



## California\* Forest Biomass Supply Estimate by County<sup>†</sup>

Philip S. Cook and Jay O'Laughlin<sup>‡</sup>

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\* Similar estimates are available for other western states, and a final project report cited often herein provides details on methods and assumptions that were used by U.S. Forest Service and University of Idaho researchers to develop these estimates (see Cook and O'Laughlin 2011, in **References Cited** section on page 6).

<sup>†</sup> Estimates for sustainable supplies of forest biomass (i.e., forest health or fire hazard reduction thinning and logging residues) for public and private lands at roadside prices of \$10 to \$40 per dry ton by \$5 increments, plus unused mill residues. This information was originally prepared in December 2009 by the University of Idaho's College of Natural Resources for the Western Governors' Association in fulfillment of Contract #20108-0840.

<sup>‡</sup> Philip S. Cook is Research Associate, Policy Analysis Group, College of Natural Resources, University of Idaho, Moscow; Jay O'Laughlin is Professor of Forestry and Policy Sciences, and Director, Policy Analysis Group, College of Natural Resources, University of Idaho, Moscow. Dr. O'Laughlin is co-chair of the Woody Biomass Utilization and Energy Production Subcommittee for the Western Governors' Forest Health Advisory Committee. He also chairs the Forestry Task Force for the Idaho Strategic Energy Alliance and is a member of its Carbon Issues Task Force.

Contact authors by phone (208) 885-5776 or e-mail at [pag@uidaho.edu](mailto:pag@uidaho.edu)

## Introduction

County-level forest biomass\* estimates can help states develop wood bioenergy policies and work with local government officials to plan new wood bioenergy facilities. The U.S. Forest Service continues its efforts to improve the forest biomass supply estimates first made available in the “Billion-ton Supply” report (Perlack et al. 2005), and an update is expected in the near future. Meanwhile the forest biomass estimates herein (**Table 1**) fill an information gap and are likely accurate enough for planning purposes. These estimates could be used to supplement U.S. Forest Service CROP (Coordinated Resource Offering Protocol, see USFS 2011) project assessments of near-term supply plans from public lands where such information exists.

**Table 1. Forest biomass supply for western states at roadside prices from \$10 to \$40 per dry ton.**

<i>State</i>	<i>\$10</i>	<i>\$15</i>	<i>\$20</i>	<i>\$25</i>	<i>\$30</i>	<i>\$35</i>	<i>\$40</i>
AZ	75,829	145,672	170,010	222,846	230,036	231,423	231,601
CA	1,904,370	2,733,657	3,155,708	3,425,863	3,538,764	3,569,309	3,602,018
CO	100,120	123,366	197,806	228,948	274,847	300,161	312,104
ID	796,410	853,887	992,527	1,208,995	1,338,801	1,395,282	1,429,463
KS	8,720	8,720	8,720	8,720	8,720	8,720	8,720
MT	646,769	729,152	1,030,913	1,272,212	1,417,237	1,477,018	1,533,464
NE	4,971	4,971	4,971	4,971	4,971	4,971	4,971
NV	4,799	7,791	7,791	7,871	7,871	7,943	7,943
NM	78,314	90,450	143,710	213,109	279,713	292,336	301,716
ND	265	265	265	265	265	265	265
OR	1,339,728	1,466,478	1,541,285	1,585,410	1,611,490	1,618,589	1,648,377
SD	95,407	95,407	97,729	103,466	108,020	108,020	108,020
TX	3,022	3,022	3,022	3,022	3,022	3,022	3,022
UT	37,927	42,887	50,736	77,294	98,360	104,654	116,094
WA	1,152,105	1,274,302	1,360,558	1,467,007	1,517,302	1,550,350	1,606,562
WY	83,644	105,728	126,208	156,919	183,664	196,388	197,171
<b>Total</b>	<b>6,332,399</b>	<b>7,685,757</b>	<b>8,891,960</b>	<b>9,986,918</b>	<b>10,623,082</b>	<b>10,868,450</b>	<b>11,111,511</b>

As illustrated in **Table 1**, west-wide forest biomass supply increases from about 6.3 million dry tons per year at a roadside price of \$10 per dry ton to 11.1 million dry tons at a price of \$40 per ton. Five states contribute most of the available forest biomass: California, Oregon, Washington, Montana, and Idaho. The tables in this report, starting on page 7, provide county-level estimates of forest biomass supply for one of the states in **Table 1**.

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\* Forest biomass is a category of woody biomass that includes three components: [1] forest thinning (removal of small-diameter trees or brush to reduce hazardous fuels and/or improve forest health conditions), [2] forest residues (logging slash), and [3] mill residues.

