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Timber Basket of the Interior West: Idaho's Forest Products Industry and Timber Harvest, 2019, With Trends Through 2021

Eric A. Simmons, Samuel G. Scott, Todd A. Morgan, Lucas P. Townsend, John D. Shaw

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Abstract: This report traces the flow of Idaho's 2019 timber harvest through the primary wood products industry and characterizes the structure, condition, and economic impacts of Idaho's forest products sector. Historical changes in the forest products industry, as well as trends in timber harvest, production, sawmill capacity, mill residuals, and sales value, are presented. Employment and worker earnings in the State's primary and secondary forest products industries are also discussed. Periodic survey data collected from the forest products industry provide detailed information on Idaho's timber resources, wood utilization, and the economic contributions of the industry to the State economy through time.

Keywords: employment, forest economics, lumber production, mill residuals, mill capacity, wood products, timber harvest, timber-processing facility, wood utilization

Cover: Full page—Clearwater Paper and IFG site. Inset left and right—log yard in Lewiston, Idaho. Courtesy photos by Eric Simmons, BBER.

Authors

Eric A. Simmons is a Senior Research Associate, **Samuel G. Scott** is a Research Forest Economist, and **Todd A. Morgan** is the Director of Forest Industry Research at the Bureau of Business and Economic Research, University of Montana, Missoula, Montana.

Lucas P. Townsend is a Forester with Green Diamond Resource Company, Kalispell, Montana.

John D. Shaw is a Research Forester, U.S. Department of Agriculture, Forest Service, Rocky Mountain Research Station, Forest Inventory and Analysis Program, Riverdale, Utah.

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HIGHLIGHTS

- A total of 73 primary wood products facilities were identified as active in Idaho during 2019, 15 fewer than the previous mill census in 2015:
  - 24 sawmills
  - 16 residue-related products facilities
  - 14 log home facilities
  - 13 post, pole, and log furniture producers
  - 5 cedar product manufacturers
  - 1 plywood/veneer plant
- Idaho's total timber harvest in 2019 was 1.04 billion board feet Scribner, 9 percent lower than in 2015.
- Timber harvested from nonindustrial private timberlands continued to increase as a proportion of the total harvest from 12 percent in 2011 (131 MMBF) and 17 percent in 2015 (195 MMBF) to 20 percent in 2019 (205 MMBF). At 44 (455 MMBF) percent, industrial timberlands' proportion of total harvest declined from the 2015 high of 49 percent to just below the 2011 proportion (45 percent) of total harvest.
- Timber harvested from National Forests accounted for nearly 14 (144 MMBF) percent of the total harvest (144 MMBF), the highest percentage since 1995 (22 percent) and the largest volume since 1990 (700 MMBF). Timber harvested from all other public lands, primarily Idaho Department of Lands, declined 3 percentage points from 25 percent in 2015 to 23 percent of total harvest in 2019.
- Saw and veneer logs comprised over 91 percent of the total harvest. Clearwater, Bonner, Shoshone, and Kootenai Counties were the largest contributors to the State's total harvest in 2019. Combined, these counties accounted for nearly 63 percent of total statewide harvest volume.
- Idaho sawmills recovered an average of 1.90 board feet lumber tally per board foot Scribner of input, the highest recovery on record and 3 percent higher than the previous mill census in 2015. Idaho's 24 active sawmills produced 1.8 billion board feet of lumber during 2019, nearly 5 percent more than in 2015.
- Idaho sawmills with annual production capacity over 50 million board feet (MMBF) lumber tally accounted for nearly 100 percent of Idaho's lumber production in 2019. Timber-processing capacity for these 14 mills averaged 153.4 MMBF per mill.
- Idaho's primary forest products industry shipped products valued at $1.8 billion (fob the producing mill) in 2019. Lumber and plywood/veneer accounted for 49 percent of total sales.
- Idaho's primary wood products facilities generated over 1.433 million bone-dry units (1.720 million bone-dry tons) of mill residuals during 2019, of which more than 99 percent was utilized.
- More than 12,700 workers were directly employed by Idaho's forest industry during 2019, with 9,350 in primary and secondary wood products and paper manufacturing, 2,200 in forestry and logging, and 1,100 in forestry support activities. Together, these workers earned about $1.03 billion during 2019.

Contents

INTRODUCTION

This report describes the utilization of Idaho's 2019 timber harvest and characterizes the condition, structure, and operation of the State's primary forest products industry. Primary forest products manufacturers are firms that process timber into manufactured products such as lumber, and facilities, such as pulp and paper mills and particleboard plants, that use the wood fiber residuals directly from timber processors. The report includes a discussion of trends since the last industry census in 2015, longer-term historic trends drawn from other reports, and trends and developments since 2011 and earlier as appropriate. The report's principal goals are to determine the utilization of Idaho's timber harvest, to identify the type and number of primary forest products firms operating during 2019, to identify their sources of raw material, and to quantify outputs and sales values of finished products and residuals. Other areas covered in this report include the extent and efficiency of Idaho's wood processing infrastructure, production and timber-processing capacities, sales trends across the forest industry, as well as employment and economic contributions to Idaho's economy.

For a more detailed discussion of historic trends in timber harvesting and processing for Idaho see *Idaho's Forest Products Industry and Timber Harvest, 2006* (Brandt et al. 2012).

About the Data

This survey effort is the tenth application of its kind in Idaho over a 40-year period, and it presents information collected from a Bureau of Business and Economic Research census of primary manufacturers in the State, as well as facilities in surrounding States that receive timber harvested in Idaho. Previous Forest Industries Data Collection System (FIDACS) censuses were completed for Idaho in 1979, 1980, 1985, 1990, 1995, 2001, 2006, 2011, and 2015 (Brandt et al. 2012; Godfrey et al. 1980; Keegan et al. 1982, 1988, 1992, 1997; Morgan et al. 2004; Simmons et al., in press). Through a written questionnaire, phone interview, or in-person interview, timber-processing and residue-utilizing facilities provided information about their 2019 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 product volumes, types, sales value, and market locations.
- Volume, utilization, and marketing of manufacturing residuals.

In the event of nonresponse from a facility, data collected in previous surveys were updated using current data collected for facilities of a similar size, product type, and location, as well as information on market trends and prices. For the 2019 Idaho mill survey, data were received for 41 of the 73 active, in-state facilities, accounting for 73 percent of the statewide harvest and 76 percent of the timber volume processed in Idaho during the calendar year 2019.

The University of Montana's Bureau of Business and Economic Research (BBER) and the USDA Forest Service's Forest Inventory and Analysis (FIA) Program at the Rocky Mountain Research Station (Ogden, Utah) cooperated in the analysis and preparation of this report. In collaboration with the FIA programs at the Rocky Mountain and Pacific Northwest Research Stations, BBER has developed the FIDACS to collect, compile, and make available State and county information on the operations of the forest products industry. Information collected from manufacturers is stored at BBER in Missoula, Montana.

Similar forest products industry censuses have been conducted periodically in the Pacific Coast and Rocky Mountain States for over 40 years by the BBER and Forest Service research stations. Information collected through FIDACS is stored at the University of Montana's BBER. Additional information is available by request; however, individual firm-level data are confidential and will not be released. All of BBER's research can be accessed at http://www.bber.umt.edu/FIR/S_ID.asp.

IDAHO'S 2019 TIMBER HARVEST, PRODUCTS, AND FLOW

Idaho Timberlands

In 2019, Idaho had over 16.6 million acres of timberland[1] available for timber production (USDA FS 2019). The USDA Forest Service's National Forest System (NFS) is responsible for the administration of nearly 73 percent of the State's timberlands (fig. 1). The remaining timberlands are divided among private owners, including Tribal (16.5 percent), State endowment lands managed by the Idaho Department of Lands (IDL) (6.8 percent), Federal Bureau of Land Management (BLM) (3.6 percent), and other public ownership (0.2 percent).

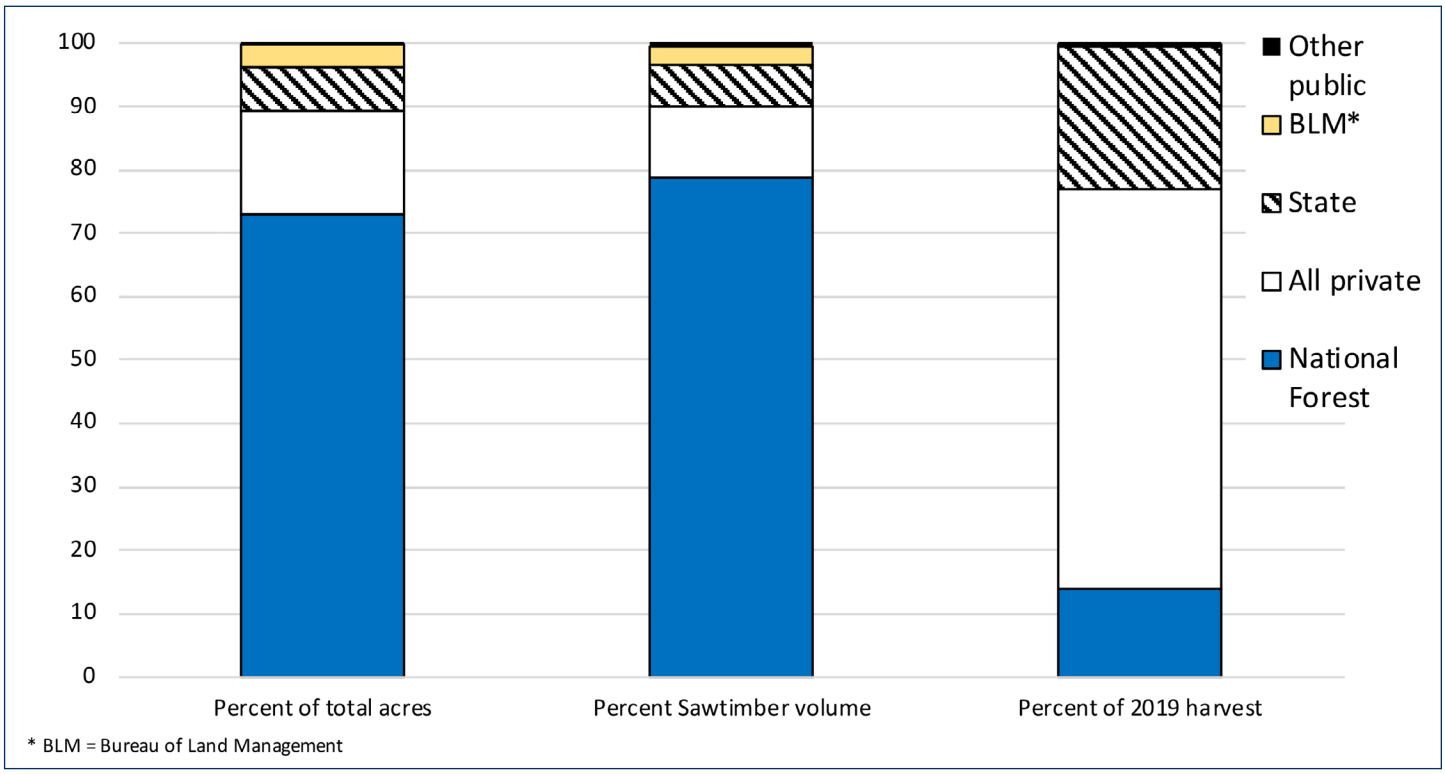

Figure 1—Percentage of Idaho timberland by ownership class in acres, standing volume and volume of harvest, 2019.

Harvest Trends 1947 Through 2019

The USDA Forest Service has kept comprehensive annual harvest data by ownership in Idaho since 1969. Other sources of information were used to develop harvest numbers for 1947 through 1969 (Keegan et al. 1997) (fig. 2). Idaho's timber harvest climbed after World War II, peaking in 1976 at 1.9 billion board feet Scribner. During the recession years of the early 1980s, harvest fell sharply, but it rebounded in the last half of the 1980s to an average annual level of 1.6 billion board feet Scribner.

[1] Timberland: Forest land that is producing or is capable of producing crops of industrial wood and not withdrawn from timber utilization by statute or administrative regulation. (Note: Areas qualifying as timberland are capable of producing at least 20 cubic feet per acre per year of industrial wood in natural stands. Currently inaccessible and inoperable areas are included.)

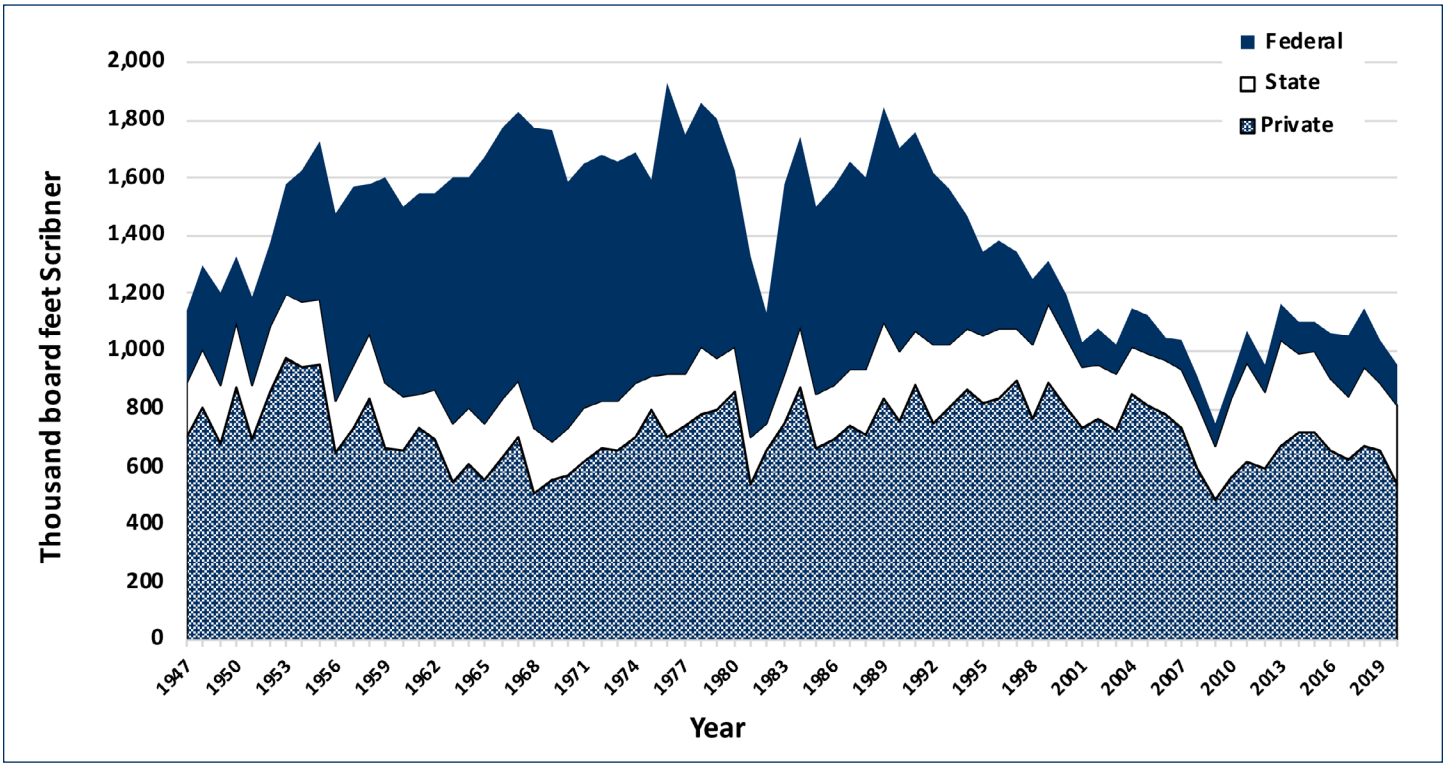

Figure 2—Idaho's timber harvest by ownership, 1947 through 2020 (Sources: Bureau of Business and Economic Research, The University of Montana-Missoula; USDA Forest Service Region One, Missoula, Montana).

Throughout the 1990s and into the 2000s, Idaho's total timber harvest declined steadily because of a dramatic decline in harvest from National Forest lands. The volume of timber harvested from Idaho's private timberlands remained stable throughout the 1990s and into the new century; however, the proportion of the harvest coming from private lands increased from 45 percent (732 MMBF) in 1990 to 74 percent (834 MMBF) in 2006. Harvest from IDL and other public forest lands has followed a similar trend, with harvest volumes remaining fairly stable, while the proportion of the total harvest increased from 14 percent (259 MMBF) in 1990 to nearly 20 percent (208 MMBF) by 2006.

The Great Recession and the associated severe declines in U.S. housing starts (fig. 3) drove Idaho's private timberland's harvests down steeply in 2008 and 2009. The 2009 total timber harvest in Idaho was less than 750 MMBF, the lowest since the end of World War II. By 2011, statewide timber harvest had recovered to prerecession levels of just over 1 billion board feet, aided significantly by the increased sustained yield calculation and harvesting program on the State of Idaho's endowment timberlands (IDL 2022a). Since 2011, timber harvests have ranged between 1.0 and 1.2 billion board feet with a high approaching 1.2 billion board feet 2013. In 2019 Idaho's timber harvest was just over 1 billion board feet Scribner.

Figure 3—United States housing starts 1980-2020.

This report is the first in the series where it is possible to estimate removals from FIA plot data, in addition to the mill survey methods used in all previous reports. FIA plot-based estimates of removals are derived from plots that have been remeasured over the course of 10 years, with the most recent measurement year referred to as the inventory year. Plot-based estimates are available for Idaho only for the 2019 inventory year, but they will be updated annually as new data are added. These removal estimates are available using the public-facing Evalidator tool (EVALIDator 2.1.0 (usda.gov)). Comparisons between the survey and plot-based estimates are discussed below by ownership and tree species.

