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Wyoming's Forest Products Industry and Timber Harvest, 2010

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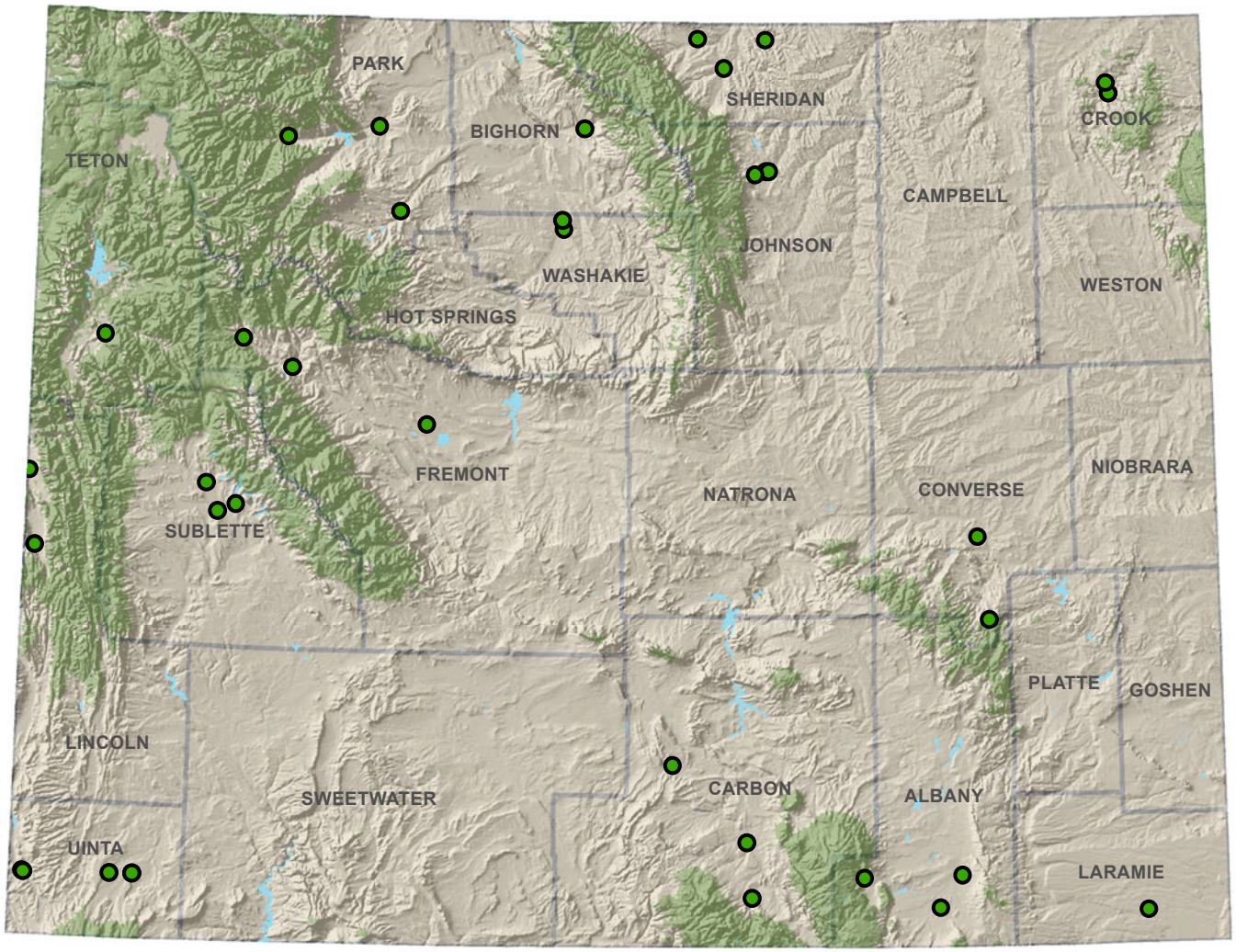

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Abstract

This report traces the flow of Wyoming's 2010 timber harvest through the primary wood-using industries; provides a description of the structure, capacity, and condition of Wyoming's primary forest products industry, and quantifies volumes and uses of wood fiber. Historical wood products industry changes are discussed, as well as changes in harvest, production, employment, and sales.

Keywords: forest economics, lumber, mill residue, overrun, timber processors, wood utilization

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Report Highlights

- A total of 29 primary wood-processing facilities operated in 13 Wyoming counties during 2010. These facilities included 12 sawmills, 7 post and pole producers, 3 log home manufacturers, 2 log furniture manufacturers, and 5 other wood products facilities.

- With the decline in U.S. housing markets beginning in 2006, the Great Recession of 2007-2009, and housing starts hitting a 50-year low in 2009, the value of wood products from Wyoming producers fell sharply from nearly $85 million in 2005 to $29.2 million in 2010 (2010 dollars). Lumber and sawn products accounted for $24.2 million, sales of house logs and log homes accounted for $1.1 million, and sales of other wood products were nearly $3.8 million in 2010.

- Wyoming's 2010 timber harvest volume was 33 million board feet (MMBF) Scribner, with 49 percent of the timber coming from national forests, 31 percent from private and tribal lands, 11 percent from state-owned lands, and slightly more than 9 percent from the Bureau of Land Management (BLM).

- Crook, Uinta, and Park were the leading timber harvest counties in Wyoming during 2010, accounting for 35, 22 and 17 percent of the total harvest, respectively.

- Estimated capacity to process timber in Wyoming during 2010 was 137 MMBF Scribner. Wood processing facilities in the state used about 32 percent of processing capacity in 2010, processing 44 MMBF of timber.

- Ponderosa pine (*Pinus ponderosa*) was Wyoming's most harvested species in 2010, accounting for nearly 16 MMBF, or 47 percent of the total harvest. This was followed by lodgepole pine (*Pinus contorta*) with 26 percent or 9 MMBF, and Englemann/Black Hills spruce (*Picea engelmannii/ Picea glauca*) with 20 percent or 6.5 MMBF.

- Nearly 64 percent of the 46 MMBF Scribner received by Wyoming mills during 2010 came from outside the state, while 50 percent of the 33 MMBF of timber harvested in Wyoming was shipped outside the state.

- Wyoming mills relied heavily on out-of-state timber from both public and private lands in 2010. Nearly three-quarters of the public lands timber processed in Wyoming came from outside the state, while 24 percent of the private timber received by Wyoming mills came from outside the state.

Contents

Introduction

This report focuses on the results of a census of Wyoming's primary forest products industry for calendar year 2010. The report includes discussion of trends since the last census in 2005, longer-term historic trends drawn from other reports, and trends and developments since 2010. The report's principal goals are to determine the utilization of Wyoming's timber harvest, identify the type and number of primary forest products firms operating during 2010 and their sources of raw material, and quantify outputs of finished products. Data on subsequent years are provided where available.

The University of Montana's Bureau of Business and Economic Research (BBER) and the USDA Forest Service, Rocky Mountain Research Station (Ogden, Utah) cooperated in the analysis and preparation of this report. BBER, in cooperation with the Forest Inventory and Analysis (FIA) programs at the Rocky Mountain and Pacific Northwest Research Stations, has developed the Forest Industries Data Collection System (FIDACS) to collect, compile, and make available state and county information on the operations of the forest products industry.

Forest Industries Data Collection System

This effort is the fourth application of FIDACS in Wyoming; the first was in 1976 (Keegan and others 1979) with the second in 2000 (Morgan and others 2005) and the third in 2005 (Brandt and others 2009). The system is based on a census of primary forest product manufacturers located in a given state and facilities in surrounding states that receive timber harvested from the state of interest. Primary forest product manufacturers are firms that process timber into manufactured products such as lumber, and facilities like wood pellet plants that use the wood fiber residue directly from timber processors. Wyoming's primary forest products manufacturers were identified through telephone directories, directories of the forest products industries (Random Lengths 2010), and with the assistance of the manufacturers themselves. Through a written questionnaire or telephone interview, manufacturers provided the following detailed information for each facility operating during calendar year 2010:

- plant location, production capacity, and employment
- volume of raw material received, by county and ownership
- species of timber received and live/dead proportions
- preferred and accepted log lengths and diameters
- finished product volumes, types, sales value, and market locations
- utilization and marketing of manufacturing residue

Firms cooperating in the 2010 Wyoming census processed virtually all of the state's commercial timber harvest. Volumes and characteristics of Wyoming timber processed by out-of-state firms were determined by surveying facilities in nearby states. A variety of publications and information provided by Federal, state, and industry managers were used to verify estimates of Wyoming's total timber harvest and wood products production and sales.

Information collected through FIDACS is stored at the University of Montana's Bureau of Business and Economic Research. Because of the substantial detail on the industry and its timber use, there is a time lag between the date of the census

and the publication of this report. To make this report more timely, results and a summary are made available online as they are compiled and reviewed (www.bber.umt.edu/fir); key data from other sources are included to provide the most recent measurers of general industry activity, and references to other publications dealing with industry conditions are included. Additional information is available by request. However, individual firm-level data are confidential and will not be released.

Historical *Overview of Wyoming's Forest Products Industry*

Wyoming's forest products industry expanded dramatically after the Second World War through the 1960s, in response to a strong demand for lumber and other wood products coupled with ready availability of Federal timber (Morgan and others 2005). From the late 1940s to the late 1960s, Wyoming's lumber production increased more than threefold, fueled by the state's timber harvest more than doubling during that time period. Through the 1970s demand for wood products remained high, the lumber markets were strong, and Wyoming's production remained high with housing starts in the U.S. exceeding 2 million units for five of the years in the decade.

Late in 1979 the demand for wood products and strong lumber markets came to an abrupt end with the precipitous drop in the U.S. housing and construction industries brought on by historically high interest rates. The sharp increase in interest rates led the U.S. and Wyoming's forest products industry into a 6-year period with the poorest sustained markets since the Great Depression. The resulting recession of 1980 only became more severe through 1982. By 1983, conditions had improved in the U.S. housing and construction industries resulting in increased demand and very high levels of forest products consumption in the United States through 1985. However, even with high demand and consumption in the United States, wood product prices remained low due to a high-valued U.S. dollar, which in turn led to decreased U.S. exports and increased Canadian imports.

Forest products markets really began to improve during the last half of the 1980s. A lower-value U.S. dollar and strong economy led to the increasing prices for wood products and Wyoming's industry responded with record production. The record production occurred because mills had considerable timber under contract from the early 1980s, which they had delayed harvesting during the poor market period. Mills experienced a temporary abundance of timber from national forests in the late 1980s when they were required to harvest some of the timber to fulfill contract obligations.

During the 1990s, the forest products industry in Wyoming and throughout the western United States was impacted by sharply reduced timber availability from Federal lands. Across the United States, harvest from Federal timberlands (mainly national forests) fell by more than 8 billion board feet, a decline of more than 80 percent. This precipitous drop in harvest levels resulted from numerous constraints on harvesting timber on public lands, including appeals and litigation of timber sales, threatened and endangered species protection, and cumulative impacts of past harvesting on other resources such as water quality and wildlife. This decrease in timber availability lead to the continued decline of the capacity to process timber in Wyoming where harvest from Federal lands had historically provided over 75 percent (WWPA 1964-2012) of the timber processed. The harvest from Federal lands throughout the West followed a similar downward trend throughout

the 1990s, and timber-processing capacity was lost in Wyoming and other western states (Keegan and others 2006).

In combination with the very large decreases in Federal timber availability, changes in U.S. and global economies had a large influence on the industry. The first Gulf War led to a recession in 1990 and 1991, which brought about decreased lumber prices. The market had reversed course by 1993 when high demand drove lumber prices to near-record highs with more robust U.S. and global economies and the significant reductions in the Federal timber supply nationwide. The markets remained strong during the last half of the 1990s, with the exception of a modest decline in the U.S. economy in 1995, and sharp declines in a number of Asian economies in late 1997 and 1998. Rising imports of Canadian softwood lumber became an increasingly contentious issue, leading, in 1996, to quotas on imports from the major timber producing provinces in Canada.