## **Limitations**

Before using the county-level tables that begin on page 7, one should know what they do not include. These results are based on U.S. Forest Service assumptions and models that in addition to “sustainability screens” excluded lodgepole pine and spruce-fir forest types from fire hazard thinning because stand-replacing fire is considered the norm in these forest types. Furthermore, moist forests west of the Cascade Range in Oregon and Washington received pre-commercial thinning rather than fire hazard reduction thinning. Further explanation is provided in the **Methods** section below, and in our final project report document (Cook and O’Laughlin 2011).

## **Background**

For several years researchers have been developing and refining estimates of forest biomass supply in the western United States. In 2006, the Biomass Task Force for the Western Governors’ Association (WGA) Clean and Diversified Energy project refined a national estimate of biomass supply from the U.S. Departments of Energy and Agriculture “Billion-ton Supply” report (Perlack et al. 2005) to obtain a west-wide estimate (WGA 2006). In 2008, the 2006 west-wide estimate was refined further to provide state-level supply estimates for western states (WGA 2008). These estimates were compiled from county-level estimates that were not published.

## **Objective**

The objective of this project was to further refine the state-level forest biomass supply estimates for western states (WGA 2008) to county-level estimates, similar to published estimates for Idaho (see O’Laughlin 2009), and make county-level data available to interested parties. The county-level estimates of forest biomass supply are in easily-read tabular format and are reported for public and private lands at roadside prices of \$10 to \$40 per dry ton in \$5 increments. This report is one of several made available by the Western Governors’ Association for individual western states.

## **Methods**

Although WGA (2008) estimates of biomass supply were reported at the state level, the model used to derive the estimates was based on county-level data provided from a U.S. Forest Service (USFS) Forest Inventory and Analysis (FIA) project. We obtained the unpublished, county-level data and spreadsheet model from Dr. Ken Skog of the U.S. Forest Service (Skog et al. 2007). Our county-level forest biomass estimates are derived from the same data using the same methods, models, and results from which the state-level estimates reported by the WGA (2008) were developed. We describe those methods briefly in the following paragraphs. Due to numerous complexities and assumptions of the modeling process used to create both the 2008 and 2006 WGA forest biomass supply estimates, the appropriate sections of each of those reports were appended to the final project report so users of this information would know exactly what they had (see Cook and O’Laughlin 2011, Appendices A and B).

The most important of these assumptions is that biomass removal is a byproduct, or secondary output, of other forest management objectives including forest health treatment, fire hazard reduction work, or the treatment of fuels after logging (see Cook and O’Laughlin 2011, Appendix A, p. 9). In the earlier WGA (2006) study, it was assumed that 50% off the removals would be used for higher-valued products and 50% available for use as fuel (see Cook and O’Laughlin 2011, Appendix B, pp. 16-17).

The later WGA (2008) study allocated a higher proportion of removals to higher-valued products (30 million dry tons ÷ 43 million dry tons = 70%; see Cook and O’Laughlin 2011, Appendix A, p. 10). It should be noted that previous estimation efforts by the WGA (2006) established “sustainability screens” that imposed constraints on forest management activities in order to protect soil productivity, wildlife habitat, biodiversity maintenance, and water quality. These screens reduced the “Billion-ton Supply” estimates for western states by about one-third. In addition, lodgepole pine and spruce-fir forest types were excluded from fire hazard thinning because stand-replacing fire is considered to be the norm in such forest types, and moist forests west of the Cascade Range in Oregon and Washington pre-commercially thinned instead of fire hazard reduction treatment (see Cook and O’Laughlin 2011, Appendix A, pp. 10-13).

Skog et al. (2007) used the USFS’s Forest Inventory and Analysis (FIA) and Timber Products Output (TPO) databases to model forest biomass supply for western states.\* In general, forest biomass in the model comes from four sources: [1] thinning of timberland with high fire hazard, [2] logging residue left behind after anticipated logging operations for conventional products, [3] general thinning on private woodlands, and [4] unused mill residue.†

Skog et al. (2007) modeled fire hazard thinnings using two tools developed by U.S. Forest Service researchers. First they used the Fuel Treatment Evaluator 3.0 (Skog and Miles 2006), applying several screens and treatments (see Cook and O’Laughlin 2011, Appendix A). Then they used the Fuel Reduction Cost Simulator (Fight et al. 2006) to estimate forest hazard thinning biomass quantities that would be available at various prices. Fire hazard thinning treatments were not applied to national forest timberlands in counties in western Oregon and Washington; instead a pre-commercial thinning treatment was applied.

We used the same supply assumptions that Skog et al. (2007) used in their Base Case estimates (WGA 2008; see Cook and O’Laughlin 2011, Appendix A). Fire hazard thinning

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\* Western states include: Arizona, California, Colorado, Idaho, Kansas, Montana, Nebraska, Nevada, New Mexico, North Dakota, Oregon, South Dakota, Texas, Utah, Washington, and Wyoming.

