

An aerial photograph of a coastal area. The water is a deep blue-green color. A white sailboat is visible in the middle of the water. In the foreground, there's a small motorboat. The shoreline on the right is lined with several docks and small houses. The sky is clear and blue.

# Invasive Species In Aquaculture

Dan Martino  
Co-Owner of Martino's Seafood, LCC



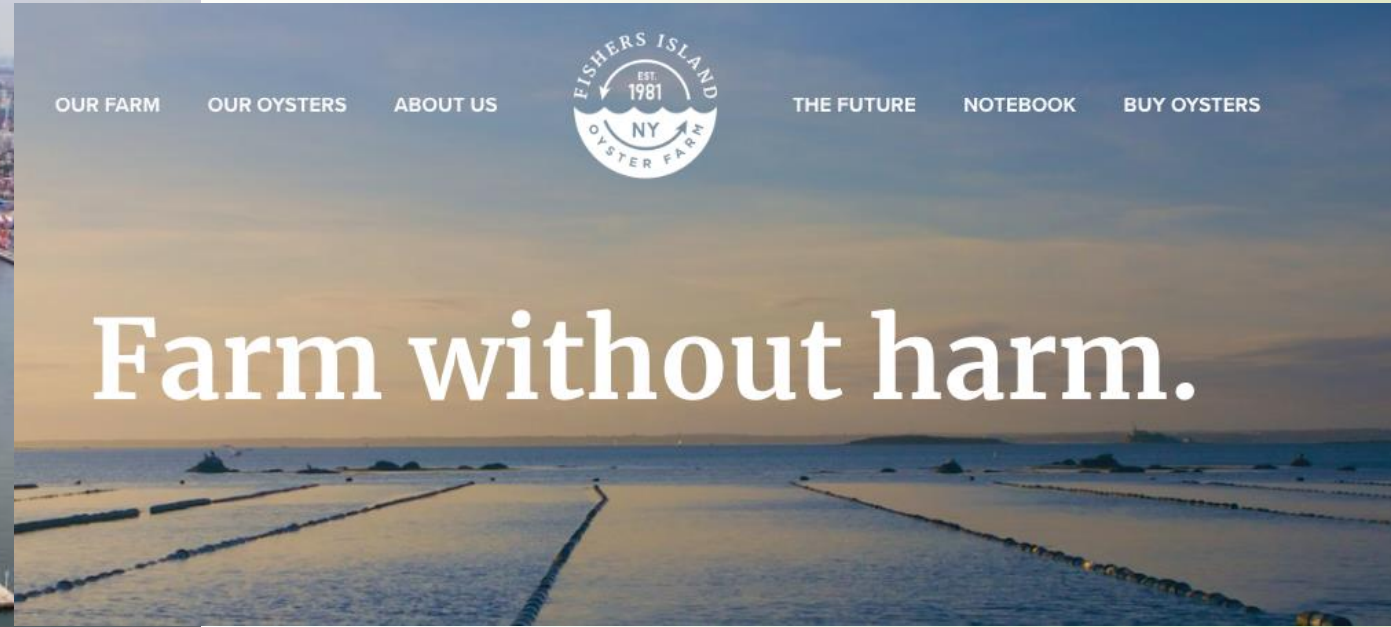
# How We Got Into This

Finance Guy



Camera Man

# Billion Oyster Project



Fishers Island Oysters



# The right seafood choices help fight climate change

Choosing certain seafoods over others can satisfy the palate and also help reduce adverse climate impacts.



By Rishya Narayanan

Wednesday, May 29, 2019

## TOPICS

[Food & Agriculture](#)

## Recent Posts

- [12 reports on carbon pricing, climate security, and more](#)



# What We're Doing

- Worked on Edgartown farm to gain experience – awarded first farm in Oak Bluffs history in 2014. Open ocean.
- 2015- teamed up with WHOI and MV Shellfish Group for research permit to farm sugar kelp
- 2017- applied for 1<sup>st</sup> commercial permit to farm and sell seaweed in State. Sold kelp to local restaurants.
- 2019- first permit in State to sell seafood at a farmer's market
- 2020- Ongoing 3 year bio-diversity study with WHOI eDNA and Southern Connecticut State University.
- 2021- Sea Ahead / Sprint program, working to develop USDA Organic label for the shellfish industry



How shellfish is typically farmed.



Wellfleet, MA



# How Martha's Vineyard Farms shellfish.

Bottom is not exposed at low tide.

Oysters remain submerged at all tides.

Bottom cages with rack bags sit on the bottom.

