

Softwood Log Volumes on Non-Federal Lands in Western Oregon
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Non-federal softwood log volumes in Western Oregon were derived from the Federal Inventory and Assessment (FIA), an inventory of non-federal lands conducted in 1996 and 1997 by the US Forest Service. Timber held on federally managed lands was not included in this report.

Eastern Oregon inventory estimates are not provided in this report. The eastern Oregon equivalent to the FIA was retracted due to unspecified errors prior to our analysis, and we lacked the necessary information to correct the raw data. The western Oregon analysis was also retracted, but we were able to obtain the details necessary to appropriately correct the raw data and use it for the following analysis. The Forest Service has initiated a new inventory process, and revised data for both eastern and western Oregon should be forthcoming.

Total Log Volumes in Western Oregon

Total softwood volume on non-federal lands in Western Oregon was estimated at nearly 59 billion board feet (Scribner log volume, 32 foot logs, 6 inch top) in 1997 (see Methods for a description of our calculation process). As shown in Table 1, Douglas-fir represented over 73% of that volume. White woods accounted for about 21% of the total volume, while cedars accounted for about 5% and pines for slightly more than 1%.

For the purposes of this analysis, species that were infrequently represented in the inventory were grouped together to provide more viable estimates of volume. This prevented estimates from being made on sample sizes too small to yield reliable estimates. The groups were defined as follows:

- Douglas-fir - well represented in the inventory, it is presented as its own category.
- White Woods - western hemlock, Sitka spruce, Pacific silver fir, white fir, grand fir and noble fir. Within the White Woods category, western hemlock is by far the dominant species (about 57% of category volume), followed by Sitka spruce (22%), and grand fir (16%). White fir occurred only in southwest Oregon and accounted for less than 3% of the category volume, while noble fir (less than 2%) was found in west central and northwest Oregon.
- Cedars - defined here as western redcedar, incense-cedar, and Port-Orford-cedar, with the small volumes of redwood and Pacific yew found by the inventory included in this group. Western redcedar was by far the most common species in the cedars group (74% of category volume), followed by incense-cedar (17%). Port-Orford-cedar accounted for less than 4% of cedars volume, and occurred only in southwest Oregon. The small volumes of Pacific yew occurred throughout western Oregon, while redwood was found only in southwest Oregon.
- Pines – including ponderosa, sugar, lodgepole, Jeffrey, western white, knobcone, and Scotch pine. Ponderosa accounted for over 76% of the category volume, sugar pine for 15%, and lodgepole for about 5%. Jeffrey and knobcone pine occurred only southwest Oregon, and the minute volumes of western white and Scotch pine were found in west central Oregon.

Total volume of non-federal timber in Western Oregon was projected to exceed 97 billion board feet in 2007 if no harvests were made within the projection period. Allocation of volume among species groups was nearly identical to the 1997 estimates. Oregon Department of Forestry (ODF) harvest reports suggest approximately 2.3 billion board feet of softwood timber would be harvested annually in Western Oregon within the projection period. Thus, a likely 2007 post-harvest standing volume would be about 74 billion board feet. Table 2 reports this volume, by species group, adjusted proportionally from the projected volumes to account for the likely harvests.

Not all of the volume reported for 1997, or predicted for 2007, is readily available for harvest. Trees occurring in Riparian Management Areas (RMAs, as defined in the Oregon Forest Practices Rules) are subject to harvest restrictions. While harvesting is not strictly prohibited in RMAs, the regulations are sufficient that many landowners choose to simply exclude the areas from harvests. About 9% of western Oregon's total timber volume occurred in RMAs in 1997. This proportion varied slightly by region (11% for northwest Oregon, 9% for west central Oregon, and 8% for southwest Oregon). It also varied in its impact on species groups, with cedars and white woods being more heavily affected than Douglas-fir or pines (Table 3).

Distribution of Total Volume by Log Size and Quality

Log volume was been allocated to four size categories, based on large-end diameter, within this report. While more typically reported by diameter-at-breast-height (dbh) for trees or small-end diameter for logs (the scaling diameter), we used large-end diameter to better estimate the proportions of volume suitable for differing processing facilities (since large-end diameter better represents limiting factors in log handling capacities). In addition, we further segmented three of the categories to identify logs with potentially more valuable wood characteristics. Our size and quality categories are:

- Small (≤ 10 " diameter inside bark on large end)
- Merch (>10 " and less than 24" diameter inside bark on large end)
- Large (≥ 24 " and less than 30" diameter inside bark on large end)
- Very Large (≥ 30 " diameter inside bark on large end)
- Small, Slow Grown (as subset of the Small logs, these had the additional criteria of being derived from trees with growth rates slow enough to result in six or more rings per inch within the log)
- Large, Outside Crown (a subset of Large logs, these logs occur below the living crown, and are therefore more likely to have fewer, smaller, branches and to fall into the higher log grades. Since the FIA inventory did not include log scale and grade information, location relative to crown was used as the indicator for log quality)
- Very Large, Outside Crown (the subset of Very Large logs occurring below the living crown)

Of the aggregate 1997 Western Oregon volume (Table 1), 73% fell in the merch size category. About 10% was large, 9% very large, and 8% small. About 25% of the small log volume was slow grown (or about 2% of total log volume). Approximately 64% of large logs occurred outside the living crown, and 67% of very large logs (each representing about 6% of total log volume). Cedars and pines had higher proportions of their volume in large or very large logs than did Douglas-fir or white woods, but since Douglas-fir and white woods had much greater overall volumes they had the higher

volumes in these categories. Variation in quality was noteworthy. Less than 25% of small Douglas-fir logs met the slow grown criteria, as compared to 27% for white woods, 24% for pines, and 42% for cedars. Seventy-three percent of large Douglas-fir logs occurred below the crown, compared to 51% for white woods, 72% for pines, and just 25% of cedars. The proportions of very large logs outside the living crown were 79% for Douglas-fir, 54% for white woods, 82% for pines, and 40% for cedars.

