University of Idaho
College of Natural Resources

Montana* 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 2009, 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 differ-ences 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		Private land thinning	Logging residue		Unused mill residues	TOTAL
County	Public	Private		Public	Private		
Montana							
Beaverhead	0	0	0	875	0	23	898
Big Horn	128	412	766	0	12,623	0	13,929
Blaine	0	0	0	0	1,145	0	1,145
Broadwater	0	271	0	909	1,776	628	3,584
Carbon	1,227	0	0	0	456	136	1,819
Carter	0	0	1,155	345	3,403	0	4,903
Cascade	249	352	0	951	7,725	124	9,401
Chouteau	0	0	0	0	1,221	0	1,221
Custer	0	0	0	0	3,849	0	3,849
Daniels	0	0	0	0	0	0	0
Dawson	0	0	0	0	0	0	0
Deer Lodge	0	156	0	1,431	4,327	0	5,914
Fallon	0	0	0	0	0	0	0
Fergus	0	0	0	97	8,945	16	9,058
Flathead	0	0	2,193	20,499	73,607	3,298	99,597
Gallatin	1,914	0	0	0	3,670	625	6,210
Garfield	0	0	0	40	304	0	343
Glacier	0	0	0	0	757	0	757
Golden Valley	0	0	0	0	395	0	395
Granite	0	0	0	1,673	26,146	0	27,819
Hill	0	0	401	0	508	0	910
Jefferson	0	51	0	2,260	4,455	0	6,765
Judith Basin	0	0	0	2,122	1,009	0	3,131
Lake	0	898	2,870	2,176	26,581	141	32,666
Lewis and Clark	0	0	877	2,987	21,782	4	25,650
Liberty	0	0	0	0	14	0	14
Lincoln	0	0	1,269	19,754	70,099	551	91,673
McCone	0	0	0	0	0	0	0
Madison	0	0	0	1,505	5,037	173	6,715
Meagher	2,877	78	0	6,513	11,682	0	21,150
Mineral	0	0	0	2,174	9,478	129	11,781
Missoula	0	0	1,931	3,515	92,124	440	98,011
Musselshell	0	0	0	57	6,483	72	6,613
Park	0	0	0	924	3,186	36	4,147
Petroleum	0	0	0	49	552	0	600
Phillips	0	0	0	0	0	0	0
Pondera	0	0	0	0	0	0	0
Powder River	0	0	576	0	8,196	0	8,772
Powell	0	0	0	11,168	27,883	143	39,194
Prairie	0	0	0	0	0	0	0
Ravalli	0	0	4,565	6,177	7,106	2,186	20,034
Richland	0	0	0	0	0	0	0

Roosevelt	0	0	0	0	0	0	0
Rosebud	0	0	524	168	12,000	0	12,692
Sanders	0	0	3,278	10,083	36,418	152	49,930
Sheridan	0	0	0	0	0	0	0
Silver Bow	0	0	0	106	830	0	937
Stillwater	0	0	588	0	949	136	1,673
Sweet Grass	0	0	0	1,560	2,706	0	4,266
Teton	0	0	0	0	0	0	0
Toole	0	0	0	0	0	0	0
Treasure	0	0	0	0	4,015	0	4,015
Valley	0	0	0	0	0	0	0
Wheatland	0	0	0	912	2,120	0	3,033
Wibaux	0	0	0	0	0	0	0
Yellowstone	0	0	0	22	1,412	124	1,558
TOTAL	6,395	2,218	20,992	101,051	506,976	9,137	646,769

