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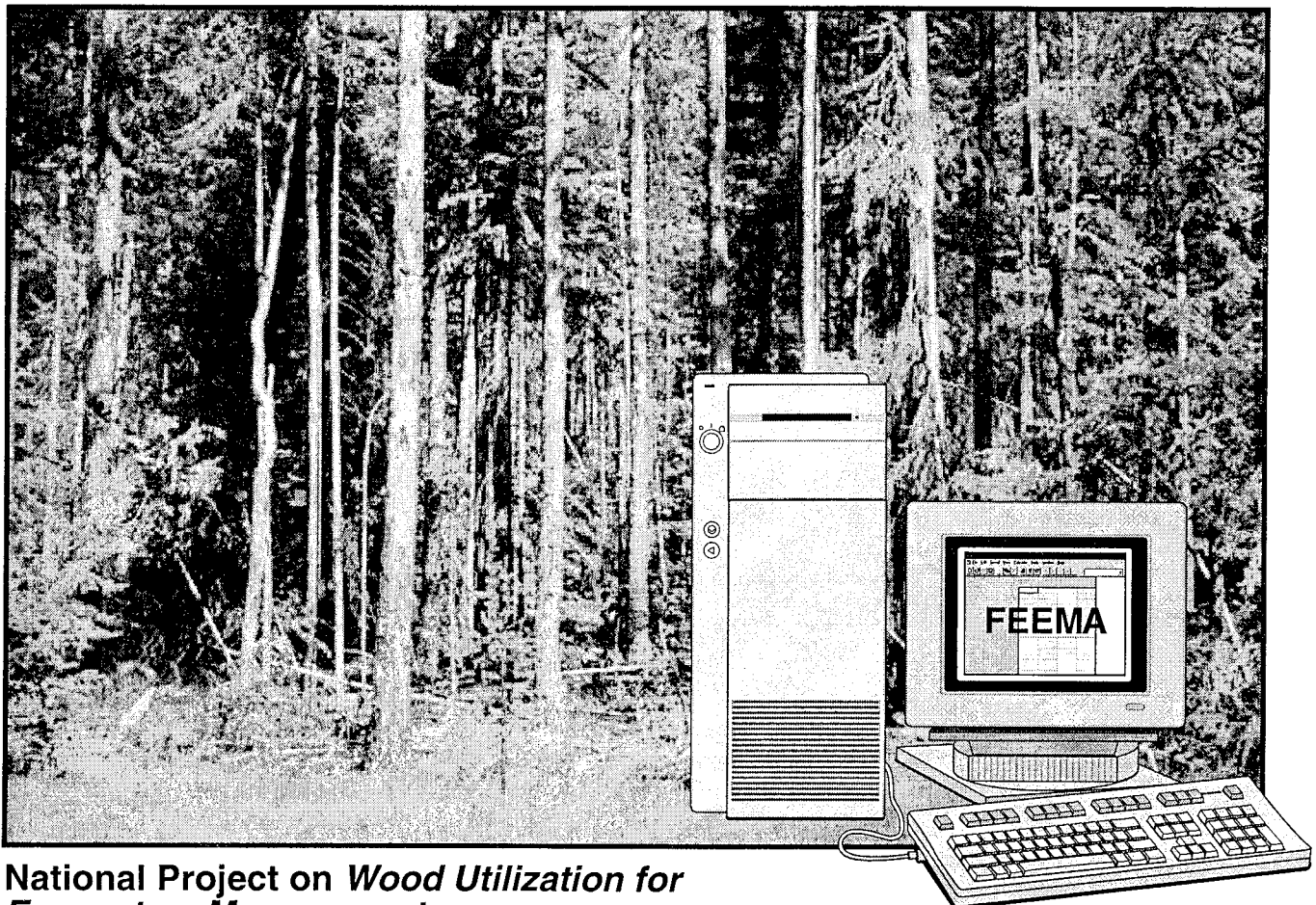
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Softwood Lumber Prices for Evaluation of Small-Diameter Timber Stands in the Intermountain West

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National Project on *Wood Utilization for
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Abstract

This paper reports prices for aggregations of lumber grades that are representative of the quality and volume of lumber produced from small-diameter timber stands in the Intermountain West area encompassing Idaho and Montana and land east of the Cascade Mountain range in Oregon and Washington. Price data are reported for Douglas Fir-Larch, Hem-Fir, ponderosa pine, and lodgepole pine. Forest managers can use the grade aggregations in conjunction with the Financial Evaluation of Ecosystem Management Activities (FEEMA) software to evaluate silvicultural treatments for small-diameter timber stands.

