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Framework for interpreting sediment quality triad data

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ABSTRACT

Integration of multiple lines of evidence (MLOE) data in a sediment quality triad assessment can be accomplished by means of numerous approaches, with most relying on some form of expert best professional judgment. Best professional judgment (BPJ) can be problematic in application to large data sets or in a regulatory setting where the assessment protocol needs to be transparent and consistently reproducible. We present a quantitative, objective framework for integrating the results of triad-based assessments and test its efficacy by applying it to 25 California sites and comparing the resulting classifications with those of 6 experts who were provided the same data. The framework is based on integrating the answers to 2 questions: 1) is there biological degradation, and 2) is chemical exposure high enough to potentially result in a biological response? The framework produced results that matched the median classifications of the experts better than did 5 of the 6 experts. Moreover, the framework was unbiased, with samples that differed from the median expert response evenly divided between those classified as more or less impacted. The framework was also evaluated by application to a set of sites from known degraded and reference areas, which the framework distinguished well. Although any framework needs to be flexible to supplemental data when they are available, the framework presented provides an objective means for using a triad-based approach in large-scale assessments for which relying on expert input for every sample is impractical.

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