



Economic Impact of the Walla Walla Wine Industry

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EXECUTIVE SUMMARY

The Walla Walla region has become one of the Northwest's most important wine production regions. The Walla Walla Valley American Viticulture Area (AVA) spans the Washington-Oregon boundary and includes most of Walla Walla County WA, and northern Umatilla County, OR. The bulk of the winery activity is located in Walla Walla County, while Umatilla County is an important producer of grapes used for wine production. In Oregon, the Rocks District of Milton-Freewater was established in 2015, and is a sub-appellation of the Walla Walla Valley. The region also attracts many visitors, whose trips were motivated by the opportunity to buy and taste wines from the Walla Walla appellation.

It is estimated that 2,484 jobs, business sales of \$430 million, and labor income of \$114 million were related to the Walla Walla wine industry in 2018. It is also estimated that \$17.4 million in tax revenues were generated for local governments and the state of Washington as result of wine-related business. These estimates were based on surveys of wineries, wine tasting rooms, and visitors to the region whose trips were motivated by the wine industry.

Wineries in the region were estimated to have revenue of \$115.3 million, and independent tasting rooms to have revenues \$8.36 million. They were estimated to employ 519 people, with labor income of \$25.62 million. Over half of total revenue (56%) was generated by sales directly to consumers: either at the winery, through wine clubs, or online sales. Another 36% of total revenue came from wholesale distribution under the winery's label. The balance of sales (7.7%) came from tasting fees, sales of wine to other wineries, grape sales, and other sales (such as consulting).

Visitors were estimated to have spent \$145 million on their trips. Over three-quarters of those interviewed said that the primary reason for their trip was to visit wineries or tasting rooms. On average, these visitors reported stays of about three days. They visited an average of 6.9 wineries or tasting rooms, or two or three wineries or tasting rooms per day. Average per capita spending was \$812, of which \$333 was for wine purchases. It should be noted that the reported wine purchases may have excluded club purchases or other types of purchases that would be obtained at a date later than the current visit. Most winery visitors

have been coming to Walla Walla for wine-related reasons for years, as over 60% said that they had been coming since 2014. The typical wine visitor comes a couple of times a year to the Walla Walla region (an average of 1.7 times), and belongs to several (an average of 1.6) Walla Walla wine clubs. They spend an average of \$795 per year on Walla Walla wine clubs. The typical wine visitor is in the 51-60 age group, is upper income, equally split between male and female, and is a U.S. resident. Most of those surveyed do not live in the local area (only 4% were local residents). Some 37% were from Western Washington, 14% from Eastern Washington, 16% from Oregon outside Umatilla County, 27% from the U.S. outside Washington and Oregon, and 2% from foreign countries.

There is good correspondence between the survey of wineries and tasting rooms, and that of their visitors. The visitor survey implied purchases during trips of \$59.6 million, while the winery survey suggested sales of \$55.5 million. Wording of the two questionnaires was not identical, and there is clearly sampling error related to both surveys.

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INTRODUCTORY COMMENTS

This report documents the economic impact of the Walla Walla wine industry. It provides estimates of sales, employment, labor income, and selected taxes generated by this industry. The Walla Walla wine industry is defined to include wine making and related activities in Walla Walla and Umatilla counties, and wine tasting rooms in these two counties.

The report is organized as follows. First, we report findings from a survey of Walla Walla winery and tasting room visitors. This survey was implemented on-line with e-mail contacts gathered at wineries, tasting rooms, and other outlets in the Walla Walla region. Appendix II contains a copy of the questionnaire used for this study. Second, we report data from a survey of wineries in the region. Walla Walla Community College coordinated the gathering of these data; they were supplemented by data from Reference USA, and information provided by an advisory committee related to this project. Appendix III contains a copy of this questionnaire. The winery visitor and winery surveys were brought together as inputs to the economic impact analysis, which was conducted using the 2007 Washington State input-output model. This model was customized for this study, by regionalizing its structure to the local area through the use of the location quotient adjustment technique. Appendix I describes this procedure. Section IV of the report presents the results of the economic impact analysis, while section V presents some concluding remarks.

This project is a result of a long-standing partnership between Walla Walla Community College, the City of Walla Walla, the Port of Walla Walla, Visit Walla Walla, and the Walla Walla Valley Wine Alliance, who share a common interest in the intersection of workforce and economic development in the Walla Walla region. The research would not have been possible without their generous financial support. The authors wish to thank Dr. Nicholas Velluzzi, Acting Assistant Vice President for Enrollment Management at Walla Walla Community College, for his guidance and assistance.

There have been other reports on tourism in Walla Walla, and reports focused on the economic impact of the Walla Walla wine industry. However, we believe that this is the first economic impact study with direct survey data from wineries and wine tasting rooms, and their visitors. Three prior studies are noted here. Tourism Walla Walla released a visitor survey in November 2013 (Tourism Walla Walla 2013). This report documents similar results to those presented in Section II of this report. In 2015, Community Attributes released a study of economic and fiscal impacts of wine and wine grapes in Washington State (Community Attributes 2015). This report addressed wine tourism in the Walla Walla region, but it was not based on a survey of visitors to the region. In 2007 and 2011 Economic Modeling Specialists Inc. (EMSI) released a study of economic impacts of the Walla Walla wine cluster (EMSI 2007, 2011). The EMSI report had methodological differences from the Community Attributes report, and also differs methodologically from the current report.

WINE VISITOR SURVEY

When we began this project, we did not realize the importance of methods used by wineries to sell their product beyond wholesaling wine to local or nonlocal retailers, compared to selling wine at the winery directly to customers. Wine clubs and other direct sales arrangements have assumed importance in the Walla Walla wine industry to sell wine to customers. Our survey was designed to capture these various modes of distribution to customers, as well as other expenditures that they incurred in buying wine from Walla Walla wineries.

GMA Research sent an online request for cooperation with the wine visitor survey. Appendix II contains a copy of this survey form. We received 728 responses to this survey request. Table II-1 indicates that 71.2% (515 cases) provided key data on the number of people in groups visiting wineries and reasonable expenditure information. These 515 cases are referred to below as the valid sample. Some respondents provided no data on these variables (181 cases), or they reported data that were implausible (19 cases), or they had a trip purpose (93) that had expenditure data unrelated to a winery visit. Some respondents also cited more than one of these reasons that were related to considering their response to be not valid to the question about number of visitors and their expenditures.

Table II-1 Classification of responses into valid cases with data for number of visitors and their spending, and invalid cases lacking these data.

		% of Total Not Valid
Lack of Data	181	85.0%
Data Issue	19	8.9%
Trip Purpose	93	43.7%
Total Not Valid	213	100.0%
Valid Sample	515	
Total Sample	728	

Winery visitors were asked which winery they had visited on their last Walla Walla winery visit was the one that contacted them to answer the wine visitor survey. Appendix IV has a tabulation that indicates the wineries and tasting rooms that these respondents identified. It should be noted that many respondents identified other locations, or explanations of their contacts. Table II-2 is an enumeration of some of these other contact points. Many respondents did not name a specific winery or could not recall who contacted them.

Table II-2 Examples of winery visitor survey contact source text other than wineries or tasting rooms

- Airport
- Can't remember
- Don't know.
- Don't recall
- Facebook / Add on Facebook
- From the Walla Walla Valley Wine Alliance
- From Walla Walla Community College
- I don't remember
- Industry newsletter
- It was linked on Facebook
- Multiple
- No clue.
- None
- None - located on the WW Regional Airport Facebook site as post
- On line - Walla Walla Valley Wine Alliance
- Online
- Saw the survey through email
- Several
- Unknown
- Visitors association
- Marcus Whitman Hotel

Table II-3 reports the number of persons in groups for the total and valid sample. The average party had two persons in it, followed in terms of frequency by one-person groups. Several respondents indicated that there were 10+ persons in their group; these cases were excluded because they did not provide specific group size, and this is an unlikely household size.

Table II-3 How many members of your household participated in your most recent visit to Walla Walla?

	% of Total	% of Valid Sample
No Response or Invalid Number (e.g. 10+)	8.8%	
1	17.7%	19.4%
2	59.1%	64.8%
3	5.1%	5.6%
4	7.3%	8.0%
5	0.8%	0.9%
6	0.8%	0.9%
7	0.3%	0.3%
8	0.1%	0.2%
Total	100.0%	100.0%

Total sample N=664; Valid sample N=515

Table II-4 reports on trip purposes of those responding to this questionnaire. Some 92% of respondents answered this question, with 77% reporting that their trip was primarily wine-related. For those answering no, they were asked to explain what the primary reason for their trip was in open ended text. Many responses were recorded here, such as visiting a family member attending a local college, or being on business. In some cases this text also made reference to wine related activity as a part of the respondents trip. As reported in Table II-1, about 44% of the cases considered to be not-valid were classified that way given the text about their trip purpose.