Improvement in the global economy and strengthening of the U.S. economy in 1999 improved the wood products market until 2000, when housing starts slipped in the United States and Japan. The September 11th terrorist attacks only worsened the U.S. and global recession in 2001. The reduction in housing starts brought about low lumber prices through the first half of 2003 (WWPA 1964-2012). Even with record U.S. lumber consumption of more than 56 billion board feet in 2002 and the replacement of the quota on Canadian softwood lumber in 2001 with a 27 percent duty, the low lumber prices continued. The persistent low prices were a result of poor economic conditions throughout much of the world and an excess lumber supply in the U.S. market. In 2003, Wyoming's largest sawmill went idle.

During the second half of 2003, prices for wood products began to experience a boost due to the increased domestic and global demand for wood products, a weakening U.S. dollar, and a countervailing duty on softwood lumber imported into the United States from Canada. This trend carried through 2004 and 2005, with prices reaching near record levels due in part to a very strong U.S. housing market and a robust global demand for wood products. By 2006, prices for most wood products experienced a precipitous decline as the U.S. housing market slowed dramatically. Consequently, 2008 and 2009 saw a severe collapse of the housing market, bottoming out at 550,000 housing starts in 2009. What came to be known as the "Great Recession" officially ended in June 2009; however, the economy remained weak through 2011, with housing starts at their lowest levels since the U.S. Census Bureau began tracking them in 1959 (Keegan and others 2012). Influenced by wood products markets, fuel prices, and timber availability, Wyoming's forest products industry suffered additional losses between 2005 and 2010, with the permanent closure of one of Wyoming's larger sawmills along with multiple smaller mills further reducing timber-processing capacity in the state.

Wyoming's Timber Harvest, Products, and Flow

This section focuses on ownership and geographic sources of timber, types of timber products harvested and processed, species composition, and movement of timber. It examines Wyoming's timber harvest and the industry's use of timber in the direct manufacture of products during 2010 and makes comparisons with previous years. Timber harvested for residential fuelwood is not included.

Wyoming has approximately 6 million acres of "nonreserved timberland" that are available for timber harvest (Miles 2013) (table 1). Nonreserved timberland

Table 1—Wyoming nonreserved timberland by ownership class (source: Interior West Forest Inventory and Analysis, 2000).

Ownership class	Thousand acres	Percentage of nonreserved timberland
National Forest	3,861	64.3
Non-industrial private	1,330	22.2
Industrial	—	0.0
Bureau of Land Management	501	8.3
State	288	4.8
Other public	23	0.4
All owners[a]	6,003	100.0

[a] Percentage detail may not sum to 100% due to rounding.

includes land that is "not permanently reserved from wood products utilization through statute or administrative designation" (Bechtold and Patterson 2005). Examples of reserved lands include National Forest Wilderness areas and National Parks and Monuments. The USDA Forest Service's National Forest System (NFS) manages the largest portion of Wyoming's nonreserved timberland, with responsibility for 64 percent or 3.9 million acres. The second largest ownership class is non-industrial private forest (NIPF) land, including tribal lands, which accounts for 22 percent of timberland, or approximately 1.3 million acres. Other public owners maintain the remaining 13.5 percent, or just under 1.0 million acres, of Wyoming's nonreserved timberland. Other public lands include timberland managed by the State of Wyoming, Bureau of Land Management (BLM), and county and municipal governments.

Available sawtimber volume on Wyoming's nonreserved timberland is approximately 37.3 million board feet Scribner (Thompson and others 2005). Approximately 80 percent (29.9 billion board feet) of this volume is on NFS land, while 13 percent (4.8 billion board feet) is located on non-industrial private forests, and the remaining 7 percent (2.6 billion board feet) on other public lands. Approximately 26 percent of the sawtimber volume is comprised of Engelmann spruce (*Picea engelmannii* Parry ex Engelm.), 23 percent is lodgepole pine (*Pinus contorta* Dougl. ex Loud. var. *latifolia* Engelm.), 16 percent Douglas-fir (*Pseudotsuga menziesii* (Mirb.) Franco), 13 percent subalpine fir (*Abies lasiocarpa* (Hook.) Nutt.), and 10 percent ponderosa pine (*Pinus ponderosa* Dougl. ex Laws.). Net annual growth of sawtimber on nonreserved timberland is approximately 639 million board feet (MMBF) per year. Lodgepole pine accounts for nearly 33 percent of net growth, followed by Engelmann spruce (21 percent), and ponderosa pine (17 percent).

In 2010, timber harvested from Wyoming and manufactured into wood products came from five land ownership categories: NIPF, NFS, BLM, state and other public lands. Wyoming has no large tracts of timberland owned by individuals or companies operating primary wood processing plants.

The timber harvest volume from lands in Wyoming was 5.9 million cubic feet (MMCF) (fig. 1) or 33 million board feet (MMBF) Scribner during 2010. This was a 48 percent decline from the 2005 harvest of 64 MMBF (Brandt and others 2009), and less than half of the reported harvest in 2000 (Morgan and others 2005) (table 2).

Nearly 85 percent of Wyoming's 2010 timber harvest came from four counties. Crook County was the source of 35 percent of the timber harvest, followed by Uinta County with 22 percent, Park County with 17 percent, and Big Horn County

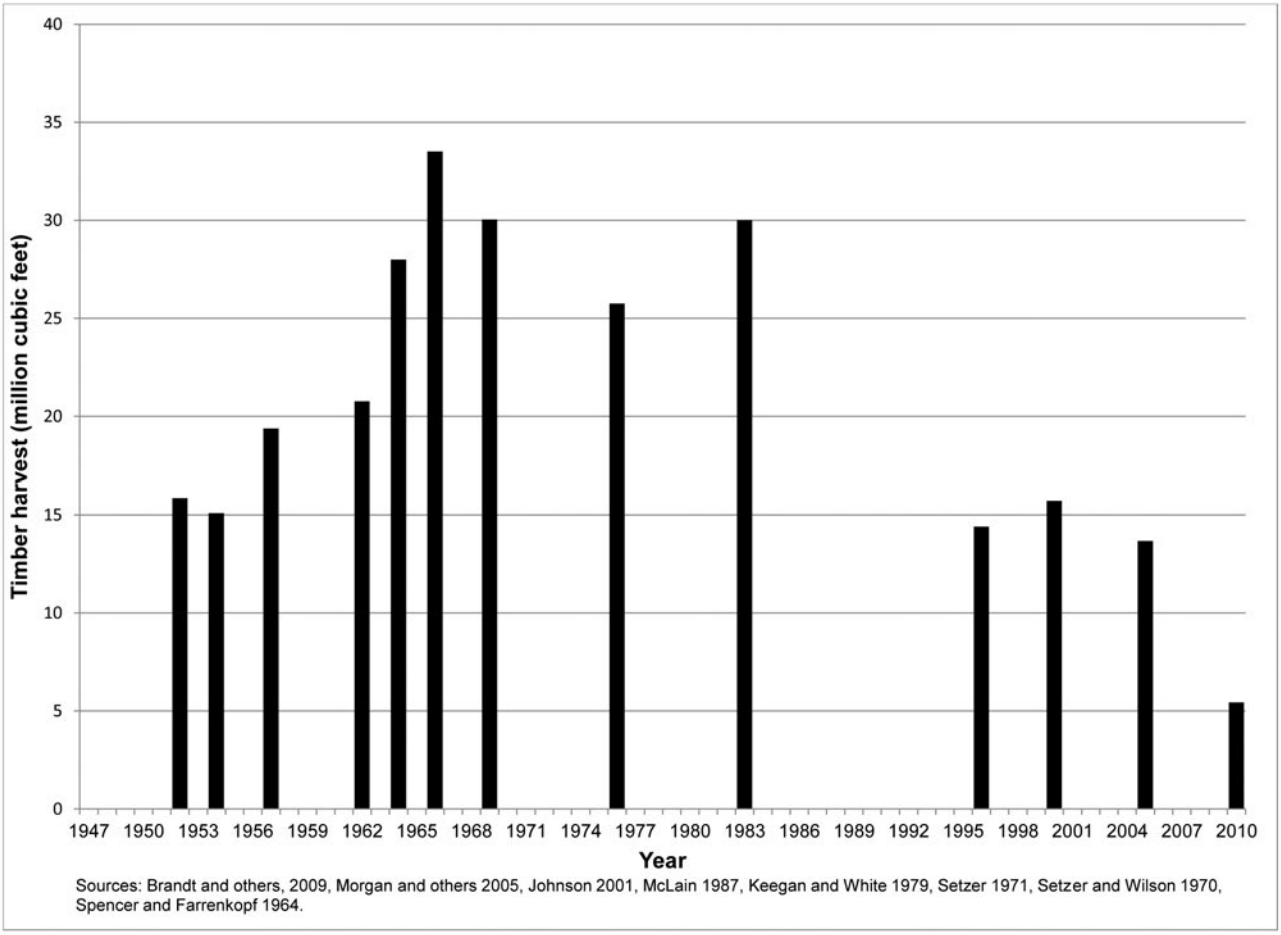


Figure 1—Wyoming timber harvest, 1947-2010.

Table 2—Wyoming timber harvest by ownership class, selected years (Sources: Morgan and others 2005; Brandt and others 2009).

Ownership class	2000	2005	2010
	---Thousand board feet, Scribner---		
Nonindustrial Private and Tribal	51,252	42,380	10,415
National Forest	13,861	18,189	16,293
Bureau of Land Management	596	903	2,939
State	4,785	2,565	3,720
All owners	70,494	64,037	33,367
	----------Percent of harvest----------		
Nonindustrial Private and Tribal	72.7	66.2	31.2
National Forest	19.7	28.4	48.8
Bureau of Land Management	0.8	1.4	8.8
State	6.8	4.0	11.1
All owners[a]	100	100	100

[a] Percentage detail may not sum to 100% due to rounding.

with 14 percent (table 3). Crook County likewise led the state's timber harvest during 2005, providing 58 percent of Wyoming's timber harvest (Brandt and others 2009).

Table 3—Wyoming timber harvest (MBF, Scribner) by county and ownership, 2010.

Resource Area	National Forest	Private and Tribal	State	BLM	Total	Percent of Total
Northeast Wyoming	**4,496**	**4,496**	**2,636**	-	**11,628**	**34.8**
Campbell	-	-	-	-	-	-
Crook	4,496	4,496	2,636	-	11,628	34.8
Weston	-	-	-	-	-	-
North Central Wyoming	**4,506**	**287**	-	-	**4,793**	**14.4**
Big Horn	4,500	52	-	-	4,552	13.6
Johnson	-	95	-		95	0.3
Sheridan	-	95	-		95	0.3
Washakie	6	45	-		51	0.2
Northwest Wyoming	**4,791**	**345**	**1,004**	**231**	**6,371**	**19.1**
Fremont	166	20	-		186	0.6
Hot Springs	-	-	2	0.5	3	0.0
Lincoln	-	20		230	250	0.7
Park	4,500	93	1,002		5,595	16.8
Sublette	125	212	-		337	1.0
Teton	-	-	-		-	-
Southeast Wyoming	**2,500**	**576**	**80**	-	**3,156**	**9.5**
Albany	2,500	514	27		3,041	9.1
Carbon	-	45	-		45	0.1
Converse	-	11	27		38	0.1
Goshen	-	-	-		-	-
Laramie	-	-	-		-	-
Natrona	-	7	27		33	0.1
Niobrara	-	-	-		-	-
Platte	-	-	-		-	-
Southwest Wyoming	-	**4,711**	-	**2,708**	**7,419**	**22.2**
Sweetwater	-	-	-		-	-
Uinta	-	4,711		2,708	7,419	22.2
All counties[a]	16,293	10,415	3,720	2,939	33,367	100

[a] Percentage detail may not sum to 100% due to rounding.

Table 4—Wyoming timber harvest by species, selected years (sources: McLain 1987; Morgan and others 2005; Brandt and others 2009).