Harvest by Geographic Source

From 1979 to 1990, between 76 and 78 percent of Idaho's total timber harvest came from north of the Salmon River (table 1). Since 2001, forests north of the Salmon River have provided approximately 90 percent of Idaho's timber harvest. The loss of the majority of southern Idaho's sawmills, from 32 in 1990 to 8 in 2019, coincided with the declines in southern Idaho timber harvest volumes (Keegan et al. 1992)

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Table 1a,b—Idaho timber harvest (MMBF Scribner) by county, selected years (sources: Keegan and others 1982, 1988, 1992, 1997; Morgan and others 2004; Brandt and others 2012; Simmons and others 2014; Simmons and others (in press).

Table 1a—North Idaho.

	1979		1985		1990		1995		2001		2006		2011		2015		2019	
County	**MMBF Scribner**	**Percent of total**	**MMBF Scribner**	**Percent of total**	**MMBF Scribner**	**Percent of total**	**MMBF Scribner**	**Percent of total**	**MMBF Scribner**	**Percent of total**	**MMBF Scribner**	**Percent of total**	**MMBF Scribner**	**Percent of total**	**MMBF Scribner**	**Percent of total**	**MMBF Scribner**	**Percent of total**
Benewah	100	5.4	94	5.9	152	9.0	117	8.5	129	12.8	144	12.9	156	14.6	122	10.7	73	7.0
Bonner	142	7.7	175	11.0	197	11.6	139	10.1	124	12.3	93	8.3	98	9.2	150	13.2	160	15.4
Boundary	94	5.1	80	5.0	86	5.1	69	5.0	57	5.7	53	4.8	39	3.6	54	4.8	46	4.4
Clearwater	544	29.4	335	21.0	267	15.8	234	17.1	182	18.1	174	15.6	221	20.7	250	22.0	269	25.8
Idaho	190	10.3	156	9.8	174	10.3	113	8.2	65	6.5	65	5.8	88	8.2	88	7.8	85	8.1
Kootenai	65	3.5	80	5.0	152	9.0	114	8.3	81	8.0	100	8.9	70	6.6	95	8.3	100	9.7
Latah	57	3.1	89	5.6	84	5.0	96	7.0	70	7.0	125	11.2	130	12.2	87	7.7	65	6.2
Lewis	4	0.2	13	0.8	20	1.2	17	1.2	14	1.4	12	1.1	6	0.6	42	3.7	6	0.6
Nez Perce	8	0.4	12	0.8	17	1.0	8	0.6	4	0.4	10	0.9	8	0.8	29	2.6	7	0.6
Shoshone	206	11.1	217	13.6	183	10.8	194	14.2	172	17.1	200	17.8	137	12.9	131	11.5	126	12.1
North Idaho total	**1,410**	**76.2**	**1,254**	**78.7**	**1,332**	**78.7**	**1,100**	**80.3**	**899**	**89.3**	**976**	**87.1**	**953**	**89.4**	**1,047**	**92.2**	**936**	**89.9**

Totals may not sum due to rounding.

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Table 1b—South Idaho.

County	1979		1985		1990		1995		2001		2006		2011		2015		2019	
	MMBF Scribner	Percent of total	MMBF Scribner	Percent of total	MMBF Scribner	Percent of total	MMBF Scribner	Percent of total	MMBF Scribner	Percent of total	MMBF Scribner	Percent of total	MMBF Scribner	Percent of total	MMBF Scribner	Percent of total	MMBF Scribner	Percent of total
Adams	52	2.8	66	4.1	87	5.1	28	2.0	25	2.5	30	2.7	24	2.2	32	2.9	30	2.9
Boise	84	4.5	67	4.2	127	7.5	93	6.8	20	2.0	25	2.2	28	2.6	17	1.5	26	2.5
Elmore	25	1.4	14	0.9	5	0.3	38	2.8	7	0.7	[a]	[b]	[a]	[b]	0	0	2	0.2
Valley	107	5.8	88	5.5	52	3.1	67	4.9	39	3.9	65	5.8	48	4.5	29	2.5	35	3.3
Washington	4	0.2	9	0.6	4	0.2	6	0.4	0	0.0	a	b	5	0.5	1	0.1	3	0.3
Other counties	20	1.1	3	0.2	6	0.3	11	0.8	1	0.1	6	0.5	[a]	[b]	[a]	[b]	4	0.4
Southwest Idaho	**292**	**15.8**	**247**	**15.5**	**281**	**16.6**	**242**	**17.7**	**91**	**9.0**	**126**	**11.3**	**104**	**9.8**	**80**	**7.0**	**100**	**9.6**
Caribou	4	0.2	10	0.6	3	0.2	5	0.3	5	0.5	4	0.3	[a]	[b]	[a]	[b]	[a]	[b]
Clark	10	0.5	10	0.6	16	0.9	0	0.0	1	0.1	6	0.6	3	0.3	1	0.1	[a]	[b]
Fremont	76	4.1	43	2.7	20	1.2	2	0.1	3	0.3	1	0.1	3	0.3	1	0.1	[a]	[b]
Lemhi	34	1.8	11	0.7	16	0.9	6	0.4	1	0.1	1	0.1	[a]	[b]	[a]	[b]	3	0.3
Other counties	24	1.3	19	1.2	24	1.4	15	1.1	7	0.7	7	0.6	3	0.3	6	0.5	2	0.2
Southeast Idaho	**148**	**8.0**	**93**	**5.8**	**79**	**4.7**	**27**	**2.0**	**17**	**1.7**	**19**	**1.7**	**9**	**0.8**	**8**	**0.8**	**5**	**0.5**
South Idaho total	**440**	**23.8**	**340**	**21.3**	**360**	**21.3**	**269**	**19.7**	**108**	**10.7**	**145**	**12.9**	**113**	**10.6**	**88**	**7.8**	**105**	**10.1**
Idaho total	**1,850**	**100**	**1,594**	**100**	**1,692**	**100**	**1,370**	**100**	**1,007**	**100**	**1,121**	**100**	**1,066**	**100**	**1,136**	**100**	**1,041**	**100**

Totals may not sum due to rounding.

[a] Less than 0.5 MMBF.

[b] Less than 0.05 percent.

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Clearwater County continued to lead the State in timber harvest with 269 MMBF in 2019—about 26 percent of Idaho's harvest. Other leading timber-producing counties were Bonner with 160 MMBF, Shoshone with 126 MMBF, Kootenai with 100 MMBF, Idaho with 85 MMBF, Benewah with 73 MMBF, and Latah with 65 MMBF. Combined, these seven counties in northern Idaho supplied almost 84 percent of Idaho's 2019 timber harvest.

Valley County had the largest harvest in southern Idaho at 35 MMBF, which was 3 percent of the State's total harvest. In southern Idaho, Valley, Adams, and Boise Counties contributed a combined 9 percent of the 2019 total State's harvest. Harvest volumes in 2019 for northern Idaho were 11 percent lower than in 2015 while the timber harvest volume in southern Idaho was 19 percent higher than in 2015. Increased harvest volumes from National Forest System timberlands in southern Idaho accounted for nearly 70 percent of the region's change from 2015 to 2019.

Northern Idaho's most dramatic county-level changes from 1990 to 2019 occurred in Benewah and Idaho Counties where the combined harvest dropped by 170 MMBF (nearly 52 percent), 80 MMBF in Benewah County, and 90 MMBF in Idaho County. Southern Idaho's most dramatic harvest decreases occurred in the southwestern counties of Adams, Boise, and Valley, where timber harvest has decreased by 175 MMBF (66 percent) since 1990. Timber harvest decreases in both northern and southern Idaho were a direct result of sharply declining timber harvests from National Forest timberlands from 700 MMBF in 1990 to 144 MMBF in 2019.

Harvest by Ownership and Product Type

Total timber harvest in Idaho in 2019 was 1,041 million board feet (MMBF) Scribner log scale, a decrease of approximately 2 percent (25 MMBF) from immediately post-recession 2011, and 8 percent (94 MMBF) lower than 2015. Private industrial timberlands declined from 49 percent of the total harvest in 2015 to 44 percent (down 98 MMBF) in 2019, which represented an 18 percent decrease in harvest from industrial timberlands between the two census years (table 2). Timber harvested from nonindustrial private forest (NIPF) lands increased to nearly 20 percent of total harvest and represented a 5 percent increase (up 9 MMBF) in timber volume harvested from nonindustrial timberlands from 2015 to 2019. Public lands contributed 37 percent of the harvest in 2019 compared to 34 percent in 2015. Harvest from other public lands, primarily made up of IDL timberlands, decreased from 25 percent to 23 percent of total harvest volume for 2019, nearly 51 MMBF less than in 2015 (from 289 MMBF to 238 MMBF). National Forest System harvest (144 MMBF) increased from 9 percent of total harvest in 2015 to 14 percent of total harvest in 2019 and represented a 46 percent increase in harvest volume from 99 MMBF to 144 MMBF in 2019. National Forest System timber harvest programs have been augmented by use of the Good Neighbor Authority partnership between the Forest Service and the IDL, which likely accounts for some of the increased volume harvested from National Forests in Idaho during 2019 (IDL 2022b).

Table 2a,b—Idaho timber harvest (MBF, Scribner) by ownership class, selected years (sources: Keegan and others 1982, 1988, 1992, 1997; Morgan and others 2004; Brandt and others 2012; Simmons and others 2014; Simmons and others (in press)).

Table 2a—Thousand board feet (Scribner).

Ownership class	1979	1985	1990	1995	2001	2006	2011	2015	2019
Private total	**808,749**	**779,109**	**754,978**	**829,417**	**750,590**	**833,797**	**615,012**	**747,403**	**658,531**
Industrial	455,721	467,474	364,178	467,518	443,029	485,590	484,176	552,835	454,851
Nonindustrial private[a]	353,028	311,635	390,800	361,899	307,561	348,207	130,836	194,569	203,680
Public total	**1,041,719**	**814,787**	**937,560**	**540,296**	**256,704**	**286,813**	**450,893**	**388,122**	**382,568**
National Forest	866,455	631,003	700,715	301,277	77,863	78,613	102,937	99,013	144,180
Other public[b]	175,264	183,784	236,845	239,019	178,841	208,200	347,956	289,109	238,388
All owners[b]	**1,850,468**	**1,593,896**	**1,692,538**	**1,369,713**	**1,007,294**	**1,120,610**	**1,065,905**	**1,135,525**	**1,041,098**

Totals may not sum due to rounding.

[a] Nonindustrial private includes Tribal harvest.

[b] Other public includes state, Bureau of Land Management, and other public ownerships.

Table 2b—Percentage of timber harvest.

Ownership class	1979	1985	1990	1995	2001	2006	2011	2015	2019
Private total	**43.7**	**48.9**	**44.6**	**60.6**	**74.5**	**74.4**	**57.7**	**65.8**	**63.3**
Industrial	24.6	29.3	21.5	34.1	44.0	43.3	45.4	48.7	43.7
Nonindustrial private[a]	19.1	19.6	23.1	26.4	30.5	31.1	12.3	17.1	19.6
Public total	**56.3**	**51.1**	**55.4**	**39.4**	**25.5**	**25.6**	**42.3**	**34.2**	**36.7**
National Forest	46.8	39.6	41.4	22.0	7.7	7.0	9.7	8.7	13.8
Other public[b]	9.5	11.5	14.0	17.5	17.8	18.6	32.6	25.5	22.9
All owners[b]	**100**	**100**	**100**	**100**	**100**	**100**	**100**	**100**	**100**

Totals may not sum due to rounding.

[a] Nonindustrial private includes Tribal harvest.

[b] Other public includes state, Bureau of Land Management, and other public ownerships.

The FIA plot-based estimate of forest harvest, described as "removals" in FIA terminology, is based on plots measured in Idaho over a 10-year period. Therefore, a comparison of the 2019 survey-based estimate and the 2019 plot-based estimate is not exact, since the survey-based estimate is based on only the target year. However, if there are no strong increasing or decreasing trends over the prior decade, the estimates should be comparable. One value of the plot-based estimate is that it is determined using a "moving window" approach to the sample, so it provides annual resolution. Therefore, if strong trends should occur, they could be evident before the next report of this kind is prepared in 2023.

The plot-based estimate for all removals is 1,228 MMBF, or about 18 percent greater than the current survey-based estimate, and greater than the highest survey-based estimate of the past decade, which occurred in 2015 (table 2). FIA removals are expected to exceed mill arrival by some amount, because FIA's definition means "removed from the inventory" and not necessarily removed from the forest. Because the ability to compare harvest to removals is new and the definitions differ slightly, it is not yet known how much of a discrepancy is significant. However, comparisons of proportions among ownerships could provide some insight.

The proportion of harvest on private ownerships as determined by survey is 63.3 percent (table 2), whereas by the plot-based estimate it is only 49.7 percent. Because of confidentiality requirements, plot-based data do not distinguish between industrial and non-industrial private ownership, so no further comparison is possible in the private category. The plot-based estimate of removals from public lands comprises the other 50.3 percent, which compares to 36.7 percent determined by survey. The plot-based estimate can be further broken down to National Forest (7.9 percent) and Other Public (42.5 percent). While the overall plot-based public lands estimate is much higher than the survey-based estimate, the plot-based estimate for Forest Service land is just over half of the survey-based estimate (7.9 percent vs. 13.8 percent). This means that Other Public ownerships account for the proportional difference between public and private land harvest. This is an interesting result, because the survey-based results have not found harvest from public lands to exceed 50 percent since the 1990 survey. However, it should be kept in mind that the plot-based estimates warrant additional statistical investigation. For example, the plot-based estimate for Other Public is currently 42.5 percent, as compared to 22.9 percent from the 2019 survey. The highest proportion of Other Public ever reported by survey was 32.6 percent in 2011, and with the exception of 2015 and in surveys conducted between 1979 and 2006, it has always been lower than 20 percent of the total. It is also worth noting, for example, that State lands alone account for 22.2 percent of the harvest by survey (table 3), as compared to 42.4 percent using plot data. The lower end of the 95 percent confidence interval for the plot-based estimate is 21.7 percent of the total, making the survey-based estimate barely within the interval. Deeper analysis will be possible as the plot-based inventory progresses.

Historically, the majority of Idaho's timber harvest has been processed into lumber and plywood, and in 2019, over 91 percent of Idaho's harvest was used to produce these products. Private lands continue to be the primary source of raw material for saw and veneer logs, providing 64 percent (606 MMBF) of the total supply in 2019 (table 3). Private lands accounted for about 66 percent of the saw and veneer logs in 2015 and 76 percent in 2011. Prior to 1995,

data showed private lands providing less than half of Idaho's saw and veneer log harvest (Keegan et al. 1997; Morgan et al. 2004).

Table 3—Idaho timber harvest by ownership class and timber product, thousand board feet, Scribner, 2019.

Ownership class	Saw and veneer logs[a]	House logs	Other timber products[b]	All products
Private timberlands	**606,366**	**1,944**	**50,220**	**658,531**
Industrial	426,438	651	27,762	454,851
Nonindustrial private[c]	179,928	1,293	22,458	203,680
Public timberlands	**345,376**	**2,070**	**35,122**	**382,568**
National Forest	131,077	1,850	11,254	144,180
State	207,148	220	23,868	231,237
Other[d]	7,151	0	0	7,151
All owners	**951,742**	**4,014**	**85,342**	**1,041,098**

Totals may not sum due to rounding.

[a] Saw and veneer logs combined to prevent disclosure.

[b] Other timber products include logs used for pulpwood, posts and poles, cedar products, utility poles, furniture logs, and bioenergy.

[c] Nonindustrial private includes Tribal.

[d] Other owners include Bureau of Land Management and other public.

Although substantial harvest declines from National Forests since the mid-1990s have contributed to the increase in the portion of harvest from private lands, National Forest timber harvests have generally been increasing since 2006. National Forests provided 13 percent (131 MMBF) of Idaho's saw and veneer log harvest in 2019 compared to 9 percent (88 MMBF) in 2015.

Industry sectors for timber harvested for other products have been combined to prevent potential disclosure of individual company data. Pulpwood accounted for the majority of the timber harvested for other products. Idaho's pulpwood harvest in 2011 was 74 MMBF; between 2011 and 2019 pulpwood harvests have declined. During the same period, lumber production increased by 33 percent. Weak pulpwood markets often occur when lumber production and prices are increasing. This is because sawmill residuals supplies increase and residue users, such as the pulp and paper industry, can be readily supplied with high quality sawmill residuals. Private timberlands accounted for over 60 percent of the pulpwood harvest in 2019. State lands provided nearly 25 percent and most of the remaining timber came from National Forest timberlands.

Timber harvested for post/pole and utility pole products were the next largest volume of timber provided for other timber products followed by timber for cedar products. Private timberlands supplied 57 percent and IDL timberlands accounted for 28 percent of the volume for these timber products users. Trees harvested for house logs were supplied primarily from National Forest timberlands (46 percent), the largest proportion from Federal ownership for

any log product. Nonindustrial private owners accounted for the second largest proportion (32 percent) of timber for house logs.