II-4 Was the primary reason for your trip to Walla Walla to visit wineries, tasting rooms or otherwise engage in wine-related activities?

	% of Total	% of Yes/No
No Response	8.1%	
Yes	71.2%	77.4%
No	20.7%	22.6%
Total	100.0%	100.0%

N=728

Visitors were asked how long their wine-related trips were to the Walla Walla region. Table II-5 presents results of these questions. The average (mean) length of stay was 2.57 days for all responses, and 2.82 days for valid responses. The median and mode lengths of stay were 3 days for both valid and all responses. Less than 5% of visitors reported trips of less than one day, while about 9% reported visits of one day, and about 22% of valid responses had trips longer than three days.

Table II-5 How long was your stay in the Walla Walla region?

	All Responses	Valid Sample
Less Than One Day	4.1%	4.6%
One Day	8.0%	8.9%
Two Days	24.7%	27.5%
Three Days	33.5%	37.3%
Four or More Days	19.6%	21.8%
No Response	10.0%	X
Total	100.0%	100.0%

N=515 Valid; N=728

Respondents were asked to identify attributes they associated with the Walla Walla Valley. They were asked to reply with regard to 22 categories plus "other." Table II-6 reports the percentage of respondents citing these attributes. Respondents cited an average of 8.6 attributes, and a median of 9 attributes. There were 72 cases where people did not check any response to this question. Table II-7 provides data on the frequency of responses to this question. About 8% of respondents cited a few (1-3) attributes, while about a quarter of them (26%) cited 4-7 attributes. A large cohort of respondents cited a larger number of attributes than the mean or the mode, with 34% citing 10-14 attributes, 12% citing 15-19 attributes, and 1.8% citing 20 or more attributes. It should be noted that one attribute managed to be listed twice in this question: "undiscovered high-quality wines." There was a good correlation between the first and second citation: the first was cited by 43.4% of respondents, while the second was cited by 41.2% of respondents.

Table II-6 Attributes you associate with the Walla Walla Valley (Non-zero cases only)

	Number of Responses	% of Total
Upscale and classy	100	15.2%
Natural beauty	363	55.3%
Friendly, family run wineries	411	62.7%
Fun small towns	308	47.0%
Fine restaurants and food	377	57.5%
Interesting non-wine activities	86	13.1%
Undiscovered high quality wines	285	43.4%
Hard to get to	71	10.8%
Often meet the owners or winemaker	369	56.3%
Good hotels and places to stay	221	33.7%
Affordable, not expensive	246	37.5%
Offers a great variety of wines worth trying	406	61.9%
Consistent and reliable quality wines	397	60.5%
Hard to find wines	114	17.4%
Good value wines	275	41.9%
Bordeaux varieties and blends	216	32.9%
Interesting discovery wines and wineries	345	52.6%
Informal and unpretentious	373	56.9%
Great for Rhone varieties	144	22.0%
Charming town	496	75.6%
Don't have to venture very far for wineries	347	52.9%
Undiscovered high quality wines (2)	270	41.2%
Other	39	5.9%
Non-zero	656	
Total Citations	6259	

N=728

Table II-7 Frequency of responses on attributes associated with the Walla Walla Valley

Number of Attributes	Number of Responses	% of Non-zero Responses
1-3	53	8.1%
4-7	172	26.2%
8-9	115	17.5%
10-14	223	34.0%
15-19	81	12.3%
20+	12	1.8%
	656	100.0%

A key question for the economic impact analysis was related to expenditures made by respondents attributed to their stay in Walla Walla Valley for wine-related purposes. Table II-8 reports results of this question. These are data reported for the valid sample. It is no surprise to find large expenditures for wine, wine tasting, and wine events. Visitor expenditures for wine purchases, wine tasting, and wine events will not be included in the economic impact analysis, because they would duplicate revenue of wineries included in this analysis. Non-wine expenditures were \$448 per person, primarily for lodging, food & beverages, and travel.

Table II-8 Average per-capita spending

Wine purchases	\$333.51
Wine tasting	\$18.25
Shopping	\$34.01
Wine events	\$12.92
Winery Tours	\$6.25
Auto travel	\$63.20
Food & beverages	\$120.23
Entertainment	\$9.01
Lodging	\$159.56
Air travel	\$50.60
Other Costs	\$4.91
Total Spending	\$812.44

N=515

Walla Walla wine visitors were asked how many wineries they visited on their most recent visit to Walla Walla. Table II-9 reports results from this question. Considering the valid sample, visitors went to an average of about seven wineries. As reported in Table II-4, the average visitor said that they spent three days on their trip to the Walla Walla Valley. This means that they visited on average two or three wineries per day.

Table II-9 How many wineries did you visit on your last wine-related visit to Walla Walla?

	All Cases	Valid Sample
None	22.8%	1.7%
1	4.5%	4.5%
2	5.1%	6.0%
3	8.4%	10.3%
4	7.6%	10.1%
5	8.7%	11.8%
6	9.9%	12.6%
7	4.3%	5.8%
8	9.2%	11.7%
9	2.5%	3.1%
10	6.1%	8.0%
11 to 20	10.3%	13.4%
More than 20	0.7%	1.0%
Total	100.00%	100.0%
	<i>N</i> =727	<i>N</i> =515
Mean	5.31	6.9
Median	5	6
Mode	0	11-20

Another perspective on the number of wineries visited is presented in Table II-10, which presents a cross-tabulation of the number of wineries visited versus the length of stay. There is a highly significant statistical association between the length of stay and the number of wineries visited, with longer trips being clearly related to a larger number of winery visits, as measured by the chi-square statistic. This is a standard way of measuring the significance of differences in responses to variables in a cross-tabulations, such as presented in Table II-10. In Table II-10, respondents on short trips reported visiting a few wineries, while those on longer trips reported an average of many more wineries.

Table II-10 Cross-tabulation of wineries visited and length of stay

Number of Wineries Visited	Less Than One Day	One Day	Two Days	Three Days	Four or More Days
1	37.5%	6.8%	3.5%	2.0%	4.8%
2	31.3%	15.9%	4.9%	3.0%	5.7%
3	18.8%	27.3%	9.9%	9.1%	5.7%
4	6.3%	22.7%	18.3%	4.5%	5.7%
5	6.3%	13.6%	12.7%	14.1%	7.6%
6	0.0%	6.8%	15.5%	15.7%	7.6%
7	0.0%	4.5%	6.3%	8.6%	1.9%
8	0.0%	0.0%	9.9%	17.7%	10.5%
9	0.0%	2.3%	2.1%	4.0%	3.8%
10	0.0%	0.0%	11.3%	8.1%	8.6%
11-19	0.0%	0.0%	4.9%	13.1%	34.3%
20+	0.0%	0.0%	0.7%	0.0%	3.8%
Total	100.0%	100.0%	100.0%	100.0%	100.0%

Chi-Square = .000 Valid sample only

Walla Walla visitors were also asked when they first visited the Walla Walla region for wine-related activities. Table II-11 presents responses to this question for all responses and for the valid responses. The data in Table II-11 clearly indicate that many Walla Walla wine visitors have been coming to the region for years, as more than 60% of valid responses indicate visits before 2014.

Table II-11 When was your first visit to Walla Walla for wine-related activities.

	All Responses	Valid Sample
No Response	10.9%	2.3%
2009 or before	22.8%	38.1%
2010	29.4%	3.5%
2011	2.9%	3.7%
2012	2.6%	5.8%
2013	4.7%	1.6%
2014	1.4%	6.4%
2015	5.2%	6.2%
2016	4.7%	8.3%
2017	6.5%	10.7%
2018	8.9%	13.4%
Total	100.0%	100.0%
	N=727	N=515
Median	2009	2012
Mode	2009	2009

Walla Walla visitors were asked how many times they have come to Walla Walla for wine related activities since their first visit. Table II-12 presents results for this question. Those who were considered valid responses indicated an average of five visits. Table II-13 presents a cross tabulation of the year of first visit to the Walla Walla Valley for wine related activity and the number of subsequent visits. There is a highly statistically-significant response to this question, with evidence of very strong repeat visits over the years. Over half of those saying they first visited in 2009 or before have come at least ten times to Walla Walla for wine related trips. As expected, the total number of visits falls off with reports of more recent first visits.

Table II-12 Since your first visit, how many times have you come to Walla Walla for wine-related activities?