Regional Variation in Log Volumes

Variation in log volume was examined for three regions within western Oregon:

- Northwest Oregon (Clackamas, Clatsop, Columbia, Hood River, Marion, Multnomah, Polk, Tillamook, Washington and Yamhill counties)
- West Central Oregon (Benton, Lane, Lincoln and Linn counties)
- Southwest Oregon (Coos, Curry, Douglas, Jackson, and Josephine counties)

Northwest Oregon

Breakdowns by species and size categories for Northwest Oregon are presented in Tables 4 and 5. In 1997, Douglas-fir accounted for 71% of regional volume. White woods accounted for 23% and cedars for 6%. The volume of pines was negligible. Seventy-five percent of regional volume fell in the merch size category, 10% in large, 8% in very large, and 7% in small. Just 26% of the small material was slow grown (about 2% of regional volume). Sixty-five percent of large log volume occurred outside the living crown, compared to 59% for very large logs. White woods were projected to increase in proportion, very slightly, relative to Douglas-fir, and the proportion of small logs meeting slow grown requirements to decrease (from 26% to 16%).

West Central Oregon

Species and size breakdowns for West Central Oregon are presented in Tables 6 and 7. In 1997, Douglas-fir represented 74% of regional volume, white woods 23%, pines 1% and cedars 2%. Seventy-two percent of volume was in the merch size category, 10% in large, 10% very large, and 8% small. Twenty-two percent of the small log volume occurred in slow grown trees (about 2% of regional total). Sixty-seven percent of both large and very large volume occurred below the living crown. The volume of slow-grown, small material was projected to decrease (from 22% to 15%), while volumes of large and very large material occurring outside the crown were predicted to increase slightly (to 72% and 69%, respectively).

Southwest Oregon

Breakdowns for Southwest Oregon appear in Tables 8 and 9. In 1997, Douglas-fir accounted for 76% of regional volume, white woods for 15%, pines for 3% and cedars for 6%. Merch volume was 72% of the regional total, large and very large 9% each, and small 10%. About 27% of the small material was slow grown (3% of regional total). Sixty-one percent of large log volume occurred outside of the living crown, and 74% of very large log volume. As in the other regions, the proportion of slow grown small material was projected to decrease by 2007. Proportions of volume occurring outside the crown were projected to increase to 64% in the large class and decrease to 70% in the very large class.

Large Log Supply Characteristics

Large and very large logs, combined, accounted for about 19% of total 1997 softwood volume in Western Oregon. The volume was relatively evenly distributed among the three Western Oregon regions (35%, 34% and 31% for Northwest, West Central, and Southwest, respectively). A substantial proportion of the volume occurred in the potentially more valuable portion of the stem below the living crown. The proportion varied by species, with Douglas-fir and pines likely to have nearly 80% of this volume outside the crown, while white woods and cedars had only 53% and 40%, respectively.

Small Log Supply Characteristics

Small logs accounted for only 8% of the total 1997 log volume in Western Oregon, and just 25% of the small log volume was slow grown (or about 2% of total log volume). Our growth model predicted that volumes of small logs would increase by 2007 (even after likely harvests are considered) but that volumes of small, slow grown logs would decrease. This may be an artifact of the inventory, rather than a sound prediction. It is likely the 1997 inventory included a number of trees very near our diameter limitation, and that in our projection they simply “grew” into the merch category. The prediction could become reality, however, if small slow grown trees are harvested and replaced with vigorous, more intensively managed ones. It should be noted that while the volume represented in small logs is low, the number of pieces is high. The top log of every tree in the inventory is a small log (generally low quality). Only those small logs associated with the lower sections of slow-grown trees are likely to have higher quality.

Regional Breakdowns by Size and Species

Tables 10 through 25 show volumes by species group and region within each size category. They are provided to facilitate the reader’s further analysis.

Methods

Volumes reported here are estimates based upon the FIA (Forest Inventory and Assessment) occasion four sample of Western Oregon conducted in 1996 and 1997 by the US Forest Service. It consists of permanent plots on non-federal lands, and serves as the most consistent inventory of private and state-owned timber in the region. FIA results have been previously reported in Azuma et al.¹, which estimated standing timber volume for land meeting the classification of timberland (land capable of producing 20 cubic feet of volume per acre per year). While informative, that report provided no estimates of volume by log size (merely estimates by tree size). Furthermore, it was retracted due to an error in the way its underlying analysis expanded volumes from the plot level to regions.

