



Butter Clams: the Culture  
Juvenile Surf Clams

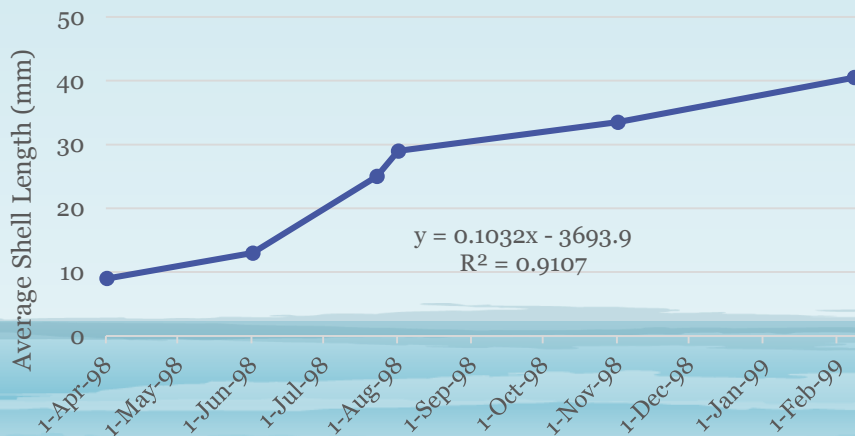
## Surf Clams (*Spisula solidissima*) aka “butter clams”



- Shellfish aquaculture in NE growing at rapid pace
- MA farm gate value for shellfish exceeds \$27 million (DMF)
  - oyster aquaculture accounts for >90%
- Monocultures risky
  - alternative species to augment hard clam & oyster crops
- Continued interest in growing surf clams at “butter clam” size
  - goal of a 1-year product

# Early Local Research

- Karl Rask (Resource, Inc. Orleans, MA) 1996 intertidal study
- 4-5mm locally-produced seed placed in nursery cages during summer '96
- By Oct. '96 seed was 40mm average size – planted on bottom and bags
- Clams grew to average size 50mm the following year, demonstrating a market size product, produced intertidally in 1-year in New England
- 1998 SEMAC Mini-Grant: *Raising Surf Clams on the Brewster Flats*

