



IMPACT Center
WASHINGTON STATE UNIVERSITY

WASHINGTON AGRIBUSINESS

STATUS AND OUTLOOK

An annual report by Washington State University's School of Economic Sciences



2025

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PREFACE

WASHINGTON *Agribusiness: Status and Outlook* is an annual publication prepared by Washington State University faculty in the School of Economic Sciences, with support from colleagues at the University of Washington, Oregon State University, and the University of Idaho. It is intended to be a concise overview of Washington's current and near-term agricultural activity. The publication is broken into two primary sections. Section I reviews the status of various sub-sectors in agriculture and provides short-term projections or areas of focus moving forward. Section II provides specialty research focused on specific issues relevant to the Washington agricultural sector. Section III provides Washington farm income statistics. A version of this report will be available online through the School of Economic Sciences. Feedback on this issue and suggestions for future featured articles are welcome. Specific questions regarding focus areas in the report should be directed to the managing editors who will work with the primary authors to provide responses.

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January 2025

ACKNOWLEDGMENTS

This publication was made possible through the financial support of the Washington Grain Commission, Washington State University's College of Agriculture, Human, and Natural Resource Sciences Office of Research, Washington State University's School of Economic Sciences, University of Washington's CINTRAFOR department, North American Potato Market News, The USA Dry Pea & Lentil Council, and Washington State University's IMPACT Center. We are grateful to Erin Hoyt for help with the report layout and design and to Elli Sensing for external editorial support. We are also indebted to the following contributors.

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SECTION I. STATUS AND OUTLOOK



Situation and Outlook for Small Grains

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U.S. net farm income fell in 2024 for the second year in a row, following the record realized in 2022.¹ In 2022, net farm income peaked at \$181.9 billion, fell to \$146.7 billion in 2023, and is forecast to total \$140.7 billion in 2024—a reduction of 4.1 percent. When accounting for inflation, the drop in farm income between 2023 and 2024 is 6.3 percent. Despite the year-over-year decline, the 2024 inflation adjusted net farm income forecast exceeds the 20-year average.

Inflation adjusted cash receipts from total U.S. farm sales in 2024 are estimated to total \$16.6 billion, a decline of 3.1 percent from 2023. Crop receipts are projected down 11.4 percent compared to 2023, while livestock receipts are up 5.9 percent year-over-year.

Lower receipts from crop sales are combined with an expected reduction in direct government farm payments for 2024. Disaster payments are estimated to be \$5.6 billion in 2024, a decrease of 21.6 percent compared to 2023. Payments to crop producers under the Agricultural Risk Coverage (ARC) and Price Loss Coverage (PLC) programs are estimated at \$461 million and \$1.9 million, respectively. This represents an increase of 70.5 percent in ARC payments compared to 2023, and a decline in PLC payments of 75.8 percent.

Direct payments do not include USDA loans or crop insurance indemnity payments made through the Federal Crop Insurance Corporation. They do include conservation payments. Conservation payments in 2024 increased, primarily due to a small increase in Conservation Reserve Program (CRP) acres and an increase in payments associated with

programs managed by the Natural Resource Conservation Service. In total, direct government payments are forecast to be \$10.6 billion in 2024.

Wheat

The most recent estimates from USDA's Economic Research Service (ERS) show U.S. farmers sold \$11.13 billion worth of wheat in 2024. Adjusted for inflation, this represents the lowest wheat sales figure since 2019 and is down 9 percent from sales revenue in 2023.

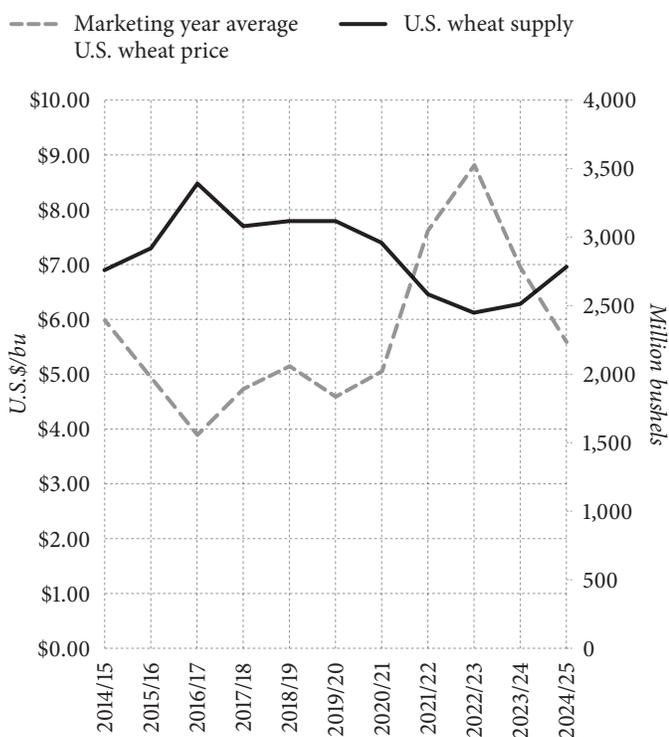
U.S. wheat producers harvested 1.4 million more wheat acres in 2024 compared to 2023, and had higher average yields compared to 2023. As a result, the entire reduction in total wheat revenue is due to lower prices. Based on USDA's World Agricultural Supply and Demand estimates released December 2024,² the average U.S. marketing year price for wheat harvested in 2024 will be \$5.60 per bushel, down from the average price of \$6.96 per bushel for the 2023 harvested crop (the U.S. wheat marketing year runs from June 1—just before U.S. producers begin wheat harvest—to the following May 31). Figure 1 shows historical U.S. wheat prices over the last several years. While prices are substantially lower than the past three years, they are still above prices in the several years prior to 2021/22.

Total domestic wheat demand is expected to exceed demand the last several years. Of note is the current expectation of a significant increase in U.S. wheat exports for the 2024/25 marketing year. Total U.S. wheat exports are currently forecast to be 850 million bushels, an increase of 20 percent compared to the 2023/24 marketing year. If

¹ <https://www.ers.usda.gov/topics/farm-economy/farm-sector-income-finances/farm-sector-income-forecast/>

² <https://www.usda.gov/oce/commodity/wasde>

Figure 1: Marketing Year Price vs. Total U.S. Wheat Supply



Source: United States Department of Agriculture, National Agricultural Statistics Service

realized this will be the largest U.S. wheat export volume in four years, but still well below the 1.1 to 1.2 billion bushels we exported a decade ago. Throughout the first half of the marketing year (June 1 to December 1, 2024) wheat exports were on pace to exceed the USDA forecast. We may see some upward revisions in the wheat export forecast as we move into the spring months, which could help support prices later in the marketing year.

Even with the year-over-year improvement in total wheat demand, the combination of increased production and larger stocks carried into the marketing year results in USDA forecasting a May 31, 2025, wheat carry-out of 795 million bushels (this is the amount of wheat we will have on hand as we head into the 2025 wheat harvest). This is an increase of 14 percent over May 31, 2024, wheat ending stocks, and the largest carry-out since May 31, 2021.

Figure 2 provides the balance sheet estimates for U.S. wheat over the last several years. The estimates represent an aggregation of all classes of wheat grown in the U.S., and the average farm price is based on average prices for all wheat classes across all states, weighted by the amount of wheat marketed by farmers each month (USDA calculates average monthly prices for the marketing year and then

Figure 2: U.S. Wheat Balance Sheet (June/May) – Based on Dec 2024 WASDE – USDA

Marketing Year	USDA	USDA	USDA	USDA	USDA	USDA	USDA	USDA
	17/18	18/19	19/20	20/21	21/22	22/23	Dec Est 23/24	Dec Fore 24/25
	<i>(in million acres/million bushels)</i>							
Beg Stocks	1,181	1,099	1,080	1,028	845	674	570	696
Imports	157	135	104	100	96	122	138	125
Acres Planted	46.1	47.8	45.5	44.5	46.7	45.8	49.6	46.1
Acres Harvested	37.6	39.6	37.4	36.8	37.1	35.5	37.1	38.5
% Harvested	81.6%	82.8%	82.2%	82.7%	79.4%	77.5%	74.8%	83.5%
Yield	46.4	47.6	51.7	49.7	44.3	46.5	48.7	51.2
Production	1,741	1,885	1,932	1,828	1,646	1,650	1,804	1,971
Total Supply	3,079	3,119	3,116	2,957	2,588	2,446	2,512	2,793
Food	964	954	962	961	971	972	961	966
Seed	63	59	60	64	58	68	62	62
Feed and Residual	51	88	97	93	64	74	85	120
Exports	901	937	969	994	796	762	707	850
Total Demand	1,980	2,039	2,087	2,111	1,889	1,888	1,815	1,998
Ending Stocks	1,099	1,080	1,028	845	698	570	696	795
Stocks to Use	55.51%	52.97%	49.26%	40.03%	36.95%	30.19%	38.35%	39.79%
Avg. Farm Price	\$4.72	\$5.16	\$4.58	\$5.05	\$7.63	\$8.83	\$6.96	\$5.60

Source: United States Department of Agriculture, World Outlook Board

weights the individual monthly estimates based on the amount of wheat sold each month to derive the annual average farm price).

About 90 percent of all the wheat grown in Washington is soft white wheat. This class of wheat is of higher quality than most other wheat classes, and as a result, soft white wheat generally receives a price premium when compared to the national average wheat price. In early December 2024, for example, the Chicago futures price for December delivery of soft red wheat was trading in the low \$5.40 per bushel range, while soft white wheat out of Portland was trading for about \$6.00 per bushel. Figure 3 Panel A shows the balance sheet for U.S. white wheat over the last few years.

Historically, Washington producers have received a price below Portland's to account for the costs of shipping to Portland, but still enjoyed a price premium compared to the national average price. Since wheat prices started to decline the second half of 2022, however, this has not been the case. Portland export prices for soft white wheat have still been above the national average wheat price most days, but Washington cash prices have lagged the national average price. Figure 3 Panel B shows average monthly wheat prices in Washington compared to national average prices over the

last few years (this is average Washington price across all classes of wheat grown in Washington weighted by volume, but white wheat does represent most of the wheat grown).

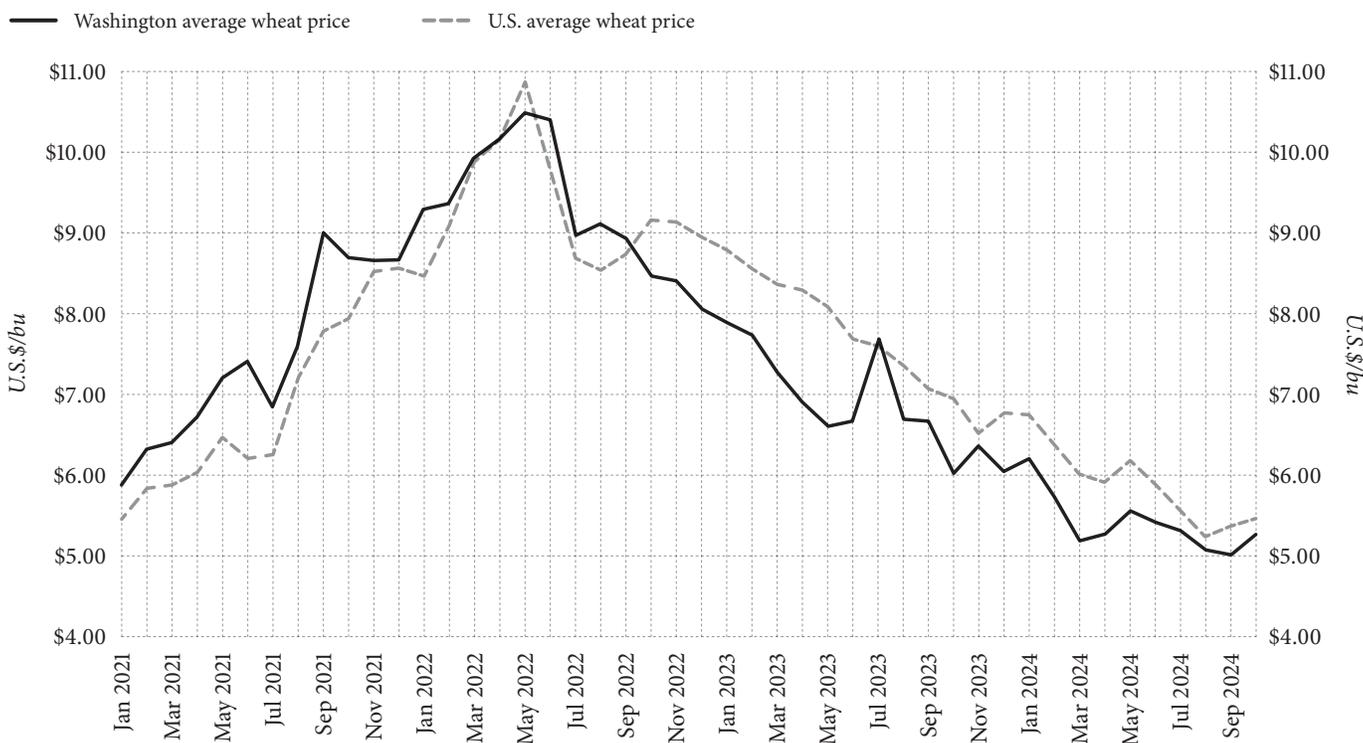
Like most Washington agriculturalists, Washington wheat producers are heavily dependent on the export market. About 90 percent of all white wheat produced in Washington

Figure 3.A: U.S. Wheat Balance Sheet (June/May) – Based on Dec 2024 WASDE – USDA

Marketing Year	USDA 20/21	USDA 21/22	USDA 22/23	USDA Dec Est 23/24	USDA Dec Fore 24/25
Beg Stocks	95	70	54	74	85
Imports	6	5	7	6	5
Production	303	201	272	234	276
Total Supply	404	276	333	314	366
Domestic Use	64	75	71	77	76
Exports	270	148	190	152	210
Total Demand	334	222	261	229	286
Ending Stocks	70	54	74	85	80
Stocks to Use	20.96%	24.32%	28.35%	37.12%	27.97%

Source: United States Department of Agriculture, World Outlook Board

Figure 3.B: Washington vs. U.S. Wheat Prices



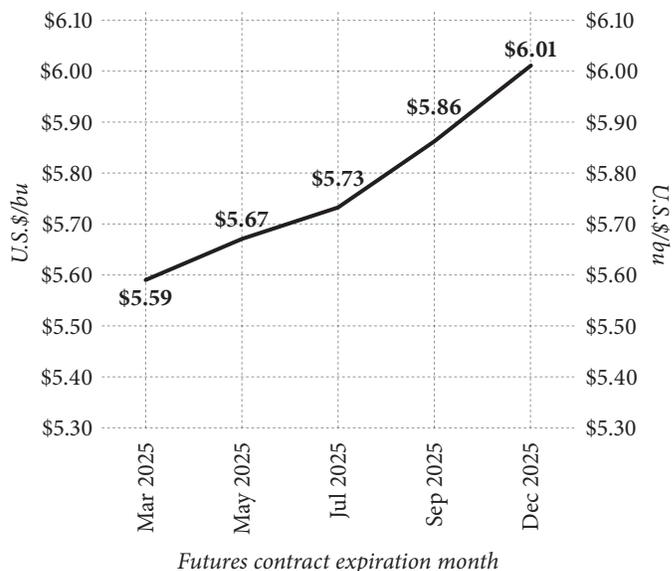
Source: USDA, National Agricultural Statistics Service

is exported. Nationally, between 40 to 45 percent of the total U.S. wheat crop goes to export. Figure 4 shows the cumulative white wheat exports over the previous three marketing years compared to the first half of the 2024/25 marketing year. Through December 2024, white wheat exports were running well above export volumes experienced in previous years. Further, the export pace through early December has exceeded the pace necessary to reach the USDA forecast of 210 million bushels by the end of the marketing year. From early December forward, we would need to export about 2.5 million bushels per week to meet the USDA marketing year forecast. In the second quarter of the marketing year (September 1 through December 1) U.S. white wheat exports averaged about 4 million bushels per week. If this pace continues through the final 2 quarters of the marketing year, USDA will need to revise their white wheat export forecast upwards.

The soft white wheat price received by Washington wheat producers is closely aligned with the soft red wheat prices traded in the Chicago futures market. By looking at futures prices for later delivery months in Chicago, we get some sense of whether the market is expecting prices to improve or drift lower as we move into the 2025/26 wheat marketing year. Figure 5 shows futures prices for soft red winter wheat

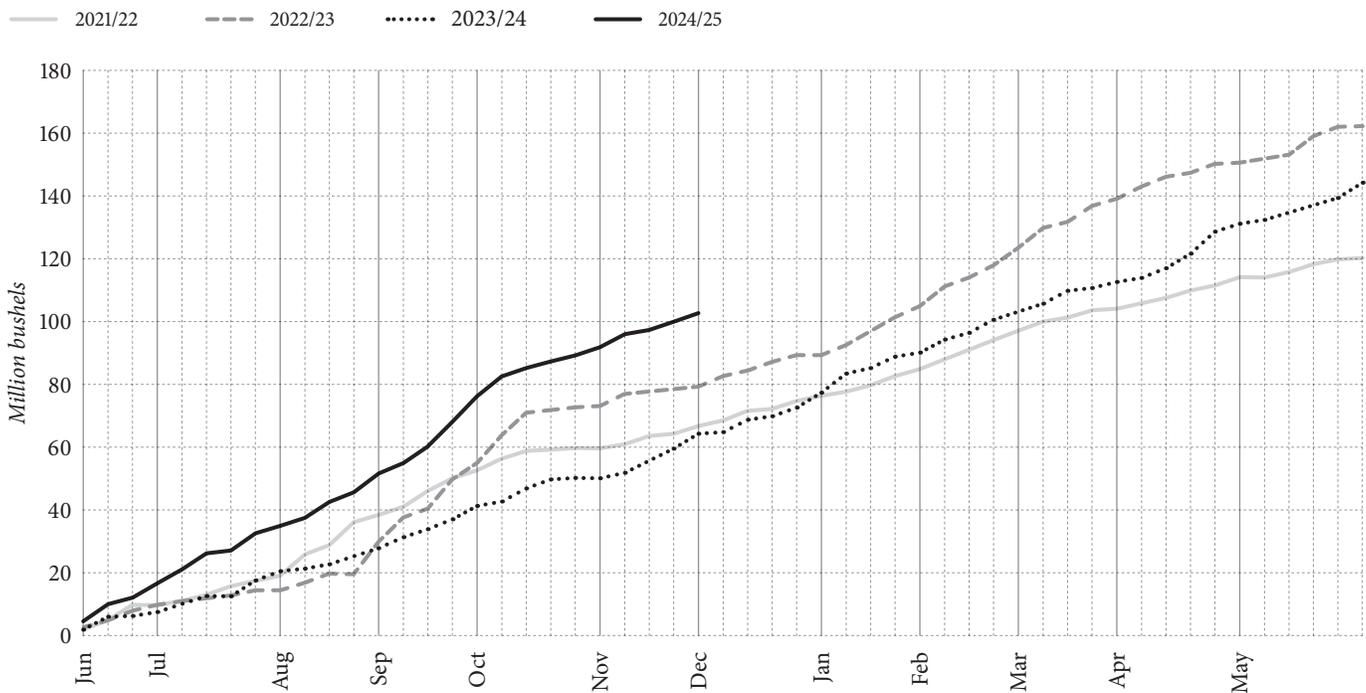
through December 2025, as reported in mid-December 2024. Note that futures prices increase as we move through the balance of this marketing year and into the first two quarters of 2025/26.³ This is a positive sign for wheat

Figure 5: Soft Red Wheat Futures Prices



Source: Barchart.com

Figure 4: U.S. Cumulative White Wheat Exports



Source: USDA, Foreign Agricultural Service

³ There are not wheat futures contracts for every month. Figure 5 shows prices for months in which futures contracts expire.

producers and suggests that the current market expectation is that wheat prices next marketing year will exceed current year levels.

Even though relative prices, as shown in Figure 5, suggest prices will improve in coming months, it does not mean the entire price surface cannot decline. If futures prices drift lower over the next several months, Washington cash prices will likely decline as well, and prices for next summer's harvest will decline as well.

One potential headwind facing future price improvement is the introduction of additional tariffs on products imported to the U.S. In the last tariff war (2018–2019) U.S. agricultural products were the primary targets of trade retaliation by trading partners. President Biden introduced a wide range of new tariffs on China in May 2024, and President elect Trump has threatened to expand tariffs on China, including increasing tariffs on all Chinese goods by 60 percent, as well as imposing new tariffs on all U.S. trade partners. According to recent work at Farmdoc, University of Illinois,⁴ U.S. wheat exports would face the steepest percentage loss, among all U.S. commodities, as the result of a retaliatory tariff increase by all trading partners. Assuming that the Trump

administration imposes a 60 percent tariff on Chinese goods and a 10 percent tariff on all other imports to the U.S., and assuming foreign tariffs increase in retaliation, Washington could incur a \$206 million dollar loss in economic activity just from the impact on Washington wheat exports.

Barley

U.S. barley production in 2024/25 fell short of the previous year's crop by 23 percent. Average barley yields in 2024 exceeded 2023 yields, but harvested acres fell 27 percent on a year-over-year basis, leading to the decline in total production.

Despite lower production in 2024, USDA estimates that the average barley price this marketing year will be \$6.60 per bushel, a decline of 11 percent compared to the previous marketing year. This is at least partially explained by a significant decrease in barley demand this year. Total use of barley is expected to fall to 165 million bushels this year, compared to 187 million bushels last year. Figure 6 shows the U.S. barley balance sheet the last several years compared to the USDA's December 2024 forecast for the current marketing year.

Figure 6: U.S. Barley Balance Sheet (June/May) – Based on Dec 2023 WASDE – USDA

Marketing Year	USDA 17/18	USDA 18/19	USDA 19/20	USDA 20/21	USDA 21/22	USDA 22/23	USDA Dec Est 23/24	USDA Dec Fore 24/25
	<i>(in million acres/million bushels)</i>							
Beg Stocks	106	94	79	80	71	37	66	78
Imports	9	6	19	7	15	23	13	12
Acres Planted	2.5	2.5	3.6	2.7	2.7	2.9	3.1	2.4
Acres Harvested	2.0	2.0	3.2	2.2	2.0	2.4	2.6	1.9
% Harvested	80.0%	80.0%	88.9%	81.5%	74.1%	82.8%	83.9%	79.2%
Yield	73	77.5	69.1	77.2	60.3	71.7	72.3	76.7
Production	143	154	218	171	120	174	186	144
Total Supply	259	254	315	258	206	235	265	234
Food	157	148	158	147	139	132	125	120
Feed and Residual	2	14	44	26	17	35	57	40
Exports	5	5	11	14	7	2	5	5
Total Demand	164	167	213	186	164	169	187	165
Ending Stocks	94	87	102	71	37	66	78	69
Stocks to Use	57.32%	52.10%	47.89%	38.17%	22.56%	39.05%	41.71%	41.82%
Avg. Farm Price	\$4.47	\$4.62	\$5.52	\$4.75	\$5.31	\$7.40	\$7.39	\$6.60

Source: United States Department of Agriculture, World Outlook Board

4 <https://farmdocdaily.illinois.edu/wp-content/uploads/2024/09/fdd091124.pdf>

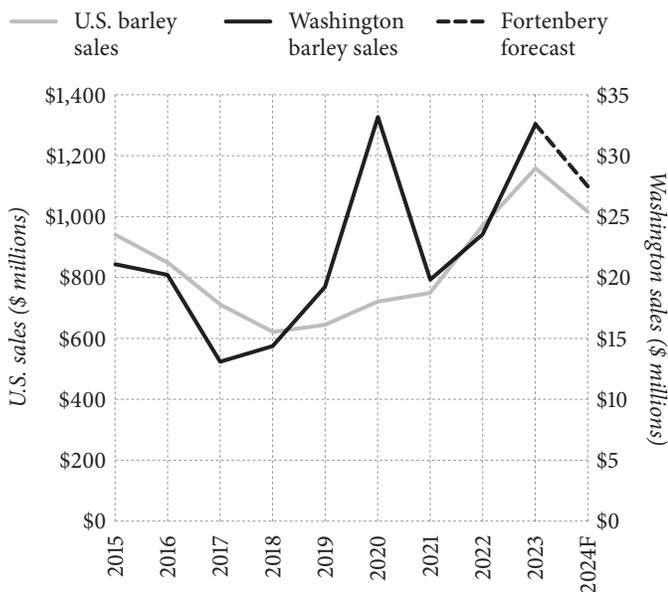
Based on USDA’s cash receipt estimates U.S. farmers sold \$1 billion worth of barley 2024, compared to \$1.2 billion in sales in 2023. State level data for 2024 was not available as of this writing, but in 2023 Washington farmers sold \$32.5 million worth of barley, an increase of about 38 percent over sales in 2022. Washington barley producers

have consistently accounted for about 2.6 percent of all U.S. barley sales over the last decade. If the ratio holds for 2024, Washington barley sales would total about \$27.3 million in 2024 (Figure 7).

Washington barley acres planted in 2024 were a significantly higher percentage of total U.S. acres planted compared to both 2022 and 2023 (Figure 8). Washington barley acres in 2024 represented the highest portion of national acres since 2019. As a result, the \$27.3 million forecast likely under-estimates actual Washington barley sales in 2024.

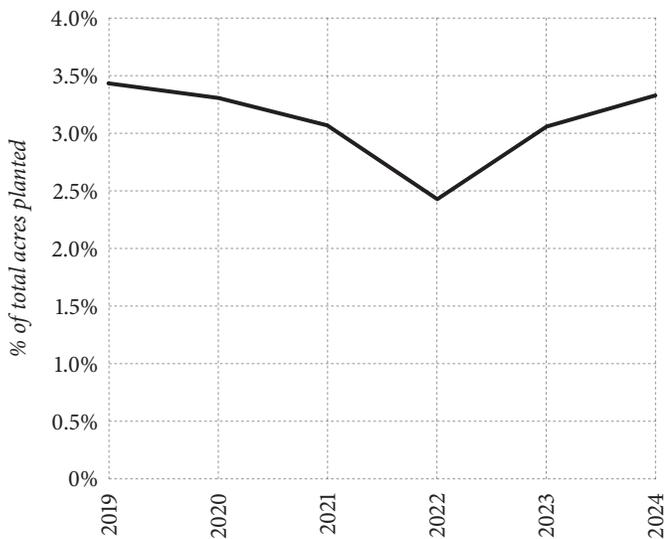
About 95 percent of all barley grown in Washington is planted in spring, as opposed to wheat which is generally planted in the fall. As a result, the size of both planted acres and the barley crop to be harvested in summer 2025 will be determined by barley prices in the spring months. If both barley and wheat prices hold steady through the spring months, we may see an increase in Washington barley acres relative to wheat in 2025.

Figure 7: Value of Farm-Level Barley Sales



Source: USDA, Economic Research Service

Figure 8: Washington Percentage of Total U.S. Barley Acres Planted



Source: United States Department of Agriculture, National Agricultural Statistics Service

Summary

Wheat prices for the current marketing year (ending May 31, 2025) are projected to be the lowest in four years. As a result, most Washington wheat farmers will face negative returns for the 2024/25 marketing year. Futures prices as of December 2024 suggested we could see some price improvement for the crops harvested in summer 2025, but there are still significant political risks, specifically the impact of a new round of tariffs, and input prices are also likely to rise for the 2025 crop.

On a positive note, U.S. exports performed quite well in the first two quarters of the 2024/25 marketing year compared to the last couple of years. In addition, Ukraine, Russia, and the European Union have a much smaller presence in the global market this year, and issues with fall plantings for their 2025 crops will likely limit their export opportunities for the 2025/26 marketing year as well.

Barley prices for the current marketing year are below those of last year and the year prior, but still above prices prior to 2022/23. Washington producers decreased their barley acreage in 2024 compared to 2023, but still represented an increased share of total U.S. acres. Since most Washington barley is planted in the spring, the amount of Washington barley harvested in 2025 will be influenced by barley prices in the spring months. If the ratio of barley to wheat continues to hold at current levels, we may see an increase in barley acres for 2025.



2024 Washington Tree Fruit Outlook

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Introduction

WASHINGTON state continues to be the nation's leading producer of apples, pears, and cherries. The 2024 Washington Tree Fruit Outlook provides an in-depth analysis of production trends, cost of production, and market conditions for these crops. We present information from 2023, as the U.S. Department of Agriculture publishes its reports in May of the following year. Consequently, the data for 2024 will be released in May 2025.

Apples

In 2023, Washington state's total apple production was at 3,805 thousand tons, representing 67 percent of all total apple production in the United States at 5,679 thousand tons. In 2023, total Washington apple production was above the 10-year average (2013–2023) at 3,460 thousand tons, but below the 2014 record production at 3,825 thousand tons. During 2013–2023, yield per acre in Washington increased 10 percent, from 20 tons per acre in 2013 to 22 tons per acre in 2023. Like previous years, the 2023 yield per acre in Washington state was above the United States average at 19 tons per acre. During 2013–2023, apple-cultivated surface in

Washington state increased 17 percent from 148 thousand acres in 2013 to 173 thousand acres in 2023. In the same year, 77 percent of all Washington apple production was sold in the fresh market.

2024 Production Costs and Returns of Washington-Grown Fresh Apples

In 2024, the Washington State University (WSU) tree fruit extension economics team conducted four production cost and return studies for the varieties Gala, Granny Smith, Honeycrisp, and Cosmic Crisp®. These studies are based on a series of assumptions that consider factors such as the size of the farm, the size of the productive block, the planting density, the trellis system, and the irrigation system.⁵

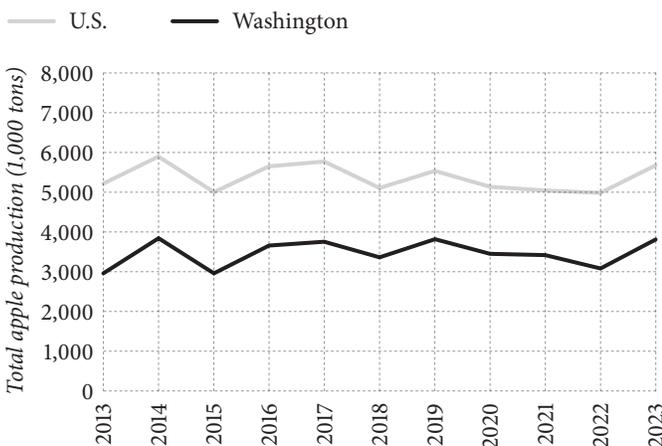
GALA

By 2019–2020, the Gala apple variety overtook Red Delicious as the leading variety shipped from Washington state, with a peak shipment of 33 million 40-pound boxes. However, by 2022–2023, shipments had declined to 23 million boxes, representing 22 percent of Washington's fresh apple shipments. Gala remains the second most exported variety, averaging 24.16 percent (6.98 million boxes) of all exports from 2020–2021 to 2022–2023.

