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FPL–RN–0316

Criterion 6, Indicator 25:
Value and Volume of Wood and Wood Products Production, Including Primary and Secondary Processing

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Abstract

Trend data through 2006 are provided on the value and volume of wood and wood products production for the United States to aid in assessing sustainability of socioeconomic benefits of forests. The volume of roundwood used to make products, the weight produced, and the value of U.S. shipments have been stable to declining in recent years. But there have been increases in the weight of oriented strandboard production and the value of furniture production. U.S. demand for products is likely to continue to increase with increasing population and Gross Domestic Product (GDP). If the cost of providing wood products from the United States is high relative to other countries or alternative materials, this would limit increase in the level of U.S. harvest and the value that contributes to forest management, employment, and wages. Volume of roundwood harvest has increased in the South but declined in other regions although value of shipments for wood and paper products (excluding furniture) has declined in all regions. If value of shipments continues to decline, this would decrease revenues to forest landowners and employees. Maintaining revenues from forests would require increased revenues from other sources including recreation, environmental services, or new products such as biomass for energy.

Keywords: production, sustainability, consumption

SI conversion factors

Inch–pound unit	Conversion factor	SI unit
inch (in.)	25.4	millimeter (mm)
foot (ft)	0.3048	meter (m)
Btu	0.293	W (watts)
tons	1.02×10^3	kilograms (kg)

In this paper 1 billion = 10^9

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Criterion 6, Indicator 25: Value and Volume of Wood and Wood Products Production, Including Primary and Secondary Processing

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Indicator Background

The purpose of this report is to provide information on the rationale and data provided for Indicator 25 for the *U.S. National Report on Sustainable Forests—2010.* Information on the rationale for the Indicator and recommended data to be developed are taken from the report of the Technical Advisory Committee (TAC) of the Montreal Process.

Verbatim Montreal Process (MD) Technical Advisory Committee Notes

Rationale

The value and volume of wood and wood products indicates the relative importance of forests as a source of raw material for a wide variety of uses. Tracking the values and volumes of goods and services through the production process from the forest to the end of secondary processing explains a key dimension of the economic contribution that forests make to local and national economies.

Measurement

The measures desired are as follows:

- Market values of wood products at three stages in the production process—harvest value of the raw material, market values after primary processing, and market values after secondary processing. Excluded are values beyond the completion of secondary manufacturing, such as the value of shipping finished coated paper to a printer, printing magazines, and retail sales of magazine subscriptions.
- Volumes of wood products for the several product categories of primary processing (e.g., pulp and paper, dimension lumber, panel products) and secondary processing (e.g., coated papers, corrugated cardboard boxes, mouldings and joinery, wooden furniture) that are important, based on national circumstances.

Production data could be obtained from a variety of sources. Official government reports are a preferred source. In some cases, industry associations also publish production data for their members and may include estimates of national production. Value data could be obtained from price reports or marketing sources and should be reported on a consistent basis (e.g., **all prices** are manufacturer's prices for products; freight on board (FOB) at the mill). In some cases, it may be necessary to include estimates of the value for subsistence or other individual uses for wood products, such as fence posts or fuel wood. Providing a spatial display of production data by sub-national region or location and product category is likely to be helpful to decision makers in understanding the relative importance of particular products to regions and/or localities.

Data may be collected and reported in quantity units that differ by product. However, conversion of product quantities to a common unit (e.g., roundwood equivalent) will allow for comparison to quantities harvested (see indicator 6.1.d for related information).

Comments and Clarifications

Additions and Clarifications to Rationale

We believe variables on volume or weight of production will meet the intent of the rationale to indicate one aspect of the size of timber and forest products sectors over time and by region. They also indicate an aspect of economic health of forest management, because forest sector demand for timber is needed to support forest management, and the variables directly indicate the economic health of the forest industry by the trends in amounts of product production.

Additions and Clarifications to Measurement

The measurements suggested for the indicator do not measure economic health of the wood products sector. Additional information would be needed on profits, employment, and other variables in addition to prices and production.

Indicator Development

Data Used To Address Indicator

The data provided for this indicator focus on timber and wood products production volume, and value. Selected data are shown over time, by Resource Planning Act (RPA) Assessment Region, by land ownership, and by type of product produced.

General Description

Volume and value of production can be illustrated in several dimensions:

- by market level –
  - production of roundwood (harvest) or production of primary products;
  - roundwood and primary products are sold for domestic use or for exports.
- by region; and
- over time.

We show a representative subset of available data that characterize volume and value in each of these dimensions.

The intent is to show data about production that may be compared to other indicators that characterize the capacity of forests to produce wood products (e.g., growth rates, management intensity), and efforts to maintain and enhance that productive capacity of forests and forest industries (e.g., investments, research, institutions).

To illustrate the relative importance of forests as a source of raw material variables are shown that are available at least at the national, many times regional level, and are long-term time series that are continuing to be collected.

Specific Data Sources

Volume and value of wood products in the forest, at the mill or, if appropriate, at the wholesale market level

- Table 1. Volume of U.S. industrial roundwood and fuelwood harvest (production), 1900–2006
- Table 2. Volume of softwood industrial roundwood harvested by landowner and region, 1952–2006 ($\times 10^6$ ft^3)
- Table 3. Volume of hardwood industrial roundwood harvested by landowner and region, 1952–2006 ($\times 10^6$ ft^3)
- Table 4. Volume of all industrial roundwood harvested by landowner and region, 1952–2006 ($\times 10^6$ ft^3)
- Table 5. Weight of U.S. industrial wood product production by product, 1950-2006 (thousand short tons)
- Table 6. Energy produced from wood by end use and its roundwood equivalent (10^{15} Btu and billion ft^3)
- Table 7. Value of shipments for forest products industries by SIC Code 1961–1996, by NAICS code, 1997–2006 (billion 2005$)
- Table 8. Value of Shipments in paper products industries (NAICS 322) by region (billion 2005$)
- Table 9. Value of shipments in wood products industries (NAICS 321) by region (billion 2005$)
- Table 10. Value of shipments in wood and paper products industries (NAICS 321,322) by region (2005$)

Analysis Techniques

General Description

This report contains data for 1965 through 2006. Some data were derived from mathematical calculations and some include conversions to different units of measurement.