We used the raw data inventory data from the FIA and considered both the “timberland” (GLC 20) land use class and a second class (GLC 49) described in the Assessment as “Forest land capable of growing crops of trees to industrial roundwood quality, but not able to grow wood at the rate of 1.4 cubic meters/hectare/year”. We calculated and applied corrected expansion factors (trees per acre divided by percent of in each condition class). Thus, the acreage included here differs from that reported by Azuma et al, but their description of the sampling technique applies.

Individual trees reported in the inventory were “grown”, by condition class, using the ORGANON dynamic link library (DLL) dated 7/10/2002 (latest release). Several condition classes (differing land uses or stand types) could be present on a plot, and expansion factors were specific to the area of each condition class. The Stand Management Cooperative version of ORGANON was used in Lane County and north, while the Southwest Oregon version was used in Douglas County and south. Individual tree species were adjusted to a similar species accepted by ORGANON if necessary. Site indexes for ORGANON were calculated and averaged for site trees as well as bored dominant/codominant trees to give a calculated site index to more condition classes. If no site information was available a regional average was used based on the FIA site class for the condition class. A description of the basic site index calculation and growth and yield projection can be found in Adams et alⁱⁱ.

Log size estimates were calculated from the existing tree data using taper equations from Czaplewski et alⁱⁱⁱ. All eight species-specific taper equations were employed (Douglas-fir, western hemlock, ponderosa pine, lodgepole pine, western larch, Shasta fir, grand fir and Pacific silver fir). Western hemlock equations were applied to any species in our data set that lacked a specific equation. An iterative approach was employed to determine the height to a six-inch top, and then the diameter inside bark was calculated at the 1-foot stump and every 33 feet (32 foot log plus trim) until the six-inch diameter merchantable height was reached. This resulted in a table of logs (rather than table of trees) that was utilized for the remainder of the analysis.

The Scribner board foot volumes for 32 foot logs were calculated using FIA procedures. The total tree volume (bf) was then allocated to the individual logs by calculating the volume of each log as a frustum of a cone and then proportioning the total tree volume to each log in the tree. This allowed assignment of tree volume in the absence of Girard Form Classes for the trees. Volumes calculated in this method were comparable to those expected at a Girard Form Class of 70.

Harvest estimates for the 10-year period from 1997 to 2007 were estimated from Oregon Department of Forestry Annual Timber Harvest Reports^{iv}. Volume occurring within protected riparian management areas (RMAs) were derived from Oregon Department of Forestry designations. RMAs differ in width based on the stream size (Small, Medium, and Large) and use (Fish, Non-fish, Domestic). These designations were not part of the original FIA inventory. Even though harvests are allowed in most of these buffers, the complexity of meeting the leave tree requirements makes harvest less likely, and we used them as an indicator of trees/logs less likely to be harvested.

Table 1: Log Volume (Mbf) by Species Group and Size, Western Oregon, 1997
 (Scribner Volume, 32 ft logs to 6" top)

Species Group	Small	Small, Slow Grown*	Merch	Large	Large, Outside Crown**	Very Large	Very Large, Outside Crown***	Total
Douglas-fir	4,050,217	993,556	32,576,732	3,888,618	2,843,536	3,041,131	2,402,113	43,556,698
White Woods	773,921	213,420	8,823,533	1,277,216	650,081	1,382,506	742,270	12,257,176
Pine	40,287	11,013	475,904	101,604	73,588	173,713	141,864	791,508
Cedar	84,481	35,500	1,478,648	452,287	113,974	751,663	300,058	2,767,079
Total	4,948,906	1,253,489	43,354,817	5,719,725	3,681,179	5,349,013	3,586,305	59,372,461

* subset of Small category

** subset of Large category

*** subset of Very Large

Percent of Log Volume, By Species Group Within Each Size Class, Western Oregon, 1997

Species Group	Small	Small, Slow Grown*	Merch	Large	Large, Outside Crown**	Very Large	Very Large, Outside Crown***	Total
Douglas-fir	82%	79%	75%	68%	77%	57%	67%	73%
White Woods	16%	17%	20%	22%	18%	26%	21%	21%
Pine	1%	1%	1%	2%	2%	3%	4%	1%
Cedar	2%	3%	3%	8%	3%	14%	8%	5%
Total	100%	100%	100%	100%	100%	100%	100%	100%

Percent of Log Volume, By Size Class Within Each Species Group, Western Oregon, 1997

Species Group	Small	Small, Slow Grown*	Merch	Large	Large, Outside Crown**	Very Large	Very Large, Outside Crown***	Total
Douglas-fir	9%	2%	75%	9%	7%	7%	6%	100%
White Woods	6%	2%	72%	10%	5%	11%	6%	100%
Pine	5%	1%	60%	13%	9%	22%	18%	100%
Cedar	3%	1%	53%	16%	4%	27%	11%	100%
Total	8%	2%	73%	10%	6%	9%	6%	100%

Subgroup Percentages

Percent of Small Log Volume that is Slow Grown	25%
Percent of Large Log Volume Outside Crown	64%
Percent of Very Large Log Volume Outside Crown	67%

Table 2: Projected Log Volume (Mbf) by Species Group and Size, Western Oregon, 2007
 (Scribner Volume, 32 ft logs to 6" top; adjusted for harvest)

