

**Timber Use, Processing Capacity, and Capability to
Utilize Small-Diameter Timber
Within
USDA Forest Service, Region One
Timber-processing Area**

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Report Highlights

- The Region One Timber-processing Area (R1-TPA) is comprised of 12 Idaho counties and 26 Montana counties. Mills in Oregon, Washington, and Wyoming also received timber from the geographic area encompassing Region One.
- Within the R1-TPA, there were 160 timber-processing facilities in operation as of 2011: 73 sawmills, 42 house log /log home facilities, 18 manufacturers of log furniture, 18 post and small pole producers, 4 cedar products producers, 4 plywood and veneer plants, and 1 utility pole producer.
- Annual capacity to process timber within the R1-TPA is 447 million cubic feet (MMCF), excluding pulpwood.
- Mills utilized 59 percent of capacity, processing an estimated 266 MMCF of timber in 2011. Over 90 percent of the timber processed (239 MMCF) was from trees ≥ 10 " dbh, with slightly more than 8 percent (22 MMCF) from trees 7 – 9.9" dbh, and less than 2 percent (5 MMCF) from trees < 7 " dbh.
- About 326 MMCF (73 percent) of timber-processing capacity cannot operate on trees < 10 " dbh.
- More than 96 MMCF of timber-processing capacity (22 percent of total capacity) in the R1-TPA are capable of efficiently operating on trees 7 – 9.9" dbh.
- Most mills capable of efficiently processing trees 7 – 9.9" dbh are also capable of and prefer processing trees ≥ 10 " dbh, and these mills process substantial volumes of these larger trees. In 2011, nearly 29 MMCF of milling capacity capable of using trees 7 – 9.9" dbh were used to process trees ≥ 10 " dbh within the R1-TPA.
- The other 5 percent (about 26 MMCF) of existing infrastructure in the R1-TPA is capable of using trees < 7 " dbh, and about 17 percent is currently being used. Utilization of large volumes (more than 26 MMCF annually) of trees < 7 " dbh would require an increase in total timber-processing capacity or increased use by the existing pulp and paper industry.

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Introduction

Landowners, managers, and planners interested in selling timber have a need for information on the capacity and capability of the timber-processing industry in their region to use trees of various sizes. The expressed need to treat millions of acres in the western United States for fuels reduction or ecosystem restoration has made accurate information on timber milling capacity and the capability of mills to handle timber of various sizes even more important. Implementing treatments designed to restore desired ecological conditions often calls for the removal of timber valuable enough to offset the costs of treatment (Fiedler et al.1999). However, these treatments also require removing smaller trees with limited value and markets. Quantification of current milling capacity and elucidation of the sizes and types of materials that existing mills are capable of using are key components of an overall financial analysis of a timber sale, fuels reduction, or ecosystem restoration program.

Goals and Objectives

The goal of this study is to provide Forest Service planners with estimates of the forest products industry's total timber-processing capacity and capability to utilize trees of various sizes from the National Forests in Region One. The specific project objectives are to:

1. identify the timber-processing area supplied by Region One,
2. estimate timber-processing capacity of facilities in the area,
3. quantify the volume of timber currently processed from trees of various sizes, and
4. estimate the capability of existing facilities to utilize trees of various sizes.

The study focuses its examination on facilities that exclusively use timber in round form (i.e., logs). Timber use and processing capacity of the pulp and paper industry, which primarily uses mill residues, are discussed separately from timber used for sawn and solid roundwood products.

Timber-processing capacity, volume of timber processed, and capability of using trees of various sizes are examined and discussed on a state-by-state basis, as well as for the identified timber-processing area, in cubic feet and board feet Scribner. In this report, “capacity” refers to the total volume of timber (excluding pulpwood and fuelwood) that existing mills could utilize annually, and “capability” refers to the volume of trees of a certain size class that existing mills can efficiently process annually.

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Methods

Data Sources and Timber-processing Capacity

The major sources of information used to estimate timber-processing capacity and volumes of timber processed were periodic censuses and annual surveys of the forest products industry. These censuses and surveys have been performed on a regular basis since 1976 by the BBER at The University of Montana-Missoula, the University of Idaho’s College of Natural Resources, and the Department of Natural Resource Sciences at Washington State University.

