SAWMILL PROFILE

By Henry Spelter & Matthew Alderman

New Forest Products Lab report defines the makeup of North America's softwood sawmill industry.

EDITOR'S NOTE: The following is an edited version of the report, "Profile 2005: Softwood Sawmills in the United States and Canada," as published by the USDA Forest Service, Forest Products Laboratory. Research Paper FPL-RP-630. It updates a similar "Profile 2003" report. It will be published in three parts in Timber Processing, with the first part this month on sawmill capacities, employment and employee productivity. Parts two and three will cover Log Sire and Lumber Recovery. and Economic Conditions and Outlook, respectively. The report in its entirety includes state-by-state maps with individual mill locations and capacities.

Capacity was defined as the production limit based on a mill's normal shift schedule rather than a fixed number of shifts. Most large mills run two shifts daily, but many run three and others only one. Shifts also range from the normal eight hours a day to nine or 10 hours and can vary as a result of market conditions. Thus. the potential for physical output may be higher than the numbers reported here. This enumeration also excluded small or seasonal operations, as their contributions to lumber production are mininial.

To make data comparable, they were

Table 1-Summary of capacity and production of U.S and Canadian softwood lumber sawmills, 1999 to 2005

Year	Mills (no.)	Capacity ($\times 10^6 m^3$)	Production ($\times 10^6 m^3$)	Capacity utilization (%)
1999	1,253	167	159	95
2000	1,244	172	160	93
2001	1,209	172	154	89
2002	1,154	174	161	92
2003	1,134	179	164	91
2004	1,097	185	172	93
2005	1,067	189	—	—

Table 2 — Reported capacity estimates

Year	Capacity estimates ($\times 10^6$ m^3) Profile 2001[a]	Profile 2003[b]	Profile 2005[c]
1995	149	149	149
1996	152	152	152
1991	157	157	156
1998	162	162	161
1999	167	169	167
2000	168	173	172
2001	166	173	172
2002	—	174	174
2003	—	174	179
2004	—	—	185
2005	—	—	189

[a]Spelter and McKeever 2001.
[b]Spelter and Alderman 2003.
[c]2005 data are from this report

converted to common international units. For lumber the researcher took board foot volumes at face value and converted them to cubic meters based on 424 board feet (BF) equaling I cubic meter (m^3). This ignores differences between nominal and actual lumber sizes; thus, the metric volumes are also nominal, not actual. Lumber recovery data presented a bigger problem because they are reported in various measures of volume and weight in which the size of the timber affects the result. Accordingly, in converting the disparate units to a common cubic platform, the researchers had to account for the confounding effect of timber size. Thus, unlike with lumber, specific rather than general conversion factors were used.

The information in this study was compiled from a variety of sources that are listed in the original report. Also available in the original report are the various conversion equations and benchmarking formulas.

As of July 2005, the mainstream of the stofwood lumber industry in the U.S. and Canada consisted of about 1,067 sawmills. These sawmills had a combined capacity of 189 million m^3 (80 billion BF), employed about 99,000, produced about 172 million m^3 (nominal, 73 billion BF) of lumber, and in the process consumed about 280 million m^3 of wood. The ca-l pacities of these large, permanent plants are laid out in Table 1. Reported capacity estimates through the years (that are updated as new information becomes available) are shown in Table 2.

As defined above, U.S. and Canadian sawmill industry capacity grew from 148.7 million m^3 (63 billion BF) in 1995 to a projected 188.9 million m^3 (80 billion BF) in 2005 (Table 3). Capacity goes where the resources is and grows gasted where wood is most abundant and wavailable. Thus, British Columbia's capacity rose the most, in particular during the past two years (Table 4) when large volumes of beetle-killed lodgepole pine became available. Once dead, such trees have a limited shelf life for sawing into lumber and need to be processed within five to 10 years, depending on climatic conditions. Several companies expanded mills to allow greater use of this relatively short-term resource.

Western U.S. sawmill capacity also grew strongly within the past three years, recovering ground lost in the early 1990s when reduced government timber sales led many mills to close. Coastal Washington, in particular, had four big greenfield plants started with a fifth on the way. A major incentive for this was consistently lower timber prices for the same species and grades than in nearby Oregon. Growth in the U.S. South was more modest but steady.