Production costs for 'Gala' on an angled V-trellis system are estimated at \$54,557 per acre. On a vertical spindle system, they are estimated at \$46,543 per acre, during full production. At a market price of \$24 per 40-pound box, returns over variable costs are negative: -\$6,619 per acre for angled V-trellis and -\$6,548 per acre for vertical spindle. This indicates that farm income is insufficient to sustain operations under either system.

As of 2024, the first break-even returns of 'Gala' are \$28.56 per 40-pound box for the angled V-trellis and \$29.6 for the spindle system. These values represent the minimum return needed for the owner-operator to cover the operation's variable costs in the two scenarios. Returns lower than these figures suggest that it is more profitable not to operate (shutdown price) than to produce 'Gala' for the fresh market. The second break-even returns are \$29.25 per 40-pound box (angled V) and \$30.45 (spindle), which is

Figure 1: Total Apple Production, United States and Washington State, 2013–2023



Source: United States Department of Agriculture, 2024

5 For more detailed information about these studies, please visit https://ses.wsu.edu/enterprise_budgets/.

needed to cover the total cash costs and to be economically viable in the short run. The third break-even returns are \$30.17 per 40-pound box (angled V) and \$31.39 (spindle), which is needed to cover the cash costs, plus depreciation of machinery and buildings. This return must be realized for the operation to be financially viable in the long run. The fourth break-even returns are about \$37.62 per 40-pound box (angled V) and \$39.81 (spindle). When this return is received, the owner-operator would recover all out-of-pocket expenses, plus realize a competitive return on equity capital invested in land, apple orchard, machinery, equipment, and buildings. Failure to obtain this break-even return level means that the owner-operator will not receive a return on capital contributions equal to what could be earned in alternative uses.

GRANNY SMITH

Over the past decade, shipments of Granny Smith apples from Washington state have remained relatively steady, with volumes recorded at 13.8 million 40-pound boxes in 2012–2013 and 13.5 million in 2022–2023. In the 2022–2023 season, Granny Smith ranked as the fourth most shipped apple variety, following Gala, Red Delicious, and Fuji.

Production costs for ‘Granny Smith’ on an angled V-trellis system are estimated at \$51,672 per acre and on a spindle vertical system at \$43,522 per acre, during full production. At a market price of \$26 per 40-pound box, returns over variable costs are negative: -\$3,227 per acre for the angled V-trellis and -\$3,472 per acre for the vertical spindle, indicating farm income is insufficient to sustain operations under either system.

As of 2024, the first break-even returns of Granny Smith are about \$28.33 per 40-pound box for the angled V and \$29.14 for the spindle system. The second break-even returns are about \$29.04 per 40-pound box (angled V) and \$30.03 (spindle). The third break-even returns are \$30.01 per 40-pound box (angled V) and \$31.04 (spindle). The fourth break-even returns are \$37.28 per 40-pound box (angled V) and \$39.35 (spindle).

HONEYCRISP

Over the past decade, shipments of Honeycrisp fresh apples from Washington state have experienced a remarkable surge. During the 2012–2013 period, the state produced approximately 5 million 40-pound boxes of Honeycrisp apples. This figure skyrocketed to around 12.6 million boxes in the 2022–2023 period. As of 2022–2023, Honeycrisp now ranks as the fifth largest variety grown in Washington state, accounting for a substantial 12 percent of the total shipments.

Production costs for an angled V-trellis system are estimated at \$50,890 per acre, and at \$43,774 per acre for a vertical spindle system during full production. Assuming a price of \$44 per 40-pound box, the returns over cash cost and depreciation are positive, amounting to \$4,528 per acre for angled V-trellis and \$2,003 per acre for vertical spindle. This indicates that the farm income is sufficient to cover the cash costs necessary to continue operations in either trellis system. However, the economic profits are negative, suggesting that the producer is unable to cover all production costs, including opportunity costs. Opportunity costs represent the returns on investment that would have been realized if the investment had been made in the next best alternative activity. In the enterprise budget, these costs are accounted for by interest costs, management costs (including the unpaid time and labor of the owner-operator), and amortization over borrowed funds.

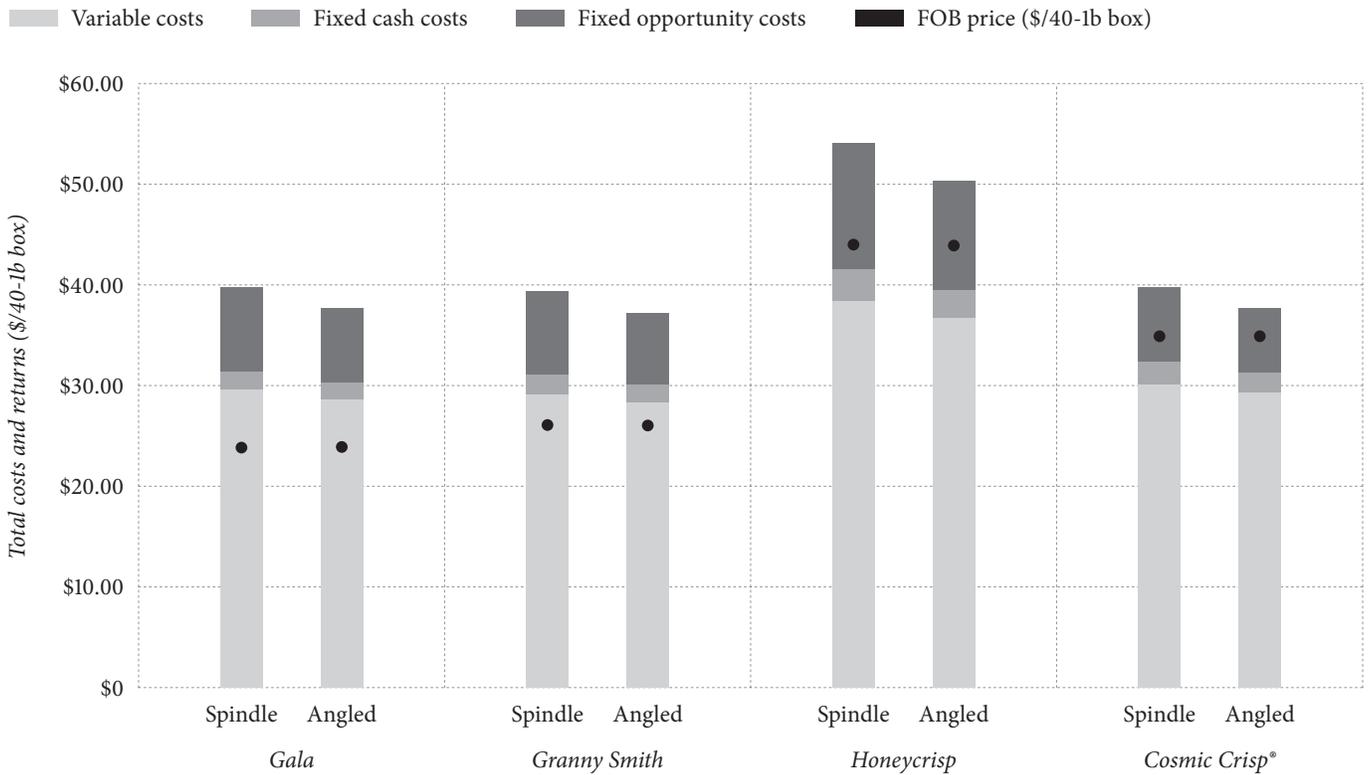
As of 2024, the first break-even returns of Honeycrisp are about \$36.72 per 40-pound box for the angled V and \$38.33 for the spindle system. The second break-even returns are about \$37.7 per 40-pound box (angled V) and \$39.55 (spindle). The third break-even returns are \$39.52 per 40-pound box (angled V) and \$41.53 (spindle). The fourth break-even returns are about \$50.34 per 40-pound box (angled V) and \$53.96 (spindle).

COSMIC CRISP®

Cosmic Crisp® apples, developed by the WSU apple breeding program, are a variety renowned for its exceptional crispness, juiciness, and extended shelf life. A cross between Honeycrisp and Enterprise apples, Cosmic Crisp® was officially released for commercial production in December 2019, with WSU holding the exclusive patent for this variety. To assist in managing and promoting the commercialization of Cosmic Crisp®, WSU engaged Proprietary Variety Management (PVM). The variety quickly gained popularity within the Washington state apple industry, with over 20 million trees sold by 2023. As of 2022–2023, Cosmic Crisp® accounted for 5.5 million 40-pound boxes, ranking it as the eighth largest variety in shipment volume, following Gala, Red Delicious, Granny Smith, Honeycrisp, Fuji, and Cripps Pink®.

Production costs on an angled V-trellis system are estimated at \$54,192 per acre, and at \$46,031 per acre on a vertical spindle system during full production. Considering a gross price of \$35 per 40-pound box, the returns over cash cost and depreciation are positive: \$5,409 per acre for angled V-trellis and \$3,128 per acre for spindle vertical. This indicates that the farm income is sufficient to cover the cash costs necessary to continue operations

Figure 2: 2024 Production Costs and Returns of Washington-Grown Fresh Apples: Gala, Granny Smith, Honeycrisp, and Cosmic Crisp®



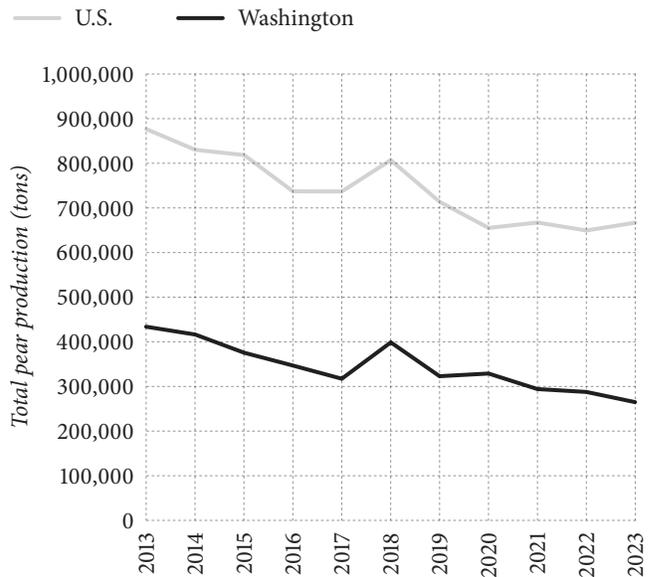
in either trellis system. However, the economic profits are negative, suggesting that the producer is unable to cover total production costs, including opportunity costs.

As of 2024, the first break-even returns of Cosmic Crisp® are about \$29.26 per 40-pound box for the angled V and \$30.04 for the spindle system. The second break-even returns are about \$29.95 per 40-pound box (angled V) and \$30.9 (spindle). The third break-even returns are \$31.23 per 40-pound box (angled V) and \$32.29 (spindle). The fourth break-even returns are about \$37.75 per 40-pound box (angled V) and \$39.87 (spindle).

Pears

Washington state, the largest pear producer in the United States, accounted for 40 percent of the country’s total pear production in 2023, reaching 267 thousand tons. However, this production fell below the 10-year average of 346 thousand tons. The yield per acre in Washington, at 16.3 tons per acre, was also lower than the national average of 17.2 tons per acre. The overall FOB price received by Washington state growers was \$490 per ton. 76 percent of Washington state’s pear production went to the fresh market.

Figure 3: Total Pear Production, United States and Washington State, 2013–2023



Source: United States Department of Agriculture, 2024

2022 Production Costs and Returns of Washington-Grown Fresh Pears

In 2022, the WSU tree fruit extension economics team conducted two production cost and return studies for fresh pears, Anjou and Bartlett. These studies are based on a series of assumptions that consider various factors, including the size of the farm, the size of the productive block, the planting density, the trellis system, and the irrigation system.⁶

ANJOU

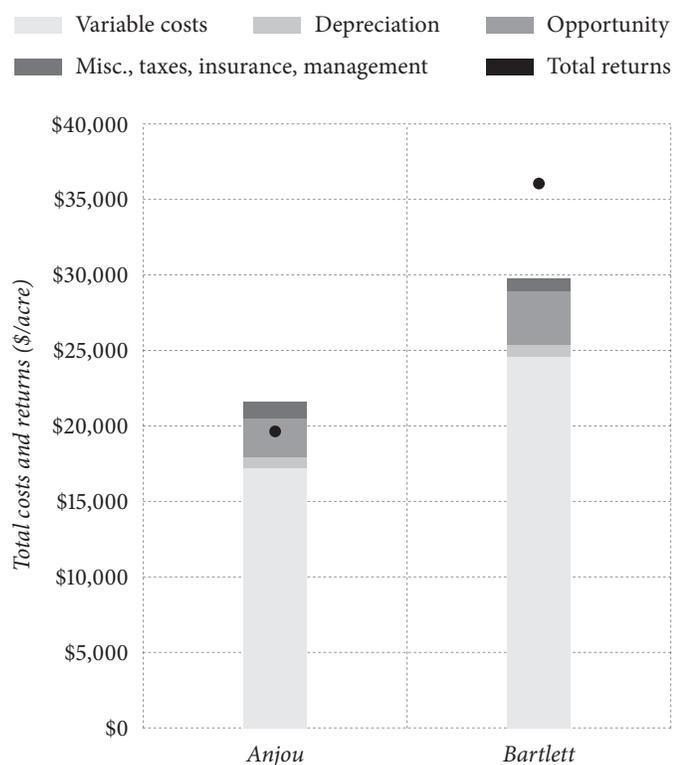
Total production costs for fresh-market Anjou pears amount to \$21,625 per acre. Considering a gross price of \$675 per 1,100-pound bin for Anjou and \$742 per bin for Bartlett, the net returns during full production are -\$1,975 per acre. As of 2022, the first break-even return for fresh-market Anjou pears is approximately \$536 per bin. This figure represents the minimum return required for the owner-operator to cover the variable costs of the operation. The second break-even return is around \$570 per bin, which is needed to cover total cash costs and be economically viable in the short term. The third break-even return is \$613 per bin, which is required to cover

cash costs, depreciation of machinery and buildings, and ensure long-term financial viability. The fourth break-even return is \$785 per bin. Achieving this return would allow the owner-operator to recover all out-of-pocket expenses and realize a competitive return on equity capital invested in land, the Anjou pear orchard, machinery, equipment, and buildings. Failure to obtain this break-even return level means that the owner-operator will not receive a return on capital contributions that could be earned in alternative uses.

BARTLETT

The total production costs for fresh-market Bartlett pears in South Washington are estimated to be \$29,794 per acre. Considering a gross price of \$675 per 1,100-pound bin for Anjou and \$742 per bin for Bartlett, the net returns during full production are approximately \$6,307 per acre. As of 2022, the first break-even return for fresh market Bartlett pears is around \$392 per bin. To cover the total cash costs and be economically viable in the short run, the second break-even return is approximately \$404 per bin. The third break-even return is \$428 per bin. The fourth break-even return is about \$551 per bin.

Figure 4: 2022 Production Costs and Returns of Washington-Grown Fresh Pears: Anjou and Bartlett



⁶ For more detailed information about these studies, please visit https://ses.wsu.edu/enterprise_budgets/.

Cherries

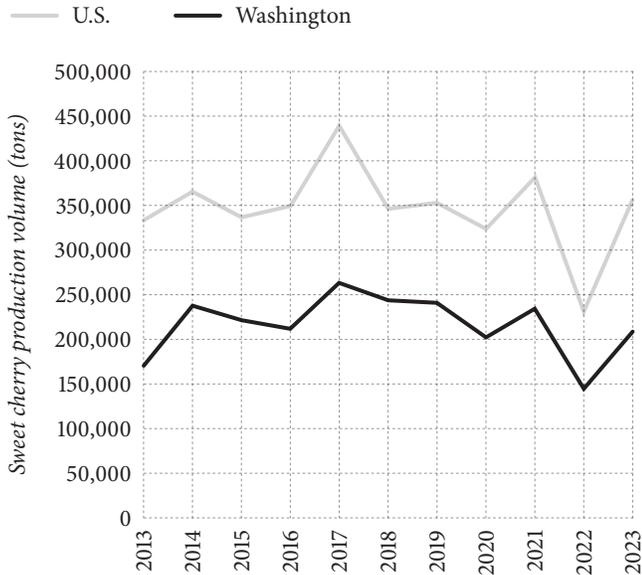
In 2023, Washington state emerged as the largest producer of sweet cherries in the United States, accounting for a substantial 59 percent of the total production. The state's sweet cherry production reached a remarkable 208 thousand tons, marking a significant 44 percent increase compared to the previous year's production of 144.5 thousand tons. However, it's worth noting that the 2023 production volume fell slightly short of the 10-year average of 215.8 thousand tons, and even lower than the production peak recorded in 2017 at 262.6 thousand tons.

Over the past decade, Washington's cultivated surface for sweet cherries has experienced a 15 percent growth, expanding from 35 thousand acres in 2013 to 39 thousand acres in 2023. Simultaneously, the yield per acre has shown a steady improvement, increasing by 10 percent from 4.8 tons per acre in 2013 to 5.3 tons per acre in 2023. Notably, Washington state's yield per acre surpassed the national average in 2023, standing at 4.1 tons per acre.

During the 2013–2023 period, a significant portion of Washington state's sweet cherry production, amounting to 78 percent, was destined for the fresh market. Notably, the sweet cherry (fresh market) FOB price received

by Washington growers reached a record low in the last decade: \$1,590 per ton. This price was substantially lower than the national average of \$2,100 per ton.

Figure 5: Total Sweet Cherry Production, United States and Washington State, 2013–2023



Source: United States Department of Agriculture, 2024

2022 Production Costs and Returns of Washington-Grown Sweet Cherries

In 2022, the WSU tree fruit extension economics team conducted four production cost and return studies for sweet cherries: 'Chelan,' 'Coral Champagne,' 'Skeena,' and 'Sweetheart.' These studies are based on a series of assumptions that consider various factors, including the size of the farm, the size of the productive block, the planting density, the rootstock and trellis, and the irrigation system.⁷

'CHELAN'

The 'Chelan' variety is among the top three sweet cherry varieties in Washington state in terms of bearing acreage, along with 'Bing' and 'Sweetheart.' The 'Chelan' variety is considered an early variety, and it ripens 10 to 12 days before 'Bing.' The total production costs for 'Chelan' sweet

cherries during full production is estimated at \$28,233 per acre. Considering a gross price (the price negotiated by the packinghouse on behalf of the grower) of \$2.55 per pound, the net returns during full production are estimated at about \$8,631 per acre. The break-even price for 'Chelan' cherries, as of 2022, is estimated at \$2.15 per pound, assuming 80 percent packout and a gross production of 14,000 pounds per acre.

'CORAL CHAMPAGNE'

'Coral Champagne' is a relatively new variety grown in Washington state. This variety is an early-to-mid season variety that may ripen and be harvested about ten days ahead of 'Bing.' The total production costs for 'Coral Champagne' sweet cherries during full production are estimated at \$28,482 per acre. At a gross price of \$2.25 per pound, the estimated net returns during full production are about \$4,062 per acre. The breakeven price for 'Coral Champagne' cherries as of 2022 is estimated at \$1.97 per pound assuming 80 percent packout, and a gross production of 18,000 pounds per acre.

'SKEENA'

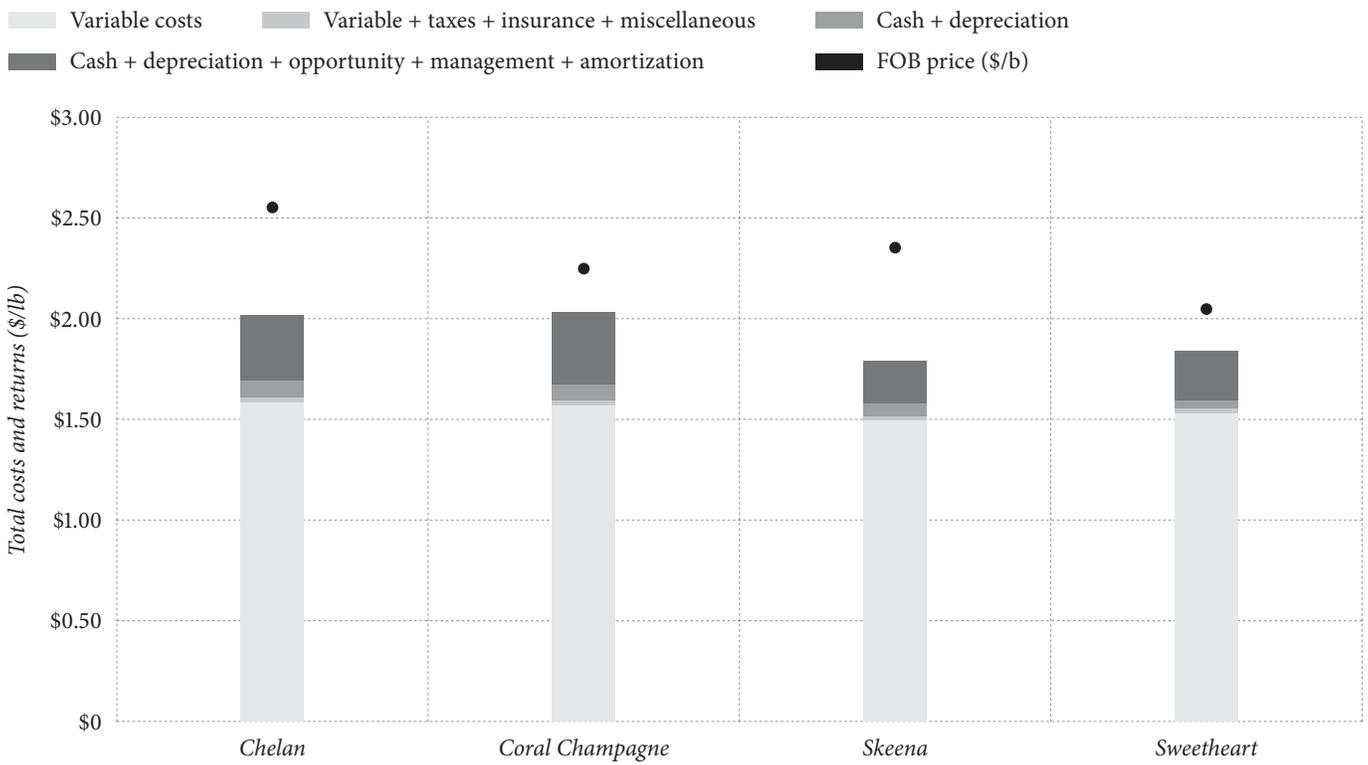
'Skeena' is among the top five sweet cherry varieties in Washington state, along with 'Bing,' 'Sweetheart,' 'Chelan,' and 'Rainier.' 'Skeena' is a late-to-mid season variety that usually ripens 12–15 days after 'Bing.' The total production costs for 'Skeena' sweet cherries during full production are estimated at \$33,815 per acre. Considering a gross price of \$2.35 per pound, the net returns during full production are about \$11,497 per acre. The breakeven price for 'Skeena' cherries as of 2022 is estimated at \$2.01 per pound assuming 80 percent packout, and a gross production of 16,000 pounds per acre.

'SWEETHEART'

'Sweetheart' is considered a late variety, that usually ripens 20–22 days after 'Bing.' The total production costs for 'Sweetheart' cherries during full production are estimated at \$35,058 per acre. At a gross price of \$2.05 per pound, the net returns during full production are about \$4,493 per acre. The break-even price for 'Sweetheart' cherries as of 2022 is estimated at \$2.11 per pound, assuming 80 percent packout, and a gross production of 16,000 pounds per acre.

⁷ For more detailed information about these studies, please visit https://ses.wsu.edu/enterprise_budgets/.

Figure 6: 2022 Production Costs and Returns of Washington-Grown Sweet Cherries: Chelan, Coral Champagne, Skeena, and Sweetheart





Specialty Crops Situation and Outlook

Michael Brady (509) 335-0970

UNDER Section 101 of the Specialty Crops Competitiveness Act of 2004 (7 U.S.C. 1621 and section 10010 of the Agricultural Act of 2014, Public Law 113-79), specialty crops are “fruits and vegetables, tree nuts, dried fruits, horticulture, and nursery crops (including floriculture).” As is provided in more detail below, specialty crops play an outsized role in the agricultural economy relative to their share of acreage. This is particularly true in what the USDA refers to as the “Fruitful Rim,” which includes Florida, Texas, and the West Coast from Arizona to Washington. Specialty crops also play a key role in making agriculture a more dynamic industry. The fresh market and direct sales provide opportunities for high margins, making it more financially feasible for new entrants into farming that operates at small scales. This section provides an overview of trends in specialty crop production and markets. For more background on specialty crop production in general see the 2014 version of this report.

This section provides a detailed summary of prices and production of the major specialty crops in Washington State. The most recent year information is available for is 2023, which is derived from USDA National Agriculture Statistics Service sources, except for wine grapes. Wine production and price trends are provided by the Washington State Wine Commission.⁸ Previous year’s data for specialty crops is generally available in late-winter to early spring.

The Big Story for Specialty Crops in 2023

The big story for specialty crops in 2023 was the significant contraction in harvested acres of approximately 30 percent compared to 2022. This marks the lowest production level in a decade. There is likely to be significant consolidation and shake-outs amongst Washington’s winemakers in the next few years, as production, in terms of quantity and varietals, adjusts to market signals.

Wine Grapes

The wine grape industry went into a significant contraction in 2023. Total white wine grape harvested production decreased from 103,000 tons in 2022 to 66,000 tons in 2023. Production of reds dropped by a similar percentage going from 137,000 tons in 2022 to 93,000 tons in 2023. This was mostly a result of not harvesting rather than direct removal of vineyards, which allows growers to respond if the market rebounds. However, it is clear that the next few years will be a time of change. Some wineries will consolidate, whereas others might shift their mix of varieties, combined with new marketing efforts. The reduction in harvested grapes, which applied to every major white and red varietal, did result in an uptick in prices compared to 2022. White Riesling was particularly notable for experiencing a large price increase. The market for Cabernet Sauvignon still appears soft as it saw prices stay flat despite a substantial decrease in production.

Figure 1: Wine Grape Production Value Trends

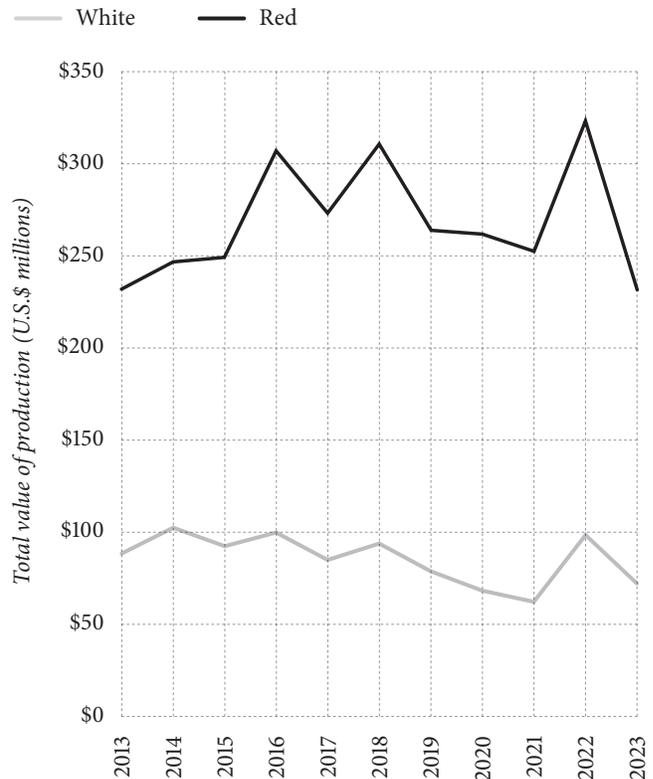


Figure 2: White Wine Grape Production Trends

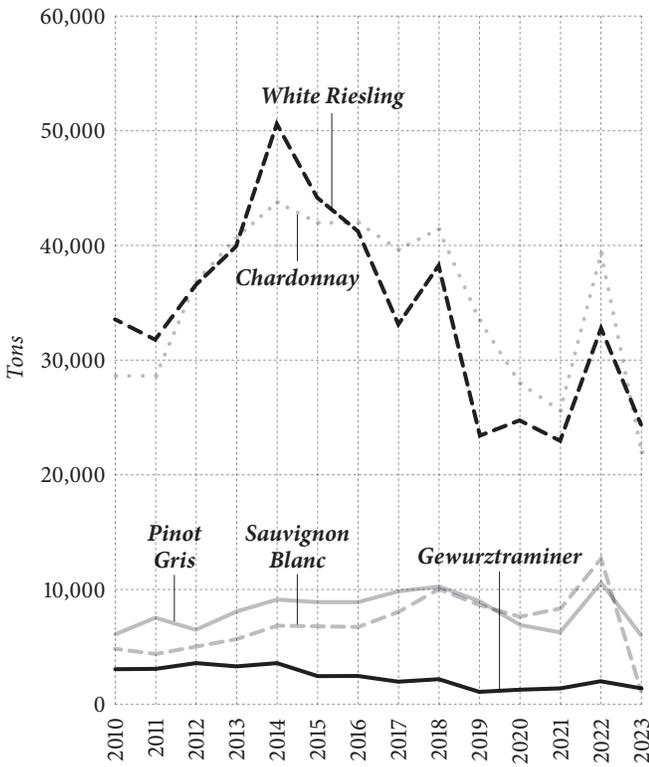


Figure 3: Red Wine Grape Production Trends

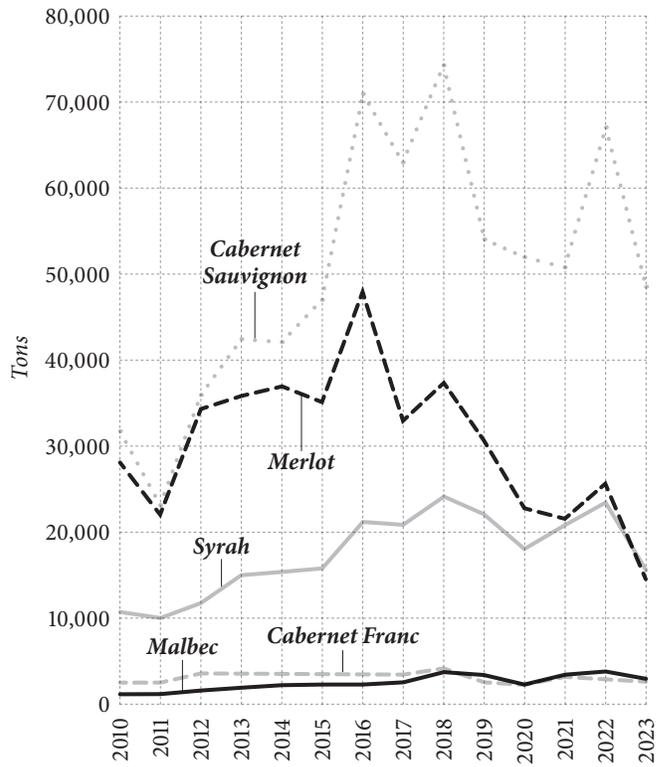


Figure 4: White Wine Grape Price Trends

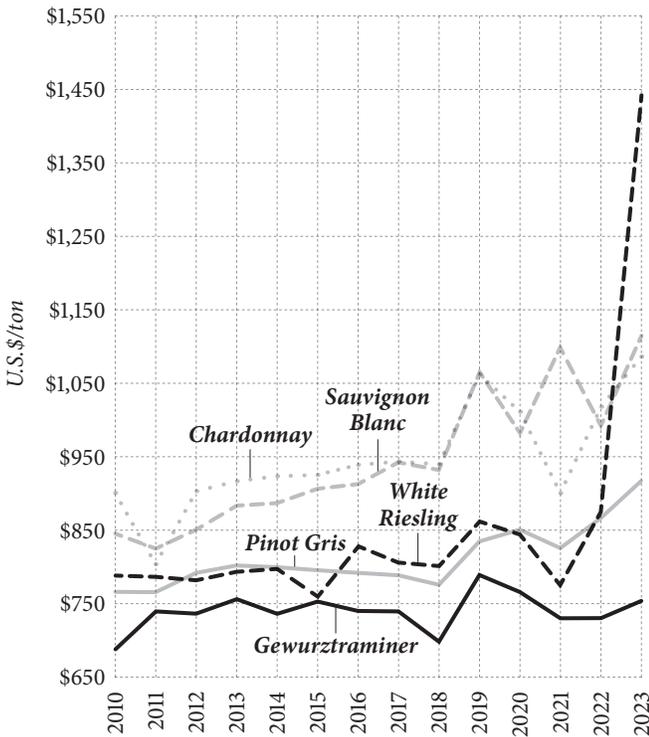
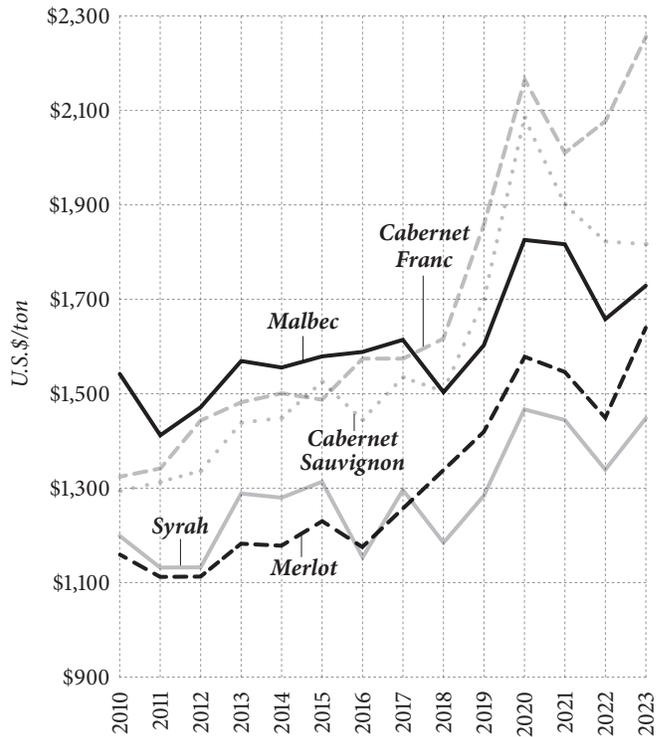


