The State of Peconic Bay Scallops in 2020

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- Cornell Cooperative Extension of Suffolk County
- New York Empire State Development
- New York State Coastal Management Program
- Town of Southold
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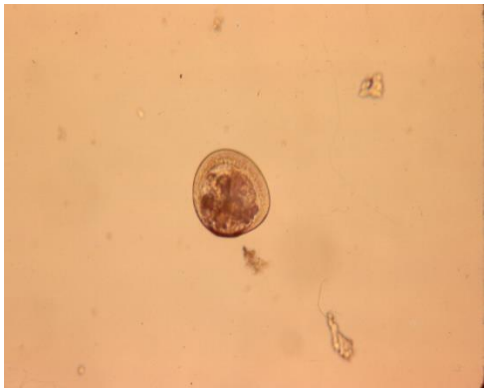
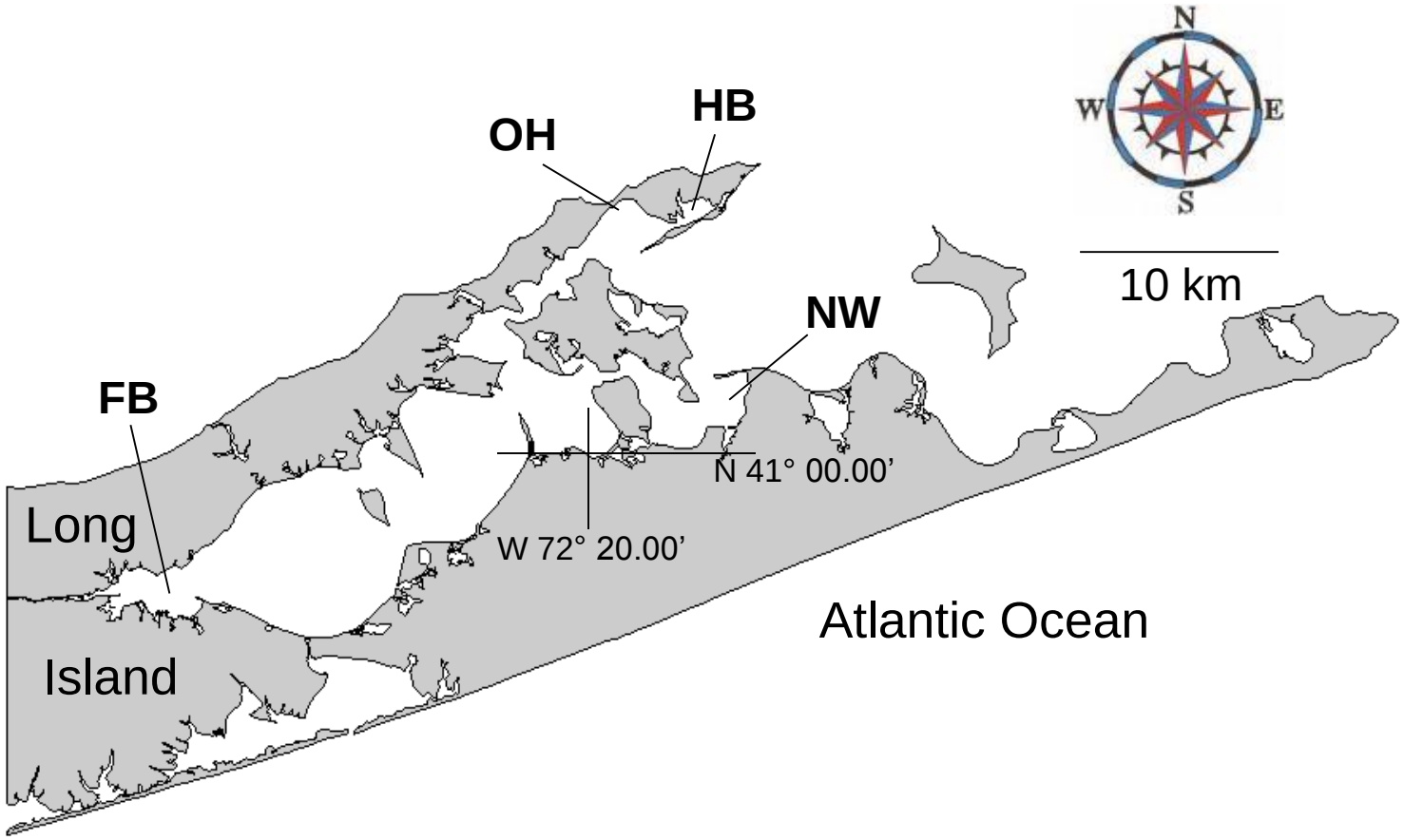
Basic Bay Scallop Biology

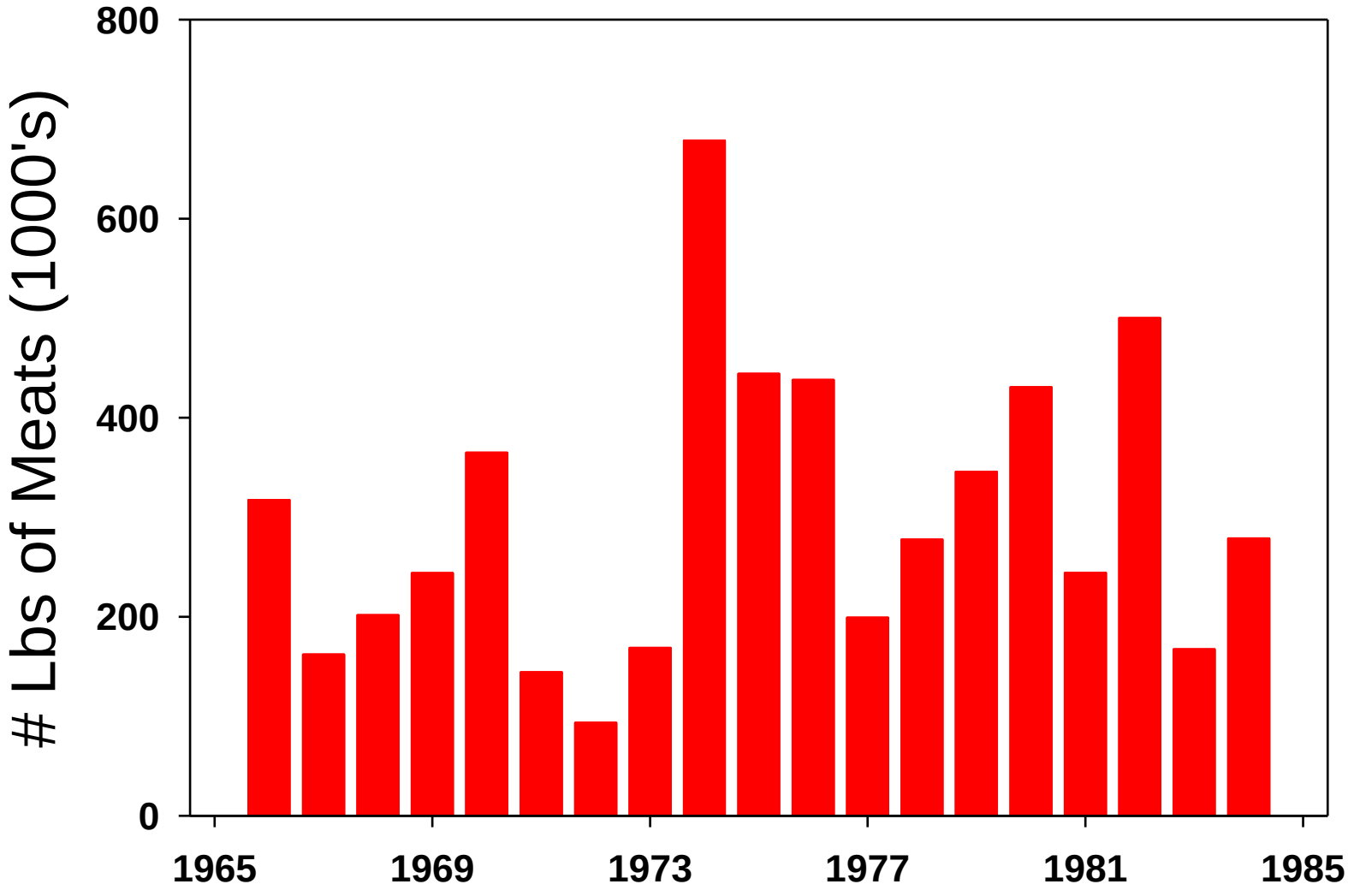
- Lifespan: usually 18-22 months
- Reproduction: (usually 1 season)
- Functional hermaphrodites
- External fertilization
- Larval cycle duration: ~1-2 weeks





Peconic Bays, Eastern Long Island, New York

New York Bay Scallop Landings
- Commercial -



NY State Dept. of Environmental Conservation

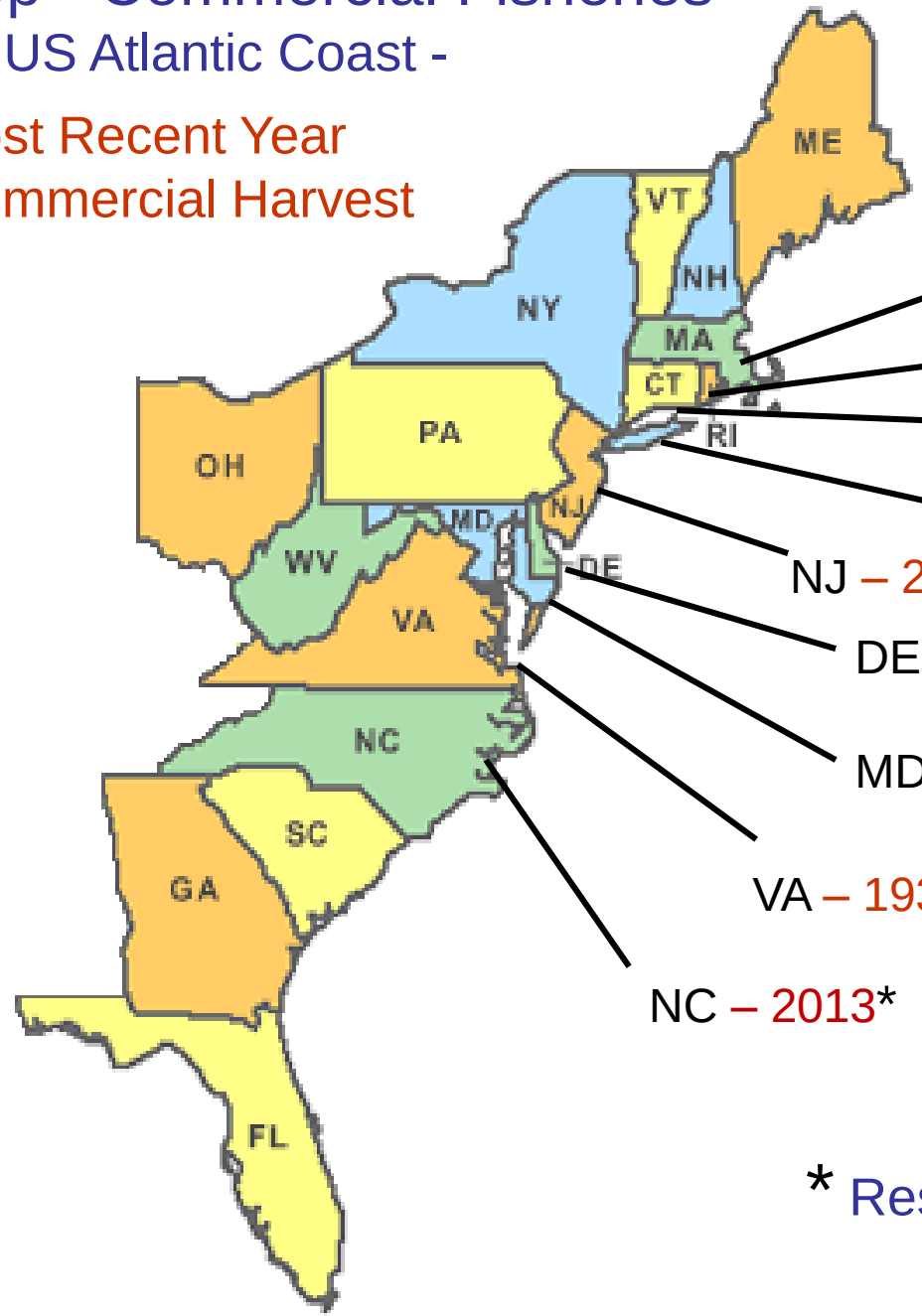

Peconic Bay Brown Tides:
1985
1986
1987
1991
1995
Impacts of brown tide blooms on bay scallops:
1. starvation of adults, juveniles, and ?larvae
2. reduced recruitment
3. shading of eelgrass

It is rare for bay scallop populations to rebuild on their own.