† Skog et al. (2007) also included biomass from treatment of pinyon-juniper woodlands. However, it is excluded in our analysis because the price at which it enters the model (\$60 per dry ton) is above our range of analysis (\$10 to \$40 per dry ton).

volumes are harvested over a period of 22 years, while private timberland thinning volumes for various purposes are harvested over a period of 30 years. Stumpage prices for fire hazard thinnings and logging residues are \$0 and \$2 per dry ton on public and private lands, respectively, while the cost of chipping biomass is \$8 per dry ton for both public and private lands. There is no cost (\$0) for unused mill residues.

***Difference in modeling method for logging residue.*** One assumption used in estimating the amount of logging residue in the model is that as thinning to reduce fire hazard increases and general thinning on private land increases (including harvesting biomass for fuels) then the extent of traditional timber harvesting operations will decrease along with associated logging residue. Both the WGA 2008 estimates and our estimates account for this reduction in volume by decreasing logging residue used for fuels by one-quarter unit for each unit increase in biomass for fuels coming from new thinnings (WGA 2008, p. 16). However, the method by which we decrease logging residue is different than the way Skog et al. (2007) did, and our method results in slightly different estimates.

The model used by Skog et al. (2007) model divides biomass from thinnings and logging residue into two land ownership categories: public and private. They computed the reduction in logging residue by subtracting one-quarter unit for each new unit of thinning regardless of land ownership. We compute the reduction for public and private land ownerships separately. Despite the differences in computation, our results aggregated at the state level did not differ by more than 4% from the results attained by Skog et al. (2007).

***Dividing “public” categories into federal and state categories.*** Both fire hazard thinning volumes and logging residue volumes are computed and reported by public and private land categories based on model results by Skog et al. (2007). It was our desire to further divide the public category into federal and state categories. We hypothesize that there are differences in the availability of forest biomass based on land ownership. Federal lands contain a greater proportion of public timberlands and timber volumes in western states than state lands do (Smith et al. 2004). However, federal timberlands tend to be managed under objectives and laws that are more restrictive of biomass removal (e.g., timber harvesting) compared to state trust timberlands that generally are managed for revenue production (Cook and O’Laughlin 2000).

Current forest conditions also may make a difference in biomass availability. Because state trust timberlands tend to be actively managed for revenue production, we hypothesize that there is less need to conduct fire hazard thinning operations on state lands compared to federal lands, which tend to be less actively managed (Koontz 1997). An informal survey of state forest land managers generally confirmed this hypothesis. Both of the above hypotheses led us to attempt to divide the “public” estimates into federal and state categories. Our attempts were unsuccessful for a variety of reasons (see Cook and O’Laughlin 2011, Appendix C); therefore, we report the results herein using only “public” and “private” categories.

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Forest biomass supply at roadside price of **\$10** per dry ton

County	Fire hazard thinning		Private land thinning	Logging residue		Unused mill residues	TOTAL
	Public	Private		Public	Private		
<b>California</b>							
Alameda	0	0	0	7,756	60,517	0	68,273
Alpine	1,781	0	0	0	0	0	1,781
Amador	1,049	124	0	54	1,245	0	2,472
Butte	0	0	31,817	1,649	689	0	34,155
Calaveras	1,367	0	6,313	454	14,446	0	22,581
Colusa	0	0	123	0	0	0	123
Contra Costa	0	0	0	0	0	0	0
Del Norte	0	2,365	13,029	277	16,651	0	32,322
El Dorado	10,531	4,065	6,334	0	23,299	0	44,228
Fresno	4,158	511	2,254	908	1,358	0	9,190
Glenn	1,167	237	0	0	976	0	2,380
Humboldt	0	0	182,712	23,352	388,220	0	594,284
Imperial	0	0	0	0	0	0	0
Inyo	0	0	0	0	0	0	0
Kern	0	1,372	1,963	75	0	0	3,410
Kings	0	0	0	0	0	0	0
Lake	0	0	1,030	5	780	0	1,815
Lassen	2,366	0	327	5,955	36,691	0	45,339
Los Angeles	0	0	0	0	0	0	0
Madera	8,149	530	1,215	0	5,750	0	15,643
Marin	0	0	0	0	0	0	0
Mariposa	0	0	7,794	336	0	0	8,130
Mendocino	1,472	7,891	123,947	15,919	141,647	0	290,876
Merced	0	0	0	0	0	0	0
Modoc	532	57	0	2,836	17,534	0	20,960
Mono	0	0	0	0	0	0	0
Monterey	0	0	0	0	0	0	0
Napa	0	0	13,375	0	0	0	13,375
Nevada	698	418	18,855	2,117	18,005	0	40,093
Orange	0	0	0	0	0	0	0
Placer	11,096	7,229	1,701	0	3,000	0	23,026
Plumas	0	0	15,781	6,363	23,553	0	45,697
Riverside	0	191	414	0	0	0	605
Sacramento	0	0	0	0	0	0	0
San Benito	0	0	0	0	0	0	0
San Bernardino	0	349	0	0	0	0	349
San Diego	0	0	0	0	0	0	0
San Francisco	0	0	0	0	0	0	0
San Joaquin	0	0	0	0	0	8	8
San Luis Obispo	0	0	0	0	0	0	0
San Mateo	0	0	56,854	0	0	0	56,854
Santa Barbara	0	0	0	0	0	0	0