Harvest by Species

True firs (*Abies* spp.)—grand fir (*Abies grandis* (Douglas ex D. Don) Lindl.) and subalpine fir (*Abies lasiocarpa* (Hook.) Nutt.) —constituted the largest component (37 percent) of Idaho's 2019 timber harvest, similar to other census years since 2006 (table 4). Douglas-fir (*Pseudotsuga menziesii* (Mirb.) Franco) at 29 percent was the second largest component of the 2019 harvest. Western redcedar (*Thuja plicata* Donn ex D. Don) and ponderosa pine (*Pinus ponderosa* Dougl. ex Laws.) rounded out the top four most-harvested species. These four species comprised 82 and 81 percent of the total harvest in 2015 and in 2019, respectively. The largest decline in harvest by species was observed for western larch (*Larix occidentalis* Nutt.), which declined by 21 percent from 2015 (70 MMBF) to 2019 (55 MMBF). At 32 percent, Engelmann spruce (*Picea engelmmanni* Parry ex Engelm.) had the largest increase in harvest between 2015 (19 MMBF) and 2019 (25 MMBF).

Table 4—Percentage of Idaho timber harvest by species in Scribner board-feet, selected years (sources: Setzer 1970; Morgan and others 2004; Brandt and others 2012; Simmons and others 2014; Simmons and others (in press)).

Species	1969	1979	1985	1990	1995	2001	2006	2011	2015	2019
True firs	24	22	27	23	25	24	34	35	36	37
Douglas-fir	18	20	21	22	27	26	28	24	29	29
Western redcedar	7	11	10	11	9	10	13	12	9	8
Ponderosa pine	14	13	12	18	17	7	7	10	8	7
Western larch	6	6	6	6	6	10	5	6	6	5
Western hemlock	[a]	1	3	3	4	12	4	7	5	5
Lodgepole pine	4	8	10	10	6	5	5	3	5	5
Spruce	[a]	3	5	3	2	2	2	2	2	2
Western white pine	19	8	6	5	3	4	1	1	1	1
Other species[a]	8	9	1	0	2	0	1	0	—	—
All species	**100**	**100**	**100**	**100**	**100**	**100**	**100**	**100**	**100**	**100**

Totals may not sum due to rounding.

[a] Western hemlock and Englemann spruce were included in the other species in 1969.

— Less than 0.5 percent.

The decline in the harvest of western white pine (*Pinus monticola* Dougl. ex D. Don) has been the greatest change to occur in the species composition of the timber harvest in Idaho during the last 50 years. In 1969, the white pine harvest was about 343 MMBF and accounted for 19 percent of Idaho's timber. White pine timber harvests have been about 1 percent of the total timber harvest since 2006, accounting for 8 MMBF in 2019. This change is the result of several interacting factors but the greatest contributing factor to the decline in harvests of white pine was white pine blister rust, an exotic disease introduced to the United States from Europe

in the early 1900s. By the 1940s, blister rust had reached epidemic levels and caused great damage to the white pine resource throughout the Inland Northwest (Fins et al. 2001).

As seen when comparing survey harvest and plot-based removals by ownership, there are some differences when comparing among species. Whereas the true firs, as a group the most-harvested group, account for 37 percent of harvest by survey, the plot-based estimate is 37.9 percent. The primary difference is found with Douglas-fir and western redcedar, the second- and third-most-harvested species by both estimation methods. Douglas-fir is estimated by the survey method to be 29 percent of the harvest, but based on plot data it accounts for only 19.1 percent. By survey, western redcedar is a distant third at 8 percent of harvest, but at 19.0 percent it's effectively equal in volume to Douglas-fir by the plot-based estimate. This difference might provide a hint as to one source of differences between the estimates. Douglas-fir has experienced substantial mortality in recent years, but salvage harvest of dead trees might not be fully accounted for in FIA methods of computing removals. This is not the case with western redcedar, since it is affected by different mortality agents and the relative magnitude of mortality is lower in that species. In other words, if a substantial portion of salvage harvest is missing from the FIA plot-based estimates, it could account for some or all of the proportional difference between Douglas-fir and western redcedar removals.

The remaining portion of harvest is spread among several other species and the proportions of all are in single digits using both methods. Although there are some differences in rank, there are few effective differences because of the small numbers of plots contributing to the estimates.

Species Composition by Product Type

In 2019, all of Idaho's species groups were used to produce lumber. Overall, harvest by species for 2019 was similar to what has been observed since 2006. Saw and veneer logs accounted for 91 percent of the 2019 timber harvest volume. True firs were the species most-harvested for saw and veneer logs, comprising 38 percent of the saw and veneer log harvest, while Douglas-fir accounted for 29 percent (table 5). Ponderosa pine and western redcedar represented 8 percent and 7 percent of the saw and veneer log harvest, respectively.

Table 5—Idaho timber harvest by species and timber product, thousand board feet, Scribner, 2019.

Species	Saw and veneer logs[a]	House logs	Other timber products[b]	All products
True firs	361,715	65	25,821	387,601
Douglas-fir	277,869	459	23,136	301,463
Western redcedar	66,443	333	17,405	84,182
Ponderosa pine	72,340	354	1,420	74,114
Western hemlock	55,761	—	202	55,963
Western larch	53,056	273	1,432	54,761
Lodgepole pine	31,728	2,398	15,812	49,937
Spruce	24,687	118	96	24,901
Western white pine	8,090	14	18	8,121
Other species	54	—	—	54
All species	**951,742**	**4,014**	**85,342**	**1,041,098**

Totals may not sum due to rounding.

[a] Saw and veneer logs combined to prevent disclosure.

[b] Other timber products include logs used for pulpwood, posts and poles, cedar products, utility poles, firewood, log furniture, and bioenergy.

— Less than 0.5 MBF or 0.05 percent.

Changes in the harvest for other timber products can generally be attributed to increased demand for saw/veneer logs, house logs, and strong pulpwood markets. The 2019 harvest for other timber products (85 MMBF) including cedar products, pulpwood, posts and poles, utility poles, furniture log, and energy wood, was primarily made up of true firs. In 2019, true firs accounted for 30 percent of the harvest for these log products compared to 35 percent in 2015. Species used for other timber products in 2019 included Douglas-fir (27 percent), western redcedar (20 percent), and lodgepole pine (19 percent).

Movement of Timber Products

The concentration of production at fewer and larger wood products facilities and shifting patterns of harvest have created manufacturing centers that draw timber from large geographic areas. Thus, large volumes of timber move across county and State boundary lines because most Idaho counties with mills now have considerably fewer timber-processing facilities than in past decades. To avoid disclosure of firm-level timber receipt information, timber movement is described by three broad geographic regions: North Idaho, Southwest Idaho, and Southeast Idaho (fig. 4). Since 2006, the movement of timber as proportions of the State's timber harvest has been similar between census years varying by rarely by more than 2 to 3 percent yearly. Notable trends since 2015 are observed in this analysis.

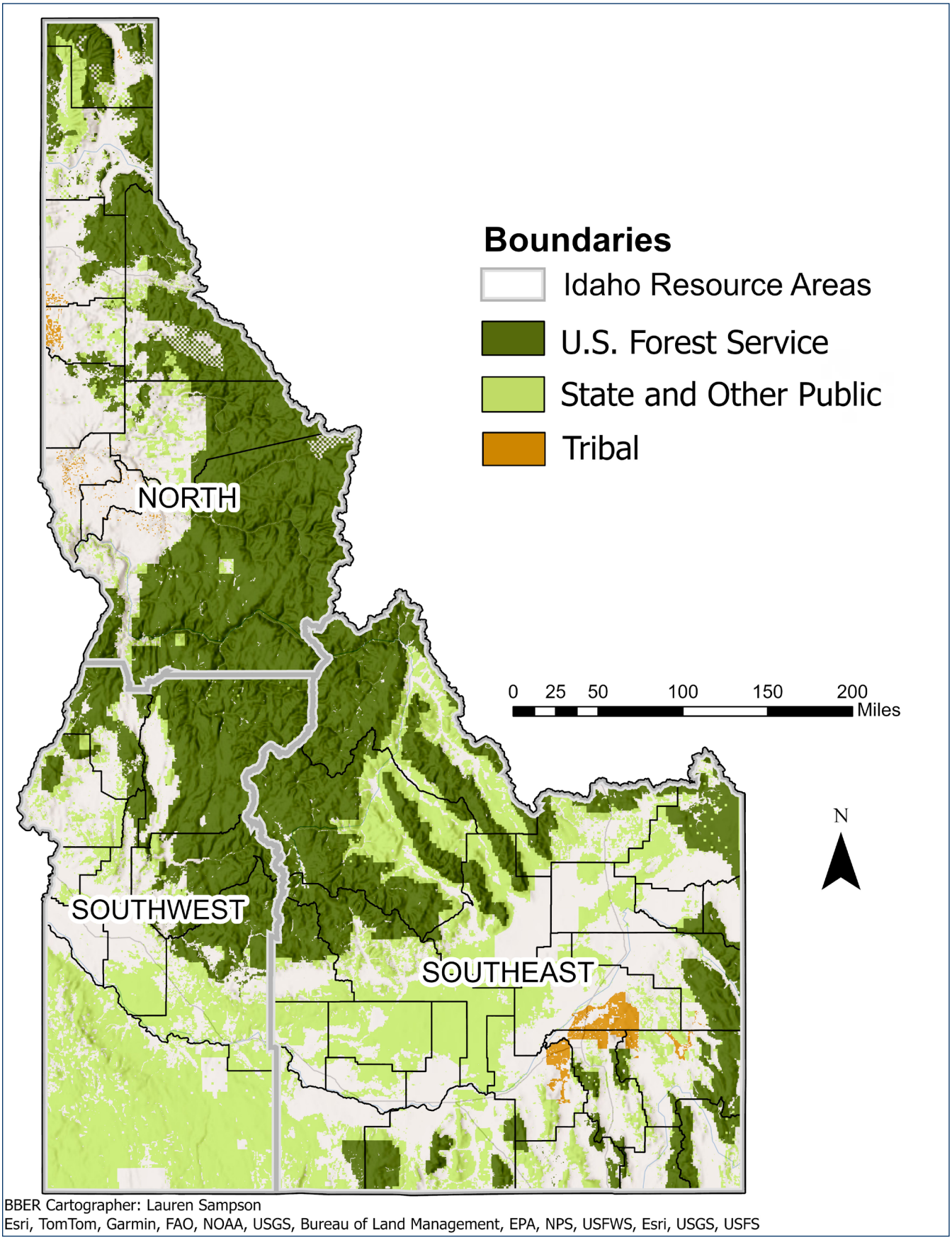


Figure 4—Idaho resource areas.

Movement Across State Lines

In 2019, nearly 6 percent (60 MMBF) of Idaho's harvest was shipped for processing outside of the State (table 6). Idaho's primary wood products manufacturers received nearly 159 MMBF of timber that was harvested outside of Idaho, making the State a net importer of nearly 100 MMBF of timber in 2019. In 2015 Idaho was a net exporter of 12 MMBF, consistent with long-term timber flow trends (Brandt et al. 2012). With sawmilling infrastructure increasing timber-processing capacity in Idaho, while infrastructure and timber-processing capacity has declined in Montana and eastern Oregon (Hayes et al. 2021; Simmons et al., in press), it is likely that Idaho will continue to be a net importer of timber in the future. Idaho mills received 74 MMBF of timber from Washington State (46 percent), over 47 MMBF from Montana (29 percent), and nearly 18 MMBF from Oregon (11 percent).

Table 6—Log flow into and out of Idaho, thousand board feet, Scribner, 2019.

Timber products	Log flow into Idaho	Log flow out of Idaho	Net inflow (net outflow)
Saw and veneer logs	154,831	57,096	97,736
House logs	2,093	608	1,485
Other products[a]	1,754	1,937	(183)
All products	**158,679**	**59,641**	**99,038**

[a] Other products include logs for pulpwood, posts and poles, cedar products, log furniture, and bioenergy.

Southern Idaho counties supplied 18 percent (11 MMBF) of Idaho's log flow to other States in 2019, with southwestern Idaho counties accounting for the majority (9 MMBF) of that volume, and northern Idaho counties being the source of the remaining 82 percent (49 MMBF). Across the three regions, the Southeast exported the largest proportion of timber harvested in region out of state (38 percent). Saw and veneer logs were the major component of timber harvest flowing into and out of Idaho. In 2019, Idaho sawmills and plywood/veneer mills imported 155 MMBF of saw and veneer logs accounting for 98 percent of the timber flowing into Idaho, while 57 MMBF of saw and veneer logs went out of state. The remainder of the timber received and shipped through inter-state transactions was for houselogs and all other products combined. In 2019, Idaho was a net exporter of timber for other products (183 MBF).

Movement Within Idaho

More than 94 percent (981 MMBF) of Idaho's 2019 timber harvest was processed within the State (table 7). Timber movement among Idaho's three regions is somewhat varied. For the North and Southwest resource areas, the majority of the timber harvested was processed within the resource area of harvest. The North retained 94 percent, the Southwest retained 52 percent, and the Southeast region retained 41 percent.

Table 7—Idaho timber flow by resource area, million board feet, Scribner 2019.

	Geographic source of timber					
Resource area	North Idaho	Southwest Idaho	Southeast Idaho	Total Idaho-harvested timber	Out-of-state harvested timber	Total timber received in Idaho
Destination						
North Idaho	875,553	38,666	680	914,899	153,810	1,068,709
Southwest	11,021	52,438	447	63,906	1,234	65,140
Southeast	441	—	2,211	2,652	3,635	6,287
Logs to other states	48,780	8,812	2,049	59,641	—	—
Total	**935,796**	**99,916**	**5,386**	**1,041,098**	**158,679**	**1,140,136**

— Less than 500 MBF (thousand board foot Scribner).

North Idaho

The 10 counties north of the Salmon River are the center of Idaho's timber harvesting and processing activities. The 2019 total harvest in these counties was about 936 MMBF, nearly 90 percent of the State's harvest. Almost 94 percent (875 MMBF) of the timber harvested in North Idaho was processed in North Idaho, while the remaining 6 percent (60 MMBF) was processed in another region or State. Just over 1 percent (11.4 MMBF) of timber harvested in the North was processed south of the Salmon River. Five percent of the resource area's harvest was shipped across State lines for processing.

Southwest Idaho

Just short of 100 MMBF of timber, 10 percent of the State's total harvest, was harvested in the 10 southwestern counties in 2019. More than 52 percent (52 MMBF) was processed in Southwest Idaho. North Idaho facilities processed 39 percent while Southeast Idaho, once again, received a negligible percentage of that resource area's timber. The proportion of the resource area's timber processed out of State declined from 24 percent in 2015 to 9 percent in 2019.

Southeast Idaho

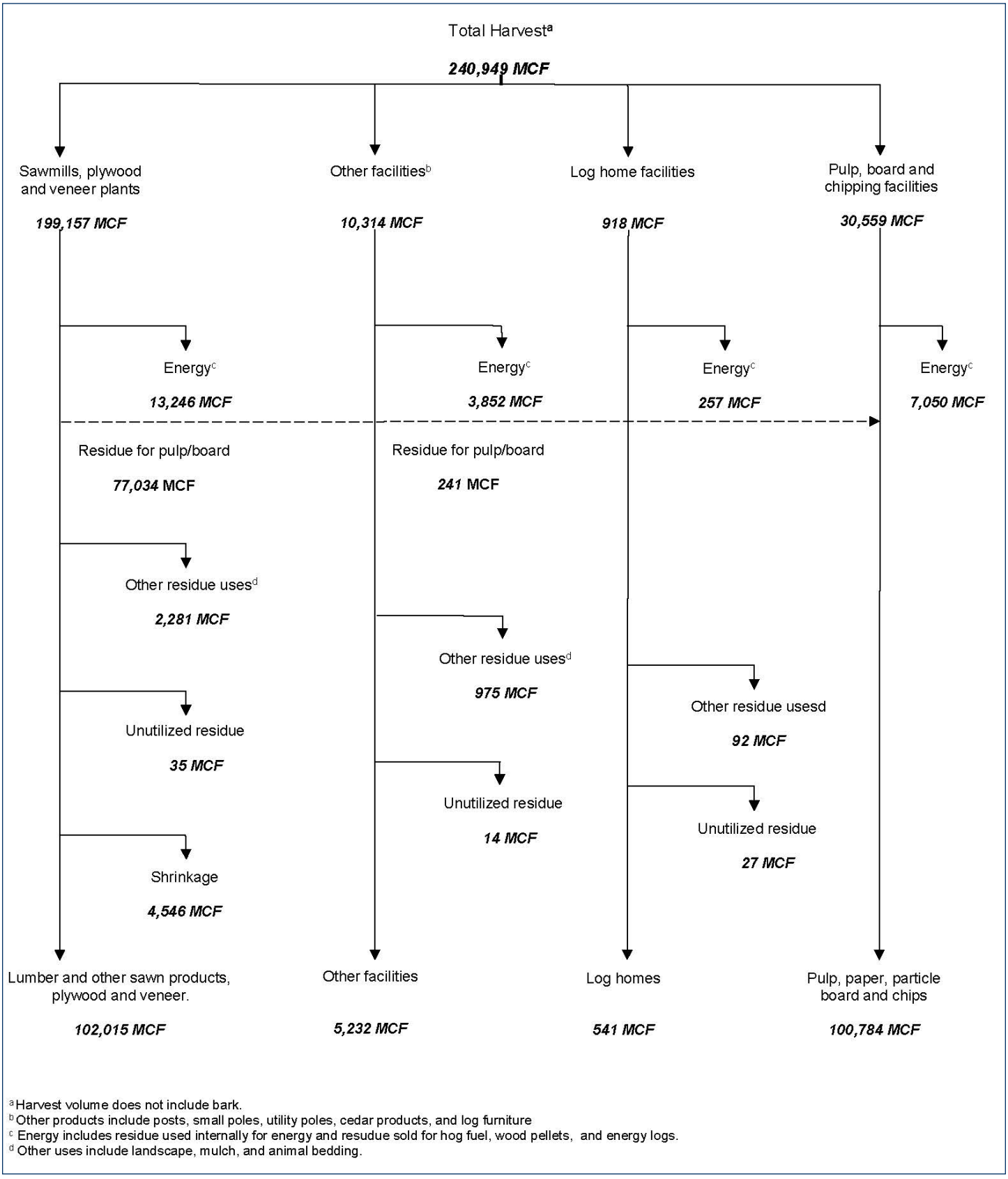
Southeast Idaho accounted for the smallest percentage of volume harvested in Idaho during 2019, only 5 MMBF, less than 1 percent of the State's timber harvest and 38 percent less (3 MMBF) than the 2015 timber harvest volume (8 MMBF). Approximately 69 percent was processed in Idaho (3.43 MMBF). Facilities within the resource area processed 2.2 MMBF (41 percent) compared to 1.5 MMBF (19 percent) in 2015. The magnitude of this change is in large part due to the decrease in the volume harvested and attendant proportion of the harvest that was shipped out of State for processing in 2019 compared to 2015. In 2015 out-of-state facilities received 6.2 MMBF, 76 percent of the Southeast Idaho timber harvest. North Idaho and Southeast Idaho received 13 and 8 percent of the resource areas timber harvest, respectively.

