ALASKA'S FOREST PRODUCTS INDUSTRY AND TIMBER HARVEST

PART 3: SALES, EMPLOYMENT AND CONTRIBUTION TO THE STATE'S ECONOMY

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INTRODUCTION

This Forest Industry Brief is part of a series of reports presenting findings from a Bureau of Business and Economic Research (BBER) census of Alaska's primary forest products industry. Part 3 of this series presents information on sales value and employment associated with primary wood products manufacturing, the economic contribution of forest products manufacturing in the state and an analysis of the changes in the broader forest industry over time. All dollar figures included have been adjusted for inflation to constant 2015 dollars, unless otherwise noted.

ALASKA'S PRIMARY PRODUCT SALES VALUE AND MARKETS

The 2015 mill census identified 60 active primary forest products manufacturers in Alaska, producing an array of products including lumber and other sawn products, house logs, firewood, tonewood (wood for making musical instruments), cedar products and wood pellets. Alaska's forest industry reported an estimated total sales value of primary wood products, log exports and residues of more than $114 million, free on board (f.o.b.) the producing mill (Table 1). This represented a 19 percent decrease from the $141 million in sales reported in 2011 (Berg et al. 2014). A similar decline in sales value was observed from 2005 to 2011 and the total sales value in 2015 was approximately 35 percent lower than in 2005 (Halbrook et al. 2009).

Excluding residues and log exports, the sales value generated as a result of primary wood products manufacturing exceeded $23 million during 2015. In contrast to the overall decline in total forest industry sales value, sales by Alaskan manufacturers increased approximately 28 percent over 2011 primary product sales. The majority (66 percent) of wood products manufactured within Alaska were sold within the state, a proportional decrease relative to in-state sales during 2011 (73 percent). Lumber and other sawn products accounted for more than half (52 percent) of total primary product sales. Approximately 49 percent of all lumber produced in Alaska was sold within the state, down from 56 percent in 2011, while sales of lumber to other states accounted for 39 percent, up from 33 percent. Finished lumber products sent to other countries declined between 2011 and 2015, from nearly 11 percent to 8 percent.

In 2015, a majority (86 percent) of the primary products other than lumber manufactured in Alaska were sold within the state. This represented a decrease from the proportion of other products – house logs, firewood, cedar products and tonewood – sold in-state during 2011 (nearly 92 percent). In 2015, out-of-state markets accounted for an increasing

Table 1. Destination and sales value of Alaska's primary wood products, residue and exports, free on board (f.o.b.) the producing facility in 2015.

Product	Alaska	West Coast	Other states	Pacific Rim	Canada	2015 total
			------- *Thousands of 2015 dollars* ------			
Lumber	5,897	4,708	633	891	38	12,167
Other[b]	9,531	723	454	250	190	11,147
Total primary product*	**15,427**	**5,431**	**1,087**	**1,141**	**228**	**23,314**
Residues[c]						4,886[e]
Sawlog and pulpwood exports[d]						86,207[e]
2015 total sales value*						**114,407**
2011 total sales value[f]						141,158
2005 total sales value[g]						177,278

[a] West Coast states include California, Hawaii, Oregon and Washington.
[b] Other products include house logs, firewood, wood pellets, cedar products and tonewood.
[c] Residue products include firewood, garden mulch, animal bedding and wood chips for park/playground fill and landscaping.
[d] United States International Trade Commission (USITC) DataWeb tool.
[e] Data pooled across destinations to prevent disclosure of confidential information.
[f] Berg et al. 2014.
[g] Halbrook et al. 2009.
* Totals may not sum due to rounding.

proportion of other product sales. Within the "other" product category, cedar and tonewood products accounted for the majority of out-of-state and international sales. Manufactured house log and log home products accounted for approximately $5.5 million of in-state sales.

While some of the residues generated from the manufacturing of primary wood products in 2015 remained unused, over 31 thousand bone dry units (BDU)[1] were repurposed and sold in the form of firewood, garden mulch, animal bedding and wood chips used for playground fill and landscaping. Estimated sales generated from residues dramatically increased from 2011 ($1.2 million) to 2015 ($4.9 million). Approximately 40 percent of utilized residues were coarse residue – including chips, edgings, slabs, cull sections of logs and log ends – sold as pulp chips to out-of-state markets.