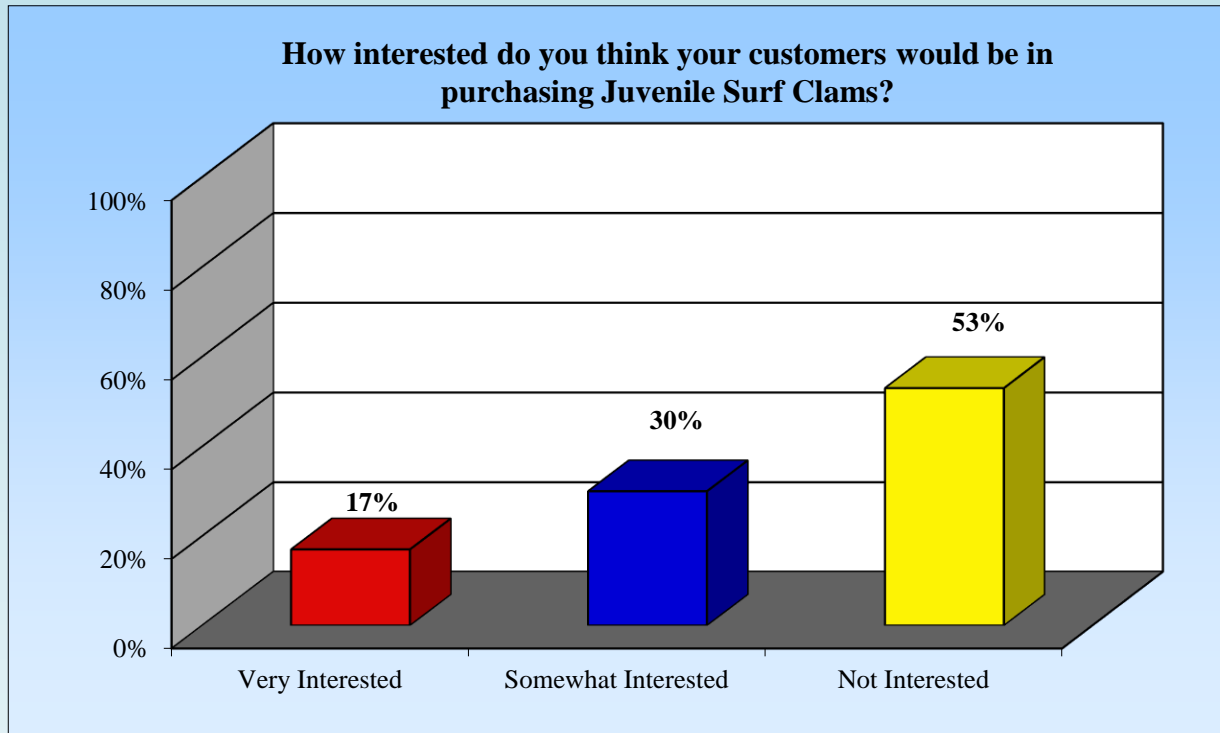


# Local Research

- Mid 1990's Karl Rask
- SEMAC Mini-Grants (1998 – 2011)
  - 1998 Raising Surf Clams on the Brewster Flats**
  - 1998** Raising Surf Clams in Barnstable Harbor
  - 1998** Growing Butter Clams in P-Town Harbor
  - 1999** Sub-tidal Aquaculture of *Spisula solidissima*
  - 2004** Research of Yearling Surf Clams in P-Town
  - 2007** Experimental Nursery & Marketing of *Spisula solidissima* on Lower Cape Cod
  - 2007** Development of Experimental Technology in the Aquaculture of Yearling Surf Clams in P-town & Truro
  - 2011** Experimental Shellfish Growth Rate Assessment
- ARC

# Wholesale Seafood Dealer Survey\* Results – ‘butter clams’

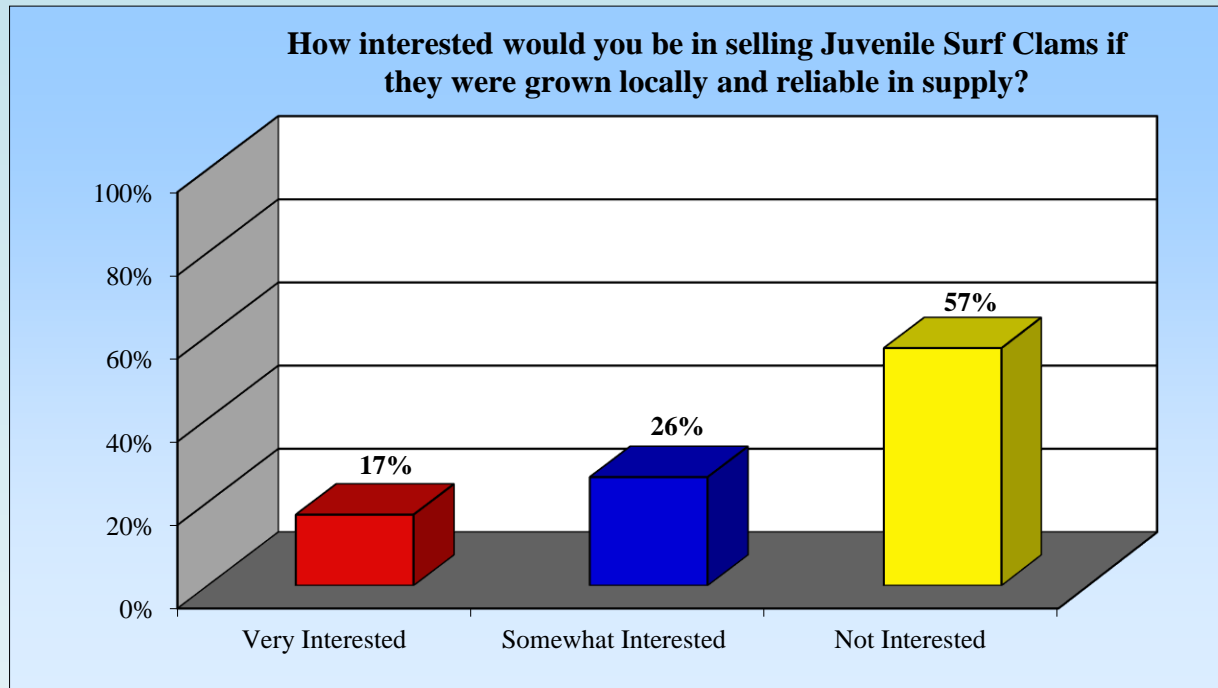
- *Customer interest in purchasing butter clams? 47% interested*



\*Survey (2014) conducted for SEMAC by:  
UMass, Center for Marketing Research, Dartmouth