End Uses of Idaho's Timber

In this section, we trace the flow of Idaho's timber harvest through the State's primary manufacturing sectors. Because timber, wood products, and mill residuals are displayed together, volumes are presented in the common unit of cubic feet so that volumes can be compared across products. These figures refer to Idaho's timber harvest and include timber products shipped to out-of-state mills; they do not include timber harvested in other States and processed in Idaho. The following conversion factors were used to convert board foot Scribner volume to cubic foot volume:

- 4.77 board feet Scribner per cubic foot for saw and veneer logs
- 4.43 board feet per cubic foot for house logs
- 3.05 board feet per cubic foot for cedar logs
- 1.28 board feet per cubic foot for post and poles
- 4.17 board feet per cubic foot for utility poles
- 1.99 board feet per cubic foot for log furniture
- 2.05 board feet per cubic foot for pulpwood and all other timber products

During 2019, Idaho's timber harvest was approximately 240,949 thousand cubic feet (MCF), exclusive of bark (fig. 5). Of this volume, 199,157 (over 83 percent) MCF went to sawmills and plywood plants, 30,559 MCF (about 13 percent) to pulp/paper and roundwood chipping, 10,314 (4 percent) to other facilities (i.e. posts, small poles, utility poles, cedar products, and log furniture), and 918 MCF (less than 1 percent) to log home manufacturers.



[a] Harvest volume does not include bark.
[b] Other products include posts, small poles, utility poles, cedar products, and log furniture
[c] Energy includes residue used internally for energy and resudue sold for hog fuel, wood pellets, and energy logs.
[d] Other uses include landscape, mulch, and animal bedding.

Figure 5—Idaho's timber harvest and flow, 2019.

Of the 199,157 MCF of timber received by sawmills and plywood plants, 102,015 MCF (51 percent) was milled into finished lumber, other sawn products, or plywood and veneer products, and 4,546 MCF was lost to shrinkage. The remaining 92,596 MCF of wood fiber became mill residuals. About 77,034 MCF (83 percent) of sawmill residuals were used as raw material by pulp mills and board plants; 13,246 MCF (14 percent) was sold or used internally as hog fuel to generate energy and 2,281 MCF was used for other products like landscape products. Only 35 MCF of sawmill and plywood plant residuals went unused in 2019, accounting for 0.04 percent of the mill residuals and 0.02 percent of the log inputs indicating extremely high utilization of the timber resource.

Pulp/paper, roundwood chipping, and other residue-using plants, both in Idaho and in other States, received approximately 30,559 MCF of wood fiber from roundwood harvested in Idaho during 2019. Saw and veneer mills supplied an additional 77,034 MCF of mill residuals to pulp and board manufacturers, and other sectors supplied 241 MCF. Facilities in this sector received 1,078 MCF of the total wood fiber from the Idaho 2019 timber harvest. Mill residuals accounted for about 70 percent of the inputs for the sector.

Other facilities including cedar products, post, pole, utility pole, and log furniture manufacturers received 10,314 MCF (4 percent of the harvest) and produced 5,232 MCF in products. Log home manufacturers received 918 MCF, of which 541 MCF became house logs. Mills in this sector seldom supplied residuals as raw material for products in other sectors. Most of the residuals from these facilities was used as hog fuel, firewood, livestock bedding, and landscape/mulch products.

STRUCTURE OF IDAHO'S FOREST PRODUCTS INDUSTRY

Structure and Location

During 2019, timber-processing facilities operated in 24 of Idaho's 44 counties, while timber was harvested in 21 counties. Idaho's 10 northern counties contain the greatest concentration of the primary forest products industry (fig. 6), which includes plants that manufacture:

- Lumber and other sawn products
- Veneer/plywood
- Posts, utility poles, small poles, stakes, and roundwood furniture
- House logs and log homes
- Cedar products—shakes, shingles, and split rail fencing
- Other products including pulp and paper, particleboard, chips, decorative bark, wood fuel pellets, and energy from biomass

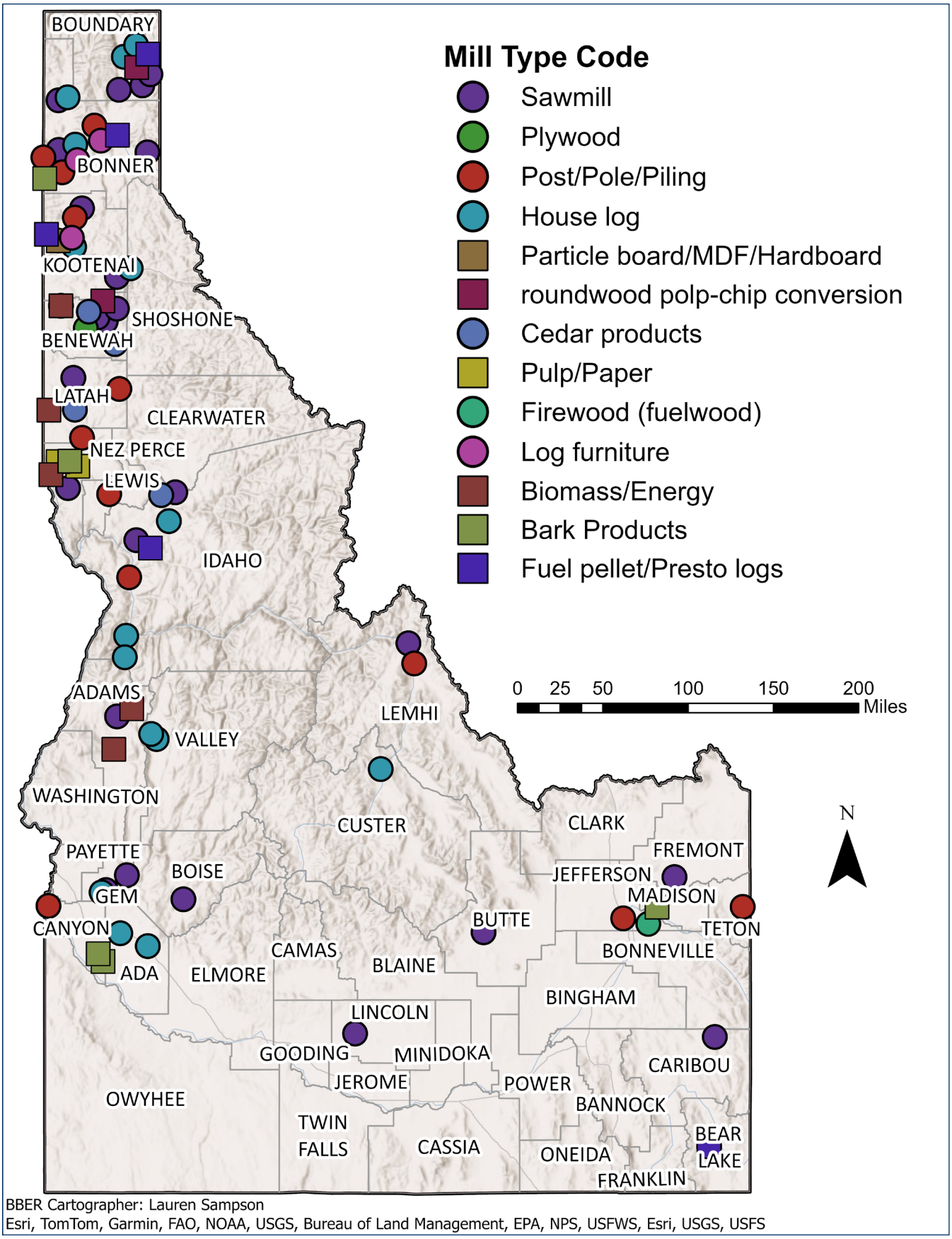


Figure 6—Location of Idaho's active primary forest products manufacturers, 2019.

The 2019 FIDACs mill census identified 73 active primary forest products plants (table 8), 15 fewer than in 20015. Every sector experienced temporary or permanent closures during the poor market conditions from 2007 to 2019. Many of the closures since 2015 were due to owners' retirements, while a few were due to mill purchases. The log home sector was the hardest hit during the Great Recession but has been making a comeback in recent years. Although the 2015 census identified two plywood veneer facilities operating in Idaho, one of these facilities was determined to be a secondary processor in 2019. Because there have been fewer than three plywood/veneer facilities operating in Idaho since 2006, mill level data for this sector have been combined with the sawmill analysis to prevent disclosure. A few large facilities have closed since the last study in 2015; these closures are addressed in more detail in the individual sector discussions. As well, discussions of trends in sales value will be discussed in the Sales, Employment, and Contribution section of this report.

Table 8a,b,c,d—Active Idaho primary wood products facilities by county and product, 2019 (a-c), with totals for selected past years (d) (sources: Keegan and others 1997; Morgan and others 2004; Brandt and others 2012; Simmons and others 2014; Simmons and others (in press)).

Table 8a—North Region Facilities.

County	Lumber	Veneer/ plywood	Post, poles, log furniture, and firewood	Log homes	Cedar products	Residue-related products[a]	All products
Benewah	4	1	—	—	2	1	8
Bonner	3	—	5	2	—	1	11
Boundary	3	—	—	1	—	2	6
Clearwater	1	—	1	3	—	1	6
Idaho	2	—	2	—	—	3	7
Kootenai	1	—	2	—	1	1	5
Latah	—	—	1	—	1	—	2
Lewis	1	—	—	—	—	4	5
Nez Perce	—	—	—	1	—	—	1
Shoshone	1	—	—	—	—	—	1
North region subtotal	**16**	**1**	**11**	7	**4**	**13**	**52**
2019 state total	**24**	**1**	**14**	**14**	**4**	**16**	**73**

[a] Residue-related products include particleboard, chips, pulp and paper products, bioenergy products, and decorative bark.

Table 8b—Southwest Region Facilities.

County	Lumber	Veneer/ plywood	Post, poles, log furniture, and firewood	Log homes	Cedar products	Residue-related products[a]	All products
Ada	—	—	—	2	—	1	3
Adams	1	—	—	—	—	—	1
Boise	1	—	—	—	—	—	1
Canyon	—	—	1	—	—	—	1
Gem	2	—	—	1	—	—	3
Payette	—	—	—	—	—	—	0
Valley	—	—	—	2	—	—	2
Southwest region subtotal	**4**	**0**	**1**	**5**	**0**	**1**	**11**
2019 state total	**24**	**1**	**14**	**14**	**4**	**16**	**73**

[a] Residue-related products include particleboard, chips, pulp and paper products, bioenergy products, and decorative bark.

Table 8c—Southeast Region Facilities.

County	Lumber	Veneer/ plywood	Post, poles, log furniture, and firewood	Log homes	Cedar products	Residue-related products[a]	All products
Bear Lake	1	—	—	—	—	1	2
Butte	1	—	—	—	—	—	1
Caribou	1	—	—	—	—	—	1
Custer	—	—	—	1	—	—	1
Fremont	1	—	—	—	—	—	1
Jefferson	—	—	—	1	—	—	1
Lemhi	—	—	1	—	—	—	1
Lincoln	—	—	—	—	—	—	0
Madison	—	—	—	—	—	1	1
Teton	—	—	1	—	—	—	1
Southeast region subtotal	**4**	**0**	**2**	**2**	**0**	**2**	**10**
2019 state total	**24**	**1**	**14**	**14**	**4**	**16**	**73**

[a] Residue-related products include particleboard, chips, pulp and paper products, bioenergy products, and decorative bark.

Table 8d—Past Selected Years Facilities.

Past years	Lumber	Veneer/ plywood	Post, poles, log furniture, and firewood	Log homes	Cedar products	Residue-related products[a]	All products
2015 Total	28	2	18	15	7	18	88
2011 Total	27	2	17	16	8	18	88
2006 Total[a]	38	3	21	26	8	18	114
2001 Total	35	4	22	21	10	17	109
1995 Total	62	6	32	32	15	15	162
1990 Total	80	6	27	22	26	11	172
1985 Total	90	7	26	20	25	6	174
1979 Total	133	8	35	15	44	7	242

[a] Revised.

Timber Received by Idaho Mills

Timber received refers to the volume of timber delivered to Idaho mills from in-state and out-of-state sources (table 9). Timber received by Idaho mills differ from the State's timber harvest because some timber harvested in Idaho was processed in other States, and some of the timber processed in Idaho was harvested outside the State. Timber inputs as percentages of total by ownership, species, and log product tend to closely mirror the same attributes as in the harvest data.

Table 9—Timber received by Idaho processors by ownership class and product, thousand board feet, Scribner, 2019.

Ownership class	Saw and veneer logs[a]	House logs	Other products[b]	All products
Private	**694,896**	**3,474**	**49,205**	**747,574**
Industrial	482,443	717	27,033	510,193
Nonindustrial private[c]	212,453	2,757	22,172	237,381
Public	**353,595**	**1,679**	**35,684**	**390,957**
National Forest	149,978	1,383	12,023	163,384
State	200,806	296	23,661	224,764
Other[d]	2,810	—	—	2,810
Canadian and unspecified[e]	**987**	**347**	**270**	**1,605**
All owners	**1,049,478**	**5,499**	**85,159**	**1,140,136**

[a] Saw and veneer logs combined to prevent disclosure.

[b] Other timber products include logs used for pulpwood, posts and poles, cedar products, utility poles, furniture logs, and bioenergy.

[c] Non-industrial private includes Tribal harvest.

[d] Other owners include Bureau of Land Management, other public lands, and unspecified in-state ownerships.

[e] Includes timber received from Canada and unspecified out-of-state sources.

— Less than 0.5 MBF.

Idaho mills received over 1,140 MMBF Scribner of timber for processing during 2019, a 2 percent (17 MBF) increase in timber volume from 2015. In 2019, 14 percent of the timber received in Idaho came from out-of-state compared to about 8 percent in 2015. Saw and veneer logs constituted the vast majority (92 percent) of Idaho's timber inputs, while logs used for other timber products, including cedar products, posts and poles, utility poles, log furniture, pulpwood, and industrial fuelwood, accounted for almost 8 percent of timber received in 2019. The remaining 5 MMBF (less than 1 percent) of timber received consisted of logs used for house logs by log home manufacturers.

Private lands supplied the majority of each timber product category in 2019. Industrial lands supplied 482 MMBF (46 percent) of saw and veneer logs, 27 MMBF (32 percent) of logs for other timber products, and 717 MBF (13 percent) of the volume used by house log manufacturers in 2019. Total timber received from nonindustrial private timberlands increased by 21 percent in 2019 compared to 2015 (237 MMBF from 196 MMBF) with saw and veneer logs accounting for the majority of the volume (89 percent). Houselog/log home facilities received half of the timber supplied to the other products category from nonindustrial timberlands (about 3 MMBF) in 2019.

National Forest timberlands provided 14 percent (163 MMBF) of all the timber received in Idaho during 2019, compared to 9 percent (103 MMBF) in 2015, an increase in National Forest timber volume delivered of nearly 58 percent. Timber processors in Idaho received nearly 20 percent (225 MMBF) of their volume from Idaho Department of Lands (IDL) timberlands in 2019, compared to 23 percent (260 MMBF) in 2015. Harvest volume from IDL timberlands delivered to Idaho facilities in 2019 declined by 20 percent for the other products category compared to 2015, the largest decline for any log product category. This decline was primarily due to a substantial decrease in volume received by post/pole and utility pole producers. The volume of timber received from Canada declined by 90 percent from 2015 (15 MMBF) to 2019 (1.6 MMBF).

Consistent with long-term trends, true firs, Douglas-fir, and western redcedar combined provided the largest percentage of timber received by Idaho timber processors in 2019, about 74 percent (838 MMBF). True firs were the leading species received by Idaho mills, accounting for nearly 37 percent of the timber received followed by Douglas-fir, which accounted for about 29 percent of Idaho's timber received (table 10). True firs accounted for the largest proportion of sawlogs and veneer logs, as well as other products, while lodgepole pine provided the largest proportion of house logs received.

Table 10—Timber received by Idaho processors by species and product, thousand board feet, Scribner 2019.

Species	Saw and veneer logs[a]	House logs	Other products[b]	All products
True firs	391,234	164	25,567	416,965
Douglas-fir	302,931	789	22,506	326,227
Western redcedar	77,415	149	17,367	94,932
Ponderosa pine	73,254	354	1,549	75,158
Western hemlock	65,853	—	248	66,101
Western larch	62,366	309	1,191	63,866
Lodgepole pine	37,581	3,492	16,712	57,784
Spruce	28,136	208	—	28,345
Western white pine	10,604	34	18	10,656
Other species[c]	103	—	—	103
All species	**1,049,478**	**5,499**	**85,159**	**1,140,136**

Totals may not not sum due to rounding.

