A satellite-style map of the state of Maine, USA, with numerous red circular icons representing lobster locations scattered across the coastline and inland areas. The map includes labels for major cities like Portland, Brunswick, and Augusta, and neighboring states like New Hampshire and Vermont. The text is overlaid on the right side of the map.

# **Lobsters to Dollars: The Economic Impact of the Lobster Distribution Supply Chain in Maine**

**Final Report  
June 2018**

A photograph of a lobster processing facility. Two workers in orange overalls are visible, one in the foreground and one in the background, working with equipment. The floor is wet and covered with yellow and blue crates. The background shows a large window and various pieces of machinery.

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In Partnership with the  
Maine Lobster Dealers' Association

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The following lobster dealers participated in the data collection and narrative descriptions of the wholesale lobster distribution supply chain in Maine.

A.C. Inc.	Greenhead Lobster	Ready Seafood
Atwood Lobster	Inland Lobster	Rocky Coast Maine LLC
Bean Maine Lobster	Island Seafood	Sea Salt Lobster
D.B. Rice Fisheries LTD	J.P.'s Shellfish	Seaview Lobster
Eastern Traders	Maine Coast	Stonington Lobster Co-op
Garbo Lobster	Maine Lobster Outlet	Taylor Lobster Company
Gouldsboro Enterprises	Maine Seafood Ventures	Vinalhaven Fishermen's Co-op

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## Summary

Maine's iconic lobster industry is arguably the most visible, and perhaps the most economically important asset for the State. In 2017 more than 110.8 million pounds of Maine lobsters were harvested, with an estimated retail value of over \$451 million – down from a historic peak of 132.5 million pounds valued at \$554.5 million in 2016. Surprisingly, there is little known about the economics of the industry after the product leaves the wharf. Although mandatory reporting provides information on the landed value of lobsters, there has never been an analysis of the value of the lobster industry along its entire supply chain – from the point of first sale to the final consumer. Wholesale distribution supply chains, by their nature, are generally invisible to consumers, policy makers, municipal officials, and regulators. This project makes visible the network of dealers that define the wholesale lobster distribution supply chain in Maine. The Lobsters to Dollars project provides an analysis of the economic output of the wholesale lobster distribution network in Maine in terms of its dollar value and jobs supported by the dealers' operations.

Economic impact studies typically rely on publicly available data on expenditures and employment published by government agencies according to industrial classification. Wholesale distribution operations, whether for furniture, electronics, or lobsters, inherently hard to disentangle from public data sources. The operations of lobster dealers in Maine are variously classified in government data bases as wholesalers, harvesters, retailers, specialty food stores, or restaurants. Further complicating the modeling of economic impacts, most readily available industry multipliers treat all wholesale industries the same. This means that the economic impact of a wholesale distributor of manufactured furniture is assumed to be equivalent to the impact of a lobster dealer shipping a live product to market, according to government estimates. Reliable data for the lobster dealer supply chain in Maine does not exist.

For the Lobsters to Dollars project, thirty-one lobster dealers in coastal Maine communities were interviewed and twenty-one dealers from Kittery to Beals agreed to complete detailed worksheets of their 'upstream' and 'downstream' spending and income relative to their position in the distribution supply chain for live and processed lobsters in 2016. Each participating dealer provided confidential detailed accounts of their spending and revenue for

2016. This sample of dealers included lobster co-ops (2); wharfs and buying stations (3); large, medium, and small volume wholesale distributors (13); and processors (3). Estimates of the business-to-business indirect effects were computed for each component of spending and induced labor market effects were calculated based on dealer labor payments. Both indirect and induced results were added to dealer direct spending on operational inputs and labor to determine the total regional contribution.

Individual economic impact models were constructed for each of the twenty-one dealers, providing them with an estimate of the dollar value of their contribution to the Maine economy and the number of jobs supported by their operations. The total number of jobs supported, either directly or indirectly by the spending of these dealers included the direct employment of workers doing the grading and packaging of lobsters to induced and indirect employment of local workers whose businesses were impacted by the wages paid to the dealers' employees or business-to-business spending initiated by the dealers.

