

Using Death Assemblages to Fill Historical Data Gaps and Estimate Long-Term Trends in Oyster Size

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Long-term data are critical to habitat management and restoration because they allow directional trajectories in a habitat's condition to be distinguished from natural variation (which often operates on multiple timescales simultaneously). In practice, however, most long-term datasets are too geographically or methodologically limited to fully address the information needs of resource managers, who are often responsible for monitoring multiple indicators across large geographic areas. Sedimentary records, such as death assemblages (DAs; the accumulated, identifiable remains of organisms that lived in or near the habitat in the past), are an increasingly common, but still underutilized, resource for generating location-specific historical data retrospectively and "on demand". We used DA samples from 31 oyster reefs in Florida, USA to add historical context for existing measurements of live oyster size. Despite its importance as an indicator of oyster population condition, monitoring records of live oyster size in Florida are generally short-term (~5-10 years) and recent (many post-2010). In contrast, most of the DA oyster samples pre-dated the monitoring records from the same reef by at least ~20 years, represented an averaged condition over years or decades, and were collected in a single season. We describe how trend assessments using the live-oyster monitoring data alone can differ after incorporating the historical information from the DA samples and how the study results are refining our understanding of the long-term condition of intertidal oyster reefs in several of Florida's Aquatic Preserves and National Estuarine Research Reserves. Given the ubiquity of DAs in marine sediments and the paucity of long-term information on many submerged habitats worldwide, the utility of DA data for supplementing real-time monitoring data demonstrated by our case study is an encouraging sign for the more general applicability of DA records to management and restoration of other submerged habitats in the future.

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