

# **Environmental life history reconstruction of the Nantucket bay scallops *Argopecten irradians* using LA-ICP-MS to determine shell geochemical fingerprinting**

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Nantucket Island, MA, is home to the last wild bay scallop (*Argopecten irradians*, Lamarck 1819) fishery in the world. Declining trends in commercial catch over the last thirty years have had severe socioeconomic impacts on the fishermen and permanent residents of Nantucket. A direct correlation between declining scallop recruitment and loss of eelgrass (*Zostera marina*) habitat has resulted in concern for the sustainability of the fishery. The short life span of the bay scallop makes successful recruitment and survival during every spawning event necessary to maintain the wild population.

Environmental life history reconstruction through the analysis of the geochemical composition of the scallop shells provides important insight to aid propagation, seeding and management of the existing Nantucket bay scallop population. Bay scallop and seawater samples were collected from thirty-two sites in the waters around Nantucket Island. Retrospective identification of essential habitat is constructed through analytical analysis of the correlation between shell trace element compositions (Sr, Ba, Mg, Cu, Zn, Pb, La, Co and Mn) via laser ablation inductively coupled mass spectrometry (LA-ICP-MS)) and harbor water chemistry. Determination of optimal spawning habitat is essential to quantifying conditions necessary for larval recruitment, juvenile survival and long-term sustainability of the bay scallop population.