

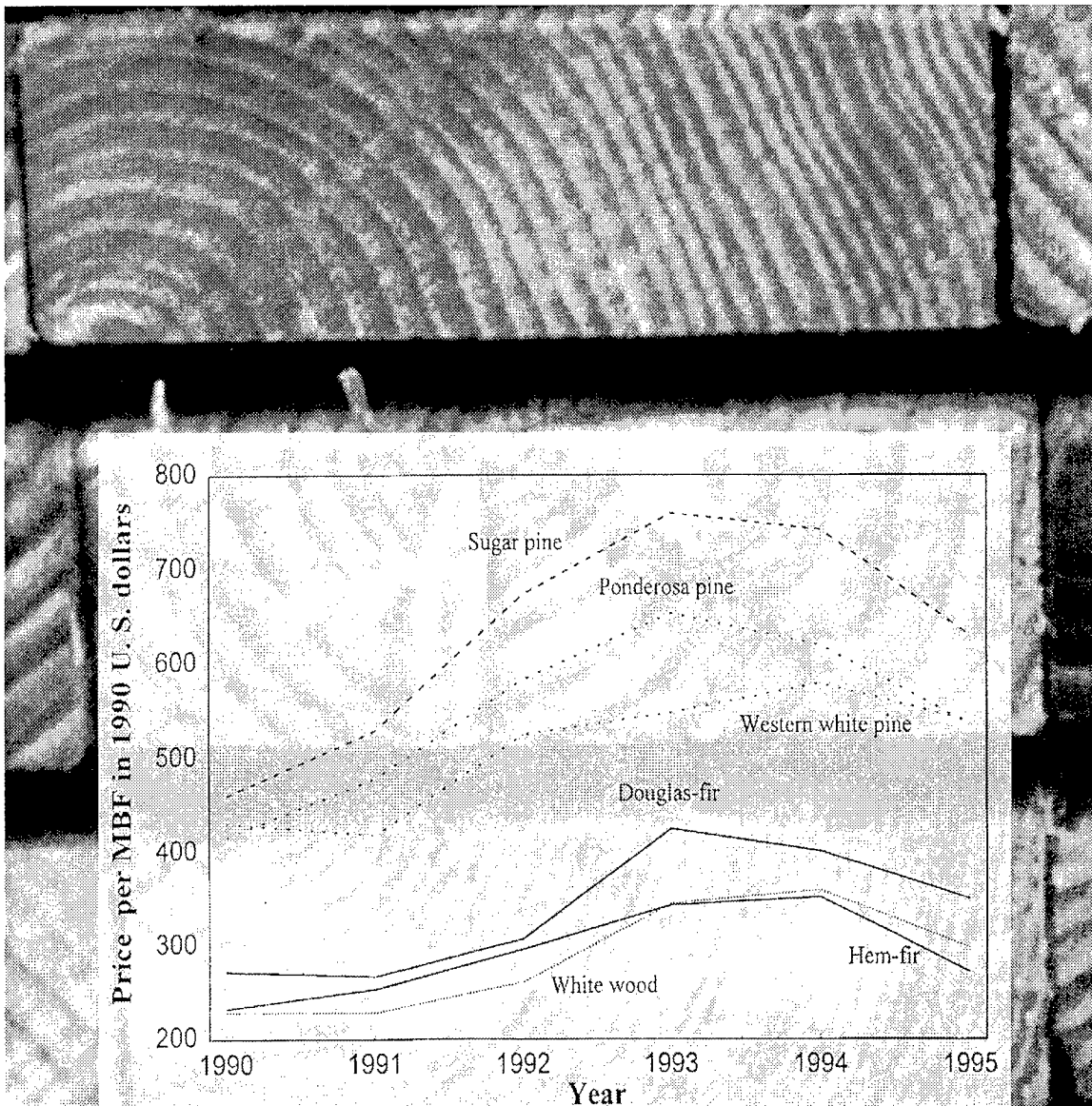


# Composition, Volume, and Prices for Major Softwood Lumber Types in Western Oregon and Washington, 1971-2020



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## Abstract

**Weigand, James F. 1998.** Grade composition, volume, and prices for major softwood lumber types in western Oregon and Washington, 1971-2020. Res. Pap. PNW-RP-509. Portland, OR: U.S. Department of Agriculture, Forest Service, Pacific Northwest Research Station. 61 p.

An analysis of lumber prices provided regressions for price trends during the period 1971-95 for composite lumber grades of major timber species found in the Pacific Northwest west of the crest of the Cascade Range. The analysis included data for coastal Douglas-fir and hem-fir lumber; coastal and inland Pacific Northwest ponderosa, sugar, and western white pines; and inland Pacific Northwest and Rocky Mountain lodgepole pine. Future prices of grades by species group are based on these price trends and the latest average regional lumber values established in the Timber Assessment Market Model (TAMM). Land managers can use the price projections in financial analyses of management practices that are designed to affect the quality of timber resources.

Keywords: Douglas-fir, hem-fir, lodgepole pine, lumber prices, ponderosa pine, price trends, sugar pine, Timber Analysis Market Model, western white pine, white woods.

## Summary

Time series of lumber prices for major timber species in the Pinaceae in western Washington and Oregon were developed based on annual average prices for lumber recorded by the Western Wood Products Association, Portland, OR, for 1971 to 1995. In this paper, the numerous lumber grades are categorized for individual species or species groupings into composite lumber grades that follow the system used by the Pacific Northwest Research Station in its quarterly reports of *Production, Prices, Employment, and Trade in Northwest Forest Industries* for coast Douglas-fir, coast hem-fir, and ponderosa pine lumber. New composite categories were created for sugar pine, western white pine, and white wood species.

Calculated regressions correlated prices of individual composite grades to annual average real prices for Pacific Northwest lumber. Many prices for composite grades of pine species, in particular, correlated better with average prices for lumber produced east of the Cascade Range. To make forecasts of future prices of lumber by composite lumber grade, the grade price regressions may be applied to future projections of average regional lumber prices from projections of the Timber Assessment Market Model (TAMM) used by the USDA Forest Service for analysis conducted under the Forest and Rangeland Renewable Resources Planning Act of 1974. Land managers then can use lumber price projections by species and composite grade, together with results of mill utilization studies and information about manufacturing and stump-to-truck costs, to calculate future stumpage prices from trees in stands under their management.

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## Introduction

Land managers provide multiple outputs of goods from public forests. Suitable management satisfies criteria for both the quantity and quality of production. Increasingly, criteria for production also must satisfy societal goals for biological diversity, conservation of biological processes, recreation, and clean air and water. Interest in longer timber rotations and uneven-aged stand management is growing (Curtis 1995, Halpern and Spies 1995, Weigand and others 1994). The call for more complex forest management with multiple goals necessitates site-specific vegetation management. Management of timber resources in the Pacific Northwest now involves more tree species, more ecosystem types, and more products and services than ever before.

Commercial reforestation in the Pacific Northwest traditionally has been concentrated on Douglas-fir, western hemlock, and ponderosa pine. As forest landscape management broadens to consider concerns of biological diversity and economic diversification based on multiple species, timber species not previously intensively managed are receiving more attention. In the Pacific Northwest west of the crest of the Cascade Range, these species may be uncommon or local in distribution (for example, sugar pine<sup>1</sup> and western white pine) or higher elevation species, such as mountain hemlock, noble fir, Pacific silver fir, and lodgepole pine. Reasons for their silvicultural neglect have been unfamiliarity with species and site conditions (Halverson and Emmingham 1982), problems with disease and pathogens (Snellgrove and Cahill 1980), and preferred use of timber resources with better quality or easier access. Timber production with lodgepole pine, for example, in the Rocky Mountains (Cole and Koch 1995, Koch 1996) and in Europe (Fitzsimmons 1989) demonstrates the economic prospects for lodgepole pine in the Pacific Northwest. In addition, attention to a greater array of tree species under management also supports, in part, the goals of increased biological diversity in managed forests.

A shift in the quality of lumber production and a shift toward stand compositions that replicate natural species diversity have coincided with the phaseout of old-growth timber harvests in the Pacific Northwest. In Federal public forests, the timber supply over the long term may be quite different from production in the recent past. One important objective of the Northwest Forest Plan (Jacobs 1994) is creation and maintenance of managed forest stands that conserve endangered species. Timber of small diameter or variable size and quality will be available from thinnings in stands managed for eventual re-creation of old-growth or late-seral features. Also, particularly for late thinnings in long rotations or for cyclic cuttings in uneven-aged stands, timber may be harvested that produces high-quality lumber products, of the sorts that have become rare over the last 25 years. The future timber supply for producing lumber from Federal lands in the Pacific Northwest may differ considerably from the timber supply from private industrial forest lands as well.

Forest managers need to know the likely product premiums for lumber from future timber produced in managed forests of the Pacific Northwest. Several tools exist to estimate the costs of management for improved timber and lumber quality; for example, models to predict premiums for pruned wood are available (Bolon and others 1992, Fight and others 1987). The present analysis provides information about lumber prices that is useful in decisions about stand management in the region. This study updates

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<sup>1</sup> Appendix 3 contains the scientific names of all commercial timber species found west of the crest of the Cascade Range. Other scientific names are included in the text.

and expands work by Adams and others (1988) and Haynes and Fight (1992) for western Oregon and Washington. An overview summarizes general and species-specific trends in the amount, quality, and value of lumber production in the Pacific Northwest from 1971 to 1995. Regression equations based on existing data relate lumber prices for specific grade categories to average prices for regional lumber production. The regressions are extrapolated to 2020 to give a scenario of future prices of lumber grades for six major species or species groups in western Washington and Oregon. A discussion of the implications of future price trends on production and value of timber resources on Federal public land in the Pacific Northwest concludes the study.

## Data Sources

The database for this study consisted of records for lumber quantities sold and average lumber prices, both in aggregate and by individual tree species and grade. Data were from year-end issues of the Coast F.O.B. Price Summary and the Inland F.O.B. Price Summary published by the Western Wood Products Association (WWPA 1971-95a, 1971-95b). Sample data published for lumber prices in WWPA reports account for 65 to 70 percent of annual regional lumber production. The WWPA summaries provide nominal prices (unadjusted for inflation) for actual transactions for lumber production.

Table 1 gives average annual prices, expressed in 1990 U.S. dollars, of lumber in aggregate produced in Pacific Northwest mills.<sup>2</sup> The use of constant dollars removes effects of inflation to allow comparison of real prices over time. Average lumber prices for the region west of the Cascade crest (west side) come directly from WWPA reports. Estimates of prices for the Pacific Northwest east of the Cascade crest (east side) are derived by using the method of Adams and others (1988). The east-side figures are a lumber price index consisting of inland West production of ponderosa pine, Douglas-fir, western larch (*Larix occidentalis* Nutt.), and hem-fir lumber, weighted by volume.

For lumber grade categories of Douglas-fir, hem-fir, and ponderosa pine, definitions follow the system established in Haynes and Fight (1992). New lumber grade categories are established in this study for sugar pine, western white pine, and white wood (including lodgepole pine) lumber. Prices and product proportions for individual lumber grade categories used in this study were volume-weighted averages of prices for composite lumber grades. Appendix 2 provides details of grade composition of lumber grade categories combined into the composite grades for four species and two species groups.

Nominal prices and proportions for the lumber grade categories of Douglas-fir, hem-fir, and ponderosa pine, for 1971-90, are taken from Haynes and Fight (1992), and from Warren (1996) for 1991-95. These sources originally derived their data from the WWPA sources. Nominal prices and proportions for the new timber species groups also were synthesized from the WWPA publications. Nominal prices by species group and lumber grade category are listed in tables 2 through 7. Information about weighted proportions of lumber grade categories to total regional lumber production are found in tables 8 to 13. Real prices in 1990 U.S. dollars were calculated from nominal prices by using the producer price index for total industrial commodities (Office of the President 1996; see table 14). Real prices for 1971-95 for individual species or species groups by lumber grade categories appear in tables 15 through 20.

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<sup>2</sup> Table 1 and all other tables are found in appendix 1.

## **Trends in Lumber Prices and Production, 1971-95**

### **General Price Trends**

Five additional years of data (1991-95) substantiate many of the trends in lumber prices observed by Haynes and Fight (1992). The annual average value of west-side lumber has remained below the computed value of lumber produced in east-side mills for all years, 1971-95 (table 1). Average real lumber prices in both the west-side and east-side Pacific Northwest for 1971-95 have fluctuated cyclically. A decline in real lumber prices that began in the late 1970s ended in the late 1980s as court injunctions and plans to conserve endangered species restricted timber sales. Lumber prices during the past eight decades have increased at an annual rate 0.9 percent (Sohnngen and Haynes 1994). Rising average prices for lumber since 1985 may represent resumption of this long-term trend or an extended cycle of high prices induced by political events—a cycle possibly on the downside since 1994. During the extended period of overall higher lumber prices (1986-95), average annual real prices for the coastal region lumber never exceeded average annual real prices for the banner years 1973 and 1979.

### **Douglas-Fir**

Production of high-quality Douglas-fir lumber in the Pacific Northwest is indicative of trends in Pacific Northwest lumber manufacturing (fig.1). High-quality grades, such as selects and shops, declined both in proportional and absolute amounts from 1971 through 1995 (table 8). In 1991-95, 1.1 percent of lumber production was in select and shop categories in contrast to more than 11 percent in the early 1970s. Production has become increasingly concentrated in the midvalue light and heavy framing grades. Commodity production and engineered products have replaced the high-value products. Framing grades comprised more than 75 percent of total production in 1991-95 in contrast to 56 percent in the early 1970s. At the same time, a move to middle grades is occurring from below. Production volume of lumber in lower valued utility grades has declined by half from 1971 to 1995, while economy grade volumes have remained roughly constant.

Highest quality lumber grades sustained a continual real price increase from 1985 to 1994 (table 15), but with one exception, 1990s real prices have yet to exceed 1979 real prices, the high for the period. The category for D select and shop lumber is the only category to have had an all-time price maximum during 1991-95. Select and shop grades, structural items, and heavy framing lumber offered price premiums above the average Douglas-fir lumber prices for the coastal Pacific Northwest. The average real value of Douglas-fir lumber spiked upward in 1993 with a 40-percent increase over the 1992 average real price (Sohnngen and Haynes 1994). In 1994-95, real prices dropped to values still substantially higher than prespike values (fig. 2 and table 15).

### **Coast Hem-Fir**

Trends in the composition of hem-fir lumber production (fig. 3 and table 16) largely reflect trends occurring with Douglas-fir. Select and shop grades have virtually disappeared in hem-fir lumber production. The long-term decline in the proportion of utility grade material also continues, and production volume of utility lumber declined by half in 1971-95. Economy grade lumber has remained relatively constant in proportion but is subject to substantial price swings. The most striking difference is the small amount of hem-fir in structural items. Here the difference in physical properties of hem-fir and Douglas-fir seems to favor Douglas-fir. Hem-fir has remained a less valuable resource overall with a greater proportion of the lumber resource produced in heavy framing and lower grade categories as compared to Douglas-fir. In 1983-95, prices for hem-fir lumber in all lumber grade categories except economy grade remained lower than prices for comparable grades of Douglas-fir lumber.

