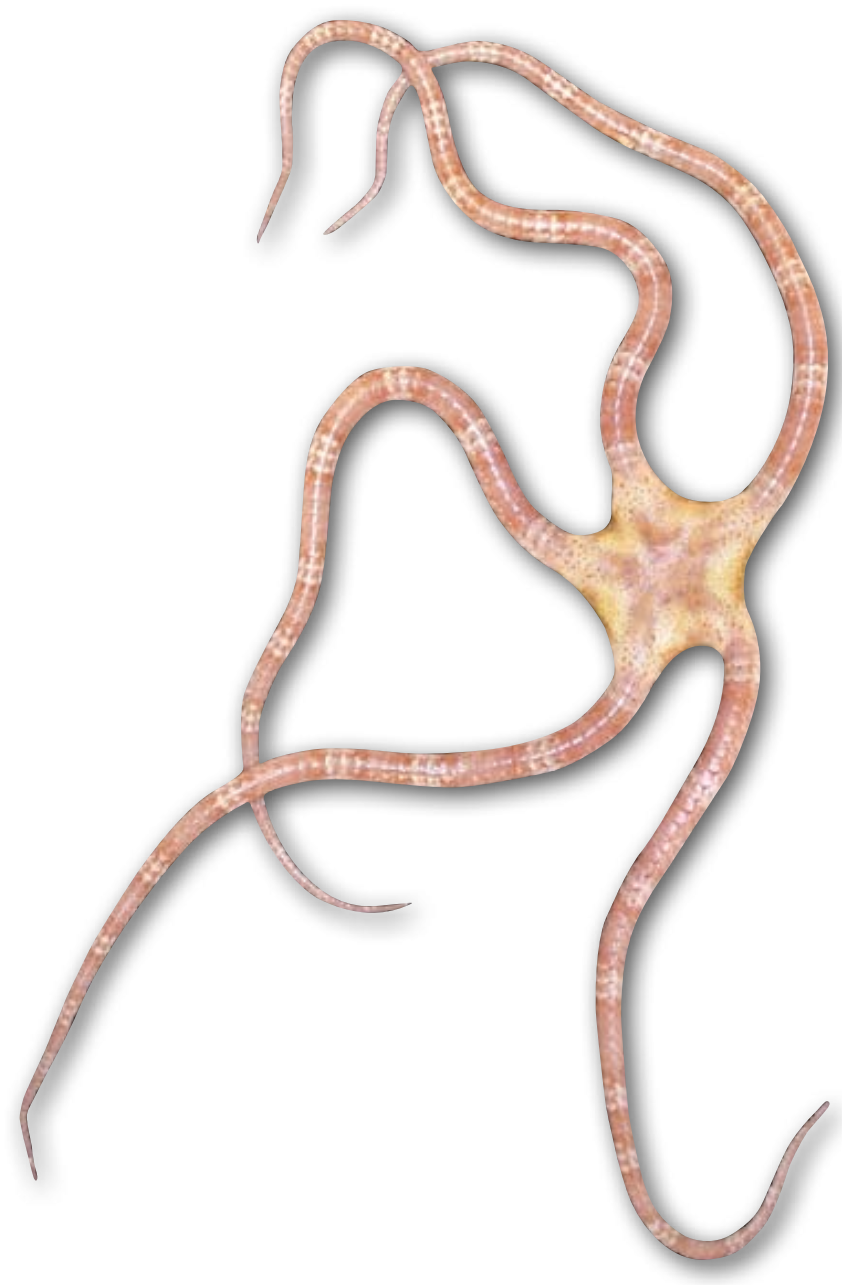
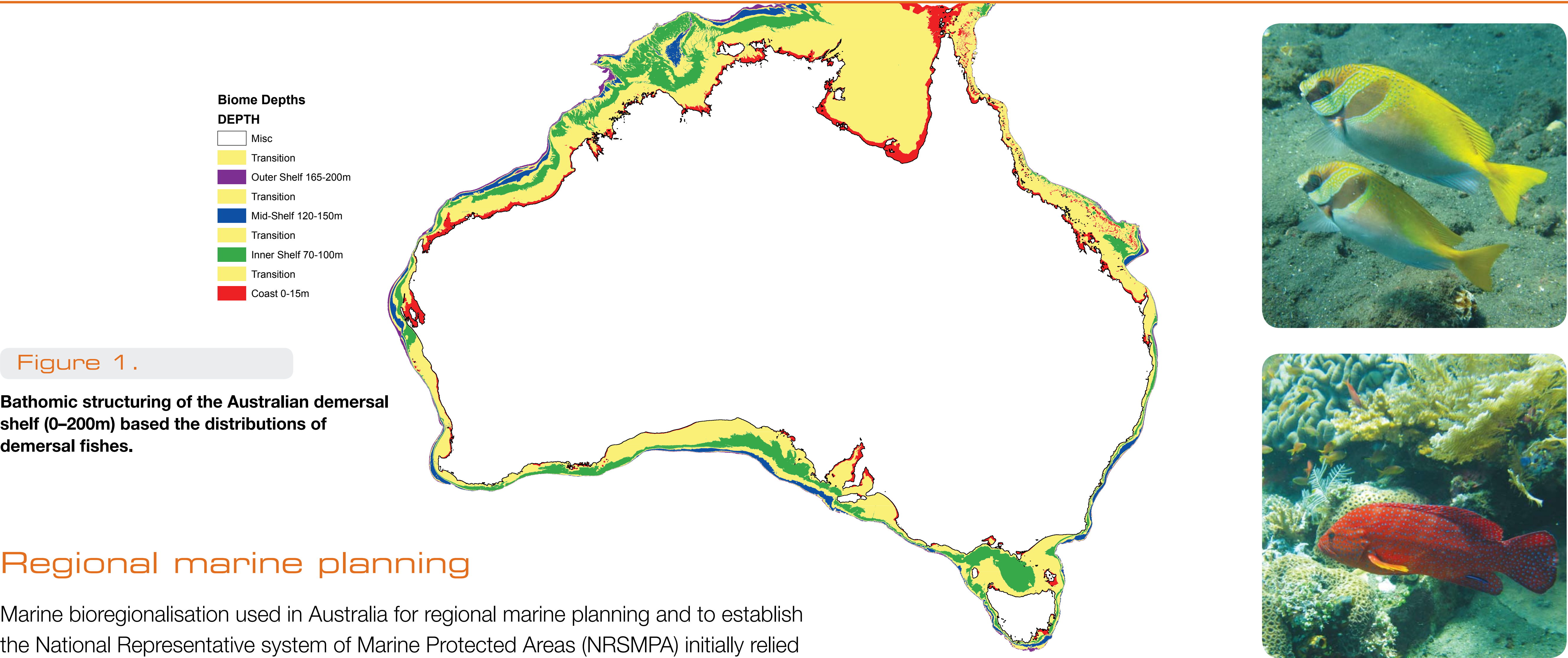


