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Watermen Workforce Challenges and Opportunities: Lessons from the Chesapeake Bay Region





Community Scope

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Watermen Workforce Challenges and Opportunities: Lessons from the Chesapeake Bay Region

AUTHORS

Jack Cooper and Emily Wavering

"The Chesapeake is a wonderful vacation spot on a quiet summer's day, but it can be an unforgiving tyrant that same night when the winds rise. The men who work it are quiet heroes, echoes of that day long distant when most Americans made their living close to nature."

– James A. Michener, *The Watermen*¹

Stretching over 200 miles from Northern Maryland to Southeastern Virginia, the Chesapeake Bay's place in the American story harkens back to the earliest days of the thirteen colonies when access to waterways and fishing were vital to the survival of the earliest settlers. In Jamestown in the summer of 1607, colonists subsisted on sturgeon and crabs found along the shallow waters of the James River, one of the major tributaries to the Chesapeake Bay.² In the nearly 410 years since, fishing on the Chesapeake Bay has become a way of life to many who work there, known as watermen.³

Often considered a generational occupation, watermen are men and women who make a living by fishing, crabbing and oyster harvesting.⁴ Many of today's watermen of the Chesapeake Bay fish the same waters trawled by their parents and grandparents.⁵ Some experts, however, have noted that the number of individuals in the watermen workforce seems to be declining.

While there is no definitive source that quantifies the number of watermen currently working in the Chesapeake Bay, estimates

Introduction

indicate that the workforce has declined from more than 10,000 individuals in the 1990s to fewer than 3,000 active watermen today.⁶ Fluctuations in the stock of shellfish and finfish in the Chesapeake Bay can make earning a living on the water a challenging prospect, as can the level of income associated with the occupation. In 2015, the estimated median hourly wage for fishers and fishing-related workers in the United States was \$13.14, which fell below \$17.40, the median hourly earnings for all occupations.⁷ This hourly wage corresponded to an annual wage of \$27,340 for fishers in 2015, which places fishers, on average, just above the 2015 poverty level for a family of four.⁸

This *Community Scope* will offer a broad overview of the challenges faced by today's watermen that may be precipitating their declining numbers and will discuss alternative and supplemental employment options that may be available to them.

The content of this publication is largely informed by interviews of watermen and other industry experts, including those who study workforce issues in the Chesapeake Bay region. For more information about those interviews, see Appendix A and for the geographic area of interest, see Map 1. Additional content reflects knowledge gleaned

from news articles and a recent history of the Chesapeake Bay's environment and surrounding workforce.

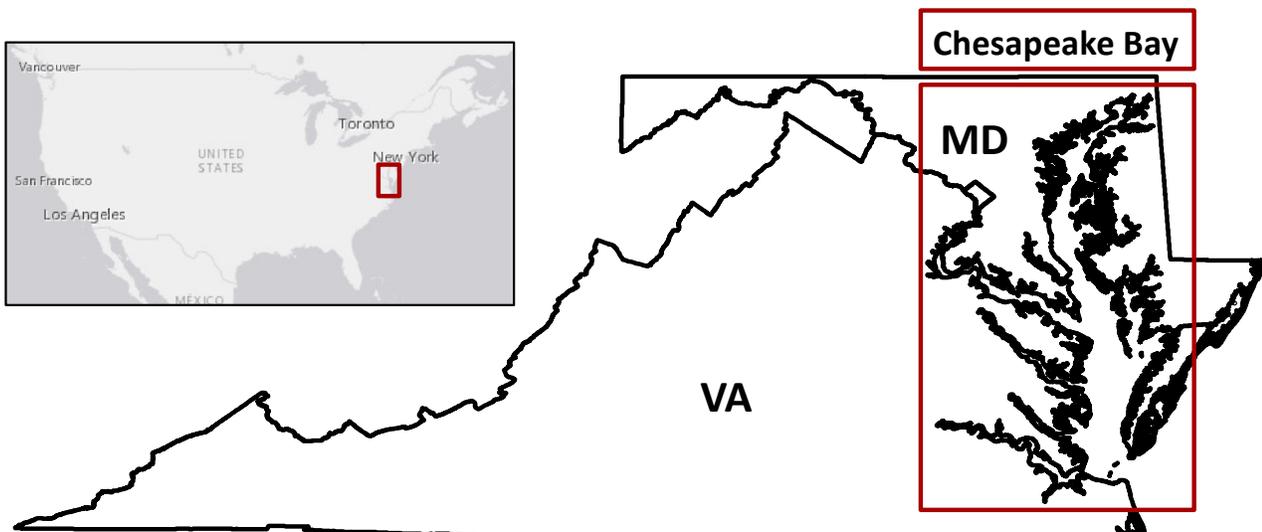
The Shrinking of the Watermen Workforce

"Today, Virginia's watermen are ... living inside a perfect storm of market forces, politics, environmental crisis, and cultural change: a time of deep uncertainty about the bay's future and their own."

