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Adaptation and application of multivariate AMBI (M-AMBI) in US coastal waters

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ABSTRACT

The multivariate AMBI (M-AMBI) is an extension of the AZTI Marine Biotic Index (AMBI) that has been used extensively in Europe, but not in the United States. In a previous study, we adapted AMBI for use in US coastal waters (US AMBI), but saw biases in salinity and score distribution when compared to locally calibrated indices. In this study we modified M-AMBI for US waters and compared its performance to that of US AMBI. Index performance was evaluated in three ways: 1) concordance with local indices presently being used as management tools in three geographic regions of US coastal waters, 2) classification accuracy for sites defined a priori as good or bad and 3) insensitivity to natural environmental gradients. US M-AMBI was highly correlated with all three local indices and removed the compression in response seen in moderately disturbed sites with US AMBI. US M-AMBI and US AMBI did a similar job correctly classifying sites as good or bad in local validation datasets (83–100% accuracy vs. 84–95%, respectively). US M-AMBI also removed the salinity bias of US AMBI so that lower salinity sites were not more likely to be incorrectly classified as impaired. The US M-AMBI appears to be an acceptable index for comparing condition across broad-scales such as estuarine and coastal waters surveyed by the US EPA's National Coastal Condition Assessment, and may be applicable to areas of the US coast that do not have a locally derived benthic index.

Full Text

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