

APPENDICES FOR Final Report

Piloting Surf Clam Aquaculture Techniques to Create Commercial Opportunities

Award Number: NA16NMF4270241

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Appendix 1 – Woods Hole Sea Grant/Marine Extension Bulletin (pamphlet to share results)

Originally produced in January 2020, updated by Cape Cod Cooperative Extension in August 2020 to include additional post-project findings.

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Woods Hole Sea Grant Program
Cape Cod Cooperative Extension
Southeastern Massachusetts Aquaculture Center



Growing Methods for Petite Atlantic Surf Clams (*Spisula solidissima*)



SURF CLAM BIOLOGY

Atlantic surf clams, *Spisula solidissima*, are marine bivalve mollusks common to the Atlantic coast of North America from the Gulf of St. Lawrence to Cape Hatteras, NC. A subspecies exists, the Southern surf clam, *Spisula solidissima similis* that ranges from the Gulf of Mexico to Massachusetts. Surf clams can be found from the surf zone extending offshore throughout the continental shelf to depths of over 100 meters, though they prefer medium to coarse sandy habitats with more shallow to moderate depths, such as Georges Bank and the shoals south of Cape Cod.

Surf clams, like other common bivalve species, are filter feeders utilizing siphons to access water for respiration, excretion, and planktonic food. Atlantic surf clams reproduce sexually through broadcast spawning. Upon fertilization, the resulting larvae begin the free-swimming larval portion of their life cycle which lasts several weeks, depending on temperature. Spawning occurs typically in summer for the Atlantic *S. s. solidissima*, while the Southern surf clam, *S. s. similis*, appears to spawn in late spring. Once surf clams settle in suitable habitat, they are not thought to actively migrate, though they are capable of movement.

Being a mostly offshore species where the habitat has less dramatic changes than inshore environments, surf clams are generally less tolerant of extremes in temperature. Growth is reportedly greatest at around 15°C (60°F) for the Atlantic *S.s. solidissima*, and around 20°C (68°F) for the Southern *S. s. similis*, with mortality for both reported when temperatures are at $\geq 30^{\circ}\text{C}$ (86°F) for weeks. The maximum reported size for Atlantic surf clam, *S. s. solidissima*, is nine inches while the southern *S.s. similis* stays smaller at around four inches in maximum length. Maximum reported age is approximately 20 years. While they can survive drops in salinity to around 12 ppt, they are much more common at oceanic salinities.

WHY GROW SURF CLAMS?

Small surf clams in the range of two inches in length have been shown to have attributes similar to both softshell clams and littleneck hard clams. Recent experiments in growing techniques took place in 2016-2019, and taste tests of the clams produced comments like, “delicious raw or cooked, briny, slightly sweet and very rich.” Market price estimations have varied depending on potential end use (raw bar being highest, steaming clam being lower), but most estimations of a new surf clam product coming online suggest a price point similar to that of littleneck clams (*Mercenaria mercenaria*).

An active wild fishery exists in MA waters for Atlantic surf clams. The 2018 numbers reported by the state were nearly 90 million pounds harvested for both a live and a processed meat market. However, enough interest has been shown in culturing surf clams that MA Division of Marine Fisheries now allows aquaculture growers of surf clams an exemption ([322 CMR 6.08.c,3](#)) from the five-inch minimum legal size required in the wild fishery of MA waters. For aquaculture production, the minimum size is set at 1.5 inches in length.

As a new candidate species for aquaculture in the region, the other attractive aspect of surf clams is growth rate. Results of studies from the 1980s, 1990s, and more recently in 2016-2019 have all suggested potential growth to a marketable size in 12 to 18 months is possible (Table 1). Growth rate is variable and not fully understood but appears to be greatest in spring and fall as temperatures are more ideal for the species, slowing in the heat of summer and during winter lows.



ANNUAL GROWTH RATES OF SURF CLAMS IN NEW ENGLAND WATERS

Location	Initial Length (mm)	Final Length (mm)	Length Increase (mm/yr)	Data Source
Milford, CT	18	55	37	Goldberg, 1980
Cape Cod, MA	10	40	30	Rask, 1996
Wellfleet, MA	17	51	34	2016 trial
Cape Cod Bay, MA	6	34	28	2017-2018 study
Cotuit Bay, MA	6	47	41	2017-2018 study
Nantucket Sound, MA	6	35	29	2017-2018 study
Wellfleet, MA	6	36	30	2017-2018 study

Table 1. Annual increases in average length reported for surf clams grown under aquaculture conditions in the New England region. The 2017-2018 study had clams start at 6 mm in length in July of 2017, grown in field nursery systems before being field planted in November of 2017 at 12 mm in length. The final average length reported was from July of 2018, one full year after initial planting.

IS SEED AVAILABLE?

Methods to spawn and rear early larval stages of the Atlantic surf clam have been demonstrated since at least the 1960s when Loosanoff and Davis (1963) described techniques. Surf clams mature at a relatively young age and small size, with clams as small as one-inch-and-a-half being used as brood stock in the hatchery, usually held in sand while conditioning. Hatchery methods have been reported to be fairly straight forward, and prices have tended to be lower than of similar sized quahog seed.



At least three commercial hatcheries have produced surf clam seed in recent years (two in MA, and one in ME). These hatcheries are trying to fit surf clams into an already full schedule so getting seed orders in early to make it a priority for them is a key recommendation to interested growers. As with most shellfish seed, it's cheaper and more readily available at smaller sizes.

NURSERY METHODS

Growers have successfully used covered sand trays in the field as well as upwellers and raceways much the same as with quahog nursery culture. Use of small mesh oyster bags in cages was attempted as well with limited success as they more easily succumb to fouling and to temperature exposure if held in the intertidal zone. Sand for burial was not found to be required until they reached ¾-1 inch in length, at which point growth may be stunted if the clams are not allowed to bury themselves in the sediment.

Recent nursery growth trials in NJ suggest growth and survival are optimized at around 20°C (68°F), with both survival and growth declining, especially above 24°C (75°F). Growers have also reported stoppage in growth or stunting, especially during warmer summer water temperatures. Seed will usually rebound as temperatures come back down although overall growth is often highly variable. There is also evidence that genetics of the seed may play a factor in growth and temperature tolerance, an area that requires further research to develop appropriate lines for aquaculture.

GROW OUT

A number of methods have been tested for the full grow out of Atlantic surf clams to two inches in length. The ideal method allows the surf clams access to sediment for burial but also provides protection from predators and containment from emigration. But this is often easier said than done, as intertidal and subtidal locations offer different challenges.

Early attempts involved semi-buried cages that were deployed by divers and provided good growth but were questionable in terms of economic feasibility. Recent trials done in 2017-2019 compared three grow out methods: planted in plots under protective netting like quahog grow-out, soft nylon mesh bags (often called Florida bags, based on FL grow out methods), and box style rigid polyethylene mesh grow bags pinned to the sediment surface.

The general observations by each type:

Planted under net – Atlantic surf clams (*S.s. solidissima*) showed the most consistent growth among all the sites when planted under net. Nets are difficult to manage subtidally so are better suited to intertidal sites. Survival did suffer due to sand mounding and predation issues because the nets were not trenched on the sides to better prevent predator entry. There was also a tendency for clams to accumulate on the downwind side or corner of the nets, likely because the clams come to the surface and get washed downwind at lower tides.

Soft mesh (FL) bags – while pinned to the sediment and even after partial filling, these bags did not consistently collect and fill with sand. When they did fill with sand, surf clams seemed to grow well. More often than not, however, sand mounded underneath the bags rather than inside, leaving the clams out of the sediment and growth lagged. Crabs and moon snails attacked the clams through the soft mesh, impacting survival.

Rigid grow bags – these bags also did not accumulate sand consistently and varied by site and bag type. Box-style bags and smaller mesh sizes seemed to accumulate sand more naturally. The bags slow down sediment-laden water that flows along the bottom, which causes sediment to drop out and accumulate. When bags did accumulate sand, the surf clams grew well. Survival tended to be higher in these bags as the rigid mesh offered protection from predators in all directions. This method, if further developed, might have the most potential subtidally where it could be possible to deploy and tend in strings or trawls from a vessel.

The Haskin Shellfish Research Laboratory at Rutgers University (NJ) also conducted trials on spawning, nursery, and grow-out techniques. Their results are summarized in [New Jersey Grower's Guide to Surf Clam Culture](#).

CHALLENGES

Combined stresses of spawning and heat in the second summer of growth can cause mortality, mostly in the intertidal where extremes can be seen. Surf clams can recover from temperatures toward the lethal limit of 86°F if exposure duration is short. In the 2017-2019 trials, winter mortality did occur when exposed to extreme lows in the intertidal; clams that were in subtidal or were able to bury themselves in the lower intertidal performed better. Burial can provide some protection if exposure to subfreezing temperatures is short.

Surf clams are very susceptible to predators, especially crabs, whelk, and moon snails. Some parasites have been noted in the literature, but

information is scant. No major disease issues have been noted to date.

The mobility of surf clams can be another challenge as they are more mobile than other cultured species. Boarded or sidewalled netted raceways have been suggested to help contain movement but those methods bring their own challenges. Growers using trenched netted raceways have done well until nets are breached or removed. Our best survival was seen in bags pinned to the bottom to allow sedimentation and prevent migration and predation.

Stunting was common in our trials and in the reports from growers who worked with surf clams. If left out of the sediment past a size of about ¾ to 1 inch in length, not unlike quahogs, growth tended to cease until they were given an opportunity to dig in. Likewise, summer and winter extremes in temperature caused cessations in growth.

Harvest of surf clams at the 1.5-2" length with jerk rake techniques currently employed in local quahog culture caused significant amounts of shell breakage. Hand scratching in the intertidal or use of a hydraulic harvester in subtidal conditions both reduced breakage. Allowing harvested clams to rest in off-bottom holding on the farm for 24 to 48 hours was required to ensure clearing of grit.

With any new product unfamiliar to the market, establishing markets with an adequate price point can be a challenge. Growers and wholesalers are suggested to begin marketing surf clams as a raw



raw bar item, and to establish relationships with local chefs that will promote the product to “early adopter” consumers of seafood. See detailed surf clam marketing and outreach recommendations for growers in [Marketing and Promotion Plan](#), Zapalac Advisors (2019).

Being a unique and new product, shelf life and storage are new challenges to be faced. Based on our limited experience, they seem to do well in refrigerated storage from 5-10 days. They tend to gape when stored so, over time, excess drying can expedite deterioration. Methods of storage should consider this gaping tendency along the lines of other shellfish species, like razor clams, mussels and softshell clams. They do remain mobile to a degree in refrigerated storage, which is another point to consider.

SUMMARY

Opportunity exists for surf clams grown in an aquaculture setting to establish a niche high-end clam product. This opportunity is not without challenges such as building new markets and streamlining grow out and harvest. Currently, field trials comparing the growth of the Atlantic (*S.s. solidissima*) and Southern surf clams (*S.s. similis*) are being conducted at various sites around Cape Cod to, but much work still needs to be done to bring this new product into a reality for industry diversification. Hatcheries have invested in producing the seed and making it commercially available. The next hurdle is getting commercial production started to introduce this new product to the market.

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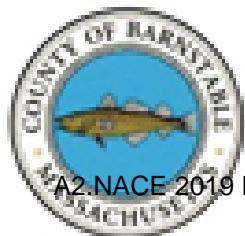
Appendix 2: Presentation of findings at the Northeast Aquaculture Conference and Exposition

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Assessing the Potential for Aquaculture Production of Surf Clams in Southern New England



Josh Reitsma, Diane Murphy, Abigail Archer, Rob Doane, Sue Machie, Melissa Sanderson, Dale Leavitt, Les Hemmila, Jared Hemmila, Chris Gargiulo, Jim O'Connell, Elizabeth Lewis, Tom Marcotti, Kris Clark⁹

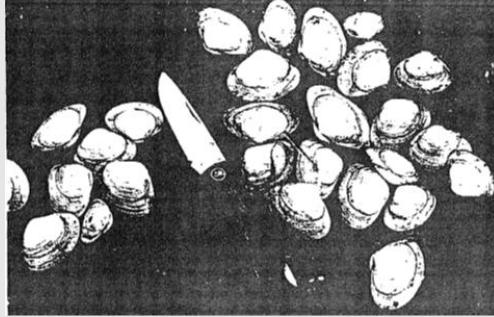


Atlantic Surf Clams

Spisula Solidissima



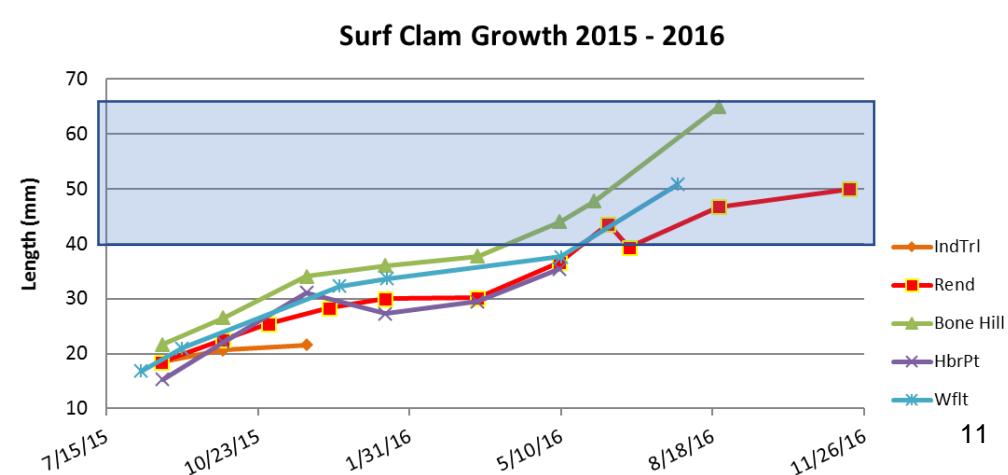
Some History



- 1980's NOAA Milford Lab
 - Grew fast
 - Organoleptic study
- More locally in MA...
 - 1990's – Karl Rask
 - “wild” seed efforts
 - ARC – CCCE 2015-16
- Current Project...
- SK Funded cooperative effort 2017-2018

Table 1: Annual growth rates of surf clams at different locations along the Atlantic Coast of the United States (Goldberg and Walker 1990).

Location	Initial Length (mm)	Final Length (mm)	Length Increase (mm/yr)	Source
Milford, CT (Long Island Sound)	15.7	47.3	31.6	Goldberg 1989
Point Pleasant, NJ	38.0	62.0	24.0	Jones et al. 1978
Barnegat Bay, NJ	34.0	58.0	22.0	Chang et al. 1978
Ocean City, MD	39.0	57.0	18.0	Chang et al. 1978
Chincoteague Bay, VA	42.2	68.6	26.4	Ropes 1969
Wassaw Sound, GA	21.6	51.0	29.4	Goldberg & Walker 1990
Barnstable, MA	18.4	46.7	28.3	Murphy & Reitsma 2016
Wellfleet, MA	16.84	50.8	33.96	Murphy & Reitsma 2016

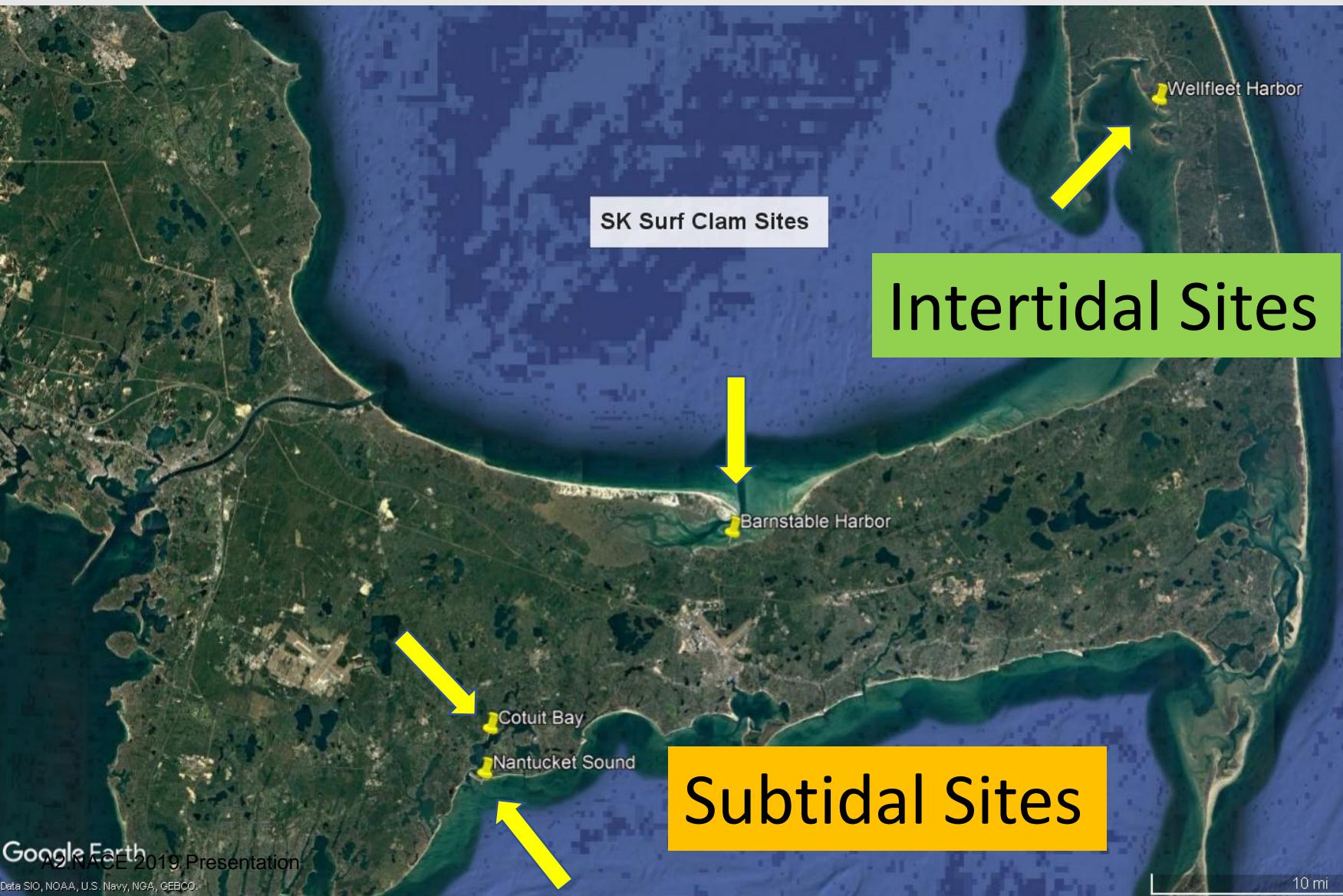


Hatchery/Nursery

- Hatcheries have been able to produce seed reliably
- Both upwellers and field nursery boxes have been used for nursery culture
- ARC has had surf clam seed commercially available for several years



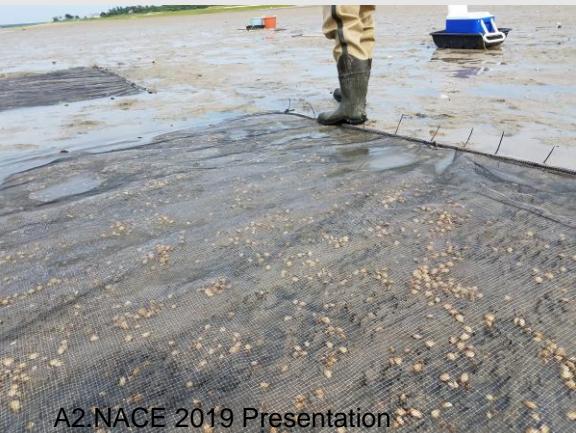
4 sites – variety of conditions



Gear Trialed

Bottom plant

- under net at 50/ft²



Oyster bags

- Off bottom at first
- On bottom later
- Several densities



Florida bags

- 800/bag final grow out



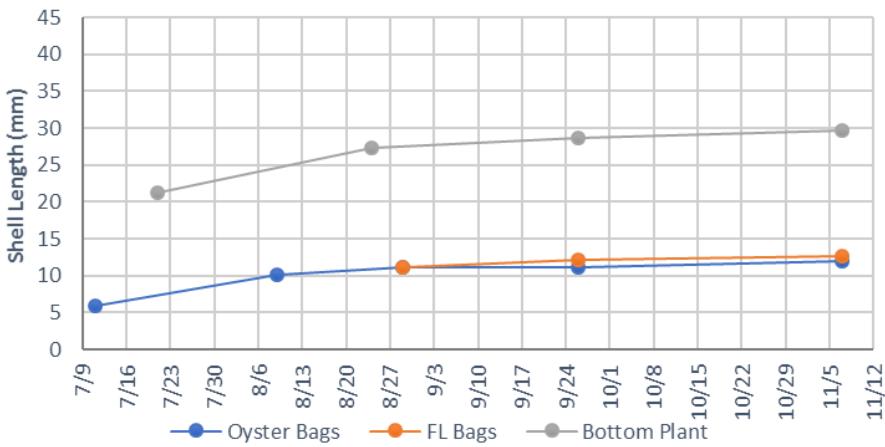
Why they need containment...
they are very mobile...see video



First Season results – Subtidal

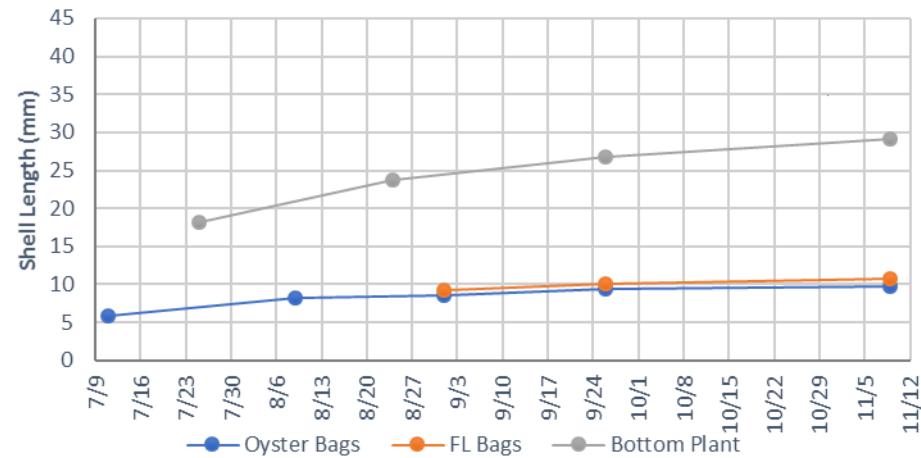
- Planted seed in July, 2 batches
 - Small seed (4-6mm) nursery (oyster) bag to FL Bag
 - Big seed (18mm, $\frac{3}{4}$ ") direct bottom plant

Cotuit Bay - Surf Clam Growth



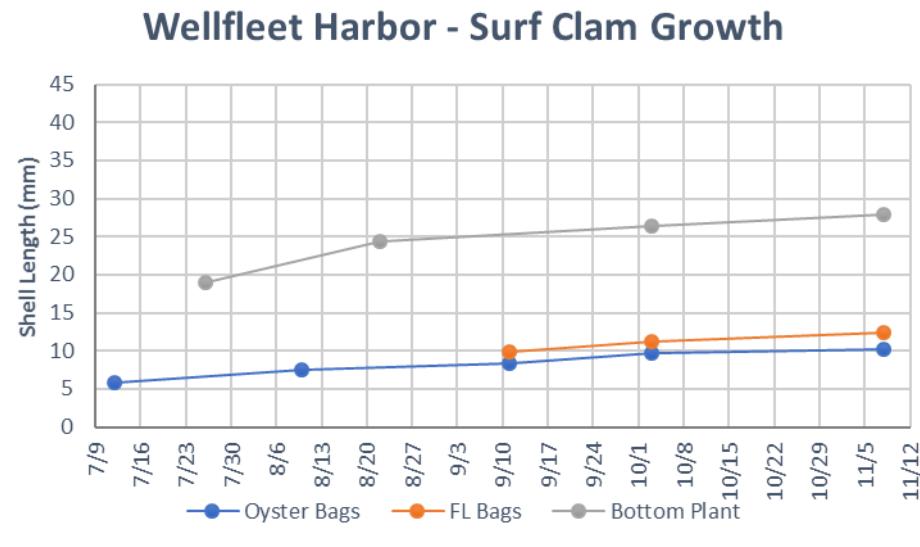
Inconsistent growth through the season
Fouling became an issue off-bottom

Nantucket Sound - Surf Clam Growth



First Season results – Intertidal

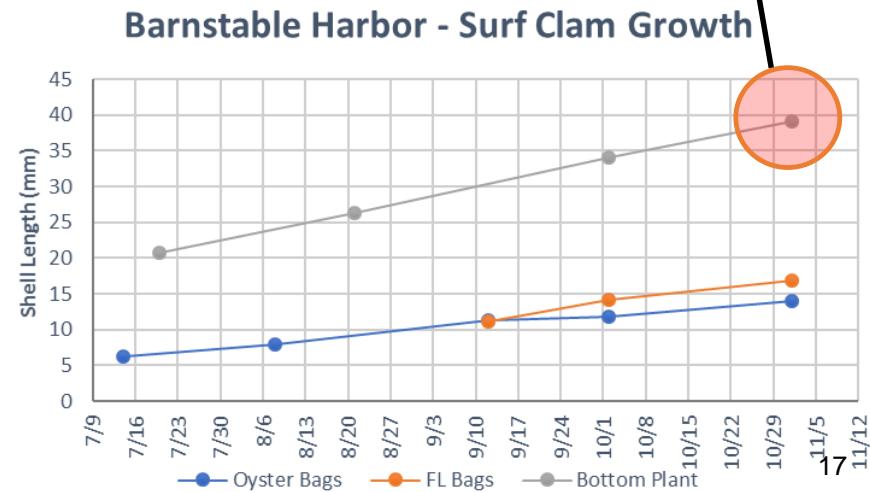
- Planted seed in July, 2 batches
 - Small seed (4-6mm) nursery (oyster) bag to FL Bag
 - Big seed (18mm, $\frac{3}{4}$ ") direct bottom plant



Inconsistent growth through the season
Clams that had sand did best

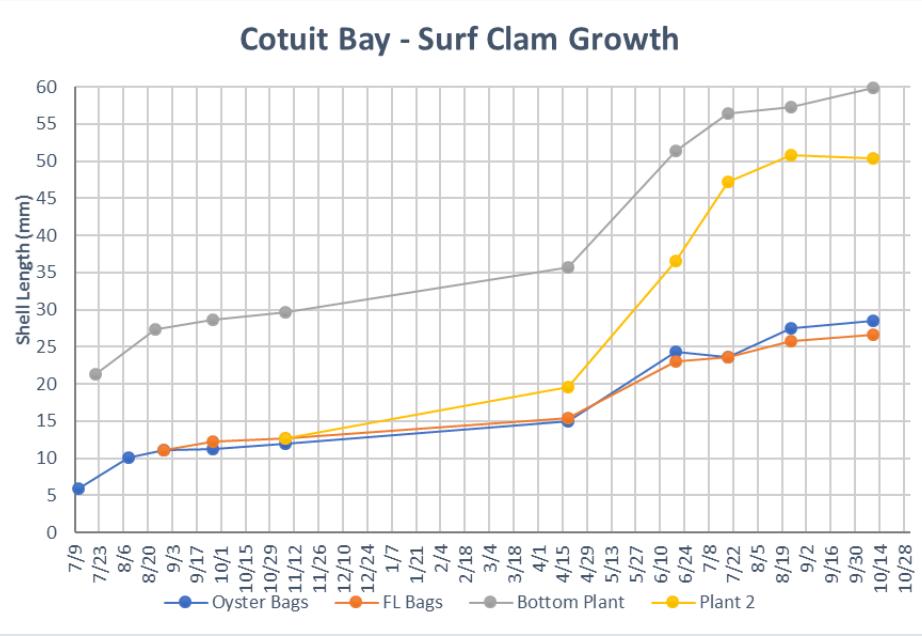
A2.NACE 2019 Presentation

Single season product
may be possible under
right conditions!

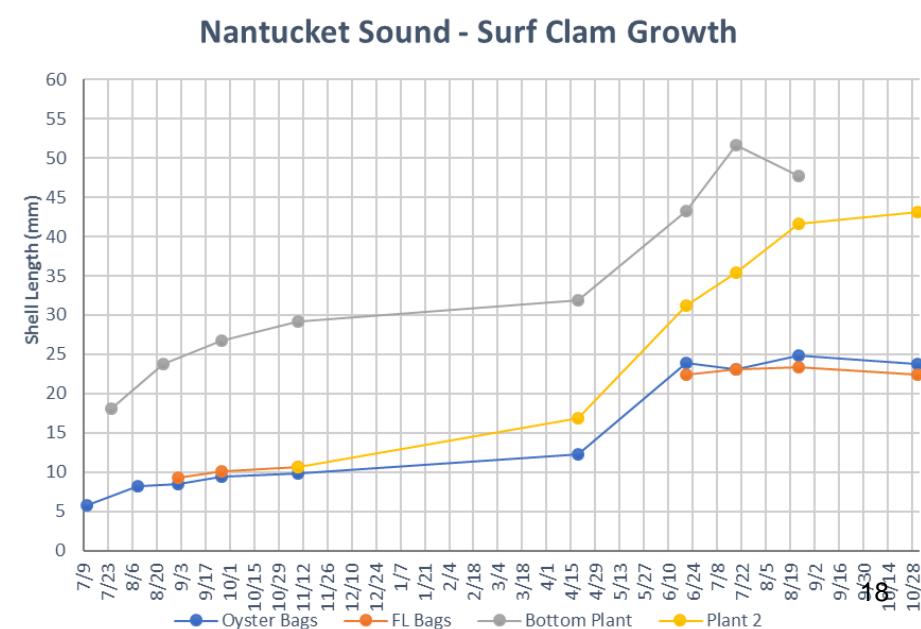


2nd Growing Season - Subtidal

- Added 2nd bottom plant – late 2017 Plant 2
- Pinned bags on the bottom – no more off-bottom



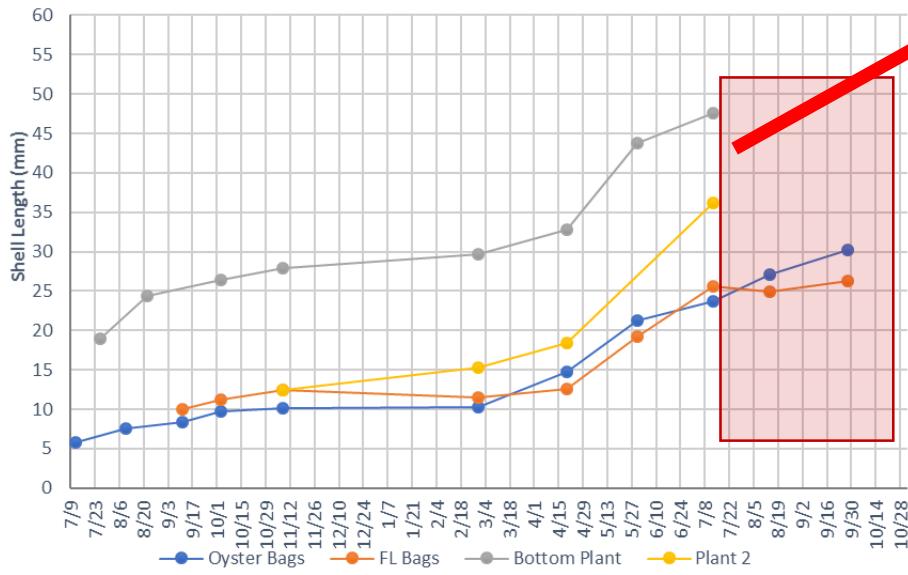
Bottom planted clams grew best
Other methods did not “sand in”
consistently and got fouled



2nd Growing Season - Intertidal

- Added 2nd bottom plant – late 2017 Plant 2
- Pinned bags on the bottom – no more off bottom

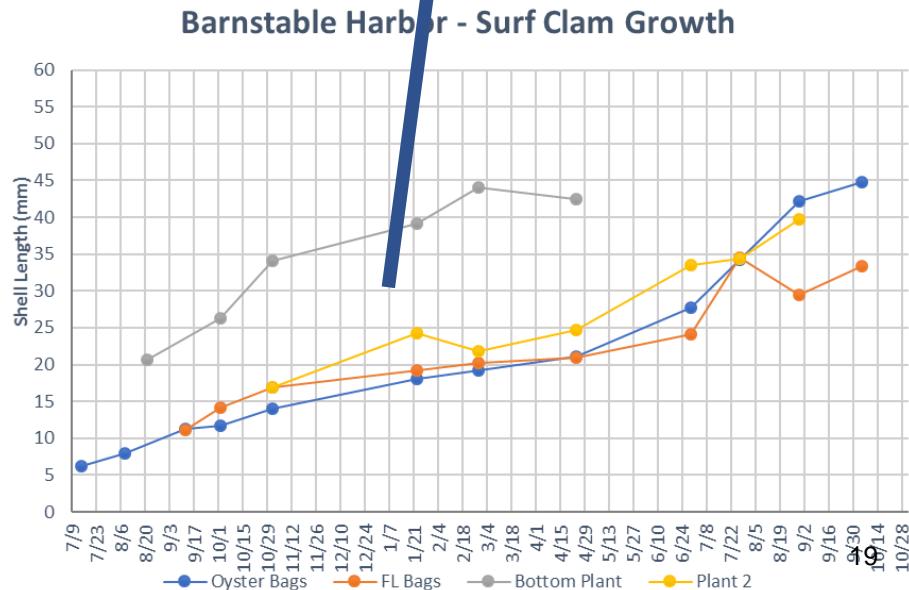
Wellfleet Harbor - Surf Clam Growth



Heat mortality event
Low survival following

Winter mortality event
Seed sorted again in April

Bottom planted clams grew best
Barnstable bags “sanded in” well and
grew well because of it

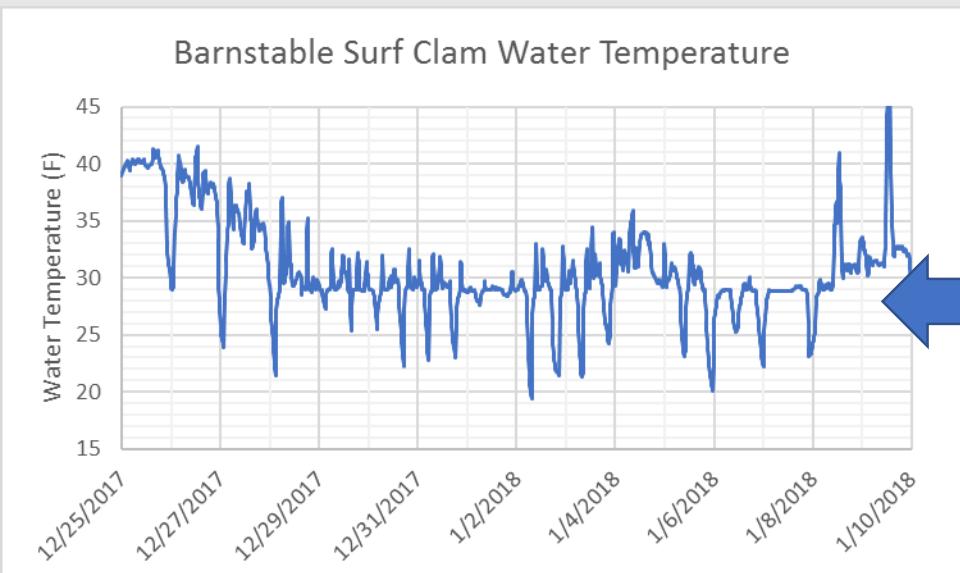


Survival – ranges are presented

- Season 1 (July thru Nov 2017)
 - Oyster bags, 40% (high intertidal heat) – 99%
 - FL bags, 63% (damaged/mounded) – 97%
 - Bottom plant, 0% (mounded or torn net) – 75%
- Winter 2017-18 (Dec 2017 – April 2018)
 - Oyster bags on-bottom, 4% (winter exposure) – 92%
 - FL bags, 0% (storm/winter damage) – 42%
 - Bottom Plant 1, July 2017, 0% (winter kill) – 60%
 - Bottom plant 2, Dec 2017, 5% (storm/winter) – 90%
- Season 2 (May 2018 – Nov 2018)
 - Oyster bags on-bottom, 0% (heat kill) – 70%
 - FL bags, 9% (heat kill) – 52%
 - Bottom Plant 1, July 2017, 0% (winter/heat/wind) – 40%
 - Bottom plant 2, Dec 2017, 0% (winter/heat) – 40%

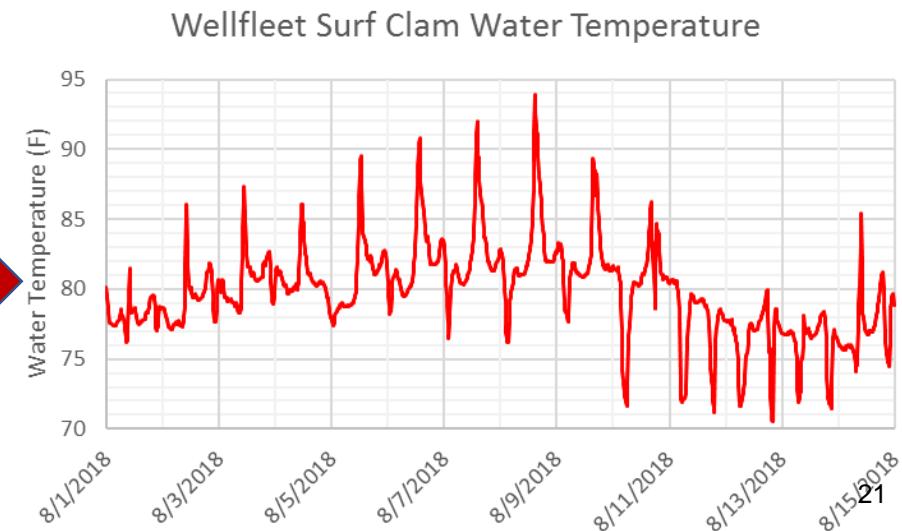
Temperature extreme events at intertidal sites

- Reported tolerance
 - Low ~0C, 32F
 - Max 30C, 86F



2 weeks of water ~29F
Exposure to 20F

Water Temps avg >80F
Exposure to >90F

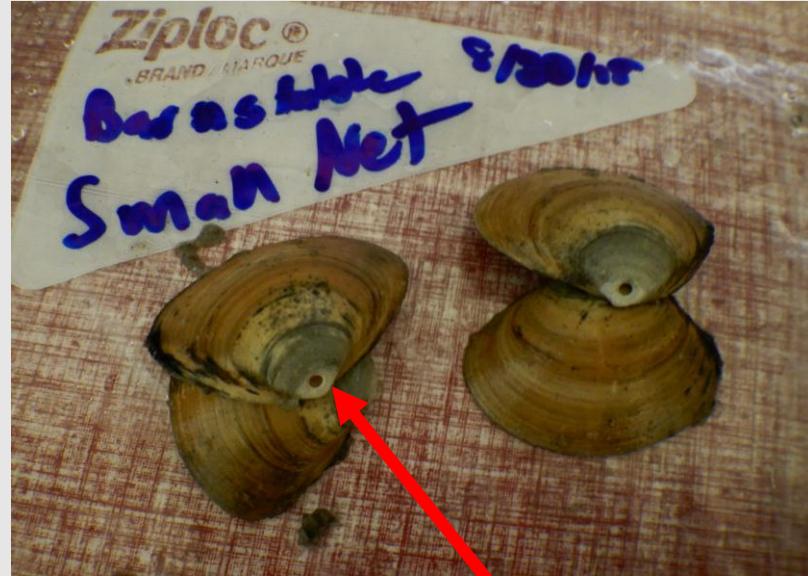


Issues...Survival

- Predators
- Mounding nets



crab activity



Moon snail activity



Issues...off-bottom

- Fouling
- Misshapen shells



Even boring sponge and mud blisters
if left out of sand for season



Sediment is needed

Clams got to dig!