	All Responses	Valid Sample
No Response	22.8%	2.3%
1	22.4%	27.0%
2	5.6%	7.8%
3	7.4%	9.7%
4	6.2%	7.2%
5	5.8%	7.6%
6	3.4%	4.1%
7	1.8%	2.3%
8	3.3%	3.9%
9	1.0%	1.4%
10	1.0%	1.2%
More than 10 times	19.3%	25.6%
Total	100.0%	100.0%
	N=727	N=515
Mean	3.99	5.16
Median	2	4
Mode	0	1

Table II-13 Cross tabulation of first visit and number of subsequent visits

Number of Visits	2009 or Before	2010-2013	2014-2016	2017-2018
1	2.6%	4.6%	27.8%	79.7%
2	2.6%	7.7%	15.7%	8.1%
3	4.6%	9.2%	24.1%	6.5%
4	8.7%	7.7%	11.1%	0.8%
5	8.7%	13.8%	9.3%	0.8%
6	5.6%	7.7%	2.8%	0.8%
7	3.6%	7.7%	0.0%	0.0%
8	6.2%	4.6%	3.7%	0.8%
9	1.0%	4.6%	1.9%	0.0%
10	2.1%	3.1%	0.0%	0.0%
More than 10	54.4%	29.2%	3.7%	2.4%
Total	100.0%	100.0%	100.0%	100.0%

Chi-Square .0000, based on valid sample.

Walla Walla Valley visitors were also asked how many times each year they visit Walla Walla for wine related activities. Table II-14 presents results for this question. The average visitor comes once or twice a year, but it is clear that there is a “tail” to this distribution with a small share of visitors coming many times a year to Walla Walla for wine related activities.

Table II-14 How many times each year do you visit Walla Walla for wine-related activities?

	All Responses	Valid Sample
No Response	25.7%	6.2%
1	47.6%	59.4%
2	14.7%	19.0%
3	5.5%	6.8%
4	2.8%	3.7%
5	0.8%	1.0%
6	0.3%	0.4%
8	0.3%	0.4%
10	0.1%	0.2%
More than 10 times	2.2%	2.9%
Total	100.0%	100.0%
	N=727	N=515
Mean	1.38	1.77
Median	1	1
Mode	1	1

Wine clubs have become a popular way of distributing wine in recent years. Walla Walla visitors were asked three questions related to their wine club activity. Table II-15 reports on the number of wine clubs survey respondents said that they belonged to. Non-respondents have been removed from both columns of data in Table II-15. For those answering this question, the number of clubs averages three. The responses also indicate that there is a cohort of respondents who belong to many wine clubs. About 80% of the valid sample of Walla Walla winery or tasting room visitors belong to at least one wine club.

Table II-15 How many wine clubs do you belong to, including Walla Walla wineries and others?

	All Responses	Valid Sample
No Response (or None)	22.1%	20.3%
1	16.0%	15.9%
2	13.3%	13.9%
3	11.5%	11.4%
4	11.5%	12.0%
5	6.6%	6.4%
6	6.8%	7.4%
7	3.1%	3.2%
8	2.7%	2.8%
9	1.6%	1.6%
10	1.3%	1.2%
More than 10	3.6%	3.8%
Total	100.0%	100.0%
Mean	3.07	3.16
Median	2	2.5
Mode	0	0

Respondents were asked how many Walla Walla wine clubs they belonged to, and Table II-16 reports responses to this question. The response suggests an average that is about half of that reported in Table II-15. It makes sense that more people belong to no Walla Walla wine clubs (Table II-16) than to any wine clubs, given that the geography encompassed in the data reported in Table II-15 is more expansive than that reported in Table II-16. Non-respondents to this question have been excluded from both columns in Table II-16. The data in Table II-16 report that about two-thirds of the valid sample of Walla Walla winery and tasting room visitors belong to at least one Walla Walla wine club.

Table II-16 How many Walla Walla wine clubs do you belong to?

	All Responses	Valid Sample
No response or zero	35.2%	33.7%
1	25.3%	26.1%
2	14.9%	15.5%
3	11.1%	10.8%
4	6.3%	6.4%
5	3.2%	3.4%
6	1.1%	1.0%
7	1.4%	1.6%
8	0.9%	0.8%
9	0.2%	0.2%
10	0.2%	0.2%
More than 10	0.2%	0.2%
Total	100.0%	100.0%
Mean	1.50	1.62
Median	1	1
Mode	0	0

Walla Walla wine visitors were also asked how much they spent on wine purchased through Walla Walla wine clubs in the past year. Table II-17 presents results from this question. Average expenditures were nearly \$800, while the median expenditure was half that (\$400). Over one third of respondents said they spent nothing on wine through Walla Walla wine clubs, a percentage almost the same as the percentage of respondents who said that they did not belong to any Walla Walla wine clubs.

Table II-17 Approximately how much did you spend on wine purchased through Walla Walla wine clubs in the past year? (Please specify in whole dollars without \$sign).

	Valid Sample
No response or zero	36.5%
\$30-\$375	12.6%
\$400-\$800	21.0%
\$801-\$1,500	15.5%
\$1,501-\$3,000	10.3%
Over \$3,000	4.1%
Total	100.0%
Mean	\$794.74
Median	\$400

N=515

Walla Walla Valley winery visitors were also asked about the frequency of their consumption of wine in various price segments. Table II-18 presents results from this question. Regarding wines that cost less than \$15 per bottle, about half of the respondents said they consumed this class of wine weekly. With regard to wines costing \$15 to \$30, almost 60% of respondents said they consumed these wines weekly. As might be expected, wines in higher priced cohorts were consumed less frequently. About 40% of respondents said they consumed wines priced \$30-\$50 weekly, while about 15% of respondents said they consumed wines costing more than \$50 dollars weekly.

Table II-18 How often do you consume wine in each of the price segments listed below

	Under \$15	\$15 to \$30	\$30 to \$50	Over \$50
Several Times per week	29.9%	27.8%	19.6%	4.1%
About once a week	20.2%	29.1%	21.3%	10.5%
1 to 3 times per month	13.8%	23.0%	25.0%	18.3%
Several times per year.	11.4%	14.8%	22.1%	35.9%
Rarely / Never	24.6%	5.3%	12.0%	31.2%
Total	100.0%	100.0%	100.0%	100.0%
N	491	526	535	295

Based on all responses

Walla Walla wine visitors were asked a set of demographic questions, whose responses are reported below. Table II-19 provides the distribution of responses regarding the age of the person answering the questionnaire. Almost 60% of respondents were aged between 51 and 70 years, with both the median and the mean in the 51-60 age category. Table II-20 reports an almost equal division between male and female respondents. Table II-21 documents that an overwhelming share of Walla Walla winery visitors are U.S. residents.

Table II-19 What is your age?

	Number of Responses	% Valid Sample
Under 21	1	0.2%
21-30	27	5.0%
31-40	85	15.8%
41-50	87	16.2%
51-60	153	28.4%
61-70	156	29.0%
71-80	28	5.2%
Over 80	1	0.2%
No Or Invalid Response	190	
Total		100.0%
Mean and Median are both in the 51-60 age group		

Table II-20 What is your gender?

Male	48.0%
Female	52.0%
Total	100.0%
N=554	

Table II-21 Are you a resident of the United States

U.S Resident	97.1%
Foreign Resident	2.9%
Total	100.0%
N=549	

Table II-22 reports a classification of the geographic origin of respondents to the Walla Wine visitor questionnaire. It should be noted that many people did not answer this question (about 25%). We cannot state whether there is a difference in the geography of the origin of the non-respondents and those answering this question. Given the data in Table II-22, it is clear that the Walla Walla region attracts a substantial cohort (about 30%) of winery visitors from outside Washington and Oregon. Half of the visitors are from Washington State outside the local area, while about 16% come from Oregon outside Umatilla County (considered to be part of the local area).

Table II-22 Geographic origin of survey respondents

Local	4.0%
Other Eastern Washington	13.5%
Western Washington	36.9%
Other Oregon	15.9%
Other US	27.4%
Foreign	2.2%
Total	100.0%

N=547

The final question Walla Walla wine visitors were asked was with regard to their income, as reported in Table II-23 About 25% of those surveyed did not answer this question, while of those providing an answer 17% said they preferred not to answer this question. However, the data reported in Table II-23 reveal a profile of upper income people visiting Walla Walla wineries.

Table II-23 Combined annual income, before taxes

Under \$50,000	6.6%
\$50,000 to \$74,999	7.7%
\$75,000 to \$99,999	8.9%
\$100,000 to \$124,999	15.5%
\$125,000 to \$249,999	26.6%
\$250,000 to \$499,999	14.2%
\$500,000 or more	3.3%
Prefer not to answer	17.3%
Total	100.0%
N=549	

WINERY SURVEY

A survey of wineries was coordinated by Walla Walla Community College. The questionnaire used for this survey is contained in Appendix III. Ninety-four wineries and seven tasting rooms were included in this survey. Seventy-eight of the ninety four wineries (84%) responded to our survey. Data from Reference USA, an online database of business statistics, was used to supplement the data supplied by the survey.