Exports of sawlogs and chipped roundwood eclipsed all other sales during 2015. As mentioned in Part 1 and 2 of this series, the vast majority of timber harvested in Alaska is exported. Log and chip exports accounted for 75 percent ($86 million) of Alaska's total wood products sales value in 2015. This represented a decrease from the 2011 estimated export sales value of $121 million (29 percent). During 2011 and 2015, the vast majority of log exports were shipped to Pacific Rim countries, predominantly China (USITC 2016) (Figure 1). The decrease in exported log volume, as well as shifts in global log markets, resulted in an overall decrease in total sales value across Alaska's forest products industry from 2011 to 2015. While the value of log exports to China increased approximately 6 percent from 2011 to 2015, exports to Japan fell 50 percent and exports to Korea decreased by 69 percent. However, over the same period, Alaskan mills were able to increase lumber production and associated sales value (Table 1), indicating some flexibility to shift away from unfavorable international log export markets to domestic production.

While overall log export value decreased, the average value ($/MBF) of log exports to all countries increased from 2011 to 2015 with the exception of Canada. Similarly, the combined average value across all export species increased from $673/MBF in 2011 to $851/MBF in 2015. Sitka spruce accounted for 74 percent of log export sales in 2015, while western red cedar had the highest average value at more than $1,400/MBF.

Between 2011 and 2015, several shifts were observed across Alaskan log export species composition and destination country (Table 2). From 2011 to 2015 average price increased for Sitka spruce and western red cedar, while western hemlock saw a slight decrease. Alaskan log exports to Korea fell in 2015, predominantly in spruce (100 percent) and western hemlock (65 percent). However, the proportion of exported red cedar logs destined for Korea increased 20 percent from 2011 to 2015. Similarly, while Japan received a smaller proportion of

[1] One bone-dry unit (BDU) equals 2,400 pounds of oven dry wood.

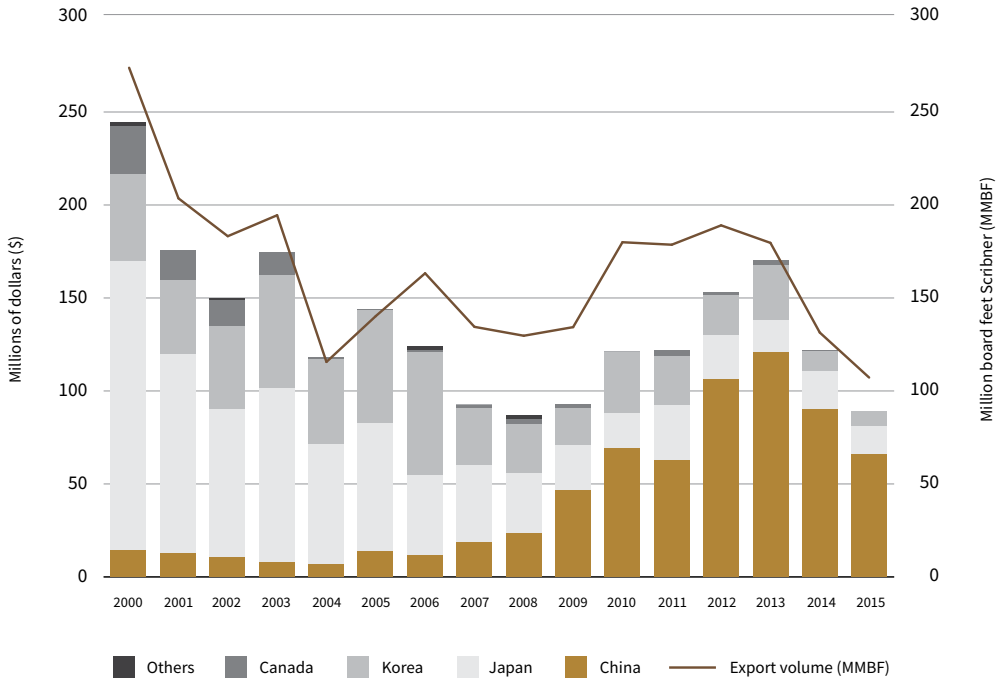


Figure 1. Total value of Alaska log exports (inflation-adjusted 2015 millions of dollars) by destination country and total export volume (MMBF), 2000 to 2015 (USITC 2016). Volumes from USITC converted using 7.0 m3/MBF (Daniels et al. in prep).

exported spruce and hemlock logs, western red cedar exports proportionally increased 12 percent. Conversely, China received a higher proportion of both spruce (27 percent increase) and hemlock (28 percent increase) in 2015, while receiving no red cedar log exports in 2015. Shifts in global log export markets and changes in demand by destination and species continue to influence the log export sector of Alaska's forest industry.

