Sea Scallop Growth and Reproduction Research to Support Improved Resource Management

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2022 Sea Scallop Research Set-Aside
Grant # NA22NMF4540050

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LAGC Scallop Fishermen Partners

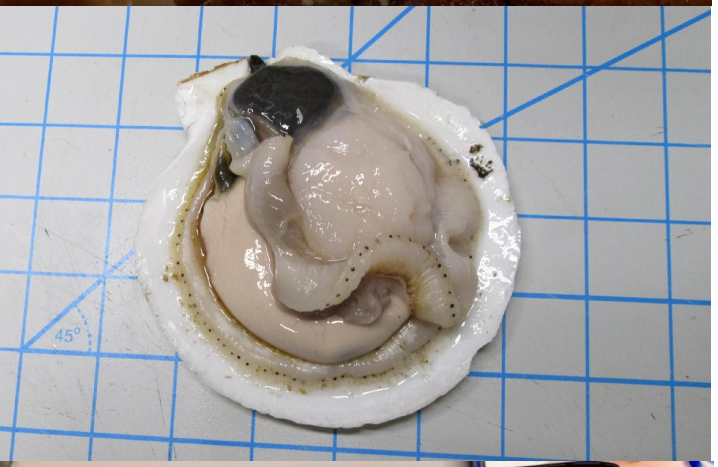
Industry Partners Collecting Biological Samples:
F/V Tricia Lynn, F/V Nemesis, F/V Midnight Our, F/V Helltown, F/V Kahuna, F/V Three Graces, F/V Three Sons, F/V White Cap, F/V Outlaw, F/V Godzilla, F/V Bada Bing, F/V Isabel & Lilee, F/V Joanne A III, F/V Sandra Anne

Industry Partners RSA Compensation Fishing:
F/V Tricia Lynn, F/V Nemesis, F/V Midnight Our, F/V Helltown, F/V Kahuna, F/V Three Graces, F/V Three Sons, F/V White Cap, F/V Outlaw, F/V Godzilla, F/V Bada Bing, F/V Isabel & Lilee, F/V Joanne A III, F/V Sandra Anne, F/V Jessica Heather, F/V Ernest & Michael, F/V Miss Emma, F/V Roen Keil, F/V Rolex, F/V Small Stuff

Project Impact

Using LAGC scallop vessels to collect biological samples is cost effective way to provide monthly insights into how meat yield and scallop spawning changes throughout the year.

It also increases the area and months sampled beyond what the observers and surveys can accomplish with existing schedules.

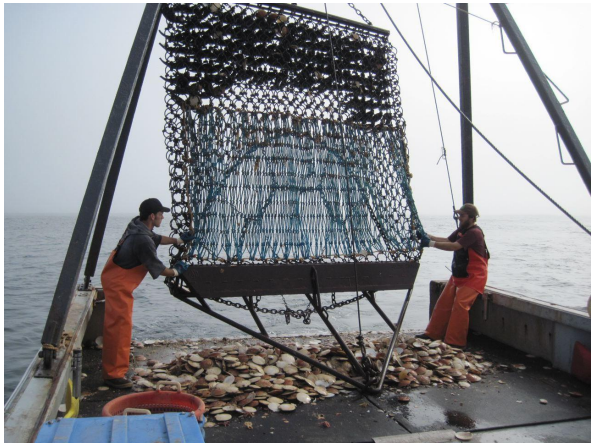


Objectives

1. Identify spawning seasonality through weekly examination of gonads.
2. Explore the seasonal relationships between scallop shell size and meat yields.
3. Develop a conversion factor to allow comparisons between wet weights and dry weights.
4. Pilot an affordable industry-supported biological sampling program that could be expanded more broadly in the scallop fishery to supplement traditional sampling programs (surveys, observers)

