

Bay Scallop Aquaculture

Optimizing Production in Year One

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The Decline of the Wild Bay Scallop Fishery

- Commercial fishery
 - Rapid decline since 1980's
 - Why?
 - Overfishing
 - Loss of eelgrass beds
 - Coastal pollution



Bangor Daily News



NOAA Habitat Conservation

Bay Scallop Aquaculture

- Incentives
 - High market value
 - Expand farmed species
 - Mitigate risk
 - Similar gear/Low startup cost
 - Job creation
- Complications
 - Physical demands
 - Limited knowledge on proper culturing methods

Bay Scallop Investigations: 2016

1. Maximize Nursery Growth and Survival



2. Maximize Growout Phase Growth and Survival



Floating Downweller Nursery System

- First used successfully by Ward Aquafarms in 2015
- Seed (0.75mm) to growout size (>20mm)
- Similar to Floating Upweller System (FLUPSY)
 - Floating dock
 - Six silos
 - Up to five trays per silo
 - Increased surface area
 - Flow (Reversed)

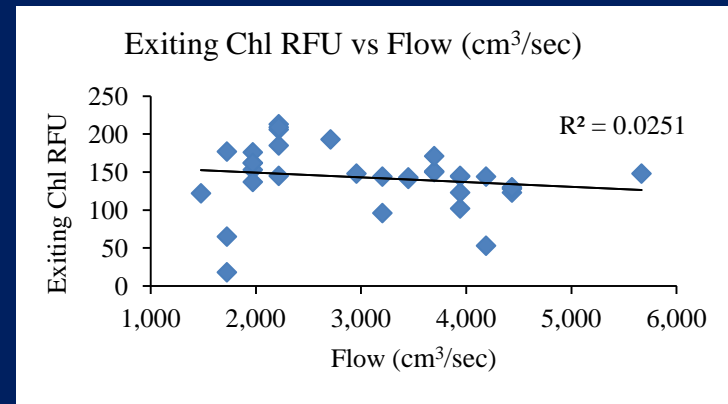
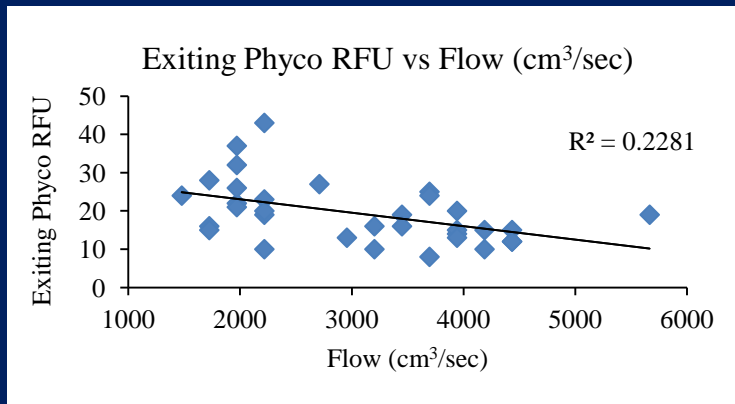


