Heatwave duration correlates with the poor recruitment of oysters in northern Gulf of Mexico coastal waters

Jeffrey D. Plumlee
Louisiana State University – Agriculture Center, Louisiana Sea Grant

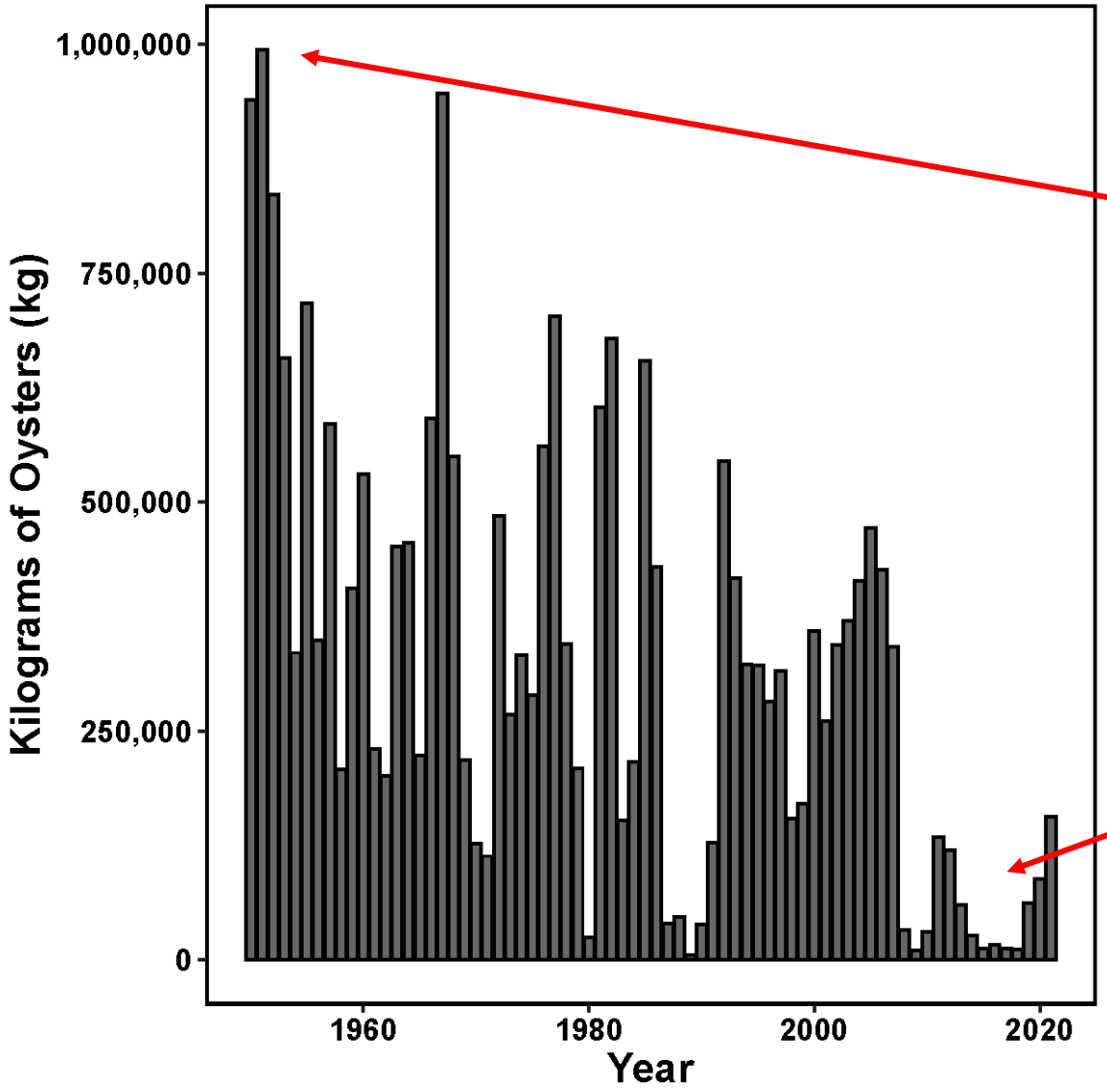
John C. Lehrter, and Sean P. Powers

Stokes School of Marine and Environmental Sciences, University of South Alabama and the Dauphin Island Sea Lab

Jason Herrmann and John Mareska

Alabama Department of Conservation and Natural Resources, Marine Resource Division

