

# Valdez New Harbor: Harbor Economic Impact Model Findings

Final Report, May 8, 2014

This report presents findings from an application of the Harbor Economic Impact Model (HEIM) using R&M Consultants' Alternative 6 design and cost estimate, prepared in September 2013 and February 2014, respectively.<sup>1</sup>

HEIM is an economic and financial model for quantifying the benefits of harbor activities. It provides a standard measure of economic and financial impacts that allow decision-makers to evaluate projects more efficiently and effectively. It is a tool to help project proponents generate reports showing the value of harbor investments on the financial position of the harbor, the fiscal effects on the community and regional government, and the economic effects on the community, regional entity, and the state. This information may be used to support local funding decisions and requests for state and federal matching funds, as well as provide information to local residents on the value of the harbor to their economy. It was developed by Northern Economics in 2003 under contract to the Alaska Department of Transportation and Public Facilities.

More information about the process of estimating economic impacts is discussed below in the section titled "Input-Output Analysis and the Harbor Economic Impact Model."

Northern Economics carried out the following steps to estimate the economic impacts of the proposed new harbor:

1. Analyzed survey data collected from recreational and commercial vessels, as well as local businesses, and incorporated spending patterns in the model;
2. Inflated expenditure information from the original model to fill in missing or lightly-covered information;
3. Modified the model to focus only on the Valdez-Cordova Census Area;
4. Updated the input-output multipliers to the most recent year available (2011);
5. Input the fleet based on the Alternative 6 harbor configuration.

Table 1 summarizes the construction and operational impacts of the new harbor. Regional impacts of construction are estimated to be \$12.6–\$29.7 million in total sales, 126–297 jobs, and \$7.1–\$16.8 million in payments to labor. Regional impacts of operations are total annual sales of \$13.4 million, 141 jobs, and annual payments to labor of \$3.4 million. Please see important information following the table regarding these estimates and their limitations.

<sup>1</sup> A change in harbor configuration, resulting in Alternative 7, was selected after this analysis was commissioned. The internal float configuration and uplands functions are functionally identical for purposes of this analysis. While a cost estimate has not been developed for Alternative 7, it is anticipated that changing to Alternative 7 would have a negligible effect on the report findings.

**Table 1. Construction and Operational Impacts of New Harbor**

<b>Construction Impacts</b>		
Estimated base construction cost for the Inner Harbor (\$)		9,975,985
Estimated total cost of new harbor including upland facilities (\$)		23,502,385
	<b>Census Area</b>	<b>Local</b>
Total Sales (Direct, Indirect, Induced) (\$)	12,595,810	≤12,595,810
Employment (Direct, Indirect, Induced) (jobs)	126	≤126
Payments to Labor (Direct, Indirect, Induced) (\$)	7,123,006	≤7,123,006
<b>Operational Impacts</b>		
	<b>Census Area</b>	<b>Local</b>
Total Sales (Direct, Indirect, Induced) (\$)	13,447,780	13,112,389
Employment (Direct, Indirect, Induced) (jobs)	141	125
Payments to Labor (Direct, Indirect, Induced) (\$)	3,431,100	≤3,431,100

Source: Harbor Economic Impact Model and Northern Economics, Inc. analysis

Input-output analysis is based on borough and census area multipliers. HEIM uses regional data to estimate the multipliers for the local economy, but the results are only approximate. The estimated local impacts are higher than the regional impacts for four of the six impacts shown in the table. In these cases, it is best to assume that the local impacts are slightly less than the census area impacts noted in the table.

The base construction cost for the inner harbor, using estimates from HEIM, is approximately \$10.0 million. The total cost of the new harbor, including upland facilities, was manually set at \$23.5 million to match R&M's Alternative 6 total cost, not including markups. The model uses only the inner harbor infrastructure to determine economic impacts, omitting mobilization and uplands improvements. The impacts can be scaled to account for the full \$23.5 million cost, but this is only approximate because the model is configured with multipliers catered to harbor construction rather than other types of civil construction. The upper end of the impact ranges given before the table are based on the full \$23.5 million cost.

