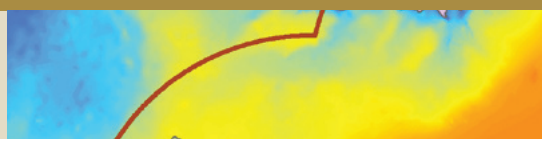
Australian Government
Geoscience Australia

AUSGEO news
ISSUE 93 Mar 2009

Classifying regional seascapes in the northwest

Key ecological features to inform marine management



Rachel Przeslawski and Inke Falkner

Geoscience Australia has been providing the federal Department of the Environment, Water, Heritage and the Arts (DEWHA) with information about the physical properties of the seabed and water column in Australia's Exclusive Economic Zone over the last five years. This information has included the derivation of 'seascapes' which consist of a range of physical properties such as bathymetry, sediment grain size and composition, and seabed temperature (Whiteway et al 2007).

The agency has recently provided the department with scientific advice on draft Key Ecological Features (KEFs) in the North-west Marine Region (Falkner et al in press) which were identified for their potential environmental significance. The advice involved assessments of both the KEFs and adjacent environments including Cuvier and Argo abyssal plains, Scott and Exmouth plateaus, the Cape Range, Cloates, Mermaid, Bower, and Oates submarine canyons, Wallaby Saddle, Glomar Shoals, Scott Reef and the last glacial shoreline at about 125 metres water depth (figure 1). Physical and biological data for each KEF and their adjacent area were sourced from national databases, museums, and individual researchers. Biological information for all of the deep-sea KEFs was anecdotal and consisted of museum records of a few invertebrate and fish species at a small number of locations.

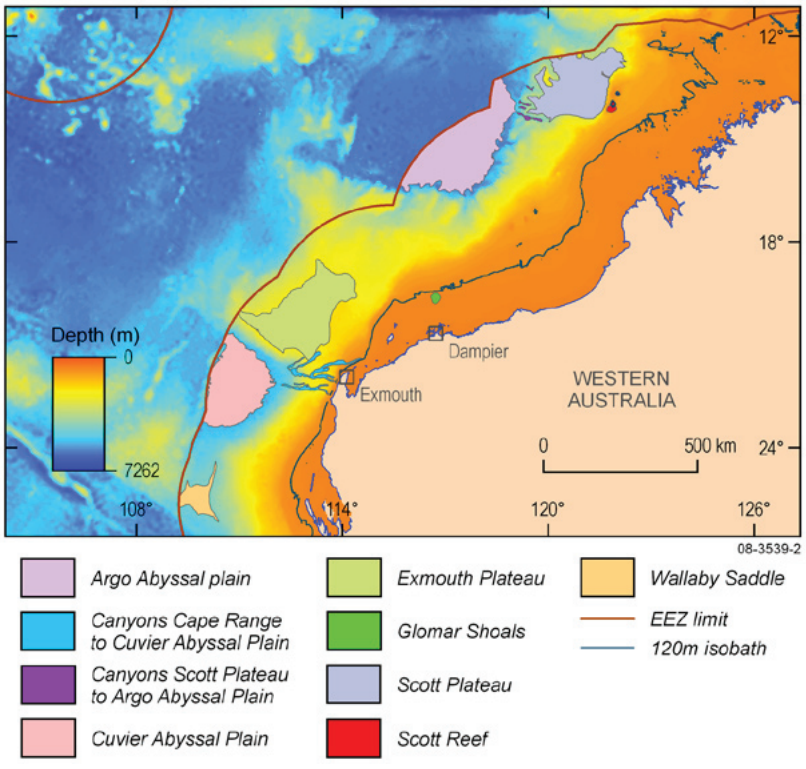


Figure 1. The draft Key Ecological Features of the North-west Marine Region.

Physical data were more robust and enabled the derivation of new regional seascapes for the northwest region, in which multiple physical factors were combined to produce a map of likely seabed habitat types (Whiteway et al 2007). These seascapes and associated analyses suggest that the abyssal plains, Wallaby Saddle and Scott Reef each represent a unique habitat type within the region. Though the other KEFs include seascapes which occur in other parts of the region, all of them are considered significant for their representativeness.