Keywords: economics, forest management, small-diameter trees, ecosystem management

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Softwood Lumber Prices for Evaluation of Small-Diameter Timber Stands in the Intermountain West

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Background

The Financial Evaluation of Ecosystem Management Activities (FEEMA) software was developed by the Pacific Northwest Research Station and the Forest Products Laboratory of the USDA Forest Service. This software is designed to aid forest managers in evaluating silvicultural treatments for small-diameter softwood timber stands located east of the Cascade Mountain range in Oregon and Washington and the northern Rocky Mountains. Products, either unprocessed logs or manufactured goods such as lumber, are an important component of the analysis. Obtaining representative product prices is critical because FEEMA requires user-entered prices and costs to estimate the potential contribution of products to the net revenue generated by a specified timber harvest activity.

Prices of softwood lumber products are relatively uniform across the region, a reflection of the broad geographic scope of lumber markets and their high level of activity. This paper presents regional prices based on species and grade aggregations typical of lumber produced from small-diameter timber stands. The price mechanisms described here are intended for use with FEEMA. Because wide-width lumber represents only a tiny fraction of the volume produced from trees with a diameter at breast height (DBH) of less than 9 in. (<229 mm), the calculations used to derive the lumber prices presented here exclude widths greater than 6 in. (>152 mm).

The use of these prices need not be confined to FEEMA analysis. We believe that these prices accurately value the range of lumber sizes produced from small-diameter trees in the region. However, those who wish to employ these values in other applications are reminded to review the specifications for each price calculation to judge whether the prices are appropriate for the timber resource, forest products industry structure, and mill production preferences associated with a particular analysis.

The FEEMA model contains 16 softwood lumber products and 4 species groups. The lumber portion of the FEEMA Product Prices input file is displayed in Figure 1. The input file also contains sections for entering softwood veneer and chip product prices. The Product Prices input file accommodates prices for up to 34 species-product combinations for lumber, which correspond to all possible lumber product options recognized in the product recovery equations utilized by the model. All the FEEMA species groups feature lumber as a product option; however, not all the FEEMA lumber products are applicable to every species group. For instance, FEEMA does not allow production of any of the four Select and Shop lumber products from lodgepole pine, and Common boards are limited to ponderosa pine. Product limitations exist because some species do not meet the quality specifications for some grades or because product recovery information is lacking for some product-species combinations. Thus, although the FEEMA lumber product list is not

Product Prices		DF & Larch	Hem & Fir	Ponderosa	Lodgepole
Select & Shop (\$/MBF)	Moulding & Btr.	1,071	993	1,440	
	#1 Shop			679	
	#2 Shop			861	
	#3 Shop			648	
Visual (\$/MBF)	1x4	400	378		378
	No. 2 & Btr.	356	339	276	331
	Stud	341	358		344
	No. 3 & Util.	227	230	205	234
	Economy	139	157	154	162
MSR (\$/MBF)	2100f	441			433
	1650f	394			394
	1450f	352			333
Commons (\$/MBF)	2 & Btr Com.			533	
	3 Commons			365	
	4 Commons			264	
	5 Commons			164	

Figure 1—Average price for FEEMA lumber products, third quarter 1998.

comprehensive, any omissions represent relatively minor volumes. FEEMA does not consider hardwood species because such species constitute a very small portion of production.