Able to dig in



On sediment surface



Methods That Worked

- Bottom planting – market in a year
 - Planted $\frac{3}{4}$ " in July 2017
 - Planted $\frac{1}{2}" - \frac{3}{4}"$ in November 2017 after being 4-6mm in July 2017



- Bags that sand in
 - Inconsistent
 - Best survival
 - Good growth when in sand



Harvest

- Raking caused spearing/breakage
 - Damaged ~15% of clams at times
 - Dry “scratching” in intertidal somewhat better
- Hydraulic harvester very effective
 - Less than 1% breakage if any
 - Harvests quickly and efficiently
- Purging of sand needed
 - Off-bottom holding for a day/tide



Hydraulic “Box” Harvester



They are tasty...



- Surf Clams are delicious raw or cooked, briny, slightly sweet and very rich
- *Testimonials from Wellfleet Oysterfest Clam Slam, which served 1.5-2" surf clam in linguine*
 - “Loved the light but clean flavor”
 - “A taste of the sea. Tender, clean, delicious.”
 - “Soooo good. Loved the size of surf clams served.”
- 100% of participants wanted to eat surf clams again!
- Value is still a work in progress – there is potential

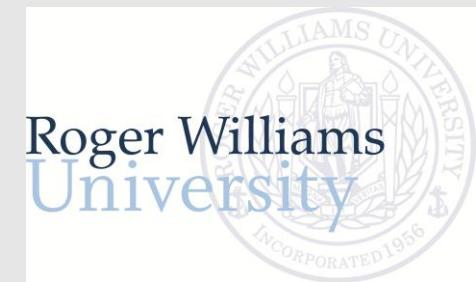
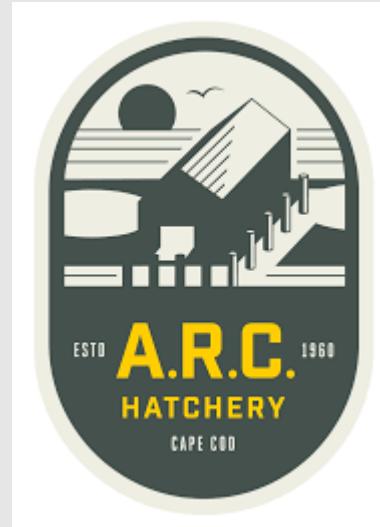
Lessons learned thus far



- People like to eat them
- Seed production seems viable/consistent
- Need containment and protection
- Extremes in temp on intertidal exposure are bad
- They need to dig in, even just shallowly
 - Under nets – lower intertidal
 - Sediment filled bags/trays in subtidal?
- Inconsistent growth through the season
 - They do grow in cooler months (Nov, Dec, Apr, May...)
- Grow rapidly when happy – 1 year product possible

Acknowledgements

- NOAA Saltonstall-Kennedy (SK) Award Number: NA16NMF4270241
- Partner shellfish farmers
 - Barnstable Sea Farms
 - Jim O'Connell
 - Cotuit Oyster
 - Town of Barnstable
- ARC
- CCCFA
- RWU
- Kris Clark



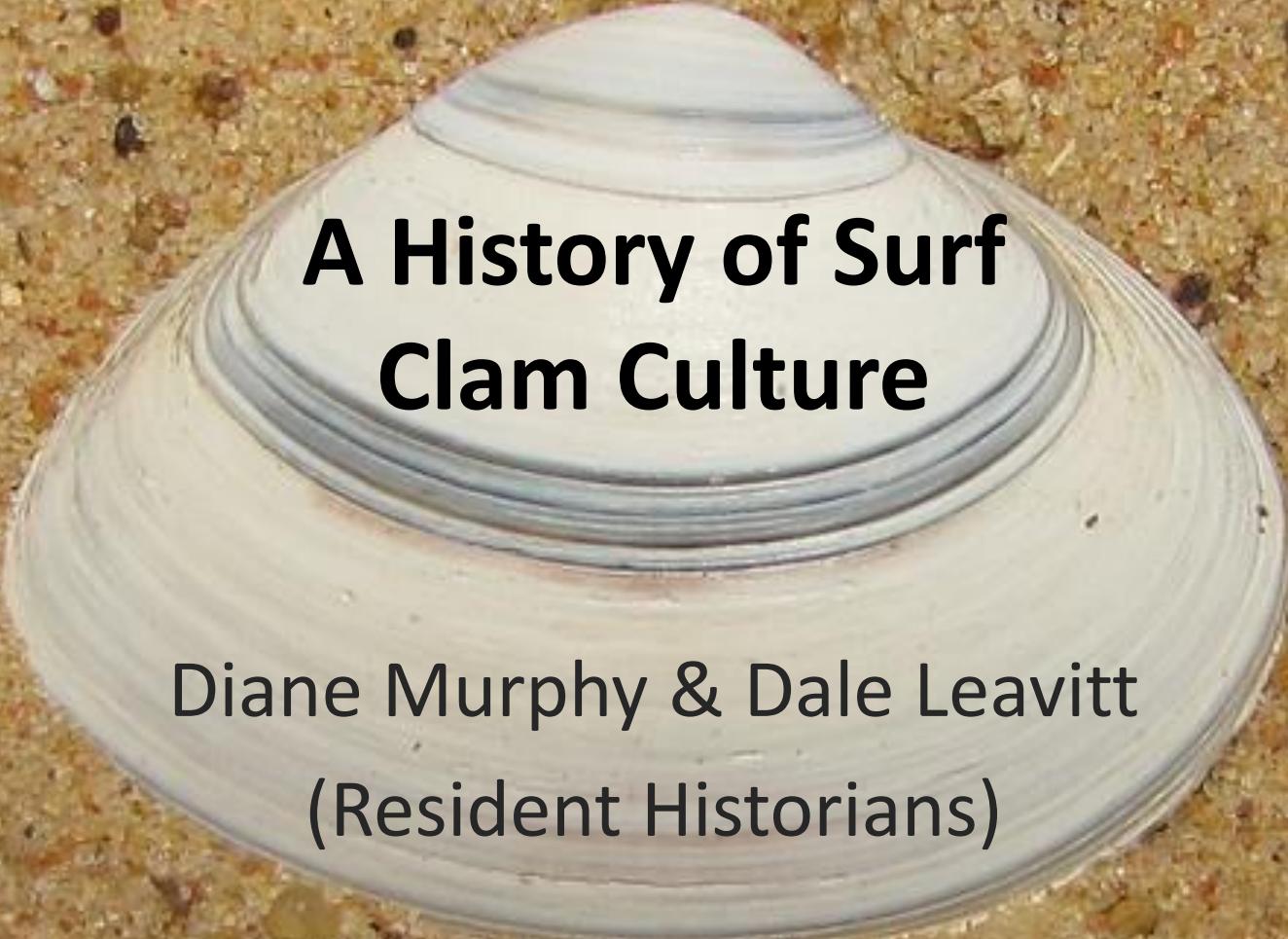
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Saltonstall-Kennedy Program

The statements, findings, conclusions, and recommendations
are those of the author(s) and do not necessarily reflect the
views of NOAA Fisheries Service.

*NOAA's Mission: To understand and predict changes in
climate, weather, oceans and coasts; to share that knowledge
and information with others; and to conserve and manage
coastal and marine ecosystems and resources.*

Appendix 3: Grower Workshop Materials

- A) Presentation Slides from Workshop**
(starts on next page)
- B) Enterprise Budget Worksheet for Surf Clams and, for comparison, Quahogs**
(provided as separate attachment to allow for excel functionality)

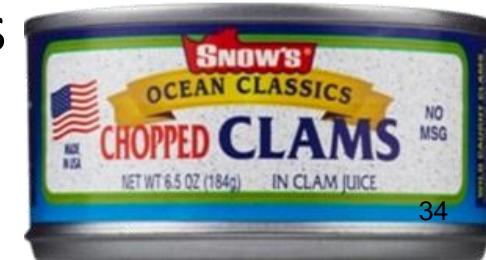


A History of Surf Clam Culture

Diane Murphy & Dale Leavitt
(Resident Historians)

Surf Clam Fishery

- Interest in harvesting surf clams started as a small bait fishery on Cape Cod in 1800s
 - Contributed 3.2% of clam meats harvested in US in 1940s
- 1950s - Snow's Canning Company started to use surf clams as their clam of choice for their chowder
- Spun up to the point where almost 72% of all clam meats used in the US (between 1970-1974) were surf clams
 - Per capita consumption of surf clams doubled between 1947 to 1974
- Clams were processed into chopped clams
 - Targeted the large adults
>5 inches (12.7 cm)



Surf Clam Culture

- Wild harvest dropped dramatically in 1970s due to overharvesting
- First serious proposal to culture surf clams presented by Harold Snow (WAS 1979)
 - Discussed seeding public beds with hatchery stock
 - Encouraged the leasing of public waters for private commercial activity
- This concept quickly developed
 - Ron Goldberg at the NMFS Milford Lab started publishing reports to the National Shellfisheries Association at their annual meeting in 1980



Culture Technology Development

- Loosanoff and Davis published spawning techniques in 1963
- Ron Goldberg (1980) applied this info to hatchery production at Milford followed by intermediate and final grow-out
 - Determined that larval culture and intermediate grow-out was generally reliable
 - Proposed to use land-based raceways for final grow-out
 - Speculated that could produce marketable clam (2") in one year

Milford Research

- Suggested intervals for the three growth stages
 - Final grow-out in land-based raceways

TABLE 10.1 Optimal growth rates under culture conditions

Culture phase	Initial size	Final size	Time interval
larval	90 microns	280 microns	21 days
nursery	280 microns	18 mm	8 weeks
grow-out	18 mm	50 mm	5 months

Field-based Grow-out

- Ron Goldberg in 1983
- Sunk 8 mm mesh cages in substrate at 6 m depth and planted at different densities
 - $500/m^2$ ($53/ft^2$) was best growth
- Planted at different water depths
 - Shallow (3 m/9 ft) grew better in the summer
 - Deeper (8 m/24 ft) grew better in the fall
 - Related to ambient water temperature
- Recommended that submerged cage culture was the best strategy



Consumer Acceptance

- Gloucester NMFS Lab evaluated marketability of cultured surf clams at the same time (Krzynowek *et al.* 1980 & 1982)
 - Tested half-shell raw, steamed, and fried clams
 - Professional taste panel evaluated raw half-shell surf clams better than little necks
 - Comparable to steamer clams in other preparations



“White Venus”

Meanwhile – in Georgia

- Ron's work sparked interest by Randy Walker in Savannah, GA in 1980s
- Demonstrated feasibility of growing surf clams in cages in southern waters
- Continued research on growing surf clams in GA & SC through 1990s
 - Later work focused on hatchery/nursery production
- Probably not a lot of grow out info applicable to our northern environment

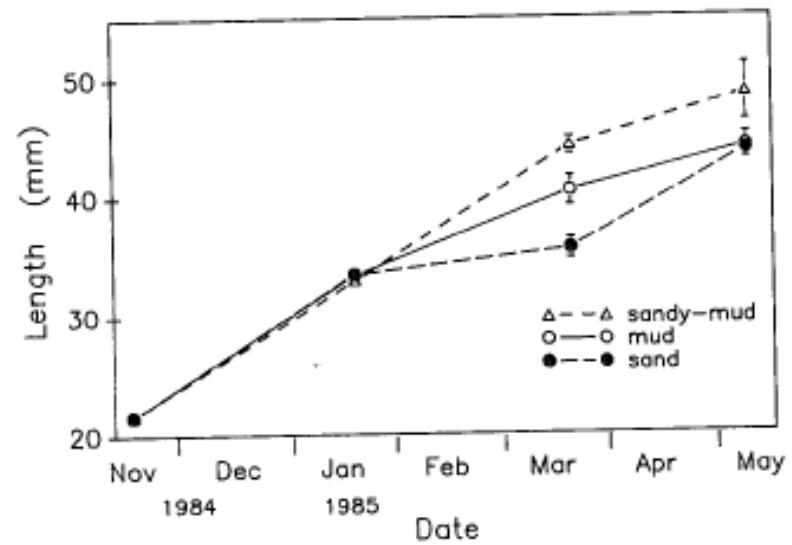


Figure 2. Growth of *Spisula solidissima* in 3 substrate types in coastal Georgia (1984–1985).

And in Delaware

- 1984 – John Monte was awarded an NSF-SBIR grant focused on “Growth of Juvenile Surf Clams (*Spisula solidissima*)”
 - Final Report: Inexpensive feeds as dietary supplements to accelerate growth of juvenile surf clams (*Spisula solidissima*)
 - Built on Goldberg’s proposed raceway culture system
 - Results
 - Continuous feeding was better than batch feeding
 - Mixture of rice starch and a commercial Purina feed resulted in growth 67% slower than Goldberg

Later on Cape Cod

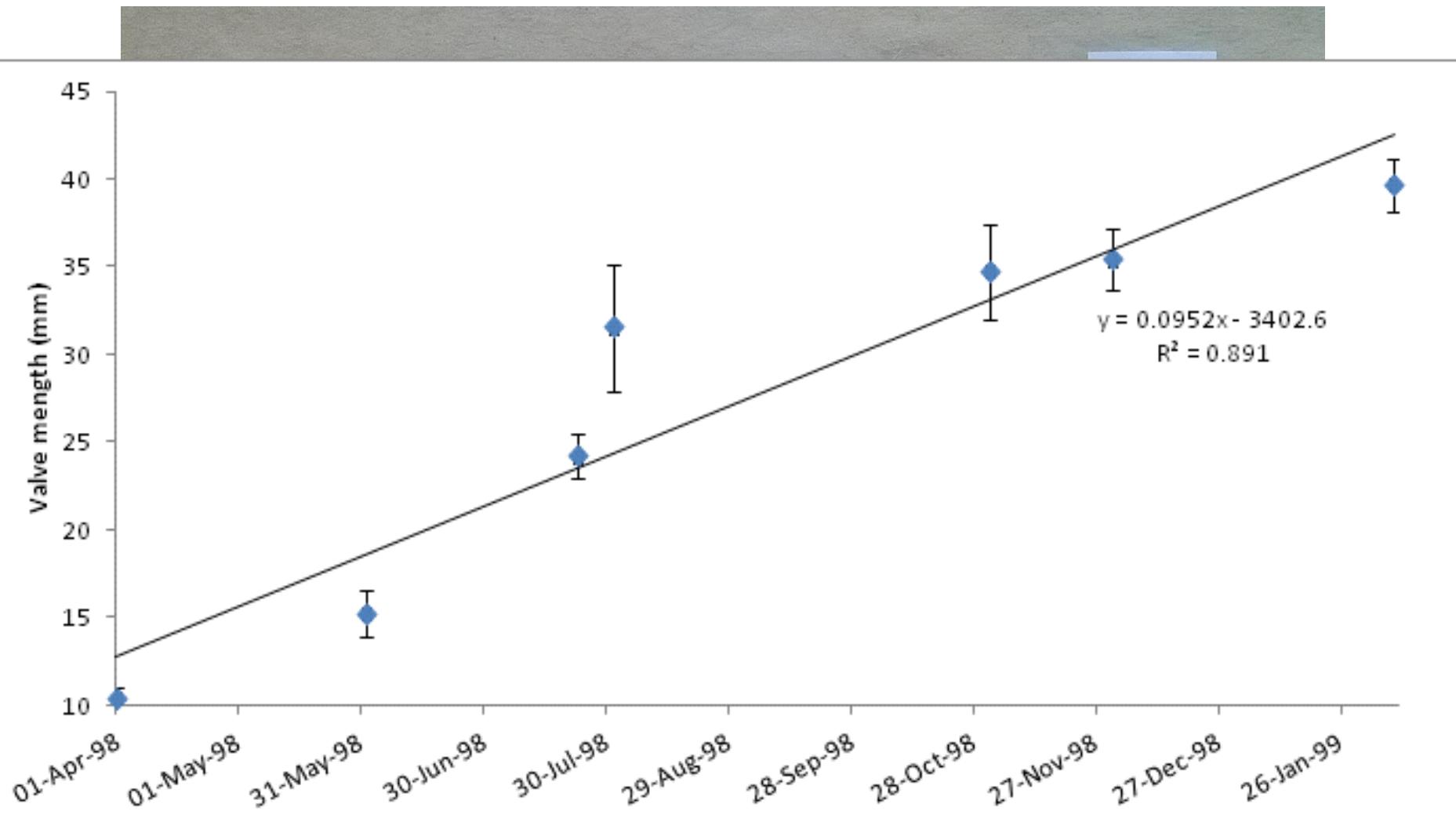
- Karl Rask & Richard Dickey initiated surf clam culture studies in outer Cape in early 1990s
- 1994 report Mass Dep't Food & Ag
 - Distributed 4-6 mm seed to growers in Brewster, Wellfleet, Truro, & P'town (May)
 - Nursery culture in quahog seed trays during summer (15% marketable by October)
 - Overwintered in Florida-type mesh bags
 - Good survival through winter
 - Most at market size by May of next year

Early SEMAC Surf Clam Research

- 1998
 - Supported a number of growers to experiment with growing surf clams
 - Brewster - successful
 - Barnstable – temperature too hot
 - Provincetown – fail (lack of seed)
 - Orleans/Eastham – marginal success



Brewster Growth



Early SEMAC Surf Clam Research

- 1998
 - Supported a number of growers to experiment with growing surf clams
 - Brewster - successful
 - Barnstable – temperature too hot
 - Provincetown – fail (lack of seed)
 - Orleans/Eastham – marginal success
- 1999
 - Continued in Provincetown
 - High water temp resulted in high mortality
- Most growers lost interest when they couldn't get enough \$\$ for clams
 - Dealers offered \$0.10 per piece



Local Commercial Efforts

- In late 1990s, Mark Simonitsch attempted to grow surf clams commercially off-shore in Chatham
 - Tended by diving
 - Proved not to be feasible (Labor)
- 2006, John Baldwin in P’town
SARE Research conclusions:
 - Planting unprotected surf clam seed leads to 100% mortality due to predation
 - Growth of surf clams in kitty litter trays covered with Tenex mesh is better in Provincetown Harbor than in Pilgrim Lake or Hatches Harbor, and reach market size in less than one year
 - If shifting sand covers the Tenex mesh, clams grow more slowly, or die
 - Clams grow well at densities of 1 per 5 sq. inch and 1 per 2.5 sq. inch, but greater density is probably possible

Current Work

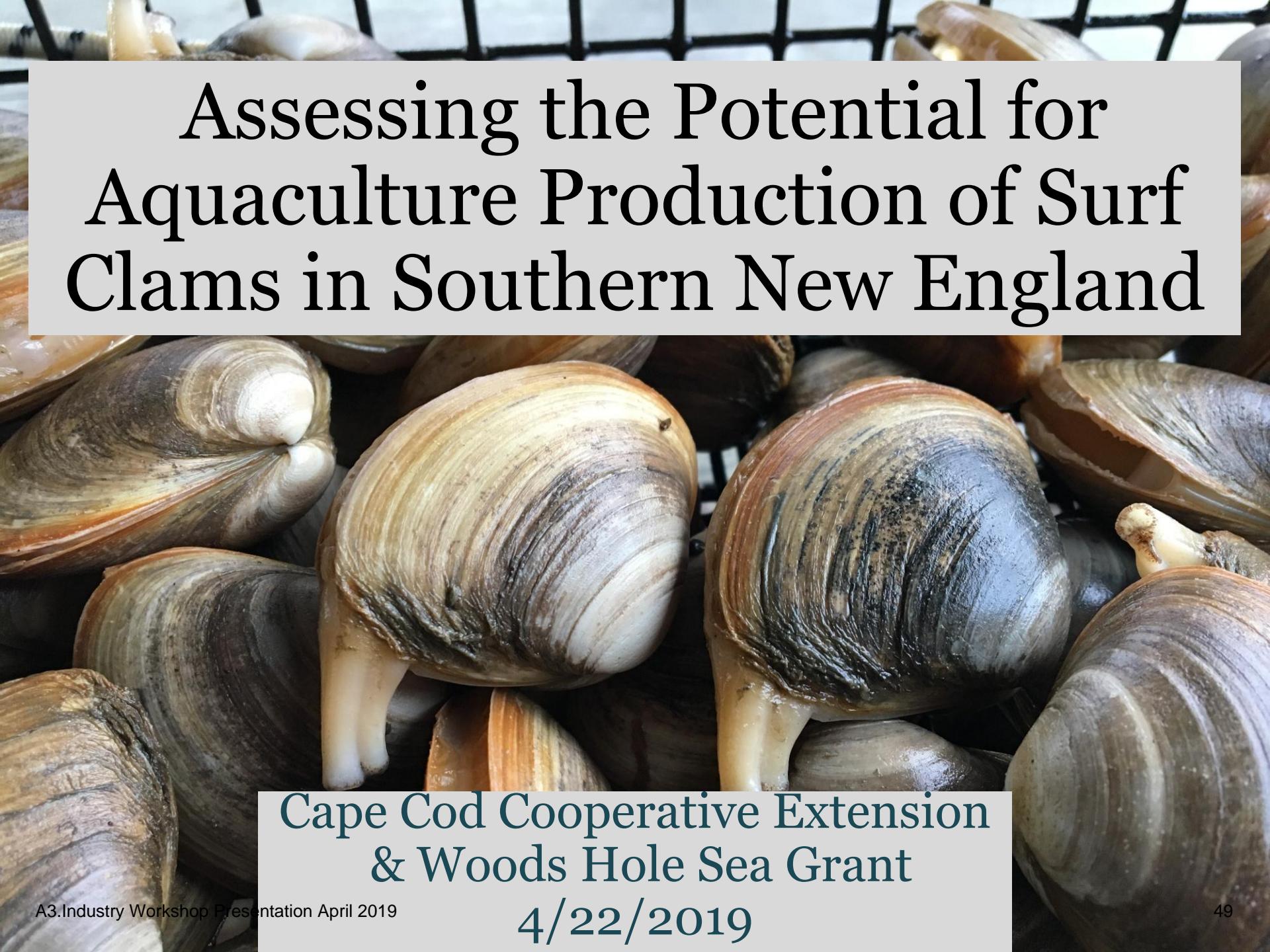
- SEMAC et al.
 - Current Project
- Rutgers University (Delaware Bay, NJ)
 - Daphne Monroe & Michael Acquafridda
- St Joseph's College (Casco Bay, ME)
 - Mark Green
- University of Maine Machias/Downeast Institute
 - Brian Beal – Stimpson's Surf Clam

Current Status – Wild Harvest

- Federally managed species (ITQ System)
 - Mid-Atlantic Fisheries Management Council
 - Minimum size
 - $4\frac{3}{4}$ inches
- Massachusetts regulation
 - Minimum size for sales
 - Wild harvested – 5 inches
 - Aquaculture-reared – $1\frac{1}{2}$ inches



Assessing the Potential for Aquaculture Production of Surf Clams in Southern New England

A close-up photograph of several surf clams (Mya arenaria) piled together. The shells are large, rounded, and exhibit a distinct spiral growth pattern with varying shades of brown, tan, and white. Some of the clam valves are open, revealing the light-colored, fleshy adductor muscles. The shells are resting on a dark, textured surface, likely a metal grate or tray.

Cape Cod Cooperative Extension
& Woods Hole Sea Grant

Atlantic Surf Clams

Spisula Solidissima



Wild – legal harvest size

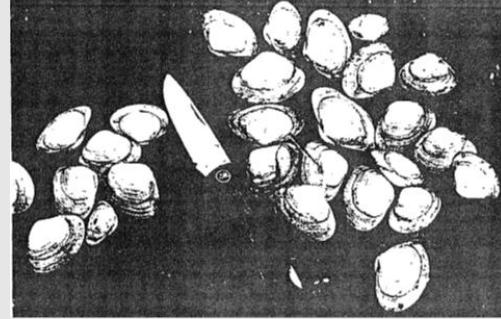
A3.Industry Workshop Presentation April 2019

Aquaculture – legal harvest size
• in Massachusetts

Harvesting under-size

- It is legal in MA...if you farm them
 - 322 CMR 6.08,c,3 – Exemption for Aquaculture reared surf clams, sets minimum size as 1.5" in longest diameter for sale (exempted from 5" wild minimum)
 - 322 CMR 14.03 all shellfish tags on containers of surf clams below the legal wild harvest size of 5" must be labelled “aquaculture reared” or “farm raised”
- Amend propagation permit to include surf clam seed – covered for possession of seed surf clams

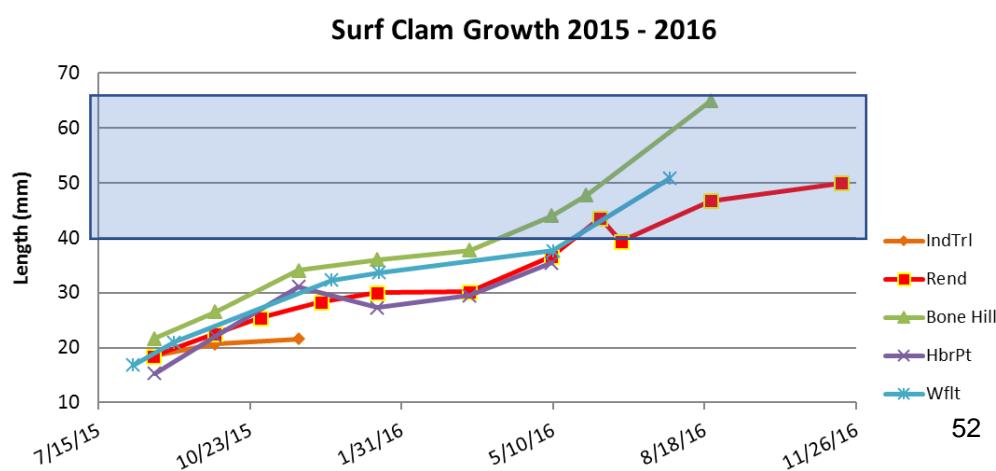
There seems to be potential



- 1980's NOAA Milford Lab
 - Grew fast
 - Organoleptic study
- More locally in MA...
 - 1990's – Karl Rask
 - ARC – CCCE 2015-16
- Current Project...
- SK Funded cooperative effort 2017-2018

Table 1: Annual growth rates of surf clams at different locations along the Atlantic Coast of the United States (Goldberg and Walker 1990).

Location	Initial Length (mm)	Final Length (mm)	Length Increase (mm/yr)	Source
Milford, CT (Long Island Sound)	15.7	47.3	31.6	Goldberg 1989
Point Pleasant, NJ	38.0	62.0	24.0	Jones et al. 1978
Barnegat Bay, NJ	34.0	58.0	22.0	Chang et al. 1976
Ocean City, MD	39.0	57.0	18.0	Chang et al. 1976
Chincoteague Bay, VA	42.2	68.6	26.4	Ropes 1969
Wassaw Sound, GA	21.6	51.0	29.4	Goldberg & Walker 1990
Barnstable, MA	18.4	46.7	28.3	Murphy & Reitsma 2016
Wellfleet, MA	16.84	50.8	33.96	Murphy & Reitsma 2016



Hatchery/Nursery

- Hatcheries have been able to produce seed reliably
- Both upwellers and field nursery boxes have been used for nursery culture
- ARC has had surf clam seed commercially available for several years



Both upwellers and sand filled nursery trays/boxes have worked – similar to quahog nursery production



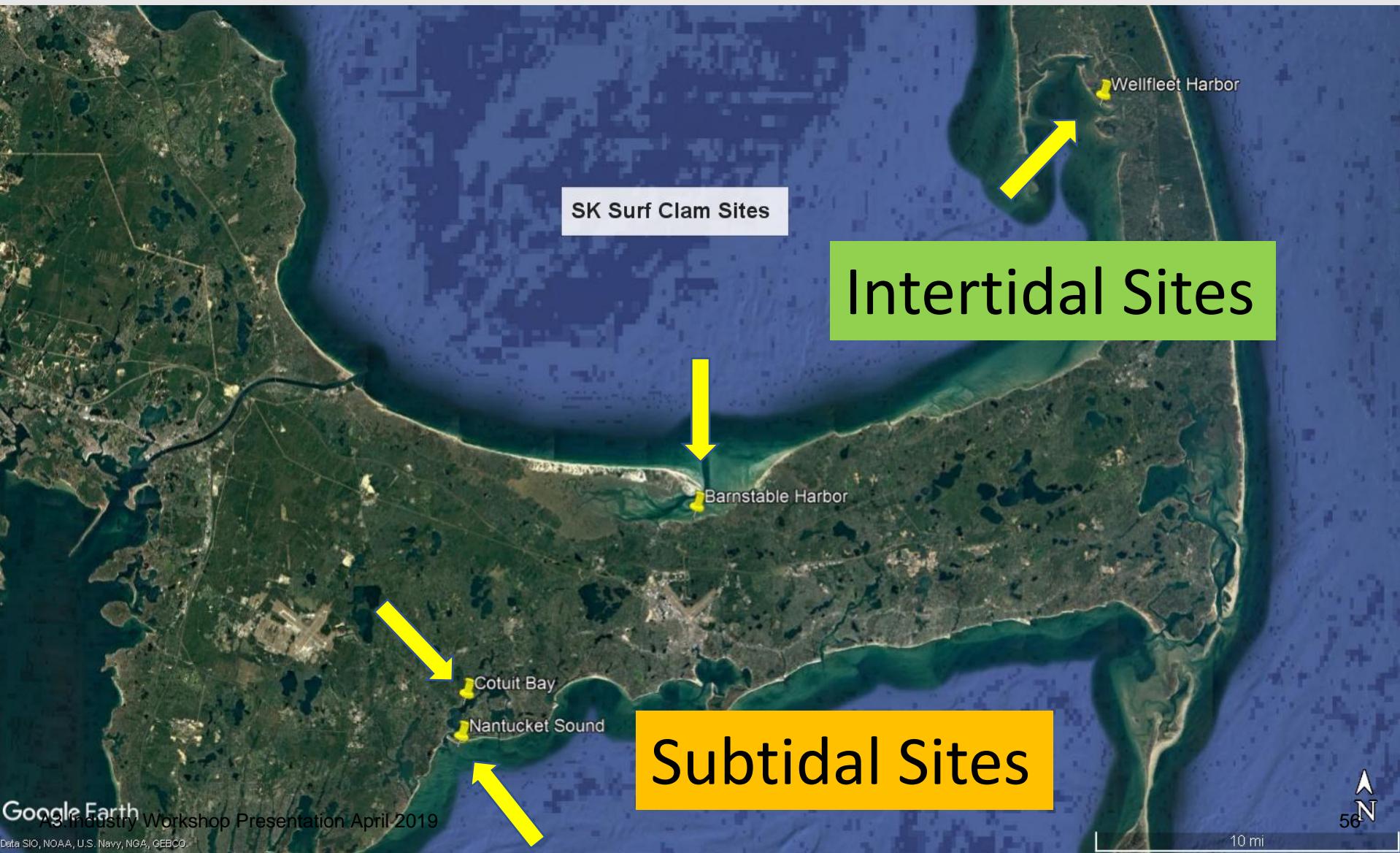
Active surf clam seed...



More active clams



4 sites – variety of conditions



Sites - intertidal

Barnstable

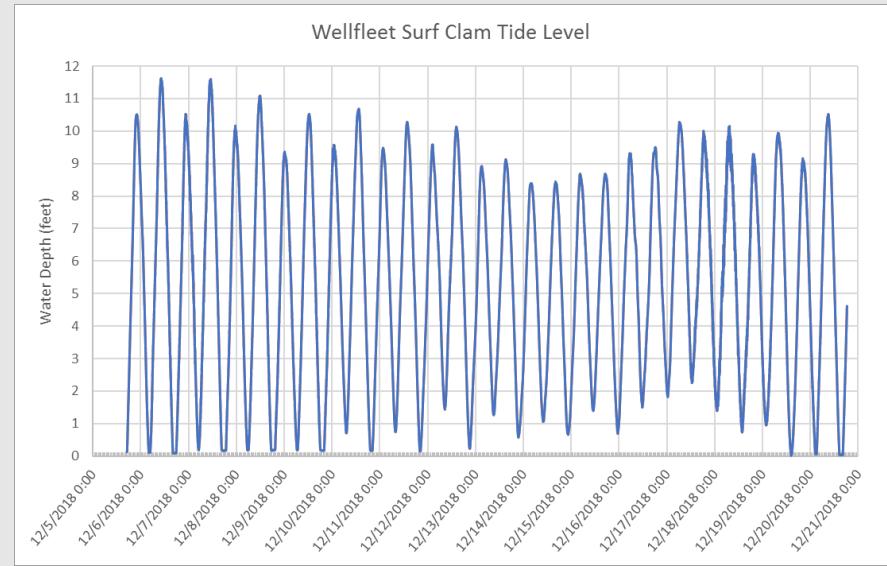
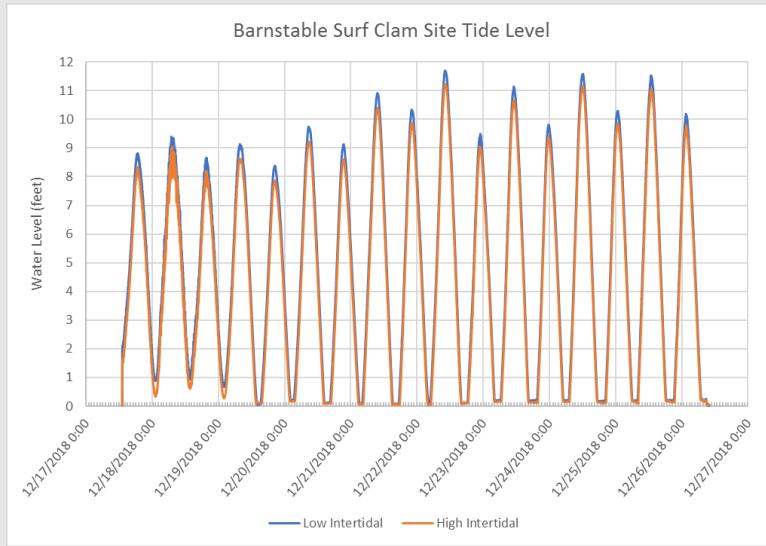