# Wholesale Seafood Dealer Survey Results – ‘butter clams’

- *Wholesale dealer interest in selling butter clams? 43% interested*
- Dealer concerns, “Illegal...legal size minimum”
- Prices paid in 2013 ranged \$.18 – \$.50/piece



\*Survey (2014) conducted for SEMAC by:  
UMass, Center for Marketing Research, Dartmouth

# Current Research

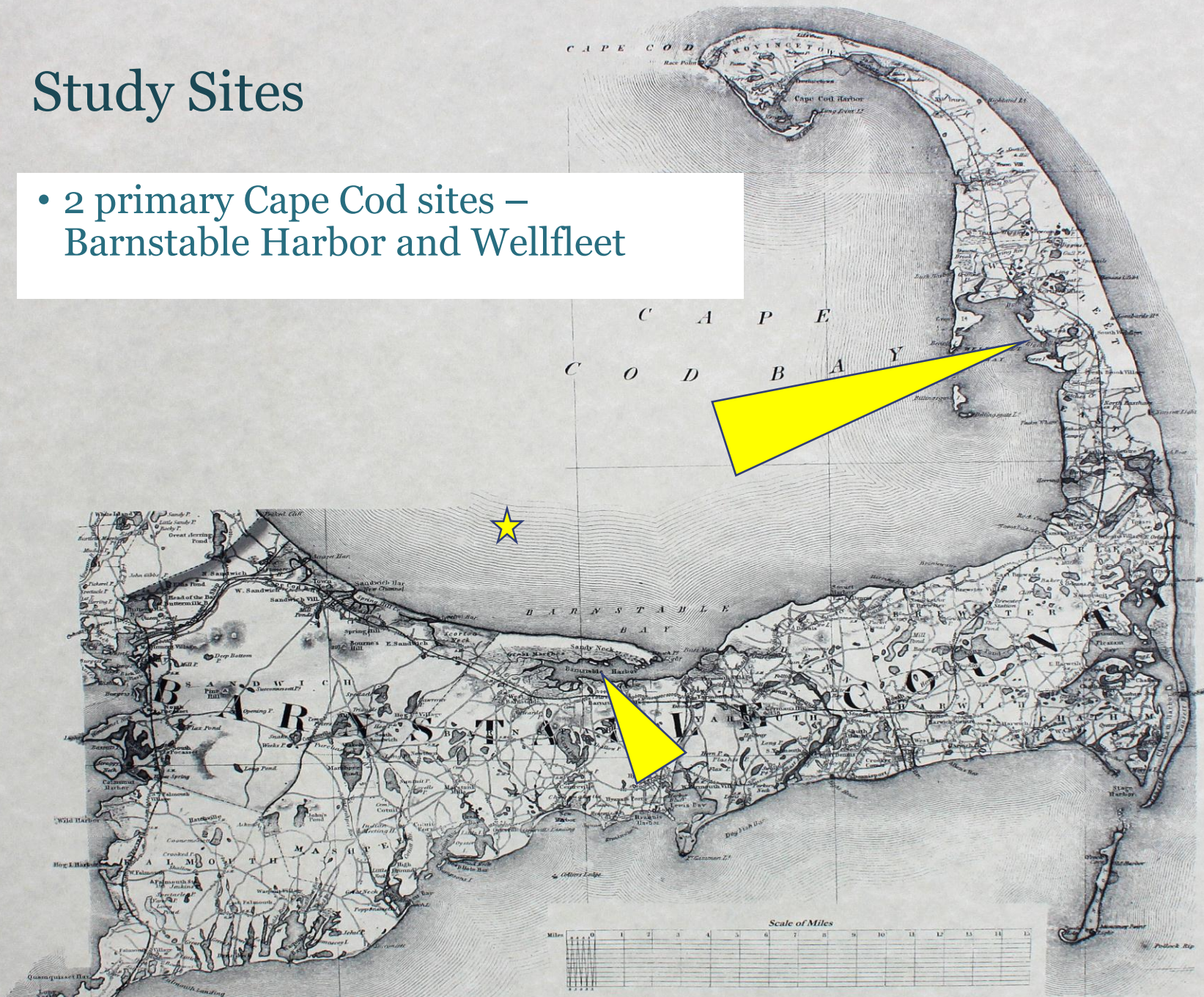
- 2015 local hatchery (ARC) spawn of surf clams
- 50,000 – 60,000 4-6mm seed were available