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

County	Fire hazard thinning		Private land thinning	Logging residue		Unused mill residues	TOTAL
	Public	Private		Public	Private		
Montana							
Beaverhead	0	0	0	875	0	23	898
Big Horn	128	412	6,393	0	11,216	0	18,149
Blaine	0	0	0	0	1,145	0	1,145
Broadwater	6,249	312	0	0	1,766	628	8,955
Carbon	3,046	0	0	0	456	136	3,638
Carter	0	0	1,155	345	3,403	0	4,903
Cascade	249	6,555	0	951	6,175	124	14,053
Chouteau	1,575	0	0	0	1,221	0	2,797
Custer	0	0	0	0	3,849	0	3,849
Daniels	0	0	0	0	0	0	0
Dawson	0	0	0	0	0	0	0
Deer Lodge	0	156	0	1,431	4,327	0	5,914
Fallon	0	0	0	0	0	0	0
Fergus	0	0	11,609	97	6,043	16	17,764
Flathead	4,373	0	2,193	19,406	73,607	3,298	102,877
Gallatin	4,081	3,367	0	0	2,829	625	10,902
Garfield	0	0	0	40	304	0	343
Glacier	0	0	0	0	757	0	757
Golden Valley	2,563	0	0	0	395	0	2,958
Granite	0	681	438	1,673	25,866	0	28,658
Hill	0	0	401	0	508	0	910
Jefferson	945	51	0	2,023	4,455	0	7,474
Judith Basin	1,981	0	0	1,627	1,009	0	4,617
Lake	1,355	898	2,870	1,837	26,581	141	33,682
Lewis and Clark	0	0	877	2,987	21,782	4	25,650
Liberty	0	0	0	0	14	0	14
Lincoln	8,182	0	1,269	17,709	70,099	551	97,810
McCone	0	0	0	0	0	0	0
Madison	0	1,153	0	1,505	4,749	173	7,580
Meagher	2,877	78	0	6,513	11,682	0	21,150
Mineral	15,555	0	0	0	9,478	129	25,162
Missoula	0	0	1,931	3,515	92,124	440	98,011
Musselshell	0	0	0	57	6,483	72	6,613
Park	9,965	4,386	0	0	2,090	36	16,476
Petroleum	0	0	0	49	552	0	600
Phillips	0	0	0	0	0	0	0
Pondera	0	0	0	0	0	0	0
Powder River	0	0	576	0	8,196	0	8,772
Powell	0	0	2,004	11,168	27,382	143	40,697
Prairie	0	0	0	0	0	0	0
Ravalli	0	0	4,565	6,177	7,106	2,186	20,034
Richland	0	0	0	0	0	0	0

Roosevelt	0	0	0	0	0	0	0
Rosebud	0	0	6,436	168	10,522	0	17,126
Sanders	0	0	6,165	10,083	35,696	152	52,096
Sheridan	0	0	0	0	0	0	0
Silver Bow	0	0	0	106	830	0	937
Stillwater	0	0	588	0	949	136	1,673
Sweet Grass	0	0	0	1,560	2,706	0	4,266
Teton	0	0	0	0	0	0	0
Toole	0	0	0	0	0	0	0
Treasure	0	0	0	0	4,015	0	4,015
Valley	0	0	0	0	0	0	0
Wheatland	0	0	0	912	2,120	0	3,033
Wibaux	0	0	0	0	0	0	0
Yellowstone	0	0	853	22	1,198	124	2,198
TOTAL	63,123	18,049	50,323	92,835	495,685	9,137	729,152

