



PORT OF
Bremerton
Washington



Economic Impact
of the Port of Bremerton
on Kitsap County
and Washington State

October 2019

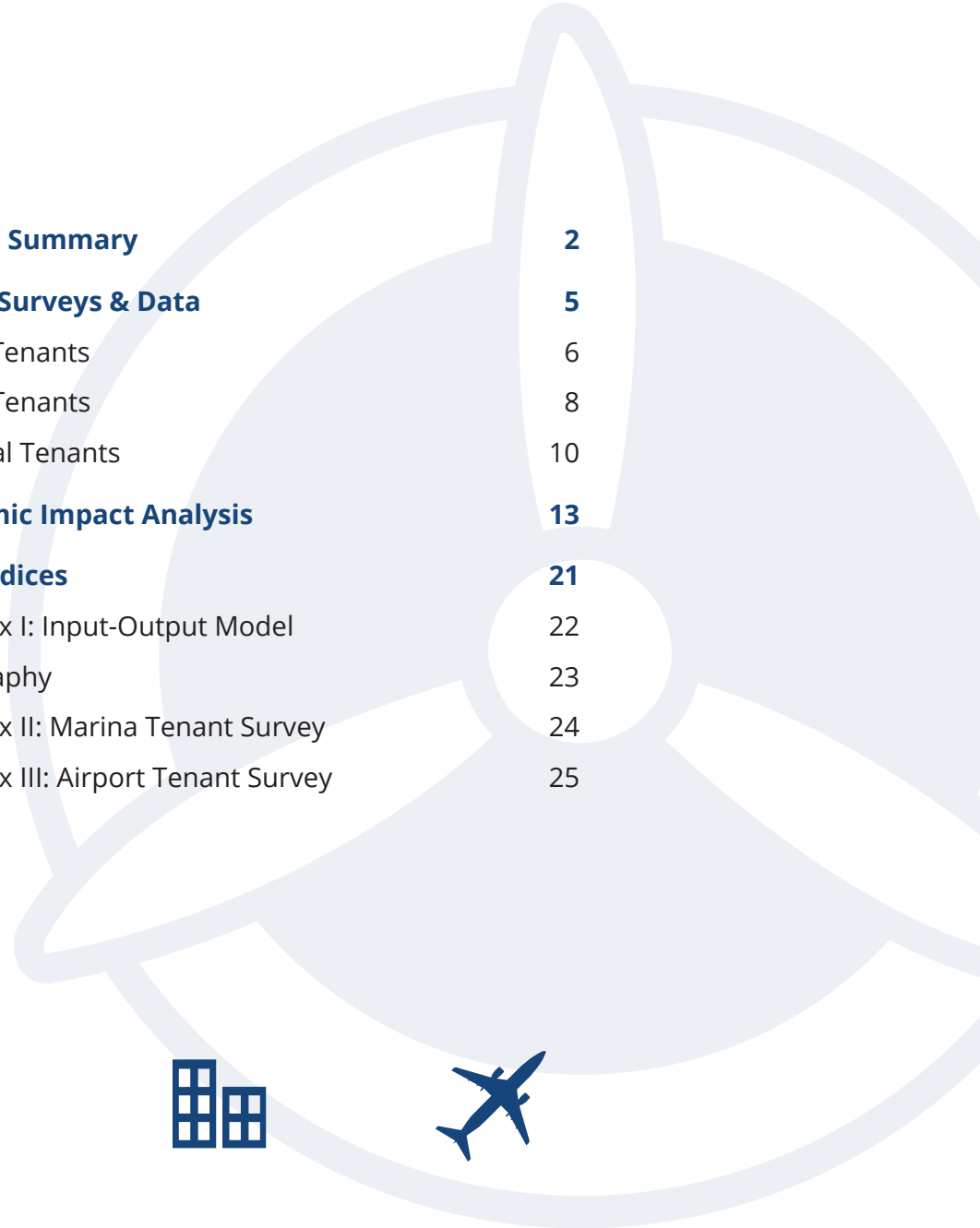


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of the Port of Bremerton
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and Washington State**

October 2019

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Executive Summary

The Port of Bremerton operates two marinas, a general aviation airport, and an industrial park. It also has industrial tenants at the marinas and at the airport. The marinas and airport lead to expenditures on the part of tenants, for moorage fees, airfield hangar and tiedown fees, and numerous other expenses. These other expenses include fuel, accommodations, food and beverage costs, electricity, maintenance, and many other expenses. Tenants have expenditures to manufacture their output or to produce their service, including labor costs.

It is estimated that these activities supported \$1.187 billion in output (sales), 5,602 jobs, and \$348.3 million in labor income in Kitsap County in 2018. Statewide impacts are estimated to be larger, \$1.440 billion in output, 6,840 jobs, and \$424 million in labor income in 2018. These activities also generate significant tax revenues. Statewide sales tax revenue is estimated to be \$13.7 million, while local sales tax revenue in Kitsap County is estimated to be \$3.5 million. Statewide B&O tax collections are estimated to be \$6.2 million. Other tax impacts include state fuel excise tax, local accommodations taxes, a local leasehold tax, and local B&O taxes.

These economic impact figures were estimated through use of the Washington State input-output model. This model was configured to provide impacts specific to Kitsap County, and impacts on the larger Washington State economy.

