

Distribution and Demographics of Fossil Oysters on the Atlantic Continental Shelf



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BACKGROUND

Glaciation and Sea Level

- Glacial periods defined by increased ice extent
- Associated with low sea level
- As ice melts, sea level rises rapidly
- End of last glacial maximum (15-110kya) resulted in rapid sea level rise (10+ mm yr⁻¹)^[1]

Evolutionary History of Oysters

- Oysters well preserved in fossil record (250+ mya)^[2,3]
- Lineages survived sea level rise and fall
- Shells store information, such as age and growth^[4]
 - Permits comparisons over geologic time

OBJECTIVES

- Describe fossil shell distribution in mid-Atlantic
- Identify when fossils were alive
- Describe demographics in shell assemblage

METHODS

Field Collections



- Sept 5-9, 2021
- F/V ESS Pursuit
- 5-min tows at 66 stations
- Collected all fossil oyster shells

Lab Processing



Cleaned to remove biofouling and sediment

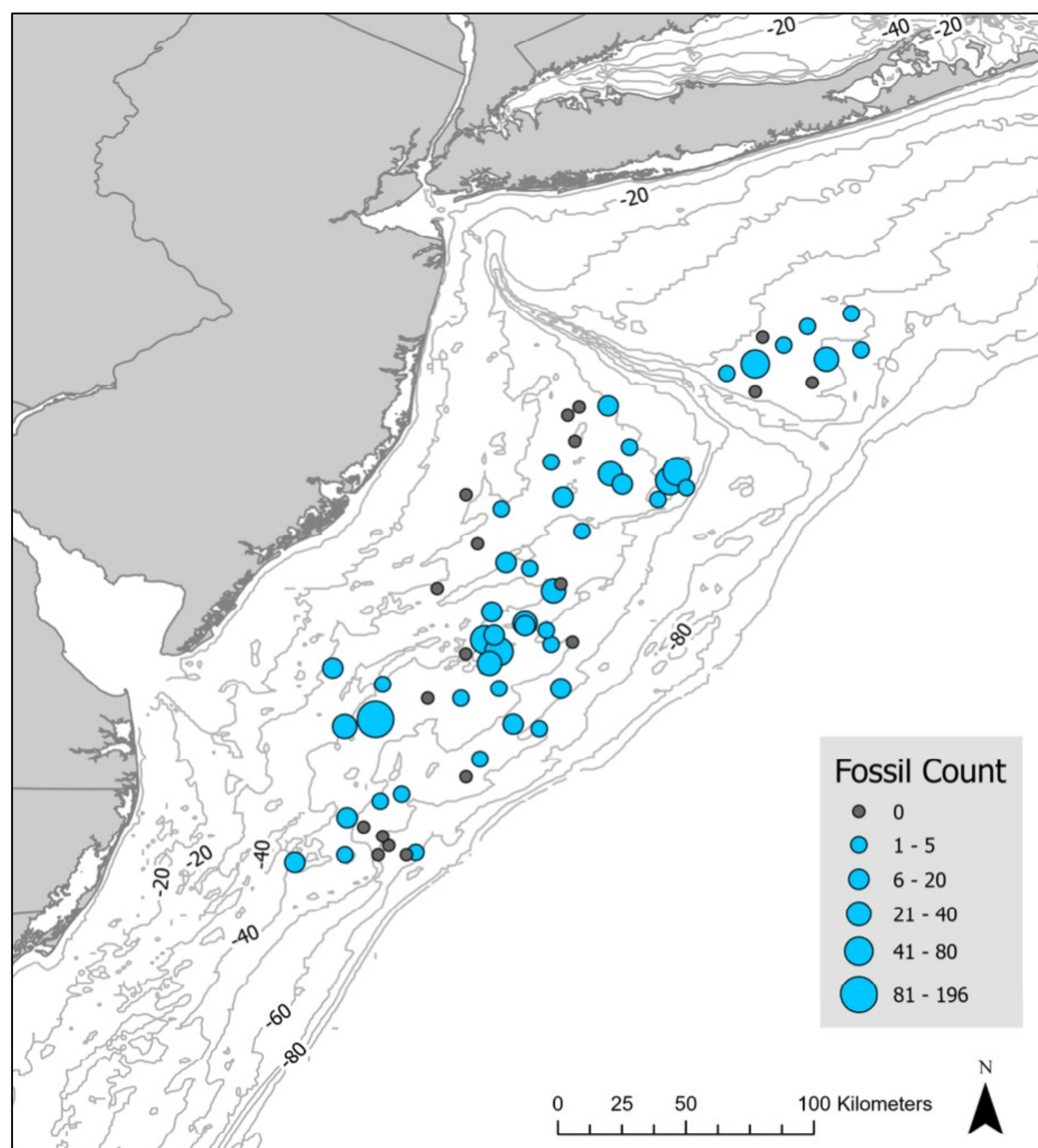


Morphometrics
Length (mm)
Weight (mm)
Thickness (mm)
Valve (L or R)

