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Calibration and evaluation of five indicators of benthic community condition in two California bay and estuary habitats

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ABSTRACT

Many types of indices have been developed to assess benthic invertebrate community condition, but there have been few studies evaluating the relative performance of different index approaches. In the present study, the performance of five indices were calibrated and compared: the Benthic Response Index (BRI), Benthic Quality Index (BQI), Relative Benthic Index (RBI), River Invertebrate Prediction and Classification System (RIVPACS), and the Index of Biotic Integrity (IBI). The study also examined whether index performance improves when the different indices, which rely on measurement of different properties, are used in combination. The five indices were calibrated for two geographies using 238 samples from southern California marine bays and 125 samples from polyhaline San Francisco Bay. Index performance was evaluated by comparing index assessments of 35 sites to the best professional judgment of nine benthic experts. None of the individual indices performed as well as the average expert in ranking sample condition or evaluating whether benthic assemblages exhibited evidence of disturbance. However, several index combinations outperformed the average expert. When results from both habitats were combined, two four-index combinations and one three-index combination performed best. However, performance differences among several combinations were small enough that factors such as logistics can also become a consideration in index selection.

Full Text

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