

## **Historic, archived document**

Do not assume content reflects current scientific knowledge, policies, or practices.



57  
47



United States  
Department of  
Agriculture

Forest Service

Pacific Northwest  
Research Station

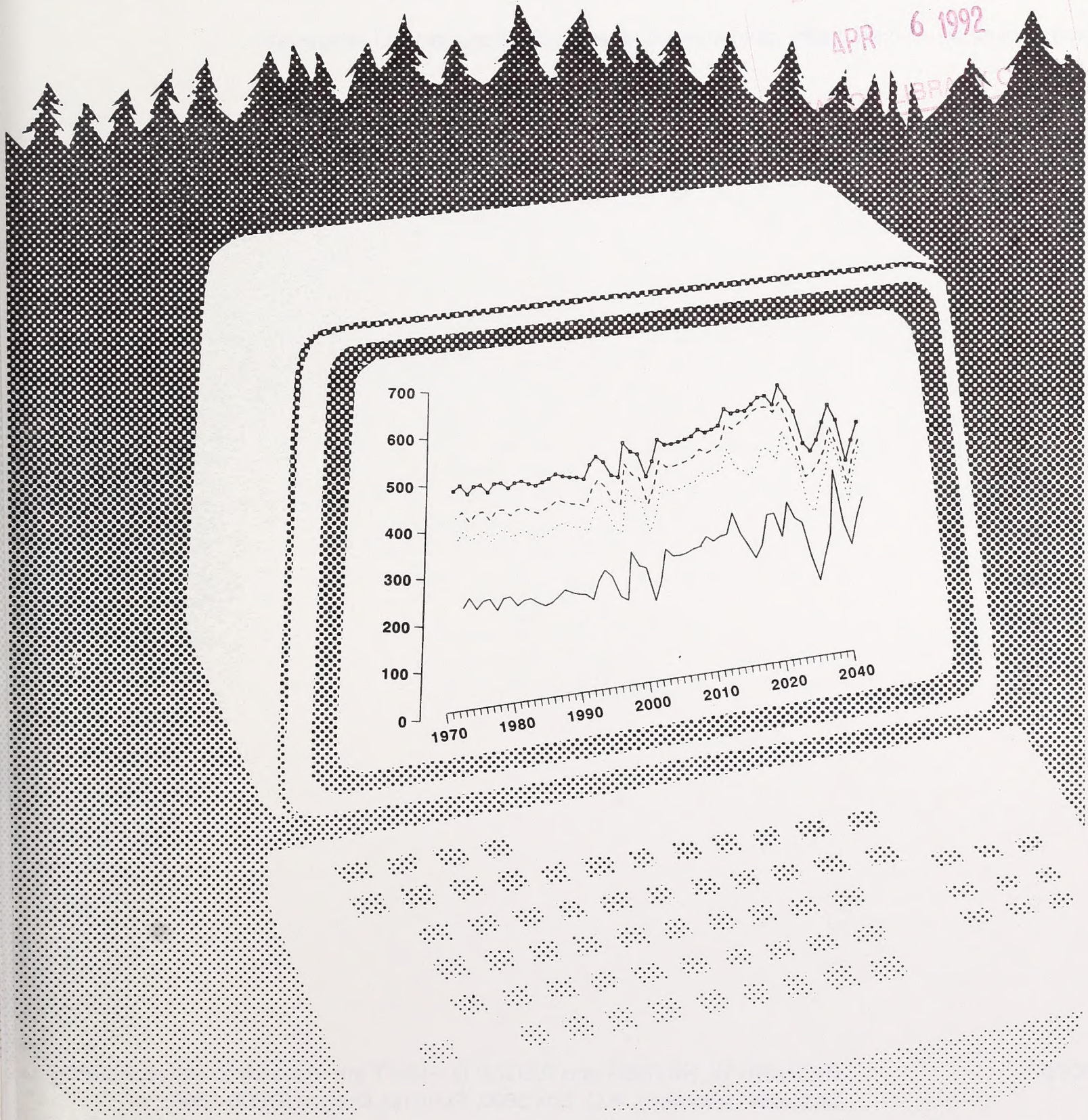
Research Paper  
PNW-RP-447  
February 1992



# Price Projections for Selected Grades of Douglas-Fir, Coast Hem-Fir, Inland Hem-Fir, and Ponderosa Pine Lumber

Richard W. Haynes and Roger D. Fight

FOREST AND RANGE  
EXPERIMENT STATION  
APR 6 1992  
LIBRARY



LIBRARY U.S. FOREST SERVICE BERKELEY

Price Projections for  
Selected Grades of Douglas  
Fir, Western Hemlock, and  
Ponderosa Pine Lumber  
Richard W. Haynes and Roger D. Fight



**Authors**

RICHARD W. HAYNES and ROGER D. FIGHT are research foresters, Forestry Sciences Laboratory, P.O. Box 3890, Portland, Oregon 97208-3890.

**Abstract**

**Haynes, Richard W.; Fight, Roger D. 1992.** Price projections for selected grades of Douglas-fir, coast hem-fir, inland hem-fir, and ponderosa pine lumber. Res. Pap. PNW-RP-447. Portland, OR: U.S. Department of Agriculture, Forest Service, Pacific Northwest Research Station. 20 p.

Grade-specific price projections were developed for Douglas-fir, coast hem-fir, inland hem-fir, and ponderosa pine lumber. These grade-specific price projections can be used in evaluating management practices that will affect the quality of saw logs produced under various management regimes.

**Keywords:** Lumber prices, Douglas-fir, coast hem-fir, inland hem-fir, ponderosa pine.

## Summary

The prevailing perception among forest managers seems to be that premiums for quality and costs of managing for quality are such that volume production is the overriding consideration. Projections of prices of lumber by grade were developed to help the forestry community determine if it is time to reassess this situation. The results support the thought that increasing scarcity of high-quality material will result in higher prices. Higher prices for what is perceived as higher quality products derived from higher quality logs provide an incentive for stumpage owners and agency land managers to modify management regimes. The extent to which regimes are modified depends on individual assessments of the relative costs and expected returns. The price projections in this paper provide a basis on which to value changes in wood quality when estimating expected returns.

## Introduction

Silviculturists have long been concerned about the quality and value of timber produced in managed stands. The prevailing perception among most forest management policy makers, however, seems to be that premiums for quality and costs of managing for quality are such that volume production is the overriding consideration. This, in combination with cash flow problems in the solid wood products industry in the Pacific Northwest during the 1980s, has resulted in many stands being managed on relatively short rotations (50 to 70 years) with relatively wide initial spacing (less than 300 trees per acre) to achieve rapid volume production and reduce management costs.

Over the past 20 years, the quantity of high-quality lumber has declined dramatically and the real price of high-quality lumber has increased dramatically. This has occurred in spite of a sharp decline in real prices for wood products since the late 1970s. Real prices for lumber are expected to return to their long-term upward trend. These long-term price increases may increase the difference, or premium, between grades. Because it is the difference in value between high-quality and low-quality logs that determines how much can be spent to improve quality, this effect alone tends to increase the amount spent to produce high-quality wood. These projections indeed show that the prices of higher grades will tend to increase more than the prices of lower grades. Even current price premiums seem sufficient to justify consideration of wood quality in the selection of management regimes, with high-quality lumber currently priced at three to five times the price for average quality construction lumber.

These projections of lumber prices by grade were developed to help the forestry community determine if it is time to reassess conclusions about management regimes that will produce timber best meeting future needs for lumber and other wood products. This paper presents both historical data and projections for prices (and production) by grade categories for major Pacific Northwest species or groups of species: Douglas-fir (*Pseudotsuga menziesii* (Mirb.) Franco), coast hem-fir (western hemlock and true firs [*Tsuga heterophylla* (Raf.) Sarg. and *Abies*]), inland hem-fir, and ponderosa pine (*Pinus ponderosa* Dougl. ex Laws). The various grade categories are the same as those for which prices are published in Warren (1990). The specific assignments of grades to categories are shown in appendix 1. Appendix 2 contains all original price and volume data.

This paper updates and expands material available for Douglas-fir lumber (Haynes and others 1988). The methods, data sources, and overall approach are similar to the earlier study but have been expanded to consider the four major species groups for lumber and interactions among these groups.

## Recent Trends

### Douglas-Fir

Douglas-fir lumber is grouped into seven categories with two perceived as high-quality: C selects, and D selects and shop (table 1). Two other categories (structural and heavy framing) also command premium prices. The proportion of volume in selects and utility has declined, and the proportion of volume in structural items, heavy framing, and light framing has increased (fig. 1)—likely the result of several factors. Because there is a large price incentive to produce selects, the decline in selects reflects a decline in the quality of logs being sawn. Although this may in part reflect export of logs of higher than average quality, it is clear that the quality of timber being harvested has declined. The decline in the utility grade reflects a declining proportion of lumber being sawn from highly defective material included in the harvest of older stands (Howard and Ward 1988, Larsen 1990). The increase in the proportion of volume in structural items and heavy framing is most likely a market-driven phenomenon. The real price of light framing lumber has experienced wide swings and, throughout the 1980s, has been substantially below the prices in the 1970s. This has provided an incentive for producers to change

## Summary

The prevailing perception among forest managers seems to be that premiums for quality and costs of managing for quality are such that volume production is the overriding consideration. Projections of prices of lumber by grade were developed to help the forestry community determine if it is time to reassess this situation. The results support the thought that increasing scarcity of high-quality material will result in higher prices. Higher prices for what is perceived as higher quality products derived from higher quality logs provide an incentive for stumpage owners and agency land managers to modify management regimes. The extent to which regimes are modified depends on individual assessments of the relative costs and expected returns. The price projections in this paper provide a basis on which to value changes in wood quality when estimating expected returns.



## Introduction

Silviculturists have long been concerned about the quality and value of timber produced in managed stands. The prevailing perception among most forest management policy makers, however, seems to be that premiums for quality and costs of managing for quality are such that volume production is the overriding consideration. This, in combination with cash flow problems in the solid wood products industry in the Pacific Northwest during the 1980s, has resulted in many stands being managed on relatively short rotations (50 to 70 years) with relatively wide initial spacing (less than 300 trees per acre) to achieve rapid volume production and reduce management costs.

Over the past 20 years, the quantity of high-quality lumber has declined dramatically and the real price of high-quality lumber has increased dramatically. This has occurred in spite of a sharp decline in real prices for wood products since the late 1970s. Real prices for lumber are expected to return to their long-term upward trend. These long-term price increases may increase the difference, or premium, between grades. Because it is the difference in value between high-quality and low-quality logs that determines how much can be spent to improve quality, this effect alone tends to increase the amount spent to produce high-quality wood. These projections indeed show that the prices of higher grades will tend to increase more than the prices of lower grades. Even current price premiums seem sufficient to justify consideration of wood quality in the selection of management regimes, with high-quality lumber currently priced at three to five times the price for average quality construction lumber.

These projections of lumber prices by grade were developed to help the forestry community determine if it is time to reassess conclusions about management regimes that will produce timber best meeting future needs for lumber and other wood products. This paper presents both historical data and projections for prices (and production) by grade categories for major Pacific Northwest species or groups of species: Douglas-fir (*Pseudotsuga menziesii* (Mirb.) Franco), coast hem-fir (western hemlock and true firs [*Tsuga heterophylla* (Raf.) Sarg. and *Abies*]), inland hem-fir, and ponderosa pine (*Pinus ponderosa* Dougl. ex Laws). The various grade categories are the same as those for which prices are published in Warren (1990). The specific assignments of grades to categories are shown in appendix 1. Appendix 2 contains all original price and volume data.