Oysters in the northern Gulf of Mexico



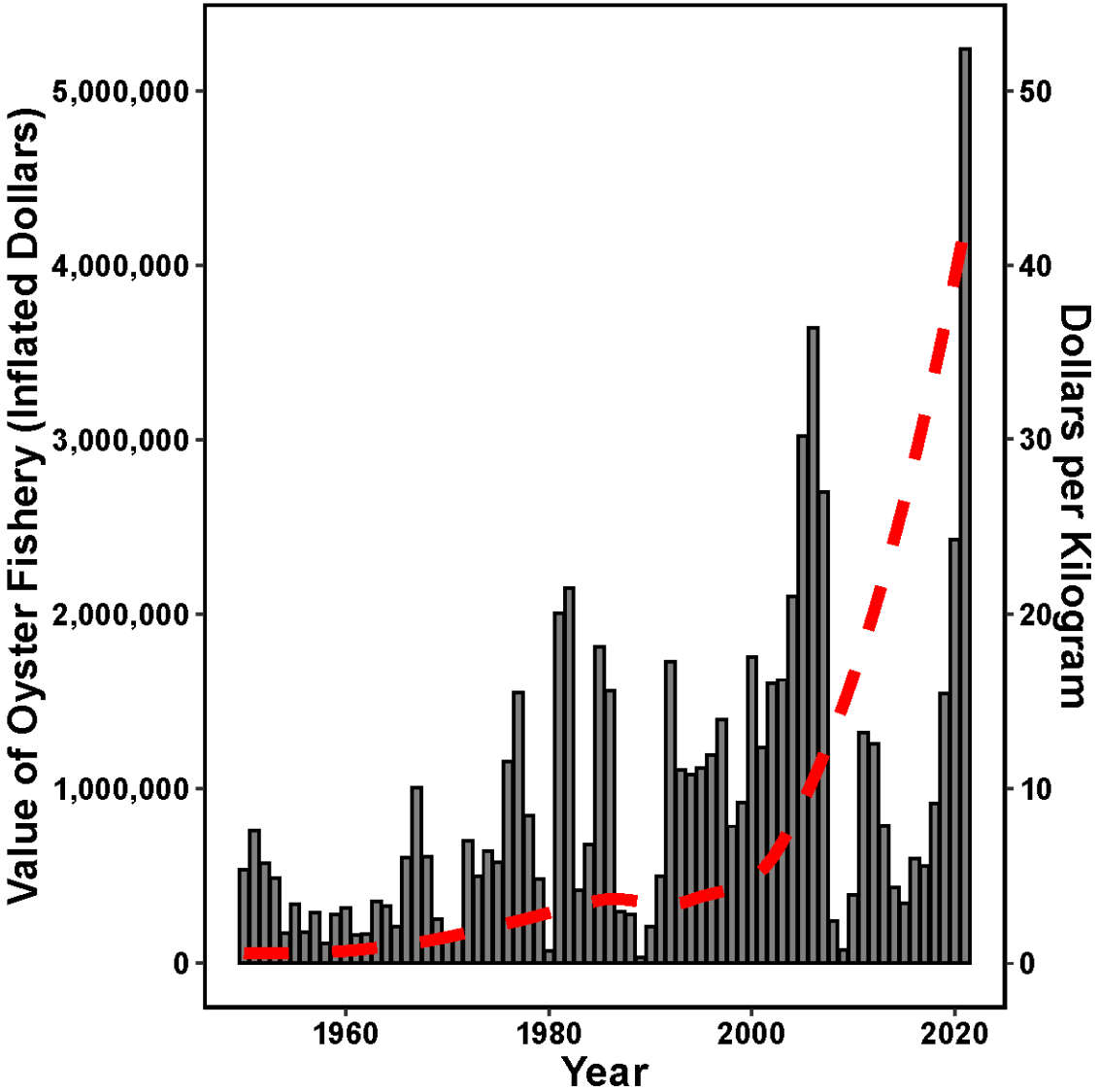
1000 metric tons in 1950's

2014 – 2018 Landings

