



MAINE  
AQUACULTURE  
ASSOCIATION

Maine Aquaculture

# Economic Contribution Report

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# Table of Contents

<b>Executive Summary</b>	<b>05</b>
<b>Introduction</b>	<b>07</b>
<b>Methods</b>	<b>08</b>
<b>The Economic Contribution of the Maine Aquaculture Industry</b>	<b>10</b>
<b>Discussion</b>	<b>13</b>
<b>Funding Acknowledgement</b>	<b>15</b>
<b>Works Cited</b>	<b>15</b>



# MAINE AQUACULTURE ECONOMIC CONTRIBUTION REPORT

## Executive Summary

- Maine aquaculture has become woven into the fabric of the coastal and rural communities where farms are located.
- From 2014 to 2023, the total economic contribution of the Maine aquaculture sector increased by 51% from \$137.6 million to \$208.1 million, and the total number of jobs increased by 60% from 1,078 to 1,720.
- Maine's aquaculture sector has a direct economic contribution of \$105.9 million in output, with an additional \$57.5 million in output from indirect (supply chain) effects and \$44.7 million in induced (household spending) effects.
- If the direct economic contribution of lobster is excluded from calculations, the aquaculture industry's direct contribution of \$105.9 million represents 69% of seafood value in Maine.
- The shellfish and seed subsector more than tripled in sales revenue from 2014 to 2023.
- The top three species by sales revenue are Atlantic salmon, eastern oysters, and blue mussels.
- Annual aquaculture production values vary considerably in part due to site rotation and fallowing routines. The current study was conducted during a period when finfish production was at a low point in its normal three-year rotation cycle, which also occurred in the 2017 study. This, paired with substantial finfish losses in 2023 due to unusual environmental conditions, significantly reduced the level of economic contribution found in that sub-sector and thus the contribution of the greater sector statewide. The finfish estimates are conservative. Subsequently, the total estimates in this study are also conservative. Total finfish production contributions in a strong year could be well over 50% higher than reported here, putting total annual aquaculture contributions to Maine over \$265 million.
- The majority of Maine aquaculture jobs reported were full-time, year-round positions.
- This is a sector of small, beginning farmers. 35% of businesses have been operating for fewer than 5 years, 44% have been operating for 6-10 years, and only 21% have been in business for more than ten years.
- 83% of respondents held 20 leased acres or fewer, and most respondents held more than 5 leased acres.
- There is substantial optimism in the aquaculture sector with 77% of respondents projecting sales revenue growth by 2030, with a median sales growth projection of 75% per business. This is likely driven by the cohorts of early and middle-stage businesses, mentioned above, who are growing to find their right size. This also likely drove the sector to triple the shellfish and seed subsector.
- Primary lease holders had high levels of educational attainment, with 89% having a four-year degree or higher. 69% of the respondents were between the ages of 40 and 69 years old.
- The aquaculture workforce is also well-educated, with an estimated over 70% holding a four-year degree or higher. The workforce skews younger than leaseholders, with the majority of the workforce under 50, and the largest segment of it under 35.
- Those who identified as women or nonbinary comprised 29% of primary leaseholders and 24% of the workforce, respectively. That is over 4x higher than the percentage of female commercial fishers and owners across the U.S. (Posadas, 2025)
- 80% of producers sell their product to wholesalers or distributors. The largest farm-level sales channels by volume, in decreasing order, are: wholesalers/distributors in Maine, direct to consumer in Maine, and split between U.S. wholesalers/distributors beyond Maine and restaurants and markets in Maine.

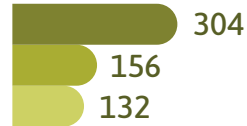
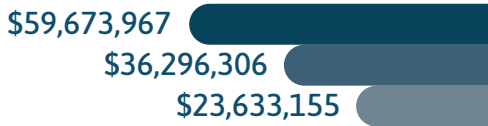
## Economic Contribution

