

## Reply to Wiersma and Nudds: Despite constraints, our approach still best available

Wiersma and Nudds (1) make four main points: (i) the area to be covered by the key conservation sites proposed is a negligible percentage of the ocean; (ii) they doubt the representativeness of our biodiversity patterns; (iii) they question the persistence of the species; and (iv) they claim we do not acknowledge the dynamic nature of ecological systems.

First, 12% of ocean coverage is not an arbitrary percentage; it derived from the most conservative approach of targeting Marxan to optimize conservation patches that contained at least 10% of all 129 marine mammal geographic ranges (2). We followed the work of Ceballos et al. on terrestrial mammals and also targeted 10% so this work would be comparable to our previous studies (3, 4).

Second, our biodiversity patterns coincide with those of Schipper et al. (5) and Kaschner et al. (6) and are based on recent distribution maps. Despite the limitations in present oceanic knowledge, it is imperative to evaluate and implement conservation measures in ways that attempt to compensate for the uncertainties. Terrestrial mammal conservation faces similar uncertainties as those on the ocean, but significant progress has been made in identifying critical conservation sites by using data similar to those in our study. Also, the goal of Marxan is to achieve the highest representation of biodiversity features at the smallest possible cost.

Third, we understand marine mammals are constantly changing their distribution patterns. Until adequate estimates become available of changes in several oceanographic variables, persistence cannot be measured in the near future. Models that incorporate distribution patterns and oceanographic variables can give us insight on what will happen with persistence if those variables shift the distribution.

Fourth, we clearly state that saving one or two populations will not be enough because of the role such mammals play; additionally, we also set Marxan to select adjacent planning units preferentially. Because of our concern about ecosystem degradation, we analyzed human impacts on the key conservation sites.

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The authors declare no conflict of interest.

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