15,263 ± 5,734 kilograms

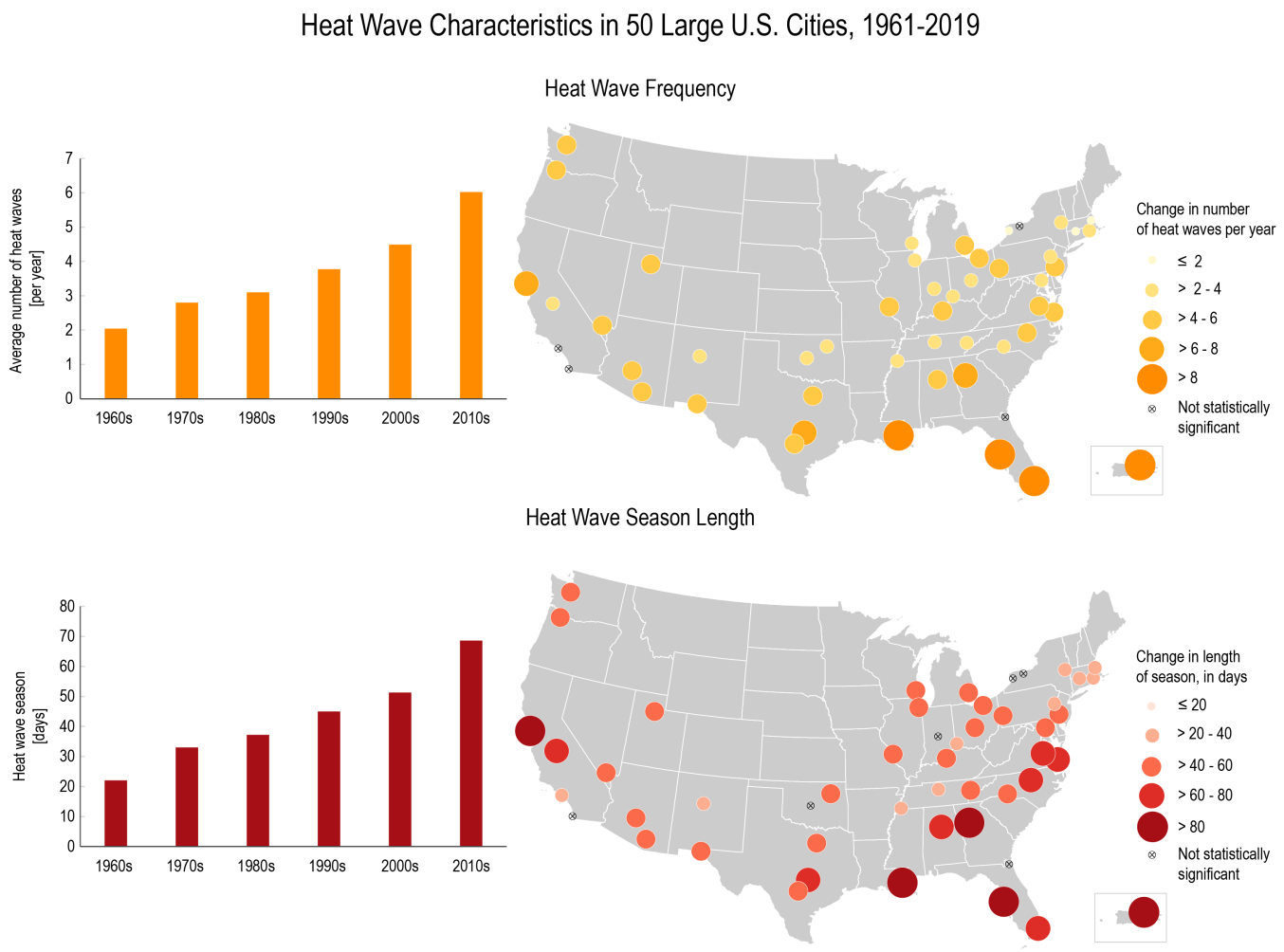
NOAA Commercial Fisheries Landings for Alabama, 2022