This paper updates and expands material available for Douglas-fir lumber (Haynes and others 1988). The methods, data sources, and overall approach are similar to the earlier study but have been expanded to consider the four major species groups for lumber and interactions among these groups.

## Recent Trends

### Douglas-Fir

Douglas-fir lumber is grouped into seven categories with two perceived as high-quality: C selects, and D selects and shop (table 1). Two other categories (structural and heavy framing) also command premium prices. The proportion of volume in selects and utility has declined, and the proportion of volume in structural items, heavy framing, and light framing has increased (fig. 1)—likely the result of several factors. Because there is a large price incentive to produce selects, the decline in selects reflects a decline in the quality of logs being sawn. Although this may in part reflect export of logs of higher than average quality, it is clear that the quality of timber being harvested has declined. The decline in the utility grade reflects a declining proportion of lumber being sawn from highly defective material included in the harvest of older stands (Howard and Ward 1988, Larsen 1990). The increase in the proportion of volume in structural items and heavy framing is most likely a market-driven phenomenon. The real price of light framing lumber has experienced wide swings and, throughout the 1980s, has been substantially below the prices in the 1970s. This has provided an incentive for producers to change

**Table 1—Real Prices for Douglas-fir lumber, coast mills, 1971-90<sup>a</sup>**

(In 1989 dollars per thousand board feet)<sup>b</sup>

| Year | C selects | D selects and shop | Structural items | Heavy framing | Light framing | Utility | Economy |
|------|-----------|--------------------|------------------|---------------|---------------|---------|---------|
| 1971 | 668       | 428                | 369              | 357           | 308           | 217     | 97      |
| 1972 | 785       | 460                | 401              | 395           | 353           | 261     | 115     |
| 1973 | 1,168     | 536                | 521              | 491           | 399           | 290     | 166     |
| 1974 | 989       | 496                | 496              | 383           | 294           | 171     | 98      |
| 1975 | 776       | 430                | 354              | 315           | 266           | 161     | 86      |
| 1976 | 888       | 504                | 418              | 396           | 318           | 201     | 89      |
| 1977 | 867       | 588                | 497              | 370           | 370           | 254     | 105     |
| 1978 | 947       | 648                | 519              | 630           | 375           | 271     | 137     |
| 1979 | 1,263     | 681                | 581              | 474           | 349           | 254     | 122     |
| 1980 | 1,154     | 629                | 454              | 337           | 257           | 186     | 106     |
| 1981 | 851       | 485                | 375              | 299           | 220           | 156     | 95      |
| 1982 | 723       | 418                | 316              | 221           | 177           | 141     | 87      |
| 1983 | 755       | 469                | 289              | 245           | 221           | 178     | 96      |
| 1984 | 740       | 438                | 268              | 240           | 203           | 147     | 77      |
| 1985 | 726       | 443                | 269              | 244           | 205           | 142     | 74      |
| 1986 | 809       | 451                | 267              | 255           | 213           | 147     | 75      |
| 1987 | 909       | 446                | 279              | 280           | 224           | 150     | 72      |
| 1988 | 973       | 498                | 312              | 299           | 230           | 145     | 89      |
| 1989 | 1,078     | 503                | 325              | 330           | 246           | 168     | 110     |
| 1990 | 1,186     | 500                | 293              | 297           | 223           | 150     | 98      |

<sup>a</sup> Figures are FOB prices computed as a volume-weighted average of green and dry surfaced and rough grades.  
<sup>b</sup> The Producer Price Index for 1989 is 111.6.

Source: Data are compiled by Western Wood Products Association from copies of invoices submitted to the association by mills accounting for approximately 65 to 70 percent of the region's production; individual groupings from Pacific Northwest Research Station.

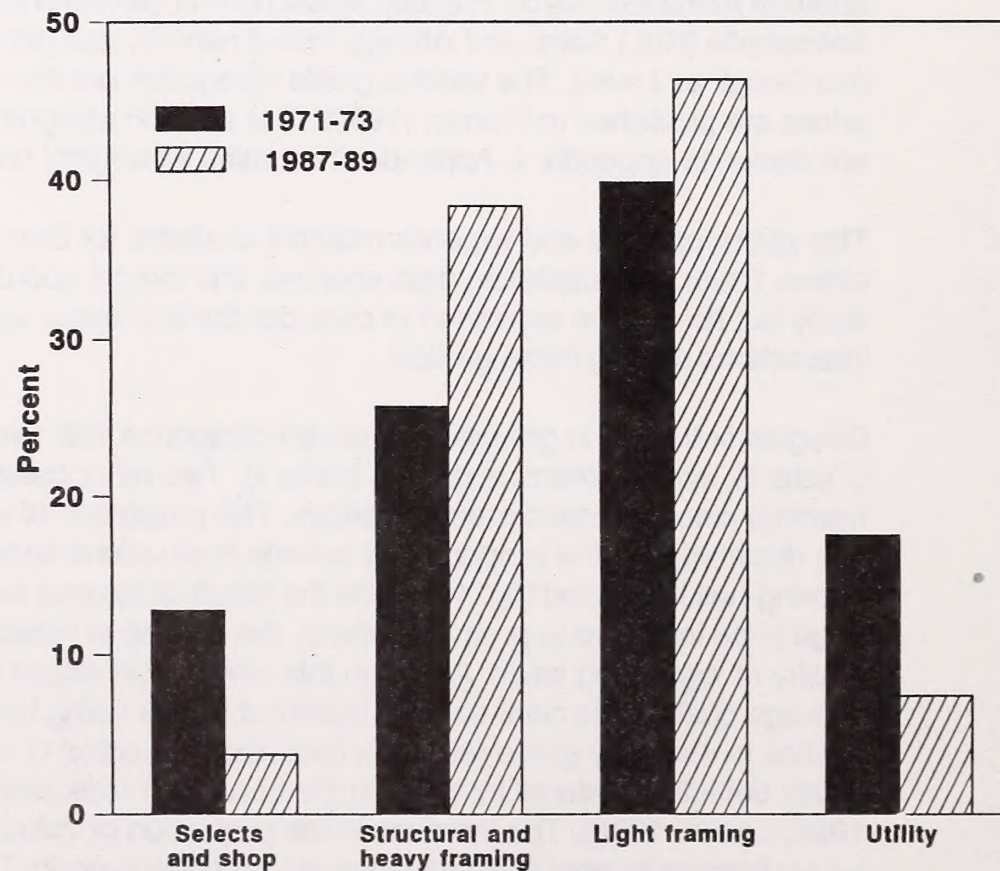


Figure 1—Douglas-fir volume.

sawing patterns to more production in heavy framing. This trend can probably continue for some time even in the face of declining quality of timber harvested.

### **Coast Hem-Fir**

The grade distribution of coast hem-fir lumber has been shifting from higher grades and the utility grades to light and heavy framing grades, just as Douglas-fir lumber has (table 2, fig. 2). Although the select grades were never a large part of the market, C select has disappeared almost completely. Price trends are similar to those for Douglas-fir for the various grades and probably for the same reasons. Prices for some grades, such as light framing and economy, probably reflect price arbitrage across species. The shift of production to structural items and heavy framing is much less pronounced in coast hem-fir than in Douglas-fir, probably owing to a market preference for Douglas-fir because of its greater strength.

### **Inland Hem-Fir**

Inland hem-fir prices move in close proximity to those for coast hem-fir (table 3). This is particularly true since 1977 when heavy framing was separated from light framing lumber in inland hem-fir grades. Note that the clear inland hem-fir goes into moulding and the clear coast hem-fir goes into selects. Changes in production proportions are similar to those for both Douglas-fir and coast hem-fir and for similar reasons (fig. 3). Inland hem-fir is not a significant player in the market for structural items, but it is a major player in the market for heavy framing. The production proportion for heavy framing has increased rapidly during the last 6 years.

### **Ponderosa Pine**

We divided ponderosa pine into 16 groups (table 4) representing several broad categories: 4/4 selects and 1 shop, 5/4 and thicker moulding and shops, 4/4 commons and 8/4 standard and better, and low value. Like Douglas-fir, the highest ponderosa pine prices are for grades in which production shares have been dropping. During the past two decades, a shift in production has occurred from the selects, moulding, and one shop to two and three shop (fig. 4). Prices for two and three shop have increased, but not as much as those for the higher grades. Because of the large price incentive to produce the higher grades, this trend is clearly a result of a long-term decline in the quality of ponderosa pine being harvested. This trend likely will continue and will greatly accelerate as the harvest of ponderosa pine shifts more to thinnings and mature young-growth stands. These changes will require major changes in the moulding and millwork industry using these higher grades of ponderosa pine.

## **Useful Price Analysis Techniques**

### **Role of Price Arbitrage**

Underlying much of this work is the premise of price arbitrage; that is, lumber prices of different species and grades differ with each other in some fixed proportion. Prices of one species and grade will not exceed prices for other species of a similar grade because of the possibilities of substitution. If the price of one species and grade rises (or falls) out of proportion to another species of similar grade, then consumers will substitute one species for another as long as possible. Another form of this arbitrage is between similar grades. In ponderosa pine, for example, the prices for various grades of commons or shop differ in proportion to each other.

### **Price Markup Rules**

In various types of price analysis, some of these forms of arbitrage are institutionalized through what have been called price markup rules (George and King 1971). Classic examples might include the relations among prices for various grades of shop lumber. These rules have been used in past forestry studies (Haynes 1977) on the relation between lumber prices and stumpage prices and implications for the derived demand for stumpage.<sup>1</sup>

<sup>1</sup> In this case, price markup rules are called marketing margins and are an accepted descriptive model of the relation between factor and product markets.

**Table 2—Real prices for hem-fir lumber, coast mills, 1971-90<sup>a</sup>**  
(In 1989 dollars per thousand board feet)<sup>b</sup>

| Year | C selects | D selects and shop | Structural items | Heavy framing | Light framing | Utility | Economy |
|------|-----------|--------------------|------------------|---------------|---------------|---------|---------|
| 1971 | 606       | 404                | 369              | 337           | 296           | 208     | 100     |
| 1972 | 676       | 423                | 415              | 387           | 342           | 252     | 115     |
| 1973 | 853       | 518                | 479              | 449           | 389           | 280     | 154     |
| 1974 | 918       | 486                | 373              | 373           | 292           | 169     | 92      |
| 1975 | 671       | 397                | 313              | 308           | 254           | 151     | 80      |
| 1976 | 780       | 471                | 367              | 376           | 300           | 194     | 88      |
| 1977 | 779       | 494                | 394              | 406           | 330           | 232     | 100     |
| 1978 | 937       | 551                | 413              | 409           | 355           | 261     | 136     |
| 1979 | 959       | 568                | 411              | 429           | 332           | 226     | 110     |
| 1980 | 893       | 503                | 320              | 304           | 242           | 164     | 96      |
| 1981 | 753       | 412                | 261              | 278           | 209           | 149     | 90      |
| 1982 | 795       | 356                | 225              | 233           | 176           | 137     | 78      |
| 1983 | 812       | 425                | 269              | 265           | 226           | 172     | 107     |
| 1984 | 735       | 375                | 244              | 246           | 201           | 138     | 85      |
| 1985 | 690       | 364                | 245              | 251           | 205           | 133     | 85      |
| 1986 | 674       | 382                | 269              | 276           | 220           | 143     | 84      |
| 1987 | 653       | 449                | 296              | 310           | 233           | 142     | 82      |
| 1988 | 662       | 481                | 286              | 302           | 230           | 144     | 93      |
| 1989 | 718       | 466                | 274              | 298           | 234           | 155     | 105     |
| 1990 | 787       | 480                | 259              | 272           | 215           | 144     | 93      |

<sup>a</sup> Figures are FOB prices computed as a volume-weighted average of green and dry surfaced and rough grades.  
<sup>b</sup> The Producer Price Index for 1989 is 111.6.

