



Economic contributions of the Virginia seafood industry

Authored by Fernando H. Gonçalves, Research Scientist, Center for Coastal Studies Affiliate Faculty, Center for Advanced Innovation in Agriculture Affiliate Faculty, Virginia Seafood AREC, Virginia Tech; Jonathan van Senten, Assistant Professor and Extension Specialist Department of Agricultural and Applied Economics, Center for Coastal Studies Affiliate Faculty, Virginia Seafood AREC, Virginia Tech; Michael H. Schwarz, Center for Coastal Studies Affiliate Faculty, Director of the Virginia Seafood AREC, Virginia Tech; Shraddha Hegde, Visiting Assistant Professor, Department of Rangeland, Wildlife and Fisheries Management, Texas A&M University.

Introduction

The Chesapeake Bay is an ecosystem with significant ecological, social, historical, cultural, and economic value. The relationship between the Chesapeake Bay with fishing activities in Virginia dates back to the indigenous Powhatan tribes that introduced Chesapeake Bay oysters to the English settlers and colonists in the early 1600s. This longstanding tradition of working waterfronts and maritime economic activities has evolved to where Virginia is now the third-largest seafood producer in the United States. In 2019, Virginia seafood landings accounted for 393,065,090 pounds, with a dockside value of over \$184.2 million (NMFS-NOAA, 2022). Similarly, the Virginia aquaculture industry has continued to grow with 191 aquaculture farms responsible for \$112.6 million in total sales (USDA-NASS, 2019). In 2019, Virginia was the largest producer of hard clams nationwide and the largest producer of oysters along the U.S. Atlantic coast. All levels of the seafood supply chain, from producers, processors, wholesalers, distributors, retailers, and consumers are found in Virginia. Many of these businesses engage in commercial activities with one another and rely on additional goods and services provided by other entities in Virginia for their continued survival and success. It is exactly this interconnected nature of the seafood industry that helps to contribute to the Commonwealth's overall economy. The present study is focused on estimating the overall direct, indirect, and induced effects of the Virginia seafood industry in 2019 utilizing primary data, obtained by surveying industry stakeholders.

Methods

The primary data on expenditures from watermen, aquaculture farmers, processors, and distributors needed for the economic contribution analysis were collected through an online survey deployed using the Qualtrics platform. The development and execution of the economic impact model was done using IMPLAN online and the analysis-by-parts approach. The state package IMPLAN dataset was purchased from The IMPLAN Group for Virginia for the most recent year available (2020) including 2019. A separate industry spending model was developed for each level of the Virginia seafood supply chain to reflect the differences in cost structures. Custom expenditure patterns were entered into Microsoft Excel, to develop standardized enterprise budgets for watermen, aquaculture farmers, processors, and distributors that were a part of the Virginia seafood industry. The expenditures of these activities were converted into spending coefficients and coded using the appropriate North American Industry Classification System (NAICS) sector codes. The coded expenditure patterns were then imported into the IMPLAN online system, relevant models were created, and those models were run and analyzed. For detailed information, see Additional Resources to access the full report.

Results

Most of the seafood production is concentrated in Eastern Virginia which presents five distinct regions: The Northern Neck, the Middle Peninsula, the Virginia peninsula, the Southern Virginia, and the

Eastern shore. There were 167 responses to the survey, of which 150 provided the necessary information for further analysis. 17 responses were removed from the dataset because they were blank, incomplete, or did not provide relevant information. The list frame accounted for 1,528 watermen, 191 aquaculture farms, 76 processors, and 36 distributors. The response rate was calculated by dividing the number of survey respondents by the total entities in the list frame. The coverage rate was calculated by aggregating the total sales by respondents from the survey and dividing by the total sales of each level of the supply chain.

Table 1. Response rate and coverage rate, Virginia economic contribution survey for 2019.

Category	Response rate	Coverage rate
Watermen	5%	9%
Aquaculture	28%	82%
Processors	16%	16%
Distributors	17%	16%

Over \$1.1 billion in total output and 7,187 jobs supported in 2019 in VA.

The total economic output effect of the Virginia seafood industry was estimated at \$1.1 billion in 2019. The total employment effect of the Virginia seafood industry was estimated to be 7,187 people; with a direct effect of 6,050 jobs, indirect effect of 523 jobs, and induced effect of 614 jobs. In 2019, the Virginia seafood industry generated over \$26 million in tax revenue from local, state and federal taxes.

Table 2. Economic contributions of the Virginia seafood industry in 2019.

Category	Total contribution
Employment	7,187
Labor income	\$168,120,129
Value-added	\$428,005,182
Output	\$1,104,868,070

The Virginia seafood industry supports a wide variety of other economic sectors (64% of 546 industries), from polystyrene foam product manufacturing, boat building, sporting and athletic goods manufacturing, commercial and industrial machinery, and equipment repair and maintenance through direct expenditures by seafood businesses. Non-depository credit intermediation, owner-occupied dwellings, and real estate sectors are supported as wages and salaries paid to employees throughout the seafood supply chain multiply in Virginia’s economy.