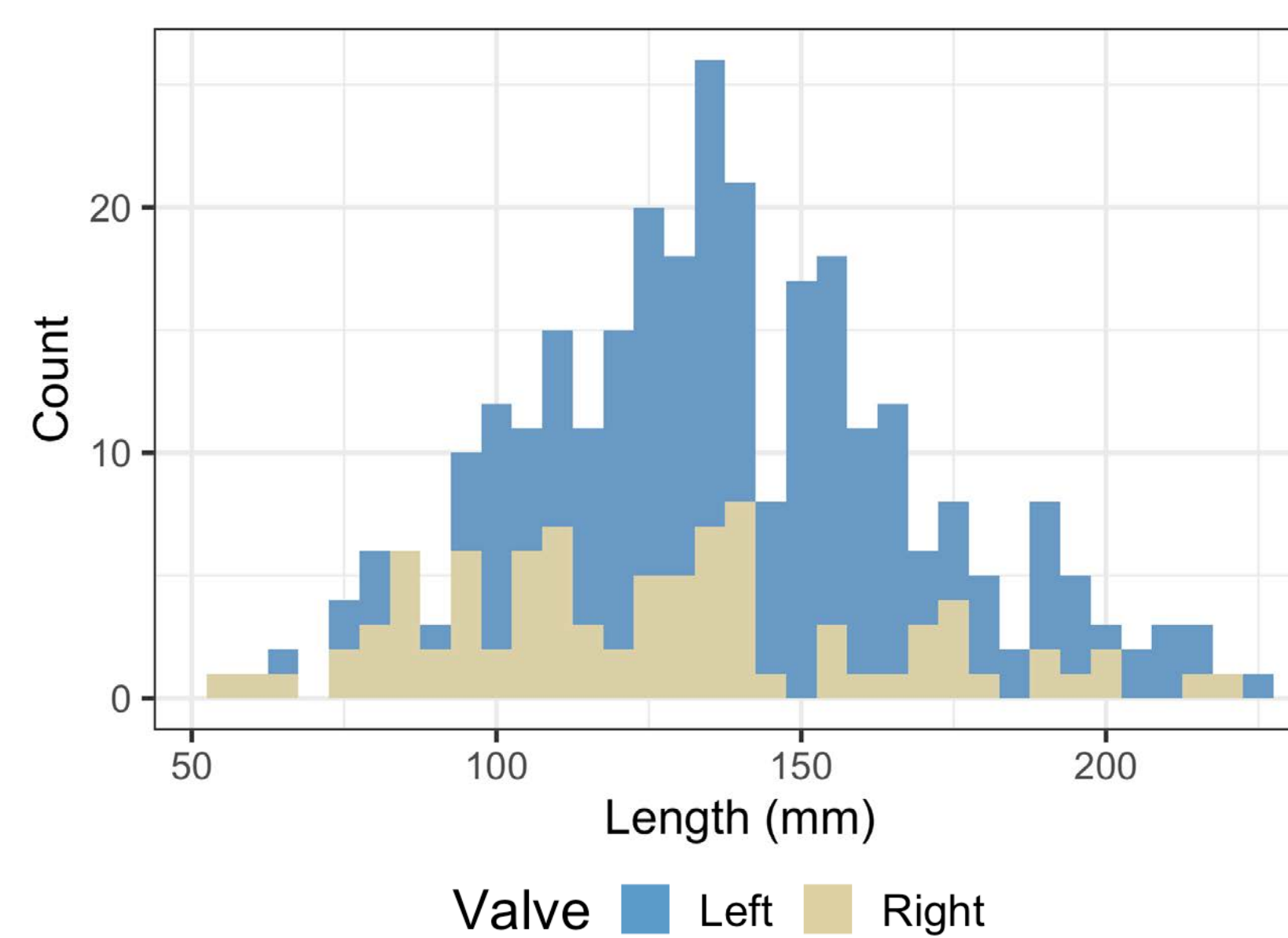


Collected samples for carbon dating
Shallowest
Deepest

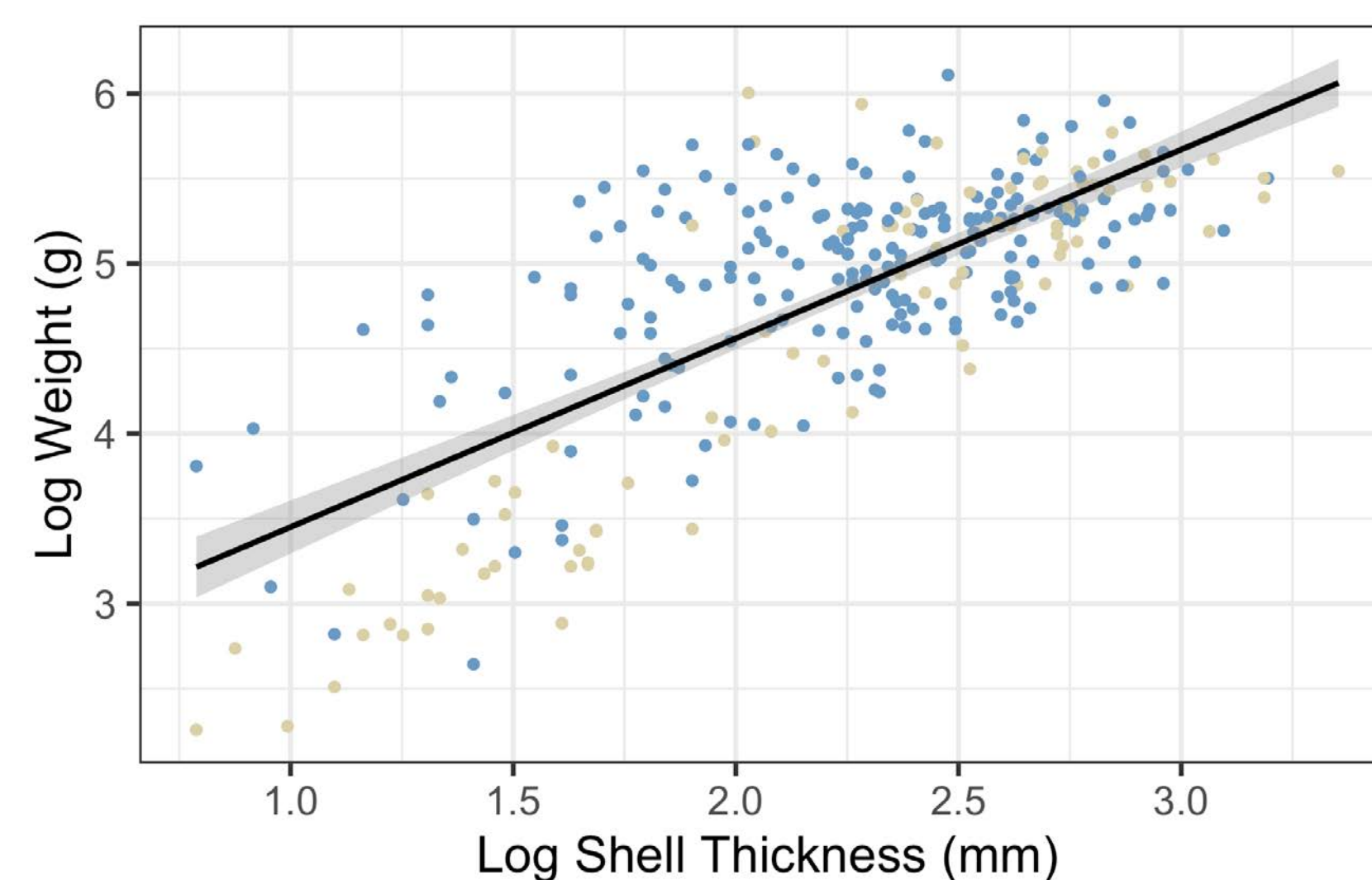