Figure 5: Red Wine Grape Price Trends



Vegetables

Table 1 reports production and Table 2 reports prices for major vegetables in Washington. Unfortunately, the USDA was unable to disclose data for a few of the important specialty crops including asparagus, as well as fresh and processed sweet corn. They were able to provide a total value

for total sweet corn, although the price is less informative since it is a weighted average of the two categories. Total sweet corn production was up more than 2 million cwt in 2023 from 2022. Other notable increases in production were achieved for onions and potatoes. Potato production exceeded 100 million cwt for the first time since 2019 and

Table 1: Vegetable Production

Year	Asparagus (cwt)	Onions (cwt)	Green Peas (cwt)	Potatoes (cwt)	Sweet corn, fresh (cwt)	Sweet corn, processing (tons)	Sweet corn, all (cwt)
2010	228,000			88,440,000			
2011	220,000			97,600,000			
2012	202,000			95,940,000			
2013	188,000			96,000,000			
2014	182,000			101,475,000	1,817,000	693,000	
2015	167,000			100,300,000	3,441,000	722,000	
2016	211,000	18,053,000	1,855,000	105,625,000	524,000	909,000	
2017	232,200	15,894,000	1,528,100	99,220,000	808,000	734,000	
2018	267,000	17,301,000	1,782,000	100,800,000	447,000	806,000	
2019	226,000	14,328,000	1,906,000	104,960,000	630,000	756,000	
2020	209,000	16,119,000	2,318,400	99,653,000	308,000	755,000	
2021	160,000	11,343,000	1,624,000	91,928,000	707,000	749,675	
2022	152,000	14,364,000	2,109,000	95,410,000	336,000	712,000	
2023	-	20,444,000	1,753,000	103,635,000	-	-	15,730,000

Table 2: Vegetable Prices

Year	Asparagus (cwt)	Onions (cwt)	Green peas (cwt)	Potatoes (cwt)	Sweet corn, fresh (cwt)	Sweet corn, processing (tons)	Sweet corn, all (cwt)
2010	77.14			7.40	38.80	79.80	
2011	78.90			7.90	41.00	109.04	
2012	90.00			7.30	33.00	113.27	
2013	95.06			8.25	37.00	121.49	
2014	75.39			7.60	27.00	107.84	
2015	93.32			7.70	-	105.65	
2016	88.30	10.29	17.09	7.70	24.40	100.00	
2017	101.40	8.15	15.63	6.92	35.50	90.00	
2018	98.11	10.27	12.78	7.82	64.18	79.97	
2019	93.99	12.60	15.82	8.90	34.20	85.00	
2020	111.00	8.43	11.93	7.56	51.30	76.96	
2021	91.23	8.92	15.35	7.75	35.07	100.00	
2022	88.80	25.65	15.45	9.88	45.46	138.90	
2023	-	18.77	22.32	11.2	-	-	7.82

onion production increased by 70 percent from the previous year. Onions had not exceeded 20 million cwt in at least a decade. Green peas decreased slightly, but were around the average level of production seen over recent years.

In terms of prices, potatoes were up despite the significant increase in production. The combination of higher prices and production allowed the potato industry in Washington to increase the value of production by more than \$200 million compared to 2022. Onions were a different story. Higher production coincided with lower prices resulting in a decrease in the total value of the onion crop. mirror image—lower production was met with higher prices.

Berries

Following many years of strong growth, the 2023 Blueberry crop saw a significant decrease in the value of production. A total of 137 million pounds were produced, compared to 176 million pounds in 2022. Also, prices dropped almost in half from \$1.04/lb to \$0.57/lb. The value of the raspberry crop dropped similarly from \$131 million to \$75.5 million as a result of both production and price drops. There was some hint that this trend was coming, as prices were down markedly in 2022 compared to 2021. The value of the blueberry crop was \$187 million in 2022 compared to \$215 million in 2021 and \$230 million in 2020. The price of blueberries in 2022 was \$1.04/pound compared to

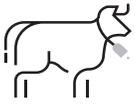
\$1.31/pound in 2021. After a decade of little growth, red raspberry production increased in 2022 and 2021. Production in 2022 reached 53.1 million pounds compared to 48.2 million in 2021. The value of the raspberry crop was \$109 million in 2021 and \$112 million in 2022.

Hops

The value of the hop crop continued a downward trend in 2023 that started in 2022. Production was up in 2023 at 76 million, compared to 71.8 million pounds in 2022. However, the value of the hop crop was \$405 million, compared to nearly \$500 million in 2021. The same value in 2022 was \$434 million. While this two-year decline is noteworthy, the 2023 crop was still well within the historical range for Washington hop which oscillates between \$400 and \$500 million.

Mint

The value of the mint crop, combining spearmint and peppermint, was down \$5 million in 2023 from \$33 million in 2022. Spearmint and peppermint production totaled 1,044 million and 0.64 million pounds, respectively. The spearmint crop value totaled \$19.5 million while peppermint was at \$14 million in 2023. The same values for 2022 were \$21 million for spearmint and \$17 million for peppermint.



Beef Cattle Sector Review and Outlook

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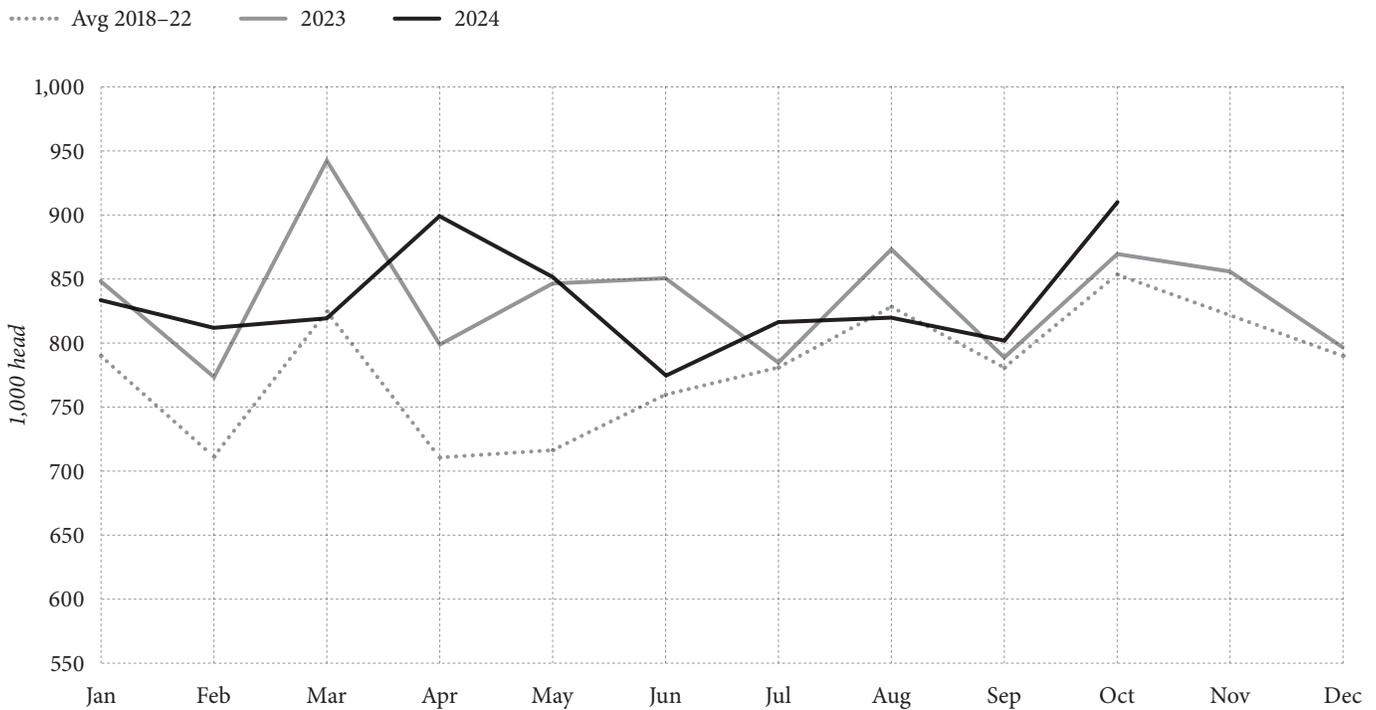
THE 2024 cattle market extended low beef cattle inventories that supported year-over-year record high prices. The U.S. beef cow herd inventory recently peaked in 2019, and will continue its year-over-year downward trend when 2025 inventory statistics are released. Direct measures of the cow herd and heifer replacement inventories are only available in the January 1, USDA NASS Cattle report, which will be released in late January 2025. The biggest question facing the cattle industry continues to be when will herd rebuilding start. The smaller beef cow herd trend that has continued since 2021 means smaller calf crops, tight supply, and higher cattle and beef prices. Cattle prices are expected to continue trending higher through 2025 due to short production supply and sustained consumer demand for beef.

Herd expansion has been constrained by drought conditions in major cattle production regions and high heifer

and cull cow prices. Pasture conditions early in 2024 were better than recent start of the year pasture conditions, with only 26 percent of the cattle inventory affected by some class of drought.⁹ However, pasture conditions deteriorated in summer and throughout the fall, forcing producers to maintain high cow culling rates and low heifer retention.

In addition to drought challenges, ongoing high production, interest, and labor costs, and low labor availability all limit herd expansion. The lack of heifer retention increases the number of head into feedyards and beef meat production. Although 2024 saw an increase in heifer feedyard placements, it did not offset the overall smaller number of feeder cattle entering the production chain. When heifer retention rates increase in the future, it will exacerbate supply decreases for two-years, due to biological production time lags. Figures 1 and 2 show monthly female slaughter rates for heifers and cows, respectively.

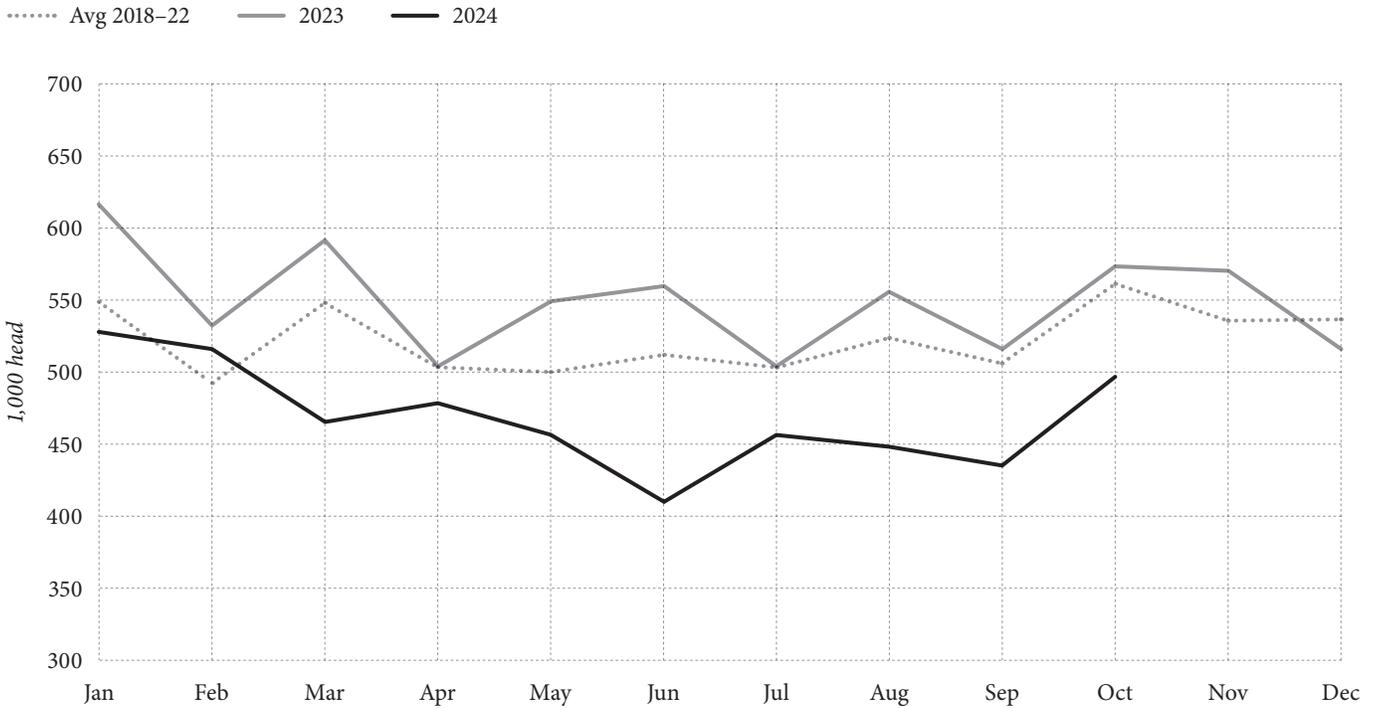
Figure 1: National Monthly Federally Inspected Heifer Slaughter



Source: USDA NASS Livestock Slaughter Report and author compilation

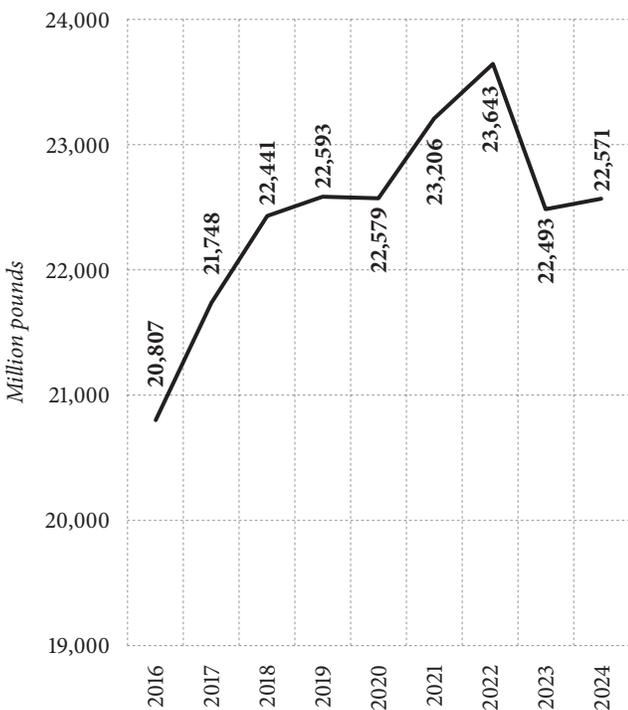
9 <https://agindrought.unl.edu/TimeSeries.aspx?2>

Figure 2: National Monthly Federally Inspected Beef Cow Slaughter



Source: USDA NASS Livestock Slaughter Report and author compilation

Figure 3: U.S. Beef Production January to October

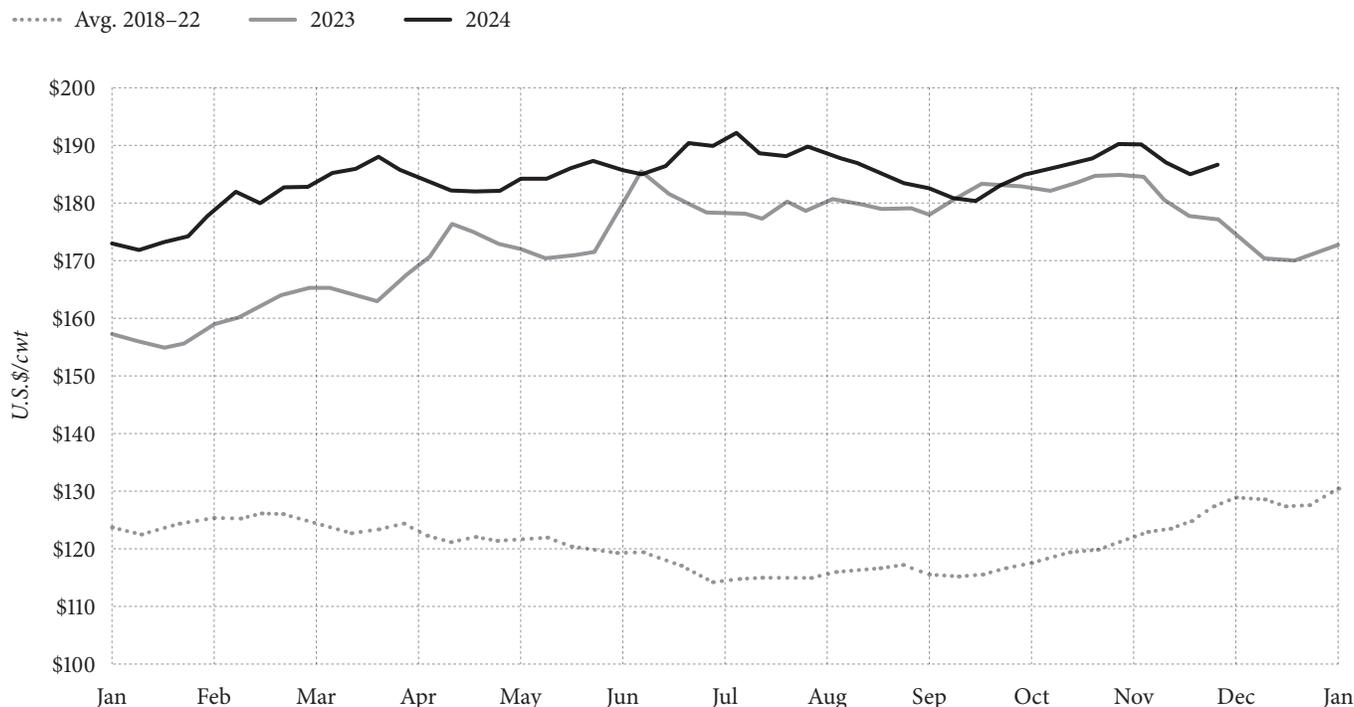


Source: Author compilation using USDA NASS data

Despite lower heifer numbers due to low cow inventory at the start of 2024, each month in 2024 has heifer slaughter number above the historic five-year average. Using data available through October, the heifer slaughter number in 2024 is the same as 2023 and is 107 percent of the 2018–22 average. Beef cow slaughter rates are below both the 2018 to 2022 average, and below 2023 cow slaughter rates for every month except February. The sustained high level of female slaughter means that future years of beef production will decrease, continuing the bullish (increasing) cattle price outlook for at least the next three years, unless an unexpected market shock occurs.

Despite lower cattle inventory numbers, beef production in 2024 through October is slightly higher than 2023, at 22,571 million pounds as shown in Figure 3. This higher beef production is due to higher imports, heavier fed cattle weights, and smaller than expected reduction in slaughter. Through October, total cattle imports are up more than 17 percent from the same period last year to just over 1.6 million head. Higher imports of live cattle have been seen from both Mexico and Canada. Cattle imports from Mexico were just over 1.0 million head, an increase of more

Figure 4: Southern Plains Finished Feedlot Steer Price



Source: USDA AMS LM CT181 and LMIC.info

than 21 percent from last year through October, and cattle imports from Canada are up more than 11 percent from the same period last year to 579,735 million head. High U.S. cattle prices and exchange rates incentivized increased imports. Another way to increase beef production with low cattle numbers is to feed cattle to heavier weights. The average weight of steers and heifers processed year to date was estimated at 916 pounds, 2.7 percent higher than a year ago and a new record high. Steer weights have reached a record dressed weight of 950 pounds, and heifer weights have also hit a new record at 863 pounds.

Despite high prices, beef exports retained their market share in 2024. Through the first ten months of the year, beef exports totaled nearly 2.1 billion pounds, down only 2 percent from the same period last year. Total year to date export value increased by 5 percent. Year to date beef exports have posted declines to the key markets of Hong Kong /China (-11 percent) and South Korea (-10 percent), but posted increases to Mexico (+13 percent), and Japan (+1 percent).

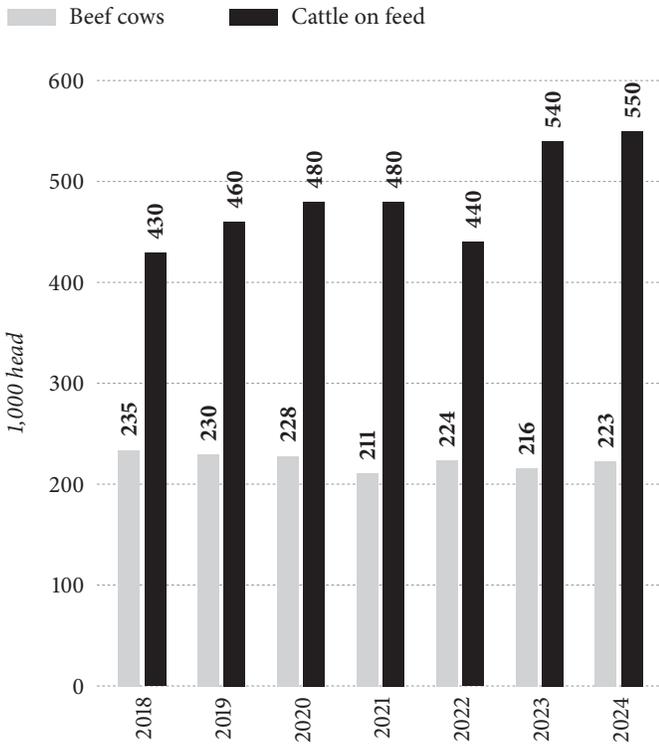
The costs to feed cattle decreased in 2024 due to lower corn and hay prices. The estimated average cost of grain decreased

19 percent year to date in 2024, enabling feedyards to be able to hold cattle for more days on feed and increase cattle weights. Figure 4 shows fed (also called finished) feedyard steer prices in the Southern Plains, reflecting major cattle feeding in Texas and Kansas. Fed steer and heifer prices are not reported in Washington under mandatory livestock reporting rules. Finished feedyard steer price continued year-over-year price increases, reaching record high levels. On average, 2024 feedyard steer prices were 6 percent higher than 2023, averaging \$184.30 per cwt through October.

Washington Beef Production Review

Beef cow inventory statistics are reported annually based on a January 1 date. Washington's beef cattle inventory is presented in Figure 6. Beef cow inventory increased in 2024 by 7,000, to 223,000 head. The higher feedlot inventory counters the declining inventory of feeder cattle across the U.S. Although data does not exist reporting the source of cattle, there is likely an increase in the number of feeder cattle imports from Canada, and potentially more cattle in the January inventory reports from having cattle with more days on feed.

Figure 5: Washington Beef Cattle Inventory



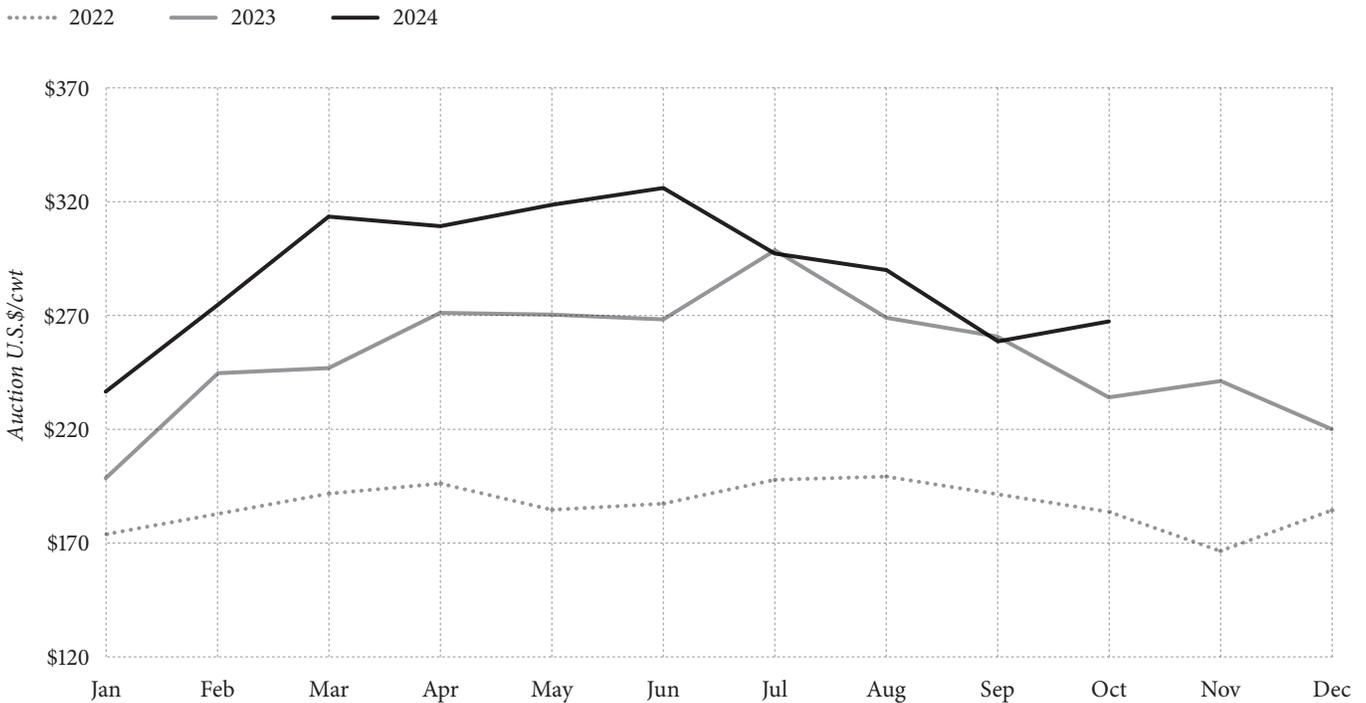
Source: Author created with USDA Quick Stats

Price Trend

The prices for calves sold during 2024 continued a three-year trend in record high prices. The seasonal peak was \$326 per cwt in June, followed by the typical seasonality of lower fall prices. Figure 6 shows monthly auction prices for steers weighing 500 to 600 pounds (the typical sale weight for cow-calf producers). Prices averaged 10 percent higher in 2024 than 2023. Over 80 percent of Washington calves are born in the spring and weaned and sold in the fall, so the majority of producers are not able to sell at the higher spring and summer prices. For weaned calves, October is the primary marketing month for the majority of Washington cow-calf producers. The October steer price is isolated and shown in Figure 7. The October 2024 price at \$267 per cwt is 14 percent higher than 2023.