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

County	Fire hazard thinning		Private land thinning	Logging residue		Unused mill residues	TOTAL
	Public	Private		Public	Private		
Montana							
Beaverhead	0	0	0	875	0	23	898
Big Horn	128	412	6,393	0	11,216	0	18,149
Blaine	0	0	0	0	1,145	0	1,145
Broadwater	6,249	339	0	0	1,759	628	8,975
Carbon	3,046	0	0	0	456	136	3,638
Carter	0	0	1,155	345	3,403	0	4,903
Cascade	8,005	9,067	0	0	5,546	124	22,743
Chouteau	1,575	5,930	2,090	0	0	0	9,595
Custer	0	487	0	0	3,727	0	4,214
Daniels	0	0	0	0	0	0	0
Dawson	0	0	0	0	0	0	0
Deer Lodge	0	156	0	1,431	4,327	0	5,914
Fallon	0	0	0	0	0	0	0
Fergus	3,079	11,145	11,609	0	3,256	16	29,105
Flathead	22,234	2,798	4,302	14,941	72,380	3,298	119,953
Gallatin	4,081	5,973	0	0	2,177	625	12,857
Garfield	0	0	0	40	304	0	343
Glacier	0	5,795	0	0	0	0	5,795
Golden Valley	2,563	0	0	0	395	0	2,958
Granite	19,788	6,818	438	0	24,332	0	51,376
Hill	0	9,276	401	0	0	0	9,677
Jefferson	2,277	51	0	1,691	4,455	0	8,472
Judith Basin	11,359	299	0	0	935	0	12,592
Lake	1,614	3,724	2,870	1,772	25,875	141	35,996
Lewis and Clark	19,747	1,029	877	0	21,525	4	43,181
Liberty	0	0	0	0	14	0	14
Lincoln	66,301	1,816	1,269	3,179	69,645	551	142,761
McCone	0	0	0	0	0	0	0
Madison	7,280	1,787	0	0	4,590	173	13,831
Meagher	35,296	3,278	0	0	10,882	0	49,455
Mineral	36,848	746	0	0	9,292	129	47,015
Missoula	898	1,299	1,931	3,290	91,800	440	99,659
Musselshell	0	0	11,696	57	3,559	72	15,384
Park	12,736	4,386	0	0	2,090	36	19,248
Petroleum	0	0	0	49	552	0	600
Phillips	0	0	0	0	0	0	0
Pondera	0	0	0	0	0	0	0
Powder River	0	0	576	0	8,196	0	8,772
Powell	0	0	2,004	11,168	27,382	143	40,697
Prairie	0	0	0	0	0	0	0
Ravalli	21,900	0	4,565	702	7,106	2,186	36,458
Richland	0	0	0	0	0	0	0

Roosevelt	0	0	0	0	0	0	0
Rosebud	0	0	6,436	168	10,522	0	17,126
Sanders	45,327	0	6,165	0	35,696	152	87,340
Sheridan	0	0	0	0	0	0	0
Silver Bow	14,912	0	0	0	830	0	15,743
Stillwater	0	0	588	0	949	136	1,673
Sweet Grass	0	7,287	0	1,560	885	0	9,731
Teton	3,682	0	0	0	0	0	3,682
Toole	0	0	0	0	0	0	0
Treasure	0	0	0	0	4,015	0	4,015
Valley	0	0	0	0	0	0	0
Wheatland	0	0	0	912	2,120	0	3,033
Wibaux	0	0	0	0	0	0	0
Yellowstone	0	0	853	22	1,198	124	2,198
TOTAL	350,923	83,898	66,217	42,202	478,535	9,137	1,030,913

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
Montana							
Beaverhead	8,716	3,903	0	0	0	23	12,642
Big Horn	128	412	6,961	0	11,074	0	18,575
Blaine	0	0	0	0	1,145	0	1,145
Broadwater	12,061	339	0	0	1,759	628	14,787
Carbon	3,046	0	0	0	456	136	3,638
Carter	0	0	1,155	345	3,403	0	4,903
Cascade	8,005	9,067	0	0	5,546	124	22,743
Chouteau	1,575	5,930	2,090	0	0	0	9,595
Custer	0	487	0	0	3,727	0	4,214
Daniels	0	0	0	0	0	0	0
Dawson	0	0	0	0	0	0	0
Deer Lodge	2,781	156	0	736	4,327	0	7,999
Fallon	0	0	0	0	0	0	0
Fergus	3,079	11,145	11,609	0	3,256	16	29,105
Flathead	57,137	7,271	4,302	6,215	71,262	3,298	149,484
Gallatin	4,081	5,973	0	0	2,177	625	12,857
Garfield	0	0	0	40	304	0	343
Glacier	0	5,795	0	0	0	0	5,795
Golden Valley	2,563	0	0	0	395	0	2,958
Granite	19,788	6,818	438	0	24,332	0	51,376
Hill	0	9,276	401	0	0	0	9,677
Jefferson	15,449	395	0	0	4,368	0	20,213
Judith Basin	12,543	2,192	0	0	461	0	15,196
Lake	6,655	21,866	2,870	512	21,339	141	53,383
Lewis and Clark	42,829	1,029	877	0	21,525	4	66,264
Liberty	0	0	0	0	14	0	14
Lincoln	66,301	12,326	1,269	3,179	67,018	551	150,643
McCone	0	0	0	0	0	0	0
Madison	7,280	1,787	0	0	4,590	173	13,831
Meagher	35,296	3,278	0	0	10,882	0	49,455
Mineral	36,848	1,526	0	0	9,097	129	47,599
Missoula	34,576	14,078	1,931	0	88,605	440	139,631
Musselshell	0	0	11,696	57	3,559	72	15,384
Park	12,736	4,386	0	0	2,090	36	19,248
Petroleum	0	0	0	49	552	0	600
Phillips	0	0	0	0	0	0	0
Pondera	0	0	0	0	0	0	0
Powder River	0	0	2,660	0	7,675	0	10,335
Powell	17,585	16,267	2,004	6,772	23,316	143	66,086
Prairie	0	0	0	0	0	0	0
Ravalli	37,652	0	4,565	0	7,106	2,186	51,508
Richland	0	0	0	0	0	0	0

