Contribution of Working Forests to the Washington State Economy: 2021

Prepared by:

Mason, Bruce & Girard, Inc.
6/4/2022

Prepared for:

WFPA

Washington Forest Protection Association

Table of Contents

Data Availability Note: The US Census Bureau has substantially delayed release of critical economic datasets, and Washington forest property tax data for 2021 remain unavailable at the release of this report. To facilitate a timely assessment of the forest industry's economic contributions, this report relies on partial-year data for 2021, some CBP county data from 2020, 2020 tax data benchmarked to 2021 GBI, and some results retained from the WFPA's 2017 economic impact report in certain cases where none of the recent 2020 or 2021 data are suitably compete. Final data for 2021 could alter the employment, wage, and tax data reported here; a final determination will not be possible until release of the 2021 County Business Patterns-Non-Employer Statistics Combined Report, expected *ca*. 2024.

1.0 INTRODUCTION

Forestland in Washington State covers approximately 23 million acres, with 11 million acres of working forest[1]. Private timberland accounts for 9.2 million acres. Forests on State land cover 2.3 million acres, approximately half of which can be classified as working forest. Although Federal land holdings represent 5.7 million acres, around one fifth qualifies as working forest. Private land produced 70% of the timber harvest in 2014[2], 72% in 2017, and 67% in 2021[3].

Working forests contribute to Washington's economy directly and indirectly. Direct impacts of the timber industry include sale of harvested timber, wood products manufacturing, transport, and tax revenues on harvested timber and timberland property. Indirect impacts include spending by the forest products industry on materials and support services. Both direct and indirect activity support an induced economic impact in the form of service jobs.

The current report estimates economic impacts (Table 1) of the Washington forest products industry in 2021[4]. Multiplication factors necessary to calculate indirect and induced jobs and wages are available on a two-year cycle with 2018 as the latest complete year. This report follows methodology consistent with prior reports WFPA commissioned to calculate forest products industry impacts for 2014 and 2017 (see §2.2). In some cases, excessive reporting delays at the State and Federal level limited 2021 data availability through Q2 or Q3. Final 2021 annual data may alter the conclusions presented in this report. Where estimated 2021 figures differ substantially from past results, and where 2020 census data are also divergent, some results from the 2017 report have been retained as a likely baseline for current activity.

Table 1. Direct and estimated jobs, wages, and revenues from forest products industry in Washington.

Economic Impact Factor	2017	2021
Stumpage sales	$ 897,705,614	$ 942,251,339
Direct jobs	40,359	42,122
Total jobs†	101,435	102,345
Direct wages	$ 2,453,176,434	$ 2,623,149,959
Total wages†	$ 5,488,652,644	$ 5,631,372,374
Total revenue	$ 28,590,532,029	$ 36,076,433,415
Total taxes	$ 231,552,544	$ 300,867,829

† Includes direct, indirect, induced jobs or wages; avoids double-counting industry activity

[1] https://www.fs.fed.us/pnw/rma/fia-topics/inventory-data/

[2] WFPA internal technical report, Forest2Market.

[3] Data available through Q3, may change when final data released: Washington Department of Revenue. https://dor.wa.gov/find-taxes-rates/other-taxes/forest-tax/harvest-statistics

[4] Complete annual data were available for export activity. Harvest, tax, and gross business income was extrapolated from Q1-Q3 data. Quarterly employment and wages were available for Q1 and Q2. Property taxes were not yet available for 2021; non-harvest tax revenues, except fire-related fees, were calculated by benchmarking 2021 to 2020 GBI. Once available, final 2021 numbers may differ from this report.

Direct stumpage sales increased from $897 million in 2017 to $942 million in 2021. Economic activity in 2021 continued to be heavily impacted by federal and local government responses to the SARS-CoV-2 pandemic declaration. Competing factors both challenged the forest industry (difficulty securing employees) and afforded advantages (record high lumber prices). It is beyond the scope of this report to discuss the trajectory of economic trends or the relative decline from market peak in 2018-2019. Direct and total (direct, indirect, induced) employment and wages in 2021 were all higher than reported in 2017. Gross Business Income (GBI), the total revenue from forest products industry sectors, increased by 26% thanks to sustained record-high prices for lumber in 2020-2021. Total tax revenues increased by $69.3 million compared to 2017. Washington's working forests produced 2,773 million board feet (MMbf) of logs in 2021, down 4.9% compared to 2017, when the annual harvest was 2,871 MMbf. Each million board feet of timber harvested in 2021 supported 15 direct jobs (one more job above 2017), 36 total jobs (also one more job from 2017) and yielded $106,481 in total tax revenues for the State of Washington.

2.0 DATA AND METHODS

2.1 Data Sources

Data to prepare this impact assessment were publicly available from Federal agencies and State of Washington sources:

1. Census Bureau (quarterly jobs and wages; exports)
2. Bureau of Labor Statistics (BLS) Quarterly Census of Employment and Wages (QCEW)
3. Washington Employment Security Department (ESD) QCEW
4. Census Bureau and Non-Employer Statistics Combined (CBP-NES)
5. Washington Department of Revenue (DOR) Gross Business Income (GBI)
6. Washington DOR stumpage revenues, property tax, business taxes and fees
7. Bureau of Economic Analysis (BEA) Regional Input-Output Modeling System (RIMS II)
8. Washington DOR Input-Output Model (2012)

Direct employment and wages were calculated chiefly from BLS QCEW and WA ESD QCEW, available for Q1 and Q2. Census Bureau CBP-NES from 2017-2018 were used in select cases where QCEW data were suppressed to maintain confidentiality; 2021 CBP-NES were inferred from ratios of QCEW to CBP-NES from 2017-2018. The ratio of forest products export tonnage relative to total export tonnage from 2021 was used to infer the fraction of port activity represented by the forest products industry by county. Total revenues (GBI) from the forest products industry were extracted from WA DOR, available through Q3 2021. Property taxes were not available for 2021 at the time this report was prepared. Property taxes were estimated for 2021 using the 2020 ratio of property tax to GBI. Other taxes were derived from NAICS categories in the Quarterly Business Review or estimated in proportion to the forest products industry direct wages. Multiplication factors from the BEA RIMS II model were used to compute indirect, induced, and total jobs and wages for the forest products industry. Double-counting of related industries was mitigated using interaction coefficients from the latest (2012) Washington Input-Output model.

