

Contribution of Working Forests to the Washington State Economy: 2021

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Data Availability Note: The 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, and certain 2020 tax benchmarked to 2021 GBI. 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 forest¹. 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 2014², 72% in 2017, and 67% in 2021³.

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 2021⁴. 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 a 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.

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	42,897
Total jobs†	101,435	101,618
Direct wages	\$ 2,453,176,434	\$ 2,840,564,163
Total wages†	\$ 5,488,652,644	\$ 5,976,102,391
Total revenue	\$ 28,590,532,029	\$ 36,076,433,415
Total taxes	\$ 231,552,544	\$ 306,193,554

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

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

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.





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 \$74.6 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 \$109,450 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 (\$ million)	Washington		USA Total (million tons)	Washington	
		\$ million	%		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.

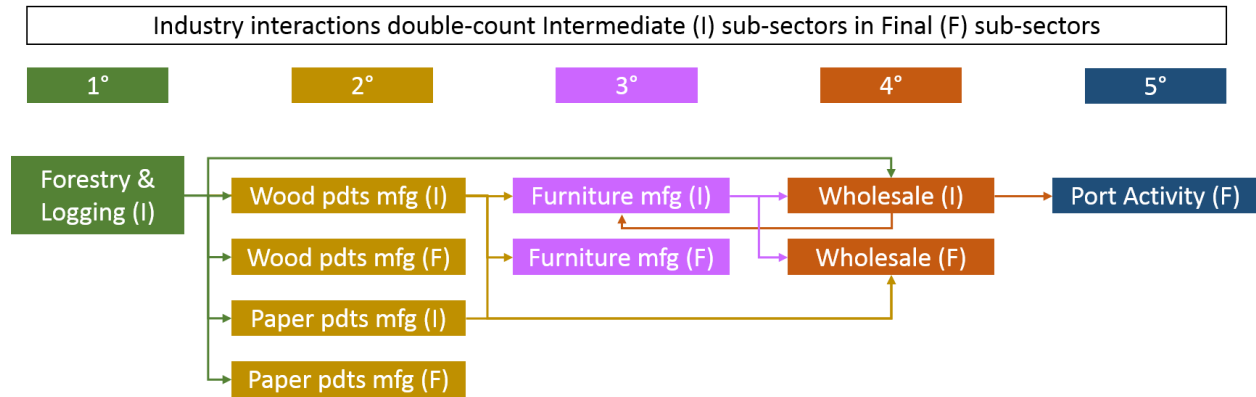


Figure 1. Intermediate (I) industries contribute to downstream production in final (F) industries, defined as exporting economic output beyond the region of analysis, or consumed as final products in the region. The most basic industry (1°) is forestry and logging, serving as intermediate to higher-degree (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 model⁵ 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 leveled 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 Review⁶. 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 is 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 42,897 direct jobs, paying \$2.84 billion in wages (Table 5). With indirect and induced economic impacts, the forest products industry contributes to 101,618 total jobs and \$5.98 billion total wages paid (Table 5). Direct and total employment and wages are likely than in 2017 (Table 1, Table 5), based on trends observed 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	6,737	10,001	\$ 411,124,853	\$ 629,159,716
Wood Product Manufacturing	4,698	8,496	\$ 250,533,437	\$ 488,004,761
Paper Manufacturing	6,017	19,182	\$ 476,914,790	\$ 1,165,278,626
Furniture	510	1,769	\$ 68,206,634	\$ 167,331,191
Wholesale	10,965	24,513	\$ 825,650,683	\$ 1,438,062,766
Ports Related	13,970	37,657	\$ 808,133,770	\$ 2,088,265,334
Total	42,897	101,618	\$ 2,840,564,164	\$ 5,976,102,391

