

An Exploration of Alternative Market Potential for MA Oysters

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Introduction

Shellfish aquaculture production of oysters has become a large industry, almost quadrupling in value over the decade from 2008 (~\$7.5M) to 2018 (~\$27.5M). Almost the entirety of this production goes to the raw half shell market, which is a high value per piece market that has requirements in terms of product size and quality. Given the oyster production growth in Massachusetts (MA) and throughout the country, and the increased concerns expressed by the growers regarding a seasonal glut of product in the Fall, a basic exploration of alternative market potential is reported here.

Current Shucked and Value-Added Oyster Market

A food industry consulting firm was hired to among other things assess the current shucked oyster market, associated products, and potential for growth in that sector. Shucked oysters, or those processed to remove the meat from the shell, represent roughly 40% of the domestic oyster volume. With no commercial scale oyster shucking houses currently located in the Northeast, the supply is from the Chesapeake, Gulf Coast, or Pacific Northwest. Value paid to the harvester in these markets is most often paid in bulk by bushel or sack which equates to roughly \$0.15-0.25 per oyster.

Further value-added product forms such as smoked, premium canned, pickled, or frozen half-shell shell forms represent only 5% of the national market for shucked products. The smoked and canned varieties are largely sourced from cheaper overseas markets. The frozen half-shell product geared for large scale catering events is estimated at 1-2% of the total fresh oyster market but requires significant expense in shucking and freezing infrastructure. None of the value-added product forms were expected to provide overall value to the harvesters greater than \$0.20-0.25 per piece, though small-scale niche market forms may have higher value.

Overall, there is estimated to be around \$1M in additional potential opportunity for shucked oyster products focused on the bulk containerized oyster meat form in the Northeast. It was overall uncertain whether a local product would have more value or opportunity in the Northeast, but there did not seem to be dissatisfaction with currently available products from elsewhere in the country. It should be noted that a Northeast product is not available for comparison. It was recommended any efforts on this market focus on the bulk containerized form, as any value-added products would play off this initial processing infrastructure and lead to additional opportunities.

Processing Infrastructure

While historically MA had many oyster shucking houses, there is no longer shucking capacity within the state. Some growers and harvesters were wondering whether they could shuck oysters just seasonally in the Fall with an endorsement similar to that used for shucking bay scallops. After talking with a representative from the MA Department of Public Health (DPH) it was clear this would not work with oysters. To be shucked, oysters would need to be handled/processed in a facility following the National Shellfish Sanitation Program (NSSP) model ordinance guidelines. The facility and permitting would be along the lines of existing shucker/packers in the state working on softshell clams, surf clams or quahogs. It was the DPH representative's opinion that it would certainly be feasible for one of these existing shucker/packer facilities to add oyster shucking capacity, likely with just some modifications to the HACCP protocols.

To see what interest there might be from existing shellfish shucker/packers an informal survey was conducted. In 2018 there were 18 MA-based shucker/packers listed on the FDA Interstate Certified Shellfish Shippers List. These 18 businesses were called and/or emailed to gauge their interest in shucking oysters. Four of those on the list expressed some level of interest in adding capacity for shucking oysters but most wanted more info on the supply for shucking, best method of shucking, overall economics, etc. A shucker/packer in RI was also contacted and had some level of interest in oysters. Of the five with some level of interest, only one was willing to do immediate test batches of oyster processing during their slower season for processing other species like softshell clams (late Fall to Winter).

With processing methods an important concern, research was done on current methods being used, including visits to several oyster shuckers. Oysters are not easy to shuck, though there are a number of methods used to expedite the process such as shell breakers/nickers, pneumatic knives, steam tunnels, and high pressure or high-hydrostatic pressure processing (for a review see Martin and Hall 2006). Each method has its benefits and trade-offs though all still require manual labor as there is no fully mechanized method. The shell breakers and pneumatic knives are examples of a lower-cost addition to processing that requires less effort be applied by the shucker, in general expediting the processing time and making the process a bit safer for the shucker. On the other end of the spectrum, high pressure processing has high capital costs (in the millions by one account) though the oyster meats usually come out completely detached from the shell and just need to be removed from the shell cavity. High pressure processing has the added benefit of significant reductions in *Vibrio* bacteria and are being used more in the Gulf Coast region, while shell breakers are more common in the Chesapeake. High pressure processing is also thought to improve yield and reduce cost to a degree as tissues are separated from the shell more cleanly than with a knife, with an end product said to be same as other fresh shucked.



