# Science-industry collaboration builds trust while opening new windows on climate-related American lobster range shifts in the Gulf of Maine

Kleman, K., Brown, C., Reardon, K., and Wahle, R.

Background

UMaine and the Maine Department of Natural Resources (DMR) teamed up with Ready Seafood Co. in 2016 to monitor patterns of recruitment of the American lobster in the Gulf of Maine (GoM) using cobble-filled bio-collectors deployed from collaborating fishing vessels. As the initial 2-year NOAA grant ended, Ready Seafood Co. recognized the unique value of the project to their business model, and has continued to fund the program while recruiting other large seafood dealers to contribute.
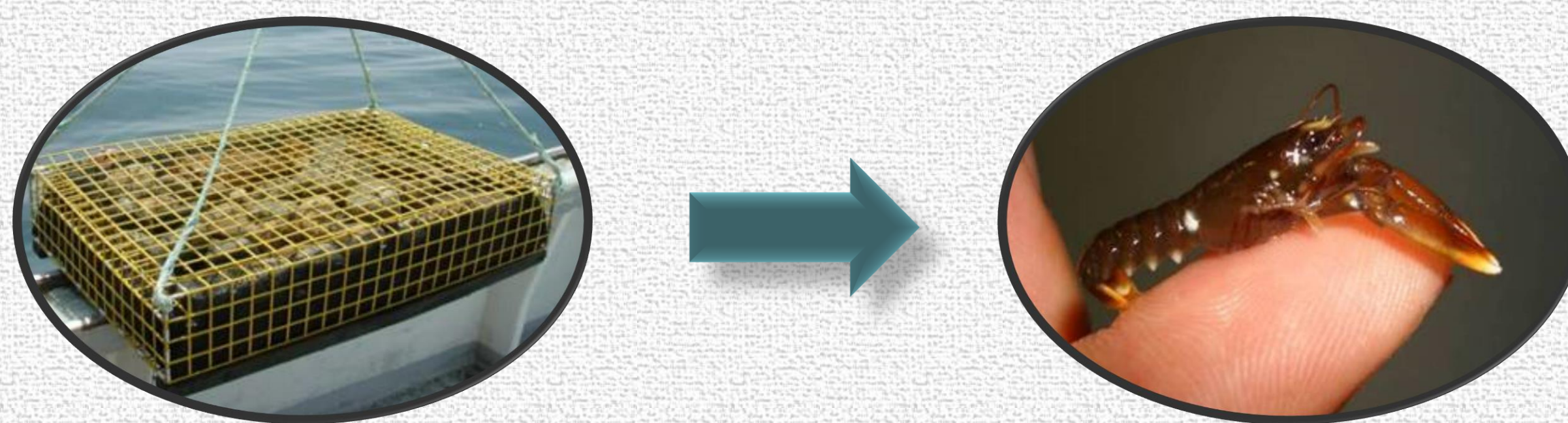
Design & Methods

Vessel-deployed bio-collectors are deployed in a random stratified design in coordination with the DMR's Ventless Trap Survey across 3 depth strata in the east and west segments of Maine's coast (Figure 1). This paired sampling approach enables us to evaluate the influence of temperature gradients on the nursery potential of the seabed for new settlers and movements by older lobsters.

