

Challenges and Opportunities in Using Aquaculture for Nitrogen Bioextraction

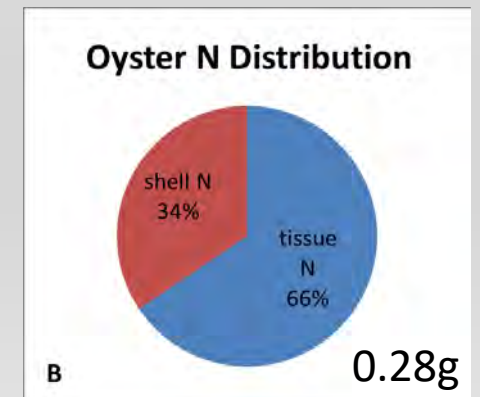
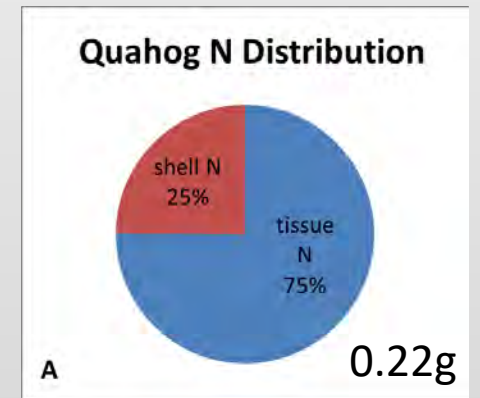


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Shellfish incorporate local nitrogen as they grow

- Our local shellfish incorporate nutrients like nitrogen as they grow
- Harvest of the shellfish can result in nitrogen removal



It's a growing and harvesting operation

- Not without its challenges...



Challenges with Shellfish - siting

- Social acceptability of use of space
- Water quality concerns in areas that most need clean up
 - Also habitat challenges



Challenges with Shellfish - physical

- Storms and ice
- Seed availability
- Disease
- Predation
- Adequate resources for grow out



Challenges with Shellfish - harvest

- Water quality classification
- Harmful algal blooms
- Market or end use?
 - Recreational
 - Commercial