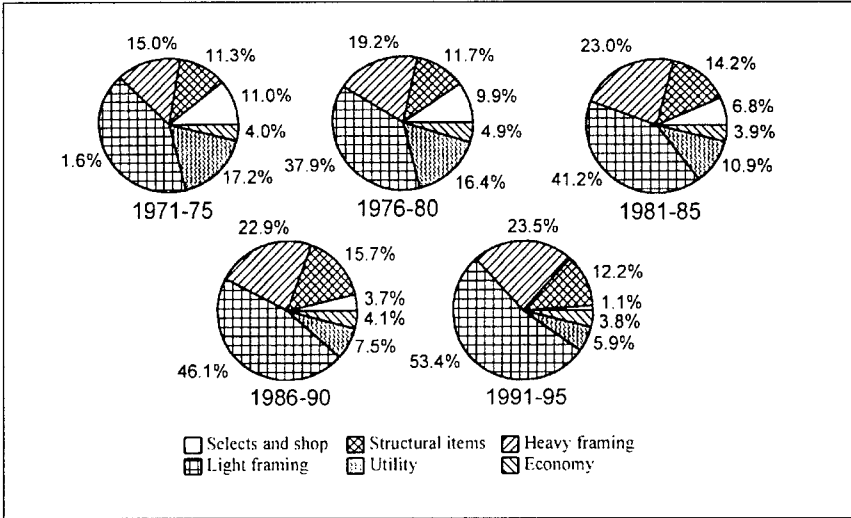


Figure 1—Douglas-fir lumber grade composition, Pacific Northwest coast mills, 1971-95

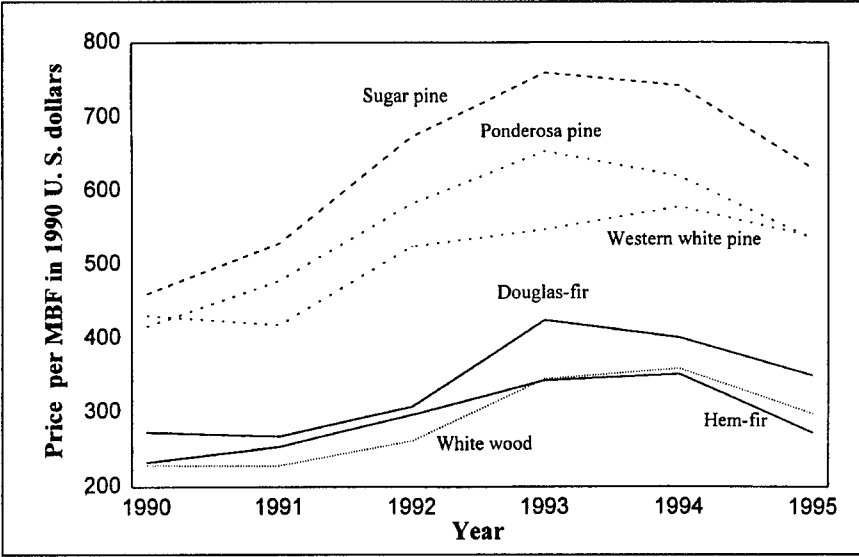


Figure 2—Lumber prices for commercial timber species in the Pacific Northwest, 1990-95

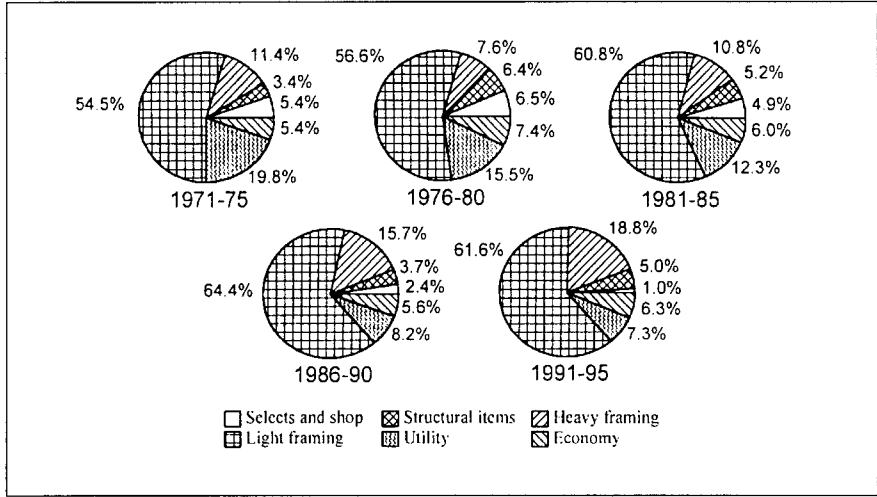


Figure 3—Hem-fir lumber grade composition, Pacific Northwest coast mills, 1971-95



## **Ponderosa Pine**

Ponderosa pine lumber production exceeds lumber production from all other pine species together in the Western United States (WWPA 1995c). Division of ponderosa pine lumber into 16 grade categories reflects this large and diversified production. The production capacity for ponderosa pine lumber has not mirrored the growth seen for coast Douglas-fir since 1982. Between 1991 and 1995, total Western United States production of ponderosa pine has fallen by nearly one-third. In the coastal Pacific Northwest region, timber comes primarily from southwestern Oregon.

As with coast hem-fir and Douglas-fir, higher valued ponderosa pine select and no. 1 shop grade categories comprise an ever smaller part of total production (fig. 4 and table 17) between 1971 and 1995. Less than 4 percent of the total lumber production for these grades in 1995 contrasts with 11.4 percent in 1971. Loss of product quality also has changed the composition of ponderosa pine lumber supply. Moulding and better and no. 2 shop grades have had their alltime lowest share of ponderosa pine lumber production since 1990. Lower value no. 3 shop, shopout, and 2 common grades were the only categories with higher percentages in 1990-95 than in the previous 20 years. Among the grades with increasing volumes of lumber, no. 3 shop and 2 common grades had annual average prices higher than the average annual prices for total east-side lumber. Despite loss of quality, ponderosa prices in 1993-94 recorded the highest real prices for 1971-95 for 2 common, all shop, moulding, and select grade categories (table 17). Prices for grades of ponderosa pine lumber below the east-side average prices rose considerably during the 2-year period but did not exceed real price levels in the banner year 1973.

## **Sugar Pine**

The supply of sugar pine lumber has historically amounted to about one-tenth of the board-foot lumber volume (table 11) of ponderosa pine (table 10) and has tracked with the production volume and composition of ponderosa pine lumber (figs. 4 and 5). Sugar pine lumber volumes have experienced relatively steeper cycles in production fluctuation than those for ponderosa pine. Since the alltime high production of sugar pine lumber in 1987-88, production has declined by two-thirds to the 1995 level. For 1971-95, lowest lumber production occurred in 1995.

Grade groupings of sugar pine lumber correspond for the most part with those used for ponderosa pine. Fourteen grades of sugar pine lumber, instead of 16 grades for ponderosa pine, are considered here. D select, 12-inch lumber has been merged into the C and better, 4-inch, and D select, 4-10-inch; utility items are incorporated into the category comprised of 4 common, 4-12-inch, and no. 3 lumber.

The value of the sugar pine production has been historically greater than any other species considered here (fig. 2 and table 18). Its physical properties and appearance make the species highly marketable. Since 1992, the value of sugar pine lumber has averaged \$100 more per thousand board feet than ponderosa lumber. In 1990-95, higher value grade categories of sugar pine lumber were consistently more valuable than comparable ponderosa pine grade categories. Low-value grades of sugar pine lumber have recently commanded prices equal to or lower than ponderosa pine lumber. This represents a change from 1971, when all grades of sugar pine were more valuable than ponderosa pine.

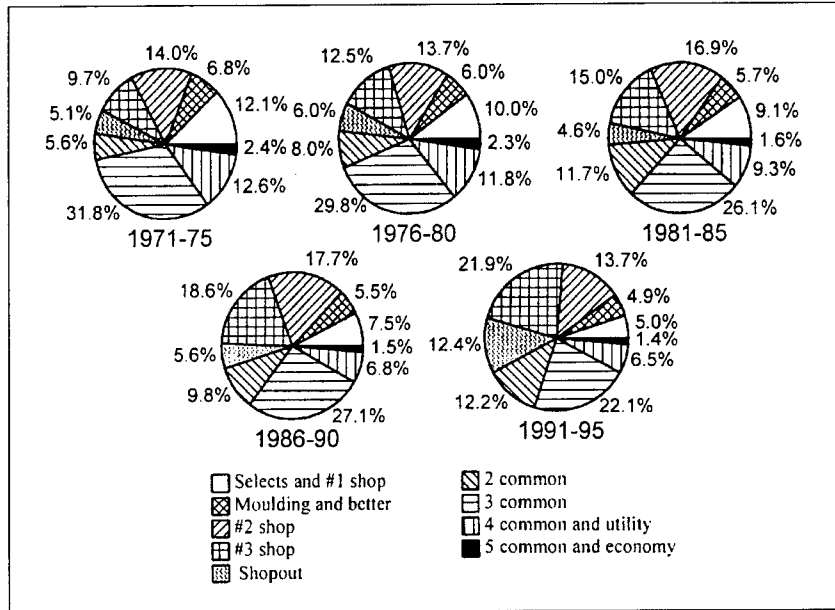


Figure 4—Ponderosa pine lumber grade composition, Western U.S. mills, 1971-95

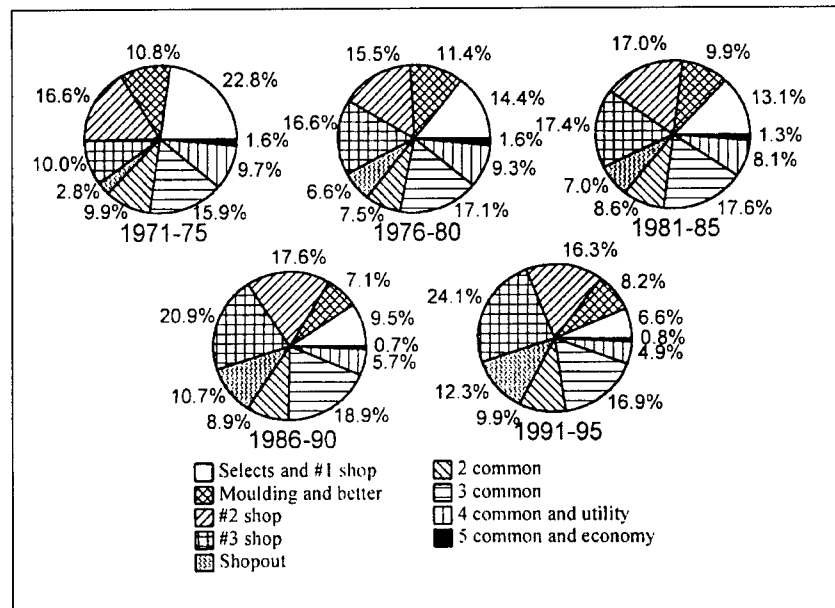


Figure 5—Sugar pine lumber composition, Western U.S. mills, 1971-95

## **Western White Pine**

Western white pine lumber represents a nearly exhausted resource in the Western United States (table 12). Volume of timber production has declined steadily since 1971, when the highest volume for 1971-95 was recorded. Much lumber production came from salvaged logs harvested after mortality caused by white pine blister rust (Snellgrove and Cahill 1980). The proportional loss of select grade lumber is not as steep as for other species, but absolute volume of high-value select grades is very small. As with the previous two pine species, greatest increase in proportion of lumber in the last 25 years has occurred in 2 common grade (fig. 6). For 2 common grade, western white pine ranks with sugar pine in value, above ponderosa pine (tables 17 through 19).

## **White Woods (Including Lodgepole Pine)**

This category is a catchall for lodgepole pine, Sitka spruce, and Englemann spruce. The greatest proportion of lumber manufactured has historically been in the 3 common grade category (fig. 7 and table 13). The share of 3 common grade in lumber production has been declining since the mid-1980s as the proportion of 2 common grade category has increased. White woods comprise the only lumber group that has seen a recent growth trend in the proportional importance of utility grades. During the early 1990s, small amounts of shops and better lumber were produced. Production of white wood lumber varies cyclically and reached peaks in 1977-79 and 1987-92.

White woods commonly are considered the least valuable of the commercial softwood species. Figure 2 and table 20 show that the average value of lumber produced from white woods is not substantially different from the hem-fir resource in the west side of the Pacific Northwest. White wood lumber has been irregularly tracked and deserves more study to understand its present and potential role in lumber supply from the Pacific Northwest.

## **Method of Analysis**

The focus of this study was somewhat different from that of Haynes and Fight (1992). As in their study, regression equations were developed for aggregated lumber grades by species or species group. But here, the regressions for lumber types are related to average regional prices for lumber (table 1), as compiled by the WWPA, rather than to a dominant lumber class (for example, Douglas-fir light framing as the base price series for all other Douglas-fir and hem-fir lumber grade categories). The aim was to derive historical relations for use in forecasting lumber prices for the existing range of lumber grade groupings defined in this study.

The present analysis emphasized only the commercial timber species in the Pinaceae from the Pacific Northwest west of the Cascade crest. Timber species in the Cupressaceae (various cedars) will be treated elsewhere. Although five pine species, ponderosa, Jeffrey, western white, lodgepole, and sugar, are commercial timber species in the west-side Pacific Northwest, average annual real prices for lumber east of the Cascade crest and in California better characterize prices for many grades of the west-side pine species. East of the Cascade crest, ponderosa pine lumber dominates the supply; accordingly, average east-side prices are often better indicators of price behavior for pine lumber grades and end uses in contrast to Douglas-fir and hem-fir lumber grades.

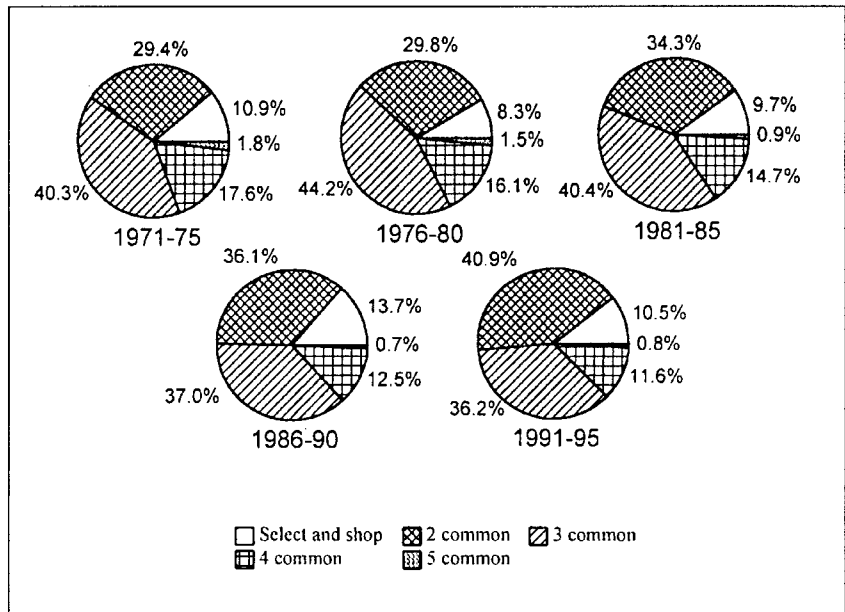


Figure 6—Western white pine lumber grade composition, Western U.S. mills, 1971-95

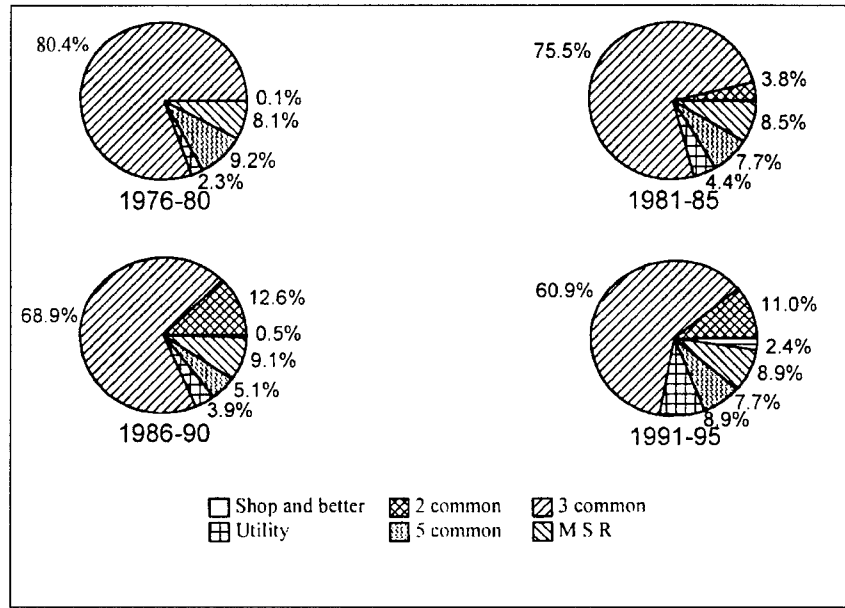


Figure 7—White wood lumber grade composition, Western U.S. mills, 1974-95

Lumber grade categories for the species treated in this study are based on similar end use. This approach to classification assumes that lumber prices of different grades and species have a fixed proportional relation. In general, price relations for one grade will not differ substantially from prices of similar grades within a species or comparable grades among species. Possibilities for substitution enable consumers to replace one grade for another grade or replace the same grade from a different species if prices begin to change. Substitution enables prices to equilibrate. Hem-fir lumber, for example, consists of grades derived from timber of multiple species of *Abies* and *Tsuga*, all having similar physical properties.

Each lumber grade category for each species was regressed against both east- and west-side lumber prices series to determine which series provided the better fit. Two simple equation forms were used to develop regressions that characterize the historic pattern of relation between a lumber grade category and average lumber price for a region. The first set of equations follows the form suggested for marketing margins (George and King 1971):

$$\text{grade price}_{jt} = b_{0j} + b_{1j} * \text{price}_{\text{average lumber, } t} \quad (1)$$

where

$\text{grade price}_{jt}$  = Pacific Northwest coast lumber prices for the  $j^{\text{th}}$  species and grade in year  $t$ ;

$b_{0j}$  = the estimated intercept value of the price relation for the  $j^{\text{th}}$  species and grade;

$b_{1j}$  = the estimated coefficient representing the proportional response to change in  $\text{grade price}_{jt}$  to change in a given  $\text{price}_{\text{average lumber, } t}$ ; and

$\text{price}_{\text{average lumber, } t}$  = the average price for all lumber products (west or east of the Cascade crest) in year  $t$ .

The other equation form is the natural log transformation of the same relation,

$$\ln(\text{grade price}_{jt}) = b_{0j} + b_{1j} * \ln(\text{price}_{\text{average lumber, } t}) \quad (2)$$

In many instances, the natural log transformation produced intercept  $b_{0j}$  values that were statistically significant, in contrast to intercept values in untransformed equations.

Durbin-Watson test statistics showed that serial autocorrelation occurs in the majority of regressions between prices from a lumber grade category and average lumber prices. A grid-search algorithm provided corrections for autocorrelations in equations with serial autocorrelation (Hildreth and Lu 1960). Whenever the Durbin-Watson statistic fell between upper and lower bounds of statistical significance in detecting autocorrelation, an alternative test (Durbin 1970) ascertained statistical significance for autocorrelation at  $\alpha=0.05$ . Best regressions for lumber grade categories are presented by species or species groups in tables 21 through 26. Best regressions are those equations having a high adjusted  $r^2$  value, a Durbin-Watson statistic close to 2.0, and a coefficient value of  $b_1$  significant at  $\alpha=0.05$ .