Data used to make these economic impact estimates were based on two tenant surveys, and on estimates of direct expenditures made by industrial park tenants and other Port of Bremerton tenants at the marinas and airfield. The Port of Bremerton provided contact information

for tenants at the marinas and the airfield. GMA Research reached out to these tenants with an online survey, using a questionnaire developed specifically for this study. Tenants were asked a variety of questions related to their tenure in 2018, including how long they were tenants in 2018, how large their boating parties were for adults and children, about their flying habits (solo or with others), and the size of their flying parties. They were also asked a variety of questions about categories of expenditures related to their tenure in 2018.

Moorage tenants reported average expenditures of \$10,351 in 2018, or a total of \$7.616 million. Airport tenants reported average expenditures of \$12,250, or a total of \$2.262 million. A total of 176 valid questionnaires were obtained from marina tenants; the marinas were estimated to have 738 tenants in 2018. A total of 37 valid questionnaires were received from airport tenants, out of a total of 185 airfield tenants in 2018.

Industrial park, marina, and airport tenant employment was classified into the sectors in the input-output model. It was estimated that these establishments had 2,436 employees in 2018, using data provided by the Port of Bremerton. Ratios were formed of output per employee to estimate total sales by these tenants. These sales estimates were used to derive estimated direct labor income and direct purchases, which were in turn inserted into the input-output model to develop the economic impact estimates reported above. It was estimated that industrial park and other business tenants had direct revenues of \$455 million, and labor income payments of \$137 million in 2018.



Marinas

Bremerton Marina and Port Orchard Marina have waitlists for permanent moorage spots.



Airport

Bremerton National Airport hangars are at capacity with new hangars being built.



Industrial Park

There were 2,436 direct jobs at Port of Bremerton facilities, mostly at the Industrial Park.



Community

Throughout the year, countless community events are supported by Port.



Direct Impact

Airport stats



2,436

Port-related jobs

7

Corporate

73

Condominium

82

Port-owned

\$137,000,000

Labor income

328

Bremerton

465

Port Orchard

793

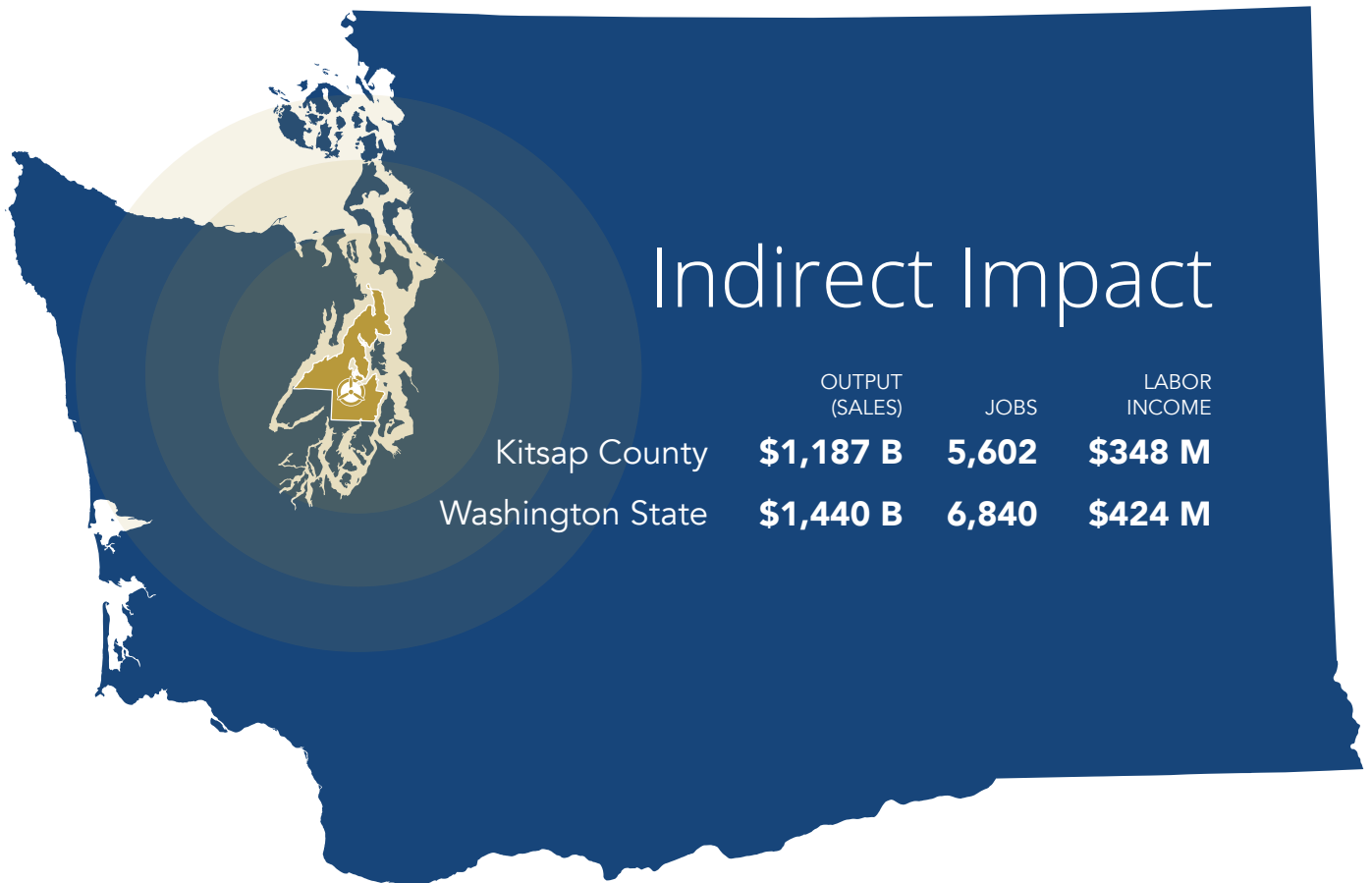
Total

\$455,400,000

Direct revenue



Marinas stats



Indirect Impact

	OUTPUT (SALES)	JOBS	LABOR INCOME
Kitsap County	\$1,187 B	5,602	\$348 M
Washington State	\$1,440 B	6,840	\$424 M



About this Report

This report documents the economic impact of the Port of Bremerton. It provides estimates of sales, employment, labor income, and selected taxes generated by the Port of Bremerton and its tenants. The Port of Bremerton is composed primarily of three major activities: (1) boats moored at two marinas, (2) aircraft tied down or otherwise stored at an airport, and (3) tenants in an industrial park. There are also industrial tenants at the marinas and airport.