Species	1983	2000	2005	2010
	---------Thousand board feet, Scribner---------			
Ponderosa pine	70,203	42,121	44,156	15,877
Lodgepole pine	60,058	18,824	9,853	8,716
Engelmann/Black Hills spruce	9,528	4,112	3,640	6,510
Douglas-fir	4,688	3,562	5,785	1,107
True firs	2,492	1,661	597	107
Other softwoods	93	13	4	1,048
Hardwoods	36	201	3	-
All species	147,098	70,494	64,038	33,367
	----------Percentage of harvest----------			
Ponderosa pine	47.7	59.8	69.0	47.6
Lodgepole piine	40.8	26.7	15.4	26.1
Engelmann/Black Hills spruce	6.5	5.8	5.7	19.5
Douglas-fir	3.2	5.1	9.0	3.3
True firs	1.7	2.4	0.9	0.3
Other species	0.1	0.3	0.0	3.1
All species[a]	100	100	100	100

[a] Percentage detail may not sum to 100% due to rounding.

As in previous years, ponderosa pine and lodgepole pine were Wyoming's most harvested species (table 4). Ponderosa pine accounted for 15.9 MMBF, or 48 percent of the total harvest in 2010, followed by lodgepole pine with 26 percent or 8.7 MMBF. Harvest of Engelmann spruce (*Picea engelmannii*) and Black Hills (white) spruce (*Picea glauca* (Moench) Voss) increased substantially to 6.5 MMBF and nearly 20 percent of the total harvest. The remaining harvest was made up of Douglas-fir with 3.3 percent, true firs (*Abies* spp.) with 0.3 percent, and other softwoods and hardwoods accounting for 3.1 percent of the harvest.

Harvest by Product Type

Wyoming's timber harvest falls into three general product categories: saw logs—timber sawn to produce lumber, mine timbers, and the like; posts and poles—timber used to manufacture fence posts, small poles, and rails used in fence construction; and other products—timber used to manufacture house logs, log furniture, and other roundwood products.

The product shares of the Wyoming harvest have been changing over the years, although the changes have been less significant in the last decade. In 1976, saw logs comprised 91 percent of Wyoming's industrial timber harvest (Keegan and others 1979), and house logs together with "other products" accounted for just over 2 percent of the harvest. The remaining 7 percent of Wyoming's 1976 timber harvest was made up of roundwood pulpwood. In 2000, saw logs accounted for 89 percent of Wyoming's industrial timber harvest, house logs had increased to nearly 3 percent, and other products made up about 8 percent of Wyoming's timber harvest, of which the majority portion was post and poles (Morgan and others 2005). In 2005, saw logs made up the vast majority of the harvest at 94 percent, while house logs and post and poles had decreased to less than 1 and 4 percent, respectively (Brandt and others 2009). During 2010, saw logs were the primary timber product harvested in Wyoming, accounting for 98 percent (32.7 MMBF) of the total harvest (table 5). Posts and small poles accounted for 1 percent (0.33 MMBF), while house logs and other products made up the remaining 1 percent of the 2010 harvest.

For the first time in a decade, private timberlands did not supply the majority of the saw log harvest in Wyoming. The 2010 saw log harvest from private timberlands accounted for only 31 percent (10.1 MMBF), while national forest timberlands supplied 50 percent (16.3 MMBF), and other public timberlands supplied the remaining 19 percent (6.3 MMBF). In 2005, private timberlands provided a significantly larger proportion of the saw log harvest, providing 67 percent (40.3 MMBF), while saw logs from Wyoming's NFS timberlands made up a lower proportion, providing only 28 percent, and the remaining 5 percent of the saw log harvest was from other public timberlands (Brandt and others 2009). The increase in the proportion from other public timberlands was due to a large increase in the harvest from State lands between 2005 and 2010.

Other public timberlands were the primary source of Wyoming's post and pole harvest, providing 92 percent (2 MMBF) in 2010, the majority of which came from BLM lands. Private and NFS timberlands supplied the remaining 8 percent. During 2005, private timberlands provided 61 percent (1.6 MMBF) of Wyoming's post and pole harvest, NFS provided an additional 0.6 MMBF (21 percent), and the remaining 18 percent came from other public timberlands (Brandt and others 2009). The harvest of house logs and other products each accounted for less than 1 percent of the total harvest in 2010.

Table 5—Wyoming timber harvest volume by ownership source and product type, 2010.

Ownership source	Saw logs	Post and Pole	Other products[a]	All products
	----------*Thousand board feet, Scribner*----------			
Private timberlands	**10,112**	**94**	**209**	**10,415**
Industrial	-	-	-	-
Nonindustrial and Tribal	10,112	94	209	10,415
Public timberlands	**22,583**	**236**	**133**	**22,952**
National Forests	16,267	6	20	16,293
Other Public[b]	6,316	230	113	6,659
Total	32,695	330	342	33,367
	----------*Percent of harvest*----------			
Private timberlands	**30.9**	**28.5**	**61.2**	**31.2**
Industrial	-	-	-	-
Nonindustrial and Tribal	30.9	28.5	61.2	31.2
Public timberlands	**69.1**	**71.5**	**38.8**	**68.8**
National Forests	49.8	1.8	5.9	48.8
Other Public[b]	19.3	69.7	32.9	20.0
Total	100	100	100	100

[a] Other timber products include logs used for house logs, log furniture, and industrial fuelwood.
[b] Other public includes state and BLM lands.

Harvest by Geographic Source

The geographic source of Wyoming's timber harvest has been from the mountainous regions of the state, where sufficient moisture allows timber to achieve a merchantable size (Green and Conner 1989). Wyoming's timber harvest was divided among five resource areas for 2010: northeast, north central, northwest, southeast, and southwest (fig. 2). The Northeast Resource Area includes Campbell, Crook, and Weston Counties and accounted for 35 percent (11.6 MMBF) of Wyoming's 2010 timber harvest (table 3). The Southwest Resource Area accounted for 19.3 percent (6.4 MMBF) and includes Sweetwater and Uinta counties. The Northwest Resource Area provided 22 percent (7.3 MMBF) and includes Fremont, Hot Springs, Lincoln, Park, Sublette, and Teton Counties. The North Central Resource Area includes Big Horn, Johnson, Sheridan, and Washakie Counties and was responsible for providing 14.5 percent (4.8 MMBF) of Wyoming's timber harvest. Over 9 percent (3.2 MMBF) of the harvest originated in the Southeast Resource Area, which includes the counties of Albany, Carbon, Converse, Goshen, Laramie, Natrona, Niobrara, and Platte. The Southwest Resource Area's proportion of the harvest experienced the largest increase from 4 percent (2.6 MMBF) in 2005 to 19.3 percent (6.4 MMBF), while the Northeast Resource Area experienced the largest decrease from 61 percent (39 MMBF) in 2005 to 35 percent (11.6 MMBF).

Harvest by Species

The species composition of Wyoming's saw log harvest has shifted from predominantly lodgepole pine (73 percent in 1969) with minor components of ponderosa pine and Engelmann spruce to a distribution with an increasing component of ponderosa pine (73 percent in 2005) (Brandt and others 2009). Between 2005 and 2010, harvest of ponderosa pine declined to its pre-2000 share of 49 percent, while harvest of lodgepole pine more than doubled from 11 to 25 percent of the cubic harvest volume and Engelmann and Black Hills spruce increased three-fold from 6 to 20 percent of the total cubic saw log harvest, the highest share on record

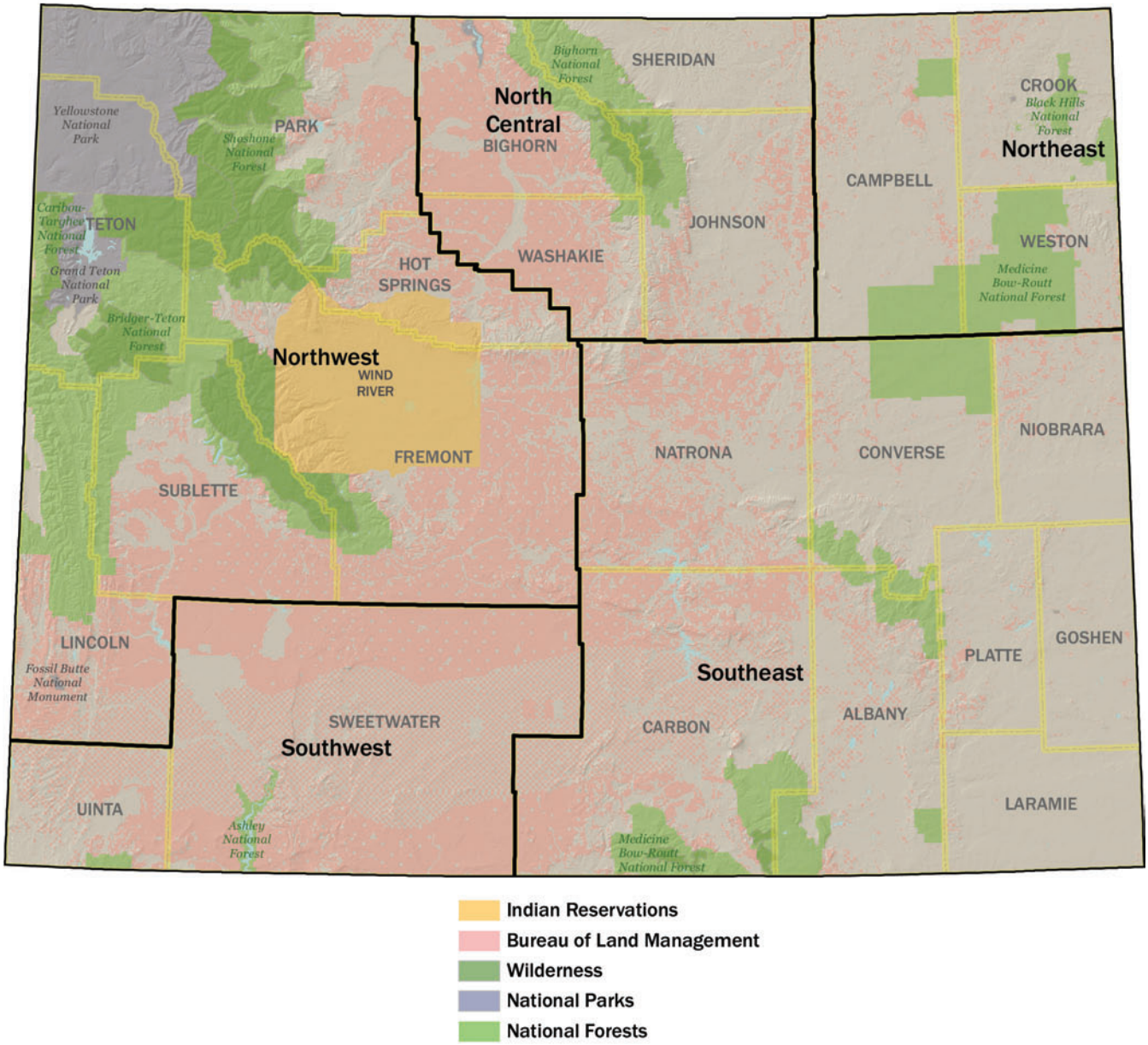


Figure 2—Wyoming Resource Areas.

(table 6). Douglas-fir decreased as a proportion of the harvest from 9 percent to 3 percent, as did true firs, decreasing from 1 to 0.3 percent. This species shift corresponds to the ongoing geographic shift in harvest from northeastern counties, where ponderosa pine predominates, to western counties where lodgepole pine, spruce, and Douglas-fir are the predominant timber species. Furthermore, nearly 52 percent of Wyoming's ponderosa pine volume on nonreserved timberland occurs on NIPF lands, where owners/managers tend to be more sensitive to market changes than public land mangers (Thompson and others 2005).

