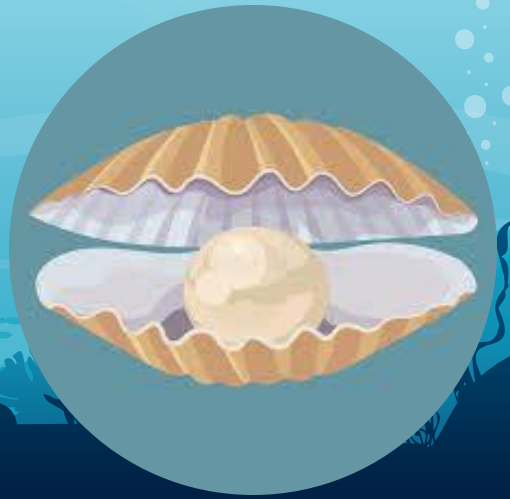
Subtidal Solutions: Investigations of the Subtidal Culture Methods of Soft Shell Clams



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Background

Why develop a new aquaculture species in Maryland?

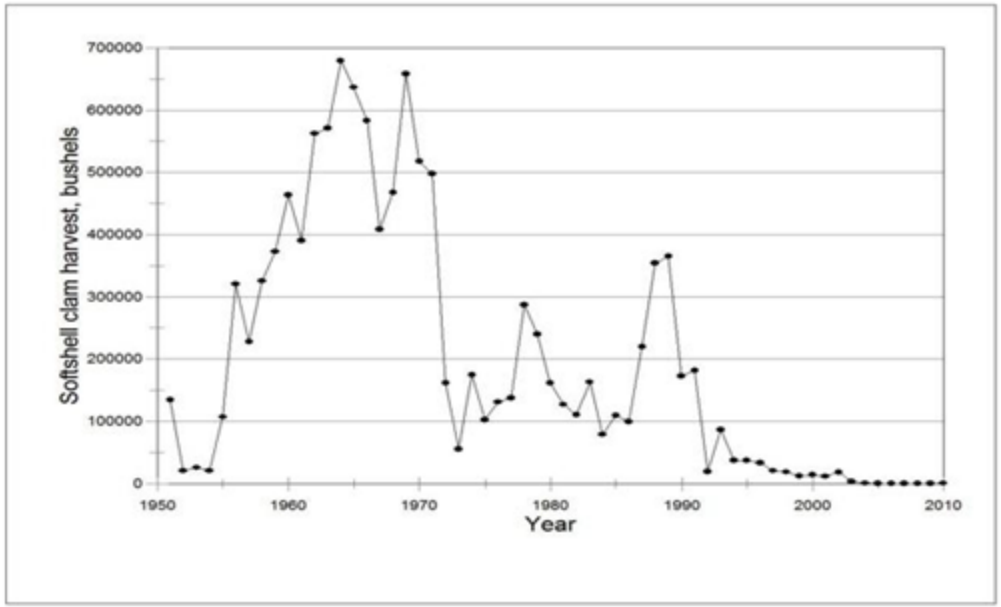
- Maryland's only aquaculture species is the Eastern Oyster

- Improve aquaculture farmer resiliency by giving them a second species to grow, reducing the impact of mass mortality events within oysters

Background

Why the Soft Shell Clam?

- Ability to grow and survive in low salinity waters
- Important role in Maryland fishing industries in the last century



Background

Challenges for Soft Shell Clams

- SSC aquaculture began in the Northeast. Southern Maryland lacks the intertidal flats that New England offers, making it harder to grow clams in mass numbers
- Maryland summer temperatures are too hot, SSC usually can't survive temps beyond 28°C. The average summer water temperature in the Chesapeake Bay is about 29°C
- Since we do not have the sprawling flats like the Northeast, we must use gear to culture clams in subtidal environments

Background

What is Gear?

- Gear is equipment used to house, raise, and protect aquaculture species

- Different types are made to accommodate different environmental settings

Preliminary Work

- By developing and testing several culture methods from 2022-2023, the PEARL aquaculture team found two sand-based culture methods that showed fast growth and high survival