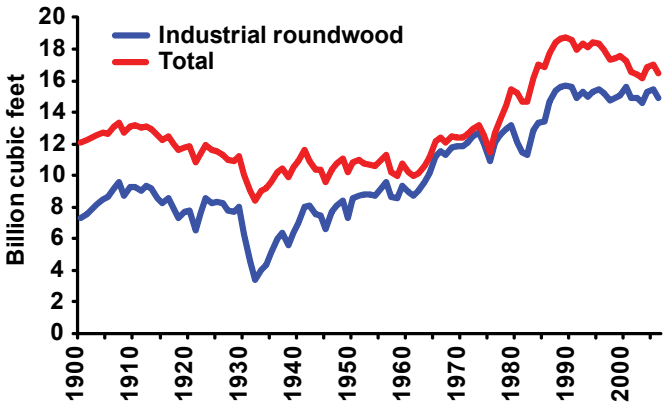

Figure 1. Volume of U.S industrial roundwood and fuelwood production (harvest), 1900–2006 (billion ft^3) (total line includes industrial roundwood plus fuelwood)
Source: Table 1

Specific Steps Taken

The data were compiled from official government and trade association reports by state, region, national level, and year. The data were then organized by primary product commodity over time. These primary products were then converted to their roundwood equivalents using government- or industry-approved conversion factors.

Data Issues

Since 2003, the national value series normally classified as the Standard Industry Classification (SIC) system was changed to the North American Industry Classification System (NAICS). This change has created problems with making direct comparisons between certain years and wood products. The NAICS as a continuing report is considered to be replicable, available, and with good precision and bias.

Indicator Interpretation and Discussion

Indicator Results

What Does the Indicator Show?

The volume of total roundwood harvest (including fuelwood) in the United States increased fairly steadily from about 10 billion ft^3 in the 1930s to 18.8 billion ft^3 in 1989. Since 1989 harvest has declined, reaching a level of 16.4 billion ft^3 in 2006 (Fig. 1), a figure equivalent to about 25% of world harvest. Industrial roundwood production increased steadily between the mid 1930s and 1989 and since has been roughly constant.

The amount of primary wood and paper products produced in the United States increased relatively steadily from 82 million tons in 1950 to 203 million tons in 1999 and has since then declined to 191 in 2006 (Fig. 3). In comparison, in 2006 the United States produced 9.5 million tons of steel and 142 million tons of Portland cement.

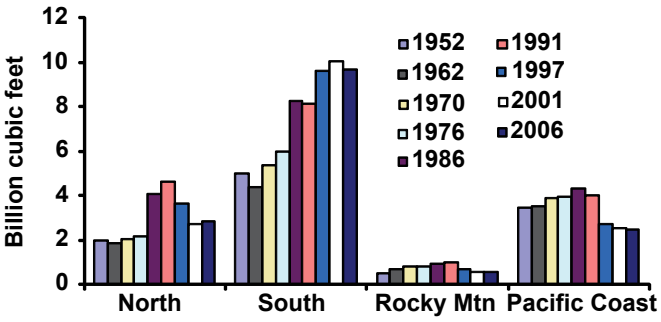

Figure 2. Volume of all industrial roundwood harvested by region, 1952–2006 (million ft³)
Source: Table 4

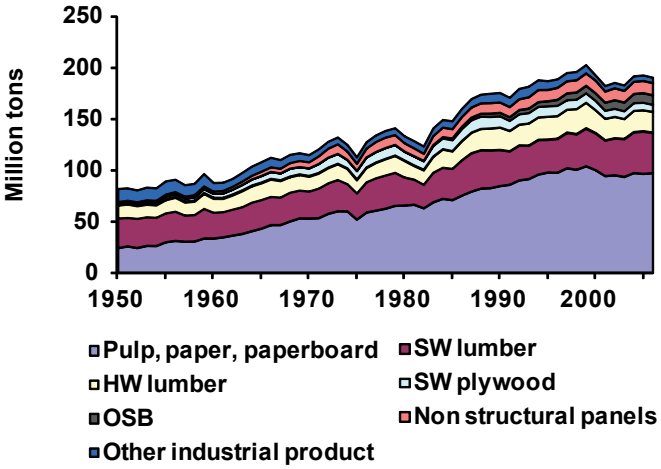

Figure 3. Weight of wood and paper products produced by product 1950–2006 (million tons)
Source: Table 5

The decline since 1999 is due primarily to declines in production of pulp and paper, hardwood lumber, and softwood plywood. These declines offset an increase of 29% in oriented strandboard (OSB) production. In 2006, the largest share of production, by weight, was for pulp and paper (51%), followed by softwood and laminated veneer lumber (LVL) lumber (21%), hardwood lumber (10%), non-structural panels (6%), OSB (5%), softwood plywood (4%), and other industrial products (3%) (Fig. 3).

Wood energy use was 2.2 quadrillion Btu (Quad) in 2006 (roughly 2.4% of U.S. consumption), down from 2.7 Quad in 1983. Industrial use (primarily in forest products firms) was 1.5 Quad Btu in 2006, which is somewhat lower than highs in 1983 and 2000. Residential wood energy use has also declined but wood use for electric power has increased from 0.10 Quad in 1989 to 0.18 Quad in 2006 (Fig. 4). (Also see Indicator 24). Wood pellet fuel production increased from about 0.5 million tons (6% moisture content) (0.01 Quad) in 2003 to 1.8 million tons in 2008 (0.03 Quad). In 2008 about 20% of production was exported. Most domestic use was for residential heating (Spelter and Toth 2009).

Total value of shipments for wood, paper, and furniture industries, using SIC industry codes, increased between 1973 and 1996 from $288 to $356 million (all values adjusted for inflation and presented in 2005$). Between 1997 and 2006, using NAICS industry codes, shipments decreased from $322 million to $309 million (Fig. 5). The decrease was due to a 10% decline for paper industries. Furniture industries increased 13% and wood products industries were about constant.