Oysters in the northern Gulf of Mexico



NOAA Commercial Fisheries Landings, 2022

Heatwaves are becoming more common



Definition

Three continuous days

Daily max temperature ≥ 90th percentile

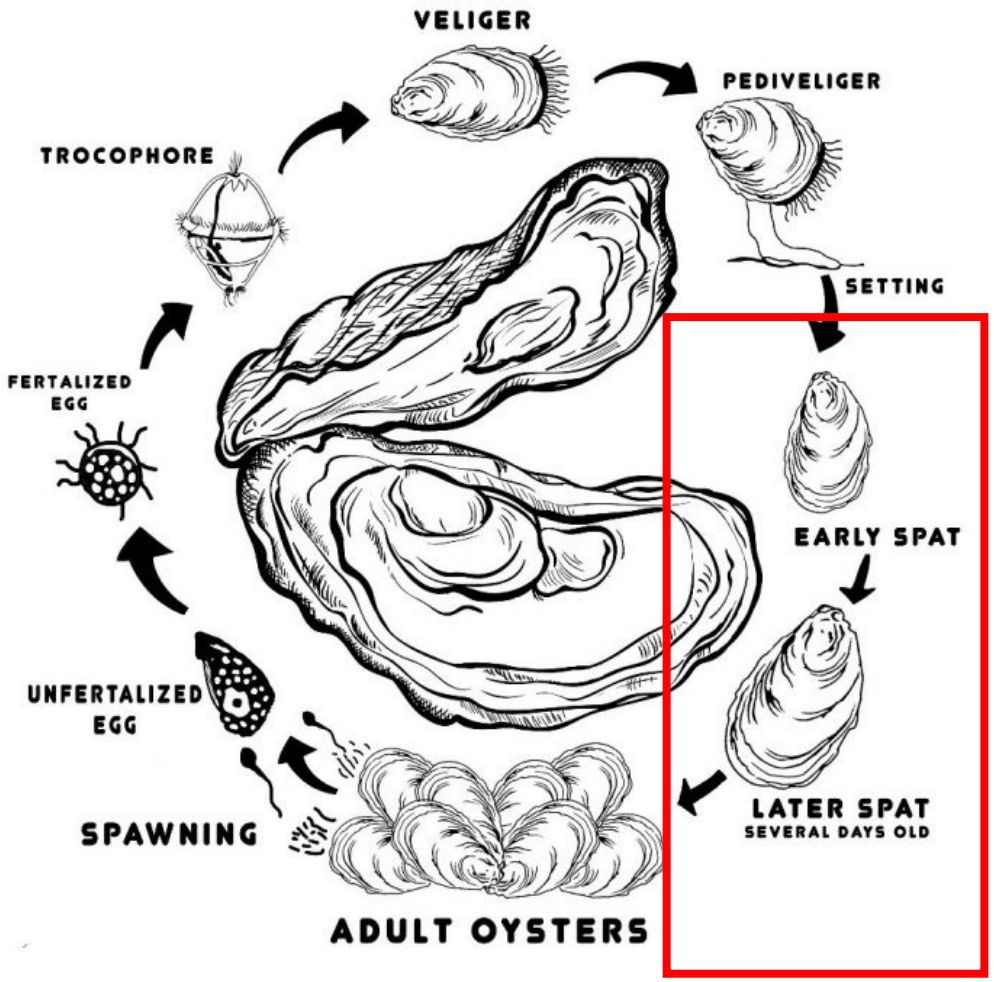
Time period July and August

globalchange.gov (2022)

Perkins et al. 2013

Oyster Recruitment

How do extreme environmental conditions (heatwaves) alter the recruitment success of oysters in Mobile Bay?