Market challenges



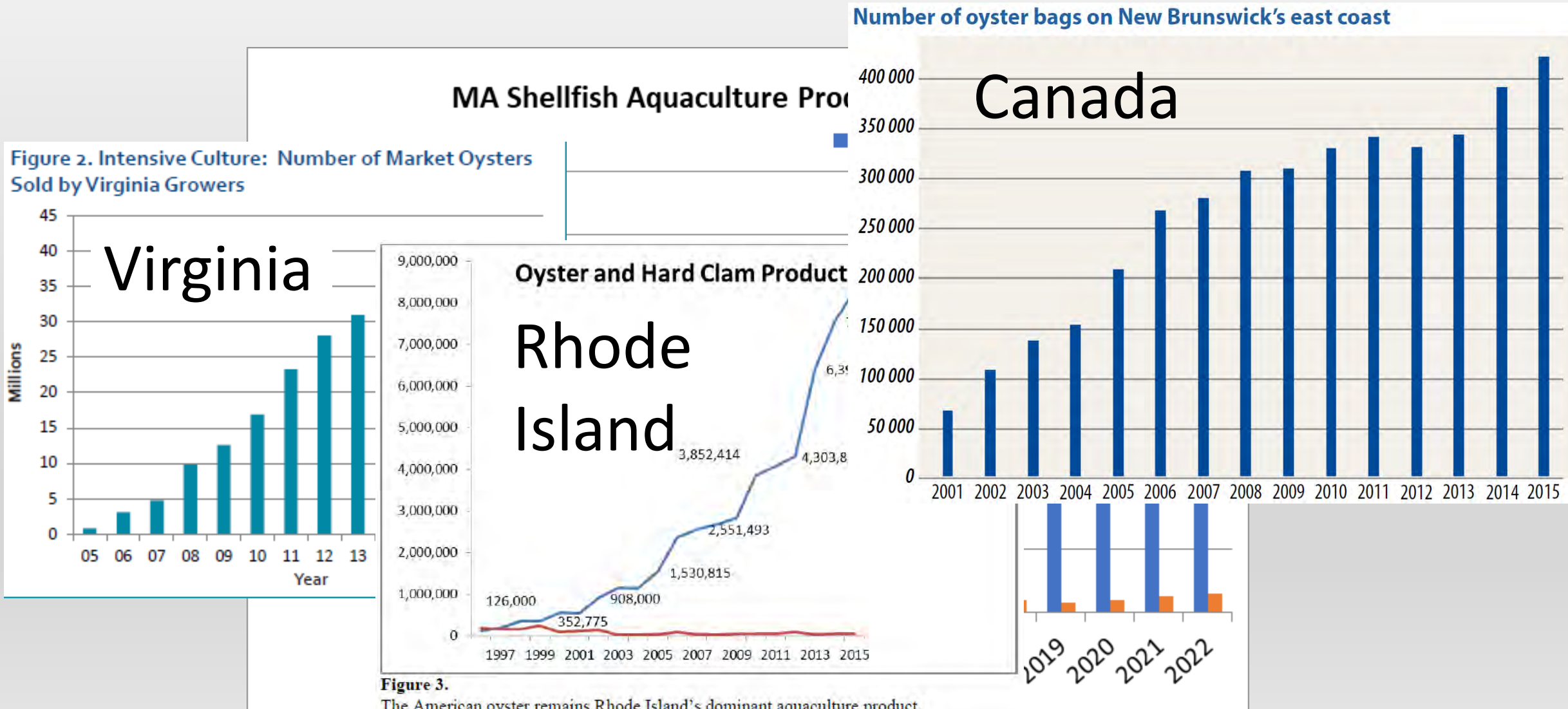
Unintended market misconceptions

- Oysters or clams used for “pollution control” can’t be eaten
- “They can’t be eaten right?”
- A lot of mixed messages when water quality improvement is goal



Market competition

- North America is investing heavily in oyster production



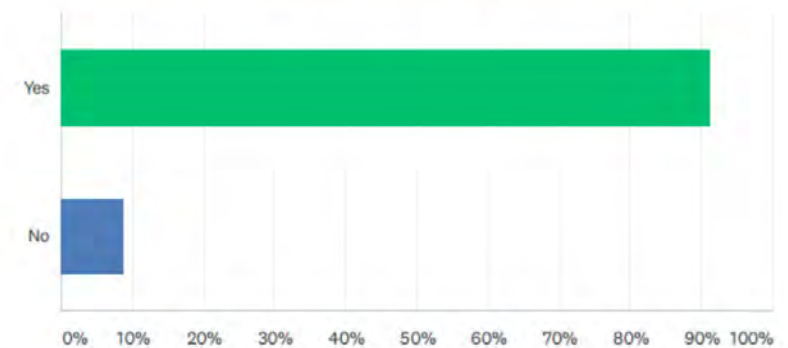
Grower survey on oyster market challenges

- Market is not unlimited
- “fall glut” a major concern
- Concern about large scale municipal shellfish grow out



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

Answered: 69 Skipped: 1

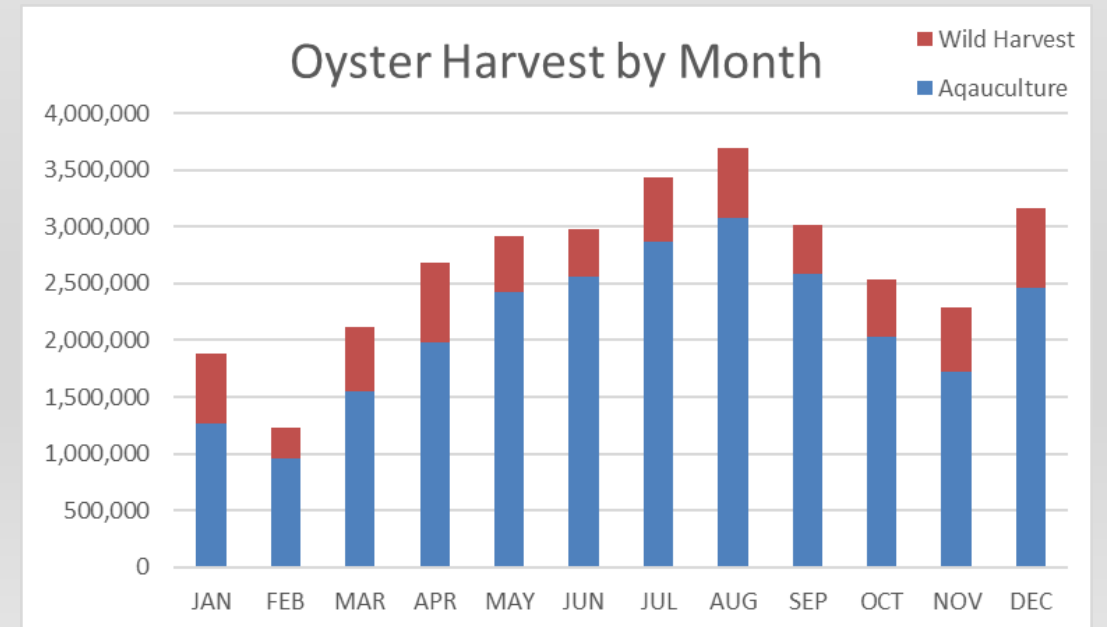
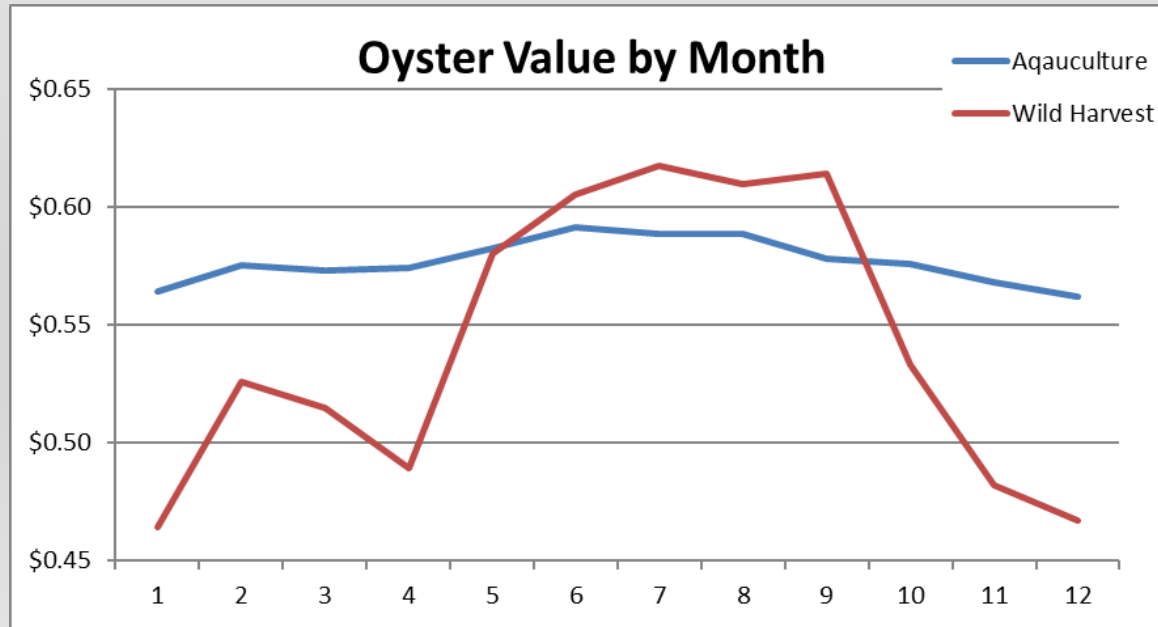


