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A spatial assessment of the risk to a mobile marine mammal from bycatch

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ABSTRACT

1. Several species of marine mammals are at risk of extinction from being captured as bycatch in commercial fisheries. Various approaches have been developed and implemented to address this bycatch problem, including devices and gear changes, time and area closures and fisheries moratoria. Most of these solutions are difficult to implement effectively, especially for artisanal fisheries in developing countries and remote regions.

2. Re-zoning of the Great Barrier Reef World Heritage Area (GBRWHA) in 2004 closed 33% of the region to extractive activities, including commercial fishing. However, the impact of re-zoning and the associated industry restructuring on a threatened marine mammal, the dugong (*Dugong dugon*), is difficult to quantify. Accurate information on dugong bycatch in commercial nets is unavailable because of the large geographic extent of the GBRWHA, the remoteness of the region adjacent to the Cape York Peninsula where most dugongs occur and the artisanal nature of the fishery.

3. In the face of this uncertainty, a spatial risk-assessment approach was used to evaluate the re-zoning and associated industry restructuring for their ability to reduce the risk of dugong bycatch from commercial fisheries netting.

4. The new zoning arrangements appreciably reduced the risk of dugong bycatch by reducing the total area where commercial netting is permitted. Netting is currently not permitted in 67% of dugong habitats of high conservation value, a 56% improvement over the former arrangements. Re-zoning and industry restructuring also contributed to a 22% decline in the spatial extent of conducted netting.

5. Spatial risk assessment approaches that evaluate the risk of mobile marine mammals from bycatch are applicable to other situations where there is limited information on the location and intensity of bycatch, including remote regions and developing countries where resources are limited.

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