The report is the result of collaboration between the Port of Bremerton, GMA Research Corporation, and Dr. William

Beyers. The authors of this study and the Port of Bremerton collaborated on development of these surveys of marina and airport tenants. These surveys were conducted by GMA Research online in June 2019 and July 2019, using contact information on tenants supplied by the Port of Bremerton. The Port of Bremerton also provided key data on business tenants at the industrial park, and also on other business tenants located at the airport and marina, that were used in the economic impact analysis.

The authors acknowledge the cooperation of marina and airport tenants with

surveys of their expenditures and other variables. Without their cooperation this project would not have been possible. We also acknowledge the assistance of the Port of Bremerton, whose staff provided crucial data about marina and airport tenants, industrial tenants, and operations of the Port. In particular, we want to acknowledge the assistance of Arne Bakker, Director of Business Development. Mr. Bakker assisted us in all aspects of this project—helping to conceptualize it, helping to obtain data crucial to conduct of the study, and facilitating distribution of study results.



I. Tenant Surveys & Data

Marina Tenants



Marina tenants were asked to complete an online survey regarding aspects of their tenure. The Port of Bremerton has two marinas. One is located in Port Orchard (465 slips), and the other in Bremerton (328 slips), a total of 793 slips. In 2018, 688 of these slips were occupied by tenants, and 50 were occupied by liveaboards. The survey had 257 returns. These were screened for the content of their responses, and 176 were determined to be valid surveys.

Those considered to be not-valid were classified this way because they failed to provide key data, such as expenditures related to their tenure.

The response rate for valid returns to the survey was about 25%. Appendix II contains a copy of the survey form used for the marina tenant survey. Table 1 reports results of the survey, that reports a percentage of respondents very close to the Port of Bremerton's count of tenant locations. The survey picked up a few respondents who said they moored their vessel at a location other than the Port of Bremerton, but this location was not identified in the survey. Thus, the survey results closely mirrors the location of marina tenants. It should be noted that the marinas also had visitors who were not tenants, but rather day or short-term visitors. These patrons were excluded from the marina tenant survey.



Table 1: Location of Marina Tenant Respondents

Port Orchard	59.0%
Bremerton	39.3%
Other	1.7%

N=173

Tenants were asked to identify the duration of their tenure in 2018. Table 2 reports results of this question. Overwhelmingly, tenants were present for the entire year; about 30% reported stays of a shorter time period.

Table 2: Number of Months in 2018 Respondents Were Marina Tenants

1	4.8%
2	1.8%
3	3.6%
4	3.6%
5	3.6%
6	3.6%
7	4.2%
8	1.2%
9	1.2%
10	3.0%
12	69.6%

N=168

Tenants were asked to describe the size and composition of their boating parties. Tables 3 and 4 document responses to these questions. Table 3 reports that the most common adult party size was two persons, followed by one person parties and those with three or four adults. Table 4 reports data on size of parties of children (people under the age of 18). Most boating parties had no children, and those with children typically had one or two children.

Table 3: Average Number of Adults in Boating Parties

1	17.1%
2	60.0%
3	10.9%

4	8.6%
5+	3.4%

N=175

Table 4: Average Number of Children in Boating Parties

None	77.1%
1	9.7%
2	9.7%
3	1.7%
4	0.6%
5+	1.1%

N=175

Moorage tenants were asked to document their expenditures in the local area year 2018 in relation to their moorage. They were specifically asked to not consider expenses made at locations other than Bremerton, such as when they were on a day trip. Table 5 presents the results from this survey question, with the average (mean) response, and estimated total expenditures. The total expenditure estimated is based on the estimated total number of tenants. The average tenant is estimated to have spent \$10,351 locally, for a total outlay of \$7.6 million. The largest expenditures were for moorage fees, food, and maintenance. Significant expenditures were also made for personal expenses, travel, shopping, and fuel.

Table 5: Expenditures Related to Moorage

	Mean Expenditure	\$ Millions
Moorage Fees	\$3010.91	\$2.222
Liveaboard Fees	87.85	0.065
Rope	78.22	0.058
Food	1443.61	1.065
Personal Expenses	786.09	0.574
Accommodations	251.61	0.184
Travel	555.11	0.410
Entertainment	276.22	0.202
Shopping	688.05	0.502
Tours	47.84	0.035
Fuel	954.22	0.704

Maintenance	1270.94	0.938
Storage	194.99	0.142
Paint	435.99	0.318
Electricity	162.52	0.120
Water	25.14	0.018
Laundry	61.52	0.045
Garbage	20.11	0.015
Other	0.34	0.000
Total	\$10351.28	\$7.616

N=176

Marina tenants were asked if they wanted to make comments or suggestions related to their tenancy at the marinas. Twenty-two percent (22%) of tenants wrote some text, ranging from one word to long text responses. The majority of these comments are complimentary to the Port of Bremerton, but there are critical comments as well. The most frequent critical comments were related to parking (hard to find), wifi (sometimes hard to get), and maintenance and cleaning. The most frequent positive comments related to the staff, and the quality of services.