ANSWER CHOICES	RESPONSES	
Yes	91.30%	63
No	8.70%	6
TOTAL		69

Oyster Value Volatility

- Opening of large-scale fisheries can cause market turmoil
 - “cannibalize” some of current market share and drive down the price
 - Lack control over market price

2015 MA data



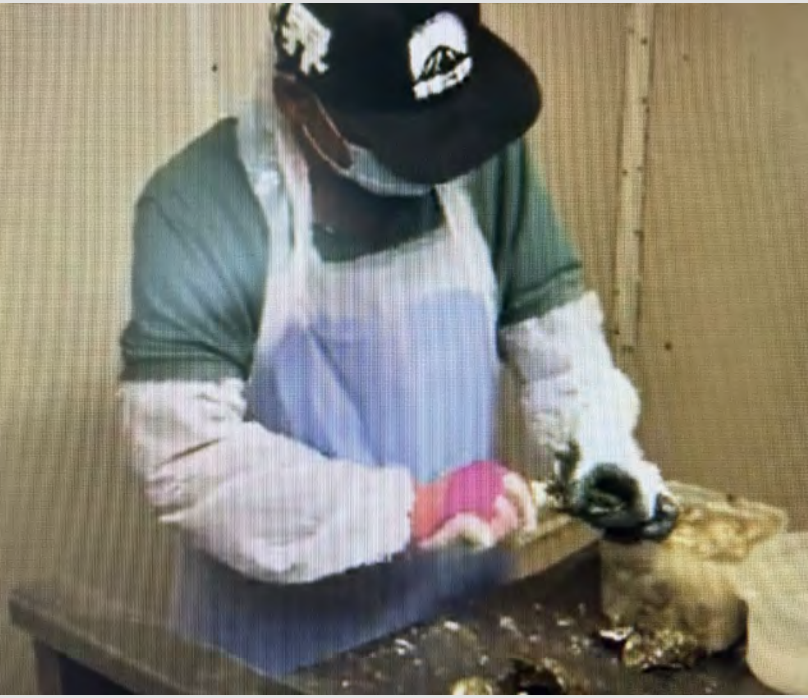
Oyster value – supply and demand

- 2004 to 2022 had inflation rate average of 54.9% on all products
 - \$0.50 should be \$0.77 now

Year	Gal of gas	Gal of Milk	12oz Corn Flakes	Oyster (to harvester)
2004	\$ 1.88	\$ 3.16	\$ 2.99	\$ 0.50
2014	\$ 3.37	\$ 3.69	\$ 3.79	\$ 0.56
2022	\$ 3.29	\$ 4.09	\$ 5.99	\$ 0.57
Inflation since 2004	75.0%	29.4%	100.3%	14.0%

Non-commercial Opportunities?

- Shucked meats donated to food banks
- Or possibly non-commercial species



Donating Oysters for Food Bank Use

Benefits

- Bigger oyster meats more N mitigation potential
- No commercial competition!
- Feeding people local protein!



Challenges

- Needs a legal pathway for towns
- Still has cost associated with shucking the oysters

Non-commercial species

Seaweeds



Ribbed mussels



Food for Thought

- Removing nitrogen through shellfish requires a lot of shellfish
- Ramping up shellfish production requires a harvest strategy
- Can we develop in water mitigation methods to avoid market competition???
- Where do we see these projects long term?



Thanks!

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