Table III-1 reports on the activities of the wineries responding to our survey. Their overwhelming activity was making wine from grapes that they purchased, but a large and overlapping share of these wineries made wine from grapes that they grew and sold under their label. While we did not survey vineyards in the Walla Walla appellation, it is clear that markets for grapes are important to wineries, as 23% of wineries reported sales of grapes to other wineries. We did not ask wineries about their purchases of wine from other wineries; future surveys might include this as a question, as several wineries noted this as an “other production activity.” However, almost 27% of the wineries included in this study sold wine to other wineries. Finally, other production activities are an important activity to a large cohort of wineries, as almost 27% reported these types of activities. Below Table III-1 is a listing of the text supplied by wineries citing other production activities. The complexity and specialization of wineries is evident in these responses.

Table III-1 Activities of Walla Walla region wineries

	Number	Percentage
Made wine from grapes that you grew, and sold it under your label	45	57.7%
Made wine from grapes that you purchased, and sold under your label	63	80.8%
Sold grapes to other wineries	18	23.1%
Sold wine to other wineries	21	26.9%
Other production activities, e.g. custom crush, consulting services, etc. (Please describe below)	21	26.9%
Total Citations	168	
N=78		

Other production activities:

- Consulting winemaker
- Custom crush some consulting
- Bottled wine which was purchased in bulk.
- Custom crush clients
- Custom crush for clients?
- Wine making consulting services
- Bought finished wine and sold it.
- Custom crush, custom bottling and full wine barrel storage
- We also make cider from estate apples grown in Walla Walla. In addition to production, we also rent out our facility for private events.

(Note 11 of the 21 wineries citing other production activity provided text about this activity).

Table III-2 reports estimates sales of \$115.3 million by wineries included in this study. Over half of this revenue (56%) was associated with direct sales to consumers. Wholesale sales accounted for 36% of revenues, with other sources of revenue amounting to 8%.

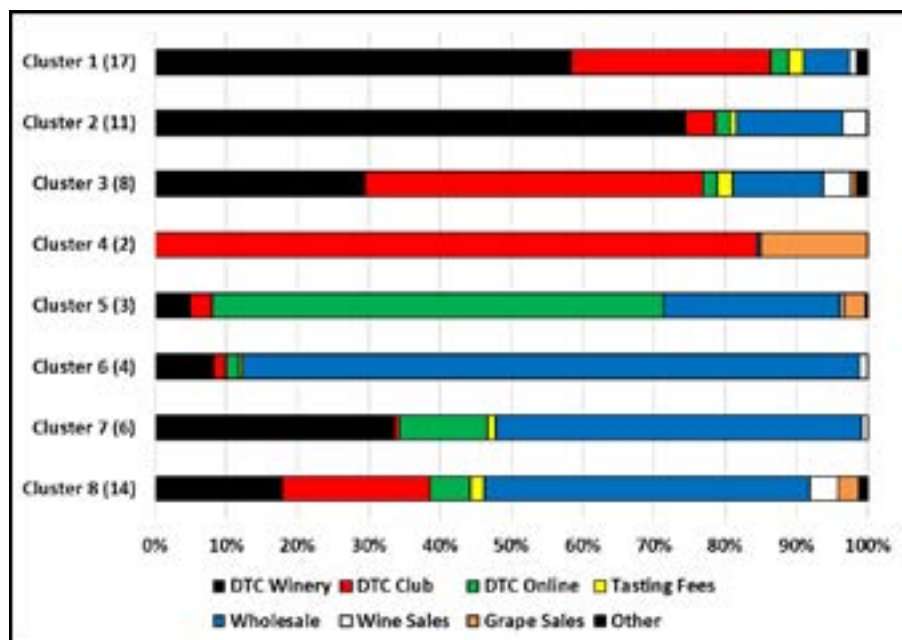
Table III-2 Winery sales

	\$ Millions	%
Direct to consumer sales at winery	\$24.156	20.9%
Direct to consumer wine club sales	26.989	23.4%
Direct to consumer online sales	13.425	11.6%
Tasting Fees at Winery	1.134	1.0%
Wholesale sales under your label	41.942	36.4%
Sales of wine to other wineries (bulk, shiners, etc.)	2.783	2.4%
Grape Sales	1.909	1.7%
Other Sources of Revenue	2.971	2.6%
Total Sales	\$115.309	100.0%

N=68

An analysis was conducted of the mix of revenue sources by wineries through the use of a statistical technique called cluster analysis. In this case hierarchical cluster analysis using the Ward’s method of grouping was used with data from individual wineries. Figure III-1 documents results of this modelling. This bar chart documents widely different market structures from the average reported in Table III-2. The number of wineries in each cluster is in parentheses after the cluster number. Clusters one through four have sales distributions dominated by direct sales to consumers at wineries and through their wine clubs. Cluster one has larger wine club sales than reported in cluster two. Clusters three and four have the largest segment of sales through wine clubs. Wholesale sales for these four clusters are lower than the overall value reported in Table III-2. Cluster five documents sales made predominately online, followed by wholesale sales. In contrast, cluster six is composed of wineries whose sales are largely made through wholesale trade channels. Cluster seven is composed of wineries with primarily wholesale and direct to consumer sales at wineries. Finally, cluster eight documents a broader balance of sales directly to consumers at wineries and through wine clubs, and via wholesale channels. In all clusters sales revenues from tasting fees, sales of wine and grapes, and other sources are modest. We are not aware of data of this type that have been previously reported.

Figure III-1 Share of Revenue of Wineries by Cluster



Wineries were asked to report their average employment, and payments of wages and salaries. Table III-3 reports results from this question. In cases of non-response, data from Reference USA or judgement were used to make estimates. Table III-4 reports similar data for tasting rooms included in this study. Tasting rooms were classified as retailers, with the average margin for food retailers applied to estimated employment and wages and salaries. This is consistent with Reference USA treatment of these establishments. Their alternative classification would be as part of food and beverage services. Future studies might seek more data from tasting rooms to determine their appropriate classification and cost structure.

Table III-3 Winery revenue and expenses (\$ millions)

Revenue	\$115.309
Employment	495
Wages & Salaries	\$20.220

N=94

Table III-4 Tasting room revenue and expenses (\$ millions)

Revenue	\$8.360
Margin	\$2.558
Employment	24
Wages & Salaries	\$0.598

N=7

A crucial part of the survey of wineries and tasting rooms was their estimate of the number of visitors that they had over the past year. The survey of winery visitors documented the frequency of their visits to wineries, as reported in section II of this report. To complete the economic impact analysis it was necessary to relate these estimates to data from wineries and tasting rooms about the number of visitors that they had in the study year (2018). These establishments were asked if they had a tasting room or received visitors. Most establishments responding to our survey reported these data, but we had to extrapolate in cases of non-responses. There are no published data on this question, so we were entirely reliant on this survey to estimate the total number of visitors on an annual basis to Walla Walla wineries and tasting rooms. We based our extrapolation on the estimated employment for those not responding to this question, either from their reported employment, or that

estimated from Reference USA. The extrapolation percentage was approximately 29%. Table III-5 contains estimates of estimated annual visit headcounts at wineries and tasting rooms.

Table III-5 Estimated annual visits to wineries and tasting rooms

Winery Visits	439,074
Tasting Room Visits	64,800
Total	503, 874

It should be noted that there are many business models for visits to wineries and their tasting rooms. Some are open every day to anyone who wants to stop in to the winery. Others are only open on a reservation basis. Some are open seasonally, typically closing in the winter months. Others are only open for a few days each year as they deliver orders to their club members or to those with whom they have a contract. Future research on the Walla Walla wine industry could include more complex questions about these visitation models.

The data reported in this section were used with data from the 2012 U.S. benchmark input-output model in section IV to estimate the economic impact of Walla Walla region wineries and tasting rooms.

ECONOMIC IMPACT ANALYSIS

Data from the survey of winery visitors, wineries, and tasting rooms were brought together into the input-output model to provide estimates of the economic impact of the Walla Walla wine industry. Technical details about the input-output modelling process are reported in Appendix I.

Total spending by winery visitors is reported in Table IV-1. This table is based on data in Table II-8, and an estimate of the average number of daily visitors derived from the winery and tasting room survey. Based on the surveys of wineries and tasting rooms of their estimated number of annual visitors (503,874), the average number of wineries and tasting rooms visited (6.9—see Table II-9), we estimate about 200 persons per day as the annual average number of winery visitors (503,874 divided by 6.9 wineries visited per capita divided by 365 days). This would be about 100 groups per day, given the average group size of two persons. Clearly, this number varies by time of year.

