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Colorado* Forest Biomass Supply Estimate by County†

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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).

† 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.

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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.

State	*$10*	*$15*	*$20*	*$25*	*$30*	*$35*	*$40*
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
Total	6,332,399	7,685,757	8,891,960	9,986,918	10,623,082	10,868,450	11,111,511

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**.

* 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

	Fire hazard thinning			Logging residue			
County	Public	Private	Private land thinning	Public	Private	Unused mill residues	TOTAL
Colorado							
Adams	0	0	0	0	0	0	0
Alamosa	0	0	0	0	1,521	0	1,521
Arapahoe	0	0	0	0	0	10	10
Archuleta	6,939	1,792	0	0	0	67	8,798
Baca	0	0	0	0	0	0	0
Bent	0	0	0	0	0	0	0
Boulder	0	0	0	0	101	4	105
Chaffee	0	0	0	0	0	0	0
Cheyenne	0	0	0	0	0	0	0
Clear Creek	0	0	0	0	2,688	0	2,688
Conejos	3,277	0	0	0	0	0	3,277
Costilla	0	0	0	0	0	0	0
Crowley	0	0	0	0	0	0	0
Custer	0	0	0	0	673	0	673
Delta	0	0	0	739	194	71	1,004
Denver	0	0	0	0	0	0	0
Dolores	0	0	0	1,166	0	0	1,166
Douglas	0	0	0	0	0	0	0
Eagle	0	0	0	1,057	0	0	1,057
Elbert	0	546	4,154	0	0	0	4,700
El Paso	0	0	2,318	0	452	0	2,769
Fremont	0	0	0	181	1,352	1	1,533
Garfield	0	0	0	541	2,467	226	3,234
Gilpin	0	0	0	0	0	0	0
Grand	567	0	0	68	1,025	35	1,695
Gunnison	0	0	0	1,332	642	12	1,986
Hinsdale	1,139	0	0	223	0	0	1,362
Huerfano	501	396	0	0	1,979	0	2,876
Jackson	0	0	0	917	1,470	0	2,386
Jefferson	333	0	615	0	1,778	12	2,737
Kiowa	0	0	0	0	0	0	0
Kit Carson	0	0	0	0	0	0	0
Lake	0	0	0	0	0	0	0
La Plata	2,711	35	7,819	0	0	92	10,657
Larimer	0	0	0	124	1,456	24	1,605
Las Animas	0	0	0	0	3,904	1,303	5,207
Lincoln	0	0	0	0	0	0	0
Logan	0	0	0	0	0	0	0
Mesa	0	0	0	688	4,082	22	4,792
Mineral	0	0	0	911	1,235	0	2,146
Moffat	0	0	0	47	0	12	59
Montezuma	0	0	0	2,522	1,025	236	3,783

Montrose	65	0	0	528	2,559	77	3,228
Morgan	0	0	0	0	0	0	0
Otero	0	0	0	0	0	0	0
Ouray	0	0	0	0	5,152	0	5,152
Park	160	62	0	0	741	5	968
Phillips	0	0	0	0	0	0	0
Pitkin	0	0	0	40	618	0	657
Prowers	0	0	0	0	0	0	0
Pueblo	0	0	0	0	1,235	0	1,235
Rio Blanco	0	0	0	361	10	0	371
Rio Grande	377	0	0	621	0	12	1,010
Routt	1,739	0	0	894	117	48	2,799
Saguache	251	0	0	576	2,794	0	3,621
San Juan	1,715	0	0	0	0	0	1,715
San Miguel	228	2,955	0	1,005	0	0	4,188
Sedgwick	0	0	0	0	0	0	0
Summit	0	0	0	46	252	20	317
Teller	0	0	0	540	479	13	1,032
Washington	0	0	0	0	0	0	0
Weld	0	0	0	0	0	0	0
Yuma	0	0	0	0	0	0	0
TOTAL	20,003	5,786	14,905	15,127	41,998	2,302	100,120