Source: Data are compiled by Western Wood Products Association from copies of invoices submitted to the association by mills accounting for approximately 65 to 70 percent of the region's production; individual groupings from Pacific Northwest Research Station.

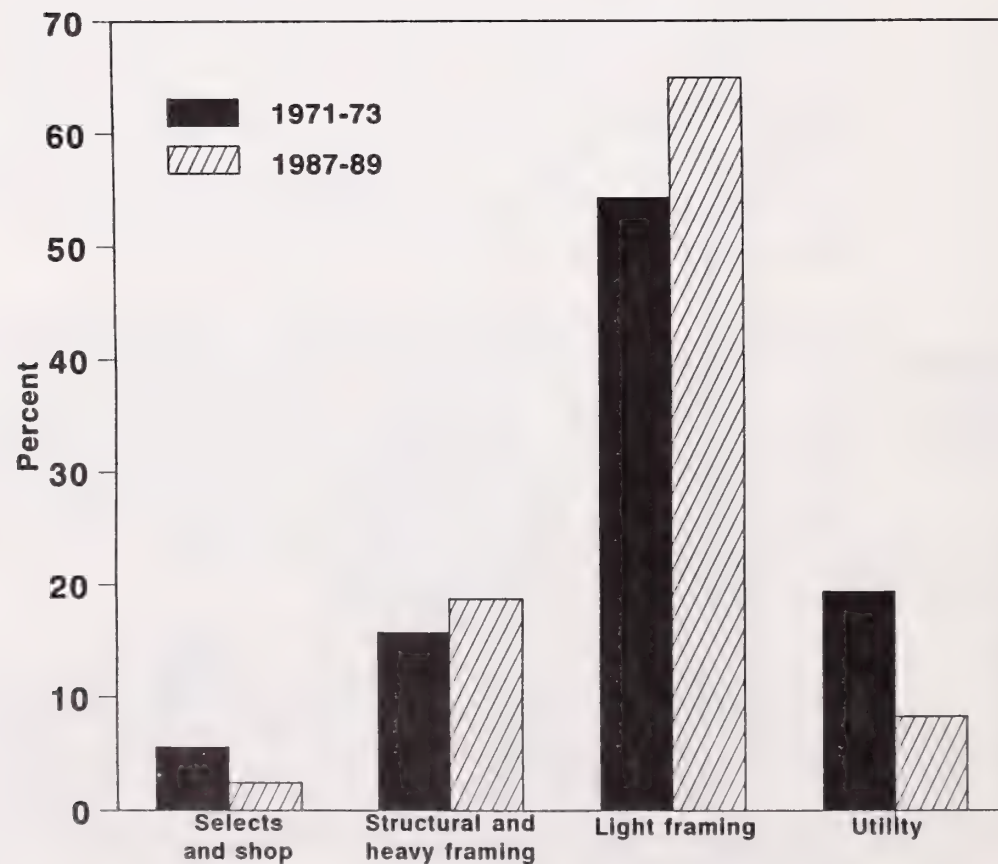


Figure 2—Coast hem-fir volume.

**Table 3—Real prices for hem-fir lumber, inland mills, 1971-90<sup>a</sup>**  
(In 1989 dollars per thousand board feet)<sup>b</sup>

| Year | Moulding | Shop | Structural items | Heavy framing | Light framing | Utility | Economy |
|------|----------|------|------------------|---------------|---------------|---------|---------|
| 1971 | 612      | 431  | 364              | 0             | 299           | 209     | 105     |
| 1972 | 648      | 451  | 427              | 0             | 360           | 256     | 132     |
| 1973 | 758      | 557  | 455              | 0             | 410           | 299     | 178     |
| 1974 | 644      | 398  | 353              | 0             | 308           | 175     | 100     |
| 1975 | 520      | 287  | 300              | 0             | 264           | 156     | 89      |
| 1976 | 678      | 443  | 376              | 0             | 318           | 200     | 95      |
| 1977 | 709      | 458  | 421              | 388           | 328           | 227     | 103     |
| 1978 | 889      | 494  | 419              | 401           | 352           | 252     | 136     |
| 1979 | 927      | 484  | 398              | 419           | 338           | 221     | 121     |
| 1980 | 738      | 364  | 282              | 275           | 244           | 163     | 102     |
| 1981 | 686      | 363  | 247              | 265           | 211           | 146     | 101     |
| 1982 | 652      | 273  | 207              | 211           | 182           | 129     | 88      |
| 1983 | 721      | 381  | 271              | 251           | 224           | 171     | 99      |
| 1984 | 598      | 290  | 242              | 226           | 199           | 138     | 82      |
| 1985 | 552      | 349  | 243              | 239           | 204           | 138     | 82      |
| 1986 | 674      | 343  | 267              | 270           | 221           | 147     | 80      |
| 1987 | 766      | 385  | 283              | 304           | 232           | 143     | 81      |
| 1988 | 748      | 367  | 283              | 287           | 225           | 140     | 89      |
| 1989 | 743      | 393  | 277              | 279           | 230           | 154     | 102     |
| 1990 | 873      | 383  | 272              | 212           | 249           | 137     | 89      |

<sup>a</sup> Figures are FOB prices computed as a volume-weighted average of green and dry surfaced and rough grades.  
<sup>b</sup> The Producer Price Index for 1989 is 111.6.

Source: Data are compiled by Western Wood Products Association from copies of invoices submitted to the association by mills accounting for approximately 65 to 70 percent of the region's production; individual groupings from Pacific Northwest Research Station.

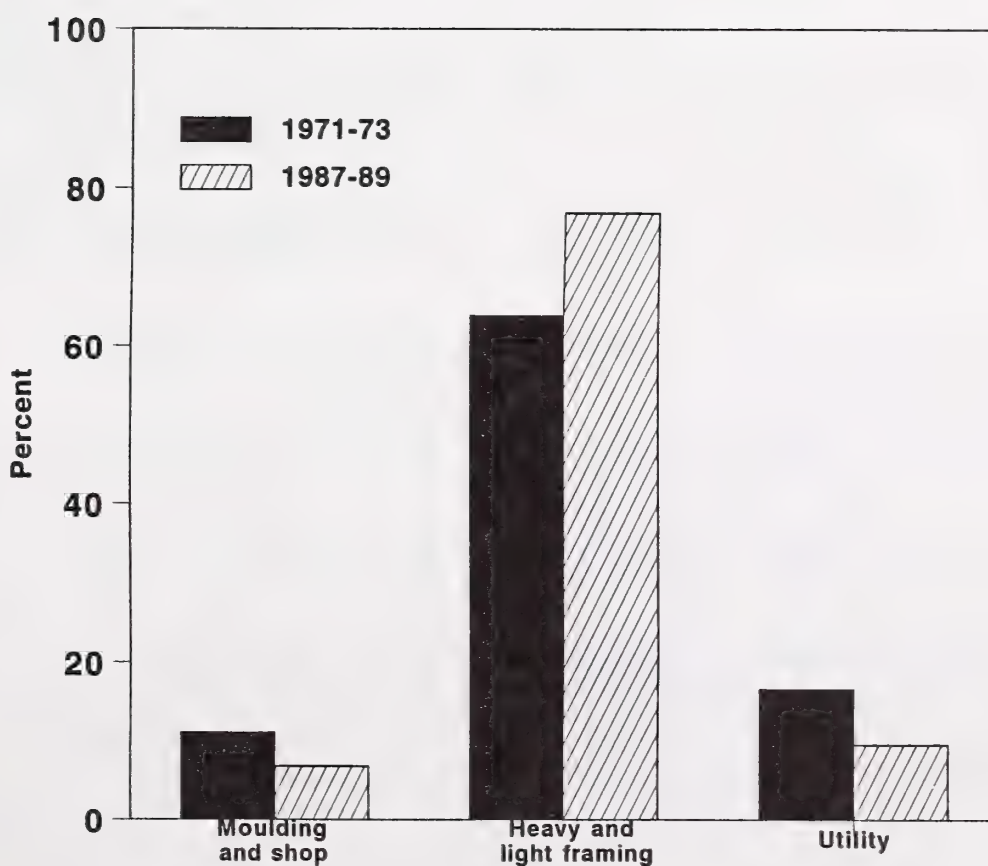


Figure 3—Inland hem-fir volume.

**Table 4—Real prices for ponderosa pine lumber, inland mills, 1971-90<sup>a</sup>**

(In 1989 dollars per thousand board feet)<sup>b</sup>

| Year | 4/4 selects and 1 shop |         |            |        | 5/4 and thicker moulding and shops |        |        |         | 4/4 commons and 8/4 std. and btr. |                |                |             | Low value                        |                        |     |     |
|------|------------------------|---------|------------|--------|------------------------------------|--------|--------|---------|-----------------------------------|----------------|----------------|-------------|----------------------------------|------------------------|-----|-----|
|      | C and better           |         | C and btr. |        | Mldg. and btr.                     |        | shop   |         | shop                              |                | shop           |             | No. 3 and 5 com. and util. econ. |                        |     |     |
|      | 6-12 in                | D 12 in | D 6-10 in  | D 4 in | 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 | 4 com. 4-12 in                   | 5 com. and util. econ. |     |     |
| 1971 | 1,126                  | 899     | 767        | 577    | 398                                | 882    | 645    | 464     | 390                               | 249            | 392            | 332         | 273                              | 220                    | 214 | 110 |
| 1972 | 1,127                  | 937     | 796        | 590    | 442                                | 882    | 692    | 519     | 439                               | 300            | 462            | 388         | 338                              | 283                    | 252 | 140 |
| 1973 | 1,188                  | 1,017   | 915        | 707    | 514                                | 972    | 729    | 575     | 483                               | 394            | 601            | 513         | 406                              | 356                    | 288 | 195 |
| 1974 | 1,277                  | 1,147   | 1,041      | 636    | 437                                | 895    | 655    | 525     | 434                               | 277            | 564            | 441         | 295                              | 223                    | 153 | 119 |
| 1975 | 1,234                  | 1,043   | 868        | 490    | 332                                | 912    | 531    | 393     | 292                               | 185            | 470            | 359         | 238                              | 169                    | 140 | 90  |
| 1976 | 1,294                  | 1,123   | 811        | 610    | 426                                | 970    | 727    | 595     | 453                               | 261            | 496            | 401         | 304                              | 235                    | 179 | 105 |
| 1977 | 1,403                  | 1,246   | 884        | 618    | 481                                | 944    | 781    | 659     | 491                               | 297            | 570            | 467         | 337                              | 251                    | 212 | 123 |
| 1978 | 1,597                  | 1,446   | 1,071      | 781    | 557                                | 1,490  | 840    | 738     | 528                               | 329            | 596            | 525         | 371                              | 293                    | 230 | 156 |
| 1979 | 1,982                  | 1,779   | 1,424      | 754    | 472                                | 1,355  | 785    | 683     | 431                               | 297            | 625            | 509         | 373                              | 261                    | 206 | 135 |
| 1980 | 1,475                  | 1,076   | 758        | 499    | 410                                | 1,010  | 682    | 588     | 382                               | 252            | 559            | 359         | 294                              | 206                    | 151 | 109 |
| 1981 | 1,264                  | 1,099   | 693        | 531    | 379                                | 930    | 671    | 579     | 405                               | 248            | 438            | 317         | 278                              | 187                    | 144 | 102 |
| 1982 | 1,324                  | 966     | 681        | 448    | 368                                | 907    | 613    | 528     | 343                               | 227            | 502            | 323         | 264                              | 185                    | 136 | 98  |
| 1983 | 1,337                  | 1,547   | 726        | 565    | 400                                | 1,163  | 729    | 628     | 442                               | 248            | 428            | 336         | 245                              | 176                    | 171 | 99  |
| 1984 | 1,467                  | 1,251   | 779        | 537    | 396                                | 1,021  | 669    | 545     | 375                               | 218            | 465            | 343         | 253                              | 160                    | 133 | 90  |
| 1985 | 1,582                  | 933     | 843        | 547    | 370                                | 1,175  | 665    | 538     | 396                               | 221            | 493            | 338         | 225                              | 155                    | 137 | 81  |
| 1986 | 1,681                  | 1,302   | 1,137      | 728    | 427                                | 1,217  | 767    | 641     | 450                               | 231            | 479            | 363         | 253                              | 182                    | 144 | 88  |
| 1987 | 1,697                  | 1,451   | 1,182      | 764    | 480                                | 1,418  | 827    | 700     | 449                               | 243            | 485            | 398         | 268                              | 190                    | 143 | 86  |
| 1988 | 1,977                  | 1,578   | 1,124      | 720    | 473                                | 1,340  | 780    | 654     | 429                               | 240            | 528            | 380         | 257                              | 182                    | 143 | 91  |
| 1989 | 1,805                  | 1,523   | 1,016      | 740    | 438                                | 1,265  | 730    | 589     | 434                               | 258            | 532            | 331         | 261                              | 189                    | 155 | 105 |
| 1990 | 1,418                  | 1,394   | 956        | 655    | 417                                | 1,009  | 650    | 520     | 397                               | 237            | 512            | 342         | 238                              | 179                    | 139 | 95  |

