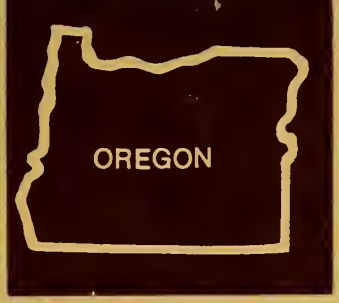

PACIFIC NORTHWEST FOREST AND RANGE EXPERIMENT STATION

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EMPLOYMENT IMPLICATIONS OF PROJECTED TIMBER OUTPUT IN THE DOUGLAS-FIR REGION, 1970-2000

by

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ABSTRACT

The demand for timber in the United States is increasing. Under present levels of timber management, the timber products output in the Douglas-fir region has been projected to decline by the year 2000. Based on these projections and on estimates of changing industry mix and increased labor productivity, employment in the timber-based industries in the Douglas-fir region is projected to drop 45 percent between 1970 and the year 2000. Employment-wood consumption relationships are a major factor influencing employment projections, although declining timber products output and a high level of log exports are also important.

FOREST SERVICE - U.S. DEPARTMENT OF AGRICULTURE - PORTLAND, OREGON

INTRODUCTION

This report presents estimates of timber-based employment associated with the level of timber products output projected for the Douglas-fir region in the year 2000. The estimates of timber products output are those prepared for inclusion in the national timber appraisal, "The Outlook for Timber in the United States."[1/] The key assumptions behind the projections are an increasing demand for timber products and a continuation of the present level of forest management. Under these assumptions, timber supply is projected to decline in the Douglas-fir region and will be a limiting factor to the development of the timber economy.

The key assumptions behind the estimates of timber-based employment associated with the projected levels of timber products output are changes in industry mix and labor productivity--expressed as changing employment-wood consumption ratios--and increasing log exports.

Because of the particular significance of timber products output expectations, trends in industry mix and labor productivity, and log export assumptions, the sensitivity of the projected level of employment to each of these factors is analyzed in the second part of the report. The alternative assumptions used in the sensitivity analysis are not meant to be used for viable employment alternative projections.

BASIC PROJECTIONS

TIMBER PRODUCTS OUTPUT

The Douglas-fir region timber supply estimates for 1970 and 2000 are a summation of individual projections for lands owned and managed by forest industry, farm and miscellaneous private owners, National Forests, and other public owners. For this analysis the continuation of present levels of forest management was assumed. Thus, the present allowable cut has been projected for public lands. On industrial timber lands, it was assumed that the harvest would gradually decrease until a balance between growth and cut was achieved. On farm and miscellaneous private lands, it was assumed that harvest would gradually increase in the Douglas-fir region, leading to a balance between growth and cut.

[1/] USDA Forest Service. The outlook for timber in the United States. Forest Resource Report No. 20, 367 p., 1973.

The projections of timber products output are as follows:

	1970		2000	
	MM cubic feet	MM board feet (Int. 1/4-inch)	MM cubic feet	MM board feet (Int. 1/4-inch)
Western Washington	1,192.6	7,543.8	954.2	5,342.8
Western Oregon	1,184.7	8,115.5	1,071.8	6,495.5
Total Douglas-fir region	2,377.3	15,659.3	2,026.0	11,838.3

In western Oregon, softwood timber products output from forest industry lands is projected to decline 73 percent during the 1970-2000 period. Softwood production is projected to increase 105 percent from farm and miscellaneous private lands, 22 percent from other public lands, and 16 percent from National Forest lands.

In western Washington, softwood timber products output on forest industry lands is also projected to decrease (58 percent) between 1970 and the year 2000. Declines are projected for farm and miscellaneous private lands (5 percent) and other public lands (2 percent). National Forest timber products output is projected to increase 25 percent by the year 2000.

EMPLOYMENT

Table 1 shows the basic forest-based employment in 1970 and projections for the year 2000 in western Oregon and western Washington. Employment decreases in both States, but the drop is greatest in western Washington. In 1970, an estimated 121,305 persons were employed in the lumber and wood products, paper and allied products, and the log export industries in the Douglas-fir region. Employment is projected to drop 45 percent by the year 2000 to 67,120 employees.

The 1970 data on employment in the lumber and wood products and paper and allied products industries are from the employment departments in the States of Washington and Oregon. Estimates of employment associated with log exports are based on known labor productivity factors.[2/]

[2/] Thomas C. Adams and Thomas E. Hamilton. Value and employment associated with Pacific Northwest log exports to Japan. USDA Forest Service Research Paper PNW-27, 15 p. Pacific Northwest Forest and Range Experiment Station, Portland, Oregon, 1965.