Species Group	Small	Small, Slow Grown*	Merch	Large	Large, Outside Crown**	Very Large	Very Large, Outside Crown***	Total
Douglas-fir	4,422,231	640,857	41,348,686	5,741,687	4,320,195	3,548,894	2,738,697	55,061,498
White Woods	983,801	202,067	10,985,434	1,610,666	905,275	1,398,751	765,134	14,978,651
Pine	34,505	6,999	531,632	121,685	70,489	171,290	137,012	859,112
Cedar	80,007	33,269	1,511,885	487,796	167,279	799,456	302,278	2,879,144
Total	5,520,543	883,192	54,377,637	7,961,834	5,463,237	5,918,391	3,943,120	73,778,405

* subset of Small category

** subset of Large category

*** subset of Very Large

Percent of Log Volume, By Species Group Within Each Size Class, Western Oregon, 1997

Species Group	Small	Small, Slow Grown*	Merch	Large	Large, Outside Crown**	Very Large	Very Large, Outside Crown***	Total
Douglas-fir	80%	73%	76%	72%	79%	60%	69%	75%
White Woods	18%	23%	20%	20%	17%	24%	19%	20%
Pine	1%	1%	1%	2%	1%	3%	3%	1%
Cedar	1%	4%	3%	6%	3%	14%	8%	4%
Total	100%	100%	100%	100%	100%	100%	100%	100%

Percent of Log Volume, By Size Class Within Each Species Group, Western Oregon, 2007

Species Group	Small	Small, Slow Grown*	Merch	Large	Large, Outside Crown**	Very Large	Very Large, Outside Crown***	Total
Douglas-fir	8%	1%	75%	10%	8%	6%	5%	100%
White Woods	7%	1%	73%	11%	6%	9%	5%	100%
Pine	4%	1%	62%	14%	8%	20%	16%	100%
Cedar	3%	1%	53%	17%	6%	28%	10%	100%
Total	7%	1%	74%	11%	7%	8%	5%	100%

Subgroup Percentages

Percent of Small Log Volume that is Slow Grown	16%
Percent of Large Log Volume Outside Crown	69%
Percent of Very Large Log Volume Outside Crown	67%

Table 3: Log Volume (Mbf) in Riparian Management Areas, by Region and Species, 1997
(Scribner Volume, 32 ft logs, to 6" top)

Species	Western Oregon		
	Western OR Volume	Volume in RMAs	% in RMAs
Douglas-fir	43,556,698	3,493,946	8%
White Woods	12,257,176	1,443,008	12%
Pine	791,508	16,921	2%
Cedar	2,767,079	568,829	21%
Total	59,372,461	5,522,704	9%

Species	Northwest Oregon		
	Region Volume	Volume in RMAs	% in RMAs
Douglas-fir	15,251,946	1,267,900	8%
White Woods	4,926,781	680,511	14%
Pine	24,502	0	0%
Cedar	1,368,848	418,598	31%
Total	21,572,077	2,367,009	11%

Species	West Central Oregon		
	Region Volume	Volume in RMAs	% in RMAs
Douglas-fir	14,098,532	1,263,977	9%
White Woods	4,453,243	409,719	9%
Pine	147,057	0	0%
Cedar	361,918	52,679	15%
Total	19,060,750	1,726,375	9%

Species	Southwest Oregon		
	Region Volume	Volume in RMAs	% in RMAs
Douglas-fir	14,206,220	962,069	7%
White Woods	2,877,152	352,778	12%
Pine	619,949	16,921	3%
Cedar	1,036,313	97,553	9%
Total	18,739,634	1,429,321	8%

Table 4: Log Volume (Mbf), by Species and Size, Northwest Oregon, 1997
 (Scribner Volume, 32 ft logs, to 6" top)

Species Group	Small	Small, Slow Grown*	Merch	Large	Large, Outside Crown**	Very Large	Very Large, Outside Crown***	Total
Douglas-fir	1,212,280	328,636	11,495,136	1,534,233	1,138,790	1,010,297	736,663	15,251,946
White Woods	375,061	84,893	3,886,956	345,056	195,673	319,708	131,408	4,926,781
Pine	197	0	11,699	6,093	6,093	6,513	6,513	24,502
Cedar	25,752	6,165	707,286	284,336	61,260	351,474	123,734	1,368,848
Total	1,613,290	419,694	16,101,077	2,169,718	1,401,816	1,687,992	998,318	21,572,077

* subset of Small category

** subset of Large category

*** subset of Very Large

Percent of Log Volume, By Species Group Within Each Size Class, Northwest Oregon, 1997

Species Group	Small	Small, Slow Grown*	Merch	Large	Large, Outside Crown**	Very Large	Very Large, Outside Crown***	Total
Douglas-fir	75%	78%	71%	71%	81%	60%	74%	71%
White Woods	23%	20%	24%	16%	14%	19%	13%	23%
Pine	0%	0%	0%	0%	0%	0%	1%	0%
Cedar	2%	1%	4%	13%	4%	21%	12%	6%
Total	100%	100%	100%	100%	100%	100%	100%	100%

Percent of Log Volume, By Size Class Within Each Species Group, Northwest Oregon, 1997