1. Maximize Nursery Growth and Survival

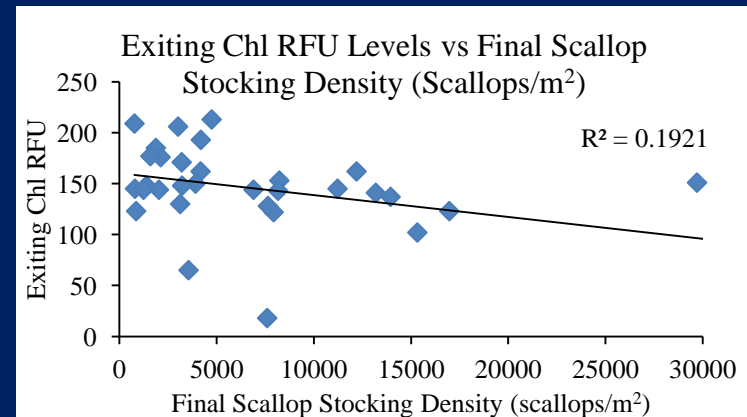
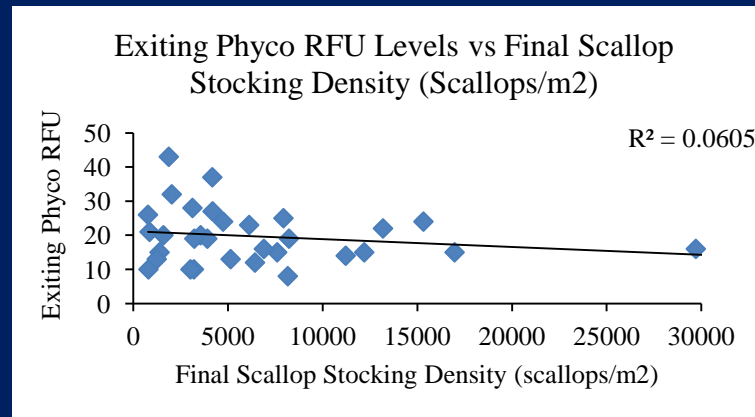
- Two Floating Downweller Systems
 - Twelve silos
 - Up to four stocked trays per silo
- 500,000 bay scallops
 - Four different densities (1X, 2X, 4X, and 8X)
 - 900-36,636 scallops/m²
 - Every 14 days, for 2 months
 - Measured flow rate and food availability
 - Sorted, measured, and restocked scallops
 - Measurements: Shell heights, counts per 100ml, total volume

Food Depletion

- Food measurements (Chlorophyll a and Phycocyanin RFUs)
 - Food depletion based on flow (cm³/sec)

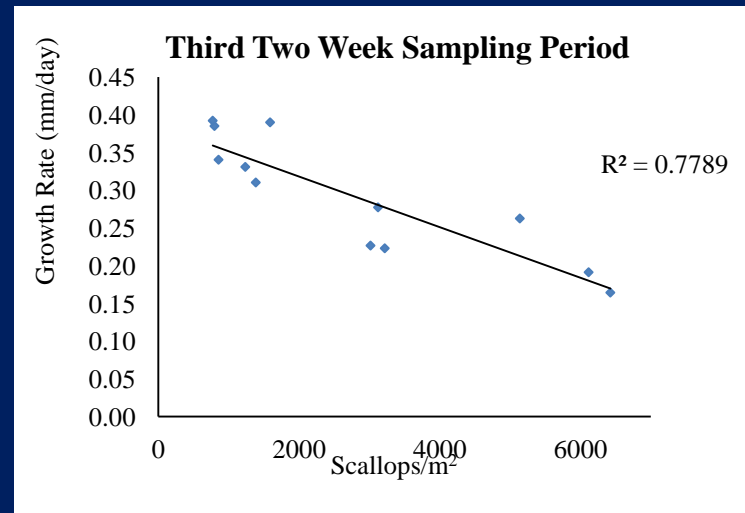
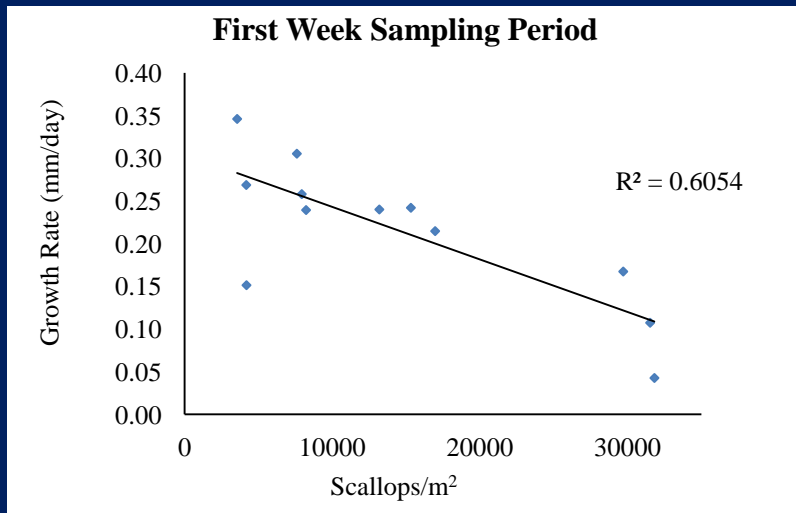
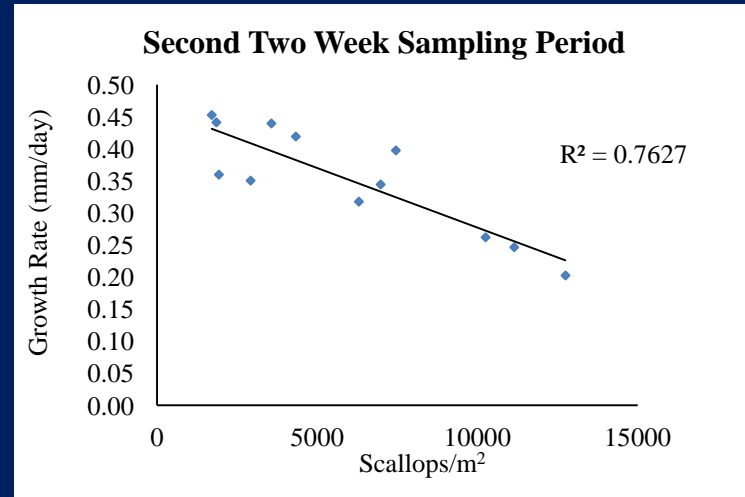