– David Bearinger, *Watermen of the Chesapeake*⁹

Why are the ranks of watermen dwindling? Watermen, and experts who work with them, point to several factors that help explain the decline in workforce numbers, including stock fluctuations, government regulation and an aging workforce. First, fluctuations of stock in Chesapeake Bay fisheries make consistent income unreliable at best. The Chesapeake Bay oyster and blue crab fisheries have both experienced drastic fluctuations over time. As of 2008, the Chesapeake Bay oyster fishery was just one percent of its historical high, according to data from the National Oceanic and Atmospheric Administration (NOAA)

Map 1: The Chesapeake Bay Region



Chesapeake Bay Office.¹⁰ Peak levels of oyster harvesting have not been seen since the 1880s, when the Bay yielded roughly 17,000 bushels to about 50,000 oystermen. According to the Chesapeake Bay Foundation, this amounted to over 120 million pounds of oyster meat.

Meanwhile, as of 2007, the Chesapeake Bay blue crab fishery was on the verge of collapse. Concentrated efforts to address environmental degradation and fishing pressure have reestablished the sustainability of blue crabs in the Bay, but the population continues to fluctuate.

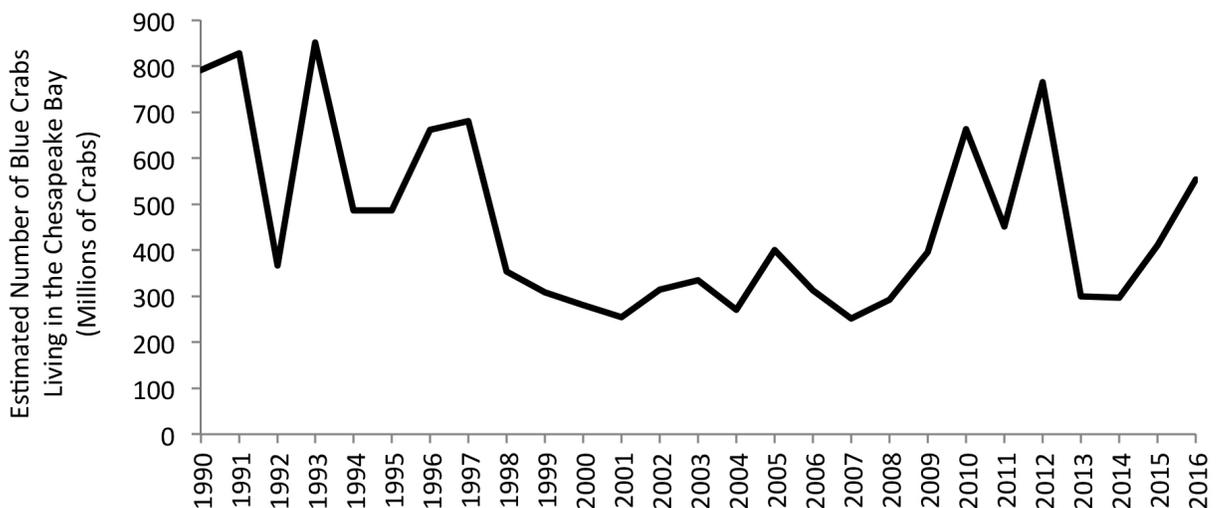
Relatedly, government regulations — which are frequently designed to protect against overfishing — may restrict fishing activity to a degree that makes it an unsustainable livelihood and may cause watermen to leave the occupation. Finally, the watermen workforce is widely reported to be an aging workforce, like many agricultural occupations.¹¹ As increasing numbers of watermen reach retirement age, they exit the workforce, and experts largely report that younger workers are not becoming fishers at a rate of replacement that maintains the total size of the workforce.