ALASKA'S FOREST INDUSTRY EMPLOYMENT AND LABOR INCOME

The primary forest products manufacturers characterized in BBER's periodic census are just one component of the broader forest industry in Alaska. The classification of the forest industry sectors used here follows the North American Industry Classification System (NAICS) available online via the U.S. Department of Commerce Bureau of Economic Analysis (BEA) website[2]. Alaska's forest industry can be described using three categories: NAICS 113 – forestry and logging; NAICS 321 – wood products manufacturing; and NAICS 322 – paper manufacturing.

These categories include employees who work in both the primary and secondary wood products and paper manufacturing sectors. It should be noted that these NAICS categories likely underestimate total employment in the forest industry because they do not include log hauling (trucking) companies, lumber and construction material wholesalers, road construction and maintenance contractors, forest management services performed by government agencies or nonprofit organizations. These publicly available data provide another point of comparison for estimates of employees and labor income for the primary forest products manufacturers to compare with BBER survey data, as well as additional information on the larger forest industry.

Alaskan forest industry employment trends have generally paralleled changes in timber harvest volume through time (Berg et al. 2014; Halbrook et al. 2009). Both timber harvest and employment in the forest industry peaked in 1989 and 1990 with more than 4,200 workers (Halbrook et al. 2009). The once robust pulp and paper sector in Alaska experienced a dramatic drop in employment with the closure of the final pulp mills in the late 1990s (Berg et al. 2014; Halbrook et al. 2009) and employment in the pulp and paper industry has since ceased. Forestry and logging employment experienced a decline in the early 2000s in response to the termination of the U.S. Forest Service's Southeast Alaska 50-year timber sale contracts (Alexander 2012; Berg et al. 2014). During 2005, approximately 1,451 workers were employed across the forest

[2] For this report, BEA estimates from 1990 to 1998 were based on previously published data (Berg et al. 2014; Halbrook et al. 2009) to bridge the shift from Standard Industrial Classification (SIC) Codes to North American Industry Classification (NAICS) Codes. From 1998 through 2015, the most recent BEA data were used (USDC BEA 2016).

Table 2. Proportion of Alaska log exports by species and destination country in 2011 and 2015[a].

	Sitka spruce		Western hemlock		Western red cedar	
Country	2011	2015	2011	2015	2011	2015
China	57%	84%	42%	70%	13%	0%
Japan	23%	16%	23%	11%	39%	51%
Korea	20%	0%	35%	19%	28%	48%
Canada	0%	0%	0%	0%	20%	1%
Avg price ($/MBF)[b]	601.58	826.67	829.05	820.57	1,294.45	1,464.36

[a] Source: USITC (2016)
[b] USITC export volumes were converted using a derived factor of 7.0 m^3/MBF.

industry (wood products manufacturing, forestry and logging) exhibiting an increase over previous years in response to the housing boom of 2004 and 2005 (Berg et al. 2014). However, by 2011 combined employment in wood products manufacturing, forestry and logging had fallen approximately 30 percent to 1,015 workers. Employment in the forest industry increased in the years following 2011 reaching 1,252 workers in 2014 (Figure 2).

In 2015, total employment in the combined sectors of wood products manufacturing, forestry and logging was an estimated 1,213 full- and part-time workers (Figure 2) (USDC BEA 2016). Of these, approximately 702 workers (58 percent) were employed in the wood products manufacturing sector. In addition, we estimate that 511 workers were employed in forestry and logging during 2015.

In addition to the previously mentioned industrial sectors, NAICS 1153 – Agricultural and forestry support activity is also a component of the forest industry. Support activities have not been included in previous BBER Alaska industry reports and BEA data were not sufficient to generate reasonable estimates for forestry support employment in Alaska throughout the entire time series shown in Figure 2. In 2011, an estimated 263 workers were employed in support activities for forestry[3] – increasing the estimate for total forest industry employment to approximately 1,278 workers. By 2015, employees engaged in support activities for forestry increased to 367 workers bringing the total forest industry employment for 2015 to 1,580 workers.