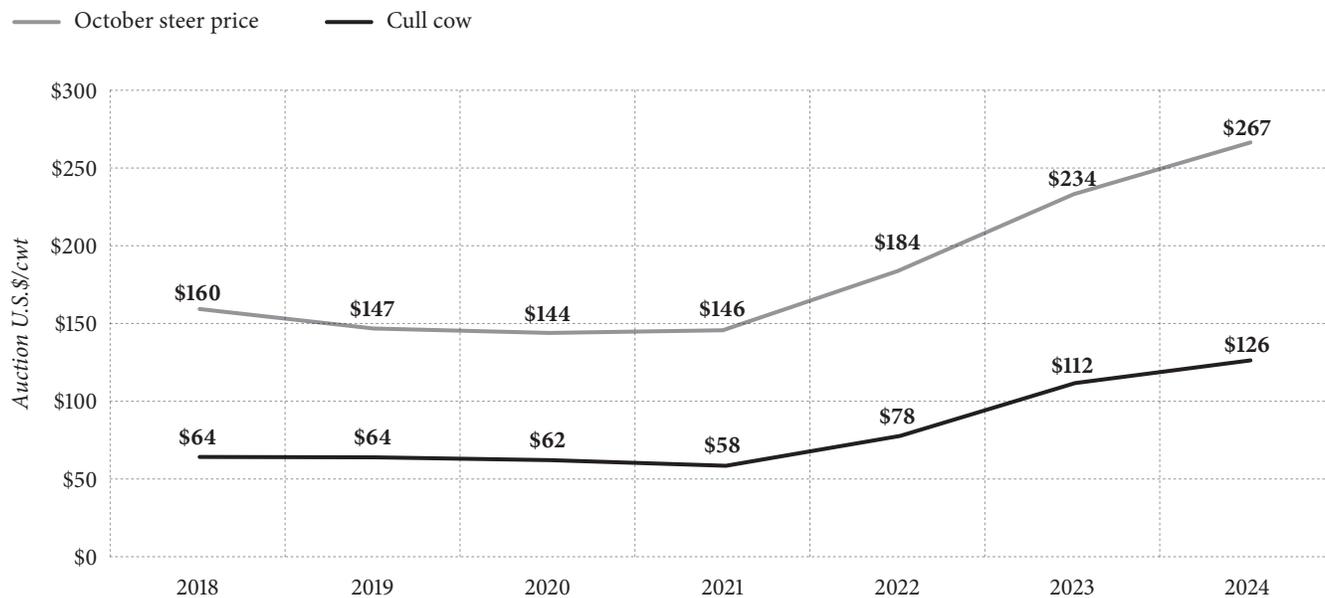
Cull cows are a significant source of revenue for cattle producers, and typically represent 15 to 20 percent of total revenue. Cull cow prices also set a new record high price. Cull cow prices increased to \$126 per cwt in 2024, which is 14 percent higher than 2023. As shown previously in Figure 2, cow slaughter decreased sharply in 2024. The primary market use of cull cows is to produce ground beef, which is the primary form of beef consumption in the U.S.

Figure 6: Washington Monthly Steer Price (500–600 lb)



Source: Author using USDA/AMS – Weekly Combined Cattle Report – ML_LS795

Figure 7: Washington October Steer and Cull Cow Prices



Source: Author USDA/AMS – Weekly Combined Cattle Report – ML_LS795

Prices for lean beef used in ground beef production set record high levels in 2024, and required record high levels of beef imports into the U.S. from Brazil, Australia, and Uruguay to supply U.S. ground beef demand.

Summary Review and 2025 Outlook

The prices cattle producers received in 2024 provided a third year in a row of record high profit potential. The low beef cattle inventory of reproducing females supports a continued record high price outlook for 2025. With the cattle market’s sustained price increases, domestic beef demand remains the key market driver. Beef producers continue to produce record high quality levels of Choice and Prime product that have become the cornerstone of sustaining consumer demand.

The cattle market will extend the decreasing cattle inventory. Any heifer retention as replacements for inventory expansion will further tighten the supply, with a rolling three-year biological production lag that can be used for strategic planning. Weather and grazing conditions are key factors driving heifer retention decisions. Fewer cattle going forward means packers will need to compete

for available cattle and leverage a larger portion of packer revenue back to the cattle production chain.

A recent market development has been the November 22, 2024, announcement that New World screwworm was detected in southern Mexico that resulted in the temporary suspension of live cattle imports from Mexico. Protocols are being developed for a partial opening of the southern border ports which will include a pre-export inspection of all cattle, treatment for insects, and a seven-day quarantine, followed by the usual border inspection and crossing process. This has regional effects on cattle feedyard placements in the South. Depending on the severity of the import ban, this will increase competition for available feeder cattle further supporting higher feeder cattle prices across the U.S.

While the cattle price outlook is bullish, cattle producers should maintain their risk management strategies with Livestock Risk Protection insurance, forward contracting, and future market hedging. The summer price seasonality in Washington steer prices provided opportunities for positive price risk management in 2024. With cattle prices at their current high levels, the potential upward price shocks are limited, but without price risk protection, the potential to fall below average historic levels is higher.



Dairy Sector Review and Outlook

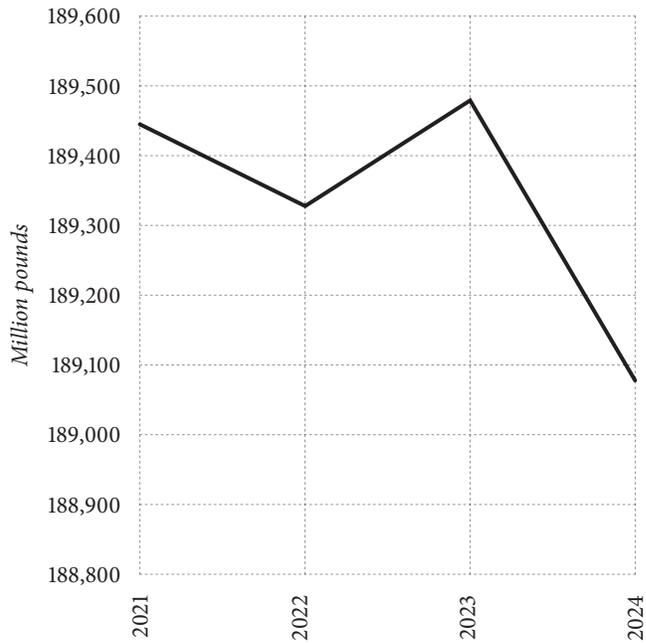
Shannon Neibergs (509) 335-6360

DAIRY producer profitability improved in 2024 due to higher milk prices that were supported by lower U.S. milk production. For an unprecedented 14 months from August 2023 to October 2024, U.S. milk production declined in a monthly year-over-year comparison. The reduction in milk production is primarily the result of low prices and profitability in 2023, leading to a contraction in the U.S. dairy herd inventory and the impact of highly pathogenic avian influenza (HPAI). The January to October U.S. milk production is presented in Figure 1 showing low milk production in 2024 and 2022 which corresponds to years of high milk price.

The U.S. Department of Agriculture (USDA), the Centers for Disease Control and Prevention (CDC), and the Food and Drug Administration (FDA) confirmed a strain (H5N1) of highly pathogenic avian influenza A virus (HPAI) in dairy herds in Texas and Kansas on March 25, 2024. Through December 4, 2024, USDA had confirmed H5N1 HPAI in 707 dairy herds in 15 states.¹⁰ No confirmed cases have been reported in Washington or Oregon, but 35 cases have been confirmed in Idaho. California has the highest number of confirmed cases with 493 cases, which is about 70 percent of the total cases.

The H5N1 strain of HPAI is a highly contagious disease with a high mortality rate in poultry. Since February 2022, more than 111 million birds in 49 states have been culled to control the disease. USDA believes H5N1 was originally transmitted to dairy cattle through wild birds. Continuing investigations indicate H5N1 may be transmitted by cow movement between herds or cross contamination between cattle and poultry premises. One of USDA's first responses was to issue a federal order in April 2024 under AHPA to require lactating dairy cattle receive a negative influenza A test from an approved National Animal Health Network Laboratory before moving interstate. Common clinical signs in affected cows include low appetite, reduced milk production, and abnormal milk appearance. Lactating cows have been most highly affected, and signs of illness have been reported in less than 10 percent of cows within an infected herd. Most affected animals reportedly recover with supportive treatment, and the mortality/culling rate has been low at 2 percent or less.

Figure 1: U.S. January to October Milk Production in Million Pounds



Source: Author using USDA Quick Stats

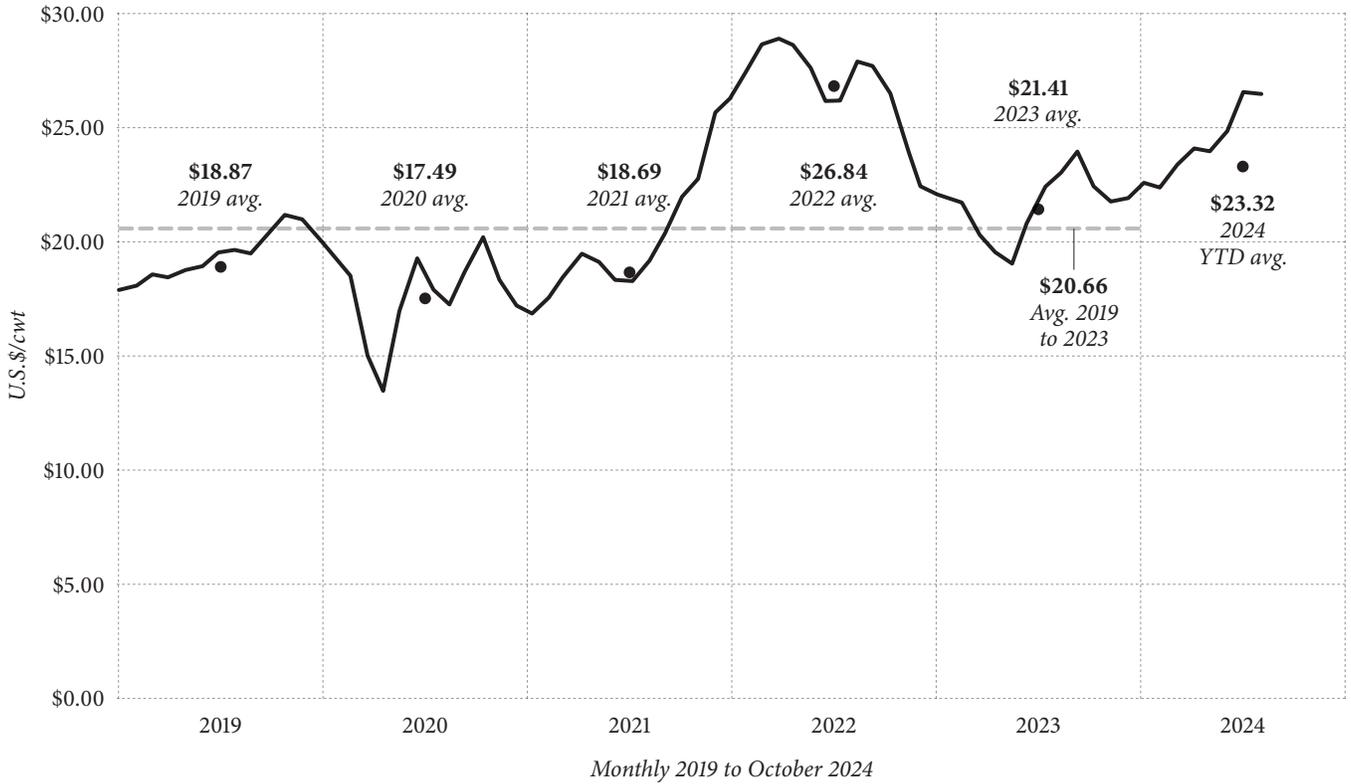
Washington Milk Price, Production, and Cow Inventory

The price variability Washington dairy producers face is illustrated in Figure 1. The 2022 average milk price of \$26.84 per cwt set a record nominal high price. Milk prices in 2023 fell to \$21.41 and increased month by month over 2024 to reach \$26.00 per cwt in October, and a year-to-date average of \$23.32. The record high prices in 2022 pulled the 5-year historic average price up to \$20.66. While 2023 prices are above the 5-year historic average, dairy producers' profit margins faced challenges from continued high production costs. Dairies are particularly sensitive to high labor costs because they have to operate every day of the year and, for some dairies, labor is required for twenty-four hours.

Washington monthly milk production from January to October in 2024 was 5,260 million pounds, which is the highest for the three years presented in Figure 3. The higher production in May and August in 2024 contributed

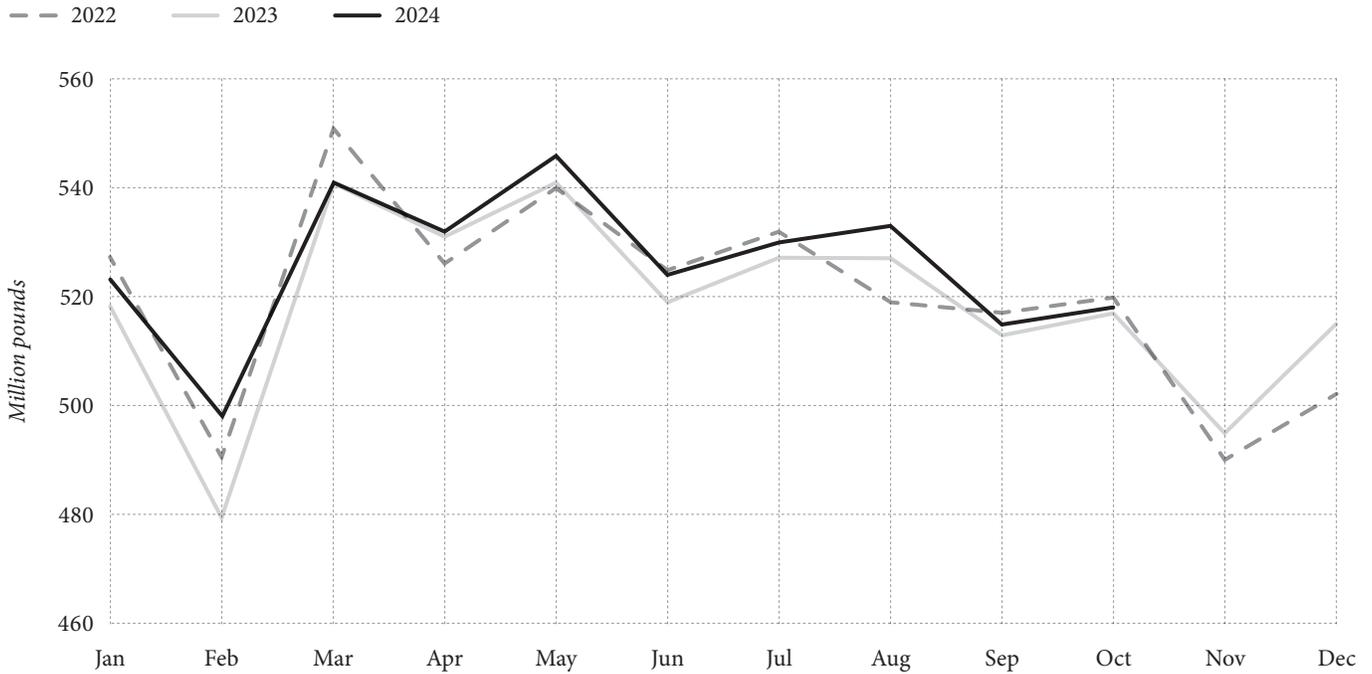
¹⁰ <https://www.aphis.usda.gov/livestock-poultry-disease/avian/avian-influenza/hpai-detections/hpai-confirmed-cases-livestock>

Figure 2: Washington Monthly Milk Price



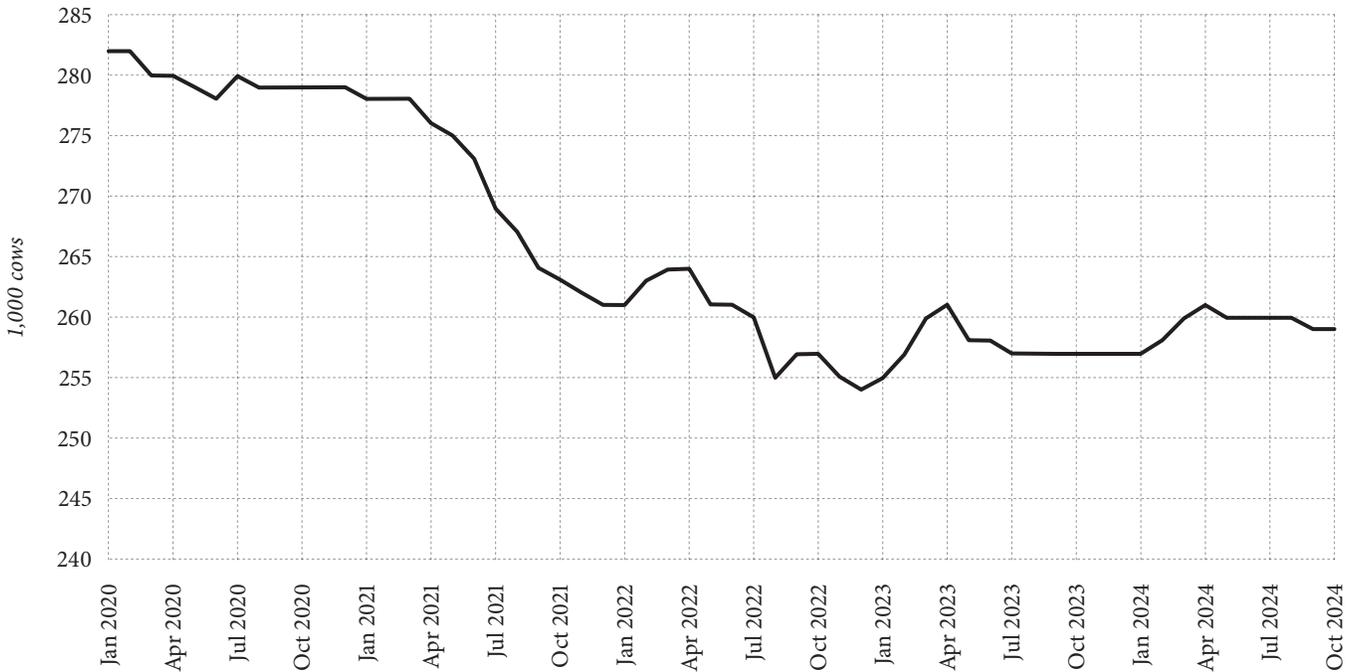
Source: Author using USDA Quick Stats

Figure 3: Washington Monthly Milk Production



Source: Author using USDA Quick Stats data

Figure 4: Washington Monthly Dairy Cow Inventory



Source: USDA NASS and author calculations

to the higher year to date totals. Overall, the year-to-year production variation is less than 1 percent.

Similar total milk production in 2022 and 2023 reflects the stability in the inventory of milk cows as shown in Figure 4. Washington dairy cow inventory increased in February to April by about 4,000 cows, and stabilized at 260 thousand cows from May to October. This relatively stable herd size counters the decreasing inventory trend from 282 thousand cows in 2020. Comparing 2020 to 2024, the average herd size decreased about 7 percent and milk production from January to October decreased about 8 percent.

The number of dairy farms in Washington continues to decrease as farms face profitability, regulatory and farm owner retirement challenges. One example is the loss of Liberty Dairy near Yakima that decided to liquidate following a new lawsuit filed against the dairy and two other dairies by the Environmental Protection Agency and the U.S. Department of Justice.¹¹ Liberty dairy liquidated 9,000 cows in October, 2024. It will be interesting to see how the liquidation will be reflected in the data used in Figure 4, when data becomes available. It's likely that most of the liquidated cows remained in production due to higher

2024 milk prices, profit margins, and the high price of dairy replacement heifers.

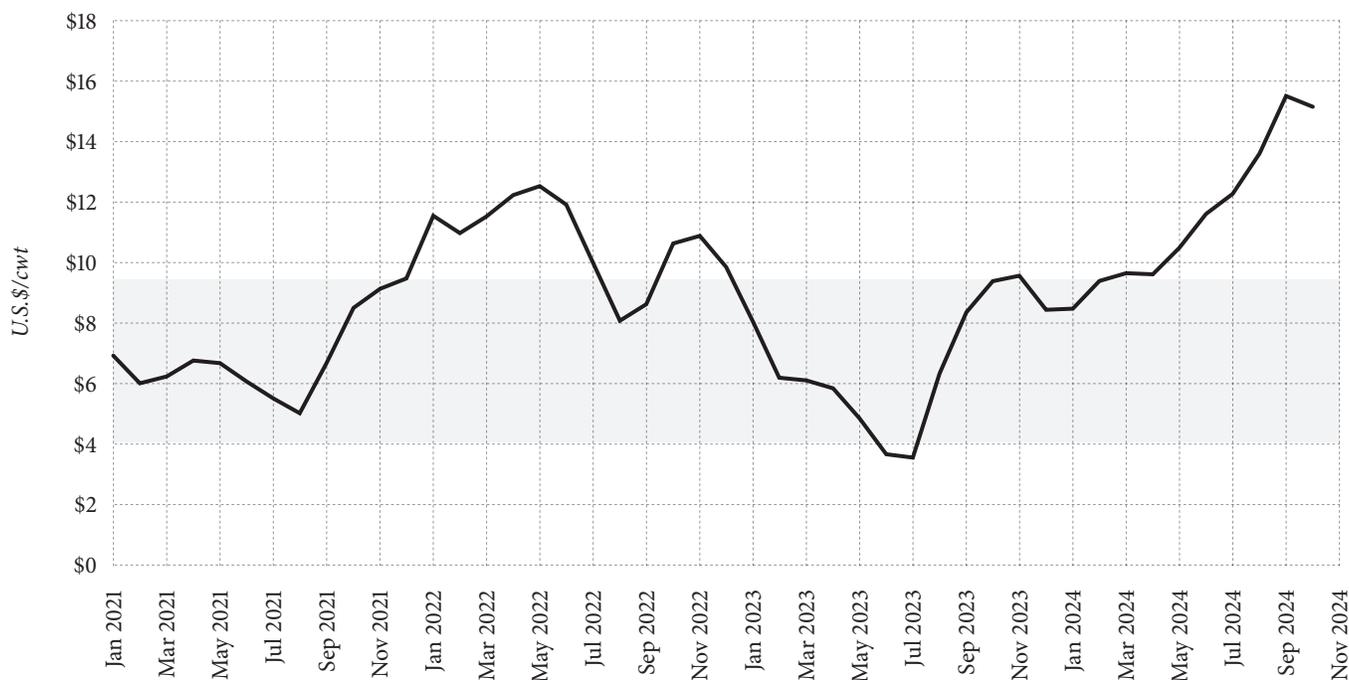
Improved Dairy Profitability Index

A national indicator of dairy profitability is the Dairy Margin Coverage (DMC) program—a Farm Bill dairy support program. The DMC margin is the difference between the USDA All Milk Price and a feed cost index formula using national alfalfa, corn, and soybean meal prices. The 2023 DMC margin levels were the lowest in program history as shown in Figure 5. In 2023 the margins in June and July were \$3.65 and \$3.52, respectively, which were below the program definition of a “catastrophic level.” Each dairy farm’s margin is unique in the amount of milk quality price premiums it receives and its actual feed costs, but the low margin level indicates the high financial stress that dairy producers incurred in 2023. Figure 5 shows the difference in 2024.¹² In September 2024, the DMC program margin was \$15.57 per cwt, which was a record-breaking increase from the previous month. This was the highest margin since DMC became the basic dairy safety net in January 2015. The DMC margin only accounts for feed costs, so increases in

11 https://www.capitalpress.com/ag_sectors/dairy/epa-doj-sue-three-lower-yakima-valley-dairies/article_5c0d87d2-3d68-11ef-bd6e-0f546fcefdef.html

12 <https://www.fsa.usda.gov/resources/programs/dairy-margin-coverage-program-dmc/prices-updates>

Figure 5: Dairy Margin Coverage Program Milk Price Minus Feed Cost Index Margin



Source: Author compilation of DMC Data

labor, fuel, and interest expenses are all additional costs that reduce dairy margins. Washington dairy producers face some of the highest agricultural wage rates in the nation. What’s more, the increased processor milk check retains to pay for Darigold’s new Pasco milk processing plant.

Dairy and the Climate Commitment Act

Washington’s Climate Commitment Act (CCA) allocated \$30 million to support the reduction of organic agricultural waste and greenhouse gas emissions, managed through the Washington State Conservation Commission Sustainable Farms and Fields Climate-Smart Livestock program. Washington dairies are looking at CCA funds for cost-share opportunities to support installation of dairy anaerobic digesters via grant applications, set to open in 2025. The failure of Initiative 2117 to repeal the CCA creates the opportunity to extend cost-share manure management programs into the future beyond 2025. Several dairies were aggressive in obtaining anaerobic digester engineering plans in 2024 to meet requirements to qualify for federal investment tax credit (ITC) benefits. Under the Inflation Reduction Act of

2022, companies that use anaerobic digestion to produce renewable energy can receive a tax credit of up to 30 percent of the eligible costs. The eligible costs include the cost of the equipment, installation, and other related expenses. The ITC is a credit against federal income tax liability. If a dairy does not have sufficient federal income tax liability to utilize the full amount of the credit, the unused portion can be carried forward to subsequent years. It may also be possible to sell some or all of the ITC to a third party for cash. The potential to sell the ITC, particularly to AD project developers to help finance the project is a lucrative option for dairies that typically have low profitability. These ITC incentives through the Inflation Reduction Act expire December 31, 2024, thus the high interest in developing AD engineering plans. The extent of potential dairy AD investment is not known because there is not a reporting requirement, and contracts between dairies and AD developers are confidential and are reported to include non-disclosure requirements. The potential for dairies to monetize carbon capture and reduction will continue to be an industry issue. It may be a potential new profit center for the dairy producer.

2025 Outlook

The USDA ERS forecast for the 2025 all milk price is \$22.85, compared to their 2024 year-to-date all milk price of \$22.75—stable market conditions. With 2024 harvest, complete feed costs are decreasing due to large corn and soybean crops, and weaker export demand for hay. Dairy feed costs are expected to maintain or be slightly lower in 2025. The combined, all dairy product export volume, year-to-date through October in 2024 is 1.9 percent higher than 2023. No major export shocks are incorporated into the all milk price forecast. However, public announcement of expanded tariffs on major dairy export markets to Mexico and China could have significant impacts that are not presently accounted for in the future milk price forecast.

Increased milk processing production capacity across the U.S. is expected to come online in 2025. The Darigold Pasco, Washington Plant, Hilmar Cheese Plant in Dodge City, Kansas, and Laprino Foods in Lubbock, Texas are expected to come on-line, and each will process up to 8 million pounds of milk annually. The Pasco plant will produce milk powders and butter, and the Hilmar and Laprino plants will produce cheese and whey. Several other plants across the U.S. represent a significant expansion

of dairy production capacity. Some of the milk for these plants will come from processors relaxing their base quota programs, allowing dairies to expand production. The net effect of economic competition between the new more efficient plants versus existing plants will unfold as the new plants come online. In areas with multiple processors, price competition is expected to increase the milk price received by dairy producers. Demand competition for milk is expected to be a factor because the amount of U.S. milk produced in 2024 is at a historic low (see Figure 1).

The reauthorization of the Farm Bill and changes to the Federal Milk Marketing Order will establish policies affecting dairy producers in 2025. The milk pricing formulas used to set milk prices in the eleven Federal Milk Marketing Orders are under review for the first time in twenty years. The USDA must conduct a producer referendum to support or oppose the pricing formula changes. Producers with milk pooled in a FMMO in January, 2024 will receive a ballot that must be postmarked for return by December 31, 2024.¹³ The USDA Economic Impact Analysis on the proposed changes shows the pricing formula changes would decrease the Pacific Northwest Market Order total pool value; but for all Market Orders combined, the total pool value increases.

13 <https://www.ams.usda.gov/rules-regulations/moa/dairy/hearings/national-fmmo-pricing-hearing>



Potato Situation and Outlook

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USDA'S November crop production report shows that Washington growers produced 99.653 million cwt of potatoes during 2024. That is 3.982 million cwt, or 3.8 percent, less than the 2023 crop. It is 0.5 percent larger than Washington's five-year average production. Nearly ideal growing conditions boosted yields, which tied the 2020 yield for the second largest on record (behind 2010). The statewide average yield for the 2024 potato crop was 645 cwt per acre. This exceeded the 2023 yield by 15 cwt per acre. Washington's reported yield is 26 cwt above the 20-year trendline yield. Though production in Washington and the Pacific Northwest is down from 2023 levels, the potato industry has a large supply of potatoes from the 2024 crop.

In terms of value, potatoes rank first among Washington field crops. USDA estimates the farmgate value of Washington's 2023 potato crop at \$1.16 billion. That increased from \$942.65 million for the 2022 potato crop. The 2023 increase can be attributed to stronger contract prices and an increase in production, due to improved yields. The

statewide average yield rose to 630 cwt per acre for the 2023 crop, from 580 cwt per acre for the 2022 crop. Growers planted 165,000 acres of potatoes in both 2022 and 2023.

The state's processing industry multiplies the economic impact of Washington potato production. Washington Potato Commission data indicates that over 80–90 percent of the potatoes grown in the state are sold to processors. They are transformed into French Fries and other frozen products, dehydrated products, and potato chips. Roughly 10 percent of the crop is marketed as table potatoes. The remainder includes seed potatoes, shrinkage, and other sales not reported.

French Fries and other frozen products constitute the largest portion of Washington's value-added industry. Though data on the total value of those sales is not available, we know that the Seattle port district exported \$772.06 million worth of frozen potato products during 2022, and \$910.80 million during 2023. During the first ten months of 2024 frozen

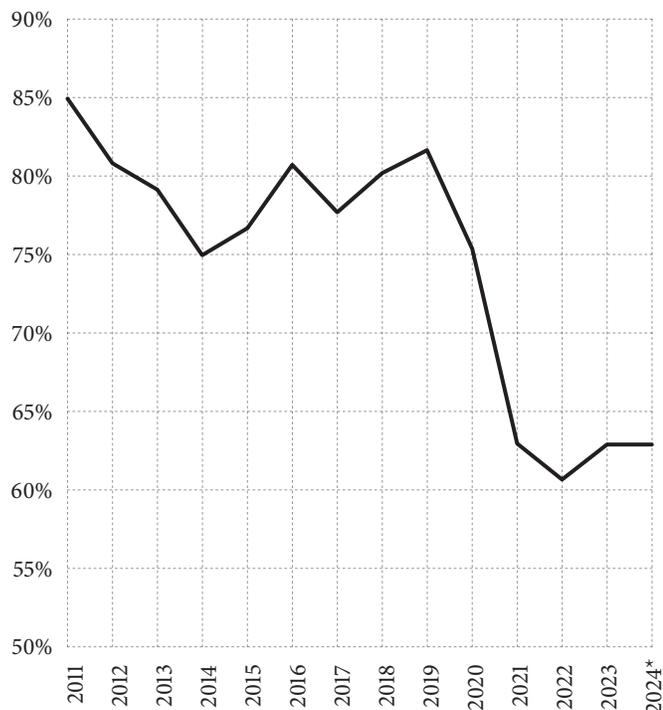
Table 1: Washington Potato Production and Disposition

Crop	Harvested (1,000 acres)	Yield (cwt/acre)	Production (1,000 cwt)	Disposition		
				Fresh (1,000 cwt)	Process (1,000 cwt)	Other (1,000 cwt)
2010	134.0	660	88,440	10,647	74,003	3,790
2011	160.0	610	97,600	10,848	75,994	10,758
2012	164.0	585	95,940	10,157	79,924	5,859
2013	160.0	600	96,000	10,282	72,342	13,376
2014	165.0	615	101,475	10,093	78,823	12,559
2015	170.0	590	100,300	9,113	76,550	14,637
2016	169.0	625	105,625	10,833	80,492	14,299
2017	164.0	605	99,220	10,579	78,468	10,172
2018	160.0	630	100,800	9,687	85,553	5,559
2019	164.0	640	104,960	11,615	84,303	9,042
2020	154.5	645	99,653	9,460	81,822	8,411
2021	154.5	595	91,928	7,627	83,335	1,023
2022	164.5	580	95,410	8,599	79,620	7,191
2023	164.5	630	103,635	9,686	85,172	8,778
2024	154.5	645	99,653	-	-	-

Sources: Production – USDA; Disposition – Washington Potato Commission

potato exports through the Seattle Port District totaled \$804.40 million, up 3.5 percent from the same timeframe in 2023.

