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Spatial and temporal patterns in the structure of intertidal reef communities in the marine parks of south-western Australia

Marine Science

Project Core Team

Supervising Scientist	Alan Kendrick
Data Custodian	
Site Custodian	

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M Rule, A Kendrick, J Huisman

Context

The Marmion Marine Park (MMP) and Shoalwater Islands Marine Park (SIMP) are located on the north and south Perth metropolitan coast, respectively, while Ngari Capes Marine Park (NCMP) is in WA's south-west. These marine parks support a diverse range of marine conservation values ranging from various marine habitats to threatened marine fauna, and are dominated by sub-tidal and emergent limestone reefs and shallow sandy embayments. The marine parks are subject to high levels of recreational and commercial human activity due to their proximity to population centres. Significant areas of intertidal reef platform occur in both mainland and island shores and as isolated offshore patch reefs. While a number of local studies of intertidal communities provide a significant regional knowledge base, the broad spatial patterns of intertidal biodiversity across MMP, SIMP and NCMP are not adequately understood. Particular gaps exist in our knowledge of the intertidal communities of offshore platform reefs. This study will determine spatial and temporal patterns in the distribution of intertidal reef organisms in WA's temperate marine reserves. Relationships between the composition of these communities and the physical structure and location of the reefs will also be examined.

Aims

- Determine the spatial and temporal patterns in the composition of intertidal reef communities in the MMP, SIMP and NCMP, including the proposed northern extension to the SIMP.
- Determine if the intertidal reef communities in management zones protected from extractive activities differ from the intertidal reef communities of otherwise comparable reefs.
- Assist in the development of methods for long-term monitoring of intertidal communities in temperate marine reserves.

Progress

- A manuscript describing differences in community structure on intertidal granite and limestone substrates at NCNP was initiated.
- Preliminary intertidal surveys were commenced at six new sites at Jurien Bay Marine Park in conjunction with regional staff. A total of 37 species were recorded during these surveys, 13 of which had not been recorded in previous surveys of temperate marine reserves.
- A collaboration to investigate intertidal ecology with researchers from CSIRO, the Western Australian Museum and Southern Cross University has been scoped and in ready for implementation.

Management implications

- As the first comprehensive spatial and temporal study of the biological communities associated with intertidal reefs of Western Australia's temperate marine parks and reserves, this work provide a baseline understanding of intertidal reef condition in the marine reserves in relation to natural processes and possible anthropogenic impacts. The results will assist to ascertain the conservation significance of these habitats and assist the implementation of long-term intertidal reef monitoring and management in marine parks and reserves.

Future directions

- Ecological papers from data collected in MMP, SIMP and NCMP will be published.

- A species identification guide to assist future intertidal reef monitoring in MMP and SIMP will be completed.
- Intertidal reef surveys at NCMP will continue.
- A pilot survey examining broad-scale, latitudinal patterns in diversity with researchers from CSIRO, the Western Australian Museum and Southern Cross University will be conducted in the MMP and SIMP during the summer of 2016/17