Table IV-1 Winery visitor spending (\$ millions)

Total spending	\$145.166
Wine purchases	59.592
Wine tasting	3.260
Shopping	6.076
Wine events	2.308
Winery Tours	1.118
Auto travel	11.293
Food & beverages	21.483
Entertainment	1.610
Lodging	28.510
Air travel	9.040
Other Costs	0.877

In calculating economic impacts, the spending reported in Table IV-1 was utilized as follows. Wine purchases and wine tasting fees were considered to be part of the revenue of wineries and wine tasting rooms. They were excluded from the modelling as visitor expenditures to avoid double-counting. Shopping and other costs were assumed to be retail purchases (with the latter

based on visitor comments). In these cases, retail margins were used as the basis for economic impacts, based on the U.S. Census Bureau Annual Survey of Retailers. Wine events, food & beverages, and entertainment were assumed to be provided by the food and beverages sectors (#50 in the WA i/o model). Winery tours were assumed to be provided by the other transportation services sector (#35 in the WA i/o model). Auto travel expenditures were allocated to producers prices using personal consumption expenditures bridge tables from the U.S. Bureau of Economic Analysis.

The input-output model has data entered on direct sales, employment, labor income, and other value added for wineries and tasting rooms. It also has estimated direct purchases in the local economy by wineries and tasting rooms entered, in combination with selected expenditures of visitors. We utilized data from the 2012 benchmark U.S. input-output model as the basis for winery direct purchases. While the Washington input-output model has a food products sector, it was felt that using a direct requirements distribution specific to wine making would be more appropriate. The national model direct requirements data were regionalized to Walla Walla and Umatilla counties through the use of location quotients for both the Washington economy relative to the U.S. economy, and also for the local economy relative to the Washington economy. A similar approach was taken for tasting rooms, which were considered to be included in retail trade. It should be noted that Reference USA classified tasting rooms to be a component of retail trade, rather than as included in food and beverage establishments. Table IV-2 contains these data.

It is recognized that this methodology is an approximation, as it does not treat Umatilla County with entirely robust data for purposes of the economic impact modelling. The ideal framework would have been separate transactions matrices for both Walla Walla and Umatilla counties that could have been combined to create a two-county matrix that could be used to calculate direct requirements and inverse matrices, as discussed in Appendix I. However, data were not available to make these computations. It is felt that the approach used in this report results in reasonable estimates of the two-county economic impacts.

Columns (1) and (2) in Table IV-2 define the sectors in the input-output model. Columns 3 and

5 contain the direct requirements coefficients for wineries and tasting rooms. For example it was estimated that wineries spent on average \$0.20563 per dollar of output on purchases from crop producers, which in this case would be largely the purchase of grapes. Columns 4 and 6 report estimated direct purchases in \$millions. Column 7 reports the sum of columns 4 and 6, as well as the allocated direct purchases of winery visitors reported in Table IV-1. It should be noted that values reported as zero in Table IV-2 may be non-zero values, due to rounding of the number of digits reported in this table.

Table IV-2 Direct Purchases

(1) Sector	(2) NAICS	(3) Winery Direct Require- ments	(4) Winery Direct Purchases (\$2018 Millions)	(5) Tasting Room Direct Require- ments	(6) Tasting Room Direct Purchases (\$2018 Millions)	(7) Total Direct Purchases (\$2018)
			\$115.309		\$2.558	
1. Crop Production	111	0.20563	23.711	0.00038	0.001	23.712
2. Animal Production	112	0.00000	0.000	0.00001	0.000	0.000
3. Forestry and Logging	113 (Incl. state forests, etc.)	0.00000	0.000	0.00000	0.000	0.000
4. Fishing, Hunting, and Trapping	114	0.00000	0.000	0.00021	0.001	0.001
5. Mining	21	0.00010	0.011	0.00000	0.000	0.011
6. Electric Utilities	2211 (Incl. public, BPA, etc.)	0.00473	0.546	0.00345	0.009	0.555
7. Gas Utilities	2212 (Incl. public)	0.00035	0.040	0.00068	0.002	0.042
8. Other Utilities	2213 (Incl. public)	0.00063	0.073	0.00016	0.000	0.073
9. Highway, Street, and Bridge Construction	2373	0.00000	0.000	0.00000	0.000	0.000
10. Other Construction	23 except 2373	0.00083	0.096	0.01502	0.038	0.134
11. Food, Beverage and Tobacco Manufacturing	311, 312	0.08584	9.898	0.00390	0.010	9.908
12. Textiles and Apparel Mills	313, 314, 315	0.00000	0.000	0.00006	0.000	0.000
13. Wood Product Manufacturing	321	0.00000	0.000	0.00033	0.001	0.001

14. Paper Manufacturing	322	0.00250	0.288	0.00037	0.001	0.289
15. Printing and Related Activities	323	0.00000	0.000	0.00086	0.002	0.002
16. Petroleum and Coal Products Manufacturing	324	0.00000	0.000	0.00000	0.000	0.000
17. Chemical Manufacturing	325	0.00053	0.061	0.00001	0.000	0.061
18. Nonmetallic Mineral Products Manufacturing	327	0.00000	0.000	0.00030	0.001	0.001
19. Primary Metal Manufacturing	331	0.00000	0.000	0.00000	0.000	0.000
20. Fabricated Metals Manufacturing	332	0.00942	1.087	0.00009	0.000	1.087
21. Machinery Manufacturing	333	0.00000	0.000	0.00017	0.000	0.000
22. Computer and Electronic Product Manufacturing	334	0.00000	0.000	0.00000	0.000	0.000
23. Electrical Equipment Manufacturing	335	0.00000	0.000	0.00000	0.000	0.000
24. Aircraft and Parts Manufacturing	3364	0.00000	0.000	0.00000	0.000	0.000
25. Ship and Boat Building	3366 (Incl. federal/PSNS)	0.00000	0.000	0.00000	0.000	0.000
26. Other Transportation Equipment Manufacturing	3361, 3362, 3363, 3365, 3369	0.00435	0.502	0.00062	0.002	0.504
27. Furniture Product Manufacturing	337	0.00000	0.000	0.00001	0.000	0.000
28. Other Manufacturing	316, 326, 339	0.00020	0.023	0.00011	0.000	0.023
29. Wholesale	423	0.00595	0.686	0.00616	0.016	0.702
30. Non-Store Retail	454	0.00000	0.000	0.00005	0.000	0.000
31 Other Retail	44-45 excluding 454	0.00000	0.000	0.00226	0.006	4.936
32. Air Transportation	481	0.00011	0.013	0.00003	0.000	4.533

33. Water Transportation	483 (Incl. Ferry)	0.00000	0.000	0.00000	0.000	0.000
34. Truck Transportation	484	0.00000	0.000	0.00343	0.009	0.009
35. Other Transportation/ Postal Offices	482, 485, 486, 487, 491, 492 (Incl. transit)	0.00101	0.116	0.00278	0.007	0.124
36. Support Activities for Storage, Transportation and Warehousing	488, 493	0.00032	0.036	0.00989	0.025	0.062
37. Software Publishers & Data Processing & related services	5112, 5182	0.00000	0.000	0.00009	0.000	0.000
38. Telecommunications	517	0.00101	0.117	0.00031	0.001	0.117
39. Other Information	5111, 512, 515, 516, 519	0.00064	0.074	0.00058	0.001	0.075
40. Credit Intermediation and Related Activities	521, 522	0.00903	1.041	0.01537	0.039	1.081
41. Other Finance and Insurance	523, 524, 525	0.00288	0.332	0.00075	0.002	0.334
42. Real Estate and Rental and Leasing	53 except real estate	0.01042	1.202	0.00633	0.016	1.218
43. Legal /Accounting and Bookkeeping /Management Services	5411, 5412, 5416, 5418, 5419, 55	0.00371	0.428	0.00188	0.005	0.433
44. Architectural, Engineer- ing, and Computing Services	5413, 5414, 5415, 5417	0.00146	0.168	0.00039	0.001	0.169
45. Educational Services	61	0.00000	0.000	0.00010	0.000	0.000
46. Ambulatory Health Care Services	621	0.00000	0.000	0.00000	0.000	0.000
47. Hospitals	622	0.00000	0.000	0.00000	0.000	0.000
48. Nursing and Residential Care Facilities, Social Assis- tance	623, 624	0.00000	0.000	0.00000	0.000	0.000
49. Arts, Recreation, and Accommodation	71, 721	0.00079	0.091	0.00083	0.002	30.213
50. Food Services and Drink- ing Places	722	0.00107	0.123	0.00164	0.004	23.919
51. Administrative/Employ- ment Support Services	561	0.00097	0.111	0.00270	0.007	0.118

52. Waste Management/ Other, and Agriculture Services	562, 81, 115	0.00366	0.422	0.00700	0.018	0.440
S&L Govt. enterprises & non- comparable imports		0.00000	0.000		0.000	0.000
Total Intermediate Inputs		0.35814	41.296	0.08932	0.228	
Compensation of employees		0.15823	18.245	0.25920	0.663	
Value added (producer value)		0.35244	40.639			
Total intermediate		0.35814	41.296			
Other value added		0.19421	22.394	0.18559	0.475	

Tables IV-3 and Table IV-4 report impact estimates from the input-output model. Table IV-3 presents detailed data, while Table IV-4 summarizes impacts by major industry categories. The model estimates total sales of \$430 million, labor income of \$114 million and 2,484 jobs generated in the local economy in relation to wine production, tasting rooms, and winery visitation.