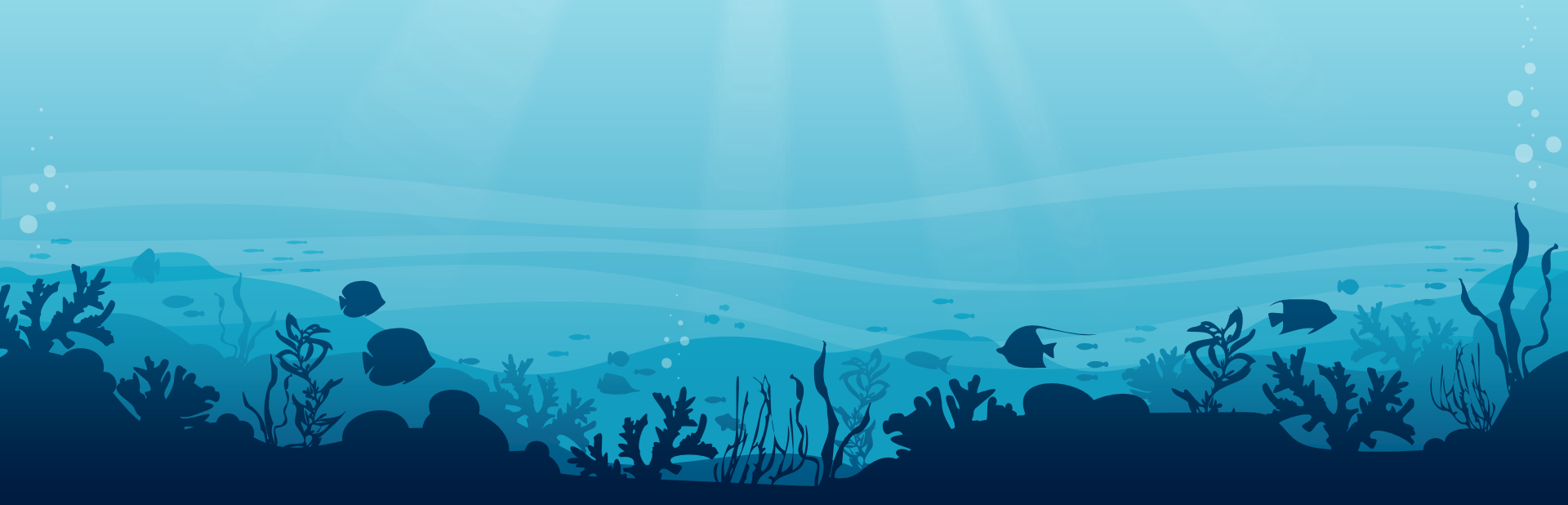
- In 7.5 months, the clams grew up to 1.8 inches, just under market size. The grow out period was cut-off by summer heat.

Floating Sand Bottle

Bottom Tray

Goal for this Study

- Exceed 2 inches before summer heat by upgrading the current gear types



Methods

Gear Upgrades

Floating Sand Bottle

-Too small

-

Overcrowded

Floating Tray

-More space

-More bouyant

Methods

Gear Upgrades

Bottom Tray

-Biofouled
-Predators

Birdcage

-Protection
-Improved Water flow

Methods

Deployment

Floating tray: 3 replicates, 100 1yr old clam seed per tray deployed only at pier site

Birdcage: 3 replicates, 100 1yr old clam seed per tray, deployed at river and pier sites.

Pier: shallow, more stagnant (<1m)

River: deeper, more flowing water (2-3m)