2.2 Methods

Detailed methodology is provided to WFPA in a separate technical memo.

2.2.1 Direct jobs and wages

Jobs and wages for 2021 were estimated from BLS QCEW, WA ESD QCEW, and CBP-NES data, organized by county and industry code. This report uses the same set of forest products industry North American Industry Classification System (NAICS) codes that were used in the WFPA 2014 and 2017 impact assessments (Table 2), standardizing NAICS categories to three-digit groups. Data from BLS QCEW and WA ESD QCEW were used in a complementary capacity to compute direct employment and wages for each target NAICS category. Both datasets must not report jobs and wages in certain cases to maintain confidentiality; to infer these quantities, we relied on reporting from the CBP-NES combined data. The CBP-NES are currently only available through 2018. To infer likely 2021 CBP-NES quantities, we constructed ratios with the QCEW as numerator and the CBP-NES as denominator for 2017-2018, then applied those ratios to annualized 2021 QCEW data to infer 2021 CBP-NES. Any inferred 2021 CBP-NES values exceeding observed 2017-2018 values were capped at the maximum of the observed source range. Checking county-level summaries from the WA ESD QCEW against the county jobs and wages from BLS QCEW provides a way to infer employees per entity and wages per employee in cases where data have been intentionally set to zero by the agencies. Where one dataset reported nonzero values while the other was zero, we adopted the nonzero value. For WA ESD QCEW, we used only values for which the three-digit and six-digit NAICS encompassed the same set. While 2021 employment data were available only for Q1 and Q2, harvest data and GBI were available through Q3, and showed continued increase. As harvest and employment are positively linked, we adjusted likely second-half employment to reflect the recorded higher harvest levels.

Table 2. NAICS codes with crosswalk to RIMS industry groups. NAICS codes with more than three digits were aggregated into three-digit groups for the remainder of this analysis.

NAICS	Description	Category	RIMS II Group
113	Forestry and logging	Forestry logging support	2
1153	Support activities for forestry	Forestry logging support	2
321	Wood product manufacturing	Wood product mfg.	8
322	Paper manufacturing	Paper manufacturing	22
33711	Wood kitchen cabinet, counter mfg.	Wood furniture mfg.	17
337122	Nonupholstered wood furniture mfg.	Wood furniture mfg.	17
337211	Wood office furniture manufacturing	Wood furniture mfg.	17
337212	Custom architectural woodwork	Wood furniture mfg.	17
42331	Lumber, plywood, etc. wholesalers	Paper lumber wholesale	27
4883	Support activities for water transport	Forestry port activity	34
483111	Deep sea freight transportation	Forestry port activity	34

Washington State is the single most important state in the nation for exporting forest products. A total of $3.06 billion in forest products were exported via Washington's ports in 2021, corresponding to 7.26 million tons of material. By mass, Washington exports 25% of national log and lumber products and 9% of paper products (Table 3), collectively 14% of the national total. Port-related NAICS reported by BLS and WA ESD include all support activities and deep-sea freight transport jobs and wages, but only a fraction of these are related to the forest product industry. We collected port-level and regional import-export data from USA Trade to estimate the fraction of port activities attributable to the forest products industry. We acquired vessel tonnage and dollar value for all forest products commodity groups for Washington ports, as well as total vessel tonnage and dollar value for those ports. We calculated the ratio between forest products tonnage and total tonnage for ports at the county level and computed an average value for counties with port-related activities but no physical port locations. We multiplied NAICS 4883 and NAICS 483111 jobs and wages by commodity ratios for 2021 from the appropriate county to estimate forestry-related port activities.

Table 3. Forest products exported through Washington State constitute 9% of total national forest products exports in terms of dollar value, and 14% of forest exports by weight measure.

Commodity	Export Value (2021 $)			Export Tonnage		
	USA Total	Washington		USA Total	Washington	
	($ million)	$ million	%	(million tons)	million tons	%
Wood products	$ 9,731	$ 1,633	17%	22.91	5.81	25%
Wood pulp	$ 9,677	$ 449	5%	22.64	0.93	4%
Paper products	$ 15,339	$ 982	6%	5.79	0.52	9%
Total:	**$ 34,747**	**$ 3,064**	**9%**	**51.34**	**7.26**	**14%**

2.2.2 Indirect, induced jobs and wages

Direct impacts of the forest products industry include jobs and wages inferred from the QCEW and modeled CBP-NES data for 2021. *Indirect* impacts measure the jobs and wages that result from supplying or servicing industries outside the target NAICS set. For example, a sawmill would purchase logs (direct), but also machinery (indirect). Further *induced* impacts of the forest products industry result when persons employed by the industry spend their income in the larger community, e.g. a logging contractor purchasing groceries. Multipliers to calculate indirect and induced jobs and wages were purchased from the Bureau of Economic Assessment RIMS I/O model. Multipliers must be aggregated by regions that share economic ties. Following prior WFPA methods, we used six regions in Washington, Kennewick-Richland-Pasco, Lewiston (includes some Idaho Counties), Portland-Vancouver-Beaverton (includes some Oregon Counties), Seattle-Tacoma-Olympia, Spokane (includes Idaho counties), and Wenatchee. Counties in each region are listed in Table 13 (§6.0); each county in a region was assigned the same RIMS multipliers.