Pretty high intertidal

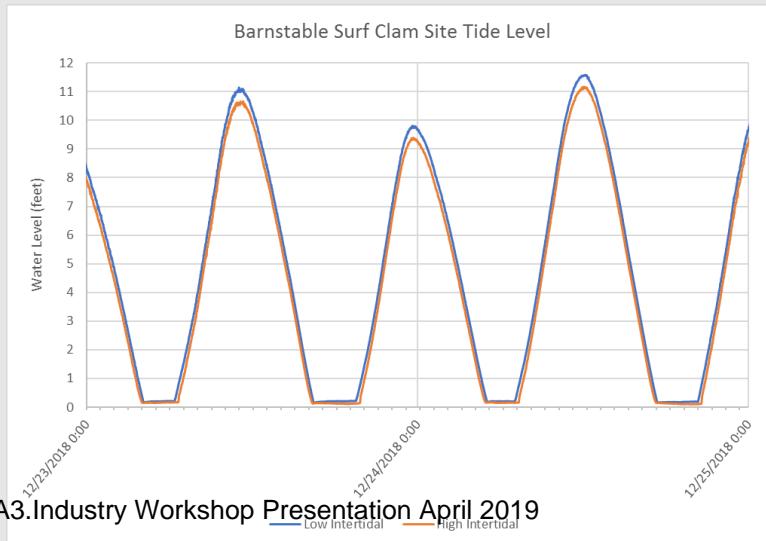
Wellfleet



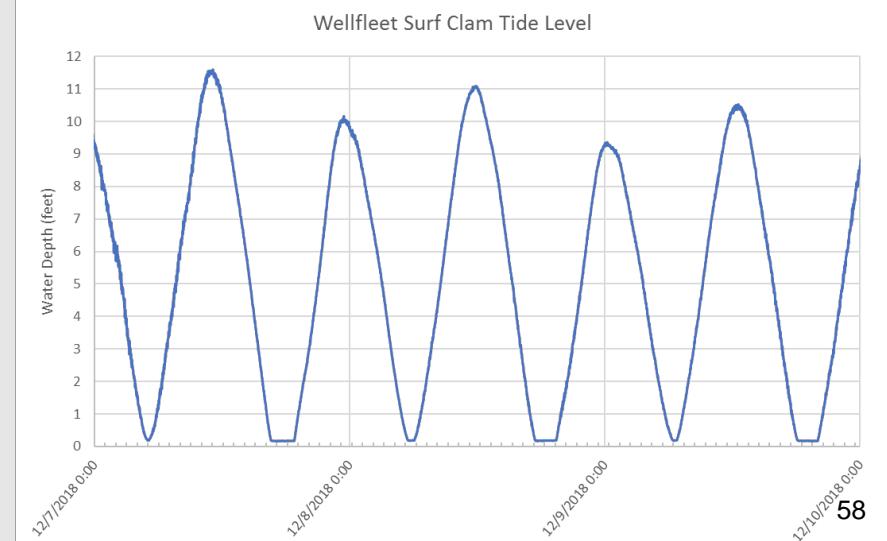
Intertidal – level of exposure



Big tides – 3-4hr tidal exposure



Big tides – 2-3hr tidal exposure



Sites - Subtidal

Cotuit Bay



Protected and about knee deep

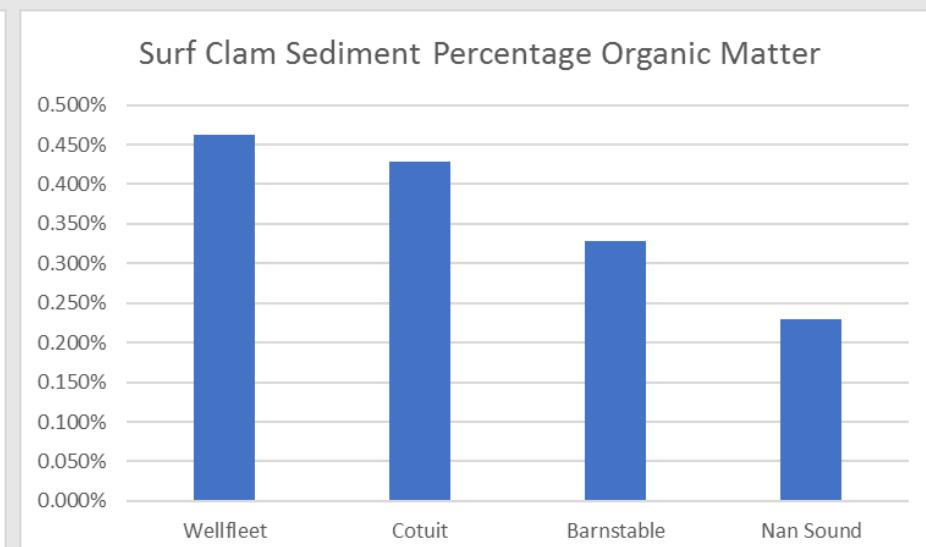
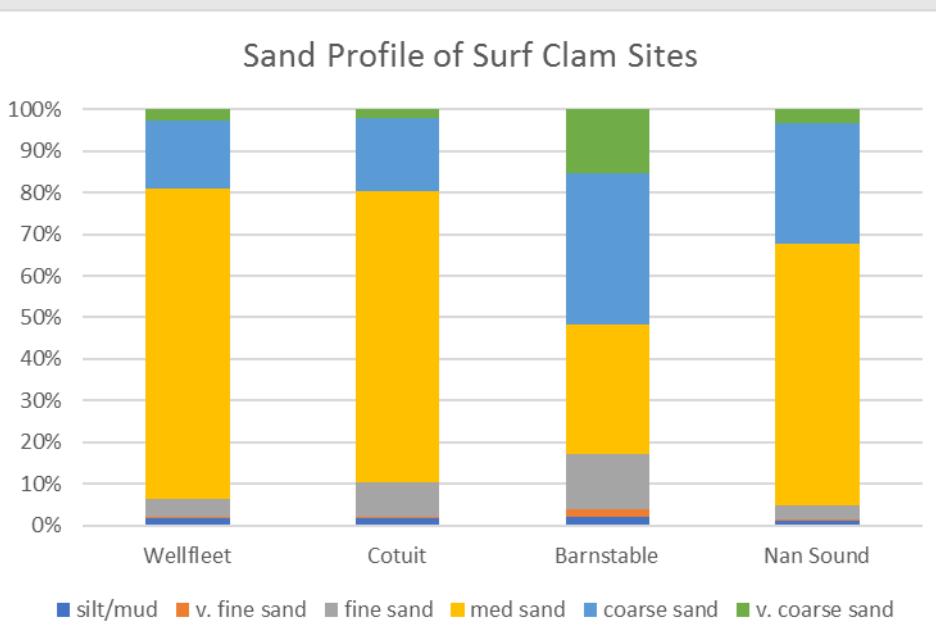
Nantucket Sound

exposed and waist/chest deep



Sand Profiles

- Fairly similar
 - Mostly medium sand
- Barnstable a bit more varied in grain size



Gear Trialed – season 1 (smaller clams)

Upweller (RWU) to bottom planting

- under net at 50/ft²
- Planted at ½-3/4"



Oyster bags/cages – started at about 5-6mm

- Off bottom – 2 tiers
- 2mm bags then 6mm bags

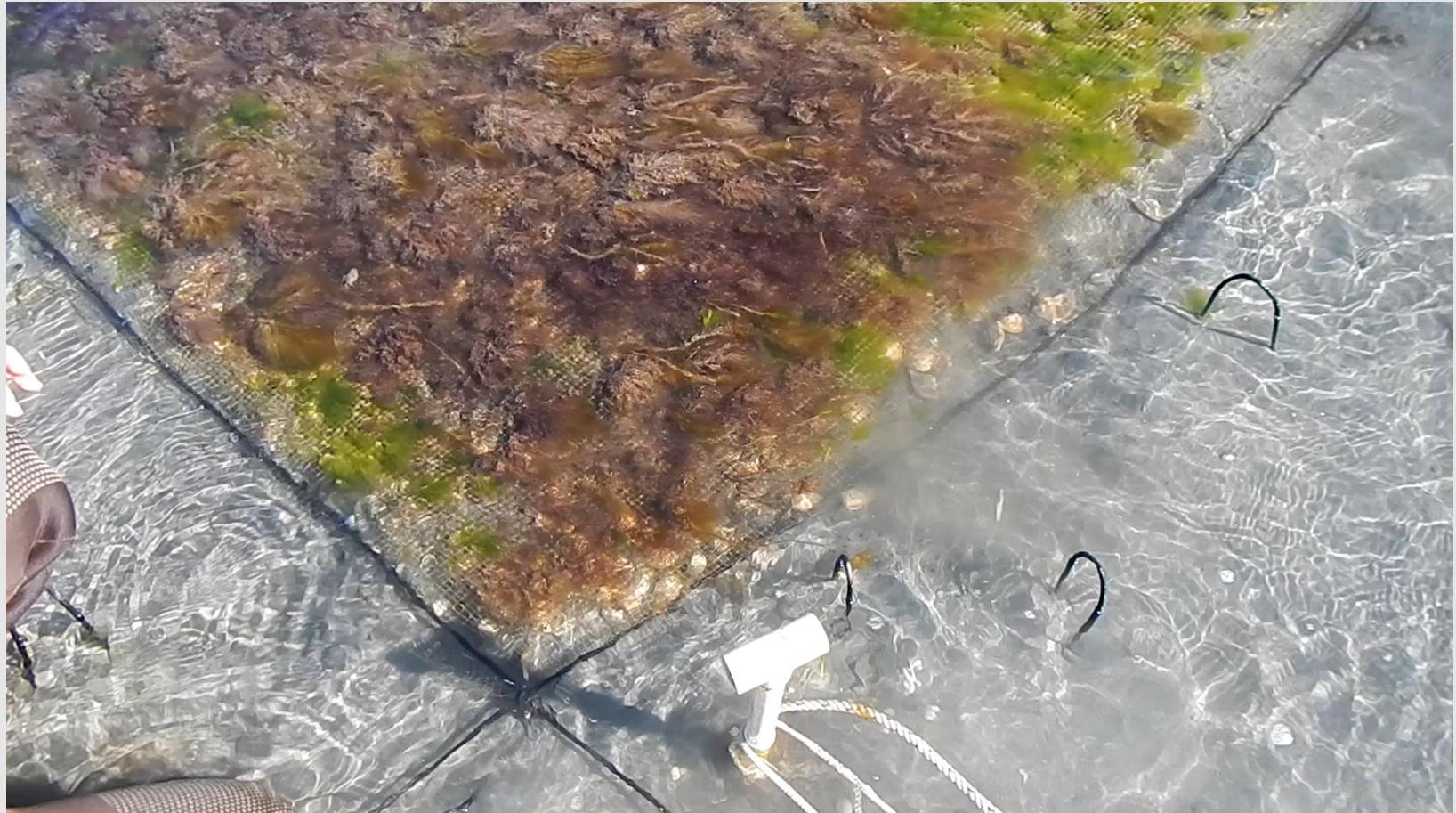


Florida bags – when large enough 9-10mm

- 4mm bags
- 800/bag final grow out



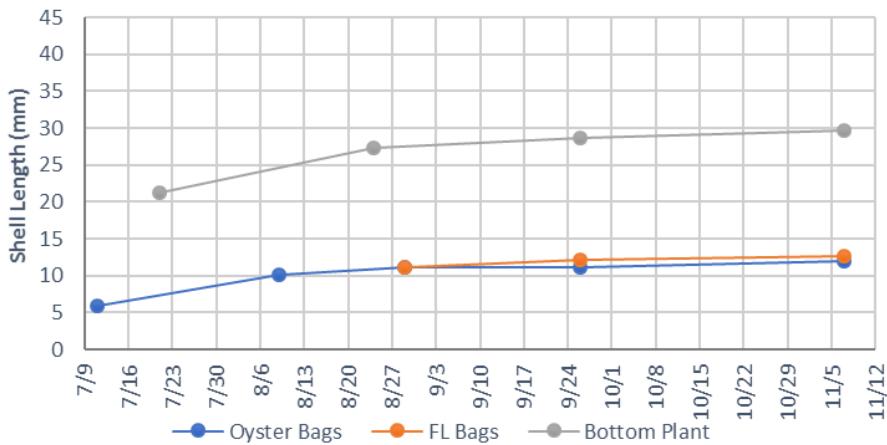
Why they need containment...



First Season results – Subtidal

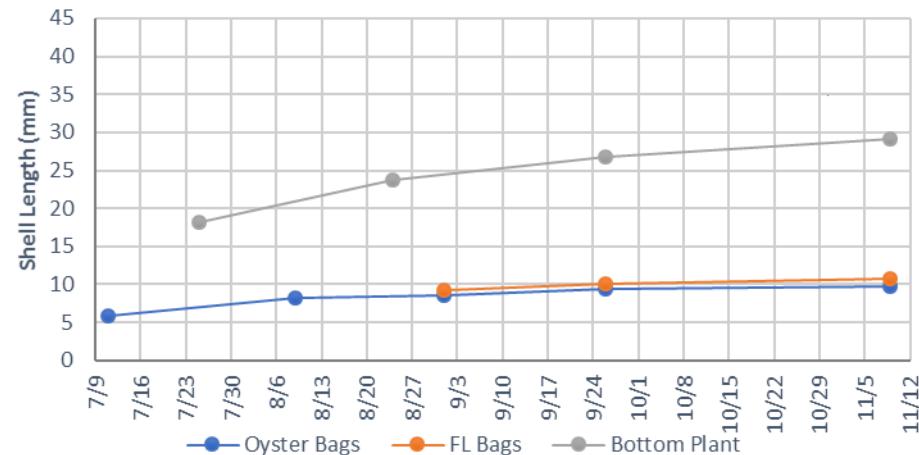
- Planted seed in July, 2 batches
 - Small seed (4-6mm) nursery (oyster) bag to FL Bag
 - Big seed (18mm, $\frac{3}{4}$ ") direct bottom plant

Cotuit Bay - Surf Clam Growth



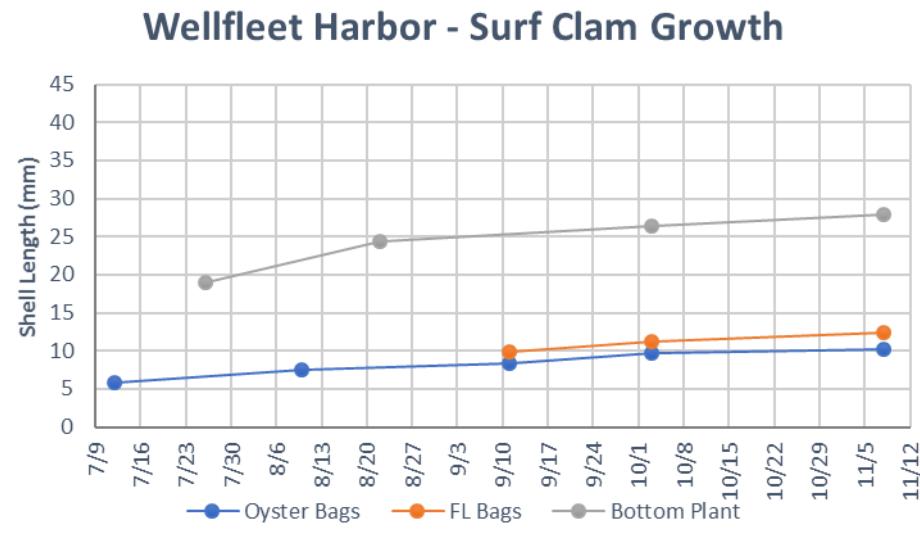
Inconsistent growth through the season
Fouling became an issue off-bottom

Nantucket Sound - Surf Clam Growth



First Season results – Intertidal

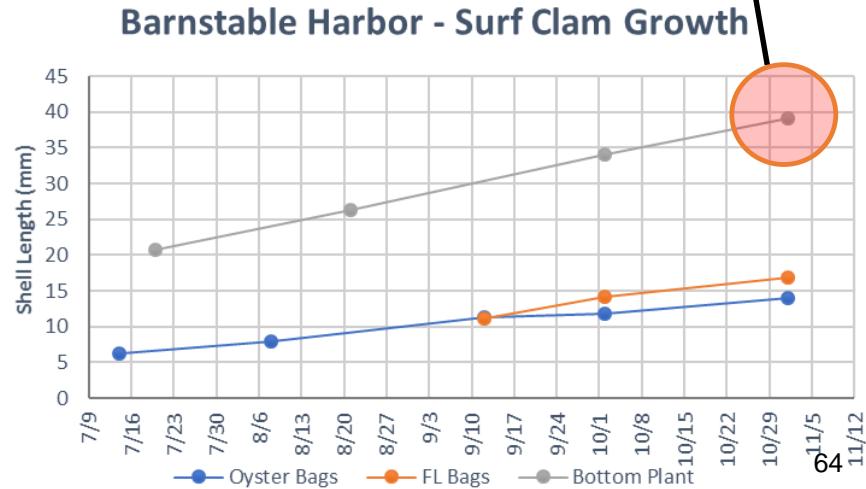
- Planted seed in July, 2 batches
 - Small seed (4-6mm) nursery (oyster) bag to FL Bag
 - Big seed (18mm, $\frac{3}{4}$ ") direct bottom plant



Inconsistent growth through the season
Clams that had sand did best

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Big seed planted under net was at 1.5" average after just 5 months!



64

Gear Trialed – winter and 2nd Season

Bottom plant – 50/ft²

- Plant 1 - July 2017
- Plant 2 – November 2017



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Oyster bags – pinned to the bottom with lines

- 9mm square mesh
- Several densities
 - 225/bag (50/ft)
 - 335/bag
 - 450/bag



Florida bags – ½" (12mm)

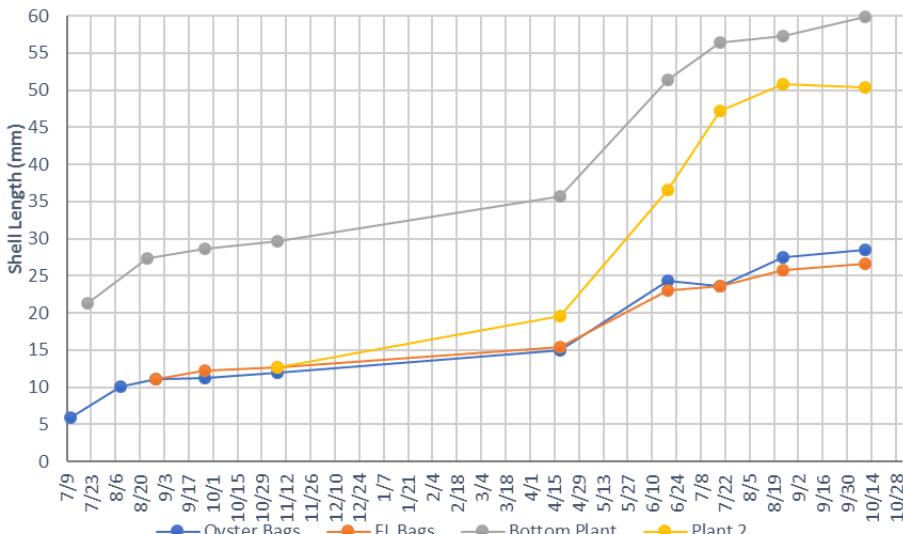
- 800/bag final grow out
- 50/ft²



2nd Growing Season - Subtidal

- Added 2nd bottom plant – late 2017 Plant 2
- Pinned bags on the bottom – no more off-bottom

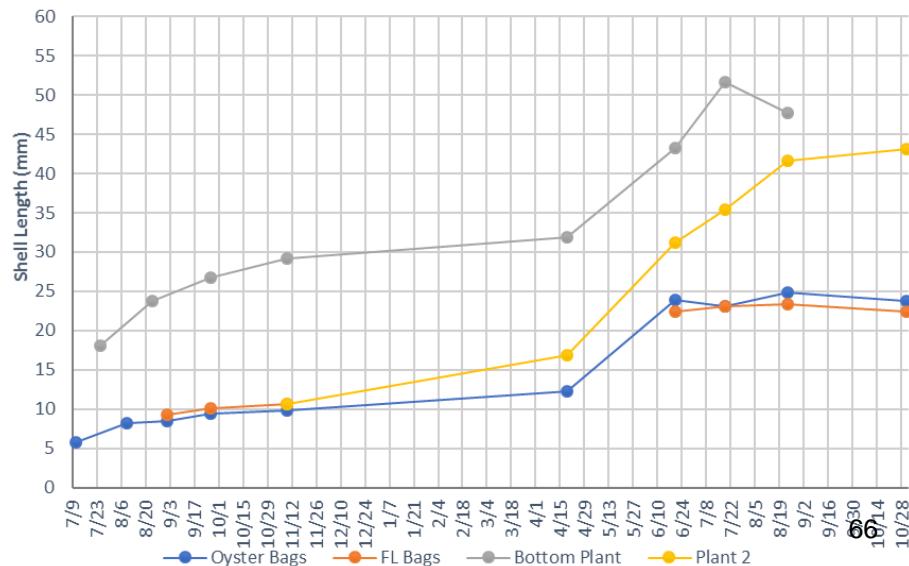
Cotuit Bay - Surf Clam Growth



Bottom planted clams grew best
Other methods did not “sand in”
consistently and got fouled

- Some growth in colder months, probably December and March
- Spring had best growth it seems

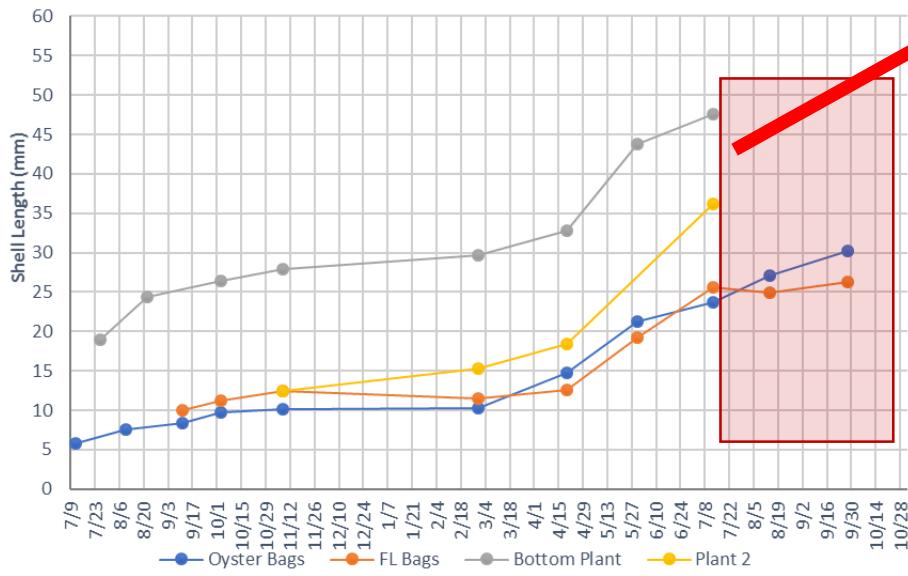
Nantucket Sound - Surf Clam Growth



2nd Growing Season - Intertidal

- Added 2nd bottom plant – late 2017 Plant 2
- Pinned bags on the bottom – no more off bottom

Wellfleet Harbor - Surf Clam Growth



Heat mortality event
Low survival following

Winter mortality event
Seed sorted again in April

Barnstable Harbor - Surf Clam Growth



- Bottom planted clams grew best
- Barnstable bags “sanded in” well and grew well because of it

Survival – Season 1

Pretty high except intertidal top tier

Period	Initial post deploy			
Date	Aug/Sept, 2017			
Site	mesh size	Oyster Bag	FL Bag	Bottom Plant 1
Barnstable Harbor		86.1%	97.3%	53.5%
Cotuit Bay		99.6%	90.8%	86.2%
Nantucket Sound		94.7%	92.5%	73.7%
Wellfleet Harbor		40.9%	94.4%	92.6%
Average		80.3%	93.8%	76.5%

Oyster bag	Oyster bag
top tier	bottom tier
68.0%	96.4%
99.7%	100.0%
94.7%	96.5%
2.9%	65.8%
66.3%	89.7%

Period	End of 2017			
Date	Nov, 2017			
Site	mesh size	Oyster Bag	FL Bag	Bottom Plant 1
Barnstable Harbor		99.6%	97.1%	32.2%
Cotuit Bay		94.1%	90.4%	69.1%
Nantucket Sound		97.2%	63.5%	37.4%
Wellfleet Harbor		98.6%	94.7%	47.3%
Average		97.4%	86.4%	46.5%

Predation under nets
We took minimalist approach to maintenance

Survival - Winter

Period	Post winter					
Date	April, 2018					
Site	mesh size	Oyster Bag	FL Bag	Bottom Plant 1	Bottom Plant 2	Bottom Plant 1 incl lost nets
Barnstable Harbor		4.0%	42.2%	0.0%	30.1%	0.0%
Cotuit Bay		64.2%	30.0%	59.6%	70.2%	19.9%
Nantucket Sound		53.4%	0.0%	44.6%	36.3%	14.9%
Wellfleet Harbor		92.2%	41.9%	40.2%	86.6%	40.2%
Average		53.5%	28.5%	36.1%	55.8%	18.8%

- Barnstable Harbor had huge losses due to extreme cold exposure
- Lost nets in Cotuit and Nantucket Sound due to ice or wind
- Best winter survival was bottom plant or oyster bags in the sand

Survival – Season 2

Nets were lost, mounded,
succumbed to predators or
suffered heat/cold kill

Period End of 2018
Date October, 2018

Site	mesh size	Oyster Bag	FL Bag	Bottom Plant 1	Bottom Plant 2
		9mm	10mm	10mm	10mm
Barnstable Harbor		51.4%	51.7%	0.0%	0.0%
Cotuit Bay		47.9%	20.7%	39.3%	20.4%
Nantucket Sound		63.9%	42.8%	0.0%	16.2%
Wellfleet Harbor		4.4%	9.2%	0.0%	0.0%
Average		41.9%	31.1%	9.8%	9.2%

Wellfleet – Heat kill

- Best results was in oyster bags – in the sand
- If you remove the Wellfleet surf clam massacre oyster bags averaged about 55% survival

Survival – Different Densities

Oyster Bag - Density Trial

Site	#/bag	225	335	450
Barnstable Harbor		40.4%	53.6%	60.1%
Cotuit Bay		32.1%	54.6%	57.1%
Nantucket Sound		59.6%	61.8%	70.2%
Wellfleet Harbor		0.0%	5.2%	8.0%
Average		33.0%	43.8%	48.9%

Without Wellfleet

Oyster Bag - Density Trial

Site	#/bag	225	335	450
Barnstable Harbor		40.4%	53.6%	60.1%
Cotuit Bay		32.1%	54.6%	57.1%
Nantucket Sound		59.6%	61.8%	70.2%
Average		44.0%	56.7%	62.5%

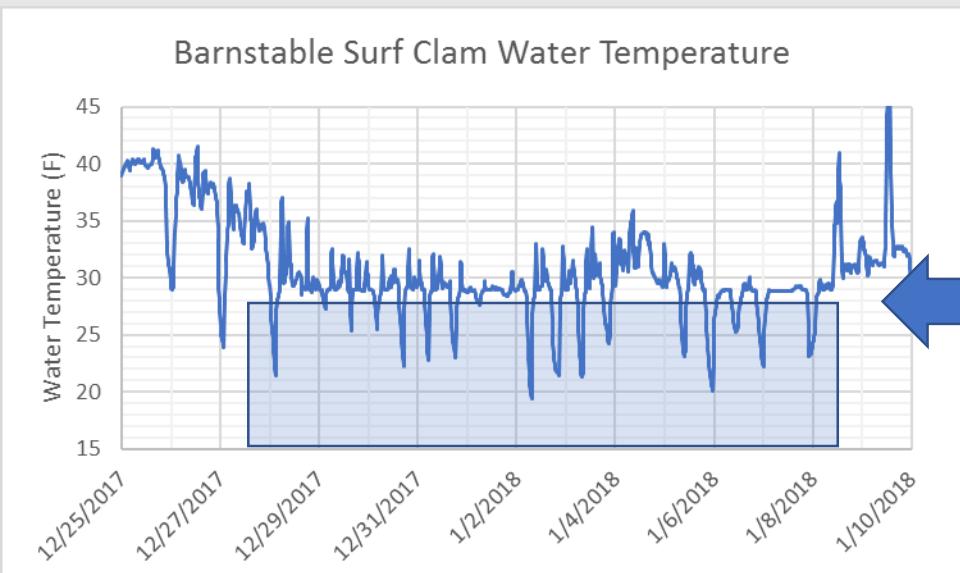
These were disturbed
more for sampling

Survival - ranges

- Season 1 (July thru Nov 2017)
 - Oyster bags, 40% (high intertidal heat) – 99%
 - FL bags, 63% (damaged/mounded) – 97%
 - Bottom plant, 0% (mounded or torn net) – 75%
- Winter 2017-18 (Dec 2017 – April 2018)
 - Oyster bags on-bottom, 4% (winter exposure) – 92%
 - FL bags, 0% (storm/winter damage) – 42%
 - Bottom Plant 1, July 2017, 0% (winter kill) – 60%
 - Bottom plant 2, Dec 2017, 5% (storm/winter) – 90%
- Season 2 (May 2018 – Nov 2018)
 - Oyster bags on-bottom, 0% (heat kill) – 70%
 - FL bags, 9% (heat kill) – 52%
 - Bottom Plant 1, July 2017, 0% (winter/heat/wind) – 40%
 - Bottom plant 2, Dec 2017, 0% (winter/heat) – 40%

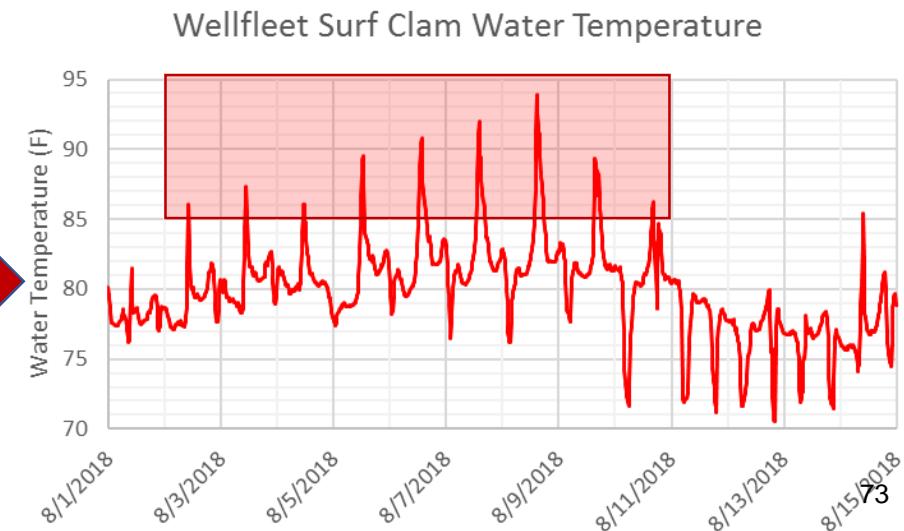
Temperature extreme events at intertidal sites

- Reported tolerance
 - Low ~0C, 32F
 - Max 30C, 86F



2 weeks of water ~29F
Exposure to 20F

Water Temps avg >80F
Exposure to >90F

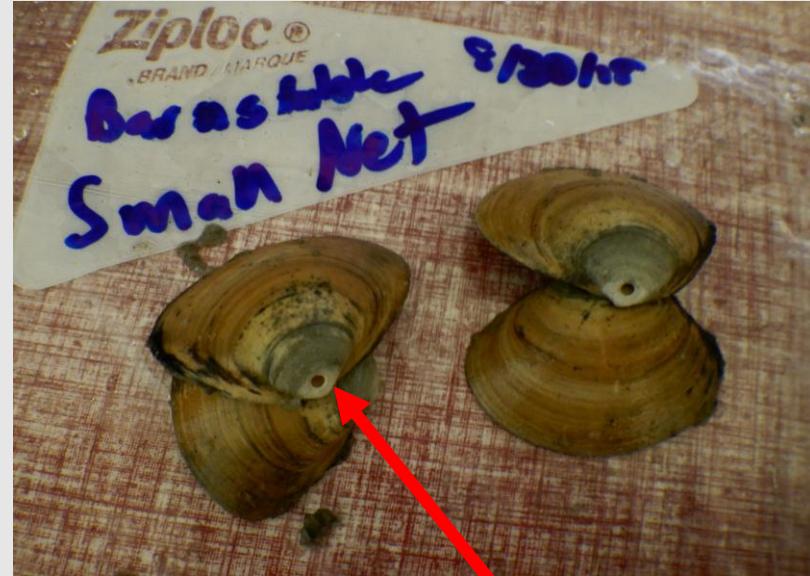
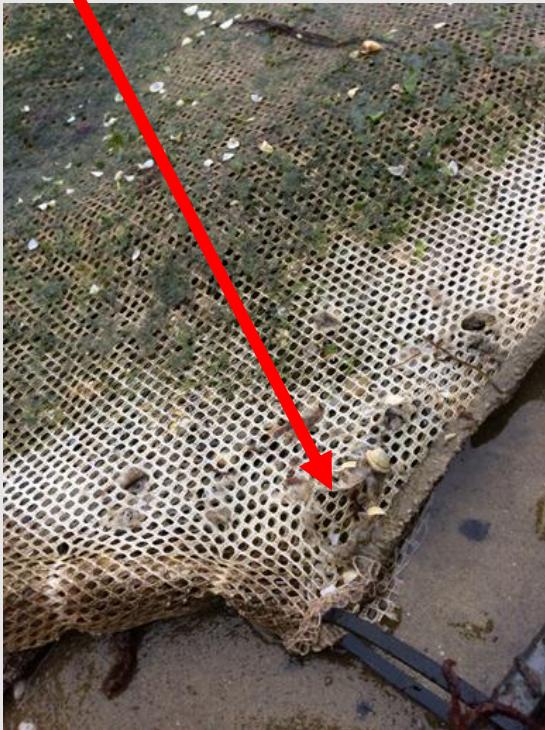


Other Issues...Survival

- Predators
- Mounding nets



crab activity



Moon snail activity



Potential Yield...

Yield Calculations

	Oyster Bag - Density Trial			Bottom Plant
# clams planted	225	335	450	50
	per bag	per bag	per bag	per sq ft
Mean survival	40.4%	53.6%	60.1%	50.0%
Yield (#/clams)	91	180	270	25
Mean Length (mm)	46.9	44.7	42.4	50.8
Mean Length (in.)	1.85	1.76	1.67	2.00
Mean Weight (g)	19.92	15.65	13.82	21.9
Yield Weight (g)	1810.7	2810.1	3737.6	547.5
Yield (lbs)	3.99	6.20	8.24	1.21
Price per pound	\$ 3.00	\$ 3.00	\$ 3.00	\$ 3.00
Net harvest value (per bag)	\$ 11.98	\$ 18.59	\$ 24.72	\$ 3.62
Yield per sq ft	\$ 2.99	\$ 4.65	\$ 6.18	\$ 3.62

Growth did decrease with density

If higher densities work in bags they appear to be an option for areas that will let them sand in effectively

Issues...off-bottom culture methods

- Fouling
- Misshapen shells



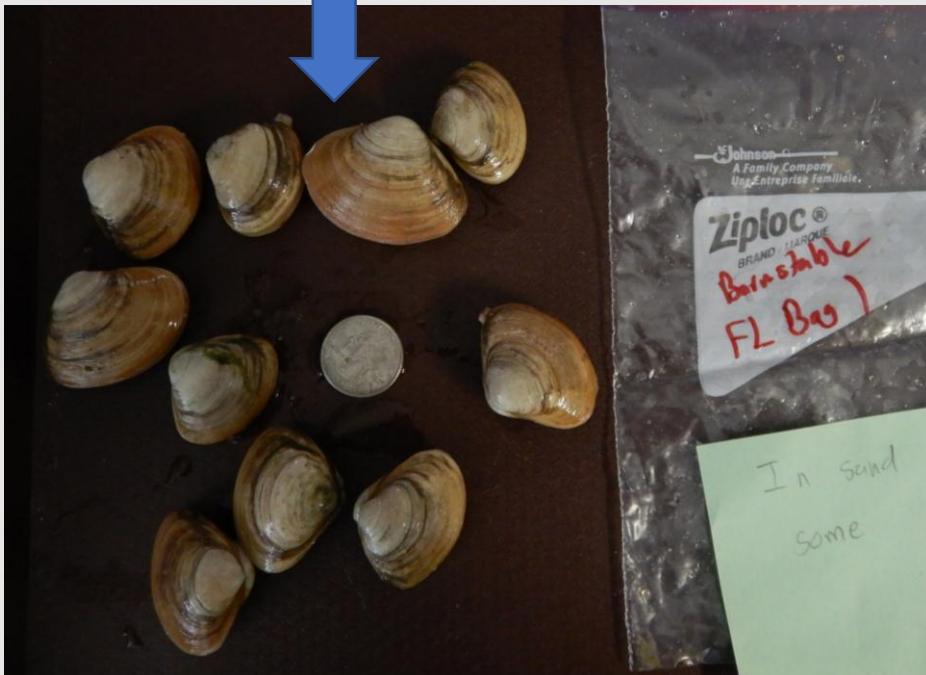
Even boring sponge and mud blisters
if left out of sand for season

Sediment is needed

Clams got to dig!

Adjacent FL bags

Able to dig in



On sediment surface



Spitting clams



Methods That Worked –

- Bottom planting – field plant seed
 - Planted $\frac{3}{4}$ " in July 2017
 - Planted $\frac{1}{2}" - \frac{3}{4}"$ in November 2017 after being 4-6mm in July 2017
- All marketable within calendar year



Methods worth considering...

- Bags with sand, inconsistent but
 - Best survival
 - Good growth
- Worked best in areas with shifting sand
 - Sanded in naturally
 - Smaller mesh worked better?
- Need to experiment more...



Harvest

- Raking caused spearing/breakage
 - Damaged ~15% of clams at times
- Dry “scratching” in intertidal
- Hydraulic harvester very effective
 - Less than 1% breakage if any
 - Harvests quickly and efficiently
- Purging of sand needed
 - Off-bottom holding for a day/tide
 - Could be less...need to experiment



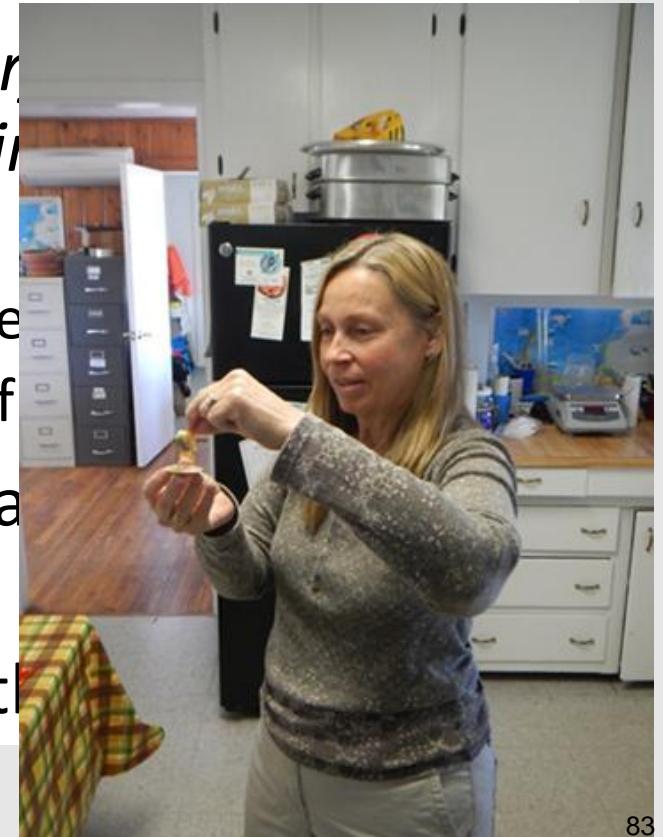
Hydraulic “Box” Harvester



They are tasty...