The twenty-one participating dealers were then matched to a 2017 census of 305 wholesale dealers and divided into subgroups according to similar scales and scope of operation. Retail outlets (including supermarkets), restaurants and individual fishermen holding a dealer's license were excluded from the analysis. Average impacts from the sample were then applied to each subgroup to derive an estimate of the total economic value for the dealer supply chain in Maine.

Scaling the results of this sample of dealers up to an estimate of the impact for the entire network of dealers in Maine proved to be challenging due to the limited participation of the dealers and restrictions on the availability of employer records from the Maine Department of Labor. Of the 305 entities holding dealers' licenses, roughly 150 represent supermarket or grocery stores, restaurants or other retail food outlets. Informal follow-up conversations with a subset of dealers made it possible to divide up the remaining wholesale lobster dealers into size categories according to anecdotal evidence regarding the scale and scope of operations at various points in the distribution supply chain. Wharves and buying stations made up one category, co-ops another, processors were separated into a third group, and the remaining wholesale distributors were categorized according to their approximate scale of operation (small,

medium, and large). The sample of 21 dealers was then matched to their corresponding functional category and average economic impact values were applied to the other dealers in each group. In this fashion, the wholesale lobster distribution supply chain contributed an estimated \$967.7 million to the Maine economy and supports more than 5,500 jobs in 2016.

Through in-person interviews and survey worksheets, participating dealers were invited to identify the biggest challenges they face as a lobster dealer in Maine. Topping the list of challenges were profit margins and labor shortages. Quality of product and ‘shrinkage’ was a close second on the list of most of the dealers. Burdensome government regulations and competition from other countries due to recent trade agreements tied for third most mentioned challenges.

The findings of the Lobsters to Dollars project are important for a variety of reasons. The lack of vertical integration and owner-operator fishing rules creates two distinct sectors in this industry: (i) harvesting lobsters; and (ii) the wholesale distribution and processing of the animal. Yet the wholesale distribution of lobsters is neither well understood nor recognized by consumers and policy makers. At the same time, the entire industry faces threats from competing trade agreements, climate change, labor shortages, and insufficient infrastructure investment. Telling the dealers’ story, and making visible their economic contributions, provides support for the maintenance and repair of Maine’s transportation network infrastructure and policy initiatives designed to improve the efficiency and sustainability of the lobster industry.

What follows is a detailed report of the activities of the Lobsters to Dollars project and accompanying economic impact results. Supporting educational outreach resources can be found at [www.colby.edu/lobsters2dollars](http://www.colby.edu/lobsters2dollars).

## **Overview of the Lobsters to Dollars Project**

The goals of the Lobsters to Dollars project include: (i) estimating the impact of the operations of wholesale lobster dealers on the Maine economy in terms of dollar value and jobs supported; (ii) providing an educational resource to help dealers, policy makers, and industry analysts better understand the wholesale lobster distribution supply chain; and (iii) make visible the inherently invisible wholesale distribution supply chain of the lobster industry in Maine through the stories told by dealers themselves about what they do.

This project involved in-person interviews with dozens of lobster dealers and harvesters, the collection of a detailed database of spending and revenue sources for lobster dealers, and the construction of dealer-level economic impact models of the wholesale distribution of lobsters on economic activity across the state of Maine.

Wholesale distribution networks, whether for electronics, furniture, or perishable food items like lobsters are an incredibly important component of Maine's economy. Delivering a commodity to its customers is a largely invisible activity that includes transportation, storage, value-added operations, and packaging. Lobsters will often pass from one dealer to another in the process of wholesale distribution and delivery. Economic impact studies of wholesale distribution networks are generally non-existent. Government estimates used for modeling this type of economic activity do not distinguish between different types of wholesale operations – delivering lobsters to market is assumed to be no different than delivering electronics in terms of their wholesale economic impacts – so standard modeling approaches could not be used for the Lobsters to Dollars project.

Further complicating this project were recent limitations imposed by the Federal government and Maine State Department of Labor on the availability of firm-level data on the number of employees and wages paid. As a result, the Lobsters to Dollars project involves several novel approaches in producing the economic impact estimates for the wholesale distribution of lobsters in Maine provided in this report.

