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TITLE: Biodiversity of the Great Barrier Reef?how adequately is it protected?

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ABSTRACT:

The Great Barrier Reef (GBR) is the world's most iconic coral reef ecosystem, recognised internationally as a World Heritage Area of outstanding significance. Safeguarding the biodiversity of this universally important reef is a core legislative objective; however, ongoing cumulative impacts including widespread coral bleaching and other detrimental impacts have heightened conservation concerns for the future of the GBR. Here we review the literature to report on processes threatening species on the GBR, the status of marine biodiversity, and evaluate the extent of species-level monitoring and reporting. We assess how many species are listed as threatened at a global scale and explore whether these same species are protected under national threatened species legislation. We conclude this review by providing future directions for protecting potentially endangered elements of biodiversity within the GBR. Most of the threats identified to be harming the diversity of marine life on the GBR over the last two-three decades remain to be effectively addressed and many are worsening. The inherent resilience of this globally significant coral reef ecosystem has been seriously compromised and various elements of the biological diversity for which it is renowned may be at risk of silent extinction. We show at least 136 of the 12,000+ animal species known to occur on the GBR (approximately 20% of the 700 species assessed by the IUCN) occur in elevated categories of threat (Critically Endangered, Endangered or Vulnerable) at a global scale. Despite the wider background level of threat for these 136 species, only 23 of them are listed as threatened under regional or national legislation. To adequately protect the biodiversity values of the GBR, it may be necessary to conduct further targeted species-level monitoring and reporting to complement ecosystem management approaches. Conducting a vigorous value of information analysis would provide the opportunity to evaluate what new and targeted information is necessary to support dynamic management and to safeguard both species and the ecosystem as a whole. Such an analysis would help decision-makers determine if further comprehensive biodiversity surveys are needed, especially for those species recognised to be facing elevated background levels of threat. If further monitoring is undertaken, it will be important to ensure it aligns with and informs the GBRMPA Outlook five-year reporting schedule. The potential also exists to incorporate new environmental DNA technologies into routine monitoring to deliver high-resolution species data and identify indicator species that are cursors of specific disturbances. Unless more targeted action is taken to safeguard biodiversity, we may fail to pass onto future generations many of the values that comprise what is universally regarded as the world's most iconic coral reef ecosystem.

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