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TITLE: Global Patterns of Extinction Risk in Marine and Non-marine Systems

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ABSTRACT:

<h2>Summary</h2> Despite increasing concern over the effects of human activities on marine ecosystems [1, 2], extinction in the sea remains scarce: 19?24 out of a total of >850 recorded extinctions [3, 4] implies a 9-fold lower marine extinction rate compared to non-marine systems. The extent of threats faced by marine systems, and their resilience to them, receive considerable attention [2, 4?6], but the detectability of marine extinctions is less well understood. Before its extinction or threat status is recorded, a species must be both taxonomically described and then formally assessed; lower rates of either process for marine species could thus impact patterns of extinction risk, especially as species missing from taxonomic inventories may often be more vulnerable than described species [7?11]. We combine data on taxonomic description with conservation assessments from the International Union for Conservation of Nature (IUCN) to test these possibilities across almost all marine and non-marine eukaryotes. We find that the 9-fold lower rate of recorded extinctions and 4-fold lower rate of ongoing extinction risk across marine species can be explained in part by differences in the proportion of species assessed by the IUCN (3% cf. 4% of non-marine species). Furthermore, once taxonomic knowledge and conservation assessments pass a threshold level, differences in extinction risk between marine and non-marine groups largely disappear. Indeed, across the best-studied taxonomic groups, there is no difference between marine and non-marine systems, with on average between 20% and 25% of species being threatened with extinction, regardless of realm.

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