Many of the lumber product options are aggregations of specific grades that are similar to each other but possess characteristics that can be distinguished by price differences. Because some FEEMA users may be unfamiliar with these grade aggregations or may have difficulty in obtaining current lumber price information, the Pacific Northwest Research Station maintains a database of lumber prices on the Internet (www.fs.fed.us/pnw/data/feema.htm). In this report, we explain the lumber grade aggregations and criteria used to derive prices for lumber products in the FEEMA price database. A description of the model and its data requirements is posted on the Internet site and has been published (Fight and Chmelik 1998).

A price series for FEEMA requires the following characteristics: (1) includes species found in eastern Oregon and Washington and the northern Rocky Mountain states; (2) prices lumber at the point of origin (the sawmill) and in terms of dollars per thousand board feet (mbf) lumber tally; and (3) covers mills throughout the region and is published frequently enough to capture change in actual market conditions effectively.

The *Inland F.O.B. Price Summary*, published monthly by the Western Wood Products Association (WWPA) for the Inland West, meets the FEEMA price series requirements. The Inland region covers all or part of 12 western states, including eastern California (outside the coast redwood region), Oregon, and Washington, and the Rocky Mountain states. The data in the *Inland F.O.B. Price Summary* represent more than 80% of lumber production in the entire region. Combined, eastern Oregon and Washington, Idaho, and Montana represented almost two-thirds of Inland lumber production in 1996 (WWPA 1997). Each *Inland F.O.B. Price Summary* contains information on species, shipment volume, and average price for hundreds of currently produced lumber items differentiated by width, length, thickness, quality (grade), and species.

Most lumber prices listed in the *Inland F.O.B. Price Summary* are not required for FEEMA analysis. Because FEEMA is designed to evaluate stands of small-diameter timber, lumber products more than 6 in. (152 mm) wide are excluded to ensure that FEEMA lumber prices do not have an upward bias from the price premium that wide widths usually command. As a result, prices for FEEMA tend to differ from price series reported elsewhere for two reasons: (1) high-priced, wide-width items have been excluded from the grade aggregations for FEEMA and (2) no green items are considered in FEEMA pricing because the majority of lumber shipments from the Inland region are kiln dried.

The *Inland F.O.B. Price Summary* includes many items that are produced in relatively small volume. To simplify price reporting, we limited items under consideration to those that represent significant proportions of production of narrower width products and therefore exert the greatest influence on pricing for those items. The aggregate price for each of 16 FEEMA lumber products was determined by calculating a volume-weighted average of the grade items selected from the WWPA listings for that product. The average price was then rounded to the nearest dollar. These aggregations are categorized into four broad grade groupings: Select & Shop, Visual Dimension, MSR Dimension, and Commons. In addition to species, important pricing attributes are nominal thickness, expressed as a fraction of an inch, where 4/4 and 6/4 represent 1 and 1.5 in. (25.4 and 38 mm), respectively, and 2x4 represents a piece nominally 2 in. thick and 4 in. wide (standard 38 mm thick and 89 mm wide); moisture content and surface condition, where D/S represents kiln dried, surfaced, and D/R represents kiln dried, rough sawn; and degree of visible defect (less defect in No. 1 grade than in No. 3).

Moulding & Better and Shop grades are the highest priced and most defect-free grades in FEEMA. This wood is destined for applications where appearance is important. Select Structural, No. 2 & better, No. 3 & Utility, and Economy grades (often described as random length dimension lumber) represent lumber for construction use and are cut to a variety of lengths. Stud grade represents a significant category within structural lumber. Stud grade lumber is traditionally 8 ft (2.4 m) long, although 9- and 10-ft (2.7- and 3-m) lengths are becoming increasingly common. All of these products are graded according to the amount of visual defect in each piece. Grades of machine-stress-rated (MSR) structural lumber are determined mechanically by modulus of elasticity tests; daily tests are conducted to verify the assigned properties more precisely. The MSR lumber grades are designated by allowable bending strength (f) and allowable modulus of elasticity (E). Examples include 2100f-1.8E, 1650f-1.5E, and 1450f-1.3E. "Commons" represent common boards (including thick lumber shipped under WWPA Board Rules) of varying widths, where appearance is an important attribute. Most boards are cut to a nominal 1-in. (standard 19-mm) thickness.