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). Counties with substantial forest products industry activity may be home to either basic forestry activity (e.g. Lewis County, with 2,742 direct jobs) or some combination of logging, processing, and manufacture or export (e.g. Cowlitz County, with 4,324 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	58	80	\$ 2,663,204	\$ 3,402,639
Asotin	35	49	\$ 1,008,831	\$ 1,464,351
Benton	349	603	\$ 21,732,102	\$ 31,324,096
Chelan	711	1,197	\$ 41,221,313	\$ 61,078,726
Clallam	1,335	2,291	\$ 54,829,870	\$ 102,227,317
Clark	2,639	7,190	\$ 184,546,614	\$ 421,840,340
Columbia	1	1	\$ 23,818	\$ 34,033
Cowlitz	4,324	13,693	\$ 346,684,499	\$ 907,464,305
Douglas	55	77	\$ 2,540,624	\$ 3,291,129
Ferry	62	98	\$ 3,072,629	\$ 4,930,611
Franklin	83	191	\$ 5,424,784	\$ 11,896,647
Garfield	-	-	\$ -	\$ -
Grant	17	30	\$ 581,130	\$ 1,020,692
Grays Hart	1,670	3,873	\$ 108,024,896	\$ 237,031,371
Island	6	19	\$ 686,982	\$ 1,706,816
Jefferson	40	104	\$ 1,281,362	\$ 3,212,875
King	7,805	17,926	\$ 578,687,648	\$ 1,107,009,855
Kitsap	561	1,178	\$ 39,928,671	\$ 73,530,726
Kittitas	105	190	\$ 3,826,128	\$ 7,074,961
Klickitat	2	5	\$ 98,966	\$ 255,649
Lewis	2,742	5,650	\$ 171,846,738	\$ 368,226,618
Lincoln	14	28	\$ 698,629	\$ 1,161,211
Mason	637	1,387	\$ 39,810,926	\$ 82,553,414
Okanogan	79	138	\$ 4,119,636	\$ 6,994,588
Pacific	184	266	\$ 9,944,270	\$ 14,744,220
Pend Orei	101	159	\$ 5,399,281	\$ 8,664,161
Pierce	5,677	13,292	\$ 376,129,935	\$ 781,210,868
San Juan	2	4	\$ 76,437	\$ 134,718
Skagit	1,031	2,687	\$ 64,684,066	\$ 162,174,932
Skamania	156	458	\$ 9,704,270	\$ 27,244,024
Snohomis	3,935	8,962	\$ 273,908,698	\$ 537,051,847
Spokane	3,106	7,353	\$ 174,190,392	\$ 350,172,675
Stevens	850	2,183	\$ 54,501,624	\$ 132,329,896
Thurston	1,137	2,352	\$ 84,408,597	\$ 152,281,197
Wahkiaku	147	242	\$ 6,505,355	\$ 10,811,008
Walla Wal	4	4	\$ 270,594	\$ 270,594
Whatcom	2,163	5,186	\$ 112,823,946	\$ 251,680,875
Whitman	30	62	\$ 1,638,912	\$ 2,744,467
Yakima	1,044	2,410	\$ 53,037,806	\$ 105,853,957
Total	42,897	101,618	\$ 2,840,564,164	\$ 5,976,102,391