RESULTS



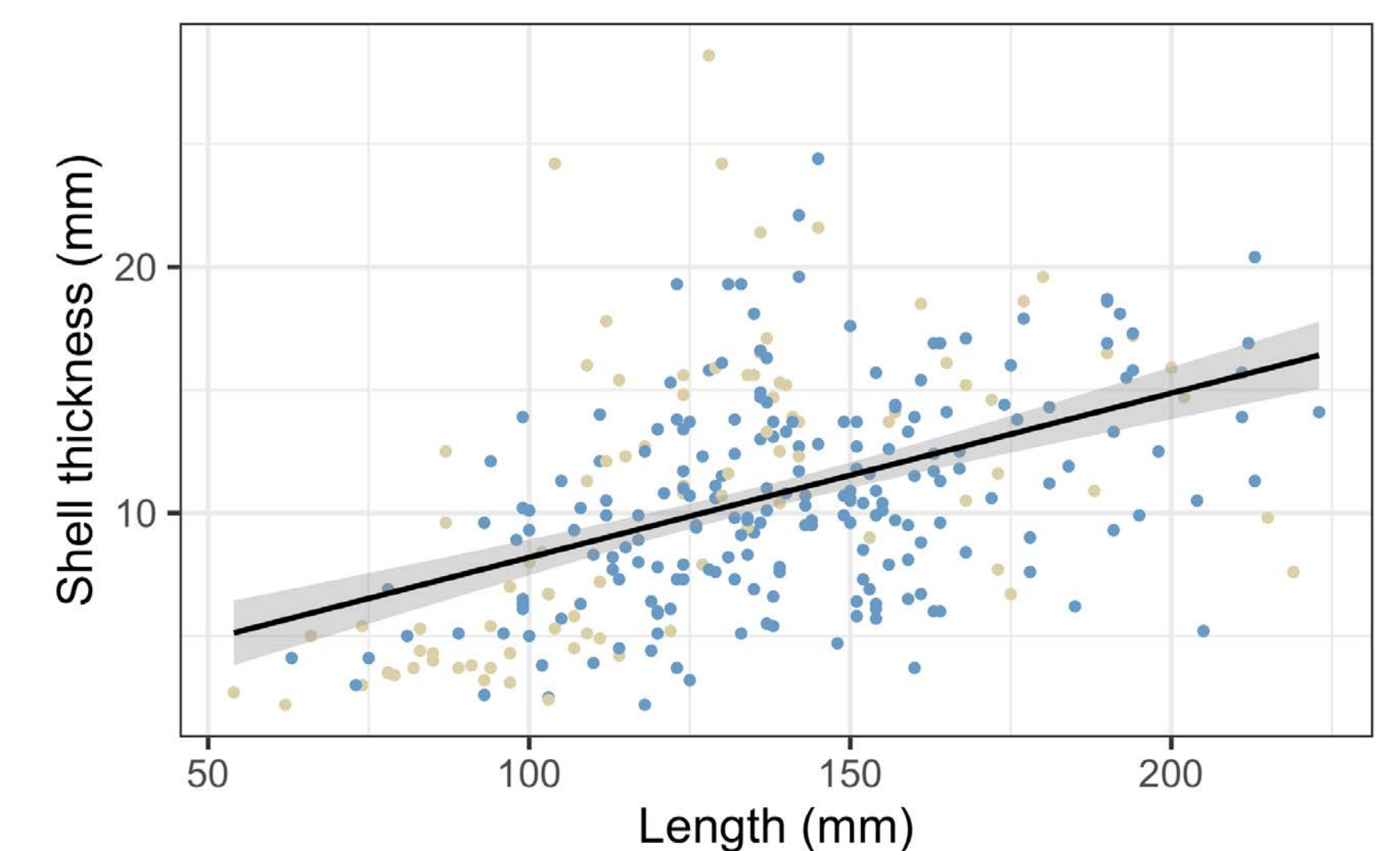
- 859 *Crassostrea virginica* shells or fragments total
- 47 of 66 survey locations fossils present
- Depths ranged 27-64 m (90-210 ft)
- 1-196 (13 ± 28 SD) shells or fragments per tow
- Fossils throughout mid-Atlantic