Species Group	Small	Small, Slow Grown*	Merch	Large	Large, Outside Crown**	Very Large	Very Large, Outside Crown***	Total
Douglas-fir	8%	2%	75%	10%	7%	7%	5%	100%
White Woods	8%	2%	79%	7%	4%	6%	3%	100%
Pine	1%	0%	48%	25%	25%	27%	27%	100%
Cedar	2%	0%	52%	21%	4%	26%	9%	100%
Total	7%	2%	75%	10%	6%	8%	5%	100%

Subgroup Percentages

Percent of Small Log Volume that is Slow Grown	26%
Percent of Large Log Volume Outside Crown	65%
Percent of Very Large Log Volume Outside Crown	59%

Table 5: Log Volume (Mbf), by Species and Size, Northwest Oregon, 2007 (adjusted for harvest)
 (Scribner Volume, 32 ft logs, to 6" top)

Species Group	Small	Small, Slow Grown*	Merch	Large	Large, Outside Crown**	Very Large	Very Large, Outside Crown***	Total
Douglas-fir	1,136,493	166,165	13,241,235	2,288,683	1,764,113	1,259,117	933,139	17,925,527
White Woods	486,995	87,833	5,087,372	503,588	292,294	314,796	127,277	6,392,752
Pine	0	0	19,547	9,091	5,294	6,448	6,448	35,086
Cedar	28,277	9,614	676,881	320,126	96,078	432,762	151,261	1,458,045
Total	1,651,765	263,612	19,025,036	3,121,487	2,157,779	2,013,122	1,218,124	25,811,410

* subset of Small category

** subset of Large category

*** subset of Very Large

Percent of Log Volume, By Species Group Within Each Size Class, Northwest Oregon, 2007

Species Group	Small	Small, Slow Grown*	Merch	Large	Large, Outside Crown**	Very Large	Very Large, Outside Crown***	Total
Douglas-fir	69%	63%	70%	73%	82%	63%	77%	69%
White Woods	29%	33%	27%	16%	14%	16%	10%	25%
Pine	0%	0%	0%	0%	0%	0%	1%	0%
Cedar	2%	4%	4%	10%	4%	21%	12%	6%
Total	100%	100%	100%	100%	100%	100%	100%	100%

Percent of Log Volume, By Size Class Within Each Species Group, Northwest Oregon, 2007

Species Group	Small	Small, Slow Grown*	Merch	Large	Large, Outside Crown**	Very Large	Very Large, Outside Crown***	Total
Douglas-fir	6%	1%	74%	13%	10%	7%	5%	100%
White Woods	8%	1%	80%	8%	5%	5%	2%	100%
Pine	0%	0%	56%	26%	15%	18%	18%	100%
Cedar	2%	1%	46%	22%	7%	30%	10%	100%
Total	6%	1%	74%	12%	8%	8%	5%	100%

Subgroup Percentages

Percent of Small Log Volume that is Slow Grown	16%
Percent of Large Log Volume Outside Crown	69%
Percent of Very Large Log Volume Outside Crown	61%

Table 6: Log Volume (Mbf), by Species Group and Size, West Central Oregon, 1997
 (Scribner Volume, 32 ft logs, to 6" top)

Species Group	Small	Small, Slow Grown*	Merch	Large	Large, Outside Crown**	Very Large	Very Large, Outside Crown***	Total
Douglas-fir	1,275,182	258,188	10,524,113	1,303,452	999,669	995,785	795,603	14,098,532
White Woods	245,457	78,320	2,946,973	461,849	223,385	798,964	412,675	4,453,243
Pine	13,150	1,192	106,218	10,518	6,855	17,171	17,171	147,057
Cedar	15,513	10,117	203,933	51,837	0	90,635	57,389	361,918
Total	1,549,302	347,817	13,781,237	1,827,656	1,229,909	1,902,555	1,282,838	19,060,750

* subset of Small category

** subset of Large category

*** subset of Very Large

Percent of Log Volume, By Species Group Within Each Size Class, West Central Oregon, 1997

Species Group	Small	Small, Slow Grown*	Merch	Large	Large, Outside Crown**	Very Large	Very Large, Outside Crown***	Total
Douglas-fir	82%	74%	76%	71%	81%	52%	62%	74%
White Woods	16%	23%	21%	25%	18%	42%	32%	23%
Pine	1%	0%	1%	1%	1%	1%	1%	1%
Cedar	1%	3%	1%	3%	0%	5%	4%	2%
Total	100%	100%	100%	100%	100%	100%	100%	100%

Percent of Log Volume, By Size Class Within Each Species Group, West Central Oregon, 1997

Species Group	Small	Small, Slow Grown*	Merch	Large	Large, Outside Crown**	Very Large	Very Large, Outside Crown***	Total
Douglas-fir	9%	2%	75%	9%	7%	7%	6%	100%
White Woods	6%	2%	66%	10%	5%	18%	9%	100%
Pine	9%	1%	72%	7%	5%	12%	12%	100%
Cedar	4%	3%	56%	14%	0%	25%	16%	100%
Total	8%	2%	72%	10%	6%	10%	7%	100%

Subgroup Percentages

Percent of Small Log Volume that is Slow Grown	22%
Percent of Large Log Volume Outside Crown	67%
Percent of Very Large Log Volume Outside Crown	67%

Table 7: Log Volume (Mbf), by Species Group and Size, West Central Oregon, 2007 (adjusted for harvest)
 (Scribner Volume, 32 ft logs, to 6" top)