## Employment (Full-Time and Part-Time jobs)

**\$119,603,429**

**Finfish**

**591 jobs**



**\$85,752,226**

**Shellfish & Seed**

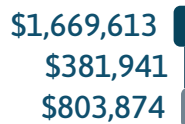
**1,047 jobs**



**\$2,855,429**

**Seaweed**

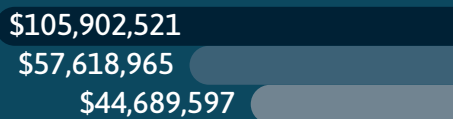
**82 jobs**



**\$208,211,083**

**Maine Aquaculture Totals**

**1,720 jobs**



○ ○ Total   ● ● Direct   ● ● Indirect   ● ● Induced

## Introduction

Maine has a rich history of harnessing its natural resources to create livelihoods. In many cases, these livelihoods spawned heritage industries and created communities that preserve cultural traditions across the state. Aquaculture, a natural combination of Maine's heritage fishing and farming industries, extends this legacy. Aquaculture occurs across all parts of the state, from the mountains to the sea. Maine's coastline and aquatic resources represent a unique asset that supports and connects Mainers through a wide network of interlinked sectors. Across the U.S., aquaculture is one of the top growing segments of commercial agriculture. As one of the top aquaculture-producing states, Maine is considered a national leader, and its sector is growing.

Aquaculture is the farming of aquatic organisms such as finfish (e.g. salmon, trout), shellfish (e.g. oysters, mussels, scallops), and algae (e.g. seaweed). Domestic consumption of seafood products has grown consistently since 1990, along with consumer preferences for specific products. Salmon, for example, has become the second-most consumed seafood in the U.S., with over 70% of it being aquaculture-raised (NFI, 2023; WWF, 2026). Several others in the top ten U.S. most-consumed seafood items, such as shrimp, tilapia, catfish, and oysters, are also often farm-raised. This suggests that the demand for U.S. seafood, particularly aquaculture products, will increase in the coming decade.

Aquaculture produces finfish, shellfish, and seaweed for a variety of uses: food, sport, bait, aquaria, research, biopharmaceuticals, nutrition, skincare, conservation, and more. Aquaculture in Maine includes 30 species, ranging from salmon, mussels, scallops, green sea urchins, and seaweed raised in the ocean, to oysters raised in estuaries, and to clownfish, trout, and tilapia raised in land-based systems, amongst other species. The majority of Maine's aquaculture products are for human food consumption. Stock restoration, or enhancement, is another form of aquaculture in Maine in which hatchery finfish, shellfish, and seaweeds are stocked to rebuild populations or protect habitats, often through government-funded conservation channels. For many Mainers, the first fish that they caught was a trout from a State-run hatchery. Maine's aquaculture legacy runs deep.

Aquaculture, still in its nascency when compared to agriculture, is the fastest growing food production sector in the world and provides more seafood globally, by weight, than capture fisheries (FAO, 2024). It is estimated that 62% of food fish will be produced by aquaculture by the year 2030. In order to meet seafood goals for 2030, it will require a 70% increase in global aquaculture production (AES, 2013; NIFA, 2016). The United States is one of the largest markets for seafood in the world but ranks seventeenth in terms of aquaculture production, despite ranking ninth in coastline and fourth in landmass (NOAA, 2021). The United States imports 80% of its seafood, leading to a \$24.6 billion trade deficit (ERS, 2024). Meanwhile, the total economic contribution of aquaculture to the U.S. economy in 2022 was \$3.8 billion, and growing (Kumar et al., 2024).

Maine has a long history of supplying North American markets with fresh, healthy seafood from its position within a 24-hour truck ride of over 150 million customers. It has a reputation as an established and valued brand known for its high quality, sustainably produced products with a great taste and longer shelf life. Maine's aquaculture sector includes products from marine farms, land-based farms, land-based hatcheries, and aquaponics systems, among other types of aquatic farming, as mentioned above.

In order to provide current insights on the nature of Maine's aquaculture sector, this work aims to provide an up-to-date and accurate understanding of the economic contribution aquaculture provides to the State of Maine. These insights also identify the supply chain businesses across the state that are supported by the aquaculture industry, along with the role of such businesses in local communities. The related work, the [Maine Aquaculture Survey Report](#), also shares a snapshot that details more about who is in Maine aquaculture, including both business owners and workers. Some highlights from the survey report are included in the executive summary and discussion of this document.

## Methods

The goal of this report is to quantify the economic contributions of the Maine aquaculture industry to the State of Maine. Additionally, the report aims to highlight the contribution of the Maine aquaculture industry's three subsectors: finfish, shellfish and seed, and seaweed.