Spawning

Spawning temperature driven

Drops > 2 ºC decreases in temperature within 24 hours

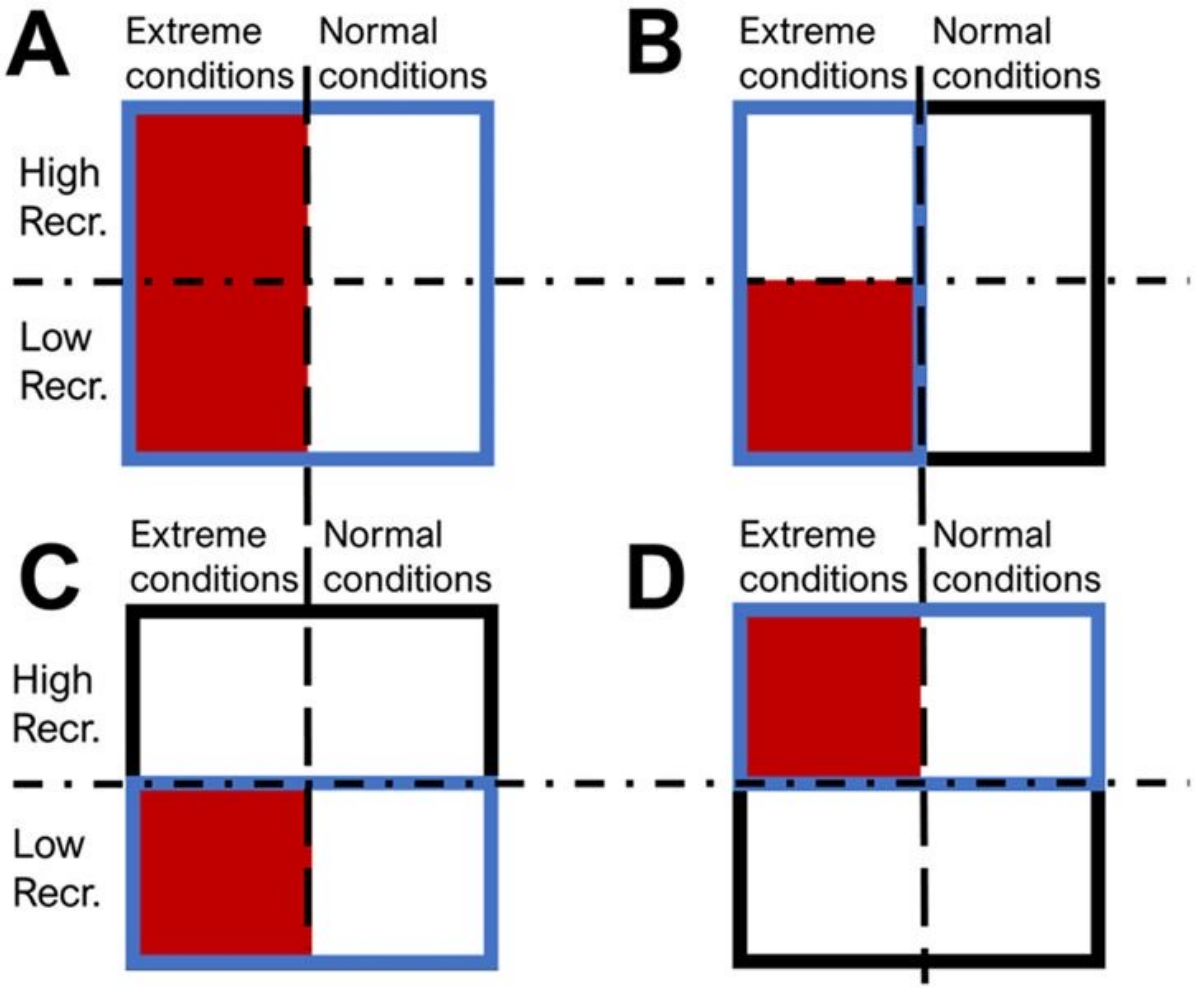
Recruitment

Oyster recruit as **spat**

Post-spat larval duration: *10-18 days*

10 -12 days in the summer months (Kim et al. 2010)

