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Biogeographical structure and affinities of the marine demersal ichthyofauna of Australia

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ABSTRACT

Aim To investigate the biogeographical structure and affinities of the Australian marine demersal ichthyofauna at the scale of provinces and bathomes for the purposes of regional marine planning.

Location Australia.

Methods Patterns of distribution in the Australian fish fauna, at both intra-regional and global scales, were examined using a science-based, management framework dividing Australia's marine biodiversity into 16 province-level biogeographical units. Occurrences of 3734 species in eight depth-stratified bathomes (from the coast to the mid-continental slope) within each province were analysed to determine the structure and local affinities of their assemblages and their association with faunas of nearby regions and oceans basins.

Results Strong geographic and depth-related structure was evident. Fish assemblages in each province, and in each bathome of each province, were distinct, with the shelf-break bathome more similar to the adjacent continental shelf bathome than to the upper slope bathome. Data based only on endemic species performed well as a surrogate of the entire dataset, yielding comparable patterns of similarity between provinces and bathomes. Tropical and temperate elements were better discriminated than elements of the Pacific and Indian oceans, with the central western province more similar to the tropical provinces (including those in the east), and the eastern province closer to southern temperate provinces. The fauna shares the closest regional affinities with those of the adjacent south-west Pacific, western Pacific Rim, and elements of wide-ranging Indo-Pacific components. Elements unique to the Pacific and Indian oceans are poorly represented.

Main conclusions The complex nature of Australia's marine ichthyofauna is confirmed. A hierarchy of provinces and bathomes, used to ensure that Australia's developing marine reserve network is both representative and comprehensive, is equally robust when based on all known Australian fish species or on only those species endemic to this continent. Latitude and depth are more important than oceanic influences on the composition of this fauna at these scales.

Keywords

Australia, bathomes, biogeography, conservation biogeography, endemism, faunal provinces, Indo-Pacific, marine fishes, regional marine planning.

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