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

	Fire hazard thinning			Logging residue			
County	Public	Private	Private land thinning	Public	Private	Unused mill residues	TOTAL
Colorado							
Adams	0	0	0	0	0	0	0
Alamosa	0	0	0	0	1,521	0	1,521
Arapahoe	0	0	0	0	0	10	10
Archuleta	12,286	2,411	0	0	0	67	14,763
Baca	0	0	0	0	0	0	0
Bent	0	0	0	0	0	0	0
Boulder	0	0	0	0	101	4	105
Chaffee	0	0	0	0	0	0	0
Cheyenne	0	0	0	0	0	0	0
Clear Creek	0	0	0	0	2,688	0	2,688
Conejos	3,277	0	0	0	0	0	3,277
Costilla	0	0	829	0	0	0	829
Crowley	0	0	0	0	0	0	0
Custer	0	0	0	0	673	0	673
Delta	0	0	0	739	194	71	1,004
Denver	0	0	0	0	0	0	0
Dolores	0	0	0	1,166	0	0	1,166
Douglas	3,657	0	1,566	0	0	0	5,224
Eagle	0	0	0	1,057	0	0	1,057
Elbert	0	546	4,154	0	0	0	4,700
El Paso	319	0	2,318	0	452	0	3,088
Fremont	0	0	0	181	1,352	1	1,533
Garfield	0	0	0	541	2,467	226	3,234
Gilpin	0	0	0	0	0	0	0
Grand	567	0	0	68	1,025	35	1,695
Gunnison	0	1,054	0	1,332	378	12	2,776
Hinsdale	1,139	0	0	223	0	0	1,362
Huerfano	501	396	0	0	1,979	0	2,876
Jackson	1,664	0	0	501	1,470	0	3,635
Jefferson	878	0	615	0	1,778	12	3,283
Kiowa	0	0	0	0	0	0	0
Kit Carson	0	0	0	0	0	0	0
Lake	0	0	0	0	0	0	0
La Plata	2,711	35	7,819	0	0	92	10,657
Larimer	660	0	0	0	1,456	24	2,141
Las Animas	0	0	0	0	3,904	1,303	5,207
Lincoln	0	0	0	0	0	0	0
Logan	0	0	0	0	0	0	0
Mesa	0	0	0	688	4,082	22	4,792
Mineral	0	0	0	911	1,235	0	2,146
Moffat	0	0	0	47	0	12	59
Montezuma	1,373	0	0	2,179	1,025	236	4,813

Montrose	2,406	0	0	0	2,559	77	5,042
Morgan	0	0	0	0	0	0	0
Otero	0	0	0	0	0	0	0
Ouray	0	0	0	0	5,152	0	5,152
Park	883	62	0	0	741	5	1,691
Phillips	0	0	0	0	0	0	0
Pitkin	0	0	0	40	618	0	657
Prowers	0	0	0	0	0	0	0
Pueblo	0	0	0	0	1,235	0	1,235
Rio Blanco	0	0	0	361	10	0	371
Rio Grande	377	0	0	621	0	12	1,010
Routt	3,261	0	795	514	0	48	4,617
Saguache	251	0	0	576	2,794	0	3,621
San Juan	1,715	0	0	0	0	0	1,715
San Miguel	228	2,955	0	1,005	0	0	4,188
Sedgwick	0	0	0	0	0	0	0
Summit	0	0	0	46	252	20	317
Teller	2,943	0	0	0	479	13	3,435
Washington	0	0	0	0	0	0	0
Weld	0	0	0	0	0	0	0
Yuma	0	0	0	0	0	0	0
TOTAL	41,097	7,459	18,096	12,795	41,617	2,302	123,366

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

	Fire hazard thinning			Logging residue			
County	Public	Private	Private land thinning	Public	Private	Unused mill residues	TOTAL
Colorado							
Adams	0	0	0	0	0	0	0
Alamosa	0	0	0	0	1,521	0	1,521
Arapahoe	0	0	0	0	0	10	10
Archuleta	12,286	2,411	0	0	0	67	14,763
Baca	0	0	0	0	0	0	0
Bent	0	0	0	0	0	0	0
Boulder	0	0	0	0	101	4	105
Chaffee	50	151	0	0	0	0	201
Cheyenne	0	0	0	0	0	0	0
Clear Creek	347	582	0	0	2,542	0	3,471
Conejos	5,248	0	0	0	0	0	5,248
Costilla	0	2,670	829	0	0	0	3,499
Crowley	0	0	0	0	0	0	0
Custer	6,976	0	0	0	673	0	7,649
Delta	0	0	0	739	194	71	1,004
Denver	0	0	0	0	0	0	0
Dolores	0	0	0	1,166	0	0	1,166
Douglas	3,657	0	1,566	0	0	0	5,224
Eagle	2,103	0	0	531	0	0	2,635
Elbert	0	546	4,154	0	0	0	4,700
El Paso	2,825	1,234	2,318	0	143	0	6,520
Fremont	3,125	0	0	0	1,352	1	4,478
Garfield	1,513	0	0	163	2,467	226	4,369
Gilpin	0	0	0	0	0	0	0
Grand	567	0	0	68	1,025	35	1,695
Gunnison	0	3,264	0	1,332	0	12	4,608
Hinsdale	1,139	0	0	223	0	0	1,362
Huerfano	7,128	1,581	0	0	1,682	0	10,392
Jackson	1,664	0	0	501	1,470	0	3,635
Jefferson	878	0	615	0	1,778	12	3,283
Kiowa	0	0	0	0	0	0	0
Kit Carson	0	0	0	0	0	0	0
Lake	0	0	0	0	0	0	0
La Plata	4,725	1,464	7,819	0	0	92	14,100
Larimer	660	2,084	0	0	935	24	3,704
Las Animas	0	0	0	0	3,904	1,303	5,207
Lincoln	0	0	0	0	0	0	0
Logan	0	0	0	0	0	0	0
Mesa	2,223	0	0	132	4,082	22	6,460
Mineral	5,484	0	0	0	1,235	0	6,719
Moffat	15	0	0	43	0	12	70
Montezuma	1,373	0	5,523	2,179	0	236	9,311