## Economic Impact Analysis

The economic impact analysis of the Lobsters to Dollars project applies specifically to the wholesale distribution network of lobster dealers in Maine. The economic impacts associated with harvesting lobsters from the Gulf of Maine and retail sales at restaurants, supermarkets, and other food outlets are not part of this project.

Intuitively, economic impact analysis works in the following fashion. Spending by an institution, firm, or individual – like a lobster dealer – directly affects those entities that receive the money. The sum total of this initial spending is referred to as the *direct effects* in economic impact analysis modeling. In general, such spending either goes to individuals in the form of wages, stipends, and salaries (labor services) or to other firms or institutions as fees for provided services (business-to-business transactions).<sup>†</sup>

Employees who receive their wages then spend this money on living expenses and investments in things like education, healthcare, real estate, cars, boats or ATVs. The retail outlets, dealerships, service providers, and entertainment venues in which this spending takes place in turn pay their employees and engage in business-to-business transactions with the money they receive. The sum total of the multiplicative rounds of spending resulting from labor payments by lobster dealers is known as the *induced effects* in an economic impact analysis.

Similarly, business-to-business transactions by a lobster dealer will also have a multiplicative effect on the local, state, and/or regional economy. Transactions for maintenance and repair of vehicles, office equipment, legal and professional services, and even bait, crates, and rubber bands initiate successive rounds of spending by the business that receive these payments and pass a portion along to their employees or supporting operations. The estimated total of this spending represent the *indirect effects* in terms of the economic impact of lobster dealers in Maine.

The total economic impact of a lobster dealer in Maine can then be estimated by summing up the direct, induced, and indirect effects of their business operations.

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<sup>†</sup>Note that some spending 'leaks' out in each round of the multiplier process in the form of retained earnings of the dealer or supporting businesses, savings by employees, or in taxes paid to the government and municipalities.

Each of the three components of economic impact analysis have accompanying employment effects. In estimating employment effects, care must be taken to distinguish between newly created jobs (e.g., when a lobster dealer begins operations) and jobs *supported* by the operations of lobster dealers and successive rounds of indirect and induced multiplier effects.

Two approaches for estimating the economic impact of the lobster distribution supply chain were proposed for the Lobsters to Dollars project. The first involved accessing confidential employer-level data from the Maine State Department of Labor (MDOL) for lobster dealers and processors and applying current zip code level multiplier estimates by matching the industry classification in the MDOL database with multipliers used in the IMPLAN software package. These multipliers are derived and regularly updated by the technical staff at IMPLAN using data from the U.S. Bureau of Economic Analysis and a wide array of other government data sets and non-government resources. While this approach would have enabled a geographically detailed level of analysis and involved a great deal of data collection and careful database management, it is not as analytically challenging as other methods of analysis. It would, however, have provided a useful baseline and 'cross-check' for more sophisticated estimates of the direct, indirect, and induced effects of the lobster distribution network on the Maine economy. Unfortunately, recent concerns over identity theft and data privacy at the Federal and State levels resulted in a recent policy decision at MDOL to no longer offer academic researchers in Maine non-disclosure access to these confidential employer records so this approach was not possible.

An alternative approach would have been to seek summary data from MDOL for industry-level employment and earnings totals and then apply aggregate multiple estimates to model the direct, induced, and indirect economic impacts of lobster dealers in Maine. As noted above, wholesale distribution operations – whether for furniture, electronics, or lobsters – are by their nature complicated and mostly invisible to the final customer. As a result, the exact nature of wholesale dealer operations are hard to disentangle from public data sources. Specifically, the operations of lobster dealers in Maine are variously classified in MDOL and U.S. Census Bureau databases as wholesalers, retailers, specialty food stores, or restaurants – there is no single

industry for the classification of lobster dealers and no way to assign the aggregate operations of lobster dealers to the various industries in which they operate.

Further complicating the modeling of economic impacts is the fact that most readily available industry multiplier estimates used to construct the models treat all wholesale industries the same. This means that the economic impact of a wholesale distributor of manufactured furniture is assumed to be equivalent to the impact of a lobster dealer shipping a live product to market according to government estimates. In sum, reliable data for the lobster dealer supply chain in Maine does not exist.