Santa Clara	0	0	0	71	810	0	881
Santa Cruz	0	0	151,237	433	0	0	151,670
Shasta	0	0	11,218	3,749	41,928	30,776	87,671
Sierra	5,110	1,817	0	318	6,254	0	13,499
Siskiyou	17,019	9,436	9,286	2,236	46,402	0	84,379
Solano	0	0	0	0	0	0	0
Sonoma	0	1,170	41,898	670	0	0	43,737
Stanislaus	0	0	0	858	1,258	0	2,116
Sutter	0	0	0	0	0	0	0
Tehama	7,691	11,199	7,822	0	7,077	0	33,789
Trinity	0	0	0	4,679	24,327	0	29,006
Tulare	5,700	0	0	0	4,758	0	10,458
Tuolumne	5,100	0	0	2,392	12,812	33,583	53,887
Ventura	0	0	0	0	0	0	0
Yolo	0	0	0	0	0	0	0
Yuba	6,277	8,311	0	0	0	720	15,308
TOTAL	91,261	57,273	707,299	83,463	899,987	65,087	1,904,370

Forest biomass supply at roadside price of **\$15** per dry ton

County	Fire hazard thinning			Logging residue		Unused mill residues	TOTAL
	Public	Private	Private land thinning	Public	Private		
<b>California</b>							
Alameda	0	0	0	7,756	60,517	0	68,273
Alpine	1,781	1,406	0	0	0	0	3,187
Amador	1,049	124	9,535	54	0	0	10,762
Butte	12,634	0	56,733	0	0	0	69,367
Calaveras	6,287	3,517	6,313	0	13,567	0	29,684
Colusa	0	0	123	0	0	0	123
Contra Costa	0	0	0	0	0	0	0
Del Norte	7,464	2,365	13,029	0	16,651	0	39,509
El Dorado	44,609	4,132	11,281	0	22,045	0	82,067
Fresno	6,979	511	2,254	203	1,358	0	11,305
Glenn	2,776	237	0	0	976	0	3,989
Humboldt	21,524	54,002	410,266	17,971	317,831	0	821,595
Imperial	0	0	0	0	0	0	0
Inyo	0	0	0	0	0	0	0
Kern	1,111	1,372	1,963	0	0	0	4,446
Kings	0	0	0	0	0	0	0
Lake	2,318	0	1,963	0	547	0	4,828
Lassen	5,936	0	327	5,062	36,691	0	48,016
Los Angeles	1,182	0	0	0	0	0	1,182
Madera	12,649	530	1,215	0	5,750	0	20,143
Marin	0	0	0	0	0	0	0
Mariposa	7,703	0	7,794	0	0	0	15,497
Mendocino	4,882	7,891	246,020	15,066	111,129	0	384,989
Merced	0	0	0	0	0	0	0
Modoc	1,754	57	1,000	2,531	17,284	0	22,626
Mono	3,216	4,771	0	0	0	0	7,988
Monterey	0	0	0	0	0	0	0
Napa	0	0	15,864	0	0	0	15,864
Nevada	10,726	14,536	36,007	0	10,188	0	71,456
Orange	0	0	0	0	0	0	0
Placer	29,576	7,475	1,701	0	2,938	0	41,691
Plumas	18,164	12,205	15,781	1,822	20,502	0	68,474
Riverside	0	191	414	0	0	0	605
Sacramento	0	0	0	0	0	0	0
San Benito	0	0	0	0	0	0	0
San Bernardino	2,622	383	0	0	0	0	3,005
San Diego	0	0	0	0	0	0	0
San Francisco	0	0	0	0	0	0	0
San Joaquin	0	0	0	0	0	8	8
San Luis Obispo	0	0	0	0	0	0	0
San Mateo	0	0	56,854	0	0	0	56,854
Santa Barbara	0	0	0	0	0	0	0

Santa Clara	0	0	0	71	810	0	881
Santa Cruz	0	0	151,237	433	0	0	151,670
Shasta	8,709	0	11,218	1,572	41,928	30,776	94,203
Sierra	48,444	26,005	0	0	206	0	74,655
Siskiyou	87,266	9,436	9,286	0	46,402	0	152,390
Solano	0	0	0	0	0	0	0
Sonoma	0	6,062	44,875	670	0	0	51,606
Stanislaus	0	0	0	858	1,258	0	2,116
Sutter	0	0	0	0	0	0	0
Tehama	29,465	11,199	7,822	0	7,077	0	55,563
Trinity	86,320	9,271	0	0	22,010	0	117,601
Tulare	9,738	0	0	0	4,758	0	14,497
Tuolumne	37,967	15,031	0	0	9,055	33,583	95,635
Ventura	0	0	0	0	0	0	0
Yolo	0	0	0	0	0	0	0
Yuba	6,277	8,311	0	0	0	720	15,308
TOTAL	521,129	201,023	1,120,873	54,069	771,478	65,087	2,733,657

