

# Does bay scalloping impact eelgrass?

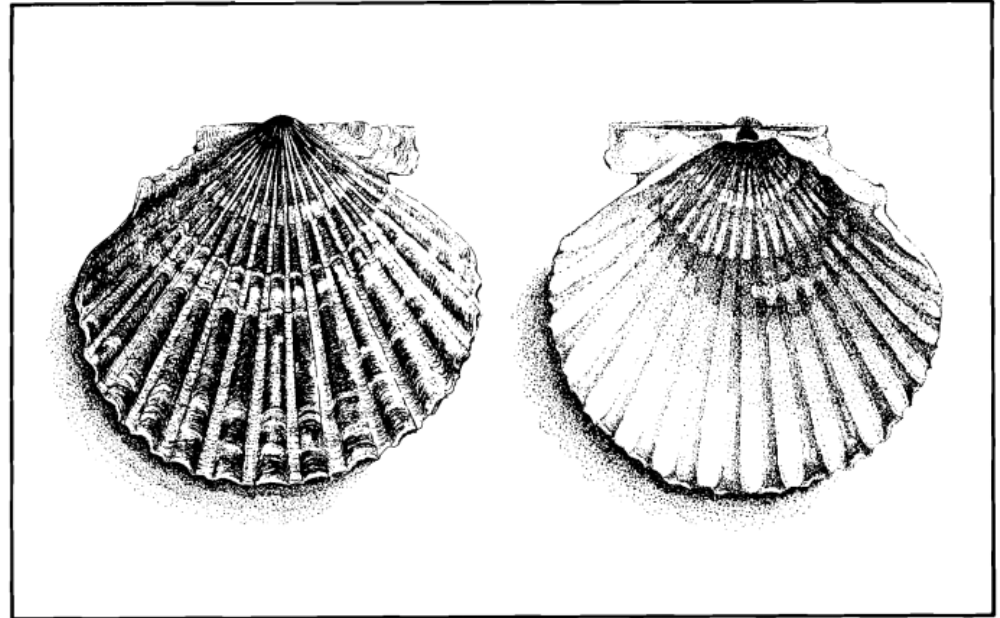
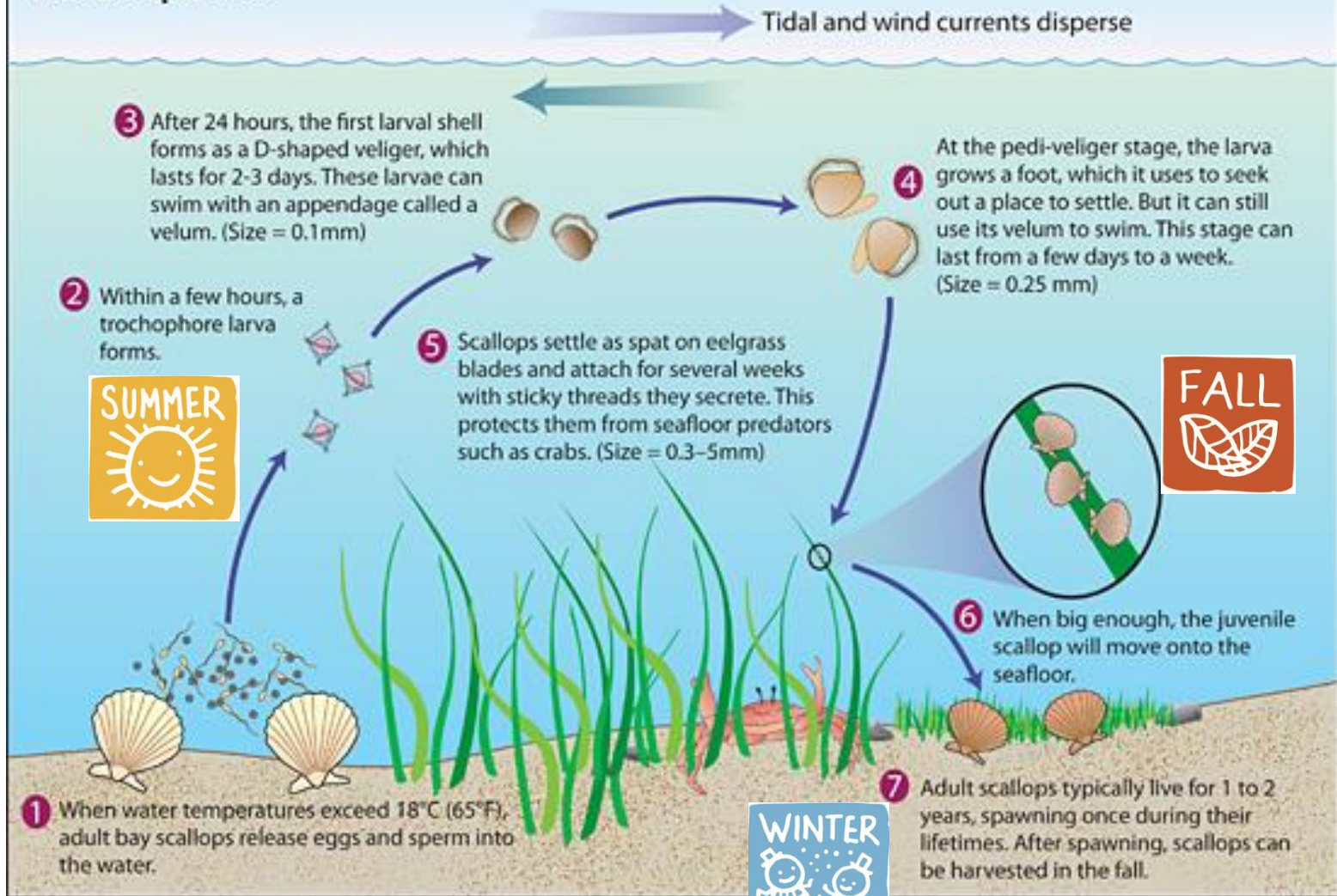


Figure 1. Bay scallop: left, external view of shell; right, internal view of shell.