The Maine Aquaculture Association (MAA) led this collaborative effort between the Maine Aquaculture Innovation Center (MAIC), Atlantic Corporation, Dr. Shraddha Hegde of Texas A&M University, and Dr. Ganesh Kumar of Mississippi State University. The work consisted of two components: (1) a detailed survey of aquaculture entities throughout Maine to estimate revenues, employment, industry spending patterns, and other key details for the sector; and (2) using the survey data in IMPLAN to estimate the size, scope, and economic contributions of aquaculture in Maine. The economic contribution report and accompanying [survey report](#) serves as an update to industry data that will be able to provide important insight for small businesses, policymakers, and other stakeholders in, and related to, the aquaculture sector across the state.



### Survey

MAA utilized the Maine Department of Marine Resources lease and limited purpose aquaculture license (LPA) data, along with expert consultation, to compile a list of all aquaculture farms in Maine. MAA contacted all 360 of the identified businesses via email to collect detailed farm-level data for 2023 on revenues, expenses, workforce, and demographics through the survey. A strong total response rate of 46% was recorded. Response rates across the 20+ individual species included ranged from 19%-100%. We calculated the response rate and reported sales volume and value within each species. We then compared the sales volume and value reported against the sales volume and value data from the Maine Department of Marine Resources, the USDA Census of Aquaculture, and Maine Sea Grant to determine the survey's coverage rate for each species. We determined each subsector's coverage rate by calculating the weighted average coverage rate of each species, with reported sales value being the weight. Last, we determined the total coverage rate by calculating the weighted average of all subsectors' coverage rates, weighted by value. This provides a much more conservative, accurate estimate than if we were to have applied the total survey response rate (46%) equally across all species and subsectors. It also allows us to estimate contributions by subsector. As mentioned above, a coverage rate weighted average was calculated based on the response rate and value of each species, compared to publicly reported sales volume and value data, to arrive at the final coverage rate for each species, each subsector, and the total model. The coverage rates used were: (1) Finfish – 83%; (2) Shellfish and Seed – 74%; (3) Seaweed – 38%; (4) Total – 81%. For each model, the adjustment factor was applied to both total revenues and expenses e.g. all shellfish revenues and expenses were divided by 0.74 to reach full coverage. Again, these rates were adjusted to ensure appropriate levels of coverage, and to provide a much more conservative estimate than if the total response rate of 46% was applied to all species and subsectors.

## Modeling

In this study, Impact Analysis for Planning (IMPLAN), the most widely-used input-output software for performing economic contribution analysis, was selected as the modeling framework. IMPLAN measures linkages across all economic sectors as goods and services flow through supply chains in a defined area to estimate an industry's economic contributions. The underlying data and multipliers for IMPLAN come from the U.S. Bureau of Economic Analysis and the Bureau of Labor Statistics, amongst other sources. However, aquaculture is not a distinct sector within IMPLAN. Instead, it is embedded with the broader category of "animal products except cattle, poultry, and eggs." This requires the creation of custom spending patterns and output information within IMPLAN to accurately capture the economic contributions of aquaculture.

The latest and most comprehensive method to achieve this level of accuracy is the Industry Impact Analysis (IIA), where information on output, employment, compensation, proprietor income, intermediate inputs, and local purchase percentages is included to create a customized spending pattern and accurately capture the effect of the aquaculture industry in Maine while separating it from the larger sector of animal products except cattle, poultry, and eggs within IMPLAN. It is an updated version of the Analysis by Parts (ABP) approach, which was previously the leading method used to capture aquaculture economic contributions (Botta et al., 2021; Kumar, Hegde, et al., 2024). IIA was used in this work by Dr. Shraddha Hegde to define Maine aquaculture subsectors by creating custom industry spending patterns and output information within IMPLAN to accurately capture the economic contributions of aquaculture in Maine. Expenditures, which were gathered in the survey, were converted to percentages of outputs, with each expenditure allocated to a specific IMPLAN sector, and then used to estimate economic contributions. The local purchase percentage, which indicates the portion of farm spending going into the local businesses in Maine, affects the multipliers and was customized for each sector within IMPLAN. The information on local purchase percentages was collected through expert opinions.