Species Group	Small	Small, Slow Grown*	Merch	Large	Large, Outside Crown**	Very Large	Very Large, Outside Crown***	Total
Douglas-fir	1,430,802	186,709	13,679,545	2,009,867	1,560,673	1,237,637	974,086	18,357,851
White Woods	320,155	79,415	3,451,308	584,777	321,916	738,979	407,684	5,095,219
Pine	10,316	455	134,615	8,927	7,084	23,687	20,360	177,545
Cedar	11,223	3,320	250,808	59,541	20,289	86,042	44,521	407,614
Total	1,772,496	269,898	17,516,276	2,663,112	1,909,961	2,086,345	1,446,650	24,038,228

* subset of Small category

** subset of Large category

*** subset of Very Large

Percent of Log Volume, By Species Group Within Each Size Class, West Central Oregon, 2007

Species Group	Small	Small, Slow Grown*	Merch	Large	Large, Outside Crown**	Very Large	Very Large, Outside Crown***	Total
Douglas-fir	81%	69%	78%	75%	82%	59%	67%	76%
White Woods	18%	29%	20%	22%	17%	35%	28%	21%
Pine	1%	0%	1%	0%	0%	1%	1%	1%
Cedar	1%	1%	1%	2%	1%	4%	3%	2%
Total	100%	100%	100%	100%	100%	100%	100%	100%

Percent of Log Volume, By Size Class Within Each Species Group, West Central Oregon, 2007

Species Group	Small	Small, Slow Grown*	Merch	Large	Large, Outside Crown**	Very Large	Very Large, Outside Crown***	Total
Douglas-fir	8%	1%	75%	11%	9%	7%	5%	100%
White Woods	6%	2%	68%	11%	6%	15%	8%	100%
Pine	6%	0%	76%	5%	4%	13%	11%	100%
Cedar	3%	1%	62%	15%	5%	21%	11%	100%
Total	7%	1%	73%	11%	8%	9%	6%	100%

Subgroup Percentages

Percent of Small Log Volume that is Slow Grown	15%
Percent of Large Log Volume Outside Crown	72%
Percent of Very Large Log Volume Outside Crown	69%

Table 8: Log Volume (Mbf), by Species Group and Size, Southwest Oregon, 1997
 (Scribner Volume, 32 ft logs, to 6" top)

Species Group	Small	Small, Slow Grown*	Merch	Large	Large, Outside Crown**	Very Large	Very Large, Outside Crown***	Total
Douglas-fir	1,562,755	406,732	10,557,483	1,050,933	705,077	1,035,049	869,847	14,206,220
White Woods	153,403	50,207	1,989,604	470,311	231,023	263,834	198,187	2,877,152
Pine	26,940	9,821	357,987	84,993	60,640	150,029	118,180	619,949
Cedar	43,216	19,218	567,429	116,114	52,714	309,554	118,935	1,036,313
Total	1,786,314	485,978	13,472,503	1,722,351	1,049,454	1,758,466	1,305,149	18,739,634

* subset of Small category

** subset of Large category

*** subset of Very Large

Percent of Log Volume, By Species Group Within Each Size Class, Southwest Oregon, 1997

Species Group	Small	Small, Slow Grown*	Merch	Large	Large, Outside Crown**	Very Large	Very Large, Outside Crown***	Total
Douglas-fir	87%	84%	78%	61%	67%	59%	67%	76%
White Woods	9%	10%	15%	27%	22%	15%	15%	15%
Pine	2%	2%	3%	5%	6%	9%	9%	3%
Cedar	2%	4%	4%	7%	5%	18%	9%	6%
Total	100%	100%	100%	100%	100%	100%	100%	100%

Percent of Log Volume, By Size Class Within Each Species Group, Southwest Oregon, 1997

Species Group	Small	Small, Slow Grown*	Merch	Large	Large, Outside Crown**	Very Large	Very Large, Outside Crown***	Total
Douglas-fir	11%	3%	74%	7%	5%	7%	6%	100%
White Woods	5%	2%	69%	16%	8%	9%	7%	100%
Pine	4%	2%	58%	14%	10%	24%	19%	100%
Cedar	4%	2%	55%	11%	5%	30%	11%	100%
Total	10%	3%	72%	9%	6%	9%	7%	100%

Subgroup Percentages

Percent of Small Log Volume that is Slow Grown	27%
Percent of Large Log Volume Outside Crown	61%
Percent of Very Large Log Volume Outside Crown	74%

Table 9: Log Volume (Mbf), by Species Group and Size, Southwest Oregon, 2007 (adjusted for harvest)
 (Scribner Volume, 32 ft logs, to 6" top)

Species Group	Small	Small, Slow Grown*	Merch	Large	Large, Outside Crown**	Very Large	Very Large, Outside Crown***	Total
Douglas-fir	1,854,936	287,984	14,427,906	1,443,137	995,409	1,052,141	831,473	18,778,120
White Woods	176,651	34,819	2,446,754	522,301	291,065	344,976	230,174	3,490,681
Pine	24,188	6,545	377,471	103,667	58,112	141,155	110,204	646,481
Cedar	40,508	20,336	584,196	108,129	50,912	280,652	106,496	1,013,485
Total	2,096,282	349,682	17,836,326	2,177,234	1,395,497	1,818,924	1,278,346	23,928,767