Methods

Field work



14 participating scallopers

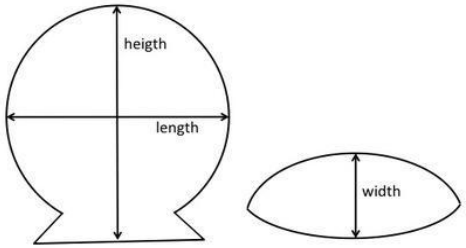
⬇

25 randomly selected scallops from the last tow

⬇

Transport scallops alive on ice to the CCCFA lab

Laboratory analysis

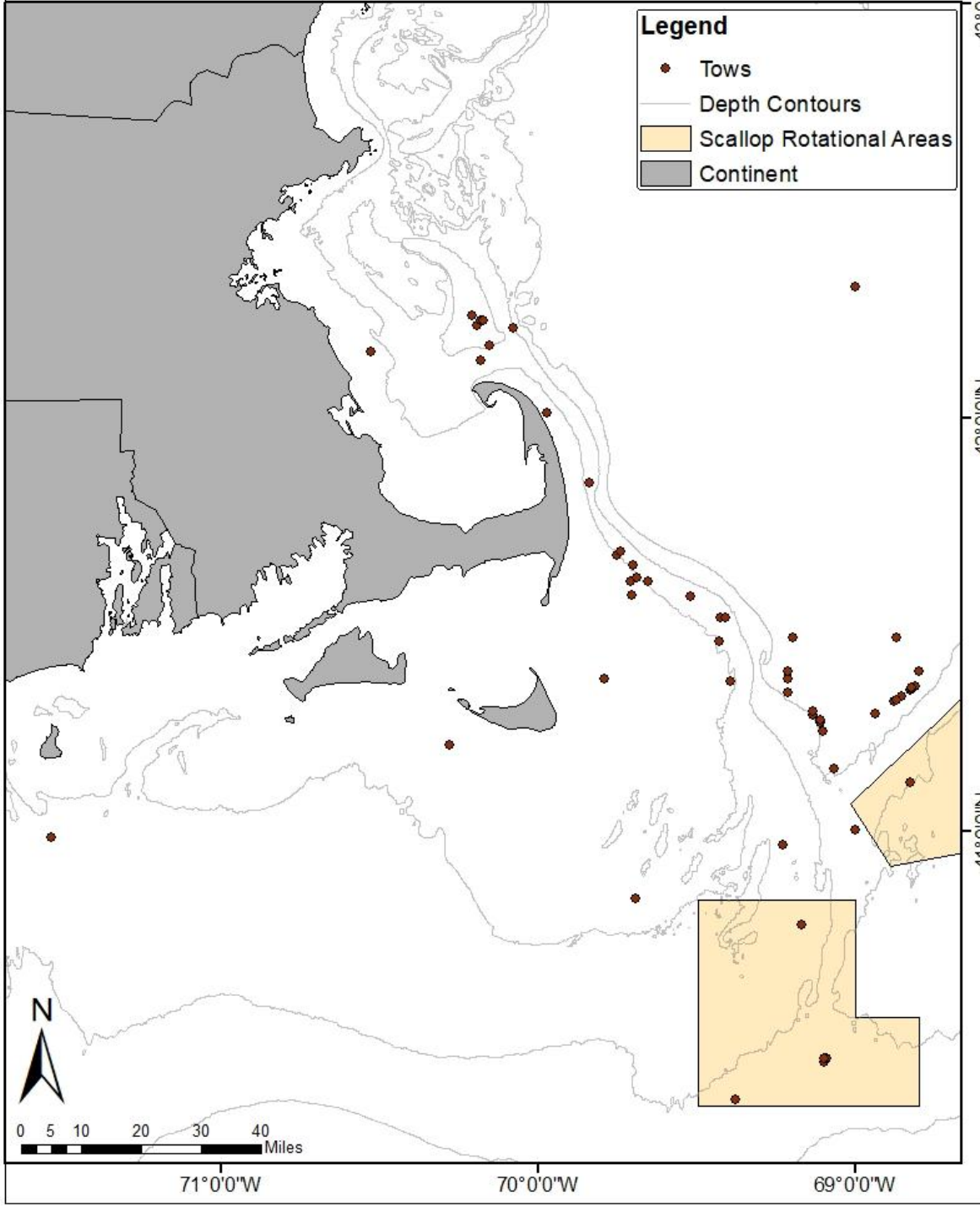


Sampling Tows