Oyster "shell breaker", the oyster is inserted bill end into the grinding surface making a simple entry point for the shucking knife

There was no clear method of shucking that seemed best. In the end it would likely be an analysis of integration into current facility setup, and costs in terms of labor, equipment, and overhead which can vary by region. One of the shuckers visited in MD indicated they currently get occasional oysters from the Northeast including from MA for shucking and would have interest in doing more if they were to be available at their market value and supplied to their facility.

Evaluation of Massachusetts Oysters

Oysters in MA are generally in high supply at the end of the growing season which also happens to correspond to the potential peak meat quality as oysters “fatten” up in preparation for the winter months. From initial conversations with local growers and processors it was thought there might be a seasonal niche for MA shucked oysters in terms of supply and processing capacity. Taking advantage of ample supply of oysters with peak meat quality, and periods when current shucker/packer operations tend to slow down in processing of other species of shellfish. Several batches of oysters from different sources in MA were evaluated for shucked product yield. Results from these tests are summarized in the table below.

Results of local oysters shucked by a MA shucker/packer				
Source	Oyster Size Range	# meats/lb.	# meats/7 lb. Gall.	Estimated \$ per Oyster
Cultured-1	3.5-5 inches	55	385	\$ 0.21
Cultured-2	3.5-4 inches	32	225	\$ 0.26
Town Fishery	3.25-4.25 inches	39	273	\$ 0.22

Each test batch included 2-3k oysters from the source, which included both farmed product and product harvested by wild harvesters but supported through a municipal oyster propagation program. All batches were processed at the same shucker/packer in off periods from shucking softshell clams. After the first 2 batches it was clear the shucking process required some help to expedite the processing so a “shell breaker” like those used in some Chesapeake shucking operations was brought in and used to make using a knife safer and easier. The cost estimates for processing ranged from about \$30/gallon to \$42.50/gallon. After several trials, the processor thought realistically with their setup (which was not setup for oysters completely) processing cost would likely land around \$35-38/gallon with more experience. Utilizing a shell breaker for each shucker would help decrease costs; they estimated a single shell breaker (shared by 4 shuckers) reduced cost by about \$4/gallon.

Processing costs were high, mainly due to the process being laborious in nature especially with very limited previous experience with oysters. The other part of processing cost is the meat yield, i.e. the less oysters you have to open to fill a gallon, the lower the overall cost. Meat yield varied a lot with these 3 batches of similarly sized oysters. It’s uncertain why the batch with the largest shell length oysters (Cultured-1) had yield which was a lot lower than the rest, but these were older animals and meat content may have been lower due to natural conditions. Two batches would have graded out as standards (>240 meats per gallon) though the cultured-2 batch was in the range of selects (190-239 meats per gallon).

Estimated potential value to be paid to the harvester was estimated by subtracting the processing cost from the average wholesale price in Boston at the time which was \$95-100. The value range from these three trials is \$0.21-0.26 per piece. This is obviously much lower than half shell prices which are usually on the order of \$0.55-0.60/piece. For an effort to create a shucked market in MA to be successful the aquaculture community would need to have an understanding of this price difference. Shucked oysters would be a very different market than the half shell market, but with tradeoffs in price comes the potential to move much larger bulk volumes of oysters that can be misshapen, overset, too big, etc. It's also been noted, if growers are going to venture into this market they will likely have to be paid by bushel or tote rather than by piece as they are used to now.

Shucked oyster meats can be frozen, and are frozen by current oyster processors. This is often done to take advantage of a good supply of quality oyster meats and freezing them for periods of higher demand and lower supply. There is some water loss upon thawing, and likely some changes to the quality of the product, but it is still a viable practice. The shelf life is said to be around two years frozen and around 7-10 days fresh. Given that a MA processor may shuck oysters on a seasonal basis, freezing to prolong supply would likely be an option. A chef-based taste test of MA frozen and thawed shucked oysters alongside other available fresh options was planned for April 2020, but has been delayed due to COVID-19 related issues.

Are oyster producers interested in this?