To encourage people to respond to this questionnaire they were given an opportunity to receive a \$200 gift certificate for dining at Anthony's restaurant in Bremerton. Table 6 reports the frequency of response to this question. Almost 80% valid respondents said they wanted to participate in the drawing, while 61% of the overall sample said that they wanted to participate.

Table 6: Percent of Respondents Entering Drawing for Food at Anthony's Restaurant

	Enter Contest	Sample Size
All Responses	60.90%	253
Valid Responses	79.50%	176

Airfield Tenants



Airfield tenants were asked a variety of questions related to their tenure; the questionnaire used for this survey is found in Appendix III. The Port of Bremerton reported a total of 82 port owned hangars, 73 condominium hangars, 7 corporate hangars, and an average of 24 tiedown occupants in 2018. This is a total of 186 leases, and the Port of Bremerton reports a total of 218 aircraft based at the airport.

It should be noted that aircraft other than those based at the Bremerton airport made use of this facility, such as practicing landings and takeoffs and on day trips to the Bremerton area. These short-term users were excluded from this study.

A total of 62 airfield tenants responded to the questionnaire. Of these, 37 were considered to be valid questionnaires. Most of the questionnaires considered to be not-valid failed to report any expenditures related to their tenure. While we had a response rate of about one-third to the airfield tenant survey, approximately 20% were considered to be valid surveys.

Table 7 reports that the majority of airfield tenants are hangar tenants (89%), and that 8% are tie-downs. Of the 3% in the other category, one turned out to be the airport fixed base operator (FBO—Avian Aeronautics and Flight Center), and several others were short-term (like weekend) tenants.

Table 7: Type of Airfield Tenant

Hangar	89%
Tie-Down	8%
Other	3%

N=37

Table 8 reports that leases were overwhelmingly for the entire 2018 year. The one respondent saying they had a lease for 0 months responded that they were a “condo hangar” tenant. Only one other respondent reported less than a full year lease.

Table 8: Duration of Leases In 2018 (Months)

0	2.7%
6	2.7%
12	94.6%

N=37

Table 9 documents that about half of airport tenants were solo flyers, and about half of them flew with others. Table 10 reports responses to the question regarding people who flew with others. The question was phrased to have the respondent include themselves in the headcount of adults, and to then indicate how many children were flying. Most were parties of two or three persons, but there was a cohort of larger parties (as large as ten persons)

Table 9: Are You flying Solo Most Of The Time, Or Flying With Others?

Solo	45.9%
With Others	54.1%

N=37

Table 10: If flying with others, how many were adults or children?

Number of persons	Adults	Children
2	1	1
2 or 3	7 or 8	1 or 2
3	2	1
5	5	
6	6	
10	10	

N=19

Airfield tenants were asked to estimate their 2018 expenditures related to being an airfield hangar or tie-down tenant. They were asked to ignore expenses made at other locations with regard to the use of their aircraft. Table 11 reports results from this question. Average expenditures were \$12, 251, and total estimated expenditures were \$2.26 million. The largest expenditures were for hangar fees, insurance, fuel, food and beverages, and shopping.

Table 11: Estimated Total Expenditures in 2018 Related to Your Airfield Tenancy? (Total \$millions)

	Total	Mean
Hangar Fees	\$0.4948	\$2674.81
Tie-Down Fees	0.0176	100.46
Tie-Down Rope	\$0.0001	.03
Fuel	\$0.9504	5137.08
Insurance	\$0.2294	1239.95
Electricity	\$0.0162	92.49
Storage	\$0	.00
Food & beverages	0.1450	783.78
Accommodations	\$0.0050	28.57
Non-airplane travel	0.0548	295.95
Entertainment	\$0.0080	47.06
Shopping	\$0.3300	1783.78
Tours	\$0	.00
Recycle	\$0.0049	27.86
Other	\$0.0060	38.71
Total	\$2.2620	\$12250.52

N=37

Airfield tenants were asked if they had comments about the airport other than those posed in the survey questionnaire. Thirty percent (30%) of valid respondents had comments. The text in these comments is mixed in terms of this tone—many comments are supportive of the Port of Bremerton, but many are also making critical comments.

Airfield tenants were also asked if they wanted to have their name entered into a contest for a \$200 dining certificate at Anthony's Restaurant. Table 12 reports answers to this question. Almost 90% of valid respondents wanted to be considered for this dining option

Table 12: Percent of Survey Respondents wanting to be considered for Anthony's Gift Certificate

		N
All Responses	67.70%	62
Valid Responses	89.20%	37

Industrial Tenants



The Port of Bremerton operates an industrial park, and also has industrial tenants at its marinas and airport. The data used for this section of this report were provided by the Port of Bremerton, and categorized into sectors in the input-output model. The authors of this report proposed that we utilize this procedure, as opposed to a survey of all of these tenants, to simplify this part of this project.

Table 13 reports estimated Employment, Output (sales), Labor Income, and Other Value added for these sectors. The procedure used for making these estimates was benchmarked against the year 2007, the year of the most recent Washington State input-output model. These values are converted into current dollars in the impact results presented in the next section of this report, and are also converted to current value (\$2017—the most recent year for which data are benchmarked in the Washington input-output table) in Table 13.