Workers in the forest industry earned $111 million in labor income or worker earnings during 2015 (USDC BEA 2016). Labor income includes wages and salaries, some benefits and earnings of the self-employed. Employees in forestry and logging earned approximately $64 million while workers in the wood products manufacturing sector earned $42 million. Employees in support activities for forestry earned approximately $5.5 million during 2015. Since 2005, inflation-adjusted earnings across all sectors have increased with earnings in the forestry and logging sector approximately 38 percent higher in 2015. Wood products manufacturing earnings increased nearly 150 percent between 2005 and 2015. This trend of increasing earnings may indicate that existing workers in the forest industry are working more days out of the year in 2015 relative to 2005, perhaps in parallel to increased lumber production in the state. The average wood products manufacturing employee earned $60,055 in 2015.

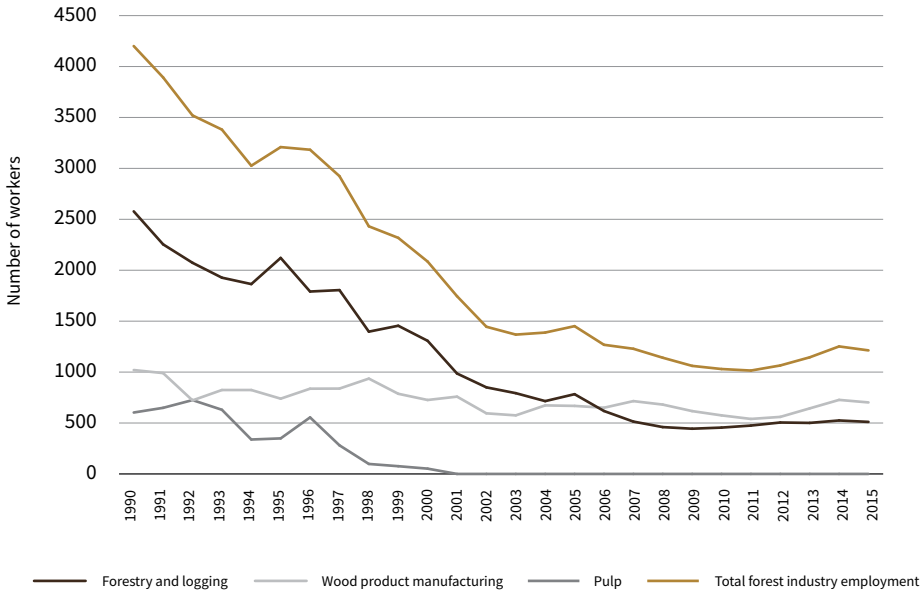
ECONOMIC CONTRIBUTION OF ALASKA'S WOOD PRODUCTS MANUFACTURING TO STATE ECONOMY

Economic contribution analyses measure gross changes in economic activity that can be associated with an industry, event or policy on an existing regional economy (Watson et al. 2007). Measuring the economic contribution of Alaska's forest industry captures the direct economic activity associated with the industry, as well as economic activity generated throughout the state economy by the existence of the forest products industry (Crandall et al. 2017). For this report, we assess the contribution of Alaska's forest industry as dollars spent on intermediate inputs, taxes, labor and households, generating economic opportunities as additional spending cycles through the state's economy.

Wood products manufacturers, workers engaged in forestry support activities and those employed in forestry and logging collectively, contributed 1,580 jobs and nearly $111 million dollars in labor income directly to the state economy in 2015.

[3] Support activities for forestry (NAICS 1153) encompasses a variety of activities including wildfire suppression and prevention activities, tree thinning and planting, and pest management.

Figure 2. Employment in Alaska's forest industry, 1990-2015 (USDC BEA 2016; BBER 2016).