To calculate indirect and induced jobs and wages, for each unique combination of WA county and NAICS code, we multiplied direct jobs and wages (§2.2.1) by the RIMS II multiplier set for the

region featuring the county in question, assigning the RIMS II industry group to the appropriate NAICS code (Table 2). Based on consultation with experts at the Bureau of Economic Analysis, inter-industry economic activity should not be double-counted. Indirect and induced jobs and wages should derive from final industries in a sector (Figure 1), which are defined as those that export value outside the region or those that provide a final good or service within the region.

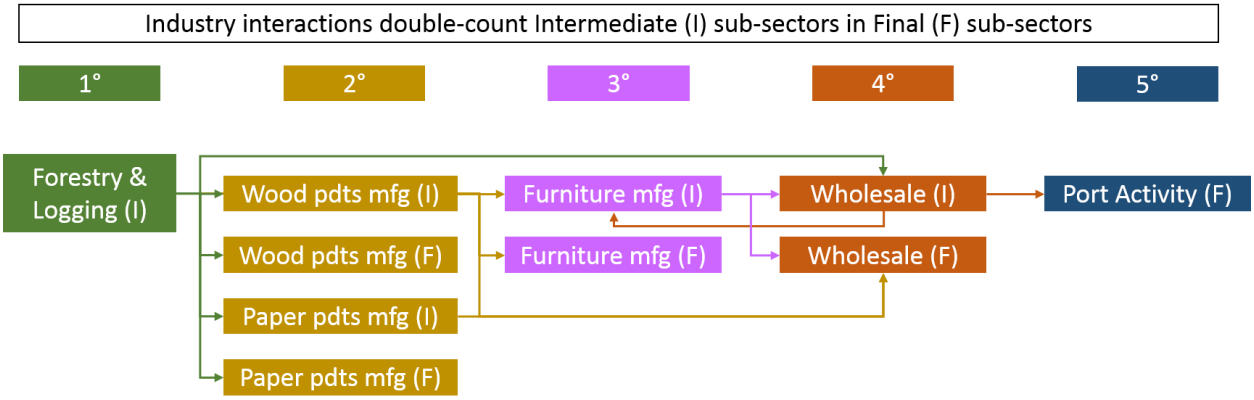

Figure 1. Intermediate (I) industries contribute to downstream production in final (F) industries, defined as exporting economic output beyond the region of analysis, or consumed as final products in the region. The most basic industry (1°) is forestry and logging, serving as intermediate to higher-degree (2° through 5°) sub-sectors.

Economic activity in final industries is a combination of final activities (export, sales) as well as contributions from intermediate industries (Figure 1). Intermediate industry contributions are counted in RIMS II multipliers for both final and intermediate industries because the multipliers enable use within a single RIMS II code. When aggregating the effects of multiple industries within a sector, intermediate impacts are likely to be counted twice.

Avoiding double-counting intermediate industry impacts is important, otherwise the combined sector impact will be overestimated. For this report, we consider forestry, logging, and their support activities (NAICS codes 113 and 115) to be intermediate industries, because their downstream products—logs—are entirely accounted for in downstream industries. The impact of double-counting forestry and logging is deducted from the forestry and logging contribution in the form of a double-count reduction factor (Table 4), which is applied against the Type 2 RIMS II multiplier (for calculation details, please refer to WFPA technical methods memo made available with this report). Some final industries are also partially intermediate, for example wood products manufacturing (Figure 1) is final relative to logging but intermediate relative to wholesale and port activities. In these industries, we accrue to the double-count reduction factor for industry interactions that are duplicated, e.g. wholesale and port activities are deducted from the impact of wood products manufacturing (Table 4). For this 2021 report, the double-count factors were calculated from the latest WA I-O model[5] released in 2021, derived from 2012 data.

[5] https://ofm.wa.gov/washington-data-research/economy-and-labor-force/washington-input-output-model/2012-washington-input-output-model

Table 4. Double-count reduction factors derived from the 2012 WA I-O model. Note that NAICS group 113 includes the contributions from 115, support activities for forestry.

WA I-O Description	NAICS group	Inter-Industry Output		Total Output		Double-Count	
		Sum	I-I DC	PCE output	Industry	Sum	Factor
Forestry and Logging	113	1,428.3	1,403.2	89.5	2,896.5	1,492.7	**0.515**
Wood Product Mfg.	321	2,210.6	1,111.6	28.3	5,187.9	1,139.9	**0.220**
Paper Manufacturing	322	1,043.0	303.9	222.6	6,504.6	526.5	**0.081**
Furniture	337	381.3	16.6	16.7	1,379.8	33.3	**0.024**
Wholesale	423	9,645.1	1,251.7	6,542.8	25,723.2	7,794.5	**0.303**
Ports Related	483	531.4	7.7	944.1	2,359.9	951.8	**0.403**

2.2.3 Direct and estimated taxes

The timber industry produces tax revenues in several forms. Sales of timber (stumpage) are subject to a direct tax, and designated forest land (DFL) is also taxed at state rates. Businesses in the forest products industry are also taxed with Business and Occupation (B&O) tax, retail sales tax, Public Utility Tax (PUT), other assorted fees, and fire protection tax. These latter taxes are leveed with slight variation across counties. Combined tax revenues from the forest products industry therefore include stumpage and land tax, and business operations taxes. These tax revenues are calculated for broad NAICS categories from the Quarterly Business Review[6]. Taxes are grouped into Primary Taxes (stumpage (2021 data), land fees (2020 data pro-rated to 2021)), for which values are directly reported by WA DOR, and Estimated Taxes (B&O, PUT, etc.). The state-level B&O, PUT, etc. taxes are known quantities at the state level by NAICS code, but we estimate county-level tax using the fraction of total GBI per county, and in this sense these taxes are estimated for the county level.