The BBER has released recent mill census results for Idaho (Brandt et al. 2012) and Montana (Spoelma et al. 2008; McIver et al., in preparation), and the 2011 census for Idaho is currently in progress. Data from the periodic censuses of the Idaho and Montana forest products industry are stored in BBER’s Forest Industries Data Collection System (FIDACS), which was developed through cooperative efforts with the USDA Forest Service’s Interior West Forest Inventory and Analysis (IW-FIA) program. FIDACS focuses on the (geographic and ownership) source and volume of timber used, as well as manufacturers utilizing that timber, on a state-by-

state basis. Mill-level data can be combined to create county, state, and multi-state (regional) summaries while protecting individual firm data. Forest products manufacturers provide the following detailed information to FIDACS through written questionnaires for each plant for a given calendar year:

- production employment,
- annual production capacity,
- volume of raw material received by county and ownership,
- species and sizes of timber received,
- quantity, sales value, and market location of finished products,
- utilization and sales value of manufacturing residue,
- plant production equipment, and
- beginning and ending inventory levels of raw materials and finished products.

The data for this assessment of Region One capacity was based on the most recent census of each state's industry—2006 for Idaho (Brandt et al. 2012) and partial results from the Idaho census for 2011 and 2009 for Montana (McIver et al., in preparation). Data from previous years have been updated to 2011 based on trends identified in several sources (WWPA 2007, 2010, 2011; Morgan et al. 2012a and 2012b). The tables in the results section are labeled 2011 and represent a composite year incorporating 2006/2009 timber flow data modified to reflect mill closures and openings in subsequent years, and 2011 levels of harvest and production.

Because the surveys and censuses used to collect mill-level data include questions addressing total volume of timber processed annually and total volume of products produced (e.g., thousand board feet of lumber, thousand square feet of plywood), recovery per unit of timber input can be readily calculated and applied to reported production capacity in units of output for each mill. Thus, annual capacity can be expressed in common units of timber input (thousand cubic feet), and the capacity figures for various segments of the industry (i.e., sawmills, plywood plants, post and pole plants) can be combined to estimate the industry's total

capacity to process timber (excluding pulpwood and fuelwood), referred to as timber-processing capacity.

Timber-processing Area

The following steps were taken to determine the timber-processing area for USDA Forest Service Region One:

1. Counties containing Region One National Forest non-reserved timberland were identified.
2. Using FIDACS, timber harvest and flow was analyzed for all ownerships within the above counties.
3. Based on this timber harvest and flow analysis, all mills receiving timber harvested from those counties with Region One non-reserved timberland were identified.
4. The counties with the above mills were designated as the Region One Timber-Processing Area (R1-TPA).

Timber Use, Capacity, and Capability by Size Class

Three tree diameter classes were used to categorize timber use and milling capacity and capability: trees < 7" diameter at breast height (dbh), trees 7 – 9.9" dbh, and trees \geq 10" dbh. These size classes were based on previous capacity and capability studies (Keegan et al. 2004). Estimates of the capacity, capability, and proportion of timber used in each of the three size classes were based upon data from earlier studies (Keegan et al. 2004) and updated to reflect changes in equipment, milling technology and mill inputs collected during censuses for each state. The two smallest size classes were chosen based on analyses of ecological restoration and fuels reduction prescriptions indicating the removal of trees in those size classes (Fiedler et al. 2001).

Financial analyses of mills of various types were undertaken to estimate the capability of mills to "profitably" use timber of various sizes. This information was used to assign, for each mill in the region, a proportion of capacity capable of processing timber in each of the three size

classes (Wagner et al. 1998 and 2000; Stewart et al. 2004). The market conditions assumed in the financial analysis represented conditions that were intermediate to the very strong markets of 2004-2006 and the historically low markets of 2009-2011. For this study, discussions with mill operators and the authors' professional judgments were to update the capability estimates for each mill as of 2011.