Eastern Canadian capacity also showed steady growth through 2004 but recently plateaued. An official assessment of Quebec forestry determined that

Table 3–North American softwood sawmill capacity estimates, 1995 to 2005

	Capacity estimates ($\times 10^6$ m^3)		
Year	United States	Canada	Total
1995	83	66	149
1996	84	67	152
1997	87	69	156
1998	90	71	161
1999	92	76	167
2000	94	78	172
2001	92	80	172
2002	92	81	174
2003	96	83	179
2004	99	87	185
2005	101	88	189
Annual increase (%)	2.0	2.9	2.4

Table 4–Softwood sawmill capacity by region given in volume and indexed to 1999

	Sawmill capacity						
Region	1999	2000	2001	2002	2003	2004	2005
	Volume ($\times 10^6$ m^3)						
U.S. South	42.7	43.9	43.8	43.9	45.0	46.4	47.0
U.S. North	5.2	5.2	4.7	4.9	4.6	4.5	4.6
U.S. West	43.6	45.2	43.5	43.8	46.4	48.3	49.5
BC[a]	35.9	36.6	36.8	37.7	39.2	42.1	43.5
Other Canada	39.7	41.1	42.8	43.8	44.1	44.5	44.3
Total	167.2	171.9	171.6	174.0	179.3	185.9	188.9
	Indexed to 1999						
U.S. South	1.00	1.03	1.03	1.03	1.05	1.09	1.10
U.S. North	1.00	1.00	0.89	0.93	0.89	0.87	0.88
U.S. West	1.00	1.04	1.00	1.00	1.06	1.11	1.14
BC	1.00	1.02	1.02	1.05	1.09	1.17	1.21
Other Canada	1.00	1.03	1.08	1.10	1.11	1.12	1.11
Total	1.00	1.03	1.03	1.04	1.07	1.11	1.13

[a]BC, British Columbia.