## Results and Conclusions

One application of these regression equations is price forecasting. This application presupposes that past relations between the average price of a lumber grade category and the regional average price will hold in the future. Under this assumption, regressions from tables 21 through 26 serve as price projections for lumber grades for 1996-2020. Future average annual prices for lumber in the east- and west-side regions of the Pacific Northwest (table 27) were taken from the baseline scenario of the 1993 version of the Timber Assessment Market Model (TAMM) (Adams and Haynes 1996). Price projections for each lumber category are arranged by species in tables 28 through 33.

Projections of prices for specific lumber grades during the next 25 years have been developed. Regressions between historical relations of lumber grades to regional average prices have been extrapolated to the future by using the average annual future prices for lumber in the Pacific Northwest as projected by TAMM. A different pattern of price trends emerges from the model than from the pattern of actual lumber during the past 25 years.

Over the past 25 years, the composition of lumber production has changed substantially in the Pacific Northwest west of the Cascade crest. Greatest production increases have occurred in midvalue categories, as select and shop grades have declined in overall proportion and volume of the lumber production. Best regressions based on average regional prices are for these midvalue grade categories—an indication of the preponderant share of these grades in lumber production. Two and 3 common grades in pine species fit the average lumber price series from the west side as well. Prices for these pine grades correspond approximately to structural items and heavy framing grade prices for Douglas-fir and hem-fir in western Oregon and Washington.

The comparatively poor explanatory power for regressions with higher grade categories indicates that those grades respond to additional factors other than average regional prices for lumber. Overall, the rate of projected price increases has been less for high-quality select and shop lumber than for midgrade framing lumber from Douglas-fir and hem-fir species and for common grade lumber from pine species. Projections based on regressions of lumber prices indicated that Douglas-fir and sugar and ponderosa pine species will continue to have commanding premiums for high-quality wood. Real price increases on the order of 11 to 16 percent for high-quality Douglas-fir are forecast at the end of the projection period, 2020, in comparison to real 1995 prices. Price increases for select grades of ponderosa and sugar pines are projected at lower rates of increase, between 5 and 9 percent. The historical ranking by value of select timber prices from each species or species group remains the same throughout the forecast period; from highest to lowest, the ranking is sugar pine, ponderosa pine, Douglas-fir, and hem-fir (tables 28 through 33). Ranking by rate of price increase in value from highest to lowest is different: Douglas-fir, hem-fir, ponderosa pine, and sugar pine.

Hem-fir grade lumber is interchangeable in quality and price with Douglas-fir in the framing grades. Efforts to develop high-grade hem-fir likely would occur only with pruning management, because of the high rate of decay and defect in older trees of hem-fir species (Harmon and others 1996). Price similarity for midpriced products on many sites could render yield and value from hemlock and true fir species equal to the value of Douglas-fir yield. This outcome is likely where Douglas-fir is at the margin of its range, for example at higher elevations or close to the Pacific coast.

At the same time, loss of higher-quality lumber supplies and steep reductions in available resources from several pine species has prompted new thinking about means to reestablish supplies from certain timber species, such as western white pine and sugar pine. Prices of common grade lumber from sugar, western white, and ponderosa pine show an 11-percent real price increase by 2020. This fact may prove to be an incentive for more intensive planting and management for pine species.

Investment in uncommon species, such as sugar and western white pines, will be rewarded as the price of commons grades for the soft pines remains consistently higher than the price for comparable grades of the hard pines (ponderosa and lodgepole pines) throughout 1996-2020. The one pine species that, until now, shows no great real price increase is lodgepole pine when used as "white wood." Such lower valued products maintain an 8- to 11-percent real price increase from 1996 to 2020. More intensive management of lodgepole pine to improve yield has not taken hold in the Pacific Northwest west of the Cascade crest, in contrast to the Rocky Mountain region.

Several means to develop higher value lumber sources through stand management are attracting interest among forest managers. Commercial thinnings of subdominant trees can extend rotations of thriftily growing retention trees. Infrequent, heavy intermediate thinnings may be able to carry the cost of developing a high-quality lumber source in forests with late-seral features designed to meet other social objectives, such as conservation of biological diversity. Curtis (1995) documents that lengthening rotations for Douglas-fir maintains good growth in large, old trees retained as canopy emergents.

Pruning young trees to reduce knot size and promote clear wood growth (Hanley and others 1995) in species not conventionally pruned can add more value to smaller diameter trees. Inclusion of high-value pine species, such as western white pine and sugar pine, as significant components of otherwise uniform stands of Douglas-fir or hem-fir species holds promise for augmenting overall stand value. Implementing advances in management (Cole and Koch 1995, Hungerford and others 1982) for pine species can forestall premature mortality through disease and infestation to realize gains in stand-level investments for lumber product quality.

Alternative sources of incomes from a stand also may come from nontimber products in the understory. These alternatives have the potential to finance young stand management for improved timber quality. As yet, options for harvesting understory vegetation or fungi with high market values are poorly known (von Hagen and others 1996). Although stand management may become more complex with multiple crops, more intensive management can make management of forest overstories for timber quality more feasible. Joint management of residual trees to develop higher-quality timber can conversely prolong understory conditions beneficial for economic yields of nontimber products. An example of the latter strategy is research ongoing in the Winema and Umpqua National Forests (southern Oregon) to develop a high-quality timber supply and more abundant pine mushroom (American matsutake) crops concurrently.

## Acknowledgments

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## Appendix 1

Tables of nominal prices, producer prices multipliers, real prices, production percentages, regression coefficients, and real price projections for lumber grade categories of major timber species in the Pinaceae in western Washington and Oregon.

**Table 1—Average real lumber prices in the Pacific Northwest, 1971-95**

Year	West side <sup>a</sup>	East side <sup>b</sup>
<i>1990 U.S. dollars per thousand board feet, Scribner</i>		
1971	351.11	369.77
1972	395.93	429.81
1973	497.45	542.45
1974	384.09	420.58
1975	317.41	347.72
1976	371.79	426.42
1977	401.65	462.89
1978	425.23	530.45
1979	434.10	499.96
1980	346.68	384.10
1981	276.41	353.29
1982	229.78	298.22
1983	260.67	369.87
1984	238.88	342.85
1985	237.38	337.36
1986	246.83	303.82
1987	261.28	366.07
1988	271.37	349.78
1989	286.74	347.07
1990	262.90	312.29
1991	258.20	333.58
1992	295.87	395.55
1993	398.97	503.54
1994	386.27	485.70
1995	333.81	410.32

<sup>a</sup> Average value is based on the Western Wood Products Association total average annual value of all lumber of all species milled in western Oregon and Washington.

<sup>b</sup> Average value is based on the Western Wood Products Association total average annual value of all ponderosa pine, hem-fir, and Douglas-fir/western larch lumber produced in the inland U.S. West (Adams and others 1988).

**Table 2—Nominal prices for Douglas-fir lumber, Pacific Northwest coast mills, 1971-95<sup>a</sup>**

Year	C select	D select and shop	Structural items	Heavy framing	Light framing	Utility	Economy
----- U.S. dollars per thousand board feet, Scribner -----							
1971	228	146	126	122	105	74	33
1972	280	164	143	141	126	93	41
1973	471	216	210	198	161	117	67
1974	474	238	238	184	141	82	47
1975	406	225	185	165	139	84	45
1976	486	276	229	217	174	110	49
1977	504	342	289	215	215	148	61
1978	593	406	325	395	235	170	86
1979	891	480	410	334	246	179	86
1980	929	506	365	271	207	150	85
1981	747	426	329	263	193	137	83
1982	648	375	283	198	159	126	78
1983	685	426	292	222	201	162	87
1984	688	407	249	223	189	137	72
1985	671	410	249	226	190	131	68
1986	726	405	240	229	191	132	67
1987	837	411	257	258	206	138	66
1988	927	474	297	285	219	138	85
1989	1,078	503	325	330	246	168	110
1990	1,236	521	305	310	232	156	102
1991	1,200	535	316	306	230	158	101
1992	1,350	576	348	349	273	205	123
1993	1,197	809	511	517	393	295	175
1994	1,413	752	478	485	385	294	148
1995	1,172	699	448	442	330	224	142

<sup>a</sup> Prices are FOB computed as volume-weighted averages of green and dry surfaced and rough grades. Sources: Haynes and Fight 1992, Warren 1996.

**Table 3—Nominal prices for hem-fir lumber, Pacific Northwest coast mills, 1971-95<sup>a</sup>**

Year	C select	D select and shop	Structural items	Heavy framing	Light framing	Utility	Economy
----- U.S. dollars per thousand board feet, Scribner -----							
1971	207	138	126	115	101	71	34
1972	241	151	148	138	122	90	41
1973	344	209	193	181	157	113	62
1974	440	233	179	179	140	81	44
1975	351	208	164	161	133	79	42
1976	427	258	201	206	164	106	48
1977	453	287	229	236	192	135	58
1978	587	345	259	256	222	164	85
1979	676	400	290	302	234	160	78
1980	718	405	257	245	195	132	78
1981	661	362	229	244	183	131	79
1982	712	319	202	209	158	123	70
1983	737	386	245	240	205	156	97
1984	683	348	227	228	187	128	79
1985	638	337	226	232	189	123	79
1986	606	343	242	248	197	129	75
1987	601	414	273	286	215	131	76
1988	633	461	273	289	221	137	89
1989	718	466	274	298	234	155	105
1990	820	500	270	283	224	150	97
1991	800	463	283	277	230	147	96
1992	883	488	321	312	266	188	129
1993	—	640	433	443	365	238	179
1994	—	596	436	452	384	268	164
1995	—	590	357	397	312	209	154

— = not available.

<sup>a</sup> Prices are FOB computed as volume-weighted averages of green and dry surfaced and rough grades.

Sources: Haynes and Fight 1992, Warren 1996.

Table 4--Nominal prices for ponderosa pine lumber, Western U.S. mills, 1971-95<sup>a</sup>

Year	4/4 select and #1 shop			5/4 and thicker moulding and shop				4/4 common and 8/4 standard and better					Low value				
	C and better 6-12 in	D 12 in	C and D 6-10 in	D 4 in	#1 shop	Mldg. and better	#1 shop	#2 shop	#3 shop	Shopout	2 com. 12 in	2 com. 4-10 in	3 com. 6-12 in	3 com. 4 in	3 com. 4 in	#3 and utility	5 com. and economy
1971	384	307	262	19	136	301	220	158	133	85	134	113	93	75	73	73	38
1972	402	334	284	21	157	314	247	185	157	107	165	138	121	101	90	90	50
1973	479	410	369	28	207	392	294	232	195	159	242	207	164	144	116	116	78
1974	612	550	499	30	210	429	314	252	208	133	270	211	141	107	73	73	57
1975	646	546	454	25	173	477	278	206	153	97	246	188	125	88	73	73	47
1976	708	615	444	33	233	531	398	326	248	143	272	219	166	129	98	98	58
1977	816	725	514	36	280	549	454	384	286	173	331	272	196	146	123	123	72
1978	1,001	906	671	48	349	934	526	462	331	206	373	329	232	184	144	144	98
1979	1,398	1,255	1,004	53	333	955	554	481	304	210	441	359	263	184	145	145	96
1980	1,187	865	610	40	330	813	549	473	308	203	450	289	237	165	122	122	87
1981	1,110	965	608	46	333	817	589	509	355	218	385	278	245	164	127	127	89
1982	1,187	865	610	40	330	813	549	473	308	203	450	289	237	165	122	122	87
1983	1,214	1,404	659	51	363	1,056	662	570	401	225	388	305	222	160	155	155	90
1984	1,363	1,163	724	49	368	949	622	506	349	203	432	319	235	149	124	124	83
1985	1,463	863	779	50	342	1,087	614	498	366	204	456	312	208	143	127	127	75
1986	1,509	1,169	1,021	65	636	1,093	688	576	404	207	430	325	227	163	130	130	79
1987	1,563	1,336	1,088	70	442	1,306	762	644	413	224	447	367	247	175	131	131	79
1988	1,892	1,510	1,076	68	452	1,282	746	625	411	229	505	363	246	174	137	137	87
1989	1,805	1,523	1,016	74	438	1,265	730	589	434	258	532	331	261	189	155	155	105
1990	1,478	1,453	996	68	435	1,051	677	542	414	247	534	356	248	187	145	145	99
1991	1,335	1,259	911	65	425	1,090	795	655	517	259	523	372	272	184	147	147	99
1992	1,749	1,484	1,195	85	622	1,371	970	845	631	335	686	423	337	226	196	196	133
1993	2,198	1,910	1,510	10	700	1,957	1,189	1,059	741	447	706	498	381	289	250	250	174
1994	2,347	2,343	1,316	88	800	1,753	1,145	1,017	701	448	803	569	413	302	254	254	157
1995	1,887	1,982	1,095	73	550	1,491	1,089	972	661	410	695	507	367	251	215	215	158

<sup>a</sup> Prices are FOB computed as volume-weighted averages of green and dry surfaced and rough grades.

Sources: Haynes and Fight 1992, Warren 1996.

**Table 5--Nominal prices for sugar pine lumber, Western U. S. mills, 1971-95<sup>a</sup>**

Year	4/4 select and #1 shop		5/4 and thicker moulding and shop				4/4 common and 8/4 standard and better			Low value			
	C and better 6-12	C and btr. 4 in D 6-12 in 4 in	#1 shop	Mldg. and better	#1 shop	#2 shop	#3 shop	Shopout	2 com. 12 in		2 com. 4-10 in	3 common 6-12 in 8/4 dimen.	3 common, 4 in 4 common, 4-12 in. #3 and utility
1971	400	307	224	309	226	165	133	106	187	139	97	76	38
1972	432	347	248	329	255	193	156	123	215	165	123	99	48
1973	528	442	323	413	303	243	206	207	270	256	183	145	91
1974	651	568	346	444	331	260	227	215	289	286	159	105	67
1975	681	557	301	500	295	225	176	182	288	267	141	92	48
1976	746	551	421	546	403	337	265	209	371	294	189	132	61
1977	848	622	482	571	452	390	295	186	380	345	231	151	76
1978	1,104	853	623	959	530	472	350	229	451	384	267	191	112
1979	1,478	1,202	729	950	557	486	319	233	435	464	314	195	116
1980	1,389	1,050	626	860	560	482	315	232	418	451	296	174	96
1981	1,277	901	749	856	601	528	367	255	478	441	312	183	99
1982	1,269	1,001	769	924	477	381	267	224	452	421	264	137	85
1983	1,293	1,114	818	1,038	673	590	406	236	488	436	257	170	103
1984	1,390	993	681	954	605	498	355	220	466	421	264	149	90
1985	1,481	889	616	1,117	618	505	365	221	438	423	229	156	89
1986	1,550	1,067	801	1,121	707	594	418	227	520	415	250	173	100
1987	1,722	1,260	837	1,338	794	655	425	247	607	437	264	185	96
1988	2,031	1,374	917	1,306	782	636	412	248	604	476	262	172	98
1989	2,005	1,380	885	1,294	745	583	423	276	603	491	279	190	119
1990	1,681	1,187	795	1,112	674	529	401	268	607	499	287	181	122
1991	1,566	1,074	808	1,159	796	673	538	275	579	511	305	174	111
1992	1,812	1,292	1,030	1,389	966	842	619	349	796	636	419	249	145
1993	2,497	1,734	1,311	1,907	1,162	103	715	417	885	675	444	305	185
1994	2,384	1,716	1,273	1,774	1,135	100	697	415	--	773	480	308	188
1995	2,248	1,498	1,271	1,435	1,077	946	663	383	--	694	442	262	159

-- = not available.

<sup>a</sup> Prices are FOB computed as volume-weighted averages of green and dry surfaced and rough grades.

Sources: Western Wood Products Association 1971-95b.

**Table 6—Nominal prices for western white pine lumber, Western U.S. mills, 1971-95<sup>a</sup>**

Year	D select and better	Shop and better	2 common	3 common	4 common	5 common
----- U.S. dollars per thousand board feet, Scribner -----						
1971	273	138	149	99	77	33
1972	310	164	187	134	102	45
1973	393	224	258	202	146	81
1974	519	249	327	198	120	66
1975	447	204	275	150	94	41
1976	508	273	317	210	133	56
1977	580	309	351	246	150	69
1978	756	419	467	297	185	96
1979	1,080	395	479	329	192	110
1980	716	342	446	267	166	87
1981	767	374	480	278	163	85
1982	826	324	493	257	133	73
1983	864	415	495	261	153	80
1984	917	400	512	297	154	81
1985	949	401	576	287	137	75
1986	1,151	487	568	292	153	76
1987	1,233	539	598	306	170	77
1988	1,332	531	568	289	169	74
1989	1,239	535	630	305	174	86
1990	1,098	519	628	314	172	88
1991	1,019	530	614	302	170	82
1992	1,315	694	607	386	239	143
1993	1,631	810	635	401	270	171
1994	1,645	824	689	463	293	173
1995	1,369	649	726	415	276	148

<sup>a</sup> Prices are FOB computed as volume-weighted averages of green and dry surfaced and rough grades.

