Estimating Sawmill Processing Capacity for Tongass Timber: 2003 and 2004 Update

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Abstract

In spring 2004 and 2005, sawmill capacity and wood utilization information was collected for selected mills in southeast Alaska. The collected information is required to prepare information for compliance with Section 705(a) of the Tongass Timber Reform Act. The total capacity in the region (active and inactive mills) was 370,350 thousand board feet (mbf) Scribner log scale during both calendar years (CYs) 2003 and 2004. The capacity of active mills for the same periods was 255,350 mbf. This is a 7.4-percent increase in active capacity from CY 2002 (237,850 mbf) to CY 2004. The actual volume of material processed during CY 2004 was 31,027 mbf Scribner log scale. This is a 21.9 percent reduction over CY 2002 (39,702 mbf Scribner log scale).

Keywords: Alaska sawmills, mill capacity, timber usage.

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Introduction

The Alaska National Interest Lands Conservation Act (ANILCA 1980) provided funds to maintain the supply of timber from the Tongass National Forest at a rate of 4,500 million board feet (mmbf) per decade. Ten years later, the Tongass Timber Reform Act (TTRA 1990) amended ANILCA and directed the Secretary of Agriculture to "provide a supply of timber from the Tongass National Forest which (1) meets the annual market demand for timber from such forest and (2) meets the market demand from such forest for each planning cycle." The reference to planning cycle demand and the National Forest Management Act (NFMA 1976) places an additional limitation on demand. Demand cannot exceed the sustainable yield and other planning requirements imposed by National Forest Service Regulations.

The record of decision (ROD) for the 1997 Tongass Land and Resource Management Plan (USDA FS 1997) stated, "The Forest Service will develop procedures to ensure that annual timber sale offerings are consistent with market demand." The Morse methodology (Morse 2000; USDA FS 2000, 2005) outlined procedures to satisfy the ROD commitment. Although a complete description of the process defined by Morse (2000) is beyond the scope of this report, one of the key assumptions of the procedure is that mill capacity is the upper limit to the annual market demand for timber from the Tongass. The objective of this report is to supply the information required by the Morse methodology. This is done by presenting results of the calendar year (CY) 2003 and 2004 surveys that were conducted to determine characteristics of the southeast Alaska sawmill industry that depends on timber from the Tongass National Forest.

Methods

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Since 2000, updated estimates of sawmill capacity and timber usage in southeast Alaska have been obtained through surveys. To assure a degree of consistency, the same list of active and inactive mills in southeast Alaska has been used since the CY 2000 survey. That list reflected the region's largest and most active mills at that time; they constituted the majority (estimated 80 percent) of the total capacity of all mills in the region. There have been no large new mill installations since 2000. Thus, that same list was used as the basis for defining the population for the CYs 2003 and 2004 surveys in this report. However, firms have been dropped from consideration when equipment and log inventory were removed from the plant site. For purposes of future capacity reports, firms will be added to the industry capacity estimates when equipment is installed onsite, an inventory of logs is onsite, and product is produced.

In spring 2004 and 2005, data for the previous calendar years were collected directly from producers. Sampling was conducted onsite when possible. If onsite visits were not possible, surveys were conducted via telephone interviews. Respondents were asked to supply information relative to any equipment purchases or modifications that would affect sawmill capacity and the volumes of logs that were processed (primary manufacture) during the respective periods. A summary of the basic information (mill name, location, description, status, and number of employees) for the established mills at the time of the survey is presented in table 1.

Information collected during the survey was as follows:

- Mill name
- Owner's name(s)
- Mill location
- Mill description (equipment)
- Number of employees
- Mill status (active, inactive, or uninstalled)
- Percentage over or underrun
- Sources of logs processed by the mill

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- Estimated mill capacity
- Actual mill output in calendar year
- Products produced
- Market information (where sold)

Mill Capacity Conventions

Terms of the Trade, 4th edition (Random Lengths 2000) contains the following definition of sawmill capacity: "1. The maximum production capability of a mill under optimum conditions. Usually expressed in board or square feet per shift or year...." Estimates of annual capacity are most commonly based on 500 eight-hour shifts per year (Stevenson 1999). Depending on the situation, capacity estimates may be in terms of raw material input or product output. In this report, all capacity values and reported board foot volumes are presented in terms of raw material input (board feet, Scribner decimal C log scale). Given this fact, sawmill output will differ depending on equipment used to produce lumber, sawing methods, and product line. The relationship between input and output will differ and is referred to as mill overrun or underrun (Random Lengths 2000).

Sawmills and other forest products manufacturing plants are composed of various machines and processing steps. In a well-designed mill, the processing speeds of individual machines and production steps have been taken into consideration (balanced) to generate a product at a desired rate. Total production capacity, however, is a function of the slowest machine or step in the production process. The capacity of a facility may also be limited or vary at different stages, depending on the raw material being processed or products being produced during a specific period (i.e., lumber for export versus domestic markets). Regardless, operators and consultants with knowledge of equipment and products can develop reasonable capacity estimates for existing and new mills. By definition, design capacity is the maximum output that can possibly be attained (Stevenson 1999).

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Textbooks concerned with production and operations management of the firm define capacity as follows:

> **Design capacity**--The maximum rate of output achieved under ideal conditions. **Effective capacity** is usually less than design capacity (it cannot exceed design capacity) owing to realities of changing product mix, the need for periodic maintenance of equipment, lunch breaks, coffee breaks, problems in scheduling and balancing operations, and similar circumstances. **Actual output** cannot exceed effective capacity and is often less because of machine breakdowns, absenteeism, shortages of materials, and quality problems, as well as factors that are outside the control of the operations managers. (Stevenson 1999)

In this report, several other definitions of capacity are used because we are concerned with the total capacity of firms in the region. **Total design capacity** of the firm is defined in the conventional manner. In the context of the industry, it is the total of all active and inactive firms in the region. **Active capacity** is the design capacity of all firms that manufactured products during the period. **Actual mill output** is the level of production truly achieved. Actual output cannot exceed active design capacity. Factors and conditions that may reduce design capacity include machine breakdown, employee absenteeism, shortage of raw material, defective output, product line, and other problems that cannot be controlled by management.