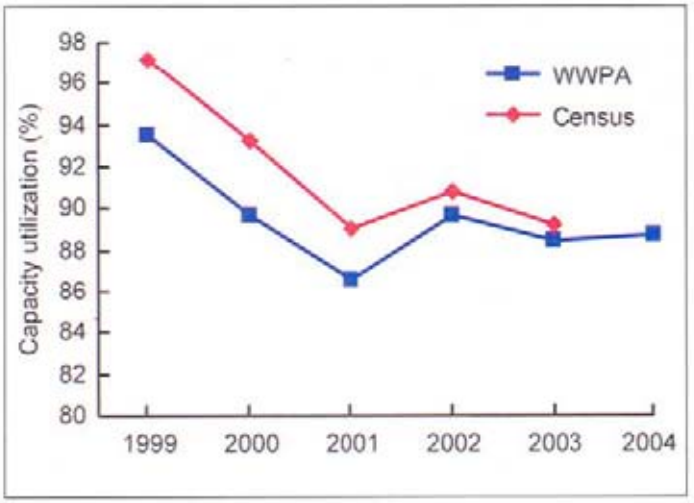

Figure 1—Capacity utilization estimates for U.S. South

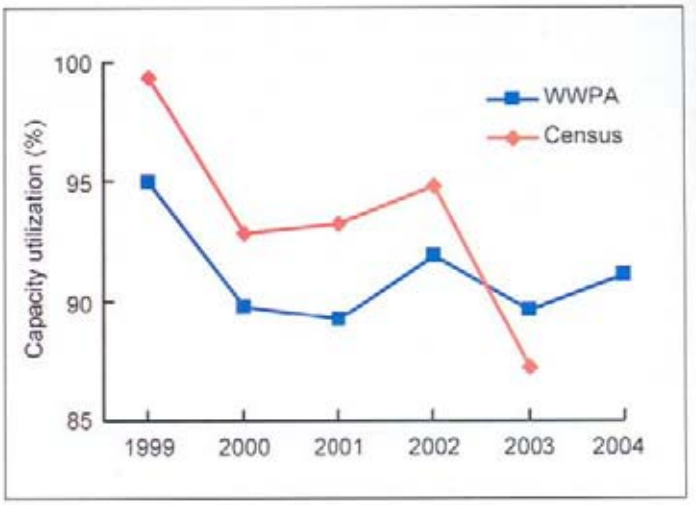

Figure 2—Capacity utilization estimates for U.S. West

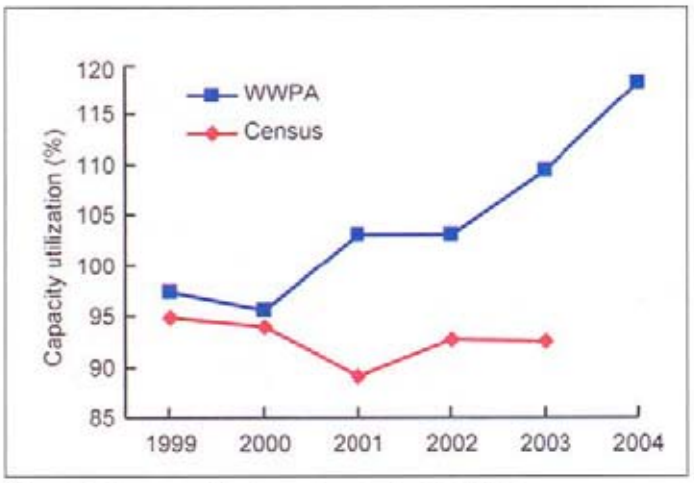

Figure 3—Capacity utilization estimates for U.S. North

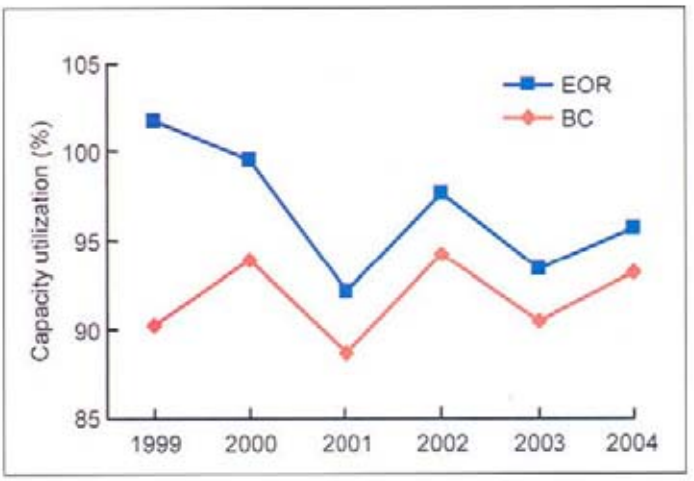

Figure 4—Capacity utilization east of Rockies, British Columbia

Table 5—North American softwood sawmill production estimates by different sources

Year	Production estimates ($\times 10^6$ m^3) Statistics Canada	U.S. WWPA[a]	U.S. Census Bureau	Difference between U.S. estimates (%)
1995	66.1	75.0	78.0	4.0
1996	67.3	77.5	80.4	3.7
1997	69.0	81.8	83.7	2.3
1998	71.2	81.8	84.7	3.5
1999	75.6	86.4	89.8	3.9
2000	77.8	84.9	87.7	3.3
2001	79.6	81.6	83.7	2.6
2002	81.3	84.6	85.8	1.5
2003	83.1	86.4	84.8	–1.8
2004	85.7	90.5		

[a]Western Wood Products Association.

forests there have been overcut. New policies will lead to a 20% cutback in harvesting over the next two years. thus dimming further growth prospects in Eastern Canada.

Among the producing regions, only the U.S. North showed a loss, as the closure of several large mills in Maine was not offset by new construction. Log shortages, intensified by competition for logs from mills in Canada, were reasons cited for limiting expansion (Table 4).