How Has it Changed Since 2003?

Volume of roundwood harvest and total weight of primary products production has remained relatively stable between 2000 and 2006, although the weight of production has increased for softwood lumber, OSB, and miscellaneous products and declined for other primary products—pulp and paper, hardwood lumber, softwood plywood, and non-structural panels.

The value of paper industry shipments decreased 12% between 2000 and 2006 from $187 to $165 million, but values were about the same between 2000 and 2006 for wood products and wood furniture shipments (Fig. 5).

Regional Variation and Associated Issues

The most important development in wood products production from a regional standpoint has been the marked increase in roundwood harvests in the South along with concurrent reductions in the North and Pacific Coast Regions. Industrial roundwood harvest volume increased 80% in the South between 1970 and 2006, accounting for 62% of the U.S. total in 2006. In 2006 the North provided 18%, followed by the Pacific Coast at 16%, and the Rocky Mountains at 3%. Harvest decreased between 1991 and 2006 in all regions except the South (Fig. 2).

Percentage changes in harvest are not fully reflected in the value of final product shipments, which have remained much more stable across the regions (Fig. 6). Even though the South had the largest volume of harvest in 2006, the value of shipments for wood and paper industries was highest for the North, at $108 billion, followed by the South, at $104 billion. Value of shipments has declined since 1997 in the North, South, and Pacific Coast, and has increased in the Rocky Mountains. The Region with the highest total value of primary products shipments may change if wood furniture industries were included. But state level wood furniture values were not available for this report.

Assessment of Ability to Measure Underlying Concern

General Assessment

The change in the SIC system to the NAICS makes it difficult to track value changes over time. So the direct comparison of values in 2003 to 2006 is difficult. The ability to track volume changes over time is a strength for this indicator.

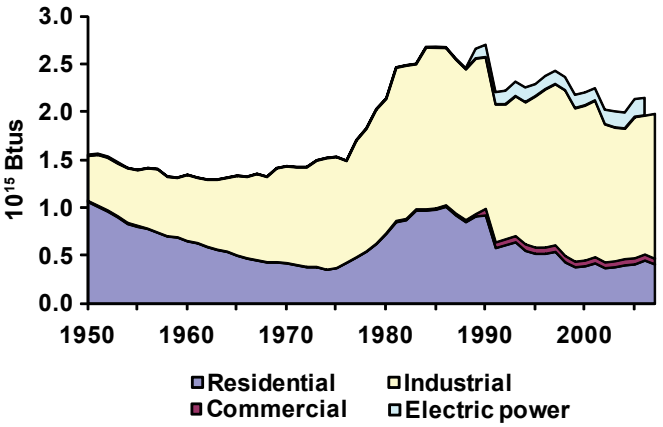

Figure 4. Wood energy produced, by consumer, 1950–2006 (10^{15} Btu) (each line is added to the line below).
Source: Table 6

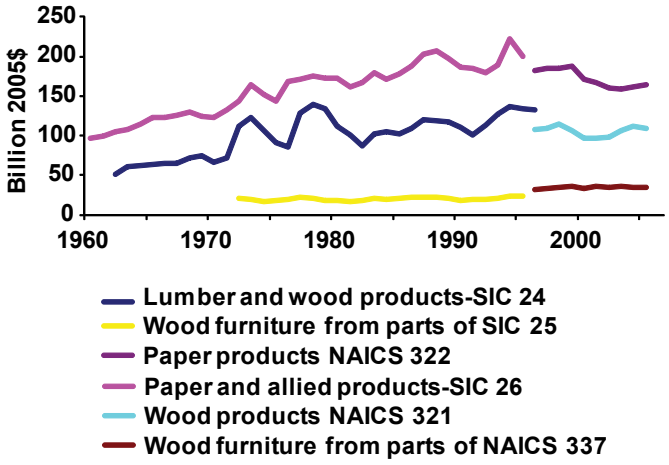

Figure 5. Value of shipments for forest products industries by SIC Code 1961–1996, by NAICS code, 1998–2006 (billion 2005$) (each line is added to the line below).
Source: Table 7

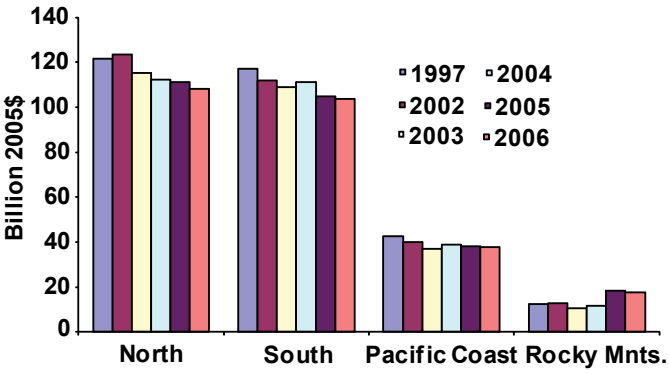

Figure 6. Value of shipments in wood and paper products industries (NAICS 321, 322) by region (billion 2005$).
Source: Table 10

Congruence of U.S. Results with TAC Recommendations

Because the availability of national data for this indicator is good, the U.S. results are consistent with the TAC recommendations. National data sources are available, enabling the compilation of volume and value of wood products production.

Suggested Steps for Improvement

None

Cross-Cutting Issues and Relation to Other Indicators

The level and trend in wood and paper production are key factors in sustaining certain benefits from forests—benefits of employment and wages (Indicators 36 and 37), benefits in revenue to various groups (Distribution of Revenues–Indicator 40), and contribution to community resiliency (Indicator 38). The level of wood and paper production are determined by the competitiveness of U.S. industries in relation to foreign industries which, in turn, is influenced in the long run by the level capital investment in new technology (Indicator 34), by levels of research and education in the United States (Indicator 35), and by the productivity of U.S. forests (Indicator 11).

Concluding Remarks

What does the information on import share of consumption and export share of production of wood products indicate about sustainable forestry and sustaining benefits of forests?