Work platform is utilized for air drying (artificial low tide) for proper husbandry.

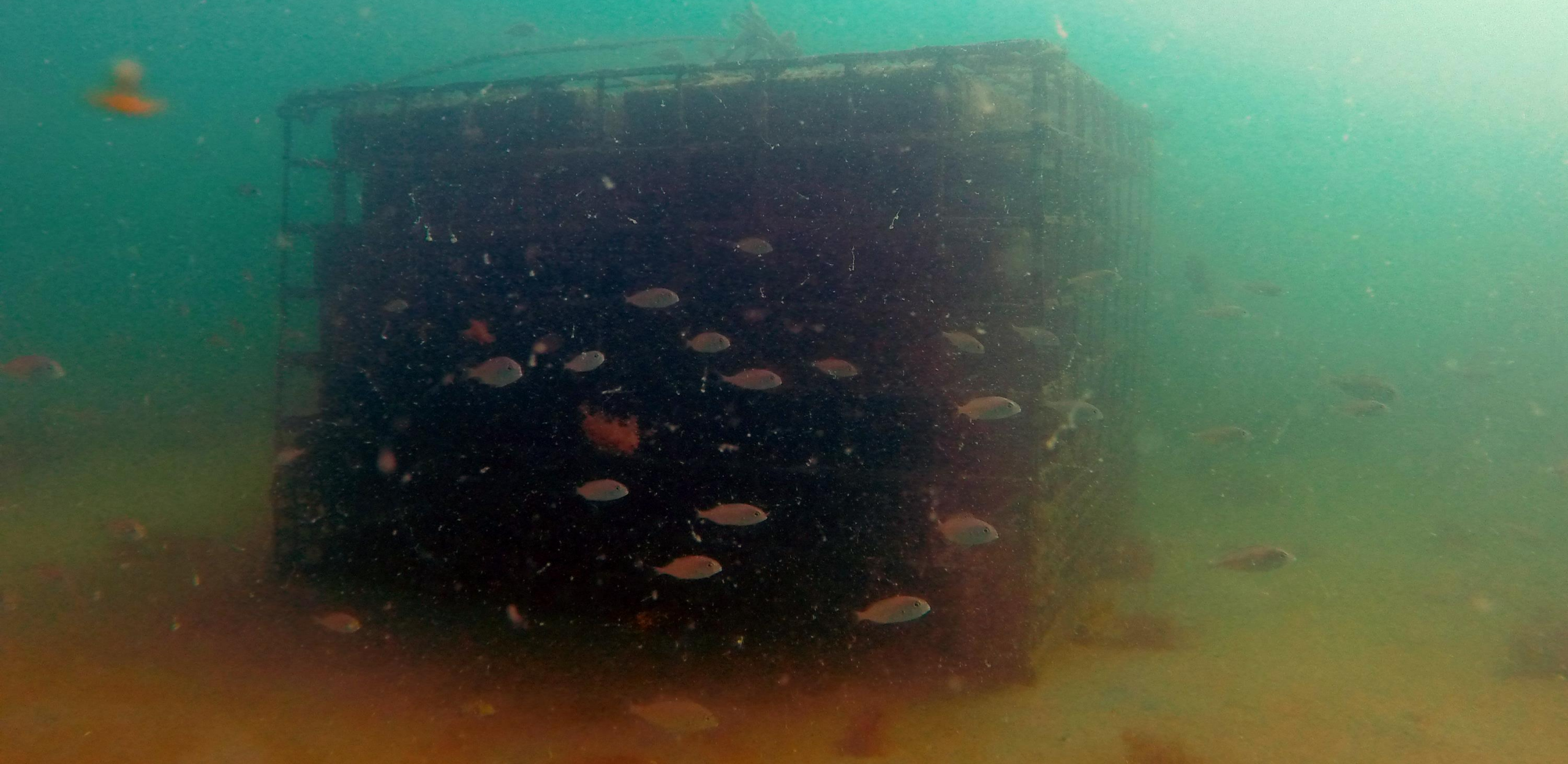
Requires boat capable of lifting 400lbs and a work platform to place cages on.