[6]https://dor.wa.gov/about/statistics-reports/quarterly-business-reviews/quarterly-business-review-2021

3.0 EMPLOYMENT AND WAGES

Direct and total jobs and wages were summarized by industry sector (RIMS II group, §3.1) and by county (§3.2). Methods were developed to compute direct jobs and wages from a complementary set of WA ESD QCEW and BLS QCEW data, using the WA ESD state-level sum by six-digit NAICS code to infer county-level employment and wages for three-digit NAICS codes. All direct jobs and wages, and tax data, were downloaded March 2022 for the 2021 calendar year, at which point Q1 and Q2 2021 were available. Final 2021 employment and wages are subject to change when the Q3 and Q4 data are released and may be updated further if the Census Bureau decides to release CBP-NES data again (currently only available through 2018).

3.1 Industry Sectors

We group NAICS codes into the six industries corresponding to RIMS II multiplier categories (Table 2, Table 5). For 2021, the forest products industry accounted for 42,122 direct jobs, paying $2.62 billion in wages (Table 5). With indirect and induced economic impacts, the forest products industry contributes to 102,345 total jobs and $5.63 billion total wages paid (Table 5). Direct and total employment and wages are likely higher than in 2017 (Table 1, Table 5), based on trends observed in data available through Q2 and Q3 2021.

Table 5. Direct and total jobs in the Washington forest products industry for 2020.

Industry Sector	Direct Jobs	Total Jobs	Direct Wages	Total Wages
Forestry and Logging	5,192	7,576	$ 326,253,694	$ 486,179,877
Wood Product Manufacturing	13,734	36,853	$ 813,872,574	$ 2,087,448,864
Paper Manufacturing	9,819	29,981	$ 689,338,433	$ 1,587,006,028
Furniture	5,740	10,338	$ 268,524,511	$ 513,830,560
Wholesale	7,139	15,840	$ 456,954,117	$ 789,575,858
Ports Related	498	1,757	$ 68,206,634	$ 167,331,191
Total	**42,122**	**102,345**	**$ 2,623,149,960**	**$ 5,631,372,375**

County direct jobs and wages figures are available from the BLS and WA QCEW datasets (§2.2.1), with modeled CBP-NES values inferred where possible, from which we computed total jobs and wages using the RIMS II multipliers and double-count avoidance factors (Table 6). Where modeled QCEW data departed substantially (more than a 10% decline or 25% gain), we either used CBP statewide data from 2020, or the 2017 baseline from the prior WFPA report. Counties with substantial forest products industry activity may be home to either basic forestry activity (e.g. Lewis County, with 2,513 direct jobs) or some combination of logging, processing, and manufacture or export (e.g. Cowlitz County, with 4,009 direct jobs). For further details pertaining to RIMS II multiplier calculations, please refer to supplemental materials provided to WFPA with this report.

3.2 Counties

Table 6. Direct and total jobs and wages in the Washington forest products industry comparing for 2021. Each county quantity represents the sum across NAICS categories.

County	Direct Jobs	Total Jobs	Direct Wages	Total Wages
Adams	144	216	$ 8,739,076	$ 12,669,141
Asotin	156	319	$ 9,468,325	$ 18,657,257
Benton	350	748	$ 21,732,103	$ 41,773,701
Chelan	485	775	$ 29,433,878	$ 42,351,684
Clallam	791	1,705	$ 64,371,822	$ 125,764,577
Clark	2,499	7,427	$ 139,825,155	$ 355,202,225
Columbia	145	379	$ 8,790,698	$ 18,318,152
Cowlitz	4,009	13,106	$ 225,263,240	$ 606,027,512
Douglas	140	222	$ 8,531,460	$ 12,570,888
Ferry	83	212	$ 5,040,042	$ 12,454,941
Franklin	462	992	$ 28,037,638	$ 52,824,529
Garfield	5	7	$ 303,920	$ 438,527
Grant	349	569	$ 21,218,673	$ 30,456,508
Grays Harbor	1,671	4,108	$ 126,824,289	$ 289,834,884
Island	335	830	$ 20,353,123	$ 42,989,388
Jefferson	270	644	$ 16,485,578	$ 32,811,489
King	7,362	17,245	$ 397,191,857	$ 783,266,956
Kitsap	373	721	$ 22,742,291	$ 42,915,861
Kittitas	118	245	$ 7,122,787	$ 13,236,126
Klickitat	329	842	$ 20,406,966	$ 51,020,805
Lewis	2,513	5,807	$ 201,752,940	$ 452,264,706
Lincoln	222	634	$ 13,528,455	$ 30,326,856
Mason	454	954	$ 27,611,591	$ 55,895,688
Okanogan	382	592	$ 23,234,009	$ 34,334,844
Pacific	278	503	$ 16,925,979	$ 29,717,081
Pend Oreille	309	835	$ 18,836,922	$ 40,945,269
Pierce	5,203	12,421	$ 297,020,576	$ 631,224,720
San Juan	84	189	$ 5,124,209	$ 11,554,016
Skagit	1,190	2,981	$ 72,332,259	$ 169,174,207
Skamania	201	567	$ 12,228,476	$ 31,815,699
Snohomish	2,650	6,013	$ 161,035,041	$ 344,433,603
Spokane	2,368	5,215	$ 204,748,939	$ 394,295,226
Stevens	779	2,104	$ 63,986,451	$ 164,262,186
Thurston	1,042	2,231	$ 64,830,013	$ 123,105,657
Wahkiakum	196	449	$ 11,951,809	$ 26,838,332
Walla Walla	611	1,535	$ 37,180,307	$ 75,997,857
Whatcom	1,983	4,781	$ 112,823,946	$ 254,996,195
Whitman	61	114	$ 3,697,190	$ 6,467,796
Yakima	1,520	3,108	$ 92,417,945	$ 168,137,307
Total	**42,122**	**102,345**	**$ 2,623,149,960**	**$ 5,631,372,375**

4.0 REVENUE AND TAXES

4.1 Direct Revenues

Annual forest products industry total revenues (Table 7) for each county are calculated as the product of annual revenue and the quotient of county wages to statewide wages. Primary taxes are extracted from WA DOR reported stumpage taxes and DFL property taxes (Table 7).