Sampling: April 2022-January 2024

Year round - data collected weekly

Opportunistic Sampling on regular commercial trips



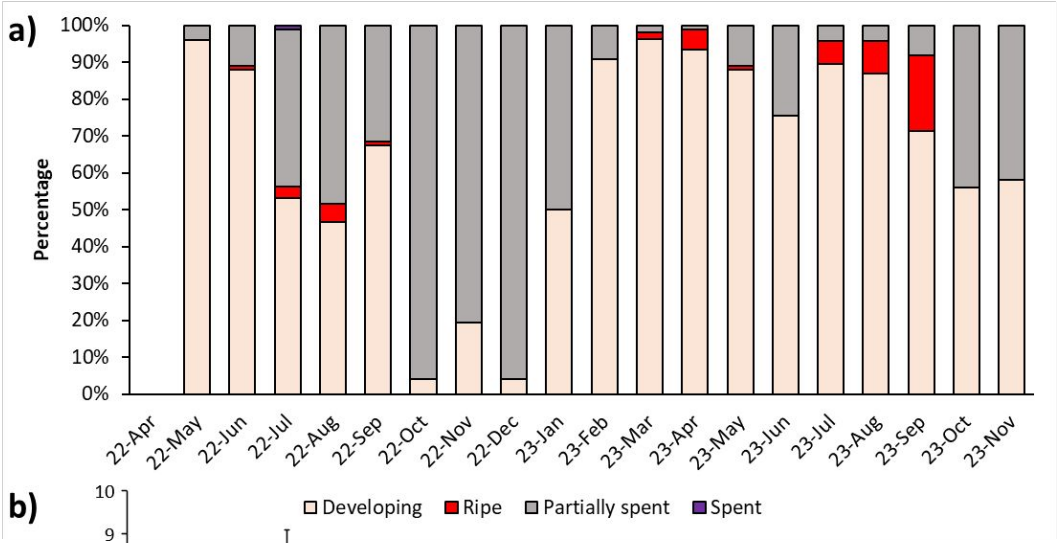
Spawning Results

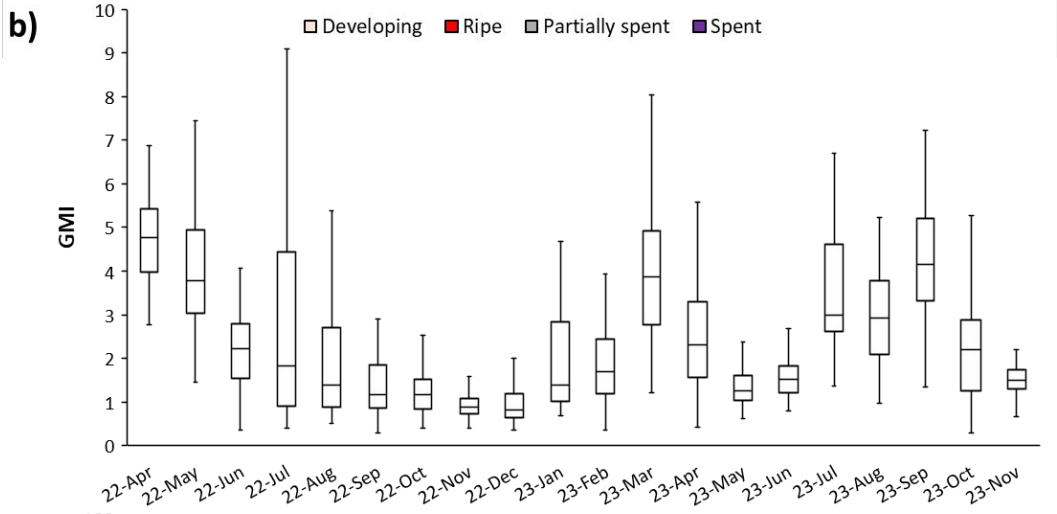
N= 1,486 for visual examination of reproductive stages