* subset of Small category

** subset of Large category

*** subset of Very Large

Percent of Log Volume, By Species Group Within Each Size Class, Southwest Oregon, 2007

Species Group	Small	Small, Slow Grown*	Merch	Large	Large, Outside Crown**	Very Large	Very Large, Outside Crown***	Total
Douglas-fir	88%	82%	81%	66%	71%	58%	65%	78%
White Woods	8%	10%	14%	24%	21%	19%	18%	15%
Pine	1%	2%	2%	5%	4%	8%	9%	3%
Cedar	2%	6%	3%	5%	4%	15%	8%	4%
Total	100%	100%	100%	100%	100%	100%	100%	100%

Percent of Log Volume, By Size Class Within Each Species Group, Southwest Oregon, 2007

Species Group	Small	Small, Slow Grown*	Merch	Large	Large, Outside Crown**	Very Large	Very Large, Outside Crown***	Total
Douglas-fir	10%	2%	77%	8%	5%	6%	4%	100%
White Woods	5%	1%	70%	15%	8%	10%	7%	100%
Pine	4%	1%	58%	16%	9%	22%	17%	100%
Cedar	4%	2%	58%	11%	5%	28%	11%	100%
Total	9%	1%	75%	9%	6%	8%	5%	100%

Subgroup Percentages

Percent of Small Log Volume that is Slow Grown	17%
Percent of Large Log Volume Outside Crown	64%
Percent of Very Large Log Volume Outside Crown	70%

Table 10: All Logs, Volume (Mbf) by Region and Species, 1997

Species Group	Northwest	West Central	Southwest	Western OR
Douglas-fir	15,251,946	14,098,532	14,206,220	43,556,698
White Woods	4,926,781	4,453,243	2,877,152	12,257,176
Pine	24,502	147,057	619,949	791,508
Cedar	1,368,848	361,918	1,036,313	2,767,079
Total	21,572,077	19,060,750	18,739,634	59,372,461

Table 11: All Logs, Volume (Mbf) by Region and Species, 2007 (adjusted for harvest)

Species Group	Northwest	West Central	Southwest	Western OR
Douglas-fir	17,925,527	18,357,851	18,778,120	55,061,498
White Woods	6,392,752	5,095,219	3,490,681	14,978,651
Pine	35,086	177,545	646,481	859,112
Cedar	1,458,045	407,614	1,013,485	2,879,144
Total	25,811,410	24,038,228	23,928,767	73,778,405

Table 12: Small Diameter Logs, Volume (Mbf) by Region and Species, 1997
(<=10" dib large end)

Species Group	Northwest	West Central	Southwest	Western OR
Douglas-fir	1,212,280	1,275,182	1,562,755	4,050,217
White Woods	375,061	245,457	153,403	773,921
Pine	197	13,150	26,940	40,287
Cedar	25,752	15,513	43,216	84,481
Total	1,613,290	1,549,302	1,786,314	4,948,906

Table 13: Small Diameter Logs, Volume (Mbf) by Region and Species, 2007 (adjusted for harvest)
(<=10" dib large end)

Species Group	Northwest	West Central	Southwest	Western OR
Douglas-fir	1,136,493	1,430,802	1,854,936	4,422,231
White Woods	486,995	320,155	176,651	983,801
Pine	0	10,316	24,188	34,505
Cedar	28,277	11,223	40,508	80,007
Total	1,651,765	1,772,496	2,096,282	5,520,543

Table 14: Small Diameter Logs, Slow Grown, Volume (Mbf) by Region and Species, 1997
(<=10" dib large end, originating from small trees with 6+ rings per inch at breast height)

Species Group	Northwest	West Central	Southwest	Western OR
Douglas-fir	328,636	258,188	406,732	993,556
White Woods	84,893	78,320	50,207	213,420
Pine	0	1,192	9,821	11,013
Cedar	6,165	10,117	19,218	35,500
Total	419,694	347,817	485,978	1,253,489

Table 15: Small Diameter Logs, Slow Grown, Volume (Mbf) by Region and Species, 2007 (adjusted for harvest)

(<=10" dib large end, originating from small trees with 6+ rings per inch at breast height)

Species Group	Northwest	West Central	Southwest	Western OR
Douglas-fir	166,165	186,709	287,984	640,857
White Woods	87,833	79,415	34,819	202,067
Pine	0	455	6,545	6,999
Cedar	9,614	3,320	20,336	33,269
Total	263,612	269,898	349,682	883,192

Table 16: "Merch" Diameter Logs, Volume (Mbf) by Region and Species, 1997
(10 to 24" dib large end)

Species Group	Northwest	West Central	Southwest	Western OR
Douglas-fir	11,495,136	10,524,113	10,557,483	32,576,732
White Woods	3,886,956	2,946,973	1,989,604	8,823,533
Pine	11,699	106,218	357,987	475,904
Cedar	707,286	203,933	567,429	1,478,648
Total	16,101,077	13,781,237	13,472,503	43,354,817

Table 17: "Merch" Diameter Logs, Volume (Mbf) by Region and Species, 2007 (adjusted for harvest)
(10 to 24" dib large end)