Four separate IMPLAN models were created: (1) all Maine aquaculture; (2) Finfish; (3) Shellfish and Seed; and (4) Seaweed. The IMPLAN database and software were updated with 2023 data, which is the same year the survey data was collected. The economic contribution analysis is presented in three effects: direct, indirect, and induced effects. The direct effect shows the sales output from aquaculture farms themselves. The indirect effect, sometimes called supply chain contributions, is the effect of spending that aquaculture drives in other local industries through the purchase of goods and services. This is driven largely by the spending on intermediate inputs, e.g. boats, equipment, feed, or services, which result in increased supply chain activity, and wages paid to those working in the businesses. The third component of the economic contribution is the induced effect, which results from the increased household spending from employee income of both direct aquaculture activities and indirect supply chain businesses. These often make contributions in sectors such as real estate, hospitals, medical services, groceries, restaurants, retail, etc.



## The Economic Contribution of the Maine Aquaculture Industry

Aquaculture is a growing sector in Maine that supports communities in all corners of the state, with a focus in coastal areas. The sector consists primarily of growers, but also includes processors, transportation providers, storage providers, service providers, retailers, boat builders, researchers, non-profits, and many more. The most important elements of aquaculture's economic contributions are shown through the direct, indirect, and induced effects. These are driven predominantly by the processes related to farming, stocking, feeding, and protecting animals and algae produced by aquaculture. In many cases, the other processes and mechanisms related to the aquaculture supply chain are captured by IMPLAN via other specialized economic sectors, e.g. boat building, truck transportation, or equipment manufacturing. A share of the MAA survey respondents was engaged primarily in research, which results in economic contributions not readily captured by IMPLAN.

The survey results indicate that research is supported by grants, and results in a very small share of the reported company revenues. But research funds that are used for the purchase of intermediate inputs and to pay workers contribute to indirect and induced effects. Although research dollars represent a relatively small percent of the revenue for commercial farmers, the majority of grants funding aquaculture research at the state's many academic and non-profit research institutions are from federal and philanthropic sources outside the state. These funds contribute significantly to the economic contribution of those institutions. This report does not estimate the economic contribution of those funds. It is important to note, however, that if Maine did not have a significant commercial aquaculture sector, it is unlikely that the state would be able to compete for those research funds, and their economic contribution on the state would be significantly reduced.



As of 2023, the most recent year for which data were available, aquaculture is estimated to contribute \$208.1 million to the Maine economy (Table 1). This includes direct contributions of \$105.9 million, which combine the effects of sales output from farms and farm expenditures. Aquaculture supports 1,720 full-time and part-time jobs in Maine. It also contributes over \$3.5 million in state taxes and nearly \$15 million in federal taxes annually, although actual tax contributions are likely much higher. According to a 2017 report commissioned by the Maine Aquaculture Innovation Center (MAIC), the direct economic contribution of Maine aquaculture as of 2014 was \$73.4 million, indicating a growth of 44% in less than 10 years to reach the 2023 direct contribution of \$105.9 million (Cole et al., 2017). Total contributions have grown by 51% from \$137.6 million to \$208.1 million in the same time span.

The majority of this growth was created by an expansion in Maine’s shellfish farming sector, which tripled in farm gate sales revenue from 2014 to 2023. This growth was spurred on by a number of small businesses and entrepreneurs, mostly oyster farms, who launched their farms between 2015 and 2020 and slowly grew to try to reach their breakeven point. This is further detailed in the [survey report](#) following this contribution report. The largest aquaculture subsector by output is finfish, with a total contribution of \$119.6 million, followed by shellfish and seed with \$85.8 million, and seaweed with \$2.9 million (Table 2). In terms of total employment, the shellfish sector supports the most jobs (full-time and part-time) at 1,047, compared to 591 from finfish, and 82 from seaweed (Table 3).

**Table 1. Total economic contributions of Maine aquaculture farms in 2023**

	Employment	Labor Income	Value Added	Output
Direct	1,207	\$36,272,094	\$29,001,661	\$105,902,520
Indirect	264	\$18,601,449	\$29,897,519	\$57,545,064
Induced	247	\$14,481,403	\$28,014,393	\$44,675,497
<b>Total</b>	<b>1,720</b>	<b>\$69,354,945</b>	<b>\$86,913,573</b>	<b>\$208,123,081</b>