[a] Saw and veneer logs combined to prevent disclosure.

[b] Other timber products include logs used for pulpwood, posts and poles, cedar products, utility poles, furniture logs, and bioenergy.

[c] Other species include: red alder, and other unknown species.

— Less than 0.5 MBF or 0.05 percent.

Sawmill and Plywood/Veneer Sector

Sawmills are the major component of Idaho's primary forest products industry in terms of sales value, number of facilities, and timber volume processed. In 2019, Idaho's 24 active sawmills (4 fewer than in 2015) processed the majority of the timber in the State and produced nearly 1.8 billion board feet of lumber and other sawn products, a 6 percent increase from 2015's 1.7 billion board feet. Idaho's 2019 production represented 5 percent of the total U.S. production of softwood lumber in 2019 (5.4 percent in 2015) and about 4 percent of the nation's softwood lumber consumption for the same year (4 percent in 2015) (WWPA 2020).

The most common species used by Idaho's sawmill sector are true firs and Douglas-fir, with smaller volumes of western redcedar, ponderosa pine, western hemlock, western larch, lodgepole pine, Engelmann spruce, and western white pine. High quality select grades and shop grades of lumber and fence boards are produced, as are small volumes of structural timbers. Approximately 87 percent of production was dimension and stud lumber used for construction.

Idaho Lumber Production

Milling timber into lumber has always been an important part of Idaho's forest products industry, with the greatest growth in lumber production occurring after the Second World War. By 1959, the volume of lumber produced in Idaho had nearly doubled from 950

MMBF lumber tally in 1947 to 1,788 MMBF (Setzer and Wilson 1970) (fig. 7). Idaho's lumber production increased and decreased in step with economic cycles primarily associated with single family housing trends and peaked in 1989 at 2,133 MMBF lumber tally. Lumber production fluctuated in response to timber availability, demand for lumber, changes in mill technology, and use of timber by other sectors over the next two decades reaching a high in 2005 of 2,026 MMBF.

At the depth of the Great Recession in 2009, lumber production had fallen to 1,105 MMBF, a 45 percent decline from the 2005 high and the lowest production since 1948. Lumber production began recovering in 2010 with a 14 percent increase from 1,105 to 1,258 MMBF lumber tally. More recently, lumber production had increased to 1,799 MMBF in 2019 and in response to the COVID-19 Pandemic building boom, has increased to just over 1,852 MMBF in 2020.

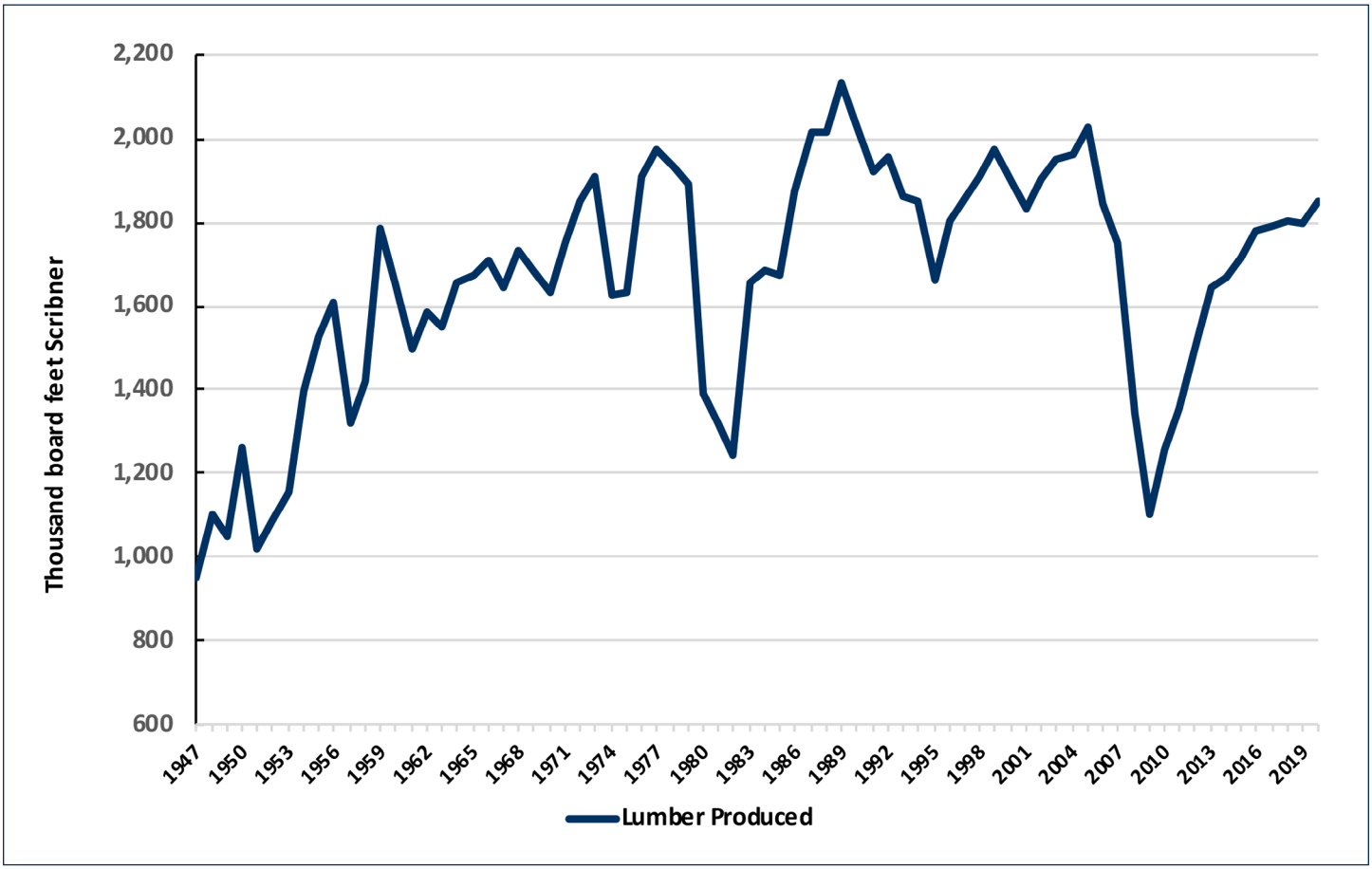


Figure 7—Idaho Lumber Production, 1947-2020 (Sources: Bureau of Business and Economic Research, The University of Montana-Missoula; USDA Forest Service Region One, Missoula, Montana; Western Wood Products Association).

Sawmill Lumber Recovery and Lumber Overrun

Product recovery ratios, or the volume of output per unit of input, are a measure of efficiency reported as lumber recovery factors (LRF) and lumber overrun (LO). The LRF is the lumber output in MBF lumber tally divided by the timber input in thousand cubic feet (MCF). Lumber overrun is the amount of lumber actually recovered in excess of the amount predicted by the log scale, expressed as a proportion of the log scale. Although LO is the most commonly

quoted measure of lumber recovery/efficiency, LO is a less accurate portrayal of efficiency in lumber output per unit of timber input primarily due to the Scribner log scale. The LRF better illustrates increased lumber output as a function of improvements in technology and sawing techniques (Keegan et al. 2010).

Both LO and LRF have shown substantial increases over the past 35 years as shown in figure 8, culminating in a 34 percent increase in LO and 42 percent increase LRF in 2019. The increase in Idaho lumber recovery and overrun since 1979 is due primarily to improved sawing technology, with LO also influenced by the characteristics of the Scribner log rule. The Scribner log rule underestimates the volume of lumber that can be recovered from a log, especially when milling small diameter trees, thus increasing calculated overrun (Keegan et al. 2012). In 2019, Idaho sawmills recovered an average of 1.90 board feet lumber tally per board foot Scribner of input, about 3 percent more than in 2015.

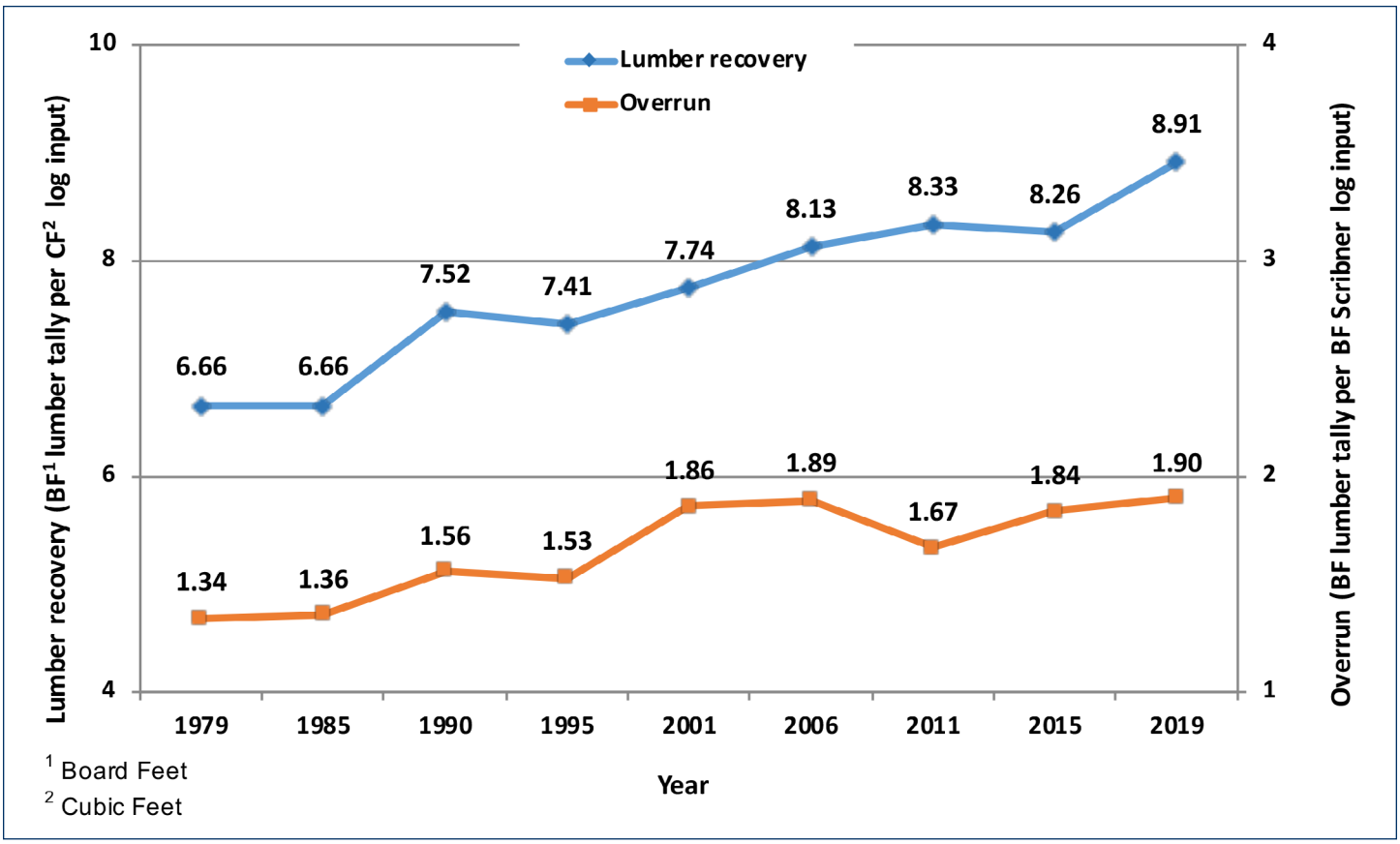


Figure 8—Idaho lumber recovery and Overrun select years (Source Keegan et al. 1982, 1988, 1992, 1997; Morgan et al 2004; Brandt et al. 2012; Simmons et al. 2014).

Number and Size of Sawmills

The number of sawmills operating in Idaho has continued to decline over the last four decades as production has become increasingly concentrated into a smaller number of large mills. In 1979 there were 133 sawmills in Idaho; the 2019 mill census identified 24 sawmills, 4 fewer than in 2015. Since 1979, the average output per mill has increased continually over time, to a level about fivefold and the number of sawmills operating has declined from 133 to 24. At nearly 75 MMBF, the average output per mill in 2019 (table 11) increased by over 25

percent compared to 2015. Several factors have an influence on sawmill outputs year to year, i.e., demand for lumber, price of lumber, access to markets, availability, and cost of logs, to name a few. In recent years some mills have reported that labor supply issues have had an effect on their ability to operate at higher output capacity.

Table 11—Active Idaho sawmills, lumber production capacity, lumber production, and capacity utilization by size class, 2019.

	Annual capacity				Annual production			
Production capacity size class	**Number of mills**	**Capacity MBF[a]**	**Percentage of total capacity**	**Average mill capacity by size class**	**Production MBF[a]**	**Percentage of total production**	**Average mill production by size class**	**Percentage of capacity utilization**
150+ MMBF[b]	6	1,371,120	63	228,520	1,220,623	68	203,437	89
50 to 150 MMBF	8	775,840	36	96,980	566,023	32	70,753	73
1 to 50 MMBF	5	12,200	1	2,440	8,831	—	1,766	72
Less than 1 MMBF	5	980	—	196	761	—	152	78
Total	**24**	**2,160,140**	**100**	**90,006**	**1,796,238**	**100**	**74,843**	**83**

[a] MBF = Thousand board feet lumber tally.

[b] MMBF = Million board feet lumber tally.

— Less than 0.5 percent.

Increases in production capacity tend to be the product of equipment upgrades or improvement in workflow processes. Idaho sawmills with a production capacity of over 150 MMBF annually accounted for 63 percent of Idaho's lumber production capacity, accounted for 68 percent of the lumber production, and utilized 89 percent of their lumber production capacity in 2019. Mills in the 50 to 150 MMBF production size class accounted for nearly 36 percent of the production capacity in 2019. Midsized sawmills have had the most attrition in the last four decades (fig. 9). The loss of several large and medium sized processors prior to 2006 was the result of declining harvest on National Forest lands (Brandt et al. 2012). Closures since 2006 have been primarily due to economic conditions created by the Great Recession and U.S. home building collapse (Keegan et al. 2012). The 2019 mill census identified 14 mills producing more than 50 MMBF annually, down from 16 in 2015 and the fewest in the last 50 years. In 2019 these mills operated, on average, at 83 percent of their stated production capacities, compared to 69 percent in 2015. Between 2015 and 2019, two large-capacity mills closed, citing timber availability as the primary reason (Simmons et al., in press), while several smaller mills closed due to owners' retirements.

The size classes in figure 9 differ from those used in table 11 due to changes in allocation between facility sizes; however, the figure provides insight regarding changes in the

structure of the industry in Idaho. Over time, the number of mid-sized (lumber production 10 to 50 MMBF lumber tally annually) mills have essentially vanished. As some firms have concentrated on making upgrades to production capacity, the competition for limited timber supplies in overlapping supply chains has led to fewer but larger mills. Lower-capacity mills tend to be mills that produce specialty products and are not engaged in the lumber commodity market. Most of the remaining true large-log sawmills fit into this category and produce primarily a mix of rough-cut lumber and larger timber products.

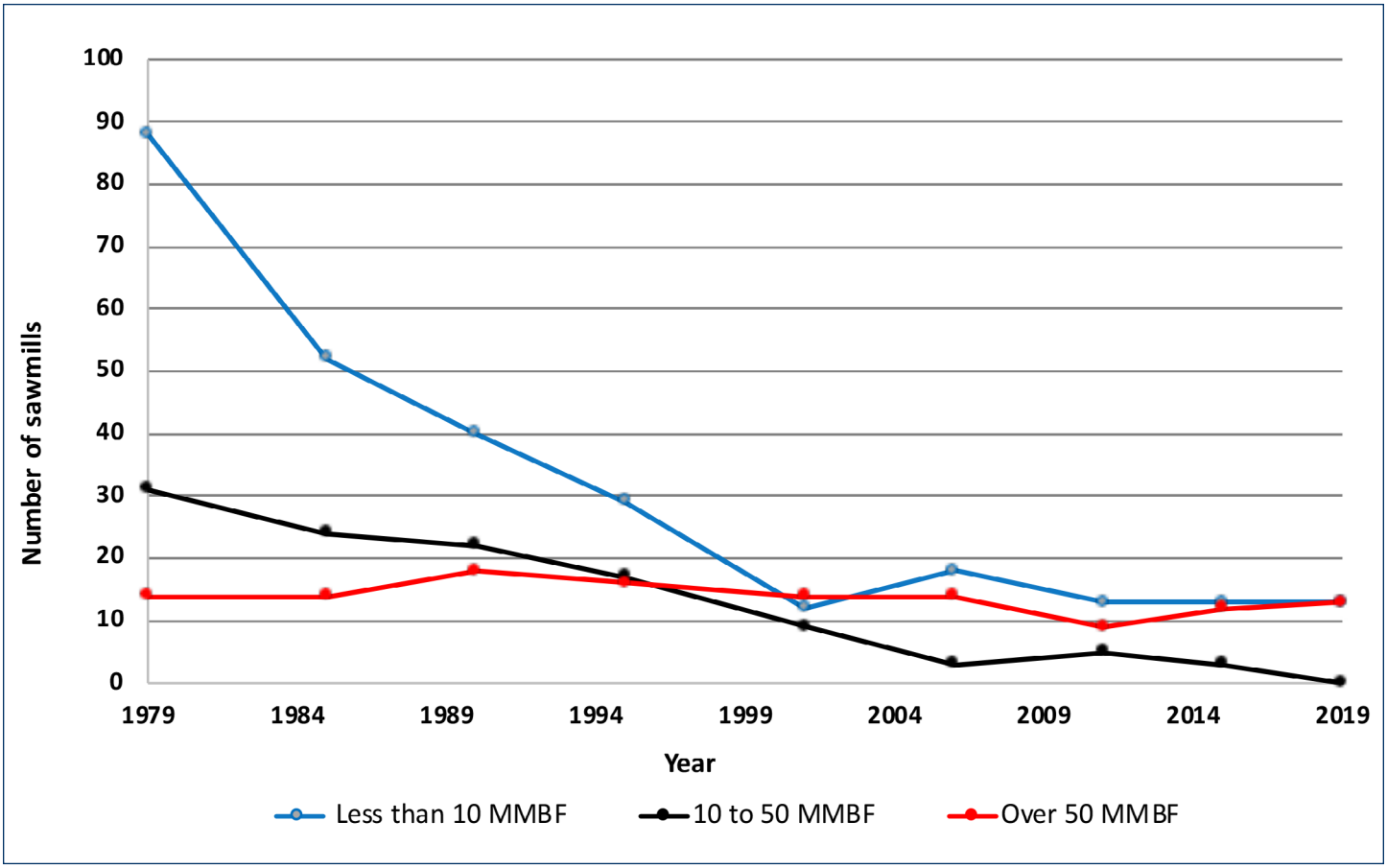


Figure 9—Number of Idaho sawmills by annual lumber production, selected years.