To address these complications, the Lobsters to Dollars project models the economic impact of the wholesale distribution supply chain for Maine’s lobster industry using a method known as an *analysis by parts*. This approach is more analytically rigorous and better suited for addressing the goals of the Lobster to Dollars project. Analysis by parts is an advanced IMPLAN modeling technique that deconstructs the existing supply chain relationships to isolate the impacts of individual lobster processors and distributors. An analysis by parts approach can produce a much more descriptive and precise impact analysis as regional multipliers are applied to firm-level data. To implement this approach a comprehensive survey of expenditures and revenues for lobster processors and distributors across Maine was created. Using this data, an economic impact analysis at the corresponding county level was constructed for each of the dealers who participated in this project. The total economic impact at the state level was then estimated by aggregating the economic impacts for the sample of dealers.<sup>‡</sup>

### **Dealer Data**

For the Lobsters to Dollars project, thirty-one lobster dealers in coastal Maine communities were interviewed in person and twenty-one agreed to complete confidential detailed worksheets<sup>†</sup> of ‘upstream’ and ‘downstream’ spending and income relative to their position in the distribution supply chain for live and processed lobsters in 2016. Dealer

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<sup>‡</sup>As a check for robustness of this approach, the spending of all the participating dealers in this study was aggregated by sectoral components and a state-wide ‘lobster dealer supply-chain industry’ level economic impact analysis was performed. This method is not a perfect comparison to the county level approach described above as the state level approach included interregional trade.

<sup>†</sup>A blank version of the dealer worksheet survey can be found in the appendix to this report.

participation was a real challenge and often involved multiple site visits to wharves, processing facilities, tank room operations, and warehouses in coastal communities across the state. Every member of the Maine Lobster Dealers' Association received multiple invitations to participate in this project. Invitations and encouragement was also provided by Maine DMR officials. Informational brochures, a short video, and sample surveys were mailed and hand delivered to dealers. There was suspicion and reluctance on the part of many dealers to provide detailed information on their spending and income and scale of operations by essentially providing open access to the profit and loss statements for their businesses. In the end, it was the tenacity of Annie Tselikis, in her role as the Director of the Maine Lobster Dealers' Association, the promise of confidentiality, the development of an introductory 'sizzle reel' video of the goals of the project, and the support of a few key dealer advocates that brought together the subgroup of businesses and individuals represented in the Lobsters to Dollars Project. Economic impact analyses were performed for each of the participating dealers totaling their direct spending with the indirect and induced multiplier effects.

Summary statistics for self-reported spending from the dealer survey worksheets used in modeling their economic impacts are reported in Table 1. The spending categories presented in Table 1 provide a glimpse into the wide variation in the type of operations that exist among lobster dealers and processors in Maine. Wharves, co-ops and pounds do little in the way of 'downstream' value-added in the distribution supply chain but typically provide the 'upstream' harvesters with bait and rubber bands. Distributors and wholesalers generally buy their lobsters directly from wharves, harvesters, and co-ops and then grade, pack and ship the lobsters along the supply-chain to other dealers, retailers or for export directly to food distribution networks and other customers both domestically and abroad. This stage of the supply chain also includes some warehousing – keeping the lobsters alive and healthy in a variety of tanks and shower units. Processors buy lobsters from whomever they can and transform the animal into a commodity that then gets sold to retailers or food distribution networks. All told, the sample of 21 participating dealers reported buying more than 120.2 million pounds of lobster in 2016 valued at over \$62 million.