Figure 1: U.S. Frozen Potato Exports: Seattle Port District Share



*Through October 31

Historically, the Seattle Port District (see Figure 2) has shipped between 75–80 percent of all U.S. frozen potato product exports. However, that percentage dropped to 60.7 percent during 2022, and 62.9 percent during 2023. During the first 10 months of 2023, 62.9 percent of the U.S. frozen product exports were shipped through the Seattle port.

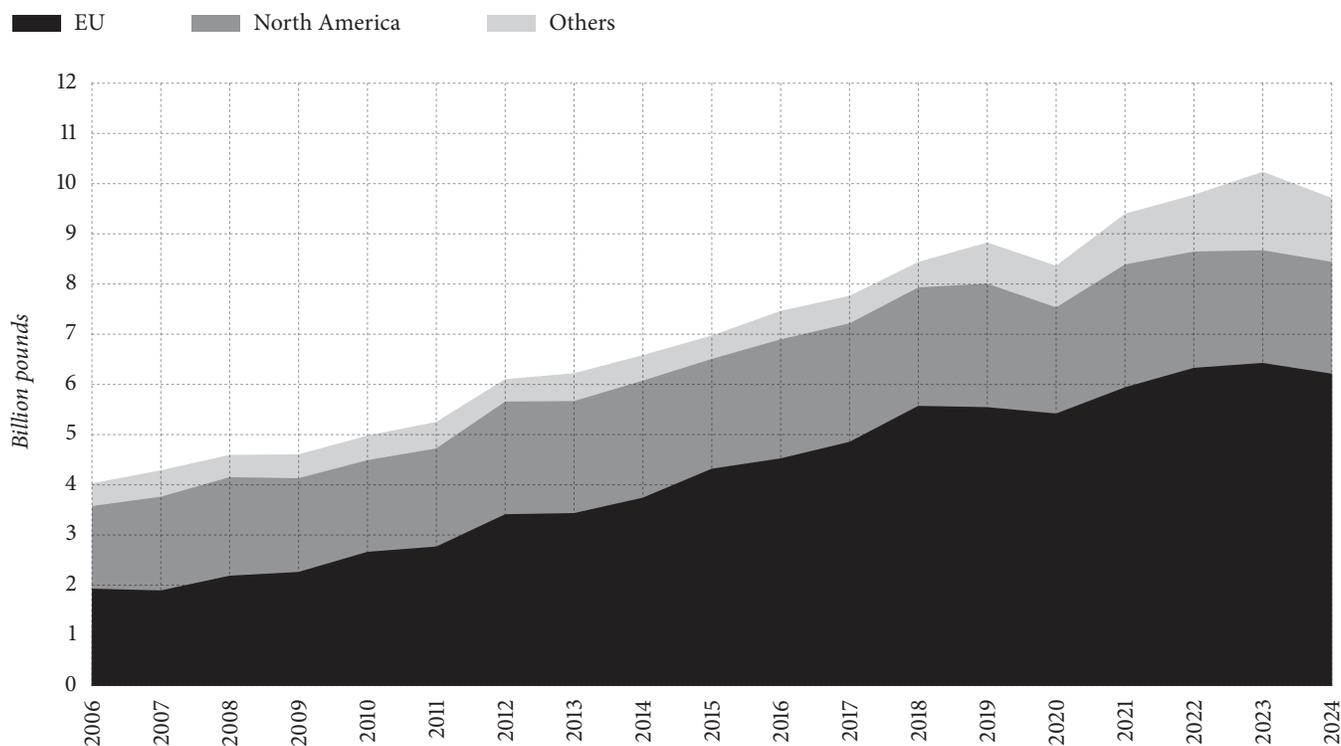
Globally, the outlook for potato markets is complex. Washington’s heavy participation in the global French Fry market leaves it exposed to foreign competition. Global French Fry trade outside of local trading zones (North America and the EU) has grown at a 5.7 percent annual rate since 2006. The growth rate had been running at 6.2 percent per year through 2019, but sales dropped during 2020 due to the pandemic. During the year ending September 30, 2024, global French Fry trade fell 5.1 percent below the 2023 record export volume, to 9.703 billion lbs.

The global French Fry market is dominated by large processing companies in two geographic areas: North America and the European Union. Together, they supplied nearly 87 percent of the product sold to customers outside of their local trading areas during the most recent reporting period. However, since 2006 North America’s share of the market has dropped from 40.9 percent to 22.9 percent, while the EU market share has increased from 47.9 percent to 64.0 percent. Smaller exporters including China, Egypt, and Turkey have significantly increased French Fry production and export trade during the past six years. Their combined exports grew from 209 million lbs. during the

Figure 2: U.S. Census Department’s Seattle Port District

District Code	Port District Name				
30	Seattle, WA				
Port Code	Port Name	Port Code	Port Name	Port Code	Port Name
3001	Seattle, WA	3012	Danville, WA	3025	Metaline Falls
3002	Tacoma, WA	3013	Ferry, WA	3026	Olympia, WA
3003	Aberdeen, WA	3014	Friday Harbor, WA	3029	Seattle-Tacoma Intl Arprt
3004	Blaine, WA	3015	Boundary, WA	3071	UPS, Seattle, WA
3005	Bellingham, WA	3016	Laurier, WA	3072	Avion Brokers @ SEATAC
3006	Everett, WA	3017	Point Roberts, WA	3073	DHL Worldwide Express
3007	Port Angeles, WA	3018	Kenmore Air Harbor, WA	3074	Airborne Express @ SEATAC
3008	Port Townsend, WA	3019	Oroville, WA	3082	Grant County Airport
3009	Sumas, WA	3020	Frontier, WA	3095	UPS Courier Hub, Seattle, WA
3010	Anacortes, WA	3022	Spokane, WA		
3011	Nighthawk, WA	3023	Lynden, WA		

Figure 3: Global Frozen Potato Product Sales by Origin*



* Excludes intra-EU trade and trade between the U.S. and Canada.

(Year ending September 30)

Source: IHS Markit – Global Trade Atlas

year ending September 30, 2019, to 1.05 billion lbs. during the year ending September 30, 2023.

We would expect global French Fry trade to return to the long-term average growth rate of 5.7 percent. At that growth rate, sales could approach 10.26 billion lbs. during the year ending September 30, 2025. Though raw-product supplies in North America are down from last year, processors across North American should be able to run plants close to capacity though the 2024/25 season, if they choose to do so. The situation in Europe has improved with the 2024 crop. North American fryers may be challenged to expand their market share during the coming year.

North American potato growers produced 544.81 million cwt of potatoes during 2024, including 417.85 million cwt in the U.S. and 126.97 million cwt in Canada. The U.S. potato crop was 0.4 percent smaller than the five-year average. Canada’s 2024 potato crop was the largest on record.

In the Pacific Northwest, where the bulk of U.S. processing capacity is located, production fell by 4.6 percent, to 261.14 million cwt. North America’s raw-product supply situation appears to be more balanced with processor demand it has been during the previous three years.

Processors have been expanding capacity to meet increased demand of French Fries and other frozen products. During the past several years they have built large new facilities and expanded capacity at existing facilities in Washington, Oregon, Idaho, Alberta, and Manitoba, while bringing on additional specialty lines in New Brunswick, Maine, and several other locations. The industry reduced contract volumes during 2024, due to the oversupply of potatoes from the 2023 crop. However, above-average yields in the western U.S. and near-record yields in the Canadian Prairie Provinces left the industry with a large supply of 2024-crop potatoes for frozen processing. In addition, production is up in the Canadian Maritime Provinces and Quebec.

After the closing of the Connell, Washington, plant, one PNW processor has indicated that it will likely turn back approximately 10 million cwt of potatoes. Most of those potatoes are in the Columbia Basin. Part of the extra supply could be diverted to cattle feed, similar to what occurred during 2023/24. Processors in the Midwest and Atlantic Northeast should have enough potatoes to run plants at capacity, though supplies could be tight in Wisconsin and PEI. Potatoes could be shipped from other areas to cover any supply gaps.

U.S. French Fry imports from EU processors have skyrocketed during the past seven years. Consumers have increased purchases of frozen potato products to meet their needs, due to limited domestic product. The U.S. imported 536.74 million lbs. of frozen potato products (not including imports from Canada) during the year ending September 30, 2024. That is 6.41 million lbs. less than the previous year's record purchases, a 1.2 percent reduction. However, it is 41.2 percent above the five-year average offshore import volume. Most of the purchases came from the EU, with 368.35 million lbs. coming from Belgium. The U.S. also imported a small amount of product from Egypt, China, and Turkey. The value of frozen imports totaled \$2.20 billion during the period, up from \$1.96 billion a year earlier.

Four countries—Belgium, Netherlands, Germany, and France—are the EU's major French Fry producers and exporters. While North American exports to offshore markets fell by 0.7 percent during the year ending September 30, 2024, EU external exports dropped by 3.3 percent. A recent forecast of potato production in the five EU Fry-exporting countries suggests that their combined 2024 potato crop exceeded 2023 production by 7.7 percent. The production increase could support continued growth in EU French Fry exports during the 2024/25 marketing year. Washington processors, and North American processors in general, will be challenged to maintain and expand their share of the global French Fry market during the next 18 months.

Several factors are impacting Washington's potato industry including:

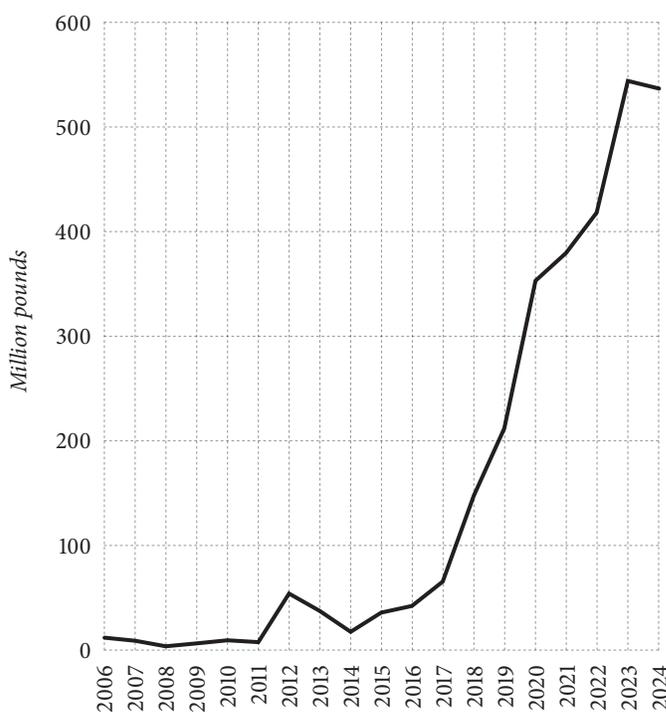
1. Washington growers and processors are still negotiating contracts for the 2025 potato crop.
2. Contract volumes are still uncertain, though one processor has indicated that volumes could be down 10 percent.
3. Growers are looking for contract price increases to keep up with inflation and rising production costs, but processors are not likely to increase prices significantly given current market conditions.
4. The value of open-market potatoes is below break-even in the current market.
5. Fryers will have to compete for additional sales—EU fryers will be looking to expand their share of the global French Fry business.
6. French Fry production in China, Egypt, and Turkey is ramping up, creating more competition for North American processors.

Table 2: North American Potato Production

Crop	U.S. (1,000 cwt)	Canada (1,000 cwt)	Total (1,000 cwt)
2010	373,984	97,153	471,137
2011	401,429	92,372	493,800
2012	431,873	100,742	532,614
2013	408,105	102,384	510,489
2014	420,639	100,772	521,411
2015	421,855	104,907	526,762
2016	430,984	105,224	536,207
2017	429,634	106,673	536,307
2018	431,783	102,447	534,229
2019	423,189	105,589	528,778
2020	419,781	104,066	523,847
2021	412,639	121,111	533,750
2022	402,054	123,521	525,575
2023	440,132	126,593	566,725
2024	417,848	126,965	544,813

Sources: USDA and Statistics Canada

Figure 4: U.S. Frozen Potato Product Imports from Offshore Locations*



* Excludes trade between the U.S. and Canada (Year ending September 30)



Pulse Industry Situation and Outlook

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WASHINGTON State's pulse crop industry is a vital, yet often underappreciated, cornerstone of the region's agricultural economy. In the late 1960's, Washington led the nation in dry pea and lentil production, followed closely by its neighbor, Idaho. Together, these two states supplied the entire U.S. market for dry peas and lentils. As part of their pioneering marketing efforts, the states' pulse-growing commissions persuaded their governors to declare the second week of November to be National Split Pea Soup Week—a tradition that continues to be celebrated today (Figure 1).

Washington State remains a leading pulse-producing powerhouse alongside Idaho, Montana, and North Dakota, solidifying its role in cultivating dry peas, lentils, and chickpeas. Emerging contributions from states like Oregon, South Dakota, and Nebraska further fuel the industry's growing momentum. The Washington Pulse Crop Commission (WPCC) is part of a coalition known as USA Pulses, whose efforts are managed by the USA Dry Pea & Lentil Council (USADPLC), a national non-profit commodity group situated directly on the Washington and Idaho border. The USADPLC represents members of the pulse growing states contributing to a check-off program. The WPCC manages Washington State check-off funds, and

Figure 1: In 1969, the governors of Washington and Idaho jointly declared the second week of November to be National Split Pea Soup Week.



through contracts with the USADPLC, serves the Washington pulse grower by contributing to national marketing and research programs, as well as domestic and federal policy education efforts. This article explores Washington's pulse crop industry, its alignment with national initiatives, and the strategies shaping its future, showcasing a sector poised to lead the way toward a healthier population, a sustainable planet, and a thriving agricultural economy.

At the heart of this growth is the expanded mission of the USA Pulses, a rebranded effort to double pulse consumption and production by 2030. However, as the industry faces challenges such as fluctuating market demands, transportation issues, and evolving policy landscapes, growers and stakeholders are finding innovative ways to adapt and thrive. With its unique climate and soil conditions, Washington provides an ideal environment for pulse cultivation, contributing to sustainable farming practices while providing significant economic and environmental gain.

National Acreage and Production

The U.S. has developed a reputation as the “Symbol of Quality” for pulse crops, including dry peas, lentils and chickpeas. Pulse crops planted and harvested in Washington are an important part of that reputation. However, the nature of the pulse crop supply chain is such that no one state can claim a unique growing identity. Traders could market and sell U.S. product in containers that include a particular class of pulse crops from Washington as well as Montana, Idaho, and North Dakota. Therefore, each state is essential as part of a U.S. brand, marketed domestically and internationally as the highest quality pulse crops in the world.

In response to strong market signals, including increased prices, national 2024 chickpea acreage increased by 38 percent, to over 500,000 acres, with production rising 30 percent to 309,000 metric tons. Lentil planted acreage jumped from 546,000 acres last year to nearly 950,000 acres in 2024. U.S. lentil farmers put 435,000 metric tons in their bins in 2024, a 175,000 metric ton increase over the 2023 harvest. Dry peas saw more modest growth, with acreage up 4 percent to just over 1 million acres and total production reaching 903,000 metric tons—still

a 10 percent increase. Despite these gains, USA Pulses CEO Tim McGreevy noted yield challenges, including chickpea yields falling 6 percent below the prior year, and Washington's dry pea yields averaging just over 1,000 pounds per acre—levels he described as "brutal" and financially unsustainable.

Washington State Pulse Crop Trends

Figure 2 displays the history of Washington State's pulse crop acreage from 2020 to 2025, reflecting important shifts in planting priorities. The data highlights trends for key pulse crops, including dry peas, lentils, chickpeas, and Austrian Winter Peas (AWP), offering insights into both opportunities and challenges for growers.

Decline in Dry Pea Acreage

Green and yellow dry peas have experienced consistent declines in acreage over this period. Green dry peas dropped significantly from 57,071 acres in 2020–21 to 40,673 acres in 2024–25, while yellow dry peas decreased steadily from 6,960 acres to 4,519 acres. This trend may be attributed to factors such as reduced market demand, lower profitability, or growers shifting focus to alternative

crops offering better returns. During the marketing panel discussion of the recent Western Pulse Growers Association (WPGA) annual grower meeting, exporter Bert Brocke lamented the decline of peas in the Pacific Northwest but expressed hope that winter pea varieties would change the landscape of fall planted crops. "The winter pea program might be the one thing that could rescue the green peas in this area," Brocke projected.

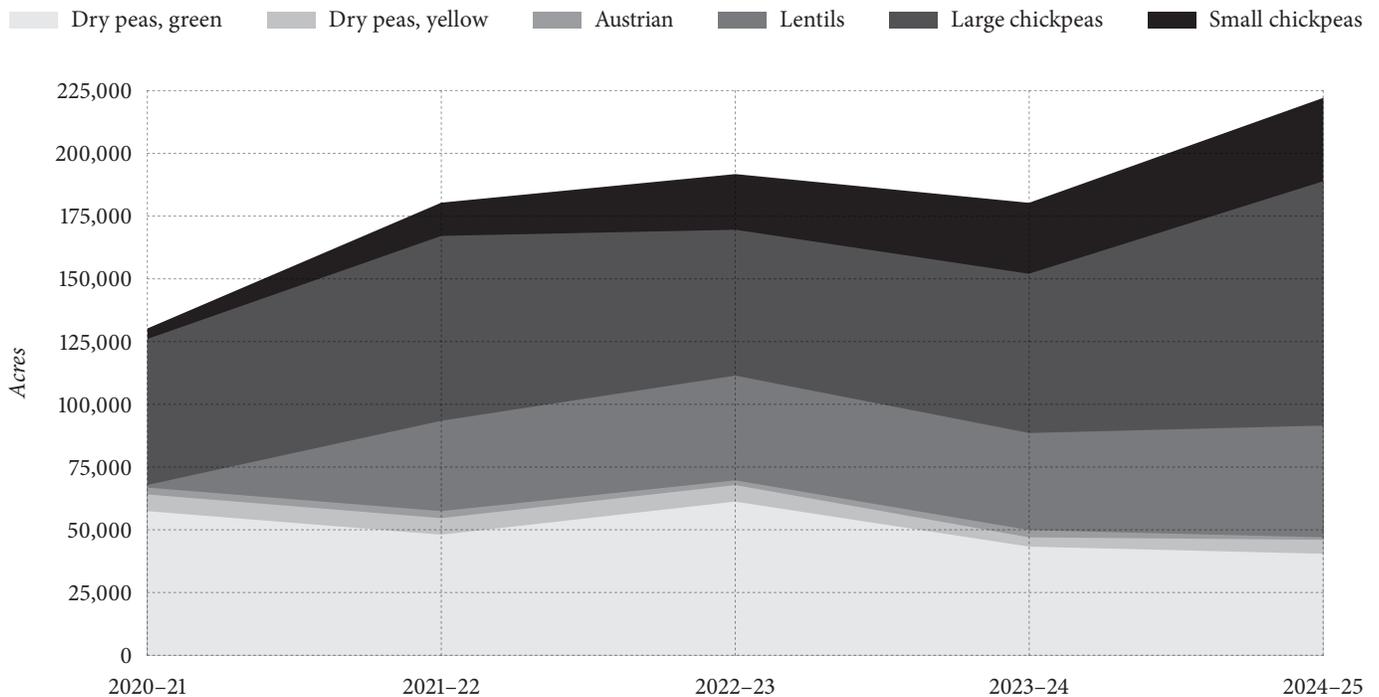
AWP: Just a Rotational Crop?

Austrian Winter Peas are primarily used as a cover crop to improve soil health or, as animal forage, show unstable acreage reflecting their importance rotational farming systems. Plantings peaked at 2,750 acres in 2023–24 before falling to 1,757 acres in 2024–25. Their value as a sustainable rotation option highlights their agronomic importance, even as market factors cause fluctuations. PNW producers provide the seed for much of the forage and cover crop uses.

Significant Growth in Lentil Production

Lentils have emerged as a major focus for growers, with acreage rising dramatically from 2,436 acres in 2020–21 to 45,046 acres in 2024–25. This impressive growth signals a

Figure 2: Washington State Planted Pulse Acreage*



*Crop Years 2020–21 through 2024–25 (June through May)

Source: USDA: NASS, USAD: FSA, and USADPLC

strong shift in planting priorities, likely driven by rising demand, favorable market prices, and their role in enhancing soil health within diverse cropping systems.

Chickpeas Lead the Way

Chickpeas—both large and small—have demonstrated remarkable gains. Large chickpea acreage expanded from 56,811 acres in 2020–21 to 97,055 acres in 2024–25, while small chickpeas grew steadily from 4,799 acres to 32,647 acres. These increases underscore the growing interest in chickpeas due to their strong market potential, profitability, and agronomic advantages.

Washington State Pulse Acreage

In the latest comparison of pulse crop acreage between 2023–24 and 2024–25, Washington's planted areas reveal varied trends. Green dry peas saw a slight decline, dropping by 5 percent from 42,638 acres to 40,673 acres, while yellow dry peas remained relatively stable, with a minor increase of 1 percent, from 4,467 acres to 4,519 acres. Austrian winter peas, however, experienced a significant decrease of 36 percent, falling from 2,750 acres to 1,757 acres.

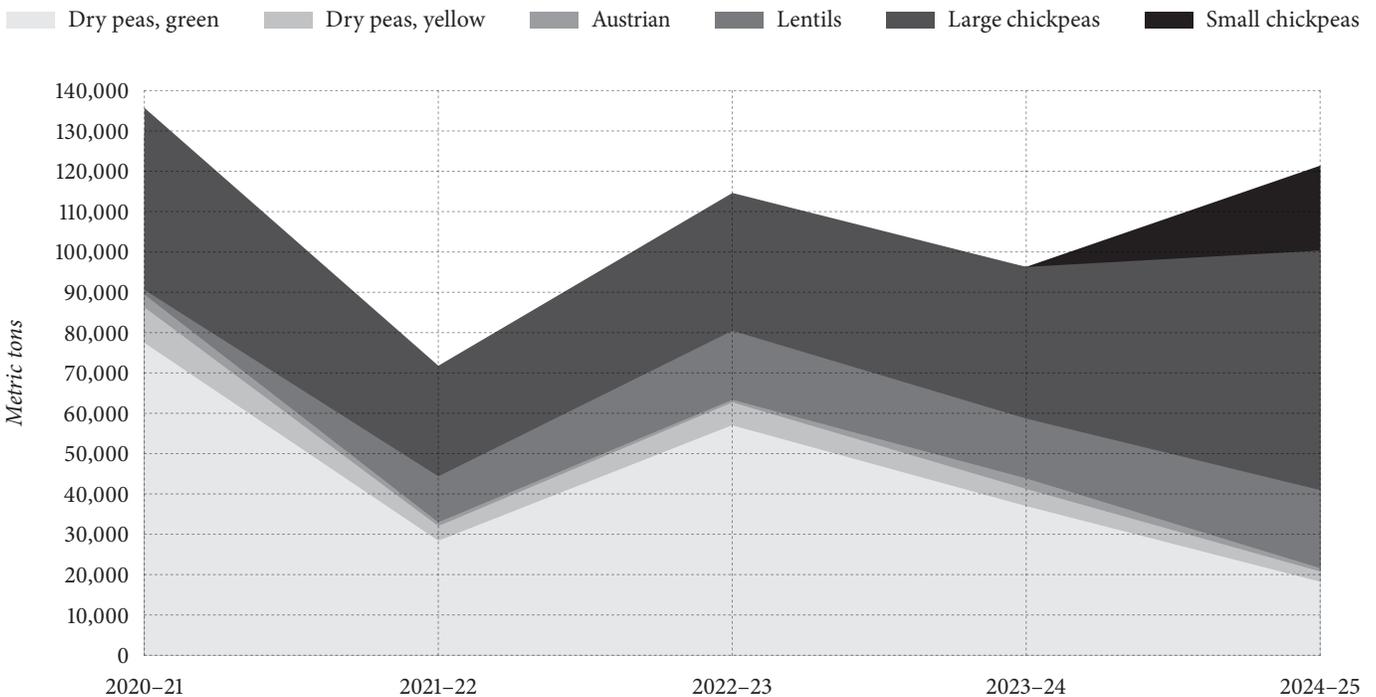
On the other hand, lentils recorded strong growth, with acreage rising by 15 percent, from 39,081 acres to 45,046 acres. The most significant increase came from large chickpeas, which surged by 53 percent, expanding from 63,427 acres to 97,055 acres. Small chickpeas also demonstrated notable growth, increasing by 16 percent, from 28,113 acres to 32,647 acres.

Overall, while declines were observed in green peas and Austrian winter peas, the growth in lentils and chickpeas—particularly large chickpeas—has driven an overall increase in Washington's pulse crop acreage this year.

Washington State Pulse Production

Pulse farmers in the Pacific Northwest planted into good subsoil moisture but experienced cool temperatures and limited moisture through June, followed by unusually high temperatures in July that shut down flowering and hurt yield potential. That continued dry spell in Washington State (as well as many pulse growing regions) resulted in disappointing yields, leading to less production than expected. Figure 3 reflects a five-year comparison of Washington State pulse production. In the most recent comparison of pulse crop production between 2023–24

Figure 3: Washington State Pulse Crop Production*



* Crop Years 2020–21 through 2024–25 (June through May)

Source: USDA: NASS, USAD: FSA, and USADPLC

and 2024–25, Washington saw notable shifts across its key crops. Green dry peas experienced a sharp decline, dropping from 37,333 metric tons in 2023–24 to 18,969 metric tons in 2024–25, marking a 49 percent decrease. Similarly, yellow dry peas fell significantly, decreasing by 46 percent from 3,911 metric tons to 2,108 metric tons. Austrian winter peas faced the steepest drop, plummeting by 66 percent from 2,408 metric tons to just 819 metric tons.

On a positive note, lentil production displayed strong growth, rising from 15,077 metric tons to 19,309 metric tons, a 28 percent increase. The most remarkable surge came from large chickpeas, which climbed 58 percent, growing from 37,312 metric tons to 58,837 metric tons. Overall, while green peas, yellow peas, and Austrian winter peas saw substantial declines over time, lentils and large chickpeas demonstrated impressive gains, with large chickpeas leading the way.

A Diversifying Industry

Overall, the five-year data tables reveal a notable diversification within Washington’s pulse crop industry. While dry peas face challenges, lentils and chickpeas are experiencing

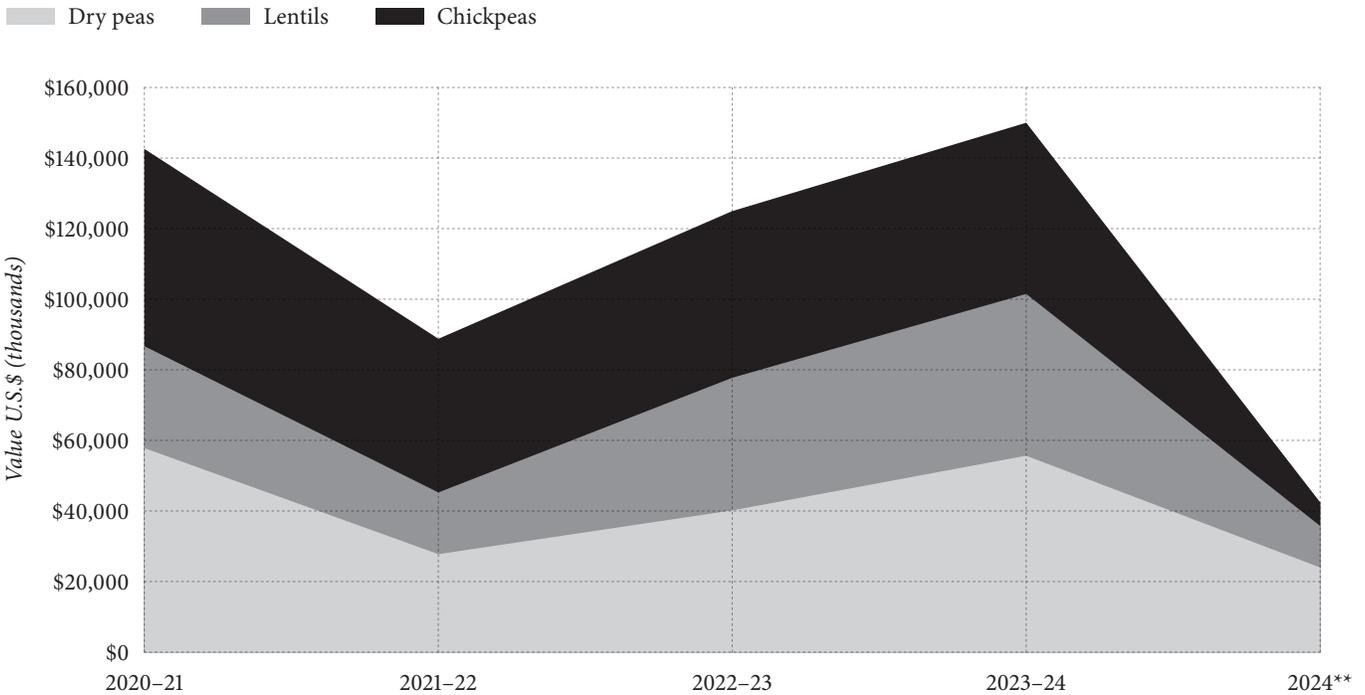
robust growth, driven by market opportunities and their fit within sustainable farming systems. Austrian Winter Peas continue to serve as a valuable, albeit fluctuating, rotational crop. These trends highlight how Washington’s growers adapt to changing markets, economic pressures, and sustainability goals.

Stocks Available for Export

According to USDA National Agricultural Statistics Service (NASS) data, all three major pulse crops—chickpeas, lentils, and dry peas—are entering the 2024/25 marketing year with multi-year lows in available stocks. This points to a strong demand relative to production, which has left limited carryover inventory to meet future market needs.