Plywood and Veneer Mills

In 1979, 8 plants producing structural panels or veneer were operating in Idaho, producing between 500 and 600 million square feet (MMSF) annually. In 1984 an oriented strand board (OSB) plant was added to the remaining plywood veneer facilities, making six total facilities in the sector for that year's census. In the late 1990s, the structural panel sector began a period of significant decline. The OSB plant closed in 1997, and a plywood plant closed in 2000, reducing the number of active structural panel plants operating in Idaho to four. Another plywood plant closed in 2001. The closures since 1995 were due primarily to reduced timber availability, as well as increased competition from OSB and plywood producers elsewhere in North America and abroad (Brandt et al. 2012). Since the 2006 mill census, the plywood and veneer sector's production, sales, and timber received have been combined with the sawmill sector to prevent firm-level disclosures. In 2011, 2015, and during 2019, one plywood/veneer

facility operated as a primary wood products facility in Idaho. With the sale and subsequent dismantling of the Idaho veneer plant in 2020, which was operating as a secondary product facility in 2019, there remains only one plywood veneer producer in Idaho (Weeks 2020). As demand for veneer logs diminished over time, the timber that may have been used to produce plywood/veneer has helped sustain lumber production in Idaho (Brandt et al. 2012).

Residue-Related Products Sector

In addition to products such as lumber and plywood, the processing of timber generates substantial volumes of wood fiber by-products. These by-products, referred to as mill residuals, are the raw material source for the residue-related products sector. The 2019 mill census identified a total of 16 facilities in this sector, 2 fewer than in 2015. The residue-related products sector included one pulp and paperboard plant, one consumer tissue products plant, one particleboard plant, five wood fuel pellet producers, two facilities generating steam or electricity, two whole-log chipping facilities, and four facilities producing bark-related products such as decorative landscaping material. In 2019 these 16 facilities combined used 3.1 million dry tons (2.6 million bone-dry units) of material from all sources to produce products or use as hog fuel.

Facilities in this sector received nearly 45 percent of the wood fiber from Idaho's 2019 timber harvest, of which 71 percent came from mill residuals, primarily sawmill residuals. The majority of the remaining raw material for this sector was in the form of "clean chips" from raw logs. Historically, as well as in 2019, pulp, paper, and board plants were the largest users of mill residuals in Idaho.

A few Idaho firms operate plants producing energy from the burning of wood residuals. Most of these plants are associated with sawmills and historically produced steam energy for in-house use. Some of these plants began to produce electricity for sale to outside markets in the early 1980s (co-generation systems). During 2019, two of these facilities operated using chipped roundwood or sawmill residuals. The largest biomass to energy plant in Idaho is located at the University of Idaho and supplies the entire campus with steam heat.

Other Primary Manufacturers

Over the last decade, covering the most recent three BBER industry analyses, the number of facilities or firms operating in some of the smaller primary wood products sectors have contracted. Because of this, sectors have been combined to prevent potential disclosures of firm-level data. In 2019, 32 (down from 40 in 2015) other primary manufacturers were identified that process timber into cedar products, utility poles, posts, and other small roundwood products such as corral poles, tree stakes, and round wood log furniture. These facilities processed nearly 8 percent (90.6 MMBF) of the timber received by Idaho facilities during 2019, compared to 10 percent (114 MMBF) in 2015. As some of these facilities use timber of sawlog size, strong demand from sawmills due to favorable lumber markets may have influenced timber availability for these facilities.

Log Homes/House Logs

The log home industry was impacted by the Great Recession more severely than any other primary sector as log home sales have been primarily for high-end recreation properties and custom second homes, markets that contracted during this period (Morgan et al. 2011.)

During 2019, there were 14 active log home facilities, 12 fewer than prerecession 2006 and 1 fewer than in 2015. Timber received for house logs rebounded from 1.8 MMBF in 2011 to 2.1 MMBF in 2015 and 5.5 MMBF in 2019. Production of house logs increased from 547 thousand lineal feet (MLF) in 2011 to 765 MLF in 2015 and 1,827 MLF in 2019. While the log home industry accounts for only a small fraction of Idaho's primary wood products industry, these facilities are labor intensive and add a great deal of value to the log with relatively low capital investment.

Timber-Processing Capacity

This section examines production capacity and estimates the timber-processing capacity and the proportion of that capacity utilized by Idaho's primary forest products manufacturers in 2019. The analysis focuses on plants processing sawtimber—sawmills, plywood and veneer plants, house log plants, and utility pole plants. Capacity and utilization for the nonsawtimber processing manufacturers are discussed in less detail.

Mills were asked to specify production capacity, the volume of finished product the facility is capable of producing, both per 8-hour shift and annually, given sufficient supplies of raw materials and firm market demand for products. Most of the larger mills estimated annual capacity based on two 8- or 10-hour shifts daily for 220 to 260 operating days per year. A few facilities estimated annual capacity at 24 hours per day for 220 to 250 days. Smaller mills reported annual capacity at one shift per day for 250 or less operating days per year.

Sawtimber processors reported production capacity in a variety of units. Sawmills reported production capacity in thousand board feet, lumber tally, while plywood capacity was reported in thousand square feet on a 3/8-inch basis. Utility pole production capacity was reported in numbers of pieces of a given size, and house log capacity in lineal feet. To combine the production capacity figures from different sectors and estimate the industry's total capacity to process sawtimber, production capacity was converted to units of timber input (MMBF Scribner) on a mill-by-mill basis, using each facility's product recovery factor.

Timber-processing capacity for sawmills was calculated by dividing lumber production capacity by each mill's lumber recovery. Plywood and veneer capacity figures were converted to MMBF Scribner by dividing production capacity in square feet by each mill's plywood recovery. Utility pole and house log capacities were adjusted to MMBF Scribner by multiplying capacity in the given finished product unit by an average Scribner board foot volume per piece or per lineal foot.

Sawtimber processors in Idaho include sawmills and producers of plywood/veneer, house logs/log home, and utility poles. Estimates of mill capacities to process timber and the utilization of total capacity since 1979 are based on complete forest products industry censuses of Idaho's industry. Idaho's sawtimber processing capacity has declined by 38

percent since 1979 (fig. 10), with most of the decline occurring after 1990 (fig. 8). In 2003, several mill closures reduced capacity to less than 1,150 MMBF. The 2006 study found that capacity to process timber actually increased from 2001. Idaho's sawtimber processing capacity in 2011 was 1,287 MMBF, down 4 percent (55 MMBF) from 2006 (1,342 MMBF). Sawtimber processing capacity in Idaho during 2015 was 1,416 MMBF, a 7 percent increase from 2011, and capacity utilization was 67 percent. However, capacity had declined to 1,221 MMBF by 2019 and capacity utilization was close to 81 percent. For all census years, the vast majority of the sawtimber processing capacity resided with sawmills.

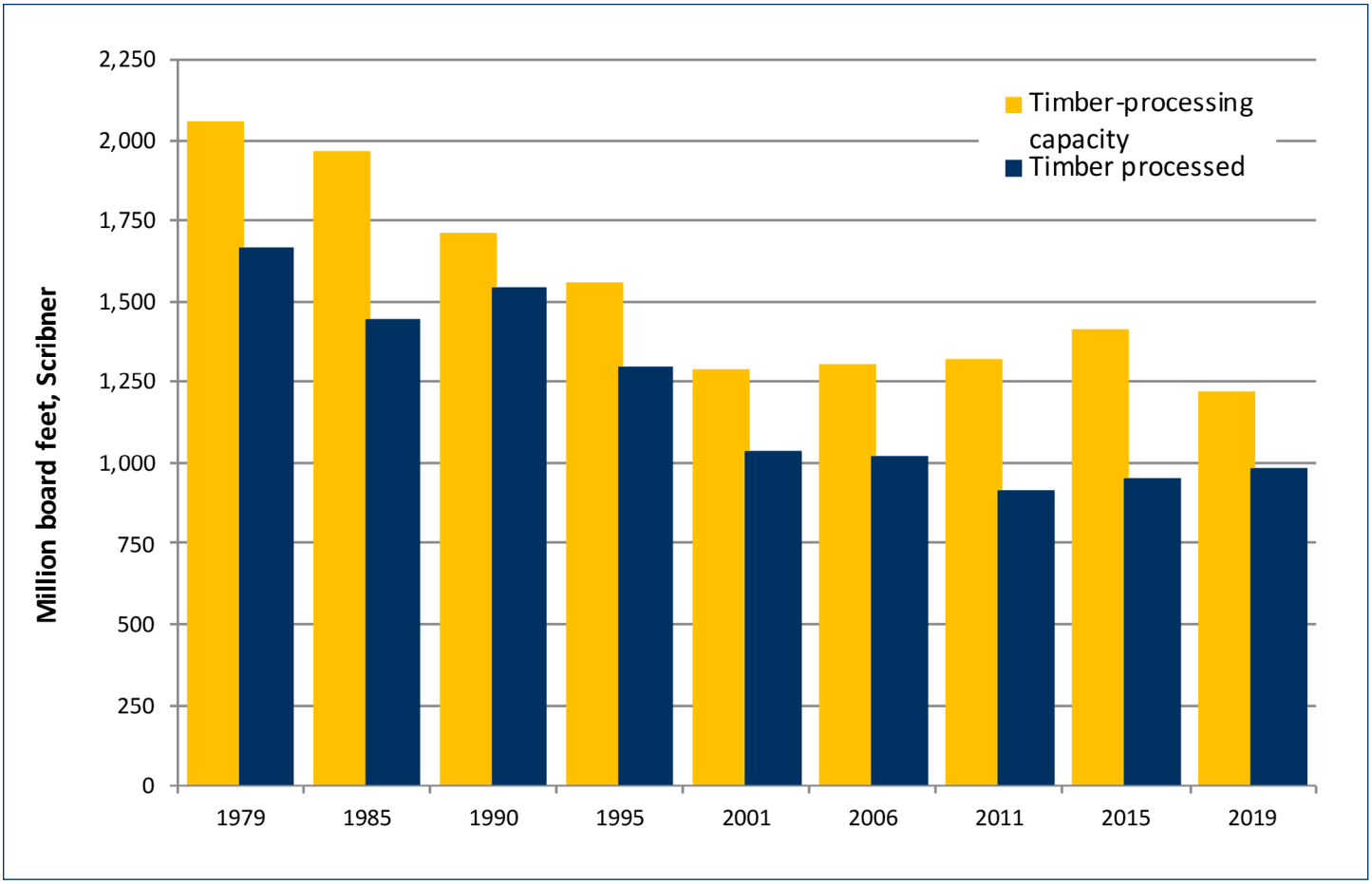


Figure 10—Idaho sawtimber processing capacity and sawtimber processed, select years.

In 2019, an additional 76 MMBF of Scribner log volume in timber-processing capacity could be found in other products sectors. Other sectors typically use timber smaller than sawtimber size, with the exception of cedar products facilities which may use large cedar logs with a high percentage of defect/cull. Capacity utilization for the other sectors in 2019 was 34 percent.

Sawmill Timber-Processing Capacity

Over time, the number of sawmills in Idaho has declined, from 141 in 1979 to 28 in 2019 (fig. 11). Timber-processing capacity estimates include "idled" capacity that existed at facilities that may have been inactive during a census year, creating a disparity among mill counts for timber-processing capacity and active mills. When timber harvests were nearly 2 MMBF and average capacities to process timber were 14 MMBF per mill, more sawmills could be

sustained by the available timber supply. As timber harvests declined substantially between 1990 and 2001 (40 percent), timber-processing capacity became concentrated in fewer larger mills. Between 1979 and 2001, the number of active sawmills declined by 73 percent statewide—63 percent in North Idaho and 90 percent in South Idaho. Timber-processing capacity for the same period declined by 62 percent while the average timber-processing capacity per mill increased from 14 MMBF to 32 MMBF, a 129 percent increase.

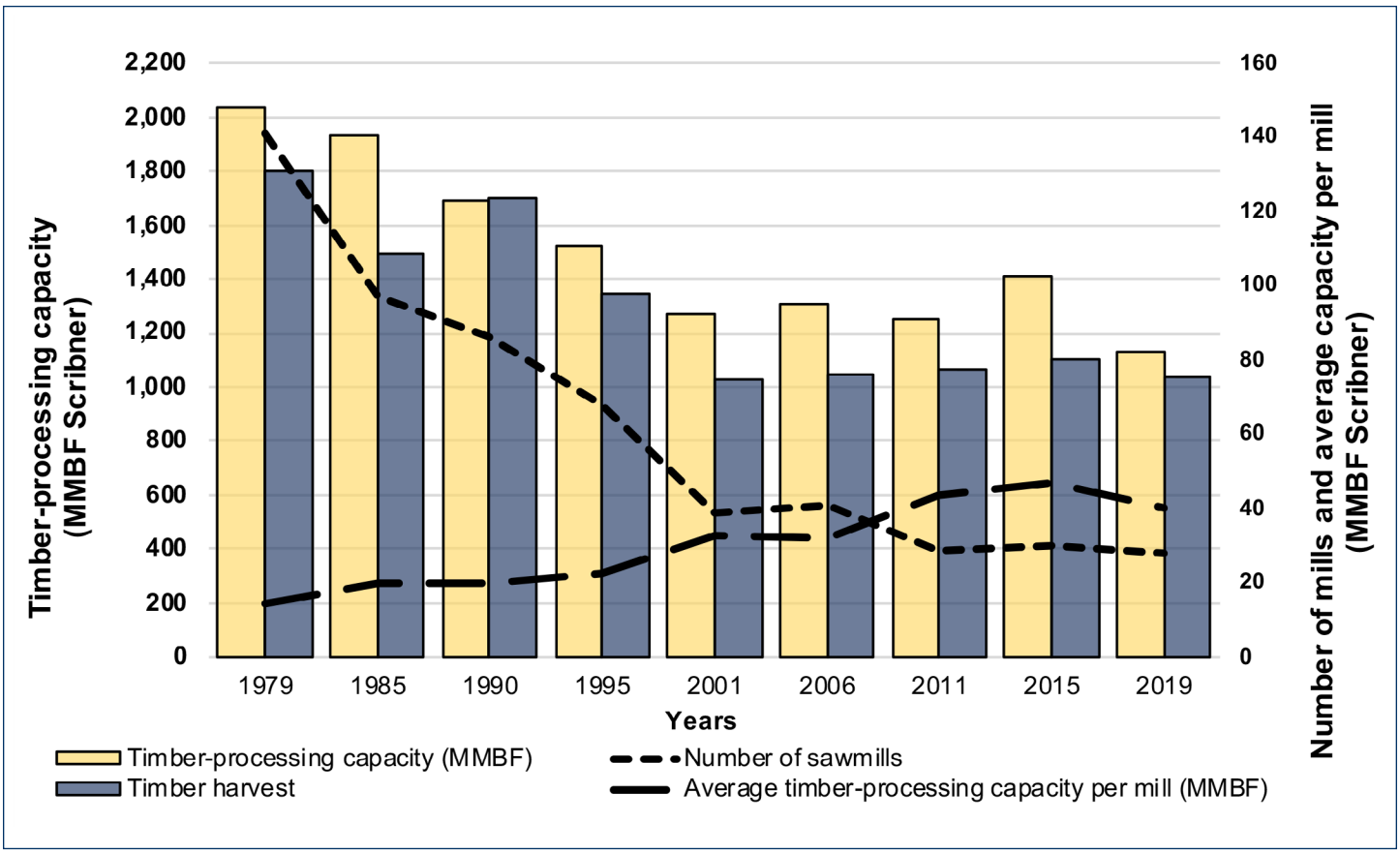


Figure 11—Declining sawmill infrastructure and effects on timber processing capacity in Idaho, select years.