In aggregate, the volume of industrial roundwood used to make products, the weight produced, and the value of U.S. shipments has been stable to declining in recent years. But for some industries there have been increases in OSB weight of production and in furniture value. U.S. demand for products is likely to continue to increase in the long run with increasing population and the Gross Domestic Product (GDP).

If the cost of providing wood products from the United States is high relative to other countries or alternative materials, this would tend to limit increase in the levels of U.S. harvest and the value that contributes to U.S. forest management, employment, and wages.

Volume of roundwood harvest has increased in the South in recent years but declined in other regions although value of shipments for wood and paper products (excluding furniture) has declined in all regions in recent years.

If the value of shipments continues to decline, this would tend to decrease revenues to forest landowners and employees from these traditional products. Maintaining revenues from forests would require increased revenues from other sources such as recreation, environmental services, or potential new products such as biomass for energy.

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Appendix—Indicator 25–Value and volume of wood and wood products production, including primary and secondary processing.

Table 1. Volume of U.S industrial roundwood and fuelwood production (harvest), 1900–2006 (million cubic feet)

Year	Industrial roundwood	Fuelwood	Total	Year	Industrial roundwood	Fuelwood	Total	Year	Industrial roundwood	Fuelwood	Total
1900	7,280	4,800	12,080	1944	7,455	2,915	10,370	1988	15,618	3,066	18,684
1901	7,580	4,650	12,230	1945	6,605	2,975	9,580	1989	15,722	3,041	18,763
1902	7,880	4,500	12,380	1946	7,705	2,675	10,380	1990	15,577	3,019	18,596
1903	8,215	4,350	12,565	1947	8,090	2,685	10,775	1991	14,894	3,028	17,922
1904	8,490	4,200	12,690	1948	8,375	2,665	11,040	1992	15,280	3,044	18,324
1905	8,625	4,050	12,675	1949	7,355	2,820	10,175	1993	15,011	3,084	18,095
1906	9,225	3,900	13,125	1950	8,530	2,270	10,800	1994	15,306	3,134	18,440
1907	9,555	3,825	13,380	1951	8,745	2,230	10,975	1995	15,430	2,937	18,367
1908	8,725	3,975	12,700	1952	8,775	2,010	10,785	1996	15,258	2,739	17,997
1909	9,275	3,825	13,100	1953	8,790	1,920	10,710	1997	14,790	2,542	17,332
1910	9,295	3,910	13,205	1954	8,755	1,835	10,590	1998	14,899	2,523	17,422
1911	9,020	4,035	13,055	1955	9,225	1,745	10,970	1999	15,032	2,542	17,574
1912	9,330	3,760	13,090	1956	9,620	1,655	11,275	2000	15,631	1,622	17,253
1913	9,170	3,780	12,950	1957	8,615	1,565	10,180	2001	14,907	1,621	16,528
1914	8,565	3,975	12,540	1958	8,530	1,480	10,010	2002	14,878	1,520	16,398
1915	8,285	3,975	12,260	1959	9,390	1,390	10,780	2003	14,614	1,515	16,129
1916	8,530	3,955	12,485	1960	8,925	1,300	10,225	2004	15,296	1,540	16,836
1917	7,940	4,040	11,980	1961	8,745	1,215	9,960	2005	15,459	1,550	17,009
1918	7,310	4,290	11,600	1962	9,035	1,125	10,160	2006	14,891	1,550	16,441
1919	7,725	4,075	11,800	1963	9,560	1,055	10,615	—	—	—	—
1920	7,770	4,065	11,835	1964	10,170	985	11,155	—	—	—	—
1921	6,565	4,270	10,835	1965	11,231	915	12,146	—	—	—	—
1922	7,605	3,760	11,365	1966	11,520	845	12,365	—	—	—	—
1923	8,535	3,375	11,910	1967	11,333	780	12,113	—	—	—	—
1924	8,245	3,380	11,625	1968	11,784	700	12,484	—	—	—	—
1925	8,350	3,225	11,575	1969	11,818	620	12,438	—	—	—	—
1926	8,220	3,065	11,285	1970	11,851	535	12,386	—	—	—	—
1927	7,775	3,200	10,975	1971	12,114	500	12,614	—	—	—	—
1928	7,670	3,225	10,895	1972	12,456	475	12,931	—	—	—	—
1929	8,045	3,170	11,215	1973	12,705	505	13,210	—	—	—	—
1930	6,305	3,790	10,095	1974	12,031	535	12,566	—	—	—	—
1931	4,610	4,390	9,000	1975	10,904	570	11,474	—	—	—	—
1932	3,400	4,980	8,380	1976	12,103	600	12,703	—	—	—	—
1933	4,040	5,005	9,045	1977	12,530	1,000	13,530	—	—	—	—
1934	4,340	4,825	9,165	1978	12,930	1,525	14,455	—	—	—	—
1935	5,095	4,510	9,605	1979	13,221	2,205	15,426	—	—	—	—
1936	5,980	4,265	10,245	1980	12,081	3,105	15,186	—	—	—	—
1937	6,370	4,075	10,445	1981	11,467	3,180	14,647	—	—	—	—
1938	5,570	4,325	9,895	1982	11,328	3,355	14,683	—	—	—	—
1939	6,370	4,190	10,560	1983	12,891	3,235	16,126	—	—	—	—
1940	6,990	3,890	10,880	1984	13,368	3,620	16,988	—	—	—	—
1941	8,055	3,595	11,650	1985	13,400	3,450	16,850	—	—	—	—
1942	8,085	2,865	10,950	1986	14,644	3,096	17,740	—	—	—	—
1943	7,560	2,785	10,345	1987	15,385	3,076	18,461	—	—	—	—

Sources: 1900–1964: (Bureau of Census 1975, table L 72-86); 1965–1999: (Howard 2007, table 5a).