Table 1.--*Average annual forest-based employment in the Douglas-fir region by State and area, 1970 and 2000*

State, area, and industry	Number of employees	
	1970	2000
Western Washington:		
Lumber and wood products; paper and allied products	54,699	23,220
Log exports	1,822	2,630
Total	56,521	25,850
Western Oregon:		
Lumber and wood products; paper and allied products	64,479	40,840
Log exports	305	430
Total	64,784	41,270
Total Douglas-fir region	121,305	67,120

Trends in employment-wood consumption relationships, including labor productivity and industry mix, are developed from a previous study by Wall.[3/] That study projected wood consumption and employment in the forest products industries to the year 2000 by the 12 subregions of the Columbia-North Pacific Region. In that study, historical employment-wood consumption relationships were developed for each industry group. Employment projections for each industry group were added together to obtain regional employment projection totals. These aggregate relationships, adjusted for a different log export projection, are used in this study.

3/ Brian R. Wall. Projected developments of the timber economy of the Columbia-North Pacific Region. USDA Forest Service Research Paper PNW-84, 87 p., illus. Pacific Northwest Forest and Range Experiment Station, Portland, Oregon, 1969.

LOG EXPORTS

Log exports are important to the Douglas-fir region; the assumed export levels in this employment analysis come from the new national study. Softwood log exports in the United States were 3.4 billion board feet (International 1/4-inch rule) in 1970. Under the assumption of constant relative prices, softwood log exports in the Nation are projected to be 4.5 billion board feet in the year 2000. For the purposes of this analysis, it has been assumed that the Douglas-fir region will maintain its 1970 share of the national log export market in the year 2000, with about 85 percent of the Nation's log exports originating in the Douglas-fir region. Under this assumption, log exports in the year 2000 from timber grown in western Washington would amount to 3.29 billion board feet (International 1/4-inch rule), and exports from western Oregon would be 535 million board feet. Under these assumptions, a substantial proportion of the harvest in western Washington would be bound for the log export market, having a substantial impact on domestic forest-based employment.

SENSITIVITY OF EMPLOYMENT PROJECTIONS

The employment projections have been examined to see how they change with different assumptions about employment-wood consumption relationships, levels of timber products output, and log exports. In the test, one factor has been varied while the others have been held constant. The resulting difference in employment level thus can be attributed to the factor which has been varied.

HOW WOULD EMPLOYMENT BE AFFECTED IF THE WOOD-CONSUMPTION RELATIONSHIP WERE FROZEN OVER TIME?

Labor and wood are two of the inputs into the forest products manufacturing process. Studies show that these relationships for individual industry segments have been changing, reflecting changes in labor productivity, hours worked, etc. Labor productivity has been increasing in sawmills and planing mills, veneer and plywood plants, and pulp and paper plants. This reflects skill levels, technology, substitution of one factor of production for another, utilization of capacity, and managerial ability. Employment-wood consumption ratios change as the industry mix changes and with increasing use of woods and mill residues. The assumptions used in the basic employment projections reflect the declining trends in these aggregate relationships.

If the 1970 employment-wood consumption relationships were frozen but other factors allowed to change as in the basic projection, the analysis shows that in the Douglas-fir region forest employment in the year 2000 would be 47 percent greater than in the basic projection. Increases would occur in both western Washington and western Oregon.

The results of this analysis are:

	Year 2000 employment (Employees)
Western Washington:	
Basic projection	25,850
Projection with constant 1970 employment-wood consumption ratio	40,600
Employment change	+14,750
Western Oregon:	
Basic projection	41,270
Projection with constant 1970 employment-wood consumption ratio	58,260
Employment change	+16,990
Douglas-fir region:	
Employment change with constant employment-wood consumption ratio	+31,740

WHAT IF TIMBER PRODUCTS OUTPUT REMAINED CONSTANT?

This analysis shows that if the output of timber were held at the 1970 level through the year 2000, employment in the year 2000 would be 16 percent above the Douglas-fir region base projection. Western Washington employment would be 25 percent higher than in the base projection, and western Oregon employment would be 9 percent higher.

The results of this analysis are:

	Year 2000 employment (Employees)
Western Washington:	
Basic projection	25,850
Projection with output constant	32,400
Employment change	+6,550
Western Oregon:	
Basic projection	41,270
Projection with output constant	45,210
Employment change	+3,940
Douglas-fir region:	
Employment change associated with constant timber output	+10,490

SENSITIVITY TO LOG EXPORT ASSUMPTIONS TESTED

The effects of log exports on employment were tested with three questions. What are the employment effects: if the log exports remain at 1970 levels; if log exports drop to zero in the year 2000 and all timber is domestically manufactured; and if log exports drop to zero in the year 2000, but the volume which would have been exported is not available for domestic markets?

WHAT IF LOG EXPORTS REMAIN AT 1970 LEVELS?

The analysis reveals that if log exports were limited to the 1970 levels and the extra timber products were manufactured domestically, forest-based employment would be 10 percent greater for the year 2000 than it was for the basic projection where log exports were higher. Western Washington has the largest increase in employment under this assumption.

