

SCCWRP #0725

Effect of sample area and sieve size on benthic macrofaunal community condition assessments in California enclosed bays and estuaries

Kamille K. Hammerstrom¹, J. Ananda Ranasinghe¹, Stephen B. Weisberg², John S. Oliver¹, W. Russell Fairey¹, Peter N. Slattery¹ and James M. Oakden¹

¹*Moss Landing Marine Laboratories, Moss Landing, CA*

²*Southern California Coastal Water Research Project, Costa Mesa, CA*

ABSTRACT

Benthic macrofauna are used extensively for environmental assessment, but the area sampled and sieve sizes used to capture animals often differ among studies. Here, we sampled 80 sites using 3 different sized sampling areas (0.1, 0.05, 0.0071m²) and sieved those sediments through each of 2 screen sizes (0.5, 1mm) to evaluate their effect on number of individuals, number of species, dominance, nonmetric multidimensional scaling (MDS) ordination, and benthic community condition indices that are used to assess sediment quality in California. Sample area had little effect on abundance but substantially affected numbers of species, which are not easily scaled to a standard area. Sieve size had a substantial effect on both measures, with the 1-mm screen capturing only 74% of the species and 68% of the individuals collected in the 0.5-mm screen. These differences, though, had little effect on the ability to differentiate samples along gradients in ordination space. Benthic indices generally ranked sample condition in the same order regardless of gear, although the absolute scoring of condition was affected by gear type. The largest differences in condition assessment were observed for the 0.0071-m² gear. Benthic indices based on numbers of species were more affected than those based on relative abundance, primarily because we were unable to scale species number to a common area as we did for abundance.

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