Bay Scallop - Commercial Fisheries

- US Atlantic Coast -

Most Recent Year
of Commercial Harvest



MA – ongoing*

RI – 2016*

CT - 1994

NY – ongoing*

NJ – 2004

DE – <1950

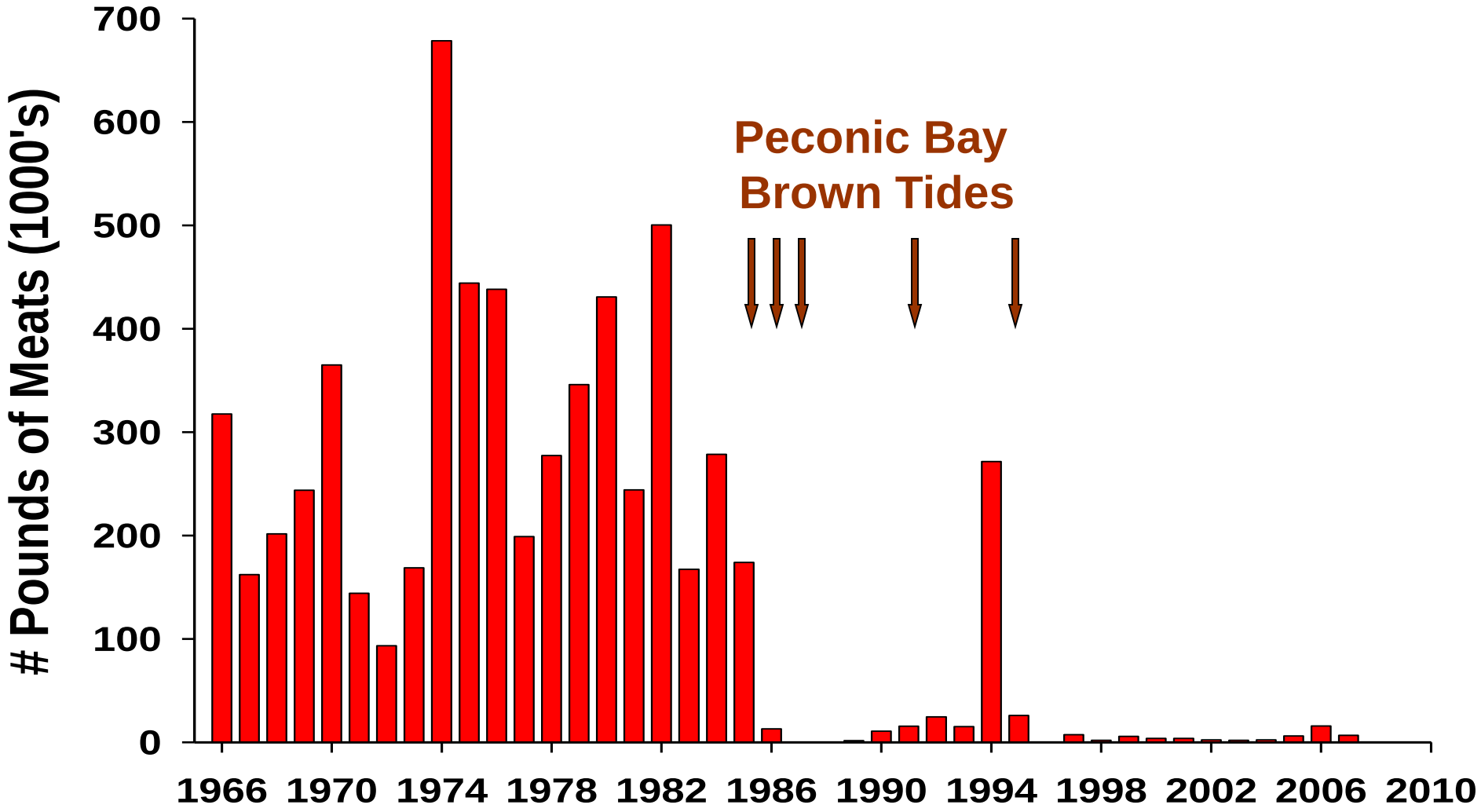
MD – 1994

VA – 1932*

NC – 2013*

* Restoration Projects

New York Bay Scallop Landings
- Commercial -



NY State Dept. of Environmental Conservation

Possible Reasons for Lack of Recovery of Peconic Bay Scallops After Last Brown Tide in 1995

- **Habitat Decline / Pollution**
- **Low Abundance of Food / Poor Food Quality/**
- **Disease**
- **Climate Change**

* **Low Population Density/Abundance → Low Fertilization Success / Recruitment Limitation**

Restoration of Peconic Bay Scallop Populations and Fisheries

Strategy:

- conduct large scale plantings of hatchery-reared scallops at high densities [lantern nets, free-plant] to boost supply of larvae

Monitor:

- scallop survival, growth, reproduction, larval recruitment
  population densities
  food quality/quantity
  genetic contribution of planted stock

Goals:

- measurable increase in bay scallop:
  larval recruitment
  benthic population sizes
  commercial fishery landings


Tettelbach & Weinstock (2008)


Orient
East Marion
Orient Harbor
Image © 2008 DigitalGlobe
© 2008 TurnHere, Inc.
© 2008 Europa Technologies
Image © 2008 TerraMetrics
©2007 Google™
Pointer 41°07'14.34" N 72°18'44.63" W elev 0 ft
Streaming 100%
Eye alt 18459 ft

Longline culture system in Orient Harbor

>5 million 40+ mm scallops stocked in 12 mm lantern nets

Fall 2006 – Fall 2020

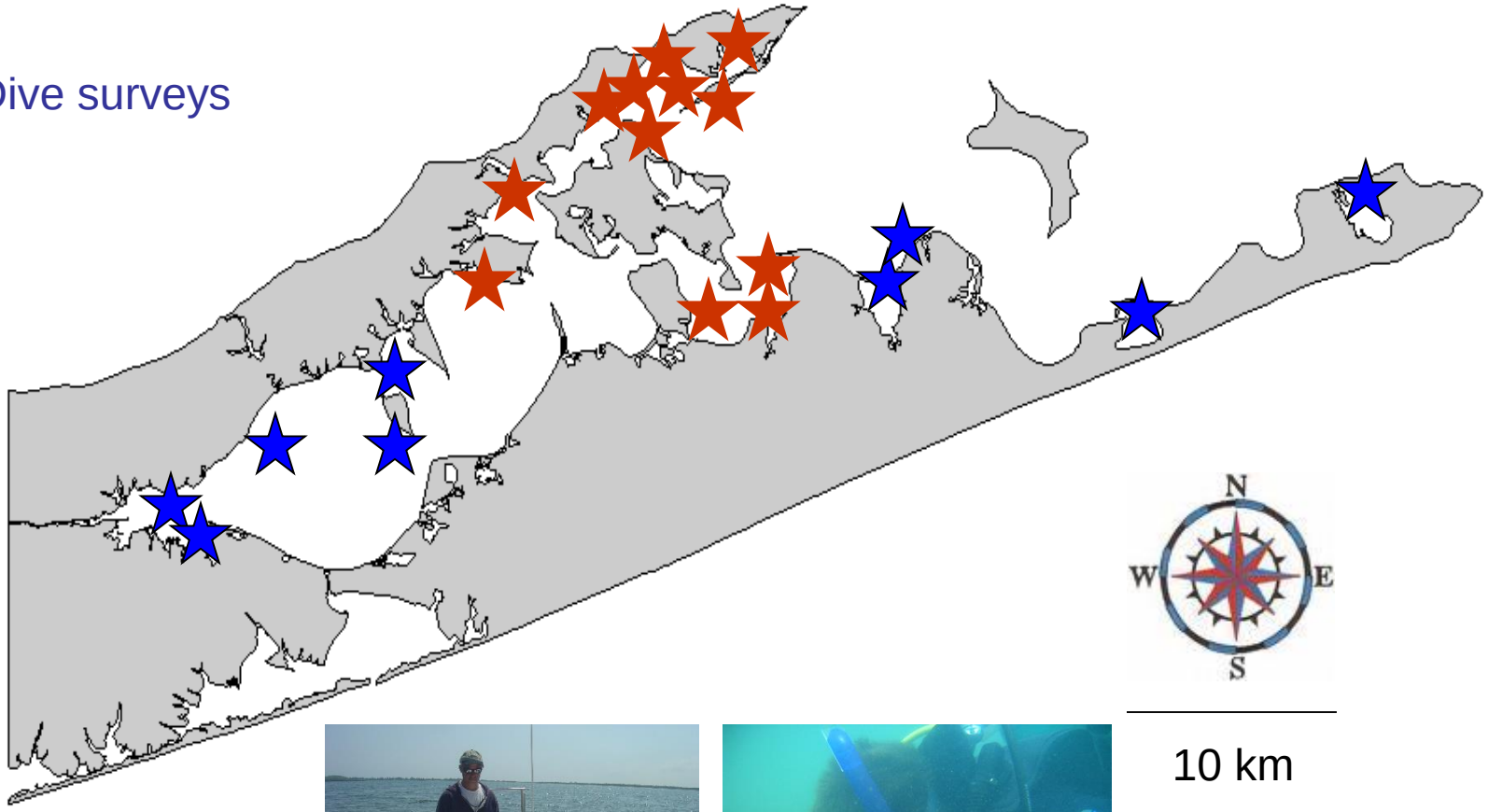
Tettelbach, ST & CF Smith (2009) Bay scallop restoration in New York. *Ecological Restoration* 27(1):20-22

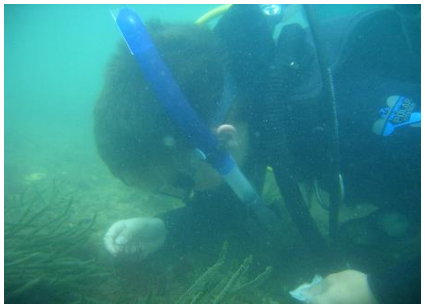
Free plantings in Peconic Bays:
3+ million scallops (30-50 mm), at 75-100/m^2
Fall 2006 – Fall 2020

Monitoring Sites: 2005-2006 (before); 2007-2020 (restoration)

