



Responses of infaunal populations to benthoscape structure and the potential importance of transition zones

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ABSTRACT: Relationships between population abundance and seafloor landscape, or benthoscape, structure were examined for 16 infaunal taxa in eastern Long Island Sound. Based on analyses of a side-scan sonar mosaic, the 19.4-km² study area was comprised of six distinct large-scale (> km²) benthoscape elements, with varying levels of mesoscale (km²-m²) and small-scale (< m²) physical and biological habitat heterogeneity. Transition zones among elements varied from ~50 to 200 m in width, comprised ~32% of the benthoscape, and added to overall benthoscape heterogeneity. Population abundances of nine taxa varied significantly among the large-scale elements. Most species were found at high abundances only in one benthoscape element, but three had several foci of elevated abundances. Analyses of population responses to habitat heterogeneity at different spatial scales indicated that abundances of eight taxa varied significantly among spatial scales, but the significant scales were mixed among these species. Relatively large residual variations suggest significant amounts of mesoscale spatial variation were unaccounted for, varying from ~1 km² to several m². Responses to transition zones were mixed as well. Abundances of nine taxa varied significantly among transition zones and interiors of benthoscape elements, most with elevated abundances in transition zones. Our results show that infaunal populations exhibit complex and spatially varying patterns of abundance in relation to benthoscape structure and suggest that mesoscale variation may be particularly critical in this regard. Also, transition zones among benthoscape features add considerably to this variation and may be ecologically important areas in seafloor environments.

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