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	\$ 33,823,881	\$ -	\$ -	\$ -	\$ -
Asotin	\$ 12,812,600	\$ 964,845	\$ 48,242	\$ 7,550	\$ 55,792
Benton	\$ 276,007,406	\$ -	\$ -	\$ -	\$ -
Chelan	\$ 523,529,081	\$ 742,055	\$ 37,103	\$ 5,807	\$ 42,909
Clallam	\$ 696,363,830	\$ 47,201,138	\$ 2,360,057	\$ 369,355	\$ 2,729,412
Clark	\$ 2,343,824,387	\$ 30,247,866	\$ 1,512,393	\$ 236,693	\$ 1,749,087
Columbia	\$ 302,500	\$ 27,761	\$ 1,388	\$ 217	\$ 1,605
Cowlitz	\$ 4,403,047,937	\$ 97,428,360	\$ 4,871,418	\$ 762,389	\$ 5,633,807
Douglas	\$ 32,267,056	\$ 14,663	\$ 733	\$ 115	\$ 848
Ferry	\$ 39,023,769	\$ 7,016,425	\$ 350,821	\$ 54,904	\$ 405,726
Franklin	\$ 68,897,174	\$ -	\$ -	\$ -	\$ -
Garfield	\$ -	\$ 111,871	\$ 5,594	\$ 875	\$ 6,469
Grant	\$ 7,380,616	\$ -	\$ -	\$ -	\$ -
Grays Hart	\$ 1,371,964,421	\$ 98,828,467	\$ 4,941,423	\$ 773,345	\$ 5,714,768
Island	\$ 8,724,981	\$ 1,931,897	\$ 96,595	\$ 15,117	\$ 111,712
Jefferson	\$ 16,273,860	\$ 30,795,058	\$ 1,539,753	\$ 240,975	\$ 1,780,728
King	\$ 7,349,591,510	\$ 34,091,072	\$ 1,704,554	\$ 266,767	\$ 1,971,320
Kitsap	\$ 507,111,957	\$ 10,804,343	\$ 540,217	\$ 84,545	\$ 624,762
Kittitas	\$ 48,593,536	\$ 686,528	\$ 34,326	\$ 5,372	\$ 39,699
Klickitat	\$ 1,256,923	\$ 38,292,490	\$ 1,914,624	\$ 299,643	\$ 2,214,268
Lewis	\$ 2,182,530,297	\$ 166,998,068	\$ 8,349,903	\$ 1,306,781	\$ 9,656,684
Lincoln	\$ 8,872,888	\$ 217,764	\$ 10,888	\$ 1,704	\$ 12,592
Mason	\$ 505,616,534	\$ 42,666,431	\$ 2,133,322	\$ 333,870	\$ 2,467,192
Okanogan	\$ 52,321,213	\$ 3,492,510	\$ 174,625	\$ 27,329	\$ 201,955
Pacific	\$ 126,296,666	\$ 62,865,824	\$ 3,143,291	\$ 491,933	\$ 3,635,224
Pend Orei	\$ 68,573,277	\$ 11,082,899	\$ 554,145	\$ 86,725	\$ 640,870
Pierce	\$ 4,777,018,120	\$ 32,583,249	\$ 1,629,162	\$ 254,968	\$ 1,884,130
San Juan	\$ 970,793	\$ 322,527	\$ 16,126	\$ 2,524	\$ 18,650
Skagit	\$ 821,516,516	\$ 45,542,407	\$ 2,277,120	\$ 356,375	\$ 2,633,495
Skamania	\$ 123,248,559	\$ 22,622,743	\$ 1,131,137	\$ 177,026	\$ 1,308,163
Snohomis	\$ 3,478,762,762	\$ 37,955,116	\$ 1,897,756	\$ 297,003	\$ 2,194,759
Spokane	\$ 2,212,295,749	\$ 6,264,417	\$ 313,221	\$ 49,020	\$ 362,241
Stevens	\$ 692,194,954	\$ 34,469,836	\$ 1,723,492	\$ 269,731	\$ 1,993,223
Thurston	\$ 1,072,026,863	\$ 41,214,146	\$ 2,060,707	\$ 322,506	\$ 2,383,213
Wahkiaku	\$ 82,620,913	\$ 15,554,847	\$ 777,742	\$ 121,719	\$ 899,461
Walla Wal	\$ 3,436,660	\$ 293,711	\$ 14,686	\$ 2,298	\$ 16,984
Whatcom	\$ 1,432,914,492	\$ 18,365,663	\$ 918,283	\$ 143,714	\$ 1,061,997
Whitman	\$ 20,814,920	\$ 352,701	\$ 17,635	\$ 2,760	\$ 20,395
Yakima	\$ 673,603,814	\$ 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	\$ 89,815	\$ 126,130	\$ 2,367	\$ 1,676	\$ 12,062	\$ 232,050
Asotin	\$ 34,022	\$ 47,778	\$ 896	\$ 635	\$ 4,569	\$ 87,901