Table 13 reports **2,436 direct jobs at tenants at Port of Bremerton facilities.**

The majority of these are at the industrial park, but there are also business tenants at the marinas and airport. For example, the port itself has offices located at the industrial park with 30 employees. The FBO at the airport provides fuel and aviation services to tenants there, while the Airport Diner provides food services. The values in Table 13 for output, labor

income, and other value added were derived from the 2007 Washington State input-output model. Ratios of output per employee, labor income per employee, and other value added per employee were estimated from this model. In one sector an adjustment was made to this procedure: shipbuilding. This sector is dominated in the Washington economy the Bremerton Naval Shipyard, and in the Washington input-output model

this sector had much higher output per employee than reported in the 2007 Census of Manufactures. We adjusted this ratio to be as reported in the 2007 Census of Manufactures.

Table 13: Industrial Tenant Direct Employment, Output, Labor Income, and Other Value Added

I/o Sector	Output \$ Millions 2017	Employment	Labor Income \$ Millions 2017	Other \$ Millions 2017
8 Other Utilities	\$22.64	95	\$7.79	\$1.52
10 Other Construction	\$36.53	131	\$9.21	\$0.46
18 Nonmetallic Minerals Products Mfg.	\$6.66	14	\$0.98	\$0.60
25 Ship and Boat Building	\$389.87	1668	\$113.44	\$87.83
27 Furniture Product Mfg.	\$ 0.81	4	\$0.22	\$0.05
29 Wholesale Trade	\$5.64	19	\$1.65	\$1.38
31 Other Retail	\$1.54	15	\$0.62	\$0.45
32 Air Transportation	\$4.02	7	\$0.66	\$0.47
34 Truck Transportation	\$9.28	50	\$3.14	\$0.69
36 Support Activities for Storage & Transportation	\$20.80	99	\$7.94	\$1.81
42 Real Estate, Rental, and Leasing	\$1.09	10	\$0.22	\$0.73
43 Legal, Accounting, Bookkeeping, and Management Services	\$6.50	60	\$5.38	\$0.51
44 Architectural, Engineering, and Computing Services	\$32.42	191	\$17.86	\$4.59
45 Educational Services	\$0.25	3	\$0.09	\$0.01
49 Arts, Recreation, and Accommodation	\$0.18	2	\$0.06	\$0.04
50 Food Services and Drinking Places	\$2.35	31	\$0.78	\$0.39
52 Waste Management, Other Services, and Agricultural Services	\$5.15	37	\$1.68	\$0.18
Total	\$545.72	2,436	\$171.70	\$101.73





II. Economic Impact Analysis

Data from the survey of airport and marina tenants, plus the estimated direct revenue, employment, and labor income of industrial tenants were brought together and inserted into the input-output model to provide estimates of economic impacts in Kitsap County and on the State of Washington. Appendix I provides technical details about this computational process.

The input-output model had data entered on direct sales, employment, labor income, and other value added for each sector. Data from the survey of marina and airport tenants were considered to be direct purchases, and were entered into the input-output model utilizing conventions appropriate to models of

this type. Estimated direct taxes were omitted from the computational process and were tracked as reported in Tables 16 and 19. Expenditures on purchases such as accommodations or food services were entered as direct purchases in the model from the appropriate sector. Expenditures made to retailers were adjusted, with margins (estimated revenue to the retailer as a percentage of gross sales) entered into the input-output model. For the Kitsap County model, it was assumed that the goods being sold by retailers were not manufactured in Kitsap County. In the case of the Washington State impact model presented below we assumed that fuel sales made at marinas were manufactured in Washington State. Expenses incurred by industrial tenants (as reported in Table 14) were estimated as “direct requirements,” using the matrix of direct requirements coefficients developed for Kitsap County as a part of this project. The Washington State impact estimates utilized the same data from the 2007 Washington State input-output model.

Tables 14 and Table 15 present detailed and summary economic impact estimates. The model estimates total sales of \$1.187 billion, 5,602 jobs, and \$348 million in labor income in Kitsap County. The large direct employment impacts in the shipbuilding sector (see Table 13) is also reflected in Tables 14 and 15, with large impacts in goods producing sectors. The majority of the economic impacts reported in Tables 14 and 15 are in various service industries (sectors 29 through sector 54). These impacts are a function of (1) direct expenditures by patrons of marinas and airfields, which are largely for services; (2) direct expenditures of industrial tenants, which have a strong services component; (3) indirect and induced impacts calculated in the input-output model. These indirect and induced impacts are driven largely by earnings of labor income and its disposition as personal consumption expenditures. Personal consumption expenditures are largely made on various services.

Table 14: Kitsap County Detailed Economic Impact Estimates

	Output \$ Millions 2017	Employment	Labor Income \$ Millions 2017
1. Crop Production	0.586	6	0.215
2. Animal Production	0.210	1	0.071
3. Forestry and Logging	0.078	0	0.016
4. Fishing, Hunting, and Trapping	0.249	1	0.070
5. Mining	0.782	3	0.157
6. Electric Utilities	9.149	12	2.835
7. Gas Utilities	2.422	2	0.187
8. Other Utilities	24.240	102	8.361
9. Highway, Street, and Bridge Construction	1.676	5	0.457
10. Other Construction	67.029	240	16.951
11. Food, Beverage, and Tobacco Manufacturing	5.531	8	0.511
12. Textiles and Apparel Mills	0.573	2	0.119
13. Wood Product Manufacturing	0.813	2	0.134
14. Paper Manufacturing	0.672	1	0.094
15. Printing and Related Activities	0.298	3	0.152
16. Petroleum and Coal Products Manufacturing	0.000	0	0.000
17. Chemical Manufacturing	0.111	0	0.022