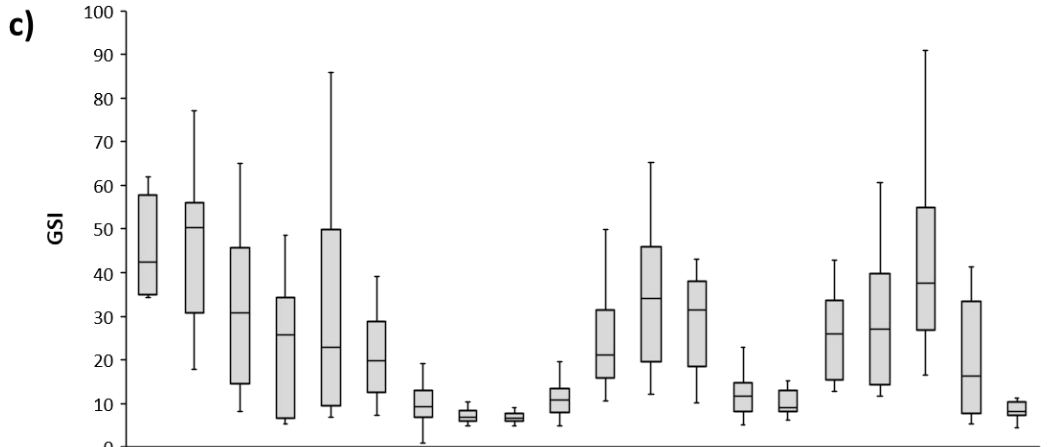
The highest percentages of ripe scallops occurred from July through September in both years.

N= 1,565 for GMI analysis
N= 380 scallops for GSI analysis

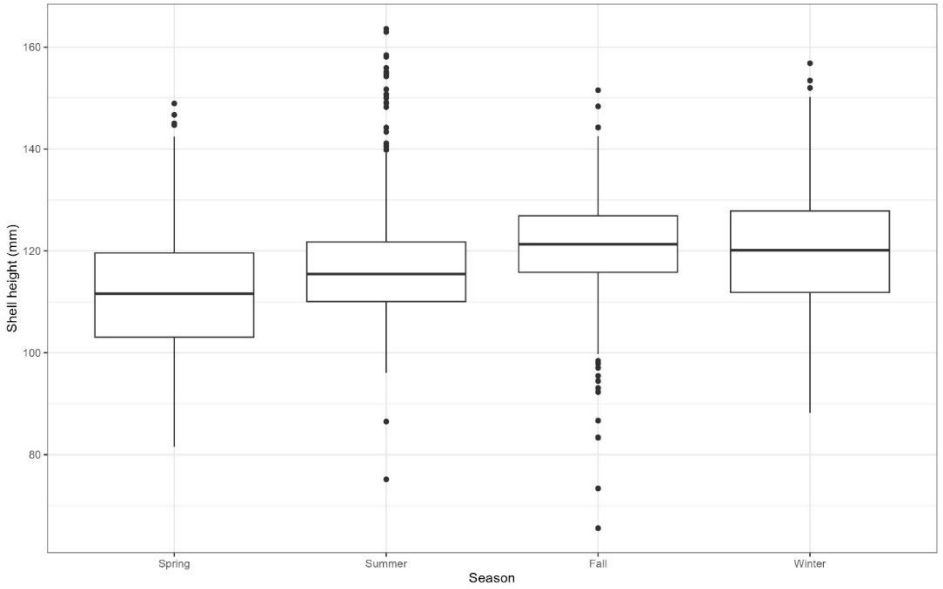
Two spawning periods were evident, in spring and fall