**Table 2. Total economic contributions of Maine aquaculture by subsector in 2023**

	Finfish	Shellfish & Seed	Seaweed	Total
Direct	\$59,673,967	\$44,558,941	\$1,669,613	\$105,902,521
Indirect	\$36,296,306	\$20,940,718	\$381,941	\$57,618,965
Induced	\$23,633,155	\$20,252,567	\$803,874	\$44,689,597
<b>Total</b>	<b>\$119,603,429</b>	<b>\$85,752,226</b>	<b>\$2,855,429</b>	<b>\$208,211,083</b>

**Table 3. Employment contributions of Maine aquaculture subsectors in 2023**

	Finfish	Shellfish & Seed	Seaweed	Total
Direct	304	829	75	1,207
Indirect	156	106	3	264
Induced	132	113	5	249
<b>Total</b>	<b>591</b>	<b>1,047</b>	<b>82</b>	<b>1,720</b>

As of 2024, Maine aquaculture is estimated to contribute more than \$208.1 million to the Maine economy and to support 1,720 jobs statewide. Given that much of the contribution of the industry’s subsectors is via indirect and induced effects in other industries, it is worth examining where in the Maine economy these contributions are the strongest.

Table 4 reports the 10 largest industries by contribution, based on both indirect (supply chain) and induced (employee spending) effects. The Maine aquaculture sector made contributions to 400 industries within Maine.

**Table 4. Industry Contributions of Maine Aquaculture**

	Industry Display	Direct Output	Indirect Output	Induced Output	Total Output
1	Animal production, except cattle and poultry and eggs	\$105,902,520	\$938,872	\$21,272	\$106,862,664
2	Wholesale - Machinery, equipment, and supplies	\$0	\$12,498,514	\$73,507	\$12,572,021
3	Monetary authorities and depository credit intermediation	\$0	\$6,039,706	\$1,155,453	\$7,195,160
4	Owner-occupied housing	\$0	\$0	\$6,403,939	\$6,403,939
5	Insurance carriers, except direct life	\$0	\$4,998,693	\$808,410	\$5,807,103
6	Other real estate	\$0	\$2,674,220	\$1,562,287	\$4,236,507
7	Hospitals	\$0	\$0	\$3,885,448	\$3,885,448
8	Boat building	\$0	\$3,867,108	\$17,382	\$3,884,489
9	Insurance agencies, brokerages, and related activities	\$0	\$2,396,171	\$589,927	\$2,986,098
10	Electric power transmission and distribution	\$0	\$1,803,190	\$605,740	\$2,408,930

The estimates for employee compensation are reported in Table 5. Total labor income, which is foundational to the estimated induced contributions shown above, is estimated at \$60.4 million per year in the State of Maine. This figure only includes compensation paid to employees. It does not include proprietor, or business owner, income.

**Table 5: Employee Compensation in Maine Aquaculture**

	Total Employee Compensation
Finfish	\$ 31,861,199
Shellfish and Seed	\$ 27,590,022
Seaweed	\$ 940,413
<b>Total Aquaculture</b>	<b>\$60,391,634</b>

## Discussion

The Maine aquaculture sector has grown to become an integral part of Maine’s working waterfront communities and economy. The total economic contribution of Maine aquaculture grew from \$137.6 million in 2014 to \$208.1 million in 2023. This represents a 51% increase, with an average annual growth of 6%. Additionally, the industry spurred on a 60% increase in total Maine jobs supported from 1,078 in 2014 to 1,720 in 2023 – an average of 7% annual growth (Table 6). This growth in mostly year-round, full-time work brings economic vitality to the often rural and coastal communities where farms are based. This attraction and retention of workers, along with investment, contributes to local infrastructure development and supports other local businesses. Aquaculture businesses provide career and entrepreneurial paths for Mainers, especially on Maine’s working waterfronts.

The Maine aquaculture sector has progressed from its early, pioneering roots to its current status as a national leader. The findings in this report corroborate this with figures that reflect substantial, yet moderately-paced growth. The majority of the growth that has occurred since 2014, the year of the previous study (Cole et al., 2017), has been driven by the expansion of Maine’s shellfish and seed sector, which has tripled in sales revenue. That being said, the estimates reported for the combined, or total, Maine aquaculture sector should be considered a lower-bound estimate. The finfish production cycle in 2023 was planned to be a lower-production year, which it also was in 2014. However, finfish also experienced significant, unexpected losses in 2023, meaning that the finfish estimate in another year could be well over 50% higher than what is reported here. This would also be reflected in the total economic contribution, which could be at least 25% higher, easily over \$265 million.