Virtually all timber used for plywood/veneer, house logs, cedar products, and utility poles was determined to come from trees $\geq 10''$ dbh. Post, small pole, and log furniture producers were found to primarily utilize timber from trees $< 7''$ dbh. Sawmills, the largest segment of the wood products industry, utilized a variety of mill configurations with a broad range of timber size requirements.

Most facilities are designed to operate using trees of a given size class (e.g., veneer/plywood plants, which use trees $\geq 10''$ dbh, or post manufacturers, which use trees $< 7''$ dbh almost exclusively). Capacity at these facilities was readily classified as being capable of processing timber of just one of the size classes.

Mills often process trees that are larger than the smallest tree sizes they are capable of processing. In other words, most mills capable of efficiently processing trees 7 – 9.9'' dbh are also capable of processing trees $\geq 10''$ dbh, and indeed these mills often prefer and process substantial volumes of these larger trees. However, some mills that process larger trees are not capable of processing smaller-diameter trees. For this reason, this report presents capability to process trees $\geq 10''$ dbh as the proportion of total capacity not capable of efficiently using trees $< 10''$ dbh. Whereas, capability to process trees $< 7''$ dbh and 7 – 9.9'' dbh are presented as maximum volumes of trees of these size classes that can be processed efficiently.

Species Preference

Information on mills' species preferences and volumes of timber harvested and processed by species was developed from a variety of sources. Timber volumes harvested and processed by species and timber product type (e.g., house log or sawtimber) are available from FIDACS at the individual mill level. However, timber volumes *by species and size class* are not available at the individual mill level. Telephone interviews of mill managers provided additional data on facilities' most and least preferred species, as well as minimum log size and purchase price by species (Keegan et al. 2004 and 2005). Preference and use of species by size class, therefore, is only discussed in terms of general trends most commonly used for products manufactured by the different industry sectors. Timber product types were designated based on the following end uses of timber:

- sawtimber used to produce lumber, plywood, veneer, pilings, or utility poles (sawtimber is defined as “trees or logs cut from trees with minimum diameter and length and with stem quality suitable for conversion to lumber”) (Helms 1998);
- house logs used for log homes;
- timber used for posts, small poles, or roundwood log furniture; and
- cedar products timber used to make shakes, shingles, or split rail fencing.

Results

Timber-processing Area

Region One National Forest System non-reserved timberland is located primarily in Idaho north of the Salmon River and in Montana. Based on timber flows from northern Idaho and Montana timberlands, the Region One Timber-processing Area (R1-TPA) includes 12 Idaho counties and 26 Montana counties (Figure 1).