18. Nonmetallic Mineral Products Manufacturing	8,954	19	1,318
19. Primary Metal Manufacturing	0,000	0	0,000
20. Fabricated Metals Manufacturing	0,984	3	0,219
21. Machinery Manufacturing	1,458	3	0,229
22. Computer and Electronic Product Manufacturing	0,061	0	0,022
23. Electrical Equipment Manufacturing	0,038	0	0,007
24. Aircraft and Parts Manufacturing	0,000	0	0,000
25. Ship and Boat Building	390,829	1,671	114,068
26. Other Transportation Equipment Manufacturing	0,379	1	0,045
27. Furniture Product Manufacturing	1,264	6	0,341
28. Other Manufacturing	0,705	2	0,150
29. Wholesale	25,934	87	7,306
30. Non-Store Retail	0,778	6	0,207
31 Other Retail	51,490	501	20,866
32. Air Transportation	4,284	7	0,705
33. Water Transportation	0,362	1	0,086
34. Truck Transportation	13,756	74	4,668
35. Other Transportation/Postal Offices	6,714	31	2,526
36. Support Activities for Storage, Transportation and Warehousing	23,528	112	9,005
37. Software Publishers & Data Processing & related services	0,303	1	0,116
38. Telecommunications	7,007	14	1,385
39. Other Information	5,369	24	2,389
40. Credit Intermediation and Related Activities	28,631	64	7,043
41. Other Finance and Insurance	7,342	33	2,374
42. Real Estate and Rental and Leasing	7,835	72	1,618
43. Legal /Accounting and Bookkeeping /Management Services	14,369	133	11,920
44. Architectural, Engineering, and Computing Services	40,037	236	18,729
45. Educational Services	4,487	54	1,647
46. Ambulatory Health Care Services	16,525	120	9,429
47. Hospitals	16,360	76	6,320
48. Nursing and Residential Care Facilities, Social Assistance	13,637	175	5,847
49. Arts, Recreation, and Accommodation	8,891	99	3,132
50. Food Services and Drinking Places	22,480	296	7,450
51. Administrative/Employment Support Services	6,543	115	4,748
52. Waste Management/Other, and Agriculture Services	36,968	266	12,082
54. State & Local Govt.	304,668	914	59,911
Total	\$1,187,389	5,602	\$348,261

Table 15: Summary Economic Impacts - Kitsap County

	Sales	Employment	Labor Income
Natural Resources and Utilities	\$37,716	126	\$11,913
Construction and Manufacturing	481,374	1,967	134,840
Retail and Wholesale Trade	78,203	594	28,379
Producer and Transport Services	166,080	916	67,311
Consumer Services	119,349	1,085	45,908
State & Local Govt	304,668	914	59,911
Total	\$1,187,389	5,602	\$348,261

Selected tax impacts were calculated based on data from the tenant survey and on impact estimates from the input-output model. Direct sales taxes, fuel excise taxes, accommodation taxes, and leasehold taxes were estimated from the survey of marina and airfield tenants. Indirect sales taxes were calculated as a function of labor income, utilizing the impact estimates presented in Tables 14 and 15. State B&O tax collections were estimated as function of output in individual sectors, as reported in Table 16, using B&O revenue estimates as a percentage of taxable sales as reported by the Washington State Department of Revenue. It is estimated nearly \$21 million in tax impacts were related to the Port of Bremerton, its tenants, and direct economic impacts. It should be noted that there are other tax impacts that cannot be calculated with the input-output model,

such as property taxes. Thus, overall tax impacts of the Port of Bremerton and its tenants are larger than reported in Table 16.

Table 16: Selected Tax Impacts (\$ millions)

Direct Sales Tax - State	\$0.429
Direct Sales Tax - Local	0.147
Indirect Sales Tax - State as % of Labor Income	10.938
Indirect Sales Tax - Local as a % of Labor Income	4.207
B&O Tax - state	4.863
State Fuel Excise Tax - Direct	0.147
Accommodation Tax	0.007
Leasehold Tax	0.260
Total	\$20.997

A second set of impact estimates were calculated for Washington State, using the same methodology as used for

Kitsap County impacts. Tables 17 and 18 present estimated statewide output, employment, and labor income impacts. They are larger than reported in Tables 14 and 15 because the Washington State input-output model has higher multipliers than found in the Kitsap County model used to calculate impacts reported in Tables 14 and 15. Statewide output (sales) impacts are estimated to be \$1.44 billion, creating 6,840 jobs, and \$424 million in labor income. Statewide economic impacts are approximately 21% higher than Kitsap County impacts. Statewide impacts are larger than Kitsap County impacts because the Washington State economy has more complex industrial linkages than Kitsap County, and includes output in industries not present in the Kitsap County economy. An example of the latter is petroleum and coal products manufacturing.