- Surf Clams are delicious raw or cooked, briny, slightly sweet and very rich
- *Testimonials from Wellfleet Oysters which served 1.5-2" surf clam in lime butter*
 - “Loved the light but clean flavor”
 - “A taste of the sea. Tender, clean, delicate”
 - “Sooooo good. Loved the size of surf clams”
- 100% of participants wanted to eat them again!
- Value is still a work in progress – the market is still being developed



Value Estimation – Surf Clams



“Perceived” market position by one consultant, is \$3.00/lb, around \$0.15/piece

- Raw bar product would be much higher (~\$0.25-0.30)
- Did buyers know there are 20-30/lb? Have they tasted?
- Conservative value - many see this as a low valuation

Value/Piece - Surf (Butter) Clam																		
Based on Length, Weight, #/lb, and Relation to Price																		
Length (mm)	Length (in.)	Weight (g)	#/lb	\$ 2.00	\$ 2.25	\$ 2.50	\$ 2.75	\$ 3.00	\$ 3.25	\$ 3.50	\$ 3.75	\$ 4.00	\$ 4.25	\$ 4.50	\$ 4.75	\$ 5.00	\$ 5.25	\$ 5.50
38.1	1 1/2	10.11	44.9	\$ 0.04	\$ 0.05	\$ 0.06	\$ 0.06	\$ 0.07	\$ 0.07	\$ 0.08	\$ 0.08	\$ 0.09	\$ 0.09	\$ 0.10	\$ 0.11	\$ 0.11	\$ 0.12	\$ 0.12
39.7	1 9/16	11.57	39.2	\$ 0.05	\$ 0.06	\$ 0.06	\$ 0.07	\$ 0.08	\$ 0.08	\$ 0.09	\$ 0.10	\$ 0.10	\$ 0.11	\$ 0.12	\$ 0.13	\$ 0.14	\$ 0.15	\$ 0.15
41.3	1 5/8	13.23	34.3	\$ 0.06	\$ 0.07	\$ 0.07	\$ 0.08	\$ 0.09	\$ 0.09	\$ 0.10	\$ 0.11	\$ 0.12	\$ 0.12	\$ 0.13	\$ 0.14	\$ 0.15	\$ 0.15	\$ 0.15
42.9	1 11/16	13.97	32.5	\$ 0.06	\$ 0.07	\$ 0.08	\$ 0.08	\$ 0.09	\$ 0.10	\$ 0.11	\$ 0.12	\$ 0.12	\$ 0.13	\$ 0.14	\$ 0.15	\$ 0.15	\$ 0.15	\$ 0.15
44.5	1 3/4	15.83	28.6	\$ 0.07	\$ 0.08	\$ 0.09	\$ 0.10	\$ 0.10	\$ 0.11	\$ 0.12	\$ 0.13	\$ 0.14	\$ 0.15	\$ 0.16	\$ 0.17	\$ 0.17	\$ 0.17	\$ 0.17
46	1 13/16	17.15	26.4	\$ 0.08	\$ 0.09	\$ 0.09	\$ 0.10	\$ 0.11	\$ 0.12	\$ 0.13	\$ 0.14	\$ 0.15	\$ 0.16	\$ 0.17	\$ 0.18	\$ 0.18	\$ 0.19	\$ 0.20
47.6	1 7/8	18.72	24.2	\$ 0.08	\$ 0.09	\$ 0.10	\$ 0.11	\$ 0.12	\$ 0.13	\$ 0.14	\$ 0.15	\$ 0.17	\$ 0.18	\$ 0.19	\$ 0.20	\$ 0.20	\$ 0.21	\$ 0.22
49.2	1 15/16	20.91	21.7	\$ 0.09	\$ 0.10	\$ 0.12	\$ 0.13	\$ 0.14	\$ 0.15	\$ 0.16	\$ 0.17	\$ 0.18	\$ 0.20	\$ 0.21	\$ 0.22	\$ 0.23	\$ 0.24	\$ 0.24
50.8	2	22.23	20.4	\$ 0.10	\$ 0.11	\$ 0.12	\$ 0.13	\$ 0.15	\$ 0.16	\$ 0.17	\$ 0.18	\$ 0.20	\$ 0.21	\$ 0.22	\$ 0.23	\$ 0.24	\$ 0.25	\$ 0.25
52.4	2 1/16	24.54	18.5	\$ 0.11	\$ 0.12	\$ 0.14	\$ 0.15	\$ 0.16	\$ 0.18	\$ 0.19	\$ 0.20	\$ 0.22	\$ 0.23	\$ 0.24	\$ 0.26	\$ 0.27	\$ 0.28	\$ 0.28
54	2 1/8	26.41	17.2	\$ 0.12	\$ 0.13	\$ 0.15	\$ 0.16	\$ 0.17	\$ 0.19	\$ 0.20	\$ 0.22	\$ 0.23	\$ 0.25	\$ 0.26	\$ 0.28	\$ 0.29	\$ 0.30	\$ 0.30
55.6	2 3/16	28.71	15.8	\$ 0.13	\$ 0.14	\$ 0.16	\$ 0.17	\$ 0.19	\$ 0.21	\$ 0.22	\$ 0.24	\$ 0.25	\$ 0.27	\$ 0.28	\$ 0.30	\$ 0.32	\$ 0.33	\$ 0.33
57.2	2 1/4	31.95	14.2	\$ 0.14	\$ 0.16	\$ 0.18	\$ 0.19	\$ 0.21	\$ 0.23	\$ 0.25	\$ 0.26	\$ 0.28	\$ 0.30	\$ 0.32	\$ 0.33	\$ 0.35	\$ 0.35	\$ 0.35
58.7	2 5/16	33.59	13.5	\$ 0.15	\$ 0.17	\$ 0.19	\$ 0.20	\$ 0.22	\$ 0.24	\$ 0.26	\$ 0.28	\$ 0.30	\$ 0.31	\$ 0.33	\$ 0.35	\$ 0.35	\$ 0.35	\$ 0.35
60.3	2 3/8	38.46	11.8	\$ 0.17	\$ 0.19	\$ 0.21	\$ 0.23	\$ 0.25	\$ 0.28	\$ 0.30	\$ 0.32	\$ 0.34	\$ 0.36	\$ 0.38	\$ 0.40	\$ 0.41	\$ 0.41	\$ 0.41
61.7	2 7/16	39.28	11.5	\$ 0.19	\$ 0.22	\$ 0.24	\$ 0.26	\$ 0.26	\$ 0.28	\$ 0.30	\$ 0.32	\$ 0.35	\$ 0.37	\$ 0.39	\$ 0.41	\$ 0.41	\$ 0.41	\$ 0.41
A3 Industry Workshop Presentation April 2019																		
63.5	2 1/2	43.06	10.5	\$ 0.19	\$ 0.21	\$ 0.24	\$ 0.26	\$ 0.28	\$ 0.31	\$ 0.33	\$ 0.36	\$ 0.38	\$ 0.40	\$ 0.43	\$ 0.45	\$ 0.47	\$ 0.47	\$ 0.47

Enterprise Budgets

Costs based on quahog production

- So much depends on market price...
- Price anecdotes:
 - \$0.18-0.50/piece
- Consistency in supply will help
- Start high...you have a unique niche product!!!

Surf Clams (butter clams)

Variable Costs

Seed

				Space Need (Sq ft.)
Number to be purchased	Seed Price (per 1000)	Total Cost		
100,000	\$ 30.00	\$ 3,000.00		3240

Planting Gear Costs

	Need	Unit Cost	Total Cost
Plant density	50 per sq ft		
Run length	50 feet		
Run width	10 feet		
Runs needed	4		
Hook spacing	2		
Rebar needed	28 in 20' lengths of 1/2"	\$ 4.00	\$ 112.00
Hooks Needed	240 bent 3/8" rebar	\$ 1.00	\$ 240.00
Net Needed	220 linear feet	\$ 0.75	\$ 165.00
		Total	\$ 517.00

Operating Expense (seed + gear)

\$ 3,517.00

Estimated Labor Need (per planting cycle)

	Hours	100,000	Need/cycle	Hours
Prep	5	per cycle		1 5
Planting	7	per cycle		1 7
Maintenance	26	per season		1 26
Harvest	27	per cycle		1 27
		Total Hours		65

Pay rate

\$ 25.00 per hour

\$ 1.91 FICA

\$ 1.00 Workmans Comp

\$ 27.91 Total payroll cost per hour

\$ 1,814.31

Returns

Sales

Survival Rate	Number to Market	Target Harvest Size (inches)	Market Price (each)	Gross Return
50%	50000	2" length	\$ 0.15	\$ 7,500.00

if needed to determine value

Return over expenses (no labor cost)

\$ 3,983.00

Profit margin

53.1%

Return over expenses (including paid labor)

\$ 2,168.69

Profit margin

28.9%

85

Economics Compared to Quahogs

- Even at low valuation – should be close due to fast growth rate

Comparison over 2 years

to plant 100,000

	Quahogs	Surf Clams
Harvest cycle per 2 yr period	1	2
Seed planted per 2 yrs	100000	200000
Seed	\$ 3,500.00	\$ 6,000.00
Gear	\$ 517.00	\$ 775.50
Labor	\$ 2,540.00	\$ 2,540.00
Costs	\$ 6,557.00	\$ 9,315.50
Survival	50%	50%
# clams to market	50000	100000
Price per piece	\$ 0.25	\$ 0.15
Income	\$ 12,500.00	\$ 15,000.00
Return over Expenses	\$ 5,943.00	\$ 5,684.50

Lessons learned thus far



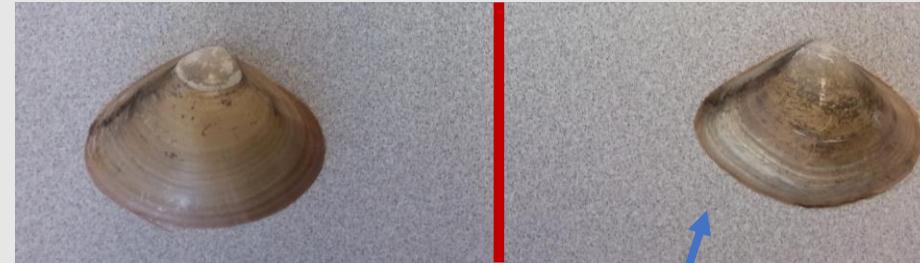
- People like to eat them
- Seed production seems viable/consistent
- Need containment and protection
- Extremes in temp on intertidal exposure are bad
- They need to dig in, even just shallowly
 - Under nets – lower intertidal
 - Sediment filled bags/trays in subtidal?
- Inconsistent growth through the season
 - They do grow in cooler months (Nov, Dec, Apr, May...)
- Grow rapidly when happy – 1 year product possible

More tidbits...



- Mounding sand is worse on big nets
 - Smaller nets had less mounding in dynamic spots
- Clams accumulate at down wind edge/corner of nets
 - They explore and get blown downwind
- Keep nets on the clams will move or blow away
- Planting/maintaining subtidal nets is challenging
- Smaller seem mesh bags sand in better
 - Reduces flow and catches sand?
- Harvest challenges – somewhat delicate
 - Need purging – how long?
- Disease – nothing we are aware of?

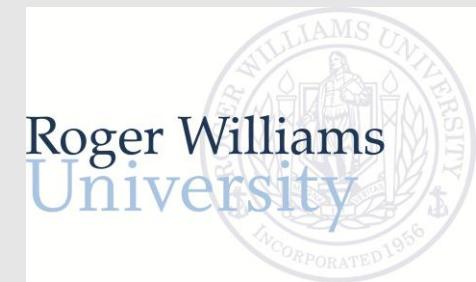
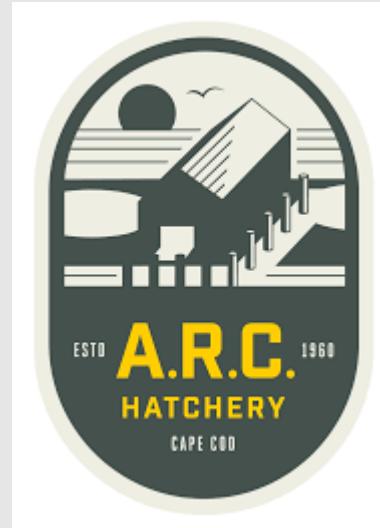
Future work...



- Work ongoing in NJ – Rutgers
 - We are sharing information
- New gear ideas?
 - How to plant them subtidally???
- There is a “southern” variety that ranges to MA
 - *Spisula solidissima similis*
 - Would it do even better in aquaculture conditions???
- Establishing the market???
 - What market suits them best?
 - More people need to taste them

Acknowledgements

- NOAA Saltonstall-Kennedy (SK) Award Number: NA16NMF4270241
- Partner shellfish farmers
 - Barnstable Sea Farms
 - Jim O'Connell
 - Cotuit Oyster
 - Town of Barnstable
- ARC
- CCCFA
- RWU
- Kris Clark



Surf Clam SEED AVAILABILITY



Spawned - January, 2019

- R1.5** June
- R2** June
- R3** July
- R4** August through September
- R6** August through October

Overwintered

Some 2018 field plant surf clam seed may be available within the next month.



Barnstable County Cooperative Extension

This project was funded by NOAA Fisheries Service
Grant #NA16NMF4270241 in cooperation with the
Saltonstall-Kennedy Program

The statements, findings, conclusions, and recommendations
are those of the author(s) and do not necessarily reflect the
views of NOAA Fisheries Service.

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climate, weather, oceans and coasts; to share that knowledge
and information with others; and to conserve and manage
coastal and marine ecosystems and resources.*

Appendix 4: Article in Aquaculture North America

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FOCUS ON SHELLFISH

Study: Surf clam aquaculture has commercial potential



Here are the big lessons learned

Diane Murphy, Fisheries and Aquaculture Specialist for Cape Cod Cooperative Extension, planting field plant surf clams Credit: Kris Clark

Interest is increasing in adding new species to the list of products available through the shellfish aquaculture industry. Over the last several years the Cape Cod Cooperative Extension, Woods Hole Sea Grant, the Cape Cod Commercial Fisherman's Alliance, Roger Williams University, and the Aquacultural Research Corporation (ARC) have teamed up with Massachusetts shellfish growers to test different potential methods for production of Atlantic surf clams (*Spisula solidissima*). The studies have shown potential for reliable seed production and a marketable product after just a year in grow-out.

The fast growth of surf clams is not a new finding but rather confirmed indications from early pilot studies, in the 1980s and the 90s. Production methods were never fully explored though, in part because the legal size for sale of surf clams in the state was set at 5 inches in length based on management of the offshore fishery. The other point early studies made was the potential market for smaller surf clams, sometimes called butter clams, at 1.5-2.5 inches in length, both cooked or on the half



Atlantic surf clams (*Spisula solidissima*) from an upweller system. Growth was best in grow-out conditions that allowed clams to dig into the sediment, planting clams under net or in bags that filled with sand, study finds
Credit: Diane Murphy



Surf clams, sometimes called butter clams. Earlier studies pointed to the market potential of smaller clams, measuring 1.5-2.5 inches in length. Massachusetts allowed their sale in 2016 provided they're clearly marked as 'farm raised'
Credit: Abigail Archer

shell along the lines of soft-shell clams and littlenecks. This hurdle was addressed in 2016, allowing an exemption for aquaculture-reared product in Massachusetts to be sold at much smaller sizes if clearly marked as "farm raised."

A local hatchery, ARC, has been able to consistently produce seed clams and received funding from a NOAA Saltonstall-Kennedy grant to further explore aquaculture methods in 2017. The study used four existing aquaculture sites ranging from intertidal to subtidal. Seed was deployed in three treatments -- planting in the sediment under protective netting; in soft nylon mesh bags; and lastly, in rigid plastic mesh oyster bags in cages off-bottom or attached to lines along the bottom. Survival and growth varied by site and grow-out methodology, but prolonged exposure during extreme hot or cold weather events caused significant mortality at higher intertidal site locations.

Growth was best in grow-out conditions that allowed clams to dig into the sediment, planting clams under net or in bags filled with sand. One site had clams reach a harvestable size in a single growing season and all sites within a calendar year, which is much faster than quahog growth in the same area.

"Another big lesson learned, and an important one with any new product, is people really seem to like them. The small surf clam product raised has been trialed at several chef and seafood events and all those that try them want more. The little surf clams are described as delicious raw or cooked, briny, slightly sweet and very rich," says Joshua Reitsma of the Cape Cod Cooperative Extension, who worked on the field portion of the study, "Piloting Surf Clam Aquaculture Techniques to Create Commercial Opportunities."

"This project parallels efforts ongoing by folks at Rutgers University in New Jersey to establish aquaculture recommendations for surf clams and the combined efforts seem to be having some impact. Shellfish growers are planting surf clam seed, so we hope to soon see these clams enjoyed as a new product," he says.

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Appendix 5: Marketing Collateral

Fact Sheet / Story Handed out at Boston Public Market

butter clams 
Local. Sustainable. Available.

Increases Diversity
99% of local aquaculturally grown shellfish in Massachusetts is quahogs and oysters.

Local
The Aquacultural Research Corporation (ARC) located in Dennis, Massachusetts, has collaborated with Cape Cod Cooperative Extension/Woods Hole Sea Grant, Roger Williams University, and Cape Cod Commercial Fishermen's Alliance to bring the NEW Cape Cod Butter Clam to a dinner plate near you.

Taste
The Butter clam has a clean, sweet, buttery taste. A small sample of butter clams were distributed to local chefs. The overall feedback was terrific. Chefs are excited for when the clams hit the market in the Spring of 2018!

What Chefs are Saying
"Buttery and complex-and we liked the smaller size"
"Great flavor...similar to a steamer"
"We always promote local, sustainable foods..."

Dishes to Try with Butters

Clam Chowder
Butter Clam Vinaigrette
Steamed with a White Wine and Garlic Sauce
Any shellfish pasta dish

Sustainability
Overfishing of wild population means aquaculture is in growing importance. 50% of seafood from America is farmed; in 2011, marine and freshwater aquaculture was valued around 1.1 billion dollars (NOAA)

Availability
The Butter Clam is a small Surf Clam. The Surf Clam can get as large as 7.9 in (20 cm), but the tender Butter Clam is just 1.5-2 in (3.81-5 cm). Butter Clams grow to legal size in 1-2 years - that's two times faster than the quahog!
 

Surf Clam Recipes Shared by Chefs Who Sampled Clams

Steamed Butter Clam with Guanciale

credit: Eastern Standard, Chef Garrett Harker

- 1 Doz Butter Clams
- 2 Cup White Wine
- 1 T Garlic
- $\frac{1}{4}$ C Guanciale (small dice) (cured pork jowl; alternate: pancetta)
- 1 Bulb Spring Onion (Julienne bulb and green top)
- 1 T Lemon Juice
- 2 T Butter
- 2 T Fine Herbs

Process: Render down guanciale, then add the bulb of the spring onion and garlic. Let sweat in the fat for about a minute. Add the clams and coat in the fat. Deglaze with white wine/ lemon and cover to steam. Once clams open, wine should be reduced, finish with butter, spring onion top, and fine herbs. Sauce should resemble a glace.

Butter clam vinaigrette

credit: Brewster Fish House, chef Reardon

clams cooked rare in a court bouillon, then shucked and sliced thin. champagne vinegar, meyer lemon segments, preserved lemon, tomato brunoise, flat parsley, chives, extra virgin olive oil. serve with monkfish, halibut, or fluke

Steamed with Garlic and White Wine

credit: Brewster Fish House, chef Reardon

- 12 clams
- 1 t chopped garlic
- $\frac{1}{4}$ cup of white wine
- 2T butter
- 1 t chopped chives

Melt butter, add garlic and let brown lightly. Add clams & wine. Steam until open. Sprinkle Chives

Other Ideas:

- Raw!
- Quickly steamed, served with a light sauce of wine, a speck of rendered chorizo, some tomato, creme fraiche and herbed butter
- Ceviche or Pickled
- Fricassee
- Escabeche, bourride, or lightly poached

Appendix 6: Chef Survey & Participant List

Butter Clam Samples- Chef Survey

This survey is sponsored by



This NOAA funded project (Saltonstall-Kennedy Program award NA16NMF4270241) will demonstrate the commercial feasibility of a new commercial aquaculture product, with the goal of helping to stabilize working waterfronts and support New England's traditional fishing communities.

The information from this survey will help quantify market potential for this new product and provide important feedback to give aquaculturists the ability to create a business plan for growing butter clams.

Thank you for sampling the butter clams and for your candid responses to the survey.

- 1) How did you utilize the butter clams in your cooking?
- 2) How do the butter clams compare in flexibility and taste to other shellfish? (Quahogs, Littlenecks, etc.)
- 3) How would you describe the flavor of the butter clam?
- 4) Are you satisfied with the size of the clams (1.5"-2")? If not would you prefer larger or smaller sizes?
- 5) Could this product potentially supplement or replace your current use of quahogs, other hard clams (Manilla, etc.), steamers, or oysters?
- 6) Can you envision new ways to use the butter clam based on the taste profile? If so what are they?
- 7) Overall enthusiasm for the butter clam, 1-10 (*10 being most enthusiastic*)? _____
- 8) Please share any thoughts on how you would promote this product.
- 9) Please share the recipe you used to prepare the clams (will be kept confidential unless you answer yes below).

- 10) Would you be willing to publically share your butter clam recipe as part of our promotion?
(you and your restaurant will be given credit; see attached example)

Yes _____ No _____

- 11) Do you sell shellfish at your restaurant?

Yes _____ No _____

- a) If yes: How much do you use in an average month per season, by type?

	Oysters	Quahog	Steamer	Other: _____
Spring				
Summer				
Fall				
Winter				

- b) How do you use the shellfish (raw bar, pasta, steamers, etc.)?

- 12) How many clam dishes do you have on your menu?

Spring _____ Summer _____ Fall _____ Winter _____

- 13) Are you interested in using local and sustainable aquaculture shellfish products in your dishes?

Yes _____ No _____

- 14) Have you used butter clams in the past?

- a) If yes:

i) How much did you sell them for? _____

ii) How many did you sell? _____

- 15) Would you be interested in using locally grown butter clams once they are commercially available?

i) If yes, how much product would you expect to use in an average month during each season?

Spring	Summer	Fall	Winter

ii) What would you expect to pay? \$_____ per _____ (bushel, pound, etc.)



*This survey was created by a group of students from
the University of Massachusetts Boston School for the Environment.*

This project received funding under award NA16NMF4270241 from NOAA Fisheries Service, in cooperation with the Saltonstall-Kennedy Program. The statements, findings, conclusions, and recommendations are those of the author(s) and do not necessarily reflect the views of NOAA Fisheries.

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2. To share that knowledge and information with others; and
3. To conserve and manage coastal and marine ecosystems and resources.

Please return to melissa@capecodfishermen.org

or mail to:

Melissa Sanderson, Cape Cod Commercial Fishermen's Alliance, 1566 Main St, Chatham, MA 02633

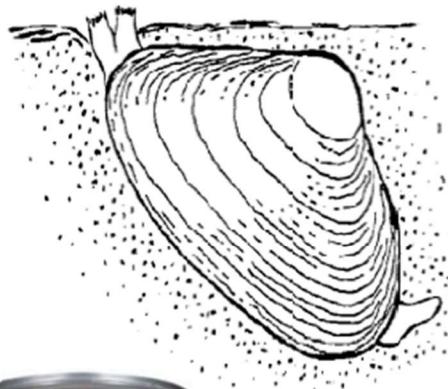
List of Chefs/Restaurants/Businesses Who Received Samples Under this Award

NAME	AFFILIATION
Chef Reardon	Brewster Fish House
Chef Lisa Flores	Ostra
Chef Garret Harker	Eastern Standard
Chef Jeremy Sewall	Island Creek Oyster Bar
Jenn Mentzer	Mac's Parties & Provisions
Chef Laura	Four Season
Chef Jacob	Gallows
Chefs Jeremy & Rebecca	Brassica
Holly Stafford	Catered Affair, Windsor House, BPL
Chef Mac Hay	Mac's Fish House Provincetown
Chef Anthony Cole	Chatham Bars Inn
Chef Olive Chase	Casual Gourmet Caterer
Chef Jacob	Banyan
Chef Justin Letterman	Lucca
Chef	La Voile
Chef Becca	Townsman (Quincy)
Chef Barton Seaver	National Geographic Fellow, food author
Rowan Jacobson	Food author
Jarvis Green	Oceans97
Chef Marc Orfaly	The Reelhouse Quincy
Chef Rizwan Ahmed	Johnson & Wales University

Appendix 7: Roger Williams University Applied Shellfish Farming Course Slides

Surf Clam (*Spisula solidissima*)

- Infaunal bivalve
 - Largest bivalve along the east coast (6 - 8")
 - "Cold water" species
 - Lives in high energy sand to deepwater habitats
 - Shallow burrower
 - Dynamic and mobile
- Traditional harvest for the chopped clam market
 - New product - 2" "steamer"



History

- Interest developed for farming surf clams in the 1980's
 - at the NMFS Milford Lab
- Commercial scale production attempted in early 1990's on Cape Cod
- Suggested product was a 2" size for the steamer market
 - Marketed as "butter clams"
- Advantages
 - Cold hardy
 - Fast growth in warm water culture conditions, i.e. near-shore
 - Highly attractive product



Surf Clam Technology

- Have experimented with a number of growout technologies
- Two seemed to work
 - Florida soft bags
 - Square mesh “suitcases”
- Clam “required” to be in sediment by ~¾” (20mm)



Surf Clam Technology

- Most productive is growout under netted raceways
 - Less effort per surface area
- Market size (2") in 18 months
- Harvest
 - Traditional hand rake
- Need to purge sand



Bottlenecks – Surf Clam

- “Cold water” species
 - High summer mortality if placed in the intertidal or in warm water location
 - Subtidal technology needed to minimize risk of summer overheating
- Availability of seed
 - No hatcheries routinely producing seed
 - One in MA is currently has surf clam seed for sale
- Must purge sand prior to market
- Market for “Butter Clam” needs to be further developed



Butter Clams: A New Species Diversifies the Aquaculture Roster on Cape Cod

By ELSPETH HAY • AUG 10, 2017

Appendix 8: Surf Clam Length Weight Relationship Table

Length to Weight Relationship - Amount per pound

Surf clams from Barnstable Harbor Sites

454 grams per pound

Individual Value at:

#	Length (mm)	Weight (g)	mm:g ratio	#/lb.	\$1/lb	\$2/lb	\$3/lb	\$4/lb	\$5/lb	\$6/lb	\$7/lb	\$8/lb	\$9/lb	\$10/lb
12	35.66	9.19	3.88	49.4	\$ 0.02	\$ 0.04	\$ 0.06	\$ 0.08	\$ 0.10	\$ 0.12	\$ 0.14	\$ 0.16	\$ 0.18	\$ 0.20
24	35.96	10.06	3.57	45.1	\$ 0.02	\$ 0.04	\$ 0.07	\$ 0.09	\$ 0.11	\$ 0.13	\$ 0.16	\$ 0.18	\$ 0.20	\$ 0.22
36	37.7	10.61	3.55	42.8	\$ 0.02	\$ 0.05	\$ 0.07	\$ 0.09	\$ 0.12	\$ 0.14	\$ 0.16	\$ 0.19	\$ 0.21	\$ 0.23
14	38.07	10.77	3.53	42.2	\$ 0.02	\$ 0.05	\$ 0.07	\$ 0.09	\$ 0.12	\$ 0.14	\$ 0.17	\$ 0.19	\$ 0.21	\$ 0.24
22	38.87	12.07	3.22	37.6	\$ 0.03	\$ 0.05	\$ 0.08	\$ 0.11	\$ 0.13	\$ 0.16	\$ 0.19	\$ 0.21	\$ 0.24	\$ 0.27
40	39.16	11.73	3.34	38.7	\$ 0.03	\$ 0.05	\$ 0.08	\$ 0.10	\$ 0.13	\$ 0.16	\$ 0.18	\$ 0.21	\$ 0.23	\$ 0.26
3	39.86	12.77	3.12	35.6	\$ 0.03	\$ 0.06	\$ 0.08	\$ 0.11	\$ 0.14	\$ 0.17	\$ 0.20	\$ 0.23	\$ 0.25	\$ 0.28
16	39.87	12.41	3.21	36.6	\$ 0.03	\$ 0.05	\$ 0.08	\$ 0.11	\$ 0.14	\$ 0.16	\$ 0.19	\$ 0.22	\$ 0.25	\$ 0.27
43	40.55	13.93	2.91	32.6	\$ 0.03	\$ 0.06	\$ 0.09	\$ 0.12	\$ 0.15	\$ 0.18	\$ 0.21	\$ 0.25	\$ 0.28	\$ 0.31
11	40.58	12.71	3.19	35.7	\$ 0.03	\$ 0.06	\$ 0.08	\$ 0.11	\$ 0.14	\$ 0.17	\$ 0.20	\$ 0.22	\$ 0.25	\$ 0.28
22	41.02	15.01	2.73	30.2	\$ 0.03	\$ 0.07	\$ 0.10	\$ 0.13	\$ 0.17	\$ 0.20	\$ 0.23	\$ 0.26	\$ 0.30	\$ 0.33
25	41.24	13.83	2.98	32.8	\$ 0.03	\$ 0.06	\$ 0.09	\$ 0.12	\$ 0.15	\$ 0.18	\$ 0.21	\$ 0.24	\$ 0.27	\$ 0.30
26	41.48	13.96	2.97	32.5	\$ 0.03	\$ 0.06	\$ 0.09	\$ 0.12	\$ 0.15	\$ 0.18	\$ 0.22	\$ 0.25	\$ 0.28	\$ 0.31
21	41.63	14.9	2.79	30.5	\$ 0.03	\$ 0.07	\$ 0.10	\$ 0.13	\$ 0.16	\$ 0.20	\$ 0.23	\$ 0.26	\$ 0.30	\$ 0.33
41	41.88	12.83	3.26	35.4	\$ 0.03	\$ 0.06	\$ 0.08	\$ 0.11	\$ 0.14	\$ 0.17	\$ 0.20	\$ 0.23	\$ 0.25	\$ 0.28
23	42.05	15.8	2.66	28.7	\$ 0.03	\$ 0.07	\$ 0.10	\$ 0.14	\$ 0.17	\$ 0.21	\$ 0.24	\$ 0.28	\$ 0.31	\$ 0.35
15	42.18	14.69	2.87	30.9	\$ 0.03	\$ 0.06	\$ 0.10	\$ 0.13	\$ 0.16	\$ 0.19	\$ 0.23	\$ 0.26	\$ 0.29	\$ 0.32
38	42.18	13.9	3.03	32.7	\$ 0.03	\$ 0.06	\$ 0.09	\$ 0.12	\$ 0.15	\$ 0.18	\$ 0.21	\$ 0.24	\$ 0.28	\$ 0.31
8	42.19	16.34	2.58	27.8	\$ 0.04	\$ 0.07	\$ 0.11	\$ 0.14	\$ 0.18	\$ 0.22	\$ 0.25	\$ 0.29	\$ 0.32	\$ 0.36

30	42.92	15.22	2.82	29.8	\$ 0.03	\$ 0.07	\$ 0.10	\$ 0.13	\$ 0.17	\$ 0.20	\$ 0.23	\$ 0.27	\$ 0.30	\$ 0.34
34	43.01	15.95	2.70	28.5	\$ 0.04	\$ 0.07	\$ 0.11	\$ 0.14	\$ 0.18	\$ 0.21	\$ 0.25	\$ 0.28	\$ 0.32	\$ 0.35
42	43.16	16.67	2.59	27.2	\$ 0.04	\$ 0.07	\$ 0.11	\$ 0.15	\$ 0.18	\$ 0.22	\$ 0.26	\$ 0.29	\$ 0.33	\$ 0.37
9	43.2	15.46	2.79	29.4	\$ 0.03	\$ 0.07	\$ 0.10	\$ 0.14	\$ 0.17	\$ 0.20	\$ 0.24	\$ 0.27	\$ 0.31	\$ 0.34
17	43.39	15.86	2.74	28.6	\$ 0.03	\$ 0.07	\$ 0.10	\$ 0.14	\$ 0.17	\$ 0.21	\$ 0.24	\$ 0.28	\$ 0.31	\$ 0.35
11	44.16	17.31	2.55	26.2	\$ 0.04	\$ 0.08	\$ 0.11	\$ 0.15	\$ 0.19	\$ 0.23	\$ 0.27	\$ 0.31	\$ 0.34	\$ 0.38
39	44.23	15.36	2.88	29.6	\$ 0.03	\$ 0.07	\$ 0.10	\$ 0.14	\$ 0.17	\$ 0.20	\$ 0.24	\$ 0.27	\$ 0.30	\$ 0.34
32	44.39	16.1	2.76	28.2	\$ 0.04	\$ 0.07	\$ 0.11	\$ 0.14	\$ 0.18	\$ 0.21	\$ 0.25	\$ 0.28	\$ 0.32	\$ 0.35
43	44.9	17.37	2.58	26.1	\$ 0.04	\$ 0.08	\$ 0.11	\$ 0.15	\$ 0.19	\$ 0.23	\$ 0.27	\$ 0.31	\$ 0.34	\$ 0.38
10	44.91	16.82	2.67	27.0	\$ 0.04	\$ 0.07	\$ 0.11	\$ 0.15	\$ 0.19	\$ 0.22	\$ 0.26	\$ 0.30	\$ 0.33	\$ 0.37
27	45.03	17.53	2.57	25.9	\$ 0.04	\$ 0.08	\$ 0.12	\$ 0.15	\$ 0.19	\$ 0.23	\$ 0.27	\$ 0.31	\$ 0.35	\$ 0.39
12	45.54	19.07	2.39	23.8	\$ 0.04	\$ 0.08	\$ 0.13	\$ 0.17	\$ 0.21	\$ 0.25	\$ 0.29	\$ 0.34	\$ 0.38	\$ 0.42
19	45.93	19.05	2.41	23.8	\$ 0.04	\$ 0.08	\$ 0.13	\$ 0.17	\$ 0.21	\$ 0.25	\$ 0.29	\$ 0.34	\$ 0.38	\$ 0.42
5	45.97	18.16	2.53	25.0	\$ 0.04	\$ 0.08	\$ 0.12	\$ 0.16	\$ 0.20	\$ 0.24	\$ 0.28	\$ 0.32	\$ 0.36	\$ 0.40
17	46.37	18.19	2.55	25.0	\$ 0.04	\$ 0.08	\$ 0.12	\$ 0.16	\$ 0.20	\$ 0.24	\$ 0.28	\$ 0.32	\$ 0.36	\$ 0.40
20	46.75	20.23	2.31	22.4	\$ 0.04	\$ 0.09	\$ 0.13	\$ 0.18	\$ 0.22	\$ 0.27	\$ 0.31	\$ 0.36	\$ 0.40	\$ 0.45
41	46.84	20.34	2.30	22.3	\$ 0.04	\$ 0.09	\$ 0.13	\$ 0.18	\$ 0.22	\$ 0.27	\$ 0.31	\$ 0.36	\$ 0.40	\$ 0.45
13	46.93	17.98	2.61	25.3	\$ 0.04	\$ 0.08	\$ 0.12	\$ 0.16	\$ 0.20	\$ 0.24	\$ 0.28	\$ 0.32	\$ 0.36	\$ 0.40
3	47.12	20.23	2.33	22.4	\$ 0.04	\$ 0.09	\$ 0.13	\$ 0.18	\$ 0.22	\$ 0.27	\$ 0.31	\$ 0.36	\$ 0.40	\$ 0.45
31	47.14	19.55	2.41	23.2	\$ 0.04	\$ 0.09	\$ 0.13	\$ 0.17	\$ 0.22	\$ 0.26	\$ 0.30	\$ 0.34	\$ 0.39	\$ 0.43
35	47.43	20.42	2.32	22.2	\$ 0.04	\$ 0.09	\$ 0.13	\$ 0.18	\$ 0.22	\$ 0.27	\$ 0.31	\$ 0.36	\$ 0.40	\$ 0.45
8	47.58	20.32	2.34	22.3	\$ 0.04	\$ 0.09	\$ 0.13	\$ 0.18	\$ 0.22	\$ 0.27	\$ 0.31	\$ 0.36	\$ 0.40	\$ 0.45
38	47.58	19.15	2.48	23.7	\$ 0.04	\$ 0.08	\$ 0.13	\$ 0.17	\$ 0.21	\$ 0.25	\$ 0.30	\$ 0.34	\$ 0.38	\$ 0.42
30	48.18	21.95	2.19	20.7	\$ 0.05	\$ 0.10	\$ 0.15	\$ 0.19	\$ 0.24	\$ 0.29	\$ 0.34	\$ 0.39	\$ 0.44	\$ 0.48
39	48.28	22.07	2.19	20.6	\$ 0.05	\$ 0.10	\$ 0.15	\$ 0.19	\$ 0.24	\$ 0.29	\$ 0.34	\$ 0.39	\$ 0.44	\$ 0.49
18	48.37	21.39	2.26	21.2	\$ 0.05	\$ 0.09	\$ 0.14	\$ 0.19	\$ 0.24	\$ 0.28	\$ 0.33	\$ 0.38	\$ 0.42	\$ 0.47
48	48.38	21.03	2.30	21.6	\$ 0.05	\$ 0.09	\$ 0.14	\$ 0.19	\$ 0.23	\$ 0.28	\$ 0.32	\$ 0.37	\$ 0.42	\$ 0.46
37	48.71	21.55	2.26	21.1	\$ 0.05	\$ 0.09	\$ 0.14	\$ 0.19	\$ 0.24	\$ 0.28	\$ 0.33	\$ 0.38	\$ 0.43	\$ 0.47
24	48.83	20.41	2.39	22.2	\$ 0.04	\$ 0.09	\$ 0.13	\$ 0.18	\$ 0.22	\$ 0.27	\$ 0.31	\$ 0.36	\$ 0.40	\$ 0.45
27	49.04	23.02	2.13	19.7	\$ 0.05	\$ 0.10	\$ 0.15	\$ 0.20	\$ 0.25	\$ 0.30	\$ 0.35	\$ 0.41	\$ 0.46	\$ 0.51
44	49.09	21.74	2.26	20.9	\$ 0.05	\$ 0.10	\$ 0.14	\$ 0.19	\$ 0.24	\$ 0.29	\$ 0.34	\$ 0.38	\$ 0.43	\$ 0.48