Roosevelt	0	0	0	0	0	0	0
Rosebud	0	0	6,436	168	10,522	0	17,126
Sanders	71,791	12,797	6,165	0	32,496	152	123,401
Sheridan	0	0	0	0	0	0	0
Silver Bow	14,912	1,234	0	0	522	0	16,669
Stillwater	0	0	588	0	949	136	1,673
Sweet Grass	0	7,860	0	1,560	741	0	10,161
Teton	5,803	0	0	0	0	0	5,803
Toole	0	0	0	0	0	0	0
Treasure	0	0	0	0	4,015	0	4,015
Valley	0	0	0	0	0	0	0
Wheatland	7,819	0	0	0	2,120	0	9,939
Wibaux	0	0	0	0	0	0	0
Yellowstone	0	0	853	22	1,198	124	2,198
TOTAL	549,035	167,592	68,869	19,654	457,925	9,137	1,272,212

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
Montana							
Beaverhead	17,428	3,903	0	0	0	23	21,354
Big Horn	1,213	412	6,961	0	11,074	0	19,660
Blaine	0	0	1,683	0	724	0	2,407
Broadwater	19,688	339	0	0	1,759	628	22,414
Carbon	3,046	0	0	0	456	136	3,638
Carter	0	0	1,155	345	3,403	0	4,903
Cascade	8,005	9,067	0	0	5,546	124	22,743
Chouteau	1,575	5,930	2,090	0	0	0	9,595
Custer	58	4,838	0	0	2,639	0	7,534
Daniels	0	0	0	0	0	0	0
Dawson	0	0	0	0	0	0	0
Deer Lodge	2,781	791	0	736	4,168	0	8,475
Fallon	0	0	0	0	0	0	0
Fergus	3,079	11,145	11,609	0	3,256	16	29,105
Flathead	57,137	17,641	4,302	6,215	68,669	3,298	157,262
Gallatin	4,081	5,973	0	0	2,177	625	12,857
Garfield	704	0	0	0	304	0	1,007
Glacier	0	5,795	0	0	0	0	5,795
Golden Valley	2,563	1,206	2,868	0	0	0	6,636
Granite	19,788	6,818	438	0	24,332	0	51,376
Hill	0	9,276	401	0	0	0	9,677
Jefferson	19,333	4,479	0	0	3,348	0	27,159
Judith Basin	13,523	2,192	0	0	461	0	16,176
Lake	6,655	23,102	2,870	512	21,030	141	54,310
Lewis and Clark	42,829	5,848	877	0	20,320	4	69,878
Liberty	0	0	0	0	14	0	14
Lincoln	99,294	18,278	1,269	0	65,530	551	184,922
McCone	0	0	0	0	0	0	0
Madison	7,280	2,385	0	0	4,441	173	14,279
Meagher	37,291	3,278	0	0	10,882	0	51,451
Mineral	36,848	1,526	0	0	9,097	129	47,599
Missoula	42,206	25,837	1,931	0	85,665	440	156,079
Musselshell	0	0	11,696	57	3,559	72	15,384
Park	12,736	5,409	0	0	1,834	36	20,014
Petroleum	0	0	0	49	552	0	600
Phillips	0	0	0	0	0	0	0
Pondera	0	0	0	0	0	0	0
Powder River	0	0	2,660	0	7,675	0	10,335
Powell	18,460	16,267	2,004	6,553	23,316	143	66,743
Prairie	0	0	0	0	0	0	0
Ravalli	37,652	2,708	4,565	0	6,429	2,186	53,539
Richland	0	0	0	0	0	0	0