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

<sup>b</sup> The Producer Price Index of 1989 is 111.6.

Source: Data are compiled by Western Wood Products Association from copies of invoices submitted to the association by mills accounting for about 65 to 70 percent of the region's production; individual groupings from Pacific Northwest Research Station.

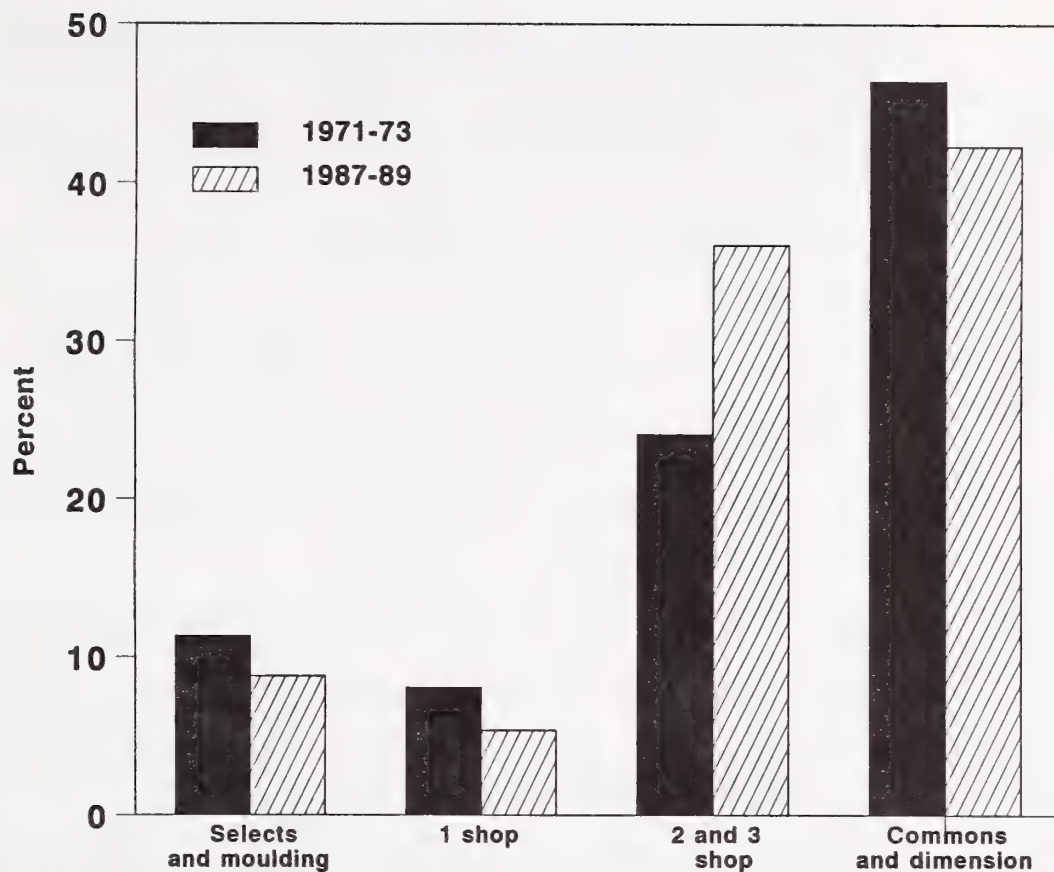


Figure 4—Ponderosa pine volume.

These price markup rules are of the general form,

$$p_i = b_1 + b_2 p_j, \quad (1)$$

where  $p_i$  and  $p_j$  are prices of related lumber grades and  $b_1$  and  $b_2$  are estimated coefficients. The significance of the estimated coefficients  $b_1$  and  $b_2$  makes a statement about the form of the relation between the two price series. It would be a fixed amount if  $b_2$  was zero,<sup>2</sup> a constant proportion if  $b_1$  was zero, or some combination if both  $b_1$  and  $b_2$  were nonzero coefficients.

## Data and Methods

All historical data on the various species and grades were obtained from Western Wood Products Association (1989) reports. Projections of all-species, all-grade lumber prices were obtained from the 1989 Resources Planning Act timber assessment (Haynes 1990). The basic methods for developing grade-specific prices is similar to the method used for projecting the prices of stumpage for individual species in the National Forests (Haynes and others 1980). The methodology was the same as that used for selected grades of Douglas-fir lumber (Haynes and others 1988).

The general method is based on the assumption that projected lumber prices represent the market equilibrium prices of the average of all lumber (all grades and species) produced within a region. This price is the volume-weighted average of species and grades produced, and the method used in this study assumes that it can be decomposed into its individual component parts (prices for each grade and species).

<sup>2</sup> In economic studies, the actual value of the  $b_2$  coefficient may be different than zero but not statistically significant; therefore, it is interpreted as being zero.

The process starts by first estimating the relation between the all-grade average and the price of the species under consideration. The next step is to estimate the relations between the prices of the selected lumber grades and the price of the dominant lumber grade for each species in the general form,

$$s_{jt} = b_{1j} + b_{2j} (s_{dt}) + b_{3j} w_{jt} , \quad (2)$$

where

$s_{jt}$  = regional lumber price for the  $j^{\text{th}}$  species and grade in year  $t$ ,

$s_{dt}$  = price of the dominant species and grade in year  $t$ ,

$w_{jt}$  = the proportion of total lumber production in year  $t$  that comes from  $j^{\text{th}}$  species and grade,

$b_{1j}$  = estimated intercept value of the price relation,

$b_{2j}$  = estimated coefficient representing the change in  $s_{jt}$  resulting from a change in  $s_{dt}$ , and

$b_{3j}$  = estimated coefficient representing the change in  $s_{jt}$  resulting in a change in  $w_{jt}$ .

The proportion ( $w_{jt}$ ) of total lumber production that comes from the nondominant grade was used as an independent variable to represent the relative scarcity (or abundance) of that grade. If, for example, we assume that producers always saw to maximize the output of the highest quality grades, the share of output presumably would be negatively related to the grade price.

If we assume that these estimated relations hold for the projection period, then the predicted price for each grade can be developed from a projection of the price for the dominant grade ( $s_{dt}$ ) and the volume proportion for the grade. The price for the dominant grade is solved mathematically given the various regression coefficients, projections of proportions of total lumber produced in each grade, and projections of the regional all-grade, all-species price. At least for the historical data, this process is relatively robust with goodness of fit correlations between the predicted and actual values that range from 0.86 for Douglas-fir to 0.97 for coast hem-fir.

The data in tables 1-4 (and appendix 2) were used to develop the relations between individual grade prices and the price of the dominant grade (by using the form shown in equation 2) and to develop the trends in shares of production by grade. Light framing was selected as the dominant grade for Douglas-fir and hem-fir species. This is the major category (accounting for at least 40 percent of total production during the last two decades). The number three shop grade was selected as the dominant grade for ponderosa pine. No one grade dominates ponderosa pine, as is the case for Douglas-fir or hem-fir, but the shop grades (5/4 and thicker) collectively have exercised the same influence over ponderosa pine prices.

The estimated price relations in the form of equation (2) are summarized in table 5.<sup>3</sup>

<sup>3</sup> Efforts to estimate these equations as a system of equations proved unsuccessful because of the singular matrices encountered while trying to correct the equations for autocorrelation. Similar problems were encountered in the earlier study of Douglas-fir lumber (Haynes and others 1988).



**Table 5—Estimated price relations, by species and grade<sup>a</sup>**

| Species and grade      | B <sub>1</sub> | B <sub>2</sub> | B <sub>3</sub> | R <sup>2</sup> | Durbin<br>Watson | Base price    |
|------------------------|----------------|----------------|----------------|----------------|------------------|---------------|
| <b>Douglas-fir:</b>    |                |                |                |                |                  |               |
| C selects              | 449.053        | 2.088          | -2926.022      | 0.435          | 1.187            | Light framing |
| D selects              | 83.078         | .337           | *518.145       | .790           | **1.862          | Light framing |
| Structural items       | --             | .699           | --             | .802           | **1.837          | Light framing |
| Heavy framing          | --             | 1.259          | --             | .778           | 2.238            | Light framing |
| Utility                | --             | .302           | --             | .937           | **1.624          | Light framing |
| Economy                | --             | .193           | --             | .674           | **1.097          | Light framing |
| <b>Coast hem-fir:</b>  |                |                |                |                |                  |               |
| D selects              | 81.874         | .339           | *-453.356      | .764           | **1.751          | Light framing |
| Structural items       | *10.5208       | 1.185          | --             | .982           | 1.438            | Light framing |
| Heavy framing          | 41.967         | 1.056          | --             | .947           | 1.559            | Light framing |
| Utility                | *-14.611       | .387           | --             | .939           | **1.408          | Light framing |
| Economy                | 28.651         | .251           | --             | .620           | 1.695            | Light framing |
| <b>Ponderosa pine:</b> |                |                |                |                |                  |               |
| D select 12 inch       | 1142.521       | *1.461         | -1758.064      | .610           | 1.888            | 5/4 3 shop    |
| D select 4 inch        | *108.419       | 1.391          | *-71.367       | .593           | 1.268            | 5/4 3 shop    |
| 4/4 1 shop             | *48.466        | .903           | *-1.4155       | .772           | 2.006            | 5/4 3 shop    |
| 5/4 1 shop             | 81.178         | .378           | --             | .844           | **1.494          | 5/4 3 shop    |
| 5/4 2 shop             | 33.334         | .289           | --             | .850           | **1.337          | 5/4 3 shop    |
| 4/4 2 com. 12 inch     | --             | 1.205          | --             | .151           | 1.351            | 5/4 3 shop    |

<sup>a</sup> The general equation is  $s_{jt} = B_1^* + B_2^* s_{jt} + B_3^* w_{jt}$ .