Poor Recruitment



Good recruitment = very difficult to predict

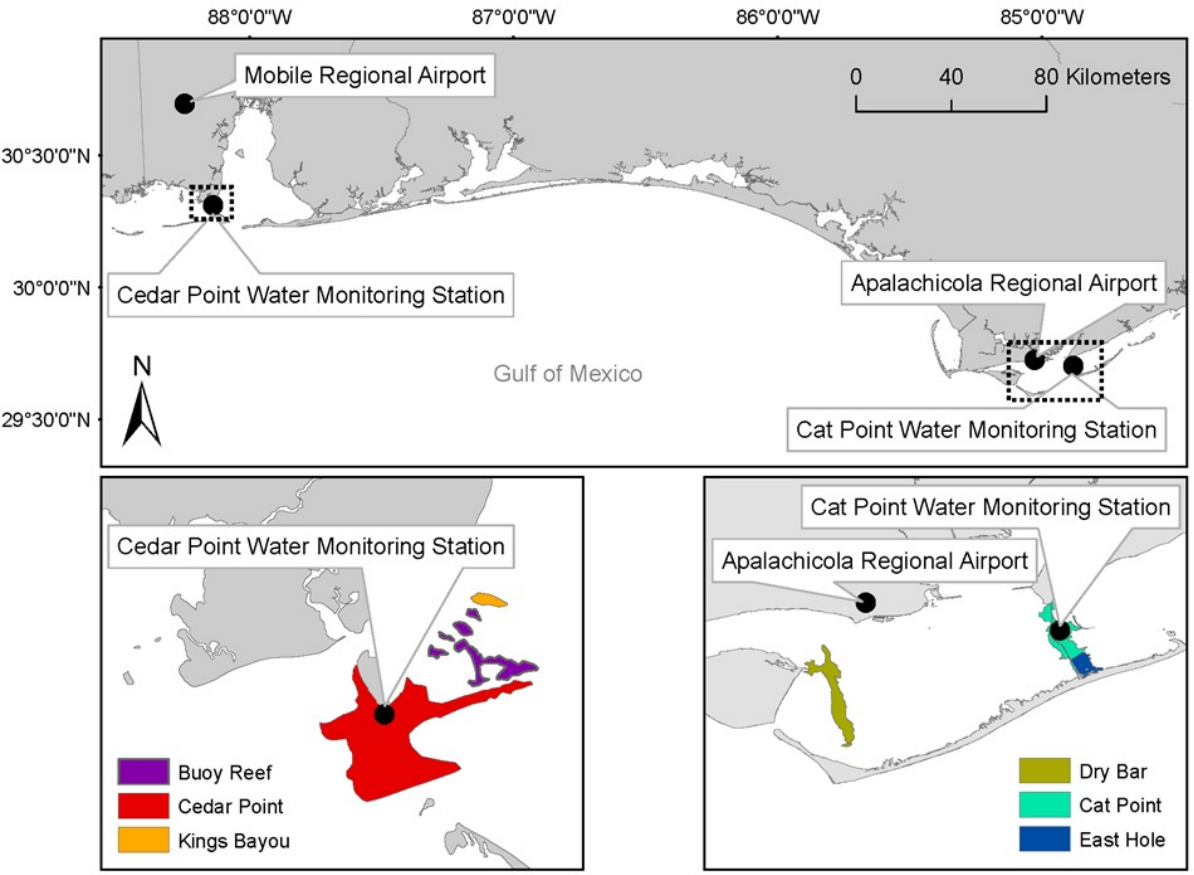
Many co-occurring favorable conditions

Poor recruitment = easier to predict

Only one unfavorable condition required

Gross et al. 2022

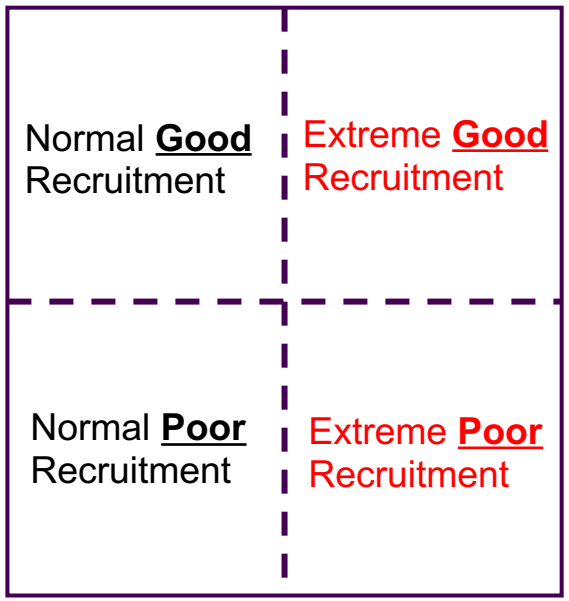
Changing Environments