Montrose	2,406	0	0	0	2,559	77	5,042
Morgan	0	0	0	0	0	0	0
Otero	0	0	0	0	0	0	0
Ouray	1,097	0	0	0	5,152	0	6,249
Park	4,473	1,160	0	0	466	5	6,105
Phillips	0	0	0	0	0	0	0
Pitkin	1,910	0	0	0	618	0	2,527
Prowers	0	0	0	0	0	0	0
Pueblo	2,448	0	0	0	1,235	0	3,683
Rio Blanco	0	1,150	0	361	0	0	1,511
Rio Grande	5,356	0	0	0	0	12	5,368
Routt	3,261	0	795	514	0	48	4,617
Saguache	10,606	0	0	0	2,794	0	13,400
San Juan	1,715	0	0	0	0	0	1,715
San Miguel	228	2,955	0	1,005	0	0	4,188
Sedgwick	0	0	0	0	0	0	0
Summit	1,202	0	0	0	252	20	1,473
Teller	2,943	1,845	0	0	18	13	4,818
Washington	0	0	0	0	0	0	0
Weld	0	0	0	0	0	0	0
Yuma	0	0	0	0	0	0	0
TOTAL	101,632	23,098	23,619	8,957	38,197	2,302	197,806

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

	Fire hazard thinning			Logging residue			
County	Public	Private	Private land thinning	Public	Private	Unused mill residues	TOTAL
Colorado							
Adams	0	0	0	0	0	0	0
Alamosa	0	0	0	0	1,521	0	1,521
Arapahoe	0	0	0	0	0	10	10
Archuleta	12,286	2,411	0	0	0	67	14,763
Baca	0	0	0	0	0	0	0
Bent	0	0	0	0	0	0	0
Boulder	0	0	0	0	101	4	105
Chaffee	50	151	0	0	0	0	201
Cheyenne	0	0	0	0	0	0	0
Clear Creek	347	582	0	0	2,542	0	3,471
Conejos	5,248	0	0	0	0	0	5,248
Costilla	0	2,670	829	0	0	0	3,499
Crowley	0	0	0	0	0	0	0
Custer	6,976	0	0	0	673	0	7,649
Delta	2,020	0	0	234	194	71	2,519
Denver	0	0	0	0	0	0	0
Dolores	0	0	0	1,166	0	0	1,166
Douglas	3,657	0	1,566	0	0	0	5,224
Eagle	2,103	0	0	531	0	0	2,635
Elbert	0	546	4,154	0	0	0	4,700
El Paso	4,685	1,234	2,318	0	143	0	8,380
Fremont	7,172	1,835	0	0	893	1	9,900
Garfield	1,513	307	0	163	2,390	226	4,599
Gilpin	0	0	0	0	0	0	0
Grand	567	0	1,685	68	603	35	2,958
Gunnison	5,419	3,587	2,876	0	0	12	11,894
Hinsdale	1,139	0	0	223	0	0	1,362
Huerfano	8,893	4,859	0	0	863	0	14,615
Jackson	1,664	0	0	501	1,470	0	3,635
Jefferson	878	0	615	0	1,778	12	3,283
Kiowa	0	0	0	0	0	0	0
Kit Carson	0	0	0	0	0	0	0
Lake	0	0	0	0	0	0	0
La Plata	4,725	2,513	7,819	0	0	92	15,148
Larimer	1,606	2,084	0	0	935	24	4,650
Las Animas	0	0	0	0	3,904	1,303	5,207
Lincoln	0	0	0	0	0	0	0
Logan	0	0	0	0	0	0	0
Mesa	2,223	0	0	132	4,082	22	6,460
Mineral	5,594	0	0	0	1,235	0	6,829
Moffat	670	0	0	0	0	12	682
Montezuma	1,373	0	5,523	2,179	0	236	9,311