\* Significant at less than the 95-percent level.

\*\* 1st order autoregressive correlation applied to correct for serial correlation.

Several species and grade relations could not be acceptably estimated in the form shown in equation (2). In these cases, we regressed these species-grade combinations on similar grades within the species (such as the case for several ponderosa pine grades) or against similar grades in different species groups. We argue, in both cases, that the justification is price arbitrage of similar grades or uses, or both. The pricing of inland hem-fir seems to be entirely a function of coast hem-fir prices, and in this case, we relied on price markup rules. Equations for these species and grades are shown in table 6.

Future demands for lumber are expected to change. Total softwood lumber consumption is expected to increase roughly 0.4 percent per year while production in U.S. regions increases by 0.7 percent per year (Haynes 1990). In the Western United States, lumber production is expected to drop, especially in areas where Douglas-fir and coast hem-fir are produced. The extent of this reduction depends on the strategy adopted to protect the habitat for the northern spotted owl (*Strix occidentalis*). The bulk of lumber consumption is used in new residential construction and in residential upkeep and alteration. After 2000, the relative shares of the two end uses change where upkeep and alteration of existing housing takes a larger share of lumber than does new construction. These market changes suggest continued strong markets for dimension lumber and lumber grades favored in millwork and other finish applications.

The projected production proportions are shown in table 7. In our process, the proportions were projected independently of expected price changes. Except for some of the ponderosa pine grades, most grades were projected as a continuation of current and

**Table 6—Estimated price relations using the price markup equation form, by species and grade<sup>a</sup>**

| Species and grade                                   | B <sub>1</sub> | B <sub>2</sub> | B <sub>3</sub> | R <sup>2</sup> | Durbin Watson | Base price                  |
|---|----------------|----------------|----------------|----------------|---------------|-----------------------------|
| Coast hem-fir, C selects                            | *93.556        | 0.526          | --             | 0.639          | **1.916       | D selects                   |
| Inland hem-fir:                                     |                |                |                |                |               |                             |
| Moulding  | *16.672        | .646           | --             | .766           | **1.814       | Coast hem-fir d selects     |
| Shop  | *-9.968        | .906           | --             | .576           | 1.237         | Coast hem-fir d selects     |
| Structural items                                    | *-9.997        | 1.016          | --             | .962           | 1.333         | Coast hem-fir structural    |
| Heavy framing                                       | -21.578        | 1.030          | --             | .991           | 1.873         | Coast hem-fir heavy framing |
| Light framing                                       | -12.405        | 1.069          | --             | .989           | 1.131         | Coast hem-fir light framing |
| Utility   | *-2.270        | .480           | --             | .989           | **1.679       | Coast hem-fir utility       |
| Economy   | *-13.057       | 1.192          | --             | .911           | 1.132         | Coast hem-fir economy       |
| Ponderosa pine:                                     |                |                |                |                |               |                             |
| 4/4 C select and btr. 6-12 inch                     | 406.038        | .823           | --             | .636           | 1.506         | 4/4 D 12 inch               |
| 4/4 C select and btr. 4 inch,<br>D select 6-10 inch | *112.933       | .284           | --             | .605           | **1.649       | 4/4 D 12 inch               |
| 5/4 mldg. and better                                | 296.585        | .619           | --             | .626           | 2.067         | 4/4 D 12 inch               |
| 5/4 shopout   | 95.643         | .563           | --             | .686           | 1.512         | Douglas-fir light framing   |
| 4/4 2 com. 4-10 inch                                | 76.830         | .590           | --             | .799           | **1.764       | Douglas-fir light framing   |
| 4/4 com., 3 com. 6-12 inch,<br>8/4 dimension        | 97.817         | .662           | --             | .792           | 1.339         | Douglas-fir light framing   |
| 4/4 com., 3 com. 4 inch,<br>4 com. 4-12 inch        | *19.468        | .705           | --             | .837           | 1.646         | Douglas-fir light framing   |
| 3 common, utility                                   | *-10.058       | .204           | --             | .872           | 1.713         | Douglas-fir light framing   |
| 5 common, economy                                   | *12.206        | .356           | --             | .738           | 1.363         | Douglas-fir light framing   |

<sup>a</sup> The general equation is  $s_{jt} = B_1^* + B_2^* s_{jt} + B_3^* w_{jt}$ .

\* Significant at less than the 95-percent level.

\*\* 1st order autoregressive correlation applied to correct for serial correlation.

recent trends. These show declines in the highest grades and increases in framing (both light and heavy). For ponderosa pine, these projections reflect an expected shift from shop to common grades. This shift is contrary to recent historical trends but reflects recent product recovery studies for young-growth ponderosa pine.<sup>4</sup>

The all-species, all-grade lumber price projections for the Douglas-fir and ponderosa pine subregions were taken from the 1989 RPA timber assessment (Haynes 1990). The relevant price projections were those for the Douglas-fir and ponderosa pine subregions of the Pacific Northwest. The next step involved the relation between the all-species, all-grade prices and the various all-grade prices for each of the four species groups considered here. The all-grade price for Douglas-fir during the 1980s was equal to the all-species, all-grade price in the Douglas-fir subregion. This was a change from past studies where Douglas-fir usually was assumed to command a premium price relative to the all-species average for the subregion. Coast hem-fir prices (excluding the C select grades estimated by using the price markup equation form) have been fairly consistent at about 80 percent of the all-grade Douglas-fir price. This relation is expected to continue into the future (fig. 5). The average price for grades of ponderosa pine estimated with the general price equation<sup>5</sup> reflects a substantial price premium relative to the average lumber prices for the subregion (fig. 5). This premium is expected to continue for the foreseeable future.

<sup>4</sup> Personal communication, Susan Willits, research forest products technologist, Pacific Northwest Research Station, P.O. Box 3890, Portland, OR 97208-3890.

<sup>5</sup> Specifically D Selects, 12 inch and 4 inch; 4/4, 1 shop; 5/4, 1, 2, and 3 shop; and 4/4 common, 12 inch.

Table 7—Projected production percentages by species and grade, 1989-2040

| Species and grade                               | 1989 | 2000 | 2010 | 2020 | 2030 | 2040 |
|---|------|------|------|------|------|------|
| <b>Douglas fir:</b>                             |      |      |      |      |      |      |
| C selects                                       | 1.0  | 0.4  | 0.4  | 0.4  | 0.4  | 0.4  |
| D selects and shop                              | 1.6  | 2.4  | 2.4  | 2.4  | 2.4  | 2.4  |
| Structural items                                | 15.9 | 16.7 | 16.9 | 17.0 | 17.1 | 17.2 |
| Heavy framing                                   | 22.9 | 23.6 | 23.8 | 23.9 | 24.0 | 24.1 |
| Light framing                                   | 47.4 | 47.7 | 47.7 | 47.7 | 47.7 | 47.7 |
| Utility   | 7.0  | 5.0  | 4.7  | 4.3  | 4.2  | 4.0  |
| Economy   | 4.2  | 4.2  | 4.2  | 4.2  | 4.2  | 4.2  |
| <b>Coast hem-fir:</b>                           |      |      |      |      |      |      |
| C selects                                       | 3    | 3    | 3    | 3    | 3    | 0.3  |
| D selects and shop                              | 2.0  | 2.0  | 2.0  | 2.0  | 2.0  | 2.0  |
| Structural items                                | 4.2  | 4.6  | 4.9  | 5.8  | 6.8  | 7.7  |
| Heavy framing                                   | 16.9 | 19.8 | 22.4 | 25.0 | 27.6 | 30.2 |
| Light framing                                   | 63.6 | 59.8 | 56.3 | 52.8 | 49.3 | 45.9 |
| Utility   | 7.4  | 8.3  | 8.3  | 8.3  | 8.3  | 8.3  |
| Economy   | 5.8  | 5.6  | 5.6  | 5.6  | 5.6  | 5.6  |
| <b>Inland hem-fir:</b>                          |      |      |      |      |      |      |
| Moulding  | 1.9  | 1.6  | 1.4  | 1.2  | 1.0  | 0.9  |
| Shop  | 5.6  | 4.6  | 3.8  | 3.1  | 2.5  | 2.1  |
| Structural items                                | 1.9  | 1.0  | 1.0  | 1.0  | 1.0  | 1.0  |
| Heavy framing                                   | 30.4 | 26.6 | 23.2 | 19.9 | 16.6 | 13.3 |
| Light framing                                   | 46.1 | 52.3 | 57.3 | 62.2 | 66.8 | 71.4 |
| Utility   | 9.3  | 10.1 | 10.1 | 10.1 | 10.1 | 10.1 |
| Economy   | 4.9  | 3.8  | 3.2  | 2.6  | 1.9  | 1.3  |
| <b>Ponderosa pine:</b>                          |      |      |      |      |      |      |
| 4/4 selects and 1 shop                          | .6   | .5   | .4   | .3   | .2   | .1   |
| C and better 6-12 inch                          | .2   | .1   | .1   | .1   | .0   | .0   |
| D 12 inch                                       | .3   | .2   | .2   | .2   | .1   | .1   |
| C and better 4 inch, D 6-10 inch                | .7   | .5   | .3   | .2   | .2   | .1   |
| D 4 inch  | 2.2  | 1.7  | 1.3  | .9   | .7   | .5   |
| 1 shop  |      |      |      |      |      |      |
| <b>5/4 and thicker moulding and shops:</b>      |      |      |      |      |      |      |
| Moulding and better                             | 5.6  | 4.4  | 3.8  | 3.3  | 2.9  | 2.4  |
| 1 shop  | 2.9  | 2.4  | 2.1  | 1.7  | 1.4  | 1.2  |
| 2 shop  | 17.8 | 13.3 | 11.1 | 8.9  | 7.0  | 5.1  |
| 3 shop  | 19.9 | 19.9 | 19.9 | 19.9 | 19.9 | 19.9 |
| Shopout   | 6.7  | 6.7  | 6.7  | 6.7  | 6.7  | 6.7  |
| <b>4/4 commons and 8/4 standard and better:</b> |      |      |      |      |      |      |
| 2 common 12 inch                                | 3.8  | 3.8  | 3.8  | 3.8  | 3.8  | 3.8  |
| 2 common 4-10 inch                              | 5.8  | 5.8  | 5.8  | 5.8  | 5.8  | 5.8  |
| 3 common 6-12 inch, 8/4 dimension               | 25.9 | 31.8 | 34.8 | 37.9 | 40.3 | 42.7 |
| 3 common 4 inch, 4 common 4-12                  | 5.0  | 6.1  | 6.7  | 7.3  | 7.8  | 8.2  |
| <b>Low value:</b>                               |      |      |      |      |      |      |
| No 3 and utility                                | 1.2  | 1.3  | 1.3  | 1.4  | 1.5  | 1.6  |
| 5 common and economy                            | 1.4  | 1.5  | 1.6  | 1.7  | 1.8  | 1.8  |