Sources: Western Wood Products Association 1971-95b.



**Table 7—Nominal prices for white wood lumber (including lodgepole pine),  
Western U.S. mills, 1974-95<sup>a</sup>**

Year	Shop and better	2 common and better	3 common and better	4 common and better	Utility	5 common	MSR <sup>b</sup>
----- U.S. dollars per thousand board feet, Scribner -----							
1974	—	225	103	98	91	40	—
1973	—	217	123	98	104	47	—
1976	—	233	154	131	133	51	—
1977	—	—	181	140	145	65	—
1978	—	—	210	170	165	90	—
1979	—	—	219	183	166	87	—
1980	—	—	187	162	142	86	—
1981	—	—	189	154	139	85	—
1982	—	—	165	131	128	81	—
1983	—	—	212	159	173	95	—
1984	—	350	195	151	145	83	230
1985	—	344	190	128	150	80	230
1986	—	360	204	151	167	81	237
1987	—	389	210	166	173	83	252
1988	—	386	217	232	170	90	252
1989	—	368	228	241	203	99	267
1990	—	395	219	207	202	95	259
1991	—	413	237	206	206	92	278
1992	—	469	289	249	273	124	306
1993	876	515	358	312	337	169	473
1994	962	623	395	317	374	155	—
1995	918	541	308	284	292	144	405

— = not available.

<sup>a</sup> Prices are FOB computed as volume-weighted averages of green and dry surfaced and rough grades.

<sup>b</sup> Machine stress rated.

Sources: Western Wood Products Association 1971-95b.

**Table 8—Production percentages for Douglas-fir lumber, Pacific Northwest coast mills, 1971-95**

Year	C select	D select and shop	Structural items	Heavy framing	Light framing	Utility	Economy	WWPA <sup>a</sup> reported harvest all grades
----- Percent -----								<i>Thousand board feet, Scribner</i>
1971	13.4	2.2	8.0	15.8	40.3	16.7	3.5	1,224,585
1972	10.9	2.0	10.1	15.8	38.4	18.1	3.8	1,413,467
1973	8.5	1.4	13.4	7.0	40.9	17.8	3.8	1,446,109
1974	7.2	1.2	12.4	17.1	41.7	15.9	4.6	1,523,405
1975	7.9	.7	11.0	17.7	42.8	16.2	3.7	1,569,174
1976	8.2	.8	12.3	17.7	41.6	15.1	4.4	1,832,619
1977	6.5	4.2	11.5	19.7	36.3	17.0	4.8	2,029,086
1978	5.2	4.3	11.1	19.6	38.6	16.3	4.9	2,030,353
1979	5.4	4.7	12.1	18.1	37.5	16.8	5.4	1,702,828
1980	5.8	4.5	11.5	21.3	35.2	16.8	4.9	1,515,924
1981	4.5	4.1	12.9	22.0	37.7	14.8	4.0	1,662,233
1982	4.5	4.3	12.3	22.3	38.1	14.6	3.9	1,551,419
1983	3.3	3.5	12.4	23.8	42.4	10.6	3.9	2,752,061
1984	2.6	3.4	15.3	22.5	42.8	9.4	4.0	3,168,494
1985	2.4	3.2	16.4	23.9	41.8	8.5	3.8	2,927,403
1986	2.1	2.3	15.6	24.0	43.7	8.6	3.6	3,584,260
1987	2.0	2.8	14.5	23.3	45.4	8.2	3.8	3,975,895
1988	1.8	2.1	16.7	21.8	46.2	7.1	4.3	3,691,263
1989	1.0	1.6	15.9	22.9	47.4	7.0	4.2	3,659,762
1990	1.0	1.5	16.1	22.5	47.9	6.5	4.5	3,038,613
1991	.6	1.2	14.3	23.5	48.7	7.3	4.4	2,674,855
1992	.3	1.0	11.6	24.3	51.9	6.6	4.2	2,507,869
1993	.1	.7	11.2	24.2	54.7	5.4	3.7	2,386,007
1994	.1	.8	11.5	23.5	55.0	5.3	3.8	2,700,841
1995	.1	.7	12.2	21.9	57.2	4.9	3.0	2,436,390

<sup>a</sup> Western Wood Products Association.

Sources: Haynes and Fight 1992, Warren 1996.

**Table 9—Production percentages for hem-fir lumber, Pacific Northwest coast mills, 1971-95**

Year	C select	D select and shop	Structural items	Heavy framing	Light framing	Utility	Economy	WWPA <sup>a</sup> reported harvest all grades
----- Percent -----								<i>Thousand board feet, Scribner</i>
1971	1.5	4.2	3.6	12.9	54.8	18.2	4.8	744,892
1972	1.1	4.5	3.2	12.9	53.6	19.4	5.3	873,074
1973	.6	4.8	3.2	11.4	54.5	20.5	5.0	758,354
1974	.5	3.7	3.6	10.6	55.4	19.8	6.4	631,208
1975	.9	5.3	3.6	8.8	54.5	21.2	5.8	670,315
1976	.7	5.5	3.4	10.7	53.1	19.8	6.9	750,733
1977	1.4	4.8	6.2	8.7	56.7	15.0	7.2	933,315
1978	1.5	5.2	7.3	7.8	55.3	14.6	8.3	970,882
1979	1.5	5.1	7.7	5.3	58.3	13.8	8.3	835,574
1980	1.4	5.4	7.5	4.9	60.5	14.4	5.9	597,383
1981	1.2	5.4	6.2	7.8	58.0	14.6	6.8	582,672
1982	.4	4.9	6.0	7.2	59.1	17.1	5.3	577,243
1983	.4	4.0	5.6	8.8	61.6	13.8	5.8	857,819
1984	.4	4.2	5.3	12.9	60.8	10.0	6.3	959,799
1985	.4	4.0	3.3	15.0	63.0	8.4	6.0	830,607
1986	.4	2.5	3.1	16.2	64.0	8.4	5.4	1,000,702
1987	.3	2.3	2.9	14.8	64.9	9.3	5.3	1,011,504
1988	.3	2.2	3.2	14.2	66.4	8.2	5.5	946,868
1989	.3	2.0	4.2	16.9	63.6	7.4	5.8	903,323
1990	.2	1.5	5.5	16.4	62.8	7.5	6.1	784,600
1991	.2	1.6	4.8	16.3	62.3	8.7	6.2	696,775
1992	.1	1.5	5.8	17.3	62.5	6.9	6.0	922,463
1993	0	.8	6.7	17.4	61.8	7.2	6.1	977,364
1994	0	.6	4.1	19.0	62.6	6.7	7.0	1,180,705
1995	0	.5	3.7	22.9	59.1	7.6	6.2	1,001,187

<sup>a</sup> Western Wood Products Association.

Sources: Haynes and Fight 1992, Warren 1996.

Table 10--Production percentages for ponderosa pine lumber, Western U.S. mills, 1971-95

Year	4/4 select and #1 shop			5/4 and thicker moulding and shop			4/4 common and 8/4 standard and better				Low value		WWPA <sup>a</sup> reported harvest all grades				
	C and btr. better 6-12 in	D 12 in	C and btr. 4 in D 6-10 in	#1 shop	Mldg. and better shop	#1 shop	#2 shop	#3 shop	Shopout	2 com. 12 in	2 com. 4-10 in	3 com 6-12 in 8/4 dimen		3 com. 4 in, 4 com 4-12 in	#3 and utility	5 com. and economy	
----- Percent -----																	
1971	1.6	0.5	1.2	1.1	3.8	7.1	4.3	14.3	8.6	5.6	4.3	2.4	29.2	11.2	2.4	2.3	1,995,778
1972	1.5	.5	1.1	1.3	4.1	6.6	4.0	14.8	10.4	5.2	3.7	2.0	30.1	10.0	2.5	2.2	2,029,950
1973	1.3	.4	.9	1.4	3.9	7.4	4.1	14.1	10.0	4.9	3.2	1.8	32.4	8.9	2.9	2.3	1,961,374
1974	1.3	.4	.9	1.5	4.0	6.4	3.4	12.7	9.3	5.0	3.1	2.2	34.6	10.3	2.3	2.6	1,691,282
1975	1.3	.4	.8	1.6	3.9	6.4	3.7	13.8	9.9	4.8	3.0	2.1	33.3	9.9	2.4	2.4	1,842,488
1976	1.3	.4	.9	1.5	4.1	6.5	3.7	14.2	11.2	5.2	3.0	2.4	31.7	10.0	1.9	2.2	2,046,066
1977	1.1	.7	.7	1.1	3.5	6.0	3.4	13.9	12.4	7.0	2.9	5.0	29.2	9.5	1.8	2.1	2,249,864
1978	.9	.3	.6	1.1	2.8	5.6	2.9	13.0	13.3	7.2	2.7	5.3	30.5	9.2	2.2	2.3	2,271,539
1979	.9	.3	.6	1.2	3.3	5.6	3.0	13.2	12.6	5.6	3.0	6.0	29.8	10.5	2.0	2.5	1,849,683
1980	1.0	.4	.8	1.3	3.3	6.5	3.2	14.4	12.8	4.7	3.2	6.9	27.3	9.9	2.1	2.3	1,614,864
1981	1.0	.3	.8	1.1	3.3	5.9	3.1	14.8	13.4	4.7	3.9	8.7	25.7	10.0	1.5	1.8	1,474,420
1982	1.1	.3	.7	.9	3.1	6.8	3.2	15.7	13.5	5.1	4.2	8.0	26.9	8.8	1.3	1.6	1,488,103
1983	1.0	.3	.7	.9	2.8	5.8	3.3	17.2	15.6	5.3	3.9	7.8	24.4	7.1	1.2	1.5	1,876,743
1984	1.0	.3	.6	.9	2.7	5.3	3.5	17.6	15.4	4.2	4.1	7.2	26.8	7.1	1.6	1.7	1,970,046
1985	.9	.3	.6	.9	2.7	5.1	3.4	18.2	16.2	4.1	3.8	7.2	26.7	7.0	1.4	1.4	2,018,896
1986	1.0	.3	.6	.8	2.8	4.9	3.3	17.9	16.6	4.5	4.3	6.7	27.6	6.1	1.4	1.3	2,164,591
1987	.9	.2	.4	.7	2.4	5.7	3.1	17.9	17.5	4.7	4.0	6.0	28.1	5.3	1.6	1.4	2,331,497
1988	.8	.2	.4	.7	2.7	5.8	2.7	17.2	18.0	5.4	3.9	5.5	28.4	5.2	1.7	1.5	2,252,696
1989	.6	.2	.3	.7	2.2	5.6	2.9	17.8	19.9	6.7	3.8	5.8	25.9	5.0	1.2	1.4	2,204,308
1990	.6	.1	.3	.6	2.0	5.3	2.7	17.8	21.3	7.0	3.7	5.4	25.0	5.2	1.1	1.7	2,045,830
1991	.7	.1	.3	.7	2.1	6.0	2.9	17.8	22.7	7.8	3.6	5.6	22.0	4.7	1.3	1.6	1,789,289
1992	.5	.1	.3	.7	1.8	5.9	2.5	16.5	23.2	9.8	3.1	7.0	20.9	4.9	1.1	1.4	1,643,951
1993	.3	.1	.2	.5	1.6	4.7	1.8	12.6	21.5	14.8	3.3	8.9	21.9	5.2	1.4	1.2	1,844,062
1994	.3	.1	.2	.5	1.4	4.1	1.5	10.8	20.8	14.7	3.4	10.4	23.5	5.5	1.3	1.5	1,712,968
1995	.3	.1	.2	.4	1.5	3.8	1.3	10.2	21.0	15.0	4.0	11.9	22.1	5.8	1.3	1.1	1,519,049

<sup>a</sup> Western Wood Products Association.

Sources: Haynes and Ficht 1992, Warren 1996.

Table 11--Production percentages for sugar pine lumber, Western U. S. mills, 1971-95

Year	4/4 select and #1 shop				5/4 and thicker moulding and shop				4/4 common and 8/4 standard and better				Low value	WWPA <sup>a</sup> reported harvest all grades	
	C and better 6-12 in	C and btr. 4 in	D 4 in	#1 shop	Mldg. and better	#1 shop	#2 shop	#3 shop	shopout	3 com. 6-12 in, 2 com. 12 in	3 com., 4 com. 4-12 in.	4 in 8/4 dimen			#3 and utility
----- Percent -----															
Thousand board feet, Scribner															
1971	4.6	2.8	4.1	5.3	10.2	8.2	18.0	9.0	2.1	3.9	6.7	14.3	9.2	1.5	184,048
1972	4.7	2.5	3.6	4.9	9.5	7.9	17.4	10.0	3.6	2.9	8.2	14.3	9.1	1.4	166,078
1973	4.4	2.5	4.4	4.5	11.3	6.6	14.3	10.1	2.9	2.4	8.4	16.8	9.8	1.6	146,489
1974	4.3	2.5	4.8	4.2	11.1	6.2	14.8	10.2	3.1	2.5	6.0	18.2	10.2	1.8	123,523
1975	3.4	1.9	4.2	3.5	12.1	7.4	17.4	11.1	2.2	2.2	5.7	16.9	10.2	1.8	144,370
1976	3.1	1.9	3.7	3.8	13.3	6.7	16.5	11.4	2.6	1.9	6.5	17.3	9.6	1.8	146,440
1977	3.0	1.5	2.9	3.2	12.2	6.7	17.1	15.2	5.2	1.0	6.3	15.4	8.7	1.6	163,370
1978	2.1	1.2	2.7	3.2	11.7	5.0	15.4	15.5	6.8	1.2	6.5	18.2	9.4	1.6	170,299
1979	1.9	1.0	2.8	3.2	10.8	4.9	15.5	17.7	6.8	1.1	5.8	17.5	9.0	1.5	143,880
1980	1.7	.8	2.7	2.8	10.7	3.7	13.7	18.8	7.7	1.0	6.9	17.7	10.1	1.6	127,687
1981	2.0	1.3	2.0	2.3	10.7	4.5	15.1	16.8	7.0	.7	7.9	18.0	10.1	1.6	114,435
1982	3.1	1.5	2.7	2.4	11.4	4.2	15.5	15.8	5.0	.7	8.4	19.0	9.3	1.2	95,251
1983	2.7	1.2	2.1	2.3	10.9	5.2	18.8	18.0	6.9	.7	7.2	15.8	7.2	1.1	141,050
1984	2.5	1.5	2.4	2.5	9.6	4.5	17.3	17.9	6.8	.6	7.9	17.5	7.9	1.1	189,252
1985	2.1	1.6	2.3	2.2	8.4	4.6	17.4	17.7	8.1	.6	8.3	18.0	7.2	1.4	209,026
1986	2.4	1.2	1.7	2.3	8.7	4.6	18.0	18.2	8.0	.7	10.1	17.4	5.8	.9	209,392
1987	1.8	1.1	1.7	1.8	8.6	4.1	17.2	19.9	10.9	.5	9.0	17.0	5.4	1.0	217,201
1988	1.5	.8	1.5	1.5	6.8	3.5	16.4	19.2	10.1	.4	8.5	21.9	6.9	.7	273,305
1989	.9	.5	1.6	1.7	6.3	3.2	17.9	22.4	11.6	.4	7.1	20.3	5.4	.5	258,242
1990	1.1	.6	1.9	1.6	5.5	3.1	18.5	24.6	12.4	.3	8.1	16.9	4.7	.5	233,003
1991	1.0	.5	1.5	1.6	6.2	3.5	19.4	23.9	11.0	.4	7.3	17.8	5.5	.5	243,516
1992	1.1	.4	1.2	1.5	8.6	3.1	19.0	26.3	12.2	.3	7.9	13.7	4.2	.4	212,008
1993	.3	.2	.9	1.4	9.5	2.6	13.7	23.0	13.7	.2	11.0	17.8	4.7	1.0	165,379
1994	.6	.3	1.0	1.2	9.5	2.4	12.9	23.1	13.3	0	10.8	18.9	4.9	1.2	137,121
1995	.5	.3	.9	1.2	7.7	2.0	11.8	22.8	12.5	0	16.1	17.8	5.3	1.2	92,761

<sup>a</sup> Western Wood Products Association.  
Sources: Western Wood Products Association. 1971-95b.