7	49.38	22.36	2.21	20.3	\$ 0.05	\$ 0.10	\$ 0.15	\$ 0.20	\$ 0.25	\$ 0.30	\$ 0.34	\$ 0.39	\$ 0.44	\$ 0.49
1	49.4	21.65	2.28	21.0	\$ 0.05	\$ 0.10	\$ 0.14	\$ 0.19	\$ 0.24	\$ 0.29	\$ 0.33	\$ 0.38	\$ 0.43	\$ 0.48
18	49.51	24.01	2.06	18.9	\$ 0.05	\$ 0.11	\$ 0.16	\$ 0.21	\$ 0.26	\$ 0.32	\$ 0.37	\$ 0.42	\$ 0.48	\$ 0.53
34	49.56	21.21	2.34	21.4	\$ 0.05	\$ 0.09	\$ 0.14	\$ 0.19	\$ 0.23	\$ 0.28	\$ 0.33	\$ 0.37	\$ 0.42	\$ 0.47
4	49.65	21.92	2.27	20.7	\$ 0.05	\$ 0.10	\$ 0.14	\$ 0.19	\$ 0.24	\$ 0.29	\$ 0.34	\$ 0.39	\$ 0.43	\$ 0.48
6	49.81	22.1	2.25	20.5	\$ 0.05	\$ 0.10	\$ 0.15	\$ 0.19	\$ 0.24	\$ 0.29	\$ 0.34	\$ 0.39	\$ 0.44	\$ 0.49
14	49.81	25.7	1.94	17.7	\$ 0.06	\$ 0.11	\$ 0.17	\$ 0.23	\$ 0.28	\$ 0.34	\$ 0.40	\$ 0.45	\$ 0.51	\$ 0.57
47	49.91	24.62	2.03	18.4	\$ 0.05	\$ 0.11	\$ 0.16	\$ 0.22	\$ 0.27	\$ 0.33	\$ 0.38	\$ 0.43	\$ 0.49	\$ 0.54
49	49.94	23.38	2.14	19.4	\$ 0.05	\$ 0.10	\$ 0.15	\$ 0.21	\$ 0.26	\$ 0.31	\$ 0.36	\$ 0.41	\$ 0.46	\$ 0.51
29	49.96	21.22	2.35	21.4	\$ 0.05	\$ 0.09	\$ 0.14	\$ 0.19	\$ 0.23	\$ 0.28	\$ 0.33	\$ 0.37	\$ 0.42	\$ 0.47
15	50.07	25.16	1.99	18.0	\$ 0.06	\$ 0.11	\$ 0.17	\$ 0.22	\$ 0.28	\$ 0.33	\$ 0.39	\$ 0.44	\$ 0.50	\$ 0.55
16	50.11	23.1	2.17	19.7	\$ 0.05	\$ 0.10	\$ 0.15	\$ 0.20	\$ 0.25	\$ 0.31	\$ 0.36	\$ 0.41	\$ 0.46	\$ 0.51
4	50.14	24.54	2.04	18.5	\$ 0.05	\$ 0.11	\$ 0.16	\$ 0.22	\$ 0.27	\$ 0.32	\$ 0.38	\$ 0.43	\$ 0.49	\$ 0.54
19	50.19	23.32	2.15	19.5	\$ 0.05	\$ 0.10	\$ 0.15	\$ 0.21	\$ 0.26	\$ 0.31	\$ 0.36	\$ 0.41	\$ 0.46	\$ 0.51
6	50.32	23.97	2.10	18.9	\$ 0.05	\$ 0.11	\$ 0.16	\$ 0.21	\$ 0.26	\$ 0.32	\$ 0.37	\$ 0.42	\$ 0.48	\$ 0.53
50	50.79	24.21	2.10	18.8	\$ 0.05	\$ 0.11	\$ 0.16	\$ 0.21	\$ 0.27	\$ 0.32	\$ 0.37	\$ 0.43	\$ 0.48	\$ 0.53
23	50.82	21.86	2.32	20.8	\$ 0.05	\$ 0.10	\$ 0.14	\$ 0.19	\$ 0.24	\$ 0.29	\$ 0.34	\$ 0.39	\$ 0.43	\$ 0.48
42	51.09	24.79	2.06	18.3	\$ 0.05	\$ 0.11	\$ 0.16	\$ 0.22	\$ 0.27	\$ 0.33	\$ 0.38	\$ 0.44	\$ 0.49	\$ 0.55
26	51.14	23.76	2.15	19.1	\$ 0.05	\$ 0.10	\$ 0.16	\$ 0.21	\$ 0.26	\$ 0.31	\$ 0.37	\$ 0.42	\$ 0.47	\$ 0.52
13	51.15	25.59	2.00	17.7	\$ 0.06	\$ 0.11	\$ 0.17	\$ 0.23	\$ 0.28	\$ 0.34	\$ 0.39	\$ 0.45	\$ 0.51	\$ 0.56
1	51.24	23.92	2.14	19.0	\$ 0.05	\$ 0.11	\$ 0.16	\$ 0.21	\$ 0.26	\$ 0.32	\$ 0.37	\$ 0.42	\$ 0.47	\$ 0.53
31	51.53	28.01	1.84	16.2	\$ 0.06	\$ 0.12	\$ 0.19	\$ 0.25	\$ 0.31	\$ 0.37	\$ 0.43	\$ 0.49	\$ 0.56	\$ 0.62
46	51.83	24.27	2.14	18.7	\$ 0.05	\$ 0.11	\$ 0.16	\$ 0.21	\$ 0.27	\$ 0.32	\$ 0.37	\$ 0.43	\$ 0.48	\$ 0.53
33	52.33	23.51	2.23	19.3	\$ 0.05	\$ 0.10	\$ 0.16	\$ 0.21	\$ 0.26	\$ 0.31	\$ 0.36	\$ 0.41	\$ 0.47	\$ 0.52
35	52.42	25.72	2.04	17.7	\$ 0.06	\$ 0.11	\$ 0.17	\$ 0.23	\$ 0.28	\$ 0.34	\$ 0.40	\$ 0.45	\$ 0.51	\$ 0.57
2	52.54	26.52	1.98	17.1	\$ 0.06	\$ 0.12	\$ 0.18	\$ 0.23	\$ 0.29	\$ 0.35	\$ 0.41	\$ 0.47	\$ 0.53	\$ 0.58
40	52.72	27.52	1.92	16.5	\$ 0.06	\$ 0.12	\$ 0.18	\$ 0.24	\$ 0.30	\$ 0.36	\$ 0.42	\$ 0.48	\$ 0.55	\$ 0.61
21	52.94	28.95	1.83	15.7	\$ 0.06	\$ 0.13	\$ 0.19	\$ 0.26	\$ 0.32	\$ 0.38	\$ 0.45	\$ 0.51	\$ 0.57	\$ 0.64
10	52.99	28.1	1.89	16.2	\$ 0.06	\$ 0.12	\$ 0.19	\$ 0.25	\$ 0.31	\$ 0.37	\$ 0.43	\$ 0.50	\$ 0.56	\$ 0.62
2	53.08	28.09	1.89	16.2	\$ 0.06	\$ 0.12	\$ 0.19	\$ 0.25	\$ 0.31	\$ 0.37	\$ 0.43	\$ 0.49	\$ 0.56	\$ 0.62
32	53.59	28.35	1.89	16.0	\$ 0.06	\$ 0.12	\$ 0.19	\$ 0.25	\$ 0.31	\$ 0.37	\$ 0.44	\$ 0.50	\$ 0.56	\$ 0.62

36	54.42	29.51	1.84	15.4	\$ 0.07	\$ 0.13	\$ 0.20	\$ 0.26	\$ 0.33	\$ 0.39	\$ 0.46	\$ 0.52	\$ 0.59	\$ 0.65
33	54.66	28.99	1.89	15.7	\$ 0.06	\$ 0.13	\$ 0.19	\$ 0.26	\$ 0.32	\$ 0.38	\$ 0.45	\$ 0.51	\$ 0.57	\$ 0.64
28	54.81	31.55	1.74	14.4	\$ 0.07	\$ 0.14	\$ 0.21	\$ 0.28	\$ 0.35	\$ 0.42	\$ 0.49	\$ 0.56	\$ 0.63	\$ 0.69
20	54.83	27.66	1.98	16.4	\$ 0.06	\$ 0.12	\$ 0.18	\$ 0.24	\$ 0.30	\$ 0.37	\$ 0.43	\$ 0.49	\$ 0.55	\$ 0.61
9	55.99	30.58	1.83	14.8	\$ 0.07	\$ 0.13	\$ 0.20	\$ 0.27	\$ 0.34	\$ 0.40	\$ 0.47	\$ 0.54	\$ 0.61	\$ 0.67
7	56.63	34.67	1.63	13.1	\$ 0.08	\$ 0.15	\$ 0.23	\$ 0.31	\$ 0.38	\$ 0.46	\$ 0.53	\$ 0.61	\$ 0.69	\$ 0.76
28	56.85	32.76	1.74	13.9	\$ 0.07	\$ 0.14	\$ 0.22	\$ 0.29	\$ 0.36	\$ 0.43	\$ 0.51	\$ 0.58	\$ 0.65	\$ 0.72
25	57.44	31.56	1.82	14.4	\$ 0.07	\$ 0.14	\$ 0.21	\$ 0.28	\$ 0.35	\$ 0.42	\$ 0.49	\$ 0.56	\$ 0.63	\$ 0.70
45	57.81	36.18	1.60	12.5	\$ 0.08	\$ 0.16	\$ 0.24	\$ 0.32	\$ 0.40	\$ 0.48	\$ 0.56	\$ 0.64	\$ 0.72	\$ 0.80
29	58.68	35.69	1.64	12.7	\$ 0.08	\$ 0.16	\$ 0.24	\$ 0.31	\$ 0.39	\$ 0.47	\$ 0.55	\$ 0.63	\$ 0.71	\$ 0.79
37	58.81	34.37	1.71	13.2	\$ 0.08	\$ 0.15	\$ 0.23	\$ 0.30	\$ 0.38	\$ 0.45	\$ 0.53	\$ 0.61	\$ 0.68	\$ 0.76
47	58.86	37.43	1.57	12.1	\$ 0.08	\$ 0.16	\$ 0.25	\$ 0.33	\$ 0.41	\$ 0.49	\$ 0.58	\$ 0.66	\$ 0.74	\$ 0.82
44	60.16	39.73	1.51	11.4	\$ 0.09	\$ 0.18	\$ 0.26	\$ 0.35	\$ 0.44	\$ 0.53	\$ 0.61	\$ 0.70	\$ 0.79	\$ 0.88
5	60.82	40.01	1.52	11.3	\$ 0.09	\$ 0.18	\$ 0.26	\$ 0.35	\$ 0.44	\$ 0.53	\$ 0.62	\$ 0.71	\$ 0.79	\$ 0.88
51	61.49	41.9	1.47	10.8	\$ 0.09	\$ 0.18	\$ 0.28	\$ 0.37	\$ 0.46	\$ 0.55	\$ 0.65	\$ 0.74	\$ 0.83	\$ 0.92
45	63.45	44.67	1.42	10.2	\$ 0.10	\$ 0.20	\$ 0.30	\$ 0.39	\$ 0.49	\$ 0.59	\$ 0.69	\$ 0.79	\$ 0.89	\$ 0.98
53	64.59	47.74	1.35	9.5	\$ 0.11	\$ 0.21	\$ 0.32	\$ 0.42	\$ 0.53	\$ 0.63	\$ 0.74	\$ 0.84	\$ 0.95	\$ 1.05
49	65.86	50.45	1.31	9.0	\$ 0.11	\$ 0.22	\$ 0.33	\$ 0.44	\$ 0.56	\$ 0.67	\$ 0.78	\$ 0.89	\$ 1.00	\$ 1.11
46	67.07	52.01	1.29	8.7	\$ 0.11	\$ 0.23	\$ 0.34	\$ 0.46	\$ 0.57	\$ 0.69	\$ 0.80	\$ 0.92	\$ 1.03	\$ 1.15
50	67.84	49.35	1.37	9.2	\$ 0.11	\$ 0.22	\$ 0.33	\$ 0.43	\$ 0.54	\$ 0.65	\$ 0.76	\$ 0.87	\$ 0.98	\$ 1.09
52	69.48	56.19	1.24	8.1	\$ 0.12	\$ 0.25	\$ 0.37	\$ 0.50	\$ 0.62	\$ 0.74	\$ 0.87	\$ 0.99	\$ 1.11	\$ 1.24
48	70.36	60.73	1.16	7.5	\$ 0.13	\$ 0.27	\$ 0.40	\$ 0.54	\$ 0.67	\$ 0.80	\$ 0.94	\$ 1.07	\$ 1.20	\$ 1.34

Appendix 9: Pentallect Aquaculture Market Assessment Report

This report was funded through a complimentary NOAA Sea Grant project (award number NA17OAR4170240), which leveraged the results of the NOAA-funded SK surf clam project. The Saltonstall Kennedy Surf Clam project partners CCCE/WHSG and CCCFA helped to develop and secure funds for the complimentary project in order to complete a robust third party market assessment of surf clams.

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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

INTRODUCTION

Project Background

Cape Cod Cooperative Extension, Woods Hole Sea Grant, the Cape Cod Commercial Fishermen's Alliance, and Wellfleet Shellfish Promotion and Tasting received funding through the NOAA Aquaculture Initiative to address hurdles that are impeding the advancement of aquaculture of three native shellfish species grown in coastal Massachusetts; 1.5-2" surf clams (*Spisula solidissima*), sometimes marketed as butter clams, blood clams (*Anadara ovalis*) and oysters (*Crassostrea virginica*). Shellfish aquaculture in the Northeastern United States has become increasingly dominated by the culture of oysters (*Crassostrea virginica*). Massachusetts is no exception; the shellfish aquaculture industry grew from \$6.5M in 2011 to \$28M in 2017 (DMF Annual Report, 2017). Of that \$28M in value over 95% of total production was from oyster culture (DMF Annual Report, 2017). Currently the shellfish aquaculture industry is dominated by the market demand for oysters that can be served, "on the half shell" (The Hale Group, 2016). With the industry successful, but veering toward an inherently risky monoculture, lack of diversification is an impediment to the advancement of the shellfish aquaculture industry.

Work has been done to develop culture methods for species other than oysters, but a significant hurdle to incorporating these, "alternative" species into farm business models is lack of adequate market-based data pertaining to wholesale value to be paid to potential shellfish growers. Before a grower can make the financial commitment to culture a new species he or she must have adequate revenue estimates. There is also a lack of information on the potential size of these markets, if any, and how they might be developed or promoted if growers were to invest in farming these alternative species.

Project Summary

Pentallect, in collaboration with CCCE and its affiliates, has produced this market research assessment that explores existing and potential markets for blood clams, butter clams, and shucked oysters from Massachusetts, including a situation assessment and market structure analysis.

Scope of Work

Specific topics, or questions, that the report addresses for each species includes:

Blood Clams and Butter Clams

- 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?
- In what form are blood clams and butter clams being sold in retail? Raw bar? Fine dining? Fried? Other?
- What is the size or volume of these markets, on Cape Cod, in Massachusetts, in the Northeast, and in other regions nationally? Is there unmet demand; if so, how much?

- Can existing markets for blood clams, butter clams, and shucked oysters be expanded (if needed), and is there potential to develop new markets? If yes, at what price point and what is the competition? Is there a market for value-added further processed Blood Clams?
- Does demand from retailers or value vary seasonally?
- What are typical marketing / trade investment dynamics to build awareness and consumer demand for the relevant species – retail and foodservice?
- What is the optimal branding for blood clams?
- If blood clams and butter clams are successful, what related species / products would they most likely cannibalize?
- Provide a list of wholesale dealers that are interested in buying blood clams and butter clams.

Shucked Oysters and Shucked Oyster Value Added Products

- 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? From what geographic area is the product sourced and is it wild harvested or aquaculture? What are current wholesale and retail prices of these value-added products?
- Evaluate consumer and retailer willingness to pay a premium for a shucked oyster product branded as ‘local’ from Massachusetts.
- 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.)?
- How often is the source of oysters by geography, from a particular town (such as Wellfleet, MA) or by brand most important in making a purchasing decision?
- Do Fall shucked oyster prices decline due to pre-winter harvesting?

Methodology

To complete the Market Assessment Report, Pentallect conducted extensive research, including over 40 interviews, within the aquaculture and broader seafood marketplace and throughout the food channel with both retail and foodservice supply chain participants. The research focused on both local (MA and New England) and national industry participants. Sources of information included:

- Shellfish aquaculture operators / harvesters
- Seafood wholesalers and distributors
- Foodservice distributors
- Restaurant operators
- Retail store managers – grocery, seafood, specialty and ethnic
- Government resources – MA DMF, VA Marine Resources Commission, ACCSP, SAFIS
- Internet-based research
- Market Assessment Report working group – see Appendix

EXECUTIVE SUMMARY

There are opportunities and challenges associated with expansion of each of the three species: Blood Clams, Butter Clams and Value-added Oysters. In total, the potential additional gross revenue MA shellfish of the three species / formats is estimated to be approximately \$2 - \$4 million. This represents approximately a 7% - 14% increase over the current MA shellfish aquaculture market value. In order to realize this market potential, investments in seed supply, aquaculture infrastructure and demand creation in the form of both marketing and business development efforts would be required and harvesters would need to accept lower pricing / margins for shucked oysters relative to the current half-shell market. The gross profit market potential for shucked oysters can not be determined at this time until the costs associated with developing any required infrastructure are identified.

Blood Clams

Blood Clams represent the greatest immediate opportunity, with an estimated \$0.5 - \$1.0 million gross revenue potential, yet market factors limit the overall growth potential. There is a proven, yet relatively limited, ethnic market for Blood Clams across a range of Asian and Hispanic cuisines and an established supply chain with inventory primarily sourced from wild harvest in Wellfleet and surrounding area. Total national market demand is estimated to be 4 – 8 times current MA-harvested annual wild landings. Assuming that the current wild inventory is not sufficient to meet the total market demand, then consistent Blood Clam seed production must be ensured to support a Blood Clam aquaculture development effort. The Blood Clam market can be price-sensitive so significantly increased MA-generated supply that satisfies the total national demand is likely to marginally reduce current market pricing of approximately \$2.00 / lb. by an estimated \$0.10 - \$0.30 per pound. Consumption is generally limited to ethnic cuisines and demand is largely outside of New England. There is limited identified market potential for expansion outside current ethnic markets .

Butter Clams

Butter Clams, or juvenile surf clams, are currently a relatively undeveloped market that represents projected market potential of \$0.6 - \$1.7 million gross revenue for MA-based harvesters. Butter Clams have potential for broad fit across a range of cuisine / menu applications due to their similarity with other clam species and also offer the potential to offset supply shortages for other clam species. There is relatively broad interest within the wholesale / distribution community for Butter Clams. Realizing the gross revenue potential will require an estimated 3+ years to build up seed supply, growing operations and shell stock. Building market penetration for Butter Clams will also require marketing investment to build awareness, create restaurant demand and minimize cannibalization of other clam species.

Value-Added Oysters

The Value-added Oyster market is primarily limited to shucked oysters and niche items including smoked and frozen half-shell oysters. The majority of shucked oysters are sourced from the Mid-Atlantic and Gulf regions at a significant discount (the average harvester pricing is \$0.15 - \$0.25 per oyster) to current MA harvester half-shell pricing. Nationally, shucked oysters account for approximately 40% of total oyster volume, yet almost none of the shucked oysters are sourced in the Northeast. While New England half-shell oysters are generally preferred to Mid Atlantic / Gulf half-shell oysters in the Northeast and other northern U.S. markets, there is overall satisfaction with the quality of shucked oysters sourced from the more southern waters given their different menu applications relative to half-shell oysters. Consequently, the expectation within the food supply chain (wholesalers, distributors, restaurant operators, etc.) is that MA-sourced shucked oysters would need to be price competitive with Mid Atlantic / Gulf offerings.

Smoked and other further processed Oysters represent less than 5% of the national market and are primarily sourced either from low cost suppliers in Asia, oyster farmers in the Pacific Northwest or more premium producers in Europe. Pentallect estimates that over 80% of domestic smoked oyster volume is sourced from Asian imports. The long term impact of potential tariffs on imported shellfish is unclear at this time. There are fewer than ten domestic producers of smoked and other further processed oyster products with established market presences, primarily via online sales and limited distribution with wholesalers / distributors.

To commercially develop a Value-added Oyster platform, MA-based harvesters will need to build shucking capabilities and ensure a reliable supply of oysters priced at approximately \$0.20 - \$0.25 / oyster (current market pricing) for shucked oysters. There are currently no further-processing (shucking) facilities in the Northeast with any significant commercial scale. If processing facilities are developed and oyster harvesters are committed to selling some inventory at a lower price point, then MA-sourced shucked oysters represent the greatest Value-added Oyster revenue opportunity, at approximately ten times the overall market potential than smoked or other further processed formats - \$0.6 - \$1.2 million for bulk shucked versus an estimated less than \$0.1 million for smoked or other processed oysters.

The estimated gross market potential for each of the three species, excluding cannibalization of other species, is summarized below. The gross margin potential assumes sufficient market investment to build awareness and create demand within high priority metropolitan areas, beginning in the Northeast.

Total Gross Revenue Potential

	Est. Annual MA-Sourced Gross Revenue Potential (\$MM)			
	Current	Year 1 ¹	Year 2	Year 3 / Ongoing
Blood Clams	\$0.1	\$0.1 - \$0.2	\$0.2 - \$0.4	\$0.5 - \$1.0
Butter Clams	\$0	\$0.2 - \$0.3	\$0.4 - \$0.5	\$0.6 - \$1.7
Value-Added Oysters	\$0	\$0.3 - \$0.4	\$0.5 - \$0.6	\$0.6 - \$1.2
Total MA-Sourced	\$0.1	\$0.6 - \$0.9	\$1.1 - \$1.5	\$1.7 - \$3.9

¹ Year 1 defined as having sufficient seed supply, commercial infrastructure and marketing support for aquaculture operations and demand creation activities.

Source: Pentallect research, ACCSP / SAFIS data

The gross revenue potential estimates assume sufficient marketing investment with targeted distributors to build demand for either Butter Clams or Value-Added Oysters. Blood Clams for the ethnic marketplace will not require additional marketing investment due to the current awareness and market demand within the ethnic marketplace. See the Marketing / Investment Requirements section for details.

SPECIES INSIGHTS – BLOOD CLAMS (*ANADARA OVALIS*)

Research findings relative to Blood Clams are detailed in this section.

Overview

- The current Blood Clams supply primarily serves ethnic markets, particularly Asian cuisines and, secondarily, some Hispanic cuisines.
- The majority of MA-sourced Blood Clams are shipped to Boston, and then New York and the West Coast, for redistribution to domestic and international Asian/ethnic distributors.
- The wholesaler / distribution community is generally aware of Blood Clams, but there is little local demand in “mainstream” seafood channels.
- Among those aware of Blood Clams, there is minimal interest among the retail / foodservice operator communities to stock or menu Blood Clams due to their relatively low volumes, appearance, texture and flavor profiles.
- Developing demand outside the current ethnic markets will require a significant marketing and product sampling effort, particularly with foodservice operators, to build awareness and scale. The incremental volume opportunity does not appear to justify this investment.
- There are differing opinions regarding whether the current wild supply (primarily Wellfleet) is sufficient to meet current demand. While the MA-based Blood Clam supply has decreased over the past 1-2 years, the general consensus is that the supply has stabilized. Since the size of the biomass has not been determined at this time, it cannot be determined whether current supply is sufficient to satisfy more of the total national demand.
- Should participants decide to produce farmed-raised Blood Clams, a reliable seed supply must be ensured to support the effort.

Blood Clam Sourcing

The domestic Blood Clam supply is almost exclusively wild-sourced. The majority of Blood Clams are sourced from Massachusetts, which accounts for an estimated 80+% share of domestic supply.

SAFIS data and supply chain interviews indicate that the MA-sourced wild supply of Blood Clams has declined since 2016. The decline is reportedly associated with relatively extensive harvesting in 2015 – 2016 accompanied by a winter die-off. An analysis of 2018 landings data will provide important insights regarding the stability of the wild supply. While supply has softened, the value per pound has remained relatively stable in recent years. If the wild supply continues to diminish, or stabilize at a lower level than historic highs, there may be an opportunity for aquaculture-sourced Blood Clams to meet some of the market demand. A summary of ACCSP / SAFIS data for Blood Clam sourcing for all Atlantic Coast reporting states is as follows:

	2014		2015		2016		2017	
State	Live Lbs. (000)	Share						
MA	32.6	51%	70.0	64%	90.7	84%	61.1	81%
VA	23.1	36%	32.2	29%	13.5	12%	10.0	13%
NC	7.2	11%	6.8	6%	3.8	4%	3.1	4%
NY	0.6	1%	0.6	1%	0.1	0%	1.4	1%
Total	63.5	100%	109.6	100%	108.1	100%	75.6	100%

Source: Pentallect research; ACCSP and SAFIS data

Massachusetts and Virginia account for approximately 95% of Atlantic Coast Blood Clam landings. The Mid Atlantic region's market share, sourced primarily from Virginia and North Carolina, has been declining as wild supply was aggressively harvested earlier in the decade and the relatively low demand did not provide incentive for aquaculture development efforts. Blood Clam pricing has held relatively constant as MA-sourced product has more than offset the declines from the Mid-Atlantic.

VA Blood Clam Landings Trends

	2014	2015	2016	2017
Virginia Landings				
Live Pounds	23,080	32,225	13,541	9,967
Value	\$36,543	\$54,058	\$22,237	\$15,105
\$ / Pound	\$1.58	\$1.67	\$1.64	\$1.51
Massachusetts Landings				
Live Pounds	32,600	69,873	90,661	61,050
Value	\$67,145	\$140,190	\$172,269	\$123,170
\$ / Pound	\$2.06	\$2.01	\$1.90	\$2.02

Source: ACCSP and SAFIS data

Current Values for Blood Clams Locally and Nationally

The current MA-sourced harvester value for wild Blood Clams is approximately \$1.75 - \$2.25 per pound. While there is a broad range of clams per pound based on size, at approximately 12 Blood Clams per pound, this equates to averages of \$0.15 - \$0.19 per clam, or an average of \$0.17. Given that MA-sourced Blood Clams represent the majority of the current national supply, MA-based pricing represents both the local and national pricing parameters.

	Harvester Price Range		
Price / Lb.	Low \$1.75	Mid \$2.00	High \$2.25
Price / Clam			
Avg. Clams / Lb.			
7 (2" length)	25¢	29¢	32¢
16 (1 ½ " length)	11¢	13¢	14¢
Avg. (12)	15¢	17¢	19¢

Source: Pentialect research; CCCE / Woods Hole Sea Grant data

Typical Blood Clam value chain dynamics are as follows:

	Selling Price per Lb.
Harvester / Grower	\$1.75 - \$2.25 (\$1.50 - \$2.50 total range estimates)
Wholesaler / Distributor	\$2.25 - \$2.75 (avg. + \$0.50 / lb.)
Specialty Distributor (Ethnic)	\$2.75 - \$3.35 (15% - 25% mark up)
Retail	\$4.50 - \$5.50
Foodservice Operator	\$8.00 - \$10.00

Blood Clam Product Formats

Blood Clams are almost exclusively sold in bulk (50 lb. cases / bushels), primarily to ethnic specialty distributors. Pentialect estimates that ethnic specialty distributors account for 75%+ of the current market.

Typical ethnic dishes that incorporate Blood Clams include: akagai, Korean “cockle” dishes, ceviche, etc. Currently, traditional domestic raw bar usage is very limited. Some higher end restaurants offer Blood Clams in ceviche and ethnic dishes

Market Size Assessment and Market Expansion Potential

The total estimated U.S. volume potential for Blood Clams is 5,000 – 10,000 lbs. per week. The majority of this demand potential is within Asian markets and is primarily sourced via distributors in Boston, New York and the West Coast. Current estimates for Boston-based distribution are approximately 1,500 - 2,000 lbs. / week; much of which is then shipped to New York and the West Coast. The research indicates that total market potential, based on the total U.S. volume potential of 5,000 – 10,000 lbs. per week, is approximately 4 – 6 times current MA-based supply.

At \$2/lb. to the harvester, this represents a \$0.5 MM - \$1 MM total market opportunity assuming year-round supply and maintaining current pricing despite the increased supply.

Blood Clam Harvester Market Potential			
Weekly Demand Potential – Lbs.	5,000 – Low	7,500 – Mid	10,000 - High
Avg. Price / Lb.	\$2.00	\$2.00	\$2.00
Annual Harvester Revenue (000)	\$500	\$750	\$1,000

Source: Pentallect research

The primary opportunities for MA-sourced Blood Clam expansion involve greater penetration of existing ethnic markets rather than expansion into new markets. Within new channels, the primary new market opportunity is within the Fine Dining sector, however the raw bar / menu expansion opportunity is limited and requires chef-focused marketing initiatives (sampling, recipe development, etc.). The estimated incremental harvester revenue opportunity within Fine Dining is estimated to be <\$100,000, which does not generate an attractive return-on-investment for the marketing expenditures required to create demand. The recommendation is to focus on expansion within the ethnic markets with fine dining as an opportunistic lower priority.

Seasonality

There is little seasonality with Blood Clam demand in the primary ethnic markets. Any supply seasonality would be related to harvest-related issues in colder waters; particularly inter-tidal areas.

In general, restaurants account for the majority of shellfish consumption and experience minimal seasonality on a national basis. Within geographies with significant tourism, the food industry does experience more seasonal demand fluctuations. Given the national distribution for MA-sourced Blood Clams, Massachusetts' summer tourism does not significantly impact overall demand dynamics.

Blood Clam Branding

There are two general perspectives regarding Blood Clam branding.

For the well-established ethnic market, the clear consensus is to maintain / leverage the current Blood Clam brand equity that is well-known in that marketplace.

If demand creation efforts are targeted against building awareness within the traditional fine dining and full-service restaurant channels, then most research respondents recommended re-branding the species for greater menu description appeal. Suggested alternatives include:

- Crimson Clams
- Blood Orange Clams
- Ark Clams
- Cranberry Clams

Pentallect's recommendation is to maintain consistent branding across channels, because the large majority of the opportunity is within the ethnic markets and the size of the fine dining / full service market opportunity does not justify the required marketing investment to develop a new brand.

Potential Cannibalization

Blood Clams are widely considered to be a unique species that would not cannibalize other species to a significant degree due to their primary usage within ethnic markets.

SPECIES INSIGHTS – BUTTER / JUVENILE SURF CLAMS (*SPISULA SOLIDISSIMA*)

Research findings relative to Butter, or Juvenile Surf, Clams are detailed in this section.

Overview

- There is general market interest in a 1.5-2" surf clam as a complement / alternative to other core clam products (manilas, razors, littlenecks, soft shell, etc.). Based on insights from food industry respondents, Pentialect estimates that approximately 25% - 40% of Butter Clams volume would cannibalize the other clam species noted above.
- Potential benefits of farmed butter clams include: appealing flavor / texture, versatility - raw bar and prepared dish applications, faster growth to market size than quahogs, steady supply to support dips in other clam species availability.
- Demand creation would require broad restaurant / retailer support to pull product through distribution; sustained marketing efforts to develop sufficient volume and steady supply through the supply chain.
- Requires sustained, sufficient seed supply.
- Wild surf clam size regulations of 5" underscore need for stringent tagging / supply chain documentation to verify aquaculture origins of 1.5" surf clams.

Projected Values for Butter Clams

The current projected harvester value for Butter Clams is approximately \$2.75 per pound, or \$0.14 per clam. The price estimates are derived from 30+ interviews with supply chain participants (wholesalers, distributors, foodservice operators and retailers) and are based on Butter Clams' perceived market positioning relative to other clam species.

The unit pricing assumes approximately 20 Butter Clams per pound, which is consistent with CCCE / Woods Hole Sea Grant data.

Projected Butter Clam value chain dynamics for retail and both prepared entrée and raw bar foodservice applications are as follows:

	Price per Lb.
Harvester / Grower	\$2.50 - \$3.00/lb. (10 lb. bag); \$0.12 - \$0.15 each
Wholesaler / Distributor	<\$4.95 / lb.
Retail	\$4.00 - \$6.00 / lb.
Foodservice Operator	\$0.75 - \$0.85 each (raw bar) \$9.99 – \$24.99 prepared foods - typical fine dining range

Source: Pentallect research; CCCE / Woods Hole Sea Grant data

Butter Clam Product Formats

Butter Clams have market potential across a broad range of menu applications, including both raw bar and prepared foods applications. The primary identified menu opportunities include:

- Appetizers
- Steamed / sautéed
- Pastas
- Seafood stews / bouillabaisse
- Ethnic dishes

Market Size Assessment and Market Expansion Potential

The total estimated Butter Clam market opportunity is for the species to achieve 1% - 3% share of total New England-sourced clam landings volume, excluding mature Surf Clams and Ocean Quahogs, which are generally used for different further-processed applications. These relevant species primarily include: northern quahog, soft shell and razor clams. The volume potential assumes that sufficient market demand and aquaculture infrastructure is created. Currently, Massachusetts accounts for approximately 40% of the relevant clam landings in New England. Given the lack of existing Butter Clam aquaculture infrastructure and the MA-based harvesters' close proximity to the New England supply chain, the volumetric assumptions assume that MA-based harvesters could achieve 100% of the total opportunity if the infrastructure was developed in Massachusetts.

This equates to a total 0.2 – 0.6 million pounds of MA-based market potential, or \$0.5 - \$1.7 million gross revenue value. As noted, approximately two-thirds of this revenue is projected to be incremental with the balance cannibalizing other species. The actual market potential will best be confirmed via market development work with distributors (see Marketing / Investment section).

MA Butter Clam Potential (000)			
MA-Sourced Market Potential	1% - Low	2% - Mid	3% - High
2017 New England Relevant Species Landings ¹	20,837	20,837	20,837
MA Gross Annual Landings Potential	208	416	624
Harvester Revenue (\$2.75/lb.)	\$572	\$1,144	\$1,716
Net Volume (35% Cannibalization Assumption)	135	270	405

¹ Northern quahogs, soft shell clams and razor clams

Source: Pentallect research; ACCSP data

Branding

There is general familiarity with the brand name Butter Clams, primarily due to the West Coast species with the same name. While respondents do not typically associate the Butter Clam brand with juvenile surf clams, the term is associated with high quality clams with broad applications from chowder to prepared entrée components. Respondents did not feel that juvenile surf clams with the same name as the West Cost species would create confusion given that West Coast Butter Clams are primarily used for chowders and are generally not branded to consumers.

When Butter Clams were defined for the purposes of the research study as juvenile surf clams, there was uniform support for the brand name as an appealing descriptor. The primary feedback associated with the brand name included: tender, flavorful, attractive name for menu listings and broad applications from prepared dishes to raw bars.

Given the differences versus larger West Coast Butter Clams, the juvenile surf clam version of Butter Clams will require clear descriptors to clarify the nature of the product and its broad range of potential applications. This marketing effort would best be targeted at seafood distributors and potentially select operators.

Cannibalization

As noted earlier, the research suggests that approximately 25% - 40% of Butter Clam volume will cannibalize other relevant species due to potential menu overlap and anticipated usage as a replacement for other species during supply shortages. For this analysis, Pentallect has assumed a 35% cannibalization rate. Note: Potential customers will need to sample Butter Clams before committing to purchases to confirm their initial assumptions regarding quality, flavor and menu applications.

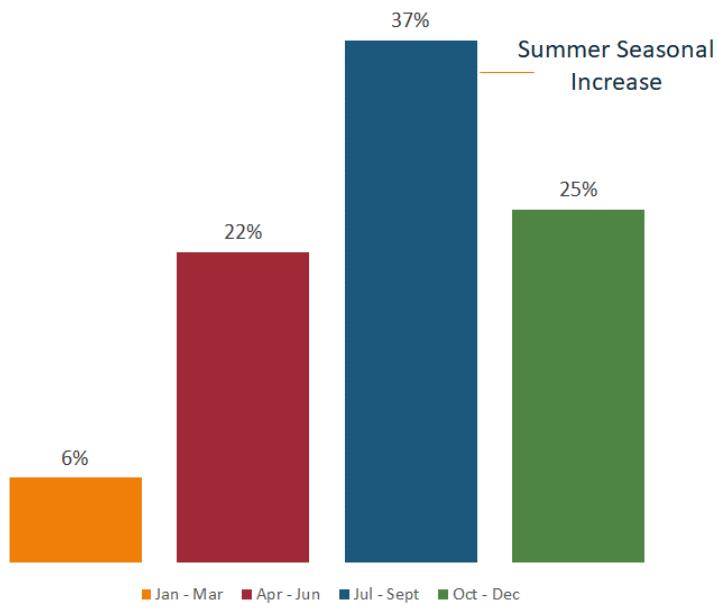
There is some potential for cannibalization within raw bars as species compete for limited menu / restaurant space. In general, Butter Clams were viewed more as an ingredient in a prepared meal rather than a core raw bar item, although a number of respondents identified Butter Clams as an attractive addition to raw bar offerings. As noted above, marketing Butter Clams' versatility and potential for raw bar applications to distributors would be required to gain trial. Many respondents also identified Butter Clams as a potential alternative for other species during inventory shortages.

Seasonality

While there is little seasonality with clam demand in non-coastal markets, summer demand for core shellfish items (steamers, raw bar, etc.) in MA and other shoreline locations can increase up to four times the rest-of-year volumes. It is anticipated that Butter Clams would follow this dynamic. A review of Massachusetts domestic visitors underscores the area's seasonality and

underscores the need to develop a broad distribution footprint to reduce dependence on the Summer New England season and enable year-round harvesting.

Domestic Visitors – Quarterly Share of Visits



SPECIES INSIGHTS – VALUE ADDED OYSTERS (*CRASSOSTREA VIRGINICA*)

Research findings relative to Value-added Oysters are detailed in this section.

Overview

- The primary value-added oyster products include: shucked (bulk), smoked and frozen on half-shell. There is negligible market presence for pickled or other value-added oyster products.
- Value-added oyster products tend to be sourced from lower priced supply areas – Virginia / Mid Atlantic, large West Coast farms and S. Korea primarily
- The shucked products that are distributed in New England are primarily sourced from the Mid-Atlantic region, where harvesters receive approximately \$0.15 - \$0.25 per oyster for shucking operations. The Mid Atlantic-sourced shucked oysters are considered to be of acceptable quality for menu applications and there is little interest among supply chain participants to pay a premium for MA-sourced shucked oysters.
- There are no commercial shucking operations in the Northeast with scalable capacity. Copps Island (CT) was identified as potentially developing a shucking operation. At this time, Copps Island's shucking facility is still in its start-up mode and is only shucking oysters on a limited basis for local restaurants. They are reportedly not currently purchasing oysters from other suppliers. There are reports of Copps Island eventually developing a 400 ft² shucking facility in the future.
- Value-added products require a sustained product supply; further processors and wholesalers / distributors are less interested in surge / excess product than a steady supply
- Value-added oyster operations require a steady, reliable labor force. This has been a significant challenge for many businesses.
- Some oyster harvesters, particularly in the Northwest, have developed premium canned products via third party processors, yet the total revenues are estimated to be less than \$1 million annually
- Achieving scale in the retail and foodservice channels would require a processor / food manufacturer to invest in packaging, quality control processes and marketing support to gain market access

Value-added Oyster Formats

Oyster formats vary significantly by U.S. region. In the Northeast, whole oysters for the half-shell market account for over 95% of volume, while in the Mid-Atlantic and Gulf regions, shucked oysters account for significantly more of the regions' oyster volumes.

Shucked oysters are by far the largest Value-added Oyster category, accounting for over 90% of both Value-added Oyster category volume and value. Nationally, shucked oysters represent

approximately \$50 million in harvester value (Source: The Hale Group, ECSGA, ACCSP – 2016). Less than 5% of this volume, or no more than \$2.5 million is estimated to be shipped into New England for consumption.