Table IV-3 Detailed Impact Results

	Output (Mils. \$2017)	Employment	Labor Income (Mils. \$2017)
1. Crop Production	\$24.878	241	\$9.138
2. Animal Production	0.409	3	0.138
3. Forestry and Logging	0.030	0	0.006
4. Fishing, Hunting, and Trapping	0.354	1	0.100
5. Mining	0.305	1	0.061
6. Electric Utilities	4.811	6	1.491
7. Gas Utilities	0.972	1	0.075
8. Other Utilities	0.662	3	0.228
9. Highway, Street, and Bridge Construction	0.742	2	0.202
10. Other Construction	8.250	30	2.086
11. Food, Beverage and Tobacco Manufacturing	131.222	519	26.351
12. Textiles and Apparel Mills	0.151	1	0.031
13. Wood Product Manufacturing	0.510	1	0.084

14. Paper Manufacturing	0.926	1	0.129
15. Printing and Related Activities	0.177	2	0.090
16. Petroleum and Coal Products Manufacturing	0.000	0	0.000
17. Chemical Manufacturing	0.120	0	0.024
18. Nonmetallic Mineral Products Manufacturing	0.561	1	0.083
19. Primary Metal Manufacturing	0.000	0	0.000
20. Fabricated Metals Manufacturing	1.201	4	0.267
21. Machinery Manufacturing	0.262	1	0.041
22. Computer and Electronic Product Manufacturing	0.000	0	0.000
23. Electrical Equipment Manufacturing	0.000	0	0.000
24. Aircraft and Parts Manufacturing	0.000	0	0.000
25. Ship and Boat Building	0.000	0	0.000
26. Other Transportation Equipment Manufacturing	0.660	1	0.079
27. Furniture Product Manufacturing	0.018	0	0.005
28. Other Manufacturing	0.185	1	0.040
29. Wholesale	7.460	25	2.192
30. Non-Store Retail	0.056	0	0.015
31 Other Retail	19.884	193	7.756
32. Air Transportation	4.645	8	0.764
33. Water Transportation	0.000	0	0.000
34. Truck Transportation	1.894	10	0.643
35. Other Transportation/Postal Offices	2.482	11	0.934
36. Support Activities for Storage, Transportation and Warehousing	1.146	5	0.439
37. Software Publishers & Data Processing & related services	0.054	0	0.021
38. Telecommunications	2.671	5	0.528
39. Other Information	1.605	7	0.714
40. Credit Intermediation and Related Activities	9.599	22	2.361
41. Other Finance and Insurance	2.482	11	0.802
42. Real Estate and Rental and Leasing	3.308	30	0.683
43. Legal /Accounting and Bookkeeping /Management Services	1.388	13	1.151

44. Architectural, Engineering, and Computing Services	0.645	4	0.356
45. Educational Services	1.588	19	0.583
46. Ambulatory Health Care Services	5.198	38	2.966
47. Hospitals	5.822	27	2.249
48. Nursing and Residential Care Facilities, Social Assistance	4.574	59	1.961
49. Arts, Recreation, and Accommodation	33.742	374	11.887
50. Food Services and Drinking Places	30.061	396	9.962
51. Administrative/Employment Support Services	1.366	24	0.991
52. Waste Management/Other, and Agriculture Services	11.993	86	3.920
54. State & Local Govt.	99.216	298	19.510
Total	\$430.285	2,484	\$114.139

Table IV-4 Summary Economic Impacts

	Sales	Employment	Labor Income
Natural Resources and Utilities	\$32.42	255	\$11.24
Construction and Manufacturing	144.99	564	29.51
Retail and Wholesale Trade	27.40	218	9.96
Producer and Transport Services	33.28	151	10.39
Consumer Services	92.98	999	33.53
State & Local Govt	99.22	298	19.51
Total	\$430.29	2,484	\$114.14

Wine production, wine tasting rooms, and wine visitation leads to taxes generated in the local and state economy. The modelling presented in this report includes some economic activity in the State of Oregon as well as in the State of Washington. The majority of this activity is located in Washington State. Washington and Oregon have very different tax structures. Oregon lacks a sales tax and is relatively dependent on a state income tax. In contrast, Washington State has no income tax and is relatively dependent on the sales tax. We have modelled tax impacts using Washington data. It is recognized that this is imperfect, but it is assumed that the results presented below in Table IV-5 are reasonable. Winery and wine tasting room visitors spending leads to direct sales tax impacts, such as the purchase of food and beverages in restaurants, and the purchase of wine at wineries and from wine clubs. Through the multiplier effects captured in the input-output model, the labor income earned by people linked to the winery and wine tasting industries is subject to sales taxes. Utilizing data from the Washington State Department of Revenue, the Office of the Forecast Council, and the U.S. Bureau of Economic Analysis, sales taxes were estimated as a percentage of labor income. In Washington State, the business and occupation (B&O) tax is essentially a sales tax applied to the gross revenue of industries. The Washington State Department of Revenue reports these payments by industry. Ratios were calculated using these data to estimate an effective B&O tax rates by sector in the input-output model. These ratios were multiplied by the output estimates in each sector in Table IV-3, and summed, to develop the estimate presented in Table IV-5. In Walla Walla there is also a 2% hotel-motel tax, which is levied in addition to the sales tax paid by people incurring hotel-motel expenses. The sales taxes paid by people staying in hotels and motels is included in the direct sales tax estimates reported in Table IV-5. It should be noted that there is also a \$2 per room night charge in a tourism promotion area in the City of Walla Walla that goes to fund Visit Walla Walla. We did not have a basis for estimating the total payments of this room night change. There are also other types of tax impacts that were beyond the scope of this study, such as property taxes.

Table IV-5 Selected Tax Impacts
(\$ Millions)

Direct Sales Tax - State	\$7.412
Direct Sales Tax - Local	2.259
Indirect Sales Tax - State as % of labor Income	3.585
Indirect Sales Tax - Local as a % of Labor Income	1.103
B&O Tax - state	2.490
Hotel- Motel Tax	0.570
Total	\$17.418

CONCLUDING COMMENTS

This report presents a first survey-based estimate of the combined economic impact of wine production, wine tasting room activity, and tourist activity stimulated by these activities in Walla Walla and Umatilla counties. The report would not have been possible without the terrific cooperation of wineries, tasting rooms, and visitors to these establishments. It also would not have been possible without the support of Walla Walla Community College, the advisory committee that they assembled, and the supporters in the community that funded this study.

There are many economic impact studies of the wine industry, but this study goes beyond the usual focus on wine making to also include the economic impacts of wine-related tourist activity. The historic model of wine manufacturing in a region such as Walla Walla or Napa Valley is that wine is shipped to wholesalers and then to retailers. This model has clearly been replaced by a more complex model of distribution in Walla Walla. This report should be regarded as a first attempt to document this newer and evolving model of wine sales, and if it is repeated or updated the questionnaires for wineries and tasting rooms, as well as winery-related visitors should be updated to reflect lessons learned in this study. For example, while we documented what wine-related visitors said they spent on wine, we did not determine if these was purchases made and taken with them on their current trip to Walla Walla, as opposed to an estimate of the value of purchases made through clubs or other sales arrangements that would shipped at a later date and charged at that time. We hope that the process of reviewing results from this study will help define a better survey instrument for documenting these patterns of expenditure and economic impact.

The economic impacts reported in this study report higher jobs and labor income impacts, and somewhat lower output (revenue) impacts than estimated in the 2015 Community Attributes economic impact study (Community Attributes 2015). The two studies used different economic models and sources of data, making comparisons of their results problematic.

The survey of wineries could be expanded. While we asked wineries about their categories of production, and the share of revenues that come from these sales categories, we did not explore with them detailed data on purchases. While asked them about their employment and wages and salaries paid, we did not ask them about their purchases of grapes from other wineries or grape growers (local or outside Walla Walla), and other types of wine production-related expenditures. We did not ask them about their purchases of wine from other wineries. And, we did not ask them about their purchases of inputs similar to those documented in the survey of sales (such as consulting). Hopefully, in the review of this report, a more robust survey instrument for wineries will be defined.