Analysis of operational impacts suggests a total sales multiplier of 1.61 for the region and 1.57 for the community. This means that for every dollar spent on this set of harbor-related expenditures, there is an additional \$0.57–\$0.61 of spending in the region and community, respectively. For every \$1 million of direct spending, there are an estimated 16.9 jobs created in the region and 14.9 created in the community. Overall, approximately 41 percent of total sales end up as payments to labor. More detail about annual harbor user spending is provided in the next section.

### **Survey Data Collection and Findings**

This analysis uses updated expenditure information based on surveys administered on paper and online by Valdez Harbor staff and R&M Consultants. The surveys were identical to those used originally to develop HEIM so that the results could be compared directly. There were a total of 263 responses to the surveys, including 178 from recreational vessels, 56 from commercial fishing vessels, and 29 from local businesses.

Surveys were used to update expenditure data in HEIM. However, some of the stated expenditures for commercial fishing vessels appeared to be too low when compared to the data collected for the

model's original development (which includes a significant response from Valdez). It appears respondents not homeported in Valdez only reported their Valdez expenditures. Where the numbers from the survey represented a major departure from the model's built-in values, the model uses the default values under the assumption that spending would be more in line with the averages if the vessels were actually homeported in Valdez.

Analysis of survey data resulted in expenditure estimates by vessel type, vessel length, and spending category, as shown in Table 2 through Table 4.

**Table 2. Vessel Expenditure Patterns, Fishing Vessels, by Vessel Length and Spending Category**

Expenditure Category	Vessel Length (Feet)			
	33-43	44-54	55-75	75-150
<b>Vessel expenditures per year</b>				
Fuel	26,506	32,267	40,664	65,829
Gear repair	5,480	11,853	21,144	48,966
Maintenance	17,121	34,785	60,467	137,536
Stores	20,461	27,870	38,617	70,885
<b>Visit related expenditures per year</b>				
Food & entertainment	10,039	14,294	22,113	42,235
Lodging	1,091	1,223	1,700	3,209
Miscellaneous	6,546	10,519	16,131	23,609

Source: Vessel surveys and Northern Economics, Inc. analysis

**Table 3. Vessel Expenditure Patterns, Charter Fishing and Commercial Recreation Vessels, by Vessel Length and Spending Category**

Expenditure Category	Vessel Length (Feet)			
	33-43	44-54	55-75	75-150
<b>Vessel expenditures per year</b>				
Fuel	29,774	36,266	45,673	73,966
Gear repair	11,501	26,177	47,532	111,619
Maintenance	7,738	12,888	20,391	42,922
Stores	22,343	24,483	27,611	36,948
<b>Visit related expenditures per year</b>				
Food & entertainment	15,337	17,237	20,936	30,463
Lodging	1,261	1,318	1,662	2,830
Miscellaneous	8,766	11,753	15,638	18,674

Source: Vessel surveys and Northern Economics, Inc. analysis

**Table 4. Vessel Expenditure Patterns, Recreation Vessels, by Vessel Length and Spending Category**

Expenditure Category	Vessel Length (Feet)		
	22-36	37-54	54-75
<b>Vessel expenditures per year</b>			
Fuel	2,079	2,572	7,500
Gear repair	816	2,494	30,910
Maintenance	574	1,387	16,127
Stores	546	1,372	18,143
<b>Visit related expenditures per year</b>			
Food & entertainment	619	995	4,142
Lodging	283	206	371
Miscellaneous	1,100	640	3,223

Source: Vessel surveys and Northern Economics, Inc. analysis

Using fleet composition data from the U.S. Army Corps of Engineers'<sup>2</sup> report, shown in Table 5, and the slip sizes from the Alternative 6 design, Northern Economics estimated the fleet composition by length and type for the new harbor, as shown in Table 6.<sup>3</sup>