Table 2. Volume of softwood industrial roundwood harvested by landowner and region, 1952–2006 ($\times 10^6$ ft^3)

		1952	1962	1970	1976	1986	1991	1997	2001	2006
Industrial land										
	North	129	109	153	196	397	433	178	143	189
	South	802	580	960	1,366	1,785	1,843	2,119	2,229	2,144
	Rocky Mountain	128	145	138	115	178	198	152	150	134
	Pacific coast	1,737	1,455	1,645	1,740	1,862	1,658	1,174	1,158	1,270
	Total	2,796	2,289	2,896	3,417	4,222	4,132	3,623	3,680	3,737
Other private land										
	North	400	321	314	352	415	383	519	412	350
	South	1,198	1,937	2,286	2,511	3,147	3,039	3,736	4,063	3,982
	Rocky Mountain	79	74	118	147	154	200	221	231	248
	Pacific coast	885	504	460	393	393,	680	783	866	684
	Total	3362	2,836	3,178	3,403	4,109	4,302	5,259	5,572	5,264
National forest										
	North	27	31	37	34	35	63	34	15	37
	South	155	117	180	235	222	217	177	47	42
	Rocky Mountain	218	387	480	426	465	425	186	79	76
	Pacific coast	561	1,100	1,221	1,172	1,431	1,084	316	109	147
	Total	961	1,635	1,918	1,867	2,153	1,789	713	250	302
Other public land										
	North	40	40	45	54	61	58	94	73	100
	South	81	73	101	139	164	183	166	174	149
	Rocky Mountain	72	78	78	85	79	173	54	51	63
	Pacific coast	210	371	478	544	510	355	263	254	242
	Total	403	562	702	822	814	769	577	552	554
Total										
	North	596	501	549	636	908	937	825	643	677
	South	3,036	2,707	3,527	4,251	5,318	5,282	6,198	6,513	6,318
	Rocky Mountain	497	684	814	773	876	996	613	511	521
	Pacific Coast	3,393	3,430	3,804	3,849	4,196	3,777	2,536	2,387	2,344
	Total	7,522	7,322	8,694	9,509	11,298	10,992	10,172	10,054	9,857

Sources: Haynes 2003, 2007, Resource Planning Act (RPA) tables.

Table 3. Volume of hardwood industrial roundwood harvested by landowner and region, 1952–2006 (×10^6 ft^3)

		1952	1962	1970	1976	1986	1991	1997	2001	2006
Industrial land										
	North	117	86	126	144	417	511	312	251	286
	South	284	323	321	291	499	527	687	628	527
	Rocky Mountain	0	0	1	1	27	0	3	3	3
	Pacific coast	20	25	40	37	81	83	67	45	51
	Total	421	434	488	473	1,024	1,121	1,069	927	867
Other private land										
	North	1,155	1,123	1,186	1,199	2,567	2,857	2,078	1,504	1,501
	South	1,554	1,253	1,414	1,299	2,255	2,224	2,570	2,793	2,764
	Rocky Mountain	1	1	1	1	17	9	29	18	17
	Pacific coast	8	28	23	44	17	130	68	58	64
	Total	2,718	2,405	2,624	2,543	4,856	5,220	4,745	4,373	4,346
National forest										
	North	41	43	55	64	102	137	87	56	55
	South	50	40	49	33	49	48	99	31	18
	West	9	14	19	4	16	12	32	4	2
	Total	100	97	123	101	167	197	218	91	75
Other public land										
	North	68	77	98	95	104	179	341	257	301
	South	45	46	56	84	128	86	83	105	69
	Rocky Mountain	2	2	1	1	1	2	3	2	1
	Pacific coast	7	5	15	19	43	43	17	14	15
	Total	122	130	170	199	276	310	444	378	386
Total										
	North	1,381	1,329	1,465	1,502	3,190	3,684	2,818	2,068	2,143
	South	1,933	1,662	1,840	1,707	2,931	2,885	3,439	3,557	3,379
	Rocky Mountain	3	3	3	3	45	11	35	26	22
	Pacific Coast	35	58	78	100	141	256	152	119	131
	West	9	14	19	4	16	12	32	—	—
	Total	3,361	3,066	3,405	3,316	6,323	6,848	6,476	5,770	5,675

Source: Haynes 2003, FS 2007.

Table 4. Volume of all industrial roundwood harvested by landowner and region, 1952–2006 (×10^6 ft^3)

		1952	1962	1970	1976	1986	1991	1997	2001	2006
Industrial land										
	North	246	195	279	340	814	944	490	394	396
	South	1,086	903	1,281	1,657	2,284	2,370	2,806	2,857	2,731
	Rocky Mountain	128	145	139	116	205	198	155	153	153
	Pacific coast	1,757	1,480	1,685	1,777	1,943	1,741	1,241	1,203	1,179
	Total	3,217	2,723	3,384	3,890	5,246	5,253	4,692	4,607	4,459
Other private land										
	North	1,555	1,444	1,500	1,551	2,982	3,240	2,597	1,916	1,931
	South	3,552	3,190	3,700	3,810	5,402	5,263	6,306	6,856	6,686
	Rocky Mountain	80	75	119	148	171	209	250	250	249
	Pacific coast	893	532	483	437	410	810	851	925	890
	Total	6,080	5,241	5,802	5,946	8,965	9,522	10,004	9,947	9,756
National forest										
	North	68	74	92	98	137	200	121	71	92
	South	205	157	229	268	271	265	276	77	60
	West	78	1,501	1,720	1,602	1,912	1,521	534	191	225
	Total	1,061	1,732	2,041	1,968	2,320	1,986	931	339	377
Other public land										
	North	108	117	143	149	165	237	435	330	401
	South	126	119	157	223	292	269	249	279	218
	Rocky Mountain	74	80	79	86	80	175	57	53	64
	Pacific coast	217	376	493	563	553	398	280	268	257
	Total	525	692	872	1,021	1,090	1,079	1,021	930	940
Total										
	North	1,977	1,830	2,014	2,138	4,098	4,621	3,643	2,711	2,819
	South	4,969	4,369	5,367	5,958	8,249	8,167	9,637	10,070	9,695
	Rocky Mountain	282	300	337	350	456	582	462	455	466
	Pacific Coast	2,867	2,388	2,661	2,777	2,906	2,949	2,372	2,395	2,326
	West	788	1,501	1,720	1,602	1,912	1,521	534	192	225
	Total	10,883	10,388	12,099	12,825	17,621	17,840	16,648	15,823	15,531

Sources: Haynes 2003; FS 2007.