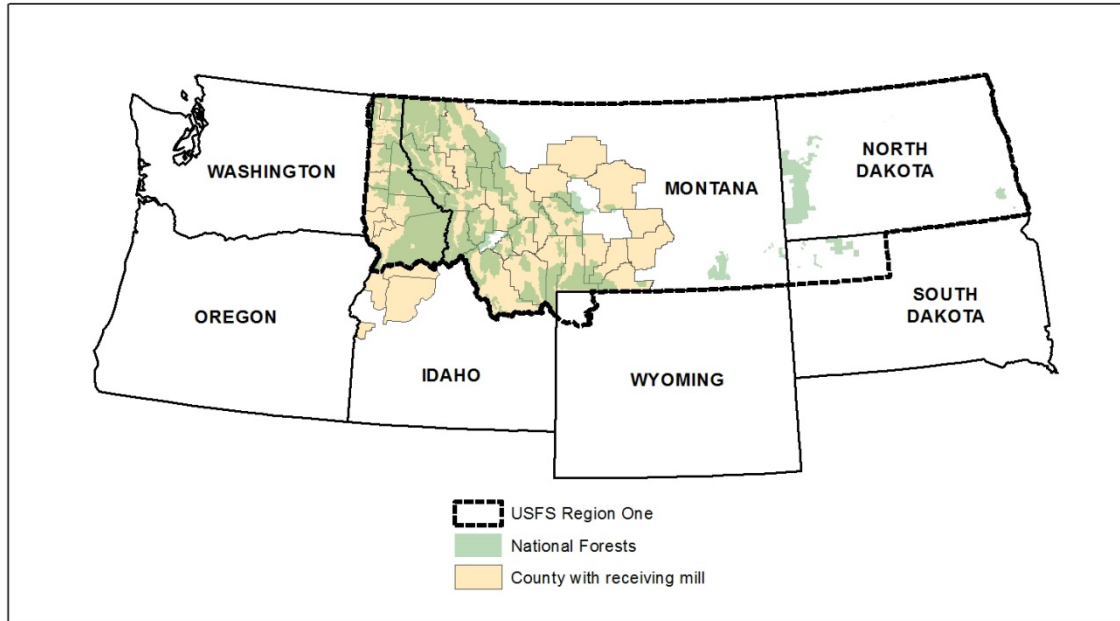


Figure 1—USDA Forest Service, Region One Timber-Processing Area

In addition to the Idaho and Montana mills, several mills in eastern Oregon and Washington and northern Wyoming have consistently received timber harvested from counties containing Region One non-reserved timberland. Because of the limited number of mills in each of these regions and the need to protect mill level data, we are unable to provide detailed information on the milling capacity in Wyoming and Oregon. The volumes flowing to these states were small and do not materially affect the overview of timber use from Region One.

Historically, there has been a modest net flow of timber from northern Idaho into eastern Washington—primarily to mills in Asotin, Ferry, Pend Oreille, and Stevens counties. Timber from Idaho has supplied 10 to 20 percent of the total timber processed in these counties (excluding pulpwood and fuelwood). Since the last report for Region One (Keegan et al. 2004) there has been substantial consolidation in mill ownership in these four counties, and with the recent very poor market conditions an additional mill has been idle and may close permanently. These factors make it difficult to report precise information on capacity and timber use in the

four counties. For this reason, we offer ranges for capacity and use estimates based on historic and recently published information. The mills in these four counties contain capacity to process 70 – 90 million cubic feet (MMCF) of timber annually (excluding pulpwood and fuelwood). In 2011, mills in this four-county area utilized 50 – 60 percent of their capacity, with over 90 percent of the timber processed coming from trees greater than 10” dbh. Although the mills prefer slightly larger trees, under good markets these mills have the capability to process substantially more small timber —30 to 50 MMCF annually, versus less than 10 MMCF used in 2011—from trees under 10” dbh.

Over 95 percent of the timber harvested in counties with Region One National Forest non-reserved timberlands was processed by mills in northern Idaho and Montana. In 2011 there were 160 timber-processing facilities in operation in these two states: 73 sawmills, 42 house log /log home facilities, 18 manufacturers of log furniture, 18 post and small pole producers, 4 cedar products producers, 4 plywood and veneer plants, and 1 utility pole producer.

Timber-processing Capacity and Volume Processed

Annual capacity to process timber within the R1-TPA in 2011 was 447 million cubic feet (MMCF), excluding pulpwood and fuelwood. Approximately 30 percent of timber-processing capacity was located in Montana and 70 percent in Idaho (Table 1). Both Idaho and Montana utilized approximately 59 percent of capacity, processing 265 MMCF of timber region-wide during 2011.

Table 1—Annual Volume of Trees Processed by Size Class (excluding pulpwood) in the Region One Timber Processing Area, 2011.					
State	Capacity	Volume Used	Volume Used by Size Class		
			dbh < 7 in.	dbh 7 - 9.9 in.	dbh 10+ in.
<i>-----Thousand Cubic Feet of Timber-----</i>					
Idaho	314,032	186,362	1,475	13,767	171,120
Montana	133,213	78,271	3,027	8,007	67,237
Total	447,245	264,633	4,502	21,775	238,357
State	Capacity	Volume Used	Volume Used by Size Class		
			dbh < 7 in.	dbh 7 - 9.9 in.	dbh 10+ in.
<i>-----Thousand Board Feet Scribner of Timber-----</i>					
Idaho	1,330,942	789,849	1,475	52,867	735,507
Montana	560,828	337,350	3,027	30,747	303,576
Total	1,891,770	1,127,199	4,502	83,614	1,039,083