Between 1985 and 2001, many sawmills were closed due to declining timber supplies (Brandt et al. 2012). Beginning in the new century, some mills made large capital investments in upgrading old equipment with newer, more efficient technology (Simmons 2014). Other mills were closed as a result of mergers, purchases, and lack of ability or desire to make infrastructure upgrades. By 2019, timber-processing capacity at sawmills was 1.1 BBF Scribner and capacity utilization was 84 percent, representing over 181 MMBF of unused timber-processing capacity at sawmills. Since lumber overrun/recovery directly affects calculated timber-processing capacity, the estimated volume of timber that can be processed is somewhat static over time. It is likely that some Idaho firms have already or will continue to upgrade milling equipment, which could increase timber-processing capacity further.

MILL RESIDUALS: TYPES, QUALITY, AND USE

Wood fiber residuals from primary wood products manufacturers (mill residue) is the major source of raw material for Idaho's pulp and paper and board industry, and an important source of fuel for all major sectors of the wood products industry. If not used, wood residuals can create difficult and expensive disposal problems. Sawmills and plywood plants consistently generate over 90 percent of the mill residuals produced by Idaho's forest products industry.

Idaho Sawmill/Veneer Residuals

Three general types of wood fiber residuals are generated by Idaho's primary wood products manufacturers: coarse, fine, and bark. The largest pieces are coarse (or chippable) residuals consisting of slabs, edgings, and trimmings from lumber manufacturing; log ends; pieces of veneer not suitable for manufacturing plywood; and plywood plant peeler cores not sawn into lumber. Coarse residuals is the majority of the volume generated by timber processors. Fine residuals consist of planer shavings and sawdust primarily from sawmills and plywood plants, and finally bark removed from logs for processing (table 12).

Table 12—Production and disposition of wood residuals from Idaho primary wood products facilities, bone dry units[a], 2019.

Type of residue	Total utilized	Reconstituted products	Hogfuel and energy fuel	Other uses[b]	Unutilized	Total
Sawmills Plywood/veneer						
Coarse	691,670	627,757	63,913	—	372	692,042
Sawdust	219,605	164,605	54,424	576	11	219,616
Planer shavings	112,940	60,846	27,316	24,778	8	112,948
Bark	314,889	—	304,545	10,344	231	315,120
Total	**1,339,104**	**853,208**	**450,198**	**35,698**	**622**	**1,339,726**
All other facilities	89,494	—	74,341	15,153	3,632	93,126
Grand total	**1,428,598**	**853,208**	**524,539**	**50,851**	**4,254**	**1,432,852**

[a] Bone dry unit (bdu) = 2,400 pounds of oven-dry wood.

[b] Other uses primarily include animal bedding and landscape material.

— Less than 500 bdu.

Respondents to the 2019 survey provided information on volume of residuals generated, its sales value, and its uses. Residuals volumes were reported in bone-dry units (BDU). A bone-dry unit equals 2,400 pounds of wood, oven-dry weight. In addition to residuals quantity and disposition, statewide residue factors, which quantify the number of BDUs of residuals generated per MBF of lumber produced, were updated for Idaho sawmills based on the 2019

mill census. In Idaho during 2019, primary wood products facilities generated 1,433 thousand BDU of mill residuals, compared to 1,595 thousand BDU in 2015.

Idaho sawmills and plywood plants generated an estimated 1,340 thousand BDU (1,608 bone-dry tons) of manufacturing residuals in 2019, mostly as "clean" chips. Coarse residuals constituted the largest share of residuals in 2019, with mills in these sectors producing 692 thousand BDU with nearly 100 percent utilized. Pulp and paper mills in Idaho and other States received nearly 628 thousand BDU (90 percent), with 64 thousand BDU going to other uses, primarily internal energy use. Less than 1 thousand BDU (0.05 percent) of coarse residuals were unused in 2019.

Of the 332 thousand BDU of fine residuals used (sawdust and planer shavings combined), nearly 68 percent (225 thousand BDU) went to pulp and paper mills or board plants for use as raw material for products, over 81 thousand BDU were consumed as fuel, and 25 thousand BDU went for other uses such as animal bedding, mulch, and raw material for other products.

Residuals From Other Manufacturers

The manufacture of utility poles, house logs, cedar products, posts, small poles, roundwood chips, and roundwood furniture generates several types of residuals, including bark, shavings and peelings, log ends, cull portions of logs, and slabs from log home manufacturers. In 2019, 93 thousand BDU of these residuals were produced, with 96 percent of this volume being utilized. Uses of these residuals included livestock bedding, garden mulch, firewood, or other fuel. The majority of the utilized volume (83 percent) was used for energy/heat, a large portion of which was in the form of firewood.

Sawmill Residue Factors

Sawmills in Idaho process the largest proportion of the timber received by facilities annually and produce the greatest quantities of mill residue. Sawmill residue factors provide an excellent snapshot of how efficiently this timber is utilized (table 13). Although several variables can affect the production of a specific type of residue (i.e., log size, log quality, tree species, lumber versus pulp chips markets), long-term reductions in residue per unit of product volume have resulted from improved milling technologies, garnering greater overrun/recovery and producing less residuals. In 2015, Idaho produced 1,717 MMBF (WWPA 2020) of lumber and generated 0.81 BDU of all residuals combined per MBF of lumber produced. In 2019, Idaho produced 1,799 MMBF of lumber (a 5 percent increase) and generated 0.69 BDU per MBF of lumber—a 15 percent decrease in residuals per unit of lumber compared to 2015. As lumber recovery and overrun have generally increased over time, sawmill residue factors help demonstrate how, given a volume of suitable logs, more lumber may be produced as a result of less residuals being generated per unit of product output.

Table 13—Idaho sawmill residue factors, BDU per MBF lumber tally[a], selected years (source: Keegan and others 1982, 1988, 1992, 1997; Morgan and others 2004; Brandt and others 2012; Simmons and others 2014, Simmons and others (in press)).

Type of residue	1985	1990	1995	2001	2006	2011	2015	2019
Coarse	0.53	0.43	0.45	0.42	0.39	0.39	0.41	0.36
Sawdust	0.21	0.18	0.18	0.17	0.15	0.15	0.13	0.12
Planer shavings	0.20	0.15	0.15	0.13	0.09	0.08	0.09	0.06
Bark	0.19	0.18	0.18	0.20	0.20	0.24	0.17	0.15
Total	**1.13**	**0.94**	**0.96**	**0.92**	**0.83**	**0.86**	**0.81**	**0.69**

[a] Bone dry unit (BDU = 2,400 lb of oven-dry wood) of residue generated for every 1,000 board feet of lumber manufactured.

SALES, EMPLOYMENT, AND CONTRIBUTION TO THE STATE'S ECONOMY

In this section, the sales values and economic contributions of Idaho's primary wood products industry to the State's economy will be examined. All comparisons to previous years' monetary values have been inflation-adjusted to 2019 dollars.

Idaho's Primary Product Sales

The periodic wood products industry censuses for Idaho have been produced since 1979 and provide the most complete estimates of sales values for Idaho's primary forest products industry. All sales are reported free on board (f.o.b.) the producing mill. Sales by Idaho's primary forest products industry totaled $1.8 billion in 2019, a real increase of nearly $36 million (2 percent) from 2015 and $231 million (15 percent) since 2011 (table 14).

Table 14—Sales value of Idaho's primary wood products including mill residue and residue-related products, million 2019 dollars, selected years (sources:Keegan and others 1982, 1988, 1992, 1997; Morgan and others 2004; Brandt and others 2012; Simmons and others 2014, Simmons and others (in press)).

Product	1979	1985	1990	1995	2001	2006	2011	2015	2019
Lumber, timbers, other sawn products	1,622	911	989	1,124	966	978	580	804	886
Residue-related products[a]	782	823	1,015	1,085	1,142	961	894	843	887
Plywood and veneer	275	172	191	271	98	[b]	[b]	[b]	[b]
Cedar products	42	17	26	22	43	42	60	75	[c]
Posts, poles, and log furnitiure	53	27	48	41	31	41	44	49	34
House logs and log homes	25	7	19	33	36	47	9	10	10
All products	**2,799**	**1,957**	**2,288**	**2,576**	**2,316**	**2,070**	**1,586**	**1,781**	**1,817**

[a] Residue-related products include particleboard, chips, pulp and paper products, bioenergy products, decorative bark, and mill residues.

[b] Plywood and veneer sales included with lumber to prevent disclosure.

[c] Cedar products combined with post, poles, and log furniture in 2019 to prevent disclosure.

About 98 percent of primary wood products sales were concentrated in three sectors of the industry: sawmills, structural panels (plywood and veneer), and residue-related products. Residue-related products include particleboard, chips, pulp and paper products, bioenergy products, decorative bark, and mill residuals. All sales values for residue-related products include mill residuals sold to users within Idaho as well as outside the State.

Sales values during periodic census years for lumber from Idaho sawmills were highest in 1979 at $1.6 billion (in 2019 dollars) and sales of all primary products totaled $2.8 billion. Since 1979 sales have generally declined overall, primarily due to lower unit prices (adjusted for inflation), timber availability and loss of milling infrastructure, and thus production capacity. To prevent disclosure of firm-level information, sales data for lumber and other sawn products were combined with plywood and veneer sales in 2006. As a result of the Great Recession, the lumber sales value of $580 million in 2011 was the lowest of any census year. Since the low point in 2011, lumber/plywood sales values have rebounded with the recovery in the housing market to $886 million in 2019, still lower than the prerecession average for the census years of about $1 billion.

Sales values for the residue-related products sector have tracked closely with lumber except in years where homebuilding was in a boom cycle (1979, 1985, and 2006), where lumber sales outpaced sales of residue-related products. Sales values between lumber and residue-related product sectors also tend to depart from one another during recessions, when lumber sales contract while residue-related products sales values surpass lumber, most notably in 2011 when residue-related products sales values were 54 percent higher than lumber sales values.

Raw material supplies for residue-related products, particularly for pulp, paper, and board producers are closely associated with residuals from sawmills. However, demand for finished products is not necessarily aligned with single family construction trends and producers will extend supply chains for clean chips, or may chip roundwood for their use when lumber production is constrained. Total sales for residue-related products in 2019 were $887 million, 5 percent higher than 2015 and close to 1 percent lower than in 2011. In 2019 sales values for lumber and residue-related products were virtually the same.

Total sales for all products other than lumber, plywood/veneer, and residue-related products comprise a fraction of the total sales in a given census year: 2 percent ($44 million) in 2019. Many of these facilities are located in rural areas, away from where large sawmills operate, providing employment and other economic benefits to their local communities.

Sales values for post, small poles, utility poles, cedar products, and log furniture were $34 million in 2019. The substantial decline in sales values for these facilities between 2015 and 2019 is primarily due to the reclassification and closure of firms. For the firms that remain in this subset and were active in 2015, sales values declined by 25 percent.

Log home and house log sales values peaked just prior to the Great Recession in 2006 ($47 million in 2019 dollars). The 2011 census revealed a sector in collapse, where sales values had fallen from the 2006 high to just under $9 million, an 81 percent decrease, and the lowest since 1985 ($7 million). Activity in the sector rebounded some in 2015 with $10 million in sales values, which was maintained in 2019.

Markets for Primary Wood Products

This section examines the markets for Idaho's primary forest products, excluding mill residuals and residue-related products. Respondent mills summarized their 2019 shipments of finished wood products, providing information on volume, sales value, and geographic destination (fig. 12). Mills usually distributed their products through their own distribution channels or through independent wholesalers and selling agents. Because of subsequent wholesaling transactions, the geographic destination reported may not precisely reflect final delivery points of shipments. All sales values comparisons are in 2019 U.S. dollars.

Figure 12—Destinations for Idaho's primary wood products.

Idaho's primary wood products sales in 2019, excluding mill residuals and sales by the residue-utilizing sector, were over $929 million, about 1 percent less than in 2015 (table 15). The major market areas for Idaho's primary wood products in 2019 remained in the other Rocky Mountain States ($314 million, or 34 percent), followed by the North Central States ($172 million, or 18 percent) and the South ($150 million, or 16 percent). A total of $87 million worth, or 9 percent, of Idaho's primary forest products were sold within the State. The 2019 value of sales by region compared to 2015 increased by 60 percent for the Northeast, 31 percent for the other Rocky Mountain States, and 28 percent for the South. Sales within Idaho in 2019 declined by 53 percent, representing a decrease in percent of total sales from 20 percent to 9 percent, the smallest percent of total sales for any census.

Table 15a,b—Destination and value of Idaho's 2019 primary wood products sales[a] (a), and totals for select years (b), 2019 dollars (Sources: Keegan and others 1982, 1988, 1992, 1997; Morgan and others 2004; Brandt and others 2012; Simmons and others 2014, Simmons and others (in press)).

Table 15a—2019 Product Sales.

Product	Idaho	Rocky Mountain	Far West	North-Central	Northeast	South	Other countries	Total
Lumber, timbers, other sawn products, plywood and veneer[b]	$72,536	$304,619	$106,653	$169,008	$80,556	$148,572	$3,948	$885,891
Posts, poles, cedar products, and log furniture	$10,814	$5,262	$11,149	$2,251	$1,901	$1,602	$710	$33,689
House logs and log homes	$4,085	$4,117	$895	$566	$332	$205	$0	$10,200
2019 All products total	**$87,435**	**$313,998**	**$118,697**	**$171,825**	**$82,789**	**$150,379**	**$4,658**	**$929,781**

[a] Does not include mill residue sales or sales by the residue-utilizing sector.

[b] Lumber, timbers, and other sawn products includes plywood and veneer sales value to prevent disclosure.

Table 15b—Past Selected Years Total Sales.

Product	Idaho	Rocky Mountain	Far West	North-Central	Northeast	South	Other countries	Total
2015 Total	$187,344	$240,445	$132,156	$199,997	$51,866	$117,597	$8,585	$937,991
2011 Total	$70,552	$153,022	$130,912	$178,216	$49,927	$90,248	$19,252	$692,131
2006 Total	$147,879	$293,984	$227,783	$250,521	$72,003	$80,102	$13,457	$1,085,729
2001 Total	$167,246	$269,270	$282,580	$231,090	$118,919	$87,007	$18,109	$1,174,222
1995 Total	$287,968	$329,567	$266,332	$330,042	$141,773	$121,193	$14,365	$1,491,239

Market Areas by Finished Product Type

Sales of Idaho's lumber, plywood/veneer, timbers, and other sawn products accounted for 95 percent ($886 million) of total sales of primary wood products excluding mill residuals and residue-related products in 2019 compared to 86 percent in 2015. The decline in sales of these products within Idaho during 2019 accounted for nearly 90 percent of the 53 percent decline for in-state sales, suggesting more engagement in the broader commodity markets for these products. The Rocky Mountain market area had the largest sales value increase from 2015 to 2019 for products in this group ($111 million), and accounted for the largest share of total sales value, 34 percent. Lumber, plywood/veneer, and other sawn products accounted for nearly 99 percent of total sales to the South.

Prior to 2019, sales value for cedar products was reported separately; however, due to contractions in the industry between 2015 and 2019, sales value for cedar products are combined with those of posts, poles, and log furniture to prevent disclosure of company-level data. Comparisons to 2015 data reflect combining sales data for the same sectors.

Sales values for this group of products represented 4 percent of total sales value in 2019 (approximately $34 million), down from 13 percent of total sales in 2015 ($75 million), a 69 percent decline. Sales to the Far West and Idaho combined accounted for 65 percent of total sales for the product group. In-state sales declined by 43 percent while the largest decline in sales occurred for the North Central area, down 93 percent. Northeast market sales increased by 11 percent and was the only market to increase as a proportion of total sales for these products in 2019. However, sales to the Northeast represented just 6 percent of total sales.

Log home and house log manufacturers generated more than $10 million in sales value during 2019, about the same as in 2015 when adjusted for inflation. Sales within Idaho and the other Rocky Mountain States increased by 5 percent and 4 percent, respectively, from 2015 to 2019. Sales to all other market areas declined from 2015 levels with sales to the South decreasing by 44 percent, the largest decrease for any market area in 2019. Recovery in this sector since the end of the Great Recession has been slow, but many of the existing firms were in business for decades before the financial crisis contributing to their resilience. While demand for high-cost custom log homes may not recover soon or ever to prerecession levels, it seems clear that some consumers are still willing to make such an investment.

Idaho's Forest Industry Employment and Labor Income

The primary forest products manufacturers characterized in BBER's periodic census represent just one component of the broader forest industry in Idaho. The classification of forest industries used here follows the 2017 North American Industry Classification System (NAICS) available online through the U.S. Department of Commerce. The forest industry encompasses four sectors: NAICS 113–forestry and logging, NAICS 1153–forestry support activities, NAICS 321–wood products manufacturing, and NAICS 322–paper manufacturing. These sectors include employees who work in both the primary and secondary wood products and paper manufacturing sectors (fig. 13). County Business Patterns (CBP) data from the U.S. Census Bureau are used to distinguish primary from secondary manufacturing employment and labor income. It should be noted that these four NAICS sectors likely underestimate total

employment associated with the forest industry because they do not reflect the additional employment stimulated through demand for services from log hauling (trucking) companies, lumber and construction material wholesalers, road construction and maintenance contractors, and forest management services performed by government agencies or nonprofit organizations. The Bureau of Labor Statistics' (BLS) Quarterly Census of Employment and Wages (QCEW) data are coupled with Bureau of Economic Analysis (BEA) data to determine employment and labor income associated with forestry support activities (fig. 14). These publicly available data sources provide another point of comparison for estimates of employees and labor income for primary forest products manufacturers, as well as additional information on the larger forest industry.

