

Biogeography of Nearshore Subtidal Benthic Invertebrates in the Gulf of Maine

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The biogeography of nearshore benthic invertebrates in the Gulf of Maine was studied to compare recent data with historical biogeographic studies, define physical-chemical factors affecting species distributions, and provide information needed to calibrate benthic indices of environmental condition. Cluster analysis and multidimensional scaling were done on Bray-Curtis similarity matrices of species relative abundance, using 145 stations (2000-2004) from the National Coastal Assessment. Depending on the salinity and sediment grain size class, faunal breaks of varying degrees occurred at Cape Ann, the Casco Bay area, Penobscot Bay, and possibly the high biodiversity Cobscook Bay-Passamaquoddy Bay area. A comparison of the ordinations of benthic community data and abiotic data, along with a multivariate regression tree, showed that temperature controlled broad distribution patterns; salinity and sediment grain size controlled local distributions. There was evidence of an excursion of warm-temperate Virginian Province species north into Cape Cod Bay. In addition to providing information for studies of chemical contamination, eutrophication, and hypoxia, these results can help address broad-scale and long-term issues such as global climate change, species invasions, conservation planning, and ecosystem-based management.

Purpose Statement: The biogeography of nearshore benthic invertebrates in the Gulf of Maine was studied to compare recent data with historical biogeographic studies, define physical-chemical factors affecting species distributions, and provide information needed to calibrate benthic indices of environmental condition.

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