**Table 5. Fleet Composition Data, Existing Valdez Small Boat Harbor**

Vessel Type Category	Vessel Length (Feet)				Total Number of Vessels
	0-21	22-36	37-55	>55	
Recreation	64	273	60	2	399
Fishers	0	6	13	5	24
Charters	15	33	19	10	77
<b>Totals</b>	<b>79</b>	<b>312</b>	<b>92</b>	<b>17</b>	<b>500</b>

Source: U.S. Army Corps of Engineers (2010)

<sup>2</sup> U.S. Army Corps of Engineers. September 2010. Valdez Harbor Expansion Feasibility Study Economics Appendix B. Available at [http://www.poa.usace.army.mil/Portals/34/docs/civilworks/currentproj/vol2appendixbeconomicanalysis\(2\).pdf](http://www.poa.usace.army.mil/Portals/34/docs/civilworks/currentproj/vol2appendixbeconomicanalysis(2).pdf).

<sup>3</sup> The analysis assumes that if the new harbor were to be focused on a specific user type, such as commercial fishing vessels, the net economic impact would be the same and that other user types shown in the estimated fleet composition would represent new entrants to the harbor system resulting from spaces being freed in the existing harbor.

**Table 6. Estimated Fleet Composition, New Valdez Harbor**

Vessel Type Category	Vessel Length (Feet)					Transient Use (Feet)
	36	40	50	60	100	
Recreation	15	31	34	1	0	460
Fishers	0	7	7	3	2	72
Charters	2	10	11	7	2	18
<b>Total</b>	<b>17</b>	<b>48</b>	<b>52</b>	<b>11</b>	<b>4</b>	<b>550</b>

Source: Northern Economics, Inc. analysis using U.S. Army Corps of Engineers (2010) and R&M Consultants (2013)

Applying the expenditure patterns shown in Table 2 through Table 4 to the fleet composition shown in Table 6, Northern Economics estimated the total spending from the fleet using the new harbor, as shown in Table 7. Note that labor payments and payments to the City of Valdez for moorage are not included in the total spending shown in Table 7 because they do not have the same multiplier effects as retail and wholesale spending.

**Table 7. Estimated Total User Spending by Expenditure Category, New Valdez Harbor**

Expenditure Category	Total Direct Spending
<b>Vessel expenditures per year</b>	
Fuel	1,919,746
Gear repair	1,266,624
Maintenance	1,743,569
Stores	1,513,943
<b>Visit related expenditures per year</b>	
Food & entertainment	940,165
Lodging	87,326
Miscellaneous	628,921
<b>Total</b>	<b>8,100,294</b>

Source: Vessel surveys and Northern Economics, Inc. analysis

Organized by sector, Table 8 shows how the spending data was used in the input-output analysis.

**Table 8. Estimated Total User Spending by Sector, New Valdez Harbor**

Expenditure Category	Total Direct Spending (\$)
<b>Vessel expenditures per year</b>	
General Merchandise Stores	2,142,864
Maintenance and Repair Other Facilities	3,010,193
Eating & Drinking	940,165
Hotels and Lodging Places	87,326
Miscellaneous Retail	1,919,746
<b>Total</b>	<b>8,100,294</b>

Source: Vessel surveys and Northern Economics, Inc. analysis

In addition to the spending shown in Table 7 and Table 8, vessels would also pay approximately \$269,000 for moorage and other harbor services, based on the rate analysis conducted for the new harbor.

**Assumptions Used in the Analysis**

A key assumption used in the analysis is that vessel activity in the new harbor will represent growth in the overall user base in Valdez and not cannibalization of users of the existing harbor. The result of this assumption is that the economic impacts presented in this report reflect new economic activity in the Valdez-Cordova Census Area rather than a reclassification of existing business activity. This section discusses the arguments in support of and against this assumption.

The primary basis for the assumption that the new harbor would attract new users to the community is the wait list, which indicates a considerable amount of demand for moorage in Valdez. In the addition to maintaining the wait list, the City of Valdez tracks which of the vessels on the wait list were in the water and using Valdez Harbor's facilities. Table 9 summarizes the composition of the wait list in 2013, including those vessels that are on the list that used Valdez facilities and current tenants on the wait list for a larger slip that did not have vessels in the water during 2013.