Table 17: Washington State Detailed Economic Impacts

	Output \$ Millions 2017	Employment	Labor Income \$ Millions 2017
1. Crop Production	1.008	10	0.370
2. Animal Production	0.332	2	0.112
3. Forestry and Logging	0.442	1	0.091
4. Fishing, Hunting, and Trapping	0.916	2	0.259
5. Mining	1.608	6	0.322
6. Electric Utilities	13.072	17	4.051
7. Gas Utilities	3.090	2	0.239
8. Other Utilities	24.612	103	8.490
9. Highway, Street, and Bridge Construction	5.732	17	1.563
10. Other Construction	82.618	296	20.894
11. Food, Beverage, and Tobacco Manufacturing	8.363	13	0.773
12. Textiles and Apparel Mills	0.746	3	0.155
13. Wood Product Manufacturing	1.840	5	0.303
14. Paper Manufacturing	1.249	2	0.175
15. Printing and Related Activities	0.925	8	0.472
16. Petroleum and Coal Products Manufacturing	15.003	2	0.325
17. Chemical Manufacturing	0.456	1	0.090
18. Nonmetallic Mineral Products Manufacturing	10.554	22	1.554
19. Primary Metal Manufacturing	0.108	0	0.015
20. Fabricated Metals Manufacturing	1.767	6	0.393
21. Machinery Manufacturing	1.903	4	0.300

22. Computer and Electronic Product Manufacturing	0.379	1	0.136
23. Electrical Equipment Manufacturing	0.184	0	0.034
24. Aircraft and Parts Manufacturing	0.038	0	,0.008
25. Ship and Boat Building	391.033	1,671	114.128
26. Other Transportation Equipment Manufacturing	0.576	1	0.069
27. Furniture Product Manufacturing	1.570	8	0.423
28. Other Manufacturing	1.056	4	0.225
29. Wholesale	42.152	142	12.071
30. Non-Store Retail	1.892	13	0.504
31 Other Retail	61.018	593	24.727
32. Air Transportation	8.408	15	1.383
33. Water Transportation	2.024	5	0.478
34. Truck Transportation	15.528	84	5.270
35. Other Transportation/Postal Offices	9.514	44	3.579
36. Support Activities for Storage, Transportation, and Warehousing	25.020	119	9.576
37. Software Publishers & Data Processing & related services	4.626	9	1.778
38. Telecommunications	17.320	34	3.423
39. Other Information	8.997	39	4.003
40. Credit Intermediation and Related Activities	35.865	81	8.822
41. Other Finance and Insurance	26.996	121	8.727
42. Real Estate and Rental and Leasing	17.023	157	3.516
43. Legal /Accounting and Bookkeeping /Management Services	21.323	197	17.689
44. Architectural, Engineering, and Computing Services	45.505	268	21.751
45. Educational Services	6.033	73	2.214
46. Ambulatory Health Care Services	26.643	193	15.202
47. Hospitals	21.443	100	8.284
48. Nursing and Residential Care Facilities, Social Assistance	15.637	200	6.705
49. Arts, Recreation, and Accommodation	13.780	153	4.854
50. Food Services and Drinking Places	28.607	377	9.481
51. Administrative/Employment Support Services	12.525	219	9.088
52. Waste Management/Other, and Agriculture Services	46.457	334	15.183
54. State & Local Govt.	354.612	1,064	69.732
Total	1440.129	6,840	424.008

Table 18: Summary Economic Impacts on Washington State (\$ Millions)

	Sales	Employment	Labor Income
Natural Resources and Utilities	\$45.081	143	\$13.933
Construction and Manufacturing	526.102	2,063	142.034
Retail and Wholesale Trade	105.062	749	37.301
Producer and Transport Services	250.673	1391	99.083
Consumer Services	158.600	1,430	61.924
State & Local Govt	354.612	1,064	69.732
Total	\$1,440.129	6,840	\$424.008

Table 19 reports statewide selected tax impacts. Direct tax impacts are the same as in Table 16. However, indirect effects sales tax and B&O tax impacts are larger at the state level than with regard to Kitsap County tax impacts. Statewide selected tax impacts are \$25.3 million. It should be noted that there are other tax impacts of activities at the Port of Bremerton, such as property taxes. However, we do not have a basis for estimating these

impacts through the use of the input-output model.

Table 19: Statewide Selected Tax Impacts (\$ Millions)

Direct Sales Tax - State	\$0.429
Direct Sales Tax - Local	0.147
Indirect Sales Tax - State as a percentage of labor Income	13.317
Indirect Sales Tax - Local as a percentage of Labor Income	5.122

B&O Tax - state	6.161
State Fuel Excise Tax - Direct	0.147
Accommodations Tax	0.007
Leasehold Tax	0.260
Total	\$25.328

Summary

This report presents an estimate of the economic impact of the Port of Bremerton on the Kitsap County and Washington State economies in 2018. The report would not have been possible without the assistance provided by marina and airfield tenants, and key data provided by the Port of Bremerton on industrial tenants. It also would not have been possible without the assistance of the Port of Bremerton, which provided contact information for marina and airfield tenants, and data on industrial tenants.

The approach taken in this study to the economic impact of industrial tenants was relatively simple. We utilized data from the Washington State input-output model on their sales, labor income, and direct purchases per dollar of output. These data were indexed against direct levels of employment, as reported by the Port of Bremerton. An alternative to this approach would have been a survey of industrial tenants, documenting their sales revenues, employment, labor income payments, and sectoral purchases

as defined in the input-output model. This alternative approach would require returns from all industrial tenants, and would have been much more expensive than the approach taken in this study.

The survey of marina and industrial park tenants was relatively short, providing key expenditure information needed for the economic impact calculations. Future surveys could add other questions related to the use of boats and aircraft, socioeconomic and demographic characteristics of





III. Appendices

tenants, and other data of interest to the Port of Bremerton.

Appendix I: Input-Output Model

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:

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

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

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:

$$r_{ij} = x_{ij}/X_j$$

Rearranging,

$$x_{ij} = r_{ij}X_j$$

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:

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

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 Kitsap County. 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 Kitsap 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 at marinas are for fuel, manufactured by petroleum refineries. However, it would be inappropriate to estimate that purchases of the manufacturers value of products from these refineries were made in Kitsap 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 purchase shares unchanged when the region has a concentration at least equal to that found in a benchmark region.