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Tom Shields, Mike Hickey, Greg Sawyer, Clyde MacKenzie, Paul Bagnall, Conrad Caia, Rod Taylor, David Chosid, Kate Frew, Jill Carr, Alex Boeri

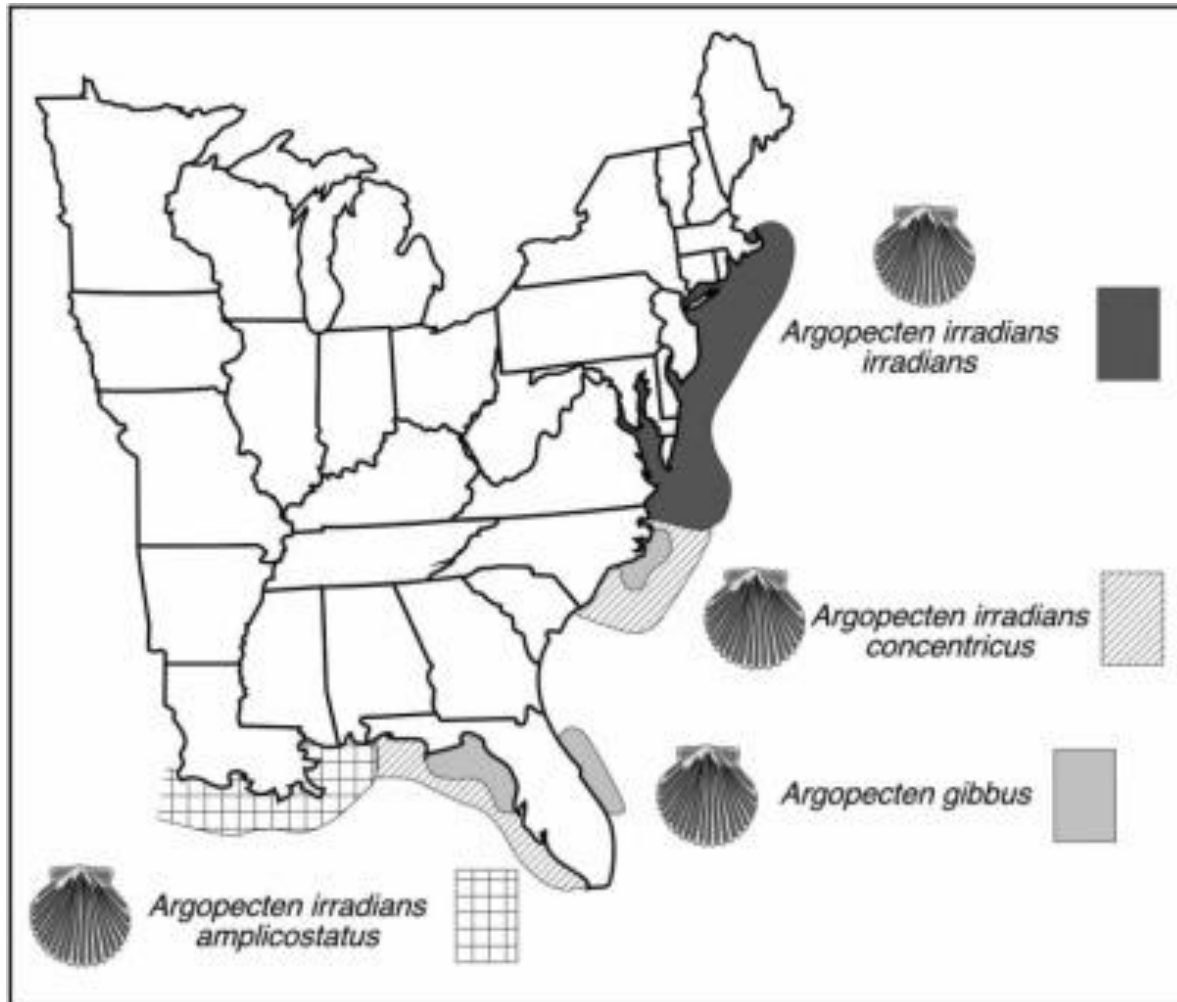
# A Scallop's Life



Scallop life cycle from <http://www.whoi.edu>  
Seasons images from Getty Images

# Northern bay scallop

## *Argopecten irradians irradians*



# Locations

Most of landings come from MA and NY

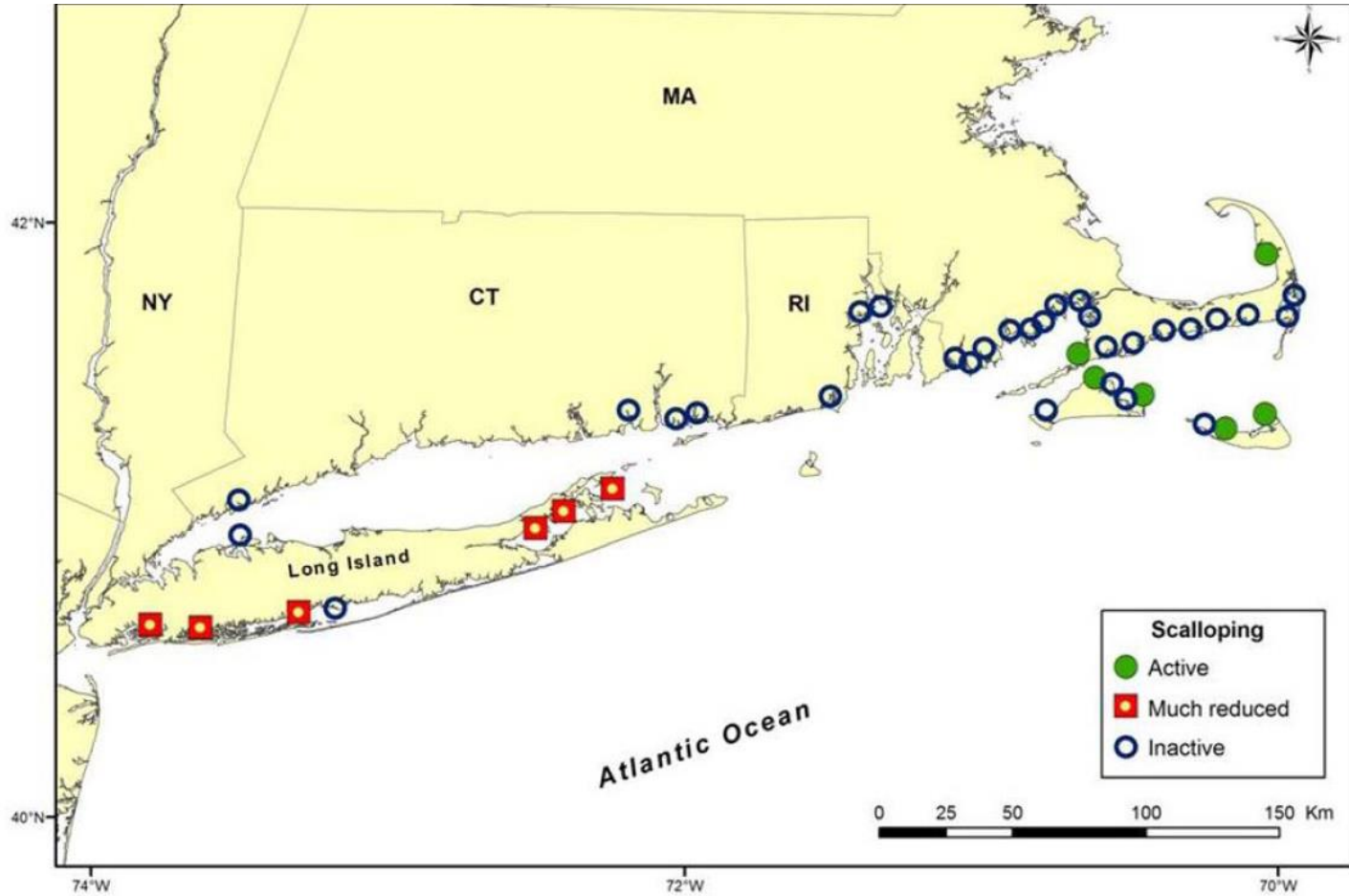


Figure 130.—Bay scallops, *Argopecten irradians irradians*, in the region from Cape Cod to western Long Island have become much scarcer than they were before 1985. The solid circles show where scalloping still exists; the squares show where scalloping continues but on a much reduced scale; and the open circles show where scalloping does not continue.

# Bay scallop fishery

- Commercial wild fishery