- Food depletion based on final stocking density (scallops/m²)

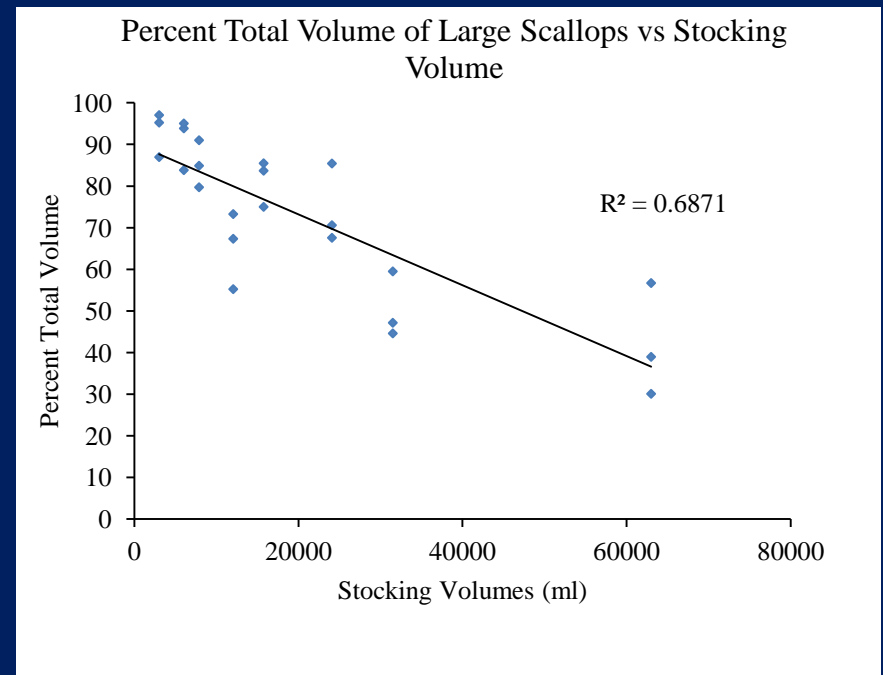
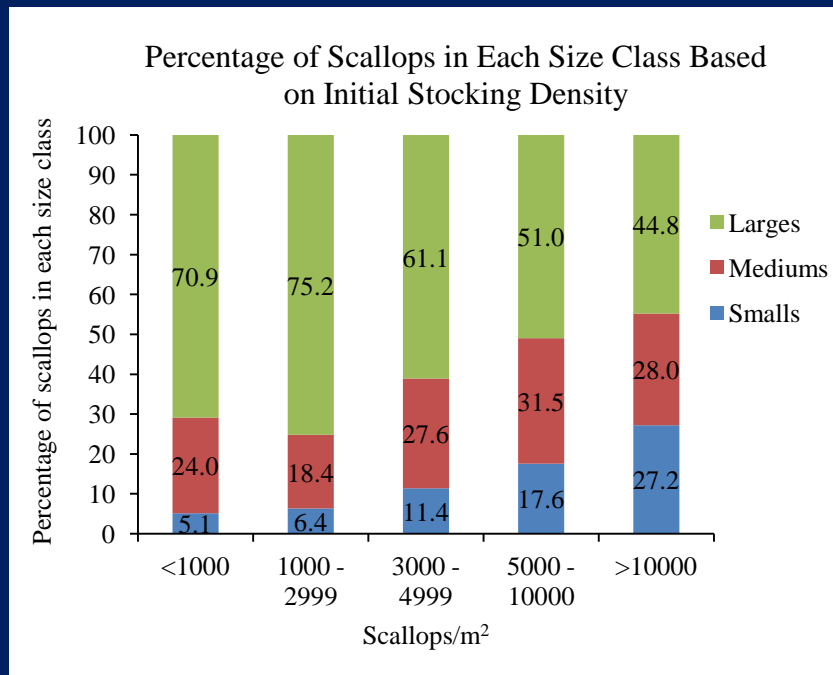