Spat collectors + dive surveys

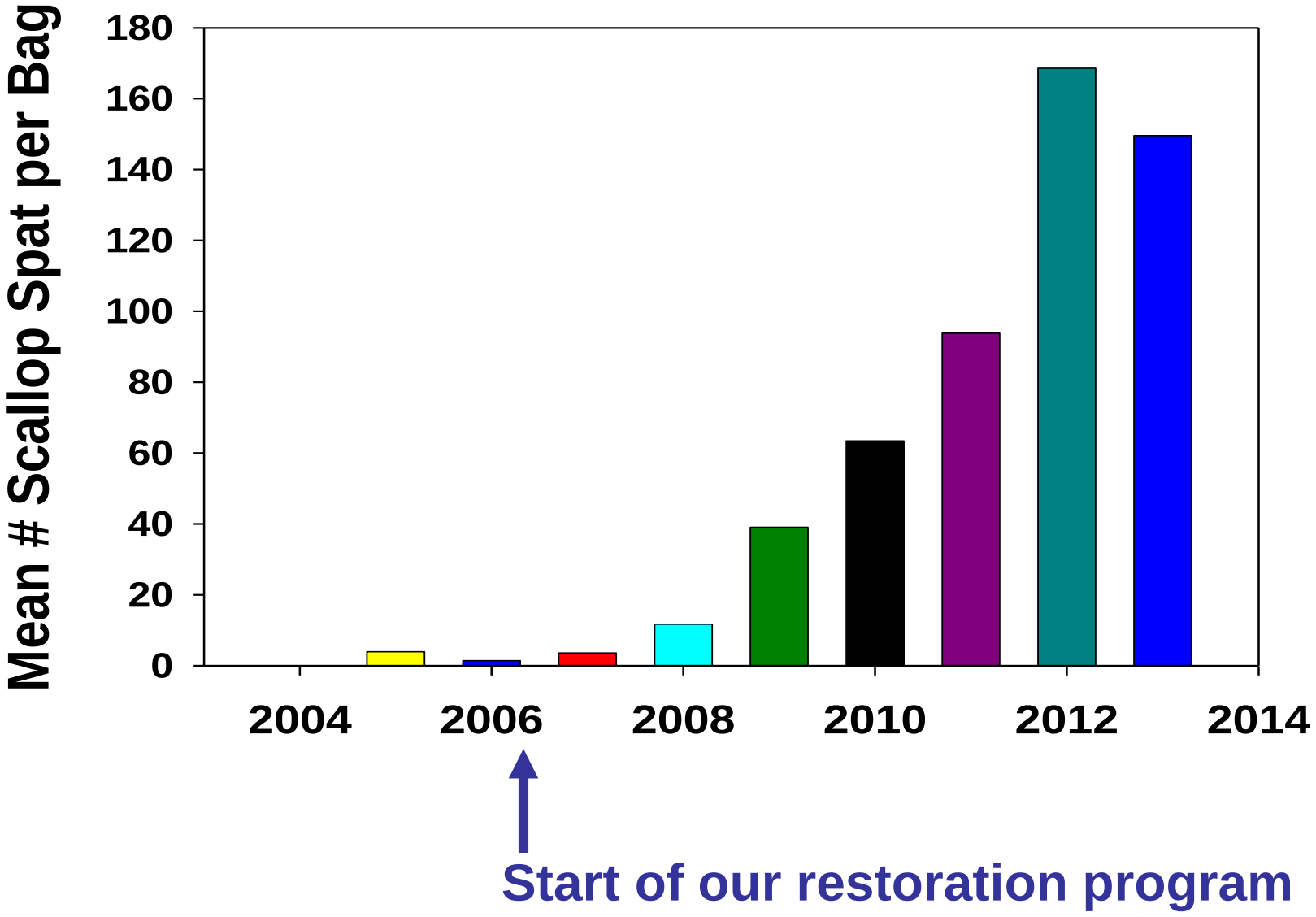
Dive surveys





Overall Mean # of Scallop Spat/Bag

(all Peconic Bay Spat Collector Sites)



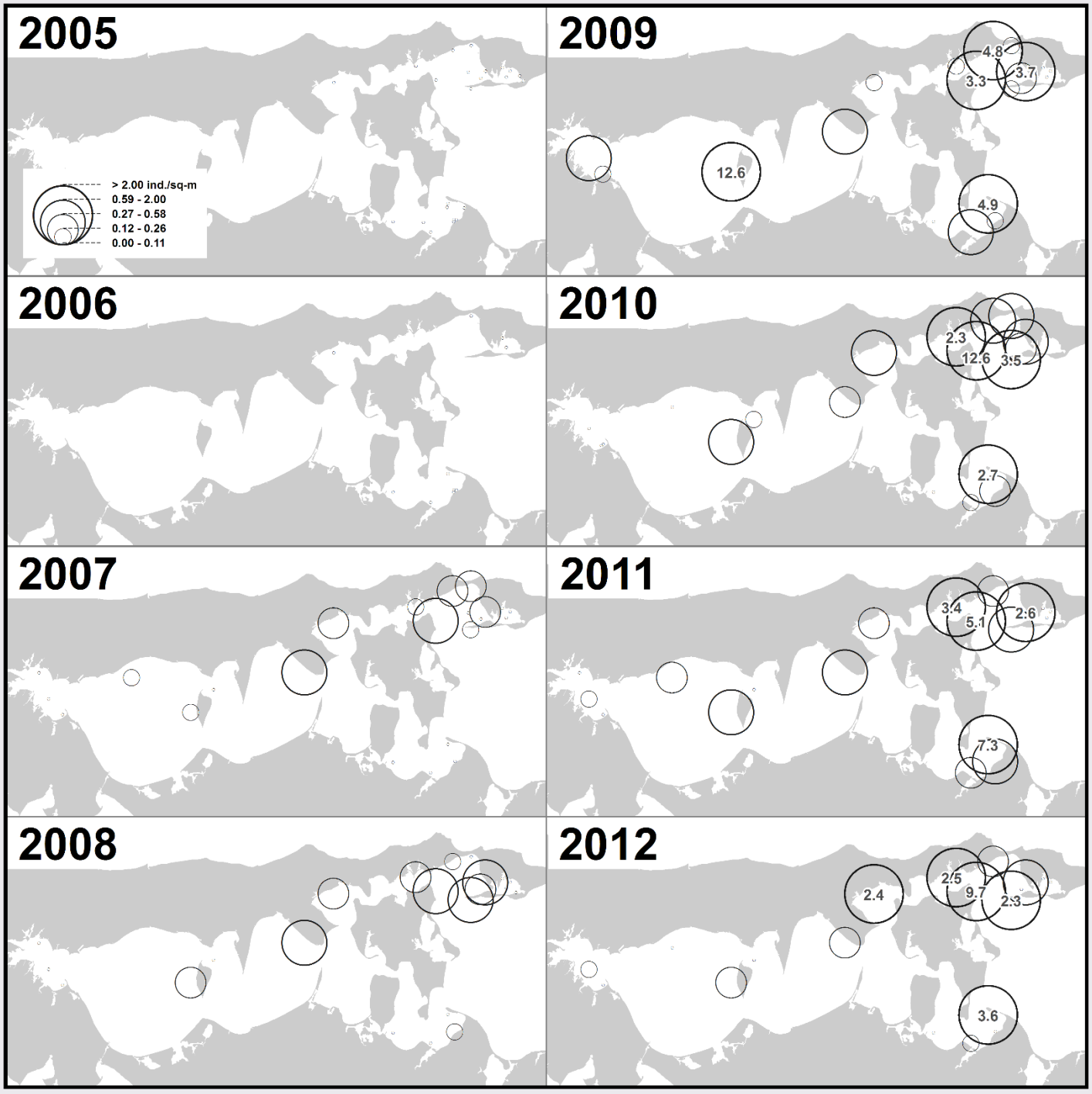
Changes in mean density (#/m^2) of juvenile (0+yr) bay scallops in natural Peconic Bay populations

Fall

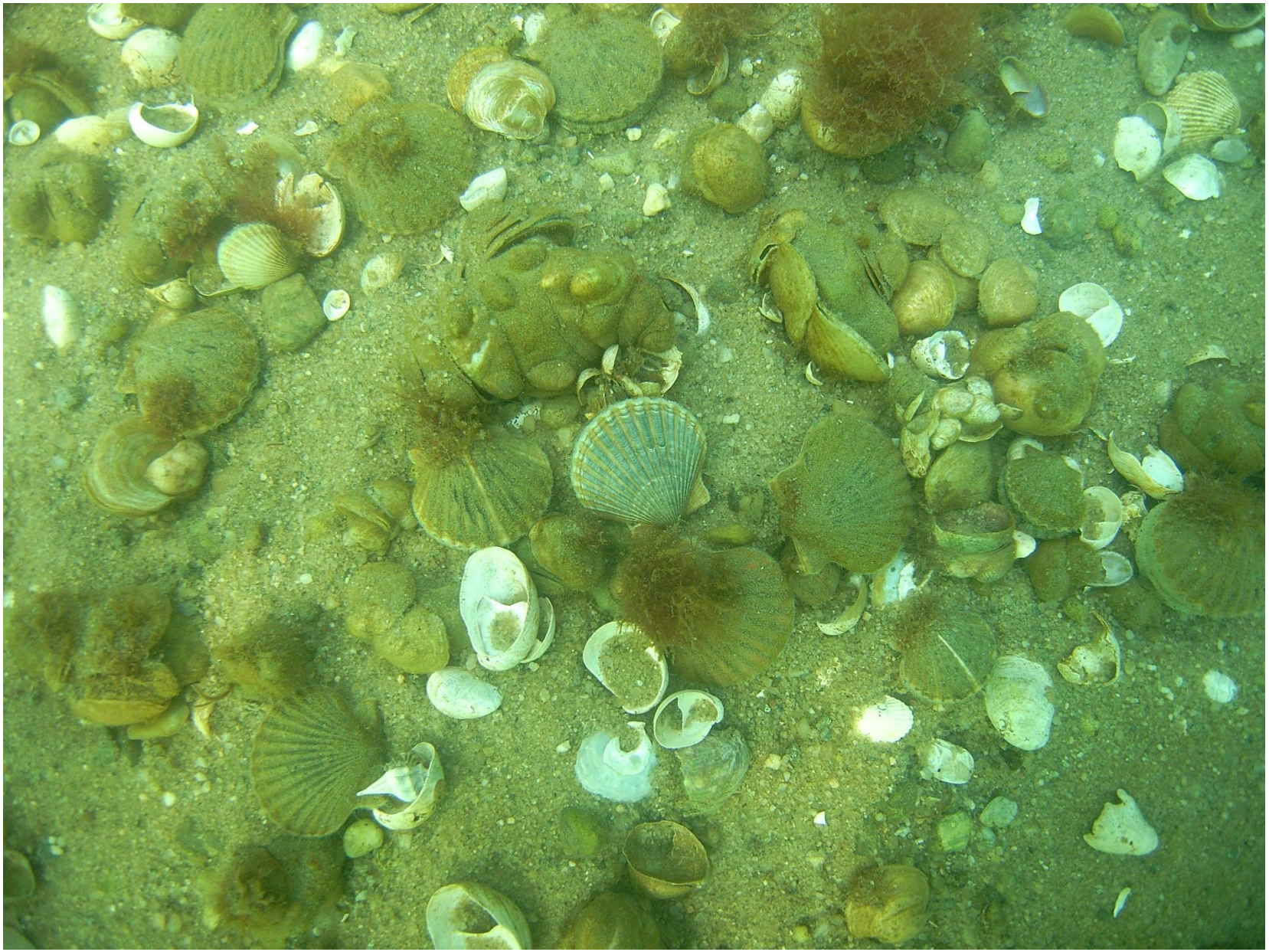
2005-2006 = pre-restoration

2007-2012 = restoration

Tettelbach et al. (2015)