As in 2000 and 2005, ponderosa pine was the leading species harvested for lumber production, followed by lodgepole pine. Lodgepole pine accounted for the majority of the volume harvested for both posts and poles and other products, followed by spruces and other species (table 7).

Table 6—Species composition of Wyoming's historical saw log harvest, selected years (Sources: Brandt and others 2009; Keegan and White 1979; Keegan and others 1979; McLain 1987; Morgan and others 2005; Setzer 1971).

Species	1969	1976	1983	2000	2005	2010
	----------Thousand cubic feet----------					
Ponderosa pine	3,383	6,000	14,138	8,870	9,235	3,181
Lodgepole pine	21,300	12,546	11,990	2,869	1,394	1,638
Engelmann/Black Hills spruce	3,399	2,563	1,902	863	761	1,297
Douglas-fir	833	1,323	937	622	1,183	216
True firs	369	1,084	503	222	124	18
Other species	3	75	26	3	-	203
All species	29,287	23,591	29,496	13,449	12,697	6,552
	----------Percentage of harvest----------					
Ponderosa pine	11.6	25.4	47.9	66.0	72.7	48.5
Lodgepole pine	72.7	53.2	40.6	21.3	11.0	25.0
Engelmann/Black Hills spruce	11.6	10.9	6.4	6.4	6.0	19.8
Douglas-fir	2.8	5.6	3.2	4.6	9.3	3.3
True firs	1.3	4.6	1.7	1.7	1.0	0.3
Other species	0.0	0.0	0.0	0.0	0.0	3.1
All species[a]	100	100	100	100	100	100

[a] Percentage detail may not sum to 100% due to rounding.

Table 7—Wyoming timber harvest by species and product, 2010.

Species	Saw logs	Post and Pole	Other products[a]	All products
	----------Thousand board feet, Scribner----------			
Ponderosa pine	15,873	-	4	15,877
Lodgepole pine	8,173	296	248	8,716
Spruces	6,470	-	40	6,510
Douglas-fir	1,077	-	31	1,107
Other species[b]	1,102	35	18	1,155
All species	32,695	330	342	33,367
	----------Percent of harvest----------			
Ponderosa pine	48.5	-	1.2	47.6
Lodgepole pine	25.0	89.5	72.6	26.1
Spruces	19.8	-	11.8	19.5
Douglas-fir	3.3	-	9.0	3.3
Other species[b]	3.4	10.5	5.4	3.5
All species	100	100	100	100

[a] Other products include logs used for log homes, log furniture, and industrial fuelwood.
[b] Other species include: subalpine fir, Rocky Mountain juniper, and aspen.

Timber Flow

Wyoming has proportionately larger log flows into and out of the state than any other western state. Wyoming imported 29.8 MMBF of timber from other states and exported 16.7 MMBF, making Wyoming a net importer of 13.1 MMBF of timber during 2010 (table 8). Consequently, more than 46.5 MMBF of timber crossed Wyoming state lines in 2010, a volume equivalent to 139 percent of the state's timber harvest. During 2005, more than 77 MMBF crossed Wyoming's state line, importing (49.9 MMBF) and exporting (27.4 MMBF) more timber than in 2010 (Brandt and others 2009). However, when you look at the amount of timber crossing Wyoming's state line for both years as a proportion of the timber harvest,

Table 8—Timber flow into (imports) and out of (exports) Wyoming, 2010.

Timber products	Imports	Exports	Net imports (net exports)
	------*Thousand board feet, Scribner*------		
Saw logs	29,213	16,725	12,488
Post and pole	458	-	458
House logs	160	-	160
All products	29,831	16,725	13,106

more timber crossed state lines in 2010 (139 percent) than did in 2005 (124 percent) or 2000 (121 percent). Facilities in the Northeast Resource Area received the most out-of-state timber, followed by the Southwest Resource Area. The Northeast Resource Area also shipped the most timber out-of-state, followed closely by the Northwest and North Central Resource Areas.

The largest volume of timber imported by Wyoming mills came from South Dakota, followed by Utah and Montana. These three states combined were responsible for 98 percent (29.2 MMBF) of the timber imported into Wyoming. In 2005, Colorado was the leading source of out-of-state-timber, which when combined with South Dakota and Montana accounted for 87 percent of all timber imported into Wyoming (Brandt and others 2009). Another 11 percent of the 2010 timber imports came from Utah, and the remaining 2 percent came from Nebraska, Idaho, Washington, and Canada.

Just over 50 percent (16.7 MMBF) of Wyoming's 2010 timber harvest went to other states for processing, with Montana receiving nearly 60 percent (10 MMBF) of the exported timber and the remainder going to South Dakota. This represented a departure from the 2005 out-of-state timber flow, when Montana and Utah received about 17 percent of Wyoming's timber harvest, and South Dakota received over 80 percent of the exported volume (Brandt and others 2009). Of the timber harvested and processed within Wyoming during 2010, 80 percent was harvested and processed in the same resource area.

Timber Received by Wyoming Mills

Wyoming mills received over 46 MMBF Scribner of timber for processing during 2010. Timber receipts refers to the volume of timber delivered to Wyoming mills from both in-state and out-of-state sources. The volume of timber received by Wyoming mills differs from the state's timber harvest because of the considerable timber flow into and out of the state. Nearly half (29.8 MMBF Scribner) of the timber processed in Wyoming in 2010 came from outside the state, while slightly more than half (16.7 MMBF) of Wyoming's 2010 timber harvest was processed by facilities in other states. Private timberlands contributed nearly 24 percent (10.9 MMBF) of the 46 MMBF of timber processed by Wyoming mills during 2010 (table 9), down from 57 percent in 2005. Public timberlands supplied the remaining 76 percent (35.4 MMBF Scribner) of timber processed by Wyoming mills, up from 43 percent in 2005.

Wyoming mills relied heavily on out-of-state timber from both public and private lands in 2010. Approximately 74 percent (27.1 MMBF) of public lands timber processed in Wyoming came from outside the state, while about 24 percent (2.6 MMBF) of private timber received by Wyoming mills came from outside the state. The distribution of Wyoming's mills near the state's borders with national

Table 9—Wyoming timber receipts by ownership class, 2010.

Ownership class	Thousand board feet, Scribner	Percent of total
Private	**10,949**	**23.6**
Industrial	-	0.0
Non-industrial and Tribal	10,949	23.6
Public	**35,389**	**76.1**
National Forest	29,071	62.6
Other public[a]	6,318	13.6
Canadian	**135**	**0.3**
All owners[b]	46,473	100

[a] Other public includes state and BLM lands.
[b] Percentage detail may not sum to 100% due to rounding.

Table 10—Wyoming timber receipts by ownership class and product type, 2010.

Ownership class	Saw logs	Post and Pole	Other products[a]	All products[b]
	----------*Thousand board feet, Scribner*----------			
Private	**10,301**	**414**	**234**	**10,949**
Industrial	-	-	-	0
Non-industrial and Tribal	10,301	414	234	10,949
Public	**34,882**	**374**	**133**	**35,389**
National Forest	28,907	144	20	29,071
Other public[b]	5,975	230	113	6,318
Canadian	**-**	**-**	**135**	**135**
All owners	45,183	788	502	46,473

[a] Other products include logs used for log homes, log furniture, and industrial fuelwood.
[b] Other public includes state and BLM lands.

forests in South Dakota, Colorado, and Montana contributed to the large proportion of out-of-state public lands timber processed by Wyoming mills.

Private lands contributed 23 percent (10 MMBF) of sawtimber receipts, with public lands contributing the remaining 77 percent (table 10). Public lands were the source of 47 percent of timber used for posts and poles, primarily from BLM lands, with the remainder coming from private lands. In 2005, receipts for posts and poles accounted for 3.5 percent (4.5 MMBF) of the total timber used in Wyoming (Brandt and others 2009), in 2010 posts and poles accounted for 1.7 percent (0.8 MMBF) of timber use. Among mills utilizing timber for other products, private lands provided 47 percent of the timber used in 2010, with public and Canadian timberlands contributing the balance with 27 percent each.

Wyoming's Primary Forest Products Industry

The following section provides details on Wyoming's forest products sectors that processed timber and mill residue into finished products during 2010: sawmills, house log and log home manufacturers, log furniture producers, post and pole manufacturers, and other primary wood products manufacturers (i.e. wood pellet, commercial firewood and animal bedding producers).

The 2010 census identified 29 active primary forest products manufacturers in Wyoming. These plants produced an array of products including lumber and other

Table 11—Active Wyoming primary wood products facilities by county and product during 2010 and other years (sources: Brandt and others 2009; Morgan and others 2005; McLain 1987; Keegan and others 1979; Keegan and White 1979).

County	Sawmills	Post and poles	Log homes	Log furniture	Other products[a]	All products
Northeast Wyoming	**2**	**-**	**-**	**-**	**1**	**3**
Campbell	-	-	-	-	-	-
Crook	2	-	-	-	1	3
Weston	-	-	-	-	-	-
North Central Wyoming	**1**	**2**	**1**	**-**	**1**	**5**
Big Horm	-	-	-	-	-	-
Johnson	1	1	-	-	-	2
Sheridan	-	-	1	-	-	1
Washakie	-	1	-	-	1	2
Northwest Wyoming	**4**	**2**	**1**	**1**	**-**	**8**
Fremont	1	-	-	-	-	1
Hot Springs	-	-	-	-	-	-
Lincoln	1	-	-	-	-	1
Park	1	1	-	1	-	3
Sublette	1	1	1	-	-	3
Teton	-	-	-	-	-	-
Southeast Wyoming	**3**	**1**	**1**	**-**	**2**	**7**
Albany	1	1	-	-	1	3
Carbon	-	-	1	-	-	1
Converse	2	-	-	-	-	2
Goshen	-	-	-	-	-	-
Laramie	-	-	-	-	1	1
Natrona	-	-	-	-	-	-
Niobrara	-	-	-	-	-	-
Platte	-	-	-	-	-	-
Southwest Wyoming	**2**	**2**	**-**	**1**	**1**	**6**
Sweetwater	-	-	-	-	-	-
Uinta	2	2	-	1	1	6
2010 Total	**12**	**7**	**3**	**2**	**5**	**29**
2005 Total	21	8	18	8	4	59
2000 Total	23	8	8	11	5	55
1983 Total	34	3	4	0	0	41
1976 Total	50	7	4	0	1	62
1962 Total	76	0	0	0	0	76

[a] Other products include fuel pellets, firewood, and other primary manufacturers.

sawn products, wood pellets, house logs, posts, poles, firewood and log furniture (table 11). Sixty-two active firms were identified in the 1976 census (Keegan and others 1979), McLain (McLain 1987, 1988) canvassed 41 firms in 1983, Morgan and others (2005) identified 55 firms operating in 2000 and Brandt and others (2009) identified 59 firms operating in 2005. Most decreases in the number of firms have occurred in the sawmill sector, which had as many as 107 active sawmills in 1957 (Miller and Wilson 1959), 50 firms in 1976 (Keegan and others 1979), 23 active plants in 2000 (Morgan and others 2005) 21 operating in 2005, and only 12 active as of 2010. In contrast, the number of primary wood products producers in other sectors increased between 1976 and 2005, before declining after 2005. The significant decrease across all sectors since 2005 is consistent with trends in other states and can be attributed to the Great Recession and steep drop and slow rebound of U.S. housing starts since 2006 (Keegan and others 2012).

