

# Are biological traits and functional diversity useful concepts in assessing ecological responses

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Biological traits are increasingly suggested for use in assessing sensitivity to stress, both where experimental information is not available and to enable comparisons across locations with differing species. In species rich systems, redundancy provided the number of species exhibiting traits is hoped to dampen variability across environmental gradients and result in slower responses to stressors. Here we summarise the results of four empirical studies on benthic macrofaunal biological traits varying from an intertidal manipulative experiment to time series and spatial analysis in both a species rich and a species poor system. We postulate that functional traits will respond more slowly to stress but the actual response is more likely to be non-linear, and thus lead to surprises. We show natural temporal and spatial variability and responses to climate-related variables, nutrients, oxygen stress and an invasive species. We observe functional diversity to be an important driver of ecosystem function and that functional traits and diversity exhibit non-linear dynamics.