Spatial distribution patterns of intertidal crabs in tropical estuaries as a baseline for estuarine health monitoring

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Abstract

Scientifically based protocols for ecosystem health monitoring, applicable across estuaries, are critical to ensure future sustainable use of tropical estuaries. Despite the potential of intertidal crabs as rapid health indicators, integration of this key faunal group in monitoring schemes has been hampered by a lack of a generally applicable model of their spatial distribution patterns within estuaries. The current project aimed to develop a conceptual model of the spatial distribution patterns of intertidal crabs as a baseline for management. Therefore, a novel photographic technique allowing large scale, high resolution mapping of intertidal crabs in the low intertidal was developed. This enabled successful modelling of distinct, temporally stable habitat associations of intertidal crabs in Stuart Creek, North Queensland, Australia. These habitat associations were found to be predictable across 8 dry tropical estuaries with various degrees of human interference along 160 km of North Queensland coast. Additionally, stable isotope diet analysis allowed implications of environmental change for energy flow through this benthic component to be modelled, indicating a strong shift in community composition and energy flow in systems modified by harbour walls and agricultural irrigation. The resulting baseline model hence provides a scientific framework for informed monitoring and management as well as further ecological research on the role of intertidal crabs in tropical estuaries.

Keywords
intertidal crabs, habitat associations, monitoring, energy flow