Table 5. Weight of U.S. industrial wood product production by product, 1950–2006 (thousand short tons)

Year	Total	Softwood plywood	Oriented strandboard	Laminated veneer lumber	Hardwood plywood and veneer	Softwood lumber	Hardwood lumber	Lumber made at pallet plants	Particleboard production	Hardboard production	Medium-density fiberboard production	Pulp paper and board	Other industrial products	Insulating board
1950	82,814	1,463	—	—	781	29,905	12,444	0	30	336	0	24,375	12,705	774
1951	83,472	1,638	—	—	786	28,793	13,012	0	42	306	0	26,048	12,045	803
1952	81,464	1,738	—	—	803	29,516	12,197	0	46	360	0	24,423	11,550	830
1953	84,182	2,104	—	—	806	28,912	12,116	0	59	371	0	26,567	12,375	871
1954	83,469	2,181	—	—	732	28,588	11,937	0	68	408	0	26,411	12,210	934
1955	90,273	2,890	—	—	889	29,107	12,766	0	98	465	0	30,154	12,870	1,033
1956	91,858	2,971	—	—	884	29,413	13,446	0	156	474	0	31,428	12,045	1,041
1957	86,501	3,091	—	—	772	26,456	12,550	0	257	500	0	30,666	11,220	988
1958	87,827	3,548	—	—	755	26,729	12,975	0	352	535	0	30,823	11,055	1,056
1959	97,302	4,231	—	—	883	29,784	14,399	0	359	645	0	33,748	12,045	1,208
1960	88,651	4,243	—	—	723	26,039	13,498	0	326	603	0	33,758	8,415	1,046
1961	88,943	4,646	—	—	856	25,447	12,842	0	410	673	0	34,937	8,085	1,046
1962	92,674	5,094	—	—	995	26,182	13,714	0	515	764	0	36,678	7,673	1,059
1963	98,468	5,674	—	—	1,104	26,898	15,419	0	641	847	0	38,272	8,498	1,116
1964	104,539	6,264	—	—	1,255	28,589	15,690	0	832	840	0	40,961	8,910	1,198
1965	108,850	6,807	—	—	1,345	28,599	15,929	153	1,059	913	105	43,465	9,240	1,234
1966	113,172	7,140	—	—	1,362	28,162	16,488	182	1,333	964	117	46,971	9,323	1,131
1967	110,976	7,086	—	—	1,257	27,503	15,712	183	1,510	949	130	46,969	8,498	1,178
1968	115,986	8,036	—	—	1,318	28,589	14,740	202	1,956	1,160	145	50,561	8,003	1,276
1969	117,566	7,489	—	—	1,227	27,669	14,727	233	2,365	1,327	161	53,530	7,508	1,330
1970	115,751	7,842	—	—	1,179	26,876	14,057	222	2,434	1,370	179	53,408	7,013	1,173
1971	121,339	9,097	—	—	1,263	29,326	14,254	242	3,317	1,633	198	53,753	6,848	1,410
1972	128,690	10,021	—	—	1,332	30,239	14,334	272	4,330	1,812	220	58,009	6,683	1,439
1973	132,863	10,011	—	—	1,186	30,836	14,837	325	4,866	1,891	245	60,548	6,683	1,437
1974	125,754	8,683	—	—	919	27,046	14,257	360	4,324	1,767	272	60,403	6,518	1,205
1975	113,612	8,777	—	—	690	26,112	12,325	278	3,520	1,775	302	52,393	6,353	1,087
1976	128,193	10,084	—	—	711	29,873	13,462	343	4,485	2,120	394	59,283	6,188	1,251
1977	134,878	10,596	—	—	779	31,923	14,343	413	5,019	2,411	620	61,149	6,353	1,271
1978	139,249	10,918	—	—	778	32,704	15,120	473	5,231	2,445	714	63,085	6,518	1,262
1979	141,870	10,748	—	—	755	32,509	15,706	518	4,748	2,402	713	65,873	6,683	1,215
1980	134,030	8,932	84	53	681	27,530	15,452	452	4,148	1,919	693	66,217	6,848	1,021
1981	129,293	9,161	169	70	641	24,797	12,622	442	4,035	1,908	726	66,931	7,013	780
1982	124,165	8,666	348	70	909	23,222	13,494	400	3,365	1,746	627	63,483	7,178	657
1983	141,708	10,653	838	88	971	29,020	14,794	450	4,231	2,282	849	69,352	7,343	836
1984	149,916	10,897	1,276	88	988	30,434	17,027	500	4,494	2,137	892	72,742	7,508	934
1985	148,675	11,030	1,668	123	881	30,577	16,196	550	4,684	1,969	963	71,459	7,673	904
1986	160,650	12,096	2,196	140	912	34,435	17,680	600	5,067	1,819	1,098	75,964	7,838	806
1987	170,251	12,523	2,548	158	1,000	37,415	19,006	600	5,212	1,705	1,264	79,830	8,168	823
1988	174,510	12,359	2,878	193	1,019	37,224	19,813	600	5,385	1,599	1,320	82,847	8,415	859
1989	175,444	11,695	3,191	210	1,011	36,653	20,345	610	5,425	1,624	1,364	83,257	9,158	901
1990	176,164	11,440	3,386	280	1,009	34,941	20,792	610	5,352	1,570	1,336	85,307	9,273	868
1991	171,482	10,200	3,508	280	982	32,373	18,847	620	5,304	1,530	1,347	86,546	9,092	853
1992	180,125	10,572	4,158	298	934	33,706	19,276	620	5,597	1,648	1,499	90,885	10,065	868
1993	182,205	10,563	4,376	368	992	32,165	20,620	620	5,964	1,640	1,633	92,154	10,247	866
1994	188,569	10,740	4,679	403	1,182	33,297	20,900	640	6,387	1,627	1,759	96,595	9,504	857
1995	187,601	10,591	4,939	490	1,209	31,467	21,337	660	5,906	1,541	1,557	98,582	8,465	857
1996	189,362	10,490	5,821	560	1,171	32,476	21,074	657	6,270	1,650	1,752	98,334	8,250	857
1997	195,566	9,824	6,584	665	1,229	33,844	21,386	628	6,372	1,407	1,948	102,822	8,003	857
1998	196,569	9,721	7,017	718	1,288	33,853	23,470	608	6,459	1,344	1,970	101,262	8,003	857
1999	203,229	9,743	7,258	838	1,323	35,803	24,145	590	6,511	1,371	1,987	104,801	8,003	857
2000	193,159	9,557	7,441	833	1,487	35,110	21,259	735	6,756	1,182	2,093	100,900	4,950	857
2001	182,836	8,269	7,833	935	1,381	33,760	19,970	735	5,760	1,038	1,946	95,080	5,273	857
2002	185,987	8,313	8,391	982	1,376	34,979	19,828	735	6,207	912	2,280	95,890	5,238	857
2003	183,454	8,042	8,509	1,181	1,343	35,738	18,360	735	5,603	1,345	2,261	94,232	5,247	857
2004	192,318	8,020	8,919	1,510	1,327	38,147	19,708	735	6,053	1,212	2,457	98,124	5,247	857
2005	193,153	7,837	9,366	1,586	1,311	39,731	19,501	735	5,781	1,358	2,588	97,256	5,247	857
2006	190,996	7,343	9,350	1,544	1,188	37,642	19,275	735	5,890	1,198	2,701	98,025	5,247	857