Fluctuations in Stock

The volatility in the amount of oysters, crabs and fish undoubtedly puts considerable pressure on watermen who traditionally work in the Bay. The watermen have felt the effects of the declining oyster fishery, and oyster harvest license data reflect this. As of 2009, just 1,000 people in Virginia and Maryland carried oyster harvesting licenses, which translates to about two percent of around 50,000 oyster harvesters in the late 1800s.¹² From 1985 to 2010, oyster harvests fell by 90 percent, and the amount of oystermen dropped by 75 percent.¹³

As previously noted, fluctuations in harvests are not confined to oysters. Blue crab stock in the Chesapeake Bay has also fluctuated significantly in recent years. The 2016 Blue Crab Winter Dredge Survey from the Maryland Department of Natural Resources estimated that the 2016 blue crab population in the Chesapeake Bay was 553 million crabs, as shown in Figure 1. While this indicates a population recovery from the population's lowest point in 2007 — at which point there were just 251 million crabs in the Bay — this population increase does not represent a full recovery.¹⁴ According to Tom Murray, associate director for Advisory Services

Figure 1: Estimated Blue Crab Population in the Chesapeake Bay (1990–2016)



Source: Maryland Department of Natural Resources, 2016 Blue Crab Winter Dredge Survey.

Watermen Workforce

at the Virginia Institute of Marine Sciences (VIMS), when oyster stock is reduced, that puts increased pressure on blue crabs and finfish, or marine animals that are not shellfish, as watermen seek non-oyster fisheries to maintain their income.

Most watermen, Murray notes, will substitute out for other fisheries when there is reduction in certain fishery stock in order to keep their boats working and their crewmen employed. For example, as the blue crab fishery has fluctuated in stock, watermen have turned to finfish to maintain their income.¹⁵

While there are cases of watermen assisting with Bay species repopulation efforts, evidence that they are doing so for payment remains slight. In the early 1990s, for example, the Chesapeake Bay Foundation, in response to an extremely low oyster population, recommended a three-year ban on oyster harvesting, during which time out-of-work watermen would be hired to help repopulate the Bay's oysters. The ban was met with immediate resistance from watermen and there were concerns about the cost associated with transitioning watermen into oyster repletion workers.¹⁶ The moratorium, which Maryland state officials said would effectively shut down the industry, ultimately did not go forward.¹⁷ More recently in 2013, watermen and scientists collaborated to plant underwater farms in the Bay, but watermen paid \$1,500 each to participate in the project. These funds, plus \$150,000 from the Potomac River Fisheries Commission, paid for equipment and oyster larvae.¹⁸

Government Regulation

The role of government regulation also appears to be a constraint on the watermen workforce. Chesapeake Bay fisheries are largely regulated by the Commonwealth of Virginia, the State of Maryland and the Potomac River Fisheries Commissions, which cover both states. Time limits, gear restrictions and catch limits are all

typically regulated for the various fisheries in the Bay, and a summary of these regulations can be found in Table 1.¹⁹ While some regulations meant to protect the Bay and its wildlife have been in effect for decades, including the Chesapeake Bay Preservation Act that was enacted by the Virginia General Assembly in 1988, much of the regulation for both Maryland and Virginia is more recent.

In the oyster fishery, for example, the Virginia Marine Resources Commission (VMRC) in August of 2016 placed a moratorium on the sale of new oyster licenses, which require an "all gear resource user fee," for working public oyster grounds until the number of user fee holders falls below a certain number.²⁰ The rule, driven by environmental concerns and the fear that the Bay's ecosystem would not exist for future generations, also restricts watermen from transferring licenses to anyone other than family members or to another person "if the transferring individual has 40 or more days of oyster harvesting during the previous calendar year."²¹ This rule is meant to reduce or eliminate the amount of part-time oystermen.²² According to Tom Murray, this outcome is largely the goal for fishing regulations across many fisheries. "The systems that have been put in place at the federal, state and regional levels have been trying to shrink the fishing effort," said Murray, who cited individual fishing quotas that set total allowable catch and limited entry regulations that restrict the number of fishers as two common examples. "All these regulations make [being a watermen] an increasingly risky investment for someone to get into."²³ Quota systems have seen some success in fisheries. Individual transferable quotas, or ITQs, grant property rights to fishermen who own a share of total allowable catch. Some analysis suggests that evidence points to ITQs having successfully raised the value and quality of the stock.²⁴ Still, some watermen oppose ITQ regulations. One waterman commented to a local news station in 2014, "They've got regulation after regulation