CERF depth structuring

in distributions of demersal fishes on Australia's continental shelf



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Regional marine planning

Marine bioregionalisation used in Australia for regional marine planning and to establish the National Representative system of Marine Protected Areas (NRSMPA) initially relied on: 1) provincial structure of the shelf (Fig. 2a), 2) provincial structure of the slope (Fig. 2b), and 3) bathomic (depth related) structure of the slope. This study uses extensively updated data on continental shelf fishes to determine 4) bathomic structuring of the continental shelf of Australia. These shelf bathomes have been used in Australia's marine planning including the designation of the NRSMPA.

Bathomes

Variably referred to as biomes, or as environmental regions or zones, bathomes are finer-scale subdivisions nested within provinces, and are characterised primarily by the bathymetric distribution of their biota. Bathomes extend over large spatial scales (usually exceeding 1000 km²).

Bathomes delineated in this study represent distinct suites of bottom-dwelling fish species that have their core distribution within particular depth-related zones. Bathomes are separated by transition zones, depth related zones where species distributions overlap. These transition zones may have higher diversity than the bathomes themselves because of mixing of species, outside their core ranges, from two or more bathomes – in much the same way that cosmopolitan cities have higher cultural diversity.

Bathomic structuring of the continental shelf

This study complements existing national biodiversity maps (IMCRA 4.0) by providing the only evidence-based means currently available to robustly predict patterns in depth zonation of demersal fish assemblages on the Australian continental shelf (Fig. 1).

The study makes use of the most recently available data on the distributions of more than 1500 Australian demersal fishes. Depth ranges for the bathomes (Table 1) showed minor variations around the Australian continental shelf, with the North Western region of Australia being more varied compared to other areas.

Bathomes need to be considered in the context of the provincial structure which influences the pool of fish available for each bathome. Thus while the bathomes show consistent zonation patterns for demersal fish around Australia, there are different suites of species in the different provinces and provincial transitions.

Table 1.

Depth ranges (to nearest five metres) for bathomes within each of the provinces, with transition zones depicted in yellow. Note that for the last two provinces in the table, the Outer Shelf and Shelf Break bathomes merge together because of the weakening transition between them.

Name	Coastal Bathome	Mid-Shelf Bathome	Outer Shelf Bathome	Shelf-Break Bathome
North East Province – 1	0 – 15	70 – 95	120 – 145	160 – 195
Central Eastern Province	0 – 15	75 – 95	120 – 150	165 – 195
Tasmanian Province	0 – 15	75 – 100	130 – 150	165 – 195
South West Province – 1	0 – 15	70 – 95	120 – 150	165 – 190
Central West Province	0 – 15	70 – 95	120 – 150	165 – 190
North West Province	0 – 15	70 – 95	120 –	– 185
Northern Province – 1	0 – 15	70 – 95	115 –	– 195

Figure 2.

Provinces of the Australian continent:
A. demersal shelf, and B. demersal slope.
Biotones are depicted in yellow.