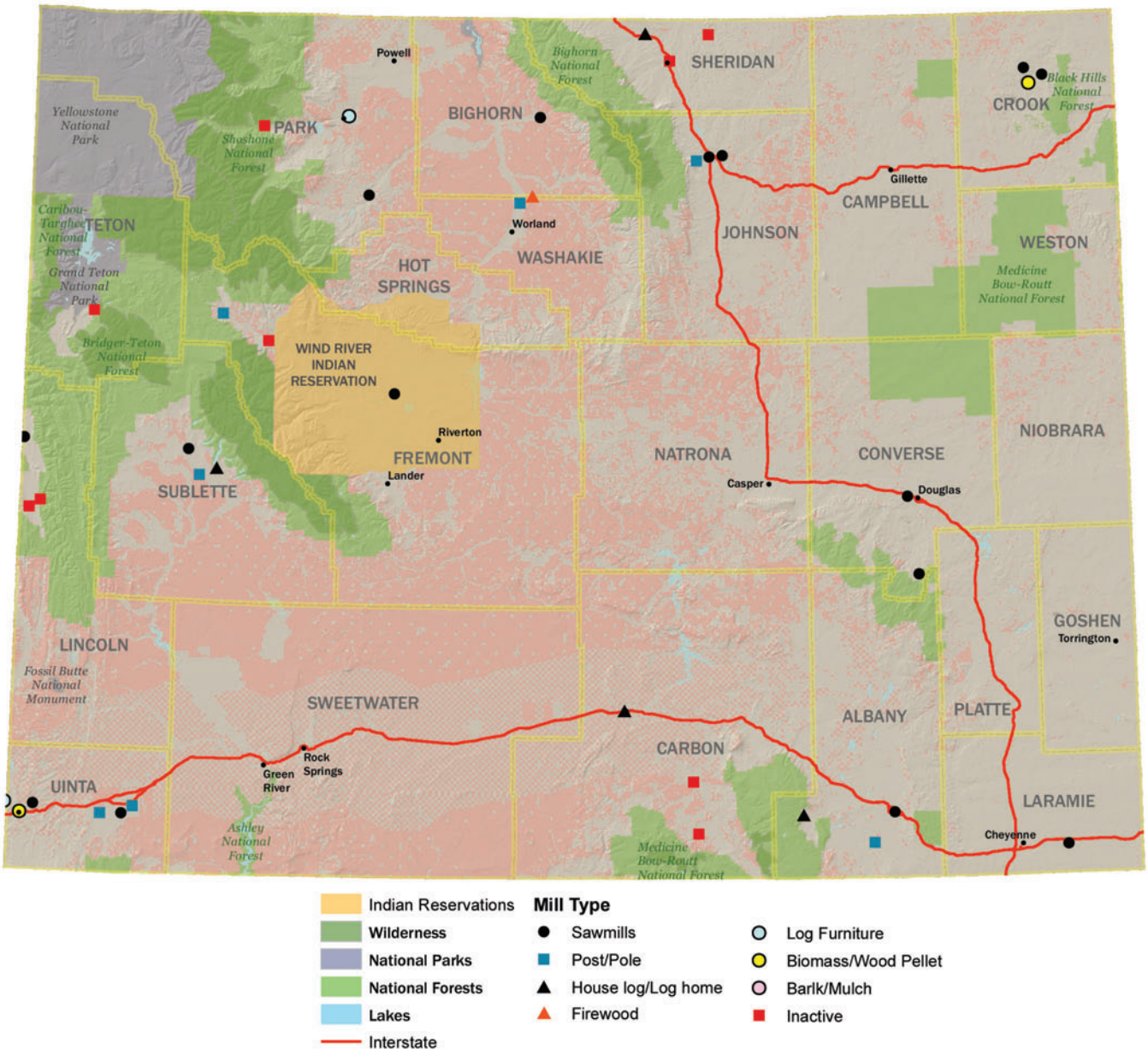


Figure 3—Location of Wyoming's primary wood products manufacturers, 2010

During 2010, wood product manufacturing facilities operated in 13 of Wyoming's 23 counties (fig. 3), two fewer counties than in 2005. Uinta County contained six active timber-processing facilities in 2010, more than any other county, but two fewer than were active in the county during 2005. Park County, which contained the greatest number of facilities in 2005 at 13, was tied for second with Albany and Crook counties with three primary wood processing facilities in 2010. Overall, the Northwest Resource Area experienced the largest decline in active timber processing facilities, falling from 28 active facilities in 2005 to just eight active facilities in 2010. Half of the Northwest Resource Area mills that closed from 2005 to 2010 were house log plants, as well as five sawmills, and five log furniture plants. The reduction in house log facilities was in conjunction with the collapse of U.S. housing markets that began in 2006, an official recession from 2007-2009, a reeling wood products industry, and a trend of log home facility closures throughout the West (Keegan and others 2012; Morgan and others 2012).

Table 12—Number of active Wyoming sawmills and annual lumber production, selected years (sources: Brandt and others 2009; Keegan and White 1979; Keegan and others 1979; McLain 1987; Miller and Wilson 1959; Morgan and others. 2005; Setzer and Wilson 1970; Setzer 1971; Spencer and Farrenkopf 1964).

Year	Number of mills	Average annual lumber production
		Million board feet, lumber tally
2010	12	4.6
2005	21	6.0
2000	23	7.3
1983	34	5.0
1976	50	4.1
1974	49	3.4
1969	50	3.8
1966	65	1.9
1962	76	1.4
1957	107	1.0

Timber-Processing Sectors

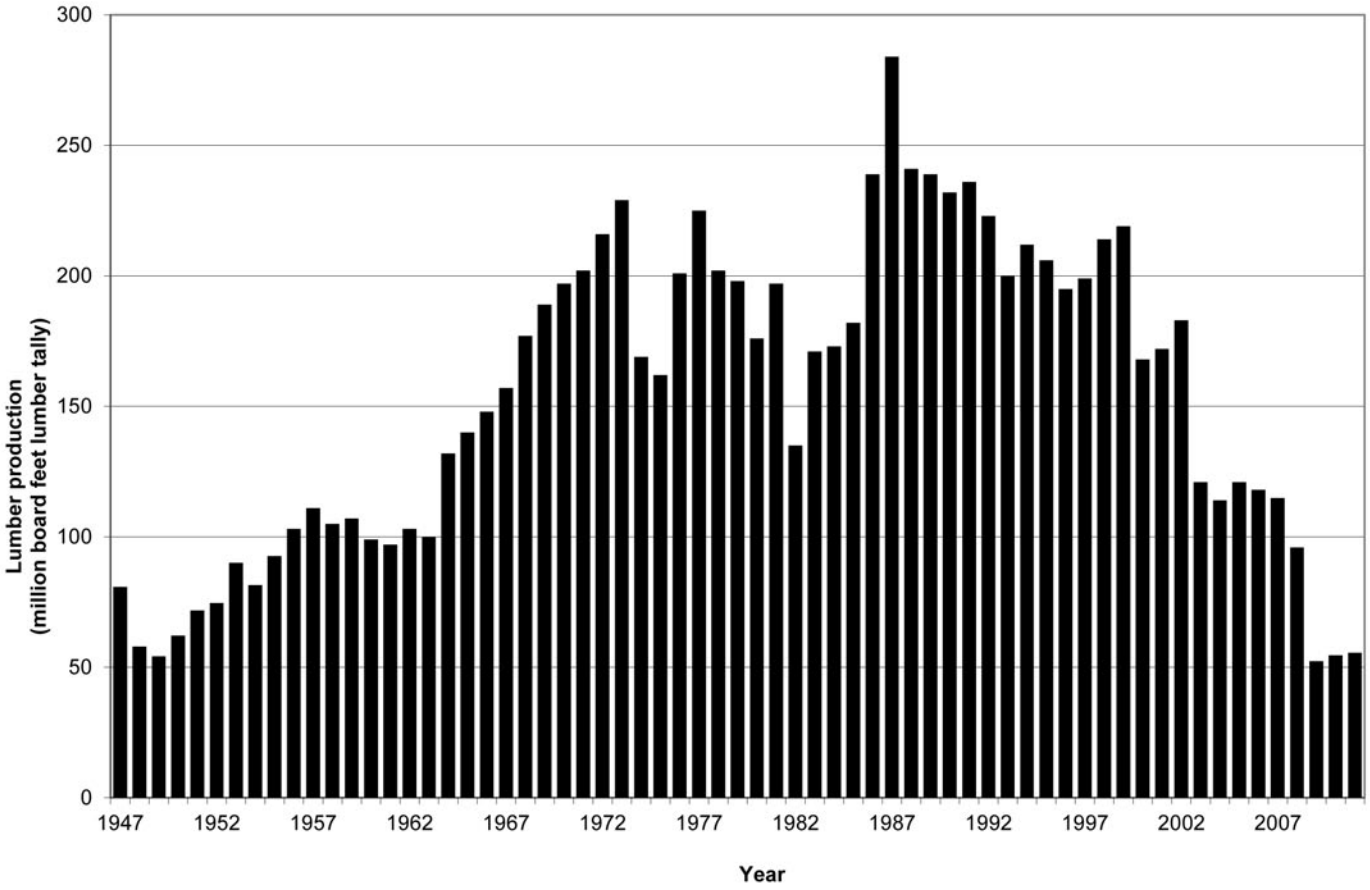
Sawmill Sector

Wyoming's 12 sawmills produced about 55 million board feet (MMBF) of lumber, timbers, and other sawn products in 2010. This was a decrease of more than 50 percent from 2005 production levels of 127 MMBF (fig. 4). Since 2003, Wyoming's lumber production has actually been less than it was in the severe recession of 1982, when only 135 MMBF were produced (WWPA 1964-2012). Of the 55 MMBF produced in 2010, approximately 49 MMBF were lumber, while 6 MMBF were structural timbers, pallets and furniture parts.

Throughout the last 50 years, the number of sawmills in Wyoming has decreased and Wyoming's annual lumber production has fluctuated widely. However, the average output per mill generally increased until it peaked at 7.3 MMBF in 2000 (table 12). Average annual lumber production per mill dropped by 18 percent from 2000 to 2005, and again dropped by 25 percent from 2005 and 2010. As has been the trend in the Four Corners states of Arizona, Colorado, New Mexico, and Utah (Hayes and others 2012), the number of lumber mills in Wyoming and the average lumber production per mill has been decreasing since 2000. This raises concerns regarding long haul distances for raw materials which can make land management projects uneconomical (Keegan and others 2006).

As in previous years, lumber production during 2010 was concentrated in the state's largest mills. Five sawmills accounted for 98 percent of Wyoming's lumber production in 2010, whereas during 2005 the four largest mills accounted for 86 percent of Wyoming's lumber production (Brandt and others 2009) (table 13). In 2010, these five sawmills each produced an average of 10.7 MMBF lumber tally. The seven mills producing 1 MMBF or less of lumber annually accounted for 2 percent of Wyoming's 2010 production, and averaged 0.2 MMBF of annual lumber production.

Sawmills reported their annual production capacity in board feet lumber tally. Wyoming's 12 active sawmills had about 67 MMBF of output capacity and utilized about 82 percent (54.7 MMBF) of capacity in 2010. This is in stark contrast



Source: Western Wood Products Association (WWPA) 1964-2006.
Note: WWPA began combining Wyoming and South Dakota lumber production in 2006. The data after 2006 are BBER estimates.

Figure 4—Wyoming lumber production, 1947-2011.

to the 2005 report by Brandt and others (2009) in which 21 active sawmills had about 132 MMBF of output capacity and only 67 percent of this capacity was utilized, which is well below the normal operating level of sawmills. During 2010, the five sawmills with an annual output capacity greater than 1 MMBF accounted for 96 percent of Wyoming's lumber-producing capacity.

Wyoming's inflation-adjusted lumber sales for 2010 are among the lowest on record (fig. 5). Prior to 2009, the lowest sales value (expressed in 2010 dollars) occurred in 2003 when sales only totaled about $41 million, which is well below the sales value seen in the recession of the early 1980s. In 1982, Wyoming's lumber sales value (in constant 2010 dollars) was about $61 million. From 1982, sales increased to the near record levels of approximately $140 million in 1994, after which the sales value dropped to about $100 million and remained relatively stable through 1999. Then in 2000, sales dropped sharply to around $60 million, where they remained until the 2003 low point. From 2003 to 2005 sales picked up slowly, going from $37 to $46 million. Beginning in 2007, due to disclosure issues and the shrinking number of mills, the Western Wood Products Association lumber production and sales value data for Wyoming began being reported with South Dakota, and are no longer available separately. Across the West, sales dropped off precipitously as a result of the 2006 housing collapse and subsequent recession.

