❖ Rapid growth potential of intertidal oyster reefs out pace any future rate of sea-level rise

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In the high salinity seaward portions of estuaries, oysters seek refuge from predation, competition and disease in intertidal areas, but this sanctuary will be lost if vertical reef accretion cannot keep pace with sea-level rise. Oyster-reef abundance has already declined ~85% globally over the last 100 years, mainly from over harvesting, making any additional losses due to sea-level rise cause for concern. Existing measures of oyster-reef growth, based on radiocarbon dates and bathymetric maps, suggest accretion rates of ~0.5 cm/yr, which is too slow to keep up with most 100-year projections of the rate of sea-level rise. Before any assessment of reef response to accelerated sea-level rise can be made, direct measures of reef growth are necessary. Here, we present direct measurements of intertidal oyster-reef growth from cores and terrestrial LIDAR-derived digital elevation models. On the basis of our measurements collected in Middle Marsh, Back Sound, NC over a 15-year period, we developed an empirical model of intertidal oyster-reef accretion. We show that previous estimates of vertical reef growth, based on radiocarbon dates and bathymetric maps, may be >1 order of magnitude too slow. The high reef-growth rates we document likely result from the oysters growing rapidly in large clusters on the reefs. In addition, the reefs show high preservation of oyster shell in the reef core (low taphonomic loss). The intertidal reefs should be able to keep up with any future accelerated rate of sea-level rise and may even benefit from the additional subaqueous space allowing extended vertical accretion.