,559	221,259	49,952	1,488	289,258
Planer shavings	215,929	15,172	56,475	144,282	29	215,958
Bark	490,416	-	259,355	231,061	1,177	491,593
All residue	1,748,249	192,181	1,007,822	548,246	2,773	1,751,022

^aBone-dry unit = 2,400 lb oven-dry wood.

^bIncludes residue from the manufacture of lumber, veneer, utility poles, log furniture, firewood, export logs and houselogs.

Figure 14 – Employment in California’s forest products industry, 1990-2017.

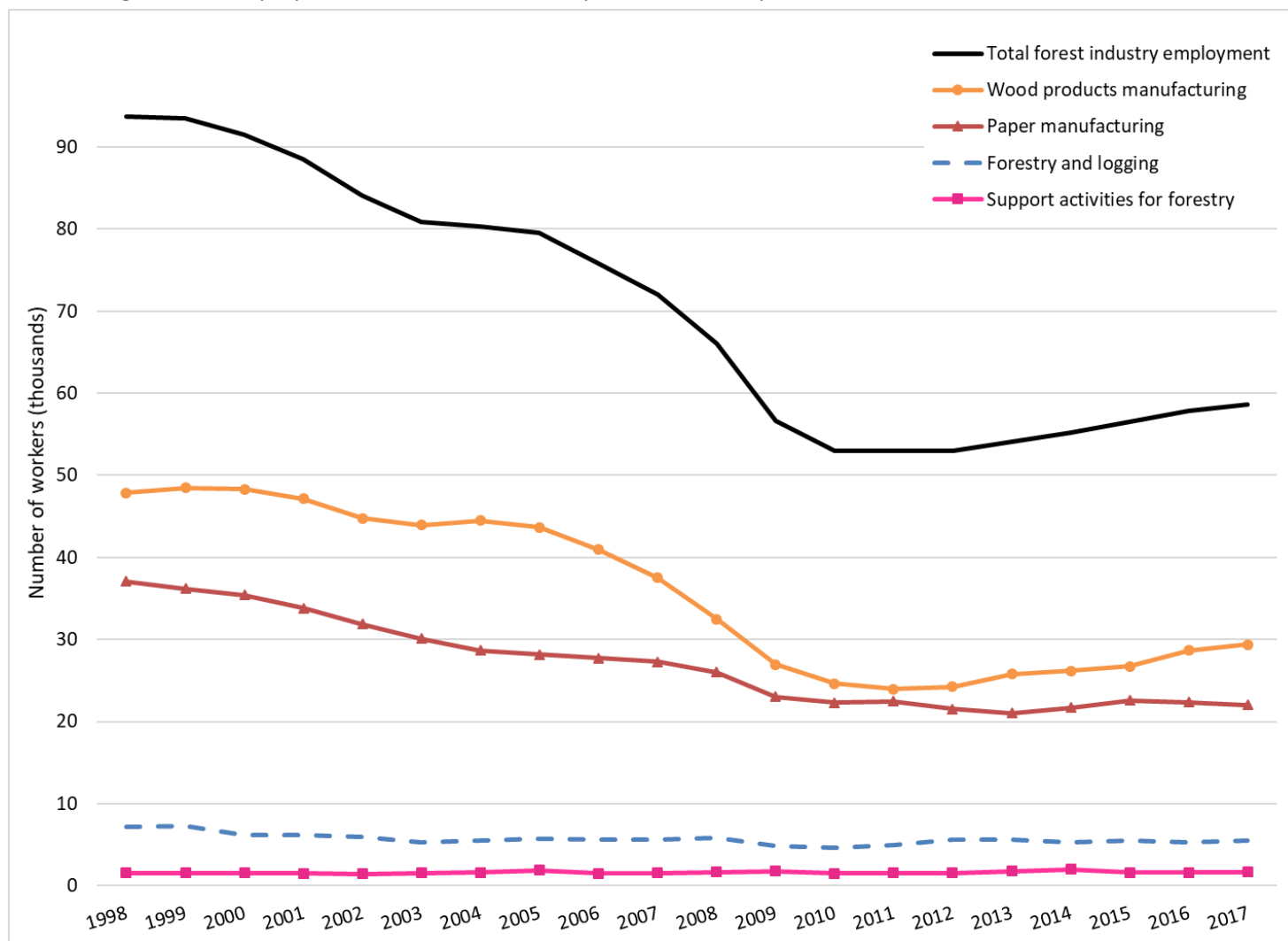


Figure 15 – Inflation-adjusted earnings in California’s forest products industry, 1990-2016.