(Spearpoints. Katama Bay, Edgartown)



Oyster Cage sitting on bottom of farm



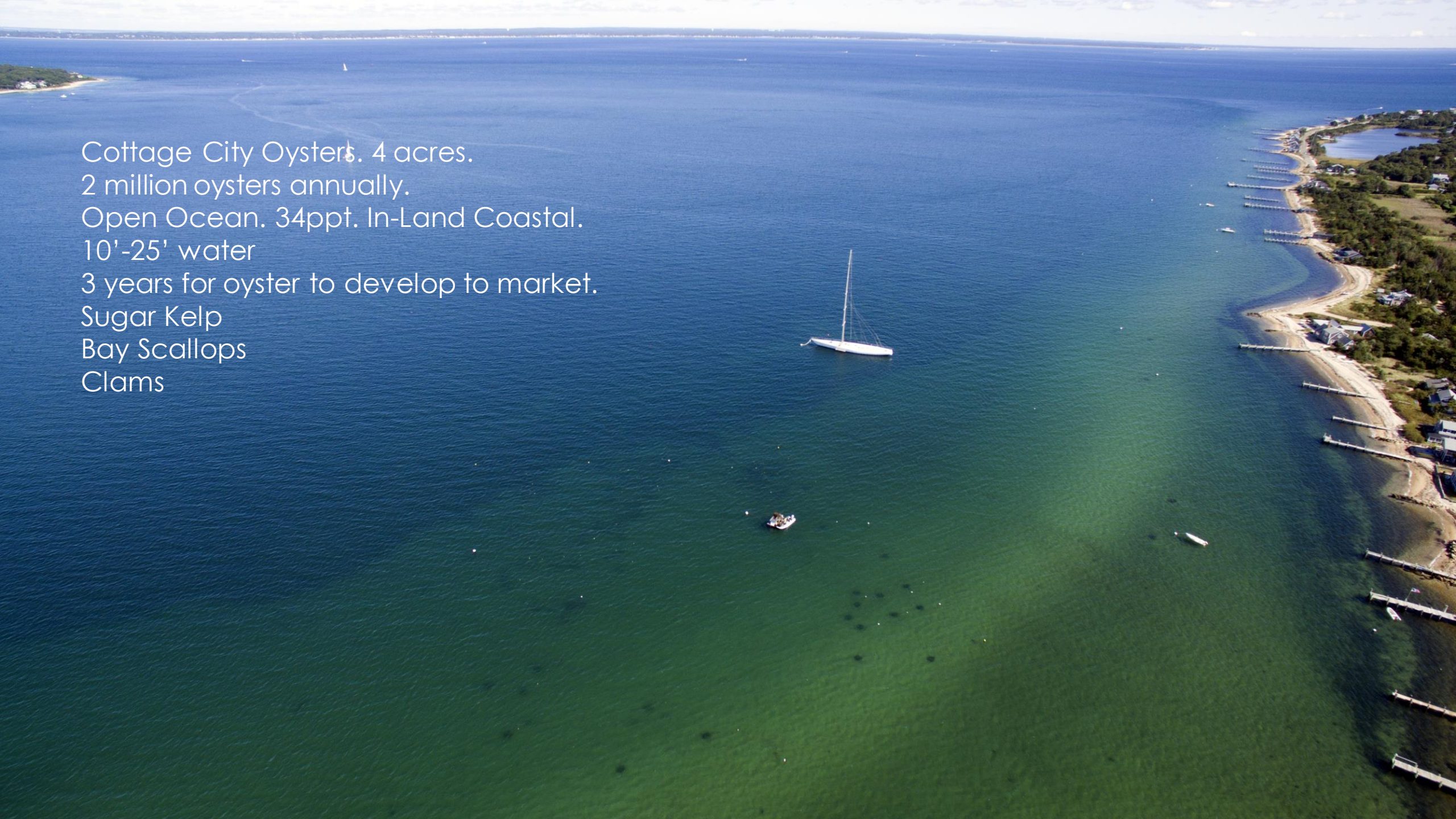


# Vineyard Haven Harbor, Martha's Vineyard.



Open Ocean Farming.  
Cottage City Oysters. 4 acres.  
2 million oysters annually.  
34ppt. In-Land Coastal.



An aerial photograph of a coastal area. The water is a deep blue-green color. A white sailboat is visible in the middle of the frame. A small motorboat is visible in the lower center. The coastline is on the right side, with several small docks and buildings. The sky is blue with some clouds.

Cottage City Oysters. 4 acres.  
2 million oysters annually.  
Open Ocean. 34ppt. In-Land Coastal.  
10'-25' water  
3 years for oyster to develop to market.  
Sugar Kelp  
Bay Scallops  
Clams



# Value of Aquaculture in MA

Table 14. 2019 private shellfish propagation permits and acreage under cultivation, by municipality.