Montrose	2,406	0	0	0	2,559	77	5,042
Morgan	0	0	0	0	0	0	0
Otero	0	0	0	0	0	0	0
Ouray	1,097	0	0	0	5,152	0	6,249
Park	4,473	1,235	0	0	448	5	6,160
Phillips	0	0	0	0	0	0	0
Pitkin	1,910	0	0	0	618	0	2,527
Prowers	0	0	0	0	0	0	0
Pueblo	2,448	0	0	0	1,235	0	3,683
Rio Blanco	2,070	1,150	0	0	0	0	3,219
Rio Grande	5,356	0	0	0	0	12	5,368
Routt	3,261	0	795	514	0	48	4,617
Saguache	10,606	435	0	0	2,685	0	13,726
San Juan	1,715	0	0	0	0	0	1,715
San Miguel	611	2,955	0	909	0	0	4,475
Sedgwick	0	0	0	0	0	0	0
Summit	1,202	0	0	0	252	20	1,473
Teller	7,191	1,845	0	0	18	13	9,066
Washington	0	0	0	0	0	0	0
Weld	0	0	0	0	0	0	0
Yuma	0	0	0	0	0	0	0
TOTAL	125,153	30,398	28,180	6,620	36,294	2,302	228,948

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

	Fire hazard thinning			Logging residue			
County	Public	Private	Private land thinning	Public	Private	Unused mill residues	TOTAL
Colorado							
Adams	0	0	0	0	0	0	0
Alamosa	0	0	0	0	1,521	0	1,521
Arapahoe	0	0	0	0	0	10	10
Archuleta	12,286	2,411	0	0	0	67	14,763
Baca	0	0	0	0	0	0	0
Bent	0	0	0	0	0	0	0
Boulder	0	0	0	0	101	4	105
Chaffee	223	151	0	0	0	0	374
Cheyenne	0	0	0	0	0	0	0
Clear Creek	347	582	0	0	2,542	0	3,471
Conejos	5,248	0	0	0	0	0	5,248
Costilla	0	11,008	829	0	0	0	11,838
Crowley	0	0	0	0	0	0	0
Custer	9,391	0	0	0	673	0	10,064
Delta	2,020	0	0	234	194	71	2,519
Denver	0	0	0	0	0	0	0
Dolores	0	0	0	1,166	0	0	1,166
Douglas	5,833	0	2,772	0	0	0	8,604
Eagle	3,571	0	0	165	0	0	3,736
Elbert	0	546	4,154	0	0	0	4,700
El Paso	4,685	1,380	2,318	0	107	0	8,489
Fremont	7,172	1,835	0	0	893	1	9,900
Garfield	6,145	307	0	0	2,390	226	9,068
Gilpin	0	0	0	0	0	0	0
Grand	567	0	1,685	68	603	35	2,958
Gunnison	10,391	3,587	2,876	0	0	12	16,866
Hinsdale	1,139	0	0	223	0	0	1,362
Huerfano	8,893	4,859	0	0	863	0	14,615
Jackson	1,664	0	0	501	1,470	0	3,635
Jefferson	1,399	0	615	0	1,778	12	3,804
Kiowa	0	0	0	0	0	0	0
Kit Carson	0	0	0	0	0	0	0
Lake	0	0	0	0	0	0	0
La Plata	4,725	2,513	7,819	0	0	92	15,148
Larimer	1,606	6,862	0	0	0	24	8,492
Las Animas	0	654	0	0	3,740	1,303	5,697
Lincoln	0	0	0	0	0	0	0
Logan	0	0	0	0	0	0	0
Mesa	2,223	0	0	132	4,082	22	6,460
Mineral	5,594	0	0	0	1,235	0	6,829
Moffat	670	0	0	0	0	12	682
Montezuma	1,373	0	5,523	2,179	0	236	9,311