**Table 12—Production percentages for western white pine lumber, Western U.S. mills, 1971-95**

Year	D select and better	Shop	2 common	3 common	4 common	5 common	WWPA <sup>a</sup> reported harvest, all grades
----- Percent -----							<i>Thousand board feet, Scribner</i>
1971	7.3	3.6	31.2	37.6	18.4	1.8	302,570
1972	7.1	4.6	28.7	39.5	18.4	1.7	274,790
1973	6.8	4.8	28.6	40.7	17.4	1.9	249,249
1974	6.6	4.2	28.3	40.9	17.6	2.4	192,589
1975	6.6	2.9	29.5	43.9	15.8	1.4	222,122
1976	6.2	3.0	31.4	43.0	14.9	1.5	216,576
1977	5.7	2.8	31.5	43.3	15.4	1.3	205,918
1978	5.0	2.1	28.0	44.7	18.0	2.2	158,205
1979	4.6	2.8	27.6	46.3	17.0	1.6	152,497
1980	5.5	3.7	29.4	44.7	15.6	1.1	135,253
1981	6.0	3.0	30.7	42.2	16.9	1.1	114,574
1982	6.0	3.5	33.0	41.6	15.1	.8	88,145
1983	5.7	3.8	33.7	41.2	14.6	1.0	118,841
1984	5.5	3.9	36.8	39.5	13.4	.9	113,666
1985	6.1	5.1	37.5	37.4	13.3	.6	99,022
1986	6.7	4.0	42.4	36.4	10.1	.5	90,195
1987	6.4	5.3	41.9	34.8	10.9	.6	89,700
1988	6.7	7.8	37.2	34.2	13.0	1.1	59,799
1989	9.9	11.1	18.5	43.7	15.8	1.0	35,310
1990	8.9	9.4	18.3	43.1	19.7	.6	29,794
1991	8.4	11.9	18.3	39.8	21.0	.6	25,516
1992	4.6	5.8	42.9	36.4	9.7	.6	55,827
1993	4.1	5.7	41.5	36.9	10.8	.9	43,849
1994	2.7	4.2	48.6	32.9	10.4	1.2	36,293
1995	3.0	3.9	47.9	35.8	8.9	.6	21,393

<sup>a</sup> Western Wood Products Association.

Sources: Western Wood Products Association 1971-95b.

**Table 13—Production percentages for white wood (including lodgepole pine), Western U.S. mills, 1974-95**

Year	Shop and better	2 common and better	3 common and better	4 common and better	Utility	5 common	MSR <sup>a</sup>	WWPA <sup>b</sup> reported harvest, all grades
	----- Percent -----							Thousand board feet, Scribner
1974	0	0.2	89.1	1.0	3.1	6.6	0	205,638
1975	0	0.3	79.5	1.9	10.4	8.0	0	434,013
1976	0	0.3	79.1	1.4	11.4	7.8	0	550,365
1977	0	0	80.6	2.0	10.6	6.8	0	632,493
1978	0	0	82.1	2.3	7.7	8.0	0	584,476
1979	0	0	80.4	2.8	7.7	9.1	0	601,749
1980	0	0	79.3	3.4	8.3	9.1	0	413,236
1981	0	0	78.8	4.2	7.9	9.0	0	419,474
1982	0	0	78.8	4.5	7.0	9.8	0	343,111
1983	0	0	79.8	3.7	8.0	8.6	0	470,483
1984	0	6.1	71.7	4.6	8.7	8.5	.3	532,148
1985	0	10.2	70.5	4.9	6.5	7.3	.6	526,174
1986	0	12.0	69.2	3.4	6.3	8.1	1.0	600,912
1987	0	9.5	73.6	2.8	4.5	8.8	0.8	750,763
1988	0	11.9	69.6	3.9	4.7	9.3	0.6	759,901
1989	0	14.0	67.1	5.0	4.6	9.2	0.2	814,907
1990	0	15.3	65.1	4.4	5.6	9.7	0	733,890
1991	0	18.4	60.7	5.5	4.8	8.4	2.3	647,762
1992	0	15.4	57.1	11.9	5.8	6.8	3.0	735,287
1993	.5	5.9	61.9	9.6	9.4	8.4	4.4	439,365
1994	.2	3.6	66.1	8.2	9.8	12.2	0	424,090
1995	.2	2.6	62.4	9.1	12.7	11.1	1.9	304,567

<sup>a</sup> Machine stress rated.

<sup>b</sup> Western Wood Products Association.

Sources: Western Wood Products Association 1971-95b.

**Table 14—Producer price multipliers  
applied to nominal lumber prices for  
indexing to 1990 U.S. dollar prices**

Year	Adjustment multiplier
1971	3.173
1972	3.063
1973	2.873
1974	2.354
1975	2.109
1976	1.983
1977	1.853
1978	1.729
1979	1.530
1980	1.316
1981	1.189
1982	1.158
1983	1.145
1984	1.121
1985	1.117
1986	1.158
1987	1.129
1988	1.089
1989	1.038
1990	1.000
1991	.994
1992	.986
1993	.973
1994	.959
1995	.923

Source: Office of the President 1996: table B-63.



**Table 15—Real prices for Douglas-fir lumber, Pacific Northwest coast mills, 1971-95<sup>a</sup>**

Year	C select	D select and shop	Structural items	Heavy framing	Ligh framing	Utility	Economy
----- 1990 U.S. dollars per thousand board feet, Scribner -----							
1971	723	463	400	387	333	235	105
1972	858	502	438	432	386	285	126
1973	1,353	621	603	569	463	336	193
1974	1,116	560	560	433	332	193	111
1975	856	475	390	348	293	177	95
1976	964	547	454	430	345	218	97
1977	934	634	535	398	398	274	113
1978	1,025	702	562	683	406	294	149
1979	1,363	734	627	511	376	274	132
1980	1,222	666	480	357	272	197	112
1981	888	506	391	313	229	163	99
1982	750	434	328	229	184	146	90
1983	785	488	300	254	230	186	100
1984	771	456	279	250	212	154	81
1985	749	458	278	252	212	146	76
1986	841	469	278	265	221	153	78
1987	945	464	290	291	233	156	74
1988	1,010	516	324	310	239	150	93
1989	1,119	522	337	342	255	174	114
1990	1,236	521	305	310	232	156	102
1991	1,193	532	314	304	229	157	100
1992	1,332	568	343	344	269	202	121
1993	1,165	787	497	503	382	287	170
1994	1,356	721	459	465	369	282	142
1995	1,081	645	413	408	304	207	131

<sup>a</sup> Prices are FOB computed as volume-weighted averages of green and dry surfaced and rough grades.  
Sources: Haynes and Fight 1992, Warren 1996.

**Table 16—Real prices for hem-fir lumber, Pacific Northwest coast mills, 1971-95<sup>a</sup>**

Year	C select	D select and shop	Structural items	Heavy framing	Light framing	Utility	Economy
----- 1990 U.S. dollars per thousand board feet, Scribner -----							
1971	657	438	400	365	320	225	108
1972	738	463	453	423	374	276	126
1973	988	601	555	520	451	325	178
1974	1,036	548	421	421	330	191	104
1975	740	439	346	340	281	167	89
1976	847	512	399	408	325	210	95
1977	839	532	424	437	356	250	107
1978	1,015	596	448	442	384	283	147
1979	1,034	612	442	462	358	245	119
1980	945	533	338	322	257	174	103
1981	786	430	272	290	218	156	94
1982	824	369	234	242	183	142	81
1983	844	442	281	275	235	179	111
1984	766	390	254	256	210	143	89
1985	712	376	252	259	211	137	88
1986	702	397	280	287	228	149	87
1987	678	467	308	323	243	148	86
1988	690	502	297	315	241	149	97
1989	745	484	284	309	243	161	109
1990	820	500	270	283	224	150	97
1991	795	460	281	275	229	146	95
1992	871	481	317	308	262	185	127
1993	—	623	421	431	365	232	174
1994	—	572	418	434	368	257	157
1995	—	544	329	366	288	193	142

— = not available.

<sup>a</sup> Prices are FOB computed as volume-weighted averages of green and dry surfaced and rough grades.

Sources: Haynes and Fight 1992, Warren 1996.

**Table 17--Real prices for ponderosa pine lumber, Western U.S. mills, 1971-95<sup>a</sup>**

Year	4/4 select and #1 shop		5/4 and thicker moulding and shop			4/4 common and 8/4 standard a better			Low value							
	C and better 6-12 in	D 12 in	D 6-10 in	#1 shop	Mldg. and better	#1 shop	#2 shop	#3 shop	Shopout	2 com. 12 in	4-10 in	3 com. 6-12 in	8/4 com. 4-12 in	#3 and utility	5 com. and economy	
1971	1,218	974	831	625	431	955	698	501	422	270	425	359	295	238	232	121
1972	1,232	1,023	870	643	481	962	757	567	481	328	505	423	371	309	276	153
1973	1,376	1,178	1,060	819	595	1,126	845	667	560	457	695	595	471	414	333	224
1974	1,440	1,295	1,174	718	494	1,010	739	593	490	313	635	497	332	252	172	134
1975	1,363	1,152	958	542	365	1,006	586	435	323	205	519	397	264	186	154	99
1976	1,404	1,219	880	662	462	1,053	789	646	492	284	539	434	329	256	194	115
1977	1,512	1,343	952	667	519	1,017	841	711	530	321	613	504	363	271	228	133
1978	1,730	1,566	1,160	845	603	1,614	909	799	572	356	645	569	401	318	249	169
1979	2,139	1,920	1,536	814	509	1,461	847	736	465	321	675	549	402	281	222	147
1980	1,562	1,138	803	528	434	1,070	722	622	405	267	592	380	312	217	161	114
1981	1,320	1,147	723	555	396	971	700	605	422	259	458	331	291	195	151	106
1982	1,375	1,002	706	464	382	941	636	548	357	235	521	335	274	191	141	101
1983	1,391	1,608	755	588	416	1,210	758	653	459	258	444	349	254	183	178	103
1984	1,528	1,304	812	559	413	1,064	697	567	391	228	484	358	263	167	139	93
1985	1,634	964	870	565	382	1,214	686	556	409	228	509	348	232	160	142	84
1986	1,747	1,354	1,182	757	736	1,266	797	667	468	240	498	376	263	189	151	91
1987	1,764	1,508	1,228	793	499	1,474	860	727	466	253	505	414	279	198	148	89
1988	2,061	1,645	1,172	751	492	1,397	813	681	448	249	550	395	268	190	149	95
1989	1,873	1,580	1,054	768	454	1,313	757	611	450	268	552	343	271	196	161	109
1990	1,478	1,453	996	683	435	1,051	677	542	414	247	534	356	248	187	145	99
1991	1,327	1,251	906	650	422	1,083	790	651	514	257	520	370	270	183	146	98
1992	1,725	1,464	1,179	844	614	1,352	957	833	622	330	677	417	332	223	193	131
1993	2,139	1,859	1,469	992	681	1,904	1,157	1,031	721	435	687	485	371	281	243	169
1994	2,252	2,248	1,263	844	768	1,682	1,099	976	673	430	770	546	396	290	244	151
1995	1,741	1,829	1,010	680	507	1,376	1,005	897	610	378	641	468	339	232	198	146

<sup>a</sup> Prices are F.O.B. computed as volume-weighted averages of green and dry surfaced and rough grades. Sources: Haynes and Fight 1992, Warren 1996.

Table 18--Real prices for sugar pine lumber, Western U.S. mills, 1971-95<sup>a</sup>

Year	4/4 selects and #1 shop		5/4 and thicker moulding and shops			4/4 commons and 8/4 standard and better		Low value						
	C and better 6-12 in.	C and btr. 4 in D 6-10 in	D 4 in shop	#1 shop	Mldg. and better	#1 shop	#2 shop		#3 shop	Shopout	2 com. 12 in	2 com. 4-10 in	3 common 6-12 in 8/4 dimen.	3 com., 4 in 4 com., 4-13 in # 3 and utility
1971	1,270	973	709	444	980	718	525	422	336	592	441	308	241	122
1972	1,325	1,064	760	499	1,009	781	591	479	378	657	505	378	303	148
1973	1,518	1,271	927	646	1,186	870	698	593	595	776	734	527	417	261
1974	1,533	1,336	814	500	1,046	779	612	534	506	680	672	373	247	159
1975	1,436	1,175	636	336	1,055	621	474	372	384	607	563	298	195	102
1976	1,479	1,093	835	458	1,083	799	668	525	415	735	584	374	262	121
1977	1,571	1,152	892	514	1,058	838	722	547	345	704	638	427	280	141
1978	1,909	1,474	1,076	607	1,658	916	816	605	396	779	663	461	330	193
1979	2,261	1,839	1,116	499	1,453	853	744	488	356	666	710	480	298	177
1980	1,828	1,381	824	438	1,131	737	635	414	306	549	594	389	229	126
1981	1,519	1,071	890	443	1,018	715	627	436	303	569	525	371	218	118
1982	1,470	1,159	891	339	1,070	553	441	309	260	523	487	306	159	98
1983	1,481	1,276	938	433	1,189	771	676	465	270	559	499	294	195	118
1984	1,558	1,114	764	393	1,069	678	558	398	247	522	472	296	167	100
1985	1,653	992	688	372	1,248	690	564	407	247	489	473	256	174	99
1986	1,795	1,235	928	426	1,298	819	688	484	263	602	481	289	200	115
1987	1,944	1,423	945	467	1,510	896	740	479	279	685	493	298	209	109
1988	2,213	1,497	999	473	1,423	851	693	449	271	658	518	285	188	107
1989	2,080	1,432	919	436	1,343	773	605	438	286	626	509	290	197	124
1990	1,681	1,187	795	427	1,112	674	529	401	268	607	499	287	181	122
1991	1,557	1,067	803	408	1,152	791	669	535	273	576	508	303	173	110
1992	1,788	1,275	1,016	603	1,370	953	831	611	344	785	628	413	245	143
1993	2,430	1,687	1,276	671	1,856	1,131	1,010	696	406	861	657	432	296	180
1994	2,287	1,647	1,221	746	1,702	1,089	959	669	399	--	742	460	296	181
1995	2,075	1,382	1,173	535	1,324	994	873	612	353	--	640	408	242	147

-- = not available.

<sup>a</sup> Prices are FOB computed as volume-weighted averages of green and dry surfaced and rough grades.

Sources: Western Wood Products Association 1971-95b.

**Table 19—Real prices for western white pine lumber, Western U.S. mills, 1971-95<sup>a</sup>**

Year	D select and better	Shop and better	2 common	3 common	4 common	5 common
----- 1990 U.S. dollars per thousand board feet, Scribner -----						
1971	866	439	472	315	243	104
1972	948	503	572	410	312	139
1973	1,128	644	743	579	419	232
1974	1,222	586	770	466	282	156
1975	943	430	580	316	199	87
1976	1,008	541	629	416	264	111
1977	1,075	572	650	456	278	127
1978	1,307	723	807	513	319	165
1979	1,652	605	733	503	294	168
1980	942	450	587	351	218	114
1981	911	444	570	331	193	101
1982	957	376	571	297	154	85
1983	989	475	567	299	175	92
1984	1,028	448	574	333	173	91
1985	1,060	447	644	320	153	83
1986	1,333	564	658	338	177	88
1987	1,392	609	675	346	191	86
1988	1,451	578	619	315	185	80
1989	1,285	555	653	316	180	89
1990	1,098	519	628	314	172	88
1991	1,013	527	610	300	169	82
1992	1,297	684	598	381	236	141
1993	1,588	788	618	391	263	166
1994	1,579	791	661	444	281	166
1995	1,263	599	670	383	254	136

<sup>a</sup> Prices are FOB computed as volume-weighted averages of green and dry surfaced and rough grades.

Sources: Western Wood Products Association 1971-95b.

**Table 20—Real prices for white wood lumber (including lodgepole pine),  
Western U.S. mills, 1974-95<sup>a</sup>**

Year	Shop and better	2 common and better	3 common and better	4 common and better	Utility	5 common	MSR <sup>b</sup>
----- 1990 U.S. dollars per thousand board feet, Scribner -----							
1974	—	530	243	231	214	94	—
1973	—	458	259	206	219	100	—
1976	—	462	305	260	264	102	—
1977	—	—	336	260	268	120	—
1978	—	—	363	293	286	156	—
1979	—	—	336	280	253	133	—
1980	—	—	246	214	187	113	—
1981	—	—	225	184	165	101	—
1982	—	—	191	151	148	94	—
1983	—	—	243	182	198	109	—
1984	—	393	219	170	163	93	258
1985	—	384	212	143	167	90	256
1986	—	417	237	175	193	94	274
1987	—	439	237	187	196	94	284
1988	—	421	236	253	185	98	274
1989	—	382	236	250	210	103	278
1990	—	395	219	207	202	95	259
1991	—	411	235	205	204	91	277
1992	—	462	285	246	269	122	302
1993	853	502	348	304	328	164	460
1994	923	598	379	304	359	149	—
1995	847	499	285	262	269	130	373

— = not available.

<sup>a</sup> Prices are FOB computed as volume-weighted averages of green and dry surfaced and rough grades.

<sup>b</sup> Machine stress rated.

Sources: Western Wood Products Association 1971-95b.

**Table 21—Regression coefficients for prices of Douglas-fir lumber from Pacific Northwest coast mills, arranged by grade category, 1971-95**

Lumber grade	B <sub>0</sub>	B <sub>1</sub> <sup>a</sup>	Adjusted r <sup>2</sup>	Durbin-Watson statistic <sup>b</sup>	Equation form	Base price source
C select and better	2.5614 [p(b <sub>0</sub> =0)=0.17]	0.7598**	0.58	1.9027	2	West side
D select and shop	1.3307 [p(b <sub>0</sub> =0)=0.20]	.8752***	.88	1.9113	2	West side
Structural items	-69.472 [p(b <sub>0</sub> =0)=0.11]	1.4596***	.91	1.8117	1	West side
Heavy framing	-.8955*	1.1770***	.89	2.0716	2	West side
Light framing	-.4782 [p(b <sub>0</sub> =0)=0.19]	1.0646***	.97	1.5030	2	West side
Utility	-.9103 [p(b <sub>0</sub> =0)=0.17]	1.0776***	.90	1.5366	2	West side
Economy	.8622 [p(b <sub>0</sub> =0)=0.97]	.3435***	.75	2.2266	1	West side

<sup>a</sup> \* significant at p<=0.10, \*\* significant at p<=0.05, \*\*\* significant at p<=0.01.

