Market Development to Diversify Shellfish Aquaculture Products in Massachusetts

Abigail Archer, Woods Hole Sea Grant & Cape Cod Cooperative Extension
Josh Reitsma, Woods Hole Sea Grant & Cape Cod Cooperative Extension
Melissa Sanderson, Cape Cod Commercial Fishermen's Alliance, Chatham, MA,
Michele Insley, Wellfleet Shellfish Promotion and Tasting, Wellfleet, MA
Shellfish Aquaculture in Massachusetts in 2018

• 390 Growers

• 1,202.7 acres under cultivation

• Oyster Aquaculture Landings
  49,361,732 individual oysters

• Oyster Aquaculture Landings Value
  $27,015,107

• Total Aquaculture Quahogs
  3,770,347 at value of $961,966

• Economic Multiplier – 1.79
  769 direct jobs in 2013
  140 indirect
<table>
<thead>
<tr>
<th>Species</th>
<th>Landing (lbs)</th>
<th>Value ($)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sea Scallop</td>
<td>179,224,746</td>
<td>$264,941,229</td>
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<tr>
<td>American Lobster</td>
<td>16,446,931</td>
<td>$78,275,162</td>
</tr>
<tr>
<td>Eastern Oyster</td>
<td>8,042,964</td>
<td>$22,735,092</td>
</tr>
<tr>
<td>Atlantic Surf Clam</td>
<td>100,857,487</td>
<td>$17,570,869</td>
</tr>
<tr>
<td>Haddock</td>
<td>11,479,792</td>
<td>$12,049,006</td>
</tr>
</tbody>
</table>
Aquaculture Strategic Plan

EXECUTIVE SUMMARY

Why Develop a Plan for Aquaculture in Massachusetts?

Aquaculture offers tremendous opportunities for the Commonwealth of Massachusetts, especially during a time when the state's fishing industry has been so hard hit by reductions in groundfish stocks. This growth industry can provide jobs that are much needed in the seafood sector of the economy. In addition, aquaculture represents a sustainable economic use of our coastal resources -- which means that aquaculture activities can be continued into the future, providing economic opportunity without depleting non-renewable resources.
1989

2010

$6.5 million
2018 MA Cultured Shellfish Value

- Quahog, 3.4%
- Oyster, 96.6%
MA Total $Value >$27 Million in 2018
So What’s the Problem?

Monoculture

Vulnerable to disease outbreak, market downturns

Fall glut leads to lower prices for growers
What is a Possible Solution?

Diversify species grown
Diversify oyster products
Assist businesses with becoming resilient to change
Alternative Shellfish Species Research Study

Prepared for:
Cape Cod Cooperative Extension

Presented By:
The University of Massachusetts Dartmouth
Charlton College of Business
Center for Marketing Research

In Collaboration With:
Dr. Nora Barnes
Director, Center for Marketing Research

Conducted By:
Cain Bochter
Andrew Boucher
Eric Karstunen
Alyssa Olson
Barley Rice

With Support From:
Cape Cod Cooperative Extension
Woods Hole Sea Grant
SouthEastern Massachusetts Aquaculture Center

Fall 2014

Research Objective

RESEARCH OBJECTIVE:
To research the demand for alternative species of shellfish among wholesalers throughout Massachusetts.

This research attempts to provide insights into the following:
- Are wholesalers aware of the 6 proposed species?
- Would wholesalers be interested in selling or have they sold these species with success?
- What is the perceived demand for alternative species?
- Is demand driven by customer request or consistent availability?
Shellfish Wholesaler Survey Results

15% think their customers would be very interested in purchasing Blood Arks

22% somewhat interested

63% not interested

Anadara ovalis

15% said they would be interested in selling Blood Arks if they were grown locally and reliable in supply

17% somewhat interested

68% not interested
Shellfish Wholesaler Survey Results

17% would be interested in selling Juvenile Surf Clams if they were grown locally and reliable in supply

26% somewhat interested

57% not interested

17% think their customers would be very interested in purchasing Juvenile Surf Clams

30% think customers somewhat interested

53% think customers would not be interested.

Spisula solidissima
Discussions with Oyster Growers

Is there potential for a local shucked oyster market?

How consistent would the supply need to be?

Could a local product compete with containers from the Chesapeake and Gulf of Mexico?

Would people pay more for local?
Research Farm Network Projects – Alternative Species
Seafood Buyer: If I buy them, can I sell them to restaurants at a profit? I don’t want to invest in marketing and cultivate regular customers until the growers can provide me with a steady supply.

Grower: If I grow them, can I sell them at a profit? I don’t want to invest in gear and seed unless I know I can make $

Restaurant Owner/Chef: If we try these and our customers like them, and the dish is at a workable price point, can we get a consistent supply from our wholesaler?
Where are the sticking points? What info can move us forward?

