

## Ecosystem health report cards: Communicating coastal ecosystem assessment to effect environmental improvements

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Ecosystem health report cards can be used as a mechanism to integrate monitoring data and to communicate the resulting assessment to a broad public audience. An informed community can then take management actions that lead to environmental improvements. Several case studies are presented to illustrate the process of developing ecosystem health report cards and to demonstrate the effectiveness of report cards within a management program. The Moreton Bay, Australia case study provides an example of using spatially explicit ecosystem health assessments to help prioritize actions and provide an impetus for ecosystem health improvements. The key steps in developing the ecosystem health report card were the following: a) defining ecosystem health using conceptual diagrams, b) quantifying a limited number of ecosystem health indicators, c) combining these indicators into an integrated ecosystem health index on a spatially explicit map, d) communicating results in an A-F marking scheme. Several US case studies are less developed, but provide examples of using conceptual diagrams, choosing appropriate indicators and integrating them into a report card. The Chesapeake Bay tributaries case study used a suite of water quality parameters including stable isotope signatures of macroalgae in an intensive mapping effort. The Chincoteague Bay case study used a less spatially intensive map but more intensive and comprehensive temporal monitoring to generate an ecosystem assessment. In this case study, living resources like seagrasses, fish and shellfish complement water quality parameters. Water quality monitoring typically dominates an assessment program, but water quality is only a component of the measurable features of coastal ecosystems. Habitat assessment (e.g., salt marshes, seagrass meadows, macroalgal beds, oyster reefs) can also be included in an assessment program as well as higher trophic levels, in particular, fisheries resources (e.g., forage fish indices, index of biotic integrity). Shallow coastal embayments like Chincoteague and Barnegat Bays provide small scale case studies for ecosystem health assessment that can be used in conjunction with management and research initiatives. Recommendations for a Barnegat Bay monitoring program include annual seagrass surveys, annual hard clam surveys, and water quality sampling that includes harmful algal blooms, pathogens and nutrients.