

Post settlement survival in Eastern oysters (*Crassostrea virginica*) to inform management and restoration in the Chesapeake Bay

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BACKGROUND

Eastern oyster (*Crassostrea virginica*)

- Dominant benthic species, ecosystem engineer, and lucrative industry
- Global oyster populations have declined by 85%^[1]
- Virginia harvest <1% historic levels^[1]
- Invertebrates have high mortality in early life stages^[2]
- Post-settlement processes important for benthic community structure and reef persistence

Project Objective

- Understand post-settlement early life history
 - Identify cohorts
 - Estimate growth and mortality in 3 months post settlement

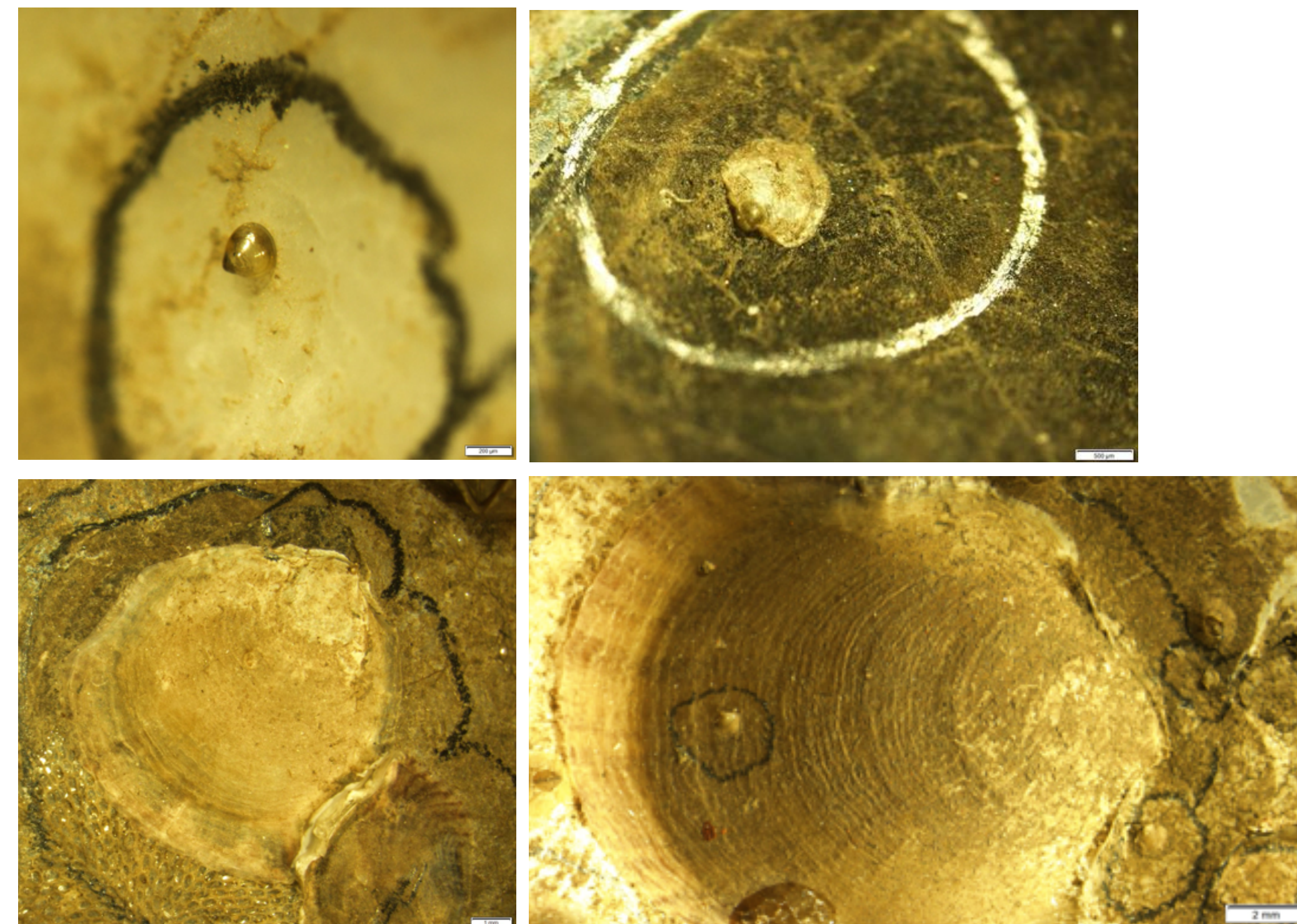
METHODS

Field Collection



- 2 sites in James River
- 5 serial deployments
- Shellstrings as settlement substrate
- 10 shells per shellstring
- Retrieve 2 shellstrings per site biweekly