Forest biomass supply at roadside price of **\$20** per dry ton

County	Fire hazard thinning			Logging residue		Unused mill residues	TOTAL
	Public	Private	Private land thinning	Public	Private		
<b>California</b>							
Alameda	0	0	0	7,756	60,517	0	68,273
Alpine	1,781	1,406	0	0	0	0	3,187
Amador	1,891	124	9,535	0	0	0	11,550
Butte	12,634	16,514	56,733	0	0	0	85,881
Calaveras	6,287	15,509	6,313	0	10,569	0	38,677
Colusa	7,334	0	123	0	0	0	7,457
Contra Costa	0	0	0	0	0	0	0
Del Norte	7,464	6,522	18,943	0	14,134	0	47,063
El Dorado	44,609	19,959	11,281	0	18,089	0	93,937
Fresno	6,979	618	2,254	203	1,331	0	11,385
Glenn	3,142	237	0	0	976	0	4,355
Humboldt	21,524	62,712	412,617	17,971	315,066	0	829,890
Imperial	0	0	0	0	0	0	0
Inyo	0	0	0	0	0	0	0
Kern	1,111	1,372	1,963	0	0	0	4,446
Kings	0	0	0	0	0	0	0
Lake	5,671	0	1,963	0	547	0	8,181
Lassen	23,275	6,012	327	727	35,188	0	65,529
Los Angeles	1,182	0	0	0	0	0	1,182
Madera	12,649	530	1,215	0	5,750	0	20,143
Marin	0	0	12,362	0	0	0	12,362
Mariposa	7,703	0	7,794	0	0	0	15,497
Mendocino	4,882	37,209	293,163	15,066	92,014	0	442,333
Merced	0	0	0	0	0	0	0
Modoc	10,121	57	1,000	439	17,284	0	28,901
Mono	3,216	4,771	0	0	0	0	7,988
Monterey	0	0	0	0	0	0	0
Napa	0	0	15,864	0	0	0	15,864
Nevada	17,116	14,536	36,007	0	10,188	0	77,846
Orange	0	0	0	0	0	0	0
Placer	29,576	24,708	1,701	0	0	0	55,985
Plumas	121,448	63,293	36,307	0	2,598	0	223,647
Riverside	0	191	414	0	0	0	605
Sacramento	0	0	0	0	0	0	0
San Benito	0	0	0	0	0	0	0
San Bernardino	4,763	383	0	0	0	0	5,146
San Diego	0	0	0	0	0	0	0
San Francisco	0	0	0	0	0	0	0
San Joaquin	0	0	0	0	0	8	8
San Luis Obispo	0	0	0	0	0	0	0
San Mateo	0	0	56,854	0	0	0	56,854

Santa Barbara	0	0	0	0	0	0	0
Santa Clara	0	0	0	71	810	0	881
Santa Cruz	0	0	151,237	433	0	0	151,670
Shasta	36,610	18,609	22,717	0	34,401	30,776	143,113
Sierra	55,041	29,044	0	0	0	0	84,085
Siskiyou	87,448	9,436	9,286	0	46,402	0	152,572
Solano	0	0	0	0	0	0	0
Sonoma	0	6,062	44,875	670	0	0	51,606
Stanislaus	0	0	0	858	1,258	0	2,116
Sutter	0	0	0	0	0	0	0
Tehama	29,465	33,005	7,822	0	1,626	0	71,917
Trinity	89,370	9,271	0	0	22,010	0	120,650
Tulare	10,032	0	0	0	4,758	0	14,790
Tuolumne	37,967	17,860	0	0	8,347	33,583	97,758
Ventura	0	0	0	0	0	0	0
Yolo	0	0	0	0	0	0	0
Yuba	11,347	8,311	0	0	0	720	20,379
TOTAL	713,638	408,261	1,220,667	44,194	703,861	65,087	3,155,708