Timber Volume Processed by Size Class

Within the R1-TPA, the proportion of timber used by size class varied slightly by state (Table 1). In Montana, 86 percent (67 MMCF) of timber used was from trees $\geq 10''$ dbh, while 92 percent of timber (171 MMCF) used by Idaho mills was from this larger size class. Less than 1 percent of timber used by Idaho mills was from trees $< 7''$ dbh, while nearly 4 percent of timber used in Montana was from this smallest size class. Across the entire R1-TPA, 90 percent of the timber processed (238 MMCF) was from trees $\geq 10''$ dbh, with 8 percent (22 MMCF) from trees 7 – 9.9'' dbh, and slightly less than 2 percent (4.5 MMCF) coming from trees $< 7''$ dbh.

Timber Volume Processed by Product Type and Size Class

Over 97 percent (257 MMCF) of timber processed in the R1-TPA was sawtimber used to produce lumber, plywood, veneer, pilings, or utility poles (Table 2). These products are based predominantly on timber from live/green trees; with the major exception that sawmills will occasionally substitute large quantities of timber from dead trees from salvage operations. Producers of posts, small poles, and log furniture processed 1.5 percent of the total timber

processed in the region, while house log and cedar products producers used about 0.4 and 1 percent of timber processed in the region, respectively. House log producers use timber from dead trees for the majority of their raw material; post, small pole, and roundwood furniture producers almost always use live timber.

Tree Size Class	Sawtimber	Posts, Small Poles, Log Furniture			Cedar Products	All Products
		House Logs				
----- <i>Thousand Cubic Feet of Timber</i> -----						
dbh < 7 in.	1,394	-	3,108	-	-	4,502
dbh 7 - 9.9 in.	20,919	107	748	-	-	21,775
dbh 10+ in.	234,780	1,049	-	2527	-	238,356
Total	257,093	1,156	3,856	2,527	-	264,633

The vast majority of the 257 MMCF of sawtimber used to produce lumber, plywood, veneer, pilings, and utility poles came from trees $\geq 7''$ dbh, with about 91 percent coming from trees $\geq 10''$ dbh (Table 2). Timber used for house logs and cedar products was almost exclusively from trees $\geq 10''$ dbh. Trees used for posts, small poles, and roundwood log furniture showed a much different distribution, with virtually all timber from trees $< 10''$ dbh and 81 percent from trees $< 7''$ dbh.

Timber Volume Processed by Size Class, Species, and Product Type

As mentioned in the Methods section, timber use by size class and species is summarized by product types for purposes of this analysis. Most timber used by post, pole, and log furniture manufacturers in R1-TPA was from lodgepole pine in the smallest (dbh $< 7''$) size class, whereas most sawtimber used by veneer and plywood manufacturers was from Douglas-fir and western

larch in the largest (dbh ≥ 10 ") size class. Cedar products manufacturers and utility pole plants primarily used western redcedar from the largest size class. Log home manufacturers used mostly lodgepole pine and Engelmann spruce also from the largest size class, while sawmills in the R1-TPA used the full variety of softwood species in the Northern Rockies.

Capability to Process Timber of Various Sizes

Estimates of the capability to process timber of various sizes in the R1-TPA were based on the physical characteristics of mills and the market conditions referred to in the Methods section. About 324 MMCF (72 percent) of timber-processing capacity cannot operate on trees < 10 " dbh (Table 3). Some of this capability is in mills designed to operate solely on larger timber (trees ≥ 10 " dbh) and some is at "two-sided" mills, with part of the mill designed to process small logs and the other part large logs. About 76 percent (246 MMCF) of this large-log-only capability is in Idaho, where it accounts for 78 percent of total timber-processing capacity. In Montana, large-log-only capability accounts for about 59 percent of total timber-processing capacity.

