CCE Seminars in Computational Science and Engineering Series

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The Potential Impacts of Climate Change on the Delaware Bay Oyster

Abstract: Oysters are a particularly good model organism for understanding marine diseases, the environmental drivers that influence them, and the likely impact of climate change on the diseases. Here, we consider the oyster populations in Delaware Bay, an urbanized estuary on the mid-Atlantic coast dominated by a single freshwater input and strong tidal forcing. Two diseases, MSX and dermo, both caused by introduced protozoan pathogens, have been the principal factors affecting oyster populations in Delaware Bay. These diseases have been monitored since 1953, and the oyster population responses have been documented.

A series of numerical simulations has been conducted to explore the relationships between observed/simulated environmental variability and the observed prevalence of the oyster diseases in Delaware Bay in the contemporary period 1953–2009. In addition, a sequence of climate sensitivity studies has been performed to anticipate the potential for future impacts on the oyster populations. We describe the conclusions drawn from these model studies, in particular, the role of local water properties and circulation patterns in regulating disease prevalence in the estuary, and the possibly significant consequences of (e.g.) rising sea levels.

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