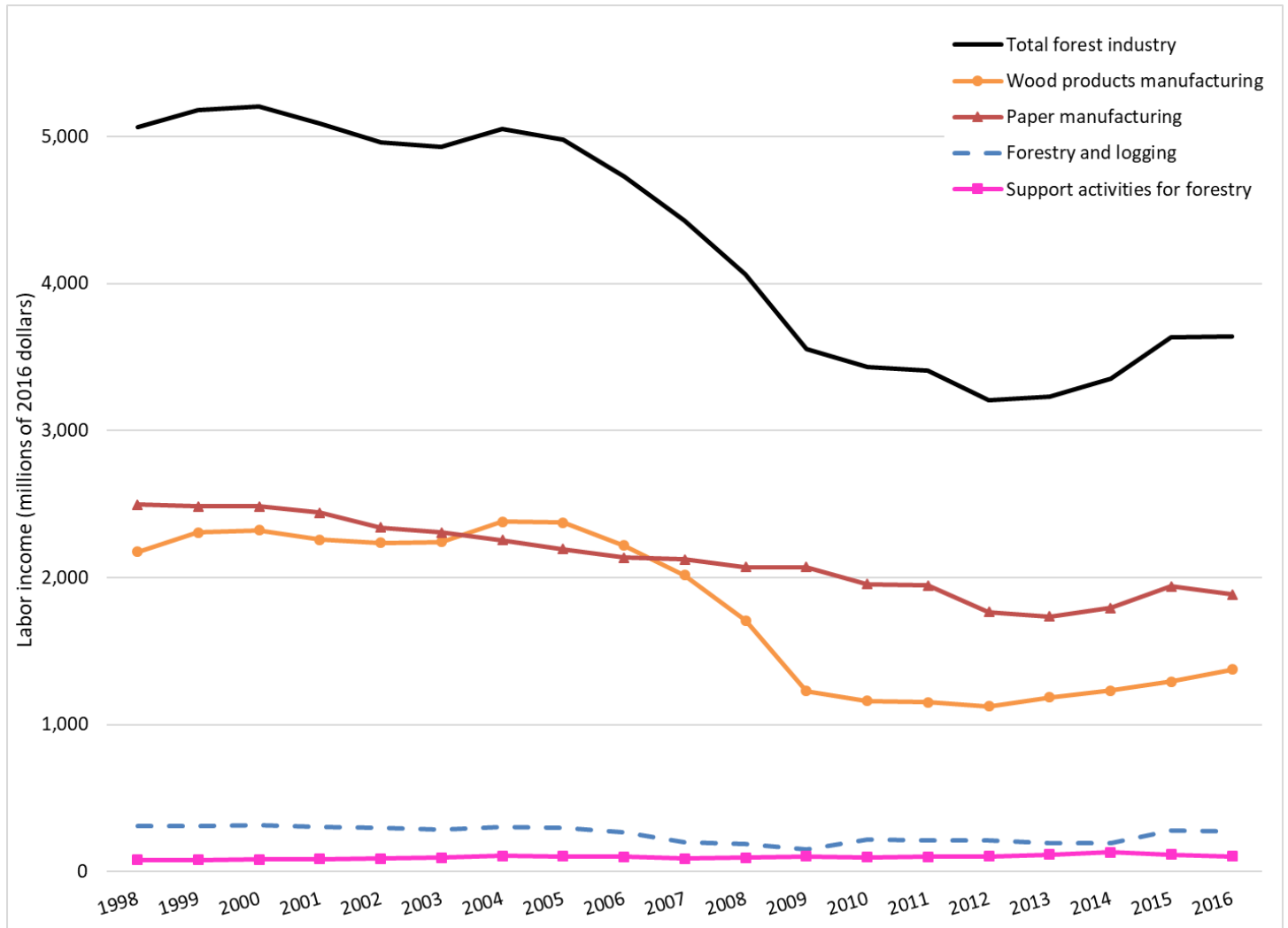


Table 22- Average annual employment and labor income contributions from California's forest industry, 2016

Sector	Direct	Indirect and	Total	Direct Labor	Indirect and	Total Labor
	Employment	Induced Employment	Employment Contribution ^a	Income	Labor Income	Income Contribution ^a
-----thousand 2016 dollars-----						
Wood Product Manufacturing	28,685	37,534	66,219	\$ 1,374,406	\$ 2,061,265	\$ 3,435,671
Forestry and Logging	5,266	6,824	12,090	\$ 273,460	\$ 251,200	\$ 524,660
Forestry Support Activities	1,595	627	2,222	\$ 105,093	\$ 53,009	\$ 158,102
Paper Manufacturing	22,345	58,573	80,918	\$ 1,886,131	\$ 2,834,289	\$ 4,720,420
Total Forest Industry	57,891	^a	^a	\$ 3,639,090	^a	^a

^a Indirect and induced employment and labor income should not be summed for multiple sectors due to some employment and income showing up as both direct contributions to their sector and indirect contributions to other sectors.