Bay scallop growth rates (mm/day) based on initial stocking density (scallops/m²)

- Dependent on stocking density
 - Stocking density: 900-36,636 scallops/m²
 - Growth rates: 0.05-0.70mm/day
- Increasing dependence as scallops increase in size
 - Avg stocking size: 9.8 – 18.6mm

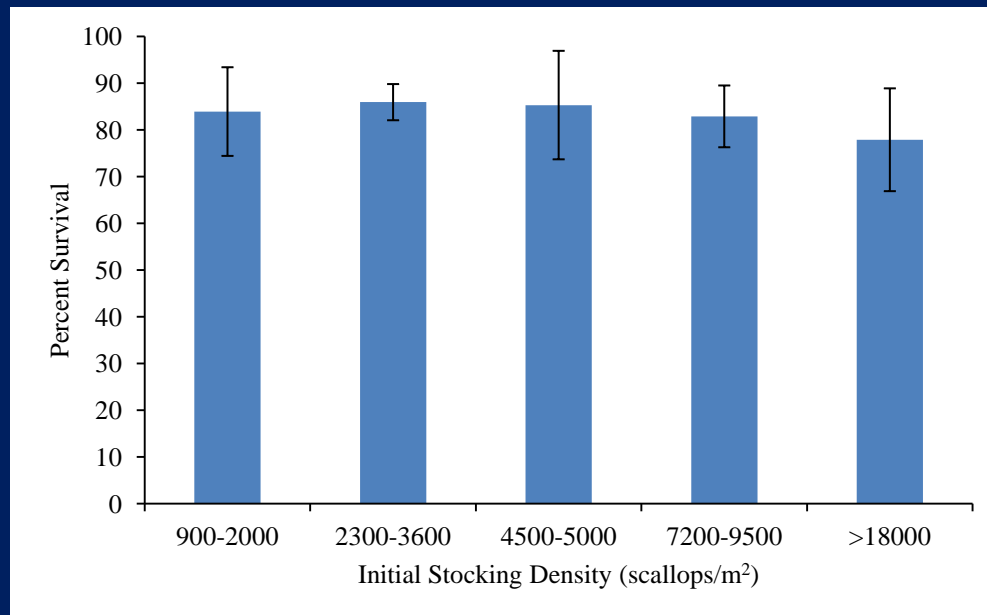


Size Class Yield based on Initial Stocking Densities and Volumes



Survival Based on Initial Stocking Density

Starting number of scallops/m ²	Percent Survival
900 - 2000	83.9 ± 9.5
2300 - 3600	85.9 ± 3.9
4500 - 5000	85.3 ± 11.6
7200 - 9500	82.9 ± 6.6
>18000	77.9 ± 11.0



Nursery Phase Conclusions

- Food availability
 - No significant effect by stocking density or flow
- Survival
 - No significant effect by stocking density
- Growth
 - Decreases as stocking density increases
 - Reducing stocking density results in larger scallops

Bay Scallop Aquaculture: First Year in Review

- Nursery Phase
 - Downweller systems allow for the successful rearing of scallops from nursery to growout
 - Increased stocking density decreases growth and number of large size class scallops
- Growout Phase
 - Surface gear is not successful in open ocean conditions
 - Growth halts once water temperatures drop below 15°C
- Next Steps
 - Investigate overwintering and year two techniques to grow scallops to market size
 - Parasite presence (year two limitations?)

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