The results are presented in the following tabulation:

	Year 2000 employment (Employees)
Western Washington:	
Basic projection	25,850
Projection with log exports at 1970 level	31,740
Employment change	+5,890
Western Oregon:	
Basic projection	41,270
Projection with log exports at 1970 level	42,250
Employment change	+980
Douglas-fir region:	
Employment change with log exports held at 1970 level	+6,870

WHAT WOULD HAPPEN IF LOG EXPORTS DROPPED TO ZERO?--TWO EXTREMES EXAMINED

The question is relevant but difficult. The drop in log exports could occur if the international demand for logs in the Douglas-fir region were not as forecast in the new national study or if log exports were restricted by legislation. The impact on employment is uncertain and the subject of debate. For example, in testimony before Congress on the log export issue, the question has been raised as to what would happen to the volume of exportable logs which would not be exported if log exports were banned. This is a matter of conjecture, for nobody knows for sure whether the exportable logs would be processed domestically or not. For the purposes of this sensitivity analysis, two extreme cases of zero log exports are examined--the impact on employment of (1) domestic manufacture of exportable logs, and (2) no use of exportable logs.

WHAT IF LOG EXPORTS DROPPED TO ZERO AND ALL THE TIMBER PRODUCTS OUTPUT WERE PROCESSED DOMESTICALLY IN THE YEAR 2000?

The following tabulation shows this employment impact:

	Year 2000 employment (Employees)
Western Washington:	
Basic projection	25,850
Projection with zero log exports with all logs processed domestically	36,680
Employment change	+10,830
Western Oregon:	
Basic projection	41,270
Projection with zero log exports with all logs processed domestically	43,470
Employment change	+2,200
Douglas-fir region:	
Employment change with all logs processed domestically	+13,030

Under this assumption forest-based employment would be 19 percent greater than the basic projection which assumed increased log exports. Western Washington forest-based employment would be 42 percent greater than it was under the assumptions of the basic projection.

WHAT IF LOG EXPORTS DROPPED TO ZERO BUT THE EXPORTABLE LOGS WERE NOT AVAILABLE FOR DOMESTIC MANUFACTURE IN THE YEAR 2000?

The employment impacts of this assumption are summarized in the following tabulation:

	Year 2000 employment (Employees)
Western Washington:	
Basic projection	25,850
Projection with zero log exports, with logs not available to domestic markets	20,526
Employment change	-5,324
Western Oregon:	
Basic projection	41,272
Projection with zero log exports, with logs not available to domestic markets	40,407
Employment change	-865
Douglas-fir region:	
Employment change with exportable logs not processed or exported	-6,189

Forest-based employment in the Douglas-fir region in this case would be 9 percent lower than the basic projection which assumed increasing log exports. The loss in employment occurs mostly in western Washington and reflects both exporting jobs and logging jobs associated with log exports.

SUMMARY AND DISCUSSION

With continuation of present levels of forest management, the timber products output in the Douglas-fir region will decline by the year 2000. Based on this projection and estimates of changing industry mix and labor productivity, employment in the timber-based industries is projected to drop 45 percent between 1970 and the year 2000 in the Douglas-fir region. These projections reflect a large volume of logs being consumed by the log export market.

Sensitivity analysis reveals that the employment-wood consumption relationship is the major factor accounting for the projected employment decline. Economic forces largely determine the change in industry mix and increasing labor productivity which will act to reduce employment over time. Such changes must continue if Douglas-fir region forest products industries are to remain competitive.

The projected decline in timber products output is an important determinant in the projected drop in employment. This decline and the employment pattern associated with it could be altered by changing the harvesting schedules of old-growth timber, but the possibilities are limited by the supply. In an old-growth timber economy such as we have in the Douglas-fir region, employment is closely related to the rate at which we draw on our reservoir of timber inventory.

Accelerated forest management and forestry employment have not been examined in this study. Management activities are labor intensive, and accelerated management would increase employment in the forestry sector. To the extent that intensive forest management does take place and results in increased output in the year 2000, it could also lessen the indicated decline in employment in the industrial sector.

Analysis suggests that the level of log exports will have an impact on domestic timber-based employment. Log export levels can be altered by economic forces or changes in public policy. If log exports are reduced, the question is how many of the exportable logs will go to domestic manufacture and generate employment. The volume of exportable logs which would be available for domestic manufacture depends on economic forces and landowner decisions. If log exports decline by the year 2000 and the logs which would have been exported were processed in the Douglas-fir region, employment would be higher than under the basic employment projection. If log exports fall to zero and the exportable logs were not domestically manufactured, projected employment would be less than the basic projection for the year 2000.

The mission of the PACIFIC NORTHWEST FOREST AND RANGE EXPERIMENT STATION is to provide the knowledge, technology, and alternatives for present and future protection, management, and use of forest, range, and related environments.

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2. Development and evaluation of alternative methods and levels of resource management.
3. Achievement of optimum sustained resource productivity consistent with maintaining a high quality forest environment.

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