

Evaluating consistency of best professional judgment in the application of a multiple lines of evidence sediment quality triad

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ABSTRACT

The bioavailability of sediment-associated contaminants is poorly understood. Often, a triad of chemical concentration measurements, laboratory sediment toxicity tests, and benthic infaunal community condition is used to assess whether contaminants are present at levels of ecological concern. Integration of these 3 lines of evidence is typically based on best professional judgment by experts; however, the level of consistency among expert approach and interpretation has not been determined. In this study, we compared the assessments of 6 experts who were independently provided data from 25 California embayment sites and asked to rank the relative condition of each site from best to worst. The experts were also asked to place each site into 1 of 6 predetermined categories of absolute condition. We provided no guidance regarding assessment approach or interpretation of supplied data. The relative ranking of the sites was highly correlated among the experts, with an average correlation coefficient of 0.92. Although the experts' relative rankings were highly correlated, the categorical assessments were much less consistent, with only 1 site out of 25 assigned to the same absolute condition category by all 6 experts. Most of the observed categorical differences were small in magnitude and involved the weighting of different lines of evidence in individual assessment approaches, rather than interpretation of signals within a line of evidence. We attribute categorical differences to the experts' use of individual best professional judgment and consider these differences to be indicative of potential uncertainty in the evaluation of sediment quality. The results of our study suggest that specifying key aspects of the assessment approach a priori and aligning the approach to the study objectives can reduce this uncertainty.

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