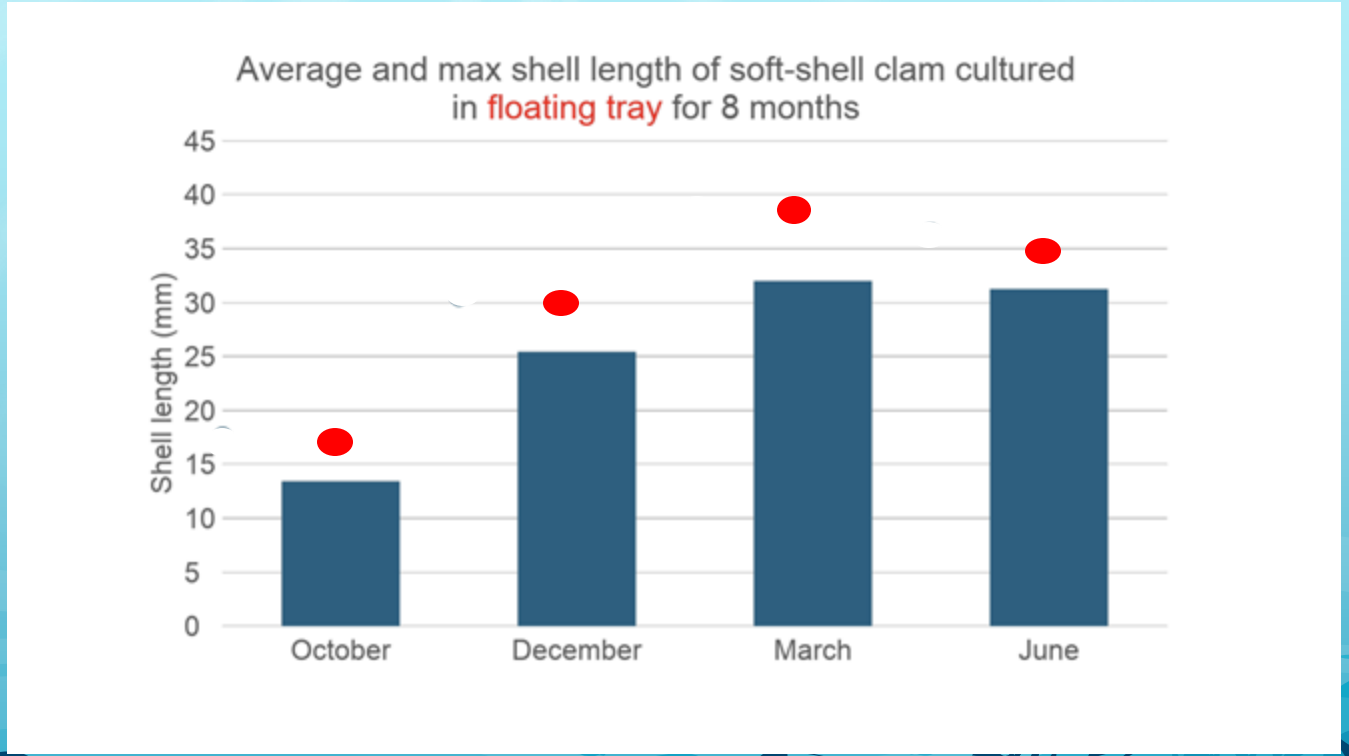
Methods

Retrieval & Measurements

- Sift and clean clams
- Separate dead & recruits
- Record Shell Length of 25 clams