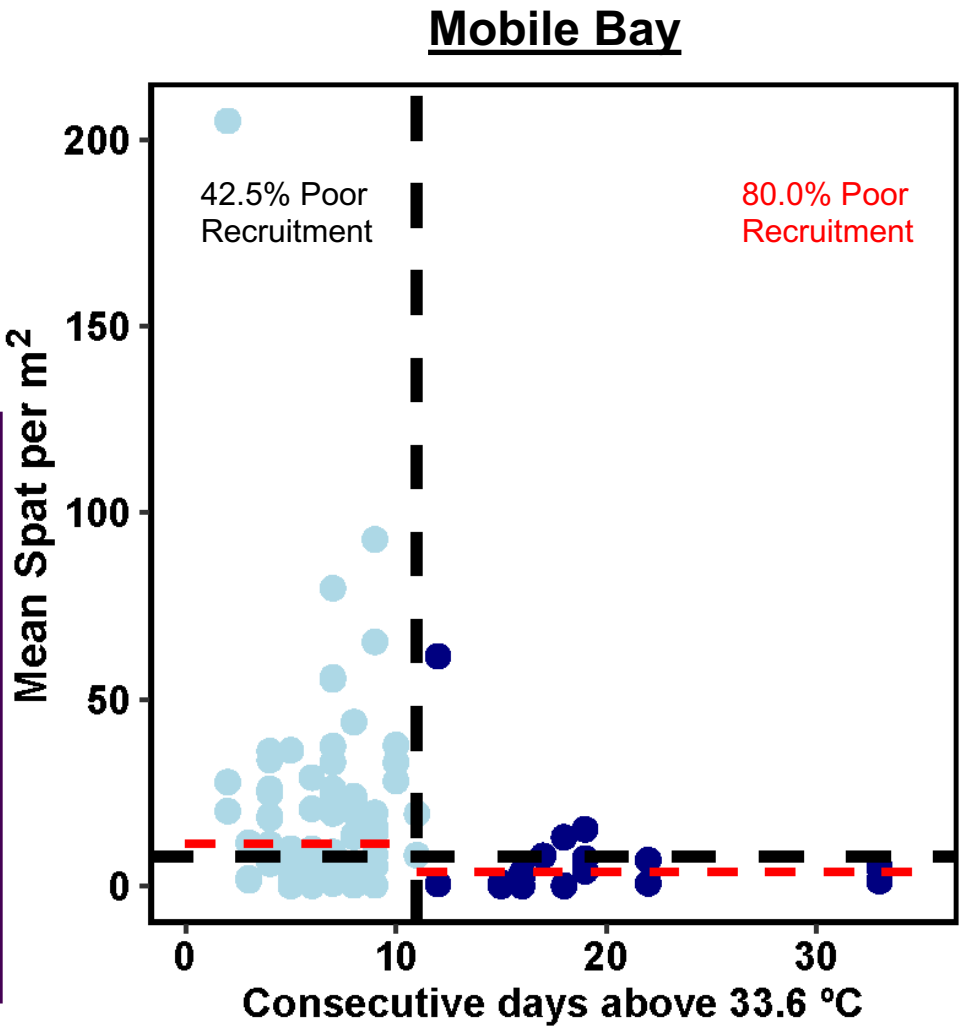


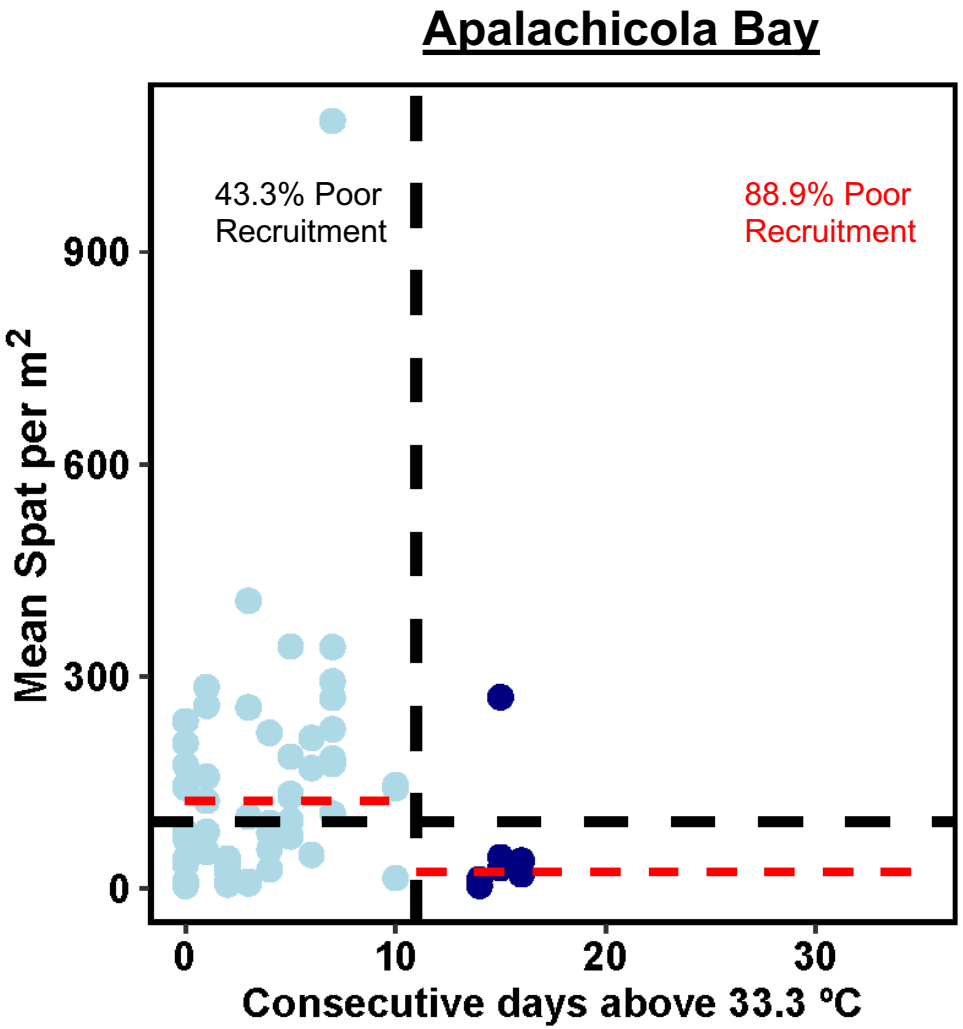
	Mobile Bay	**Apalachicola Bay**
Cutoff	33.6 ºC	33.2 ºC
Magnitude		
Maximum Yearly Temperature	37.2 ºC	36.7 ºC
Duration		
Annual Number of Days	44.5 Days	42.5 Days
Consecutive Days Above	11 Days	11 Days
Frequency		
Number of Heatwaves	6 Heatwaves	5 Heatwaves