The relatively undeveloped further-processed oyster categories in the Northeast are a reflection of both the price premium that northern oysters command in the marketplace and the lack of further processing infrastructure.

Oyster Format Shares – Volume and Values

	Total U.S. Share		Northeast Share	
	<u>Volume</u>	<u>Value</u>	<u>Volume</u>	<u>Value</u>
Whole	58%	69%	95+%	97+%
Shucked	40%	28%	<3%	<2%
All Other ¹	2%	3%	<1%	<2%
Total	100%	100%	100%	100%

¹ Domestically produced smoked, pickled, frozen half-shell, etc.

Source: Pentallect research, The Hale Group, GMRI Farmed Shellfish Report - 2016

The majority of smoked oyster product volume is sourced from Asia (primarily China and South Korea). Domestically-produced smoked oysters are primarily produced in the Pacific Northwest by a relatively small group of processors including: Ekone Oyster Co., Goose Point and SeaBear.

Smoked oyster producers report that the majority of their products are sold to traditional grocery stores. Other leading channels include: ecommerce, specialty stores (food stores and seafood retailers) and select restaurants.

Frozen half-shell oysters are a small product category that is primarily utilized for high-volume catered events at hotels, banquet halls, contract management companies, etc. Frozen half-shell oysters are typically the same quality as fresh oysters for half-shell usage, since the shell and meat appearance must be comparable to fresh half-shell. The research indicates that the overall market for frozen half-shell oysters is approximately 1% - 2% of the current fresh market for half-shell oysters. There are few domestic suppliers, including Goose Point (OR). The processor price per oyster for the frozen half-shell format is comparable to fresh oysters for the half-shell market, yet require further processing operations for opening, packaging and freezing the product. The limited market opportunity does not appear to justify the required investment in further processing infrastructure.

Value Chain: Value-added Oysters

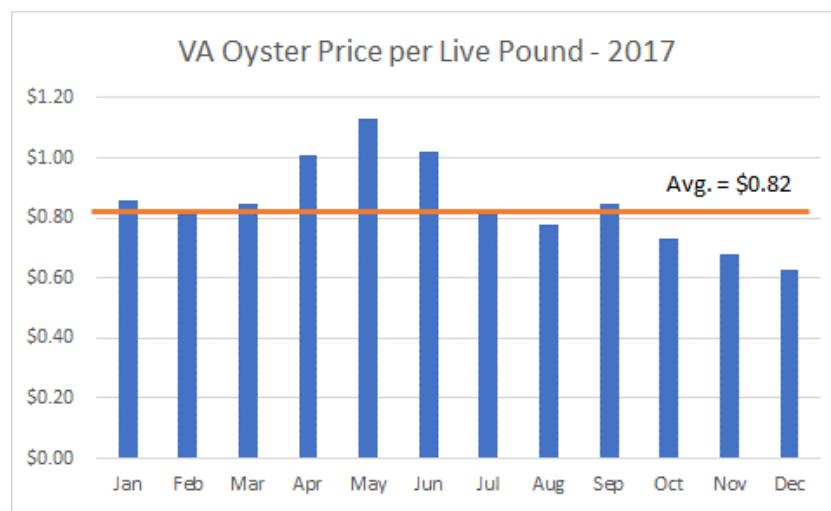
Value-added Oyster value chains vary by product format. In general, MA-based oyster harvesters can expect to receive approximately \$0.20 - \$0.25 per oyster for shucked or smoked operations, should the infrastructure be developed.

Typical Value-add Oyster value chain dynamics are as follows:

	Shucked	Smoked	Frozen Half-Shell
Harvester / Grower	\$0.15 - \$0.25 each; \$60 - \$70/gallon (size dependent)	Domestic: \$0.20 - \$0.50 each International: <\$0.10 (3-4 oysters per can)	\$0.62 - \$0.75 ea. \$90 - \$110 / 144 ct.
Wholesaler / Distributor	\$75 - \$100 / gallon	\$1.55 - \$3.75 can / pouch	\$115 - \$139 / 144 ct.
Retail	N/A	\$1.95 - \$5.85 can / pouch 2.25 – 3 oz.	N/A
Foodservice Operator	\$250 - \$300 equiv. 200- 400 oysters	N/A (minimal)	\$375 - \$450 equiv.
Primary Sources	<ul style="list-style-type: none"> • Virginia / Mid Atlantic • Pacific NW 	<ul style="list-style-type: none"> • S. Korea • Pacific NW (<10%) 	<ul style="list-style-type: none"> • Gulf / Mid Atlantic • Pacific NW
Method	<ul style="list-style-type: none"> • Primarily aquaculture 	<ul style="list-style-type: none"> • Primarily aquaculture 	<ul style="list-style-type: none"> • Primarily aquaculture

Source: Pentallect research

While distributors and wholesalers report minimal seasonality to shucked oyster pricing, there is often a fall price decline associated with the pre-winter harvest. As a potential indicator for MA-sourced shucked oysters, ACCSP 2017 data showed that Virginia oyster pricing declined during the fall's pre-winter harvest period. Virginia is a primary supplier of shucked oysters to the New England market. Based on in-market interviews, the Virginia price decline may also be partially attributable to the end of the Virginia shoreline tourist season after early fall.



Source: ACCSP data

Branding

While consumers and retailers / restaurants consider cold water oysters from New England (MA, ME and RI) to be premium oysters in the half-shell market, there is no indication that they are willing to pay a premium for MA shucked products.

Most shucked oysters are used in prepared foods that somewhat mask the quality of the oyster and lower price alternatives adequately meet current consumer and retailer/restaurant quality expectations. In addition, restaurant menu listings with shucked oysters generally do not identify the source of the products, further limiting the opportunity to realize a MA brand premium.

Purchase Decision Criteria

Outside of the Southeast and Gulf regions, cold water oysters are considered to be the premium half-shell products and a primary purchase decision driver, which is reflective in pricing dynamics.

Region	Value per Piece	State	Value per Piece
Northeast	\$0.59	MA	\$0.57
Mid Atlantic ¹	\$0.37	ME	\$0.58
Southeast	\$0.40	NH	\$0.45
Gulf	\$0.17	RI	\$0.68
Pacific NW	\$0.57	Total Northeast	\$0.59
Total U.S.	\$0.29		

Source: GMRI 2016 Aquaculture Study; ECSGA

¹ Includes CT

Oyster location branding is important, particularly for raw bar applications. The challenge is balancing the need for steady supply, often minimal product differentiation within a local area and limited menu listings with the desire for micro (harvester name) versus local (Wellfleet) branding. The majority of restaurants use local versus micro branding for oysters.

While purchasing decision criteria vary by respondent, the primary criteria include:

Purchase Decision Criteria
1. High quality meat and shell cup formation
2. Shell thickness and cleanliness
3. Meat easily separates from shell
4. Sea-to-delivery timing (3 days max. outside New England)
5. Pricing
6. Branding – interesting or recognized harvester name or region; ability to offer menu variety (sourcing from variety of locations)

MARKETING / INVESTMENT REQUIREMENTS

Pentallect does not recommend investing resources to build demand for Blood Clams beyond the ethnic markets.

Building awareness and creating demand for Butter Clams and MA-sourced Shucked Oysters would require coordinated marketing and business development efforts with distributors to penetrate fine dining and casual restaurants with compatible menus. Pentallect estimates that marketing and business development costs would be approximately \$3,100 - \$4,600 per distributor depending on the species, with the majority of the cost associated with samples.

An overview of estimated marketing requirements per distributor to build demand include:

Butter Clams

Marketing Element	Cost	Assumptions
Samples	\$2,400	100 lbs. per week x 12 weeks per distributor x \$2.00+ / lb. harvester opportunity cost
Marketing Materials	\$500	\$5,000 sell sheets, branding, etc. by 10 target distributors
Menu Development	\$250	\$2,500 total cost divided by 10 target distributors
Total per Distributor	\$3,150	

Bulk Shucked Oysters

Marketing Element	Cost	Assumptions
Samples	\$3,900	5 gallons / week x 12 weeks per distributor x \$65 / gallon harvester opportunity cost
Marketing Materials	\$500	\$5,000 sell sheets, branding, etc. by 10 target distributors
Menu Development	\$250	\$2,500 total cost divided by 10 target distributors
Total per Distributor	\$4,650	

OPPORTUNITY SUMMARY AND STRATEGIC IMPLICATIONS

The Aquaculture Market Assessment identifies that there are varying degrees of market potential for Massachusetts-based growers / harvesters to expand operations to include Blood Clams, Butter Clams and Value-added Oysters (primarily shucked). Based on “best estimate” projections, the total incremental landed gross revenue potential is approximately \$2 - \$4 million.

A summary of key findings and recommended actions to further evaluate and, assuming sufficient interest among MA-based harvesters, ultimately pursue the opportunity include:

Blood Clams

- Total projected MA-sourced market opportunity: \$0.5 - \$1.0 million gross revenue
- Massachusetts is the leader in wild Blood Clam landed volume and can leverage this market position for growth
- The top priority is expanding MA-sourced penetration of ethnic markets
- Fine Dining is not a strategic priority due to the fragmented customer base, relatively low volume and demand creation investment required. There may be an opportunity to leverage supply chain partners (wholesalers / distributors) to opportunistically acquire Fine Dining customers.
- Support wild supply with aquaculture capacity as required to meet 10,000 pounds per week national ethnic market demand
- Apply business development efforts against expansion within leading ethnic distribution hub markets – New York, Los Angeles, Seattle, Chicago, etc.

Butter Clams

- Total projected MA-sourced market opportunity: \$0.6 - \$1.7 million gross revenue
- Butter Clams have versatility and growth potential both as an incremental item and as a replacement for other clam species
- The Butter Clam market must be developed, including infrastructure, awareness and trial
- The recommended approach is to conduct a Boston / New England test market to confirm market opportunity and refine business development efforts
- The infrastructure should be developed in a staged manner - test, confirm/refine and expand
 - Seed development
 - Capacity – either dedicating some existing or sourcing additional growing space
 - Refining aquaculture growing / harvesting techniques

- An investment in demand creation will be required to create demand and operator “pull” through the distribution system
 - Recipe / menu development
 - Market development plans
 - Sampling
 - Distribution / operator plans
- MA growers should leverage MA-based wholesaler / distributor relationships to initially build the supply chain
 - New England test market
 - Ultimately for expansion outside New England – New York, Philadelphia, Chicago, etc.
- Pro Forma Profit & Loss Analysis
 - Understand grower-specific financial impact to make informed decisions regarding the opportunity
 - Revenues, costs, margins, net income, etc.

Value-Added Oysters

- Total projected MA-sourced market opportunity: \$0.6 - \$1.2 million, which represents 25% - 50% of the current shucked volume that is consumed in New England and sourced from other regions of the U.S. This relatively high market share is supported by Massachusetts harvesters’ strong reputation for high quality oysters and well-established distribution systems.
- Prioritize bulk shucked oysters for further evaluation, as other formats do not have sufficient volume potential and / or are being serviced by low cost imported products (smoked, frozen on half shell, etc.)
- Input should be obtained from MA-based oyster harvesters to understand the overall level of interest in developing shucked capabilities with their understanding that the enterprise would require a regular supply of oysters at approximately \$0.20 - \$0.25 each. A shucking operation with irregular supply will face challenges maintaining distribution.
- Explore opportunities to develop MA-based shucking operations, either stand alone or supported by multiple oyster harvesters. A critical element of a shucking operation business plan is identification of a steady, reliable labor force.
- If there is sufficient commitment among oyster harvesters, begin with a focused effort with Boston / New England distributors to build awareness, create demand, confirm the market opportunity and refine the business development efforts.
- Leverage MA-based wholesaler / distributor relationships
 - New England test market
 - Ultimately for expansion outside New England – New York, Philadelphia, Chicago, etc.
- Pro Forma P&L Development

- Understand grower-specific financial impact to make informed decisions regarding the opportunity
 - Revenues, costs, margins, net income, etc.

Appendix

Massachusetts Shellfish Aquaculture Marketing Working Group

The working group provided valuable insights and perspectives to Pentalllect via both group meetings and one-on-one interviews during the market assessment research. The working group's input helped to craft the research and strengthened the findings by asking pertinent questions and providing relevant information and feedback throughout the process.

Representation	Name	Organization	Position
Grant Partner	Josh Reitsma	Woods Hole Sea Grant	Marine Program Specialist
Grant Partner	Abigail Archer	Woods Hole Sea Grant	Marine Resource Specialist
Grant Partner	Diane Murphy	Woods Hole Sea Grant	Fisheries & Aquaculture Specialist
		Cape Cod Cooperative Extension	Same As Above
Grant Partner	Same As Above		
Grant Partner	Michele Insley	Wellfleet SPAT	Executive Director
Grant Partner	Melissa Sanderson	Cape Cod Commercial Fishermen's Alliance	Chief Operating Officer
Grant Partner	Joan Francolini	Cape Cod Commercial Fishermen's Alliance	Marketing
Northeast MA Aquaculture Center	Dr. Joe Buttner	Salem State University	Professor of Biology, Director of NEMAC
Southeastern MA Aquaculture Center	Rick Karney	Martha's Vineyard Shellfish Group	Former Director, retired, emeritus
MA DMF Seafood Marketing Program	Wendy Zisson	Massachusetts Division of Marine Fisheries	Coordinator, Seafood Marketing Program
Mass Aquaculture Association	Dan Martino	MAA, business is Cottage Point Oysters on MV	Owner, Grower
Grower	Mark Begley	Barnstable, Beachpoint Oysters	Owner, Grower
Grower	Jared Hemila	Barnstable, Barnstable Sea Farms	Owner, Grower
Wellfleet Grower	Andrew Cummings	Wash-Ashore Oyster Ranch	Owner/Grower
Wellfleet Grower	Jake Puffer		Owner/Grower
Wellfleet Grower	Alfred Pickard		Owner/Grower
Grower/Dealer/Distributor	Steve Wright	Chatham Shellfish Company	Owner/Grower
Wholesaler/Distributor/Restaurant Owner	Alex Hay	Mac's Seafood	Owner
Distributor	Ben Lloyd	Pangea Shellfish Company	Owner/President
Wholesaler/Distributor	Meggie O'Neil	Island Creek Oysters	
Wholesaler/Distributor	Valerie Rosenberg	Red's Best	Marketing & Retail
East Coast Shellfish Growers Association	Bob Rheault	East Coast Shellfish Growers Association	Executive Director

Interviewed Organizations

Organizations and individuals that provided insights via interviews included:

Growers / Wholesalers / Distributors	Retailers	Foodservice Operators	Other
Ben E. Keith (FS – TX / SW) *	Captain Marden's (MA)	Atlantic Sea Grill (MA)	East Coast Shellfish Growers Association **
Big Rock Oyster (MA) *	Cub Foods (IL)	B&G Oysters (MA)	MA Aquaculture Association **
Bristol Seafood (ME)	Donelan's (MA)	Fog Harbor Fish House (CA)	MA Dept. of Marine Fisheries **
Copps Island (CT)	Hannaford (ME)	GT Fish & Oyster (IL)	VA Marine Resources Commission
Ekone Oyster (WA)	H.E. Butt (TX)	Harraseeket Inn (ME)	Salem State Univ. **
Fortune Fish (IL) *	Quarterdeck Seafoods (MA)	Joe's Seafood (IL)	
Ipswich Shellfish (MA) *	Safeway (CA / West)	Legal Seafoods (N. England)	
Island Creek Oysters **	Stop & Shop (New England)	Pearl Oyster Bar (NY)	
Lobster Place (NY) *	Twin Seafood (MA)	The Hourly Oyster House (MA)	
Jake Puffer **	Whole Foods (New England)		
Mac's Seafood **			
Pangea Shellfish Company **			
Red's Best **			
Seattle Fish Co (CO)			
Sysco (FS - National)			
US Foods (FS – National)			
Wash A-Shore Oyster Ranch **			
Michael Ziembra			

* Expressed potential interest in supporting the relevant products

** Working group member

Research topics that were discussed with the interviewed organizations included:

Blood / Butter Clams

- What are current retail values for blood clams and butter clams locally and nationally?
- In what form are blood clams and butter clams being sold in retail? Raw bar? Fine dining? Fried? Other?
- What is the size or volume of these markets, on Cape Cod, in Massachusetts, in the Northeast, and in other regions nationally? Is there unmet demand; if so, how much?
- If Blood or Butter clams were successful, what related species / products would they most likely cannibalize; what are estimations regarding level of incrementality versus cannibalization

Value-Added Oysters

- What value added products such as smoked or pickled oysters are on the market? From what geographic area is the product sourced and is it wild harvested or aquaculture?
- What value-added oyster products offer the greatest growth potential? Why?
- 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.)?

- How often is the source of oysters by geography, from a particular town (such as Wellfleet, MA) or by brand most important in making a purchasing decision?

Value Chain discussion:

- What are current value chain dynamics for clams, in general? What could harvesters expect for blood clams and butter / juvenile surf clams? What are current wholesale values for blood clams and butter clams locally and nationally?
- For value-added oyster products (smoked, pickled, frozen shucked, breaded / battered, etc.)? Especially for harvesters selling to value-added product producers?
- What are current wholesale and retail prices of these value-added products?

General Questions

- How can existing markets for blood clams, butter clams, and value-added oysters be expanded (if needed), and is there potential to develop new markets? If yes, at what price point and what is the competition?
- Does demand from retailers or value vary seasonally?
- Branding
 - What is the optimal branding for Blood Clams?
 - How can branding differentiate Butter Clams from larger Surf Clams?
 - Explore branding options for MA-sourced versus Cape Cod or specific towns/areas on the Cape
 - Would MA-sourced (or specific MA locations) potentially command a price premium? Why / why not?
- Wholesalers / Dealers – which ones are potentially interested in buying blood clams and butter clams.

GLOSSARY

Incremental	Additional revenue or investment above the current state.
Cannibalization	Taking market share, or volume, from another product. For example, it is anticipated that approximately 35% of Butter Clam volume will cannibalize other clam species' volume.
Gross Market Potential	The total sales potential for a species excluding the impact of cannibalization.

FOODSERVICE CHANNEL DEMAND CREATION REQUIREMENTS

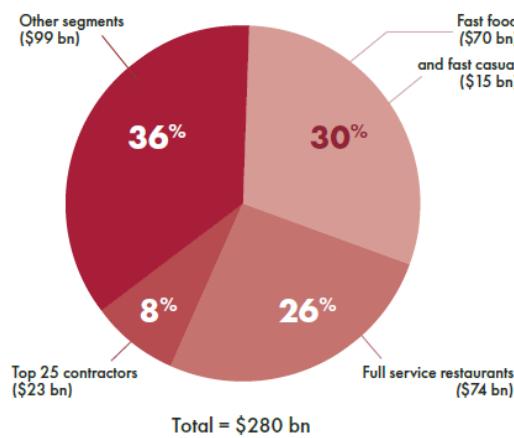
The majority of shellfish consumption occurs within the foodservice channel. Developing a successful foodservice channel business requires both building a distribution network and creating demand among operator customers (restaurants, hotels, contract management companies, etc.).

Key elements of a successful foodservice go-to-market strategy include:

Operator Targeting, Prioritization and Planning

Identifying which customer segments, types (size, chain versus independents, menu dynamics, etc.), and geographies for focused growth. Developing specific customer development plans for key customers.

Foodservice Operator Purchases



Sources: Pentallect, Technomic, Food Management, company reports

Distribution Network Mapping and Strategy Development

Profiling the distribution systems to identify primary distributors that service the targeted operator customers. For shellfish, the majority of the distribution will be via seafood distributors / wholesalers. Some distribution may also go through broadline foodservice distributors (Sysco, US Foods, etc.) depending on operator contracts.

Developing a distribution strategy that engages the targeted distributors and communicates a selling proposition to encourage the distributors to stock and support the products.

Type of distributor	2016	2025	Annual growth
Top 3 broadliners ¹	\$77	\$100	3.0%
Power distributors ²	\$32	\$44	3.5%
Other major broadliners ³	\$5	\$7	3.5%
Custom distributors ⁴	\$47	\$61	3.0%
Club stores/cash-n-carry ⁵	\$24	\$34	4.0%
Specialists/small broadliners	\$81	\$105	3.0%
Manufacturer direct delivery	\$10	\$18	6.5%
Third party online	\$4	\$14	15.0%
Total	\$280	\$383	3.5%

1. Includes broadline and specialty division sales, excludes PFG's Vistar
2. A power distributor is a broadliner with annual sales, greater than \$250 mm; excludes Gordon's store volume
3. Is a broadliner with annual sales of \$100-250 million
4. include sales of Sysco's Sigma, PFG's Customized Division and FSA's SSA
5. Includes supermarket sales to foodservice accounts

Source: Pentallect

Go-to-Market Organization Development

Developing a direct or brokered sales team aligned against distributor and operator customers. Brokers typically requires 2% - 3% ongoing commission and an initial monthly retainer. The Sales organization will need to be managed by a dedicated manager(s).

Marketing / Trade Investment

Foodservice industry average is 18% of sales to support brand building initiatives (promotions, sampling, point-of-sale materials, trade advertising, etc.), distributor incentive programs, deviated operator contract pricing, etc.

Appendix 10: Zapalac Advisors: New England Butter Clam Marketing and Promotion Plan

This report was funded through a complimentary NOAA Sea Grant project (award number NA17OAR4170240), which leveraged the results of the NOAA-funded SK surf clam project. The Saltonstall Kennedy Surf Clam project partners CCCE/WHSG and CCCFA helped to develop and secure funds for the complimentary project in order to use SK project findings to develop a marketing plan and materials to promote surf clams (aka, the New England Butter Clam).

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NEW ENGLAND BUTTER CLAMS

GREAT FOR YOUR TABLE. GREAT FOR OUR TOWNS.

MARKETING & PROMOTION PLAN



ZAPALAC ADVISORS

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Report Date: July 10, 2019

Product Introduction: New England Butter Clams

New England Butter Clam (*Spidula Solidissima*, or Surf Clam): A delicious, healthy, versatile, affordable, farmed New England shellfish product (sized at 1.5 to 2") that provides benefits to bays and estuaries while allowing the communities who grow them to take one step forward in economic diversification.

Why grow and create a market for New England Butter Clams?

While there is a long history of harvesting mature surf clams in wild fisheries, New England Butter Clams are a relatively new product on the market. Farming them means they can be harvested at a size in which they are tender, buttery and sweet - as well as easy and versatile to prepare. This results in an entirely different product than mature surf clams harvested from wild fisheries. Creating a new farmed shellfish product is important for a number of reasons. Over the last few decades, oyster farming has grown substantially in New England. While shellfish farming has many benefits, there is pressing need for species diversification so that shellfish farmers can become more resilient in their practices, as overdependence upon any one species can result in both environmental and economic risks for shellfish communities. For the last three years, research led by the Cape Cod Cooperative Extension/Woods Hole Sea Grant, in conjunction with the Cape Cod Commercial Fishermen's Alliance and Wellfleet Shellfish Promotion and Tasting (SPAT), A.R.C. Hatchery, Roger Williams University, and the MA Shellfish Aquaculture Marketing Working Group have focused on enhancing seed supply, testing grow out practices, market research, and collaboration with chefs and consumers to obtain product feedback. Building on that foundation, this document is a roadmap for supporting early stage market development, gaining ongoing market feedback, and anticipating next steps once product supply reaches benchmarks.

Who's doing the marketing?

This document aims to provide direction to the marketing efforts of individual shellfish farmers who are growing and selling New England Butter Clams, as well as collaborative marketing efforts. Following this introduction is a value proposition statement, description of key end consumers, and synthesis of findings from interviews with supply chain actors. These set the stage for a roadmap/timeline for action with detailed recommendations, realizing that lead actors and/or funding will need to be identified in order for some ideas to be implemented. Following the roadmap is a recommended storyline approach and suggested content for product print materials (for which funding has already been identified) to equip wholesalers to sell the product, as well as to educate chefs and restaurant staff on the product story, product handling, and recipe suggestions.

How is the market starting?

Given the relatively limited supply of New England Butter Clams that will be available in the near future, this plan works under the assumption that the first goal is to *develop the restaurant demand for the product*. Restaurant chefs who are influential among probable "early adopter" consumers will continue to play a central role in the product launch - some as champions of the product who play an active role in the product storytelling. Developing this market segment first - creating conditions in which chefs are asking distributors for New England Butter Clams - will help establish a favorable wholesale price per unit, hopefully encouraging further expansion of supply. Time and again, chefs have communicated that they need a predictably available high quality supply.

As supply grows, further attention should be paid to broader market opportunities, including a larger swath of restaurants as well as specialty seafood markets and e-commerce opportunities that enable home consumption of New England Butter Clams. Higher volume opportunities, including supermarket sales and value-added product development opportunities are viewed as later stage goals to be developed only after a predictably available high quality supply is established.

Product Introduction, continued

A key part of marketing is relationship-building, especially for a new product launch. This includes relationships among supply chain actors as well as relationships between supply chain actors and end consumers. Relationships are a central part of your story: the “invention” and promulgation of the New England Butter Clam is a story of collaboration among various supply chain actors and industry organizations who realize the need for product diversification and the opportunity to grow and serve a delicious product.

Product name: New England Butter Clams

New England: Ties the name to the product provenance. Generally speaking, “New England” has a positive connotation for seafood -- in particular, groundfish and lobster. Over the last few decades, the resurgence of high quality oyster production has benefited from and reinforced the New England brand. It is acknowledged that restaurants may shorten the product name to “butter clams,” and that is okay. The inclusion of the words “New England” will be more important to restaurants that emphasize product locality. Celebrating *where these clams come from* -- including the New England towns, growers and waters -- is important to establish appreciation for context and sourcing.

Butter Clams: Speaks to the natural flavor of the clam, implying a full-bodied and sweet richness, slightly salty without being overly heady or fishy.

Price, Preparation and Menu Placement

There is enthusiasm for a new clam product from growers, chefs, consumers and distributors--regardless of prior exposure to the product--as well as curiosity about taking advantage of programs to assist with farming and marketing. With oysters having reached a pricepoint of \$3-\$4 typically in restaurants, a consistently high quality new clam adds variety and interest at a more approachable price. Marketing should follow the pattern of oysters, with clam type/farm/grower identified to maximize the boutique and place-based nature of the product as well as to encourage differentiation/competition among growers.

Grower: \$.28-\$.34/piece

Wholesaler: \$.50

Retail: \$.75

Restaurant: \$1-2.00 raw bar, menu items:
variable

At the onset, the strongest positioning for New England Butter Clams includes a) as a raw bar item, especially contrasted with other types of clams b) in ceviche, steamed and other appetizer modes c) in recipes such as paellas, bouillabaisse, and risotto with other premium New England shellfish and d) as a specialty pasta clam.

Particularly while supply is growing, there is an opportunity to take advantage of existing relationships and reach of actors in the supply chain, engaging them in the New England Butter Clam’s novel and innovative blue economy story. We suggest to showcase initially the clams as an *amuse bouche* or appetizer of limited portion as a way to grow rapidly the number of consumers who have tried the product.



New England Butter Clams. Photo by Matt Weeks.

Value Proposition



New England Butter Clams - Universal Value Proposition:

- 1. TASTE & VERSATILITY:** Attractive buttery taste with ample salinity in an easy to handle size of clam. Versatile for preparation: tastes great raw and works well steamed or sautéed. Durable for transport, easy to shuck, with an 7-10 day shelf life under proper conditions.
- 2. SUSTAINABILITY:** A new production method that provides polyculture benefits to bays and estuaries while allowing the communities who grow them to take one step forward in economic diversification. Opportunity for buyers to satisfy Corporate Social Responsibility (CSR) goals.
- 3. SOURCING & TRACEABILITY:** New England branded product, where healthy waters produce a healthy product. Grown by New England farmers. Clear chain of custody.
- 4. FAVORABLE PRICE POINT:** Attractive price point from grower (\$.28-.34/piece), restaurant, and consumer (\$1-2/piece in raw bar) standpoints. Pricing runs roughly half of boutique oysters throughout the supply chain.
- 5. A STORY OF SHELLFISH AQUACULTURE INNOVATION:** A variety of actors are working in innovative ways to build a new supply. There are many opportunities for positive storytelling—about product, place and people—and ways to highlight shellfish aquaculture innovation.
- 6. MARKET ENTRY STRATEGY:** Opportunity to build upon strong marketing and supply chain relationships established for oysters.

continued

Value Proposition

New England Butter Clams - Audience Specific Value Propositions:

Shellfish Industry/ Regional Economy	Farmer (Grower)	Wholesaler/ Dealer	Restaurant/Bar / Retail	End Consumer
Promotes polyculture and reduces economic dependence on oysters and quahogs	Opportunity to diversify livelihood while still making a living from the water -- and be an innovator	Adds variety to offerings and responds to current high demand for clams by consumers	Boutique offering with a positive story, connected to beautiful places and compelling people	Attractive buttery taste with ample salinity. As one chef described: "Sweet, mild mineral, brine, buttery!"
Other Massachusetts products benefit from augmented clam industry—both from ecological and branding standpoint.	Short time to maturity (1 year) Lower touch than oyster farming (no need for tumbling)	Once established, supply is expected to be consistent, though it may be seasonal at outset	Highly versatile. Can be incorporated into raw bar programs and featured dishes.	"Just right" size and cost
Part of the Blue Economy story, driving travel and tourism	Industry support (for seed, growing, branding and marketing) is already in motion	Initial grower community is expected to overlap with current shellfish purveyors, taking advantage of existing channels	New England Butter Clams are a complement to beer, wine or spirits; opportunities to partner with local and national beverage brands.	Easy to prepare and flexible. Can be utilized in a variety of applications (raw, ceviche, steamed, sautéed, etc.) and paired with beverages

Potential barriers to overcome / address in marketing:	Responses
Competition with littlenecks	There is room for more than one type of clam on raw bars. Expanded choices may augment interest in all clam types.
Initial limited supply / scarcity	Communicate regularly to chefs on supply so that they can anticipate and incorporate product into their plans. Establish New England Butter Clams as having predictable availability, even if seasonal in nature.
Limited knowledge of handling methods related to project fragility and shucking methods / shelf life	Address handling practices in product information materials. Continue research to clarify understanding of best practices for transport and product shelf life.

Understanding End Consumers

From an end consumer standpoint, who are the probable early adopters of New Butter Clams? Who should you be trying to communicate to -- and reflect in your messaging? Findings from interviews and research on seafood consumption suggest four early adopters types to consider as you develop your marketing messages, as well as a fifth broader market category to keep in mind as supply grows. The groups described are not mutually exclusive. Continuing to refine understanding of end consumers is critical. Use surveys and interviews to continue engaging consumers who have tried New England Butter Clams. Also engage consumers via various social media channels.

Consumer groups

1) Lifestyle / experience consumers

- Love the place associations of seafood, including dining at farms & raw bars, clams shacks and lobster shacks. Familiar with traditional ways of serving shellfish in New England.
- High volume eaters (young, male - though not exclusively).
- Beverage pairings interest: shellfish & beer--and also wine and spirits
- Loyal to/champions for brands they want to be like; purchasers of swag/gear
- Prepare seafood at home, including product sourced through e-commerce or direct retail

2) Luxury product / cuisine as art consumers

- Support higher end restaurants / fine dining experience
- Willing to pay for freshness, exclusivity and presentation. May consume few pieces, but at a higher price point
- Interested in *terroir* and *merroir* concepts
- Beverage pairings: shellfish and wine--and also beer and spirits
- Revere and follow chefs
- Prepare seafood at home; use e-commerce to source specialty or hard to source items

3) Sustainability focused / food system tech & innovation consumers

- Willing to pay for products that articulate values around health and sustainability
- Interested in sourcing information on menus and restaurant websites
- Loyal to restaurants, brands and food purveyors they trust to deliver fresh, traceable products
- Buys product via community supported agriculture (CSA) and/or community supported fisheries (CSF)
- Generally savvy about e-commerce technology and social media; share information willingly

4) Aficionados of ethnic cuisine (in the United States)

- Interested in culinary traditions from places with access to shellfish. May be part of their own heritage or “exotic” cuisine they’ve found they enjoy through restaurant experiences and travel. A non-exhaustive list of cuisine includes: Mediterranean, Southeast Asian, Coastal Latin American, European Atlantic
- May be open to consuming fresh New England Butter Clams in place of foreign seafood products

As supply grows:

5) General (New England) seafood consumers

- Encompasses the demand for New England seafood outside of New England, as well as demand for New England seafood among visitors to New England
- General trust in the New England brand, though operating with limited product / geographic knowledge
- Less sensitive to sourcing concerns
- Often more price conscious

Key Actors in the Seafood Supply Chain

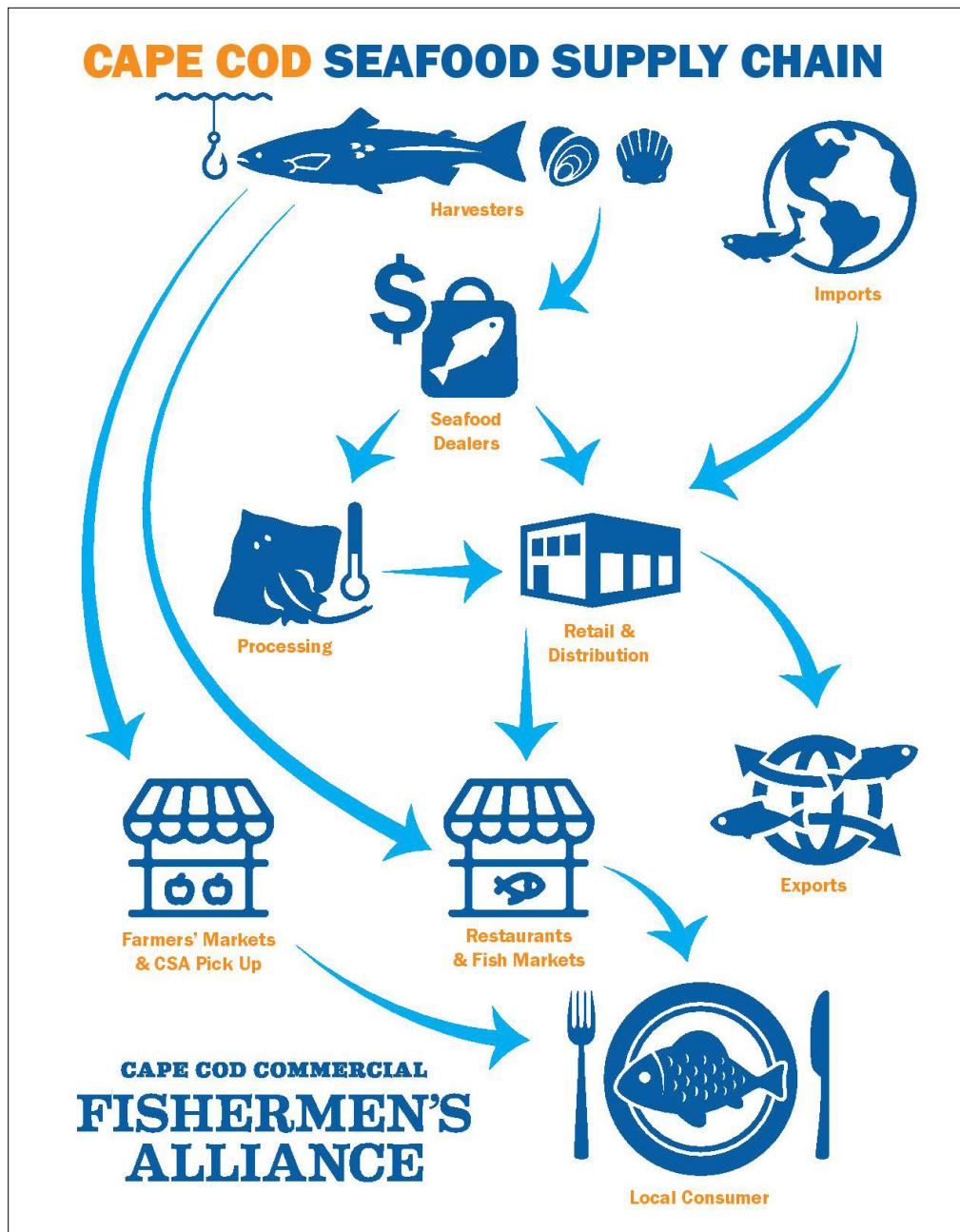


Image courtesy of the Cape Cod Commercial Fishermen's Alliance

This stylized view of the Cape Cod Seafood Supply Chain, encompassing both shellfish and finfish, is included to emphasize:

1. The supply chain for farmed shellfish may be more streamlined compared to finfish, but to continue to develop the market, it will be necessary to share feedback obtained at all points along the supply chain with all critical actors (see examples, next page). This is important for keeping dealers, distributors and chefs apprised of supply conditions, and for keeping hatcheries and growers informed about growth or change in demand.
2. The chefs engaged to date are knowledgeable about and keenly interested in growing practices. Keeping them informed about production status equips them to be champions of the product.
3. Continuing to cultivate chef-grower relationships will shorten feedback loops and set the stage for interesting storytelling.

Key Actors: What They're Saying about New England Butter Clams:



HATCHERIES

"Three million seed spawned in spring 2019. We'll plant what we don't sell."

"If the demand is there, we'll produce more seed."



SHELLFISH GROWERS

"We're glad to be able to grow two products and we'd like to be able to grow more."

"The seed is available? Great, we'll call for some."

"I for one am excited to give this new species a try on our site and applaud everyone's effort to get ahead of production by increasing the visibility of the product among chef and consumer."

"Currently we sell wild harvest clams to customers, but hope to supplement these with our farmed product once they come to size. We would be very open to being a vendor for butter clams."



SEAFOOD DEALERS

"Chefs tell us they want new product. These clams will sell."

"Give us a couple of bags and we'll work with them. But be sure the product quality is there."

"Cultivating demand for a limited supply is okay and scarcity can drive up value - so long as you don't over promise and can deliver quality."



CHEFS

"Sweet, mild mineral, brine, buttery!"

"We always promote local, sustainable foods that show up on our menu through server education. I am always looking for a good story behind a product we bring on. We make sure it is relayed to our guests when they dine. Your story would qualify!"

"I think the size of the clam gives it new opportunity ... Maybe pickled, or ceviche style..."

"Focus on growing a spectacular product, consistently. If you do that, it (demand) will grow organically."



END CONSUMERS

"SOOOO good!"

"Wonderful - clams had a great flavor!"

"A taste of the sea. Clean, delicious."

"I tried it raw and enjoyed the slightly buttery and sweet taste - and super tender texture."

