

are not much more abundant. This precipitous decline makes it difficult to establish baselines, adding to the already difficult task of restoring a sustainable fishery in the face of ongoing harvest, eutrophication, sedimentation, and disease (15). In the 17th century, Captain John Smith and other early colonists reported on the bounty of the Chesapeake, including its massive, widespread oyster reefs (16). These early accounts are largely anecdotal, but some scholars have speculated that oysters were so plentiful during this time that they could filter a volume of water equal to that in the Chesapeake in just a few days (17, 18). Catch records provide empirical data on the oyster fishery but they begin in the 1870s, after the bay had already been the focus of intensive historical harvest (8). Given the current state of decline and the major

"fishing down the coast," with historical overharvest of oysters occurring first in Massachusetts and New York estuaries and then southward to the Chesapeake Bay and the Gulf of Mexico (12). Several US estuaries, including the Chesapeake Bay, experienced declines in oysters as part of a broader pattern of historical reductions in a variety of estuarine organisms (6, 8).

Although the precise numbers are debated, oyster populations in Maryland's waters today are estimated to represent less than 1% of their historical abundance (13) and, although some Virginia oyster populations have shown signs of improvement (5, 14), they

## Discussion

Pleistocene-to-Anthropocene Oysters. This study of a long-term record of oyster size changes, comparing archaeological, Pleistocene fossil, and modern oysters, provides to our knowledge the first baywide, millennial-scale window into human harvest of Chesapeake oysters, serving as a model for future research elsewhere around the world. These data do not fully support our predictions about the effects of Native American harvest on oysters. Prehistoric archaeological oyster sizes do vary through time but are generally smaller than Pleistocene oysters, and there is no evidence for a systematic size reduction during prehistoric human occupation (~3,500-400 y ago). At the bay-wide scale, oysters actually demonstrate an increase in size through time. No single environmental or cultural variable explains this increase, it does not occur within individual watersheds or at single sites, and we caution that our Early Woodland sample comes primarily from the lower salinity waters of Rhode River, and oyster sizes may be smaller as a result.

The size data from the Pleistocene reefs compared with later archaeological and modern samples demonstrate differences in population structure between cultu was similar to a pattern identified in the St. Mary's and Patuxent

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## Materials and Methods

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We reconstructed the size of C. virginica using measurements of whole left oyster valve height from archaeological and fossil contexts and modern reef