**Table 1. Self-Reported Lobster Dealer Spending by Category**

Category	Average	Median	Maximum	Minimum
Background checks	\$39,626	\$9,000	\$230,000	\$300
Bait	\$655,071	\$290,179	\$4,000,000	\$260
Bank services	\$14,675	\$12,356	\$40,793	\$2,250
Building maintenance	\$17,514	\$13,537	\$63,229	\$750
Business entertainment	\$16,665	\$7,500	\$125,000	\$300
Business insurance	\$32,028	\$10,220	\$289,630	\$300
Cell phone	\$505,622	\$184,000	\$3,500,000	\$2,243
Computer repairs & maintenance	\$49,205	\$49,205	\$95,281	\$3,129
Electricity	\$74,199	\$50,000	\$250,000	\$3,000
Equipment rental	\$184,225	\$134,091	\$587,000	\$18,260
Equipment repairs & maintenance	\$3,365	\$940	\$16,373	\$100
Motor fuel	\$34,384	\$152,308	\$1,300,000	\$1,500
Legal and professional services	\$29,714	\$15,486	\$124,000	\$342
Marketing & advertising	\$356,517	\$14,982	\$120,000	\$1,500
Office supplies	\$42,457	\$17,337	\$140,000	\$5,000
Packaging expenses	\$328,582	\$15,000	\$2,863,669	\$500
Payroll services	\$138,223	\$100,000	\$450,000	\$8,560
Plowing/landscaping	\$441,411	\$441,411	\$880,000	\$2,823
Postage	\$836	\$617	\$1,805	\$306
Product shipping fees	\$220,542	\$80,000	\$1,485,884	\$1,530
Rent	\$49,807	\$15,000	\$209,064	\$375
Rubber bands	\$194,585	\$76,000	\$1,000,000	\$2,040
Sewer & Water	\$8,748	\$1,530	\$37,000	\$765
Telephone and business internet	\$35,551	\$15,000	\$170,000	\$500
Vehicle leasing	\$107,918	\$67,284	\$350,000	\$9,000
Vehicle maintenance & repairs	\$42,700	\$29,865	\$175,000	\$2,000
Waste removal	\$35,300	\$22,000	\$75,000	\$8,899