- What challenges have growers and wholesalers experienced as they tried to buy/sell blood arks, petite surf clams (butter clams) and shucked oysters? (Advisory Committee)

- 19 Questions to a consultant to produce a market research assessment (Pentallect)
  - What are current wholesale values for blood clams and butter clams locally (New England) and nationally?
  - What are current retail values for blood clams and butter clams locally and nationally?
  - What are current wholesale and retail prices for shucked oyster product?
  - What value added products such as smoked or pickled oysters are on the market?
  - What are the most important factors in purchasing decisions for oysters and what makes one region have more value than another (shape, size, availability, flavor, name, etc.)?

- Develop financial assessments for growing butter clams and blood arks, including initial production cost estimates, enterprise budgets, and minimum sale price (Spreadsheets)

- Assess the infrastructure needed to develop a shucked oyster product

**Funding Opportunity Title:** NOAA Sea Grant 2017 Aquaculture Initiative: Addressing Impediments to Aquaculture Opportunities

**Funding Opportunity #:** NOAA-OAR-SG-2017-2005177
Aquaculture Market Assessment Report

The Status of Existing and Potential Markets for Massachusetts Blood Clams, Butter Clams and Shucked Oyster Products

Prepared exclusively for:

Cape Cod Cooperative Extension
And Affiliates

August 2018
Executive Summary – Interim Findings

There are opportunities and challenges associated with expansion of each of the three species: Blood Clams, Butter Clams and value-added Oysters

- Blood Clams: Greatest short-term opportunity given the existence of a proven ethnic market, yet price-driven and demand is largely outside of New England
- Butter Clams: Greatest long-term market potential; requires marketing investment to build awareness and create restaurant demand
- Value-added Oysters: Challenging economic model unless MA harvesters are willing to significantly reduce pricing for value-added inventory and identify / invest in further processing capabilities

<table>
<thead>
<tr>
<th>Species</th>
<th>Est. Annual MA-Sourced Revenue Potential</th>
</tr>
</thead>
<tbody>
<tr>
<td>Blood Clams</td>
<td>$0.2 - $0.5 million</td>
</tr>
<tr>
<td>Butter Clams</td>
<td>$1.1 - $2.8 million</td>
</tr>
<tr>
<td>Value-Added Oysters</td>
<td>---</td>
</tr>
<tr>
<td>Total MA-Sourced</td>
<td>$1.3 - $3.3 million</td>
</tr>
</tbody>
</table>

Source: Pentallect research; preliminary estimates
Lessons Learned & Next Steps for Blood Arcs

Delicious!

Town concerns about wild harvest

There is potential!

Need to focus efforts on nursery culture
Next Steps for Juvenile Surf Clams aka Butter Clams

Just Need Product!
Tender, delicious, sweet, subtle, delicate, fresh, clean, light
### Best Choices
- Barramundi (US & Vietnam farmed)
- Bass (US hooks and lines, farmed)
- Bluefish (US handlines)
- Catfish (US)
- Clams, Cockles, Mussels
- Crab: Blue (MD trotline)
- Crab: King, Snow & Tanner (AK)
- Croaker: Atlantic (beach seines)
- Lionfish (US)
- Mahi Mahi (US handlines)
- Oysters (farmed & Canada)
- Prawn (Canada & US)
- Salmon (New Zealand)
- Scallops (farmed)
- Seaweed (farmed)
- Shrimp (US farmed)
- Squid (US)
- Swordfish (Canada & US buoys, handlines, harpoons)
- Tilapia: (Canada, Ecuador, Peru & US)
- Trout (US farmed)
- Tuna: Albacore (trolls, pole and lines)
- Tuna: Skipjack (Pacific trolls, pole and lines)

### Good Alternatives
- Bluefish (US gillnets and trawls)
- Branzino (Mediterranean farmed)
- Cod: Atlantic (handlines, pole and lines)
- Crab: Atlantic Rock (Canada & MA)
- Crab: Blue (AL, DE, MD & NJ pots)
- Haddock
- Hake (US)
- Monkfish (US)
- Oysters (US wild)
- Pollock (Canada longlines, gillnets & US)
- Salmon: Atlantic (BC & ME farmed)
- Salmon: CA, OR & WA
- Shrimp (Canada & US wild, Ecuador & Honduras farmed)
- Tilapia (Colombia, Honduras, Indonesia, Mexico & Taiwan)
- Trout (Canada & Chile farmed)
- Tuna: Albacore (US longlines)
- Tuna: Skipjack (free school, imported trolls, pole and lines, US longlines)
- Tuna: Yellowfin (free school, troll, pole and lines, US longlines)