Table 3—Annual Capacity to Process Trees by Size Class (excluding pulpwood) in the Region One Timber Processing Area, 2011.				
State	Capacity	Capability by Size Class		
		dbh < 7 in. ^a	dbh 7 - 9.9 in. ^a	dbh 10+ in. ^b
<i>-----Thousand Cubic Feet of Timber-----</i>				
Idaho	314,032	18,900	49,596	245,535
Montana	133,213	7,523	47,139	78,551
Total	447,245	26,423	96,735	324,087
Capability by Size Class				
State	Capacity	dbh < 7 in. ^a	dbh 7 - 9.9 in. ^a	dbh 10+ in. ^b
		<i>-----Thousand Board Feet Scribner of Timber-----</i>		
Idaho	1,330,942	18,900	190,450	1,121,592
Montana	560,828	7,523	181,013	372,291
Total	1,891,770	26,423	371,463	1,493,884

Nearly 97 MMCF of timber-processing capacity (22 percent of total capacity) in the R1-TPA are capable of efficiently operating on trees 7 – 9.9” dbh, split nearly evenly between Idaho and Montana. Only about 26 MMCF (6 percent) of the total timber-processing capacity (excluding pulpwood processors) within the R1-TPA would be capable of operating on trees < 7” dbh. Of this 26 MMCF of capacity, 28 percent is in Montana and 72 percent is in Idaho.

Discussion

As forest restoration and fuel reduction treatments involving the mechanical removal of trees continue to increase, land managers need to understand what volume of trees of various sizes could be processed by the forest products industry in their National Forest planning zone. This study addresses several topics worthy of consideration by those planning treatments that could result in the removal of substantial volumes of trees of various sizes. The two most relevant topics, because of their perceived likelihood of occurrence and impact on regional

timber use, are expanded utilization of current timber-processing capacity and use of timber by the pulp and paper industry.

Expanded Utilization of Current Timber-processing Capacity

Utilization of timber-processing capacity in the R1-TPA was at 59 percent as of 2011, leaving over 182 MMCF of milling capacity unutilized. Mill managers have indicated that they would increase capacity utilization if raw material availability increased (Morgan et al. 2012a and 2012b). However, mills have rarely operated at more than 90 percent of capacity, even during favorable market conditions (Spoelma et al. 2008; Brandt et al. 2012). Thus, it is unlikely that *all* of the unutilized capacity would be used, but the existing industry infrastructure could readily process an additional 130-140 MMCF of timber annually. Additional volumes of trees $\geq 10''$ dbh would be most preferred by existing mills because over 72 percent of the region's milling capacity is not capable of using smaller diameter trees.

While the majority of existing capacity in the R1-TPA is configured to process trees $\geq 10''$ dbh, the results of this study do indicate an opportunity to expand the use of trees 7 – 9.9'' dbh with no change in industry infrastructure. During 2011, mills processed 22 MMCF of timber (Table 1) in this size class; they *could* process closer to 97 MMCF (Table 3). Processing more volume in the 7 – 9.9'' dbh size class could come about if more volume became available in this size class and mills substituted these smaller trees for larger timber. However, while many mills may be capable of processing a larger volume of trees in the 7 – 9.9'' dbh class, they prefer trees $\geq 10''$ dbh and often process larger trees in place of smaller diameter timber. In fact, in 2011, nearly 29 MMCF of milling capacity capable of using trees 7 – 9.9'' dbh were used to process trees $\geq 10''$ dbh within the R1-TPA.

Expanded utilization of timber-processing capacity in the smallest size class (trees < 7” dbh) is somewhat more limited. Study results indicate that the capability of mills in the R1-TPA to process logs in this size class has doubled from 13 MMCF to 26 MMCF, though only 17 percent of that capability was used in 2011. The majority of this processing capacity is in sawmills, which have increased their capability to process trees < 7” dbh in recent years. If very large volumes of small trees were made available from fuel reduction or restoration treatments, existing small-log sawmills, log furniture manufacturers, and post and pole producers would be able to use approximately 20 MMCF more than they processed in 2011. Therefore, utilizing more than an additional 20 MMCF of small trees per year would require an increase in total timber-processing capacity or increased use by the existing pulp and paper industry.