Figure 4 shows Washington’s world export value for dry peas, lentils, and chickpeas from 2020 to 2024. Values for dry peas showed notable fluctuations, starting at \$58.36 million in 2020–21, dropping to \$28.22 million in 2021–22, rebounding to \$55.92 million in 2023–24, and then sharply declining to \$23.99 million by September 2024. Lentils experienced a similar pattern, with export values beginning at \$28.61 million in 2020–21, falling to

Figure 4: *Washington State Pulse Crop Exports**



* Crop Years 2020–21 through 2024 (June through May)

** Crop Year 2024 through September 2024

Source: USDA: NASS

\$17.88 million in 2021–22, peaking at \$45.71 million in 2023–24, and decreasing significantly to \$11.65 million by September 2024. Chickpeas also displayed variability, with export values at \$56.24 million in 2020–21, dropping to \$42.92 million in 2021–22, remaining relatively steady around \$47–48 million through 2022–23 and 2023–24. The chart shows \$6.82 million by September 2024 which reflects only the first six months of data for the marketing year. The trend for the past five years for the industry is positive and the values seem to be holding or declining slightly for the current marketing year.

An Old Friend Returns

The U.S. and India signed an agreement in June 2023 that ended the 20 percent tariff disparity and returned U.S. lentils and chickpeas to the same tariff as other exporting countries. This helped increase U.S. pulse exports to India. The U.S. shipped over 37,000 metric tons of pulses to India in 2023 largely due to that agreement. India is currently suffering from a production deficit, unable to meet domestic demand. There are rumors of further import relief, which could boost global pulse trade, so exporters are bullish on the market, despite anticipating less inventory to meet that demand.

Washington Exporters Face Significant Trials

The agricultural industry is facing disruptive shipping and logistics challenges that have also negatively affected the pulse crop sector, making it increasingly difficult to deliver products to market reliably and cost-effectively. A combination of rising costs, delays, and systemic inefficiencies are straining supply chains. Ocean freight rates have been steadily increasing since August, adding substantial costs to shipments. Meanwhile, a growing shortage of shipping containers has made it harder to secure transport bookings, further complicating logistics.

Transit times have also ballooned, with pulse exporters describing scenarios where shipments are now taking up to six months to reach their destinations. This issue is exacerbated by severe port congestion, particularly in Asia and the Red Sea region, where delays are slowing movement and clogging the supply chain. Exporters expressed frustration with shipping carriers, describing them as disorganized and unresponsive to the needs of the agricultural sector, which often gets deprioritized in favor of higher-value cargo. The pulse trade notes that

freight advantages enjoyed by competitors, such as Russia, make it increasingly difficult for U.S. pulse producers to compete globally.

The overall sentiment from the pulse traders who purchase Washington-grown crops is the industry's inability to deliver products on time and maintain its reputation with both domestic and international customers. Andrew Fontaine from Spokane Seed Company is concerned the industry will lose customers in the long run. "I think these issues are making it difficult for our industry to deliver the high-quality products that our global customers want, and now we're becoming known as inconsistent. It's not our fault."

Addressing these deeply rooted logistical issues remains a pressing challenge for the pulse sector and the wider agricultural industry as they work to stay competitive in an increasingly strained global market.

The Washington Pulse Industry and the USA Pulses Vision

Despite these challenges, there are reasons to be hopeful for a pulse industry renaissance. McGreevy stated the following about pulses and world hunger at the recent WPGA grower meeting, "We believe pulses can help end world hunger completely, revolutionize our food system, and improve the nutrient quality of every diet. We believe they can lower carbon and water use in our food system and support family farming operations and rural communities."

The USA Pulses organization is driving several key initiatives to advance pulse production, research, and consumption across the U.S., and there are clear opportunities for Washington State grower to play a pivotal role in this effort. With pulses like dry peas, lentils, and chickpeas being central to Washington agriculture, growers can directly contribute to these programs and help shape the future of the pulse industry through the following:

1. **Doubling pulse crop consumption and production:** The USA Pulses organization has set a goal to double pulse crop consumption and production, as they believe pulses can help improve nutrient quality, revolutionize the food system, and lower carbon and water use.
2. **Expanding trade relationships:** The strong historical trade relationship between the U.S. and India has resulted in India becoming the top market for U.S. pulses for decades. Efforts to maintain and strengthen

this trade collaboration, even amidst potential trade tensions, can help ensure the continued flow of pulses between the two countries.

3. Promote the benefits of pulses to address global food security and sustainability goals.
4. Addressing policy and tariff challenges: Challenges created by trade policies and tariffs between the U.S. and India previously reduced pulse sales, but a recent agreement to equalize tariffs has helped increase shipments. Continued work to address policy and tariff barriers with countries in addition to India can further facilitate pulse trade and increase access to global markets.
5. Investing in research and innovation: Improving pulse yields and quality through research and innovation can help increase overall production and make pulses more attractive to consumers and food manufacturers.

Despite the significant logistical and market challenges facing the broader U.S. pulse industry, the future remains promising for pulse growers in Washington State. During the recent WPGA marketing panel discussion, industry leaders underscored Washington's reputation as a "premium growing spot" for high-quality large chickpeas and dry green peas, positioning the region as a leader in the

pulse sector. These qualities have solidified the region's standing as a top supplier of pulses both domestically and internationally.

Looking to the future, innovative solutions are emerging to address ongoing challenges. One such advancement is the development of winter pea varieties, which offer a promising solution to the spring planting issues that have hampered yields in recent years. The USDA-ARS breeding program at Washington State University has several winter pulse varieties in the works, and several private breeders in the state have released winter pea varieties as well.

While challenges related to shipping and logistics persist, the panelists expressed confidence in the ability of Washington growers to navigate these hurdles. As Andrew Fontaine of Spokane Seed pointed out, the region's pulse crops remain in high demand and benefit from well-established markets.

With strong demand, a reputation for premium quality, and promising advancements in crop varieties, Washington State's pulse industry is well-positioned for continued success. By embracing innovation and adaptability, growers in this region can overcome challenges, strengthen their markets, and further solidify their role as leaders in the U.S. pulse industry for years to come.



Forestry Sector Review

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AS Washingtonians in the future deal with the impacts of global warming, they may look back to the present day with some incredulity at the enormous sums we invested to mitigate climate change, often ineffectively, while failing to take advantage of the proven and best-known solution that nearly two decades ago the UN Intergovernmental Panel on Climate Change (IPCC) said would “generate the largest sustained mitigation benefit.” A solution that would not have increased taxes, but would have created jobs and much needed economic activity in rural areas. A solution that would have addressed pressing environmental problems like wildfire and forest health. How could it be that people who professed to care so much about the environment blocked the most effective and economically advantageous mitigation strategy—growing and harvesting more trees while increasing the use of natural, sustainable, renewable wood products?

It’s not as if we didn’t know better. The World Resource Institute lists six ways to remove carbon from the atmosphere. Number one on their list is “expanding, restoring, and managing tree cover to encourage more carbon uptake can leverage the power of photosynthesis, converting carbon dioxide in the air into carbon stored in wood and soils.”¹⁴ In 2007, after years of exhaustive study, the IPCC concluded in their fourth Assessment Report that “in the long term, a sustainable forest management strategy aimed at maintaining or increasing forest carbon stocks, while producing an annual sustained yield of timber, fiber or energy from the forest, will generate the largest sustained mitigation benefit.” Europeans embraced these findings and now have the most productive and healthy forests in the world.

The University of Washington’s research center CINTRAFOR has shown that Washington’s managed forests (corporate and state) have significantly higher net global warming mitigating benefits compared to the relatively unmanaged USFS forests. This is because forest biomass loss due to natural tree mortality, disease, and fire is much higher in unmanaged forests. In private and state forests, a large proportion of the annual growth is removed to

produce wood products like lumber, plywood, glulam and cross-laminated timber (CLT), while replanted trees continue absorbing more carbon. Using wood products rather than carbon intensive concrete and steel reduces the embodied carbon in our built environment. Over a 100-year cycle a sustainable working forest producing a typical mix of wood products will result in **twice as much** carbon storage than if the forest was left unmanaged.

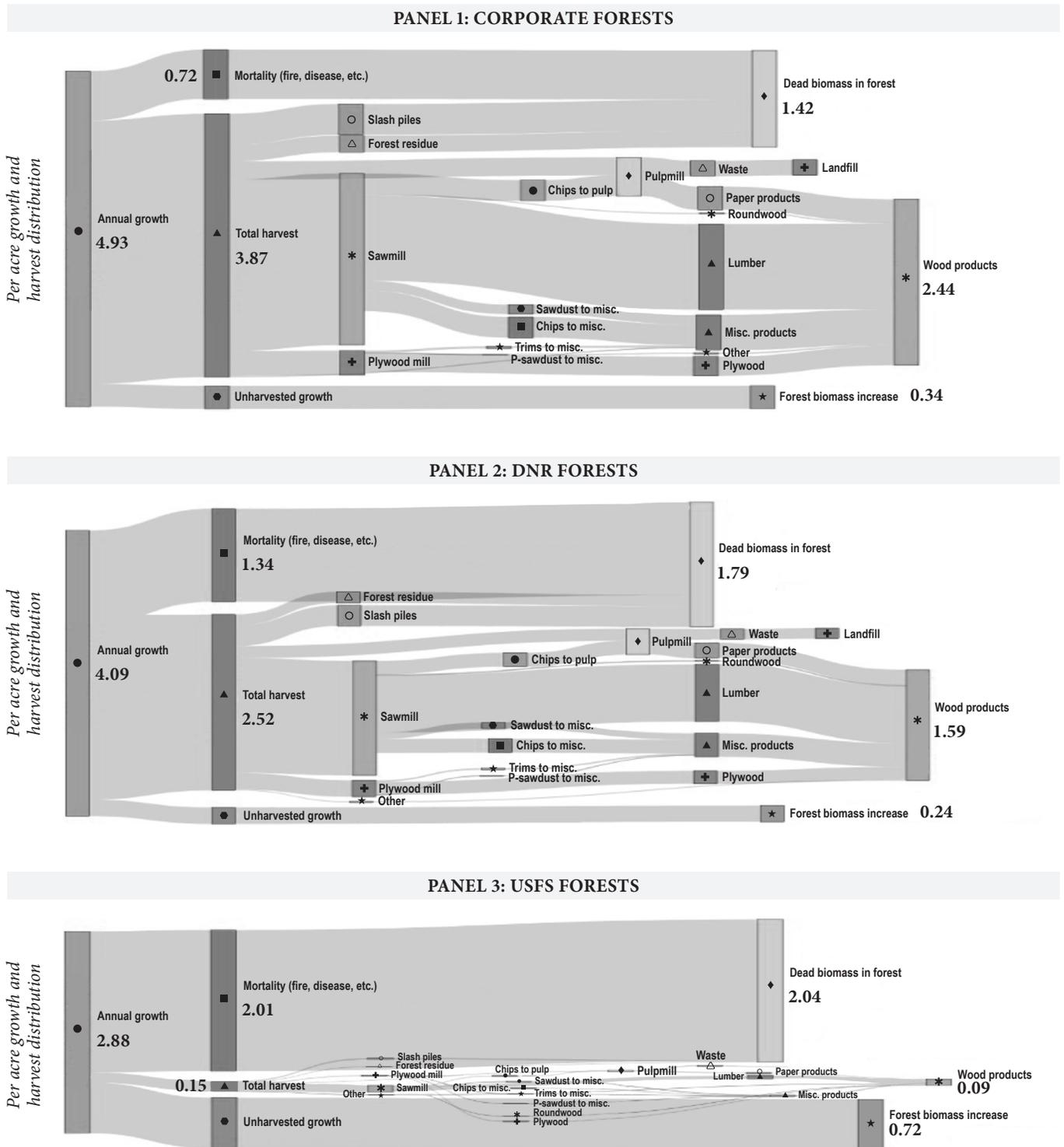
And yet, people who grew up choosing plastic over paper to “save trees” persist in their misguided efforts opposing or restricting timber harvests. If timber harvests can’t be stopped completely, they are delayed through efforts such as extending rotations, ignoring the fact that we already have a disastrous real-life experience with extended rotations in our federal forests. After decades of managing federal timberlands for wood production and rural employment, 90 percent of those harvests were curtailed in the late 1980s and early 90s due to the Spotted Owl and other environmental efforts, effectively extending the rotation on those lands for the past 35 years. The resulting collapse of many rural economies caused widespread social hardship and despair, while our USFS forests are now burning up at unprecedented rates, ironically releasing massive amounts of carbon into the atmosphere.

Figure 1 shows average annual change (flux) in Washington State’s forests by ownership type. These figures are based on currently available FIA (Forest Inventory Analysis) data, the best measure we have of the state of our forests. The flux includes growth and natural mortality in forests, annual average harvests, and annual storage of biomass in wood products and live standing trees in tons of CO₂ per acre per year (sources: forest growth, natural mortality, and harvest data from Christensen et al., 2020; wood products mix and distribution data from Ganguly et al., 2020). On the far left of each panel is the average annual tons of CO₂ absorbed and stored per acre by the trees growing on corporate (4.93 t/ac), state (4.09 t/ac), and USFS (2.88 t/ac) forests. Corporate and State timberlands are managed for yield, so it is not surprising that there is more growth and carbon storage relative to unmanaged USFS forests.

14 <https://www.wri.org/insights/6-ways-remove-carbon-pollution-sky>

Figure 1: Average Annual Change (Flux) in Washington State's Forests by Ownership Type

▲ Blue △ Lt. blue + Brown * Gray ■ Green ● Orange ◆ Pink * Purple ● Red ○ Yellow



Sources: Forest growth, natural mortality, and harvest data from Christensen et al., 2020; wood products mix and distribution data from Ganguly et al., 2020

The information to the right of the annual growth numbers shows average annual extractions from that growth. Of the 4.93 tons of annual storage in corporate forests, nearly half, 2.44 tons (49 percent) is stored in solid wood products like lumber, plywood, and glulam. 1.42 tons (17 percent) is lost to mortality, wildfire, disposal of harvest waste, etc. One-third of a ton is a net increase in forest biomass (i.e., more growth than harvest). The net result is that of 56 percent of the annual growth in carbon storage is maintained. State forests retain 45 percent of the increase.

But for federal USFS forests, because there is very little harvesting, carbon stored in wood products is negligible. There is a higher increase in net forest biomass of 0.72 tons, but a whopping 2.04 tons (84 percent) is lost to mortality, mostly due to wildfires. The net result is that corporate forests are storing 2.58 tons of carbon, State forests 1.83 tons, and USFS forests only 0.72 tons. Some of the carbon stored in wood products will be released as those products age and decay, but over 100 years managed timberlands are storing twice as much carbon as unmanaged USFS forests. As the IPCC told us nearly 20 years ago, carefully managing forests for a sustainable yield of wood products results in a superior carbon mitigation impact relative to unmanaged forests.

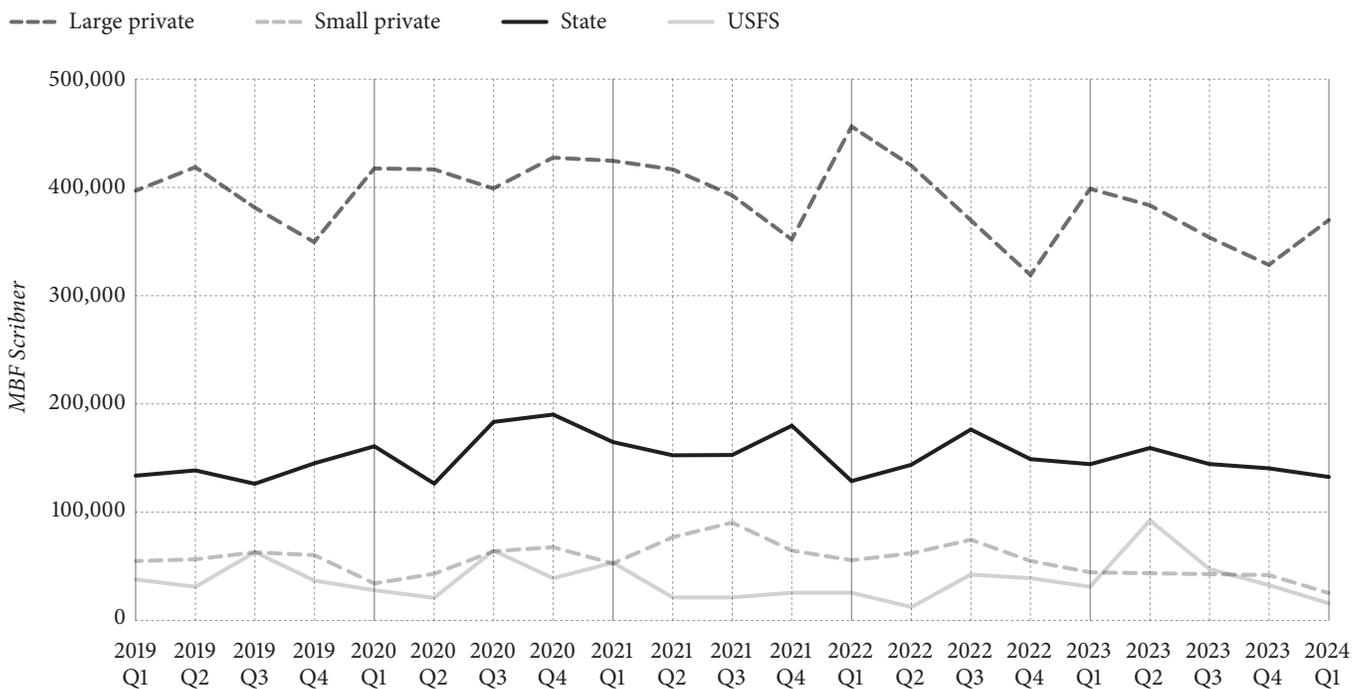
Nevertheless, we continue to restrict harvesting on our managed forests and not manage our federal forests. Instead, we attempt to mitigate climate change by pouring billions of dollars into dubious carbon credit schemes (google “John Oliver carbon offsets”) and various technologies that are more complicated and costly than growing and harvesting trees.

As a consequence of increasing restrictions on harvesting, Washington State’s log production has dropped three years in a row (Fig. 2)—down 1.9 percent in fiscal 2021, another 3.3 percent in 2022, and down 3.2 percent in 2023. Private timberlands provide about three-fourths of Washington’s timber harvest, with the remaining quarter coming from State land (DNR). Only about 5 percent comes from Federal forests (USFS), even though those forests make up 44 percent of Washington’s total forests.

As you might expect, the State’s lumber production has also been dropping for three years in a row (Figure 3) and is now about the same as it was nine years ago, in 2015.

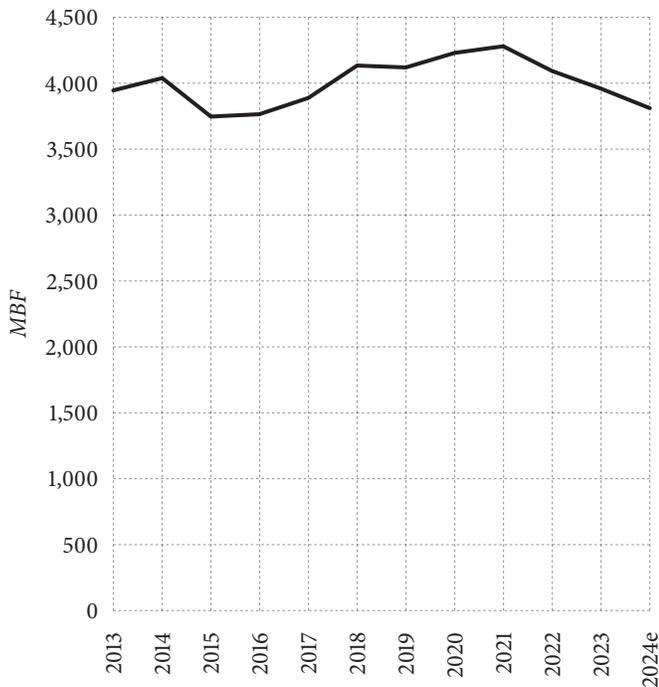
It could be worse, but log exports have dropped even faster (Figure 4), as forest products trade between the U.S. and China has been on a downward trend for a decade. As a reminder, logs harvested from state and federal forests

Figure 2: Washington State Timber Harvests by Ownership



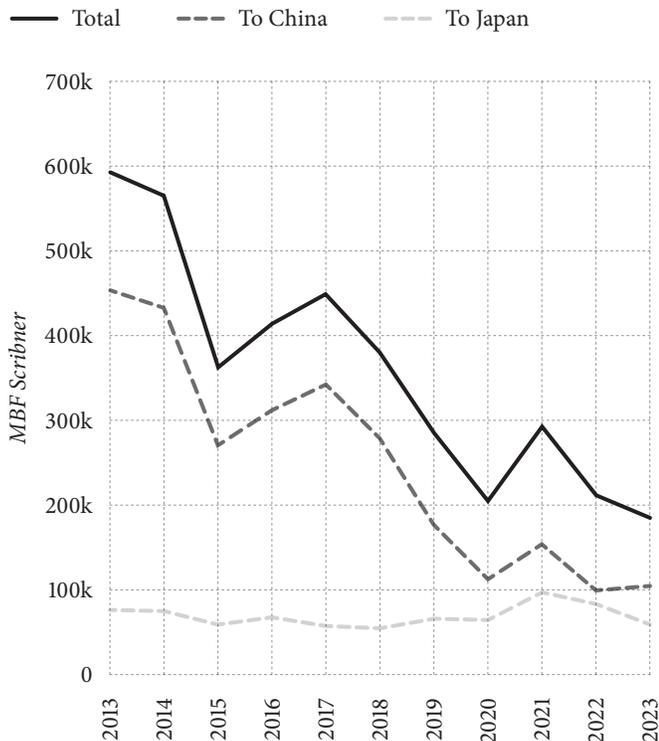
Source: Washington State Department of Revenue (fiscal years)

Figure 3: Washington Softwood Lumber Production



Source: Western Wood Products Association

Figure 4: Washington State Conifer Log Exports



Source: Western Wood Products Association

cannot be exported. Only private timber owners are allowed to export raw logs, and any company that does export logs cannot access public logs for their domestic sawmills. With log supply so tight in the Pacific Northwest, logs are staying in country for processing.

Washington is not alone among western states. Lumber production has been declining or remained relatively flat throughout the west (Figure 5). There has been very little investment in new sawmilling capacity due to the declining supply of logs.

The forestry consulting and analysis firm Forisk estimates that an additional 3 percent of the harvestable inventory in Oregon will be removed from harvesting plans due to the Private Forest Accord. Over the next ten years, commercial softwood sawlog inventory is expected to fall in coastal Oregon.

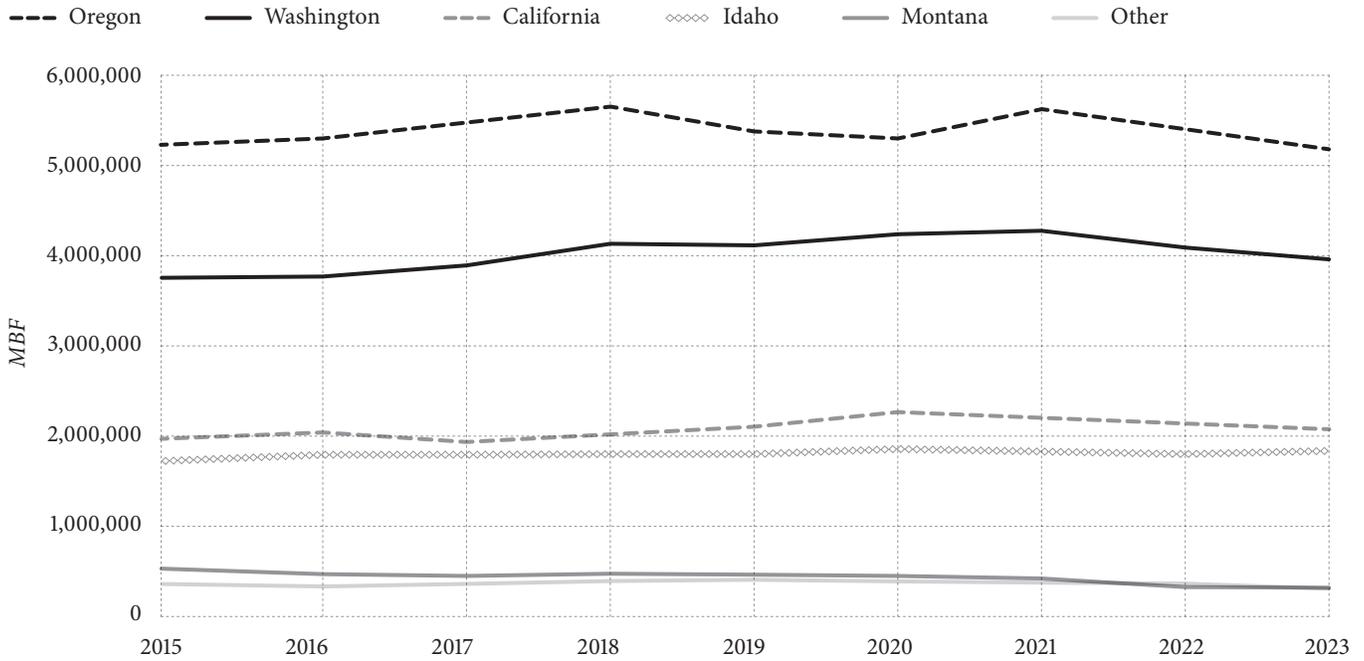
More and more of Washington’s lumber production is staying in the domestic market. Softwood lumber exports are now one-third of what they were in 2013 (Figure 6), and alder exports are the lowest they’ve been in 15 years (Figure 7).

The hardwood lumber industry is suffering. Historically, new single-family home construction and residential remodeling are among the biggest drivers of demand for hardwood lumber. Housing starts and remodeling were both up in 2024, but domestic consumption of hardwood lumber was down 8 percent, the lowest amount on record due to competition from imported flooring, cabinets, and furniture, and greater use of composite wood products and non-wood alternatives.

There is some good news—wildfire control in Washington State has been remarkably effective. The 2024 fire season in the U.S. was the most active since 2020, with 8.15 million acres burned. However, Washington was a small part of the total, losing only 327,000 acres to wildfire.

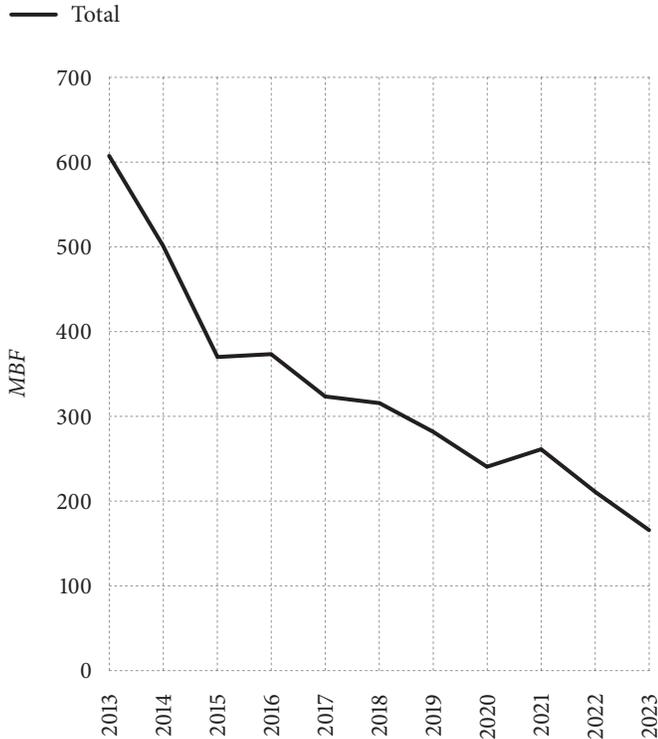
Recognizing the plight of the state’s forest products industry, the Washington Department of Commerce organized the Washington Forest Products Roundtable, a collaborative forum devoted to the economics and sustainability of wood products and the societal recognition of the benefits of managed forests. Monthly meetings are being held throughout the state in key lumber producing regions. The Roundtable was created to provide consistent information sharing, networking, and education for the entire spectrum of forest products in Washington State. Membership includes forest products industry, public and private and tribal landowners, state and local government agencies, and other community leaders.

Figure 5: Western States Lumber Production



Source: Western Wood Products Association

Figure 6: Washington State Softwood Lumber Exports



Source: Western Wood Products Association

Figure 7: Washington State Alder Lumber Exports



Source: U.S. Census Bureau, USA Trade Online



Macroeconomic Conditions and Washington Agriculture

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EXPORT markets play a vital role in attracting money to the Pacific Northwest. But the outlook for that lifeline over the next few years is uncertain, if not precarious, for Washington agriculture. During the previous trade war, when foreign countries reacted to U.S. import tariffs with retaliatory tariffs of their own, the U.S. agriculture sector was hit hard. Alternative markets showed little ability to absorb Washington agricultural goods. The prospect of further tariffs and retaliation does not bode well for the sector. Moreover, decreased labor supply from tighter immigration policy threatens to increase production costs

What follows is data and analysis, partly based on the authors’ interviews and experiences with local growers and commodity commissions. It is difficult to make quantitative forecasts at this time due to the rapidly changing political environment and the uncertain evolution of ongoing international conflicts. But it does seem clear that Washington’s agriculture sector should prepare for an economic environment of retaliatory tariffs and tighter

labor supply. Many farmers may lack adequate support to deal with these challenges.

World Status and Outlook

The IMF World Economic Outlook, issued in October, summarizes the economic situation as follows: “Risks to the global outlook are tilted to the downside amid elevated policy uncertainty.” The IMF indicates that persistent geopolitical tensions and conflict are playing large roles in rising commodity food prices in both advanced and Emerging Markets and Developing Economies (EMDEs). IMF forecasts of movement in key economic variables can be seen in Table 1.

Since the IMF’s forecasts were released in October, they fail to fully account for the effects of a new trade policy regime in the United States and the expected international response. The trade projections therefore tend to be overstated. The IMF projects further cooling of inflation, but this could also be affected by new rounds of tariffs,

Table 1: 2021 IMF World Economic Outlook Annual Percent Changes

	2023	2024*	2025**
World Output	3.3	3.2	3.2
Advanced Economies	1.7	1.8	1.8
Emerging Markets and Developing Economies	4.4	4.2	4.2
World Trade Volumes	0.8	3.1	3.4
Imports			
Advanced Economies	-0.7	2.1	2.4
Emerging Markets and Developing Economies	3.0	4.6	4.9
Exports			
Advanced Economies	1.0	2.5	2.7
Emerging Markets and Developing Economies	0.6	4.6	4.6
Consumer Prices	6.7	5.8	4.3
Advanced Economies	4.6	2.6	2.0
Emerging Markets and Developing Economies	8.1	7.9	5.9

Source: IMF World Economic Outlook 2024.4

* Based on projections for Q4

** Projections

which would create further uncertainty about the future of monetary policy around the globes.