Roadmap for Action

Start Date: July 15, 2019 for target period: July 15 - Dec 31, 2019		
Supply Milestone:	50,000 pieces (Fall 2019)	
Category / Element	Description / Notes	Potential Lead or Vendor
1) Branding		
Confirm product name, value proposition and tagline.	As written in this plan	Core team + working group
Gather and commission images for collective use.		Core team + photographer
Discuss individual SWAG opportunities with growers (branding will be left to individual growers).	A product logo is not currently envisioned.	Core team + growers
2) Communications		
Develop product information sheets & FAQs. Make distribution plan.	Based on Zapalac Advisors' recommendations as outlined in this plan	Core team with graphic designer
Establish strategy for social media presence, as well as website content and process for sharing feedback/analytics. Social media engagement by growers can start as soon as they are ready.	See pages 20-31. Discuss how individual actors can roll out + reinforce each others' messaging.	All. Website/social media, if consolidated, will need a manager.
All parties participating share their communication approach and desired outcomes including a) planned messaging and cadence and b) digital and non digital approaches and c) transparency parameters for product supply and demand information.	Continue regular communication among working group and supply chain actors. Issue periodic reporting / press releases.	All, with core team facilitating.
3) Distribute product samples & surveys / share feedback		
Distribute samples and surveys to select group of chefs and supply chain actors.	Crosscheck distribution list with list in report appendix.	A.R.C.
Report survey findings to working group.	Further equip growers with information about demand.	A.R.C.
4) Confirm champions and related stories for media coordination		
Identify emerging champions among chefs, growers, dealers, consumers. Determine who to feature in photography for production information sheets, who to be on call for media contacts.	See Potential Actors, pages 12-18	Core team + working group
5) Media		
Secure coverage in one national magazine: focus on imperatives + growing innovation.		Core team or Zapalac Advisors
Set up podcast feature: Aaron Niederhelman, Sourcing Matters.	Connect with product champions.	Core team or Zapalac Advisors
Create a short film (3-5 minute+clips) incorporating each key actor group.		Film Producer with core team or Zapalac Advisors
6) Determine event participation		
Create a master events calendar.		Core team + working group
Hooker's Ball 2019 (August) - Chatham	If product is available	Core team + growers
Wellfleet OysterFest 2019 (October) - Wellfleet	Assuming product is available	Core team + growers
Work with key chefs to plan restaurant events in which growers engage customers and talk about the product.	See Potential Actors, pages 12-14 and Appendix B.	Core team + growers

Roadmap for Action, continued

Start Date: January 1, 2020 for target period: January 1 - December 31, 2020		
Supply Milestone:	500,000 pieces (Summer 2020)	
Category / Element	Description / Notes	Potential Lead or Vendor
2) Communications		
Refine product information sheets for expanded distribution among wholesalers and restaurants.		Core team with graphic designer
Discuss efficacy of messaging, including social media use. Refine as necessary.		Core team + working group
3) Distribute product samples & surveys / share feedback		
Determine strategy for distributing samples to next target groups.		Working group
Report survey findings to working group.		Working group
4) Confirm champions and related stories for media coordination		
Identify other product champions.		Core team + working group
5) Media		
Secure coverage in 2-3 regional/national media.		Core team or Zapalac Advisors
Set up podcast features 2 and 3.		Core team of Zapalac Advisors
Create a short film sequel including each key actor group.		Film Producer with Core Team or Zapalac Advisors
6) Determine event participation		
Confirm master events calendar.		Core team + working group
Seafood Expo		TBD
NACE Conference Presentation		TBD
Chatham Bars inn Summer Guest Chef Series 2020 (June-August) - Chatham		Core team
ICO Raw Bar dinner series (Summer 2020)		Core team
Organize more restaurant events in which growers engage customers.	Expand to chefs in NYC, DC, etc.	Core team + growers
Develop tour programs / shellfish aquaculture itineraries.	Coordinate with Expedition: Blue!	Growers with core team + Zapalac Advisors

Universal note to growers on roadmap items:

- Storytelling via social media and website content development by growers can start as soon as a grower is ready to share aspects of the experience of growing New England Butter Clams. There is no starting threshold.
- Growers may also continue outreach to dealers and chefs as they feel ready to do so, but keep in mind the recommendations of chefs: ***provide a high quality product and be clear about product availability. Do not overpromise.*** To this end, regular communication about supply among growers and the marketing group will help all parties. It will help legitimize New England Butter Clams and their presence in the market, even while supply is limited.

Roadmap for Action, continued

Start Date: January 1, 2021 for target period: January 1 - December 31, 2021		
Supply Milestone:	3 million pieces (Summer 2021)	
Category / Element	Description / Notes	Potential Lead or Vendor
2) Communications		
Refine product information sheets for expanded distribution (wholesalers, restaurants, retail and e-commerce).		Core team with graphic designer
Discuss efficacy of messaging, including social media use. Refine as necessary.		Core team + working group
3) Distribute product samples & surveys / share feedback		
Determine strategy for distributing samples and surveys to national retailers, restaurant chains and e-commerce companies.		Working group
Report survey findings to working group.		Working group
4) Confirm champions and related stories for media coordination		
Identify other product champions + new stories.		Core team + working group
5) Media		
Secure coverage in regional/national media.		Core team or Zapalac Advisors
Set up podcast features 4 and 5.		Core team or Zapalac Advisors
Expand film series.		Film producer with core team or Zapalac Advisors
Coordinate New England Butter Clam feature on the Food Network / Chopped etc.		Core team + Jen Bender
6) Determine event participation		
Confirm master events calendar.		Core team + working group

Roadmap Details

1) Branding

- Confirm consensus on New England Butter Clams as the product name.
- Refine Value Proposition as new information becomes available.
- Confirm primary tagline as product information sheets are developed: *Good for your table. Good for our towns.* See product information sheet mock up for examples of application.
- Logo: developing a logo is not recommended since product branding will be left to individual producers.
- Determine photo needs for product information sheet and social media execution; assemble and/or commission photography. (This will be an ongoing process.) Work with a photographer who is based on Cape Cod (ideally), such John Deignan.
- Discuss individual SWAG opportunities (hats, t-shirts, stickers) with growers. Identify ways to work New England Butter Clams into existing SWAG repertoires.

Roadmap Details, continued

2) Communications

Develop product information sheets & FAQs. Determine distribution plan. Graphic designer recommendations include:

1. Claudio del Castillo. Cape Cod based and formerly of Reebok, with restaurant/consumer product clients.
2. Oat. Somerville-based. Extensive work for restaurants and retail.
3. Medium Studio. New Bedford based, familiar with Cape Cod culture and the commercial seafood industry.

Discuss social media and website content recommendations for individual parties (growers, industry organizations, etc.) Discuss how individual actors can reinforce each others' messaging. For **scalable talking points/messaging content examples**, see page 21 and for **social media recommendations**, see page 30.

All parties participating should share their communication approach and desired outcomes, including a) planned messaging and cadence and b) digital and non digital approaches and c) transparency parameters for product supply and demand information. Continue regular communication among working group and supply chain actors. Issue periodic reporting / press releases. Build off media contact lists assembled by working group members for other relevant projects.

Collect and share social media and website analytics to inform marketing. This can be done on an individual basis, coordinated by a working group member or outsourced.

Plan updates on projections of available seed (including any discount programs to encourage growers), technical assistance available, harvest reports and harvest projections.

3) Distribute samples & surveys / share feedback

Refine end consumer understanding and share knowledge with working group members. Extend outreach and provide samples based upon milestones. See **Appendix B: Recommended Contact List: Dealers and Chefs/Restaurants** for lists corresponding to the following milestones:

Milestone 1:

- Select group of restaurants with chefs who are passionate about New England shellfish
- Select specialty seafood dealers based in Boston

Milestone 2:

- Expanded group of restaurants in New England and the Mid-Atlantic. (Many of the specialty dealers identified for Milestone 1 already service these restaurants.)
- Select specialty seafood dealers based in New York

Milestone 3:

- Expanded group of restaurants, including select chains with national reach
- E-commerce (Island Creek Oysters + others vendors)
- Note: Identify supermarkets, value added product companies and other restaurants once Milestone 2 is reached.

Note: In addition to sharing product information and samples with chefs and shellfish dealers, invite them to come to farm locations; they are often interested and receptive.

Roadmap Details, continued

4) Confirm champions and related stories for media coordination

Introducing your audience to people who are part of the New England Butter Clam supply chain will humanize your story. Emphasizing relationships promotes a collaborative marketing approach in which many different actors will be sharing content.

Specific chefs and other supply chain actors are poised to play a special role as product supporters and champions. Continue cultivating these relationships! Consumers romanticize shellfish farming, admiring those who are involved. Your audience will be pleased to hear more from each of you (growers, dealers, chefs, industry organization representatives) and curious about how you interface with each other to bring New England Butter Clams to market. Include end consumers in your storytelling, too, so that they see themselves in the New England Butter Clam story.

Potential Actors

The following are intended as examples of storylines that might be developed by individual growers or through a collaborative effort, including chefs and shellfish dealers. These chefs are not yet confirmed as product champions but have been helpful in the process so far. Importantly, the tone and degree of detail should reflect the messaging context and format, and the voice should reflect whoever is doing the actual messaging.

Chefs

Chef Mark Orfaly
Executive Chef, Reelhouse
Boston and Quincy

Background / story points: Chef Orfaly is the chef with the most experience cooking with and developing recipes for New England Butter Clams, offering consumers his take on butter clam linguine during Wellfleet OysterFest 2018. When asked “would you eat these clams again?” 18/18 Wellfleet OysterFest attendees surveyed would make at home, and 14/18 would order at a restaurant. In December 2018, Mark featured crispy butter clams with black truffle in his dinner at the James Beard House, along with other Cape Cod products.



Quote / quote prompt: Tell us about your experience at the James Beard House - how were New England Butter Clams received? What is your connection to Cape Cod and what do you find special about it?

Anthony Cole
Executive Chef, Chatham Bars Inn
Chatham

Background / story points:
Chef Cole oversees all culinary programming at Chatham Bars Inn, which has four restaurants and a large farm with farmstand. He thinks New England Butter Clams are a great product and enjoyed them raw



Roadmap Details, continued

and steamed with wine and shallots. An avid fisherman with a deep knowledge of local products, he is interested in alternative species such as green crabs and kelp--and in the "how" of getting things done. He is open to incorporating New England Butter Clams into CBI's Summer Chef Series (target 2020), which brings exceptional chefs to Chatham each year.

Quote / quote prompt:

Chef Cole recommends, once supply is established, that chefs be offered opportunity to visit growers, see grants, and understand ecosystems--because this "translates to more passion."

Jeremy Sewall

**Executive Chef, Island Creek Oyster Bar and Row 34
Boston, Burlington and Portsmouth, NH**

Background / story points:

As a deeply knowledgeable chef and author of two books on New England seafood, Chef Sewall's advice is to focus on growing a spectacular product, consistently. He suggests that if you do that, demand will grow organically. He suggests to highlight local seafood, responsible aquaculture, and opportunity for farmers/fishermen to diversify. He also advises to "do what you can to get it on menus." Chef Sewall also referenced the collaborations Row 34 does with producers and beverage companies. He is open to discussing having a grower visit his restaurants to highlight the product story to staff and customers.

Quote / quote prompt:

Chef Sewall offered the idea of doing a five clam tasting --suggesting butter clams, littlenecks, razor clams, blood arks and mahogany clams from Maine -- as a way to celebrate the bounty of New England and peak consumer interest in clams.



Grower Skip Bennett and Chef Jeremy Sewall enjoy shellfish and time together at Island Creek Oysters.

Matt Garland

**Culinary Project Manager, Eastern Standard, Branchline, The Hawthorne, and Shybird
Boston and Cambridge**

Background / story points:

Chef Garland's enthusiasm for locally sourced seafood and respect for those innovating in the commercial seafood industry comes across clearly. A southerner by birth, Chef Garland now resides in New Bedford.

Before arriving at Eastern Standard, he worked at B&G Oyster Bar. In server training, Eastern Standard emphasizes provenance of shellfish. Chef Garland points out that Eastern Standard aims to "meet the customer where they are" while also introducing them to new products they may not have experienced. Chef Garland observes that their menu doesn't identify the source of clams -- yet. He thinks people will be able to taste the difference in clams based on location and would be intrigued to assemble an offering of clams from Cape Cod, Rhode Island and Virginia to test this out.



Roadmap Details, continued

Quote / quote prompt:

What aspects of seafood provenance are most important to share and why? What opportunities for pairing New England Butter Clams with beverages do you and the Beverage Team see?

Jenn Mentzer
Mac's Parties & Provisions
Wellfleet

Background / story points:

Jenn offered great ideas from a catering perspective and is a rich trove of information about the history and growth of Mac's Seafood. Given the multiple customer-facing channels and operations throughout Cape Cod, Alex and Mac Hay/Mac's Seafood has the potential to play a central role in rollout once supply is well established. Mac's Shack is a logical starting point, and then later expanding to more casual restaurants, catering operations and markets. Jenn's connection to and participation in local events and programs, such as the Women's Chef Series and Eating with the Ecosystem, as well as deep industry knowledge, situate her as a strong strategic partner and important "culinary steward" on Cape Cod.



Quote / quote prompt:

You've interfaced with a wide variety of customers through catering. Are customers today more discerning about product sourcing, particularly related to shellfish? If so, what do you think is driving them?

Growers

Steve Wright
Chatham Shellfish
Chatham

Background / story points:

Chatham Shellfish has a variety of customer facing operations (tours, raw bar, direct to consumer) and has a strong social media presence, including conversations with chefs, other growers and customers. These represent a prime opportunity to engage audiences already interested in shellfish. The short film, an *Oyster in Winter* describes Steve's views on the ingenuity and innovations of oyster farming; a sequel on New England Butter Clams would make an interesting follow up. Several chefs encouraged us to connect further with Steve, praising his problem-solving abilities as a grower. Steve can play an important role in growing and the dissemination of the New England Butter Clam story.



Quote / quote prompt:

"I for one am excited to give this new species a try on our site and applaud everyone's efforts to get ahead of production by increasing the visibility of the product among chefs and consumers. Lets hope we can create a network of growers willing and able to consistently grow this product for market. I would welcome the possibility of receiving subsidized surf clam seed with technical support from the county extension to begin the inevitable trial and error of growing these animals."

Roadmap Details, continued

Dan Martino
Cottage City Oysters
Oak Bluffs, Martha's Vineyard

Background / story points:

Based on Martha's Vineyard and launched in 2014, Cottage City is mission-driven and incorporates a variety of customer facing aspects (Farm Tours, Educational Speaker Sessions, Catering Raw Bar, Oyster Tastings and all things Aquaculture). The Martins represent a "new" type of shellfishermen: originally hailing from Texas, they are both geographic and industry transplants. Prior to becoming shellfishermen, Dan has expertise in video production and Greg in finance; they have learned to be shellfishermen through their experience on Martha's Vineyard. Cottage City focuses on sustainability education/next generation and partner with Farm.Field.Sea on tours. Dan and Greg are driven in part by the quest to provide a more sustainably produced source of protein than land-based farming. They have incorporated a number of sustainable strategies, such as solar power, into their farm and find that many visitors, especially younger generations, are hyper interested in these topics.



The Martins also grow/sell sugar kelp and are farming littlenecks this year, using a technique from a Maine farmer, and they feel confident they'll have success. They haven't yet tried Butter Clams. They are excited to do so.

Quote / quote prompt:

Cottage City seems very open to experimentation. How can this same spirit be parlayed to chefs and consumers?

Les, Aaron and Jared Hemmila
Barnstable Seafarms
Barnstable

Background / story points:

Les Hemmila started Barnstable Seafarms in 1991 and it has since grown to 7 acres on two sites. The Hemmilas produce two branded oysters: Sandy Neck and Garrison Point. Importantly, Les first grew surf clams in the late 1990s to sell to a caviar importer. They are expecting to harvest 50,000 butter clams from their trial planting in 2019-2020.



Visiting the surf clam grow out site and Les' oyster operations, he mentioned partnering and co-leading tours with the Mass Audubon's Long Pasture Wildlife Sanctuary adjacent to the lease. Online, their storytelling voice is playful and personal (featuring family) and emphasizes beauty of place and product, along with the challenges of farming. Sons Jared and Aaron are in the process of taking over the business. Les mentioned that Aaron really enjoys the storytelling aspects of running a shellfish farm.

Quote / quote prompt:

As a longtime successful producer of oyster, why also grow New England Butter Clams? What have you applied from your past growing experience in the 1990s to your current strategy?

Roadmap Details, continued

Mark Begley
Beach Point Oysters
Barnstable

Longtime oyster farmer Mark Begley is a natural teacher. A former engineer who transitioned into oyster farming full time, he understands the need for risk mitigation that comes along with shellfish farming. For example, he buys seed from four different hatcheries. He admits he's "not really a clam person"- though his brother and growing partner likes the idea of growing a lot of different types of shellfish. To him, a one season harvest is appealing; both because of less time cost and less exposure risk. He sees other benefits, such as not having to worry about JOD (Juvenile Disease of Eastern Oysters), too, while acknowledging the need to resolve other unknowns about equipment, labor and predation, such as clam worms and moonsnails. Beach Point sells directly to restaurants and via Island Creek Oysters.



Quote / quote prompt:

Mark would be willing to do a table walk at restaurants and/or bring chefs to his lease. He has done staff teaching at B&G Oysters in Boston. What has he learned from this type of engagement?

Jim O'Connell
Wellfleet Shellfisherman
Wellfleet

Jim O'Connell has a reputation for his meticulous growing techniques; presently he's growing oysters and quahogs. In the 2017-2018 trial growing period, Jim got surf clam seed from the A.R.C. Hatchery and learned a lot. "If you don't net them, they're gone. Plant as deep as you can as they don't like the heat or to be dry, but be able to check on them." Location is another thing Jim is a realist about. The harbor is a multiple use harbor, or as he puts it, "a whole mess of stuff." Gear and product can easily get knicked up. While Jim may be weary of the challenges, he's also thinking about the future, bringing other family members into the business. Jim's nephew, Jimmy, who studied resource management and aquaculture at the University of Rhode Island now works full time on the grant. The two Jims and their experiences are complementary, which could be advantageous for making another pass at growing New England Butter Clams.



Quote / quote prompt:

"I feel very fortunate that I have the opportunity to grow two things--or more."

Alfred Pickard
Wellfleet Shellfisherman
Wellfleet

"Wellfleet has been great to my family," says Alfred Pickard, a 5th generation Wellfleet resident and 4th generation shellfisherman.



Roadmap Details, continued

The Pickards have a diversified family business encompassing shellfish (oysters, clams and lobster), as well as a boat yard and a gift store/shellfish market in Wellfleet. "Shellfish is one of the things I still enjoy on the waterfront," he says.

Alfred hasn't grown New England Butter Clams, but they were grown on the grant next to his and he has been observing progress and challenges via interactions with the Massachusetts Shellfish Aquaculture Marketing Working Group. He is keenly aware of what successful butter clam farming can mean for Wellfleet growers. As a member of the Wellfleet Planning Board for 17 years and part of Wellfleet SPAT, Pickard knows that shellfish is part of the town's heritage and vital for its future. At last year's Wellfleet OysterFest, he worked along side Chef Marc Orfaly in the "Clam Slam" featuring butter clams and others.

Quote / quote prompt:

"I would love to grow butter clams. I would love to grow anything other than what's normal." He is keen to protect the reputation of Wellfleet shellfish, for instance, advocating for a grading system for oysters. "In all species, incentivize [particular behavior]. No grower can go it alone. We need other growers."

Matt Weeks
Falmouth Grower
Falmouth

Last year Falmouth shellfish grower Matt Weeks bought 20,000 seed from A.R.C. Hatchery to see how it could do, and it did pretty well relative to oysters. This year, he ordered 50,000 more for his grant in Nantucket Sound. He's also actively permitting to expand his grant acreage. He observes, "I have a whole different situation here than growers in the bay. Locally, surf clams thrive in sub-tidal exposed areas with dynamic sand, full salinity, and strong tides. They seem to prefer areas with some slope such as shoals and berms. This could be much of the shore line of the south side of the Cape."



He sees helpful innovation coming from industry, too, mentioning a new product – Netminder, produced in Falmouth – a coating on bags that prevents fouling and is nontoxic to shellfish. "If I can leave bags in sand and not have to haul them out to address fouling – in which sand falls out -- it will impact growing time and make it more efficient." If all goes well, he plans to bump up production again next year.

Quote / quote prompt:

"A lot of people are approaching this from the oyster culture perspective. It might be a totally different paradigm – different gear, seasons, handling methods."

Dealers

Rob Doane, President/CEO

Rick Sawyer, Sales/Marketing Manager

Jonathan Fleming, Board Chair

Paul Wittenstein, General Manager/Nursery Manager

Aquacultural Research Corporation (A.R.C.) (hatchery, grower, dealer)

Dennis



Roadmap Details, continued

250 farms depend on the shellfish seed that the A.R.C. hatchery spawns and grows for sale. A.R.C. wears others hats as well, as a grower and shellfish dealer. They are also in the process of expanding activities to teach tourists and Cape Codders about the Blue Economy.

In the spring of 2019, A.R.C. spawned three million surf clams and plans to plant whatever seed they don't sell. They are now discussing their fall spawn. It is suggested to integrate very tightly with A.R.C. when developing communication plans, as they are wearing multiple hats in the supply chain: hatchery, nursery, grower, and dealer. The New England Butter Clams they grew are delicious!

Quote / quote prompt:

When do you need to hear from growers, dealers, and chefs, to prompt expanded seed production?

Skip Bennett

Island Creek Oysters (hatchery, grower, dealer, restaurateur)

Duxbury

May spawn surf clams again this fall. Keep ICO informed through the working group.

Jared Auerbach

Red's Best

Boston

Price point has to be right. "Cultivating demand for a limited supply is okay and scarcity can drive up value - so long as you don't over promise and can deliver quality."

Ben Lloyd

Pangea Shellfish Company

Boston

Interested to receive samples. Would be interested to hear and share with customers even more about potential environmental impact and economic impacts on towns.

Desiree Pombo and Team

Wulf's Fish

Boston

Always excited to source high quality new products for their customers. Would like to move New England Butter Clams through their pick up and transport system to test durability and shelf life.

5) Media

The media opportunities to promote New England Butter Clams are myriad, but it is important to time these with sufficient supply.

- Press and magazine coverage. Chef/authors such as Ali Bouzari, Barton Seavor and Jeremy Sewall would all do excellent work developing stories around the imperative for bringing New England Butter Clams into the market and explaining some of the technical aspects of growing clams and developing recipes for them. See potential actors spreadsheet in appendix for additional details on recommended authors, food bloggers and publications.
- Podcasts. Partner with media contacts to produce podcast highlighting new product, digging into the drivers for the shift and outcomes. Aaron Niederhelman's podcast, *Sourcing Matters*, could host an interview/conversation between a grower and industry organization (core team member) to explore the ingenuity required to grow New England Butter Clams. See potential actors spreadsheet (Google

Roadmap Details, continued

spreadsheet) for additional details.

- Television. Secure product features on the Food Network / Chopped (post 2021). Jen Bender has offered to help make introductions. Consult dealers and identify a quantity of product sufficient to serve the national market; time television feature accordingly.
- Film. Short films such as *Oyster Brothers* show the value of thoughtful storytelling around aquaculture. Create one overarching film (3 to 5 minutes) incorporating each key actor group (Chef, Grower, and Consumer). These should be interwoven stories. For examples, see *storyline development: vignettes*, page 29.

Film producer recommendations include:

1. State Park Pictures, Taylor Toole, producer of *Oyster Brothers*, a short film on Dan and Greg Martino of Cottage City Oysters. <https://stateparkpictures.com>
2. Wicked Delicate. Ian Cheney, food film director and producer, including *King Corn*. <http://www.wickeddelicate.com>
3. Rob Apse. New England-based freelancer, has worked on projects related to oceans and farmers. <http://www.robapse.com/>
4. Tripp Clemens, Windy Films. New England-based production company, has worked on projects related to oceans and farmers. <https://windyfilms.com/>

6) Determine event participation

- Plan chef collaborations in which growers serve New England Butter Clams at restaurant staff trainings and walk tables to engage diners directly. Also work with beverages directors, to plan beverage pairings. See potential actors spreadsheet in appendix for additional details.
- Target participation in industry events (NACE, Seafood Expo) to drive story, to share technical knowledge and to engage the market.
- Build New England Butter Clam content into existing farm tours hosted by growers. Consider developing, in collaboration with other organizations, a shellfish aquaculture itinerary/route. In particular, interface with the Cape Cod Chamber of Commerce and the Cape Cod Blue Economy Foundation to consider integration with Expedition: Blue!
- Develop programs with pertinent NGOs, such as Eating with the Ecosystem. Integrate New England Butter Clams in to the Buy Fresh / Buy Local initiative (Cape Cod Cooperative Extension) when product is available for retail purchase.
- Consider co-promotion with symbiotic brands, including local beverages companies. Evaluate potential to co-develop accessory products (a clam shucking knife, dish/serving ware).
- Discuss among all working group members potential participation in annual consumer facing events, including the following (in chronological order):
 1. Nantucket Food & Wine Festival (May) - Nantucket
 2. ICO Waterfront Raw Bar, Saltwash dinner series - (Summer) - Duxbury
 3. Hooker's Ball (August) - Chatham
 4. Boston Seafood Festival (August) - Boston Fish Pier
 5. Boston Oyster Bash (September) as well as Oyster Bash events held at other sites
 6. Wellfleet OysterFest (October) - Wellfleet

Outreach Recommendations For Growers: Engaging Seafood Dealers and Chefs/Restaurants

In support of growers promoting New England Butter Clams, a **Recommended Contact List** of dealers and chefs/restaurants is included in this report as **Appendix B**. Those individuals who have already received samples of clams (in 2017) are indicated with “**S**” and those who were interviewed as a part of this plan are indicated with “**I**.” Those who have requested samples are indicated with “**R**.”

Once collateral materials (see pages 32-34) are ready, they will be shared with you so that you can use them to promote your product. In outreach you will need to expand upon the critical questions the materials address using your own knowledge as a grower.

Cold Calling

1. If you do not already have a relationship with dealers or chefs/restaurants listed, we recommend you start by reviewing their website and social media (Instagram, Facebook, Twitter, etc.) to brush up on the values and themes that matter to them. Further, these will often expose relationships with others in the industry. If you see someone on their social media with whom you have a strong relationship, it may be beneficial to engage that person as an intermediary—or to mention the connection when reaching out.
2. Follow them on social media and when relevant, comment on their posts. You might also choose to invite them to follow you.
3. If it's possible to meet them in person, do so - let them know you'd like to schedule a time to come by with product samples. Offer to come by at a convenient time for staff tastings and Q&A. If it happens that you'll be dining in their restaurant and would like to say a quick hello, let them know.
4. If it isn't possible to visit in person, outreach by phone or email is better than no outreach. We encourage you to share a bit about your background and tell them how you learned about them (even if it's from this report). Orient them to the location of your grant/town. Tell them why have chosen to grow New England Butter Clams. This last point is likely to be particularly compelling to the caliber of dealers and chefs included in the list. Your individual story matters!
5. Context: Invite them to come visit your grant. Tell them about your grant location and explain how you've been able to optimize for growing clams.
6. Chefs are interested in a high quality product that is available on a predictable basis. Provide clear details about expected product availability.
7. Answer any follow up questions in a timely manner. Review the **FAQs (Appendix A)** to be aware of anticipated questions.

Building on Existing Relationships

Once you have established a relationship - or for those dealers and chefs/distributors with whom you may already have a relationship:

1. Be prepared that you will still need to articulate the value proposition / selling points of your New England Butter Clams.
2. Offer to work with chefs to help develop an *amuse bouche*, a dinner series and/or special menus - and volunteer to participate so that their customers can engage you directly.
3. Identify other opportunities to collaborate: special events, panels, catering, etc.
4. Promote any collaboration (visits, special dinners, etc.) on your social media and tag people as is appropriate.
5. Actively and regularly ask for feedback on the product - handling, preparation, response from end customers, etc.

Scalable Talking Points/Messaging Content Examples

The following are provided as examples of how you might communicate the value proposition of New England Butter Clams while conveying the **broad takeaway/tagline** for the product:

New England Butter Clams:

Great for your table. Great for our towns.



Three global ideas around demonstrating relationships:

1. Associate the clams on consumers' dining tables with the waters of the New England **towns** in which your clams are grown. This means explaining your grants and what makes the ecology and culture (growing culture, town culture) of your locations special. For each grower, this will be an individual and personal explanation.
2. Communicate **relationships** in the supply chain: specifically between growers and chefs, but also include dealers who play an active role in supporting New England shellfish growers. Show the human aspects of the supply chain - who is involved and what they do. Include end consumers! In this way, the relationship between “your” and “our” in the tagline/takeaway is positively connected.
3. Show clams on a variety of dining **tables** with people gathered around them, enjoying the clams and each other. Tie these clams to the idea of community -- sharing a meal with others. Show a variety of tables (from fine dining to picnic style), speaking to versatility of these clams for restaurant preparation, and in the future, for home consumption as well.

Guidelines for recommended social media and media

Instagram: Focused on media content (visuals), making it a strong platform for visual storytelling about food and place; built in ad capability with target audience options.

- Image sizes: 1080x1080 (1:1 ratio) or 1080x1350 (4:5); up to 10 images in a single post - tell a story!
- Video: 3-60 sec.
- Characters: 125-300 recommended; 2,200 max; 30 hashtag limit.
- Instagram stories: meant to be ephemeral; 1080x1920px (9:16 ratio), max 10 sec video. Use Canva for composition.
- Actively incorporate handles (@) and hashtags (#)
- Reposting within Instagram can be very effective.

Facebook: Offers a high degree of flexibility on content (text, photos, images, comments/replies) and interaction, access to a broad audience and strong analytics, but also a high level of distraction to users,

Scalable Talking Points/Messaging Content Examples, continued

especially give page layout.

- Images sizes: 1,200x630 pixels, optimal.
- Video: 360-view video allowed. A 10-20 sec video can be very effective! Max length is 120 minutes.
- Facebook stories: meant to be ephemeral; 1080x1920px (9:16 ratio), max 10 sec video. Use Canva for composition.
- Tag when relevant, incorporate hashtags (#) and usernames (@)
- Recommended post length: 40-280 characters.
- Facebook Live: live streaming from the Facebook app; real-time commenting.

Twitter: Designed to be conversational (retweets, multilevel replies). Built in ad capability with target audience options. Generally speaking, Twitter is not as popular a medium for food-related postings, but images posted to it can stand out against what is still predominately a text-based platform.

- Images: minimum to appear expanded 440x220 pixels (a 2:1 ratio)
- Can tweet up to 4 images at one time
- Video: 2min 20 sec or less
- Characters: 70-100 recommended; 280 max.
- Incorporate hashtags (#) but use sparingly (2 max).
- Concerning reposts to Instagram and vice versa: be aware that handles may not be the same across platforms.

While it is possible to cross-post from one social media platform to another, effective posting requires editing for caption length, image preservation and formatting, handles, vocabulary and tone. You may want to manage social media posts using applications such as Hootsuite. All of the above social media applications include built in ad capabilities with target audience options, too.

Film/Video:

- Allows for immersive and well curated storytelling, with 3 to 5 minutes providing sufficient time for full product introduction or focused exploration of topics. Film clips/snippets (10 sec to 1 minute) derived from filming can also be used across social media platforms.
- Post film/videos to YouTube or Vimeo and share links to your website and social media.
- At this length of film, professional production is recommended. It can be expected to cost in the range of \$3,000 to \$7,000 and have a shelf life of three to five years. (See page 18 for recommended vendors and page 29 for example vignettes.)

Your Website: Offers the most flexible on content detail, format and delivery, but requires that you drive traffic (customers / followers) to your actual site. Also requires independent site construction and maintenance.

- Can be the strongest communicator of your brand, in the respect you have near full control over format and, while visitors are on your website, they are receiving your content alone, as opposed to engaging your content between other posts.
- Use your website for core content as well as in-depth descriptions, articles or blog formats.
- Include links to your website in social media posts.
- Deploy search engine optimization (SEO) to help drive traffic through your site.
- Website builders such as Squarespace and Wix offer easy to use templates (no coding required) and comprehensive analytics. Squarespace website subscriptions range in cost from \$12 to \$40 per month depending upon complexity and whether a transaction/online store component is included.

Scalable Talking Points/Messaging Content Examples, continued

Talking points / messaging examples based upon Value Propositions

@Chef, @Restaurant, and @Grower, as well as photos, are generalized placeholders. Quotes are representative in nature and will need to be tailored to individual or organization posting.

TASTE & VERSATILITY

Short text + image:



We're proud to introduce New England Butter Clams: attractive buttery taste with ample salinity in an easy to handle size of clam. Versatile and unique, these clams taste great raw and work well steamed or sautéed. New England at its best!

#Newenglandbutterclams #Greatforyourtable #Greatforourtowns
#aquaculture #seafoodie

(Take photo in good natural light. Should show chef - hands at least - presenting the dish to a table.)

Expanded text and image series, with 3-10 images and captions:

Join @Chef from @Restaurant as he shows how to shuck and prep New England Butter Clams for a delicious ceviche, with all ingredients regionally sourced. Versatile and unique, these clams taste great raw and work well steamed or sautéed. New England at its best!

#Newenglandbutterclams #Greatforyourtable #Greatforourtowns #aquaculture #seafoodie

- Include photo that shows chef at his prep table and key steps in preparation.
- Include tips for shucking.
- Include photo that shows ceviche being consumed by diners at dining table.

Film/Video:

Join Chef from Restaurant and Grower on his grant to harvest New England Butter Clams. Watch as they shuck and prep New England Butter Clams for a delicious ceviche, with all ingredients regionally sourced. Versatile and unique, these clams taste great raw and work well steamed or sautéed. New England at its best!

- Explain how New England Butter Clams are harvested and purged.
- Show clams being eaten raw (with enthusiasm!) while being prepared for ceviche.
- See also page 29 for additional examples.

Website (combining film and article formats):

Join Chef from Restaurant and Grower on his grant to harvest New England Butter Clams. Watch as they shuck and prep New England Butter Clams for a delicious ceviche, with all ingredients regionally sourced. Versatile and unique, these clams taste great raw and work well steamed or sautéed. New England at its best! See below for other recipes from Chef and New England Butter Clam fans.

- Include recipes, plus link to #butterclamrecipes on social media.
- Include expanded interview with Chef discussing quality and value of New England seafood.

Scalable Talking Points/Messaging Content Examples, continued

SUSTAINABILITY
<p><i>Short text + image:</i></p>  <p>@Grower says: Why do I grow New England Butter Clams? They're helping me diversify my livelihood while making a living from the waters I know and love.</p> <p>#Newenglandbutterclams #Greatforyourtable #Greatforourtowns #Wellfleet #aquaculture #clams #Blueeconomy #knowyourclamfarmer #clamfarmer <i>(Photo should be close enough to see facial expressions)</i></p>
<p><i>Expanded text and image series, with 3-10 images and captions:</i></p> <p>@Grower says: Why do I grow New England Butter Clams? They're helping me diversify my livelihood while making a living from the waters I know and love. As a shellfish grower for # years who is always finding new ways to innovate, I know we're making a difference and contributing to the Blue Economy.</p> <p>#Newenglandbutterclams #Greatforyourtable #Greatforourtowns #Wellfleet #aquaculture #knowyourclamfarmer #clamfarmer</p> <ul style="list-style-type: none">• Include photo that shows grant in town context.• Include photos of key steps in planting seed, tending, managing gear and harvesting (success!).• Include qualitative/quantitative data on impact of shellfish aquaculture on local economies.
<p><i>Film/Video:</i></p> <p>Grower says: Why do I grow New England Butter Clams? They're helping me diversify my livelihood while making a living from the waters I know and love. As a shellfish grower for # years who is always finding new ways to innovate, I know we're making a difference and contributing to the Blue Economy. Join us on a journey through the seasons as we plant seed, choose sites, endure weather, repair gear and harvest these beautiful clams.</p> <ul style="list-style-type: none">• Explain the "Blue Economy" concept: how better stewardship of the ocean, driven by expansion of marine science and technology, can bring economic benefits to coastal communities.• Include Cape Cod Cooperative Extension marine specialists on grants, discussing with growers aspects of gear and conditions, and translating research in to action.• See also page 29 for additional examples.
<p><i>Website (combining film and article formats):</i></p> <p>Grower says: Why do I grow New England Butter Clams? They're helping me diversify my livelihood while making a living from the waters I know and love. Join us on a journey through the seasons as we plant seed, choose sites, endure weather, repair gear and harvest these beautiful clams. Learn about the different forces shaping Cape Cod Bay and the vital roles shellfish play in maintaining a healthy marine ecosystem.</p> <ul style="list-style-type: none">• Discuss shellfish farming as an efficient form of high quality food production.• Explain key sustainable strategies growers are using: integration of solar power, strategies to limit ocean waste, etc. (as applicable).• Include interviews with growers and others about the economic and environmental imperatives for shellfish aquaculture diversification.

Scalable Talking Points/Messaging Content Examples, continued

SOURCING & TRACEABILITY

Short text + image:



In the clean, cold waters of New England, shellfish farmers are drawing on their knowledge of growing oysters and quahogs to grow New England Butter Clams. Enjoy these delightful, buttery beauties and the peace of mind that they are grown sustainably and are 100% traceable. They're an excellent source of protein, too!

**#Newenglandbutterclams #Greatforyourtable #Greatforourtowns
#Barnstable #clams #aquaculture #traceableseafood #seafoodtech**

(Photo should include hands on clams)

Expanded text and image series, with 3-10 images and captions:

In the clean, cold waters of New England, shellfish farmers are drawing on their knowledge of growing oysters and quahogs to grow New England Butter Clams. Enjoy these delightful, buttery beauties and the peace of mind that they are grown sustainably and are 100% traceable. They're an excellent source of protein, too! Meet the growers, dealers and chefs who work to ensure a high quality and efficient supply chain.

**#Newenglandbutterclams #Greatforyourtable #Greatforourtowns #Barnstable #clams
#aquaculture #traceableseafood #Eatingwiththeecosystem #seafoodtech**

- Start with a photo of a chef receiving clams and reviewing the sourcing ticket at his prep table.
- Include photos of key steps from harvest, to dealer, to restaurant. Introduce each person profiled.
- Conclude with a photo that shows raw bar clams being consumed by diners at dining table.