Sources: 1950–1964: (Ince, 1998 table 2); 1965–1999: (Howard, 2001, table 9); 1999–2006 (Howard, 2007, table 9).

Table 6. Energy produced from wood by end use, and its roundwood equivalent (10^{15} Btu and $\times 10^{6}$ ft^3)

Year	Residential	Commercial	Industrial	Electric power	Total	Total in roundwood equivalent ($\times 10^{6}$ ft^3)
1949	1.06	0.02	0.47	0.01	1.55	6.20
1950	1.01	0.02	0.53	0.01	1.56	6.24
1951	0.96	0.02	0.55	0.01	1.53	6.12
1952	0.90	0.02	0.55	0.01	1.47	5.88
1953	0.83	0.02	0.57	0.01	1.42	5.68
1954	0.80	0.02	0.58	0.00	1.39	5.56
1955	0.78	0.01	0.63	0.00	1.42	5.68
1956	0.74	0.01	0.66	0.00	1.42	5.68
1957	0.70	0.01	0.62	0.00	1.33	5.32
1958	0.69	0.01	0.62	0.00	1.32	5.28
1959	0.65	0.01	0.69	0.00	1.35	5.40
1960	0.63	0.01	0.68	0.00	1.32	5.28
1961	0.59	0.01	0.70	0.00	1.29	5.16
1962	0.56	0.01	0.73	0.00	1.30	5.20
1963	0.54	0.01	0.77	0.00	1.32	5.28
1964	0.50	0.01	0.83	0.00	1.34	5.36
1965	0.47	0.01	0.85	0.00	1.33	5.32
1966	0.45	0.01	0.90	0.00	1.37	5.48
1967	0.43	0.01	0.89	0.00	1.34	5.36
1968	0.43	0.01	0.98	0.00	1.42	5.68
1969	0.42	0.01	1.01	0.00	1.44	5.76
1970	0.40	0.01	1.02	0.00	1.43	5.72
1971	0.38	0.01	1.04	0.00	1.43	5.72
1972	0.38	0.01	1.11	0.00	1.50	6.00
1973	0.35	0.01	1.16	0.00	1.53	6.11
1974	0.37	0.01	1.16	0.00	1.54	6.15
1975	0.43	0.01	1.06	0.00	1.50	5.99
1976	0.48	0.01	1.22	0.00	1.71	6.85
1977	0.54	0.01	1.28	0.00	1.84	7.35
1978	0.62	0.01	1.40	0.00	2.04	8.14
1979	0.73	0.01	1.40	0.00	2.15	8.60
1980	0.85	0.02	1.60	0.00	2.47	9.90
1981	0.87	0.02	1.60	0.00	2.50	9.98
1982	0.97	0.02	1.52	0.00	2.51	10.04
1983	0.97	0.02	1.69	0.00	2.68	10.74
1984	0.98	0.02	1.68	0.00	2.69	10.74
1985	1.01	0.02	1.65	0.01	2.69	10.75
1986	0.92	0.03	1.61	0.01	2.56	10.25
1987	0.85	0.03	1.58	0.01	2.46	9.85
1988	0.91	0.03	1.63	0.01	2.58	10.31
1989	0.92	0.08	1.58	0.10	2.68	10.72
1990	0.58	0.07	1.44	0.13	2.22	8.86
1991	0.61	0.07	1.41	0.13	2.21	8.86
1992	0.64	0.07	1.46	0.14	2.31	9.25
1993	0.55	0.08	1.48	0.15	2.26	9.04
1994	0.52	0.07	1.58	0.15	2.32	9.30
1995	0.52	0.07	1.65	0.13	2.37	9.48
1996	0.54	0.08	1.68	0.14	2.44	9.75
1997	0.43	0.07	1.73	0.14	2.37	9.48
1998	0.38	0.06	1.60	0.14	2.18	8.74
1999	0.39	0.07	1.62	0.14	2.21	8.86
2000	0.42	0.07	1.64	0.13	2.26	9.05
2001	0.37	0.07	1.44	0.13	2.01	8.02
2002	0.38	0.07	1.40	0.15	2.00	7.98
2003	0.40	0.07	1.36	0.17	2.00	8.01
2004	0.41	0.07	1.48	0.17	2.12	8.48
2005	0.45	0.07	1.45	0.18	2.16	8.63
2006	0.41	0.06	1.52	0.18	2.17	8.69

[a]Notes: Residential use is primarily roundwood with some waste wood from other sources. Commercial use is a mix of roundwood and wood waste. Industrial use is from pulp liquor and wood waste. Energy is converted to roundwood equivalent using 4 billion cubic feet per quadrillion Btus.
[b]Sources: 1949–1988: (USDE EIA 2001, tables 10.2a, 102b); 1973–2006: (USDE EIA 2010).
[c]Table 6. Value of shipments in wood and paper products industries (NAICS industry codes 321, 322) by region (billion 2005$).
[d]Source: Table 10.