Montrose	2,406	0	0	0	2,559	77	5,042
Morgan	0	0	0	0	0	0	0
Otero	0	0	0	0	0	0	0
Ouray	1,097	0	0	0	5,152	0	6,249
Park	9,505	1,235	0	0	448	5	11,192
Phillips	0	0	0	0	0	0	0
Pitkin	1,910	0	0	0	618	0	2,527
Prowers	0	0	0	0	0	0	0
Pueblo	2,448	4,854	2,450	0	0	0	9,752
Rio Blanco	2,535	1,150	0	0	0	0	3,685
Rio Grande	5,356	0	0	0	0	12	5,368
Routt	3,271	0	795	511	0	48	4,626
Saguache	13,529	435	0	0	2,685	0	16,650
San Juan	1,715	0	0	0	0	0	1,715
San Miguel	611	2,955	0	909	0	0	4,475
Sedgwick	0	0	0	0	0	0	0
Summit	1,202	0	0	0	252	20	1,473
Teller	7,191	3,451	0	0	0	13	10,655
Washington	0	0	0	0	0	0	0
Weld	0	0	0	0	0	0	0
Yuma	0	0	0	0	0	0	0
TOTAL	149,942	50,775	31,835	6,088	33,905	2,302	274,847

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

	Fire hazard thinning			Logging residue			
County	Public	Private	Private land thinning	Public	Private	Unused mill residues	TOTAL
Colorado							
Adams	0	0	0	0	0	0	0
Alamosa	0	0	0	0	1,521	0	1,521
Arapahoe	0	0	0	0	0	10	10
Archuleta	12,286	2,411	0	0	0	67	14,763
Baca	0	0	0	0	0	0	0
Bent	0	0	0	0	0	0	0
Boulder	0	0	0	0	101	4	105
Chaffee	223	151	0	0	0	0	374
Cheyenne	0	0	0	0	0	0	0
Clear Creek	347	582	0	0	2,542	0	3,471
Conejos	5,248	0	0	0	0	0	5,248
Costilla	0	17,528	829	0	0	0	18,357
Crowley	0	0	0	0	0	0	0
Custer	9,391	0	0	0	673	0	10,064
Delta	2,020	0	0	234	194	71	2,519
Denver	0	0	0	0	0	0	0
Dolores	0	0	0	1,166	0	0	1,166
Douglas	5,833	0	2,772	0	0	0	8,604
Eagle	3,571	1,499	0	165	0	0	5,235
Elbert	0	546	4,154	0	0	0	4,700
El Paso	4,685	3,083	2,318	0	0	0	10,085
Fremont	7,172	3,865	0	0	385	1	11,423
Garfield	6,145	465	0	0	2,351	226	9,187
Gilpin	0	0	0	0	0	0	0
Grand	567	0	1,685	68	603	35	2,958
Gunnison	10,391	3,587	2,876	0	0	12	16,866
Hinsdale	3,918	0	0	0	0	0	3,918
Huerfano	8,893	4,859	0	0	863	0	14,615
Jackson	1,664	3,819	0	501	515	0	6,499
Jefferson	1,399	0	615	0	1,778	12	3,804
Kiowa	0	0	0	0	0	0	0
Kit Carson	0	0	0	0	0	0	0
Lake	0	0	0	0	0	0	0
La Plata	4,725	2,513	7,819	0	0	92	15,148
Larimer	1,606	6,862	0	0	0	24	8,492
Las Animas	0	654	0	0	3,740	1,303	5,697
Lincoln	0	0	0	0	0	0	0
Logan	0	0	0	0	0	0	0
Mesa	2,403	0	0	87	4,082	22	6,595
Mineral	5,594	0	0	0	1,235	0	6,829
Moffat	670	0	0	0	0	12	682
Montezuma	1,373	0	5,523	2,179	0	236	9,311

Montrose	2,406	0	0	0	2,559	77	5,042
Morgan	0	0	0	0	0	0	0
Otero	0	0	0	0	0	0	0
Ouray	1,097	0	0	0	5,152	0	6,249
Park	10,030	3,067	0	0	0	5	13,103
Phillips	0	0	0	0	0	0	0
Pitkin	2,818	0	0	0	618	0	3,435
Prowers	0	0	0	0	0	0	0
Pueblo	2,448	5,560	2,450	0	0	0	10,458
Rio Blanco	6,887	1,205	0	0	0	0	8,092
Rio Grande	5,356	0	0	0	0	12	5,368
Routt	3,271	0	795	511	0	48	4,626
Saguache	13,529	435	0	0	2,685	0	16,650
San Juan	1,715	0	0	0	0	0	1,715
San Miguel	611	2,955	0	909	0	0	4,475
Sedgwick	0	0	0	0	0	0	0
Summit	1,773	0	0	0	252	20	2,045
Teller	7,191	3,451	0	0	0	13	10,655
Washington	0	0	0	0	0	0	0
Weld	0	0	0	0	0	0	0
Yuma	0	0	0	0	0	0	0
TOTAL	159,258	69,097	31,835	5,820	31,849	2,302	300,161