Quarterly price updates for all FEEMA lumber grades are posted on the FEEMA Internet site (www.fs.fed.us/pnw/data/feema.htm). This price file can be downloaded and brought into FEEMA without modification and used as a Product Prices Input file. Users also have the option to enter their own price choices for lumber and other products. However, any price must reflect the grade composition for each species group that FEEMA uses for product recovery (discussed in the following section).

Lumber Pricing

Douglas Fir–Larch

Because the wood of Douglas-fir and western larch is very similar, these species often share the same WWPA grade and price schedules and are usually sold in a commercial species group called Douglas Fir–Larch. The price of Moulding & Better lumber is the average of prices for dried and surfaced (D/S) and dried rough (D/R) 5/4 (1.25-in., 32-mm) and thicker Moulding & Better lumber. Because the monthly WWPA *Inland F.O.B. Price Summary* does not include Douglas Fir–Larch production volume or price for 1450f MSR lumber, the price of Douglas Fir–Larch 2×4 Standard & Better is used as an approximation. This price was chosen to reflect the common practice of selling only the higher level MSR grades as MSR lumber and grading the remainder of the production under the appropriate visual grading rules. This is possible when 1650f is the lowest recognized MSR grade because this grade exceeds all properties for Construction and Standard lumber in the Douglas Fir–Larch species group. The WWPA grades that constitute the FEEMA lumber product categories for Douglas Fir–Larch are shown in Table 1.

Table 1—WWPA grades for FEEMA Douglas Fir–Larch lumber product categories

Product category	WWPA grade ^a
Moulding & Better	5/4 and thicker Moulding & Better (D/S) 5/4 and thicker Moulding & Better (D/R)
Select Structural	2×4 No. 1 & Better 2×6 Select Structural
No. 2 & better	2×4 Standard & Better 2×6 No. 2 & Better
Stud grade	2×4 8-ft Stud 2×6 8-ft Stud
No. 3 & Utility	2×4 Utility 2×6 No. 3
Economy	2×4 Economy 2×6 Economy 2×4 Economy Stud
MSR 2100f	2×4 2100f MSR
MSR 1650f	2×4 1650f MSR
MSR 1450f	2×4 Standard & Better

^a5/4 denotes 1.25 in. (32 mm) thick; 2×4 denotes nominal 2- by 4-in. (standard 38- by 89-mm); 2×6 denotes nominal 2- by 6-in. (standard 38- by 140-mm). 1 ft = 0.3048 m.

Hem–Fir

In FEEMA, Hem–Fir includes western hemlock and several true fir species. For the Hem–Fir species group, as for Douglas Fir–Larch, several species share one WWPA grade and price schedule for the Inland region. Because the WWPA does not report prices for Hem–Fir MSR lumber and no information on MSR product recovery from Hem–Fir is available, Hem–Fir MSR is not a product recognized in FEEMA. Table 2 lists the WWPA grades in the FEEMA lumber product categories for Hem–Fir.

Ponderosa Pine

Ponderosa pine products mainly consist of appearance grades. The WWPA distinguishes two types of ponderosa pine in the Inland region: Rocky Mountain and Coast–Inland North. FEEMA uses the Coast–Inland North prices. As for Hem–Fir, the WWPA does not report MSR or Stud grade prices for ponderosa pine and no information on product recovery from these grades of ponderosa pine has been available. Therefore, those products are not recognized in FEEMA. Table 3 lists the WWPA grades in the FEEMA lumber product categories for ponderosa pine.