Sample Processing



- Count recruits on each shell
- Photograph up to 25 oysters/shell (up to 250 per shellstring)
- Measure length of individual oysters in ImageJ software
- Construct length-frequency

RESULTS

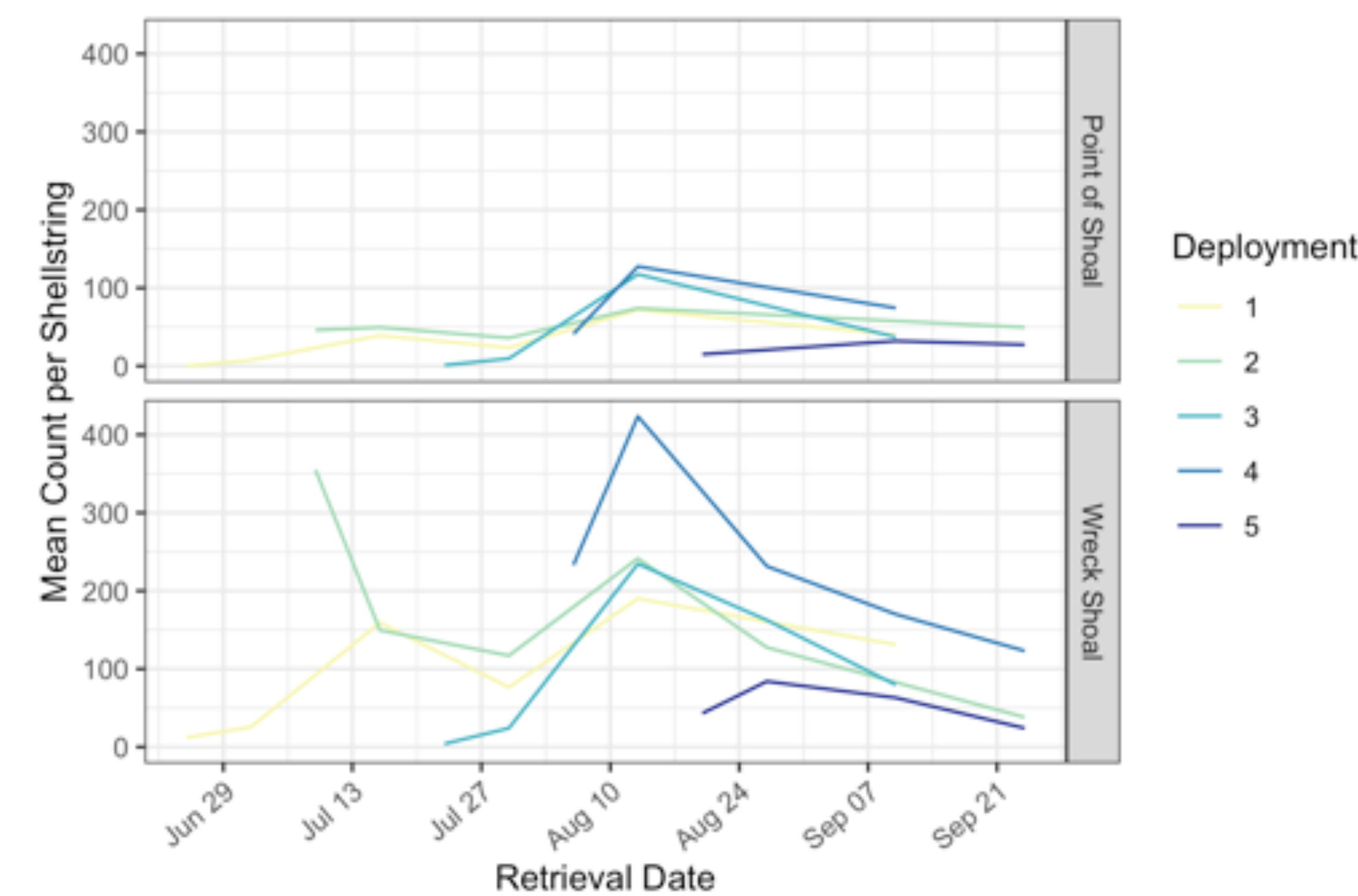


Fig 1. Mean count of recruited oysters across the study period. Deployments are staggered every 2 weeks.