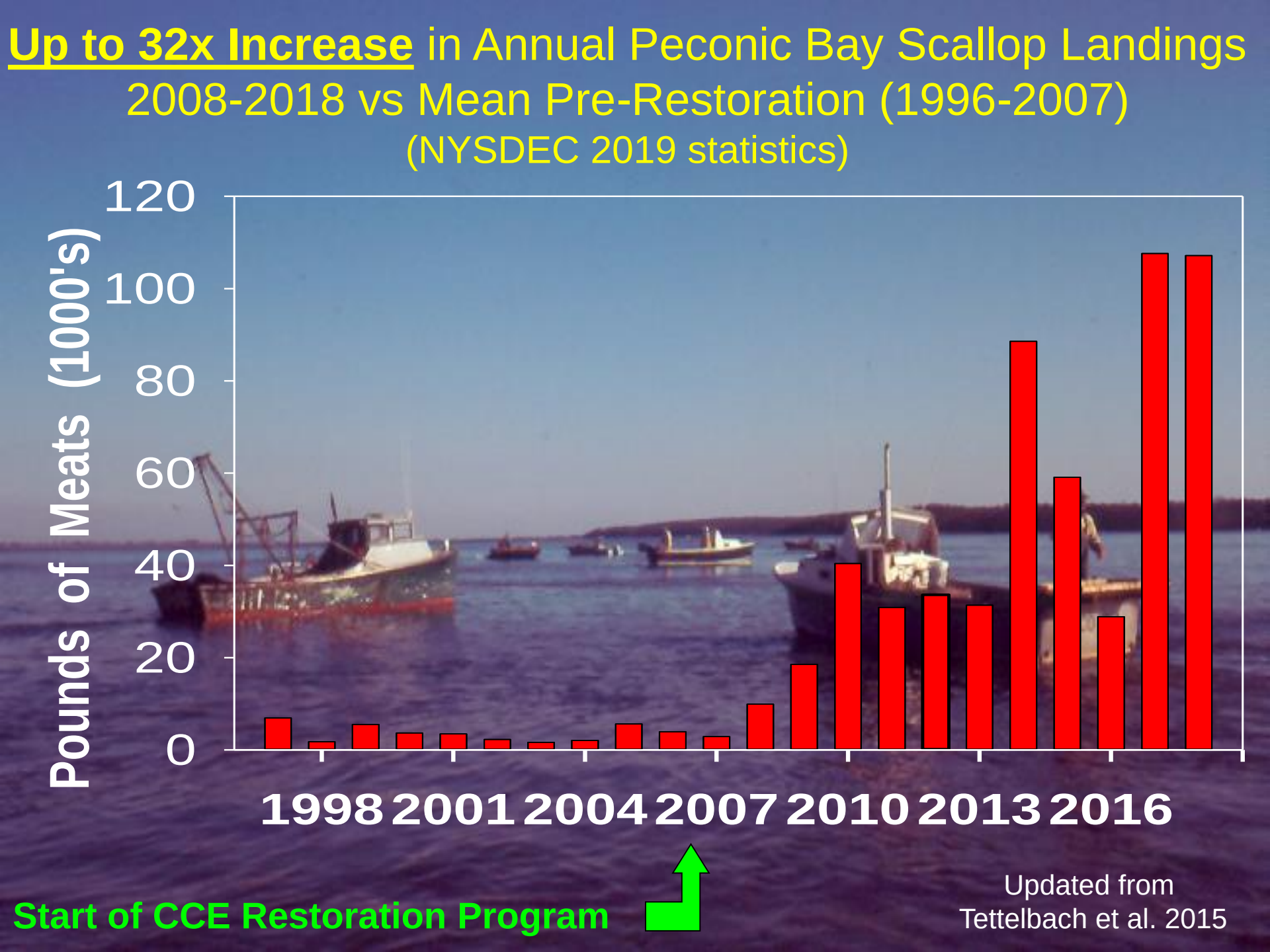


Resurgence of scallop populations has occurred despite extremely low coverage of eelgrass



Up to 32x Increase in Annual Peconic Bay Scallop Landings 2008-2018 vs Mean Pre-Restoration (1996-2007)

(NYSDEC 2019 statistics)



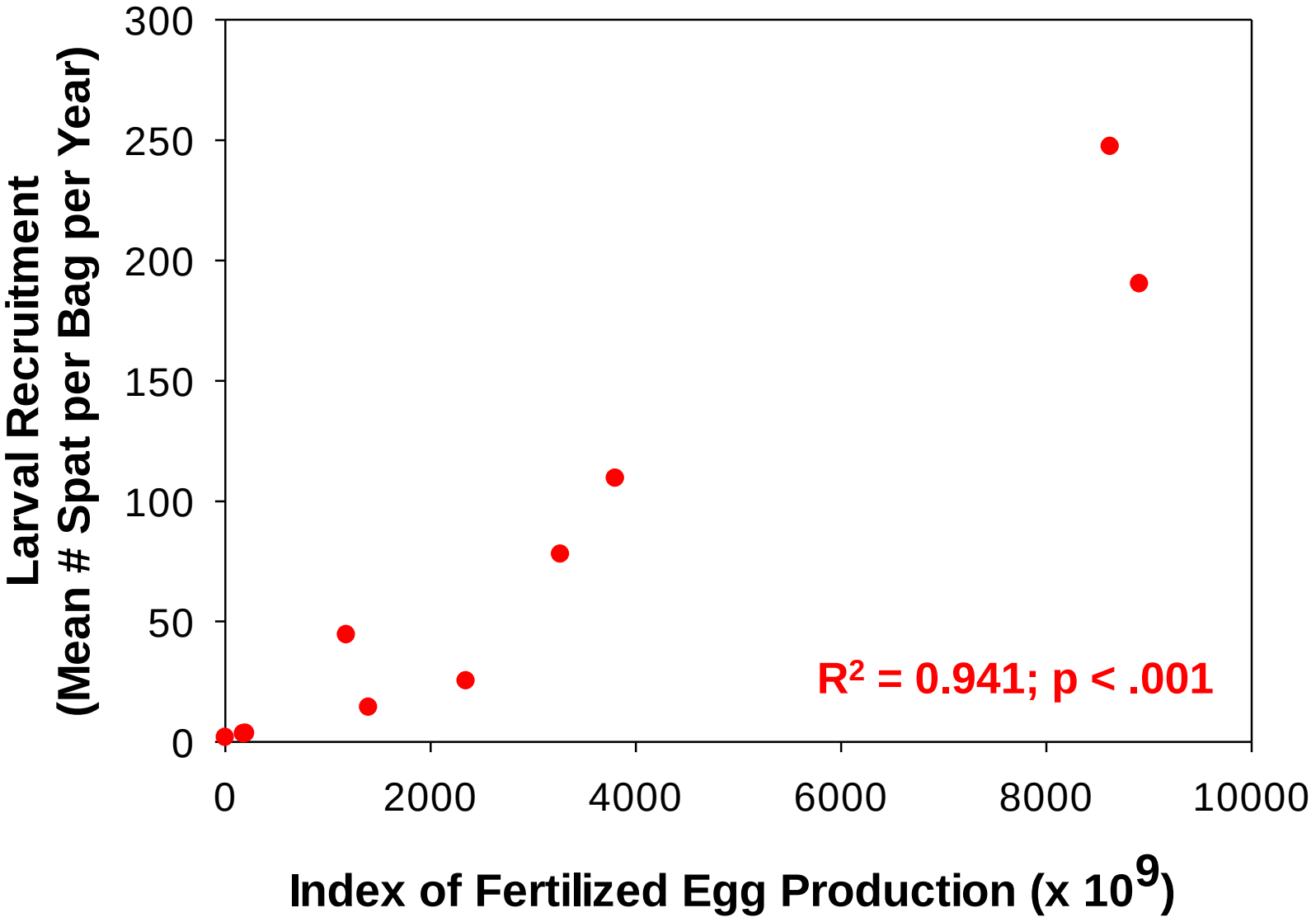
Possible Reasons for Increases In Peconic Bay Scallop Larval Recruitment, Benthic Populations and Fishery Landings Following Initiation of Our Restoration Efforts

Weak → Strong

- Higher food levels
- Better food quality
- Better temporal match of food with larval presence
- Increased water temperature
- Improved water quality
- Improved habitat (e.g. more eelgrass)
- Reduced # of predators
- Temporal mismatch with predators
- Increased scallop fecundity
- Allochthonous larval input
- Restoration: higher scallop density/abundance → recruitment

Bay Scallop Stock-Recruitment Relationships

Orient Harbor: 2005-2014

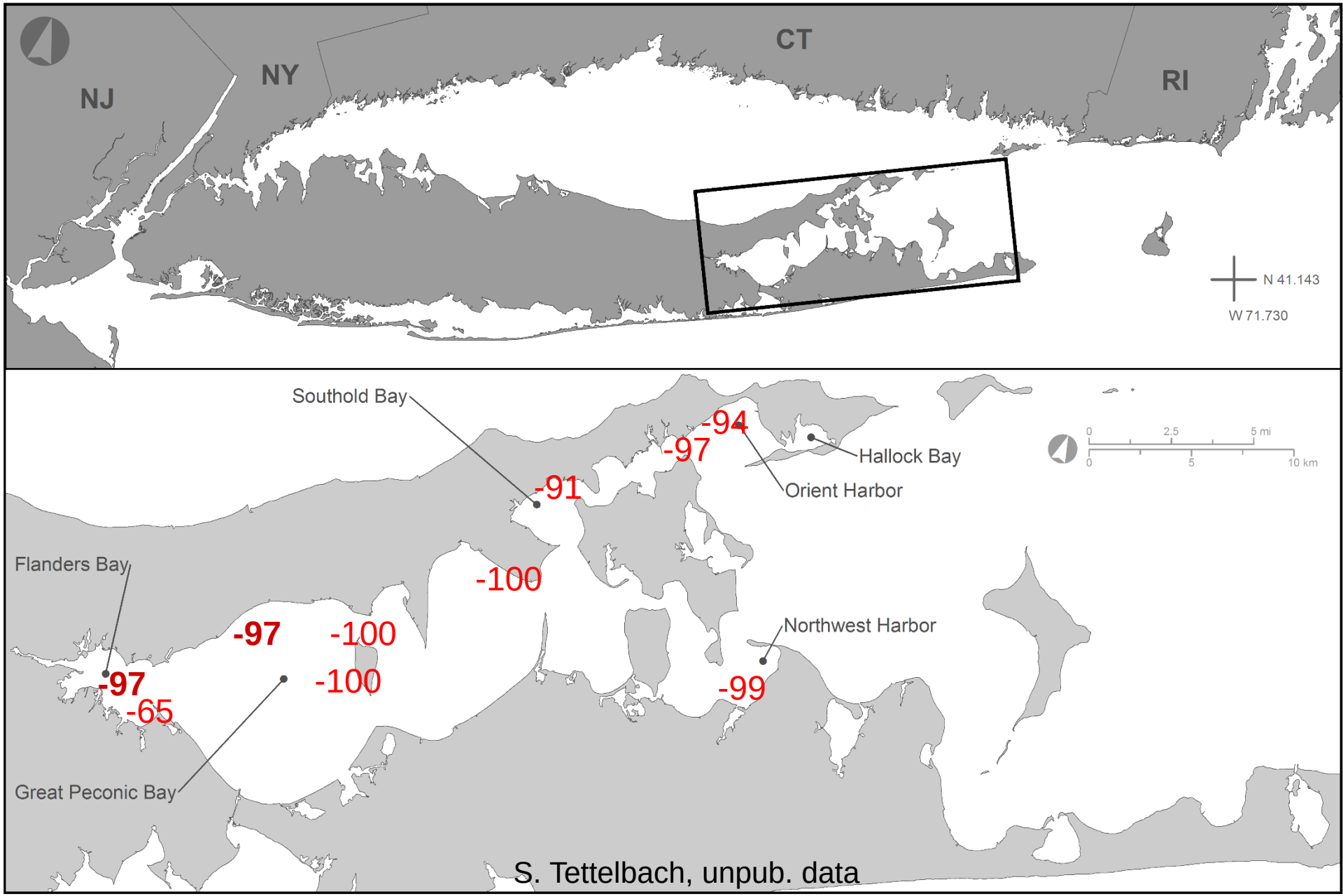


Updated from Tettelbach et al. 2013

Fertilization success rates based on polynomial regression model of Lundquist & Botsford (2004)