Table 1: Oyster and Blue Crab Regulations in the Virginia Section of the Chesapeake Bay

	Oysters	Blue Crabs
Season Restrictions	It is unlawful to harvest clean cull oysters from the public oyster grounds and unassigned grounds except during lawful seasons that are separately identified for 16 lawful areas. There are seasons for each of the public oyster grounds, ranging from a start on October 1, 2016, through an end on May 31, 2017.	For blue crabs, the seasons are determined by the type of gear used to harvest the crabs. The lawful seasons for the commercial harvest of crabs by crab pot in 2017 is March 1 through December 20. For all other lawful commercial gear, the season is from April 1, 2017, through October 31, 2017.
Gear Restrictions	Oyster harvesting with gear other than hand tongs (pictured on page 5) is prohibited within certain areas of the Chesapeake Bay. Similarly, oyster harvesting with gear other than hand scrapes is prohibited in other areas. Hand tongs are large rakes that manually scoop oysters by being pushed together ²⁵ , while hand scrapes are motorized rake-like dredges. ²⁶	The main types of gear identified by VMRC’s regulations are various types of crab pots.
Licenses	Oyster dredge licenses are required to harvest in public oyster grounds, and other licenses in certain cases are also required.	Multiple licenses are available for crabbing based on the amount of crab pots being used.

Source: “Pertaining to Restrictions on Oyster Harvest,” Chapter 4VAC 20-720-10 ET. SEQ., Virginia Marine Resources Commission.



Hand tongs. Photo by Jack Cooper.

Employment Options

piled on top of us, and they got more coming down the pike.” He went on to remark, “We just can’t stand much more.”²⁷

Federal and local regulations may also impact the activity of watermen in the Chesapeake Bay, although less directly. Federal government regulations tend to focus more on point sources and non-point sources of pollution, including pipes, ditches and land runoff, while local governments manage land use within lands that are designated as environmentally sensitive by Virginia’s Chesapeake Bay Preservation Area Designation and Management Regulations.²⁸

Aging Workforce

In his essay “Watermen of the Chesapeake,” Virginia Foundation for Humanities’ David Bearer writes, “Some watermen whose families have worked on the bay for generations are getting out of the business altogether; others are taking jobs on the mainland and working the water part-time. Those who remain are hanging on as best they can. Fewer and fewer young people are choosing hard work, long hours and [the] steady diet of uncertainty that come with life on the water.” Indeed, conversations with those who work in the industry also point to the aging of the watermen workforce as another reason for its declining numbers. Citing the increasingly strenuous nature of his work and the constraints on the ability to generate a profit, Don Pierce, a waterman since 1969, said, “Neither one of my grandsons have been on my boat to learn and take part in the industry. I don’t want them to work like I’ve had to work to be a success.”²⁹

Exploring Alternative Employment Options

“A lot of [watermen] that used to shed crabs in the summers, they’ve gone to carrying fishing parties out as their way of surviving.”

– Jeanne Webster Abbott, *Voices of the Bay: A Way of Life, Lost*³⁰

As watermen attempt to adapt to regulatory changes and as market pressures mount, many watermen may look for alternative sources of employment to supplement their income. We explore below several options that arose based on conversations with individuals within the industry and experts who study the watermen workforce. The alternative employment options range from the marine trades — including maintenance work on recreational boats — to watermen tourism programs to oyster aquaculture.

Marine Trades and Boat Maintenance

With a shoreline of 11,684 miles, the Chesapeake Bay is a hub for marine trades activity.³¹ Marina workers, boating service providers, marine technicians, builders and other positions characterize this aquatic industry.³²

Susan Zellers, executive director of the Marine Trades Association of Maryland (MTAM), supports the notion that maintenance work on recreational boats could be an attractive workforce option for today’s watermen across the Chesapeake Bay region who are looking for alternative employment. Anecdotally, this appears to be true for Virginia as well as Maryland. Noting the availability of jobs in this field, Zellers said, “There is plenty of room to take watermen and move them into the recreational boating industry. They, after all, have knowledge of the boats and how they work.” Moreover, Zellers sees a parallel between occupations in the watermen workforce and the boating industry in that the watermen way of life is a generational type of employment, passed down from parent-to-child. This, Zellers argues, is similar to the way the boating industry has evolved. She calls it “a slightly different path, but potentially more lucrative.” Recreational boating is also a graying industry, so the demand for workers is only increasing. But whether watermen are aware of this potential opportunity is another question, and Zellers does not yet see any interest from watermen, or anyone for that matter, in pursuing this option,

citing the push for students to attend college rather than joining the workforce after high school.³³

