

There is a broad recognition of the importance of marine biodiversity in terms of benefits we enjoy from increased productivity and greater resilience in the face of impacts and disturbances. The Convention on Biological Diversity describes biodiversity conservation as a “common concern of humankind” - to ensure that we can continue to enjoy the benefits of a healthy ocean into the future.

Setting conservation priorities requires understanding the current status of biodiverse ecosystems. We may want to protect a heavily impacted area to allow the ecosystem recover to a healthy state; we may want to protect a pristine area to maintain its healthy condition.

But common global measures of marine biodiversity provide no information about the status of those species or ecosystems. So we’ve developed a new map to better inform conservation decision making.

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My colleagues and I have taken range maps, like this one, for nearly 5300 marine species, in combination with their IUCN Red List extinction risk, from least concern to extinct.

This example shows the global range of the green turtle, and I’ve color coded it [HIT BUTTON] to indicate that the global population is considered “endangered.”

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Stacking all 5300 species range maps and finding the average status of all species in each pixel,

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we create a map showing the distribution of at-risk marine biodiversity around the globe.

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This sidebar shows how much of the global oceans fall into different risk levels; the global mean is at about “near threatened”. A few patterns stand out:

- coastal waters are often generally at lower risk than the open ocean;
- certain locations show higher risk due to increased pressure from human activities;
- a few places show very high risk due to the presence of critically endangered species found nowhere else.

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These blue areas show marine reserves under full or strong protection that prohibits fishing and other extractive uses; the sidebar now differentiates between protected biodiversity, in blue, and unprotected biodiversity, in red.

Note that biodiversity under protection is at about 5% lower risk than unprotected biodiversity. Don’t take this as a sign that marine reserves are awesome, though they are. Instead consider that highly impacted areas are generally where people are exploiting the oceans for food and livelihoods - so closing off highly impacted ocean is politically and financially more costly than protecting a healthy but remote bit of ocean where no one is going to complain.

Effective conservation will require a balanced approach between preservation of healthy marine biodiversity and recovery of highly impacted marine biodiversity.

This global map of at-risk marine biodiversity can focus our attention on opportunities and needs for future marine conservation efforts. Next steps will be to compare these general risk patterns with patterns of specific human impacts, for instance fishing effort, which can be mitigated through conservation policy, and climate change impacts which may require more adaptive conservation strategies.

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Additional maps and detailed analysis can be found in our manuscript which is currently under review at Conservation Letters.