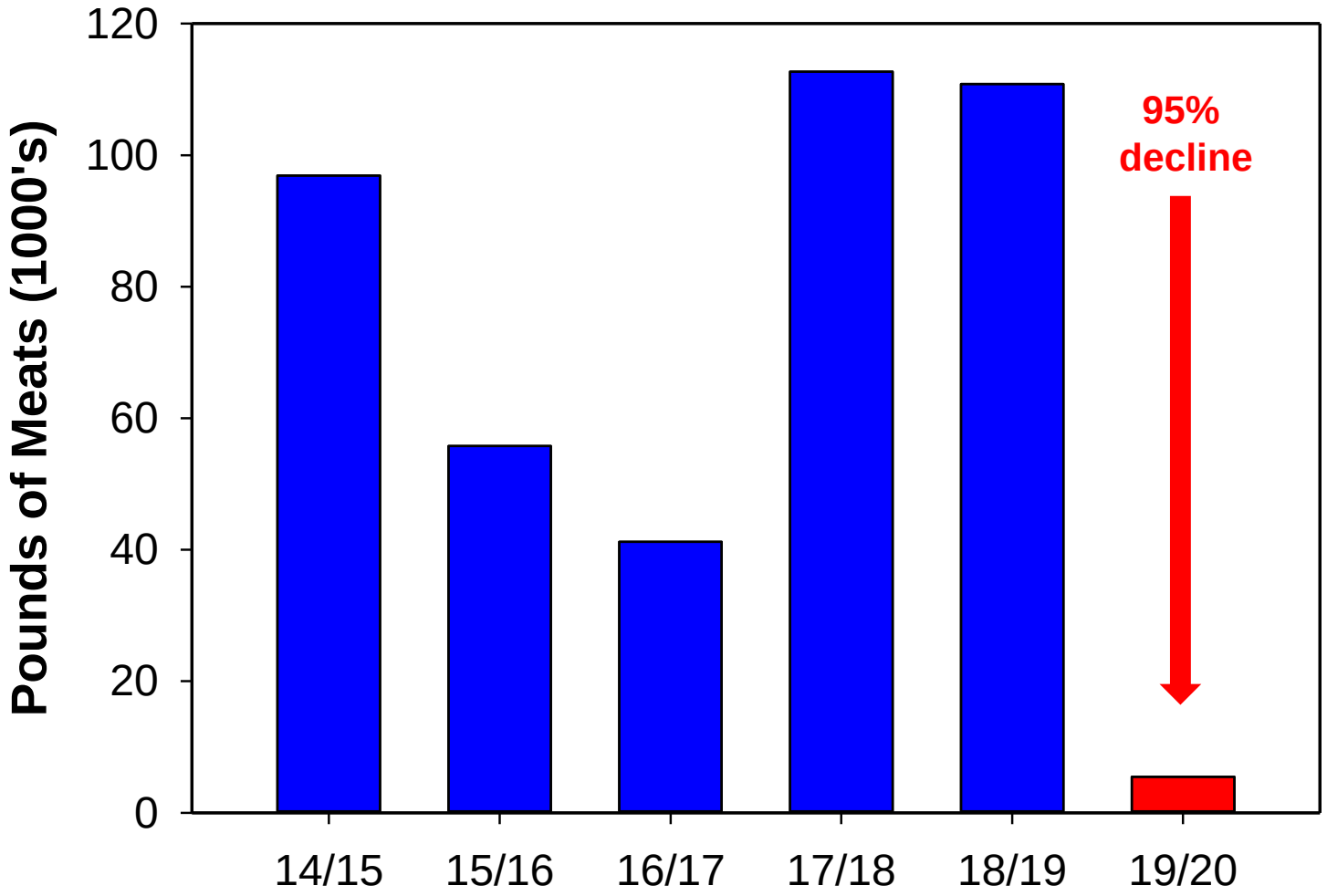
2019 Peconic Bay Scallop Die-Off

% Δ in adult bay scallop density: May/June to October 2019



S. Tettelbach, unpub. data

Peconic Bay Scallop Landings, By Season 2014/15 – 2019/20



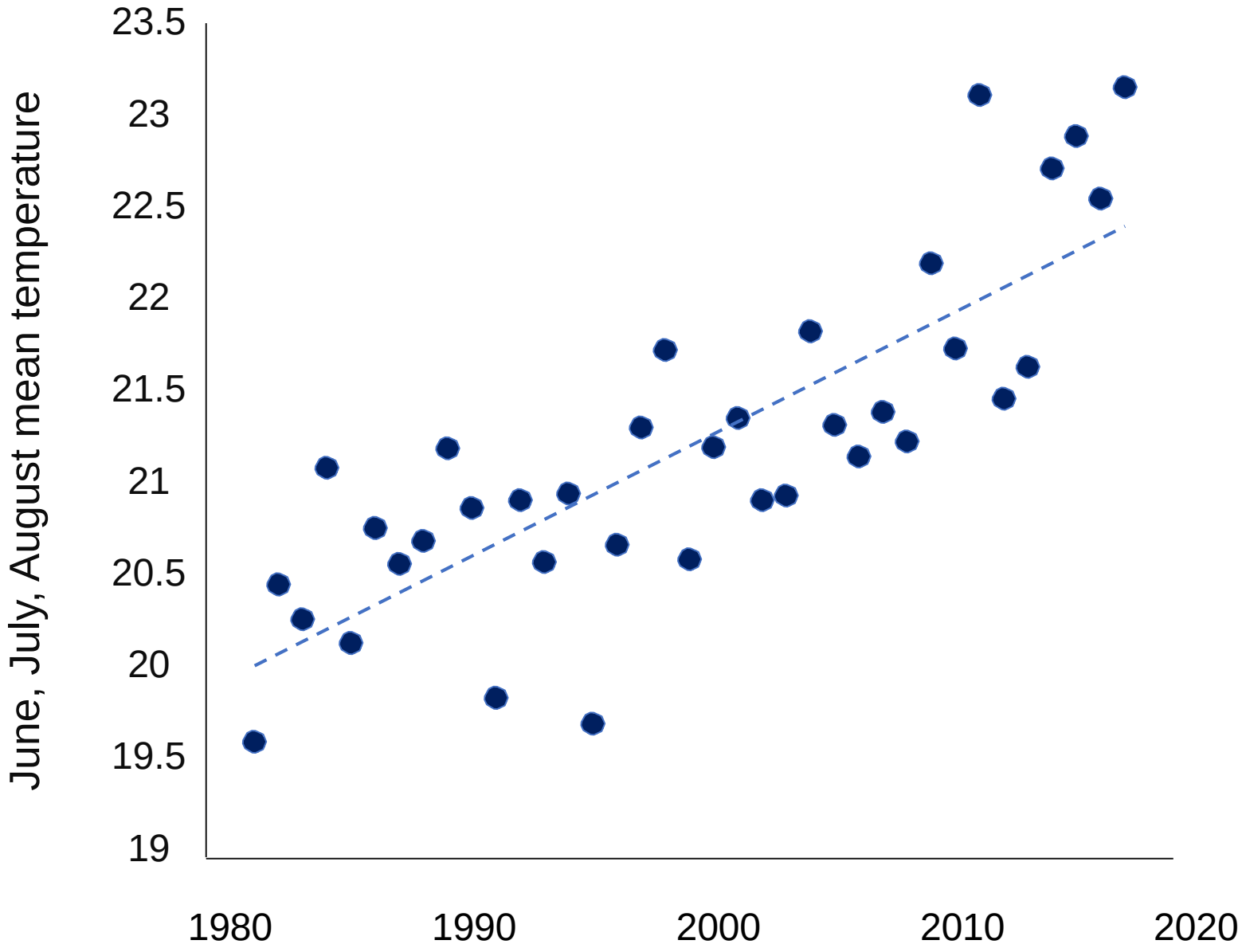
NYS DEC

WHY??

Four Horsemen of the (Ocean Climate Crisis) Apocalypse

Chris Gobler, Stony Brook

35-year trend, summer water temperature around Long Island



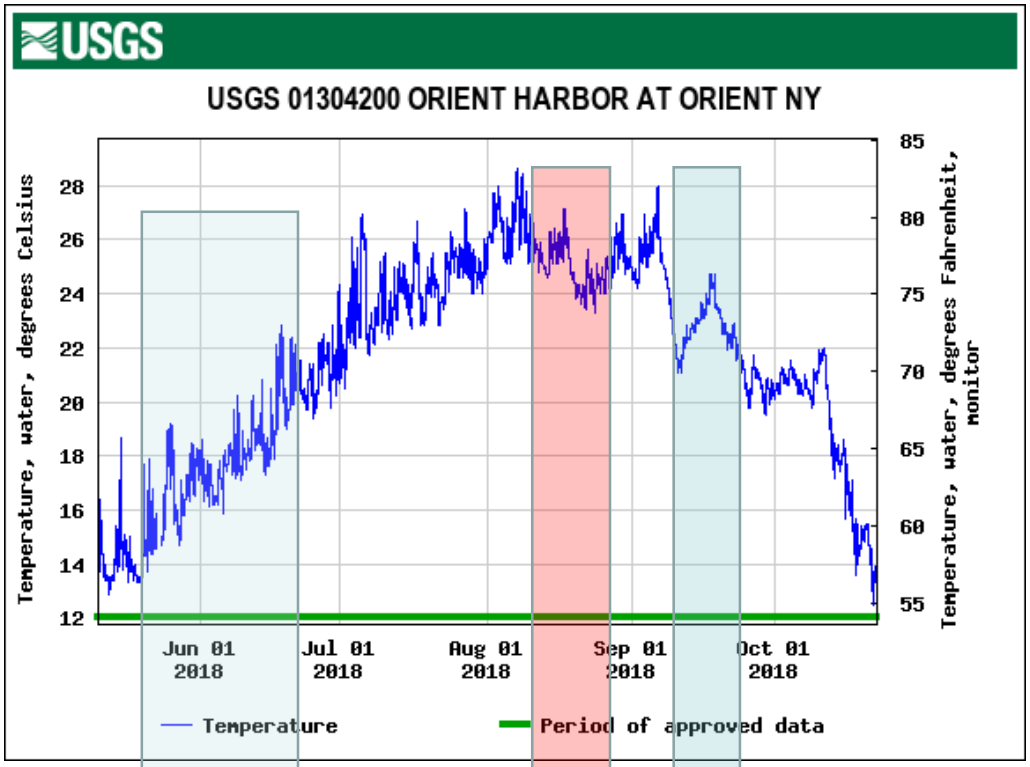
Chris Gobler, Stony Brook

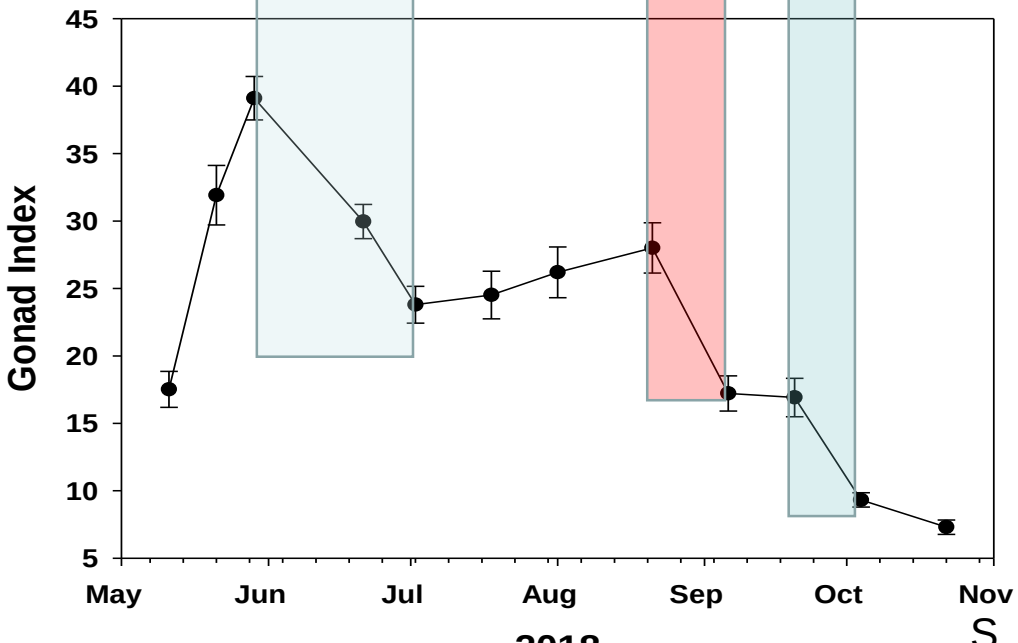
2018

Orient Harbor
Longline field
CCE Scallop
Restoration Program

(scallops held
in nets,
above bottom)