Capacity data are most useful for assessing market conditions in connection with production figures. Production data in Canada are compiled by a government statistical agency (Statistics Canada), whereas in the U.S. both the government (U.S. Census Bureau) and the Western Wood Products Assn. (WWPA) gather such information. Table 5 compares these various production estimates. For most of the years, data from the Census. which theoretically cover all U.S. producing sawmills, show higher volumes than the WWPA

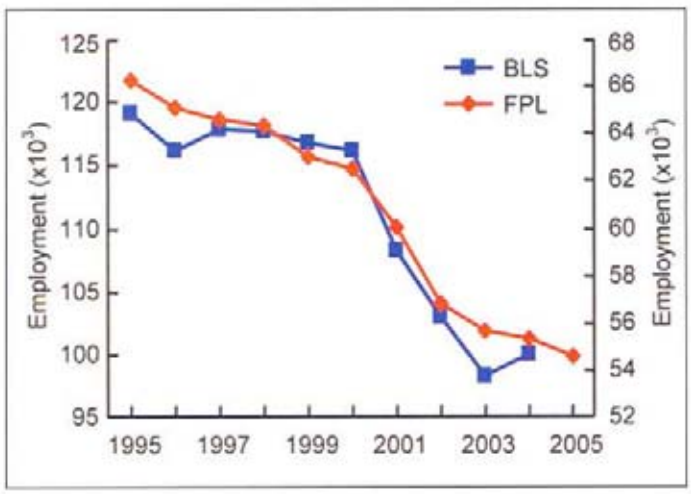

Figure 5—Employment by all U.S. sawmills (Bureau of Labor Statistics (BLS), left scale), U.S. softwood sawmills (Forest Products Laboratory (FPL), right scale)

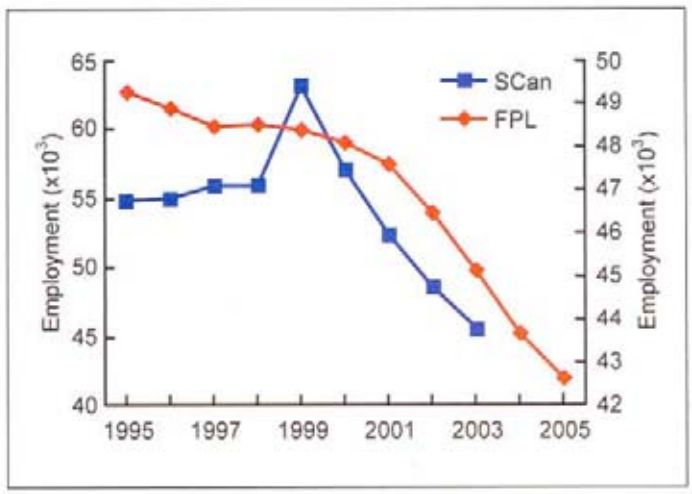

Figure 6—Employment by all Canadian sawmills (Statistics Canada, (SCan), left scale), and Canadian softwood sawmills (Forest Products Laboratory (FPL), right scale)

data. Over time, though, the differences have tended to decline, and in 2004 the Census estimate was lower.

To investigate these production differences, we combined them with our estimates of capacity to calculate capacity utilization rates (Figures 1 to 3). For the South, both production data fit within our estimates of capacity (utilization rates below 1) and also showed similar movements in year-to-year changes, with the gap between them narrowing in recent years. Likewise, both estimates of Western output were within capacity and showed relatively stable relationships to each other through 2002. However, the preliminary 2003 Census-based data fell abruptly. Because the Census often revises its estimates in the year following initial publication, this discrepancy may disappear in the final figures.

The largest systematic divergence occurred in the North. where WWPA estimates relative to the Census and our capacity estimates have risen over time. Approximately six large mills, mostly in Maine, produce most of the lumber in the North. The reported capacities and production volumes of

these mills have not shown the kinds of increases implied by the WWPA estimates. Therefore, if more production is coming from the region, its source must be smaller operations, some of whose capacities we do not account for. If that is the case, however, the Census. which canvasses all operating mills, should have registered these volumes. The differences between these data remain to he resolved.

The ratios between Statistics Canada productions and our capacities are shown in Figure 4. The production data fell below our capacity figures in each year except for 1999, when production exceeded our capacity east of the Rockies

EMPLOYMENT OUTPUT

In the United States. the U.S. Bureau of Labor Statistics (2004) tracks combined employment in sawmills, planing mills (both soft- and hardwoods), and wood preservation plants. By contrast, the data in this report are limited to softwood mills only and as such complement the U.S. Bureau of Labor Statistics' more general data.