Realizing a shucked market would be a dramatic alternative for some growers (though we acknowledge some already ship occasional lots to shuckers), an anonymous survey was sent to MA growers to gauge potential interest in and supply for a shucked market. The online survey was emailed in December of 2019 to an estimated 200 growers and received a total of 70 responses, most within the first 5 days while the survey was left open for 30 days. The survey questions and responses are summarized here; there were also many individual comments not included here because they are difficult to summarize.

Q1 Have you ever had live market sized oysters you were unable to sell?

Results: 63.8% (n=44) said yes, 36.2% (n=25) said no, 69 respondents.

Summary: Around 2/3 of respondents had marketable oysters they couldn't sell at one point.

Q2 If yes, what are the reasons they could not be sold? (check all that apply)

Results: given multiple choice for response, they could check all that applied. 45 respondents.

- a) Lost market or no place to sell them in the market (even if just seasonally) – 82.2% (n=37)
- b) Oysters got too large – 31.1% (n=14)
- c) Too heavily fouled, barnacles, oyster overset, etc – 6.7% (n=3)
- d) Boring sponge or other shell condition – 13.3% (n=6)
- e) Clumps or doubles – 4.4% (n=2)
- f) Other (please specify) – 15.6% (n=7), main comments on other were flooded markets, or shells that were deemed too thin

Summary: The vast majority (over 80%) indicated challenges in the market were the cause of lost sales. Oysters getting too big (31%) or with boring sponge (13.3%) were the top two biological challenges, though much less than market related.

Q3 Do you currently, or have you ever had challenges selling oysters in Fall due to market flooding or glut of product?

Results: 91.3% (n=63) said yes, 8.7% (n=6) said no. 69 total respondents.

Summary: This question got a little more specific about whether the period in the Fall, or the “Fall glut”, is a problem for selling oysters. With over 90% of respondents saying yes, the vast majority seems to think so.

Q4 If yes, are any of the following true? (check all that apply)

Results: given multiple choice for response, they could check all that applied. 62 respondents.

- a) I am forced to sell the oysters for much less \$ just to maintain income – 41.9% (n=26)
- b) I am forced to sell at a loss just to maintain income – 8.1% (n=5)
- c) I lost product waiting (over Winter or otherwise) for market to rebound – 38.7% (n=24)
- d) I took product to the dump (or disposed of rather than sold) because of lack of market – 6.5% (n=4)
- e) I have to sell fewer oysters in the Fall due to market conditions – 85.5% (n=53)
- f) Other (please specify) – 9.7% (n=6), comments focused mostly on how they try to manage sales in the glut period

Summary: Responses indicate growers largely sell less in the Fall than they could (85.5%), or drop their prices and sell for less in the Fall (41.9%), both indicating supply outweighs demand during this period. Holding product for when markets return in winter or spring is not without risk as 39% indicated they incurred losses taking this approach. Though with a small percentage of growers, product is currently being dumped and/or sold at a loss, indicating a potential need for additional outlets.

Q5 Can you estimate the percent of your crop that goes to waste or you are unable to sell annually?

Results: had 47 responses that gave an estimated percentage. The average was 11%, median was 5%, with a range of 0-75%. There were 20 responses indicated 0% waste in crop.

Summary: The intent here was to try and quantify how much product is going to waste due to market related issues. This probably needs to be interpreted conservatively given the huge amount of waste reported in some instances. The response of 75% may have misunderstood the question, maybe to mean average survival, but was meant to mean marketable product that is wasted. Given the responses 10-20% was not uncommon, though so was 0%, the 11% average is probably a fair number though the median response of 5% is likely a more conservative estimate.

Q6 Can you estimate the number of oysters that go to waste or you are unable to sell annually?

Results: 35 responses that gave numbers, 20 responded 0 while 15 gave actual estimated numbers of oysters being wasted. Total of 15 responses with numbers was 1,136,000 oysters with a range of 0-400,000.

Summary: The intent here was again to try and quantify how much product is going to waste due to market related issues. This probably needs to be interpreted conservatively given the huge amount of waste reported in some instances. The response of 400k animals going to waste may again misinterpreted the question to mean mortality through all life stages or something else. That said, even if that number is removed as an outlier there is still a waste of

around 750,000 oysters per year just among 15 growers. If one includes those that don't have waste, the average wasted product per grower is around 24,000 oysters (1,136,000 divided by 45). A conservative estimate for the entire industry might be 100 growers with 24,000 oysters which lack a market, so a supply of around 2,400,000 oysters annually.