United States Status and Outlook

Inflation in the U.S. has slowed recently but high prices Inflation in the United States has continued to slow yet remains above the Federal Reserve's target, so monetary policy has begun easing but only slowly.¹⁵ Agricultural production costs remain elevated, and farm gate prices are struggling to cover increased input costs. A senior official at the Kansas City Fed noted that there has been increased growth in farm debt but that the delinquency rate has remained low. Land debt remains below historic trends, which suggests that the scale of agricultural production has not rebounded to its pre-COVID level.¹⁶

Political uncertainty in the United States has persisted post-election. It is all but certain that there will be more tariffs and other trade restrictions. The incoming administration has proposed a prohibitive tariff on all vehicles imported from Mexico (Trump at Coachella, CA, Oct. 12, 2024), as well as a 60 percent tariff on all imports from China (Trump during a Fox interview, Feb 4, 2024).¹⁷ As happened in the prior Trump term, China and other countries retaliated against these tariffs, drastically affecting U.S. and PNW agricultural exports (see WASO 2019).

As before, these policies will have detrimental indirect effects on agricultural export markets. During the previous trade war, domestic and foreign markets were not able to absorb all the residual U.S. agricultural production. This time is likely to be similar, and the abundance of supply may mean that growers and processors face increased inventories and low market prices that leave them with losses. Farmers who recall the 2019-2021 agricultural markets may preemptively reduce production to save on input costs and try to mitigate these losses in the short run, but recovering from major disruption of export markets is still quite costly in the medium to long term.

Farm labor, particularly during harvest in the U.S. and the PNW, is linked to foreign-born labor. With the new restrictions on immigration, labor-intensive specialty

crops will struggle to operate at historic capacities. This will result in further downward pressure on production and put additional stress on farm protection programs. However, with deregulation and budget reductions affecting USDA and FDA programs, it is not clear whether these protection packages will be sufficient. The government did issue a support package for farmers in 2019 (see USDA July 25, 2019, press release).¹⁸ The \$16 billion farm relief package administered by the FSA provided payments to trade-affected crops between \$15/acre and \$150/acre—not nearly enough to cover realized losses.

Washington Agriculture's Relationship to the Macroeconomy

Washington State may be harmed to a greater extent than surrounding PNW states due to its strict labor regulations and overtime pay rates. According to state law: "Beginning January 1, 2024, any agricultural employee shall not be employed for more than 40 hours in any one workweek unless the agricultural employee receives one and one-half times that agricultural employee's regular rate of pay for all hours worked over 40 in any one workweek." Even the farm laborers that were supposed to be helped by this law now find it problematic as growers limit their hours. Labor will likely flock to those states where larger earnings, via hours worked, are achievable. While apples, cherries, and other labor-intensive specialty crops in Washington will certainly be affected by these labor regulations, capital-intensive industries may be affected as well. Skilled labor commands high wages, leaving medium to small growers strapped, and likely resulting in increased consolidation and farm closures.¹⁹

Given the dichotomy between the incoming federal and Washington State administrations, countervailing policies may have multiple adverse effects on the state. For example, deregulation in emissions standards in surrounding states and advancing regulations in Washington State may put Washington producers at a competitive disadvantage, harming their ability to use more efficient production techniques. An unintended consequence of such differing regulatory structures could be that consumers substitute

15 <https://www.bls.gov/news.release/cpi.nr0.htm>

16 <https://www.kansascityfed.org/agriculture/agfinance-updates/farm-debt-continues-to-rise-but-delinquencies-remain-low/>

17 <https://youtu.be/WAg99owBB6w>

18 <https://www.usda.gov/article/usda-announces-details-support-package-farmers>

19 [https://app.leg.wa.gov/rcw/default.aspx?cite=49.46.130#:~:text=\(1\)%20Except%20as%20otherwise%20provided,times%20the%20regular%20rate%20at](https://app.leg.wa.gov/rcw/default.aspx?cite=49.46.130#:~:text=(1)%20Except%20as%20otherwise%20provided,times%20the%20regular%20rate%20at)

away from greener Washington-grown foods and consume more foods grown out of state.

Washington saw its number of farms fall by 10.4 percent between 2017 and 2022, according to the Census of Agriculture. Farm numbers continue to fall, with recent data suggesting that we are now below 32,000 farms. In contrast, in 2007 the number of farms in Washington exceeded 39,000. Acreage had remained fairly steady, around 14.7 to 14.9 million acres, but that number in the most recent census fell 5.6 percent to 13.9 million acres. Since land in production has fallen at a slower rate than the number of farms, the average farm size has grown. This suggests consolidation of production to take advantage of economies of scale.

We see this trend continuing, as fixed costs of agricultural production continue to rise. This consolidation is continuing within the processing element of the food supply chain as well, and more antitrust lawsuits are being filed against processors, most recently in the potato processing and beef processing sectors. Food retailers Albertsons and Kroger recently lost a merger attempt. They argued that the merger was necessary to achieve the economies of scale needed to compete with food retail giants Walmart and Amazon, but the merger was denied due to its potential

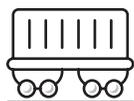
anticompetitive effects. The tradeoff between efficiency gains from economies of scale and consumer losses from increased market power (the Williamson tradeoff) is the key tension in these cases.

Summary

Though Washington agriculture has remained strong over the past few years, it looks as though the near- to mid-term outlook will not be as robust. There are signs that consolidation will continue in the agricultural production space to further take advantage of economies of scale, but those gains are largely gone in the processing arena for Washington.

Demand for key commodities like grapes, hops, and potatoes shows signs of weakening, and this may lead to further acreage reductions. These trends are likely to be exacerbated by pending international trade barriers and labor market supply issues. Some deregulation at the national level may allow for increased competition, but that competition will depend on capital and labor availability, which is increasingly a concern for Washington relative to other PNW states like Idaho, Oregon, and Montana.

SECTION II. SPECIAL FOCUS



An Inland Terminal in Washington State

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INLAND container terminals are high-capacity, intermodal, inland, freight depots with infrastructure to handle containers, and with direct Class 1 rail connections to one or more seaports (Crainic et al., 2014). Inland terminals provide shippers with a repositioning depot away from the often-congested seaport. In doing so, inland terminals potentially offer many benefits to shippers, port operators, railroads and the broader public if successfully positioned. These benefits include expanding port operations (volumes of throughput), offer inland shippers cost effective opportunities to meet secondary container demands (Kim and Van Wee, 2011), and reduce congestion, pollution, and roadway wear near densely populated seaports and along heavily trafficked highways (Bryan et al., 2007).

The Northwest Seaport Alliance (Ports of Seattle and Tacoma, WA) has attempted to develop inland container terminals in the past. A current semi-operational inland container terminal is located at Richland, WA, approximately 200 miles east of Seattle, WA. Other attempts have been located at the Port of Quincy, WA and at the Port of Moses Lake, WA. Each attempted inland terminal has faced the challenge of uncertainty over rates/service from the Class 1 rail line, and volume of shipment from the regional shippers. Without sufficient volume Class 1

rail lines will not commit to adequate rates/service, and without adequate rates/service regional shippers will not commit to enough volume.

This uncertainty over volumes is caused in part by the diverse and varied nature of the many different agricultural commodities produced in the Pacific Northwest. Because production is spread across a wide array of commodities, any single commodity is not shipped with high enough volumes to secure competitive rates and service from the shipping lines and Class 1 railroads. Collectively, however, the many small to mid-size shippers across multiple commodities—including hay, potatoes, onions, apples, cherries, peas, lentils, and garbanzo beans—represent a very sizeable market opportunity, likely warranting service from shipping lines and Class 1 railroads.

A transportation optimization model is developed to: 1) evaluate the feasibility of an inland container terminal in Washington State by estimating volume throughput, and 2) evaluate the impacts of the proposed terminal on vehicle miles traveled, shippers' transportation costs, port truck traffic, and the collective public benefit realized from diverted truck traffic (reduced emissions, congestion, accidents, roadway wear, etc.).

Freight Demand and Mode Choice

Shippers can choose to ship directly to the seaport or indirectly via the inland terminal to the seaport. These choices are evaluated using a transportation optimization model under a baseline scenario without an inland terminal, and under the operation of three proposed inland terminals. The baseline scenario is compared to alternative operating scenarios under which one the proposed inland terminals in Ellensburg, Quincy, and Wallula become operational. The baseline and alternative operating scenarios include:

1. Not Operational (baseline): *Ellensburg, Quincy, and Wallula are not operational.*
2. Ellensburg Operational: *Ellensburg is operational, but Quincy and Wallula are not.*
3. Quincy Operational: *Quincy is operational, but Ellensburg and Wallula are not.*
4. Wallula Operational: *Wallula is operational, but Ellensburg and Quincy are not.*

Rail from Spokane to the seaports is assumed to be operational in all scenarios. Under these operating scenarios we evaluate the impacts of inland terminal operations on commodity flows throughout the region. Commodity flows are used to calculate the impacts of inland terminal operations on public and private transportation costs under each scenario including: transport costs, greenhouse gas emissions, air pollution, highway accidents, noise pollution, congestion, and roadway wear.

Data

Monthly containerized export data provided by U.S. Customs aggregates export volumes by two-digit HS code, state of origination, and mode (air, containerized vessel, or bulk vessel). Containerized vessel export volumes are measured by weight; for analysis, weights are converted into the number of 20-ft equivalent units (TEUs) (Table 1). Containerized vessel exports from Washington total on average 179,687,133 kg/month, or approximately 14,244 TEUs/month. Oil Seeds and Misc Grain represent the largest share of containerized vessel export volumes, accounting for approximately 8,535 TEUs/month. Fruit and Vegetables account for approximately 2,215 TEUs/month and 1,602 TEUs/month respectively.

Agricultural export volumes within the state are mapped to production originations based on county-level production volumes (shares as a percentage of total state production) and township-level agricultural land use data. Figure 1 shows estimated monthly export volumes (TEUs) from each county in Washington. Figure 2 shows estimated monthly export volumes (TEUs) from each production origin in the state (township/region/section). These production origins are used in the transportation optimization model to estimate commodity flows.

Information on truck transportation costs is derived from consultations with shippers and data from Bulkloads.com, a broker of agricultural truck transportation services. Average weekly rates per mile are shown in Figure 3, as a function of total transport distance. Most agricultural truck

Table 1: Monthly Containerized Agricultural Vessel Exports Originating in Washington

Commodity	Monthly containerized vessel exports SWT (kg)	Monthly containerized vessel exports (TEUs)
02 Meat and edible meat offal	3,042,528	252
03 Fish, crustaceans, and aquatic invertebrates	10,546,810	917
06 Live trees, plants, bulbs, etc.; cut flowers, etc.	285,746	55
07 Edible vegetables and certain roots and tubers	25,267,100	1,602
08 Edible fruit and nuts; citrus fruit or melon peel	23,805,120	2,215
10 Cereals	9,740,629	668
12 Oil seeds, etc.; misc. grain, seed, fruit, plants, etc.	106,999,200	8,535
Total	179,687,133	14,244

Figure 1: Containerized Agricultural Vessel Export Volumes by County (Monthly)

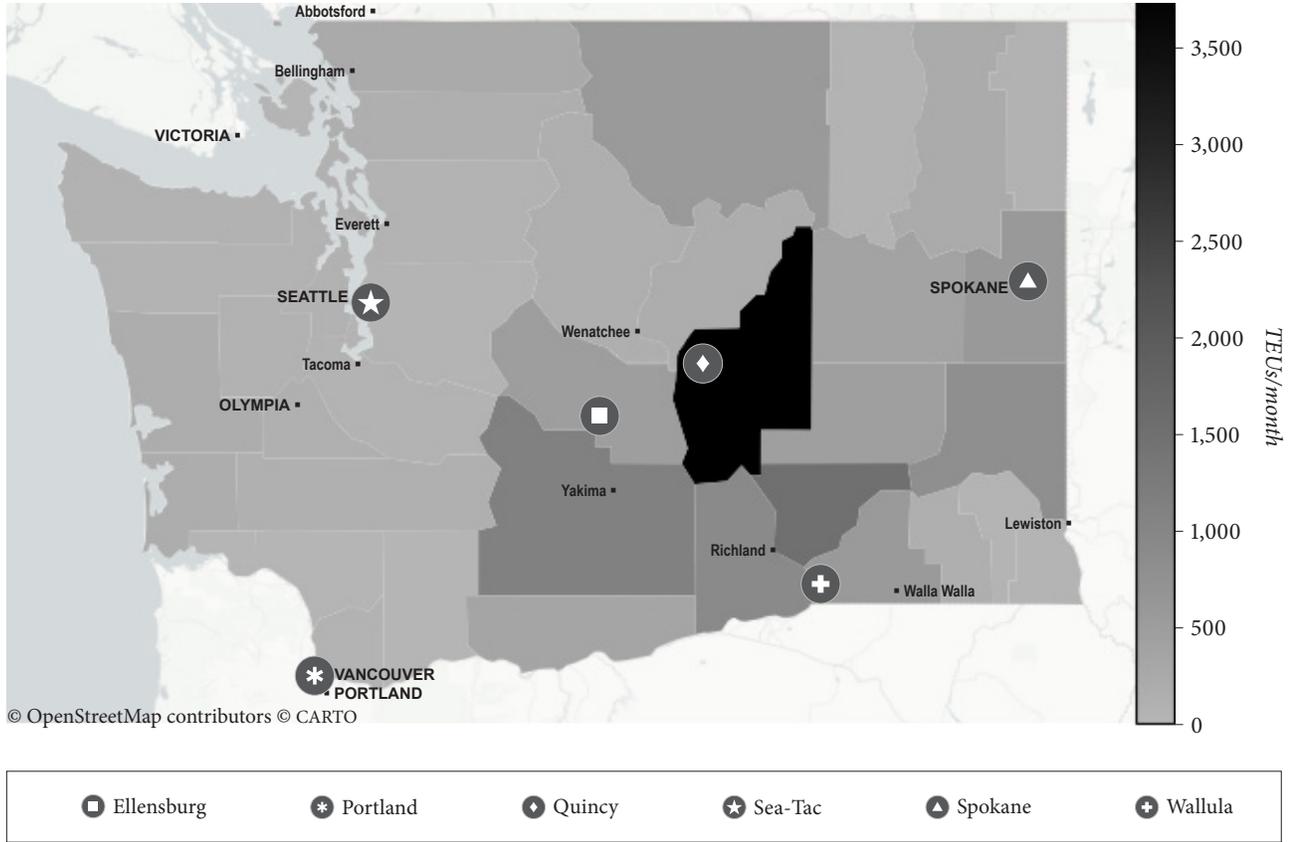


Figure 2: Containerized Agricultural Vessel Export Volumes by Township/Region/Section (Monthly)

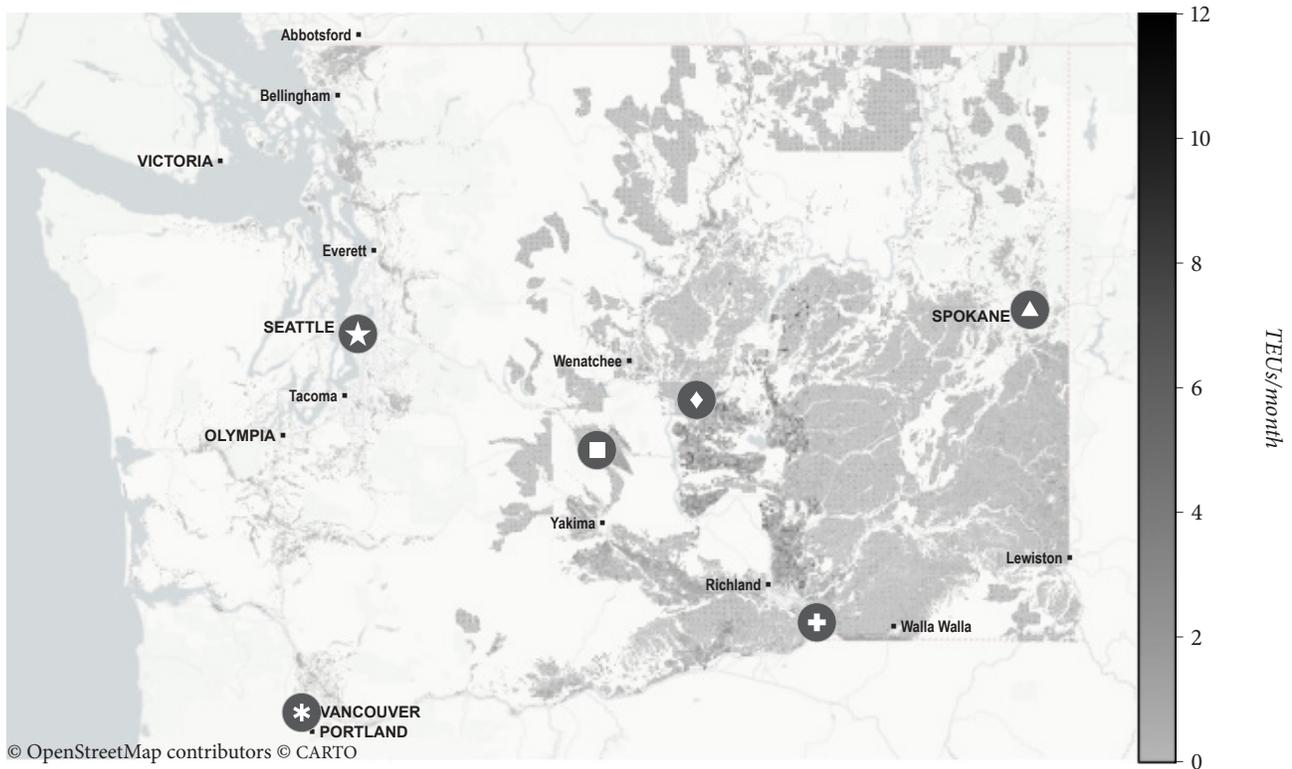
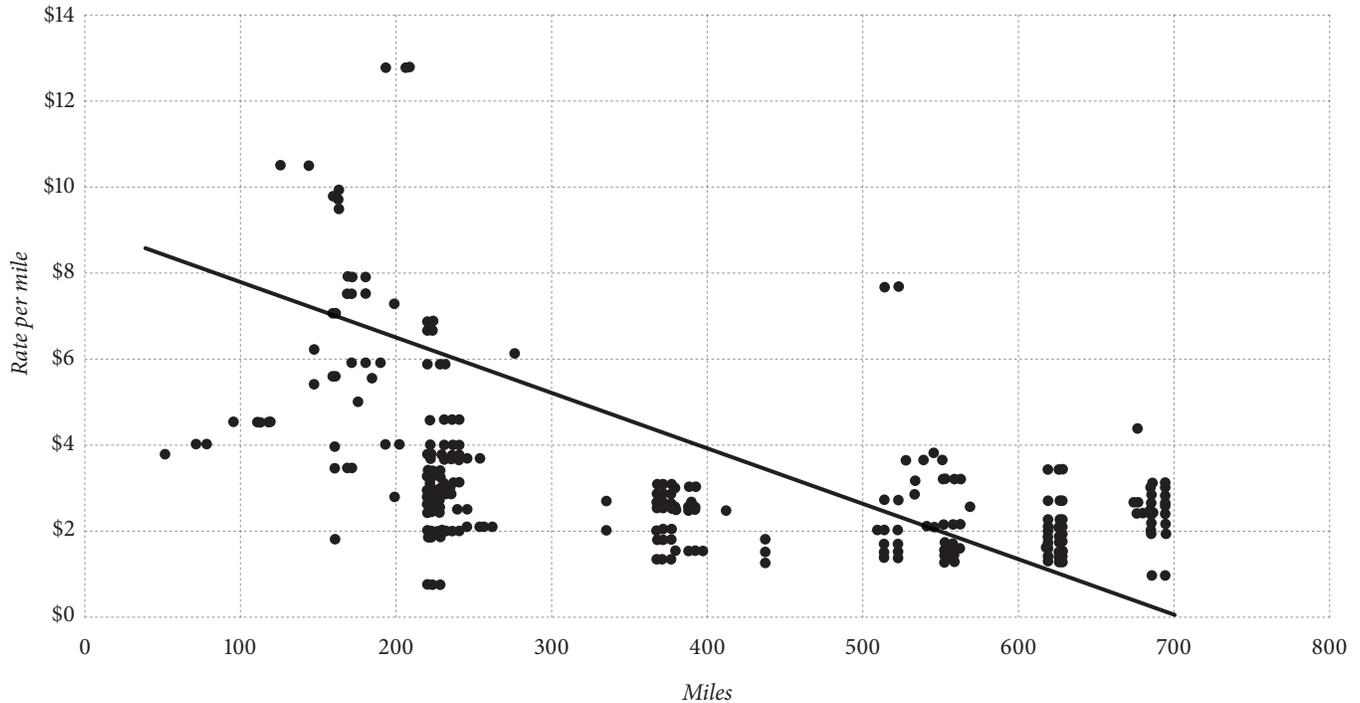


Figure 3: Truck Rate Data



Source: Bulkloads.com

transportation within Washington is under 200 miles. For this analysis we assume an average truck rate of \$7.5/mile.

Information on rail transportation costs is derived from consultations with shippers and data from the Surface Transportation Board Confidential Waybill Sample, which provides reported rail rates for a sample of rail shipments within the U.S. These are the estimated rates per two TEU (40-ft container) for rail service to the seaports from each intermodal terminal: Ellensburg: \$800, Quincy: \$1,000, Spokane: \$1,475, Wallula: \$1,200.

Results

For each operational scenario, commodity flows from each production origin are identified based on the least cost mode/route. In total, 14,244 TEUs/month of containerized agricultural exports are modeled across 32,023 production origins, all destined for export from Sea-Tac.

Without an inland terminal, shippers exporting containerized products through the seaports must truck export containers long distances to the seaport. Figure 4 shows shippers' terminal choices, terminal throughput volumes, and truck flows under the baseline scenario. Townships

are shaded to reflect their terminal choice, where darker shaded regions indicate higher volume townships. Under this baseline scenario, an estimated 87 percent of all containerized export volumes are trucked to the seaports, with an estimated 9,518 TEUs/month (4,759 trucks/month) transiting Snoqualmie Pass. Shippers located near Spokane truck their export containers to Spokane where they are loaded onto trains for delivery to the seaports. A small number of shippers (120 TEUs/month) ship from Portland to Sea-Tac via rail.

The introduction of an inland terminal diverts export volumes from being trucked to the seaports, by drawing shippers' business within proximity of the inland terminal. Figure 5 shows shippers' terminal choice and volume flows after the introduction of an inland terminal in Ellensburg. An inland terminal in Ellensburg is estimated to reduce truck miles traveled from the baseline (Not Operational) scenario by 42 percent, diverting an estimated 9,365 TEUs/month (2,341 carloads/month) to the inland terminal at Ellensburg, and yielding a 76 percent reduction in daily port truck traffic. With an inland terminal at Ellensburg an estimated 851 TEUs/month (426 trucks/month) transit Snoqualmie Pass.

Figure 4: Terminal Choices and Traffic Flows—Not Operational Scenario

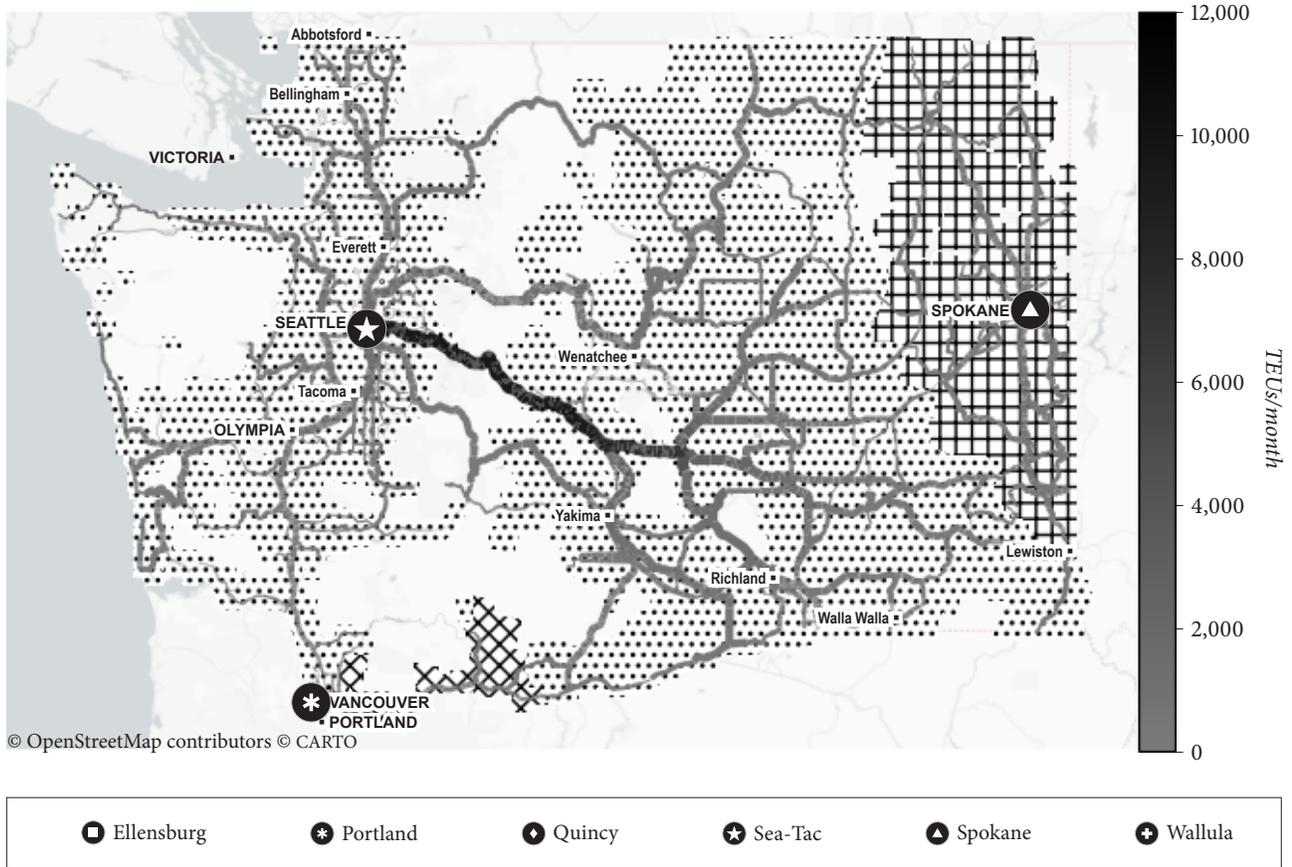


Figure 5: Terminal Choices and Traffic Flows—Ellensburg Operational Scenario

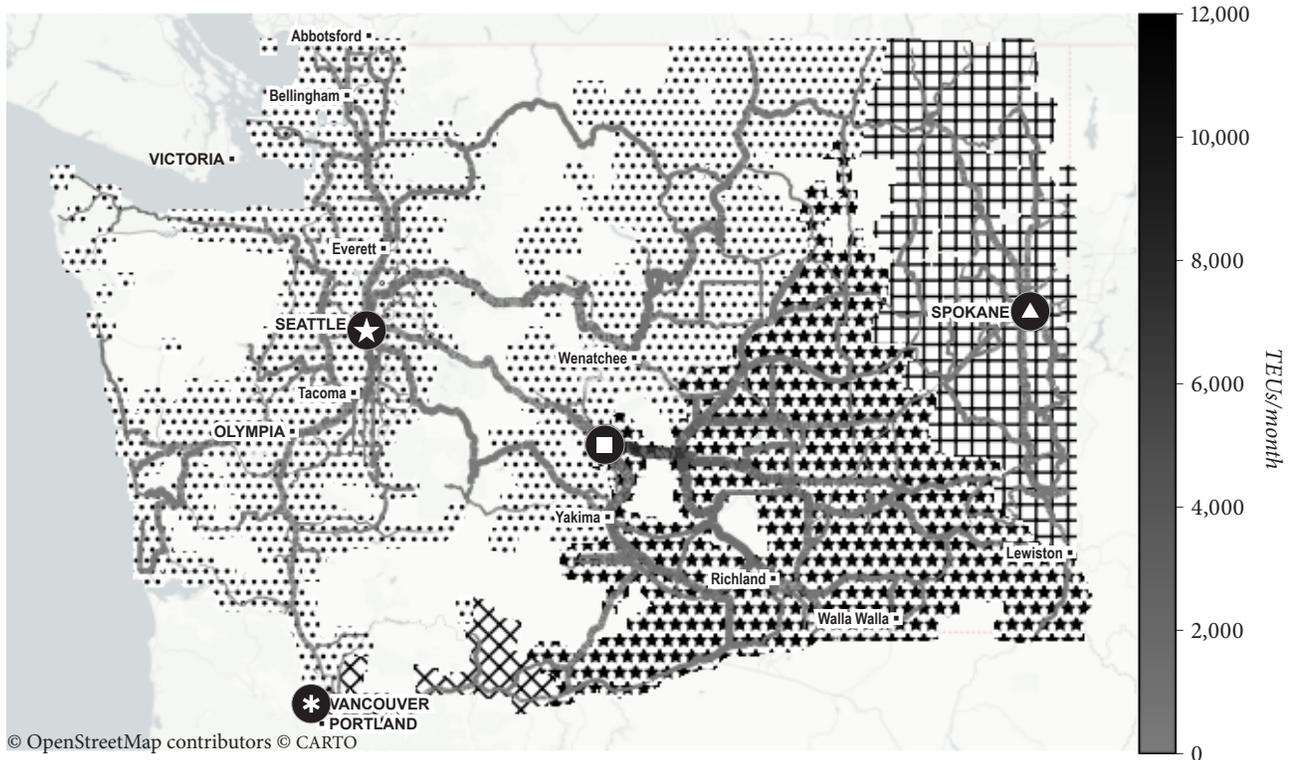


Figure 6 shows shippers' terminal choice and volume flows after the introduction of an inland terminal in Quincy. An inland terminal at Quincy draws volumes from North of I-90 and West of Spokane. Production in the greater Tri-Cities area continues to be trucked to the seaports. An inland terminal in Quincy is estimated to reduce truck miles traveled from the baseline (Not Operational) scenario by 18 percent, diverting an estimated 3,176 TEUs/month (794 carloads/month) to the inland terminal at Quincy, and yielding a 24 percent reduction in daily port truck traffic. Production in the greater Tri-Cities area continues to be trucked to the seaports. With an inland terminal at Quincy an estimated 6,580 TEUs/month (3,290 trucks/month) transit Snoqualmie Pass.

Figure 7 shows shippers' terminal choice and volume flows after the introduction of an inland terminal in Wallula. An inland terminal in Wallula is estimated to reduce truck miles traveled from the baseline (Not Operational) scenario by 22 percent, diverting an estimated 2,541 TEUs/month (635 carloads/month) to the inland terminal at Wallula, and yielding a 21 percent reduction in daily port truck traffic.