Benton	\$ 732,906	\$ 1,029,236	\$ 19,312	\$ 13,673	\$ 98,430	\$ 1,893,558
Chelan	\$ 1,390,172	\$ 1,952,248	\$ 36,631	\$ 25,935	\$ 186,702	\$ 3,591,688
Clallam	\$ 1,849,115	\$ 2,596,752	\$ 48,724	\$ 34,497	\$ 248,339	\$ 4,777,427
Clark	\$ 6,223,759	\$ 8,740,158	\$ 163,994	\$ 116,111	\$ 835,860	\$ 16,079,884
Columbia	\$ 803	\$ 1,128	\$ 21	\$ 15	\$ 108	\$ 2,075
Cowlitz	\$ 11,691,794	\$ 16,419,036	\$ 308,075	\$ 218,124	\$ 1,570,226	\$ 30,207,254
Douglas	\$ 85,682	\$ 120,324	\$ 2,258	\$ 1,598	\$ 11,507	\$ 221,369
Ferry	\$ 103,623	\$ 145,520	\$ 2,730	\$ 1,933	\$ 13,917	\$ 267,724
Franklin	\$ 182,949	\$ 256,919	\$ 4,821	\$ 3,413	\$ 24,570	\$ 472,671
Garfield	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Grant	\$ 19,598	\$ 27,522	\$ 516	\$ 366	\$ 2,632	\$ 50,635
Grays Hart	\$ 3,643,096	\$ 5,116,077	\$ 95,994	\$ 67,966	\$ 489,273	\$ 9,412,407
Island	\$ 23,168	\$ 32,536	\$ 610	\$ 432	\$ 3,112	\$ 59,858
Jefferson	\$ 43,213	\$ 60,686	\$ 1,139	\$ 806	\$ 5,804	\$ 111,647
King	\$ 19,516,005	\$ 27,406,743	\$ 514,241	\$ 364,093	\$ 2,621,029	\$ 50,422,112
Kitsap	\$ 1,346,578	\$ 1,891,029	\$ 35,482	\$ 25,122	\$ 180,847	\$ 3,479,058
Kittitas	\$ 129,035	\$ 181,206	\$ 3,400	\$ 2,407	\$ 17,330	\$ 333,378
Klickitat	\$ 3,338	\$ 4,687	\$ 88	\$ 62	\$ 448	\$ 8,623
Lewis	\$ 5,795,461	\$ 8,138,690	\$ 152,709	\$ 108,121	\$ 778,339	\$ 14,973,320
Lincoln	\$ 23,561	\$ 33,087	\$ 621	\$ 440	\$ 3,164	\$ 60,873
Mason	\$ 1,342,607	\$ 1,885,452	\$ 35,377	\$ 25,048	\$ 180,314	\$ 3,468,799
Okanogan	\$ 138,933	\$ 195,107	\$ 3,661	\$ 2,592	\$ 18,659	\$ 358,951
Pacific	\$ 335,366	\$ 470,962	\$ 8,837	\$ 6,257	\$ 45,040	\$ 866,462
Pend Orei	\$ 182,089	\$ 255,711	\$ 4,798	\$ 3,397	\$ 24,455	\$ 470,449
Pierce	\$ 12,684,829	\$ 17,813,576	\$ 334,241	\$ 236,650	\$ 1,703,592	\$ 32,772,888
San Juan	\$ 2,578	\$ 3,620	\$ 68	\$ 48	\$ 346	\$ 6,660
Skagit	\$ 2,181,444	\$ 3,063,448	\$ 57,480	\$ 40,697	\$ 292,971	\$ 5,636,041
Skamania	\$ 327,273	\$ 459,596	\$ 8,624	\$ 6,106	\$ 43,953	\$ 845,551
Snohomis	\$ 9,237,459	\$ 12,972,362	\$ 243,404	\$ 172,335	\$ 1,240,605	\$ 23,866,165
Spokane	\$ 5,874,500	\$ 8,249,686	\$ 154,791	\$ 109,595	\$ 788,954	\$ 15,177,527
Stevens	\$ 1,838,045	\$ 2,581,206	\$ 48,432	\$ 34,291	\$ 246,852	\$ 4,748,826
Thurston	\$ 2,846,646	\$ 3,997,605	\$ 75,008	\$ 53,107	\$ 382,309	\$ 7,354,675
Wahkiaku	\$ 219,390	\$ 308,095	\$ 5,781	\$ 4,093	\$ 29,464	\$ 566,823
Walla Wal	\$ 9,126	\$ 12,815	\$ 240	\$ 170	\$ 1,226	\$ 23,577
Whatcom	\$ 3,804,942	\$ 5,343,361	\$ 100,259	\$ 70,985	\$ 511,009	\$ 9,830,556
Whitman	\$ 55,272	\$ 77,619	\$ 1,456	\$ 1,031	\$ 7,423	\$ 142,801
Yakima	\$ 1,788,678	\$ 2,511,879	\$ 47,131	\$ 33,370	\$ 240,222	\$ 4,621,281
Total	\$ 95,796,871	\$ 134,529,593	\$ 2,524,218	\$ 1,787,199	\$ 12,865,664	\$ 247,503,546