Municipality	# Growers	Total Acres	Species Grown
Aquinnah	1	1.6	Quahog
Barnstable	49	158	Oyster, Quahog, Soft Shell Clam, Surf Clam
Bourne	8	15	Oyster, Quahog, Soft Shell Clam
Brewster	11	11.5	Oyster, Quahog
Chatham	2	7	Oyster, Quahog, Soft Shell Clam, Sugar Kelp
Chilmark	9	23	Oyster, Blue Mussel, Sugar Kelp
Dartmouth	2	1	Oyster
Dennis	26	32	Oyster, Surf Clam
Duxbury	28	77.5	Oyster, Quahog, Surf Clam
Eastham	27	39.6	Oyster, Quahog
Edgartown	13	17	Oyster
Essex	1	8.5	Oyster
Fairhaven	2	38	Oyster, Quahog
Falmouth	9	54	Oyster, Quahog, Surf Clam, Sugar Kelp, Steelhead Trout, Bay Scallop
Gosnold	1	32	Oyster
Harwich	1	0	Oyster, Sugar Kelp
Ipswich	3	3	Soft Shell Clam
Kingston	3	8.5	Oyster
Marion	4	2.5	Oyster, Quahog
Mashpee	5	19	Oyster, Quahog
Mattapoissett	2	7	Oyster, Bay Scallop
Nantucket	8	73	Oyster, Quahog
Oak Bluffs	2	2	Oyster, Sugar Kelp
Orleans	15	18.5	Oyster, Quahog, Blue Mussel, Surf Clam
Plymouth	30	81.5	Oyster, Quahog, Surf Clam, Bay Scallop
Provincetown	16	34	Oyster, Quahog, Soft Shell Clam
Rowley	3	4	Oyster, Soft Shell Clam
Truro	5	20	Oyster
Wareham	7	83	Oyster, Quahog
Wellfleet	93	261	Oyster, Quahog, Soft Shell, Surf Clam, Blood Arc
Westport	5	80	Oyster, Quahog
Yarmouth	4	27	Oyster, Quahog
<b>Grand Total</b>	<b>395</b>	<b>1240</b>	

Table 15. 2019 Aquaculture Landings and Value for Oysters and Quahogs.

American Oyster		
Town or Region	Pieces	Reported Value
Barnstable	13,388,943	\$7,358,572
Bourne/Falmouth	1,024,211	\$563,867
Brewster	586,945	\$336,143
Chatham	830,078	\$490,699
Dennis	2,328,009	\$1,278,132
Duxbury	10,191,839	\$5,736,938
Eastham	952,324	\$505,712
Edgartown	2,705,510	\$1,679,617
Essex	*	*
Kingston	183,543	\$99,392
Marion	87,934	\$44,881
Mashpee	326,051	\$187,631
Nantucket	475,925	\$375,572
Orleans	1,128,850	\$648,828
Other Island Towns	244,781	\$202,482
Other South Coast Towns	2,189,888	\$1,144,951
Plymouth	3,173,940	\$1,680,423
Provincetown/Truro	146,783	\$88,321
Wareham	1,117,200	\$677,450
Wellfleet	10,089,940	\$5,437,374
Yarmouth	907,110	\$498,202
<b>Total</b>	<b>52,079,804</b>	<b>\$29,035,187</b>
Quahog		
Town or Region	Pieces	Reported Value
Barnstable	645,803	\$190,989
Eastham/Orleans	95,283	\$25,196
Other Towns	31,737	\$7,641
Wellfleet	2,035,557	\$599,270
<b>Total</b>	<b>2,808,380</b>	<b>\$823,094</b>
<b>Total Aquaculture Landings Value</b>		<b>\$29,858,281</b>

\* Confidential Data; Totals reflect only displayed values.

Source: SAFIS Dealer Reports on April 21, 2020 and staff edits.





GREEN CRAB





# GREEN CRABS



- Destroy local eco-systems
- Decimate eel grass beds by clipping and uprooting vegetation
- Contribute to decline of wild Bay Scallops
  
- WHAT CAN WE DO?
- Grow shellfish in bags that “block” green crabs from products
- Trap and Eat them!
- Survey farmers about numbers of crabs in gear/on farms
- Create Green Crab traps and market for them. Food? Fertilizer? Bait?