  - Small boat fishery operating in coastal bays by town residents
- Aquaculture fishery
- Recreational fishery



# Gear Types



Dredge with pressure plate “pan dredge” in use on Vineyard in 2006 (MacKenzie 2008)



Figure 103.—Bay scalloper tossing out his dredge, Peconic Bay, N.Y., 31 Dec. 2005. (MacKenzie 2008)



Dipnetting

# Does scalloping impact eelgrass?...

## What does the literature tell us?



### Bishop et al 2005 and Fonseca et al 1984

Bay scallop dredging in eelgrass in North Carolina

- Both measured eelgrass effects by simulating dredging activity

### Results:

Immediate impacts to eelgrass (both studies)  
but no effects 1 month later (Bishop et al)

### Limitations:

Only immediate and short-term impacts  
NC results may not reflect MA

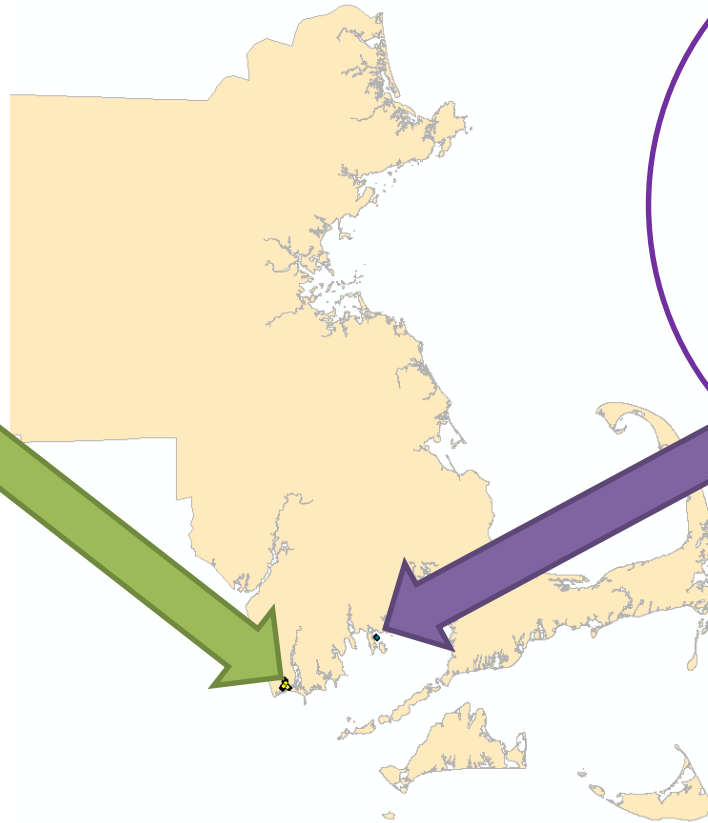


Dredging up eelgrass in Nantucket Harbor in 1950s (MacKenzie 2008)