Forest biomass supply at roadside price of **\$25** per dry ton

County	Fire hazard thinning			Logging residue		Unused mill residues	TOTAL
	Public	Private	Private land thinning	Public	Private		
<b>California</b>							
Alameda	0	0	0	7,756	60,517	0	68,273
Alpine	1,781	1,406	0	0	0	0	3,187
Amador	1,891	3,524	9,535	0	0	0	14,950
Butte	12,634	16,514	56,733	0	0	0	85,881
Calaveras	6,287	15,509	6,313	0	10,569	0	38,677
Colusa	7,334	0	123	0	0	0	7,457
Contra Costa	0	0	0	0	0	0	0
Del Norte	7,464	6,522	33,193	0	10,571	0	57,750
El Dorado	48,005	19,959	11,281	0	18,089	0	97,333
Fresno	6,979	618	2,254	203	1,331	0	11,385
Glenn	3,142	3,242	0	0	225	0	6,609
Humboldt	21,524	62,712	412,617	17,971	315,066	0	829,890
Imperial	0	0	0	0	0	0	0
Inyo	0	0	0	0	0	0	0
Kern	1,440	1,372	1,963	0	0	0	4,775
Kings	0	0	0	0	0	0	0
Lake	5,671	0	1,963	0	547	0	8,181
Lassen	23,392	52,774	327	698	23,498	0	100,688
Los Angeles	1,182	0	0	0	0	0	1,182
Madera	12,649	530	1,215	0	5,750	0	20,143
Marin	0	0	12,362	0	0	0	12,362
Mariposa	7,703	0	7,794	0	0	0	15,497
Mendocino	7,776	37,497	302,968	14,343	89,490	0	452,074
Merced	0	0	0	0	0	0	0
Modoc	10,121	1,932	1,000	439	16,815	0	30,307
Mono	3,216	4,771	0	0	0	0	7,988
Monterey	0	0	0	0	0	0	0
Napa	0	0	20,206	0	0	0	20,206
Nevada	17,116	22,543	36,007	0	8,186	0	83,851
Orange	0	0	0	0	0	0	0
Placer	29,824	24,708	1,701	0	0	0	56,233
Plumas	121,448	73,512	37,421	0	0	0	232,381
Riverside	0	191	414	0	0	0	605
Sacramento	0	0	0	0	0	0	0
San Benito	0	0	0	0	0	0	0
San Bernardino	4,763	383	0	0	0	0	5,146
San Diego	0	0	0	0	0	0	0
San Francisco	0	0	0	0	0	0	0
San Joaquin	0	0	0	0	0	8	8
San Luis Obispo	0	0	0	0	0	0	0
San Mateo	0	0	56,854	0	0	0	56,854

Santa Barbara	0	0	0	0	0	0	0
Santa Clara	0	0	0	71	810	0	881
Santa Cruz	0	0	151,237	433	0	0	151,670
Shasta	49,106	75,200	22,717	0	20,253	30,776	198,053
Sierra	55,041	29,044	0	0	0	0	84,085
Siskiyou	87,448	77,973	10,611	0	28,937	0	204,968
Solano	0	0	0	0	0	0	0
Sonoma	0	8,476	77,423	670	0	0	86,568
Stanislaus	0	0	0	858	1,258	0	2,116
Sutter	0	0	0	0	0	0	0
Tehama	34,850	39,519	7,822	0	0	0	82,191
Trinity	89,370	48,155	0	0	12,289	0	149,814
Tulare	10,032	0	0	0	4,758	0	14,790
Tuolumne	37,967	17,860	0	0	8,347	33,583	97,758
Ventura	0	0	0	0	0	0	0
Yolo	0	0	0	0	0	0	0
Yuba	11,347	11,028	0	0	0	720	23,095
TOTAL	738,503	657,475	1,284,052	43,441	637,305	65,087	3,425,863

Forest biomass supply at roadside price of **\$30** per dry ton

County	Fire hazard thinning			Logging residue		Unused mill residues	TOTAL
	Public	Private	Private land thinning	Public	Private		
<b>California</b>							
Alameda	0	0	0	7,756	60,517	0	68,273
Alpine	1,781	1,406	0	0	0	0	3,187
Amador	1,891	3,524	9,535	0	0	0	14,950
Butte	12,634	16,514	56,733	0	0	0	85,881
Calaveras	6,287	16,117	6,313	0	10,417	0	39,133
Colusa	7,334	0	123	0	0	0	7,457
Contra Costa	0	0	0	0	0	0	0
Del Norte	7,464	6,522	33,193	0	10,571	0	57,750
El Dorado	48,255	21,592	11,281	0	17,680	0	98,809
Fresno	7,025	618	2,254	191	1,331	0	11,421
Glenn	3,165	3,242	0	0	225	0	6,631
Humboldt	21,524	62,712	435,325	17,971	309,389	0	846,922
Imperial	0	0	0	0	0	0	0
Inyo	0	0	0	0	0	0	0
Kern	1,440	1,372	1,963	0	0	0	4,775
Kings	0	0	0	0	0	0	0
Lake	5,671	0	1,963	0	547	0	8,181
Lassen	23,392	52,774	327	698	23,498	0	100,688
Los Angeles	1,182	0	0	0	0	0	1,182
Madera	12,649	530	1,215	0	5,750	0	20,143
Marin	0	0	12,362	0	0	0	12,362
Mariposa	7,703	0	7,794	0	0	0	15,497
Mendocino	7,776	56,946	302,968	14,343	84,628	0	466,660
Merced	0	0	0	0	0	0	0
Modoc	10,121	28,311	1,000	439	10,221	0	50,091
Mono	3,216	4,771	0	0	0	0	7,988
Monterey	0	0	0	0	0	0	0
Napa	0	0	20,206	0	0	0	20,206
Nevada	17,116	22,543	36,007	0	8,186	0	83,851
Orange	0	0	0	0	0	0	0
Placer	29,824	24,708	1,701	0	0	0	56,233
Plumas	128,628	73,512	37,421	0	0	0	239,562
Riverside	0	191	414	0	0	0	605
Sacramento	0	0	0	0	0	0	0
San Benito	0	0	0	0	0	0	0
San Bernardino	4,763	383	0	0	0	0	5,146
San Diego	0	0	0	0	0	0	0
San Francisco	0	0	0	0	0	0	0
San Joaquin	0	0	0	0	0	8	8
San Luis Obispo	0	0	0	0	0	0	0
San Mateo	0	0	56,854	0	0	0	56,854