Longline 17



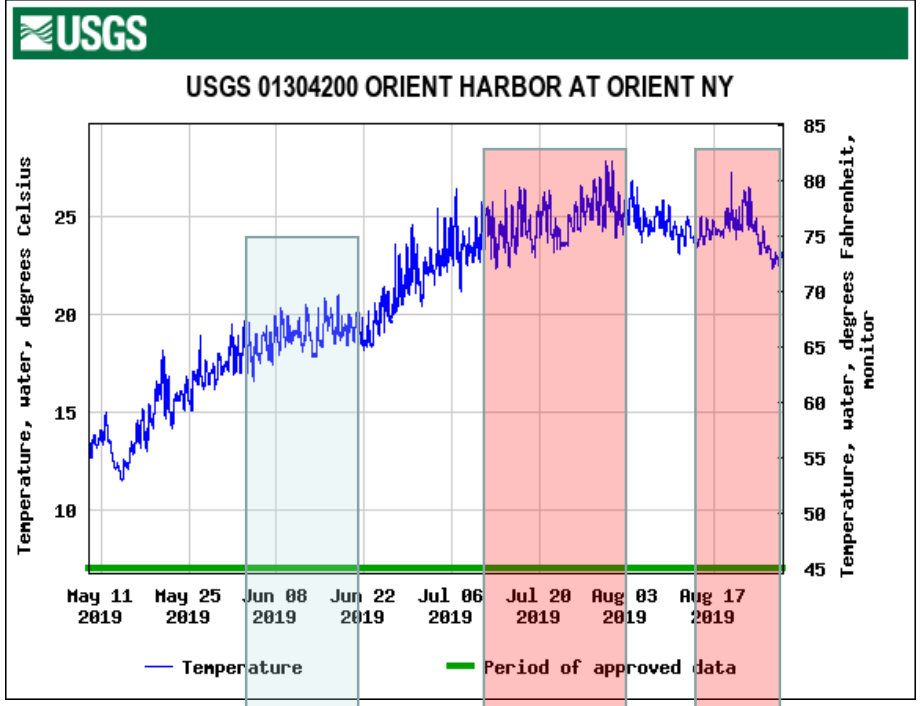


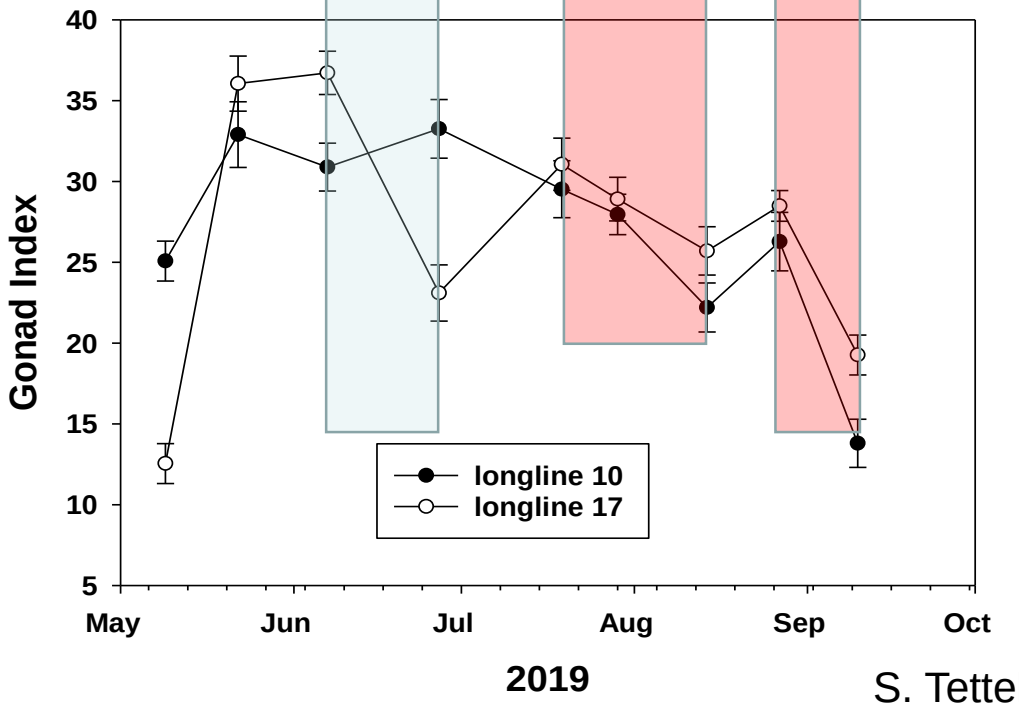
S. Tettelbach, unpub. data

2019

Orient Harbor
Longline field
CCE Scallop
Restoration Program

(scallops held
in nets,
above bottom)

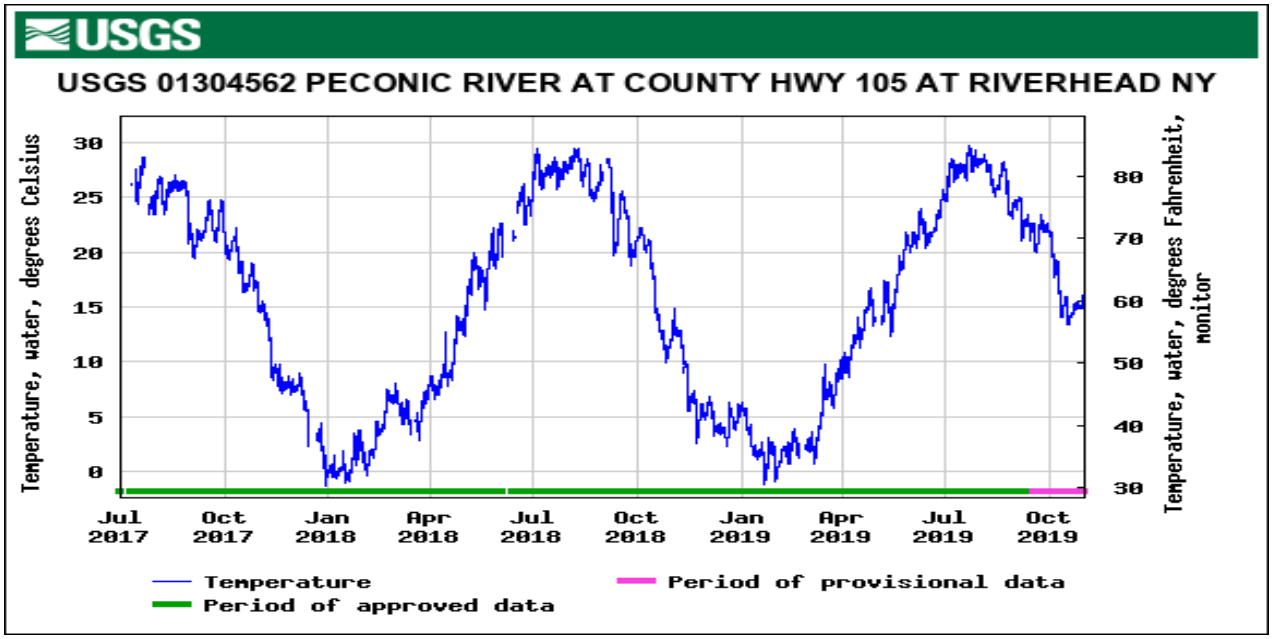


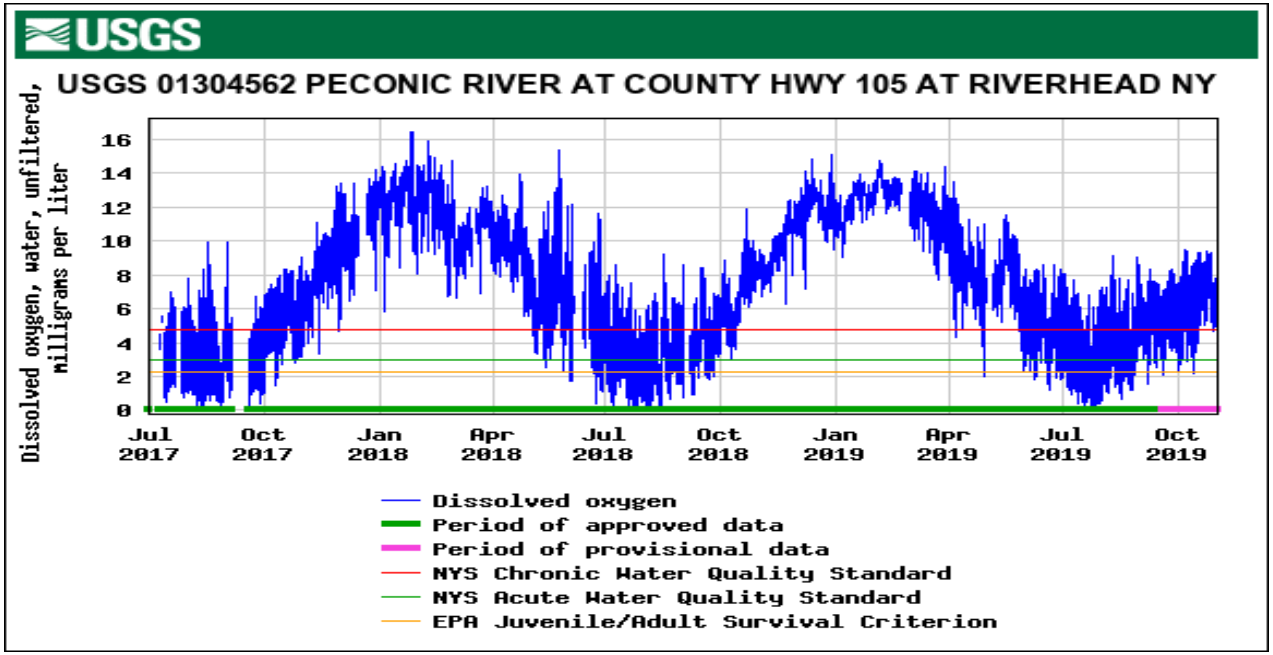


S. Tettelbach, unpub. data

Water Temperature, Dissolved Oxygen, 2017-2019

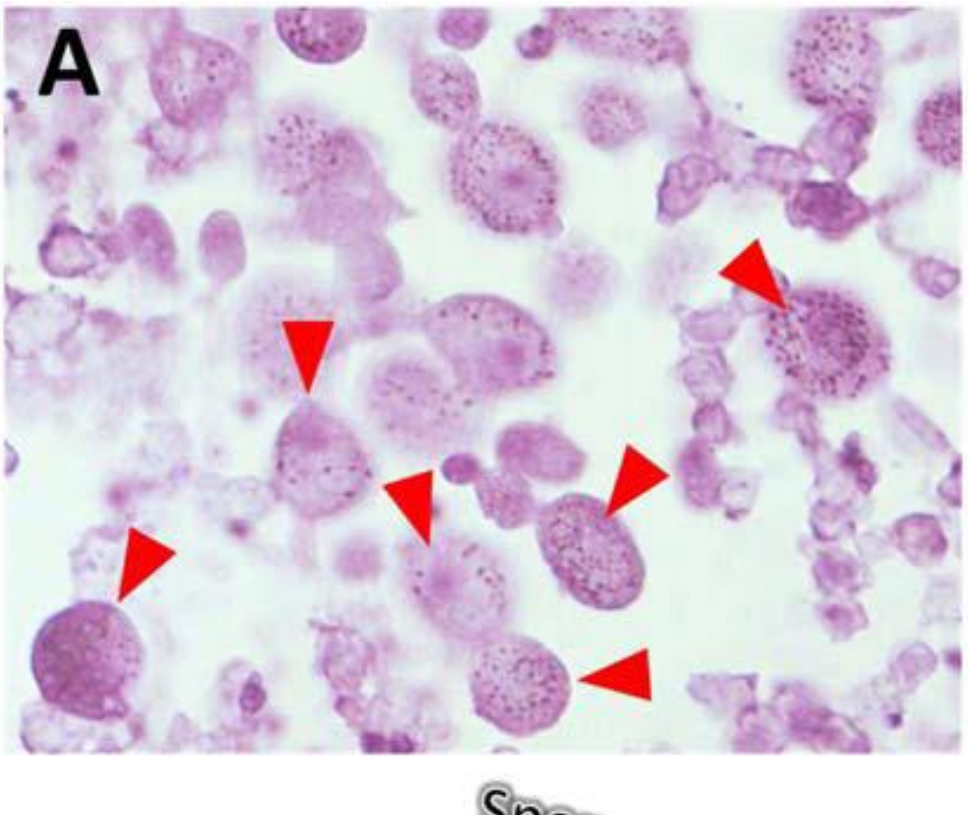
Peconic River mouth





Disease

100% incidence of a protozoan parasite in bay scallops in November 2019 and in July 2020.