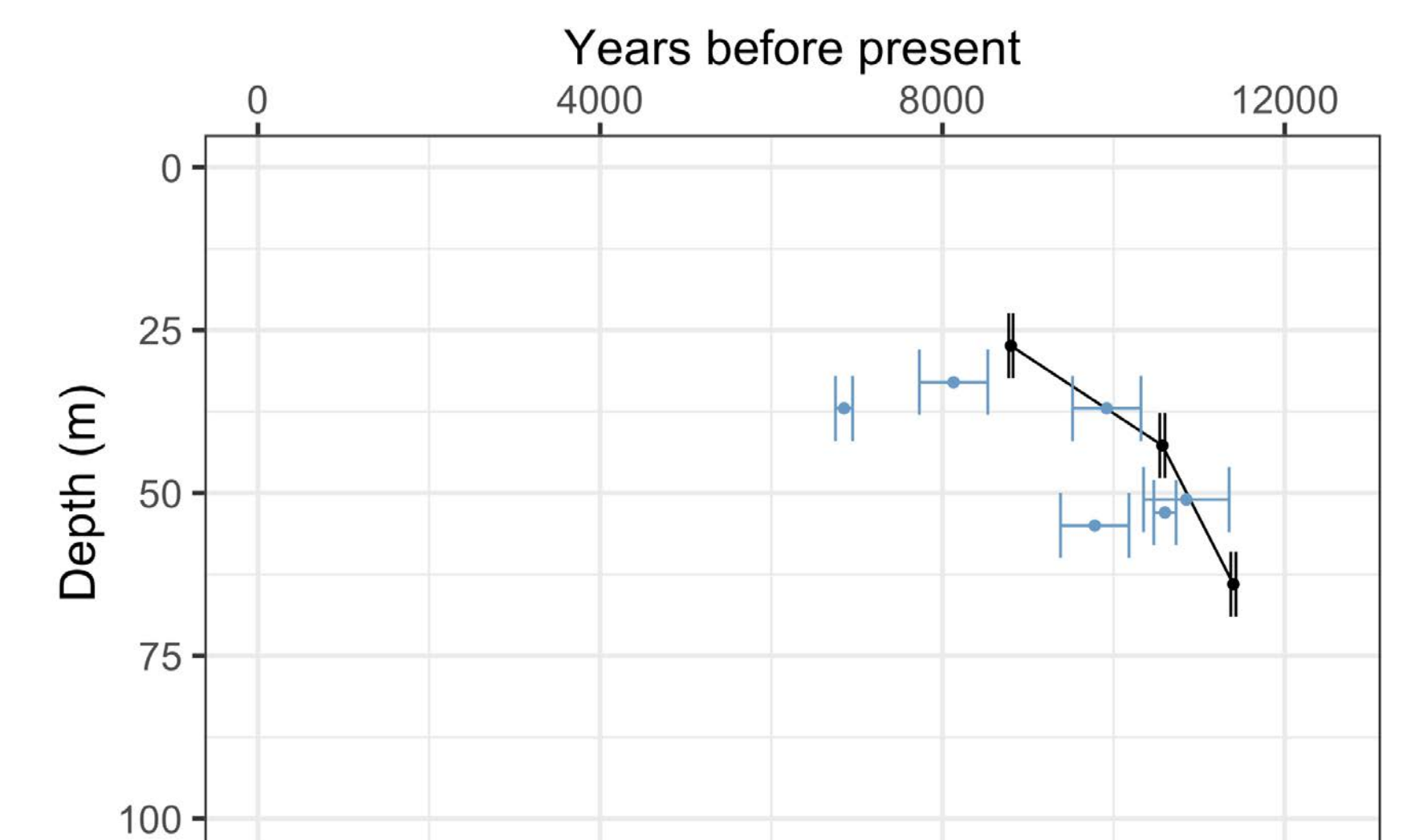
- 295 intact shells
- 207 left and 88 right valves
- Sizes larger than modern oysters



- Significant relationship between shell thickness and weight (F: 356.3, df: 1, 293, p < 0.001, Adj R²: 0.55)



- Significant relationship between length and shell thickness (F: 135.9, df: 1, 293, p < 0.001, Adj R²: 0.31)
- Thickness conserved, reliable proxy



- Shells date 8,800 to 11,400 BP (black)
- Similar to previous accounts (blue)^[5,6]

FUTURE DIRECTIONS

- Fossil *C. virginica* assemblages contain a wealth of information
 - Determine ages for all specimens
 - Estimate age-length or age-thickness relationship
 - Estimate reef accretion rates
 - Estimate carbonate production rates
- Compare to modern day populations

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