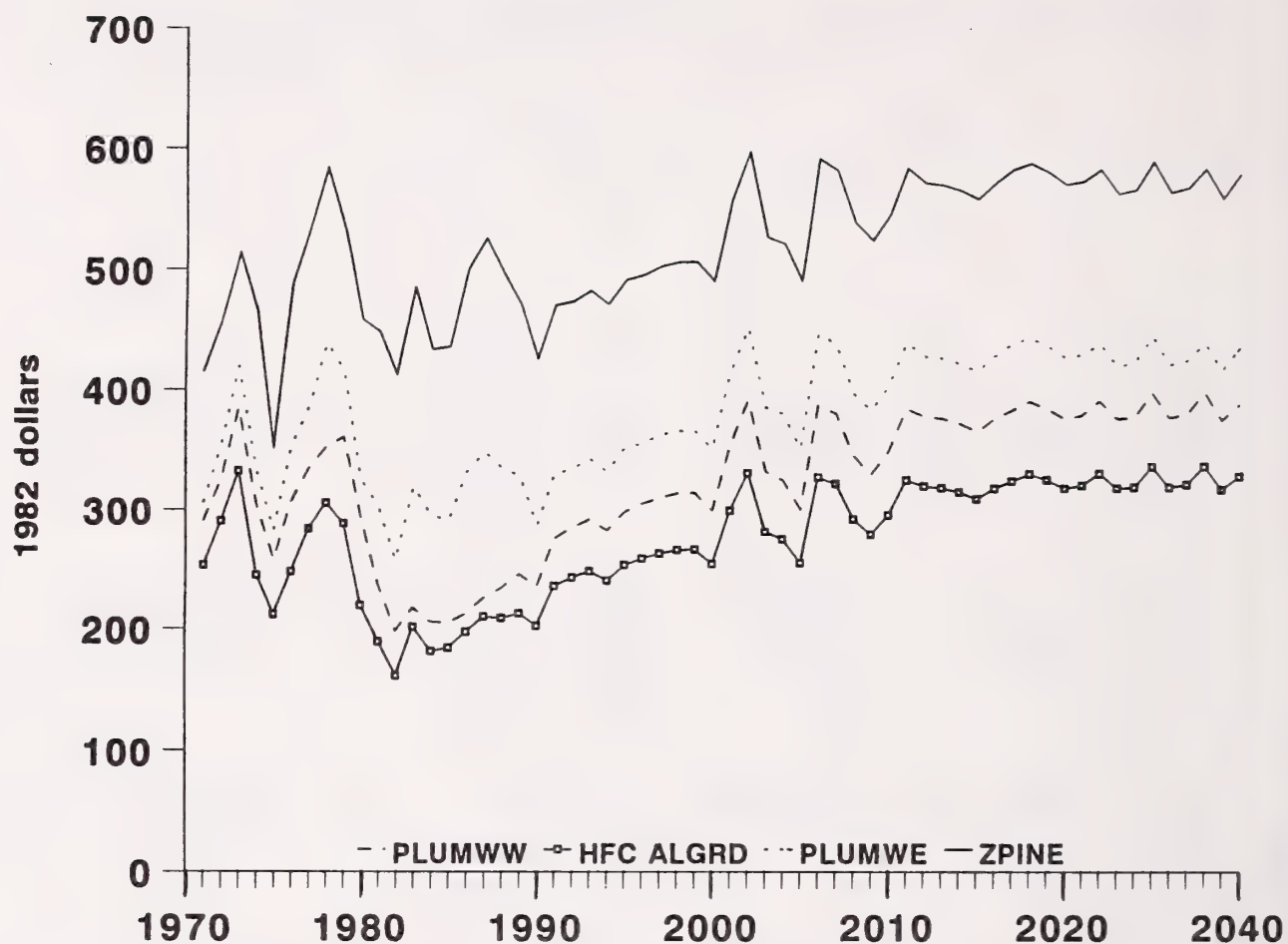


Figure 5—Softwood lumber prices by year: PLUMWW = west-side average price all species, all grades; HFC ALGRD = hem-fir coast average price, all grades except for C select; PLUMWE = east-side average price all species, all grade; ZPINE = average price for selected grades of ponderosa pine.

## Results

Price projections by species and grades are shown in table 8. The results mostly are consistent with the various assumptions and estimated relations. One exception is the projections for C select Douglas-fir lumber. These projections are somewhat low relative to the recent (since 1986) increase in export clear prices, which comprise about 10 percent of the C select grade. The impact of recent price increases in the export market have reduced the explanatory and predictive ability of the general price relation for C selects.

The results support the notion that increasing scarcity of high-quality material will result in higher prices. In general, the relative price position for each grade remains unchanged. The historically highest priced grades remain so in the future; in general, they show greater price increases but lower rates of price growth. Price arbitrage and substitution between products, however, act to limit the extent that prices for selected species and grades can increase. The fact that prices of higher priced items generally increase more than lower priced items is significant to forest land management decisions, because it is the dollar difference, not the percentage difference, that determines how much can be spent in forest management to increase quality. We believe that the current and projected premiums for quality are sufficient to warrant a reassessment of the general attitude of the forestry community about the importance of wood quality and the rotation ages and management regimes likely to be commonly employed.

Table 8—Projected prices by species and grade, 1989-2040

(In 1989 dollars per thousand board feet)

| Species and grade                               | 1989  | 2000  | 2010  | 2020  | 2030  | 2040  |
|---|-------|-------|-------|-------|-------|-------|
| <b>Douglas-fir:</b>                             |       |       |       |       |       |       |
| C selects                                       | 1,078 | 1,116 | 1,220 | 1,276 | 1,322 | 1,300 |
| D selects and shop                              | 503   | 532   | 579   | 603   | 622   | 613   |
| Structural items                                | 325   | 418   | 488   | 526   | 556   | 542   |
| Heavy framing                                   | 330   | 379   | 442   | 476   | 503   | 490   |
| Light framing                                   | 246   | 301   | 351   | 378   | 399   | 389   |
| Utility   | 168   | 213   | 248   | 268   | 283   | 276   |
| Economy   | 110   | 111   | 129   | 139   | 148   | 144   |
| <b>Coast hem-fir:</b>                           |       |       |       |       |       |       |
| C selects                                       | 718   | 848   | 901   | 929   | 950   | 937   |
| D selects and shop                              | 466   | 509   | 554   | 577   | 595   | 583   |
| Structural items                                | 274   | 344   | 399   | 427   | 449   | 435   |
| Heavy framing                                   | 298   | 343   | 392   | 417   | 436   | 424   |
| Light framing                                   | 234   | 281   | 327   | 351   | 369   | 357   |
| Utility   | 155   | 193   | 230   | 249   | 264   | 254   |
| Economy   | 105   | 102   | 114   | 120   | 125   | 122   |
| <b>Inland hem-fir:</b>                          |       |       |       |       |       |       |
| Moulding  | 743   | 790   | 856   | 890   | 917   | 900   |
| Shop  | 393   | 450   | 490   | 511   | 527   | 517   |
| Structural items                                | 277   | 339   | 395   | 423   | 445   | 430   |
| Heavy framing                                   | 279   | 330   | 380   | 406   | 426   | 413   |
| Light framing                                   | 230   | 287   | 336   | 361   | 381   | 368   |
| Utility   | 154   | 194   | 232   | 252   | 268   | 257   |
| Economy   | 102   | 108   | 121   | 129   | 134   | 130   |
| <b>Ponderosa pine:</b>                          |       |       |       |       |       |       |
| 4/4 selects and 1 shop                          | 1,805 | 2,049 | 2,173 | 2,173 | 2,208 | 2,206 |
| C and better 6-12 inch                          | 1,523 | 1,940 | 2,089 | 2,090 | 2,133 | 2,130 |
| D 12 inch                                       | 1,016 | 1,304 | 1,386 | 1,386 | 1,409 | 1,408 |
| C and better 4 inch, D 6-10 inch                | 740   | 756   | 886   | 897   | 938   | 936   |
| D 4 inch  | 437   | 466   | 551   | 558   | 585   | 583   |
| 1 shop  |       |       |       |       |       |       |
| <b>5/4 and thicker moulding and shops:</b>      |       |       |       |       |       |       |
| Moulding and better                             | 1,266 | 1,532 | 1,624 | 1,624 | 1,651 | 1,649 |
| 1 shop  | 730   | 753   | 854   | 863   | 894   | 892   |
| 2 shop  | 589   | 638   | 741   | 750   | 782   | 780   |
| 3 shop  | 434   | 456   | 550   | 558   | 587   | 586   |
| Shopout   | 258   | 276   | 304   | 319   | 332   | 326   |
| <b>4/4 commons and 8/4 standard and better:</b> |       |       |       |       |       |       |
| 2 common 12 inch                                | 532   | 550   | 663   | 673   | 708   | 706   |
| 2 common 4-10 inch                              | 331   | 421   | 469   | 494   | 515   | 505   |
| 3 common 6-12 inch, 8/4 dimension               | 261   | 308   | 341   | 359   | 373   | 367   |
| 3 common 4 inch, 4 common 4-12 inch             | 189   | 233   | 269   | 288   | 304   | 296   |
| <b>Low value:</b>                               |       |       |       |       |       |       |
| No 3 and utility                                | 155   | 193   | 232   | 253   | 271   | 263   |
| 5 common and economy                            | 105   | 121   | 138   | 148   | 156   | 152   |

## Acknowledgments

Our thanks to Jim Cahill, Tom Fahey, and Sue Willits for numerous discussions about lumber grades and for helping combine the lumber grades into the grade categories used in the projections. Our thanks to Judy Mikowski and Debra Warren for assembling 20 years of price data, combining it into grade groupings, and estimating the various grade equations, including numerous revisions of grade groupings and equation forms.

## Literature Cited

- George, P.S.; King, G.A. 1971.** Consumer demand for food commodities in the United States with projections for 1980. Giannini Found. Monogr. 26. Berkeley, CA: California Agricultural Experiment Station. 161 p.
- Haynes, Richard W. 1977.** A derived demand approach to estimating the linkage between stumpage and lumber markets. *Forest Science*. 23: 281-288.
- Haynes, Richard W. 1990.** An analysis of the timber situation in the United States: 1989-2040. Gen. Tech. Rep. RM-199. Fort Collins, CO: U.S. Department of Agriculture, Forest Service, Rocky Mountain Forest and Range Experiment Station. 286 p.
- Haynes, Richard W.; Connaughton, Kent P.; Adams, Darius M. 1980.** Stumpage price projections for selected western species. Res. Note PNW-367. Portland, OR: U.S. Department of Agriculture, Forest Service, Pacific Northwest Forest and Range Experiment Station. 14 p.
- Haynes, Richard W.; Fahey, Thomas D.; Fight, Roger D. 1988.** Price projections for selected grades of Douglas-fir lumber. Res. Note PNW-RN-473. Portland, OR: U.S. Department of Agriculture, Forest Service, Pacific Northwest Research Station. 12 p.
- Howard, James O.; Ward, Franklin R. 1988.** Oregon's forest products industry: 1985. Resour. Bull. PNW-RB-149. Portland, OR: U.S. Department of Agriculture, Forest Service, Pacific Northwest Research Station. 90 p.
- Larsen, David N. 1990.** 1984 Washington mill survey: wood consumption and mill characteristics. Series Rep. 10. Olympia, WA: Washington State Department of Natural Resources. 17 p.
- Warren, Debra D. 1990.** Production, prices, employment, and trade in Northwest forest industries, first quarter 1990. Resour. Bull. PNW-RB-175. Portland, OR: U.S. Department of Agriculture, Forest Service, Pacific Northwest Research Station. 99 p.
- Western Wood Products Association. 1989.** Price summary past sales. Portland, OR: Western Wood Products Association. Monthly.