<sup>b</sup> Adjusted for serial autocorrelation.

66 **Table 22—Regression coefficients for prices of hem-fir lumber from Pacific Northwest coast mills, arranged by grade category, 1971-95<sup>a</sup>**

Adjusted lumber grade	B <sub>0</sub>	B <sub>1</sub> <sup>b</sup>	Adjusted r <sup>2</sup>	Durbin-Watson statistic <sup>c</sup>	Equation form	Base price source
C select and better, 1971-92 only	305.19**	1.3356***	0.52	1.7214	1	West side
D select and shop	148.01*	1.0859***	.82	2.1384	1	West side
Structural items	.3322 [p(b <sub>0</sub> =0)=0.40]	.9527***	.97	1.2418	2	West side
Heavy framing	19.479* [p(b <sub>0</sub> =0)=0.21]	1.0167***	.95	1.2483	1	West side
Light framing	1.4211 [p(b <sub>0</sub> =0)=0.94]	.8726***	.96	1.5717	1	West side
Utility	-.9025*	1.0655***	.87	1.3456	2	West side
Economy	.1521 [p(b <sub>0</sub> =0)=0.91]	.7915***	.70	2.1796	2	West side

<sup>a</sup> Except where otherwise noted.

<sup>b</sup> \* significant at p<=0.10, \*\* significant at p<=0.05, \*\*\* significant at p<=0.01.

<sup>c</sup> Adjusted for serial autocorrelation.



**Table 23—Regression coefficients for prices of ponderosa pine lumber from Western U.S. mills, arranged by grade category, 1971-95**

Lumber grade	B <sub>0</sub>	B <sub>1</sub> <sup>a</sup>	Adjusted R <sup>2</sup>	Durbin-Watson statistic <sup>b</sup>	Equation form	Base price source
4/4 select and #1 shop: C select and better D select, 12 in	2.6318 [p(b <sub>0</sub> =0)=0.19]	0.5712** .7729**	0.50 .43	1.7931 2.1072	2 2	East side East side
C select, 4 in; D select, 6-10 in	2.9791*	.6584**	.44	1.8461	2	East side
D select, 4 in	2.6732*	.6454***	.62	2.0646	2	East side
#1 shop	2.3028*	.6518***	.28	1.5531	2	East side
5/4 and thicker moulding and shop:						
Moulding and better	2.5356 [p(b <sub>0</sub> =0)=0.13]	.7694***	.65	1.8671	2	East side
#1 shop	431.51*** [p(b <sub>0</sub> =0)=0.97]	1.0635***	.82	1.7101	1	East side
#2 shop	310.46 [p(b <sub>0</sub> =0)=0.11]	1.1650***	.81	1.8341	1	East side
#3 shop	207.45*	.7314***	.72	2.0088	1	East side
Shopout	-23.946 [p(b <sub>0</sub> =0)=0.67]	.8337***	.88	1.8235	1	East side
4/4 common and 8/4 standard and better:						
2 common, 12 in	266.98**	.9433***	.57	2.3366	1	West side
2 common, 4-10 in	101.74*	.9923***	.80	1.6739	1	West side
3 common, 6-12 in	-1.8669 [p(b <sub>0</sub> =0)=0.94]	.8001***	.88	2.0912	1	East side
3 common, 4 in	-1.4292 [p(b <sub>0</sub> =0)=0.11]	1.1473***	.83	1.9749	2	East side
Low value: 3 and utility	-.0920 [p(b <sub>0</sub> =0)=0.91]	.9207***	.82	1.5649	2	West side
5 common and economy	-2.743***	1.2608***	.80	1.3614	2	East side

<sup>a</sup> \* significant at p<=0.10, \*\* significant at p<=0.05, \*\*\* significant at p<=0.01.

<sup>b</sup> Adjusted for serial autocorrelation.

**Table 24—Regression coefficients for prices of sugar pine lumber from Western U.S. mills, arranged by grade category, 1971-95<sup>a</sup>**

Lumber grade	B <sub>0</sub>	B <sub>1</sub> <sup>b</sup>	Adjusted r <sup>2</sup>	Durbin-Watson statistic <sup>c</sup>	Equation form	Base price source
4/4 select and #1 shop:						
C select and better	3.4920**	0.6683***	0.63	1.5530	2	East side
C select, 4 in; D select, 6-12 in	3.1794**	.6656***	.44	1.5632	2	East side
D select, 4 in	2.7218*	.6892***	.58	2.1055	2	East side
#1 shop	2.4574**	.6438***	.60	2.1331	2	West side
5/4 and thicker moulding and shop:						
Moulding and better	3.4011**	.6261***	.59	1.9288	2	East side
#1 shop	374.41***	1.1745***	.46	2.0698	1	East side
#2 shop	218.97	1.2565***	.74	2.2060	1	East side
	[p(b <sub>0</sub> =0)=0.21]					
#3 shop	149.69	.8866***	.70	2.1785	1	East side
	[p(b <sub>0</sub> =0)=0.13]					
Shopout	.2500	.9298***	.82	1.6815	1	East side
	[p(b <sub>0</sub> =0)=0.84]					
4/4 commons and 8/4 standard and better:						
2 common, 12 in, 1971-93 only	307.79***	.8729***	.70	1.8329	1	East side
2 common, 4-10 in	182.69**	1.2068***	.73	1.8675	1	West side
3 common, 6-12 in	-1.0723	.8327***	.79	1.9966	2	West side
	[p(b <sub>0</sub> =0)=0.20]					
3 common, 4 in #3 and utility	-2.3383	1.3034***	.87	1.4040	2	East side
Low value:						
5 common and economy	-2.6058***	1.2554***	.79	1.5421	2	East side

<sup>a</sup> Except where otherwise noted.

<sup>b</sup> \* significant at p<=0.10, \*\* significant at p<=0.05, \*\*\* significant at p<=0.01.

<sup>c</sup> Adjusted for serial autocorrelation.

**Table 25—Regression coefficients for prices of western white pine lumber from Western U.S. mills, arranged by grade category, 1971-95**

Lumber grade	B <sub>0</sub>	B <sub>1</sub> <sup>a</sup>	Adjusted r <sup>2</sup>	Durbin-Watson statistic <sup>b</sup>	Equation form	Base price source
D select and better	3.1732*	0.6512**	0.45	2.0540	2	East side
Shop and better	1.7788	.7602***	.74	2.1625	2	East side
	[p(b <sub>0</sub> =0)=0.16]					
2 common	342.51***	.7394***	.40	1.5358	1	East side
3 common	.0157	.9883***	.80	1.9255	2	East side
	[p(b <sub>0</sub> =0)=0.98]					
4 common	-1.1727***	1.1417***	.93	1.9754	2	West side
5 common	-4.6944***	1.5798***	.84	1.6651	2	East side

<sup>a</sup> \* significant at p<0=0.10, \*\* significant at p<=0.05, \*\*\* significant at p<=0.01.

<sup>b</sup> Adjusted for serial autocorrelation.

**Table 26—Regression coefficients for prices of white wood lumber (including lodgepole pine) from Western U.S. mills, arranged by grade category, 1974-95**

Lumber grade	B <sub>0</sub>	B <sub>1</sub> <sup>a</sup>	Adjusted r <sup>2</sup>	Durbin-Watson statistic <sup>b</sup>	Equation form	Base price source
2 common	2.6568***	0.6045***	0.72	1.8185	2	West side
3 common	67.650	.6363***	.79	1.8048	1	West side
	[p((b <sub>0</sub> =0)=0.11)]					
4 common	-.1741	.9735***	.77	2.3395	2	East side
	[p(b <sub>0</sub> =0)=0.89]					
Utility	80.357	.4731***	.77	1.6815	1	West side
	[p(b <sub>0</sub> =0)=0.18]					
5 common	-.8731***	.9352***	.72	1.3155	2	East side
	[p(b <sub>0</sub> =0)=0.26]					

<sup>a</sup> \* significant at p<0.10, \*\* significant at p<=0.05, \*\*\* significant at p<=0.01.

<sup>b</sup> Adjusted for serial autocorrelation.

**Table 27—Projections of average lumber prices in the Pacific Northwest from the Timber Assessment Market Model,<sup>a</sup> 1996-2020**

Year	West side	East side
<i>1990 U.S. dollars per thousand board feet, Scribner</i>		
1996	380.54	446.80
1997	384.58	451.56
1998	369.84	436.43
1999	371.52	437.42
2000	366.92	434.06
2001	370.93	431.37
2002	376.67	428.68
2003	378.24	430.35
2004	387.42	439.53
2005	392.30	444.41
2006	392.49	444.85
2007	387.78	439.99
2008	392.92	444.85
2009	394.57	446.88
2010	398.87	451.25
2011	408.75	460.76
2012	416.76	469.87
2013	427.68	480.03
2014	435.42	488.42
2015	432.65	485.09
2016	430.46	482.20
2017	433.09	485.46
2018	434.57	487.29
2019	437.34	489.19
2020	434.83	486.05

<sup>a</sup> TAMM, 1993 version LR 207

Source: Adams and Haynes 1996.

**Table 28—Price projections for Douglas-fir lumber, Pacific Northwest coast mills, 1996-2020**

Year	C select	D select and common	Structural items	Heavy framing	Ligh framing	Utility	Economy
----- 1990 U.S. dollars per thousand board feet, Scribner -----							
1996	1,183	686	486	445	346	243	131
1997	1,192	692	492	450	350	246	132
1998	1,158	669	470	430	336	235	127
1999	1,162	672	473	432	338	237	128
2000	1,151	664	466	426	333	233	126
2001	1,160	671	472	432	337	236	127
2002	1,174	680	480	440	343	240	129
2003	1,178	682	483	442	344	241	130
2004	1,199	697	496	454	353	248	133
2005	1,211	704	503	461	358	251	135
2006	1,211	705	503	461	358	251	135
2007	1,200	697	497	455	353	248	133
2008	1,212	705	504	462	358	251	135
2009	1,216	708	506	464	360	252	136
2010	1,226	715	513	470	364	255	137
2011	1,249	730	527	484	374	262	140
2012	1,268	743	539	495	381	268	143
2013	1,293	760	555	510	392	275	147
2014	1,310	772	566	521	400	281	150
2015	1,304	767	562	517	397	279	149
2016	1,299	764	559	514	395	277	148
2017	1,305	768	563	518	397	279	149
2018	1,309	770	565	520	399	280	149
2019	1,315	775	569	524	402	282	150
2020	1,309	771	565	520	399	280	149

**Table 29—Price projections for hem-fir lumber, Pacific Northwest coast mills, 1996-2020**

Year	C select	D select and common	Structural items	Heavy framing	Light framing	Utility	Economy
----- 1990 U.S. dollars per thousand board feet, Scribner -----							
1996	813	561	401	406	333	228	110
1997	819	566	405	410	337	230	111
1998	799	550	390	395	324	221	108
1999	801	551	391	397	326	222	108
2000	795	546	387	393	321	219	107
2001	800	551	391	397	325	222	108
2002	808	557	397	402	330	225	109
2003	810	559	398	404	331	226	110
2004	823	569	407	413	339	232	112
2005	829	574	412	418	344	235	113
2006	829	574	413	419	344	235	113
2007	823	569	408	414	340	232	112
2008	830	575	413	419	344	236	113
2009	832	576	415	421	346	237	113
2010	838	581	419	425	349	239	114
2011	851	592	429	435	358	246	117
2012	862	601	437	443	365	251	118
2013	876	612	448	454	375	258	121
2014	887	621	455	462	382	263	123
2015	883	618	453	459	379	261	122
2016	880	615	450	457	377	260	122
2017	884	618	453	460	379	261	122
2018	886	620	455	461	381	262	122
2019	889	623	457	464	383	264	123
2020	886	620	455	462	381	263	122

4 Table 30--Price projections for ponderosa pine lumber, Western U.S. mills, 1996-2020

Year	4/4 select and #1 shop				5/4 and thicker moulding and shop						4/4 common and 8/4 standard and better				Low value		
	C and better		C and btr.		Mldg. and better	#1 shop	#2 shop	#3 shop	Shopout	2 com. 12 in	2 com. 4-10 in	3 com. 6-12 in	3 com. 8/4 dimen.	3 com. 4 in	4 com. 4-12 com.	#3 and utility	5 com. and economy
	D 6-12 in	D 12 in	D 4 in	D 6-10 in													
1996	1,737	1,553	1,093	744	534	1,381	907	831	534	349	626	479	357	263	238	141	
1997	1,748	1,566	1,101	749	537	1,392	912	837	538	353	630	483	361	266	240	143	
1998	1,714	1,525	1,076	732	526	1,356	896	819	527	340	616	469	349	256	231	137	
1999	1,716	1,528	1,078	734	526	1,359	897	820	527	341	617	470	350	257	232	137	
2000	1,709	1,518	1,072	730	524	1,351	893	816	525	338	613	466	347	254	230	136	
2001	1,703	1,511	1,068	727	522	1,344	890	813	523	336	617	470	345	253	232	135	
2002	1,697	1,504	1,064	724	520	1,338	887	810	521	333	622	476	343	251	235	134	
2003	1,700	1,508	1,066	726	521	1,342	889	812	522	335	624	477	344	252	236	135	
2004	1,721	1,533	1,081	736	528	1,364	899	823	529	342	632	486	352	258	241	138	
2005	1,732	1,546	1,089	741	532	1,375	904	828	532	347	637	491	356	261	244	140	
2006	1,732	1,547	1,089	741	532	1,376	904	828	533	347	637	491	356	261	244	140	
2007	1,722	1,534	1,082	736	528	1,365	899	823	529	343	633	487	352	258	242	138	
2008	1,733	1,548	1,090	742	532	1,376	905	829	533	347	638	492	356	262	245	140	
2009	1,737	1,553	1,093	744	534	1,381	907	831	534	349	639	493	358	263	246	141	
2010	1,747	1,565	1,100	748	537	1,392	911	836	537	352	643	498	361	266	248	143	
2011	1,768	1,590	1,115	759	545	1,414	922	847	544	360	653	507	369	272	254	147	
2012	1,788	1,614	1,130	768	552	1,436	931	858	551	368	660	515	376	279	258	150	
2013	1,810	1,641	1,146	779	559	1,459	942	870	559	376	670	526	384	285	264	154	
2014	1,828	1,663	1,159	788	566	1,479	951	879	565	383	678	534	391	291	269	158	
2015	1,821	1,655	1,154	784	563	1,471	947	876	562	380	675	531	388	289	267	157	
2016	1,815	1,647	1,149	781	561	1,465	944	872	560	378	673	529	386	287	266	155	
2017	1,822	1,656	1,154	785	563	1,472	948	876	563	381	675	531	388	289	268	157	
2018	1,826	1,660	1,157	786	565	1,476	950	878	564	382	677	533	390	290	268	157	
2019	1,830	1,665	1,160	788	566	1,481	952	880	565	384	680	536	391	292	270	158	
2020	1,823	1,657	1,155	785	564	1,474	948	877	563	381	677	533	389	290	269	157	



**Table 31--Price projections for sugar pine lumber, Western U. S. mills, 1996-2020**

Year	4/4 select and #1 shop			5/4 and thicker moulding and shop			4/4 common and 8/4 standard			Low value				
	C and better 6-12 in	C and btr. 4 in D 6-12 in	#1 shop	Mldg. and better	#1 shop	#2 shop	#3 shop	Shopout	2 com. 12 in	2 com. 4-10 in	3 common 6-12 in 8/4 dimen.	3 common, 4 in 4-12 in #3 and utility	5 common economy	
-----1990 U.S. dollars per thousand board feet, Scribner-----														
1996	1,939	1,395	1,020	535	1,368	899	780	546	415	698	642	411	275	157
1997	1,953	1,405	1,027	539	1,377	905	786	550	420	702	647	415	278	159
1998	1,909	1,374	1,003	525	1,348	887	767	537	406	689	629	402	266	152
1999	1,912	1,376	1,005	527	1,350	888	769	538	407	690	631	403	267	153
2000	1,902	1,369	1,000	523	1,344	884	764	535	404	687	625	399	264	151
2001	1,894	1,363	995	526	1,339	881	761	532	401	684	630	403	262	150
2002	1,886	1,358	991	532	1,333	878	758	530	399	682	637	408	260	149
2003	1,891	1,361	994	533	1,337	880	760	531	400	683	639	409	261	150
2004	1,918	1,380	1,008	541	1,354	891	771	539	409	691	650	418	269	154
2005	1,932	1,390	1,016	546	1,364	896	777	544	413	696	656	422	273	156
2006	1,932	1,391	1,016	546	1,364	896	777	544	413	696	656	422	273	156
2007	1,919	1,381	1,009	542	1,355	891	772	540	409	692	651	418	269	154
2008	1,933	1,391	1,017	546	1,365	897	778	544	414	696	657	423	273	156
2009	1,939	1,396	1,020	548	1,369	899	780	546	416	698	659	424	275	157
2010	1,952	1,405	1,027	552	1,377	904	786	550	420	702	664	428	278	159
2011	1,979	1,424	1,042	560	1,395	916	798	558	428	710	676	437	286	163
2012	2,005	1,443	1,056	567	1,412	926	809	566	437	718	686	444	293	167
2013	2,034	1,464	1,071	577	1,431	938	822	575	446	727	699	453	301	172
2014	2,058	1,481	1,084	584	1,447	948	833	583	454	734	708	460	308	175
2015	2,048	1,474	1,079	581	1,441	944	828	580	451	731	705	458	306	174
2016	2,040	1,468	1,075	579	1,435	941	825	577	448	729	702	456	303	173
2017	2,049	1,475	1,080	582	1,441	945	829	580	451	732	705	458	306	174
2018	2,055	1,478	1,083	583	1,445	947	831	582	453	733	707	460	307	175
2019	2,060	1,482	1,085	585	1,448	949	834	583	455	735	710	462	309	176
2020	2,051	1,476	1,081	583	1,442	945	830	581	452	732	707	460	306	174