**Table 9. Composition of Valdez Harbor Wait List, 2013**

Slip Length (Feet)	Number of Vessels on Wait List in 2013	Wait List Vessels in the Water in 2013		Number of Tenant Vessels Needing Larger Slips and Not in the Water in 2013
		Number	Percentage of Wait List (%)	
20	0			
24	33	10	30.3	
30	107	53	49.5	9
40	52	26	50.0	10
50	43	25	58.1	5
<b>Total</b>	<b>235</b>	<b>114</b>	<b>48.5</b>	<b>24</b>

Source: City of Valdez (2014) and Northern Economics, Inc. analysis

As seen in the table, nearly half of vessels on the wait list in 2013 used Valdez facilities at least once that year. However, the wait list does not provide a true representation of demand, and the analysis assumes that existing demand will be sufficient to make up for any current users on the wait list who are able to get a slip as a result of the new harbor.

The cost for maintaining a position on the wait list is a deterrent for some users, especially in cases where the waiting time until a slip becomes available is perceived to be too long. Vessel owners who choose not to pay to maintain their position on the wait list are not represented on the list yet still represent part of the total market demand for moorage in the community.

Valdez is a desirable location for many boaters and offers low costs for boaters that use it frequently, even after accounting for travel costs from Interior and Southcentral Alaska to Valdez versus other, closer harbors. A market analysis suggests that the potential demand for moorage in Valdez is considerable.

The new harbor would also offer moorage to larger vessels that have not been accommodated by the existing harbor. These larger vessels would be new to the community and would contribute to a significant amount of spending on goods and services in the community.

A number of vessels on the wait list currently use harbor facilities as transients, as was shown in Table 9. It is important to recognize that there are costs associated with hot berthing transient users that the City of Valdez would no longer have to bear if the vessels had permanent moorage, including staff time, time taken by owners to move boats, and those boats that cannot be left in the water due to the owner not being able to travel to Valdez in a timely manner.

**Comparison of the Input-Output Analysis and the Harbor Economic Impact Model**

To place the estimated economic impacts of the new harbor in perspective, Northern Economics applied HEIM to the existing harbor as it is configured. To ensure a fair comparison, the actual float layouts were used instead of the actual users of the harbor, since the existing harbor operates in excess of its capacity. Table 10 shows the results of this analysis.

**Table 10. Operational Impacts of Existing Harbor**

Operational Impacts		
	Census Area	Local
Total Sales (Direct, Indirect, Induced) (\$)	22,842,353	22,250,589
Employment (Direct, Indirect, Induced) (jobs)	243	217
Payments to Labor (Direct, Indirect, Induced) (\$)	5,213,500	≤5,213,500

Source: Harbor Economic Impact Model and Northern Economics, Inc. analysis

Table 11 shows the slip sizes and counts used in the analysis. For simplicity, it was assumed that all slips were occupied by permanent moorage holders, and that occupants were categorized as commercial fishing, charter, and recreational vessels according to the ratios found by the U.S. Army Corps of Engineers (2010) and as shown in Table 5.

**Table 11. Estimated Fleet Composition, Existing Harbor**

Vessel Type Category	Vessel Length (Feet)							Transient Use (Feet)
	20	24	30	32	40	48	50	
Recreation	92	94	74	74	43	25	7	1,666
Fishers	0	2	2	2	9	5	2	261
Charters	21	11	9	9	14	8	2	65
<b>Total</b>	<b>113</b>	<b>107</b>	<b>85</b>	<b>85</b>	<b>66</b>	<b>38</b>	<b>11</b>	<b>1,992</b>

Source: Northern Economics, Inc. analysis using City of Valdez (2014) and U.S. Army Corps of Engineers (2010)

Using the of slip sizes and counts shown in Table 11, the existing harbor has 15,792 linear feet of permanent moorage space and an average slip or vessel length of 30.8 feet; the new harbor has only about 40 percent of the total linear permanent moorage space (6,192 feet), but larger vessels on average (46.9 feet). The existing harbor also has nearly four times the transient moorage space as the new harbor. The net effect is that the existing harbor's economic impact is approximately 1.7 times the impact projected for the new harbor or, conversely, the new harbor would contribute an additional 60 percent over the total sales the existing harbor currently generates.