# In Massachusetts, does winter bay scalloping cause damage to eelgrass that can be detected in the next growing season?

1. How long does it take for eelgrass to recover from intensive bay scalloping?  
(Westport recovery study)

2. Does increased intensity of harvest cause more impact to eelgrass?  
(Fairhaven impact study)





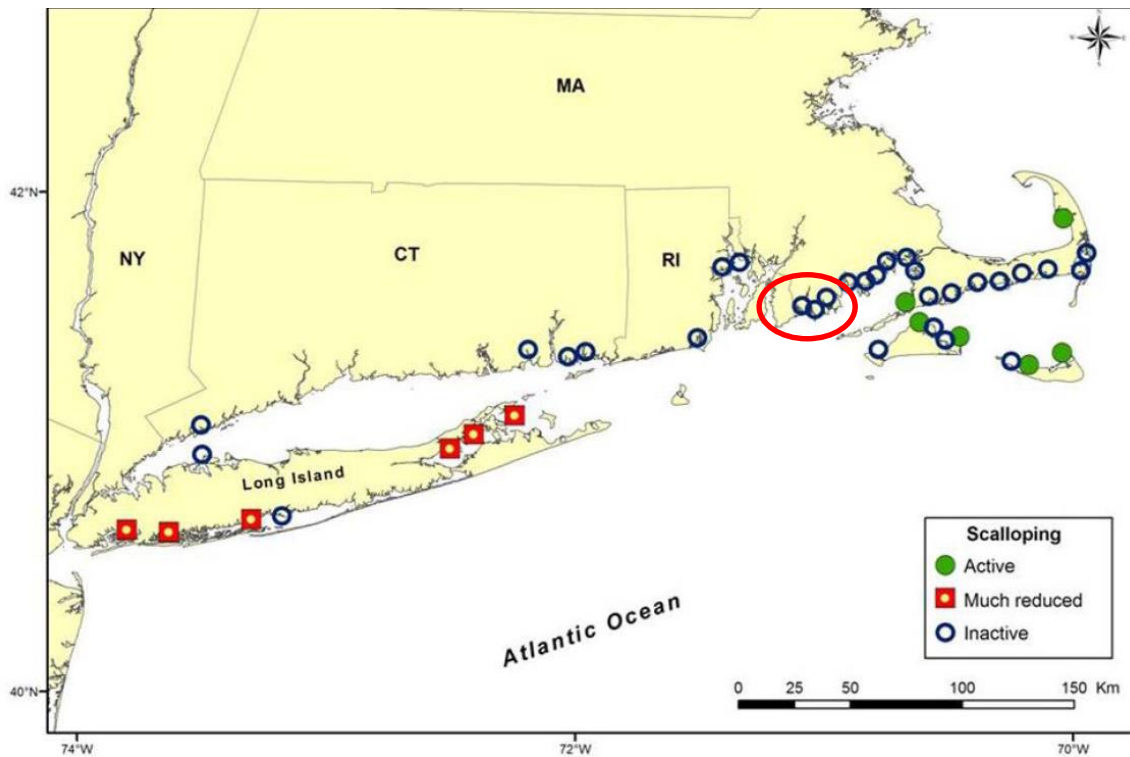


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Mackenzie (2008)