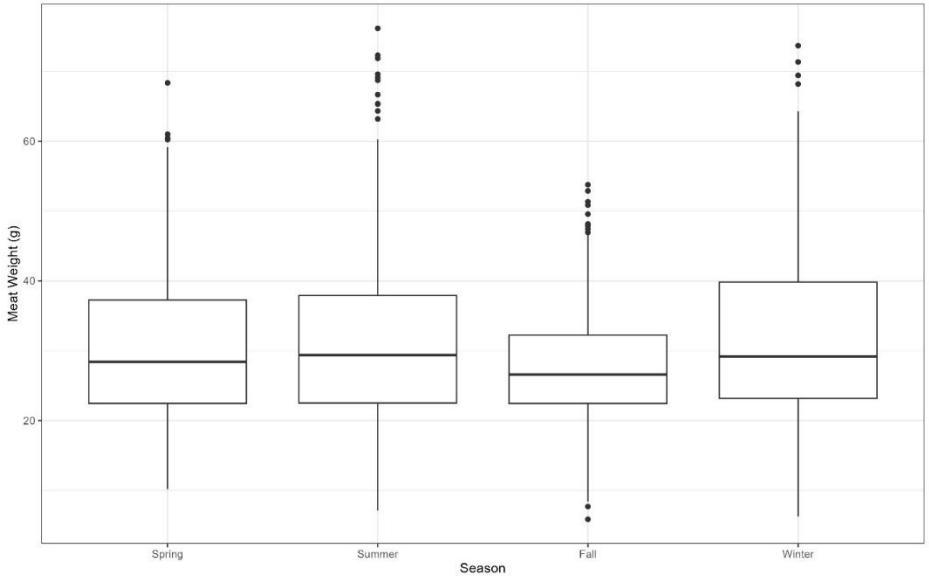


Shell Height-Meat Weight Relationship



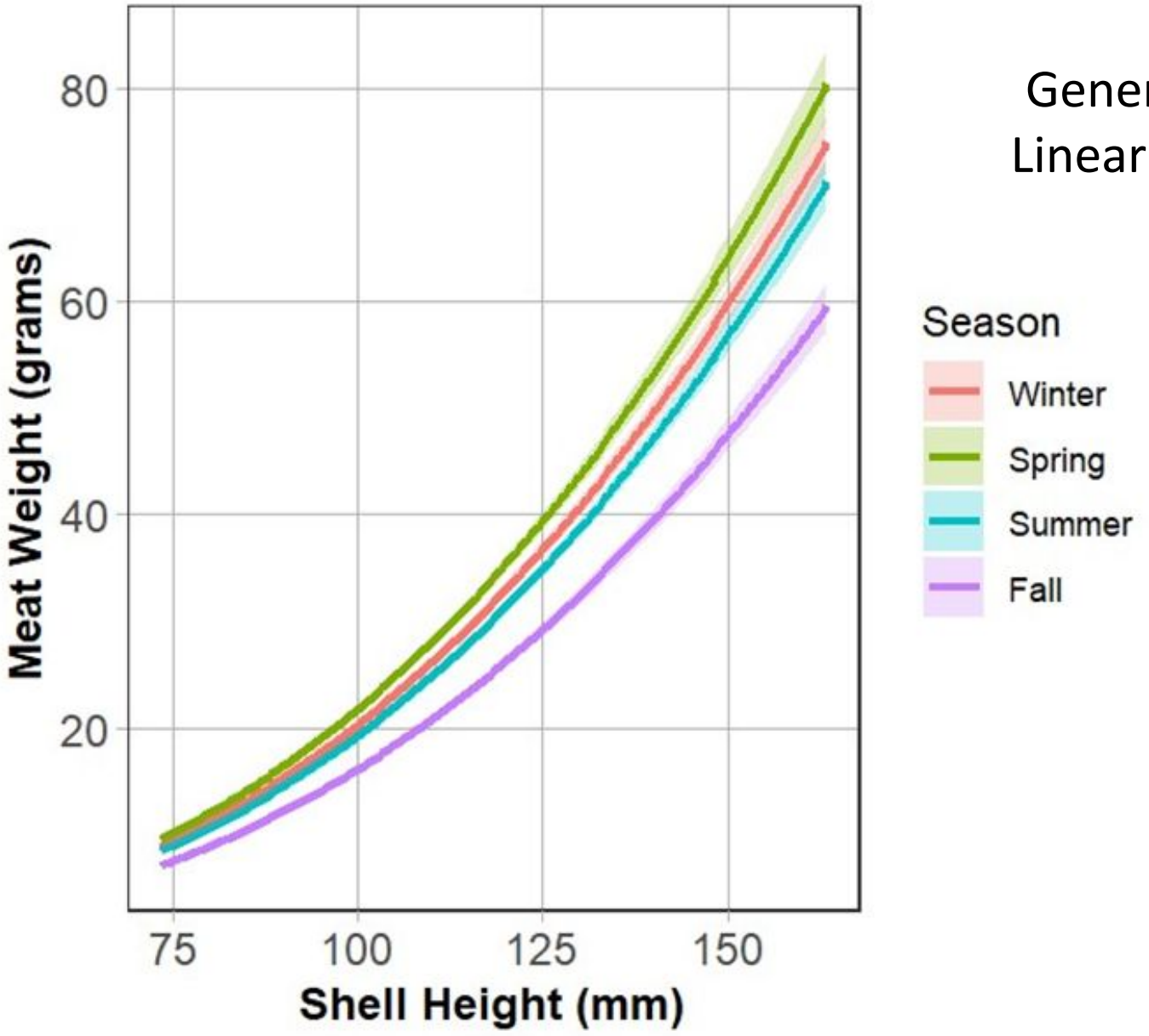
N = 1587

Scallop shell height (mm) by season



Scallop meat weight (g) by season

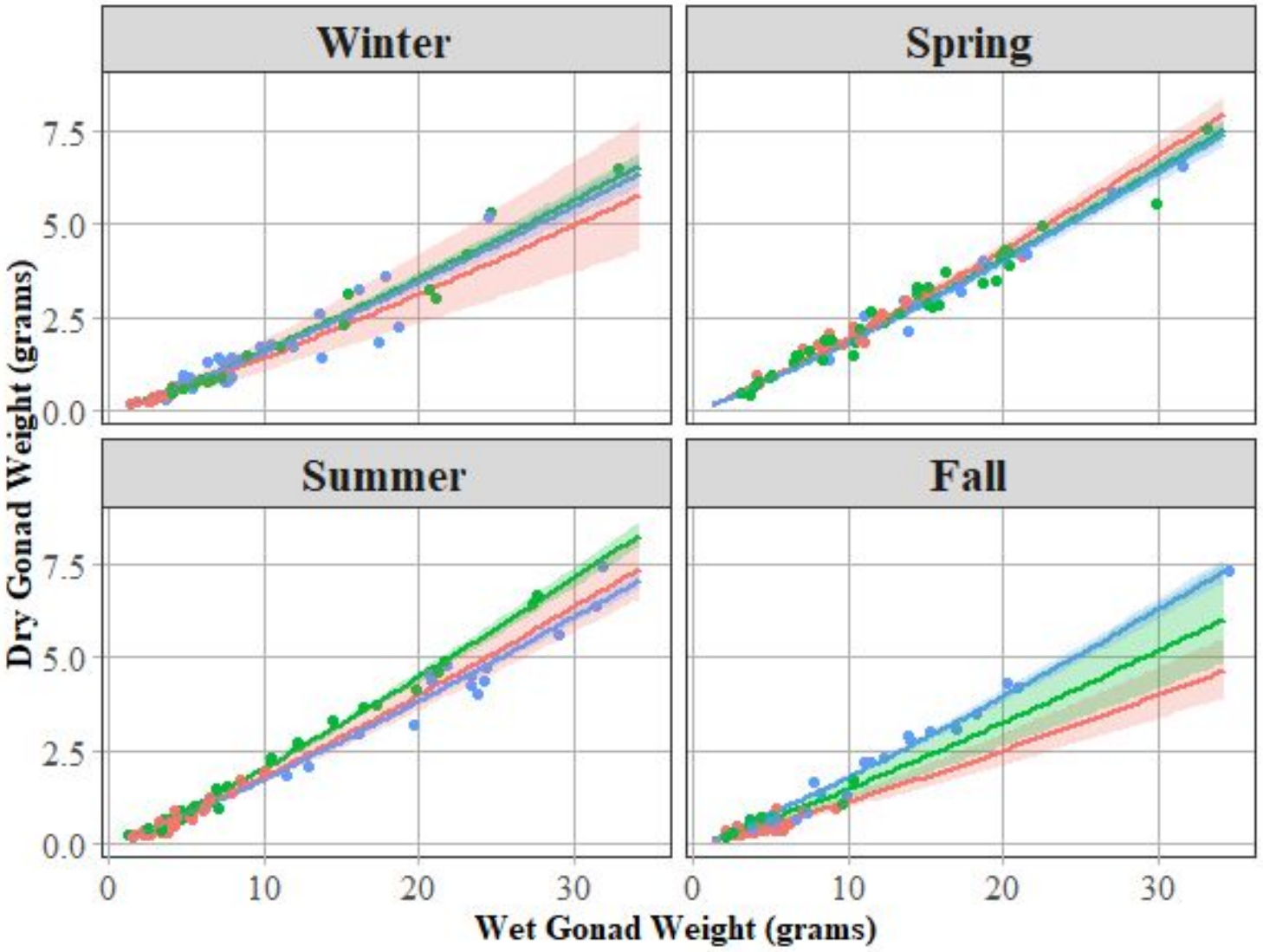
Shell Height-Meat Weight Relationship



Generalized Linear Model

Conversion Factor: Wet vs Dry

Gonads

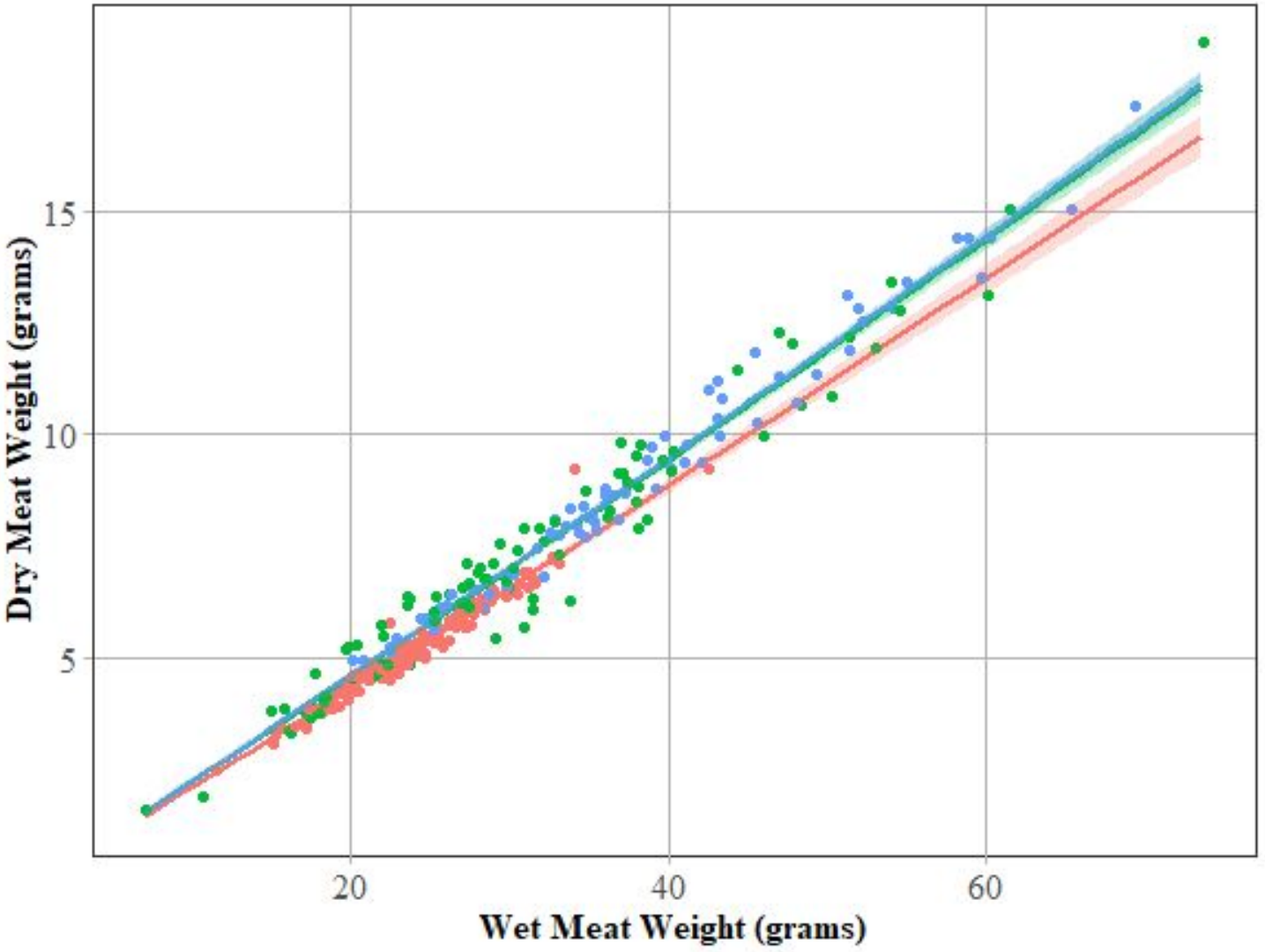


N = 400

Conversion factor = 6.73

Conversion Factor: Wet vs Dry

Meats



N = 400

Conversion factor = 4.29

Best Practices for Continued Sampling

- Use a deck log to standardize location, reduce error, and streamline data entry.
- Install eMOLT sensors to record surface and bottom water temperature.
- Continue targeting weekly samples but ultimately set a monthly goal.
- Increase sample size to three to five trips per week.