Plumlee et al. *in Prep*

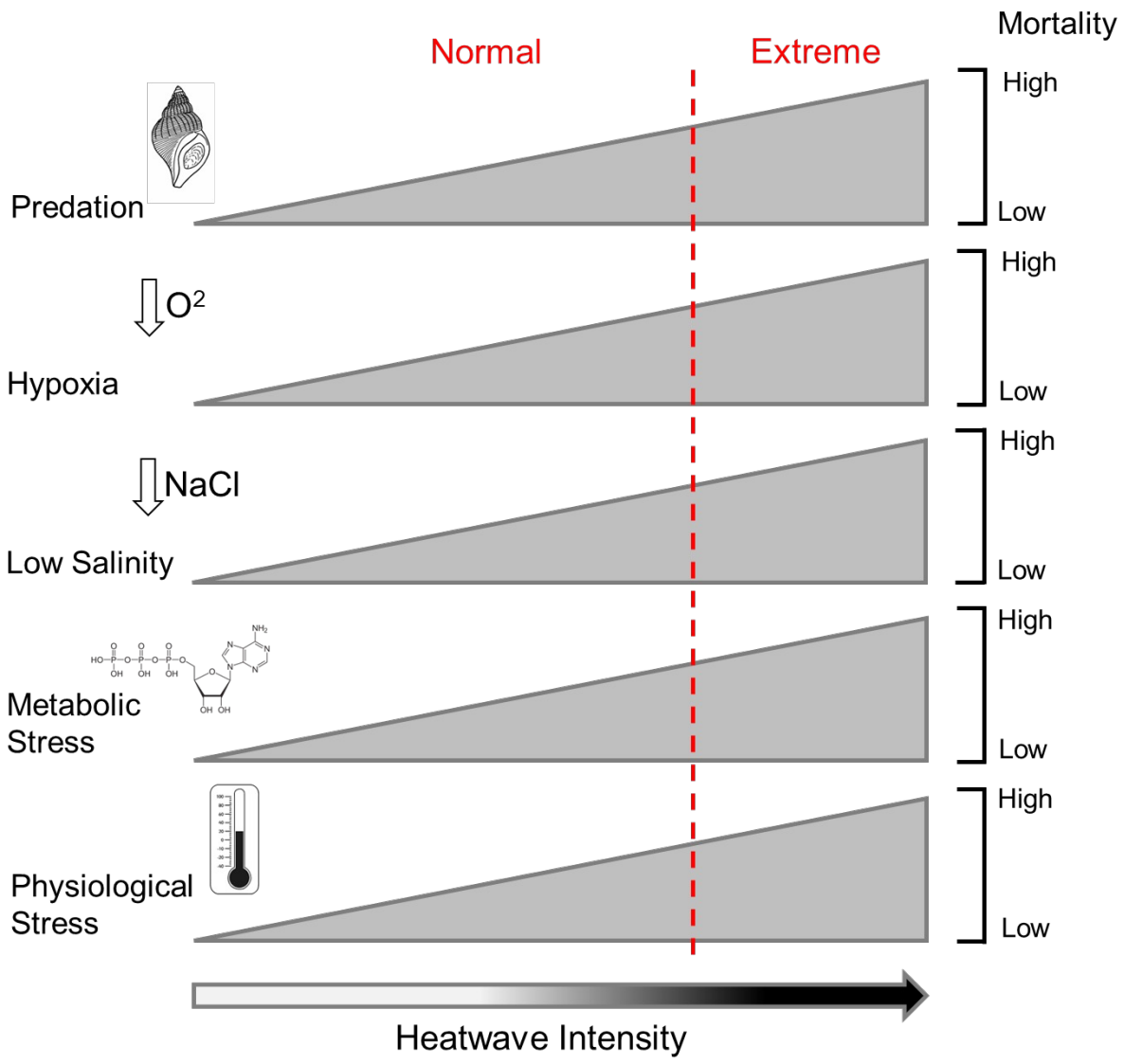
Changing Environments







Plumlee et al. *in Prep*



RESTORE
SCIENCE PROGRAM