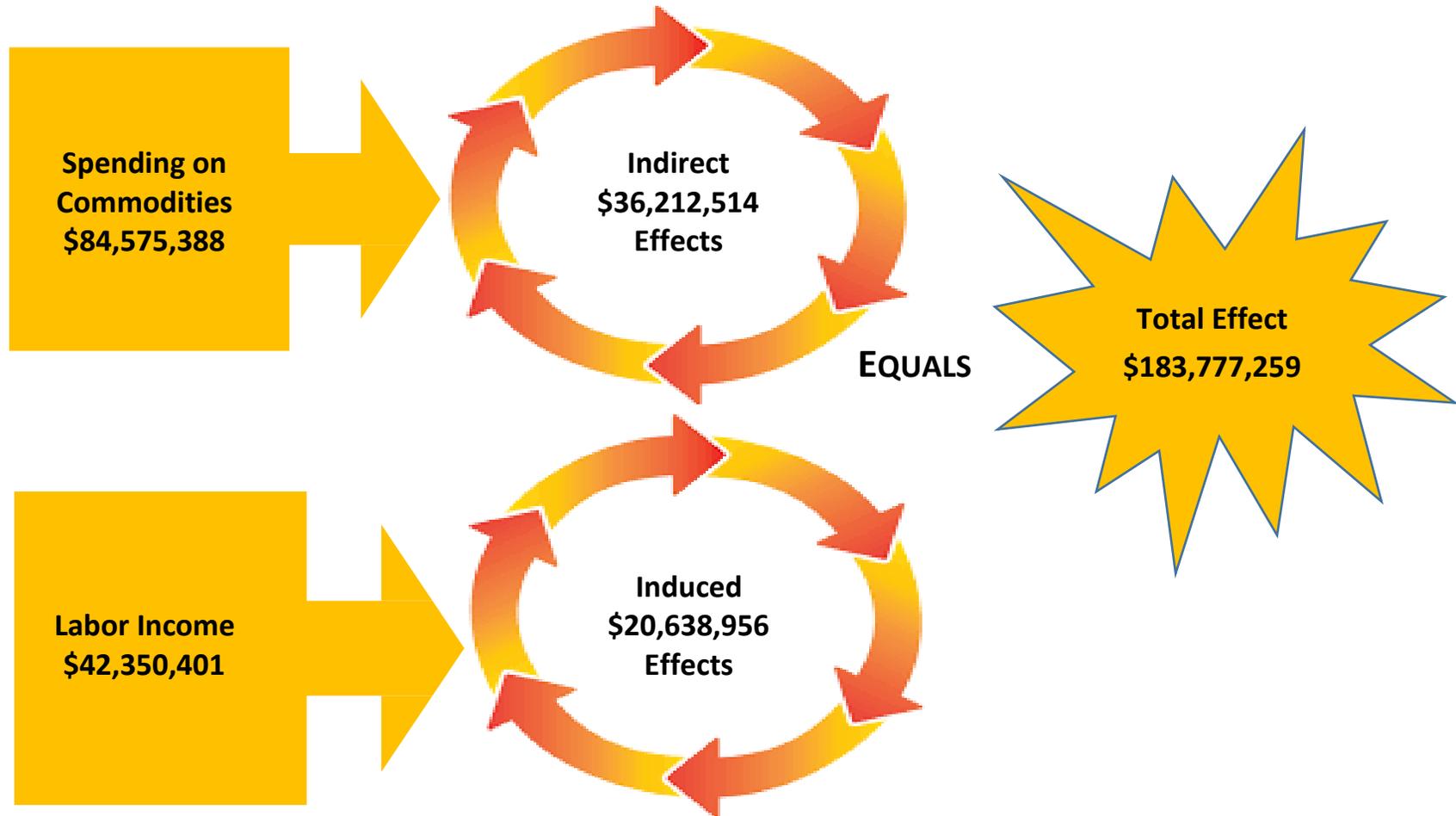
## Results

The spending categories in Table 1 were assigned to IMPLAN's activity sectors using NAICs codes and definitional categories specific to the modeling application and a dealer's scope of operations. Each dealer model included two activities: one for employment, income and *direct value added* – non-commodity payments and income associated with a dealer's operations including payroll expenses, business taxes, and other income (profits, rents, etc.); and a second for the individual categories of spending on commodities. The model was then solved in IMPLAN, applying 2016 county-level multiplier estimates. Figure 1 on the following page presents the results.

Dealers who participated in the Lobsters to Dollars project reported total spending on goods and services in the amount of \$84,575,388 in 2016 which in turn generated an estimated additional \$36,212,514 in indirect (business-to-business) economic activity. This group also reported payroll spending and other income totaling \$42,350,401 in 2016 which is estimated to have generated \$20,638,956 in induced economic activity. The total economic output from the operational activities of this group of wholesale distributors and processors is estimated to have been \$183,777,259 in 2016. Accompanying this level of economic activity is an estimated 1,206 jobs that were supported as a result of these dealers' operations in 2016.

The twenty-one participating dealers were then matched to a 2017 census of wholesale dealers and classified by similar scale and scope of operation. Using these economic impact results from the sample of dealers the entire list of firms and individuals holding lobster dealer licenses was then arranged by function (e.g., processor, wharf, co-op, wholesaler, and distributor) and scale of operations. As noted above, retail outlets (including restaurants and supermarkets) and individual fishermen holding dealer's licenses were excluded from the analysis. Average economic impacts calculated from the sample of participating dealers were then applied to the remaining dealers for each operational subgroup. The subgroup results were then aggregated and an estimate of the total economic output and number of supported jobs attributable to the wholesale distribution of lobsters in Maine was derived as detailed below.

Figure 1. Economic Impacts for the Sample of Participating Dealers



### Aggregate Economic Impact for the Maine Economy

As noted above, aggregating and extrapolating the \$183,777,259 in economic output attributable to the 21 dealers who participated in the Lobsters to Dollars data collection exercise required a subjective analysis of the full census of 305 Maine businesses, harvesters, and co-ops holding dealers' licenses in 2017. With the help of DMR professionals, the director of the Maine Lobster Dealers' Association (Annie Tselekis) and conversations with some of the participating dealers, the census of dealer license holders was classified into subgroups according to the nature of their business and their scale of operations. After excluding restaurants, supermarkets, grocery stores, other retail outlets and fishermen holding one or more dealer's licenses, 167 wholesale dealers and processors remained. Each of these representative subgroups had one or more dealer who participated in the Lobsters to Dollars project. Average economic impact values and estimated impacts were then applied to each group and totaled to get an estimate for the total economic impact of the wholesale lobster dealer distribution supply chain in Maine as described below in Table 2. These 167 wholesale distributors, processors, wharfs, pounds, and co-ops licensed lobster dealer contributed an estimated \$967,675,313 – nearly \$1 billion – to the Maine economy and supported more than 5,500 jobs in 2016.