Figure 1. Summer sea surface temperature in the GoM. Red boxes depict our two oceanographically contrasting study areas, with sample thermoclines below.
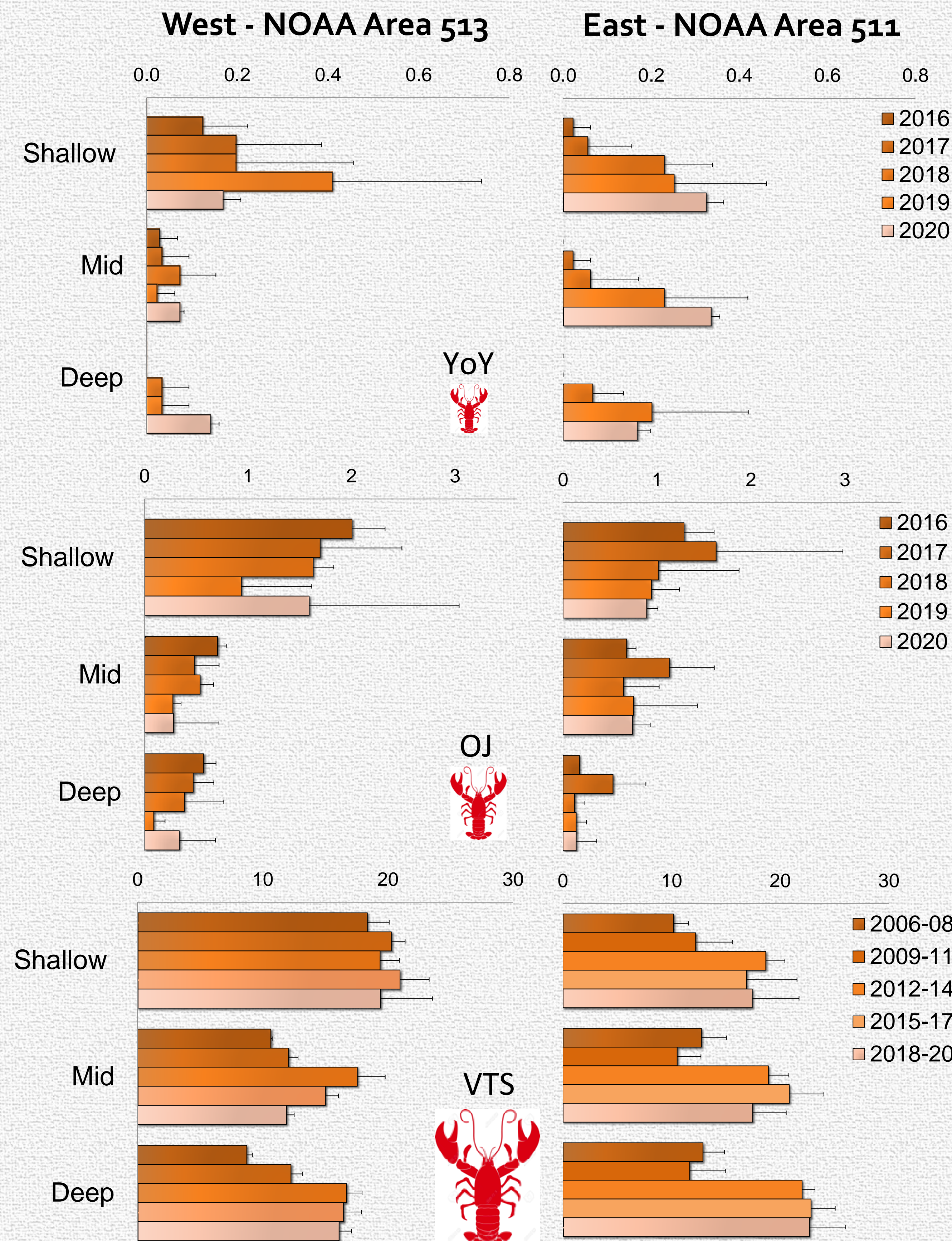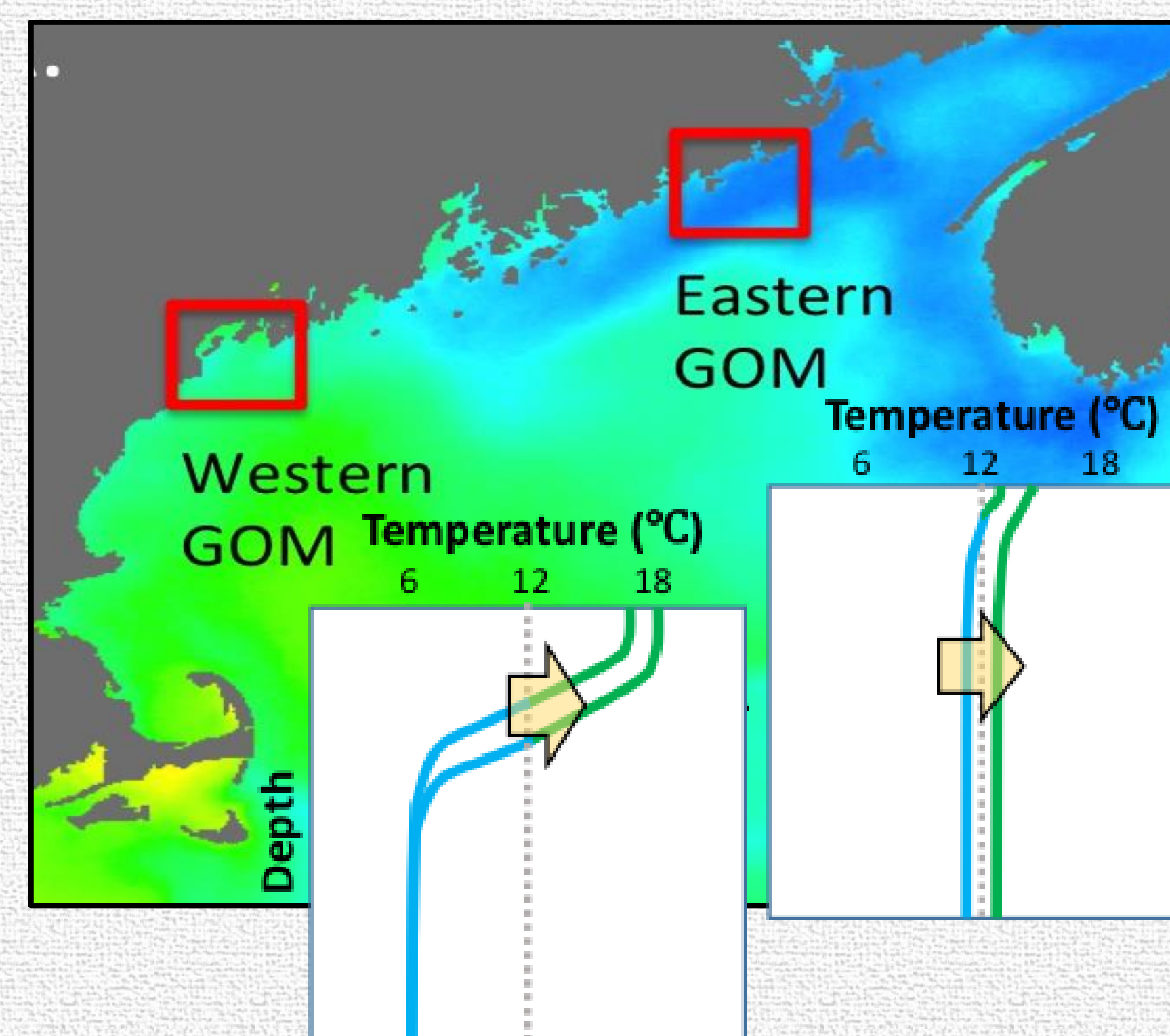
West - NOAA Area 513   East - NOAA Area 511

Figure 2. Average Catch per Trap of young-of-year, older juvenile, and adolescent lobsters over time in shallow, mid, and deep strata.

Present Trends

- YoY spread into deep water over time, esp. in West
- Increase in YoY across all depths in East
- Increase or stable Adolescent populations – high OJ CPT in 2016, possibly high settlement pre 2016
- OJ declines in both study areas – reflection of poor settlement in 2016-17

Importance of this Collaboration

- Fills data gap on patterns of settlement not quantified by the larger scale American Lobster Settlement Index (ALSI) that monitors recruitment of YoY lobster in coastal nurseries from Rhode Island to Newfoundland, but only in sites accessible to divers.
- Allows for tracking of cohorts over time through VTS

Conclusions

As we face a rapidly changing GoM, bio-collector-based sampling in collaboration with the fishing industry and DMR will continue to provide data on changing recruitment patterns of lobster. Leveraging the collective resources and experience of commercial harvesters allows for more extensive and comprehensive research while engaging private investment in sustainability research.

Acknowledgements

I greatly appreciate the hard work of our collaborating lobstermen, and the assistance of graduate students, undergraduate students, research interns, and volunteers on this project.