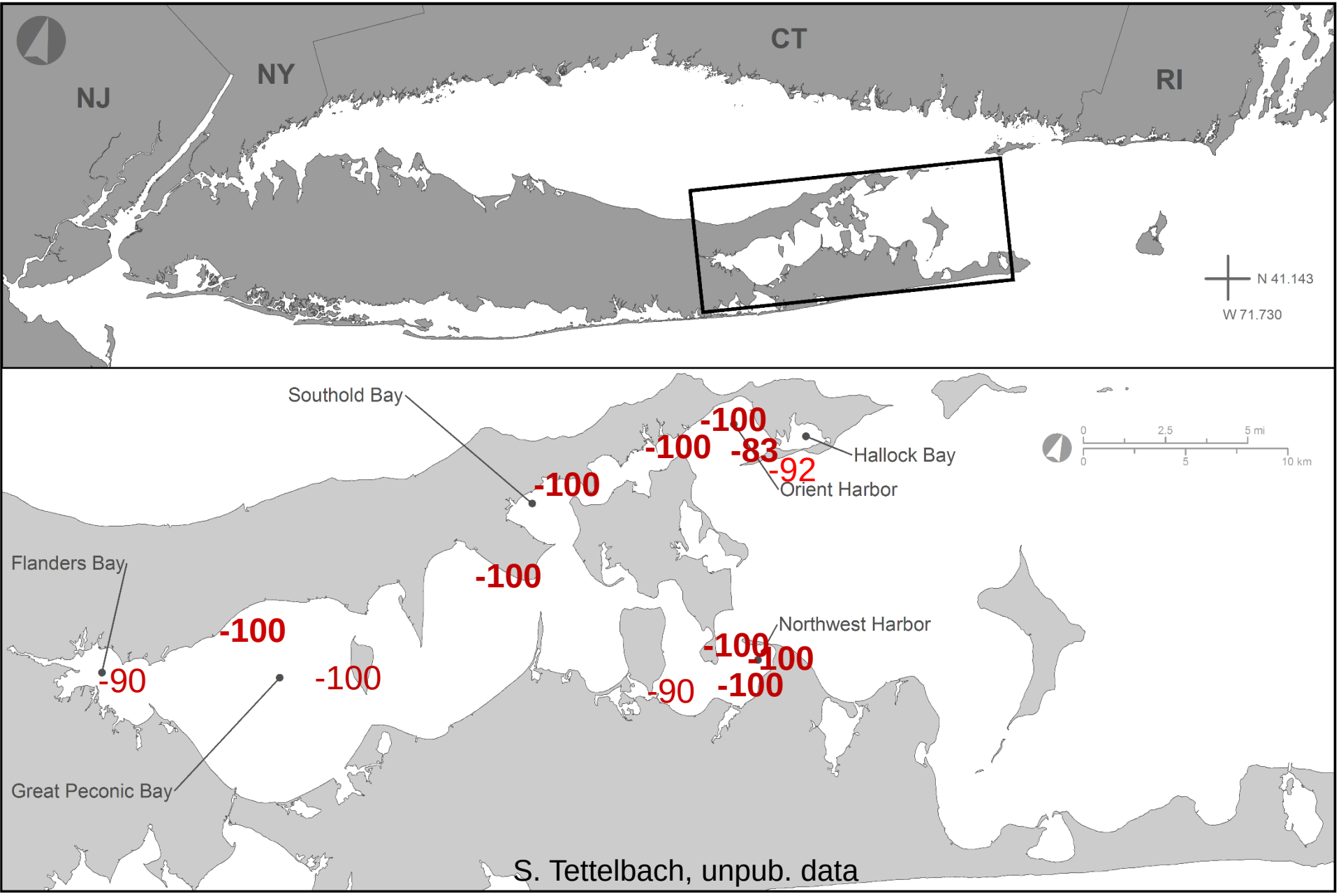
A. Presence of the gamonts (red arrowheads) of the Coccidian bay scallop parasite is associated with the disruption of kidney tubules. Bassem Allam, Stony Brook

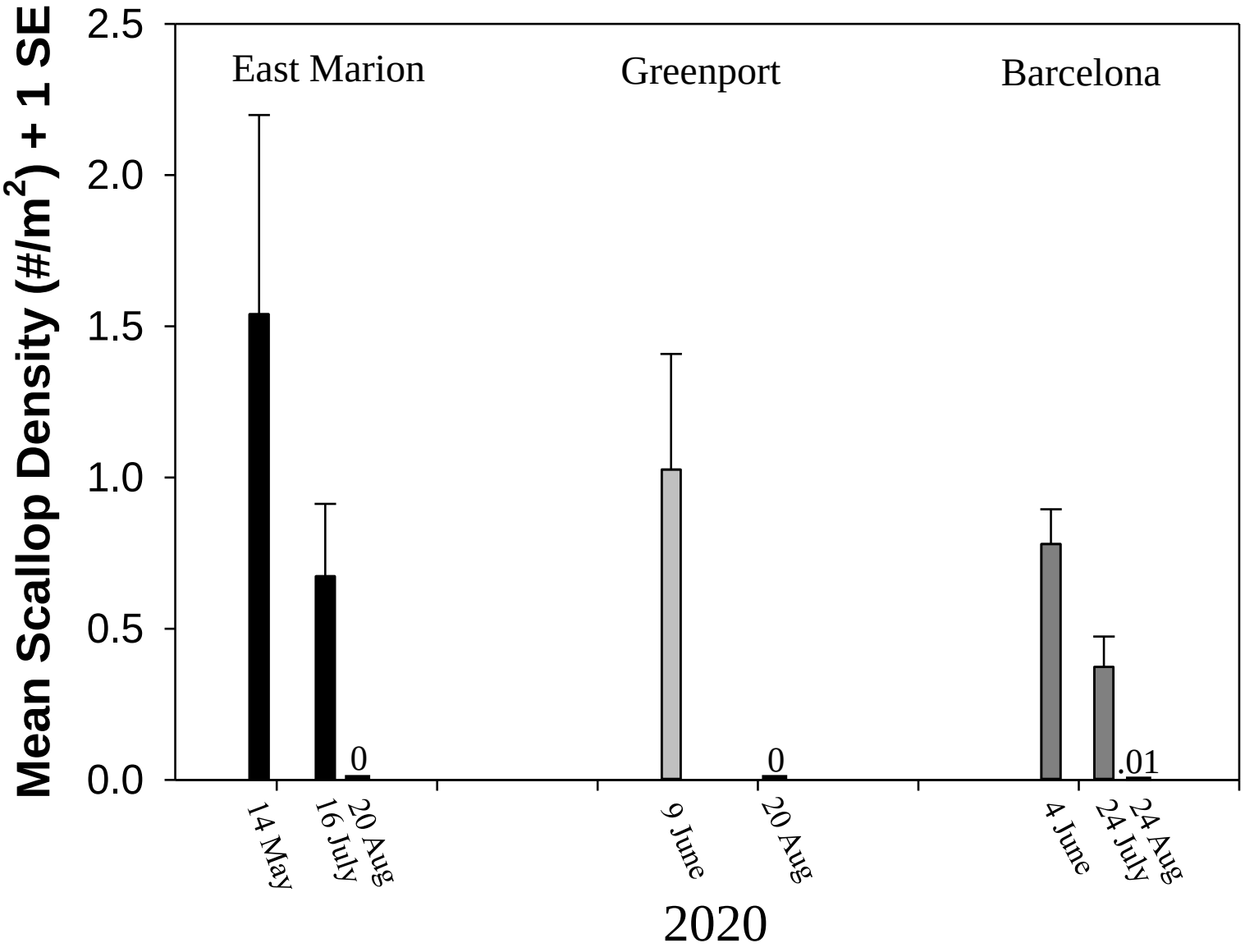
Cownose Rays, *Rhinoptera bonasus*

Source: flmnh.ufl.edu, Photo credit: Tim Flanagan.

2020

% Δ in adult bay scallop density: May/June to October 2020



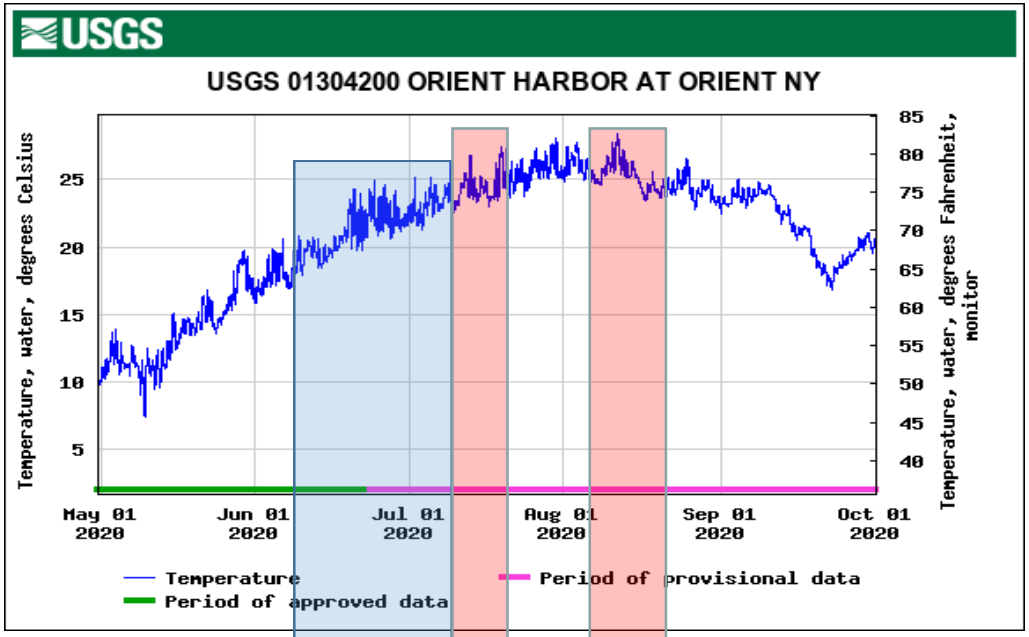


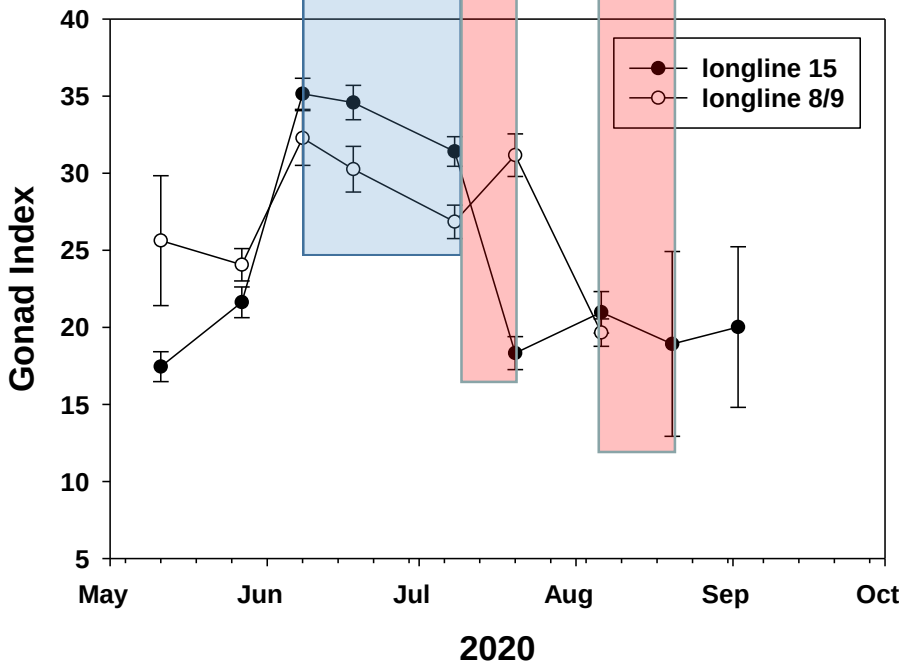
Live scallop densities (mean + 1 SE) observed in population surveys at Peconic sites with the highest abundances in Spring 2020. Barcelona = Barcelona Neck, Northwest Harbor. S.Tettelbach, unpub. data