Table 3. Economic contributions of the Virginia seafood industry activities for each level of the supply chain in 2019.

Category	Employment	Output
Watermen	1,969	\$226,282,561
Aquaculture	1,367	\$177,200,126
Processors	2,570	\$592,764,852
Distributors	1,281	\$108,620,531
Total	7,187	\$1,104,868,070

Discussion and Conclusion

The estimates produced by this study are conservative and likely underestimate the economic contributions of the Virginia seafood industry in 2019. The response rate is the primary limitation of this analysis, and a potential cause of underestimated activity expenditures. However, the response rates are similar to those obtained in other studies (Dumas, 2021, van Senten et al., 2019, Barnes, 2015). In addition, this project did not seek to measure the impact of Virginia’s seafood industry at retail and restaurant levels. The economic impact estimated in this study was confined to activities and expenditures within the state of Virginia. That is to say, expenditures and activities that happened outside of the state are not captured in the final economic contributions estimates. Rephann (2017) reported that the total economic impact of agriculture and forestry-related industries in Virginia was over \$91 billion in total output in 2015. Aquaculture, sport fishing, seafood processing, and distribution activities were included in these estimates.

Retail and restaurant services were not included in this analysis.

Despite the conservative numbers, the models generated by the primary data collected directly from the industry are relevant and provide a snapshot of the valuable economic contributions and employment opportunities supported by the Virginia seafood industry in 2019 for the state of Virginia.

References

- Barnes, N. G. 2015. Massachusetts Shellfish Aquaculture Economic Impact Study. University of Massachusetts Dartmouth, Charlton College of Business, Center for Marketing Research.
- Dumas, C. 2021. Economic Impact Analysis of North Carolina's Commercial Fisheries -- Commercial Harvesters Survey. Report for North Carolina Department of Environmental Quality, Division of Marine Fisheries, Commercial Fishing Resource Fund Program.
- National Marine Fisheries Service. 2022. Fisheries Economics of the United States, 2019. U.S. Dept. of Commerce, NOAA Tech. Memo. NMFS-F/SPO-229, 236 p. Available at: <https://media.fisheries.noaa.gov/2022-03/FEUS-2019.pdf>
- United States Department of Agriculture. 2019. 2018 Census of Aquaculture. National Agricultural Statistics Service, USDA, Washington, District of Columbia, USA. https://www.nass.usda.gov/Surveys/Guide_to_NASS_Surveys/Census_of_Aquaculture/index.php
- Rephann, T.J. 2017. The economic impact of Virginia's agriculture and forest industries. Weldon Cooper Center for Public Service University of Virginia. <https://www.vdacs.virginia.gov/pdf/weldoncooper2017.pdf>
- van Senten, J., Engle, C.R., Parker, M. Webster, D. 2019. Analysis of the economic benefits of the

Maryland shellfish aquaculture industry. Final Project Report, 31 p. <https://www.cbf.org/document-library/non-cbf-documents/analysis-of-the-economic-benefits-of-themaryland-shellfish-aquaculture-industry-full-report.pdf>

Additional Resources

Additional information may be found in the full report, infographic, and video accessible through the QR code below or link <https://qrco.de/bdMpi1>



Acknowledgment

The Virginia Seafood Agricultural Research and Extension Center (VSAREC) acknowledges the support of the Virginia Marine Products Board (VMPB). This report was prepared by the Seafood Economic Analysis and Marketing Research team (SEAMaR) under award number 301-21-019 (Virginia Department of Agriculture and Consumer Services) from the Virginia Marine Products Board, Commonwealth of Virginia. Any opinions, findings, conclusions, or recommendations expressed in this publication are those of the authors and do not necessarily reflect the view of the Virginia Marine Products Board. The authors would like to thank the Virginia Marine Products Board and all of the Virginia seafood stakeholders for their contributions to this report. This project was made possible due to the industry support and trust in us to maintain the confidentiality of their primary data.

Visit Virginia Cooperative Extension: ext.vt.edu

Virginia Cooperative Extension programs and employment are open to all, regardless of age, color, disability, gender, gender identity, gender expression, national origin, political affiliation, race, religion, sexual orientation, genetic information, veteran status, or any other basis protected by law. An equal opportunity/affirmative action employer. Issued in furtherance of Cooperative Extension work, Virginia Polytechnic Institute and State University, Virginia State University, and the U.S. Department of Agriculture cooperating. Edwin J. Jones, Director, Virginia Cooperative Extension, Virginia Tech, Blacksburg; M. Ray McKinnie, Administrator, 1890 Extension Program, Virginia State University, Petersburg.

2022

AAEC-303NP