The industry standard for estimating capacity, based on volume of material used during 500 eight-hour shifts per year, has been used in this publication. When considering the sawmill industry, double shifts do not necessarily double the mill design capacity. In many mills, the evening shift may resaw material rejected by the day shift.

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Results and Discussion

Of the 20 original sawmills selected for inclusion in the TTRA timber demand survey in 2001, the CY 2004 survey determined that equipment had been removed from four mill sites (uninstalled). Of the remaining 16 mills, 13 were active and 3 were inactive in CYs 2003 and 2004. Total estimated design capacity and usage for CYs 2003 and 2004 are presented in table 2. Additional tables have been prepared to summarize mill production by species (table 3), mill production by product (table 4), sources of logs processed (table 5), and destinations of manufactured products (table 6). Mill information has been aggregated to provide industry-level information for all firms in southeast Alaska.

The listed tables present information for CYs 2003 and 2004. Tables summarizing specific data for CYs 2000 and 2002 are available in Kilborn et al. (2004). Data from all four calendar years are presented graphically in figures 1 through 6. The total capacity of active mills and volume of logs sawn were both greatly reduced from CY 2000 to CY 2002; however, since CY 2003, these figures have maintained steady levels (fig. 1 and 2). Western hemlock (*Tsuga heterophylla* (Raf.) Sarg.) remains the primary species of logs processed by southeast Alaska mills (fig. 3). As shown in figure 4, lumber continues to be the product with the greatest volume manufactured by these mills; although, in the past 2 years the percentage of cants production has increased. Since CY 2000, the percentage of processed logs coming from national forest sources has decreased, whereas there has been an increase in logs from the state lands (fig. 5). Figure 6 shows that the main shipping destination of southeast Alaska forest products continues to be other states within the United States.

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There were few changes in design capacity or actual production from CY 2003 to CY 2004. The estimated industry design capacity for both calendar years was 370,350 thousand board feet (mbf) Scribner log scale. When compared with CY 2002 (453,850 mbf), this is a reduction of 18.4 percent. However, the CY 2004 active capacity was 255,350 mbf, an increase of 7.4 percent over CY 2002. Actual mill output during CY 2003 was 32,005 mbf and during CY 2004 was 31,027 mbf. This is a 21.9 percent reduction between CYs 2002 and 2004.

Conclusions

During the past 10 years, the forest products industry in southeast Alaska has been exposed to tremendous change. The integrated industry that provided all grades of timber became outdated. At this time there are limited markets for chips produced from low-grade logs. The traditional foreign markets that were served by the industry underwent major changes, including depressed economic conditions and a major reduction in housing construction in Japan. Substantial shifting of production operations from nations with high-cost labor to countries with lower labor costs has also been changing the markets throughout the world. However, it appears that in CYs 2003 and 2004 the rate of decline in timber usage by southeast mills has diminished considerably.

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Literature Cited

Alaska National Interest Lands Conservation Act [ANILCA] of 1980; 16 U.S.C. 3101 et seq. (1988).

Kilborn, K.A.; Parrent, D.J.; Housley, R.D. 2004. Estimating sawmill processing capacity for Tongass timber. Res. Note PNW-RN-545. Portland, OR: U.S. Department of Agriculture, Forest Service, Pacific Northwest Research Station. 12 p.

Morse, K.S. 2000. Responding to the market demand for Tongass timber: using adaptive management to implement Sec. 101 of the Tongass Timber Reform Act. R10-MB-413. Juneau, AK: U.S. Department of Agriculture, Forest Service, Alaska Region. 47 p. http://fsweb.r10.fs.fed.us/staffs/fm/documents/morse_april_2000_ttra.doc. (August 24, 2005).

National Forest Management Act of 1976 [NFMA]; Act of October 22, 1976; 16 U.S.C. 1600.

Random Lengths. 2000. Terms of the trade. 4th ed. Eugene, OR: Random Lengths Publications, Inc. 423 p.

Stevenson, W.J. 1999. Production operations management. 6th ed. Boston, MA: Irwin/McGraw-Hill. 912 p.

Tongass Timber Reform Act of 1990 [TTRA]; Public Law 101-626, 104 Stat. 4426.

U.S. Department of Agriculture, Forest Service [USDA FS]. 1997. Tongass land and resource management plan revision record of decision. R10-MB-338a. Juneau, AK: U.S. Department of Agriculture, Forest Service, Alaska region. 44 p.

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U.S. Department of Agriculture, Forest Service [USDA FS]. 2000. Tongass National Forest timber sales procedures: using information about market demand for schedule of FY 2001 timber offerings. Juneau, AK: U.S. Department of Agriculture, Forest Service, Alaska region. 17 p. http://fsweb.r10.fs.fed.us/staffs/fm/plans_info.shtml. (August 24, 2005).

U.S. Department of Agriculture, Forest Service [USDA FS]. 2005. Tongass annual market demand 2005: [Excel Spreadsheet]. Juneau, AK: U.S. Department of Agriculture, Forest Service, Alaska region. http://fsweb.r10.fs.fed.us/staffs/fm/documents/TimberDemand2005_Final.xls. (August 24, 2005).

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