By employment we mean only those who are directly involved in procuring, processing, administering and selling wood at a site. Remote location staffs of large firms, loggers and haulers, and those employed by other non-lumber producing facilities within a complex fall outside of our definition, and we have attempted to remove data associated with them where practical.

On that basis. we estimated employment in U.S. softwood sawmills in 2004 at 55,300 compared to 66,200 in 1995. This 16% loss over the nine years closely parallels the more general data available from the U.S. Bureau of Labor Statistics, which also shows a 16% decline, from 119,000 to 100,000 (Figure 5)

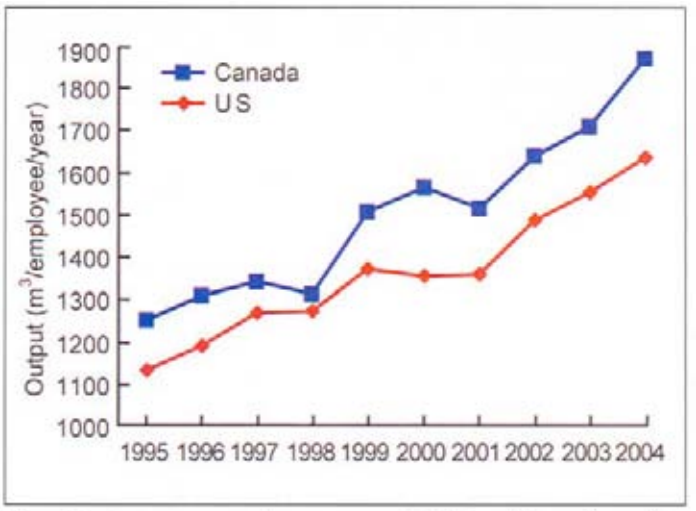

Figure 7—Output per employee per year in U.S. and Canadian mills

Our estimates of Canadian softwood sawmill employment were about 49,200 in 1995 compared to 43,500 in 2004, for a decline of 12%. This compares with estimates for all sawmills from Statistics Canada of 51,900 in 1995 and 45,600 in 2003, a 17% decline (Figure 6).

In terms of output per employee, our numbers indicate about a 45% improve-

ment in the U.S. and 50% in Canada (Figure 7). Canadian labor productivity has tended to be 5% to 15% higher than that of U.S. mills, and a closer look at 2004 productivities by type of mill indicates some reasons why (Table 6). Labor productivity (represented here against capacity) is least in value-added board, cedar, and specialty operations (Columns I and 5) where greater product variety and thinner pieces require more labor per unit of output. Productivity in U.S. mills was lower in both categories. On the other hand, productivity is greatest in dimension mills, where production focuses on more standardized. high-volume commodities (Column 2).

Access to technology is unhindered and spreads freely across borders, resulting in no statistically significant differences between U.S. and Canadian dimension mills. However, studs, even though they are similar high-volume commodities. showed higher productivity in the U.S. The explanation lies partly in the raw material, which is smaller in boreal Canada where harsh growing conditions limit tree sizes. Smaller logs affect throughput per log and labor productivity. Also, many Western U.S. mills sell lumber green, requiring fewer personnel to handle drying. Finally, timber mills, which are more prevalent in the US., show about equal productivities.

Next month: Log Size and Lumber Recovery **TP**

Table 6–2004 North American softwood sawmill employment and productivity

	Board & cedar	Dimension	Stud	Timbers	Specialty & unknown
U.S.					
Employees (no.)	8,300	33,000	6,300	2,560	5,100
Capacity ($\times 10^6$ bf/yr)	3,470	29,400	6,120	1,320	1,780
Capacity per employee ($\times 10^6$ bf/yr)	416	891	968	516	349
Canada					
Employees (no.)	4,100	26,100	8,400	530	4,330
Capacity ($\times 10^6$ bf/yr)	2,040	25,000	6,840	250	2,520
Capacity per employee ($\times 10^6$ bf/yr)	498	958	812	475	582

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