The activity associated with this direct employment generates additional economic opportunities by relying upon other industries for raw and intermediate inputs and services, thus indirectly bolstering employment and wages in various other sectors. Using regional data and existing linkages within Alaska's economy represented by the Bureau of Economic Analysis' (BEA) RIMS II multipliers[4] (USDC BEA 2014), BBER estimates that the wood products manufacturing sector alone supported over 1,500 full- and part-time jobs and an associated $118 million dollars in labor income during 2015 (Table 3). Thus, for every wood products manufacturing job in the state another 1.2 jobs are supported in related sectors. Additionally, for every $1 dollar paid in labor income by wood products manufacturers another $1.81 is paid in supporting sectors, including forestry and logging, forestry support, trucking, wholesale trade and management.

Additionally, BBER estimates that the 511 people employed in the forestry and logging sector during 2015 supported an additional 541 full- and part-time jobs along with $43.5 million dollars in labor income in supporting sectors, such as equipment sales and repair. It should be noted that we do not aggregate sectors and avoid providing estimates of the total employment and labor income contribution for the entire forest industry to avoid double counting since some employment and labor income shows up as both direct contributions to their sector, as well as indirect contributions to other sectors. In other words, some or all of the direct employment and labor income in the forestry and logging sector would be included with the indirect and induced contributions from wood products manufacturing since these manufacturers rely upon forestry and logging business to supply their raw material inputs.

ABOUT THE DATA

This survey effort is the third application of its kind in Alaska (Halbrook et al. 2009; Berg et al. 2014) and presents information collected from a BBER census of primary manufacturers in the state that receive timber harvested in Alaska. Primary forest product manufacturers are firms that process timber into products such as lumber, as well as facilities like wood pellet plants that use the wood fiber directly from timber processors. Through a written questionnaire, phone or in-person interview, timber-processing and residue-utilizing facilities provided information about their 2015 operations including:

- Plant location, production capacity and employment.
- Volume of raw material received, by county and ownership origin.
- Species of timber volume received and corresponding live/dead proportions.
- Finished product volumes, types, sales value and market locations.
- Volume, utilization and marketing of manufacturing residue.

[4] The Bureau of Economic Analysis does not endorse any resulting estimates and/or conclusions about the contribution of a given sector on an area.

Table 3. Average annual employment and labor income contributions from Alaska's forest industry.

Sector	Direct employment	Indirect and induced employment	Total employment contribution[a]	Direct labor income	Indirect and induced labor income	Total labor income contribution[a]
				---------- *Thousand 2015 dollars* ---------		
Wood products manufacturing	702	851	1,553	$ 42,159	$ 76,316	$ 118,475
Forestry and logging	511	541	1,052	$ 63,756	$ 43,526	$ 107,282
Forestry support activities	367	69	436	$ 5,528	$ 1,871	$ 7,399
Total forest industry	**1,580**	[a]	[a]	**$ 111,443**	[a]	[a]

[a] Indirect and induced employment and labor income should not be summed for multiple sectors due to some employment and income showing up as both direct contributions to their sector and indirect contributions to other sectors.

In the event of nonresponse from a facility, data collected in previous surveys were updated using current data collected for facilities of a similar size, product type and location, as well as information on market trends and prices. For the 2015 Alaskan mill census, data were received for 51 of the 60 active, in-state facilities accounting for 85 percent of primary manufacturers. While some facility data was estimated, 80 percent of the 2015 harvest volume data was captured through direct census of manufacturers or published information. Unlike other western states (ODF 2015, WA-DNR 2015), no single state agency compiles and comprehensively reports statewide timber harvest statistics for Alaska. For this report, timber harvest estimates were based on several sources including: BBER mill census data collected from primary processors, USDA Forest Service Cut and Sold Reports, Timber Supply and Demand (706a) reports to Congress under The Alaska National Interest Lands Conservation Act (ANILCA) (Alexander 2012), State of Alaska Division of Forestry personal correspondence, as well as trade and export data compiled from the United Sates International Trade Commission (USITC).

The University of Montana's Bureau of Business and Economic Research (BBER) and the USDA Forest Service's Forest Inventory and Analysis (FIA) Program at the Pacific Northwest Research Station (Portland, Oregon) cooperated in the analysis and preparation of this report. With the FIA programs at the Pacific Northwest and Rocky Mountain Research Stations, BBER 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. Information collected from manufacturers is stored at the BBER. Additional information not presented here, including the full set of data tables, is available on the BBER website at www.bber.umt.edu/FIR/S_AK.asp or upon request. However, individual firm-level data are confidential and will not be released.