  Note: Weather windows in the winter may mean that most LAGC vessels are fishing on the same day, which limits the number of samples that can be processed in a given week unless you have multiple technicians or hold samples overnight.
- Identify key areas to be re-sampled each month, to develop year-round trends *It is most cost effective for this sampling to be opportunistic (wherever they are fishing). However, with compensation, some vessels would be willing to conduct a series of short tows at reference stations to track key areas over time*.

Best Practices for Continued Sampling

- All summer and early fall trips should hold samples in chilled seawater.
- Involve a fisheries monitoring company or an organization with several lab technicians that have the flexibility to match their schedule to align with the landing from each fishing trip.
- Technicians distributed across various ports to capture the range of the fishery (NY/NJ, RI/New Bedford, Cape Cod, Gloucester, Portland).
- Schedule analyses to ensure that timely results are available to the PDT/Council.
- Recent ambiguity between reproductive stages means that future research should use histology to assess the reproductive stage.
- Projected Research Costs to Continue: 1300 samples/year: $65,170 plus $14,738 for histological verification vs 3900 samples/year: $141,526.50. Assumes vessels compensated with access to RSA quota.

QUESTIONS

This presentation was prepared by Cape Cod Commercial Fishermen's Alliance and Coonamessett Farm Foundation using Federal funds under Cooperative Agreement Award NA22NMF4540050 from NOAA Fisheries, U.S. Department of Commerce.

NOAA Fisheries is responsible for the stewardship of the nation's ocean resources and their habitat. The statements and recommendations are those of the author(s) and do not necessarily reflect the views of NOAA Fisheries or the U.S. Department of Commerce.

Data Requests: www.coonamessettfarmfoundation.org/data-management

Mean observed dry and wet scallop meat weight and predicted mean dry meat weight by season. Also presented is the observed conversion factor (Wet/Dry Ratio) relative to the conversion factor using the dry meat weight as predicted by the generalized linear model.

	Observed Values					
	n	*Wet Meat Weight (g)*	*Std Dev.*	*Dry Meat Weight (g)*	*Std Dev.*	*Ratio (Wet/Dry)*
Winter	72	34.111	13.10	8.087	3.62	4.329
Spring	95	29.163	8.90	7.223	2.29	4.065
Summer	126	30.653	11.20	7.398	3.13	4.268
Fall	107	28.667	7.21	6.466	1.98	4.521

	Predicted Values		
	Dry Meat Weight (g)	*Std Dev.*	*Ratio (Wet/Dry)*
Winter	8.092	3.41	4.270
Spring	7.174	2.39	4.100
Summer	7.436	2.95	4.174
Fall	6.501	1.78	4.437