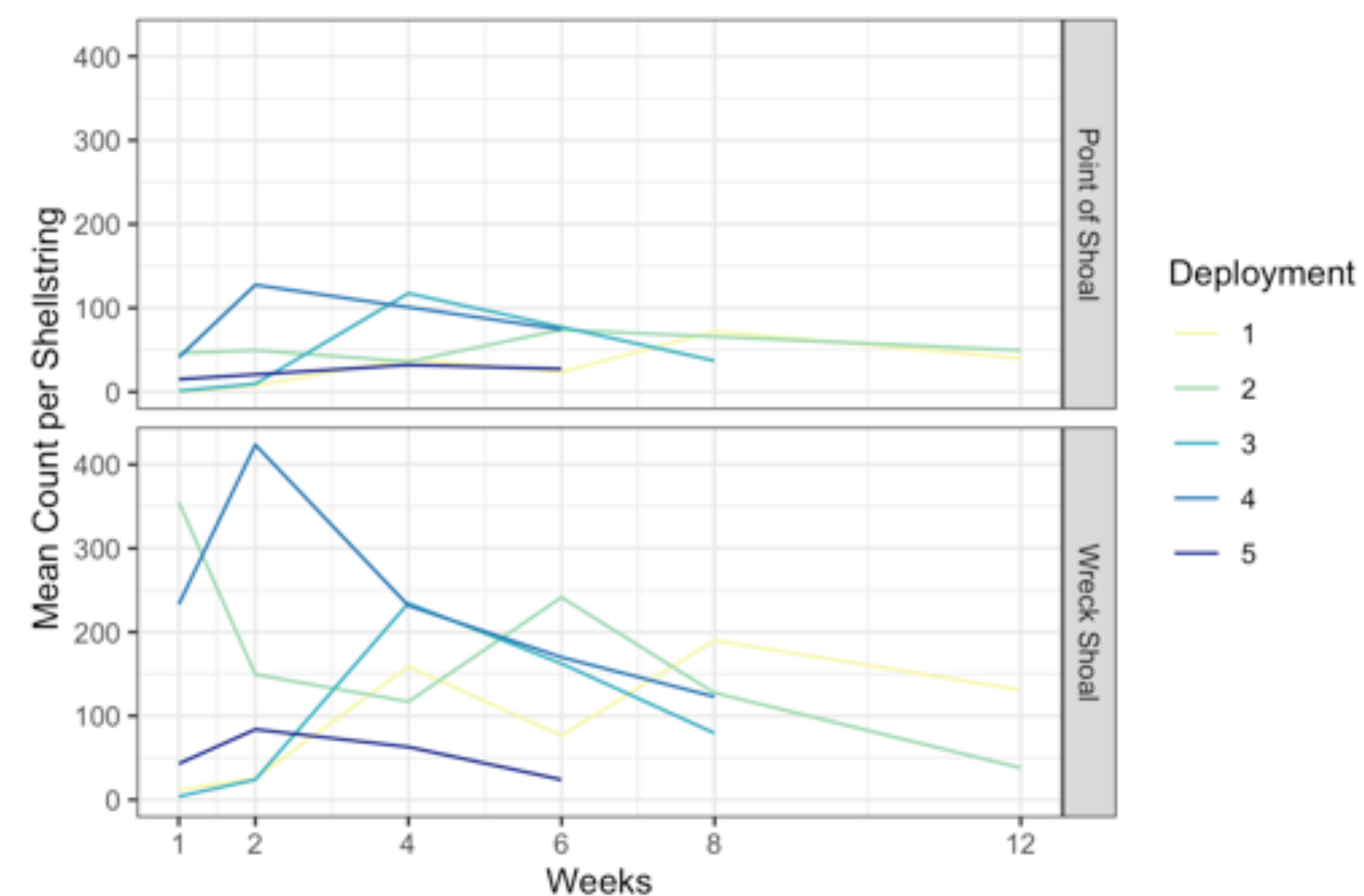


Fig 2. Comparison of mean counts of recruited oysters across the deployment period.