Use of Timber by the Pulp and Paper Industry

Timber used as a raw material by the pulp and paper industry is referred to as roundwood pulpwood. Roundwood pulpwood is dealt with separately from other timber products in this report because it has historically been a large-volume user of trees < 10” dbh, and because use of roundwood pulpwood has been variable and relatively unpredictable from year to year. Erratic use of roundwood pulpwood by mills outside the R1-TPA, including overseas purchasers, has also occurred. Reported roundwood pulpwood use, including some timber used as industrial fuelwood by pulp and paper mills within the R1-TPA, has ranged from less than 20 MMCF to more than 40 MMCF annually in recent years. An estimated 30 to 40 percent of this material has been from trees < 10” dbh, with the remainder coming from larger cull trees.

Variability and unpredictability of the roundwood pulpwood market exist primarily because timber in round form is an alternative to the major source of raw material of the pulp and

paper industry—mill residue from sawmills (Keegan et al. 1999). The year-to-year wood fiber requirements of pulp and paper mills vary less than the supply of mill residue varies. Pulp and paper mills have much higher fixed costs and are much more expensive to operate at varying production levels than sawmills. Thus during recessions, when lumber production and related mill residue supplies decline substantially more than pulp and paper production, demand for roundwood pulpwood increases to fill the raw material void. Decreased lumber production and increased demand for chips come both from within the R1-TPA and from other areas, including overseas.

In the context of the recession and the protracted housing collapse, 2007 through 2011 was a period of very weak demand for lumber and plywood, low product output, and reduced levels of associated mill residues. During 2007 through 2009, this led to strong demand for fiber which could not be satisfied by mill residue; as a result, the harvest of timber for use as raw material by the pulp and paper industry (pulpwood) was at historically high levels. The closure of the Smurfit Stone pulp and paper mill—one of two in Montana and Idaho—and a small uptick in lumber production, reduced the demand for pulpwood somewhat in 2011. However, demand from Oregon and Washington pulpmills supported pulpwood harvest levels well above the historic average. A return to more typical lumber and wood products markets will likely reduce the demand for roundwood pulpwood, as pulpmills will find more sawmill residue available. The chipping operation that opened during 2012 in Bonner, MT is expected to consume a portion of the roundwood pulpwood volume that the Frenchtown pulp mill used until its closure in 2010.

Recent Past and Future Outlook

The period from 2007 to 2011 represents the worst operating environment experienced by the North American and northern Rockies forest products industry since the Great Depression. It

involved a two-year recession from 2007 to 2009, the related financial crisis, and a housing collapse with the lowest levels of new home construction in over 50 years (Keegan et al. 2012). Very low prices for lumber and other wood products have accompanied this broad economic downturn.

After wood products markets and housing starts hit a low point in 2009, there were small improvements in 2010 and 2011. However, housing starts rose at a faster pace during 2012, and improvements are expected in domestic lumber markets during 2013 as well. Substantial improvements could be seen in 2014 and beyond if U.S. home building continues to recover and global demand for wood products remains strong.

With less than 60 percent of R1-TPA capacity utilized in recent years—versus a historic level of over 80 percent during good market years such as 2004 and 2006 (Spoelma et al. 2008 and Brandt et al. 2012)—the industry could process substantially more timber as markets improve, provided adequate timber supply is available.

Conclusion

As the Forest Service continues to implement fuels reduction and ecosystem restoration treatments across the country and region—often coupled with the utilization of longer-term contracts—an understanding of the current industry capacity and constraints associated with processing trees of various size classes will be essential. Specifically, poor timber markets and fluctuating pulp demand limit the utilization of small trees (<10" dbh). While there exists additional unused capacity in both of the smaller size classes, significant increases in utilization would need to coincide with an overall increase in capacity within the R1-TPA.