## Goals:

- 1) Deploy seed at several sites
- 2) Monitor growth & survival
- 3) Gain insight into the needs of this species for aquaculture
  - Water & sediment conditions
  - Temperature
  - Handling
  - Gear
  - Planting density
  - Predation

# Study Sites

- 2 primary Cape Cod sites – Barnstable Harbor and Wellfleet





# Wellfleet Surf Clams

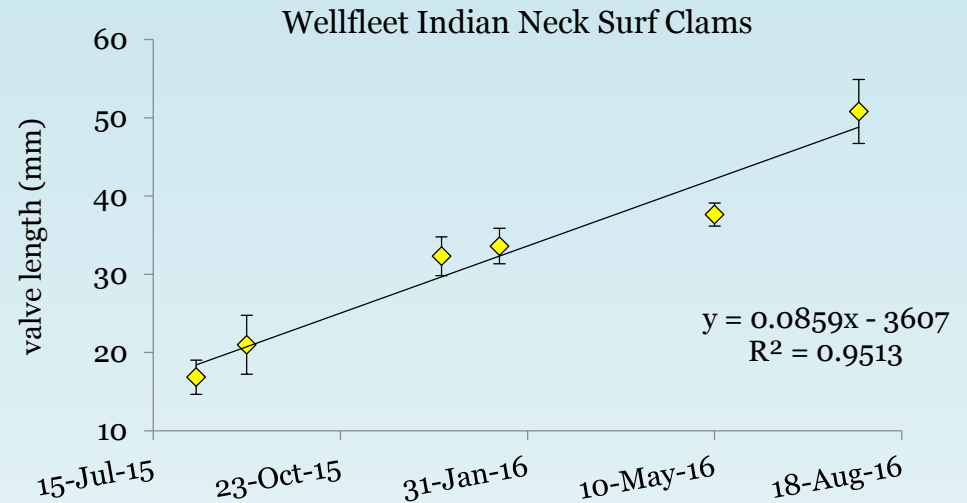
- Nursey boxes to quahog runs
- Late Fall 2015



- Planted at 6 – 8mm in June 2015 into nursery boxes

# Wellfleet Surf Clams – Growth

- Doubled in size from August '15 to January '16
  - a little over 5 months or 23 weeks
- Tripled in size from August '15 to July '16



# Barnstable Surf Clams – 5 Sites

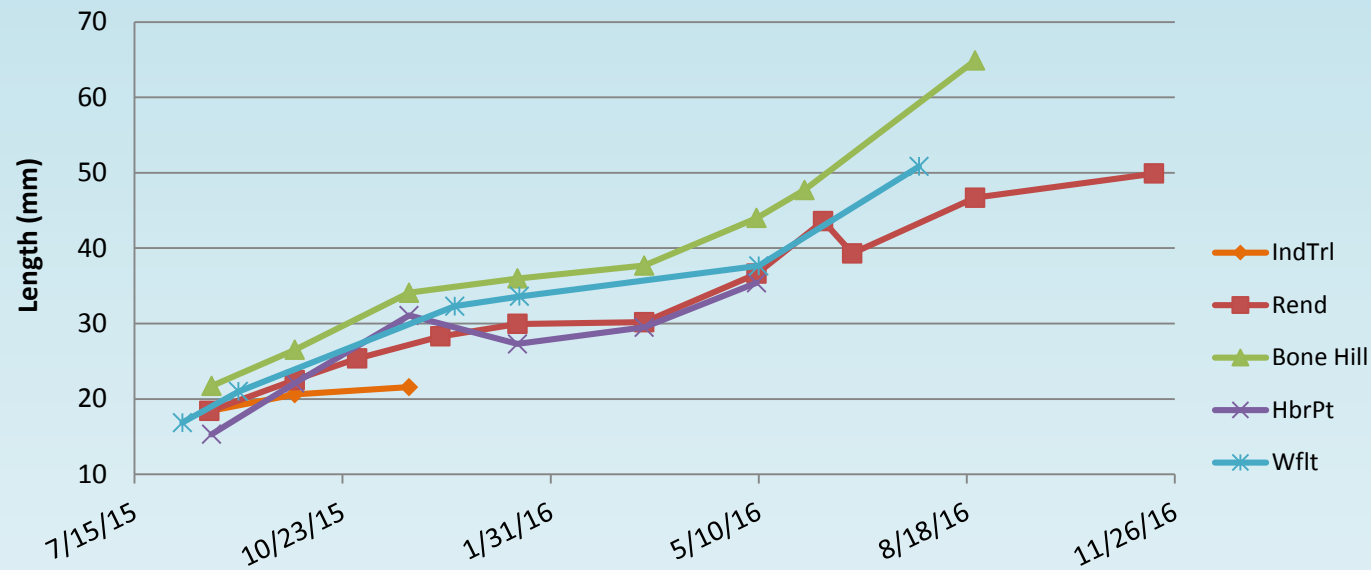
- 4 sites with Tenex mesh nets (14' x 20')
  - low intertidal
- 1 site with small wire mesh cages
  - high intertidal