The comparatively shallow Glomar Shoals yielded sufficient biological data on bottom-dwelling fish to incorporate into

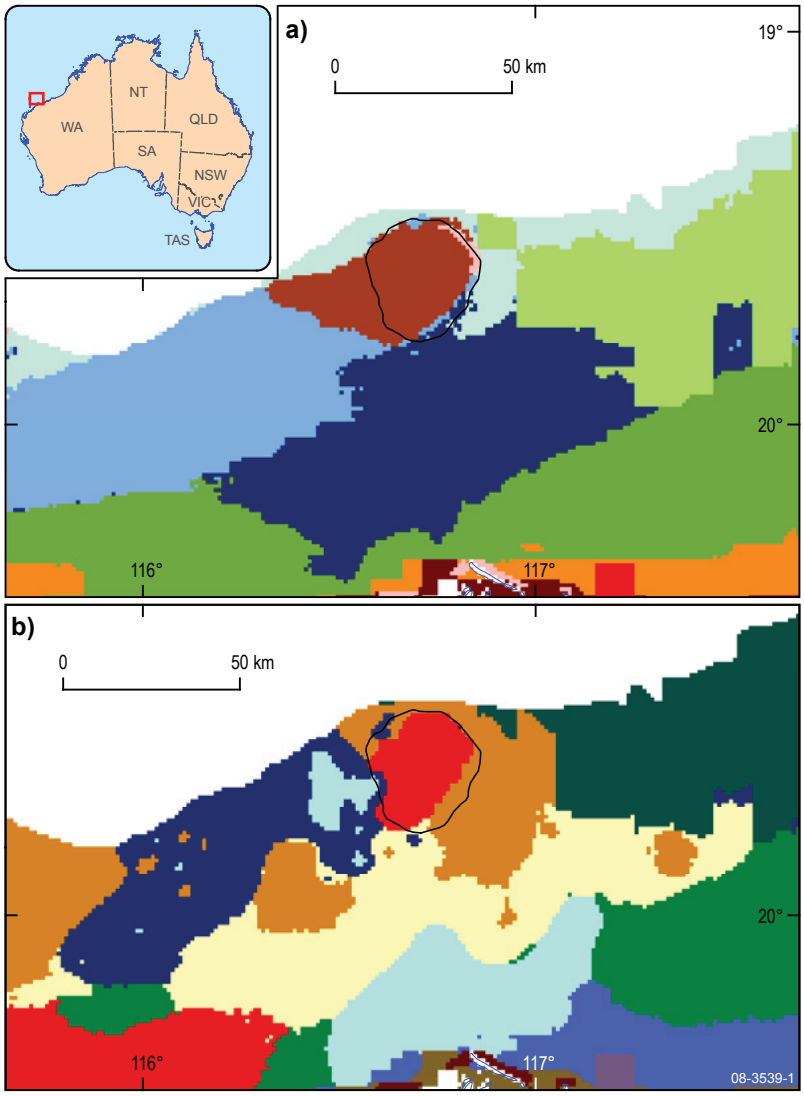


Figure 2. Comparison of seascapes from Glomar Shoals and surrounds from an analysis (a) excluding biological data and (b) including biological data. The black line outlines the Glomar Shoals.

a seascape analysis of this KEF and its immediate surrounds. In order to compare the effects of biological integration, two seascape maps of the Glomar Shoals were generated with and without the biological layer (figure 2). For the seascapes with biological data incorporated, a biodiversity index was used as an additional layer in the analysis. This is the first time biological data has been included in the derivation of seascapes. Importantly, the inclusion of the biological layer resulted in habitat classes that more closely matched the actual geomorphology (or landform) of Glomar Shoals (figure 2). These results suggest that more accurate seascapes may be derived by integrating appropriate biological data with physical data, at least at the regional scale used here.

Geoscience Australia's Marine & Coastal Environment Group continues to investigate the utility of seascapes to map Australia's marine biodiversity, including integrating biological data into seascapes at national, regional, and local scales as in this project. Our assessment of the value of the northwest KEFs and associated seascape maps will be used by DEWHA to support the establishment of a national representative system of marine protected areas as well as other conservation measures in the North-west Marine Region.

For more information

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References

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Whiteway T, Heap AD, Lucieer V, Hinde A, Ruddick R & Harris PT. 2007. Seascapes of the Australian Margin and Adjacent Sea Floor: Methodology and Results. Geoscience Australia Record 2007/11.

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www.ga.gov.au/ausgeonews/ausgeonews200612/conservation.jsp