Literature Cited

- Brandt, J.P.; Morgan, T.A.; Keegan, C.E., III; Songster, J.M.; Spoelma, T.P.; DeBlander, L.T. 2012. Idaho's forest products industry and timber harvest, 2006. Resour. Bull. RMRS- RB-12. Fort Collins, CO: U.S. Department of Agriculture, Forest Service, Rocky Mountain Research Station. 44 p.
- Fiedler, C.E., C.E. Keegan, C.W. Woodall, T.A. Morgan, S.H. Robertson and J. Chmelik. 2001. A strategic assessment of fire hazard in Montana. Report submitted to National Joint Fire Sciences Program, Boise, ID.
- Fiedler, C.E., C.E. Keegan, D.P. Wichman and S.F. Arno. 1999. Product and economic implications of ecological restoration. *Forest Products Journal* 49 (2):19-23.
- Helms J.A. 1998. *The Dictionary of Forestry*. Society of American Foresters. Bethesda, MD. 210 p.
- Keegan C.E., K.A. Blatner and D.P. Wichman. 1999. Changing Use Patterns by Major Users of Mill Residue in the Inland Northwest. *Forest Products Journal* 49(3): 38-42.
- Keegan, C.E., T.A. Morgan, F.G. Wagner, T.P. Spoelma, P.J. Cohn, K.A. Blatner, S.R. Shook. 2004. Timber Use, Processing Capacity, and Capability to Utilize Small-Diameter Timber within USDA Forest Service, Region One Timber-processing Area. Submitted to USDA Forest Service Inventory and Monitoring Institute and Region One. Challenge cost share agreement #03-CS-1132463-241.
- Keegan, C.E., T.A. Morgan, F.G. Wagner, P.J. Cohn, K.A. Blatner, T.P. Spoelma, S.R. Shook. 2005. Capacity for utilization of USDA Forest Service, Region 1 small-diameter timber. *Forest Prod J.* 55(12):143-147.
- Keegan, C.E., III; Sorenson, C.B.; Morgan, T.A.; Hayes, S.W; Daniels, J.M. 2012. Impact of the great recession and housing collapse on the forest products industry in the western United States. *Forest Products Journal* 61(8). 625-634.
- McIver, Chelsea P.; C.B. Sorenson; C.E. Keegan; T.A. Morgan. In preparation. Montana's forest products industry and timber harvest, 2009. Resour. Bull. RMRS-RB-X. Fort Collins, CO: U.S. Department of Agriculture, Forest Service, Rocky Mountain Research Station. XX p. Preliminary data tables available at: <http://www.bber.umt.edu/forest/regionalReports.asp>.
- Morgan, T.A., C.E. Keegan, S.W. Hayes, C.B. Sorenson, J. O'Laughlin, R.G Taylor, P.Watson, T.M. Gorman, and S.R. Shook. 2012a. Idaho's forest products industry: current conditions and 2012 forecast. Idaho Forest, Wildlife and Range Experiment Station, Moscow, ID, Station Bulletin 98. 4p.
- Morgan, T.A., S.W. Hayes, C.E. Keegan, and C.B. Sorenson. 2012b. Montana's forest products industry: current conditions and 2012 forecast. BBER Economic Outlook Seminar booklet.

Spoelma, T.P., T.A. Morgan, T. Dillon, A.L. Chase, C.E. Keegan, and L.T. DeBlander. 2008. Montana's Forest Products Industry and Timber Harvest, 2004. Gen. Tech. Rep. Fort Collins, CO: USDA Forest Service, Rocky Mountain Research Station. 36 p.

Stewart, H.G., K.A. Blatner, F.G. Wagner and C.E. Keegan. 2004. Risk and economic feasibility of processing small-diameter material in the US West part I: structural lumber. *Forest Products Journal* 54(12). 97-103.

Wagner F.G., C.E. Keegan and C.E. Fiedler. 2000. Processing Value of Small-diameter Sawtimber at Conventional Stud Sawmills and Modern, High-speed Small-log Sawmills in the Western U.S.—A Comparison. *Western Journal of Applied Forestry* 15 (4): 208-212.

Wagner, F.G., C.E. Keegan, R.D. Fight and S.A. Willits. 1998. Potential for Small-Diameter Sawtimber Utilization by the Current Sawmill Industry in Western North America. *Forest Products Journal* 48(9). p30. 5p.

Western Wood Products Association (WWPA) various years. 1964-2011. Statistical yearbook of the Western lumber industry. Portland, OR.