## GREEN CRAB & MONKFISH CEVICHE

Green crab cafe

by Thanh Thai  
Blogger, Green Crab Cafe

- Ingredients**
- 1 lb Green Crab
  - 1 cup of diced monkfish
  - 2 thin slices red onion
  - 1 lime juice-to taste
  - 1/2 cup chopped chili peppers (optional)
  - 1/2 cup chopped cilantro leaves
  - 1/2 cup chopped scallion (green parts only)
  - Salt, to taste
  - A generous pinch each-lime and lemon zest
- Preparation:** 20 MIN  
**Cooking:** 25 MIN  
**Ready in:** 45 MIN
- Directions**
1. Boil the green crabs (use the amount depending on how much there is and your preference) for about 10 minutes. Drain and completely cool.
  2. Remove the roe and save.
  3. Boil and dice monkfish until just cooked (if you can easily pierce with a fork-then it is done).
  4. Thinly slice red onion and soak in cold water, squeeze out water and set aside.
  5. Combine all ingredients in a bowl and gently mix.

## GREEN CRAB FRIED RICE

by Julie Upham  
4th Grade Teacher, West Bath School

### Ingredients

- Green crab stock - amount needed to cook rice (may vary)
- 3 cups cooked rice
- 2-3 tablespoons vegetable oil
- 6 cloves chopped garlic
- 2 eggs, beaten
- 3 tablespoons fish sauce
- 4-6 chopped green onion
- Salt and pepper to taste

### Directions

1. Cook the rice according to package instructions, substituting green crab stock for the water.
2. Heat oil in large skillet, sauté garlic 1-2 minutes.
3. Pour beaten eggs into pan and scramble using spatula.
4. Add cooked rice and fish sauce to skillet, stir well, season to taste.
5. Add chopped green onions, stir, and serve immediately.

**Preparation:** 10 MIN  
**Cooking:** 25 MIN  
**Ready in:** 35 MIN

## GREEN CRAB STOCK

by Julie Upham  
4th Grade Teacher, West Bath School

### Ingredients

- Make 6 quarts
- 4 tablespoons olive oil
- 2 bunches celery, with the leaves, about 1 pound, roughly chopped
- 1 large red onion, roughly chopped
- 1 small head fennel, cut into 1/2" slices
- 12 green ribs (optional)
- Salt
- 2 bay leaves
- 1 tablespoon Old Bay seasonings
- Approximately 2 quarts water
- 2 cups white wine
- 2 dozen green crabs

### Directions

1. Boil crabs well in cold water. I recommend doing this outside in a large pot, bucket, with water and throw your crabs in. Stir well and leave them in the stock as boiling.
2. In a large stock pot or boiler pot, heat the olive oil to medium. Add the onion, fennel, celery, bay, and stock until vegetables are soft, about 15 minutes. Add celery, the salt, bay leaves and Old Bay and stir well, tossing the vegetables, seasoning. Allow to cook for 5 more minutes, or until the onions just begin to brown.
3. Add the water and wine, and bring to a boil. Let simmer for 10-20 minutes, stirring occasionally, particularly the rice wine.
4. Bring stock heat to a hard boil. Bring the crabs into the kitchen and add to the stock. Allow to cook at a strong simmer/low boil for 45 minutes. Let cool the cooked crabs and as much of the vegetables as you can. Strain the stock through cheesecloth. Pour into pan or plastic containers for storing.



A close-up photograph of a person's hand holding an open oyster shell. On the inner surface of the shell, a small, green and white Oyster Drill is visible, along with a cluster of small, yellow, oval-shaped eggs. The background shows other oyster shells and a wet, rocky surface.

The biggest problem is usually the smallest.  
It's all in the details.

Responsible for roughly 20% of  
mortality.

Currently zero comprehensive disease  
and predator management plan in  
MA for shellfish.

Oyster Drill and eggs  
on an oyster





# Oyster Drills

- Small enough to infiltrate aquaculture mesh bags. Able to kill/eat shellfish. Lay eggs on shellfish.
- WHAT CAN WE DO?
- Current Solutions: Hand Cull, Traps
- Students could: Survey farmers to understand nature of the problem. How many drills per bag? Does this number change throughout the year? Number of eggs per bag? What is their preferred food? Experiment to prove this. Can we make a trap, based on their food preference? Does the trap work? Create a market for the drills (chicken feed, human food, etc).





COME TO THE FARM!

2 ACRES DEDICATED TO SCIENCE AND  
LEARNING

Questions?



# Martino's Seafood

Martha's Vineyard, MA

Dan Martino

Co-Owner | Captain | Farmer

[DAN-MARTINO@HOTMAIL.COM](mailto:DAN-MARTINO@HOTMAIL.COM)

[WWW.COTTAGECITYOYSTERS.COM](http://WWW.COTTAGECITYOYSTERS.COM)

COTTAGE CITY  
OYSTERS

MARTHA'S

VINEYARD