Table 7. Value of shipments for forest products industries by SIC Code 1961–1996, by NAICS code, 1997–2006 (billion 2005$)

Year	Lumber and wood products SIC 24	Paper and allied products SIC 26	Wood furniture from parts of SIC 25	Total wood, paper and furniture industries	Wood products NAICS 321	Paper products NAICS 322	Wood furniture from parts of NAICS 337	Total wood, paper and furniture NAICS industries
1960	–	–	–	–	–	–	–	–
1961	–	96,592	–	–	–	–	–	–
1962	51,657	98,898	–	–	–	–	–	–
1963	60,166	104,396	–	–	–	–	–	–
1964	62,257	108,329	–	–	–	–	–	–
1965	63,848	115,190	–	–	–	–	–	–
1966	64,618	123,051	–	–	–	–	–	–
1967	65,519	122,618	–	–	–	–	–	–
1968	72,227	125,194	–	–	–	–	–	–
1969	74,709	129,989	–	–	–	–	–	–
1970	65,657	124,836	–	–	–	–	–	–
1971	72,001	122,764	–	–	–	–	–	–
1972	111,274	132,047	–	–	–	–	–	–
1973	123,079	144,065	20,625	287,768	–	–	–	–
1974	106,377	165,054	19,704	291,136	–	–	–	–
1975	91,457	151,532	16,328	259,317	–	–	–	–
1976	86,135	143,170	18,603	247,907	–	–	–	–
1977	128,727	167,861	19,862	316,450	–	–	–	–
1978	139,349	170,741	21,693	331,782	–	–	–	–
1979	134,111	175,396	20,235	329,742	–	–	–	–
1980	111,738	172,532	18,399	302,670	–	–	–	–
1981	100,566	172,388	17,775	290,728	–	–	–	–
1982	86,893	161,593	16,632	265,118	–	–	–	–
1983	101,976	166,631	17,706	286,313	–	–	–	–
1984	105,569	179,847	20,248	305,664	–	–	–	–
1985	102,280	171,882	19,806	293,968	–	–	–	–
1986	108,896	177,668	20,471	307,034	–	–	–	–
1987	119,810	187,380	22,750	329,940	–	–	–	–
1988	118,940	202,866	22,275	344,081	–	–	–	–
1989	117,194	207,736	21,768	346,698	–	–	–	–
1990	110,916	197,878	20,465	329,259	–	–	–	–
1991	101,079	186,598	18,268	305,944	–	–	–	–
1992	113,821	185,226	19,715	318,762	–	–	–	–
1993	127,411	180,111	19,191	326,713	–	–	–	–
1994	136,398	189,303	20,330	346,030	–	–	–	–
1995	134,487	222,619	23,460	380,566	–	–	–	–
1996	132,590	199,983	23,758	356,331	–	–	–	–
1997	–	–	–	–	107,652	182,884	31,121	321,657
1998	–	–	–	–	109,242	185,696	33,338	328,275
1999	–	–	–	–	114,394	184,622	34,960	333,975
2000	–	–	–	–	106,233	187,471	35,903	329,607
2001	–	–	–	–	96,216	171,862	33,833	301,911
2002	–	–	–	–	96,697	166,910	36,359	299,966
2003	–	–	–	–	97,776	160,373	35,204	293,353
2004	–	–	–	–	106,924	159,186	35,738	301,847
2005	–	–	–	–	112,095	161,928	34,387	308,410
2006	–	–	–	–	108,891	165,037	35,052	308,980

[a]Sources: SIC 24, 26 1977–2000 (USDC BEA, 2002a); SIC 25 1977–1992 (USDC BOC 1995a, 1995b); SIC 25 1993–1996 (USDC BOC 1998); NAICS 1997–1999 (USDC BOC 2001); NAICS 2000–2006 (USDC BOC 2002–2006); GDP deflator (USDC BEA, 2002b).
[b]Note: Definitions of SIC groups changed somewhat in 1987 and so data before 1987 are not strictly comparable with data for 1987 and after.
[c]Note: Codes used under SIC 24 are 2511, 2517, 2521, and 2541. Codes used under NAICS 337 are 33711, 337122, 337211, and 337212.

Table 8. Value of shipments in paper products industries (NAICS 322) by region (billion 2005$)

	North	South	Pacific coast	Rocky Mountains	Not specified	Total
1997	89	71	19	5	1	185
1998	–	–	–	–	–	196
1999	–	–	–	–	–	198
2000	–	–	–	–	–	196
2001	–	–	–	–	–	183
2002	87	73	19	6	0	185
2003	80	67	17	5	1	170
2004	76	67	17	4	1	165
2005	75	59	17	10	10	170
2006	73	60	17	10	2	163

[a]Sources: USDC BOC 1999, 2004–2010.

Table 9. Value of shipments in wood products industries (NAICS 321) by region (billion 2005$)

	North	South	Pacific coast	Rocky Mountains	Not specified	Total
1997	32	46	23	8	0	109
1998	–	–	–	–	–	115
1999	–	–	–	–	–	122
2000	–	–	–	–	–	111
2001	–	–	–	–	–	180
2002	36	40	21	7	3	107
2003	35	42	20	6	0	104
2004	37	44	22	7	0	111
2005	36	46	21	8	0	112
2006	35	44	20	8	0	107

Sources: USDC BOC 1999, 2004–2010.

Table 10. Value of shipments in wood and paper products industries (NAICS 321, 322) by region (2005$)

	North	South	Pacific coast	Rocky Mountains	Not specified	Total
1997	122	117	42	13	1	295
1998	–	–	–	–	–	311
1999	–	–	–	–	–	320
2000	–	–	–	–	–	307
2001	–	–	–	–	–	363
2002	123	112	40	13	3	292
2003	115	109	37	11	2	274
2004	113	111	39	12	2	276
2005	111	105	38	18	10	283
2006	108	104	38	18	3	270

[a]Sources: USDC BOC 1999, 2004–2010.