Santa Barbara	0	0	0	0	0	0	0
Santa Clara	0	0	0	71	810	0	881
Santa Cruz	0	0	151,237	433	0	0	151,670
Shasta	56,294	99,841	27,454	0	12,908	30,776	227,273
Sierra	55,041	29,044	0	0	0	0	84,085
Siskiyou	106,824	78,157	10,611	0	28,891	0	224,483
Solano	0	0	0	0	0	0	0
Sonoma	0	8,476	77,423	670	0	0	86,568
Stanislaus	0	0	0	858	1,258	0	2,116
Sutter	0	0	0	0	0	0	0
Tehama	34,850	41,534	7,822	0	0	0	84,206
Trinity	89,370	50,261	0	0	11,762	0	151,393
Tulare	10,032	0	0	0	4,758	0	14,790
Tuolumne	37,967	17,860	0	0	8,347	33,583	97,758
Ventura	0	0	0	0	0	0	0
Yolo	0	0	0	0	0	0	0
Yuba	11,347	11,028	0	0	0	720	23,095
TOTAL	772,567	734,489	1,311,498	43,430	611,694	65,087	3,538,764

Forest biomass supply at roadside price of **\$35** per dry ton

County	Fire hazard thinning			Logging residue		Unused mill residues	TOTAL
	Public	Private	Private land thinning	Public	Private		
<b>California</b>							
Alameda	0	0	0	7,756	60,517	0	68,273
Alpine	1,781	1,406	0	0	0	0	3,187
Amador	1,891	3,524	9,535	0	0	0	14,950
Butte	12,634	16,514	56,733	0	0	0	85,881
Calaveras	6,287	16,117	6,313	0	10,417	0	39,133
Colusa	7,334	0	123	0	0	0	7,457
Contra Costa	0	0	0	0	0	0	0
Del Norte	7,464	6,996	33,193	0	10,453	0	58,106
El Dorado	48,255	21,592	11,281	0	17,680	0	98,809
Fresno	7,025	1,033	2,254	191	1,228	0	11,732
Glenn	3,165	3,242	0	0	225	0	6,631
Humboldt	21,524	62,712	435,325	17,971	309,389	0	846,922
Imperial	0	0	0	0	0	0	0
Inyo	0	0	0	0	0	0	0
Kern	1,440	1,372	1,963	0	0	0	4,775
Kings	0	0	0	0	0	0	0
Lake	5,671	0	1,963	0	547	0	8,181
Lassen	23,392	52,774	327	698	23,498	0	100,688
Los Angeles	1,182	0	0	0	0	0	1,182
Madera	12,649	530	1,215	0	5,750	0	20,143
Marin	0	0	12,362	0	0	0	12,362
Mariposa	7,703	0	7,794	0	0	0	15,497
Mendocino	7,776	56,946	302,968	14,343	84,628	0	466,660
Merced	0	0	0	0	0	0	0
Modoc	10,121	28,311	1,000	439	10,221	0	50,091
Mono	3,216	4,771	0	0	0	0	7,988
Monterey	0	0	0	0	0	0	0
Napa	0	0	20,206	0	0	0	20,206
Nevada	17,116	22,543	36,007	0	8,186	0	83,851
Orange	0	0	0	0	0	0	0
Placer	29,824	24,708	1,701	0	0	0	56,233
Plumas	128,899	73,512	37,421	0	0	0	239,832
Riverside	0	191	414	0	0	0	605
Sacramento	0	0	0	0	0	0	0
San Benito	0	0	0	0	0	0	0
San Bernardino	4,763	383	0	0	0	0	5,146
San Diego	0	0	0	0	0	0	0
San Francisco	0	0	0	0	0	0	0
San Joaquin	0	0	0	0	0	8	8
San Luis Obispo	0	0	0	0	0	0	0
San Mateo	0	0	56,854	0	0	0	56,854