2020

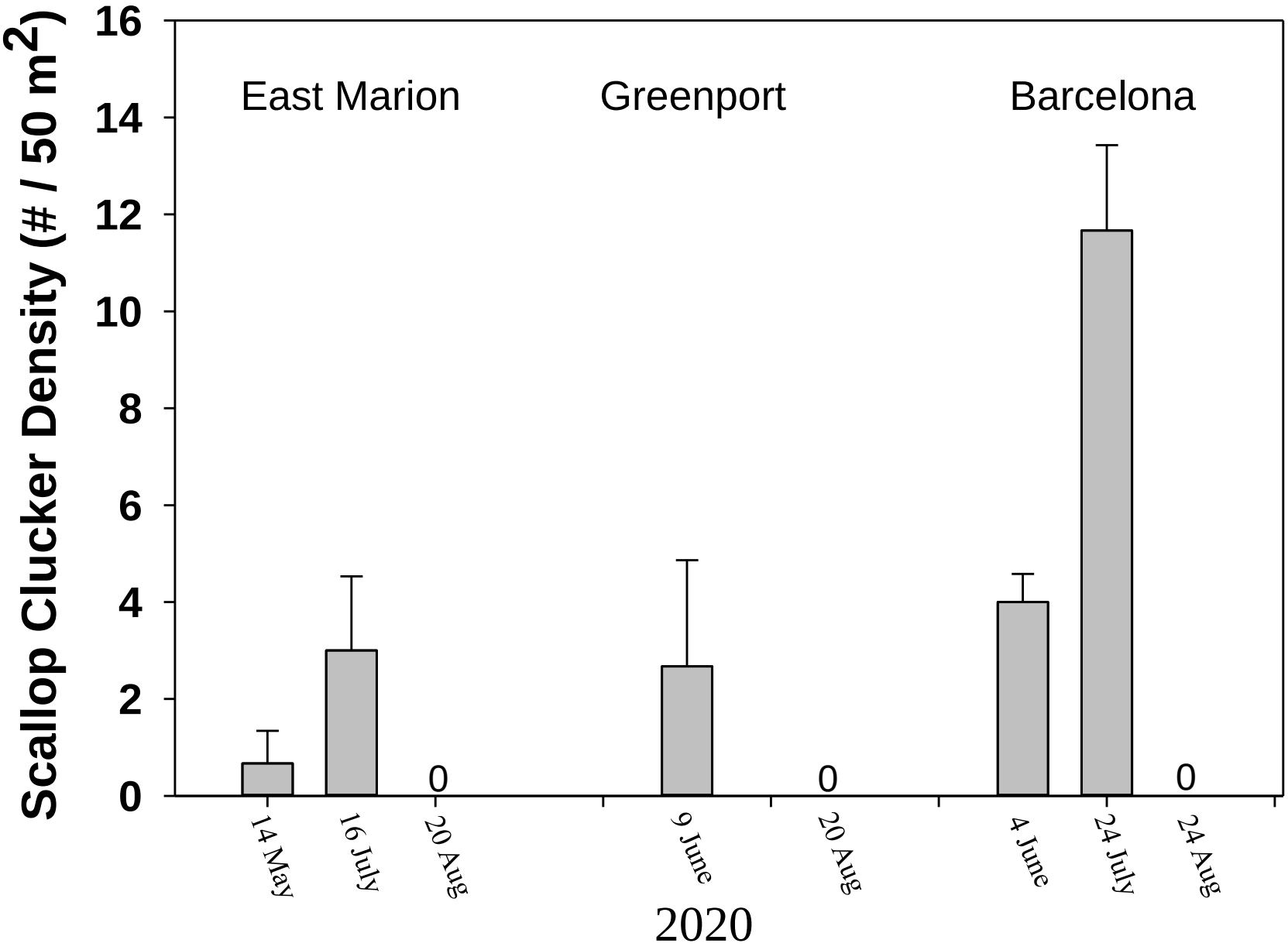
Orient Harbor
Longline field
CCE Scallop
Restoration Program

(scallops held
in nets,
above bottom)





S. Tettelbach, unpub. data



Scallop clucker densities (mean + 1 SE) observed in population surveys at Peconic sites with the highest abundances in Spring 2020. B = Barcelona Neck, NW Harbor. S.Tettelbach, unpub. data

Cownose Rays, *Rhinoptera bonasus*

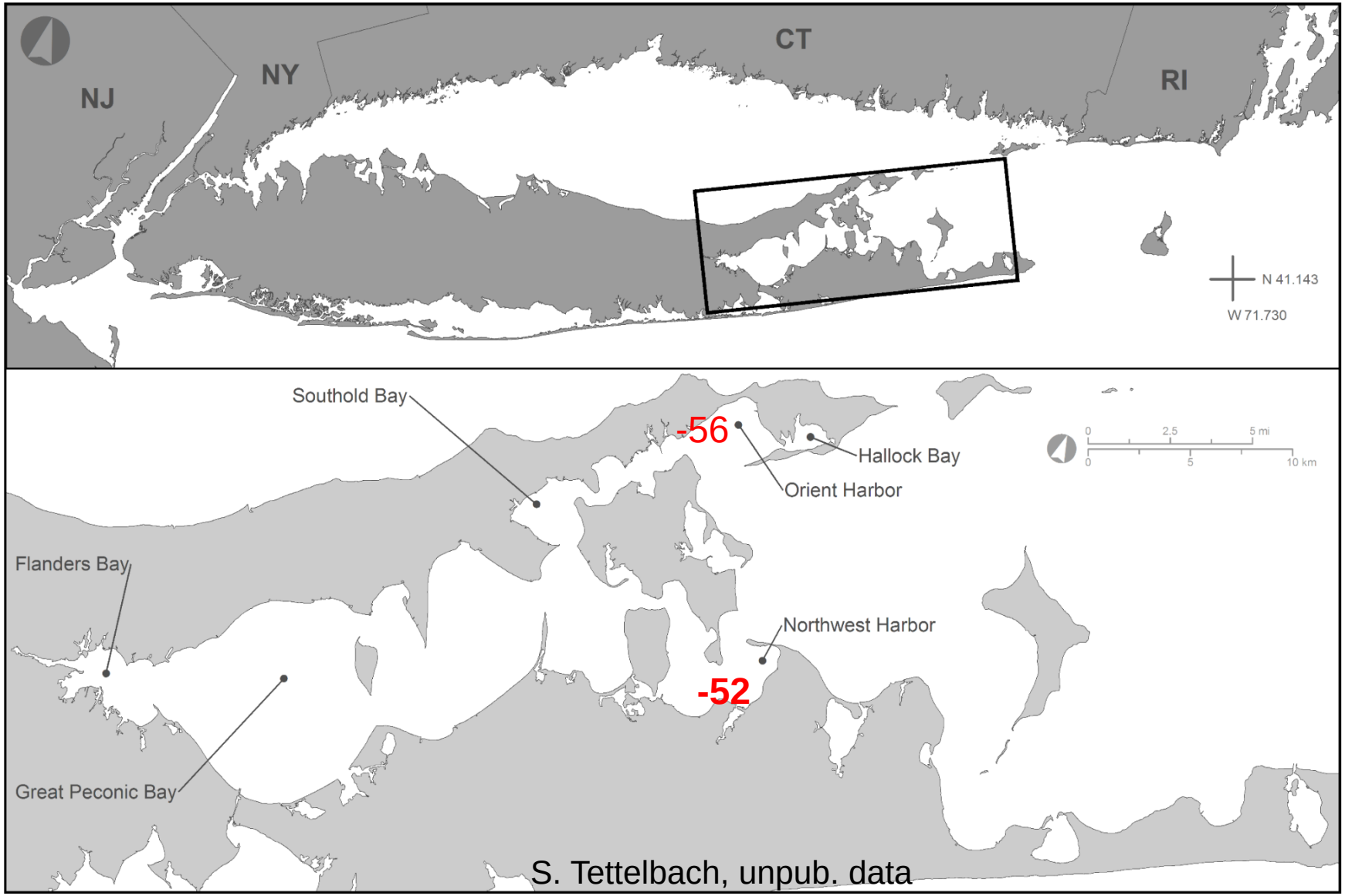
- First seen in LI inshore waters: end of July/1st week of August 2020
- Seen/caught in Plum Gut, around Shelter Is, Orient Hbr, Shinnecock, Flanders Bay
- Local social media chatter about cownose rays over by end of August 2020

Margalefidinium (Cochlodinium) polykrikoides (rust tide)

http://www.newsday.com/long-island/suffolk/officials-toxic-rust-tide-returns-to-east-end-1.5920797

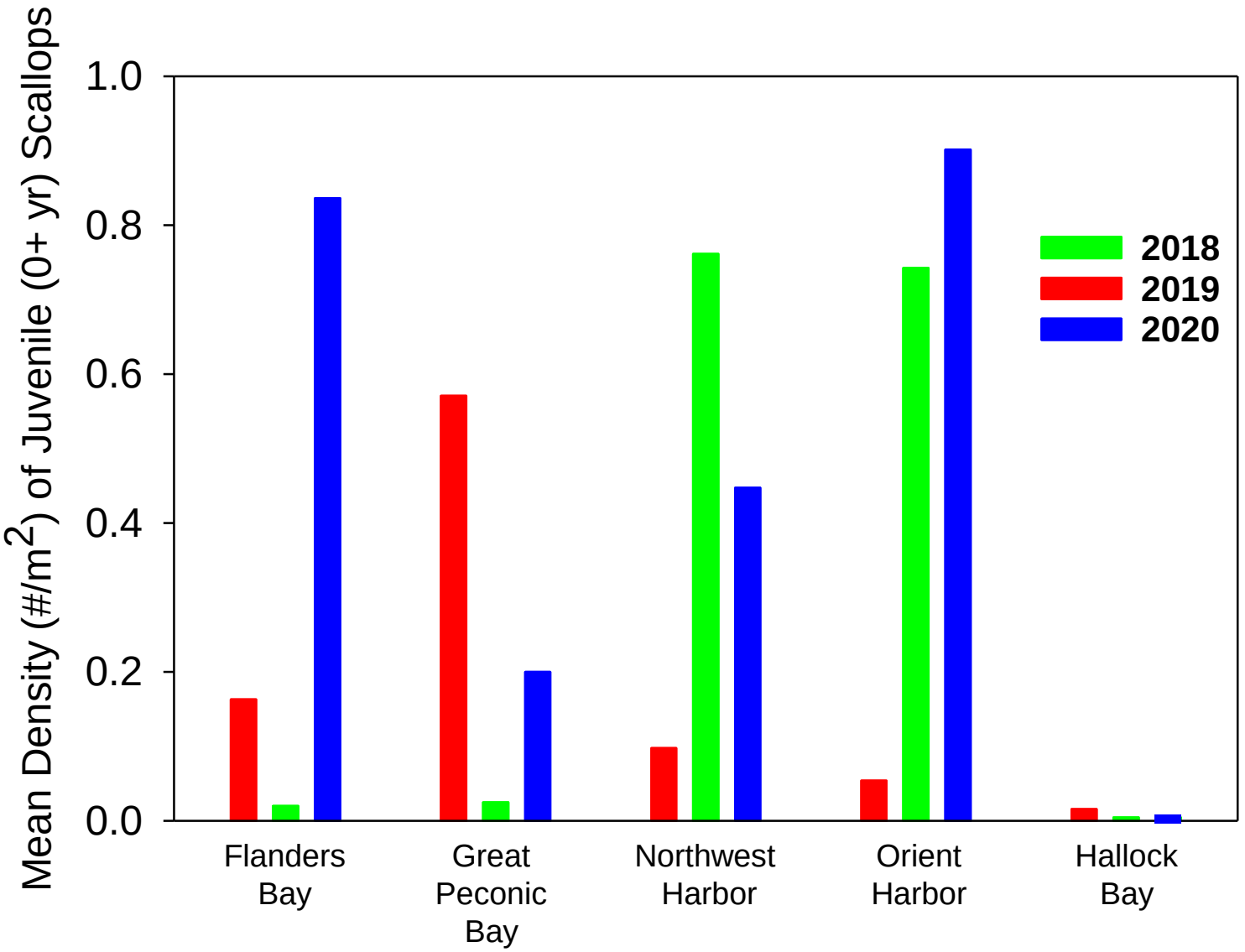
% Δ in adult bay scallop density: May/June to July 2020

declines in 1½ to 2 months: before rust tide, cownose rays



S. Tettelbach, unpub. data

Mean densities of juvenile bay scallops in October, 2018-2020



S. Tettelbach, unpub. data

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