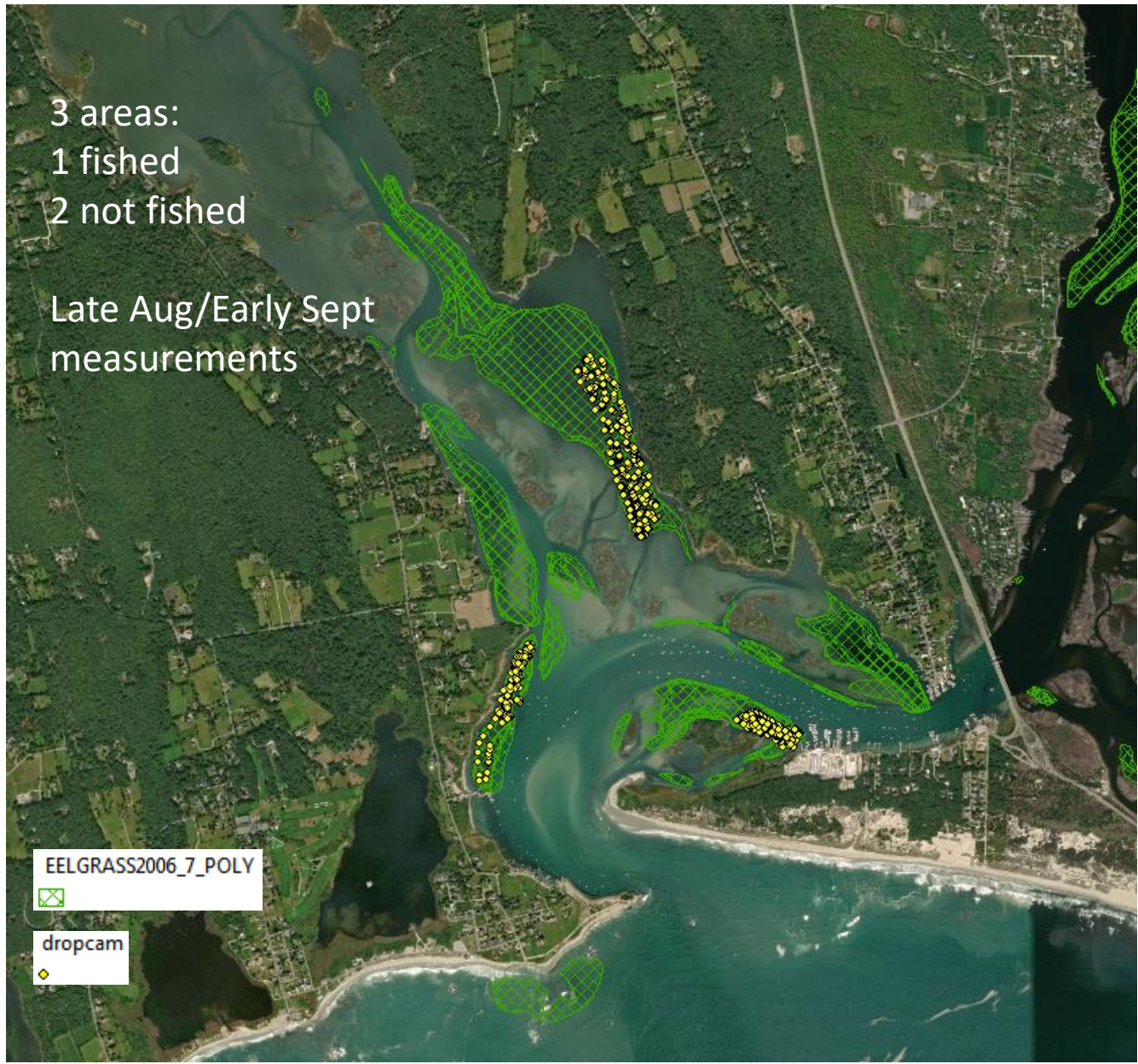
2017



# Westport Recovery Study

## Sampling Design

Control-  
Impact



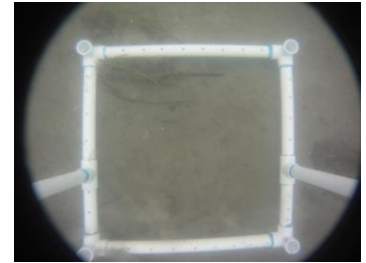
# Data Collected



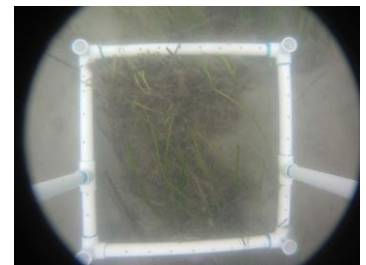
## Schedule

- Post-fishing sampling in August/September for up to 3 years

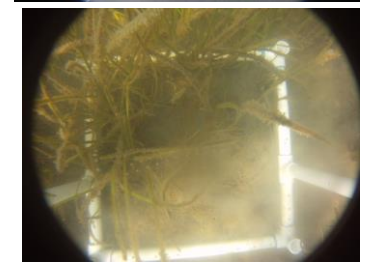
<5 %



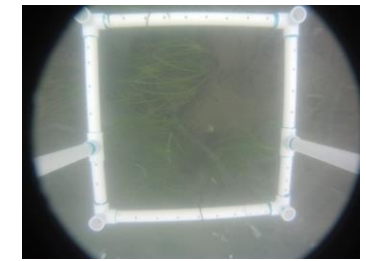
6-25%



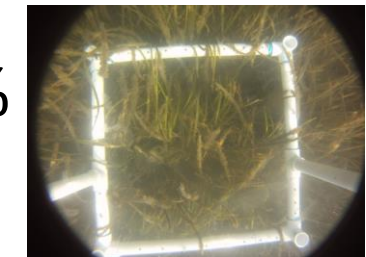
26-50%



51-75%

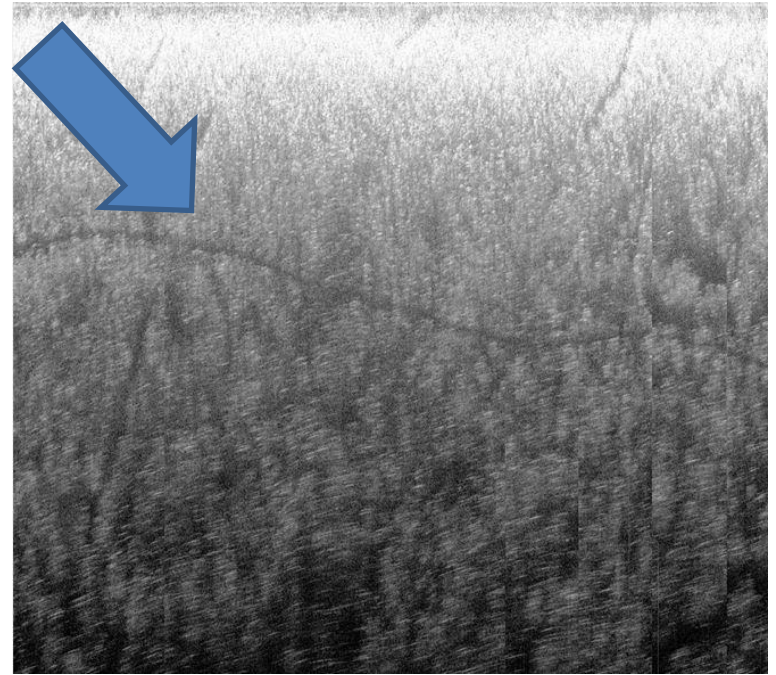


76-100%



# Preliminary results

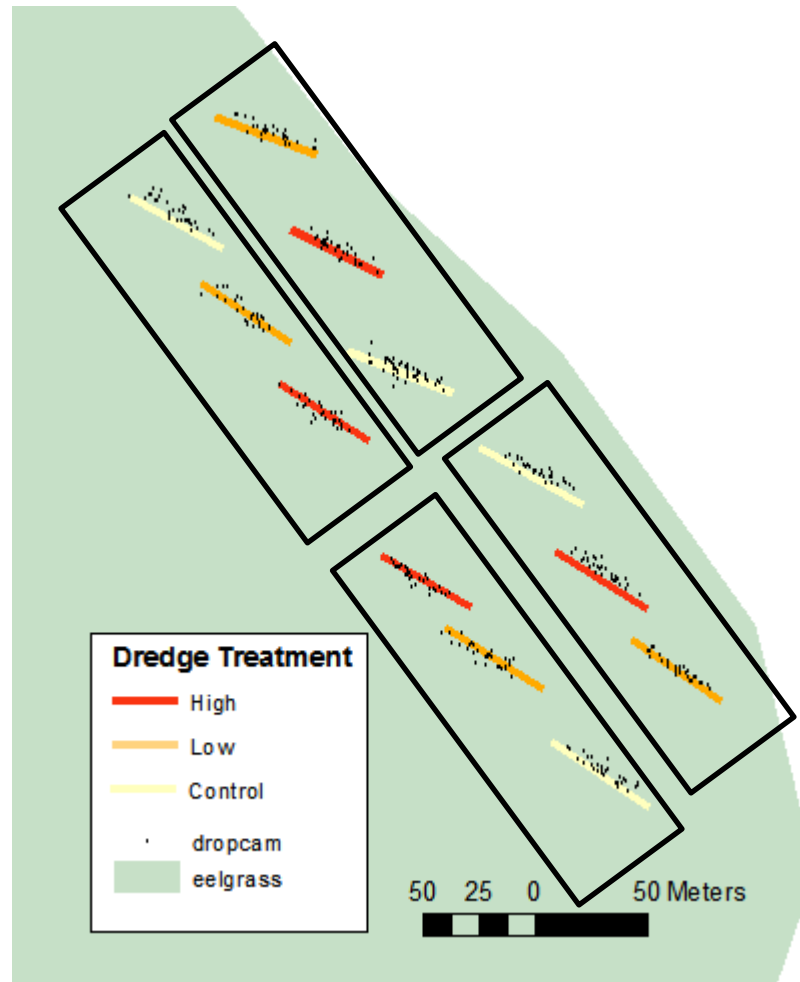
- Some scars visible, but unclear source of scarring
- The fished meadow looked healthy and dense in drop camera data and from the boat



# Fairhaven Impact Study

## Sampling Design

## Before-After Control-Impact



4 Replicate Blocks

Treatments

“High Intensity” –  
Four days of dragging,  
20 tows per day

“Low Intensity” –  
Single day of  
dragging, 20 tows

Control – No dragging

Diver quadrats at 12  
randomly distributed  
fixed stations along  
each dredge transect