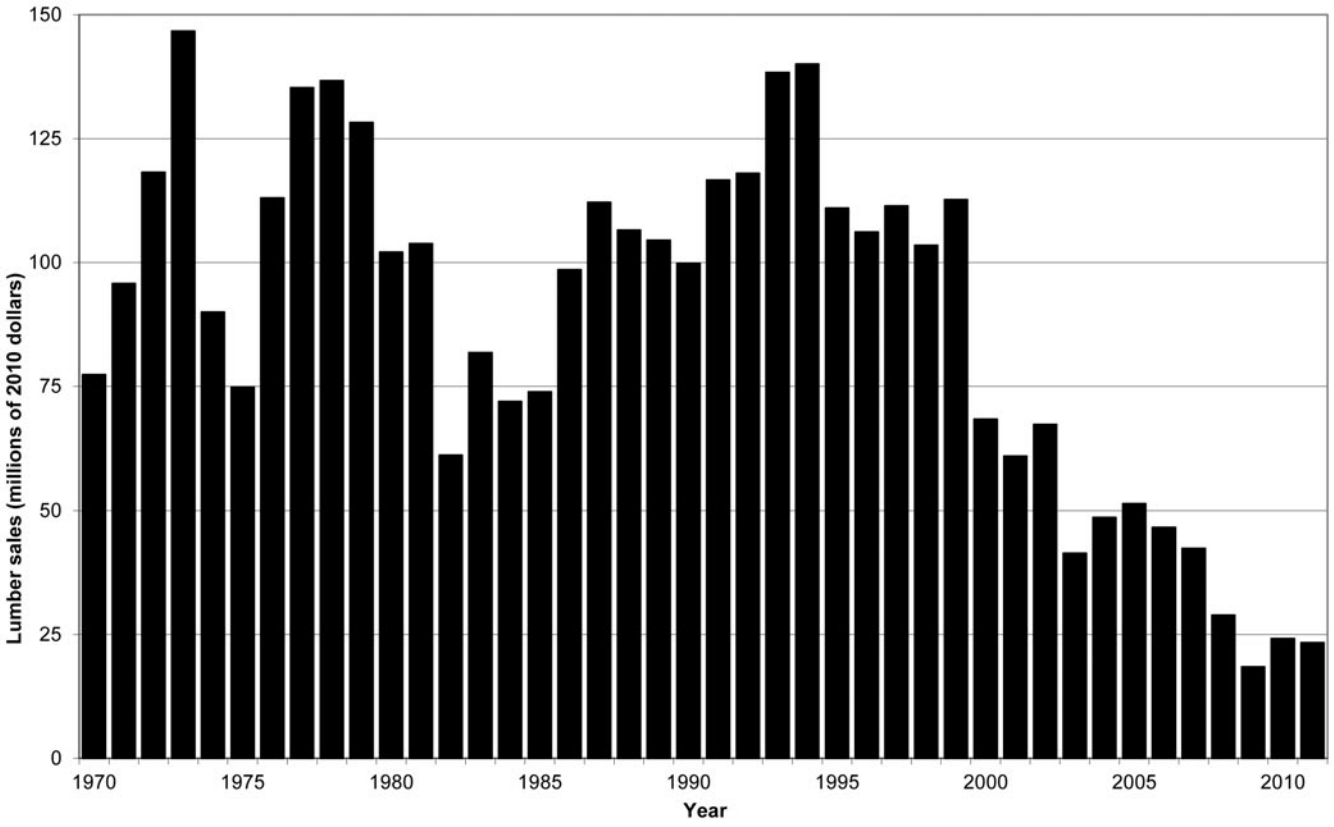
Overrun—the volume of lumber recovered from a board foot (Scribner) of timber—was calculated for each sawmill using timber processed and lumber

Table 13—Number of active Wyoming sawmills by production capacity size class, percentage of total capacity, production, and percentage of total production, 2010.

Lumber production capacity size class	Number of mills	Production Capacity	Percentage of total capacity	Average capacity per mill	Production	Percentage of total production	Average production per mill
		MBF[a]		MBF[a]	MBF[a]		MBF[a]
1 MMBF or less	7	2,378	4	340	1,009	2	144
over 1 MMBF	5	64,200	96	12,840	53,610	98	10,722
Total	12	66,578	100	5,548	54,619	100	4,552

[a] Production and capacity expressed in thousand board feet (MBF) lumber tally.

production volumes. On average, Wyoming sawmills produced approximately 1.29 board feet of lumber for every board foot Scribner of timber processed, for a volume weighted average overrun of 29 percent in 2010. Overrun ranged from 10 to 60 percent among Wyoming's sawmills. Sawmills producing primarily random length dimension lumber and studs typically had greater overrun, and mills producing mostly boards and timbers had lower overrun. This is an improvement from 1976, when average overrun was only 18 percent, but a significant decrease from the 58 percent overrun reported for 2005 (Brandt and others 2009). Over the last three decades, the increases in overrun have been due primarily to advances in milling technology and decreases in log diameter (Keegan and others 2010a,



Source: Western Wood Products Association 1964-2006.
Note: WWPA began combining Wyoming and South Dakota lumber production in 2006. The data after 2006 are BBER estimates.

Figure 5—Wyoming lumber sales, 1947-2011.

2010b). As log diameter decreases, the Scribner Decimal C log rule, which is used in Wyoming, underestimates by an increasing amount the lumber that can be recovered, thus giving a higher lumber recovery per board foot Scribner of timber. Advances in production technology increase lumber recovery through computerized log sensing capabilities that identify optimum sawing patterns. Likewise, using thinner kerf saws and scanning equipment to edge and trim lumber has reduced the portion of the log that becomes sawdust. The decline in the overrun between 2005 and 2010 was due, in part, to the poor markets for lumber beginning in 2007 and extending through 2010.

Log Home and Log Furniture Sectors

Facilities in Wyoming's log home industry manufacture both house logs and complete log homes, and the industry offers two log styles: hand-hewn and sawn logs. Most firms specialize in one of the two styles. Wyoming's log home industry experienced substantial growth starting in 1976 when there were just four log home plants. By 2000, there were 8 facilities producing house logs or log homes, and in 2005 there were 18 log home facilities in Wyoming. The log home industry experienced a severe contraction across the West, including in Wyoming, in response to the 2006 housing collapse and resulting recession. The 2010 census only identified three active log home facilities, the lowest number on record.

Wyoming's log furniture sector has grown over the past 30 years. In 1976, no firms producing log furniture were reported; by 2000 there were 11 firms operating, but by 2005 there were only eight facilities and in 2010 just two. This sector predominately uses small-diameter (less than 7 inches d.b.h.) lodgepole pine timber to construct log furniture. The logs are typically debarked and assembled into different types of furniture including bed frames, chairs, tables, and couch frames.

Combined sales for the log home and log furniture sectors in 2010 were $1.6 million, a significant drop from the 2005 sales in just the log home industry of $10.2 million (2010 dollars). Log homes and, to some extent, log furniture, tend to be luxury goods resulting in an industry that is highly tied to national and regional economic influences. However, the industry is also very fluid, requiring very little capital investment to manufacture logs, homes, and furniture compared to wood or paper products. It is likely that a significant number of the previously active facilities could once again produce house logs and log furniture should market demand resurge.

Post and Pole Plants

The post, pole, and other roundwood products sector consists of manufacturers of fence posts, small poles, and rails used in fence construction. These products are often treated with wood preservatives, but untreated products are also available. Since 1976 the number of post and pole producers has been relatively stable (see table 11). In both 2000 and 2005, eight post and pole manufacturers were identified and seven were confirmed to be operating in 2010. Total sales from the sector were nearly $1.9 million, an increase from 2005 when sales were only $1.3 million (2010 dollars). Post and pole manufacturers prefer to use lodgepole pine over other species. As a result, post and pole manufacturers have seen an increasing supply of their preferred species due to the mountain pine beetle (*Dendroctonus ponderosae* Hopk.) epidemic sweeping the Interior West.

Other Sectors

Other sectors of Wyoming's primary forest products industry include three wood pellet plants (one of which was inactive), a commercial firewood operation, and a facility providing bagged shavings for animal bedding. The combined sales value for these sectors was $1.4 million in 2010. Going back to 1976, only one plant produced other products (Keegan and others1979). Production statistics and sales figures for the individual sectors are not provided in order to protect firm-level data.

Capacity to Process Timber

Wyoming's timber-processing facilities report shift capacity and annual production capacity in volume of outputs that could be produced given a sufficient supply of raw material, firm market demand for their products, and ordinary maintenance and down-time. Facilities also report the number and length of daily shifts and number of annual operating days. Sawmills report annual capacity and shift capacity in MBF of lumber. Post and pole and log furniture manufacturers report in number of pieces, and log home manufacturers in thousands of lineal feet. Although different units are used by each industry sector to measure output, a common unit, MBF Scribner, has been used by each sector to quantify timber input. Calculating capacity in terms of timber input allows capacity for different sectors to be summed together, which in turn provides a better understanding of the entire forest products industry's size and ability to process timber (Keegan and others 2006). The measurement of capacity in units of timber input is referred to as timber-processing capacity, and is calculated by dividing each mill's stated production capacity in units of output by its product recovery per board foot Scribner of timber processed.

Wyoming's total estimated capacity to process timber in 2010 was 137 MMBF Scribner (table 14), including capacity at inactive mills (defined as mills not actively processing timber but still having installed equipment in place). Timber-processing capacity during 2010 was 76 percent of the capacity reported in 2005. Mills utilized only 32 percent of total capacity in 2010, with almost 44 MMBF of timber being processed in 2010. By comparison, Wyoming's total estimated capacity to process timber in 2000 was nearly two times as much (260 MMBF), with 44 percent (114 MMBF) utilized.

Wyoming's capacity to process timber has been declining for over two decades, with the loss of 171 MMBF or 55 percent of the state's ability to process timber between 1986 and 2010. The largest capacity loss occurred between 2000 and 2005, when timber-processing capacity dropped by 31 percent, or more than 80 MMBF Scribner. This was largely due to the closure of one of Wyoming's major sawmills in Newcastle. The period between 2005 and 2010 saw a smaller percentage reduction in total capacity, in part because the (inactive) Saratoga mill retained most of its equipment and was therefore included in total capacity estimates; however, the state suffered two more major closures in Laramie and Sheridan.

Sawmills accounted for 93 percent (43 MMBF) of Wyoming's *active* timber-processing capacity in 2010. The state's five largest sawmills had a combined timber-processing capacity of 50 MMBF, accounting for 96 percent of sawmill capacity. The five largest mills also processed 98 percent (42 MMBF) of the timber used by sawmills in Wyoming (table 15). Four percent (2 MMBF) of sawmill

Table 14—Wyoming's timber-processing capacity and volume utilized, 1976-2010 (sources: Keegan and White 1979; Keegan and others 1979; McLain 1987; Morgan and others 2005; Brandt and others 2009; Big Book 2013).

Year	Processing capacity[b]	Volume utilized	Percent utilized
	----------*Thousand board feet, Scribner*----------		
2010	137,104	43,873	32
2005[a]	180,157	88,522	49
2002	217,094	74,875	34
2000	260,194	113,687	44
1996	273,483	116,906	43
1986	307,800	153,608	50
1983	272,867	153,260	56
1976	302,083	147,280	49

[a] Represents revised processing capacity.
[b] Includes inactive facilities with installed equipment as well as active sawmills, post and pole, log home, log furniture and commercial firewood facilities.

timber-processing capacity was held by the seven smaller sawmills that processed less than 1 MMBF (2 percent) of the timber received by Wyoming sawmills.