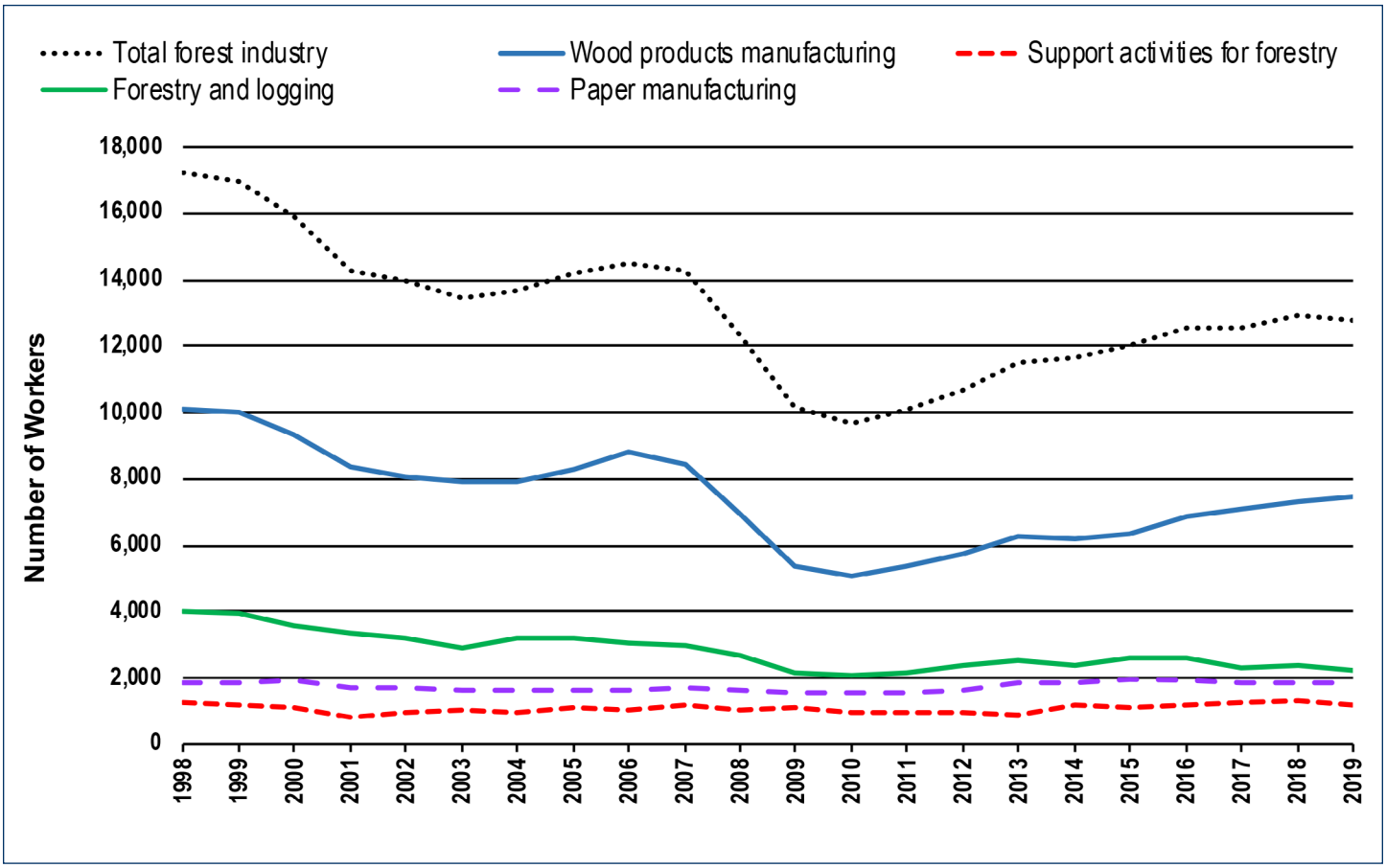


Figure 13—Employment in Idaho's forest industry, 1998-2019. Sources: USDC BEA 2019; USDC CB 2019; USDL BLS 2019; BBER 2019.

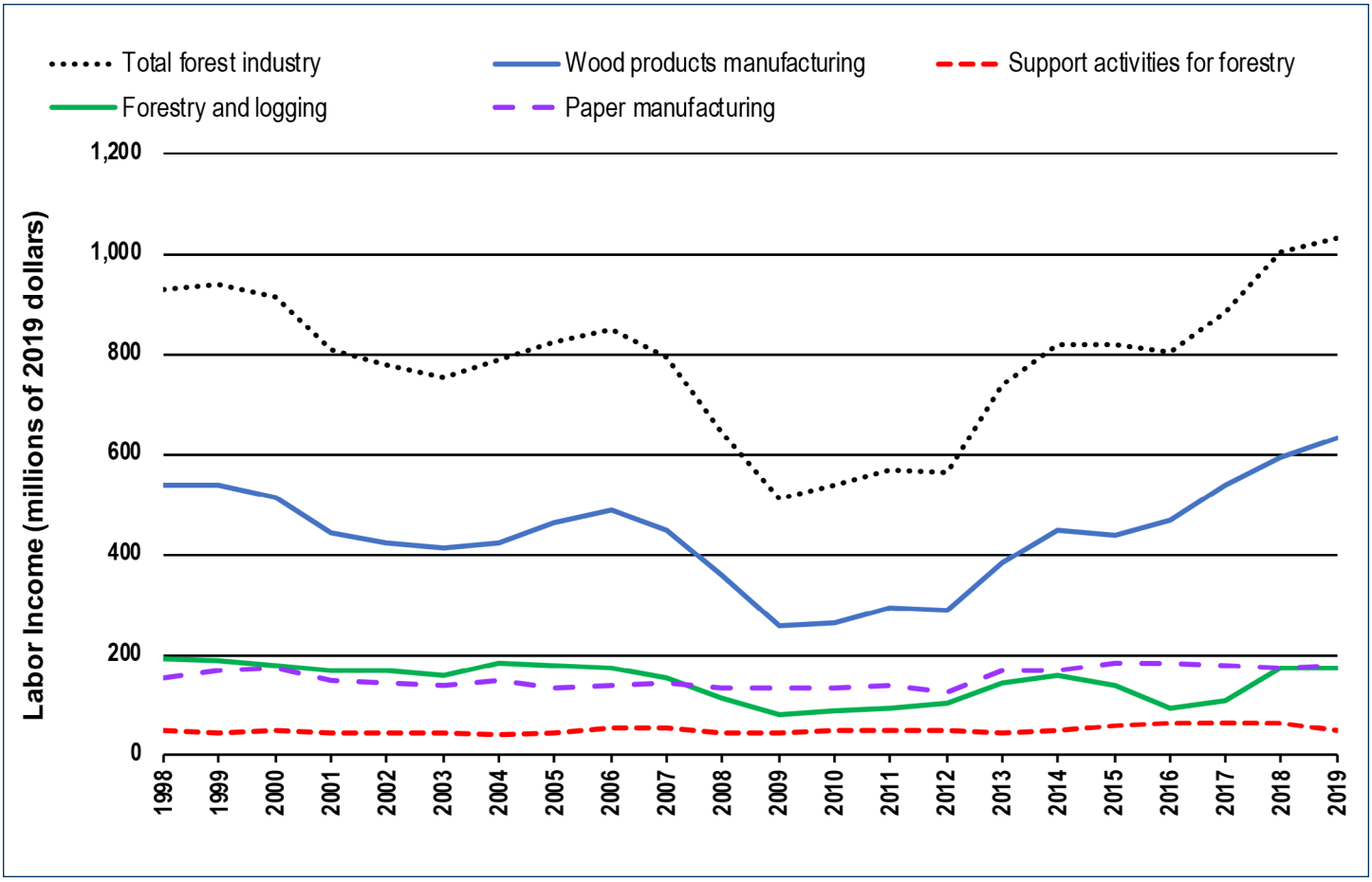


Figure 14—Inflation-adjusted earnings in Idaho's forest products industry, 1998-2019. Sources: USDC BEA 2019; USDC CB 2019; USDL BLS 2019; BBER 2019.

In 2019, total employment in the forest industry in Idaho was an estimated 12,700 full- and part-time workers (USDC BEA 2022; USDC CB 2022; USDL BLS 2022). Of these, approximately 3,784 workers were employed in the manufacturing of primary wood products. In addition, we estimate 2,212 workers were employed in forestry and logging, 1,139 workers provided supporting activities for forestry operations, 1,858 workers were employed in paper manufacturing, and the remaining 3,707 workers were employed in secondary manufacturing of wood products. Relative to 2015, total employment in sector rose by 7 percent. However, employment in both the forestry and logging and forestry support subsectors decreased by 11 percent and 3 percent, respectively. The largest increase over the same period was in the secondary wood products manufacturing sector (21 percent) and primary wood products manufacturing sector (15 percent). Paper manufacturing experienced stable employment with a 1 percent increase.

During 2019, workers in the forest industry earned over $1.03 billion in labor income. Labor income includes wages, salaries, and some benefits and earnings of the self-employed. Inflation-adjusted labor income for the forest industry grew 26 percent between 2015 and 2019, while total employment in the industry rose by 7 percent. In 2019 dollars, employee average income rose from $68,231 in 2015 to $81,193 in 2019. Within the wood products manufacturing sector, total earnings jumped 44 percent after inflation, continuing along the significant upward trend started in 2011. In 2019 dollars, average employee earnings

within the sector grew from $69,043 in 2015 to $84,393 in 2019. The primary wood products manufacturing sector saw the largest increase in total income at 64 percent, which is comparable to the change between 2011 and 2015.

The forestry and logging sector also saw increases, but to a lesser extent. Real income rose 24 percent, while real average employee income rose from $53,678 in 2015 to $77,542 in 2019. However, total income decreased for forestry support activities. The 17 percent total decrease resulted in a significant decrease in average worker earnings, from $53,770 in 2015 to $43,9200 in 2019.

Economic Contribution of Idaho's Forest Industry to the State Economy

Idaho's forest industry directly contributes to the statewide economy, as well as indirectly through the additional economic activity it generates in other sectors. Economic contribution analyses measure gross changes in economic activity that can be associated with an industry, event, or policy on an existing regional economy (Watson et al. 2007). For this report, we assess the contribution of Idaho's forest industry as dollars spent on intermediate inputs, taxes, labor and, in turn, by households, all of which generate economic opportunities as they cycle through the State's economy (fig. 15).

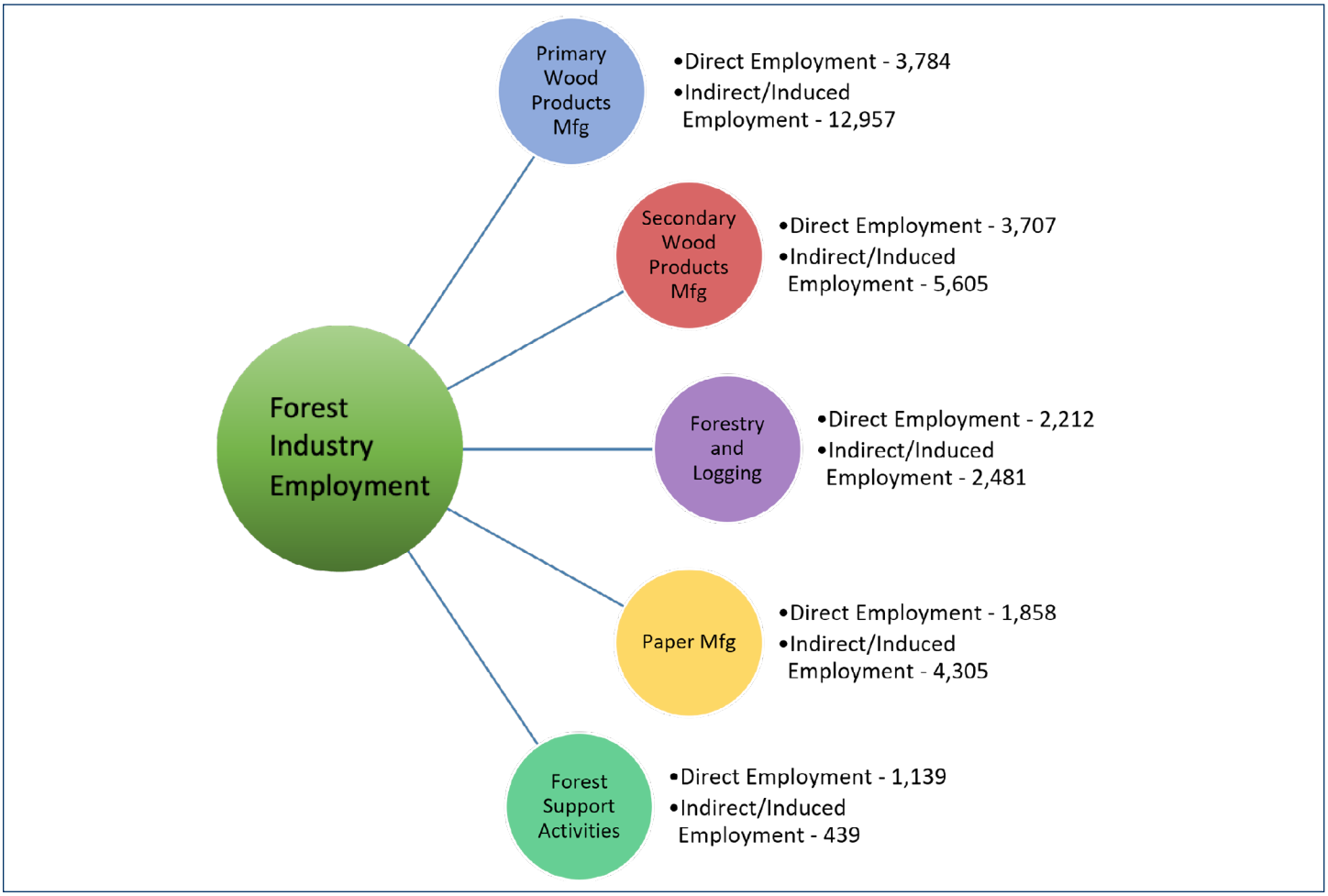


Figure 15—Economic contribution of Idaho's forest industry employment (number of workers) by sector in 2019 (BBER 2019; USDC BEA 2019; USDC CB 2019; USDL BLS 2019).

Primary and secondary wood products manufacturers, forestry and logging workers, paper manufacturers, and forestry support firms comprising Idaho's forest industry directly contributed approximately 12,700 jobs and over $1.03 billion in labor income to the State economy in 2019. In other words, for every million board feet harvested in Idaho during 2019, approximately 10 jobs and $709 thousand in labor income were directly generated by the forest industry. The activity associated with those directly employed in the forest industry generates additional economic opportunities as the industry relies on other industries for raw and intermediate inputs and services, thus indirectly supporting employment and wages in additional sectors. Using regional data and existing linkages within Idaho's economy represented by the BEA RIMS II multipliers[2] allows for a broad economic contribution analysis of the economic activity generated and cycled through Idaho's economy by different sectors within the forest industry. It should be noted that we do not aggregate sectors and avoid providing estimates of the total employment and labor income contribution for the entire forest industry to avoid double counting—given that some employment and labor income shows up as both direct contributions to their sector and indirect contributions to other sectors. For example, some or all of the direct employment and labor income in the forestry and logging sector would be included with the indirect and induced contributions from primary wood products manufacturing since these manufacturers rely upon forestry and logging business to supply their raw material inputs.

BBER estimates that the primary wood products manufacturing sector alone supported over 16,741 full- and part-time jobs and an associated $1.36 billion in labor income (table 16). As such, for every primary wood products manufacturing job in the State, another 3.42 jobs were supported in related sectors, while for every $1.00 paid in labor income by primary wood products manufacturers, another $2.69 was paid in supporting sectors, including forestry and logging, forestry support, trucking, wholesale trade, and management.

Likewise, BBER estimates that the 2,212 people employed in the forestry and logging sector supported an additional 2,481 full- and part-time jobs along with nearly $168 million in labor income in supporting sectors, such as equipment sales and repair.

[2] The Bureau of Economic Analysis does not endorse any resulting estimates and/or conclusions about the contribution of a given sector on an area.

Table 16—Average annual employment (number of employees) and labor income contributions (thousands of 2019 dollars) from Idaho's forest industry, 2019.

Sector	Direct Employment	Indirect and Induced Employment	Total Employment Contribution[a]	Direct Labor Income	Indirect and Induced Labor Income	Total Labor Income Contribution[a]
Forestry and Logging	2,212	2,481	4,693	$171,523	$168,418	$339,941
Forestry Support Activities	1,139	439	1,578	$50,004	$21,927	$71,931
Primary Wood Products Mfg	3,784	12,957	16,741	$368,417	$990,305	$1,358,722
Secondary Wood Products Mfg	3,707	5,605	9,312	$263,772	$342,244	$606,016
Paper Manufacturing	1,858	4,305	6,163	$177,413	$241,654	$419,067
Total Forest Industry	**12,700**	[a]	[a]	**$1,031,129**	[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.

CONCLUSION

Idaho has over 18 million acres of forestland, with approximately 16.5 million acres of this classified as nonreserved timberlands, meaning that the land is both open to management and is capable of producing at least 10 cubic feet of wood volume per acre per year. About three quarters of nonreserved timberland is in the National Forest System, making public lands an important source of raw material for the industry and the wood products industry an important outlet for material removed from the forest during restoration or fuels reduction. Sales of finished products by Utah's primary wood products sectors have increased over the past decade, but they still lag behind the sales values seen in the 1990s and early 2000s. However, total forest industry income is the highest in over 20 years, surpassing the previous high that occurred in 2007. During the past 20 years the total wood volume in Utah has declined about 12 percent due to fire, drought, insects, and disease, but recent inventories suggest that the decline has leveled off or reversed. As a result, recent trends in forest volume, manufacturing sales, and labor income point to a potentially brighter future for forest resources and the wood products industry in Utah.

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