**Table 32—Price projections for western white pine lumber, Western U.S. mills, 1996-2020**

Year	D select and better	Shop and better	2 common	3 common	4 common	5 common
<i>----- 1990 U.S. dollars per thousand board feet, Scribner -----</i>						
1996	1,270	613	673	416	273	141
1997	1,279	618	676	420	277	143
1998	1,251	602	665	406	265	135
1999	1,253	603	666	407	266	136
2000	1,246	599	663	404	262	134
2001	1,241	596	661	402	265	133
2002	1,236	594	659	399	270	132
2003	1,239	595	661	401	271	132
2004	1,257	605	667	409	279	137
2005	1,266	610	671	414	283	139
2006	1,266	610	671	414	283	139
2007	1,257	606	668	410	279	137
2008	1,266	611	671	414	284	140
2009	1,270	613	673	416	285	141
2010	1,278	617	676	420	288	143
2011	1,296	627	683	429	297	148
2012	1,312	637	690	437	303	152
2013	1,331	647	697	447	312	157
2014	1,346	656	704	454	319	162
2015	1,340	652	701	451	317	160
2016	1,335	649	699	449	315	159
2017	1,341	653	701	452	317	160
2018	1,344	654	703	453	318	161
2019	1,347	656	704	455	320	162
2020	1,342	653	702	452	318	161

**Table 33—Price projections for white wood lumber (including lodgepole pine), Western U. S. mills, 1996-2020**

Year	2 common and better	3 common and better	4 common and better	Utility	5 common
<i>----- 1990 U.S. dollars per thousand board feet, Scribner -----</i>					
1996	517	310	305	260	126
1997	520	312	308	262	127
1998	508	303	298	255	123
1999	510	304	299	256	123
2000	506	301	297	254	122
2001	509	304	295	256	122
2002	514	307	294	259	121
2003	515	308	295	259	121
2004	523	314	300	264	124
2005	527	317	304	266	125
2006	527	317	304	266	125
2007	523	314	301	264	124
2008	527	318	304	266	125
2009	529	319	305	267	126
2010	532	321	308	269	127
2011	540	328	314	274	129
2012	546	333	320	278	132
2013	555	340	326	283	134
2014	561	345	332	286	137
2015	559	343	330	285	136
2016	557	342	328	284	135
2017	559	343	330	285	136
2018	560	344	331	286	136
2019	562	346	332	287	137
2020	560	344	330	286	136

## Appendix 2

Following is a list of Western Wood Products Association (WWPA) lumber grades classified by the lumber grade categories used by the U.S. Department of Agriculture, Forest Service, Pacific Northwest Research Station.

The aggregate lumber grade categories used by the Pacific Northwest Research Station in reporting regional lumber prices are listed in **boldface** under the appropriate timber species or species group. Names of commercial lumber grades included in a given category for analysis are listed underneath the corresponding category along with the years in which the lumber grade is recorded by the WWPA.

## A. Grade categories for Douglas-fir lumber

Note: Grades in use from 1977 to 1995 are included here.

	<i>Years appearing in WWPA reports</i>	<i>Years appearing in WWPA reports</i>
<b>C select and better (1)</b>		
export clear		
2 in RW/L clear and better	1977-82	
2 in RW/L #3 clear and better	1983-92	
3 in RW/L clear and better	1977-82	
3 in RW/L #3 clear and better	1983-92	
4 in RW/L clear and better	1977-82	
4 in RW/L #3 clear and better	1983-92	
5 in and thicker RW/L clear and better	1977-83	
5 in and thicker #3 clear and better	1984-92	
3 in x RW/L #4 clear	1988-92	
finish		
4/4 C and better	1977-95	
4/4 C and better VG	1977-90	
5/4 and thicker C and better	1977-95	
5/4 and thicker C and better VG	1977-90	
flooring		
4/4 C and better	1977-90	
4/4 C and better VG	1977-90	
industrial clear		
5/4 and thicker clear and better	1977-92	
5/4 and thicker clear and better VG	1977-90	
<b>D select and shop (2)</b>		
finish		
4/4 D	1977-95	
5/4 and thicker D	1977-95	
5/4 and thicker D and better	1993-95	
5/4 and thicker D and better	.1995	
industrial clear		
5/4 and thicker D and better	1993-95	
moulding		
4/4 moulding	1993	
5/4 and thicker moulding	1993, 1995	
5/4 and thicker moulding and better	1993-95	
shop		
shop	1977-95	
shop VG	1977-95	
shop MG	1977-95	
<b>D select and shop (2) continued</b>		
Structural items (3)		
crossarm stock		
crossarm stock		1977-95
domestic cargo west		
3 inch and thicker #2 and better		1977-95
export common		
2 in #2 and better merch		1993
2 in #3 and better common		1993
3 in and thicker select merch		1977-91
3 in and thicker #1 and better merch		1984-95
3 in and thicker #2 merch		1984-92
3 in and thicker #2 and better		1977-82
3 in and thicker #2 and better merch		1983-95
3 in and thicker #3		1977-82
3 in and thicker #3 common R 1st		1983-91
3 in and thicker #3 and better common		1993-95
laminating stock		
laminating stock 2 in		1977-80
laminating stock 2 x 6		1981-83
laminating stock 2 x 8		1981-83
laminating stock 2 x 10		1981-83
2 x 4 L3 and better		1984-95
2 x 6 L3 and better		1984-95
2 x 8 L3 and better		1984-95
2 x 10 L3 and better		1984-95
machine stress rated		
2 x 4 1650 F MSR		1984-86, 1995
2 x 4 1800 F and better MSR		1984-93
2 x 6 1800 F and better MSR		1984-93
2 x 4 2400 F and better MSR		1995
structural joist and plank		
2 x 6 select structural		1995
2 x 6 and wider select structural		1977-94
2 x 8 select structural		1995
2 x 10 select structural		1995
2 x 12 and wider select structural		1995
2 x 6 #1 and better		1995
2 x 6 and wider #1		1977-93

	<i>Years appearing in WWPA reports</i>		<i>Years appearing in WWPA reports</i>
<b>Structural items (3) continued</b>		<b>Heavy framing (4) continued</b>	
2 x 6 and wider #1 and better	1993-94	ties	
4 x 6 #1	1988-92	#1 ties	1977-94
4 x 6 #1 and better	1993-95	timber, beam, stringer	
4 x 8 #1	1984-92	#1	1977-93
4 x 8 #1 and better	1995	#1 and better	1992-95
4 x 10 #1	1984-92	#2	1993-95
4 x 10 #1 and better	1995	#2 and better	1977-95
4 x 12 #1	1977-83	standard and better	1977-93
4 x 12 and wider #1	1984-93		
4 x 12 and wider #1 and better	1993-95	<b>Light framing (5)</b>	
4 in x RL/W #1 and better	1993-94	board, 1 in	
4 in x RL/W #1	1993	standard and better	1977-94
structural light framing		x 4 standard and better	1995
2 x 4 select structural	1977-95	x 6 standard and better	1995
2 x 4 #1 and better	1992-95	utility	1977-92
2 x 4 #1	1977-95	utility and better	1988
timber, beam, stringer		utility and better 4 in	1977-92
select structural	1977-95	1 x 4 utility and better	1993-95
<b>Heavy framing (4)</b>		utility and better 6 in	1977-92
domestic cargo west		1 x 6 utility and better	1993-95
2 x 10 #2 and better	1977-95	domestic cargo west	
2 x 12 #2 and better	1977-89	2 x 4 standard and better	1977-95
2 x 12 and wider #2 and better	1990-95	2 x 6 #2 and better	1977-95
structural joist and plank		2 x 8 #2 and better	1977-95
2 x 10 #2 and better	1977-95	light framing	
2 x 12 #2 and better	1977-90	2 x 3 standard and better	1977-95
2 x 12 and wider #2 and better	1990-95	2 x 4 standard	1977-81, 1983
3 in x RW/L #2 and better	1977-95	2 x 4 standard and better	1977-95
3 x 6 #2 and better	1995	2 x 4 utility and better	1977-95
3 x 8 #2 and better	1995	3 x 4 standard and better	1992
3 x 10 #2 and better	1995	4 x 4 standard and better	1977-95
3 x 12 and wider #2 and better	1995	4 x 4 utility and better	1977-92, 1995
4 in x RW/L #2 and better	1977-94	structural light framing	
4 x 6 #2 and better	1977-95	2 x 4 #2	1977-87, 1990, 1992, 1994
4 x 8 #2 and better	1977-95	2 x 4 #2 and better	1977-95
4 x 10 #2 and better	1977-95	2 x 4 #3	1993-95
4 x 12 #2 and better	1977-83		
4 x 12 and wider #2 and better	1984-95		

*Years appearing  
in WWPA reports*

*Years appearing  
in WWPA reports*

**Light framing (5) continued**

Structural joist and plank	
2 x 6 #2	1995
2 x 6 #2 and better	1977-95
2 x 8 #2 and better	1977-95
2 x 6 #2 structural	
4 x 4 #1	1988-94
4 x 4 #1 and better	1993-95
4 x 4 #2 and better	1988-95

stud	
standard and better	1977-93
2 x 4 construction	1984-95
2 x 4 standard and better	1984-95
#2 and better	1993-94
2 x 4 #2 and better	1984-95
2 x 6 #2 and better	1984-95
stud grade	1977-83
2 x 4 stud grade	1984-95
2 x 6 stud grade	1984-95
construction	1993

**Utility (6)**

light framing	
2 x 3 utility and better	1984-91
2 x 4 utility	1977-95
4 x 4 utility	1977-95

structural joist and plank	
2 x 6 #3	1977-95
2 x 8 #3	1984-95
2 x 8 and wider #3	1977-94
2 x 10 #3	1984-95
2 x 12 #3	1984-91
2 x 12 and wider #3	1990-95
3 x 12 and wider #3	1995
4 x 6 #3	1995
4 x 8 #3	1995
4 x 10 #3	1995
4 x 12 and wider #3	1995
3 in x RW/L #3	1977-94
4 in x RW/L #3	1977-94

**Utility (6) continued**

stud	
utility	1977-95
2 x 6 #3	1993-95
2 x 4 utility	1984-95
timber, beam, and stringer	
#3	1984-92
#3 and better	1984-87, 1989-90

**Economy (7)**

board, 1 in	
x 4 economy	1993-95
light framing	
economy	1977-95
2 x 4 economy	1995
4 x 4 economy	1995
structural joist and plank	
economy	1977-95
2 x 6 economy	1995
2 x 8 economy	1995
2 x 10 economy	1995
2 x 12 and wider economy	1995
4 x 6 economy	1995
4 x 12 and wider economy	1995
stud economy	1977-95
2 x 4 economy	1984-94
2 x 6 economy	1995

## B. Grade categories for hem-fir lumber

Note: Grades in use from 1977 to 1995 are included here.

	<i>Years appearing in WWPA reports</i>
<b>C select and better (1)</b>	
finish flooring pattern	
4/4 C and better	1977-87
5/4 and thicker C and better	1977-92
industrial clear	
4/4 C and better	1977-88
5/4 and thicker C and better	1977-91
5/4 and thicker C and better VG	1977-92
<b>D select and shop (2)</b>	
dimension pullout D and better	1977-95
finish flooring pattern	
4/4 D	1977-86
4/4 D and better	1984-89, 1991-92
5/4 and thicker D and better	1984-95
moulding	
5/4 and thicker moulding and better	1984-92
shop	
shop	1995
shop VG	1977-93
shop MG	1977-92
<b>Structural items (3)</b>	
decking 2 in	
select decking	1992-93
export common	
export common	1977-83
2 x 4 #2 and better merch	1991
2 x 6 #2 and better merch	1991
2 x 10 #2 and better merch	1989
3 in and thicker #2 and better merch	1984-94
machine stress rated	
2 x 4 1650 F MSR	1977-93
2 x 6 1650 F MSR	1984-93
2 x 4 1800 F and better MSR	1977-91
2 x 6 1800 F and better MSR	1984-93

*Years appearing  
in WWPA reports*

### Structural items (3) continued

structural joist and planks	
2 x 6 select and structural	1995
2 x 6 and wider select structural	1977-95
structural light framing	
2 x 4 select structural	1977-95
2 x 4 #1	1977-91
2 x 4 #1 and better	1993-95
timber beam stringer standard and better	1977-87

### Heavy framing (4)

structural joist and plank	
2 x 10 #2 and better	1977-95
2 x 12 #2 and better	1984-89
2 x 12 and wider #2 and better	1990-95
3 x 12 and wider #2 and better	1995
4 x 6 #2 and better	1992-95
4 x 8 #2 and better	1992-95
4 x 10 #2 and better	1995
4 x 12 #2 and better	1992
4 x 12 and wider #2 and better	1993-95
4 x 6 # 3 and better	1992-95
ties	
#1 ties	1977-94
timber, beam, stringer	
standard and better	1977-87, 1993, 1995
#2 and better	1984-87, 1994-95
#3 and better	1993-95

### Light framing (5)

decking 2 in	
decking 2 in	1977-90
domestic cargo west	
2 x 10 #2 and better	1977-91
2 x 12 #2 and better	1977-89
2 x 12 and wider #2 and better	1990-91



	<i>Years appearing in WWPA reports</i>		<i>Years appearing in WWPA reports</i>
<b>Light framing (5) continued</b>		<b>Utility (6) continued</b>	
light framing		structural joist and plank	
2 x 4 standard and better	1977-95	2 x 6 #3	1977-95
2 x 4 utility and better	1977-95	2 x 8 and wider #3	1977-94
4 x 4 standard and better	1977-95	2 x 10 #3	1995
4 x 4 utility and better	1977-95	2 x 12 and wider #3	1995
structural joist and plank		stud	
#2 and better 6 in and wider	1977-91	utility	1977-83
2 x 6 #2 and better	1977-95	2 x 4 utility	1984-95
2 x 8 #2 and better	1977-95	timber beam stringer	
4 x 4 standard and better	1988-95	utility and better	1984, 1987
structural light framing		<b>Economy (7)</b>	
2 x 4 #2	1977-85, 1987	light framing	
2 x 4 #2 and better	1984-95	economy	1977-94
4 x 4 #2 and better	1992-95	2 x 4 economy	1984-95
stud		4 x 4 economy	1992-95
standard and better	1977-94	structural joist and plank	
stud grade	1977-95	economy	1977-94
2 x 4 construction	1984-95	2 x 6 economy	1995
2 x 4 #2 and better	1995	2 x 8 economy	1995
2 x 6 #2 and better	1984-95	2 x 10 economy	1995
2 x 4 standard and better	1984-95	2 x 12 and wider economy	1995
2 x 4 stud grade	1984-95	stud	
2 x 6 stud grade	1984-95	economy	1977-95
<b>Utility (6)</b>		2 x 4 economy	1984-95
board, 1 in		2 x 6 economy	1993-95
standard and better	1977-91		
utility	1977-89		
utility and better	1977-95		
domestic cargo west			
stud grade	1977-91		
light framing			
2 x 4 utility	1977-95		
4 x 4 utility	1977-95		