Log Utilization and Mill Residue

This section traces the flow of Wyoming's timber harvest through various manufacturing sectors. Since mill residues as well as timber and finished products are accounted for, volumes are presented in cubic feet. The following conversion factors, developed from the 2010 census of timber processors, were used to convert board foot Scribner volume to cubic feet of bole wood:

- 5.70 board feet per cubic foot for house logs
- 5.94 board feet per cubic foot for saw logs
- 1.18 board feet per cubic foot for posts and small poles
- 5.00 board feet per cubic foot for firewood

Table 15—Number of active Wyoming sawmills by capacity size class, percentage of total timber capacity, timber use, and percentage of total timber use, 2010.

Lumber production capacity size class[a]	Number of mills	Timber capacity	Percentage of total timber capacity	Average timber capacity per mill	Timber use	Percentage of total timber use	Average timber use per mill
		MBF[b]		MBF[b]	MBF[b]		MBF[b]
1 MMBF or less	7	1,897	4	271	882	2	126
over 1 MMBF	5	50,007	96	10,001	41,754	98	8,351
Total	12	51,904	100	4,325	42,636	100	3,553

[a] Lumber production capacity expressed in million board feet (MMBF) lumber tally.
[b] Timber use and capacity expressed in thousand board feet (MBF) Scribner.

Log Utilization

Wyoming's timber harvest in 2010 was approximately 5,872 thousand cubic feet (MCF), exclusive of bark (fig. 6). Of this volume, 94 percent went as logs to sawmills, less than one percent went to log home manufacturers and 6 percent went to post and pole plants and other facilities. Sawmills received 5,508 MCF of logs, producing 2,407 MCF of finished lumber, while 2,988 MCF (54 percent) of volume delivered to sawmills became mill residue. Nearly all the residue (1,403 MCF) generated from sawmills was shipped to other facilities to be utilized as fuel or processed into another product. Virtually all residues generated by sawmills were utilized, and 113 MCF was lost to shrinkage while drying lumber.

House log and log home manufacturers received 16 MCF of timber from Wyoming's timberlands in 2010. Approximately 11 MCF became finished goods, and 5 MCF became residue. The 348 MCF of timber received by other timber-processing facilities was utilized for solid wood products such as posts, poles, log furniture, and commercial firewood or was combined with residues from other sectors for use in residue-related products like pulp and wood pellets.

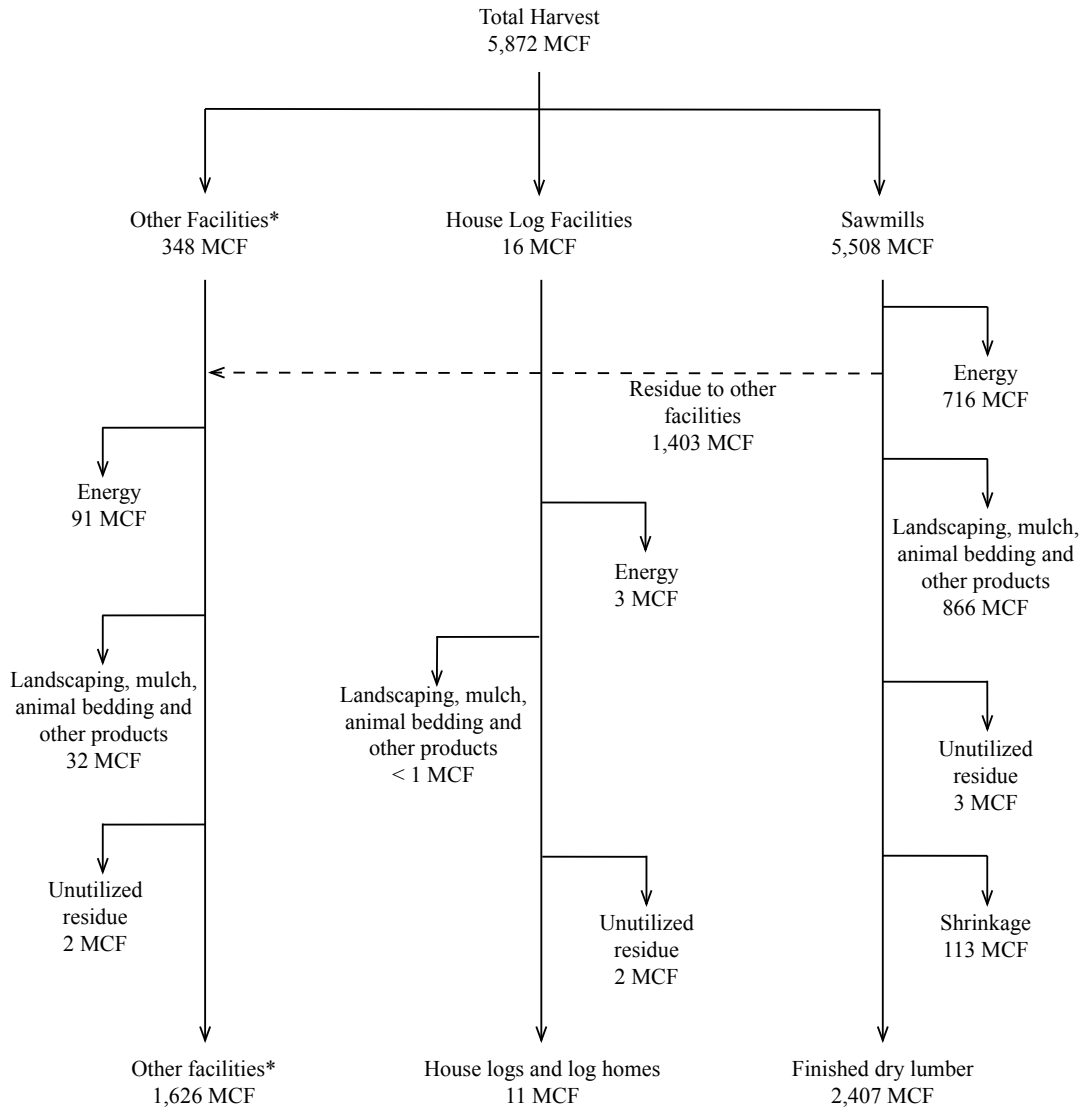
Mill Residue Quantity, Type, and Use

As indicated above, a substantial portion, about 53 percent, of the wood fiber processed by primary forest products plants ends up as mill residue. Mill residue from primary wood products manufacturers can present difficult and expensive disposal problems, or they can be used to produce additional products and generate revenue. Three types of wood residues are typically created by Wyoming's primary wood products industry: coarse residue, consisting of chips, slabs, edging, trim, and log ends; fine residue, consisting primarily of planer shavings and sawdust; and bark. The 2010 census gathered information on volumes and uses of mill residue. Actual residue volumes were obtained from facilities that sold all or most of their residues, and all mills reported, on a percent basis, how their residues were used. Peelings from the log home, log furniture, and the post and pole facilities are included with the coarse residue.

Statewide residue volume factors (table 16), which express mill residue generated per MBF of lumber produced, were derived from production and residue output volumes provided by sawmills. Sawmills accounted for 88 percent of all mill residues generated in Wyoming in 2010. Sawmills generated about 56,000 bone dry units (BDU) of mill residue; 97 percent of this residue was utilized (table 17). One bone dry unit is the equivalent of 2,400 pounds of ovendry wood.

Facilities other than sawmills produced about 5,000 BDU of residue, meaning all Wyoming timber processors generated about 61,000 BDU of residue in 2010. The proportion of Wyoming's mill residues that are utilized has been increasing since the late 1960s. For all residue combined, utilization has increased from 33 percent in 1969, to 60 percent in 1983, 85 percent in 2000, and 97 percent in 2010 (table 18).

Nearly 100 percent of both coarse and fine residues were utilized in 2010 (tables 18 and 19), which represents a slight increase since 2005. This high level of mill residue utilization represents a significant increase, especially for fine residue, since the 1960s and 1970s. This residue utilization increase is likely due to out-of-state pulp and reconstituted board mills expanding their procurement and increasing demand for wood for energy, such as wood pellets. Historically, more than half of Wyoming's coarse residues have been utilized, whereas less than half of fines were



*Other facilities include wood pellet manufacturers and out-of-state pulp and reconstituted board plants.

Figure 6—Wyoming timber harvest and flow, 2010.

utilized. Fine residue made up the largest component (38 percent) of residue in 2010, at over 23,000 BDU. Sawdust comprised 62 percent and planer shavings 38 percent of fine residue. Less than 1 percent (58 BDU) of the fine residue was left unused with the major uses for fine residues being other uses such as landscaping and mulch (9,813 BDU), reconstituted products (7,613 BDU), and fuel and energy products such as wood pellets (5,710 BDU). Coarse residue was the state's second largest residue component in 2010 accounting for 34 percent (20,597 BDU) of the total residue production. Over 62 percent of course residue was chipped and sent out-of-state to pulp and paper mills and reconstituted board plants, 23 percent was burned as fuel, 14 percent was used for other products and less than 1 percent went unused.

Bark, which has typically been the least utilized residue, has undergone dramatic increases in utilization since 1969, when less than 1 percent was utilized. From 1983 to 2000, bark utilization remained rather consistent at about 32 percent, while

Table 16—Wyoming's 2010 sawmill residue factors.

Type of residue	Bone-dry units[a]
	per thousand board feet lumber tally
Coarse	0.35
Sawdust	0.27
Planer Shavings	0.12
Bark	0.29
Total	1.03

[a] Bone-dry units (2,400 lbs. of ovendry wood) of the various residue types generated for every 1,000 board feet of lumber manufactured.

Table 17—Estimated volume of wood residue generated and utilized by Wyoming's sawmills, 2010.

Residue Type	Wood residue			Percentage of type		
	Used	Unused	Total	Used	Unused	Total
	----------Bone-dry units----------			*----------Percent----------*		
Coarse	18,714	20	18,734	99.9	0.1	34
Fine[a]	20,961	10	20,971	100.0	0.0	38
Bark	14,633	1,454	16,087	91.0	9.0	29
Total	54,308	1,484	55,792	97.3	2.7	100

[a] Fine residue includes sawdust and planer shavings.

in 2005 approximately 70 percent of the bark was used and in 2010, 91 percent was reported utilized. Of the roughly 17,000 BDU of bark produced by Wyoming facilities, 78 percent (13,217 BDU) was burned for fuel, 12 percent (2,231 BDU) was used in other products, and about 10 percent (1,551 BDU) was not used.

Product Markets, Employment, and Labor Income

Products, Markets, and Sales Value

Mills summarized their 2010 shipments of finished wood products, providing information on volume, sales value, and geographic destination. Mills usually distributed their products in two ways: through their own distribution channels, or through independent wholesalers and selling agents. Because of subsequent wholesaling transactions, the geographic destination reported here may not precisely reflect final delivery points of shipments.

Periodic industry censuses provide the most complete estimates of sales values for Wyoming's primary forest products industry (Keegan and White 1979; Morgan and others 2005; Brandt and others 2009). All sales are reported free on board (f.o.b.) the producing mill. The estimated total sales value of Wyoming's primary forest products in 2010 was slightly more than $29 million (f.o.b.) the producing mill (table 20). This represents a 65 percent decrease from the $84 million in sales reported in 2005 (2010 dollars). The Rocky Mountain States (including Wyoming) collectively accounted for 36 percent of Wyoming's total primary wood products sales. Approximately 11 percent of the total wood products sales remained in Wyoming. Wyoming lumber purchasers accounted for 6 percent of lumber sales in 2010. Sales of posts and poles made up 4 percent of total sales in 2010, while other products accounted for 13 percent of total sales. The majority (75 percent) of other

Table 18—Historical utilization of Wyoming mill residues (Sources: Brandt and others 2009; Keegan and White 1979; Keegan and others 1979; McLain 1987; Morgan and others 2005; Setzer 1971).