Santa Barbara	0	0	0	0	0	0	0
Santa Clara	0	0	0	71	810	0	881
Santa Cruz	0	0	151,237	433	0	0	151,670
Shasta	56,394	99,841	27,454	0	12,908	30,776	227,373
Sierra	55,272	31,091	0	0	0	0	86,363
Siskiyou	110,170	103,212	10,611	0	22,627	0	246,619
Solano	0	0	0	0	0	0	0
Sonoma	0	8,476	77,423	670	0	0	86,568
Stanislaus	0	0	0	858	1,258	0	2,116
Sutter	0	0	0	0	0	0	0
Tehama	34,850	41,534	7,822	0	0	0	84,206
Trinity	94,464	50,261	0	0	11,762	0	156,487
Tulare	10,032	0	0	0	4,758	0	14,790
Tuolumne	37,967	17,860	0	0	8,347	33,583	97,758
Ventura	0	0	0	0	0	0	0
Yolo	0	0	0	0	0	0	0
Yuba	11,347	11,028	0	0	0	720	23,095
TOTAL	781,607	762,480	1,311,498	43,430	605,208	65,087	3,569,309

Forest biomass supply at roadside price of **\$40** per dry ton

County	Fire hazard thinning			Logging residue		Unused mill residues	TOTAL
	Public	Private	Private land thinning	Public	Private		
<b>California</b>							
Alameda	0	0	0	7,756	60,517	0	68,273
Alpine	1,781	1,406	0	0	0	0	3,187
Amador	2,020	3,524	9,535	0	0	0	15,079
Butte	12,634	16,514	56,733	0	0	0	85,881
Calaveras	6,287	16,117	6,313	0	10,417	0	39,133
Colusa	7,334	0	123	0	0	0	7,457
Contra Costa	0	0	0	0	0	0	0
Del Norte	8,365	11,151	33,193	0	9,414	0	62,123
El Dorado	48,255	21,592	11,281	0	17,680	0	98,809
Fresno	7,025	1,033	2,254	191	1,228	0	11,732
Glenn	3,165	3,242	0	0	225	0	6,631
Humboldt	21,524	62,712	435,325	17,971	309,389	0	846,922
Imperial	0	0	0	0	0	0	0
Inyo	0	0	0	0	0	0	0
Kern	1,440	1,372	1,963	0	0	0	4,775
Kings	0	0	0	0	0	0	0
Lake	5,671	0	1,963	0	547	0	8,181
Lassen	23,392	52,774	327	698	23,498	0	100,688
Los Angeles	1,182	0	0	0	0	0	1,182
Madera	12,649	530	1,215	0	5,750	0	20,143
Marin	0	0	12,362	0	0	0	12,362
Mariposa	7,703	0	7,794	0	0	0	15,497
Mendocino	7,776	56,946	306,216	14,343	83,816	0	469,096
Merced	0	0	0	0	0	0	0
Modoc	10,121	28,838	1,000	439	10,089	0	50,487
Mono	3,216	4,771	0	0	0	0	7,988
Monterey	0	0	0	0	0	0	0
Napa	0	0	20,206	0	0	0	20,206
Nevada	17,116	24,130	36,007	0	7,789	0	85,042
Orange	0	0	0	0	0	0	0
Placer	29,824	24,708	1,701	0	0	0	56,233
Plumas	128,899	76,754	37,421	0	0	0	243,074
Riverside	0	191	414	0	0	0	605
Sacramento	0	0	0	0	0	0	0
San Benito	0	0	0	0	0	0	0
San Bernardino	4,763	383	0	0	0	0	5,146
San Diego	0	0	0	0	0	0	0
San Francisco	0	0	0	0	0	0	0
San Joaquin	0	0	0	0	0	8	8
San Luis Obispo	0	0	0	0	0	0	0
San Mateo	0	0	56,854	0	0	0	56,854

Santa Barbara	0	0	0	0	0	0	0
Santa Clara	0	0	0	71	810	0	881
Santa Cruz	0	0	151,237	433	0	0	151,670
Shasta	61,789	111,858	27,454	0	9,904	30,776	241,781
Sierra	58,789	31,091	0	0	0	0	89,880
Siskiyou	110,170	103,212	10,611	0	22,627	0	246,619
Solano	0	0	0	0	0	0	0
Sonoma	0	8,476	77,423	670	0	0	86,568
Stanislaus	0	0	0	858	1,258	0	2,116
Sutter	0	0	0	0	0	0	0
Tehama	37,121	42,165	7,822	0	0	0	87,107
Trinity	94,935	50,261	0	0	11,762	0	156,958
Tulare	10,032	0	0	0	4,758	0	14,790
Tuolumne	37,967	17,860	0	0	8,347	33,583	97,758
Ventura	0	0	0	0	0	0	0
Yolo	0	0	0	0	0	0	0
Yuba	11,347	11,028	0	0	0	720	23,095
TOTAL	794,292	784,640	1,314,746	43,430	599,824	65,087	3,602,018