Table 7. Primary forest products industry tax revenues from stumpage and DFL property taxes.

County	Annual Revenues	Stumpage Sales	Stumpage Taxes	Property Taxes	Total Primary Taxes
Adams	$ 120,189,351	$ -	$ -	$ -	$ -
Asotin	$ 130,218,782	$ 964,845	$ 48,242	$ 7,550	$ 55,792
Benton	$ 298,883,698	$ -	$ -	$ -	$ -
Chelan	$ 404,806,949	$ 742,055	$ 37,103	$ 5,807	$ 42,909
Clallam	$ 885,311,846	$ 47,201,138	$ 2,360,057	$ 369,355	$ 2,729,412
Clark	$ 1,923,028,777	$ 30,247,866	$ 1,512,393	$ 236,693	$ 1,749,087
Columbia	$ 120,899,313	$ 27,761	$ 1,388	$ 217	$ 1,605
Cowlitz	$ 3,098,066,960	$ 97,428,360	$ 4,871,418	$ 762,389	$ 5,633,807
Douglas	$ 117,333,988	$ 14,663	$ 733	$ 115	$ 848
Ferry	$ 69,316,181	$ 7,016,425	$ 350,821	$ 54,904	$ 405,726
Franklin	$ 385,604,326	$ -	$ -	$ -	$ -
Garfield	$ 4,179,841	$ 111,871	$ 5,594	$ 875	$ 6,469
Grant	$ 291,822,446	$ -	$ -	$ -	$ -
Grays Harbor	$ 1,744,226,619	$ 98,828,467	$ 4,941,423	$ 773,345	$ 5,714,768
Island	$ 279,918,454	$ 1,931,897	$ 96,595	$ 15,117	$ 111,712
Jefferson	$ 226,727,737	$ 30,795,058	$ 1,539,753	$ 240,975	$ 1,780,728
King	$ 5,462,617,731	$ 34,091,072	$ 1,704,554	$ 266,767	$ 1,971,320
Kitsap	$ 312,776,911	$ 10,804,343	$ 540,217	$ 84,545	$ 624,762
Kittitas	$ 97,960,373	$ 686,528	$ 34,326	$ 5,372	$ 39,699
Klickitat	$ 280,658,962	$ 38,292,490	$ 1,914,624	$ 299,643	$ 2,214,268
Lewis	$ 2,774,727,548	$ 166,998,068	$ 8,349,903	$ 1,306,781	$ 9,656,684
Lincoln	$ 186,058,140	$ 217,764	$ 10,888	$ 1,704	$ 12,592
Mason	$ 379,744,861	$ 42,666,431	$ 2,133,322	$ 333,870	$ 2,467,192
Okanogan	$ 319,539,556	$ 3,492,510	$ 174,625	$ 27,329	$ 201,955
Pacific	$ 232,784,614	$ 62,865,824	$ 3,143,291	$ 491,933	$ 3,635,224
Pend Oreille	$ 259,065,996	$ 11,082,899	$ 554,145	$ 86,725	$ 640,870
Pierce	$ 4,084,952,489	$ 32,583,249	$ 1,629,162	$ 254,968	$ 1,884,130
San Juan	$ 70,473,738	$ 322,527	$ 16,126	$ 2,524	$ 18,650
Skagit	$ 994,792,500	$ 45,542,407	$ 2,277,120	$ 356,375	$ 2,633,495
Skamania	$ 168,179,404	$ 22,622,743	$ 1,131,137	$ 177,026	$ 1,308,163
Snohomish	$ 2,214,730,375	$ 37,955,116	$ 1,897,756	$ 297,003	$ 2,194,759
Spokane	$ 2,815,931,810	$ 6,264,417	$ 313,221	$ 49,020	$ 362,241
Stevens	$ 880,011,802	$ 34,469,836	$ 1,723,492	$ 269,731	$ 1,993,223
Thurston	$ 891,613,391	$ 41,214,146	$ 2,060,707	$ 322,506	$ 2,383,213
Wahkiakum	$ 164,374,376	$ 15,554,847	$ 777,742	$ 121,719	$ 899,461
Walla Walla	$ 511,344,331	$ 293,711	$ 14,686	$ 2,298	$ 16,984
Whatcom	$ 1,551,678,558	$ 18,365,663	$ 918,283	$ 143,714	$ 1,061,997
Whitman	$ 50,847,809	$ 352,701	$ 17,635	$ 2,760	$ 20,395
Yakima	$ 1,271,032,868	$ 201,640	$ 10,082	$ 1,578	$ 11,660
Total	**$ 36,076,433,415**	**$ 942,251,339**	**$ 47,112,567**	**$ 7,373,233**	**$ 54,485,800**

4.2 Estimated Tax Revenues

The forest products industry contributes additional taxes to state revenues in the form of business and occupation tax (B&O), public utility tax (PUT), retail sales tax, assorted other fees, and fire protection dues paid to WA DNR (Table 8).

Table 8. Estimated revenues for taxes from Business and Occupation (B&O), retail sales, Public Utility Tax (PUT), other fees, and fire protection as relative fractions of county-level Gross Business Income (GBI), distributed to counties in accordance with the fraction of forest economic activity represented by the county (Table 7).