The authors of this study welcome comments on how to improve future studies of this important industry in the Walla Walla regional economy. We also again thank those who sponsored this study, and especially the leadership of Dr. Nick Velluzzi of Walla Walla Community College, the work of his research team (Mike Eberle, Aiden Fleischer, Cynthia Hurlbutt, and Laurie Klicker), and his administrative assistant (Danielle Swan-Froese).

Appendix I. Input-Output Model Technical Appendix

The impact estimates developed in this study stem from the utilization of an “input-output model.” Models of this type are based on static, cross-sectional measures of trade relationships in regional or national economies. They document how industries procure their inputs and where they sell their outputs. Pioneered by Wassily Leontief, who won the Nobel Prize in Economic Science for his insights into the development of input-output models at the national level, these models have become “workhorses” in regional economic impact analysis in recent decades.

Washington State is fortunate to have a rich legacy of research developing input-output models. Early work was led by Philip J. Bourque and Charles M. Tiebout. Input-output models have now been estimated in Washington State for the years 1963, 1967, 1972, 1982, 1987, 1997, 2002, and 2007. No other state in the U.S. has this rich historical legacy of survey-based or quasi-survey based regional input-output models. The current study is based on work completed in 2011 and 2012 by a team of Washington State government staff and William B. Beyers (Beyers and Lin 2012).

Input-output models decompose regional economies into “sectors”—groups of industries with a common industrial structure. The heart of these models are “Leontief production functions,” which are distributions of the cost of producing the output of sectors. Leontief augmented the national accounts schema developed by Kuznets (also a Nobel laureate in economics) to take into account the significant levels of intermediate transactions that occur in economic systems in the process of transforming raw materials and services into “finished products” or “final products.” Sales distributions among intermediate and final sources of demand are used as the accounting bases for the development of the core innovation of Leontief: that these relationships can be used to link levels of final demand to total industrial output by way of a system of “multipliers” that are linked through the channels of purchase in every industry to the production of output for final demand.

This system of relationships is based on accounting identities for sales and purchases. Mathematically, the system may be represented as follows. For each industry we have two balance equations:

$$(1) X_i = x_{i,1} + x_{i,2} + \dots + x_{i,n} + Y_i$$

$$(2) X_j = x_{1,j} + x_{2,j} + \dots + x_{n,j} + V_j + M_j$$

where: X_i = total sales in industry i,
 X_j = total purchases in industry j
 $x_{i,j}$ = intermediate sales from industry i to industry j
 Y_i = final sales in industry i
 M_j = imports to sector j
 V_j = value added in sector j.

For any given sector, there is equality in total sales and total purchases:

$$(3) X_i = X_j \text{ when } i=j.$$

This system of transactions is generalized through the articulation of Leontief production functions, which are constructed around the columns of the regional input-output model. They are defined in the following manner.

Let us define a regional purchase coefficient:

$$r_{i,j} = x_{i,j}/X_j.$$

Rearranging,

$$x_{i,j} = r_{i,j} X_j$$

Substituting this relationship into equation (1) we have:

$$(4) X_i = r_{i,1} X_1 + r_{i,2} X_2 + \dots + r_{i,n} X_n + Y_i$$

Each sector in the regional model has this equation structure, and since the values of X_i equal X_j when $i=j$, it is possible to set this system of equations into matrix notation as:

$$(5) X = RX + Y$$

This system of equations can then be manipulated to derive a relationship between final demand (Y) and total output (X). The resulting formulation is:

$$(6) \quad X = (I-R)^{-1}Y$$

where the $(I-R)^{-1}$ matrix captures the direct and indirect impacts of linkages in the input-output model system. The input-output model utilized in the modeling for this research project was developed by a committee led by Dr. William Beyers and Dr. Ta-Win Lin, and was published in 2012 by the Washington State Office of Financial Management. The model has 52 sectors.

A major issue that surrounds the estimation of the $(I-R)^{-1}$ matrix is the level of “closure” with regard to regional final demand components, which are personal consumption expenditures, state and local government outlays, and capital investment. It is common practice to include the impacts of labor income and the disposition of this income in the form of personal consumption expenditures in the multiplier structure of regional input-output models. The additional leveraging impact of these outlays is referred to as “induced” effects in the literature on models of this type. It is less common to include state and local government expenditures in the induced effects impacts, but it can be argued that demands on state and local governments are proportional to the general level of business activity and related demographics. In contrast, investment is classically argued to be responsive to more exogenous forces, and is not a simple function of local business volume. In the model developed for this impact study, personal consumption expenditures and state and local governments have been included as a part of the induced-demand linkages system. We have considered Washington personal consumption expenditures to be a function of labor income, and state and local government to be a function of other value added.

The Washington State input-output model was adjusted through the use of the location quotient method into a formulation benchmarked against Walla Walla County Washington and Umatilla County Oregon (Miller and Blair 2009). We utilized the Washington State input-output model for this project because the majority of the wine-related activity studied was located in Washington State, and because we did not have a model that could be combined with the Washington input-output model to create a two-county model. It is recognized that this approach is simplistic, and ideally we should have had models for the two counties that could be aggregated. It is the authors’ judgement that the approach that we have taken does not lead to major errors in the economic impact estimates.

The location quotient method of input-output model adjustment is widely utilized. The fundamental assumption is that local regions that do not have the concentration of an industry found in a benchmark region are unable to supply the output of this industry locally. Instead, they must import output of these industries from other regions. An example of this situation in Walla Walla County versus Washington State is with the petroleum refining industry. Washington State has four major petroleum refineries all located in Skagit and Whatcom counties. Part of the expenditures for auto travel are for fuel, manufactured by local petroleum refineries. However, it would be inappropriate to estimate that purchases of the manufacturers value of products from these refineries were made in Walla Walla County. The location quotient method adjusts regional purchases to account for differences in the geographic concentration of industries, reducing these purchases when the local concentration of these industries is lower than found in a benchmark region, and leaving these purchases shares when the region as a concentration at least equal to that found in a benchmark region.

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Appendix II. Winery Visitor Questionnaire

Dear Walla Walla Wine Visitor:

We are conducting a survey to learn more about visitors to the Walla Walla wine appellation.

Please take a few minutes to help us with this very brief survey regarding your most recent visit.

The information you provide will be used for research purposes only and will be kept strictly confidential.

Please note one person should answer this questionnaire for their entire household.

At the end of the survey, you can enter your email address for a drawing for a \$250 VISA gift card. This is strictly optional and no other use will be made of your email except for the drawing.

Thank you for your participation.

Walla Walla Community College

1. From which winery or tasting room did you see/receive the invitation to take this survey?

2. Including yourself, how many members of your household participated in your most recent visit to Walla Walla?

3. Was the primary reason for your visit to Walla Walla to visit wineries, tasting rooms or otherwise engage in wine-related activities?

Yes No

4. If No to Question 2., what was the primary reason for your Walla Walla trip?

5. How long was your stay in the Walla Walla region?

Less than one day 1 day 2 days 3 days 4 or more days

6. Please check any of the following attributes that you associate with Walla Walla Valley.
(Check as many as apply)

- | | |
|---|--|
| <input type="checkbox"/> Upscale and classy | <input type="checkbox"/> Consistent and reliable quality wines |
| <input type="checkbox"/> Natural beauty | <input type="checkbox"/> Hard to find wines |
| <input type="checkbox"/> Friendly, family run wineries | <input type="checkbox"/> Good value wines |
| <input type="checkbox"/> Fun small towns | <input type="checkbox"/> Bordeaux varieties and blends |
| <input type="checkbox"/> Fine restaurants and food | <input type="checkbox"/> Interesting discovery wines and wineries |
| <input type="checkbox"/> Interesting non-wine activities | <input type="checkbox"/> Informal and unpretentious |
| <input type="checkbox"/> Undiscovered high quality wines | <input type="checkbox"/> Great for Rhone varieties |
| <input type="checkbox"/> Hard to get to | <input type="checkbox"/> Charming town |
| <input type="checkbox"/> Often meet the owners or winemaker | <input type="checkbox"/> Don't have to venture very far for wineries |
| <input type="checkbox"/> Good hotels and places to stay | <input type="checkbox"/> Undiscovered high-quality wines |
| <input type="checkbox"/> Affordable, not expensive | <input type="checkbox"/> Other (please specify) |
| <input type="checkbox"/> Offers a great variety of wines worth trying | |

7. On your last visit, please estimate the total expenditures IN WHOLE DOLLARS WITHOUT A DOLLARSIGN (\$) made by your household for each of the following. Include only those expenditures you attribute to/associate with your stay in the Walla Walla Valley for wine-related purposes. (**Note: one person should estimate the expenditures for the entire party**)

\$	Wine purchases
\$	Wine Tasting Fees, including at wine tasting rooms not part of a winery
\$	Shopping & Gifts (excluding wine)
\$	Wine events, including winemaker dinner(s)
\$	Winery Tours
\$	Auto travel costs (gas, rentals)
\$	Food & beverage costs (except wine tasting fees, wine events, and wine, purchases)
\$	Entertainment
\$	Lodging & Accommodation costs
\$	Air travel costs
\$	Other costs

8. How many wineries did you visit on your last wine-related visit to Walla Walla? _____
9. When did you first visit Walla Walla for wine-related activities? _____
10. Since your first visit, how many times have you come to Walla Walla for wine-related activities? _____
11. How many times each year do you visit to Walla Walla for wine-related activities? _____
12. How many wine clubs do you belong to, including Walla Walla wineries and others? _____
13. How many Walla Walla wine clubs do you belong to? _____
14. Approximately how much did you spend on wine purchased through Walla Walla wine clubs in the past year? (Please specify in whole dollars without \$ sign) _____
15. In general, how often do you consume wine in each of the price segments listed below?