Results

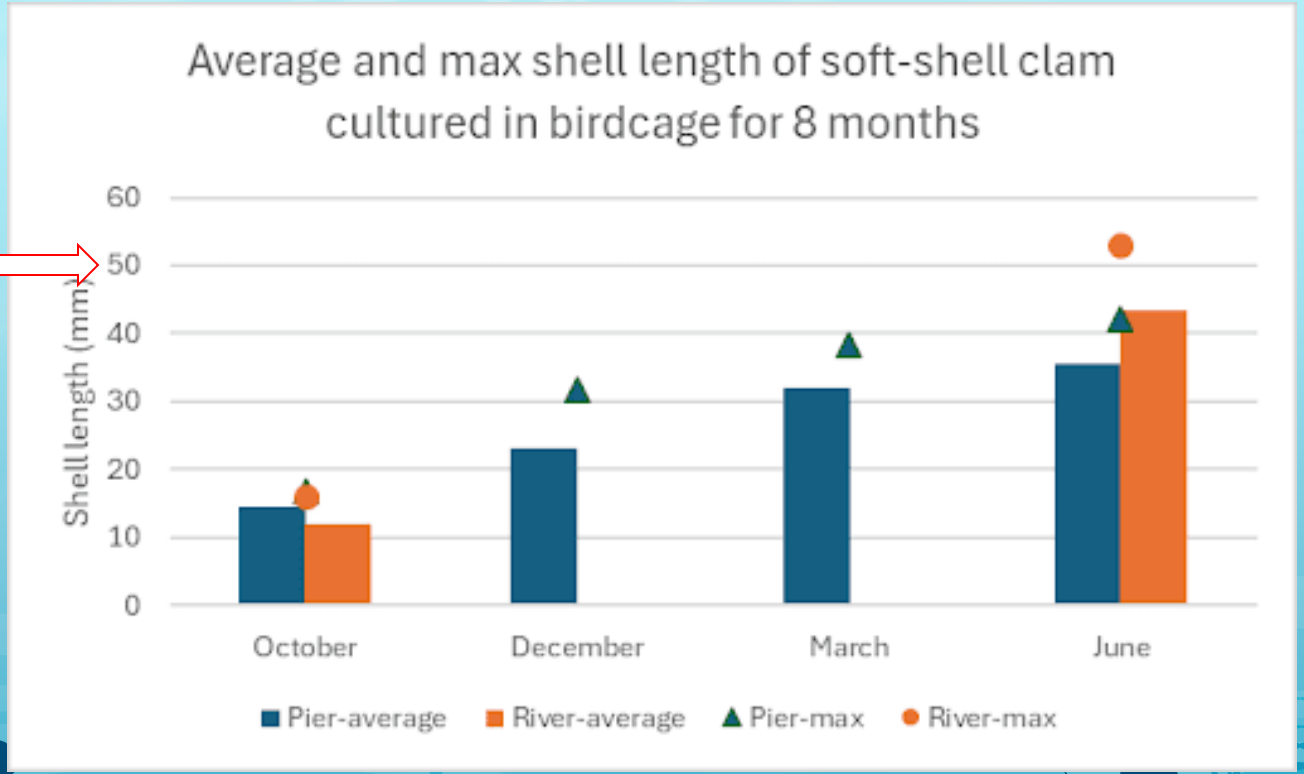
Floating Tray



Results

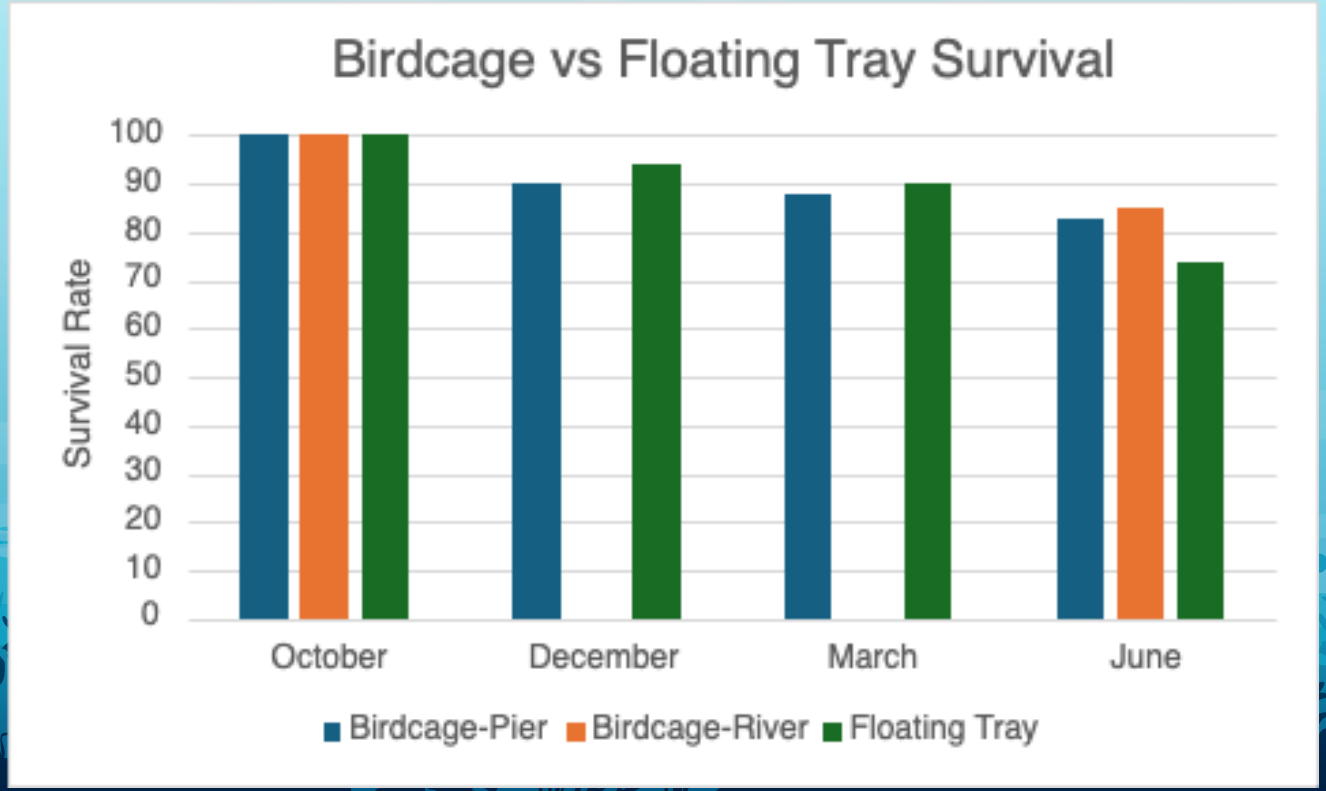
Bird Cage

Commercial Size



Results

Birdcage vs Floating Tray Survival



Conclusions

- The Birdcages showed both the highest survival and growth, making it our best gear candidate

- Birdcages at the river site showed higher growth than the birdcages at the pier, likely due to increased water flow in the river.

Conclusion

- Bird Cage River results reveal that is is possible to grow clams to market size (2 inches) in under 1 year, avoiding the summer heat

Future Works

- Test birdcage at deeper water to see if clams can withstand summer heat

- Further improve gear functionality and deployment density

Acknowledgements

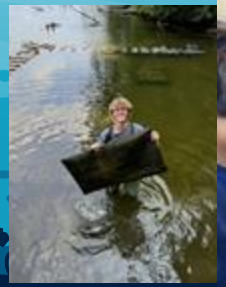
I'd like to thank my fellow interns, my mentors Brittany and Ming, and all the PEARL staff who made this project possible.

This project is funded by the Maryland Sea Grant, MSU Office of Technology Transfer, and the National Earmark.







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Thank you!!!