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 \$302 million (Table 9).

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

County	Total Primary Taxes	Total Estimated Taxes	Combined Taxes
Adams	\$ -	\$ 232,050	\$ 232,050
Asotin	\$ 55,792	\$ 87,901	\$ 143,694
Benton	\$ -	\$ 1,893,558	\$ 1,893,558
Chelan	\$ 42,909	\$ 3,591,688	\$ 3,634,598
Clallam	\$ 2,729,412	\$ 4,777,427	\$ 7,506,838
Clark	\$ 1,749,087	\$ 16,079,884	\$ 17,828,970
Columbia	\$ 1,605	\$ 2,075	\$ 3,681
Cowlitz	\$ 5,633,807	\$ 30,207,254	\$ 35,841,061
Douglas	\$ 848	\$ 221,369	\$ 222,217
Ferry	\$ 405,726	\$ 267,724	\$ 673,449
Franklin	\$ -	\$ 472,671	\$ 472,671
Garfield	\$ 6,469	\$ -	\$ 6,469
Grant	\$ -	\$ 50,635	\$ 50,635
Grays Hart	\$ 5,714,768	\$ 9,412,407	\$ 15,127,175
Island	\$ 111,712	\$ 59,858	\$ 171,570
Jefferson	\$ 1,780,728	\$ 111,647	\$ 1,892,375
King	\$ 1,971,320	\$ 50,422,112	\$ 52,393,432
Kitsap	\$ 624,762	\$ 3,479,058	\$ 4,103,821
Kittitas	\$ 39,699	\$ 333,378	\$ 373,076
Klickitat	\$ 2,214,268	\$ 8,623	\$ 2,222,891
Lewis	\$ 9,656,684	\$ 14,973,320	\$ 24,630,004
Lincoln	\$ 12,592	\$ 60,873	\$ 73,465
Mason	\$ 2,467,192	\$ 3,468,799	\$ 5,935,990
Okanogan	\$ 201,955	\$ 358,951	\$ 560,906
Pacific	\$ 3,635,224	\$ 866,462	\$ 4,501,686
Pend Orei	\$ 640,870	\$ 470,449	\$ 1,111,319
Pierce	\$ 1,884,130	\$ 32,772,888	\$ 34,657,019
San Juan	\$ 18,650	\$ 6,660	\$ 25,310
Skagit	\$ 2,633,495	\$ 5,636,041	\$ 8,269,536
Skamania	\$ 1,308,163	\$ 845,551	\$ 2,153,714
Snohomis	\$ 2,194,759	\$ 23,866,165	\$ 26,060,924
Spokane	\$ 362,241	\$ 15,177,527	\$ 15,539,768
Stevens	\$ 1,993,223	\$ 4,748,826	\$ 6,742,049
Thurston	\$ 2,383,213	\$ 7,354,675	\$ 9,737,888
Wahkiaku	\$ 899,461	\$ 566,823	\$ 1,466,284
Walla Wal	\$ 16,984	\$ 23,577	\$ 40,561
Whatcom	\$ 1,061,997	\$ 9,830,556	\$ 10,892,553
Whitman	\$ 20,395	\$ 142,801	\$ 163,196
Yakima	\$ 11,660	\$ 4,621,281	\$ 4,632,941
Total	\$ 54,485,800	\$ 247,503,546	\$ 301,989,346