Table 2—WWPA grades for FEEMA Hem–Fir lumber product categories

Product category	WWPA grade ^a
Moulding & Better	5/4 Moulding & Better 6/4 Moulding & Better
Select Structural	2×4 Select Structural 2×6 Select Structural
No. 2 & better	2×4 Standard & Better 2×4 No. 2 & Better 2×6 No. 2 & Better
Stud grade	2×4 8-ft Stud 2×6 8-ft Stud
No. 3 & Utility	2×4 Utility 2×6 No. 3
Economy	2×4 Economy 2×6 Economy 2×4 Economy Stud

^a5/4 and 6/4 denote 1.25 and 1.5 in. (31.8 and 38 mm) thick, respectively.

Table 3—WWPA grades for FEEMA ponderosa pine lumber product categories^a

Product category	WWPA grade
Moulding & Better	5/4 Moulding & Better D/S
	6/4 Moulding & Better D/S
	5/4 Moulding & Better D/R
	6/4 Moulding & Better D/R
No. 1 Shop	4/4 No. 1 Shop
	5/4 No. 1 Shop
	6/4 No. 1 Shop
No. 2 Shop	4/4 No. 2 Shop
	5/4 No. 2 Shop
	6/4 No. 2 Shop
No. 3 Shop	5/4 No. 3 Shop
	6/4 No. 3 Shop
No. 2 & better Commons	4/4×4-in. No. 2 & Better Commons
	4/4×6-in. No. 2 & Better Commons
	5/4 No. 2 & Better Commons
	6/4 No. 2 & Better Commons
No. 3 Commons	4/4×4-in. No. 3 Commons
	4/4×6-in. No. 3 Commons
	5/4 No. 3 Commons
	6/4 No. 3 Commons
No. 4 Commons	4/4×4-in. No. 4 Commons
	4/4×6-in. No. 4 Commons
	5/4 No. 4 Commons
	6/4 No. 4 Commons
No. 5 Commons	4/4 No. 5 Commons
	5/4 & Thicker No. 5 Commons
No. 2 & better	2×4 Standard & Better
	2×6 No.2 & Better
No. 3 & Utility	2×4 Utility
Economy	2×4 Economy
	2×6 Economy

^a4/4, 5/4, and 6/4 denote 1, 1.25, and 1.5 in. (25.4, 31.8, and 38 mm) thick, respectively

Lodgepole Pine

The WWPA does not report prices for lodgepole pine. For pricing purposes, WWPA includes this species in a category designated as White Woods. White Woods prices are used for all FEEMA lodgepole pine products except those from Select Structural lumber. Lumber recovery data used in FEEMA include estimates of Select Structural volume produced from lodgepole pine, but the *Inland F.O.B. Price Summary* does not include White Woods production volumes or prices for the Select Structural grades. Therefore, the WWPA prices used by FEEMA for Hem–Fir Select

Table 4—WWPA grades for FEEMA lodgepole pine lumber product categories

Product category	WWPA grade
Select Structural	Hem–Fir 2×4 Select Structural
	Hem–Fir 2×6 Select Structural
No. 2 & better	White Woods 2×4 Standard & Better
	White Woods 2×6 No. 2 & Better
Stud grade	White Woods 2×4 8-ft Stud
	White Woods 2×6 8-ft Stud
No. 3 & Utility	White Woods 2×4 Utility
	White Woods 2×6 No. 3
Economy	White Woods 2×4 Economy
	White Woods 2×6 Economy
	White Woods 2×4 Economy Stud
MSR 2100f	White Woods 2×4 2100f MSR
MSR 1650f	White Woods 2×4 1650f MSR
MSR 1450f	White Woods 2×4 Standard & Better

Structural lumber are also employed for lodgepole pine Select Structural lumber. As for Douglas Fir–Larch MSR lumber, the *Inland F.O.B. Price Summary* does not include White Woods production volume or price for 1450f MSR lumber, so the price of White Woods 2×4 Standard & Better is used as an approximation. This price was chosen to reflect the common practice of selling only the higher level MSR grades as MSR lumber and grading the remainder of the production under the appropriate visual grading rules. This practice is possible when 1650f is the lowest recognized MSR grade because this grade exceeds all properties for Construction and Standard lumber in the White Woods species group. Table 4 shows the WWPA grades that constitute the FEEMA lumber product categories for lodgepole pine.

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