### C. Grade categories for ponderosa pine lumber

	<i>Years appearing in WWPA reports</i>	<i>Years appearing in WWPA reports</i>
<b>C select and better, 6-12 in (1)</b>		
4/4 C select and better, 6 in	1971-91	
4/4 x 6 C select and better	1992-95	
4/4 C select and better, 8 in	1971-91	
4/4 x 8 C select and better	1992-95	
4/4 C select and better, 10 in	1971-91	
4/4 C x 10 select and better	1992-95	
4/4 C select and better, 12 in	1971-89	
4/4 C select and better, 12 in and wider	1990-91	
4/4 x 12 and wider C select and better	1992-95	
4/4 C select and better RW	1971-76	
<b>D select, 12 in (2)</b>		
4/4 D select, 12 in	1971-89	
4/4 D select, 12 in and wider	1990-91	
4/4 x 12 and wider D select	1992-95	
<b>C select and better, 4 in, and D select, 6-10 in (3)</b>		
4/4 C select and better, 4 in	1971-91	
4/4 x 4 C select and better	1992-95	
4/4 D select, 6 in	1971-91	
4/4 x 6 D select	1992-95	
4/4 D select, 8 in	1971-91	
4/4 x 8 D select	1992-95	
4/4 D select, 10 in	1971-91	
4/4 x 10 D select	1992-95	
4/4 D select RW	1971-76	
<b>D Select, 4 in (4)</b>		
4/4 moulding stock, surf and rough	1971-91	
4/4 D select, 4 in	1971-91	
4/4 x 4 D select	1992-95	
4/4 moulding and better, surf and rough	1971-76	
4/4 moulding, surf	1992-95	
<b>4/4 #1 Shop (5)</b>		
4/4 #3 clear	1971-95	
4/4 #1 shop	1971-95	
<b>5/4 and thicker moulding and better (6)</b>		
5/4 C select and better	1971-95	
5/4 moulding stock, surf	1971-91	
6/4 moulding stock, surf	1971-91	
5/4 moulding and better, surf	1971-95	
<b>5/4 and thicker moulding and better (6) continued</b>		
6/4 moulding and better, surf		1971-95
5/4 moulding, surf and rough		1992-95
6/4 moulding, surf and rough		1992-95
5/4 moulding and better, rough		1971-95
6/4 moulding and better, rough		1971-95
6/4 C select and better		1971-95
8/4 C select and better		1971-95
5/4 D select		1971-95
6/4 D select		1971-91
8/4 D select		1971-91
<b>5/4 #1 shop (7)</b>		
5/4 and 6/4 #3 clear		1971-95
5/4 #1 shop		1971-95
6/4 #1 shop		1971-95
8/4 #1 shop		1971-92
8/4 and thicker #1 shop		1993-95
<b>5/4 #2 shop (8)</b>		
5/4 #2 shop		1971-95
6/4 #2 shop		1971-95
8/4 #2 shop		1971-92
8/4 and thicker #2 shop		1993-95
<b>5/4 #3 shop (9)</b>		
5/4 #3 shop		1971-95
6/4 #3 shop		1971-95
8/4 #3 shop		1971-92
8/4 and thicker #3 shop		1992-95
stained shop		1977-95
5/4 #2 and better common		1992-95
6/4 #2 and better common		1971-95
<b>Shop out (10)</b>		
5/4 and thicker shop outs		1971-95
5/4 #3 common		1971-95
5/4 #3 and better common		1993-95
6/4 #3 common		1971-95
5/4 #4 common		1971-95
5/4 #4 and better common		1993-95
6/4 #4 common		1971-95
6/4 #4 and better common		1993-95
5/4 and thicker #5 common		1971-95
box (includes rough)		1977-95

*Years appearing  
in WWPA reports*

*Years appearing  
in WWPA reports*

**Shop out (10) continued**

6/4 #3 common, 8 in resawn	1971-91
6/4 x 8 #3 common resawn	1992-94
6/4 #3 common, 10 in resawn	1977-91
6/4 x 10 #3 common resawn	1992-94
6/4 #3 common, 12 in resawn	1971-89
6/4 #3 common, 12 in and wider resawn	1990-91
6/4 x 12 and wider #3 common resawn	1992
6/4 #4 common, 8 in resawn	1971-91
6/4 x 8 #4 common resawn	1992
6/4 #4 common, 10 in resawn	1977-91
6/4 x 10 #4 common resawn	1992
6/4 #4 common, 12 in resawn	1971-89
6/4 #4 common, 12 in and wider resawn	1990-91
6/4 x 12 and wider #4 common resawn	1992
shop common	1992-95

**2 common, 12 in (11)**

4/4 #2 and better common, 12 in	1971-89
4/4 #2 and better common, 12 in and wider	1990-91
4/4 x 12 and wider #2 and better common	1992-95

**2 common, 4-10 in (12)**

4/4 #2 and better common, 4 in	1977-91
4/4 x 4 #2 and better common	1992-95
4/4 #2 and better common, 6 in	1977-91
4/4 x 6 #2 and better common	1992-95
4/4 #2 and better common, 8 in	1971-91
4/4 x 8 #2 and better common	1992-95
4/4 #2 and better common, 10 in	1977-91
4/4 x 10 #2 and better common	1992-95
4/4 #2 and better, 8 in pattern	1971-87
4/4 #3 common, 8 in pattern	1971-87

**3 common, 6-12 in, and 8/4 dimension (13)**

4/4 #2 shop	1971-95
4/4 #3 common, 6 in	1971-91
4/4 x 6 #3 common	1992-95
4/4 #3 common, 8 in	1971-91
4/4 x 8 #3 common	1992-95
4/4 #3 common, 10 in	1971-91
4/4 x 10 #3 common	1992-95
4/4 #3 common, 12 in	1971-89
4/4 #3 common, 12 in and wider	1990-91
4/4 x 12 and wider #3 common	1992-95
standard and better, 4 in	1971-91

**3 common, 6-12 in, and 8/4 dimension (13) continued**

2 x 4 standard and better	1992-95
standard and better, 6 in	1971
standard and better, 8 in and wider	1971
#2 and better, 6 in	1971-91
2 x 6 #2 and better	1992-95
#2 and better, 8 in and wider	1971-76
#2 and better, 8 in	1977-91
2 x 8 #2 and better	1992-95
#2 and better, 10 in	1977-91
2 x 10 #2 and better	1992-95
#2 and better, 12 in	1977-89
#2 and better, 12 in and wider	1990-91
2 x 12 and wider #2 and better appearance	1992-95
standard and better studs	1974-76
stud	1971-76
stud grade	1971-76
utility and better studs	1977-91
select decking, 6 in	1971-76
2 x 6 select decking	1977-91
#2 and better patio	1992-95

**3 common, 4 in, and 4 common, 4-12 in (14)**

4/4 shop outs	1971-95
4/4 #3 common, 4 in	1971-91
4/4 x 4 #3 common	1992-95
4/4 #4 common, 4 in	1971-91
4/4 x 4 #4 common	1992-95
4/4 #4 common, 6 in	1971-91
4/4 x 6 #4 common	1992-95
4/4 #4 common, 8 in	1971-91
4/4 x 8 #4 common	1992-95
4/4 #4 common, 10 in	1971-91
4/4 x 10 common #4 common	1992-95
4/4 #4 common, 12 in	1971-89
4/4 #4 common, 12 in and wider	1990-91
4/4 x 12 and wider #4 common	1992-95

**# 3 and utility (15)**

#3	1971
#3, 6 in and wider	1972-91
2 x 6 and wider #3	1992-94
2 x 6 #3	1995
2 x 8 #3	1995

*Years appearing  
in WWPA reports*

**# 3 and utility (15)** continued

2 x 10 #3	1995
2 x 12 and wider #3	1995
utility	1971
utility, 4 in	1972-91
2 x 4 utility	1992-95

**5 common and economy (16)**

4/4 #5 common	1971-95
economy	1971-94
2 x 4 economy	1995
2 x 6 economy	1995
2 x 8 economy	1995
2 x 10 economy	1995
2 x 12 and wider economy	1995

## D. Grade categories for sugar pine lumber

	<i>Years appearing in WWPA reports</i>		<i>Years appearing in WWPA reports</i>
<b>C select and better, 6-12 in (1)</b>		<b>Moulding and better (5) continued</b>	
4/4 C select and better	1977-95	8/4 D select	1971-76
4/4 C select and better, 6 in	1971-76	8/4 and thicker D select	1984-91
4/4 C select and better, 8 in	1971-76	<b>5/4 and thicker #1 shop (6)</b>	
4/4 C select and better, 10 in	1971-76	5/4 #1 shop	1971-95
4/4 C select and better, 12 in	1971-76	6/4 #1 shop	1971-95
<b>C select and better, 4 in, and D select, 6-12 in (2)</b>		8/4 #1	1971-76
4/4 C select and better, 4 in	1971-76	8/4 and thicker #1 shop	1977-92
4/4 D 12 in	1971-76	<b>5/4 and thicker #2 shop (7)</b>	
4/4 D select	1977-95	5/4 #2 shop	1971-95
8/4 and thicker D select	1984-91	6/4 #2 shop	1971-95
4/4 D select, 6 in	1971-76	8/4 #2 shop	1971-76
4/4 D select, 8 in	1971-76	8/4 and thicker #2 shop	1977-95
4/4 D select, 10 in	1971-76	stained select	1984-95
<b>D select, 4 in (3)</b>		<b>5/4 and thicker #3 shop (8)</b>	
4/4 D select, 4 in	1971-76	5/4 #3 shop	1971-95
4/4 moulding and better, surf	1971-76	6/4 #3 shop	1971-95
4/4 moulding, surf	1971-95	8/4 #3 shop	1971-76
4/4 moulding and better, rough	1971-76	8/4 and thicker #3 shop	1977-95
4/4 moulding, rough	1971-92	stained shop	1977-95
<b>4/4 #1 shop (4)</b>		5/4 and 6/4 #2 and better common	1971-95
4/4 #1 shop	1971-95	<b>Shopout (9)</b>	
<b>Moulding and better (5)</b>		reject shop	1977-95
5/4 C select and better	1971-76	5/4 and 6/4 #3 common	1971-95
5/4 moulding and better, surf	1971-76	8/4 #3 common	1971-93
5/4 and thicker moulding and better, surf	1993-95	box	1977-95
6/4 moulding and better, surf	1971-76	shop common	1992-95
5/4 moulding, surf	1971-76	<b>2 common, 12 in (10)</b>	
5/4 and thicker moulding, surf	1993-95	4/4 factory select	1971-93
6/4 moulding, surf	1971-76	factory select	1971-76
5/4 moulding and better, rough	1971-95	<b>2 common, 4-10 in (11)</b>	
6/4 moulding and better, rough	1971-95	4/4 #2 and better common	1971-95
8/4 and thicker moulding, rough	1977-92	8/4 #2 and better common	1971-95
8/4 and thicker moulding and better, rough	1978-82	<b>3 common, 6-12 in, and 8/4 dimension (12)</b>	
5/4 moulding, rough	1971-92	4/4 #2 shop	1971-95
6/4 moulding, rough	1971-92	4/4 #3 common	1971-95
6/4 C select and better	1971-76	standard and better, #2 and better, 4 in and wider	1988-91, 1993-95
8/4 C select and better	1971-76		
5/4 and thicker C select and better	1977-95		
5/4 D select	1971-76		
6/4 D select	1971-76		

*Years appearing  
in WWPA reports*

**3 common, 4 in, and 4 common, 4-12 in, # 3 and  
utility (13)**

4/4 and thicker #4 common	1971-95
4/4 and thicker #4 and better common	1993
utility and better, #3 and better, 4 in and wider	1988-91
utility and #3, 4 in and wider	1988-95

**5 common and economy (14)**

4/4 and thicker #5 common	1971-95
economy	1993-95

## E. Grade categories for western white pine lumber

	<i>Years appearing in WWPA reports</i>		<i>Years appearing in WWPA reports</i>
<b>D select and better (1)</b>		<b>4 common (5)</b>	
4/4 choice and better	1971-95	4/4 utility 4 in	1971-91
4/4 choice	1977-95	4/4 x 4 utility	1992-95
4/4 quality	1971-95	4/4 utility 6 in	1971-91
5/4 choice and better	1971-76	4/4 x 6 utility	1992-95
5/4 quality	1971-76	4/4 utility 8 in	1971-91
		4/4 x 8 utility	1992-95
<b>Shop and better (2)</b>		4/4 utility 10 in	1971-91
4/4 moulding	1992-95	4/4 x 10 utility	1992-95
4/4 moulding stock	1971-91	4/4 utility 12 in and wider	1971-91
4/4 factory	1971-91	4/4 x 12 and wider utility	1992-95
4/4 factory select	1992-93	4/4 x R/W utility	1992-93
4/4 #1 shop	1971-95	5/4 and thicker utility	1971-90
		utility 4 in	1977-83
<b>2 common (3)</b>		<b>5 common (6)</b>	
4/4 colonial	1971-85	4/4 and thicker industrial	1971-95
4/4 sterling 4 in	1971-91		
4/4 x 4 sterling	1992-95		
4/4 sterling 6 in	1971-91		
4/4 x 6 sterling	1992-95		
4/4 sterling 8 in	1971-91		
4/4 x 8 sterling	1992-95		
4/4 sterling 10 in	1971-91		
4/4 x 10 sterling	1992-95		
4/4 sterling 12 in and wider	1971-92		
4/4 x 12 and wider sterling	1992-95		
4/4 x R/W sterling	1992-95		
5/4 and thicker sterling	1971-93		
<b>3 common (4)</b>			
4/4 standard 4 in	1971-91		
4/4 x 4 standard	1992-95		
4/4 standard 6 in	1971-91		
4/4 x 6 standard	1992-95		
4/4 standard 8 in	1971-91		
4/4 x 8 standard	1992-95		
4/4 standard 10 in	1971-91		
4/4 x 10 standard	1992-95		
4/4 standard 12 in and wider	1971-91		
4/4 x 12 and wider standard	1992-95		
4/4 x R/W standard	1992-95		
4/4 # 2 shop	1992-95		
5/4 and thicker standard	1971-93		
standard and better 4 in	1977-83		

**F. Grade categories for white wood (including lodgepole pine) lumber**

	<i>Years appearing in WWPA reports</i>		<i>Years appearing in WWPA reports</i>
<b>Shop and better (1)</b>		<b>Utility (5)</b>	
4/4 D select and better	1993-95	utility 4 in	1974-91
4/4 D select	1993	# 3 6 in	1974-91
4/4 moulding	1993	# 3 and better 6 in	1974-83
#1 shop	1993	# 3 8 in	1984-91
#2 shop	1993	# 3 10 in	1984-91
#3 shop	1993	# 3 12 in	1984-91
<b>2 common and better (2)</b>		# 3 12 in and wider	1990-89
4/4 2 and better common	1974-77, 1984-95	2 x 4 utility	1993-95
4/4 2 common	1994	utility and better 4 in	1974-91
5/4 and thicker 2 and better common	1993	2 x 4 utility and better	1992-95
<b>3 common and better (3)</b>		2 x 6 # 3	1992-95
4/4 3 common	1974-95	2 x 6 # 3 and better	1993-95
4/4 3 and better common	1993-95	2 x 10 # 3	1995
standard and better 4 in	1974-91	<b>Economy (6)</b>	
2 x 4 standard and better	1992-95	4/4 5 common	1974-95
#2 and better 6 in	1974-91	economy	1974-94
#2 and better 8 in	1977-91	2 x 4 economy	1995
#2 and better 8 in and wider	1974-76	2 x 6 economy	1995
#2 and better 10 in	1977-91	2 x 8 economy	1995
#2 and better 12 in	1977	2 x 10 economy	1995
#2 and better 12 in and wider	1990-91	2 x 12 and wider economy	1995
2 x 6 # 2 and better	1992-95	economy stud	1974-94
2 x 8 # 2 and better	1992-95	2 x 4 economy stud	1995
2 x 10 # 2 and better	1992-95	2 x 6 economy stud	1995
2 x 4 standard and better	1992-95	<b>MSR grades (7)</b>	
2 x 12 and wider 2 common and better	1995	2 x 4 1650 F MSR	1984-93, 1995
standard and better stud	1974-76	2 x 4 1800 F and better MSR	1988-93, 1995
stud	1974-76	2 x 6 1800 F and better MSR	1988
stud 2 x 4	1984-87	2 x 4 2100 F MSR	1995
stud 2 x 6	1984-87		
stud grade	1977-83		
2 x 3 stud grade	1988-95		
2 x 4 stud grade	1988-95		
2 x 6 stud grade	1988-95		
2 x 4 stud grade 9 ft and 10 ft	1992		
2 x 6 stud grade 9 ft and 10 ft	1992		
utility and better stud	1974-80		
5/4 and thicker 3 common	1993		
4/4 4 common	1974-95		
4/4 4 and better common	1974-95		
short common	1992-95		



## Appendix 3

Scientific names of commercial timber species in the Pinaceae found in western Oregon and Washington.

Scientific name	Common name
<i>Abies amabilis</i> Dougl. ex Forbes	Pacific silver fir
<i>Abies concolor</i> (Gord. and Glend.) Lindl. ex Hildebr.	white fir
<i>Abies grandis</i> (Dougl. ex D. Don) Lindl.	grand fir
<i>Abies magnifica</i> A. Murr. var. <i>shastensis</i> Lemmon	Shasta red fir
<i>Abies procera</i> Rehd.	noble fir
<i>Picea engelmannii</i> Parry ex Engelm.	Englemann spruce
<i>Picea sitchensis</i> (Bong.) Carr.	Sitka spruce
<i>Pinus contorta</i> Dougl. ex Loud.	
var. <i>murrayana</i> (Grev. and Balf.) Engelm.	lodgepole pine
<i>Pinus jeffreyi</i> Grev. and Balf.	Jeffrey pine
<i>Pinus lambertiana</i> Dougl.	sugar pine
<i>Pinus monticola</i> Dougl. ex D. Don	western white pine
<i>Pinus ponderosa</i> Dougl. ex Laws.	ponderosa pine
<i>Pseudotsuga menziesii</i> (Mirb.) Franco	Douglas-fir
<i>Tsuga mertensiana</i> (Bong.) Carr.	mountain hemlock
<i>Tsuga heterophylla</i> (Raf.) Sarg.	western hemlock