### Avoid
- Cod: Atlantic (gillnet, longline, trawl)
- Crab: Argentina, Asia & Russia
- Crab: Atlantic Rock (US, except MA)
- Crab: Blue (FL, GA, LA, MS, NC, SC, TX & VA)
- Halibut: Atlantic (wild)
- Mahi Mahi: imported
- Orange Roughy
- Pollock (Canada trawls & Russia)
- Salmon: Canada Atlantic, Chile, Norway & Scotland
- Sharks
- Shrimp: (other imported sources)
- Squid: Argentina, China, India & Thailand
- Swordfish (imported longlines)
- Tilapia (China)
- Tuna: Albacore (imported except trolls, pole and lines)
- Tuna: Bluefin
- Tuna: Skipjack (imported purse seines)
- Tuna: Yellowfin (longlines except US)

### How to Use This Guide
Most of our recommendations, including all eco-certifications, aren't on this guide. Be sure to check out SeafoodWatch.org for the full list.

#### Best Choices
Buy first; they're well managed and caught or farmed responsibly.

#### Good Alternatives
Buy, but be aware there are concerns with how they're caught, farmed or managed.

#### Avoid
Take a pass on these for now; they're overfished, lack strong management or are caught or farmed in ways that harm other marine life or the environment.
# Nutritional Value of Shellfish

## What’s in a 100g serving (roughly)

<table>
<thead>
<tr>
<th>Type of shellfish:</th>
<th>Quahog</th>
<th>Oyster</th>
<th>Mussel</th>
<th>Soft-shell Clams</th>
<th>Bay Scallops</th>
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<tbody>
<tr>
<td>Calories</td>
<td>63.6</td>
<td>69.1</td>
<td>60.5</td>
<td>58.5</td>
<td>85.5</td>
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<tr>
<td>Protein</td>
<td>11.1</td>
<td>8.3</td>
<td>11.2</td>
<td>11.9</td>
<td>15.0</td>
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<tr>
<td>Carbohydrates</td>
<td>3.9</td>
<td>5.5</td>
<td>1.9</td>
<td>1.5</td>
<td>5.5</td>
</tr>
<tr>
<td>Fat</td>
<td>0.4</td>
<td>1.5</td>
<td>0.9</td>
<td>0.5</td>
<td>0.4</td>
</tr>
<tr>
<td>Cholesterol</td>
<td>41.4</td>
<td>48.7</td>
<td>62.6</td>
<td>46.5</td>
<td>46.7</td>
</tr>
<tr>
<td>Total Omega-3</td>
<td>107.5</td>
<td>401.5</td>
<td>215.4</td>
<td>97.1</td>
<td>138.9</td>
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<tr>
<td>Saturated fats</td>
<td>58.8</td>
<td>275.2</td>
<td>107.2</td>
<td>50.5</td>
<td>78.9</td>
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</tbody>
</table>

## Minerals

<table>
<thead>
<tr>
<th>Mineral</th>
<th>Unit</th>
<th>Amount Per 100g (3.5oz.) Serving</th>
</tr>
</thead>
<tbody>
<tr>
<td>Calcium</td>
<td>mg</td>
<td>147.5</td>
</tr>
<tr>
<td>Phosphorus</td>
<td>mg</td>
<td>113.4</td>
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<tr>
<td>Magnesium</td>
<td>mg</td>
<td>77.1</td>
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<tr>
<td>Manganese</td>
<td>mg</td>
<td>0.7</td>
</tr>
<tr>
<td>Iron</td>
<td>mg</td>
<td>3.7</td>
</tr>
<tr>
<td>Zinc</td>
<td>mg</td>
<td>1.4</td>
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<tr>
<td>Potassium</td>
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<td>243.5</td>
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<tr>
<td>Iodine</td>
<td>ug</td>
<td>55.4</td>
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<tr>
<td>Selenium</td>
<td>ug</td>
<td>35.9</td>
</tr>
</tbody>
</table>

## Vitamins

<table>
<thead>
<tr>
<th>Vitamin</th>
<th>Unit</th>
<th>Amount Per 100g (3.5oz.) Serving</th>
</tr>
</thead>
<tbody>
<tr>
<td>Vitamin A</td>
<td>IU</td>
<td>71.9</td>
</tr>
<tr>
<td>Riboflavin</td>
<td>mg</td>
<td>0.7</td>
</tr>
<tr>
<td>Vitamin C</td>
<td>mg</td>
<td>8.8</td>
</tr>
<tr>
<td>Niacin (B3)</td>
<td>mg</td>
<td>1.9</td>
</tr>
<tr>
<td>Pantothenic Acid (B5)</td>
<td>mg</td>
<td>0.2</td>
</tr>
<tr>
<td>Choline</td>
<td>mg</td>
<td>3.8</td>
</tr>
<tr>
<td>Folic Acid</td>
<td>ug</td>
<td>23.6</td>
</tr>
<tr>
<td>Cyanocobalmine (B12)</td>
<td>ug</td>
<td>33.4</td>
</tr>
</tbody>
</table>