Residue	Year	Used	Unused
		----------Percent----------	
Coarse	2010	99.8	0.2
	2005	98.5	1.5
	2000	97.7	2.3
	1983	77.4	22.6
	1976	77.8	22.2
	1969	58.2	41.8
Fine	2010	99.7	0.3
	2005	99.7	0.3
	2000	98.8	1.2
	1983	49.4	50.6
	1976	34.9	65.1
	1969	28.7	71.3
Bark	2010	90.9	9.1
	2005	69.8	30.2
	2000	32.5	67.5
	1983	31.9	68.1
	1976	11.7	88.3
	1969	0.1	99.9
All residues	2010	97.3	2.7
	2005	91.9	8.1
	2000	84.5	15.5
	1983	59.5	40.5
	1976	48.6	51.4
	1969	32.8	67.2

Table 19—Wyoming's production and disposition of residues, 2010.

Type of residue[a]	Total utilized	Pulp and Board	Energy	Other uses	Unused	Total
			Bone-dry units			
Coarse	20,549	12,880	4,810	2,859	48	20,597
Fine:	23,136	7,613	5,710	9,813	58	23,194
Sawdust	14,470	7,613	4,358	2,499	10	14,480
Planer Shavings	8,666	-	1,352	7,314	48	8,714
Bark	15,448	-	13,217	2,231	1,551	16,999
Total	59,133	20,493	23,737	14,903	1,657	60,790
			percent of total			
Coarse	99.8	62.5	23.4	13.9	0.2	100
Fine:	99.7	32.8	24.6	42.3	0.3	100
Sawdust	99.9	52.6	30.1	17.3	0.1	100
Planer Shavings	99.4	-	15.5	83.9	0.6	100
Bark	90.9	-	77.8	13.1	9.1	100
Total	97.3	33.7	39.0	24.5	2.7	100

[a] Includes residue from the manufacture of lumber, post and poles, house logs, and log furniture.

primary products stayed within Wyoming and the Rocky Mountain States, which accounted for 32 and 37 percent of sales, respectively.

Employment and Labor Income

This section discusses trends in employment and labor income from 1990 through 2010 in Wyoming's forest products industry. Employment data developed as part of the FIDACS census were used in conjunction with employment and earnings data from the U.S. Department of Commerce, Regional Economic Information System (REIS), and the U.S. Census Bureau's County Business Patterns to identify employment for Wyoming's primary and secondary forest products industry (U.S. Census Bureau 2013; U.S. Department of Commerce 2013). The primary forest products industry includes logging, processing logs into lumber and other wood products, processing wood fiber residue from timber processors, and private sector forest management services. The secondary industry includes firms processing outputs from the primary industry, including outputs from out-of-state mills. Secondary products include items like prefabricated buildings, trusses, molding, millwork and cut stock, doors, and windows.

The REIS system uses the North American Industry Classification System (NAICS) as defined by the U.S. Office of Management and Budget to report on industry sectors. The primary and secondary forest products industry sectors are captured in two categories (OMB 1998): NAICS 113 (forestry and logging) and NAICS 321 (wood product manufacturing). These industrial classifications give a conservative representation of forest industry employment and labor income. A number of activities involving workers associated with forest products such as truck or rail transport of logs, wood fiber, or finished products, and timber management activities by government employees are not included.

In 2011, the most recent year for which comprehensive information is available, there were 637 workers in Wyoming's forest products industry and these workers earned approximately $24 million in labor income or workers earnings. Labor income includes wages and salaries, some benefits, and earnings of the self-employed. Of the 637 workers, approximately 120 were employed in logging and other private sector forest management activities, 330 were employed in processing

Table 20—Destination and sales value of Wyoming's primary wood products, 2010.

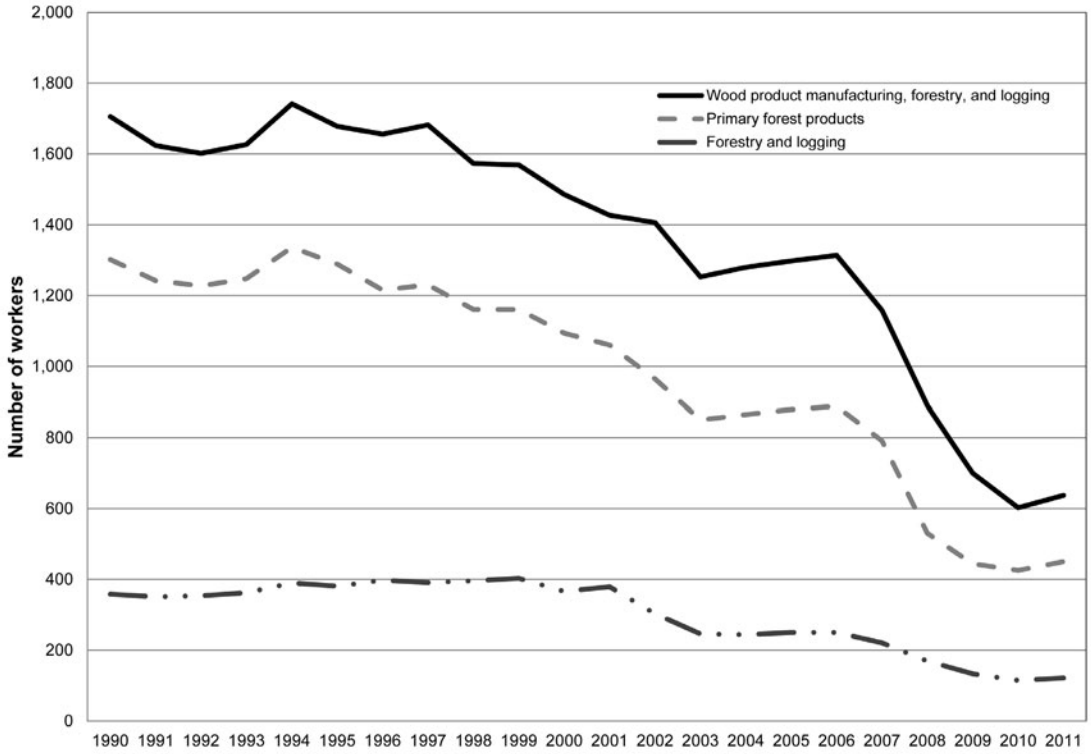
Product	Wyoming	Rockies[a]	Far West[b]	North Central[c]	Northeast[d]	South[e]	Pacific Rim Countries	Total
	Thousand 2010 dollars							
Lumber, timbers and associated products	1,463	5,686	446	12,770	871	1,917	1,046	24,200
House logs and log homes	605	92	92	152	92	92		1,126
Other finished products[f]	1,208	1,428	423	584	27	155		3,824
All primary wood products	3,276	7,207	961	13,506	991	2,164	1,046	29,151
	Percentage of sales							
Lumber, timbers and associated products	5.0	19.5	1.5	43.8	3.0	6.6	3.6	83.0
House logs and log homes	2.1	0.3	0.3	0.5	0.3	0.3	-	3.9
Other finished products[f]	4.1	4.9	1.5	2.0	0.1	0.5	-	13.1
All primary wood products[g]	11	24.7	3.3	46.3	3.4	7.4	3.6	100.0

[a] Rocky Mountains includes Arizona, Colorado, Idaho, Nevada, New Mexico, Utah, and Montana.
[b] Far West includes Alaska, California, Hawaii, Oregon, and Washington.
[c] North Central includes Illinois, Indiana, Iowa, Kansas, Michigan, Minnesota, Missouri, Nebraska, North Dakota, Ohio, South Dakota, and Wisconsin.
[d] Northeast includes Connecticut, Maine, Massachusetts, New Hampshire, New Jersey, Pennsylvania, Rhode Island, and Vermont.
[e] South includes Alabama, Arkansas, Delaware, Florida, Georgia, Kentucky, Louisiana, Maryland, Mississippi, North Carolina, Oklahoma, South Carolina, Tennessee, Texas, Virginia, and West Virginia.
[f] Other products include posts, poles, log furniture, wood pellets and firewood.
[g] Percentage detail may not sum to 100% due to rounding.

timber, and the remaining 187 workers were involved in secondary processing of lumber and other primary wood products.

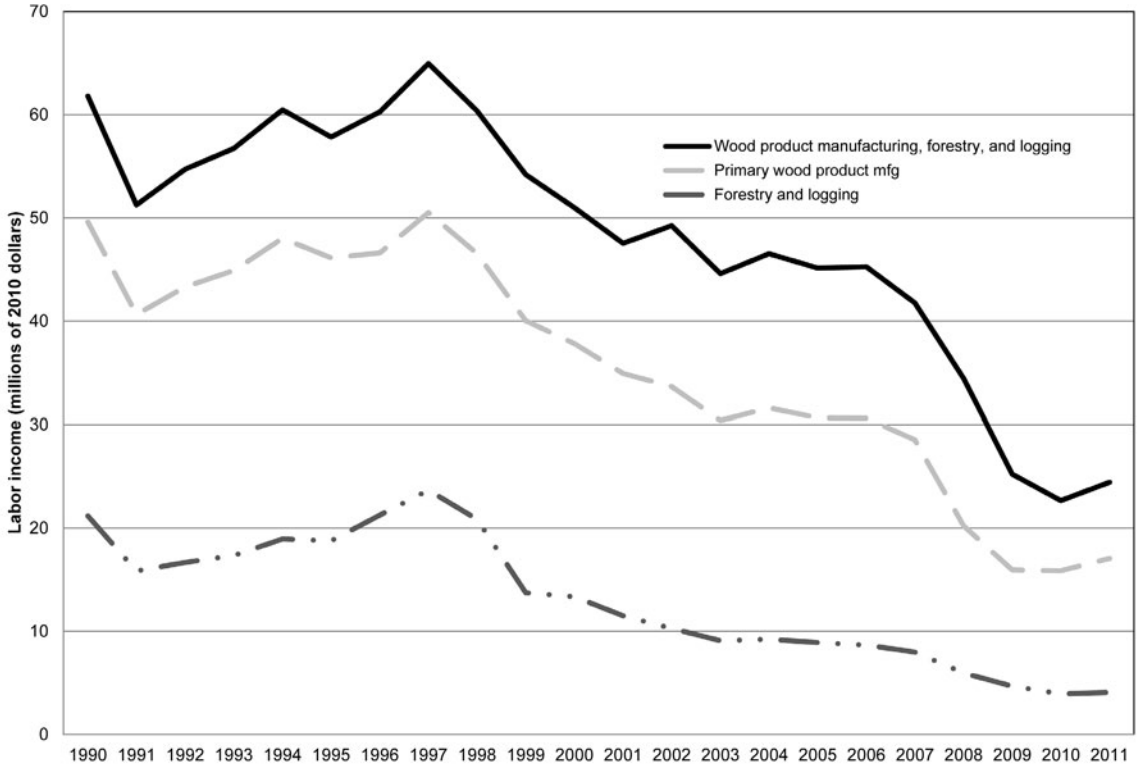
Since 1990, total employment in Wyoming's forest products industry has declined by more than 63 percent or nearly 1,070 workers (fig. 7). The decline over that period has been concentrated in the logging and timber processing sectors with a net decrease of 850 jobs, while the secondary component was steady through 2006 before a net loss of 220 jobs in the wake of the housing collapse and Great Recession of 2007-2009.

Total inflation-adjusted labor income (in constant 2010 dollars) in Wyoming's forest products industry has decreased by 60 percent from nearly $62 million in 1990 to just over $24 million in 2011 (fig. 8). Similar to employment, the decrease in labor income was in the primary timber harvesting and processing components with modest growth in the secondary wood products industry from 1990-2006, followed by steep declines coinciding with the Great Recession. Labor income in the forestry and logging sectors declined by more than 80 percent from over $21 million in 1990 to just over $4 million in 2011; labor income in the timber processing component declined from $50 to $17 million (66 percent). Secondary forest industry labor income increased from $12 million in 1990 to $16 million in 2006, before falling to $7 million by 2010 and 2011.



Source: U.S. Census Bureau 2013; U.S. Department of Commerce 2013.

Figure 7—Employment in Wyoming's forest products industry, 1990-2011.



Source: U.S. Census Bureau 2013; U.S. Department of Commerce 2013.

Figure 8—Labor income in Wyoming's forest products industry, 1990-2011.

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