Roosevelt	0	0	0	0	0	0	0
Rosebud	0	0	6,436	168	10,522	0	17,126
Sanders	80,499	18,975	6,165	0	30,952	152	136,744
Sheridan	0	0	0	0	0	0	0
Silver Bow	14,912	1,234	0	0	522	0	16,669
Stillwater	0	0	588	0	949	136	1,673
Sweet Grass	15,583	7,860	0	0	741	0	24,184
Teton	17,578	0	0	0	0	0	17,578
Toole	0	0	0	0	0	0	0
Treasure	0	0	2,920	0	3,284	0	6,205
Valley	0	0	0	0	0	0	0
Wheatland	7,819	0	0	0	2,120	0	9,939
Wibaux	0	0	0	0	0	0	0
Yellowstone	0	0	853	22	1,198	124	2,198
TOTAL	651,643	222,509	76,340	14,657	442,951	9,137	1,417,237

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
Montana							
Beaverhead	17,428	3,903	0	0	0	23	21,354
Big Horn	1,213	412	6,961	0	11,074	0	19,660
Blaine	0	0	1,683	0	724	0	2,407
Broadwater	21,590	339	0	0	1,759	628	24,316
Carbon	3,046	0	0	0	456	136	3,638
Carter	0	0	1,155	345	3,403	0	4,903
Cascade	8,005	9,067	0	0	5,546	124	22,743
Chouteau	1,575	5,930	2,090	0	0	0	9,595
Custer	1,335	4,838	0	0	2,639	0	8,812
Daniels	0	0	0	0	0	0	0
Dawson	0	0	0	0	0	0	0
Deer Lodge	2,781	791	0	736	4,168	0	8,475
Fallon	0	0	0	0	0	0	0
Fergus	4,210	11,145	11,609	0	3,256	16	30,236
Flathead	57,137	17,641	4,302	6,215	68,669	3,298	157,262
Gallatin	4,081	5,973	0	0	2,177	625	12,857
Garfield	704	0	0	0	304	0	1,007
Glacier	0	5,795	0	0	0	0	5,795
Golden Valley	2,563	1,206	2,868	0	0	0	6,636
Granite	19,788	10,392	438	0	23,439	0	54,057
Hill	0	9,276	401	0	0	0	9,677
Jefferson	19,333	4,479	0	0	3,348	0	27,159
Judith Basin	13,523	2,192	0	0	461	0	16,176
Lake	6,655	23,102	2,870	512	21,030	141	54,310
Lewis and Clark	44,781	5,848	877	0	20,320	4	71,830
Liberty	0	0	0	0	14	0	14
Lincoln	106,973	19,863	1,269	0	65,133	551	193,790
McCone	0	0	0	0	0	0	0
Madison	27,236	3,635	0	0	4,129	173	35,172
Meagher	37,291	4,882	0	0	10,481	0	52,654
Mineral	36,848	1,526	0	0	9,097	129	47,599
Missoula	42,206	31,260	1,931	0	84,309	440	160,147
Musselshell	0	0	11,696	57	3,559	72	15,384
Park	12,736	5,409	0	0	1,834	36	20,014
Petroleum	0	0	0	49	552	0	600
Phillips	0	0	0	0	0	0	0
Pondera	0	0	0	0	0	0	0
Powder River	0	0	2,660	0	7,675	0	10,335
Powell	18,460	17,190	2,004	6,553	23,085	143	67,435
Prairie	0	0	0	0	0	0	0
Ravalli	37,652	5,504	4,565	0	5,730	2,186	55,636
Richland	0	0	0	0	0	0	0