The existing harbor's impact reflects activity that currently occurs within Valdez's economy and elsewhere in the Valdez-Cordova Census Area. This includes direct impacts such as \$5.2 million of sales and 40 jobs related to maintenance and repair, \$2.3 million of sales and 38 jobs in eating and drinking establishments, \$9.2 million of sales and 25 jobs in retail stores, and \$400,000 of sales and 4 jobs in hotels and lodging. Indirect impacts contribute to another \$4.6 million of household spending and 107 other jobs above and beyond those created by direct spending in the community. This activity allows Valdez to have more businesses and a greater diversity of businesses than it would have if the harbor were not there.

The Alaska Department of Labor and Workforce Development's Alaska Local and Regional Information (ALARI) database<sup>4</sup> shows that Valdez had 1,999 employed residents in 2012. The estimated 217 jobs generated from the existing harbor's operations represent nearly 11 percent of the employment in the community.

### **Input-Output Analysis and the Harbor Economic Impact Model**

The economic benefits of harbor-related spending were estimated by quantifying the direct, indirect, and induced effects of local spending on goods and services. The expenditure data described above were used as inputs to an Input-Output (I-O) model used to quantify the multiplier effects of local spending.

The Harbor Economic Impact Model was developed in 2003 and has been applied a number of times in Southcentral Alaska communities. Northern Economics has used it to analyze the local and regional effects of adding moorage in the Seward Small Boat Harbor and to determine the local, regional, and state impacts of expanding Homer's harbor. Former Port Director Alan Sorum also used it for analysis of the Valdez Harbor.

No studies have been completed to assess the efficacy of the model and, due to the extensive and time-delayed nature of the economic data that would be required, it is not possible to do so. However, the Harbor Economic Impact Model essentially estimates vessel expenditures in selected sectors of the economy and then looks at the economic impacts of that spending by applying multipliers provided by IMPLAN™ software. IMPLAN, and the broader technique of I-O analysis that it applies, is well-established and accepted in the economics community. A history of the development and major users can be found on the IMPLAN website.<sup>5</sup>

I-O models are economic tools used to measure the effects of an economic activity on a region; using expenditure patterns, tax payments, labor requirements and other economic data they aim to replicate the inter-industry transactions within a community, tracking the flow of money between the industries within a specified economic region of interest. An I-O model can measure how many times a dollar is re-spent in, or "ripples" through, the economic region before it leaks out.

The I-O model yields multipliers that are used to calculate the indirect and induced effects on jobs, income, and business sales/output generated per dollar of spending on various types of goods and services in the Valdez-Cordova Census Area. Only the local expenditures in Valdez are used in the model; the rest are considered leakages. More leakages mean smaller multipliers; and the larger the local expenditures, the greater the multiplier effects. The multipliers for any given industry in any given location are unique, based on industry composition and geographic area. In this case, IMPLAN

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<sup>4</sup> See ALARI at <http://live.laborstats.alaska.gov/alari/>.

<sup>5</sup> For example, see [http://implan.com/index.php?option=com\\_content&view=article&id=871&Itemid=171](http://implan.com/index.php?option=com_content&view=article&id=871&Itemid=171).



was used to model the Valdez-Cordova Census Area economy, which in turn allows the Harbor Economic Impact Model to estimate the local impacts of harbor-related spending.

IMPLAN uses specific data on what inputs are needed to produce the goods or services for over 400 industries, and borough-specific data on what industries are available locally from which to purchase those inputs. The most recent (2011) IMPLAN data on multipliers for the Valdez-Cordova Census Area were applied for this analysis.

Figure 1 illustrates conceptually how the total economic impacts or benefits are determined.

**Figure 1. Framework in Evaluating the Total Economic Effects or Impacts of Local Spending**