Species Group	Northwest	West Central	Southwest	Western OR
Douglas-fir	13,241,235	13,679,545	14,427,906	41,348,686
White Woods	5,087,372	3,451,308	2,446,754	10,985,434
Pine	19,547	134,615	377,471	531,632
Cedar	676,881	250,808	584,196	1,511,885
Total	19,025,036	17,516,276	17,836,326	54,377,637

Table 18: Large Diameter Logs, Volume (Mbf) by Region and Species, 1997
(24 to 30" dib large end)

Species Group	Northwest	West Central	Southwest	Western OR
Douglas-fir	1,534,233	1,303,452	1,050,933	3,888,618
White Woods	345,056	461,849	470,311	1,277,216
Pine	6,093	10,518	84,993	101,604
Cedar	284,336	51,837	116,114	452,287
Total	2,169,718	1,827,656	1,722,351	5,719,725

Table 19: Large Diameter Logs, Volume (Mbf) by Region and Species, 2007 (adjusted for harvest)
(24 to 30" dib large end)

Species Group	Northwest	West Central	Southwest	Western OR
Douglas-fir	2,288,683	2,009,867	1,443,137	5,741,687
White Woods	503,588	584,777	522,301	1,610,666
Pine	9,091	8,927	103,667	121,685
Cedar	320,126	59,541	108,129	487,796
Total	3,121,487	2,663,112	2,177,234	7,961,834

Table 20: Large Diameter Logs, Outside Crown, Volume (Mbf) by Region and Species, 1997
(24 to 30" dib large end, no part of log inside living crown)

Species Group	Northwest	West Central	Southwest	Western OR
Douglas-fir	1,138,790	999,669	705,077	2,843,536
White Woods	195,673	223,385	231,023	650,081
Pine	6,093	6,855	60,640	73,588
Cedar	61,260	0	52,714	113,974
Total	1,401,816	1,229,909	1,049,454	3,681,179

Table 21: Large Diameter Logs, Outside Crown, Volume (Mbf) by Region and Species, 2007 (adjusted for harvest)
(24 to 30" dib large end, no part of log inside living crown)

Species Group	Northwest	West Central	Southwest	Western OR
Douglas-fir	1,764,113	1,560,673	995,409	4,320,195
White Woods	292,294	321,916	291,065	905,275
Pine	5,294	7,084	58,112	70,489
Cedar	96,078	20,289	50,912	167,279
Total	2,157,779	1,909,961	1,395,497	5,463,237

Table 22: Very Large Diameter Logs, Volume (Mbf) by Region and Species, 1997
(30" plus dib large end)

Species Group	Northwest	West Central	Southwest	Western OR
Douglas-fir	1,010,297	995,785	1,035,049	3,041,131
White Woods	319,708	798,964	263,834	1,382,506
Pine	6,513	17,171	150,029	173,713
Cedar	351,474	90,635	309,554	751,663
Total	1,687,992	1,902,555	1,758,466	5,349,013

Table 23: Very Large Diameter Logs, Volume (Mbf) by Region and Species, 2007
(adjusted for harvest)
(30" plus dib large end)

Species Group	Northwest	West Central	Southwest	Western OR
Douglas-fir	1,259,117	1,237,637	1,052,141	3,548,894
White Woods	314,796	738,979	344,976	1,398,751
Pine	6,448	23,687	141,155	171,290
Cedar	432,762	86,042	280,652	799,456
Total	2,013,122	2,086,345	1,818,924	5,918,391

Table 24: Very Large Diameter Logs, Outside Crown, Volume (Mbf) By Region and Species, 1997
(30" plus dib large end, no part of log inside living crown)

Species Group	Northwest	West Central	Southwest	Western OR
Douglas-fir	736,663	795,603	869,847	2,402,113
White Woods	131,408	412,675	198,187	742,270
Pine	6,513	17,171	118,180	141,864
Cedar	123,734	57,389	118,935	300,058
Total	998,318	1,282,838	1,305,149	3,586,305

Table 25: Very Large Diameter Logs, Outside Crown, Volume (Mbf) by Region and Species, 2007 (adjusted for harvest)
(30" plus dib large end, no part of log inside living crown)

Species Group	Northwest	West Central	Southwest	Western OR
Douglas-fir	933,139	974,086	831,473	2,738,697
White Woods	127,277	407,684	230,174	765,134
Pine	6,448	20,360	110,204	137,012
Cedar	151,261	44,521	106,496	302,278
Total	1,218,124	1,446,650	1,278,346	3,943,120

References

ⁱ Azuma, David L. 2002. Timber Resource Statistics for Western Oregon. USDA Forest Service. Pacific Northwest Research Station. PNW-RB-237.

ⁱⁱ Adams, Darius M., Schillinger, Randall R., Latta, Greg, and Adrienne Van Nults. 2002. Timber Harvest Projections for Private Lands in Western Oregon. Oregon State University. FRL-RC37.

ⁱⁱⁱ Czuplewski, Raymond L., Brown, Amy S., and Dale G. Guenther. 1989. Estimating Merchantable Tree Volume in Oregon and Washington Using Stem Profile Models. USDA Forest Service. Rocky Mountain Forest and Range Experiment Station. Research Paper RM-286.

^{iv} Oregon Department of Forestry. Annual Timber Harvest Reports. www.odf.state.or.us