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-classification

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/report-s-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 (MMbf)	Quantity / MMbf				
		Direct Jobs	Total Jobs	Direct Wage	Total Wage	Total Tax
Adams	-	-	-	-	-	\$ -
Asotin	8.8	4	6	\$ 115,251	\$ 167,291	\$ 16,416
Benton	-	-	-	\$ -	\$ -	\$ -
Chelan	4.1	173	291	\$ 10,024,638	\$ 14,853,776	\$ 883,900
Clallam	215.5	6	11	\$ 254,477	\$ 474,458	\$ 34,841
Clark	65.6	40	110	\$ 2,811,953	\$ 6,427,619	\$ 271,662
Columbia	0.0	250	250	\$ 5,954,500	\$ 8,508,250	\$ 920,147
Cowlitz	246.7	18	56	\$ 1,405,394	\$ 3,678,691	\$ 145,293
Douglas	0.1	1,058	1,481	\$ 48,858,154	\$ 63,290,942	\$ 4,273,406
Ferry	44.4	1	2	\$ 69,235	\$ 111,100	\$ 15,175
Franklin	-	-	-	\$ -	\$ -	\$ -
Garfield	0.7	-	-	\$ -	\$ -	\$ 8,902
Grant	-	-	-	\$ -	\$ -	\$ -
Grays Hart	279.5	6	14	\$ 386,438	\$ 847,934	\$ 54,115
Island	4.8	1	4	\$ 143,002	\$ 355,291	\$ 35,714
Jefferson	118.2	-	1	\$ 10,838	\$ 27,174	\$ 16,005
King	99.7	78	180	\$ 5,805,454	\$ 11,105,637	\$ 525,616
Kitsap	22.4	25	53	\$ 1,785,186	\$ 3,287,514	\$ 183,479
Kittitas	3.5	30	54	\$ 1,088,205	\$ 2,012,219	\$ 106,108
Klickitat	103.6	-	-	\$ 955	\$ 2,467	\$ 21,449
Lewis	401.1	7	14	\$ 428,394	\$ 917,947	\$ 61,400
Lincoln	1.5	9	18	\$ 453,655	\$ 754,033	\$ 47,705
Mason	97.6	7	14	\$ 407,748	\$ 845,522	\$ 60,797
Okanogan	15.2	5	9	\$ 271,457	\$ 460,898	\$ 36,960
Pacific	201.3	1	1	\$ 49,405	\$ 73,252	\$ 22,365
Pend Orei	89.3	1	2	\$ 60,458	\$ 97,016	\$ 12,444
Pierce	80.6	70	165	\$ 4,664,695	\$ 9,688,436	\$ 429,810
San Juan	1.4	1	3	\$ 52,837	\$ 93,123	\$ 17,496
Skagit	115.5	9	23	\$ 559,880	\$ 1,403,723	\$ 71,578
Skamania	60.3	3	8	\$ 160,958	\$ 451,878	\$ 35,722
Snohomis	102.1	39	88	\$ 2,681,874	\$ 5,258,341	\$ 255,166
Spokane	23.7	131	310	\$ 7,345,260	\$ 14,766,080	\$ 655,281
Stevens	167.3	5	13	\$ 325,858	\$ 791,182	\$ 40,310
Thurston	92.9	12	25	\$ 908,779	\$ 1,639,524	\$ 104,842
Wahkiaku	51.0	3	5	\$ 127,616	\$ 212,080	\$ 28,764
Walla Wal	2.1	2	2	\$ 129,430	\$ 129,430	\$ 19,401
Whatcom	47.6	45	109	\$ 2,370,251	\$ 5,287,413	\$ 228,835
Whitman	3.0	10	20	\$ 537,466	\$ 900,022	\$ 53,519
Yakima	1.7	616	1,422	\$ 31,296,896	\$ 62,462,996	\$ 2,733,836
Total	2,773	15	36	\$ 1,013,418	\$ 2,137,957	\$ 107,950





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