## Appendix 1

| Grouping                                 | Grades and items combined in group   |
|--|--|
| Douglas-fir and coast hem-fir:           |  |
| C selects                                | C select; export clears  |
| D selects and shop                       | D select; D and better; all shop grades  |
| Structural items                         | All laminating stock; all machine stress-rated lumber; 2-inch select structural; 2-inch number 1; 3-inch and thicker select structural; crossarms; scaffold planks; export commons |
| Heavy framing                            | 2 by 10 and wider number 2 and better; 3-inch and thicker number 2 and better; ties  |
| Light framing                            | All studs; standard and better light framing; 2 by 6 and 2 by 8 number 2 and better; 1 by 4 and 1 by 6 utility and better; 4 by 4 utility and better; 4 by 4 standard and better   |
| Utility                                  | All utility; all number 3 grade lumber   |
| Economy                                  | All economy lumber   |
| Inland hem-fir:                          |  |
| Moulding                                 | Moulding and better  |
| Shop                                     | All shops  |
| Structural items                         | All machine stress-rated lumber; 2-inch select structural  |
| Heavy framing                            | 2 by 10 and wider number 2 and better  |
| Light framing                            | All studs; standard and better light framing; 2 by 6 and 2 by 8 number 2 and better; 1 by 4 and 1 by 6 utility and better  |
| Utility                                  | All utility; all number 3 grade; shopouts  |
| Economy                                  | All economy lumber   |
| Ponderosa pine:                          |  |
| 4/4 selects and 1 shop—                  |  |
| C and better 6-12 inch                   | C and better selects 6-12-inch widths  |
| D 12 inch                                | D select 12-inch width   |
| C and better 4 inch, D 6-10 inch         | C and better select 4-inch width; D select 6-10-inch widths  |
| D 4 inch                                 | D select; 4-inch width; all 4/4 moulding   |
| 1 shop                                   | 1 shop; 3 clear  |
| 5/4 thicker moulding and shops—          |  |
| Moulding and better                      | Moulding and better; C and better select; D select   |
| 1 shop                                   | 1 shop; 3 clear  |
| 2 shop                                   | 2 shop   |
| 3 shop                                   | 3 shop; stained shop; 2 and better common  |
| Shopout                                  | Shopout; 3, 4, 5 common; resaw; box  |
| 4/4 commons and 8/4 standard and better— |  |
| 2 common 12 inch                         | 2 common; 12-inch width  |
| 2 common 4-10 inch                       | 2 common; 4-10-inch widths; 2, 3 common patterns   |
| 3 common 6-12 inch, 8/4 dimension        | 3 common; 6-12-inch widths; 8/4 number 2 and better; 8/4 stud grade; 8/4 standard and better studs; 8/4 select decking; standard and better; 4/4 2 shop                            |
| 3 common 4 inch, 4 common 4-12 inch      | 3 common 4-inch width; 4 common 4-12-inch widths; 4/4 shopout  |
| Low value:                               |  |
| No. 3 and utility                        | Number 3; utility 4-inch width   |
| 5 common and economy                     | 5 common; economy grade  |

Appendix 2

**Table 9—Nominal prices for Douglas-fir lumber, coast mills, 1971-90<sup>a</sup>**

(In dollars per thousand board feet)

| Year | C selects | D selects and shop | Structural items | Heavy framing | Light framing | Utility | Economy |
|------|-----------|--------------------|------------------|---------------|---------------|---------|---------|
| 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                | 262              | 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     |

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

Source: Data are compiled by Western Wood Products Association from copies of invoices submitted to the association by mills accounting for approximately 65 to 70 percent of the region's production; individual groupings from Pacific Northwest Research Station.

**Table 10—Percentage of total volume for Douglas-fir lumber, coast mills, 1971-90<sup>a</sup>**

| Year | C selects           | D selects and shop | Structural items | Heavy framing | Light framing | Utility | Economy | Total volume, all grades   |
|------|---------------------|--------------------|------------------|---------------|---------------|---------|---------|----------------------------|
|      | ----- Percent ----- |                    |                  |               |               |         |         | <i>Thousand board feet</i> |
| 1971 | 13.4                | 2.2                | 8.0              | 15.8          | 40.3          | 16.7    | 3.5     | 1,244,585                  |
| 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             | 14.2          | 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 | 2.8                 | 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     | 3.8     | 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                  |

<sup>a</sup> Figures are a volume-weighted average of green and dry surfaced and rough grades.

Source: Data are compiled by Western Wood Products Association from copies of invoices submitted to the association by mills accounting for approximately 65 to 70 percent of the region's production; individual groupings from Pacific Northwest Research Station.



**Table 11—Nominal prices for hem-fir lumber, coast mills, 1971-90<sup>a</sup>**

(In dollars per thousand board feet)

| Year | C selects | D selects and shop | Structural items | Heavy framing | Light framing | Utility | Economy |
|------|-----------|--------------------|------------------|---------------|---------------|---------|---------|
| 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      |

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

Source: Data are compiled by Western Wood Products Association from copies of invoices submitted to the association by mills accounting for approximately 65 to 70 percent of the region's production; individual groupings from Pacific Northwest Research Station.

**Table 12—Percentage of total volume for hem-fir lumber, coast mills, 1971-90<sup>a</sup>**

| Year | C selects           | D selects and shop | Structural items | Heavy framing | Light framing | Utility | Economy | Total volume, all grades |
|------|---------------------|--------------------|------------------|---------------|---------------|---------|---------|--------------------------|
|      | ----- Percent ----- |                    |                  |               |               |         |         |                          |
| 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     | 831,208                  |
| 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                  |

<sup>a</sup> Figures are a volume-weighted average of green and dry surfaced and rough grades.

Source: Data are compiled by Western Wood Products Association from copies of invoices submitted to the association by mills accounting for approximately 65 to 70 percent of the region's production; individual groupings from Pacific Northwest Research Station.

**Table 13—Nominal prices for hem-fir lumber, inland mills, 1971-90<sup>a</sup>**

(In dollars per thousand board feet)

| Year | Moulding | Shop | Structural items | Heavy framing | Light framing | Utility | Economy |
|------|----------|------|------------------|---------------|---------------|---------|---------|
| 1971 | 209      | 147  | 124              | --            | 102           | 71      | 36      |
| 1972 | 231      | 161  | 152              | --            | 128           | 91      | 47      |
| 1973 | 306      | 225  | 183              | --            | 165           | 120     | 72      |
| 1974 | 309      | 191  | 169              | --            | 148           | 84      | 48      |
| 1975 | 272      | 150  | 157              | --            | 138           | 81      | 46      |
| 1976 | 371      | 242  | 206              | --            | 174           | 109     | 52      |
| 1977 | 412      | 266  | 245              | 226           | 191           | 132     | 60      |
| 1978 | 557      | 309  | 262              | 251           | 221           | 158     | 85      |
| 1979 | 654      | 341  | 281              | 295           | 238           | 156     | 85      |
| 1980 | 594      | 293  | 227              | 221           | 196           | 131     | 82      |
| 1981 | 602      | 318  | 217              | 233           | 185           | 128     | 89      |
| 1982 | 584      | 245  | 185              | 189           | 163           | 116     | 77      |
| 1983 | 655      | 346  | 246              | 228           | 204           | 155     | 90      |
| 1984 | 555      | 269  | 225              | 210           | 185           | 129     | 76      |
| 1985 | 511      | 323  | 225              | 221           | 188           | 128     | 76      |
| 1986 | 605      | 308  | 240              | 242           | 198           | 132     | 72      |
| 1987 | 706      | 354  | 261              | 280           | 214           | 132     | 75      |
| 1988 | 712      | 350  | 270              | 274           | 215           | 134     | 85      |
| 1989 | 743      | 393  | 277              | 279           | 230           | 154     | 102     |
| 1990 | 910      | 399  | 283              | 260           | 221           | 143     | 93      |

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

Source: Data are compiled by Western Wood Products Association from copies of invoices submitted to the association by mills accounting for approximately 65 to 70 percent of the region's production; individual groupings from Pacific Northwest Research Station.

**Table 14—Percentage of total volume for hem-fir lumber, inland mills, 1971-90<sup>a</sup>**

| Year | Moulding            | Shop | Structural items | Heavy framing | Light framing | Utility | Economy | Total volume, all grades |
|------|---------------------|------|------------------|---------------|---------------|---------|---------|--------------------------|
|      | ----- Percent ----- |      |                  |               |               |         |         |                          |
| 1971 | 2.2                 | 6.5  | 0.8              | 0             | 66.5          | 16.8    | 7.2     | 999,983                  |
| 1972 | 3.2                 | 9.2  | 1.0              | 0             | 62.9          | 16.4    | 7.3     | 1,045,932                |
| 1973 | 3.6                 | 8.7  | 1.5              | 0             | 62.4          | 16.8    | 7.0     | 1,009,912                |
| 1974 | 3.2                 | 8.3  | .9               | 0             | 62.0          | 17.6    | 8.1     | 920,555                  |
| 1975 | 3.8                 | 9.2  | .6               | 0             | 62.8          | 16.6    | 7.0     | 890,092                  |
| 1976 | 3.4                 | 8.1  | .9               | 0             | 64.4          | 16.8    | 6.3     | 1,010,955                |
| 1977 | 2.6                 | 8.1  | 1.8              | 15.2          | 48.9          | 16.9    | 6.5     | 1,180,716                |
| 1978 | 2.5                 | 8.2  | 1.3              | 16.3          | 47.5          | 17.1    | 7.1     | 1,066,062                |
| 1979 | 2.2                 | 6.8  | .8               | 19.3          | 43.6          | 18.5    | 8.8     | 1,141,817                |
| 1980 | 2.6                 | 8.9  | .6               | 20.1          | 41.0          | 18.7    | 8.1     | 872,830                  |
| 1981 | 2.4                 | 8.9  | .7               | 20.0          | 43.2          | 17.4    | 7.3     | 774,018                  |
| 1982 | 1.8                 | 6.4  | .5               | 20.6          | 49.2          | 15.1    | 6.3     | 659,593                  |
| 1983 | 1.9                 | 7.0  | .7               | 20.9          | 50.3          | 14.0    | 5.2     | 812,622                  |
| 1984 | 2.2                 | 6.4  | .9               | 22.0          | 49.5          | 13.1    | 5.9     | 1,065,130                |
| 1985 | 1.7                 | 5.7  | .9               | 24.5          | 50.2          | 11.5    | 5.5     | 1,101,286                |
| 1986 | 1.9                 | 4.8  | .8               | 28.1          | 48.5          | 10.3    | 5.6     | 1,382,074                |
| 1987 | 1.7                 | 4.9  | .6               | 29.3          | 47.8          | 10.0    | 5.6     | 1,562,432                |
| 1988 | 1.7                 | 4.8  | 1.6              | 29.7          | 47.3          | 9.6     | 5.3     | 1,613,020                |
| 1989 | 1.9                 | 5.6  | 1.9              | 30.4          | 46.1          | 9.3     | 4.9     | 1,710,614                |
| 1990 | 1.4                 | 5.4  | 1.8              | 29.7          | 47.6          | 8.8     | 5.1     | 1,563,427                |

<sup>a</sup> Figures are a volume-weighted average of green and dry surfaced and rough grades.