# Growth – All Cape Cod Sites



Surf Clam Growth 2015 - 2016



~75 – 80% survival

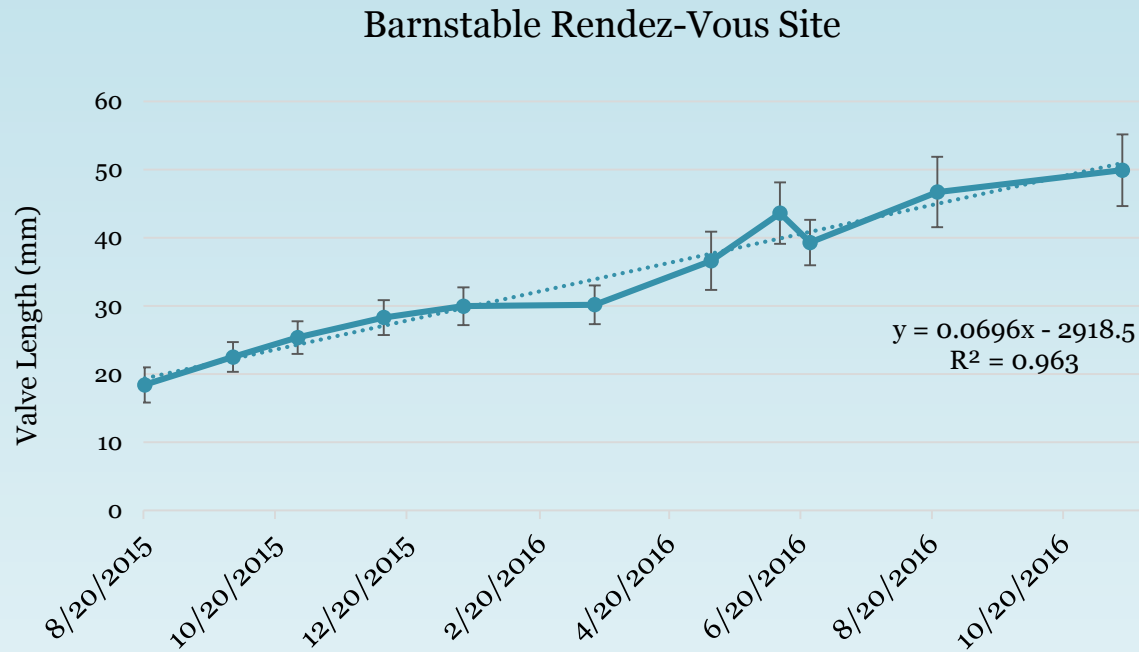
# Annual Growth Comparison – Atlantic Coast

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 <i>et al.</i> 1978
Barnegat Bay, NJ	34.0	56.0	22.0	Chang <i>et al.</i> 1978
Ocean City, MD	39.0	57.0	18.0	Chang <i>et al.</i> 1978
Chincoteague Bay, VA	42.2	68.6	26.4	Ropes 1989
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