County	B&O	Retail Sales	Public Utility	Other Fees	Fire Protection	Total Estimated Tax
Adams	$ 319,149	$ 448,188	$ 8,409	$ 5,498	$ 39,582	$ 820,827
Asotin	$ 345,781	$ 485,588	$ 9,111	$ 5,957	$ 42,885	$ 889,322
Benton	$ 793,652	$ 1,114,542	$ 20,912	$ 13,673	$ 98,430	$ 2,041,210
Chelan	$ 1,074,919	$ 1,509,532	$ 28,324	$ 18,519	$ 133,314	$ 2,764,607
Clallam	$ 2,350,845	$ 3,301,342	$ 61,944	$ 40,501	$ 291,557	$ 6,046,189
Clark	$ 5,106,384	$ 7,171,005	$ 134,552	$ 87,974	$ 633,305	$ 13,133,220
Columbia	$ 321,034	$ 450,835	$ 8,459	$ 5,531	$ 39,815	$ 825,675
Cowlitz	$ 8,226,565	$ 11,552,741	$ 216,767	$ 141,729	$ 1,020,277	$ 21,158,079
Douglas	$ 311,567	$ 437,540	$ 8,210	$ 5,368	$ 38,641	$ 801,326
Ferry	$ 184,061	$ 258,481	$ 4,850	$ 3,171	$ 22,828	$ 473,391
Franklin	$ 1,023,928	$ 1,437,925	$ 26,980	$ 17,640	$ 126,990	$ 2,633,464
Garfield	$ 11,099	$ 15,587	$ 292	$ 191	$ 1,377	$ 28,546
Grant	$ 774,901	$ 1,088,211	$ 20,418	$ 13,350	$ 96,105	$ 1,992,985
Grays Harbor	$ 4,631,596	$ 6,504,249	$ 122,041	$ 79,794	$ 574,421	$ 11,912,100
Island	$ 743,292	$ 1,043,820	$ 19,586	$ 12,806	$ 92,185	$ 1,911,688
Jefferson	$ 602,050	$ 845,471	$ 15,864	$ 10,372	$ 74,668	$ 1,548,425
King	$ 14,505,361	$ 20,370,188	$ 382,212	$ 249,901	$ 1,798,987	$ 37,306,649
Kitsap	$ 830,544	$ 1,166,350	$ 21,885	$ 14,309	$ 103,006	$ 2,136,093
Kittitas	$ 260,123	$ 365,296	$ 6,854	$ 4,481	$ 32,261	$ 669,015
Klickitat	$ 745,258	$ 1,046,582	$ 19,637	$ 12,839	$ 92,429	$ 1,916,745
Lewis	$ 7,367,974	$ 10,347,003	$ 194,144	$ 126,937	$ 913,792	$ 18,949,850
Lincoln	$ 494,056	$ 693,814	$ 13,018	$ 8,512	$ 61,274	$ 1,270,674
Mason	$ 1,008,369	$ 1,416,075	$ 26,570	$ 17,372	$ 125,060	$ 2,593,447
Okanogan	$ 848,501	$ 1,191,568	$ 22,358	$ 14,618	$ 105,233	$ 2,182,278
Pacific	$ 618,133	$ 868,058	$ 16,288	$ 10,649	$ 76,662	$ 1,589,790
Pend Oreille	$ 687,920	$ 966,061	$ 18,126	$ 11,852	$ 85,317	$ 1,769,277
Pierce	$ 10,847,127	$ 15,232,853	$ 285,819	$ 186,877	$ 1,345,285	$ 27,897,960
San Juan	$ 187,135	$ 262,798	$ 4,931	$ 3,224	$ 23,209	$ 481,297
Skagit	$ 2,641,558	$ 3,709,597	$ 69,604	$ 45,509	$ 327,612	$ 6,793,881
Skamania	$ 446,581	$ 627,144	$ 11,767	$ 7,694	$ 55,386	$ 1,148,572
Snohomish	$ 5,880,965	$ 8,258,765	$ 154,962	$ 101,318	$ 729,370	$ 15,125,380
Spokane	$ 7,477,387	$ 10,500,654	$ 197,027	$ 128,822	$ 927,362	$ 19,231,252
Stevens	$ 2,336,771	$ 3,281,578	$ 61,573	$ 40,258	$ 289,812	$ 6,009,992
Thurston	$ 2,367,578	$ 3,324,840	$ 62,385	$ 40,789	$ 293,632	$ 6,089,225
Wahkiakum	$ 436,477	$ 612,955	$ 11,501	$ 7,520	$ 54,133	$ 1,122,586
Walla Walla	$ 1,357,817	$ 1,906,811	$ 35,778	$ 23,393	$ 168,399	$ 3,492,198
Whatcom	$ 4,120,306	$ 5,786,234	$ 108,569	$ 70,985	$ 511,009	$ 10,597,104
Whitman	$ 135,021	$ 189,612	$ 3,558	$ 2,326	$ 16,746	$ 347,262
Yakima	$ 3,375,083	$ 4,739,702	$ 88,932	$ 58,147	$ 418,585	$ 8,680,449
Total	**$ 95,796,871**	**$ 134,529,593**	**$ 2,524,218**	**$ 1,650,408**	**$ 11,880,938**	**$ 246,382,029**

Total combined tax revenue from the forest products industry includes primary taxes directly from forestry activities (stumpage, DFL property tax) and taxes from business activity apportioned to counties by the ratio of forest products industry activity in each county. Total 2021 tax revenue from forest products industry activity summed to $300.9 million (Table 9).

Table 9. Direct and estimated tax revenues by county for 2021.