Bibliography

Beyers, W. & T. Lin (2012) [The 2007 Washington Input-Output Model](http://www.ofm.wa.gov/economy/io2007/default.asp). <http://www.ofm.wa.gov/economy/io2007/default.asp>

Miller, R.E. & P.D. Blair (2009) [Input-Output Analysis: Foundations and Extensions](#). (Cambridge: Cambridge University Press).

Appendix II: Marina Tenant Survey

Invitation Letter

Dear Marina Tenant:

The Port of Bremerton is conducting an economic impact study with the assistance of Dr. William Beyers, Professor Emeritus, Geography Department, University of Washington.

This study will document the impact of business activity on Port property as well as economic impact of Port marina tenants such as yourself.

As part of the study team, GMA Research, an independent firm, is helping the Port with an outreach survey to all marina tenants.

The Port has not conducted a study of this type previously, so we need participation from all marina tenants to help us with the survey.

We would like you to complete this short survey to identify and describe expenses incurred in 2018 as a result of being a marina port tenant.

Please think of all expenses you incurred in 2018 for your boat in relation to your moorage.

Do not consider expenses made at other locations when you are on a trip, but only those local expenses due to your moorage.

In the survey, please list expenditure as best you can for the 2018 calendar year. The amounts you list do not have to be exact but estimates as best you can include.

All information we collect is private, confidential and will be combined with other results for reporting purposes.

Thank you in advance for your assistance in this very important economic impact study. If you have any questions, please contact Arne Bakker, Director, Business Development at 360-674-2381 or arneb@portofbremerton.org

Thank you!

Survey Questions

1. At which marina were you a tenant in 2018?
 - Port Orchard Marina
 - Bremerton Marina
 - Other (please specify)
2. For how many months in 2018 were you a Port of Bremerton/Port Orchard marina tenant?
3. On average, including yourself, how many were in your boating party?
4. On average, how many children under 18 were in your boating party?
5. Please think of expenses you incur in relation to your moorage. Do not consider expenses made at other locations when you are on a trip but only those that are local. For each of the categories provided, please estimate your total expenditures in the calendar year 2018 at the Port of Bremerton/Port Orchard marinas or in the Bremerton area. (Please use whole dollars and estimates are acceptable)
 - Moorage Fees
 - Moorage Live a Board Fee Ropes Lines
 - Food and Beverage, including dining out
 - Personal Items
 - Accommodations (Not on boat)
 - Non-boat travel costs Entertainment
 - Shopping - Non food items
 - Land excursions - tours, etc.
 - Fuel & Marine Services Annual Maintenance
 - Storage Room/Locker Fee Paint/Zinc
 - Electricity Water Laundry
 - Refuse/garbage
 - Other, specify
6. Thank you for helping us with the Port of Bremerton/Port Orchard Marina Tenant Survey. If you have other comments/suggestions please include them in the space below.
7. If you would like to be entered in a drawing for a \$200 Anthony's Restaurants gift card, please provide your email address below. (This is optional)

Appendix III: Airport Tenant Survey

Invitation Letter

Dear Port of Bremerton Airfield Tenant:

The Port of Bremerton is conducting an economic impact study with the assistance of Dr. William Beyers, Professor Emeritus, Geography Department, University of Washington.

This study will document the impact of business activity on Port property as well as economic impact of Port of Bremerton airfield tenants such as yourself.

As part of the study team, GMA Research, an independent firm, is helping the Port with an outreach survey to all airfield tenants, both hangar and tie-down.

The Port has not conducted a study of this type previously, so we need participation from all airfield tenants to help us with the survey.

We would like you to complete this short survey to identify and describe expenses incurred in 2018 as a result of being an airfield tenant.

Please think of all expenses you incurred in 2018 for your airplane in relation to being an airfield tenant.

Do not consider expenses made at other locations when you are on a trip, but only those local expenses due to your being an airfield tenant.

In the survey, please list expenditure as best you can for the 2018 calendar year. The amounts you list do not have to be exact but estimates as best you can include.

All information we collect is private, confidential and will be combined with other results for reporting purposes.

Thank you in advance for your assistance in this very important economic impact study. If you have any questions, please contact Arne Bakker, Director, Business Development at 360-674-2381 or arneb@portofbremerton.org

Thank you!

Survey Questions

1. Which type of airfield tenant are you?
 - Hangar Tie-Down
 - Other (please specify)
2. For how many months in 2018 were you a Port of Bremerton airfield tenant? (Please use whole numbers)
3. Are you most of the time flying solo or with others?
 - Solo
 - With others
4. If flying with others, how many, including yourself are:
 - Adults 18 years of age or older
 - Children under age of 18
5. Please think of expenses you incur in relation to being an airfield hangar or tie-down tenant. Do not consider expenses made at other locations when you are on a trip but only those that are local. For each of the categories provided, please estimate your total expenditures in the calendar year 2018 at the Port of Bremerton airfield or in the Bremerton area. (Please use whole dollars and estimates are acceptable)
 - Hangar fees Tie-down fees Tie-down lines
 - Fuel & airplane services Insurance
 - Electricity
 - Storage room/locker
 - Food & beverages, including dining
 - Accommodations
 - Non-airplane travel costs Entertainment
 - Shopping - non food items
 - Land excursions/tours, etc. Refuse/recycle
 - Other, specify
6. Thank you for helping us with the Port of Bremerton Airfield Tenant Survey. If you have other comments/suggestions please include them in the space below.
7. If you would like to be entered in a drawing for a \$200 Anthony's Restaurants gift card, please provide your email address below. (This is optional)





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