Roosevelt	0	0	0	0	0	0	0
Rosebud	2,506	0	6,436	0	10,522	0	19,464
Sanders	80,499	21,999	6,165	0	30,196	152	139,012
Sheridan	0	0	0	0	0	0	0
Silver Bow	14,912	1,234	0	0	522	0	16,669
Stillwater	0	523	588	0	819	136	2,065
Sweet Grass	17,162	7,860	0	0	741	0	25,764
Teton	17,578	0	0	0	0	0	17,578
Toole	0	0	0	0	0	0	0
Treasure	0	0	2,920	0	3,284	0	6,205
Valley	0	0	0	0	0	0	0
Wheatland	14,256	0	0	0	2,120	0	16,377
Wibaux	0	0	0	0	0	0	0
Yellowstone	0	0	853	22	1,198	124	2,198

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
Montana							
Beaverhead	17,428	3,903	0	0	0	23	21,354
Big Horn	1,213	412	6,961	0	11,074	0	19,660
Blaine	0	0	1,683	0	724	0	2,407
Broadwater	21,590	544	0	0	1,708	628	24,470
Carbon	3,046	0	0	0	456	136	3,638
Carter	0	0	1,155	345	3,403	0	4,903
Cascade	8,005	9,067	0	0	5,546	124	22,743
Chouteau	1,575	5,930	2,090	0	0	0	9,595
Custer	1,335	4,838	0	0	2,639	0	8,812
Daniels	0	0	0	0	0	0	0
Dawson	0	0	0	0	0	0	0
Deer Lodge	2,781	791	0	736	4,168	0	8,475
Fallon	0	0	0	0	0	0	0
Fergus	4,210	11,145	11,609	0	3,256	16	30,236
Flathead	64,978	17,641	4,302	4,255	68,669	3,298	163,143
Gallatin	4,081	5,973	0	0	2,177	625	12,857
Garfield	704	0	0	0	304	0	1,007
Glacier	0	5,795	0	0	0	0	5,795
Golden Valley	2,563	1,206	2,868	0	0	0	6,636
Granite	31,986	10,392	438	0	23,439	0	66,255
Hill	0	9,276	401	0	0	0	9,677
Jefferson	19,333	4,479	0	0	3,348	0	27,159
Judith Basin	13,523	2,192	0	0	461	0	16,176
Lake	7,135	24,975	2,870	392	20,562	141	56,075
Lewis and Clark	47,736	11,257	877	0	18,968	4	78,842
Liberty	0	0	0	0	14	0	14
Lincoln	108,419	21,042	1,269	0	64,839	551	196,120
McCone	0	0	0	0	0	0	0
Madison	27,236	3,635	0	0	4,129	173	35,172
Meagher	44,012	4,882	0	0	10,481	0	59,375
Mineral	56,097	3,042	0	0	8,718	129	67,986
Missoula	42,206	31,260	1,931	0	84,309	440	160,147
Musselshell	0	0	11,696	57	3,559	72	15,384
Park	12,736	5,409	0	0	1,834	36	20,014
Petroleum	0	0	0	49	552	0	600
Phillips	0	0	0	0	0	0	0
Pondera	0	0	0	0	0	0	0
Powder River	0	0	2,660	0	7,675	0	10,335
Powell	18,460	17,190	2,004	6,553	23,085	143	67,435
Prairie	0	0	0	0	0	0	0
Ravalli	37,652	5,504	4,565	0	5,730	2,186	55,636
Richland	0	0	0	0	0	0	0

Roosevelt	0	0	0	0	0	0	0
Rosebud	2,506	0	6,436	0	10,522	0	19,464
Sanders	80,499	21,999	6,165	0	30,196	152	139,012
Sheridan	0	0	0	0	0	0	0
Silver Bow	14,912	1,234	0	0	522	0	16,669
Stillwater	0	523	588	0	819	136	2,065
Sweet Grass	17,162	7,860	0	0	741	0	25,764
Teton	17,578	0	0	0	0	0	17,578
Toole	0	0	0	0	0	0	0
Treasure	0	0	2,920	0	3,284	0	6,205
Valley	0	0	0	0	0	0	0
Wheatland	14,256	0	0	0	2,120	0	16,377
Wibaux	0	0	0	0	0	0	0
Yellowstone	0	0	853	22	1,198	124	2,198
TOTAL	746,953	253,396	76,340	12,409	435,229	9,137	1,533,464