See also, **Part 1: Timber Harvest, Products and Flow** (BBER-FIB-7), **Part 2: Industry Sectors, Capacity and Outputs** (BBER-FIB-8); and **Alaska 2015 Data Tables and Figures**.

REFERENCES

Alexander, S.J. 2012. Timber Supply and Demand: 2011. Alaska National Interest Lands Conservation Act Section 706 (a) report to Congress. Report no. 27. Anchorage, AK: U.S. Department of Agriculture, Forest Service, Alaska Region.

Berg, E.C.; Gale, C.B.; Morgan, T.A.; Brackley, A.M.; Keegan, C.E., III; Alexander, S.J.; Christensen, G.A.; McIver, C.P.; Scudder, M.G. 2014. Alaska's Timber harvest and Forest Products Industry, 2011. Gen. Tech. Rep. PNW-GTR-903. Portland, OR: U.S. Department of Agriculture, Forest Service, Pacific Northwest Research Station. 39 p.

Bureau of Business and Economic Research (BBER). 2016. Forest Industries Data Collection System (FIDACS). Missoula, MT. Bureau of Business and Economic Research, Forest Industry Research Program. Unpublished dataset.

Crandall, M.S.; Anderson III, J.L.; Rubin, J. 2017. Impacts of Recent Mill Closures and Potential Biofuels Development on Maine's Forest Products Industry. Maine Policy Review. Volume 26, Issue No. 1. 9p.

Daniels, J.M.; Scudder, M.G.; Marcille, K.C.; Berg, E.C.; Morgan, T.A. (2017). Alaska Log Exports & Timber Harvest Analysis. Extension of BBER White Paper prepared for PNW Research Station. Manuscript in Preparation.

Halbrook, J.M.; Morgan, T.A.; Brandt, J.P.; Keegan, C.E., III; Dillon, T.; Barrett, T.M. 2009. Alaska's Timber Harvest and

Forget Me Not Cabins owner Ron Jones mills white spruce logs on a portable Wood-Mizer in Southcentral Alaska. (Kate Marcille, BBER)

Forest Products Industry, 2005. Gen. Tech. Rep. PNW-GTR-787. Portland, OR: U.S. Department of Agriculture, Forest Service, Pacific Northwest Research Station. 30 p.

Oregon Department of Forestry (ODF). 2015. Oregon Timber Harvest Data (1962-2015. Salem, Oregon: Oregon Department of Forestry, State of Oregon Government. https://data.oregon.gov/Natural-Resources/Timber-Harvest-Data-1942-2015/v7yh-3r7a. Accessed August 8, 2016.

U.S. Department of Commerce, Bureau of Economic Analysis (USDC BEA). 2016. Table SA05N. Personal income by major source of earnings by NAICS industry. http://www.bea.gov/iTable/iTable.cfm?reqid=70&step=1&isuri=1&acrdn=6#reqid=70&step=1&isuri=1. (October 17, 2016).

U.S. Department of Commerce, Bureau of Economic Analysis (USDC BEA). 2016. Table SA25N. Total full-time and part-time employment by NAICS industry. http://www.bea.gov/iTable/iTable.cfm?reqid=70&step=1&isuri=1&acrdn=6#reqid=70&step=1&isuri=1. (October 17, 2016).

U.S. Department of Commerce, Bureau of Economic Analysis (USDC BEA). 2014. Regional Input-Output Modeling System (RIMS II). https://www.bea.gov/regional/rims/rimsii/.

United States Department of Commerce, International Trade Commission Dataweb (USITC). 2016. USITC Interactive Tariff and Trade Data Web 3.1.0. Washington, D.C.

Washington State Department of Natural Resources (WA-DNR). 2015. Washington State Timber Harvest Reports. Olympia, Washington. http://www.dnr.wa.gov/TimberHarvestReports. Accessed on January 4, 2017.

Watson, P.; Wilson, J.; Thilmany, D.; Winter, S. 2007. Determining Economic Contributions and Impacts: What is the Difference and Why Do We Care? The Journal of Regional Analysis and Policy. 37(2): 140-146.

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A full set of data tables are also available at: http://www.bber.umt.edu/pubs/forest/fidacs/AK2015Tables.pdf