	Several Times a Week	About Once a Week	1-3 times per month	Several times per year	Rarely/Never
Under \$15					
\$15-\$29.99					
\$30-\$49.99					
\$50.00+					

The following questions are for tabulation purposes only. All survey results will be combined for reporting purposes.

16. What is your age? _____
17. Your gender: Male Female
18. Are you a resident of the United States? Yes No
19. What is your USA zip code, Canadian postal code or name of other country of residence? _____
20. For tabulation purposes only, in which of the following categories is your combined annual household income, before taxes?
- Under \$50,000 \$125,000 to \$249,999
- \$50,000 to \$74,999 \$250,000 to \$499,999
- \$75,000 to \$99,999 \$500,000 or more
- \$100,000 to \$124,999 Prefer not to answer

Appendix III. Winery Questionnaire

What is the name of your winery or tasting room?

What is your name and title?

What is your email address?

4. Please check each category of production activity at this winery that produced revenue in your most recent fiscal year.

Made wine from grapes that you grew, and sold it under your label.

Made wine from grapes that you purchased, and sold under your label.

Sold grapes to other wineries.

Sold wine to other wineries.

Other production activities, e.g. custom crush, consulting services, etc. (Please describe) _____

5. What is your gross revenue (dollar amount) for your most recent budget year? _____

6. What was the distribution (in percentage) of revenue in this most recent budget year from the following sources of revenue? (Needs to equal 100%)

_____ % Direct to consumer (DTC) at winery

_____ % Sales of wine to other wineries (bulk, shiners, etc.)

_____ % DTC wine club

_____ % Grape sales

_____ % DTC online Sales

_____ % Other sources of revenue (please describe below)

_____ % Tasting fees at winery

_____ % Wholesale sales under your label

7. Does your winery have a tasting room or receive visitors?

Yes No

8. How many days per year is your tasting room or winery open to visitors? _____

9. On a typical day when your winery is open to visitors, how many people visit your winery/tasting room? _____

10. What were your payments of wages & salaries (dollar amount) to your employees (including benefits) for 2017 or your most recent fiscal year? \$ _____

11. What was your average monthly employment (number of employees) in 2017, or your most recent fiscal year?

Appendix IV. Wineries and tasting rooms included in this study

Winery or Tasting Room	X - Cited in Visitor Survey; TR = tasting room only
Abeja	X
Adamant Cellars	
a'Maurice Cellars	
Aluve	
Amavi Cellars	X
Armstrong Family Winery	X
Balboa Winery	X
Barons Winery Tasting Room	
Basel Cellars Estate Winery	X
Bergevin Lane Vineyards	
Bontzu Cellars	
Brady Cellars	
Brook & Bull Cellars	
Browne Family Vineyards	X
Buty	X
Cadretta Winery	
Canoe Ridge Vineyard	
Caprio Cellars	
Castillo de Feliciano Vineyard & Winery	X
CAVU Cellars	X
Charles Smith Wines	X , TR
College Cellars of Walla Walla	X
Corliss Estates	
Cougar Crest Estate Winery	
Cayuse Vineyards	
DaMa Wines	X
Delmas	
Doubleback/ Bledsoe Family Winery	
Dumas Station	
Dunham Cellars	X
Dusted Valley Vintners	X
El Corazon Winery	
Elegante' Cellars	

Winery or Tasting Room Cont.	X - Cited in Visitor Survey; TR = tasting room only
Elephant Seven	
Enchanted Cellars	
Eternal Wines	
Five Star Cellars	
Forgeron Cellars	
Foundry Vineyards	X
g.Cuneo Cellars / Latin Corner	
Gård Vintners	TR
Garrison Creek Cellars	
Gifford Hirlinger	
Golden Ridge Cellars	
Goose Ridge Estate Winery	TR
Gramercy Cellars	
Grantwood Winery	
Hence Cellars	
Henry Earl Estates	TR
Isenhower Cellars	
Kontos Cellars	X
Lagana Cellars	X
L'Ecole No 41	X
Leonetti Cellar	
Locati Cellars	
Lodmell Cellars	
Long Shadows Vintners	
Mackey Vineyards	
Maison Bleue Winery	
Mansion Creek Cellars	X - TR
Mark Ryan Winery	TR
Morell Family Wines	
Nocking Point Winery	
Northstar Winery	X
Otis Kenyon Wine	
Palencia Wine Company	
Pepper Bridge Winery	X

Winery or Tasting Room Cont.	X - Cited in Visitor Survey; TR = tasting room only
Plumb Cellars	
Proletariat Wine Company	X
Rasa Vineyards	
Reasons Wines	
Reininger Winery	
Revelry Vintners	
Reynvaan Family Vineyards	
Rotie Cellars	
Rulo Winery	
Russell Creek Winery	
Saviah Cellars	
Scarlet Oak Barrels	X
Seven Hills Winery	
Sinclair Estate Vineyards	X
Skylite Cellars	TR
Sleight of Hand Cellars	X
Solemn Cellars	
Somme des parties	X
Spring Valley Vineyard	
SuLei Cellars	
Tamarack Cellars	X
Tempus Cellars	
TERO Estates, Flying Trout Wines, and 21 Grams	
Tertulia Cellars	
The Walls Vineyards at the Passatempo Taverna Wine Studio	
Three Rivers Winery	
Truth Teller Winery	X
Va Piano Vineyards	
Vital Winery	
Walla Walla Vintners	
Watermill Winery	X
Waters Winery	
Woodward Canyon	X
Zerba Cellars	X

Appendix V. Economic Impact of Walla Walla Wineries and Tasting Rooms

This brief memorandum was prepared in response to a question raised by Marty Clubb at our presentation at Walla Walla Community College on April 26, 2019. He asked if we could separate the economic impact of wineries and tasting rooms from our overall economic impact estimates which also includes the expenditures of winery and tasting room visitors. We indicated that we could make this estimate.

The direct inputs to the impact estimation are the sales, employment, labor income, and direct purchases of wineries and tasting rooms. These inputs are the same as used in our overall economic impact analysis. Omitted here are the local expenditures of winery and tasting room visitors.

Table 1 below reports sales impacts of \$293 million, labor income impact of \$72 million, and job impacts of 1,409 persons. Direct winery sales are \$115 million, and direct employment is 495 persons, and direct labor income is \$20.22 million. Tasting room gross revenues are \$8.36 million, employment is 24 persons, and labor income \$0.6 million. As measured by jobs, the impact of wineries and tasting rooms alone is about 57% of the total estimated in our more comprehensive report.

Table 1 Walla Walla Winery and Tasting Room Economic Impacts (\$millions)

	Sales	Employment	Labor Income
Natural Resources and Utilities	\$ 29.993	247	\$ 10.275
Construction and Manufacturing	135.603	539	27.840
Retail and Wholesale Trade	14.65	113	5.139
Producer and Transport Services	17.651	89	5.781
Consumer Services	22.926	204	8.874
State & Local Govt	73.417	220	14.437
Total	\$ 293.286	1,409	\$ 72.347

Tax revenue impacts are reported below in Table 2. They are about 26% of the values reported in our report. The main reason for much lower tax revenue impacts stems from treatment of DTC tax collections, which are excluded here. Tax revenue impacts included here are based on direct state B&O tax payments, and indirect sales taxes generated as a share of labor income. If tax revenues on DTC sales were included, the level of tax revenue impacts would be larger than reported in Table 2.

Table 2 Winery and Tasting Room Tax Impact (\$ millions)

Indirect Sale Tax - State as % of Labor Y	2.272
Indirect Sales Tax - Local as a % of Labor Y	0.699
B & O Tax - State	1.545
Total	4.517