Drop camera surveys  
at 30 random  
locations along each  
transect

Sidescan sonar of  
whole site



1. Haul back dredge and dump contents on sorting table



2. Separate out + count live eelgrass and scallops



3. Dump remaining contents in bushel basket for volumetric estimate



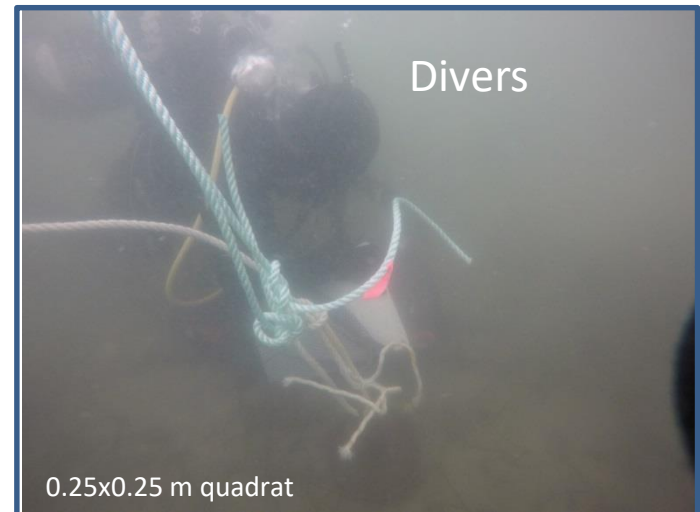
# Data Collected



- eelgrass live stem count
- presence and id of fauna
- # dredge passes
- ~volume of dead eelgrass & algae



- eelgrass meadow area
- scars



- stem count
- % cover
- canopy height



- % cover



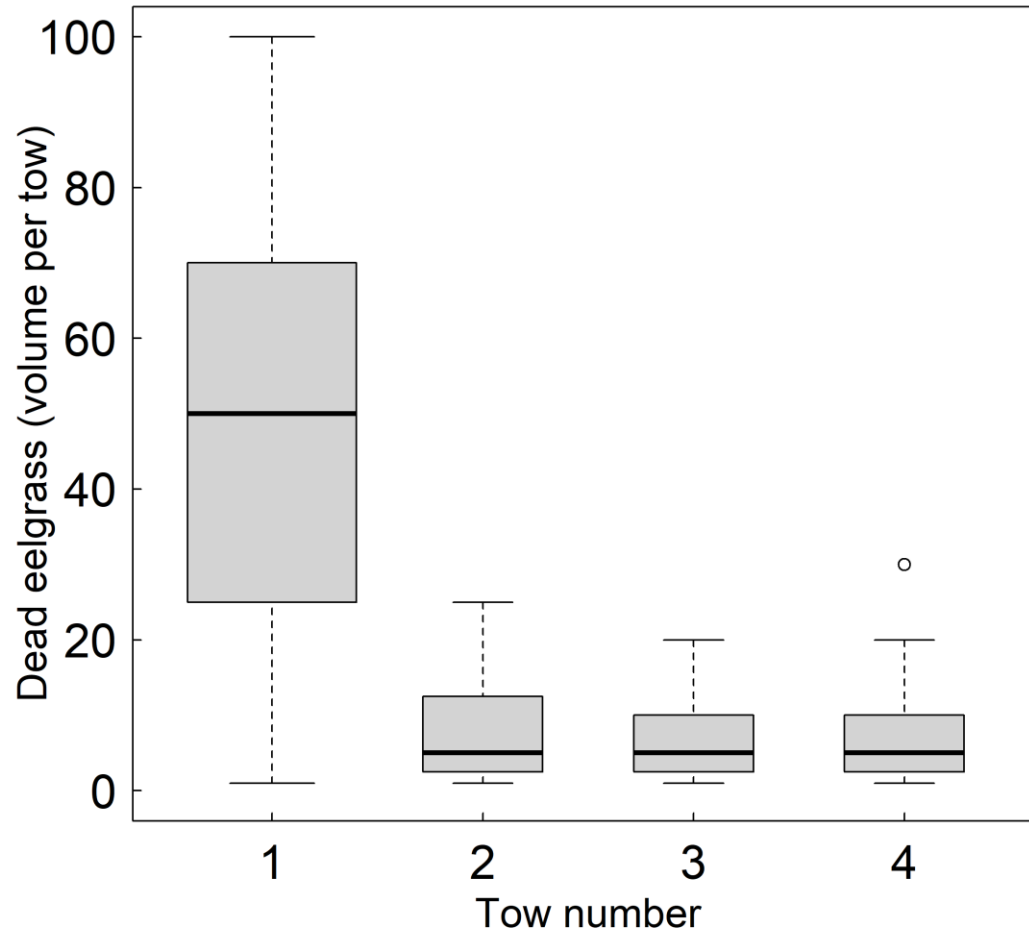
# Schedule

- Pre-fishing data collection in Oct 2018
- Controlled impact fishing in Nov-Dec for 3 years
- Post-fishing sampling in Dec, June, and Oct for 3 years