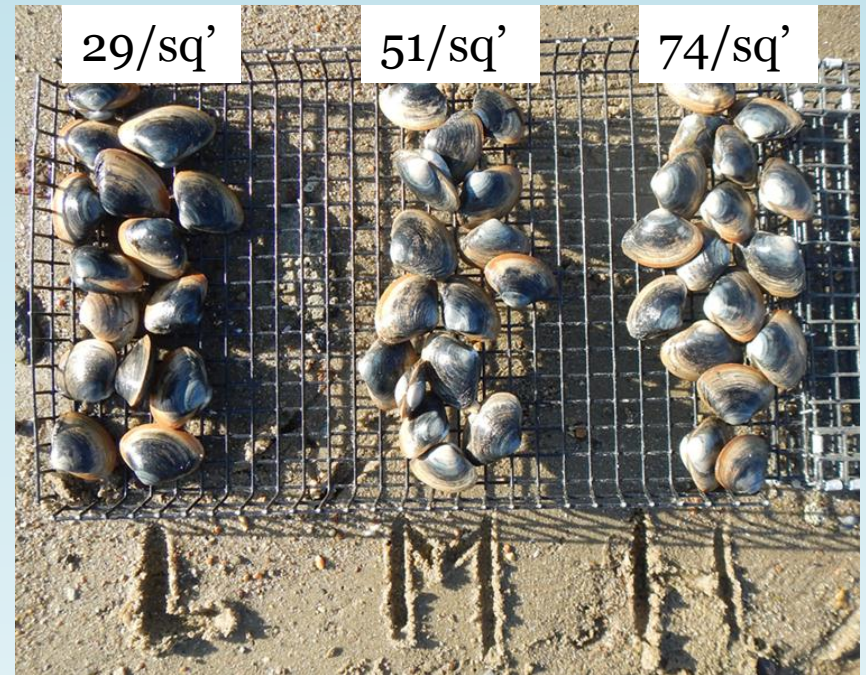
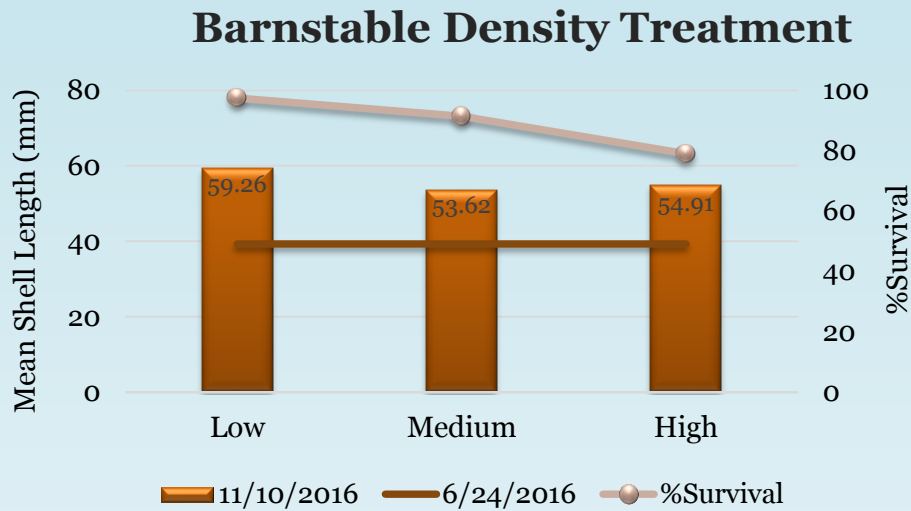
# 1-Year Growth

- Growth 18.4mm to 46.7mm in one year (154% increase)



# Density Treatment

- Rendez-vous site, Barnstable, MA
- Mesh trays @ 3 densities



# Shelf Life

- Keep cool
- Keep moist
- Best quality 8 days
- Use within 9 - 13

Test #1	Shelf Life Days													
12 clams - Uncovered Bowl	1	2	3	4	5	6	7	8	9	10	11	12	13	14
close when disturbed	12	12			10	10			9					
slow to close					2	2						8		5
remain gaped open									3			4		7
odor?														X

Test #2	Shelf Life Days													
15 clams - Unsealed Plastic Bag	1	2	3	4	5	6	7	8	9	10	11	12	13	14
close when disturbed			15		15		15			15	15		15	12
slow to close														
remain gaped open														3
odor?														X

Test #3 A - Unsealed Plastic Bag	Shelf Life Days													
B - Paper Cup	1	2	3	4	5	6	7	8	9	10	11	12	13	14
<b>A - 16 clams</b>														
close when disturbed				16		16			16				12	
slow to close														
remain gaped open													4	
odor?									X				X	
<b>B - 12 clams</b>														
close when disturbed				12		12			12					
slow to close													9	
remain gaped open													3	
odor?									X				X	



# Risks: Predation

- Moon snails and crabs



# Next Steps

## Goals of recent Saltonstall-Kennedy grant:

1. Determine best location and conditions to commercially grow out surf clam seed
2. Evaluate commercial feasibility to provide wholesale & retail markets with 'new' product
  - Evaluate best strategies (temperature, sediment type, tidal height, gear, predator control) for aquaculture of this species
  - Fine tune hatchery production of surf clam seed – demonstrate commercial-scale production capacity
  - Identify appropriate locations for surf clam culture
  - Determine effective grow out technologies
  - Document all costs associated with surf clam production
  - Initiate formulation of a marketing strategy