

Environmental heterogeneity and community structure drive spatial groundfish diversity patterns in the Gulf of Alaska

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NOTE: body of the abstract is limited to 1600 characters (including spaces)

The mechanisms structuring patterns of diversity and community composition are often difficult to identify, and much of our knowledge stems from studies of local ecological systems. Two candidate mechanisms include dispersal and environmental heterogeneity, which can structure communities at local and larger scales by fostering local species coexistence and niche partitioning, respectively. It is increasingly important to understand these patterns and their drivers at larger scales, especially in the face of changing climate and anthropogenic perturbations. We examined what drives patterns of diversity and community composition in the groundfish community across 14 sites in the Gulf of Alaska (GOA) using geostatistically modeled groundfish abundance and biomass from the Alaska Fisheries Science Center trawl survey data (1984 – 2015). We found that species richness, and alpha, beta, and functional diversity varied little both within and between study areas, and were conserved across the central GOA. Conversely, community composition varied significantly along a longitudinal gradient, with distinct groups of species in individual study areas. These differences in community composition were driven by rare and lower-density species, while high-density species remained the same. Thus, community structure was conserved despite variation in species identities. Overall, environmental heterogeneity and community structure groundfish diversity across the GOA large marine ecosystem.