In 2014, MTAM conducted a survey by mail of more than 300 marine industry related businesses throughout the entire Chesapeake Bay region that was designed to assess the industry's workforce needs. Researchers used data from this survey to complete a three-part skills gap analysis for the regional marine trades industry:

- 1) The researchers in this study assessed the economic impact of the marine trades industry in Maryland through research reviews.
- 2) They analyzed results from the survey.
- 3) They followed up on the survey by initiating personal contact with Maryland marine trade businesses in order to obtain input from employers across the Chesapeake Bay area.

A total of 51 employers completed the survey with 61 percent engaged in boat service repair services, 51 percent in marina/boat storage services and 22 percent acted as boat dealer-brokers.³⁴ Most of the marine trades businesses surveyed were small businesses.³⁵

The MTAM survey found that the job skills most in demand were leadership/management and IT, marine engine mechanics, marine electronics and marine composites (fiberglass repair and molding). The primary skills deficiency was reported as "Other," which included deficiency in boat mechanics, engine repair and electronics. This was followed by basic math and communications skills. Sixty percent of respondents offered in-house trainings to address skill deficiencies. Many of these trainings included technical programming. These trainings were either through on the job training, manufacturer classes or outside instructors coming in-house.

The survey report identified four potential career pathways in the marine trades (Table 2). Each of these pathways was also given educational

recommendations, and MTAM has partnered with a community college and designed a six week internship plus a mini-apprenticeship program to address these gaps.

The Association of Marine Industries (AMI) serves the marina industry around the country. AMI builds affiliate programs with state trade associations, including in Virginia. Wendy Larimer is the legislative coordinator for AMI and she serves as the state coordinator for the Virginia Marine Trades Association (VMTA). "I see a lot of openings in recreational boating," Larimer says. She ascribes this to boats being increasingly large, while also being equipped with more technologically advanced electronics. Both reasons require more workers to work on the boats. The need, Larimer says, is not necessarily for skilled workers as much as it is for reliable workers who will show up for work. The idea of watermen transitioning to recreational boat maintenance "makes so much sense," according to Larimer. "They're out there fixing their own engine when they have to. They'd come with more knowledge than someone newly trained right out of high school."³⁶

Larimer says that some of the available positions in recreational boating and marina management are very specialized, indicating that the skills may not be as transferable.³⁷ To help address the specialized skill requirements, VMTA, in partnership with Rappahannock Community College and the American Boat and Yacht Council, has established the Marine Trades Technology Career Studies Certificate program. Students are trained to be full-time marine technicians and marine engineer assistants as well as service mechanics for boat dealers, marine equipment dealers and marine repair businesses. According to the program's description, "Wide-spread use of vessels for pleasure and commerce in this region has created a steady demand for qualified marine technicians as part of the large marine trades industry." Occupational objectives for the program are listed as marine technicians, marine repair company mechanics, marine engineer assistants, boat dealership technicians and marine equipment dealership technicians.³⁸

Employment Options

Table 2: Marine Trades Career Pathways

Pathway	Job Titles	Justification
Marine Leadership/ Management/IT	Foreman, supervisor, project manager, service writer, office manager, bookkeeper and customer service manager	“Companies are seeking employees with management and leadership skills in the marine trades, including those with knowledge of computer use, marine engineering and design, marketing management, service contract design and public relations. They also seek employees who can handle leadership and decision making using their own initiative.”
Marine Engine Mechanics	Mechanic (gas and diesel), rigger and outboard technician	“The Skills Gap Study showed a need for marine mechanics on all levels of the recreation boating industry in Maryland. In addition to training specific to specific engine or components offered by the manufacturers, training for a career as a marine mechanic is similar to other maritime career pathways.”
Marine Electronics Installation/Repair	Marine electrician, marine systems technician and HVAC technician	“The Maryland marine industry needs workers trained in Marine Electrical, such as: electricians for installing/maintaining DC/AC systems; general ‘systems technicians’ who can install, maintain and repair boat systems of all mechanical, electrical and plumbing nature; and HVAC technicians to deal with refrigeration, heating and air conditioning on boats.”
Marine Composites/ Fiberglass/Repair/ Molding	Composite technicians	“It’s obvious that most boats manufactured around the world today are made of fiberglass. Because of this there is always demand in the marine trades for jobs in boat repair.”