The growth of aquaculture in Maine has generated a palpable excitement both for small business owners and for those who work, or wish to work, in the sector. While not a direct part of the economic contribution analysis, demand for programs such as the registered Maine Aquaculture Apprenticeship program, which receives roughly ten times the number of applications as it has positions available, highlights the growing excitement around Maine aquaculture, especially amongst younger people who want to build a career in it. Such programs also have broad appeal, from fishermen who want to stay in their hometowns to become apprentices and start their own farms, to others who have relocated from across the country to launch their career in Maine aquaculture. This is further explored in the [Maine Aquaculture Sector Survey Report](#).

There are also a number of aquaculture-adjacent businesses who have adopted aquaculture as part of their business model. This includes trap mills who have adapted to also make aquaculture gear, marinas and mooring services who help to set up farms and land their product, and aquaculture-specific boat building and repair. Additionally, there has been an explosion of oyster bars and aquaculture-related tourism. The Maine Oyster Trail, which has drawn in tourists from across the globe, boasts over 5,000 users who have checked into businesses over 9,000 times, including some businesses who exist solely as aquaculture tourism or gastro-tourism businesses. Although this economic contribution study includes revenue generated from other activities on aquaculture farms, such as paid tours hosted by a farm, this work does not capture the secondary contributions associated with all of these related tourism activities, which can be significant.

**Table 6. 2014 to 2023 Maine Aquaculture Economic Contribution Growth**

Total	2014	2023	% Growth
Employment	1,078	1,720	60%
Labor Income	\$56,087,244	\$69,345,945	24%
Output	\$137,648,270	\$208,123,081	51%

In 2023, Maine reported a total value of \$635 million in commercial marine landings (DMR, 2025). After accounting for Maine lobster's dockside value of \$482 million, that leaves a total of \$153 million in other seafood value. Based on the estimates in this study, that means that aquaculture's direct contribution of \$105.9 million makes up 69% of seafood in Maine that is not lobster. In other words, excluding lobster, the majority of seafood from Maine, by value, is raised on Maine's aquaculture farms. After lobster, finfish production in Maine, even in an exceptionally low-value year, is the next most valuable category at \$59.7 million. Aquaculture represents a significant, growing sector in Maine's seafood economy. It has a bright future ahead, with plenty of opportunity, especially as many fisheries either stagnate or decline. As a sector with many young businesses still early in their growth phases, aquaculture also presents an opportunity to extend the maritime, food-producing legacies and heritage industries of Maine's working waterfronts, both now and for future generations.

Aquaculture plays a significant role in Maine's working waterfront economy, with room to grow. Following the iconic Maine lobster, finfish aquaculture provides the state's second most valuable commercial landings. As a whole, aquaculture's production, number of species being raised, and value are increasing. The entrepreneurship and full-time, year-round work that it provides offers opportunity to those looking to build their own business or career, usually without the same level of capital needs or generational hurdles often present in capture fisheries. This strengthens the working waterfronts where aquaculture occurs alongside Maine's other marine sectors. Aquaculture is by no means a substitute, rather, it is an inclusive complement to commercial fishing. It is here to stay, and it is here to grow with Maine.

Two additional areas of future exploration are the roles of processing and research. Processing, or the value-add process, is vital for certain types of aquaculture products to move downstream and reach consumers. It is not precisely known how much of this processing is captured by the analysis because it is vertically integrated and conducted by growers, or takes place after the commodities change hands. A deeper understanding of this stage of the supply chain will aid in fully understanding the broader economic contribution of aquaculture. More work is also needed to account properly for the role of research in the burgeoning Maine aquaculture sector. Maine has emerged as one of the preeminent research hubs for cold water marine research in the country, accounting for multiple startups, incubators, and research centers. New facilities have been constructed, creating jobs and additional tax revenues for the state economy. Maine has also attracted interest and investment from land-based finfish businesses who could provide a significant boost to aquaculture's economic contribution and employment figures, both on the coast and inland, if they are built to scale. This increases the state's ability to attract both grant money and businesses moving to Maine because of the research capacity. The economic contribution of these developments and investments, amongst other projects such as proposed land-based finfish facilities, is not included in the current economic contribution study, but can be measured, conservatively, in the millions of dollars.



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