County	Total Primary Taxes	Total Estimated Taxes	Combined Taxes
Adams	$ -	$ 820,827	$ 820,827
Asotin	$ 55,792	$ 889,322	$ 945,114
Benton	$ -	$ 2,041,210	$ 2,041,210
Chelan	$ 42,909	$ 2,764,607	$ 2,807,516
Clallam	$ 2,729,412	$ 6,046,189	$ 8,775,600
Clark	$ 1,749,087	$ 13,133,220	$ 14,882,306
Columbia	$ 1,605	$ 825,675	$ 827,281
Cowlitz	$ 5,633,807	$ 21,158,079	$ 26,791,886
Douglas	$ 848	$ 801,326	$ 802,174
Ferry	$ 405,726	$ 473,391	$ 879,117
Franklin	$ -	$ 2,633,464	$ 2,633,464
Garfield	$ 6,469	$ 28,546	$ 35,015
Grant	$ -	$ 1,992,985	$ 1,992,985
Grays Harbor	$ 5,714,768	$ 11,912,100	$ 17,626,869
Island	$ 111,712	$ 1,911,688	$ 2,023,400
Jefferson	$ 1,780,728	$ 1,548,425	$ 3,329,153
King	$ 1,971,320	$ 37,306,649	$ 39,277,969
Kitsap	$ 624,762	$ 2,136,093	$ 2,760,855
Kittitas	$ 39,699	$ 669,015	$ 708,714
Klickitat	$ 2,214,268	$ 1,916,745	$ 4,131,013
Lewis	$ 9,656,684	$ 18,949,850	$ 28,606,534
Lincoln	$ 12,592	$ 1,270,674	$ 1,283,266
Mason	$ 2,467,192	$ 2,593,447	$ 5,060,638
Okanogan	$ 201,955	$ 2,182,278	$ 2,384,233
Pacific	$ 3,635,224	$ 1,589,790	$ 5,225,014
Pend Oreille	$ 640,870	$ 1,769,277	$ 2,410,147
Pierce	$ 1,884,130	$ 27,897,960	$ 29,782,090
San Juan	$ 18,650	$ 481,297	$ 499,947
Skagit	$ 2,633,495	$ 6,793,881	$ 9,427,376
Skamania	$ 1,308,163	$ 1,148,572	$ 2,456,735
Snohomish	$ 2,194,759	$ 15,125,380	$ 17,320,139
Spokane	$ 362,241	$ 19,231,252	$ 19,593,493
Stevens	$ 1,993,223	$ 6,009,992	$ 8,003,215
Thurston	$ 2,383,213	$ 6,089,225	$ 8,472,438
Wahkiakum	$ 899,461	$ 1,122,586	$ 2,022,047
Walla Walla	$ 16,984	$ 3,492,198	$ 3,509,182
Whatcom	$ 1,061,997	$ 10,597,104	$ 11,659,101
Whitman	$ 20,395	$ 347,262	$ 367,657
Yakima	$ 11,660	$ 8,680,449	$ 8,692,109
Total	**$ 54,485,800**	**$ 246,382,029**	**$ 300,867,829**

5.0 REFERENCES

5.1 Data

Beyers, W.B., Lin, T. 2021. The 2012 Washington Input-Output Study. Washington State Office of Financial Management.

Thompson, J. 2018. The Pacific Northwest Forest Inventory and Analysis Database. Forest Inventory and Analysis Program (USFS), 2018. https://www.fs.fed.us/pnw/rma/fia-topics/inventory-data/

Table 10. Agency, abbreviation, and URL for data sources that remain fixed once initially posted. †Data source requires establishing a user account and is subject to surcharge.

Data type	Agency Source	URL
Regional Input-Output Modeling System†	BEA	https://bea.gov/regional/rims/rimsii/
Washington Input-Output Model	WA OFM	https://ofm.wa.gov/sites/default/files/public/dataresearch/economy/IO_2012_report.pdf
Private / public harvest statistics	WA DoR	https://dor.wa.gov/find-taxes-rates/other-taxes/forest-tax/harvest-statistics
Gross business income (GBI)	WA DoR	http://apps.dor.wa.gov/ResearchStats/Content/GrossBusinessIncome/Report.aspx
Designated Forestland Valuation	WA DoR	https://dor.wa.gov/find-taxes-rates/other-taxes/forest-tax/forest-land-values
Tax levy rates by industry	WA DoR	https://dor.wa.gov/about/statistics-reports/detailed-tax-data-industry-and-tax-classfication

Table 11. Agency, abbreviation, and URL for data sources that may be subject to retroactive revision. †Data source is freely available but requires establishing a user account to access.

Data type	Agency Source	URL
Port-level import-export†	Census Bureau	https://usatrade.census.gov/
Quarterly Census of Employment and Wages (QCEW)	BLS	https://www.bls.gov/cew/datatoc.htm
WA Employment Security Department (ESD) Quarterly Census of Employment and Wages (QCEW)	WA ESD QCEW	https://fortress.wa.gov/esd/employmentdata/reports-publications/industry-reports/quarterly-census-of-employment-and-wages

5.2 Methods

Ehrlich, E.M., Landefeld, J.S., Barker, B.L. 1997. Regional Multipliers: A user Handbook for the Regional Input-Output Modeling System (RIMS II). Bureau of Economic Analysis.

The Contribution of Working Forests to the Economy of the State of Washington. 2014. Washington Forest Protection Association.

6.0 APPENDIX

Table 12. Jobs, wages, and tax revenues expressed on a per-MMbf (million board feet) harvest scale for 2021.