Source: “Workforce Needs in the Boating Industry,” Marine Trades Association of Maryland, 2014.

Watermen Tourism

While the recreational boating industry may offer some promising alternative workforce options for watermen hoping to transition out of their current employment, our analysis identified additional programs that reflect a persistent need for watermen to supplement their current income. One such program is the Virginia Watermen's Heritage Tourism Training Program. Created in 2013 by Rappahannock Community College and Chesapeake Environmental Communications, this program is designed to assist watermen looking to find an additional income stream by offering tourism training. The Virginia Sea Grant funds the program. "We need to explore every available opportunity to keep our working watermen where they love to be — out on the water, said Glenn Markwith, program coordinator of the program, stressing the need to diversify. "That's one of the main reasons for the program."³⁹

Paula Jasinski of Chesapeake Environmental Communications has been involved with the tourism training program from the start. She cites the collapse of the Chesapeake Bay blue crab fishery and its subsequent declaration as a disaster as an indirect initial driver of

the program, because the collapse made emergency funding available in both Maryland and Virginia. In 2010, Virginia Watermen's Association President Ken Smith, inspired by a similar tourism training program in Maryland, discussed with Jasinski the prospect of creating a tourism training program in Virginia.⁴⁰

Maryland's tourism training program, called Watermen Heritage Tours, was created out of a concern held by fishery managers regarding a crash of the blue crab stock in the Chesapeake Bay. In response to the declining numbers of blue crab stock, Congress made \$15 million available for restoration measures and to support watermen, some of which went to the creation of the training program. The program, which, according to its website, "isn't meant to take the watermen off the water, but to give them skills they can use to supplement their incomes with a related new business," has graduated more than 100 waterman since 2010.⁴¹

Through a collaboration based on shared learning with individuals from Maryland's tourism training program, the Virginia program was designed and launched. To date, about 50 captains have been trained through the Virginia Watermen's Heritage Tourism Training Program



Deadrise workboats used for crabbing and oyster harvesting in Newport News, Virginia. Photo by Jack Cooper



Boats used for oyster harvesting, crabbing and fishing in Newport News, Virginia. Photo by Jack Cooper

with more on the way, but continued funding is a challenge, and outreach to watermen is extensive. “Most watermen don’t yet know about it,” Jasinski says.⁴²

An article from the Virginia Sea Grant in 2014 described the program as one that offers watermen the chance to “learn how to offer on-the-water tours, get speaking opportunities to highlight watermen heritage and partner with charter boat captains and ecotourism guides. The program also promotes working watermen as educators and stewards of the environment and encourages the purchase of local Virginia seafood.”⁴³

While there are no data to indicate how profitable participating in the tourism program is, the Virginia program’s website connects interested parties with 11 captains along the Chesapeake Bay from the Northern Neck to Virginia Beach and one on Chincoteague Island on the Atlantic Ocean side of the Eastern Shore. Prices for the tours vary but are typically quoted at around \$300–\$350 for a 3 to 3.5 hour tour per boat.⁴⁴

Oyster Aquaculture

While many experts agree that the overall watermen workforce is declining in number of employees, Jasinski says that oyster aquaculture, another potential alternative workforce option for today’s watermen, “has gone through the roof.”⁴⁵ Aquaculture refers to the farming of plants and animals in all types of aquatic environments.⁴⁶

Tom Murray agrees, though there are caveats. “More watermen are getting into the aquaculture presence. It mitigates the natural ups and downs (of fisheries). There is good diversification, but out of maybe 100 watermen trained in aquaculture, only 10 to 15 stick with it.”⁴⁷ This is perhaps due to the complexity of maintaining an oyster aquaculture enterprise. A 2001 marketing plan called “Small-Scale Oyster Farming for Chesapeake Watermen” had the goals of helping “local watermen communities around [the] Chesapeake Bay develop small-scale sustainable oyster farms that offer an additional economic option compatible with their lifestyles and traditions” and of helping oyster repopulation efforts. This marketing plan found total start-up costs for watermen to engage in the plan’s aquaculture project

to be \$6,400. Additionally, the marketing plan notes, “Every aspect of growing and selling — as opposed to harvesting wild — oysters has been new to the watermen, and they face logistical challenges with distribution and sales due to their remote location and limited distribution options and experience.” To assist them with logistical needs, the marketing plan notes that watermen would need support for being able to take orders, schedule deliveries and oversee billing.⁴⁸