Film/Video:

In the clean, cold waters of New England, shellfish farmers are drawing on their knowledge of growing oysters and quahogs to grow New England Butter Clams. Enjoy these delightful, buttery beauties and the peace of mind that they are grown sustainably and are 100% traceable. They're an excellent source of protein, too! Meet the growers, dealers and chefs who work to ensure a high quality and efficient supply chain. Learn why traceability is important for health reasons as well as management of wild fisheries.

- Include background on commercial shellfish history in New England.
- Share nutritional information for New England Butter Clams.
- See also page 29 for additional examples.

Website (combining film and article formats):

In the clean, cold waters of New England, shellfish farmers are drawing on their knowledge of growing oysters to grow New England Butter Clams. Enjoy these delightful, buttery beauties and the peace of mind that they are grown sustainably and are 100% traceable. Meet the growers, dealers and chefs who work to ensure a high quality and efficient supply chain. Learn about shellfish identification tags and systems, and how new technology is making traceability an even more seamless process.

- Expand interviews with growers and town representatives on management of grants.
- Visit a New England Butter Clam grower using an app-based aquaculture management platform.
- Link to **#seafoodtech** on social media.

Scalable Talking Points/Messaging Content Examples, continued

FAVORABLE PRICE POINT / A CONTRIBUTOR TO THE BLUE ECONOMY

Short text + image:



Hey Chefs! We're growing a new product we think you and your customers will love: New England Butter Clams, harvested at 1.5" to 2" and highly versatile. Elevate your raw bar and get creative using steamed or sautéed preparations - or however you please! And thanks for supporting New England shellfish farmers. Order here: ([links](#))

**#Newenglandbutterclams #Greatforyourtable #Greatforourtowns
#aquaculture #Blueeconomy #Knowyourclamfarmer #clamfarmer**
(Photo should speak to chef-grower collaborations. Include names.)

Expanded text and image series, with 3-10 images and captions:

Hey Chefs! We're growing a new product we think you and your customers will love: New England Butter Clams, harvested at 1.5" to 2." Highly versatile -- elevate your raw bar and get creative using steamed or sautéed preparations - or however you please! And thanks for supporting New England shellfish farmers. Order here: ([links](#)) and share your creations tagging #butterclamrecipes

**#Newenglandbutterclams #Greatforyourtable #Greatforourtowns #Aquaculture #Blueeconomy
#Knowyourclamfarmer #clamfarmer #butterclamrecipes**

- Include photo that shows growers harvesting and chefs receiving at prep table.
- Include photos that address handling and shelf life.
- Include photo that shows a variety of preparations.

Film/Video:

We're shellfish farmers growing a new product we think you'll love: New England Butter Clams. Spend the day with us at Wellfleet OysterFest as we explain why growing a variety of shellfish is vital to the economy and culture of our communities, as well as the future of New England's commercial seafood industry. Hear from people as they try New England Butter Clams for the first time!

- Expand to focus on the role of shellfish aquaculture in keeping New England Commercial Seafood a competitive industry and retaining knowledge in the industry.
- See also page 29 for additional examples.

Website (combining film and article formats):

We're shellfish farmers growing a new product we think you'll love: New England Butter Clams. Spend the day with us as we explain why growing a variety of shellfish is vital to the economy and culture of our communities, as well as the future of New England's commercial seafood industry. See how we're working with chefs to ensure this new product is a success in the market.

- Add profiles with different chefs featuring their dishes and discussing their passion for New England seafood, and the importance of the industry to the region.

Scalable Talking Points/Messaging Content Examples, continued

A STORY OF SHELLFISH AQUACULTURE INNOVATION

Short text + image:



What's that, you ask? [@Grower \(Matt Weeks\)](#) tweaking gear design for growing delicious New England Butter Clams just off Falmouth in the waters of Nantucket Sound.

#Newenglandbutterclams #Greatforyourtable #Greatforourtowns #Falmouth #aquaculture #Capecod #seafoodtech

(Photo should include people included with gear)

Expanded text and image series, with 3-10 images and captions:

What's that, you ask? [@Grower \(Matt Weeks\)](#) tweaking gear design for growing delicious New England Butter Clams just off Falmouth in the waters of Nantucket Sound. Deep water sites require different farming techniques than shallow subtidal sites, but benefit from strong nutrient flow and cool temperatures.

#Newenglandbutterclams #Greatforyourtable #Greatforourtowns #Falmouth #aquaculture #Capecod

- Include photos that explain different types of gear.
- Include photos of key steps, including farm team working on grants in winter.
- Include photo that show the joy / success of harvesting, selling to dealers.

Film/Video:

There's more than one way - and one place - to grow a clam. Join [Matt Weeks](#) tweaking gear design for growing delicious New England Butter Clams just off Falmouth in the waters of Nantucket Sound. Investigate with [Jared and Aaron Hemmila](#) as they explain what they've learned from their dad, [Les](#), about growing shellfish in Barnstable. Visit [Jim O'Connell](#) and his nephew [Jimmy](#) as they combine local knowledge with academic research. Hear each discuss his connection to New England waters.

- Profile multiples growers and the variety of locations in which they grow. Reveal how growers tailor their gear and growing practices to their grant locations.
- Include examples of the risks and rewards of shellfish aquaculture.
- See also page 29 for additional examples.

Website (combining film and article formats):

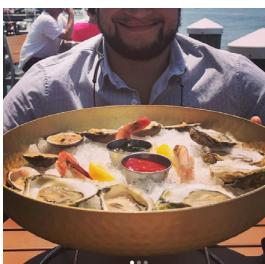
There's more than one way - and one place - to grow a clam. Join [Matt Weeks](#) tweaking gear design for growing delicious New England Butter Clams just off Falmouth in the waters of Nantucket Sound. Investigate with [Jared and Aaron Hemmila](#) as they explain what they've learned from their dad, [Les](#), about growing shellfish in Barnstable. Visit [Jim O'Connell](#) and his nephew [Jimmy](#) in Wellfleet as they combine local knowledge with academic research. Hear each discuss his connection to New England waters and his take on shellfish farming innovation.

- Expand interviews, including seasoned growers as well as newer shellfish farmers, with each explaining what drew them to shellfish aquaculture.

Scalable Talking Points/Messaging Content Examples, continued

MARKET ENTRY STRATEGY

Short text + image:



The only thing growers like more than producing great shellfish is being sure it gets to your table as soon as possible. Capitalizing on strong marketing and supply chain relationships established for shellfish, our New England Butter Clams are ready and eager to be your next favorite bivalve.

**#Newenglandbutterclams #Greatforyourtable #Greatforourtowns
#aquaculture #happyasabutterclam #seafoodie**

(photo to include: raw bar medley, casual table, happy consumer eating a clam)

Expanded text and image series, with 3-10 images and captions:

The only thing growers like more than producing great shellfish is being sure it gets to your table as soon as possible. With strong marketing and supply chain relationships established for New England shellfish, our New England Butter Clams are ready and eager to be your next favorite bivalve. Know what goes well with butter clams? Other clams, plus mussels, oysters, scallops and lobster! Take a look at these epic raw bars and add yours by tagging [#epicrawbar](#) Hungry now? Visit these establishments for some mouth watering New England Butter Clams: ([links](#))

**#Newenglandbutterclams #Greatforyourtable #Greatforourtowns #aquaculture #epicrawbare
#shellfishtower #happyasabutterclam #seafoodie**

- Include photo of multiple growers in town context, bringing clams off the water.
- Include photos and discuss the role of shellfish dealers.
- Include photos of raw bars, including reposts of those tagged with [#epicrawbar](#)

Film/Video:

The only thing growers like more than producing great shellfish is being sure it gets to your table as soon as possible. Capitalizing on strong marketing and supply chain relationships established for shellfish, New England Butter Clams are ready and eager to be your next favorite bivalve. Watch as [Chef](#) assembles one of the most epic raw bars we've seen and explains how she sources shellfish.

- Interview chef as she assembles the raw bar: why do customers love a good raw bar? How have raw bars evolved as shellfish has become more popular? What beverage pairings do you recommend?
- Profile farms that offer tours and explain how this helps grow the market for shellfish.
- See also page 29 for additional examples.

Website (combining film and article formats):

The only thing growers like more than producing great shellfish is being sure it gets to your table as soon as possible. Step inside ([location](#)) to learn the role that shellfish dealers play in this equation. Capitalizing on strong marketing and supply chain relationships established for shellfish, New England Butter Clams are ready and eager to be your next favorite bivalve.

- Include interviews with dealers about why they're excited to offer New England Butter Clams nationally and what they hear from chefs across the country.

Storyline Development: Vignettes

New England Butter Clams: Great for your table. Great for our towns.

A story of shellfish aquaculture innovation as told through different perspectives on the industry, suitable for 3 to 5 minute film segments from which short clips/snippets can also be derived.



The Chef:
A New Opening for Butter Clams: Marc Orfaly cooks at the James Beard House

"Pride in New England seafood is personal - and collective. It's part of our identity."

Spend time with Marc Orfaly as he prepares the medley New England clams he presented at the James Beard House. Hear how New England Butter Clams will fit into the program of his expanding restaurant group, why he believes restaurant guests are so passionate about locals sourcing, and what to know in case you ever buy a Tall Ship.



The Growers:
"It's a great day for a swim!" Ingenuity on the Bay

Spend a day with oyster farmers Jared and Aaron Hemmila, and their dad Les Hemmila, who has been farming shellfish for decades. See what they decide as they consult with marine resource specialists Abigail Archer and Josh Reitsma from the Cape Cod Cooperative Extension & Woods Hole Sea Grant on New England Butter Clams grow out methods. "Growing a new species keeps us doing what we love: making a living on the water."



The End Consumers:
Shellfish farmers for a day

"We love the story behind these clams -- and where they come from."

Foodies Karen and Bill O'Sullivan are avid followers of the Boston restaurant scene and frequent visitors to Cape Cod. They enjoy any activity outside, sports related and/or on the water, and they travel with groups of family and/or friends. "It's fascinating to hear that the oyster farms we love are starting to diversify." On a recent farm tour, they and their friends had a chance to taste New England Butter Clams. See what they discovered.

**Note: these photos, quotes and storylines are mockups. They are not intended as final products. The end consumers portrayed are fictional characters.*

Social Media Recommendations

Social media offers a cost effective way to engage not only end consumers, but also fellow actors across the supply chain. The visual storytelling that social media allows is well-suited to marketing of food products and experiences - in part because it cannot replace the real world sensory experience, but can effectively entice consumers to try new things.

The chance to obtain direct feedback on social media gives you a way to experiment with messaging and see firsthand what motivates consumers, while also providing helpful analytics through which you can refine your understanding of potential market size, geography, conversion rates, amplification and brand awareness. It's also a way to meet people where they are. And there are a lot of seafood-loving people on social media! (#seafoodlover = 609K posts on Instagram and Chef Jamie Oliver has 7.3 million followers, etc.)



Cottage City Oysters Instagram: Example of an effective re-post that includes product, co-branding while revealing chef-grower relationships.

Assumptions:

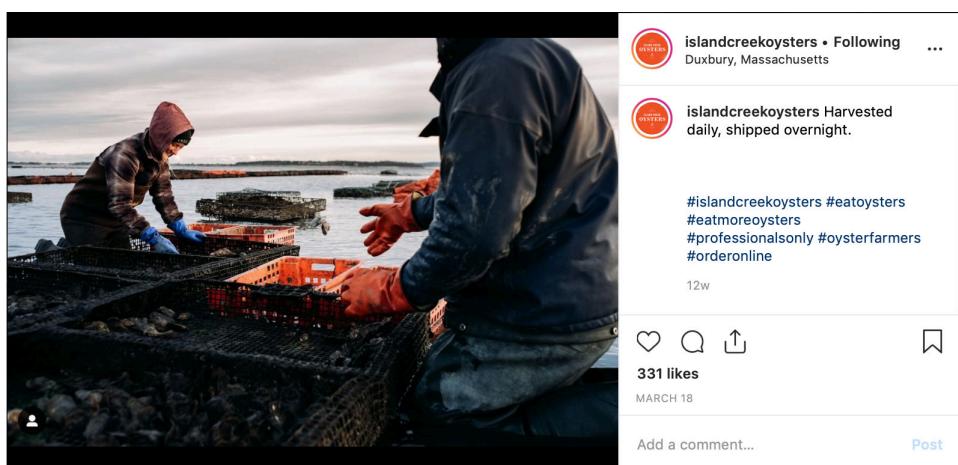
Storytelling about New England Butter Clams will involve a variety of shellfish farmers, as well as Wellfleet SPAT, the Cape Cod Commercial Fishermen's Alliance and the Cape Cod Cooperative Extension/Woods Hole Sea Grant in a collaborative and disaggregated approach. This means starting multiple stories and conversations about New England Butter Clams, rather than executing firmly controlled messaging. As such, recommendations are intended to guide and inspire this variety of actors as they individually develop their stories around New England Butter Clams. They are also intended to help involve dealers and chefs/restaurants, as well as food writers and other members of food media, by engaging these actors in conversations over social media in a way that reflects their real world relationships.

Recommendations for enriching your social media:

1. SELECT IMAGES CAREFULLY. Select images carefully, as the quality of your images reflects the quality of your product. Images do not have to be perfect, but they do need to be able to compete. Often a small amount of photo editing or cropping (even just using the app on your phone) can create the right tone and focus for the message.
2. HUMANIZE YOUR MESSAGE. Whenever possible, include people in your imagery. If you intend to explain something about gear, show human hands holding the gear. People look longer and engage more deeply with images that show some element of human life and presence - even if the purpose of the image is to show a beautiful landscape or to explain something technical.

Social Media Recommendations, continued

3. EXPLAIN PROCESS. Use images to explain process and activity. People are curious about the steps required in aquaculture. By teaching them, you enroll them in your success.
4. REVEAL RELATIONSHIPS. Demonstrate your relationship to others in the supply chain. Images that show relationships between growers and chefs will be particularly valuable, because they reveal and reinforce that this is a collaborative effort. If they show you having fun along the way, even better!
5. TELL A STORY. Just a few words can capture a reader's imagination and prime them for deeper engagement. This is especially true when accompanied by a compelling image.
6. USE VIDEO. Even a few seconds of film can go a long way, particularly to explain process. Video is also useful for conveying opinion or commentary on the experience of a food or a place. (Think Anthony Bordain.) Video does not need to be professional so long as it is well-edited.



7. BE RELATABLE. Reveal your humanity! This means showing your sleepy face on a cold winter morning as you drink your coffee and prepare to work your grant. It means showing your family involved in the tending effort, if that is your situation. It also means being aware of what your followers romanticize about shellfish aquaculture -- time out on the water when the weather is perfect -- and celebrating those moments with gratitude.

Island Creek Oysters Instagram: a post that celebrates the work process of the shellfish farmer while evoking a strong sense of place.

8. BUILD AND RESPOND TO ENGAGEMENT. The purpose of social media is to advance engagement between people separated by space. At the start of a campaign, posting at least once a day for two weeks can help build momentum, but how frequently you post is up to you. Respond to your followers and their comments, and encourage them to meet you and your clams in the real world - at your farm, at restaurants, at events.

9. USE HASHTAGS:

- The most important hashtag to use across platforms is: **#Newenglandbutterclams**
- Tag the product tagline subsets **#greatforyourtable** and **#greatforourtowns**
- Include the hashtag for your town: **#Wellfleet** or **#Cotuit**, etc. as well as **#CapeCod**, as appropriate
- Integrate: **#surfclam**, **#aquaculture** and **#clamfarmer** **#happyasabutterclam** **#seafoodlover**
- Look for ways to reference particular events, such as **#wellfleetoysterfest**
- For chefs/restaurants, use their specific handle: **@ESKDBoston** (Eastern Standard), **@Row34**, etc.
- Tag your favorite preparation: **#rawbar**, **#epicrawbar**, **#seafoodtower**, **#butterclamlinguine**, etc.
- As appropriate, include thematic tags as a way of reaching your consumer groups: **#clams**, **#seafoodlover** **#sustainablefarming**, **#newengland**, **#newenglandlife**, **#seafoodie**, **#eatlocal** **#eatingwiththeecosystem**, **#blueeconomy**, **#seafoodtech**

Promotion Materials: Content and Format Recommendations

Images below intended for example only. Graphic designer will guide final selection and formatting.

- 1) **8"x 6" product card or table tent for restaurants, with information for consumers.** Include map and reference to growers to allow restaurant staff to explain specific geography and sourcing. Also utilize this content on social media. Keep design simple so it does not conflict with restaurant branding.



Side 1: Name, tagline, description. Map, calling out where clams are grown + why these areas work well. (Map may need to be expanded to include growing areas.) Could also include brief information on tours, tastings and events.

Side 2: Product image + medley of iconic images of each town, including growers and end consumers. There should be less chef presence on this piece as it is intended work in any restaurant.

- 2) Production Information Sheets for Distributors/Wholesalers/Restaurants:** 8.5x11 pdf and printed front/back on heavy card stock. See example, next page. Consider also an additional page with F.A.Q.s and map, similar to above. When possible, select or commission food photos that also include a person to drive home the human connection with the product.

New England Butter Clams:

Great for your table. Great for our towns.



We'd like to introduce you to the New England Butter Clam ...

Whoa - I see surf clams all the time at the beach. Why haven't I ever had these before?

Farmed surf clams, when harvested at a size of 1.5"-2" are sweet, buttery with just the right salinity, tender and easier to handle than a mature surf clam. They're a whole new product!

Surf Clam Consumption History

Surf clams consumption is a part of New England culinary heritage, and in the mid-20th century, the Howard Johnson's chain made fried clam strips (prepared using just the foot of the mature surf clam) popular on a national level. Surf clam is also often minced into small pieces for use in chowders, while surf clam juice is used as a base in a wide variety of food and beverage preparations. So chances are, you and your customers have eaten surf clams! As a farmed product harvested for size and tenderness, the whole of the New England Butter Clam can be eaten, just like the littleneck size of a quahog.

These little guys are playing a big role in the future of New England Seafood

How? By giving shellfish farmers across New England a chance to further diversify what they grow. That's great for their own economic resiliency, great for the waters in which their grants are located, and great for the towns that support these farms. New England Butter Clams are grown sustainably and 100% traceable.

Market Name: New England Butter Clams

Scientific Name: Spisula solidissima

Common Name: Surf Clams

Handling Instructions: Keep cool, moist/wet to prevent dry out from gaping.

Cover or tightly pack (like razor clams).*

Flavor characteristics: Attractive buttery taste with ample salinity. As one chef described: "Sweet, mild mineral, brine, buttery!" Can be consumed raw, ceviche style, sautéed or used in soups and paellas.

Size: 1.5 - 2.0 inches, approximately 20 pieces / pound

Availability: Year round

Production method: Aquaculture, Farmed in bays and estuaries by New England farmers and fisherman

SOURCING / PURCHASE INFORMATION : *contact placeholder - contact info to be filled in by end user of the collateral*

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SERVING SUGGESTIONS

New England Butter Clams are the perfect fit for your raw and refined culinary creations.

Offer a medley showcasing clams from across New England, paired with a flight of New England microbrews, a dry cider or Pét-nat. Beyond the raw bar, these clams are highly versatile - taking on Asian and Latin cuisine preparation incredibly well.

Recipe interchangeability: can be used in place of littlenecks and topneck clams (quahogs), manila clams, as well as cockles. Some adjustment of cooking time may be necessary.

DRESS UP YOUR RAW BAR

Nutrition Facts

Serving Size 3 oz (85g)
Clam, mixed species, cooked moist heat
Amount Per Serving
Calories 130 Calories from Fat 15
Total Fat 1.7g % Daily Value*
Saturated Fat 0g 2%
Trans Fat 0g 0%
Cholesterol 57mg 19%
Sodium 1,022mg 50%
Total Carbohydrate 4g 1%
Dietary Fiber 0g 0%
Sugars 0g
Protein 22g
Vitamin A 10% Vitamin C 30%
Calcium 8% Iron 130%
Selenium 80%

*Percent Daily Values are based on a 2,000 calorie diet. Your daily values may be higher or lower depending on your calorie needs.

2 dozen Fresh Clams (Cherrystone, Middle-neck, Little-neck or Top-neck)
2-3 tbsp. butter
4 whole eggs
2 C milk
3 large potatoes, peeled and medium dice size
1 C onion, chopped
1 C celery, chopped
1 C biscuit mix
Dash of nutmeg
6-8 oz. cheddar cheese
Salt and pepper to taste

PREPARATION: Preheat oven to 400 degrees F. Shuck clams, drain and coarsely chop. Dice potatoes and cook until tender but not overcooked. In large skillet add butter and sauté onions and celery until tender. In a large mixing bowl add the biscuit mix, eggs, milk, nutmeg, cheese, salt and pepper and blend well. Combine onions, celery, and chopped clams and mix well. Place clam mixture in bottom of well greased baking pie dish. Season with salt and pepper to desired taste. Pour biscuit batter over potatoes and clam mixture, covering fully. Bake in oven until golden brown, approximately 35-40 minutes. Yields 4-6 servings.

NOTE: When using smaller size clams keep whole and add more if desired.

EAST COAST CEVICHE



Watch these short films to learn more from chefs, farmers and consumers:

QR (link to film and tour information) and/or website

Share your own stories and recipes via social media: #newenglandbutterclams

+ add other social media links as relevant

A10.Butter Clam Marketing and Promotion Plan



APPENDICES

- Appendix A: FAQs
- Appendix B: Recommended Contact List: Dealers and Chefs/Restaurants
- Appendix C: Massachusetts Shellfish Aquaculture Marketing Working Group
- Appendix D: List of Project Team Members, Contributors and Funders
- Appendix E: Interview List (Interview notes available in Google drive project folder)

Appendix A: FAQs

This is a running list of questions, asked primarily from the vantage point of the consumer, related to New England Butter Clams. Some questions may be critical to answer in promotional materials or as part of the marketing and promotions plan implementation. (Many shellfish companies provide FAQs on their websites.) Others may be worth exploring as part of storytelling / social media campaigns.

What?

- What species of clam is this?
- What do they taste like?
- What clams can they “replace” in recipes?
- What is the size range? Count per pound?
- What is the nutritional information?
- What is the risk of food poisoning? / shellfish contamination?
- Is it greater or less than from other clams? Why?

Who?

- Who grows them? Is it hard? Answer specifically and categorically
- Who's involved in this collaborative to bring them to market?

Why?

- Why are you growing them / selling them? What is the need for the market?
- Why should I buy these instead of other clams / other seafood?

When?

- When did shellfish farmers first start growing them? / When did they come on the market?
- When are they spawned?
- When are they planted?
- When are they available?

Where?

- Where are surf clams come from in nature? Where are they wild harvested?
- Where in the world are they farmed?
- Where do these clams come from?
- Where else are they harvested or grown?
- Where can I order/buy them wholesale?
- Where can I order/buy them retail?
- Where can I order them at a restaurant?

Appendix A: FAQs, continued

How?

- How are they grown? Compared to oysters?
- Are surf clams prone to disease or disease resistant? How does water temperature affect them?
- How does growing clams impact the environment? Ecosystem health? Water filtering?
- How does it help communities respond to climate change?
- How do I store them?
- How do I open them? / clean them? (Are they gritty? Why? Why not?)
- How long do they last?
- How do I know if they are bad?
- Are they alive when I buy them?
- How can they be prepared?
- How do I know when they're done?
- How can I keep from overcooking them?
- How much do they cost?

Appendix B:

Recommended Contact List: Dealers and Chefs/Restaurants

See also the *potential actors* spreadsheet (Google sheet) for further description of relevance.

Key: **S**: Received samples/survey (2017); **I**: interviewed (2019); **R**: Has requested samples (2019).

Name	Organization / Location	Position
Stage 1 - Dealers		
Chloe Starr Chloe@archatchery.com	A.R.C., Dennis (Hatchery/Grower/Dealer)	Farm and Wholesale Operations Manager
Alex Hay Alex@macsseafod.com	Wellfleet Shellfish Co / Mac's Seafood, Wellfleet (Dealer/Restaurateur/Retail): Mac's Shack, Mac's, Markets, Chatham Fish & Lobster, multiple locations	Owner
Meggie O'Neal Meggie@islandcreekoysters.com	Island Creek Oysters, Duxbury (Hatchery, Grower, Dealer, Restaurateur) - Island Creek Oyster Bar / The Shop / Raw Bar at Island Creek Oyster Farm	Director of Procurement
Ben Lloyd benl@pangeashellfish.com	Pangea Shellfish Company, Boston	Owner I, R
Desiree Pombo dpombo@wulfsfish.com	Wulf's Fish, Boston	Quality Assurance Director & Customer Relations I, R
Jared Auerbach Jared@redsbest.com Ryan Rasys Ryan.rasys@redsbest.com	Red's Best, Boston (Dealer / Retail) + Red's Best Fish Market & Eatery (at Boston Public Market)	Owner Operations Manager I, R
Stage 1 - Chefs and related		
Chef Anthony Cole acole@chathambarsinn.com	Chatham Bars Inn (multiple restaurants), Chatham	Executive Chef I, R
Chef Michael Ceraldi ceraldi@ceraldicapecod.com	Ceraldi, Wellfleet	Chef/Owner
Chef Jared Chianciola jared@macseafood.com	Mac's Seafood, Wellfleet	Chef
Jenn Mentzer catering@macsseafod.com	Mac's Parties and Provisions, Wellfleet	Chef/Catering Director
Chef Jeremiah Reardon miah.reardon@gmail.com	Vers, Orleans	Chef S (at Brewster Fish House)
Chef Adam Dunn adam@pheasantcapecod.com	The Pheasant, Dennis	Chef/Owner
Jason Montigel chf@cleanslateeatery.com	Clean Slate Eatery, Dennis	Chef
Chuck Konner rockharborgrill.net	Rock Harbor Grill, Orleans Grill 43, Yarmouthport	Chef/Owner
Chef Marc Warner epicoyster@yahoo.com	Epic Oyster, North Falmouth	Chef/Owner
Chef Joe Monteiro hello@19rawoysterbar.com	19 Raw Oyster Bar, Edgartown	Owner
Sal Liotta www.thebackeddy.com	The Back Eddy, Westport	Owner

Appendix B: Recommended Contact List, continued

Name	Organization / Location	Position
Chef Marc Orfaly cheforfaly@gmail.com	Reelhouse, Boston/Quincy + forthcoming (Navy Yard Hospitality)	Chef/Partner S, I
Chef Jeremy Sewall jeremy@row34.com	Island Creek Oyster Bar / Row 34, Boston, Burlington, Portsmouth	Chef/Partner/Author S, I
Chef Matt Garland mgarland@easternstandard-boston.com Vanessa Rea vrea@easternstandardboston.com Diego Pena-Herrera dpena@easternstandardboston.com	Eastern Standard, Boston; Shy Bird, Cambridge	Culinary Project Manager I, R Wine Director, R Bar Manager, R
Kristin Cantz Chef Charlie Foster kristincantz@gmail.com	Woods Hill Table, Concord/Boston	Owner Chef I, R
Chef Josh Lewin josh@juliet somerville.com	Juliet, Somerville; Peregrine, Boston	Chef/Owner R
Chef Jeremy Kean Chef Philip Kruta	Brassica, Boston	Chef/Owner, S
Chef Maxime Fanton	Alcove, Boston	Executive Chef
Chef Michael Scelfo	Waypoint, Alden & Harlow, Longfellow Bar, Cambridge	Chef/Owner
Chefs Tim and Nancy Cushman	O Ya (Boston, NYC) and Hokojo, Boston	Chef/Owner
Chef Rob Wong	Hokojo (with Tim Cushman), Boston	Chef
Chef Brian Young	The Emory, Boston	Chef
Chef Tiffani Faison	Tiger Mama, Fool's Errand, (Big Heart Hospitality) Boston	Chef/Owner
Chef Jaime Bissonnette	Toro, Boston, NYC, etc.	Chef/Owner
Chef Ken Oringer	Uni/Toro, Boston, NYC, etc.	Chef/Owner
Chef Barbara Lynch	Menton / B&G Oyster, etc., Boston	Chef
Chef Lydia Shire	Scampo, Boston	Chef
Chef Kyle McClelland	Salty Girl (Met Restaurant Group), Boston	Chef
Chef Jody Adams	Trade / Porto, Boston	Chef/Owner
Chef Michael Schlow	Alta Strada, Tico, Nama, etc. (Boston+multiple U.S. locations)	Chef / Author
Chef Jamie Mammano	Ostra, Boston	Chef/Owner, S
Chef Adrian Wright	Deux Aves, Boston	Chef
Chef Daniela Soto-Innes	Cosme and ATLA, NYC	Chef
Daniel Abrams	Mermaid Oyster Bar, NYC	Owner

Appendix B:

Recommended Contact List, continued

Name	Organization / Location	Position
Chefs Maria and Fabio Trabocci	Fiola Mare and other restaurants, DC	Chef/Owner
Chef Max Peterson	Hemingway's, Providence, RI (Newport Hospitality Group)	Chef
Chef Benjamin Sukle	Birch Restaurant, Providence, RI	Chef
Chef Beau Vestal	New Rivers, Providence, RI	Chef
Chef Derek Wagner	Nick's on Broadway, Providence, RI	Chef/Owner
Executive Chef Lou Rossi	Castle Hill Inn, Newport, RI	Chef
Perry Raso	Matunuck Oyster Bar, South Kingstown, RI	Chef/Owner/Grower
Chef Evan Mallet	Black Trumpet Bistro, Portsmouth, NH	Chef/Owner
Chef Andrew Taylor Chef Mike Wiley	Eventide Oysters, Portland, ME	Chef/Owners
Stage 2 & 3 - Dealers		
Ian MacGregor sales@lobsterplace.com	The Lobster Place, Chelsea Market / the Bronx	Wholesale w/ co-located restaurants
Richard Martin richm@wildeibles.com	Wild Edibles, NYC	Wholesale, emphasis on sustainability, clams
Stage 2 & 3 - Chefs & Related		
Chef Mike Price	The Clam, NYC	Chef/Co-Owner
Chef Julian Medina	Los Mariscos, NYC	Chef
Jeff Zalaznick	ZZ's Clam Bar (Major Food Group) NYC	Chef
Chef Kyle Bailey	The Saltline (Longshot Hospitality Group), DC	Chef/Owner
Chef Carlos Delgado	China Chilcano (ThinkFoodGroup - Jose Andres), D.C.	Chef
Travis Croxton	Rappahanock Oyster Bar (and others), DC and VA	Owner
Chef Michael Serpa	Select Oyster Bar, Boston	Chef/Owner
Chef John Ross	Neptune Oyster Bar, Boston Waterfront and Oyster Bar, Everett (Encore)	Chef
Chef Scott Jensen	Gallows / Banyan, Boston	Chef, S
Chef Carolyn Johnson	Mooncusser Fish House, Boston	Chef
Chef Danny Levesque	Atlantic Fish, Tavistock Group, Boston + other	Executive Chef
Chef Chris Chung	Momi Nonmi, Cambridge	Chef/Owner
Chef Colin Lynch	Bar Mezzana, Boston	Chef
Chef Richard Vellante	Legal Seafood, (multiple locations), U.S.	Executive Chef & Executive Vice President
Jarvis Green (<i>contact through Jen Bender</i>)	Ocean 97 (value-added product company) www.oceans97.com	Owner (received samples in 2018)

Appendix C:

Massachusetts Shellfish Aquaculture Marketing Working Group

The working group has played a critical role in the development of the Marketing and Promotion Plan, providing feedback to the Cape Cod Commercial Fishermen's Alliance and directly to Zapalac Advisors during on-site interviews and by email. The group's input has been invaluable for bringing this project forward and it will continue to be important to the effective marketing and promotion of New England Butter Clams.

Representative	Name	Organization	Position
Grant Partner / Contract Lead	Melissa Sanderson	Cape Cod Commercial Fishermen's Alliance	Chief Operating Officer
Grant Partner	Elisabeth Leaning	Cape Cod Commercial Fishermen's Alliance	Project Coordinator
Grant Partner	Abigail Archer	Cape Cod Cooperative Extension / Woods Hole Sea Grant	Marine Resource Specialist
Grant Partner	Josh Reitsma	Cape Cod Cooperative Extension / Woods Hole Sea Grant	Marine Program Specialist
Grant Partner	Michele Insley	Wellfleet SPAT	Executive Director
Northeast MA Aquaculture Center	Dr. Joe Buttner	Salem State University	Professor of Biology, Director of NEMAC
Southeastern MA Aquaculture Center	Rick Karney	Martha's Vineyard Shellfish Group	Former Director, retired, emeritus
MA DMF Seafood Marketing Program	Wendy Zisson	Massachusetts Division of Marine Fisheries	Coordinator, Seafood Marketing Program
Grower	Dan Martino	Martha's Vineyard, Cottage Point Oysters	Owner
Grower	Mark Begley	Barnstable, Beachpoint Oysters	Owner
Grower	Jared Hemila	Barnstable, Barnstable Sea Farms	Owner
Grower	Andrew Cummings	Wellfleet, Wash-Ashore Oyster Ranch	Owner
Grower	Jake Puffer	Wellfleet Grower	Owner
Grower	Alfred Pickard	Wellfleet Grower	Owner
Grower/Dealer	Steve Wright	Chatham Shellfish Company	Owner
Dealer/Restaurateur/Retail	Alex Hay	Mac's Seafood	Owner
Dealer	Ben Lloyd	Pangea Shellfish Company	Owner
Hatchery/Grower/Dealer/ Retail/Restaurateur	Meggie O'Neal	Island Creek Oysters	Director of Procurement
Dealer/Retail	Jared Auerbach	Red's Best	Owner
East Coast Shellfish Growers Association	Bob Rheault	East Coast Growers Association	Executive Director

Appendix D: Project Partners, Funders and Contributors

Project Partners:

Cape Cod Cooperative Extension/Woods Hole Sea Grant

Cape Cod Commercial Fishermen's Alliance

Wellfleet Shellfish Promotion and Tasting (SPAT)

Project Funders:

Sea Grant - NOAA Award NA17OAR4170240 - Market Development to Diversify Shellfish

<https://seagrant.noaa.gov/Our-Work/Aquaculture>

Wellfleet Shellfish Promotion and Tasting (SPAT)

With special thanks to:

Massachusetts Shellfish Aquaculture Marketing Working Group

Appendix E: Interview List

The following individuals were interviewed for this plan. We thank them for their input.

Representative	Name	Organization	Position
RESEARCHERS			
UMass Boston, School for the Environment	Jen Bender, PhD	UMass Boston, School for the Environment	Aquaculture Education Coordinator; Executive Director, Marine Studies Consortium
HATCHERIES			
Hatchery/Grower/Dealer	Rob Doane Rick Sawyer Jonathan Fleming Paul Wittenstein	A.R.C.	President & CEO Sales + Marketing Manager Board Chairman GM/Nursery Manager
Hatchery/Grower/Dealer/ Retail/Restaurateur	Skip Bennett*	Island Creek Oysters	Owner (note: limited conversation)
GROWERS			
Grower	Mark Begley	Barnstable, Beachpoint Oysters	Owner
Grower	Les Hemmila	Barnstable, Barstable Sea Farms	Owner
Grower	Steve Wright	Chatham, Chatham Shellfish Company	Owner (note: limited conversation)
Grower	Jim O'Connell	Wellfleet Grower	Owner
Grower	Alfred Pickard	Wellfleet Grower	Owner
Grower	Dan Martino	Martha's Vineyard, Cottage Point Oysters	Owner
Grower	Matt Weeks	Falmouth Grower	Owner
DEALERS / WHOLESALERS			
Distributor	Ben Lloyd	Pangea Shellfish Company	Owner
Wholesaler/Retail/Eatery	Jared Auerbach	Red's Best	Owner
Wholesaler	Desiree Pombo + team	Wulf's Fish	Quality Assurance Director & Customer Relations
CHEFS / RESTAURATEURS			
Chef	Chef Matt Garland	Eastern Standard, Branch Line, Shy Bird	Culinary Project Manager
Chef	Chef Mark Orfaly	Reelhouse	Chef/Owner
Chef/Event Planner	Jenn Mentzer	Mac's Parties & Provisions	Director of Catering
Chef	Jared Chianciola	Mac's Seafood	Chef de Cuisine (note: limited conversation)
Chef	Chef Anthony Cole	Chatham Bars Inn	Executive Chef
Chef/Partner/Author	Chef Jeremy Sewall	Island Creek Oyster Bar / Row 34	Executive Chef
Restaurant Owner	Kristin Canty	Woods Hill Table	Owner/Filmmaker (note: limited conversation)
RETAIL (ONLINE + PHYSICAL)			
Fish Market + Eatery	Ryan Rasys	Red's Best Fish Market & Eatery	Retail Manager (note: limited conversation)

Appendix 11: Grower Workshop Participant List

PARTICIPANT NAME	AFFILIATION
Brad Braginton-Smith	Grower, Chatham
Stephen Davies	Researcher, Coonemessett Farm Foundation
Mike Dunbar	Grower, Yarmouth
Chris George	Aspiring grower
Al Supernaught	Grower, Barnstable
Kayla Baler	Volunteer, AmeriCorps
Curtis Graham	Grower
Steven Ham	Grower
Ed Janiunas	Grower, Yarmouth
John Miliken	Grower, Eastham
Regina O'Connor	Recreational Harvester
Patrick Ross	Grower, Bourne
Leigh & John Townes	Growers, Barnstable
Matt Weeks	Grower, Falmouth
Patrick Winslow	Grower, Wellfleet
Harvey Cataldo	Grower, RI
Doug McLaughlin	Grower, RI
Todd McAdams	Grower, Plymouth
Alan Marcy (plus 2 others)	Grower, Dennis
Jake Angelo	Grower, Barnstable
Joe Werzanski	Grower, Brewster
John Martin	Grower, Barnstable
Jennifer Koopmans	Grower, Barnstable
Jared & Aaron Hemmilla	Growers, Barnstable
Greg Dardia	Grower
Tom Dermody	Aspiring grower
Doug Bartlett	Grower
Bethany Gibbons	Grower, Orleans
Douglas Hayes	Grower, Barnstable
Cameron Christopher	Grower, Barnstable
Wayne Hayes	Grower, Barnstable
Paul Werzanski	Grower, Brewster

Registered for Workshop, did not attend, received materials via email

NAME	AFFILIATION
Ricky Alexander	Researcher, Coonemessett Farm Foundation
Richard Banks	Recreational Harvester
William Barrio	Grower, Wellfleet
Glenn Chamberlain	Grower, Falmouth
Stephen Kirk	The Nature Conservancy
Dianne & Doug Langeland	Media; Edible Cape Cod
Dan Smith	Grower, Truro