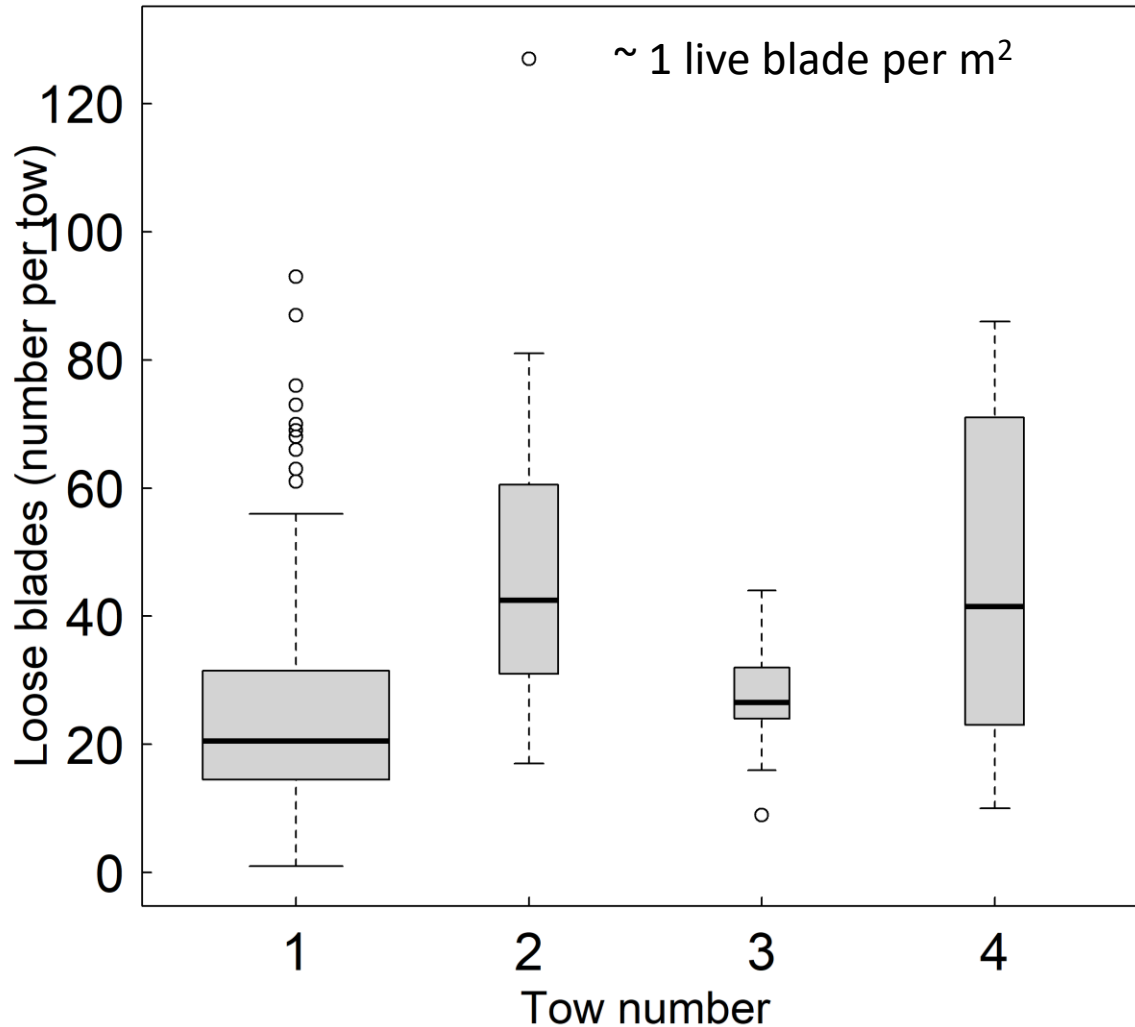
|           | Year 1 |    |    |   |   |   |   |   |   |   | Year 2 |   |    |    |    |   |   |   |   |   | Year 3 |   |   |   |    |    |    |   |   |   |   |   |   |   |   |   |    |  |  |  |   |   |
|-----------|--------|----|----|---|---|---|---|---|---|---|--------|---|----|----|----|---|---|---|---|---|--------|---|---|---|----|----|----|---|---|---|---|---|---|---|---|---|----|--|--|--|---|---|
|           | 10     | 11 | 12 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8      | 9 | 10 | 11 | 12 | 1 | 2 | 3 | 4 | 5 | 6      | 7 | 8 | 9 | 10 | 11 | 12 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |  |  |  |   |   |
| Acoustics | █      |    | █  |   |   |   |   |   | █ |   |        |   | █  |    | █  |   |   |   |   |   | █      |   |   |   | █  |    | █  |   |   |   |   |   |   |   | █ |   |    |  |  |  |   | █ |
| Video     | █      |    | █  |   |   |   |   |   | █ |   |        |   | █  |    | █  |   |   |   |   |   | █      |   |   |   | █  |    | █  |   |   |   |   |   |   |   |   | █ |    |  |  |  |   | █ |
| Diver     | █      |    |    |   |   |   |   |   | █ |   |        |   | █  |    |    |   |   |   |   |   | █      |   |   |   | █  |    |    |   |   |   |   |   |   |   | █ |   |    |  |  |  | █ |   |
| Fishing   |        | █  | █  |   |   |   |   |   |   |   |        |   |    | █  |    | █ |   |   |   |   |        |   |   |   |    |    | █  |   | █ |   |   |   |   |   |   |   |    |  |  |  | █ |   |