With an inland terminal at Wallula an estimated 6,979 TEUs/month (3,490 trucks/month) transit Snoqualmie Pass.

Throughput volumes for each terminal under each operational scenario are presented in Table 2. Throughput volumes represent each shippers' terminal choice multiplied by their volume of export production. In total, 14,244 TEUs are moved to export in each scenario. From commodity flows, we report truck miles traveled, rail carloads (assuming double stack 40-ft containers), daily port traffic at Seattle and Tacoma, and the average cost to ship a 40-ft container to port (Table 3).

Inland terminal operations affect private costs through transport costs, and public costs through greenhouse gas emissions, air pollution, noise pollution, congestion, accidents, and roadway wear (Table 4). Transport costs are affected by truck miles traveled and the proximity and service rate of inland terminals. Compared to terminals in Quincy or Wallula, an inland terminal in Ellensburg yields relatively little cost savings to shippers, saving approximately \$21,782/month across all shippers or approximately

Table 2: Terminal Throughput Volumes (Monthly)

TEUs/month	Seattle (direct)	Spokane	Portland	Ellensburg	Quincy	Wallula
Not operational	12,368	1,758	120	-	-	-
Ellensburg	3,002	1,756	120	9,365	-	-
Quincy	9,342	1,604	120	-	3,176	-
Wallula	9,826	1,755	120	-	-	2,541

Table 3: System Performance (Monthly)

	Truck miles traveled	Rail carloads (double stack 40-ft)	Port truck traffic (trucks/day)	Average cost of 40-ft container to port
Not operational	1,306,462	470	203	\$1,423
Ellensburg	757,968	2,810	49	\$1,420
Quincy	1,076,615	1,225	153	\$1,400
Wallula	1,021,169	1,104	161	\$1,379

Table 4: Private and Public Costs (Monthly)

	Transport cost	Emissions	Air pollution	Noise pollution	Congestion	Accidents	Roadway wear
Not operational	\$10,135,992	\$159,966	\$248,504	\$31,473	\$195,448	\$567,766	\$156,775
Ellensburg	\$10,114,210	\$126,482	\$180,481	\$51,526	\$111,133	\$329,400	\$90,956
Quincy	\$9,968,541	\$148,036	\$222,265	\$42,225	\$162,664	\$467,878	\$129,194
Wallula	\$9,822,811	\$144,277	\$214,985	\$44,215	\$157,538	\$443,782	\$122,540

Figure 6: Terminal Choices and Traffic Flows—Quincy Operational Scenario

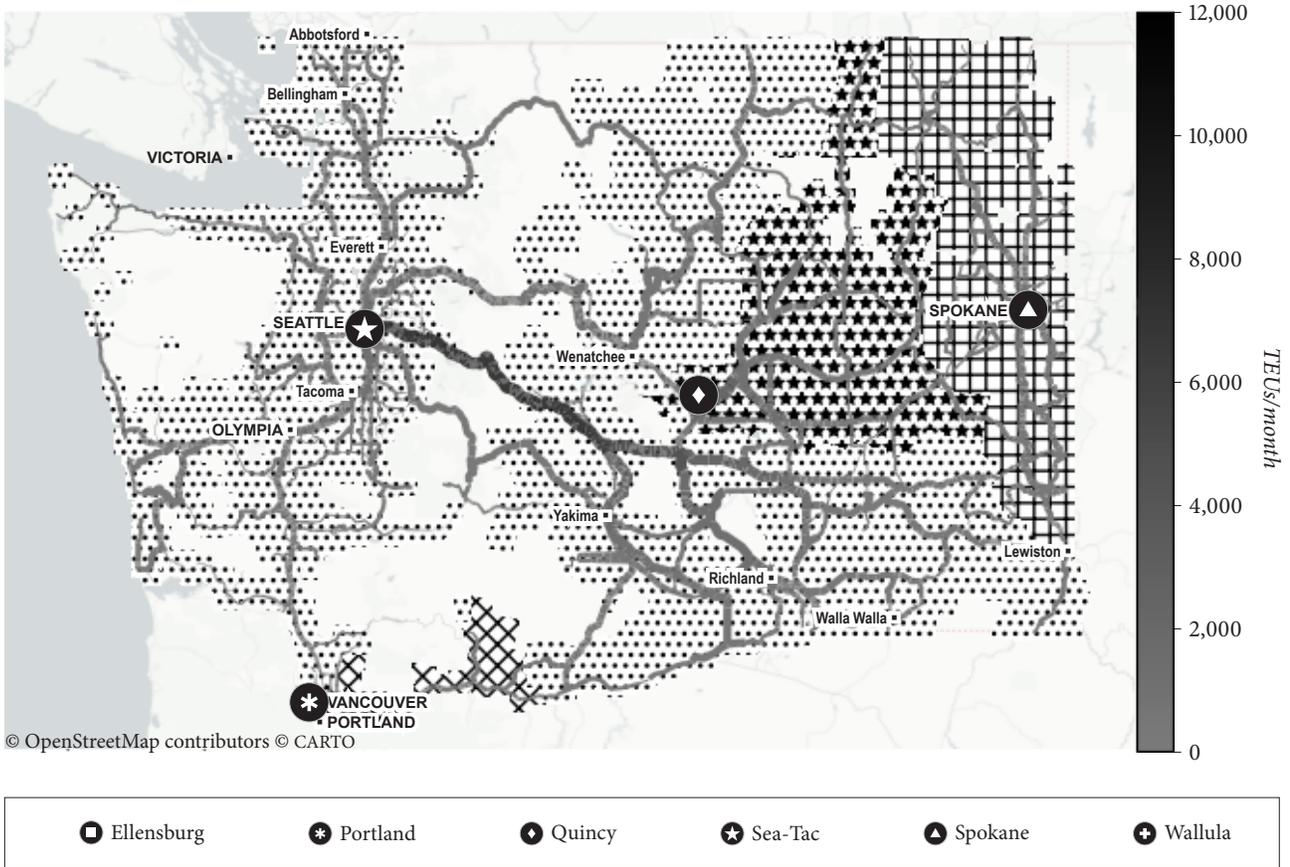
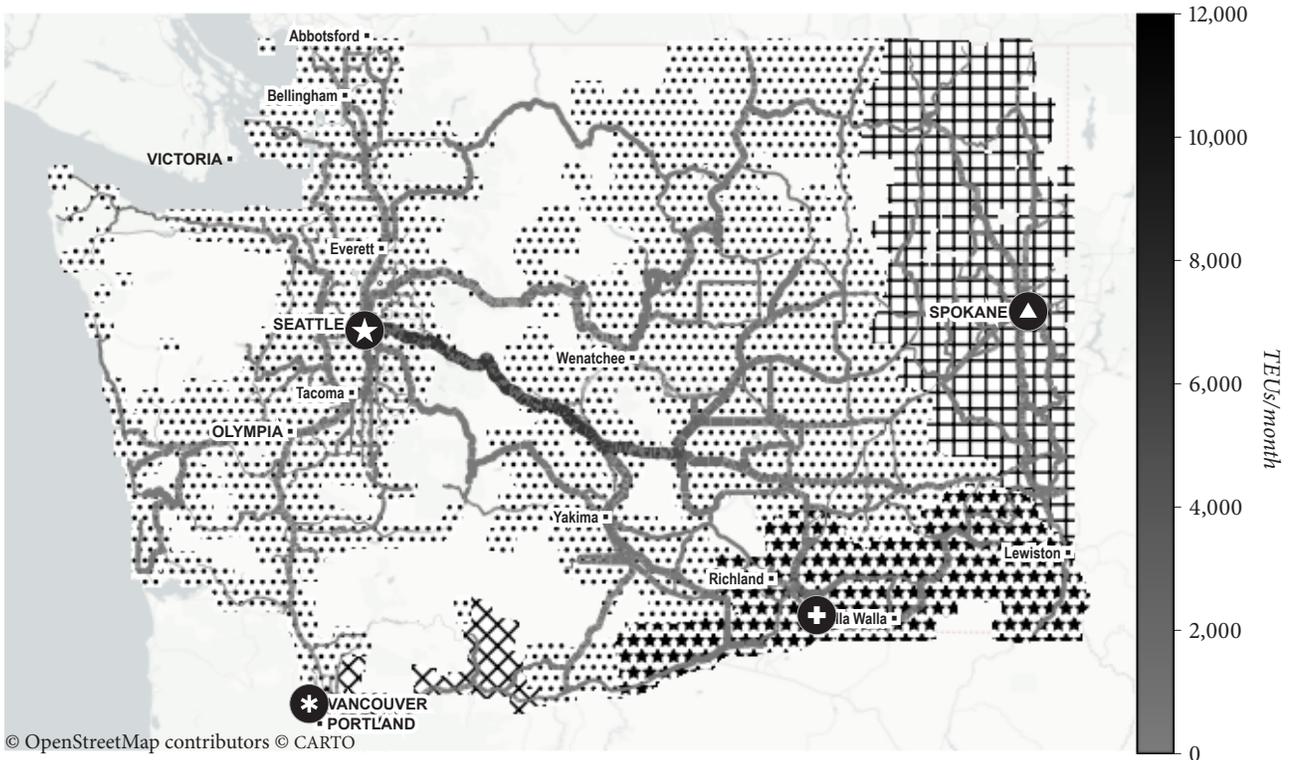


Figure 7: Terminal Choices and Traffic Flows—Wallula Operational Scenario



\$3/container. Inland terminals in Quincy and Wallula on the other hand, yield \$167,451/month (\$23/container) and \$313,181/month (\$44/container) in cost savings respectively.

Public costs are driven predominately by truck miles traveled, as truck traffic has higher emissions and pollution, causes congestion and accidents, and causes damage to public roadways; noise pollution caused by trains is higher cost and is thus increasing in rail miles traveled. An inland terminal in Ellensburg provides the largest public cost savings of \$467,226/month (\$5.6 million annually). Inland terminals in Quincy and Wallula provide public cost savings of \$185,178/month (\$2.2 million annually) and \$230,206/month (\$2.8 million annually) (Table 6).

Table 5: Total, Private and Public Costs (Monthly)

	Private costs	Public costs	Total costs
Not operational	\$10,135,992	\$1,359,932	\$11,495,924
Ellensburg	\$10,114,210	\$889,978	\$11,004,188
Quincy	\$9,968,541	\$1,172,261	\$11,140,802
Wallula	\$9,822,811	\$1,127,337	\$10,950,148

Table 6: Total, Private and Public Cost Savings (Monthly)

	Private cost savings	Public cost savings	Total cost savings
Not operational	-	-	-
Ellensburg	\$21,782	\$468,470	\$490,252
Quincy	\$167,451	\$186,187	\$353,638
Wallula	\$313,181	\$231,111	\$544,292

Private costs, public costs, and total costs for each scenario are reported in Table 5. The difference in private costs, public costs, and total costs relative to the baseline scenario are reported in Table 6. We focus our discussion on the cases where only one inland terminal is operational (Ellensburg, Quincy, or Wallula). An inland terminal at Ellensburg yields the largest public cost savings, while an inland terminal at Wallula yields the largest private and total cost savings.

Costs, and cost savings are borne unequally among stakeholders. For localized public costs (e.g., congestion, noise

pollution, accidents, roadway wear, air pollution), diverging truck traffic to an inland terminal benefits stakeholders who experience this reduction in truck traffic and thus the reduction in public costs. Placement of an inland terminal at Ellensburg, for example, accrues most public benefits to stakeholders on the I-90 corridor between Ellensburg and Seattle. The reduction of non-localized public costs (e.g., emissions) benefits stakeholders beyond the study region, and are priced to reflect these benefits accrued globally.

Discussion

Positioning an inland terminal at either Ellensburg or Wallula is only viable if the Class 1 railroad is willing to provide adequate rail service. The Class 1 railroads willingness to provide service is dependent on throughput volumes and the rates they can charge. Throughput volumes at Ellensburg far exceed those projected for an inland terminal at Wallula. To be competitive with truck traffic, however, the rail rates offered at Ellensburg must be much lower than the rates offered at Wallula.

Public entities have a stake in the construction and location of an inland terminal, as an inland terminal within the region can generate significant public cost savings. Public entities can contribute to the construction of an inland terminal via cost share with the railroad(s). Public entities can also play a role in diverting traffic to an inland terminal through subsidies for terminal utilization, or discouraging port-bound truck traffic through port delivery fees. Investment decisions in an inland terminal are costly and are best served if coordinated between the public and private sectors.

Ultimately the construction of an inland terminal is a capital intensive, high risk investment. This work provides estimates of throughput volumes, private cost savings, and public cost savings for three proposed inland terminals in Eastern Washington. Decision makers are tasked with evaluating the validity of these estimates, and in the case of the railroad(s) identifying if projected throughput volumes are lucrative enough to build and operate a terminal, and in the case of public entities identifying what role they are willing to play in the construction of an inland terminal for the benefit of public cost savings.

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Agricultural Viability and Competitiveness in Washington State

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THE Washington State University (WSU) IMPACT Center is conducting analysis on the viability and competitiveness of agriculture in Washington State, as funded by the Washington State Department of Agriculture (WSDA). While many pressures on agriculture are beyond the influence of state-level policy, substantial pressures facing Washington producers are unique to the state. Climate conditions, regulations, and labor markets specific to agriculture are examples of the many state-specific pressures that impact agricultural producer's ability to operate year-over-year. This report provides an update as to the status of the study that began in July 2023, including progress to date, current findings, and future plans. Completion of the study, and circulation of final deliverables, is scheduled for June 30, 2025.

Agriculture in Washington had a production value of \$14 billion in 2023 (USDA NASS, 2024). Agriculture in the state is diverse, not only in commodities grown but also the composition of farms. Washington ranked first nationally in the production of six commodities for 2023 (USDA NASS, 2024) including apples, sweet cherries, pears, hops, onions, and spearmint oil. In 2023 there were more than 32,000 farms in the state (USDA ERS, 2024). Agriculture is a key industry in Washington, contributing 13.5 percent in 2023 (USDC BEA, 2024) to the state's Gross Domestic Product (GDP). This industry serves as a conduit for job creation, promotes rural economic viability, and is vital to global food supply chains.

Agriculture in Washington State is valuable. Therefore, there is great interest in deepening the understanding of threats, pressures, opportunities, and weaknesses to the sector. This study seeks to inform policy makers and stakeholders on the state of the sector, both in terms of sector viability and sector competitiveness with other U.S. states. Additionally, the study serves as a concise representation for producers to provide information on the status of their operations. Through data collection, interaction, and extensive communication with producers of selected

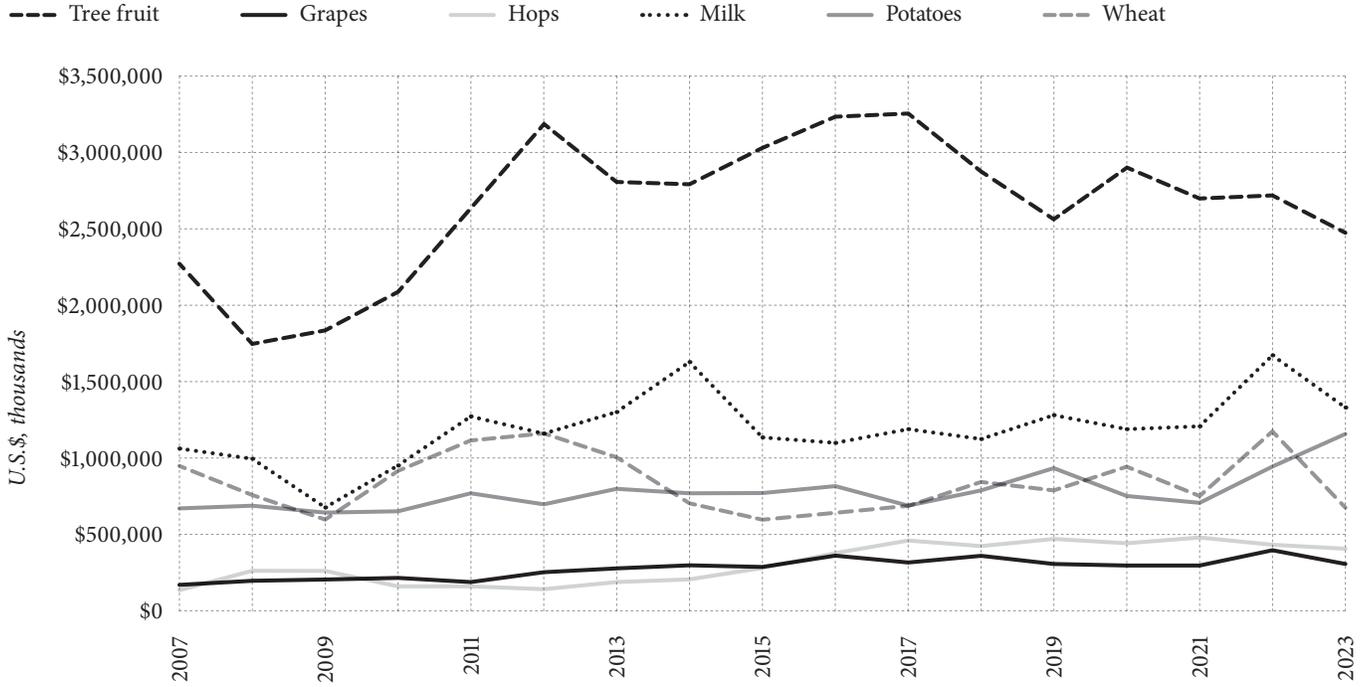
commodities in the state, the study will provide quantitative support and qualitative discussion on the viability of agricultural production and relative competitiveness with peer states. While the study is unable to be a panacea, it provides foundational work for future solutions that can be extended to all commodities grown within the state.

Value and Costs of Production

Figure 1 provides the value of agricultural production for the six commodities of focus in the study—tree fruit (apples, cherries, and pears), grapes, hops, milk, potatoes, and wheat. From 2007 to 2023, tree fruit is the most valuable agricultural commodity produced in the states of Washington, with an annual average value of production of \$2,659,449,629 over the time period shown. Milk, wheat, and potatoes are the next most valuable commodities included with annual average values of production of \$1,194,549,000, \$844,984,865, and \$780,669,787, respectively. Hops and grapes each have an annual average value of production of \$312,314,920 and \$279,695,441, respectively.

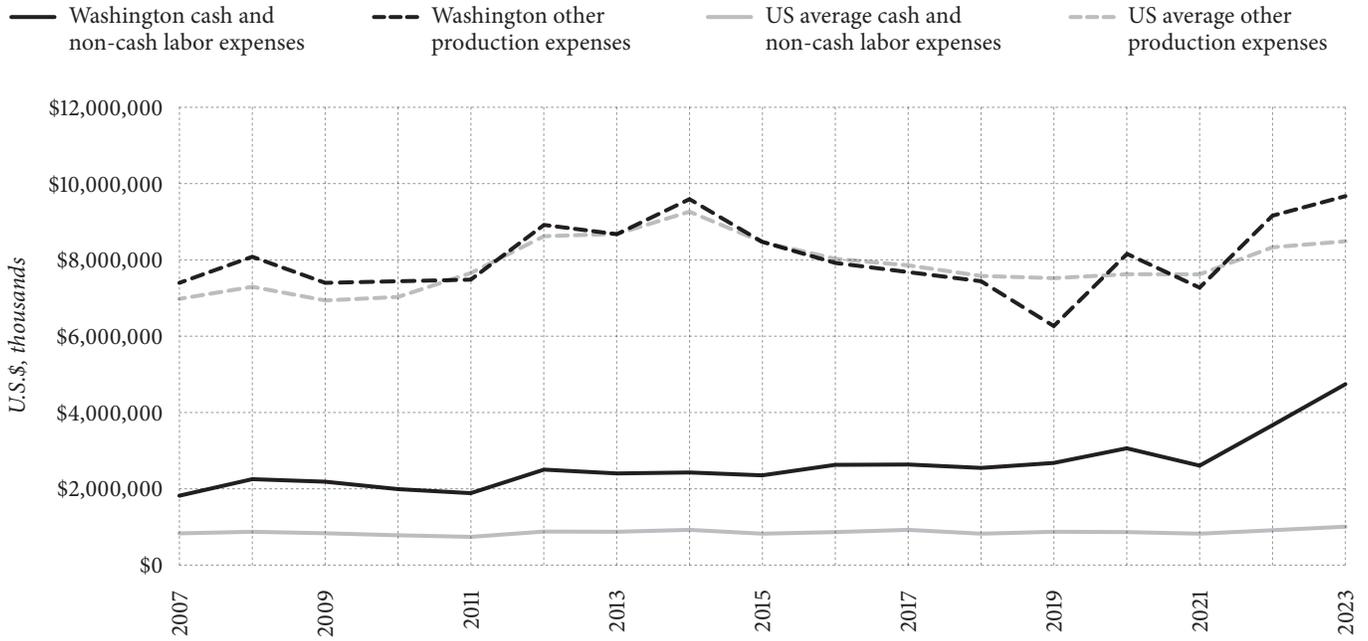
In addition to the value of Washington State agriculture, both the viability and competitiveness of the sector are influenced by the costs of production. Figure 2 provides the production expenses for all agriculture in Washington compared with the U.S. average from 2007–2023, separated into labor expenses and other production expenses. While the total production expense for agricultural production has risen substantially since 2007, labor expenses in particular have grown dramatically especially in the past three years. The U.S. average of other production expenses has slightly and smoothly increased since 2021, compared with Washington's sharp rise. Washington ranks eight for highest production expenses in the U.S., with hired labor being the largest component (USDA ERS, 2024). Compared with the relatively flat U.S. average, there is sharp increase in cash and non-cash labor expenses for Washington State since 2021.

Figure 1: Washington State Value of Production Selected Commodities, 2007–2023



Source: USDA NASS QuickStats

Figure 2: Agricultural Production Expenses, 2007–2023



Source: USDA ERS Income and Wealth Statistics

A more granular look at the financial health of the agricultural sector in Washington shows there is potential for short-term liquidity trouble in the largest operations for certain commodities, as well as general concerns with profitability, contrasted with the low-risk of future solvency issues. Table 1 provides selected financial metrics exhibiting the differences between the type of commodity and size of production operation. Data is anonymized, benchmark financial data provided by AgWest Farm Credit. Producer categories (small, midsize, large, and agribusiness) are separated by gross revenue of the reporting operation. Breaks are included in Table 1 and follow AgWest's specification. Each metric is for the year ending 12/30/2023 and is not exhaustive of all producers specializing in each commodity.

The current ratio is used as a measure of liquidity and an operation's ability to pay short-term obligations. Industry

standard suggests a current ratio of 2.0 is healthy. Nearly all operations in the sample exceed the 2.0 threshold, with the exception of agribusiness sized dairy producers (1.61), all pear producers (1.39), and agribusiness sized potato producers (1.77). It is notable that the largest size of producers in dairy and potatoes have lower average current ratios than the other size categories of producers sampled. The largest operations in dairy and potatoes may be experiencing short-term liquidity concerns.

Debt to asset ratio compares the total amount of liabilities to the total assets of an operation. A higher value indicates a greater proportion of debt funding used by the operation and a greater risk of future solvency. A ratio less than 0.3 is ideal in the agricultural sector, while greater than 0.6 may be concerning. All sampled producers for the included commodities and operation sizes have ratios within the

Table 1: Financial Metrics by Commodity, 2023

Commodity		Current ratio	Debt to asset ratio	Profit margin
Apples	Midsize producers	13.38 (44.43)	0.26 (0.18)	-0.11 (0.51)
	Large producers	12.66 (25.52)	0.30 (0.25)	0.10 (0.63)
	Agribusiness producers	2.69 (1.38)	0.45 (0.21)	-0.10 (0.30)
Cherries	All producers	2.71 (2.62)	0.20 (0.17)	-0.12 (0.28)
Dairy	Midsize producers	2.35 (1.88)	0.24 (0.11)	-0.05 (0.29)
	Large producers	2.90 (3.53)	0.25 (0.15)	0.03 (0.14)
	Agribusiness producers	1.61 (0.91)	0.39 (0.14)	-0.02 (0.09)
Grapes	All producers	4.39 (6.47)	0.34 (0.23)	-0.07 (0.49)
Hops	All producers	3.14 (2.03)	0.33 (0.17)	-0.43 (0.52)
Pears	All producers	1.39 (0.57)	0.39 (0.26)	-0.04 (0.15)
Potatoes	Large producers	3.67 (3.59)	0.29 (0.17)	0.14 (0.11)
	Agribusiness producers	1.77 (0.62)	0.45 (0.14)	0.25 (0.12)
Wheat	Small producers	9.38 (13.71)	0.34 (0.22)	0.15 (0.28)
	Midsize producers	2.63 (2.54)	0.31 (0.16)	0.15 (0.37)
Gross revenue breaks				
Small producers	Less than \$350,000			
Midsize producers	\$350,000 to \$5,000,000			
Large producers	\$5,000,000 to \$20,000,000			
Agribusiness producers	More than \$20,000,000			

Source: Anonymous, summary level financial benchmark data provided by AgWest Farm Credit

Note: Metrics included are the average (standard deviation). Commodities with production expenses listed as "All Producers" did not have enough respondents to separate total farm expenses by operation size. Operations are separated by primary commodity produced, but operations may be diversified in their commodity production. Value-added aspects of commodity production are included in total farm expenses.

ideal range. This is indicative of well-positioned operations to meet their long-term financial obligations. It is also suggestive of the resilience in each operation, suggesting their ability to operate long-term and potentially grow or expand.

The profit margin provides short-term profitability insights, indicating the amount of revenue that the operation returned as net profit after all expenses were accounted for. Tree fruit (Apples, cherries, and pears), dairy, grapes, and hops each had many sizes of operations that returned negative profit margins for the year. This highlights the short-term pressures experienced by each commodity, resulting in their operating at a net loss. It is worth noting that apple producers falling into the large producer category did not operate at a loss on average (0.10), unlike the other two sizes of operations. There is a similar result with large dairy producers (0.03) compared with the other sizes, on average. The highest profit margin was for agribusiness sized potato producers (0.25), while the most consistent profit margin was for wheat producers (0.15).

The financial metrics included in Table 1 highlight the variation in short-term and long-term health of each commodity, especially by size of operation. Larger operations do not necessarily maintain higher levels of profitability or liquidity than smaller operations. Growth is not always better, particularly if an operation has achieved economies of scale. Future work in this study will provide additional insight into where optimal operating may be, both for short- and long-term health of the operation.

Completion of the Study

The next phase of the study is to conduct surveys on the burden and cost of state-level regulatory compliance. Regulatory compliance is a crucial part of each agricultural operation and has not been recorded quantitatively to date. Surveys have been constructed for each commodity and consolidated to focus on regulatory impacts to protect respondent confidentiality. Topics in the surveys include general farm information, labor practices, chemical (pesticide, fertilizer, etc.) compliance, climate-related regulations, workplace safety, and food safety. Surveys

will be distributed in collaboration with each respective commodity commission in early 2025.

Once surveys have been completed, responses will be combined with USDA ARMS Microdata on the costs of production. Deliverables will include budgets, analogous to enterprise budgets, focused on the size of operation to determine the potential for economies of scale. Analysis of the value of agriculture, the costs of production, and the impact of regulatory burden will inform policy makers and commodity stakeholders of the challenges, threats, barriers, and opportunities with quantitative data. Consolidation of operations is a prominent concern among stat-level policy makers, and such information can provide clarity on the ways in which the current production environment does or does not incentivize consolidation of commodity operations.

The final deliverable for the study will include budgets by size of operation for each of the selected commodities, as well as materials for circulation summarizing key findings. Analysis of peer-states, both in value of production by commodity and regulatory environment, will be incorporated to the extent possible. Peer-state comparison will highlight the ways in which Washington State agriculture has threats or opportunities to its competitive edge. In conjunction with the WSDA, commentary on quantitative findings will be provided to producers and policymakers to inform future interactions. In this way, the study will serve as a mouthpiece for producers to show the specific threats, barriers, opportunities and challenges of agricultural production in the state of Washington.

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SECTION III. WASHINGTON DATA

Washington (\$1,000)	2019	2020	2021	2022	2023
Gross cash income	\$10,102,167	\$11,777,620	\$11,646,278	\$13,582,928	\$14,771,440
All commodity receipts	\$9,466,342	\$10,044,712	\$10,231,139	\$12,360,855	\$11,933,853
Crop receipts	\$6,828,263	\$7,240,137	\$7,242,190	\$8,238,447	\$7,639,169
Animals and products receipts	\$2,638,078	\$2,804,575	\$2,988,949	\$4,122,407	\$4,294,684
Cash farm-related income	\$411,084	\$774,453	\$916,141	\$853,001	\$2,622,288
Forest products sold	\$12,982	\$6,487	\$23,230	\$41,111	\$48,695
Machine hire and custom work	\$53,573	\$128,146	\$126,430	\$70,916	\$38,311
Other farm income	\$344,528	\$639,821	\$766,481	\$740,974	\$2,535,283
Total direct government payments	\$224,742	\$958,455	\$498,998	\$369,073	\$215,299
Cash expenses	\$6,878,507	\$8,866,740	\$8,181,511	\$11,468,993	\$13,469,007
Interest	\$385,836	\$366,882	\$369,850	\$504,286	\$595,326
Nonreal estate	\$147,287	\$130,965	\$120,575	\$203,470	\$266,667
Real estate	\$238,549	\$235,918	\$249,275	\$300,815	\$328,659
Labor expenses	\$2,201,000	\$2,530,412	\$2,240,467	\$3,415,578	\$4,615,674
Property taxes and fees	\$202,129	\$289,042	\$252,580	\$309,075	\$266,472
Farm origin	\$1,082,222	\$1,508,206	\$1,903,890	\$2,077,324	\$2,571,722
Feed purchased	\$630,000	\$860,000	\$1,120,000	\$1,070,000	\$1,230,000
Livestock and poultry	\$202,222	\$328,206	\$443,890	\$567,324	\$911,722
Seed	\$250,000	\$320,000	\$340,000	\$440,000	\$430,000
Manufactured inputs	\$1,042,113	\$1,568,172	\$1,477,920	\$2,299,609	\$1,886,719
Electricity	\$93,599	\$148,927	\$141,618	\$177,158	\$193,247
Fertilizer and lime	\$350,000	\$510,000	\$540,000	\$910,000	\$670,000
Fuel and oil	\$198,514	\$279,245	\$276,303	\$442,451	\$403,473
Pesticides	\$400,000	\$630,000	\$520,000	\$770,000	\$620,000
Other intermediate expenses	\$1,739,714	\$2,043,308	\$1,629,250	\$2,625,476	\$3,139,974
Net rent to landlords	\$225,494	\$560,718	\$307,553	\$237,645	\$393,120
Net cash income	\$3,223,660	\$2,910,880	\$3,464,767	\$2,113,935	\$1,302,433

Data reported in Real 2024 dollars

Source: USDA ERS Farm Income and Wealth Statistics

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