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

	Fire hazard thinning			Logging residue			
County	Public	Private	Private land thinning	Public	Private	Unused mill residues	TOTAL
Colorado							
Adams	0	0	0	0	0	0	0
Alamosa	0	0	0	0	1,521	0	1,521
Arapahoe	0	0	0	0	0	10	10
Archuleta	12,286	2,411	0	0	0	67	14,763
Baca	0	0	0	0	0	0	0
Bent	0	0	0	0	0	0	0
Boulder	0	873	0	0	0	4	877
Chaffee	223	151	0	0	0	0	374
Cheyenne	0	0	0	0	0	0	0
Clear Creek	347	582	0	0	2,542	0	3,471
Conejos	5,248	0	0	0	0	0	5,248
Costilla	0	17,528	3,850	0	0	0	21,378
Crowley	0	0	0	0	0	0	0
Custer	9,391	0	0	0	673	0	10,064
Delta	2,020	0	0	234	194	71	2,519
Denver	0	0	0	0	0	0	0
Dolores	0	0	0	1,166	0	0	1,166
Douglas	5,833	0	2,772	0	0	0	8,604
Eagle	3,571	1,499	0	165	0	0	5,235
Elbert	0	546	4,154	0	0	0	4,700
El Paso	4,685	3,083	2,318	0	0	0	10,085
Fremont	7,172	3,865	0	0	385	1	11,423
Garfield	10,330	465	0	0	2,351	226	13,372
Gilpin	0	0	0	0	0	0	0
Grand	567	0	1,685	68	603	35	2,958
Gunnison	10,391	3,587	2,876	0	0	12	16,866
Hinsdale	3,918	0	0	0	0	0	3,918
Huerfano	8,893	4,859	0	0	863	0	14,615
Jackson	2,317	3,819	0	337	515	0	6,988
Jefferson	1,399	0	615	0	1,778	12	3,804
Kiowa	0	0	0	0	0	0	0
Kit Carson	0	0	0	0	0	0	0
Lake	0	0	0	0	0	0	0
La Plata	4,725	2,513	7,819	0	0	92	15,148
Larimer	1,606	6,862	0	0	0	24	8,492
Las Animas	0	654	0	0	3,740	1,303	5,697
Lincoln	0	0	0	0	0	0	0
Logan	0	0	0	0	0	0	0
Mesa	2,403	0	0	87	4,082	22	6,595
Mineral	5,594	0	0	0	1,235	0	6,829
Moffat	670	0	0	0	0	12	682
Montezuma	1,373	0	5,523	2,179	0	236	9,311

Montrose	5,315	0	0	0	2,559	77	7,951
Morgan	0	0	0	0	0	0	0
Otero	0	0	0	0	0	0	0
Ouray	1,383	0	0	0	5,152	0	6,535
Park	10,030	3,067	0	0	0	5	13,103
Phillips	0	0	0	0	0	0	0
Pitkin	2,818	0	0	0	618	0	3,435
Prowers	0	0	0	0	0	0	0
Pueblo	2,448	5,560	2,450	0	0	0	10,458
Rio Blanco	6,887	1,205	0	0	0	0	8,092
Rio Grande	5,356	0	0	0	0	12	5,368
Routt	3,271	0	795	511	0	48	4,626
Saguache	13,809	435	0	0	2,685	0	16,929
San Juan	1,715	0	0	0	0	0	1,715
San Miguel	611	2,955	0	909	0	0	4,475
Sedgwick	0	0	0	0	0	0	0
Summit	1,773	0	0	0	252	20	2,045
Teller	7,191	3,451	0	0	0	13	10,655
Washington	0	0	0	0	0	0	0
Weld	0	0	0	0	0	0	0
Yuma	0	0	0	0	0	0	0
TOTAL	167,571	69,970	34,856	5,656	31,748	2,302	312,104