Still, the trends in Virginia around aquaculture are compelling. According to Hollee Freeman, Director of the MathScience Innovation Center in Central Virginia, shellfish aquaculture in Virginia produced \$55.9 million in dockside value in 2014, a 33 percent increase from 2013. Oysters are approximately 28 percent of that value. VIMS, in an effort to meet the growing demand for aquaculture employees, runs an “oyster boot camp” internship, and the MathScience Innovation Center says these jobs “appeal to a diverse population: blue-collar positions in the outdoors leading to farm management, laboratory jobs in algal culture or oyster genetics, engineering and system design, marketing, retail sales, culinary arts, fisheries (and) transportation logistics.”⁴⁹

Doug Lipton, senior research economist at NOAA Fisheries, says that oyster aquaculture is a bright spot in the industry in terms of attracting younger workers. “You see more young people getting into oyster aquaculture. This is just an observation, but it was doom and gloom a couple years ago and there are more optimism and opportunities now.”⁵⁰

There have been some reports of watermen successfully transitioning to oyster aquaculture as a way to make a living. From 1997 to 2010, the VMRC trained about 130 watermen in oyster aquaculture. One waterman spoke about his aquaculture endeavors to the *Chesapeake Bay Journal*, “I haven’t looked back one second since I started looking at what we got here The oysters are growing. The market is incredible. And it gives us an opportunity to still be watermen and live in the traditions we grew up in.”⁵¹

Additional Potential Sources of Income

In addition to the potential alternative and supplemental sources of income detailed above, experts in the field cite other sources of income for today’s watermen. When harvests are particularly low, watermen often haul their boats out of the water and work construction.⁵² The U.S. Bureau of Labor Statistics reports that the 2015 median hourly wage for construction trades workers is \$19.72, which corresponds to an average annual wage of \$46,290.⁵³ Working on tugboats is also a popular source of income among watermen during the offseason, as it is a relatively well-paying option with a high degree of skills transference.

Conclusion

“I love to work. What I love about being a waterman is, at the end of the day, you look at the stern of your boat, and you’ve done the best you can to provide for your help and family and not having hurt the industry.”

– Don Pierce, *Waterman*⁵⁴

The watermen who live and work along the coastline of the Chesapeake Bay are facing headwinds in their industry. The graying of the industry, regulation and environmental factors are all contributing toward a shrinking of their workforce. As these pressures mount, watermen and marine industry workforce experts have been working toward additional employment options to help watermen supplement their income or pursue alternative occupations entirely.

The occupations range from work in the marine trades, including maintenance on recreational boats, to watermen tourism programs to oyster aquaculture. Programs, usually structured as a partnership between watermen and government or community colleges, exist to support each of these industries that can help watermen transition. While quantitative data determining the success of these programs remain limited, there are qualitative metrics indicating that these options may be promising. Interviews with industry experts in the marine trades reveal that the potential for watermen to transfer their skills to a profession in the marine trades is largely unexplored. Watermen tourism programs in both Virginia and Maryland are already providing additional income to watermen around the Bay who are participating in the programs. Oyster aquaculture, similar to marine trades occupations, may be an area with a high degree of skills transference for watermen while also being an area that has seen increased activity in recent years. As each of these additional employment options continues to be explored, the industries would do well to capture and analyze quantitative metrics that can help gauge the success and efficacy of the programs as well as interest from the watermen of the Chesapeake Bay.

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Appendix

Appendix A: List of Interviews

Interviewee	Job Title	Organization	Date of Interview
Jorge Holzer	Assistant Professor	Department of Agricultural and Resource Economics at the University of Maryland	March 28, 2016
Paula Jasinski	President	Chesapeake Environmental Communications	July 26, 2016
Wendy Larimer	U.S. Legislative Coordinator	Association of Marine Industries	August 17, 2016
Doug Lipton	Senior Research Economist	NOAA Fisheries	March 28, 2016
Tom Murray	Associate Director for Advisory Services	Virginia Institute of Marine Sciences	March 16, 2016
Susan Zellers	Executive Director	Marine Trades Association of Maryland	June 6, 2016



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