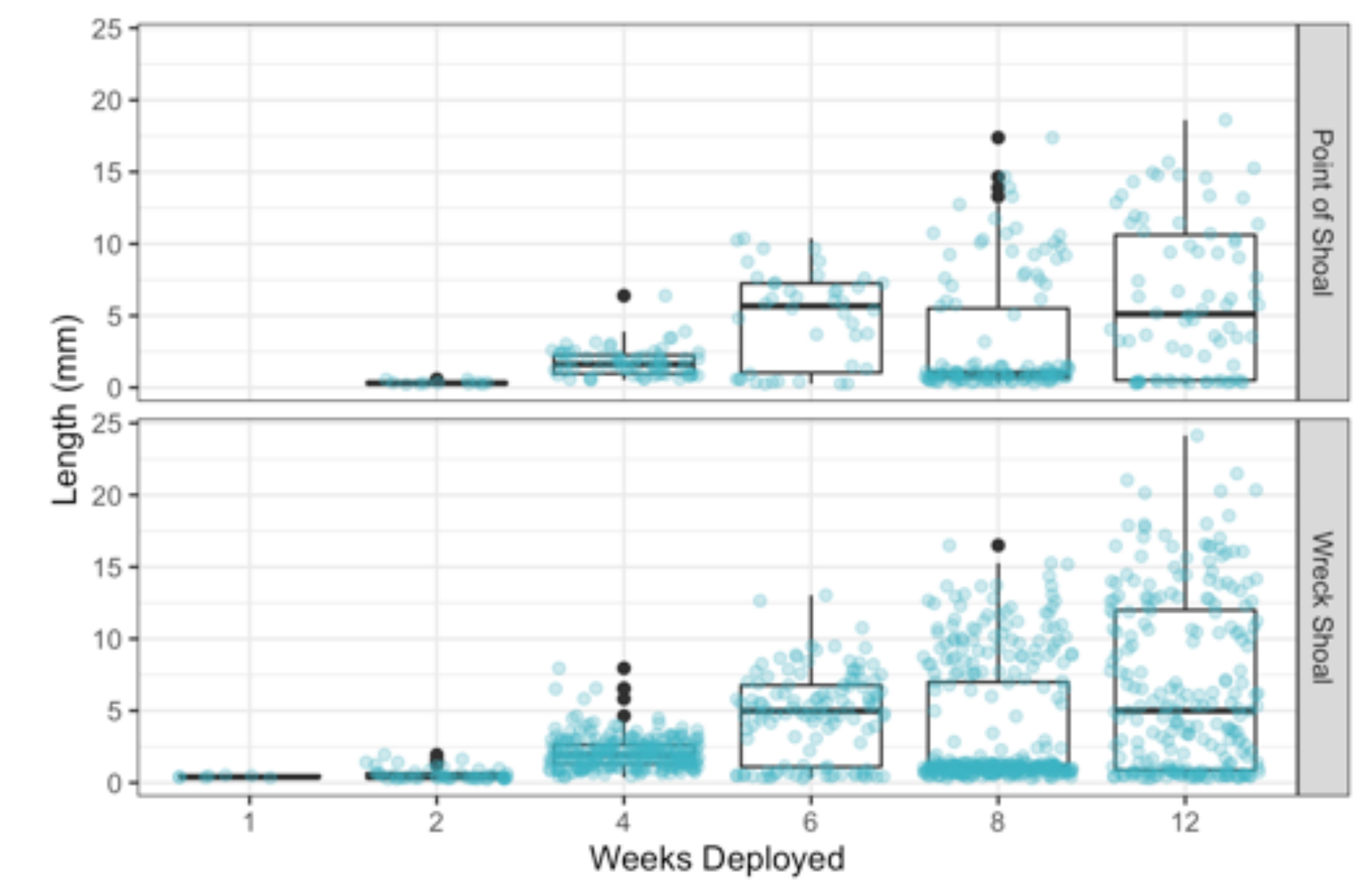


Fig 3. Size distribution of recruited oysters across retrieval dates for a single deployment.

- Recovered 89 shellstrings in 2020
 - 39 Point of Shoal
 - 50 Wreck Shoal
- Documented 8,504 juvenile oysters
 - Deployment 1: 1,325 images of oysters
 - 391 at Point of Shoal
 - 1,098 at Wreck Shoal
- Size range 0.22 mm – 24.14 mm

FUTURE DIRECTIONS

- Use length frequency data to identify individual cohorts with Bhattacharya methods
- Estimate growth and mortality rates in post settlement early life stage
- Expand study in 2021 to incorporate 6 sites across 2 rivers: James, Great Wicomico, and Piankatank

LITERATURE CITED

- ^[1] Beck, M. W., R. D. Brumbaugh, L. Airoidi, A. Carranza, L. D. Coen, C. Crawford, O. Defeo, G. J. Edgar, B. Hancock, M. C. Kay, H. S. Lenihan, M. W. Luckenbach, C. L. Toropova, G. Zhang, and X. Guo. 2011. Oyster Reefs at Risk and Recommendations for Conservation, Restoration, and Management. *BioScience* 61:107–116.
- ^[2] Hunt, H., and R. Scheibling. 1997. Role of early post-settlement mortality in recruitment of benthic marine invertebrates. *Marine Ecology Progress Series* 155:269–301.

ACKNOWLEDGEMENTS

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