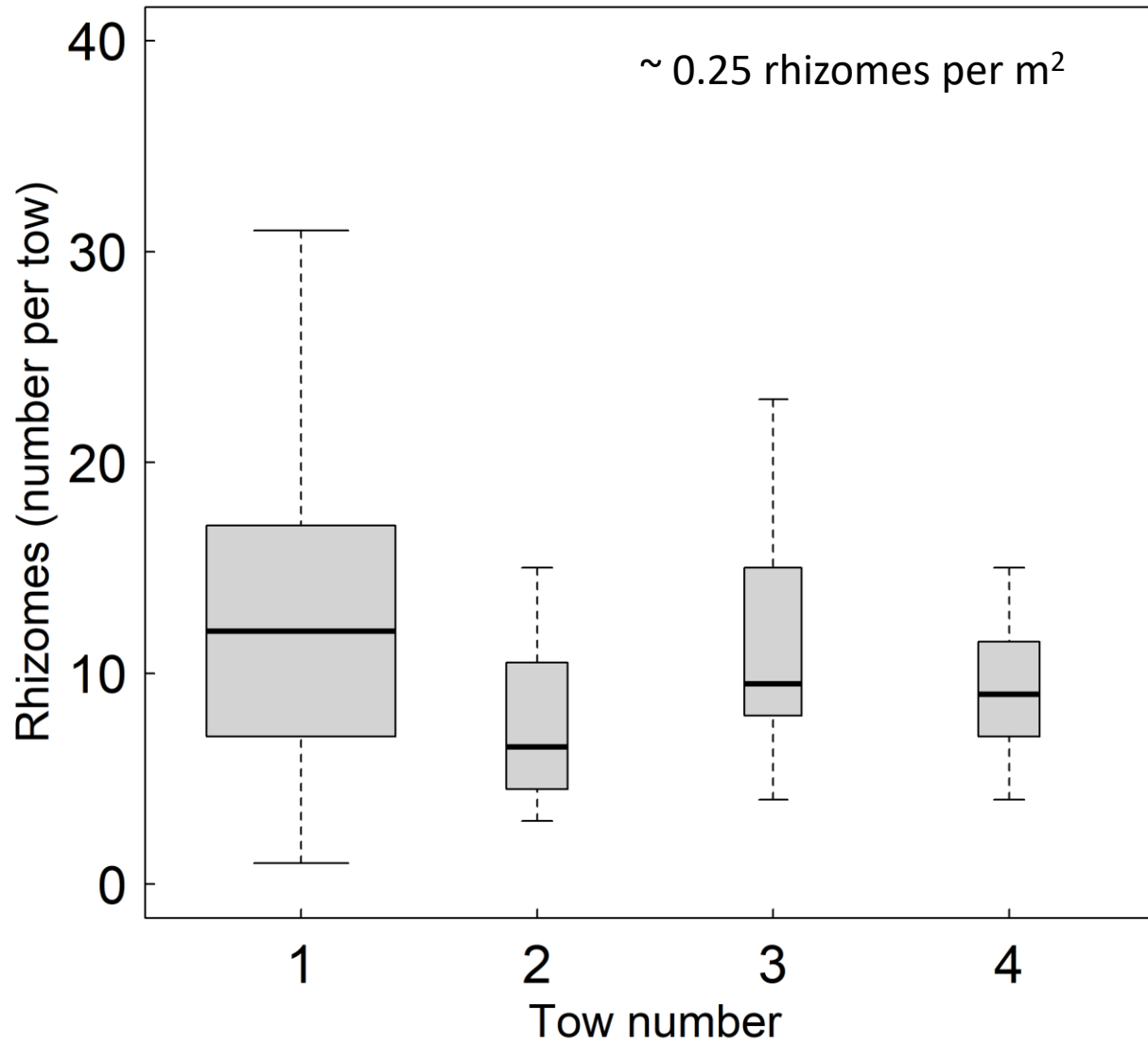
# Preliminary results



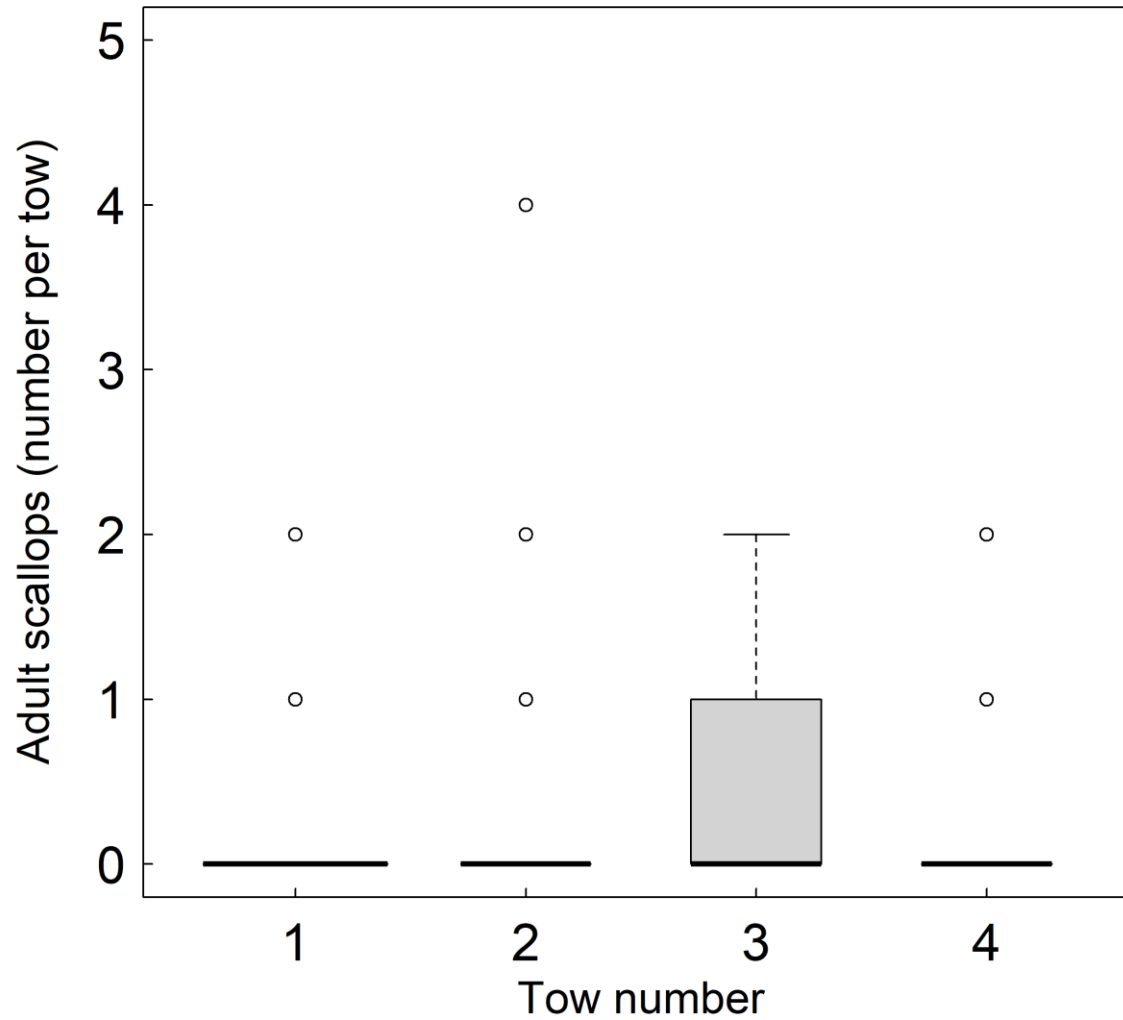
# Preliminary results



# Preliminary results



# Preliminary results



# Summary

- Imagery still being analyzed
- Minimal evidence of disturbance to commercially dragged bed
- Density of live eelgrass removals by experimental dragging low
- Does bay scalloping impact eelgrass?





Thank you!  
Questions?

**Marine Fisheries**  
Commonwealth of Massachusetts