Source: Data are compiled by Western Wood Products Association from copies of invoices submitted to the association by mills accounting for approximately 65 to 70 percent of the region's production; individual groupings from Pacific Northwest Research Station.

Table 15—Nominal prices for ponderosa pine lumber, inland mills, 1971-90<sup>a</sup>

(In dollars per thousand board feet)

| Year | 4/4 selects and 1 shop |         |            |        | 5/4 and thicker moulding and shops |        |        |        | 4/4 commons and 8/4 std. and btr. |       |         |         | Low value<br>No. 3 5 com.<br>and<br>util.<br>econ. |            |         |
|------|------------------------|---------|------------|--------|------------------------------------|--------|--------|--------|-----------------------------------|-------|---------|---------|--|------------|---------|
|      | C and better           |         | C and btr. |        | Mldg. and btr.                     |        | shop   |        | Shopout                           |       | 2 com.  |         |  | 3 com.     |         |
|      | 6-12 in                | D 12 in | D 6-10 in  | D 4 in | 1 shop                             | 1 shop | 2 shop | 3 shop | Shopout                           | 12 in | 4-10 in | 6-12 in |  | 8/4 4 com. | 4-12 in |
| 1971 | 384                    | 307     | 262        | 197    | 136                                | 301    | 220    | 158    | 133                               | 85    | 134     | 113     | 93   | 75         | 38      |
| 1972 | 402                    | 334     | 284        | 210    | 157                                | 314    | 247    | 185    | 157                               | 107   | 165     | 138     | 121  | 101        | 50      |
| 1973 | 479                    | 410     | 369        | 285    | 207                                | 392    | 294    | 232    | 195                               | 159   | 242     | 207     | 164  | 144        | 78      |
| 1974 | 612                    | 550     | 499        | 305    | 210                                | 429    | 314    | 252    | 208                               | 133   | 270     | 211     | 141  | 107        | 57      |
| 1975 | 646                    | 546     | 454        | 257    | 173                                | 477    | 278    | 206    | 153                               | 97    | 246     | 188     | 125  | 88         | 47      |
| 1976 | 708                    | 615     | 444        | 334    | 233                                | 531    | 398    | 326    | 248                               | 143   | 272     | 219     | 166  | 129        | 58      |
| 1977 | 816                    | 725     | 514        | 360    | 280                                | 549    | 454    | 384    | 286                               | 173   | 331     | 272     | 196  | 146        | 72      |
| 1978 | 1,001                  | 906     | 671        | 489    | 349                                | 934    | 526    | 462    | 331                               | 206   | 373     | 329     | 232  | 184        | 98      |
| 1979 | 1,398                  | 1,255   | 1,004      | 532    | 333                                | 955    | 554    | 481    | 304                               | 210   | 441     | 359     | 263  | 184        | 96      |
| 1980 | 1,187                  | 865     | 610        | 401    | 330                                | 813    | 549    | 473    | 308                               | 203   | 450     | 289     | 237  | 165        | 87      |
| 1981 | 1,110                  | 965     | 608        | 467    | 333                                | 817    | 589    | 509    | 355                               | 218   | 385     | 278     | 245  | 164        | 89      |
| 1982 | 1,187                  | 865     | 610        | 401    | 330                                | 813    | 549    | 473    | 308                               | 203   | 450     | 289     | 237  | 165        | 87      |
| 1983 | 1,214                  | 1,404   | 659        | 513    | 363                                | 1,056  | 662    | 570    | 401                               | 225   | 388     | 305     | 222  | 160        | 90      |
| 1984 | 1,363                  | 1,163   | 724        | 499    | 368                                | 949    | 622    | 506    | 349                               | 203   | 432     | 319     | 235  | 149        | 83      |
| 1985 | 1,463                  | 863     | 779        | 506    | 342                                | 1,087  | 614    | 498    | 366                               | 204   | 456     | 312     | 208  | 143        | 75      |
| 1986 | 1,509                  | 1,169   | 1,021      | 654    | 636                                | 1,093  | 688    | 576    | 404                               | 207   | 430     | 325     | 227  | 163        | 79      |
| 1987 | 1,563                  | 1,336   | 1,088      | 703    | 442                                | 1,306  | 762    | 644    | 413                               | 224   | 447     | 367     | 247  | 175        | 79      |
| 1988 | 1,892                  | 1,510   | 1,076      | 689    | 452                                | 1,282  | 746    | 625    | 411                               | 229   | 505     | 363     | 246  | 174        | 87      |
| 1989 | 1,805                  | 1,523   | 1,016      | 740    | 438                                | 1,265  | 730    | 589    | 434                               | 258   | 532     | 331     | 261  | 189        | 105     |
| 1990 | 1,478                  | 1,453   | 996        | 683    | 435                                | 1,051  | 677    | 542    | 414                               | 247   | 534     | 356     | 248  | 187        | 99      |

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

Source: Data are compiled by Western Wood Products Association from copies of invoices submitted to the association by mills accounting for approximately 65 to 70 percent of the region's production; individual groupings from Pacific Northwest Research Station.



Section 104(b)(2) of the Internal Revenue Code provides that the amount of a taxpayer's net operating loss for a taxable year may be carried back to the preceding taxable year and carried forward to the succeeding taxable years. The amount of a net operating loss which may be carried back to the preceding taxable year is limited to the amount of the net operating loss for the taxable year.

The amount of a net operating loss which may be carried forward to the succeeding taxable years is limited to the amount of the net operating loss for the taxable year. The amount of a net operating loss which may be carried forward to the succeeding taxable years is limited to the amount of the net operating loss for the taxable year.

The amount of a net operating loss which may be carried forward to the succeeding taxable years is limited to the amount of the net operating loss for the taxable year.

The amount of a net operating loss which may be carried forward to the succeeding taxable years is limited to the amount of the net operating loss for the taxable year.

The amount of a net operating loss which may be carried forward to the succeeding taxable years is limited to the amount of the net operating loss for the taxable year.

The amount of a net operating loss which may be carried forward to the succeeding taxable years is limited to the amount of the net operating loss for the taxable year.

|     |                       |
|-----|-----------------------|
| 1   | 11111111111111111111  |
| 2   | 22222222222222222222  |
| 3   | 33333333333333333333  |
| 4   | 44444444444444444444  |
| 5   | 55555555555555555555  |
| 6   | 66666666666666666666  |
| 7   | 77777777777777777777  |
| 8   | 88888888888888888888  |
| 9   | 99999999999999999999  |
| 10  | 10101010101010101010  |
| 11  | 11111111111111111111  |
| 12  | 12121212121212121212  |
| 13  | 13131313131313131313  |
| 14  | 14141414141414141414  |
| 15  | 15151515151515151515  |
| 16  | 16161616161616161616  |
| 17  | 17171717171717171717  |
| 18  | 18181818181818181818  |
| 19  | 19191919191919191919  |
| 20  | 20202020202020202020  |
| 21  | 21212121212121212121  |
| 22  | 22222222222222222222  |
| 23  | 23232323232323232323  |
| 24  | 24242424242424242424  |
| 25  | 25252525252525252525  |
| 26  | 26262626262626262626  |
| 27  | 27272727272727272727  |
| 28  | 28282828282828282828  |
| 29  | 29292929292929292929  |
| 30  | 30303030303030303030  |
| 31  | 31313131313131313131  |
| 32  | 32323232323232323232  |
| 33  | 33333333333333333333  |
| 34  | 34343434343434343434  |
| 35  | 35353535353535353535  |
| 36  | 36363636363636363636  |
| 37  | 37373737373737373737  |
| 38  | 38383838383838383838  |
| 39  | 39393939393939393939  |
| 40  | 40404040404040404040  |
| 41  | 41414141414141414141  |
| 42  | 42424242424242424242  |
| 43  | 43434343434343434343  |
| 44  | 44444444444444444444  |
| 45  | 45454545454545454545  |
| 46  | 46464646464646464646  |
| 47  | 47474747474747474747  |
| 48  | 48484848484848484848  |
| 49  | 49494949494949494949  |
| 50  | 50505050505050505050  |
| 51  | 51515151515151515151  |
| 52  | 52525252525252525252  |
| 53  | 53535353535353535353  |
| 54  | 54545454545454545454  |
| 55  | 55555555555555555555  |
| 56  | 56565656565656565656  |
| 57  | 57575757575757575757  |
| 58  | 58585858585858585858  |
| 59  | 59595959595959595959  |
| 60  | 60606060606060606060  |
| 61  | 61616161616161616161  |
| 62  | 62626262626262626262  |
| 63  | 63636363636363636363  |
| 64  | 64646464646464646464  |
| 65  | 65656565656565656565  |
| 66  | 66666666666666666666  |
| 67  | 67676767676767676767  |
| 68  | 68686868686868686868  |
| 69  | 69696969696969696969  |
| 70  | 70707070707070707070  |
| 71  | 71717171717171717171  |
| 72  | 72727272727272727272  |
| 73  | 73737373737373737373  |
| 74  | 74747474747474747474  |
| 75  | 75757575757575757575  |
| 76  | 76767676767676767676  |
| 77  | 77777777777777777777  |
| 78  | 78787878787878787878  |
| 79  | 79797979797979797979  |
| 80  | 80808080808080808080  |
| 81  | 81818181818181818181  |
| 82  | 82828282828282828282  |
| 83  | 83838383838383838383  |
| 84  | 84848484848484848484  |
| 85  | 85858585858585858585  |
| 86  | 86868686868686868686  |
| 87  | 87878787878787878787  |
| 88  | 88888888888888888888  |
| 89  | 89898989898989898989  |
| 90  | 90909090909090909090  |
| 91  | 91919191919191919191  |
| 92  | 92929292929292929292  |
| 93  | 93939393939393939393  |
| 94  | 94949494949494949494  |
| 95  | 95959595959595959595  |
| 96  | 96969696969696969696  |
| 97  | 97979797979797979797  |
| 98  | 98989898989898989898  |
| 99  | 99999999999999999999  |
| 100 | 100100100100100100100 |

**Haynes, Richard W.; Fight, Roger D. 1992.** Price projections for selected grades of Douglas-fir, coast hem-fir, inland hem-fir, and ponderosa pine lumber. Res. Pap. PNW-RP-447. Portland, OR: U.S. Department of Agriculture, Forest Service, Pacific Northwest Research Station. 20 p.

Grade-specific price projections were developed for Douglas-fir, coast hem-fir, inland hem-fir, and ponderosa pine lumber. These grade-specific price projections can be used in evaluating management practices that will affect the quality of saw logs produced under various management regimes.

**Keywords:** Lumber prices, Douglas-fir, coast hem-fir, inland hem-fir, ponderosa pine.

The **Forest Service** of the U.S. Department of Agriculture is dedicated to the principle of multiple use management of the Nation's forest resources for sustained yields of wood, water, forage, wildlife, and recreation. Through forestry research, cooperation with the States and private forest owners, and management of the National Forests and National Grasslands, it strives—as directed by Congress—to provide increasingly greater service to a growing Nation.

The U.S. Department of Agriculture is an Equal Opportunity Employer. Applicants for all Department programs will be given equal consideration without regard to age, race, color, sex, religion, or national origin.

Pacific Northwest Research Station  
333 S.W. First Avenue  
P.O. Box 3890  
Portland, Oregon 97208-3890



U.S. Department of Agriculture  
Pacific Northwest Research Station  
333 S.W. First Avenue  
P.O. Box 3890  
Portland, Oregon 97208

---

Official Business  
Penalty for Private Use, \$300

do NOT detach label