Early Detection of Coastal Ecosystem Response to Management Actions

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The ability to detect ecosystem response to management actions is the goal of coastal monitoring programs. Moreover, the ability to detect change early is needed as a valuable assessment tool for managers. Typical methods to evaluate ecosystems include trend analyses and current status of conditions. Trend analyses require many years of data collection and often a high magnitude of change to be significant. Status analyses often rely on established thresholds levels, and a change in category, either better or worse, requires sizeable changes in concentration in relation to these thresholds. Therefore, an indicator of integrated ecosystem response that can track changes and respond in a timely fashion is a valuable tool. This presentation compares results from the Maryland Coastal Bays standard status and trend analyses to new signal of change techniques, including CUSUM and duration of dissolved oxygen criteria exceedances. The CUSUM technique allows for the detection of change from the long term mean in a variety of nutrient and water quality parameters collected monthly. Duration of DO criteria exceedances are calculated from *in situ* continuous monitoring data and allow for evaluation of habitat conditions. The combination of these two techniques shows improving conditions that have not yet been detected in standard status and trend analyses. In the case study presented, conditions in Bishopville Prong, a tidal tributary to the St. Martin River in the Maryland Coastal Bays watershed, are showing improvement based on the new methods, although the status (degraded) and trends show no change. This ability to show improvement in habitat conditions sooner is important to managers, to demonstrate to policymakers and stakeholders that management actions are producing positive effects that may not be readily observed using standard methods.

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