Q7 Do you currently sell oysters to be processed, or to a market different than the raw half shell market, when you have product unfit for the half shell market?

Results: 12.9% (n=9) said yes they were already, 82.9% said no, 4.3% (n=3) responded other, of which responses indicated they were selling large oysters to a different market. Total of 70 responses.

Summary: Roughly 13% of responding growers were already selling to a secondary market which we assumed was a shucked market but given the "other" responses some indicated a separate market for jumbo oysters for roasting. From other conversations growers have indicated they occasionally send product to be shucked in MD.

Q8 Would you be interested in selling oysters not fit for the raw half shell market to a processed market even if at a lower price than current half shell prices?

Results: 30% (n=21) said yes they had interest, 22.9% (n=16) said no interest, and 47.1% (n=33) said maybe. Total of 70 responses.

Summary: A greater percent of growers than are currently reporting they are selling to an alternative market expressed interest in selling to a processor. More said yes than said no, but the majority said maybe. The maybe response is not a surprise as much depends on the value or bottom line.

Q9 Some tests have suggested the market value for oysters that yield well for a local MA shucked product (nothing value added) would be in the neighborhood of \$0.20-0.28 a piece. If this market was to prevent wasted product, and the processor would accept large/ugly/fouled/overstock product in Fall to early Winter, would that price be worth considering as a way to move product?

Results: 28.4% (n=19) said yes, 58.2% (n=39) said no, and 13.4% (n=9) said other specifying that they didn't think they had product for this market or were still unsure the market would work for them. Total of 67 responses.

Summary: The intent of this question was to see if growers still had interest even if the prices fell within the range of theoretical values found in 3 small trials and proposed by the market consultant. The number of yes responders did drop a couple percent with this price information, from 30% to 28.4%, and a lot more said no they wouldn't do it given those prices (no responses went from 22.9% last question to 58.2% with price info). Its likely a lot of the "maybe" responses from the previous question got enough info to make a business decision and say no. There were some responses saying these prices were below breakeven point so they couldn't consider it but the intent here was to have a market to prevent waste, not a primary market.

Q10 Are there any other comments or concerns you'd like to share on oyster market challenges?

Results: This was an open-ended question added to let growers say whatever they wanted related to the subject, it got 41 varied responses.

Summary: There were a wide range of comments, here are several representative:

- “Fall glut gets worse every year...”
- “State needs to limit aquaculture growth...”
- “Fall glut is just a blip in cash flow...plan for it”
- “There is a market for every grade of oyster”
- “If you can’t market your product open a shoe store”

Though by far the most mentioned topic (17/41 responses or 41.5%) were comments regarding large scale municipal programs further flooding the Fall market as an issue and concern.

Summary

While potential value per oyster for a shucked or processed market is much lower than the half shell market MA oyster growers rely upon, there may be potential as the industry has grown significantly. Supply is growing and market challenges are being experienced every Fall, and with easier access to an alternative market like shucked/processed the grading of half shell oysters may also improve if the industry has a planned outlet for oysters with subpar half shell characteristics. Growers surveyed anonymously indicated both a potential supply of product for a local shucker/processor, a need for a secondary market, and some level of interest despite the acknowledgement of significantly lower value.

For a processor it might make the most sense to seasonally shuck oysters in the Fall, or early Winter, providing an additional outlet for growers in a tough market period while also catching oyster meats at their peak quality. To be cost effective, improvements in shucking efficiency would be needed to make this viable, and existing MA shucker/packers would likely need to consider adjustments to their infrastructure. More investigation is also required to see if freezing for distributing supply through the year is a viable option. There may be additional value-added options such as smoked or premium canned, but the market was thought to be limited to smaller scale niche products, and frozen half shell products would require significantly more infrastructure.

Given the current situation (in April of 2020) related to oyster markets all but shut down related to COVID-19, it is thought there will likely be a glut of oysters when markets do eventually return. Depending on when they return, oysters may have overgrown target size. With this in mind, it may be an opportune time to consider oyster shucking here in MA, especially going into the Fall of 2020. A segment of the MA grower population has a strong interest in seeing this market become more accessible, so there seems to be an opportunity for a processor. With the current market crisis there may also be funding opportunities, though even previous to the current COVID crisis there appeared to be opportunity to help an alternative market emerge.

References

Martin, D.E., and S.G. Hall. 2006. *International Journal of Food Science and Technology*, 41, 223–232.