**Table 2. Aggregation of Economic Impacts**

Category of Operations	Total Dealer License Holders	Lobster to Dollars Participants	Impacts	
			Economic Output (2016 \$s)	Jobs Supported
Distributor	7	1	\$19,980,073	1,163
Processor	11	3	\$274,489,504	873
Wharf	84	3	\$206,551,022	1,259
Large & medium volume wholesaler	15	8	\$162,304,010	1,008
Other wholesaler	36	4	\$141,684,999	652
Pound/Co-op	14	2	\$162,665,705	631
<b>TOTALS</b>	<b>167</b>	<b>21</b>	<b>\$967,675,313</b>	<b>5,586</b>

### Challenges Facing Lobster Dealers in Maine

In addition to gathering data, dealers were surveyed as to the most pressing challenges they face in their day-to-day operations. Their responses are reported in the table at right. Chief among the concerns, with nine dealer responses each, was a shortage of labor and shrinking profit margins.

Next on the minds of dealers is the challenge of “shrink”, or the quality of product in terms of lobsters that arrive weak, unhealthy or die before reaching the end of the wholesale distribution supply chain.

The supply of herring as a source of bait for lobster traps was of significant concern among dealers at the time of this survey in 2017.

Migrant labor plays an important role in the wholesale lobster distribution supply chain, primarily in the sorting, grading, and packing of lobsters. Dealers from Kittery to Beals all had stories to share about how difficult it was to find workers. In the end,

it’s clear that the wholesale distribution of lobsters is an important ‘second-chance’ industry for workers willing to show up and work hard. Dealers are willing to pay a premium for workers regardless of their background or skill level.

Rank	Challenge
1	Labor shortage
	Profit margins
3	Shrink
4	Competition
	Regulation
6	Bait supply
7	Future supply
	Aging dealers
	Disconnect between mkt place and the share harvesters think the dealers are selling at
	False price reports
	Financing
	Getting paid for lobsters
	Keeping employees happy
	Lack of respect
	Market dynamics
	Paper work
	Price volatility
	Seasonally constrained cash flow
	Space
	Taxes
	Year-round Maine supply

## Outreach Resources and Recommendations

A variety of outreach resources accompany the Lobsters to Dollars project. Specifically, an interactive web site ([www.colby.edu/lobsters2dollars](http://www.colby.edu/lobsters2dollars)) and an eight minute video (<https://youtu.be/LSBK72HiW U>) provide opportunities for telling the dealers' story, informing policy makers and the general public about the work of lobster dealers in delivering this crustacean to market, and generally make visible the wholesale lobster dealer supply chain in Maine.

The findings of the Lobsters to Dollars project are important for a variety of reasons. The lack of vertical integration and owner-operator fishing rules creates two distinct sectors in this industry: harvesting lobsters; and the wholesale distribution and processing of the animal. Yet the wholesale distribution of lobsters is neither well understood nor recognized by consumers and policy makers. At the same time, the entire industry faces threats from competing trade agreements, climate change, labor shortages, and insufficient infrastructure investment. Telling the dealers' story, and making visible their economic contributions, provides support for the maintenance and repair of Maine's transportation infrastructure network and policy initiatives designed to improve the efficiency and sustainability of the lobster industry.

Looking forward, there is a need for better data and additional research regarding the economic impact the lobster industry has in Maine. Increased participation of the dealers would improve the estimates offered in this report. Similar economic impact analyses for the harvesting and retail sale sectors of the lobster industry would provide valuable information as well. There is no doubt that the lobster industry in Maine is among the most – if not *the* most – important in the state in terms of economic impact and cultural identity. There is a general consensus that the lobster industry today faces serious threats from climate change, environmental degradation, uncertain biological behavior of the species, and cultural and economic barriers to trade coming from abroad. The ability of policy makers, government regulators, and members of this industry – from harvesters to dealers to trade representatives and retailers – to sustain this important sector of the Maine economy depends critically on the availability of accurate and timely information.