County	Harvest	Quantity / MMbf				
	(MMbf)	Direct Jobs	Total Jobs	Direct Wage	Total Wage	Total Tax
Adams	-	-	-	-	-	$ -
Asotin	8.8	18	36	$ 1,081,682	$ 2,131,446	$ 107,972
Benton	-	-	-	$ -	$ -	$ -
Chelan	4.1	118	188	$ 7,158,044	$ 10,299,534	$ 682,762
Clallam	215.5	4	8	$ 298,763	$ 583,699	$ 40,729
Clark	65.6	38	113	$ 2,130,528	$ 5,412,248	$ 226,763
Columbia	0.0	***	***	***	***	***
Cowlitz	246.7	16	53	$ 913,175	$ 2,456,722	$ 108,609
Douglas	0.1	***	***	***	***	***
Ferry	44.4	2	5	$ 113,566	$ 280,643	$ 19,809
Franklin	-	-	-	$ -	$ -	$ -
Garfield	0.7	7	10	$ 418,239	$ 603,478	$ 48,186
Grant	-	-	-	$ -	$ -	$ -
Grays Harbor	279.5	6	15	$ 453,689	$ 1,036,828	$ 63,057
Island	4.8	70	173	$ 4,236,703	$ 8,948,665	$ 421,191
Jefferson	118.2	2	5	$ 139,433	$ 277,515	$ 28,157
King	99.7	74	173	$ 3,984,670	$ 7,857,815	$ 394,041
Kitsap	22.4	17	32	$ 1,016,794	$ 1,918,742	$ 123,436
Kittitas	3.5	34	70	$ 2,025,821	$ 3,764,541	$ 201,568
Klickitat	103.6	3	8	$ 196,910	$ 492,308	$ 39,861
Lewis	401.1	6	14	$ 502,947	$ 1,127,445	$ 71,313
Lincoln	1.5	144	412	$ 8,784,711	$ 19,692,764	$ 833,290
Mason	97.6	5	10	$ 282,801	$ 572,491	$ 51,832
Okanogan	15.2	25	39	$ 1,530,971	$ 2,262,444	$ 157,105
Pacific	201.3	1	2	$ 84,092	$ 147,641	$ 25,959
Pend Oreille	89.3	3	9	$ 210,924	$ 458,479	$ 26,987
Pierce	80.6	65	154	$ 3,683,595	$ 7,828,335	$ 369,352
San Juan	1.4	58	131	$ 3,542,080	$ 7,986,647	$ 345,585
Skagit	115.5	10	26	$ 626,080	$ 1,464,306	$ 81,600
Skamania	60.3	3	9	$ 202,825	$ 527,705	$ 40,748
Snohomish	102.1	26	59	$ 1,576,714	$ 3,372,392	$ 169,584
Spokane	23.7	100	220	$ 8,633,853	$ 16,626,640	$ 826,218
Stevens	167.3	5	13	$ 382,566	$ 982,100	$ 47,850
Thurston	92.9	11	24	$ 697,988	$ 1,325,408	$ 91,218
Wahkiakum	51.0	4	9	$ 234,460	$ 526,490	$ 39,667
Walla Walla	2.1	292	734	$ 17,783,948	$ 36,351,016	$ 1,678,499
Whatcom	47.6	42	100	$ 2,370,251	$ 5,357,063	$ 244,939
Whitman	3.0	20	37	$ 1,212,458	$ 2,121,052	$ 120,570
Yakima	1.7	897	1,834	$ 54,534,586	$ 99,215,563	$ 5,129,097
Total	**2,773**	**15**	**36**	**$ 917,225**	**$ 1,981,153**	**$ 105,800**

*** Limited harvest prevents computation of jobs or wages per volume

Table 13. Interrelated economic regions in Washington, organized by RIMS II multiplier regions.

RIMS Abbr.	Region	County	State
KRP	Kennewick-Richland-Pasco	Benton	WA
KRP	Kennewick-Richland-Pasco	Columbia	WA
KRP	Kennewick-Richland-Pasco	Franklin	WA
KRP	Kennewick-Richland-Pasco	Walla Walla	WA
KRP	Kennewick-Richland-Pasco	Yakima	WA
LEW	Lewiston	Asotin	WA
LEW	Lewiston	Garfield	WA
PVB	Portland-Vancouver-Beaverton	Clark	WA
PVB	Portland-Vancouver-Beaverton	Cowlitz	WA
PVB	Portland-Vancouver-Beaverton	Klickitat	WA
PVB	Portland-Vancouver-Beaverton	Skamania	WA
PVB	Portland-Vancouver-Beaverton	Wahkiakum	WA
STO	Seattle-Tacoma-Olympia	Clallam	WA
STO	Seattle-Tacoma-Olympia	Grays Harbor	WA
STO	Seattle-Tacoma-Olympia	Island	WA
STO	Seattle-Tacoma-Olympia	Jefferson	WA
STO	Seattle-Tacoma-Olympia	King	WA
STO	Seattle-Tacoma-Olympia	Kitsap	WA
STO	Seattle-Tacoma-Olympia	Kittitas	WA
STO	Seattle-Tacoma-Olympia	Lewis	WA
STO	Seattle-Tacoma-Olympia	Mason	WA
STO	Seattle-Tacoma-Olympia	Pacific	WA
STO	Seattle-Tacoma-Olympia	Pierce	WA
STO	Seattle-Tacoma-Olympia	San Juan	WA
STO	Seattle-Tacoma-Olympia	Skagit	WA
STO	Seattle-Tacoma-Olympia	Snohomish	WA
STO	Seattle-Tacoma-Olympia	Thurston	WA
STO	Seattle-Tacoma-Olympia	Whatcom	WA
SPK	Spokane	Ferry	WA
SPK	Spokane	Lincoln	WA
SPK	Spokane	Pend Oreille	WA
SPK	Spokane	Spokane	WA
SPK	Spokane	Stevens	WA
SPK	Spokane	Whitman	WA
WEN	Wenatchee	Adams	WA
WEN	Wenatchee	Chelan	WA
WEN	Wenatchee	Douglas	WA
WEN	Wenatchee	Grant	WA
WEN	Wenatchee	Okanogan	WA